

SPECIFICATIONS

for

Property of
Flood Control District of MC Library
Please Return to
2801 W. Durango
Phoenix, AZ 85009

INDIAN BEND WASH

SCOTTSDALE BIKE STOP

and

GREENBELT TRAIL SYSTEM

SCOTTSDALE AND VICINITY
MARICOPA COUNTY, ARIZONA

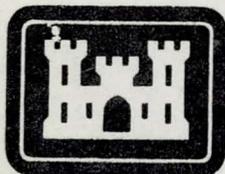
Authority:

Energy and Water Development
Appropriation Act of FY 82
(PL 97-88)

Appropriation:

96x3122 Construction General
Corps of Engineers, Civil

96x8862 Contributed Funds, Other



**US Army Corps
of Engineers**

A680.509

Phoenix District

REFERENCE

DACW09-82-B-0011

INVITATION FOR BIDS
(CONSTRUCTION CONTRACT)

DATE

82 APR 28

NAME AND LOCATION OF PROJECT

INDIAN BEND WASH
SCOTTSDALE BIKE STOP AND
GREENBELT TRAIL SYSTEM,
MARICOPA COUNTY, ARIZONA

DEPARTMENT OR AGENCY

DEPARTMENT OF THE ARMY

BY (Issuing office)

U. S. ARMY ENGINEER DISTRICT, LOS ANGELES
P.O. BOX 2711, LOS ANGELES, CALIFORNIA 90053

Sealed bids in duplicate for the work described herein will be received until
1 p.m. local time at the place of bid opening, 26 May 1982

at Room 1030 (South Tower) 2721 North Central Avenue, Phoenix, Arizona 85004

and at that time publicly opened.

Information regarding bidding material, bid guarantee, and bonds

BID BONDS. Each bidder shall submit with his bid a Bid Bond (Standard Form 24) with good and sufficient surety or sureties acceptable to the Government, or other security as provided in paragraph 4 of Instructions to Bidders (Standard Form 22) in the form of 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.

PERFORMANCE AND PAYMENT BONDS Within 5 days after the prescribed forms are presented to the bidder to whom award is made for signature, a written contract on the form prescribed by the specifications shall be executed and two bonds, each with good and sufficient surety or sureties acceptable to the Government, furnished; namely a performance bond (Standard Form 25) and a payment bond (Standard Form 25-A). The penal sums of such bonds will be as follows:

(a) Performance Bond. The penal sum of the performance bond shall equal 100% of the contract price.

(b) Payment Bond.

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

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

(3) When the contract price is more than \$5,000,000, the penal sum shall be \$2,500,000.

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

NOTE: For bids less than \$25,000, bid bonds, performance and payment bonds will not be required.

Description of work

The work consists of a concrete bike path, chain link fence, bike path lighting, CMU restroom, steel foot bridges and slump block ramadas. Job also includes excavation, backfill, grading, landscaping, irrigation and other appurtenant work.

ESTIMATED CONSTRUCTION COST IS BETWEEN \$500,000 TO \$1,000,000.

This is a Civil Works Program procurement and is not funded by the Department of Defense. Buy American Act price differential to foreign qualifying country end products in accordance with paragraph 6-104.f(f) of the Defense Acquisition Regulation applies.

READ THE FOLLOWING IN CONJUNCTION WITH INSTRUCTIONS TO BIDDERS (U. S. STANDARD FORM 22).

10/11/65

1. **PLANT AND EQUIPMENT.** Each bidder shall, upon request of the Contracting Officer, furnish a list of the plant available to the bidder and proposed for use on the work.

3/22/65

2. **MODIFICATIONS PRIOR TO DATE SET FOR OPENING BIDS.** The right is reserved, as the interest of the Government may require, to revise or amend the specifications or drawings, or both prior to the date set for opening bids. Such revisions and amendments, if any, will be announced by an amendment or amendments to this Invitation for Bids. If the revisions and amendments are of a nature which requires material changes in quantities or prices bid or both, the date set for opening bids may be postponed by such number of days as in the opinion of the District Engineer will enable bidders to revise their bids. In such cases, the amendment will include an announcement of the new date for opening bids.

1/13/65

3. **BIDDERS** are required to acknowledge receipt of all amendments to this Invitation on the Bid Form (Standard Form 21) in the space provided, or by separate letter or telegram prior to opening of Bids. Failure to acknowledge all amendments may cause the rejection of the bid.

12/1/70

4. **NOTICE REGARDING BUY AMERICAN ACT (1970 SEP).** The Buy American Act (41 U.S.C. 10a-10d) generally requires that only domestic construction material be used in the performance of this contract. Exception from the Buy American Act shall be permitted only in the case of nonavailability of domestic construction materials. A bid or proposal offering nondomestic construction material will not be accepted unless specifically approved by the Government. When a bidder or offeror proposes to furnish nondomestic construction material, his bid or proposal must set forth an itemization of the quantity, unit price, and intended use of each item of such nondomestic construction material. When offering nondomestic construction material pursuant to this paragraph, bids or proposals may also offer, at stated prices, any available comparable domestic construction material, so as to avoid the possibility that failure of a nondomestic construction material to be acceptable under this paragraph will cause rejection of the entire bid.

5. **AVAILABILITY OF SPECIFICATIONS, STANDARDS AND DESCRIPTIONS (1977 JUN)** Specifications, standards and descriptions cited in this solicitation are available as indicated below:

5.1 **Unclassified Federal, Military and Other Specifications and Standards (Excluding Commercial), and Data Item Descriptions.** Submit request on DD Form 1425 (Specifications and Standards Requisition) to:

Commanding Officer
U.S. Naval Publications and Forms Center
5801 Tabor Avenue - Philadelphia, Pa. 19120

The Acquisition Management Systems and Data Requirements Control List, DoD Directive 5000.19-L, Volume II, may be ordered on the DD Form 1425. The Department of Defense Index of Specifications and Standards (DODISS) may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D. C., 20402. When requesting a specification or standard, the request shall indicate the title, number, date and any applicable amendment thereto by number and date. When requesting a data item description, the request shall cite the applicable data item number set forth in the solicitation. When DD Form 1425 is not available, the request may be submitted in letter form, giving the same information as listed above, and the solicitation or contract number involved. Such requests may also be made to the activity by Telex No. 834295, Western Union No. 710-670-1685, or telephone (area code 215-697-3321) in case of urgency.

8/25/77

5.2 **Commercial Specifications, Standards and Descriptions.** These specifications, standards and descriptions are not available from Government sources. They may be obtained from the publishers.

6. **AVAILABILITY FOR EXAMINATION OF SPECIFICATIONS, STANDARDS, DRAWINGS, AND OTHER PERTINENT DOCUMENTS.** The specifications, standards, drawings, and other pertinent documents cited in this solicitation may be examined at the following location:

U.S. Army Engineer District, Los Angeles
300 No. Los Angeles Street
Los Angeles, California 90053

7. In addition to the immediate site of construction, the Department of Labor has stated that the Davis-Bacon Act applies to Contractor's operations connected with temporary facilities located off the immediate site of construction such as batch plants, sand pits, rock quarries and similar operations which have been set up exclusively to furnish materials for the contract. Therefore, employees related to these temporary facilities are considered on-site employees, and the Contractor shall maintain complete records as set out in the Labor Standards Provisions of the contract.

4/15/71

8. The Government further reserves the right to make award of any or all schedules of any bid, unless the bidder qualifies such bid by specific limitation; also to make award to the bidder whose aggregate bid on any combination of bid schedules is low. For the purpose of this Invitation for Bids, the word "item" as used in paragraph 10(c) of Standard Form 22, shall be considered to mean "schedule."

Read the following in conjunction with instructions to bidders (U.S. Standard Form 22).

9. DRAWINGS. Sets of drawings, half-size, and of specifications will be furnished upon receipt of payment of \$2.30 per set. If individual plan sheets are requested, they will be furnished at the rate of \$0.10 for half 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 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 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 should be made payable to "FAO, U. S. Army, Los Angeles District."

10. HAND CARRIED BIDS. 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 bids may be delivered to Room 7412 immediately prior to bid opening time.

11. TELEGRAPHIC MODIFICATIONS TO BIDS should be addressed to:

U.S. Army Engineer District, Los Angeles
CENTRAL MAIL ROOM - ROOM NO. 6532
300 North Los Angeles Street
Los Angeles, California 90053

12. NOTE THE AFFIRMATIVE ACTION REQUIREMENT OF THE EQUAL OPPORTUNITY CLAUSE WHICH MAY APPLY TO THE CONTRACT RESULTING FROM THIS SOLICITATION.

13. NOTE THE CERTIFICATION OF NONSEGREGATED FACILITIES IN THIS SOLICITATION. Bidders or offerors and applicants are cautioned to note the "Certification of Non-Segregated Facilities" in the solicitation. Failure of a bidder or offeror to agree to the certification will render his bid or offer nonresponsive to the terms of solicitation involving awards of contracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause. (1975 OCT)

14. 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. George E. Davis, P.O. Box 2711, Los Angeles, California 90053. Telephone 213 688-5493.

15. NOTICE OF TOTAL SMALL BUSINESS SET-ASIDE. (1972 JUL)

15.1 Restriction. Offers under this procurement are solicited from small business concerns only and this procurement is to be awarded only to one or more small business concerns.. This action is based on a determination by the Contracting Officer, alone or in conjunction with a representative of the Small Business Administration that it is in the interest of maintaining or mobilizing the Nation's full productive capacity, in the interest of war or national defense programs, or in the interest of assuring that a fair proportion of Government procurement is placed with small business concerns. Offers received from firms which are not small business concerns shall be considered nonresponsive and shall be rejected.

15.2 Definition. A "Small Business Concern" is a concern including its affiliates, which is independently owned and operated, is not dominant in the field of operation in which it is offering on Government contracts, and can further qualify under the criteria set forth in regulations of the Small Business Administration (Code of Federal Regulations, Title 13, Section 121.3-8). For the purpose of this Invitation for Bids, in order to qualify as a "Small Business Concern" the average annual receipts of the concern and its affiliates for its preceding three fiscal years must not exceed \$12,000,000, except that if the concern has 50 percent or more of its annual sales or receipts attributable to business activity within Alaska, such average annual receipts must not exceed \$15,000,000.

16. PRE-AWARD SURVEY.

16.1 As part of the pre-award survey, the low bidders will be required to, within 48 hours after bid opening, submit a detailed list of all equipment to be used on the work, including earth moving, materials handling, concrete batching, hauling, paving, and all associated equipment, with supporting evidence of its availability, as well as written assurance said equipment is to be committed to this project alone. Release of any equipment from the project to any other work is subject to the approval of the Contracting Officer.

16.2 Failure to provide timely and satisfactory information data required for the pre-award survey may cause rejection of the bid.

17. ARITHMETIC DISCREPANCIES.

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

(1) Obviously misplaced decimal points will be corrected;

(2) In case of discrepancy between unit price and extended price, the unit price will govern;

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

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

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

18. SITE INSPECTION. Arrangements for visiting the site may be made by contacting Mr. Edgar Dunnigan, Project Office, Indian Bend Wash, telephone (602) 992-6848. 241-2641

19. MINIMUM ACCEPTANCE PERIOD (1975 MAR). Bids allowing less than the number of calendar days specified in the "Bid" portion of SF 19 (or on the reverse of SF 21 as applicable) for acceptance by the Government will be rejected as nonresponsive.

20. SMALL DISADVANTAGED BUSINESS CONCERNS SUBCONTRACTING. Bidders are cautioned that compliance with GENERAL PROVISIONS; UTILIZATION OF SMALL BUSINESS AND SMALL DISADVANTAGED BUSINESS CONCERNS requires direct and specific solicitation of small business and small disadvantaged business in the preparation of the bid for any subcontract or supplies when time or other circumstances would not permit such solicitation after award. In order to assist prime contractors in developing a source list of these business concerns, you are encouraged to contact minority contractor associations, the Minority Business Development Agency or its appropriate business development center and/or the Small Business Administration, addresses of which may be obtained from:

Write:

U. S. Army Engineer District, Los Angeles
ATTN: SPLED-B
300 North Los Angeles Street, P.O. Box 2711
Los Angeles, CA 90053

Telephone:

Mr. Aubrey E. Simons
Small and Disadvantaged Business
Utilization Specialist
Area Code (213) 688-5676

21. EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE. Whenever, a modification or equitable adjustment of contract price is required, 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, contained in the SPECIAL PROVISIONS section of the specifications. A copy of EP 1110-1-8 "Construction Equipment Ownership and Operating Expense Schedule" is available for review upon request.

INSTRUCTIONS TO BIDDERS

(CONSTRUCTION CONTRACT)

1. Explanations to Bidders. Any explanation desired by a bidder regarding the meaning or interpretation of the invitation for bids, drawings, specifications, etc., must be requested in writing and with sufficient time allowed for a reply to reach bidders before the submission of their bids. Any interpretation made will be in the form of an amendment of the invitation for bids, drawings, specifications, etc., and will be furnished to all prospective bidders. Its receipt by the bidder must be acknowledged in the space provided on the Bid Form (Standard Form 21) or by letter or telegram received before the time set for opening of bids. Oral explanations or instructions given before the award of the contract will not be binding.

2. Conditions Affecting the Work. Bidders should visit the site and take such other steps as may be reasonably necessary to ascertain the nature and location of the work, and the general and local conditions which can affect the work or the cost thereof. Failure to do so will not relieve bidders from responsibility for estimating properly the difficulty or cost of successfully performing the work. The Government will assume no responsibility for any understanding or representations concerning conditions made by any of its officers or agents prior to the execution of the contract, unless included in the invitation for bids, the specifications, or related documents.

3. Bidder's Qualifications. Before a bid is considered for award, the bidder may be requested by the Government to submit a statement regarding his previous experience in performing comparable work, his business and technical organization, financial resources, and plant available to be used in performing the work.

4. Bid Guarantee. Where a bid guarantee is required by the invitation for bids, 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.

A bid guarantee shall be 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, in accordance with Treasury Department regulations, cer-

tain bonds or notes of the United States. Bid guarantees, other than bid bonds, will be returned (a) to unsuccessful bidders as soon as practicable after the opening of bids, and (b) to the successful bidder upon execution of such further contractual documents and bonds as may be required by the bid as accepted.

If the successful bidder, upon acceptance of his bid by the Government within the period specified therein for acceptance (sixty days if no period is specified) fails to execute such further contractual documents, if any, and give such bond(s) as may be required by the terms of the bid as accepted within the time specified (ten days if no period is specified) after receipt of the forms by him, his contract may be terminated for default. In such event he shall be liable for any cost of procuring the work which exceeds the amount of his bid, and the bid guarantee shall be available toward offsetting such difference.

5. Preparation of Bids. (a) Bids shall be submitted on the forms furnished, or copies thereof, and must be manually signed. If erasures or other changes appear on the forms, each erasure or change must be initialed by the person signing the bid. Unless specifically authorized in the invitation for bids, telegraphic bids will not be considered.

(b) The bid form may provide for submission of a price or prices for one or more items, which may be lump sum bids, alternate prices, scheduled items resulting in a bid on a unit of construction or a combination thereof, etc. Where the bid form explicitly requires that the bidder bid on all items, failure to do so will disqualify the bid. When submission of a price 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.

(c) Unless called for, alternate bids will not be considered.

(d) Modifications of bids already submitted will be considered if received at the office designated in the invitation for bids by the time set for opening of bids. Telegraphic modifications will be considered, but should not reveal the amount of the original or revised bid.

6. **Submission of Bids.** Bids must be sealed, marked, and addressed as directed in the invitation for bids. Failure to do so may result in a premature opening of, or a failure to open, such bid.

~~7. **Late Bids and Modifications or Withdrawals.**~~
(This paragraph applies to all advertised solicitations. In the case of Department of Defense negotiated solicitations, it shall also apply to late offers and modifications (other than the normal revisions of offers by selected offerors during the usual conduct of negotiations with such offerors) but not to withdrawal of offers. Unless otherwise provided, this paragraph does not apply to negotiated solicitations issued by civilian agencies.)

(a) Bids and modifications or withdrawals thereof received at the office designated in the invitation for bids after the exact time set for opening of bids will not be considered unless: (1) They are received before award is made; and either (2) they are sent by registered mail, or by certified mail for which an official dated post office stamp (postmark) on the original Receipt for Certified Mail has been obtained and it is determined by the Government that the late receipt was due solely to delay in the mails for which the bidder was not responsible; or (3) if submitted by mail (or by telegram if authorized), it is determined by the Government that the late receipt was due solely to mishandling by the Government after receipt at the Government installation: *Provided*, That timely receipt at such installation is established upon examination of an appropriate date or time stamp (if any) of such installation, or of other documentary evidence of receipt (if readily available) within the control of such installation or of the post office serving it. However, a modification which makes the terms of the otherwise successful bid more favorable to the Government will be considered at any time it is received and may thereafter be accepted.

(b) Bidders using certified mail are cautioned to obtain a Receipt for Certified Mail showing a legible, dated postmark and to retain such receipt against the chance that it will be required as evidence that a late bid was timely mailed.

(c) The time of mailing of late bids submitted by registered or certified mail shall be deemed to be the last minute of the date shown in the postmark on the registered mail receipt or registered mail wrapper or on

~~the Receipt for Certified Mail unless the bidder furnishes evidence from the post office station of mailing which establishes an earlier time. In the case of certified mail, the only acceptable evidence is as follows: (1) Where the Receipt for Certified Mail identifies the post office station of mailing, evidence furnished by the bidder which establishes that the business day of that station ended at an earlier time, in which case the time of mailing shall be deemed to be the last minute of the business day of that station; or (2) an entry in ink on the Receipt for Certified Mail showing the time of mailing and the initials of the postal employee receiving the item and making the entry, with appropriate written verification of such entry from the post office station of mailing, in which case the time of mailing shall be the time shown in the entry. If the postmark on the original Receipt for Certified Mail does not show a date, the bid shall not be considered.~~

8. **Withdrawal of Bids.** Bids may be withdrawn by written or telegraphic request received from bidders prior to the time set for opening of bids.

9. **Public Opening of Bids.** Bids will be publicly opened at the time set for opening in the invitation for bids. Their content will be made public for the information of bidders and others interested, who may be present either in person or by representative.

10. **Award of Contract.** (a) Award of contract will be made to that responsible bidder whose bid, conforming to the invitation for bids, is most advantageous to the Government, price and other factors considered.

(b) The Government may, when in its interest, reject any or all bids or waive any informality in bids received.

(c) The Government may accept any item or combination of items of a bid, unless precluded by the invitation for bids or the bidder includes in his bid a restrictive limitation.

11. **Contract and Bonds.** The bidder whose bid is accepted will, within the time established in the bid, enter into a written contract with the Government and, if required, furnish performance and payment bonds on Government standard forms in the amounts indicated in the invitation for bids or the specifications.

Paragraph 12 below replaces paragraphs 7 and 8 of Standard Form 22 which have been deleted.

12. LATE BIDS, MODIFICATIONS OF BIDS OR WITHDRAWAL OF BIDS (1979 MAR)

(a) 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 either:

(i) it was sent by registered or certified mail not later than the fifth calendar day prior to the date specified for the 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 earlier); or,

(ii) it was sent by mail (or telegram 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.

(b) Any modification or withdrawal of bid is subject to the same conditions as in (a) above except that withdrawal of bids by telegram is authorized. A bid may also be withdrawn in person by a bidder or his authorized representative, provided his identity is made known and he signs a receipt for the bid, but only if the withdrawal is made prior to the exact time set for receipt of bids.

(c) The only acceptable evidence to establish:

(i) 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 deemed to have been mailed late. (The term "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 on the date of mailing by employees of the U.S. or Canadian Postal Service. Therefore, offerors should request the postal clerk to place a hand cancellation bull's eye "postmark" on both the receipt and the envelope or wrapper.)

(ii) the time of receipt at the Government installation is the time/date stamp of such installation on the bid wrapper or other documentary evidence of receipt maintained by the installation.

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

NOTE: The term "telegram" includes mailgrams.

STANDARD FORM 21
DECEMBER 1965 EDITION
GENERAL SERVICES ADMINISTRATION
FED. PROC. REG. (41 CFR) 1-16.601

BID FORM
(CONSTRUCTION CONTRACT)

REFERENCE

DACW09-82-B-0011

Read the Instructions to Bidders (Standard Form 22)
This form to be submitted in duplicate

DATE OF INVITATION
82 APR 28

NAME AND LOCATION OF PROJECT

INDIAN BEND WASH
SCOTTSDALE BIKE STOP AND
GREENBELT TRAIL SYSTEM,
MARICOPA COUNTY, ARIZONA

NAME OF BIDDER (*Type or print*)

(Date)

TO: U. S. ARMY ENGINEER DISTRICT, LOS ANGELES
P. O. Box 2711
Los Angeles, California 90053

In compliance with the above-dated invitation for bids, the undersigned hereby proposes to perform all work for construction of Indian Bend Wash, Scottsdale Bike Stop and Greenbelt Trail System and appurtenant work.

in strict accordance with the General Provisions, specifications, schedules, drawings, and conditions, for the amounts set forth in the attached Bidding Schedule.

EQUAL EMPLOYMENT COMPLIANCE (1978 SEP) By submission of this offer, the offeror represents that, to the best of his knowledge and belief, except as noted below, up to the date of this offer no written notice such as a show cause letter, a letter indicating probable cause, or any other written notification citing specific deficiencies, has been received by the offeror from any Federal Government agency or representative thereof that the offeror or any of its divisions or affiliates or known first-tier subcontractors is in violation of any of the provisions of Executive Order 11246 of September 24, 1965, as amended, or rules and regulations of the Secretary of Labor (41 CFR, Chapter 60) and specifically as to not having an acceptable affirmative action compliance program or being in noncompliance with any other aspect of the Equal Employment Opportunity Program. It is further agreed that should there be any change (i) in the offeror's status or circumstances between this date and the date of expiration of this offer or any extension thereof, or (ii) during any contract or extension thereof resulting from this solicitation, the Contracting Office will be notified promptly.

The undersigned agrees that, upon written acceptance of this bid, mailed or otherwise furnished within 30 calendar days ~~(unless a longer period is allowed)~~ after the date of opening of bids, he will within 5 calendar days (unless a longer period is allowed) after receipt of the prescribed forms, execute Standard Form 23, Construction Contract, and give performance and payment bonds on Government standard forms with good and sufficient surety. (See paragraph No. 19 of the Invitation for Bids).

The undersigned agrees, if awarded the contract, to commence and to complete the work in accordance with the stipulations of Paragraph 1. of the SPECIAL PROVISIONS.

RECEIPT OF AMENDMENTS: The undersigned acknowledges receipt of the following amendments of the invitation for bids, drawings, and/or specifications, etc. (Give number and date of each):

The representations and certifications on the accompanying STANDARD FORM 19-B are made a part of this bid.

ENCLOSED IS BID GUARANTEE, CONSISTING OF		IN THE AMOUNT OF
NAME OF BIDDER (Type or print)		FULL NAME OF ALL PARTNERS (Type or print)
BUSINESS ADDRESS (Type or print) (Include "ZIP Code") <i>Am 2</i> <i>n-pho</i>		
BY (Signature in ink. Type or print name under signature)		
TITLE (Type or print)		

DIRECTIONS FOR SUBMITTING BIDS: Envelopes containing bids, guarantee, etc., must be sealed, marked, and addressed as follows:

Envelopes shall be marked in the upper left hand corner
Bid Under Reference No.

DACW09-82-B-0011

Envelopes shall be addressed:
U.S. ARMY ENGINEER DISTRICT
PHOENIX RESIDENT OFFICE
2721 NORTH CENTRAL AVENUE
PHOENIX, ARIZONA 85004

CAUTION—Bids should not be qualified by exceptions to the bidding conditions.

BIDDING SCHEDULE

<u>Item No.</u>	<u>Description</u>	<u>Estimated Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Estimated Amount</u>
1.	CLEARING SITE AND REMOVING OBSTRUCTIONS	1	Job	L.S.	_____
2.	EARTHWORK	700	Cu.Yd.	_____	_____
3.	CONCRETE BIKE PATH, 4-INCH	6100	Sq.Yd.	_____	_____
4.	EXPOSED AGGREGATE WALK	120	Sq.Yd.	_____	_____
5.	SIDEWALK RAMP	1	Job	L.S.	_____
6.	MODIFICATION OF EXISTING BIKE PATH	1	Job	L.S.	_____
7.	LAKESIDE BIKE PATH	1	Job	L.S.	_____
8.	SLOPE PAVING	1	Job	L.S.	_____
9.	CONCRETE CURBS	1	Job	L.S.	_____ <i>Am 2</i>
10.	DRAINAGE CHANNEL	1	Job	L.S.	_____
11.	DRAINAGE PIPE	1	Job	L.S.	_____
12.	DRAINAGE SCUPPER	1	Job	L.S.	_____
13.	MAINTENANCE GATE AND ROAD	1	Job	L.S.	_____
14.	ASPHALT CONCRETE PARKING LOT	65	Ton	_____	_____
15.	ASPHALT CONCRETE BIKE PATH	92	Ton	_____	_____
16.	McDONALD UNDERPASS	1	Job	L.S.	_____
17.	POST AND CHAIN FENCE	530	Lin.Ft.	_____	_____
18.	WATERLINE	1	Job	L.S.	_____
19.	ELECTRICAL WORK FOR BIKE STOP	1	Job	L.S.	_____
20.	RESTROOM	1	Job	L.S.	_____
21.	RAMADA	4	Each	_____	_____
22.	LITTER RECEPTACLES	4	Each	_____	_____
23.	BENCHES	5	Each	_____	_____

BIDDING SCHEDULE (Continued)

<u>Item No.</u>	<u>Description</u>	<u>Estimated Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Estimated Amount</u>
24.	PICNIC TABLES	14	Each	_____	_____
25.	BARBEQUES	4	Each	_____	_____
26.	PREFABRICATED METAL TRUSS BRIDGE	1	Job	L.S.	_____
27.	BIKE TRAIL BRIDGE	1	Job	L.S.	_____
28.	SIGN A	1	Each	_____	_____
29.	SIGN B	1	Each	_____	_____
30.	TRAIL SIGNS	6	Each	_____	_____
31.	TRASH ENCLOSURE	1	Job	L.S.	_____
32.	BICYCLE PARKING AREA	1	Job	L.S.	_____
33.	ENTRY GATE	1	Job	L.S.	_____
34.	IRRIGATION SYSTEM	1	Job	L.S.	_____
35.	GROUND COVER	1	Job	L.S.	_____
36.	TREES AND SHRUBS	1	Job	L.S.	_____
37.	PAVEMENT MARKING	1	Job	L.S.	_____
38.	TRAIL LIGHTING	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 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. If it is not stated, the bidder agrees that the lump sum adjustment shall be applied on a pro rata basis to every unit price in the bidding schedule.

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

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

REPRESENTATIONS AND CERTIFICATIONS
(Construction and Architect-Engineer Contract)
(For use with Standard Forms 19, 21 and 252)

REFERENCE (Enter same No.(s) as on SF 19, 21 and 252)

NAME AND ADDRESS OF BIDDER (No., Street, City, State, and ZIP Code)

DATE OF BID

In negotiated procurements, "bid" and "bidder" shall be construed to mean "offer" and "offeror."

The bidder makes the following representations and certifications as a part of the bid identified above. (Check appropriate boxes.)

1. SMALL BUSINESS

He is, is not, a small business concern. (A small business concern for the purpose of Government procurement is a concern, including its affiliates, which is independently owned and operated, is not dominant in the field of operations in which it is bidding on Government contracts, and can further qualify under the criteria concerning number of employees, average annual receipts, or other criteria as prescribed by the Small Business Administration. For additional information see governing regulations of the Small Business Administration (13 CFR Part 121)).

2. MINORITY BUSINESS ENTERPRISE

He is, is not a minority business enterprise. A minority business enterprise is defined as a "business, at least 50 percent of which is owned by minority group members or, in case of publicly owned businesses, at least 51 percent of the stock of which is owned by minority group members." For the purpose of this definition, minority group members are Negroes, Spanish-speaking American persons, American-Orientals, American-Indians, American-Eskimos, and American-Aleuts."

3. CONTINGENT FEE

(a) He has, has not, employed or retained any company or person (other than a full-time bona fide employee working solely for the bidder) to solicit or secure this contract, and (b) he has, has not, paid or agreed to pay any company or person (other than a full-time bona fide employee working solely for the bidder) any fee, commission, percentage or brokerage fee, contingent upon or resulting from the award of this contract; and agrees to furnish information relating to (a) and (b) above as requested by the Contracting Officer. (For interpretation of the representation, including the term "bona fide employee," see Code of Federal Regulations, Title 41, Subpart 1-1.5.)

4. TYPE OF ORGANIZATION

He operates as an individual, partnership, joint venture, corporation, incorporated in State of

5. INDEPENDENT PRICE DETERMINATION

(a) By submission of this bid, each bidder certifies, and in the case of a joint bid each party thereto certifies as to his own organization, that in connection with this procurement:

(1) The prices in this bid have been arrived at independently, without consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;

(2) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, in the case of a bid, or prior to award, in the case of a proposal, directly or indirectly to any other bidder or to any competitor; and

(3) No attempt has been made or will be made by the bidder to induce any other person or firm to submit or not to submit a bid for the purpose of restricting competition.

(b) Each person signing this bid certifies that:

(1) He is the person in the bidder's organization responsible within that organization for the decision as to the prices being bid herein and that he has not participated, and will not participate, in any action contrary to (a) (1) through (a) (3) above; or

(2) (i) He is not the person in the bidder's organization responsible within that organization for the decision as to the prices being bid herein but that he has been authorized in writing to act as agent for the persons responsible for such decision in certifying that such persons have not participated, and will not participate, in any action contrary to (a) (1) through (a) (3) above, and as their agent does hereby so certify; and (ii) he has not participated, and will not participate, in any action contrary to (a) (1) through (a) (3) above.

(c) This certification is not applicable to a foreign bidder submitting a bid for a contract which requires performance or delivery outside the United States, its possessions, and Puerto Rico.

(d) A bid will not be considered for award where (a) (1), (a) (3), or (b) above, has been deleted or modified. Where (a) (2) above, has been deleted or modified, the bid will not be considered for award unless the bidder furnishes with the bid a signed statement which sets forth in detail the circumstances of the disclosure and the head of the agency, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

NOTE.—Bids must set forth full, accurate, and complete information as required by this invitation for bids (including attachments). The penalty for making false statements in bids is prescribed in 18 U.S.C. 1001.

THE FOLLOWING NEED BE CHECKED ONLY IF BID EXCEEDS \$10,000 IN AMOUNT.

6. EQUAL OPPORTUNITY

He has, has not, participated in a previous contract or subcontract subject to the Equal Opportunity Clause herein, the clause originally contained in Section 301 of Executive Order No. 10925, or the clause contained in Section 201 of Executive Order No. 11114; he has, has not, filed all required compliance reports; and representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained prior to subcontract awards.

(The above representations need not be submitted in connection with contracts or subcontracts which are exempt from the equal opportunity clause.)

7. PARENT COMPANY AND EMPLOYER IDENTIFICATION NUMBER

Each bidder shall furnish the following information by filling in the appropriate blocks:

(a) Is the bidder owned or controlled by a parent company as described below? Yes No. (For the purpose of this bid, a parent company is defined as one which either owns or controls the activities and basic business policies of the bidder. To own another company means the parent company must own at least a majority (more than 50 percent) of the voting rights in that company. To control another company, such ownership is not required; if another company is able to formulate, determine, or veto basic business policy decisions of the bidder, such other company is considered the parent company of the bidder. This control may be exercised through the use of dominant minority voting rights, use of proxy voting, contractual arrangements, or otherwise.)

(b) If the answer to (a) above is "Yes," bidder shall insert in the space below the name and main office address of the parent company.

NAME OF PARENT COMPANY	MAIN OFFICE ADDRESS (No., Street, City, State, and ZIP Code)
------------------------	--

(c) Bidder shall insert in the applicable space below, if he has no parent company, his own Employer's Identification Number (E.I. No.) (Federal Social Security Number used on Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941), or, if he has a parent company, the E.I. No. of his parent company.

EMPLOYER IDENTIFICATION NUMBER OF		PARENT COMPANY	BIDDER
-----------------------------------	---	----------------	--------

8. CERTIFICATION OF NONSEGREGATED FACILITIES

(Applicable to (1) contracts, (2) subcontracts, and (3) agreements with applicants who are themselves performing federally assisted construction contracts, exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause.)

By the submission of this bid, the bidder, offeror, applicant, or subcontractor certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. He certifies further that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The bidder, offeror, applicant, or subcontractor agrees that a breach of this certification is a violation of the Equal Opportunity clause in this contract. As used in this certification, the term "segregated facilities" 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 areas, transportation, and housing facilities provided for employees which 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. He further agrees that (except where he has obtained identical certifications from proposed subcontractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause; that he will retain such certifications in his files; and that he will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT FOR CERTIFICATIONS OF NONSEGREGATED FACILITIES

A Certification of Nonsegregated Facilities must be submitted prior to the award of a subcontract exceeding \$10,000 which is not exempt from the provisions of 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. CLEAN AIR AND WATER

(Applicable if the bid or offer exceeds \$100,000, or the contracting officer has determined that orders under an indefinite quantity contract in any year will exceed \$100,000, or a facility to be used has been the subject of a conviction under the Clean Air Act (42 U.S.C. 1857c-8(c)(1)) or the Federal Water Pollution Control Act (33 U.S.C. 1319(c)) and is listed by EPA, or is not otherwise exempt.)

The bidder or offeror certifies as follows:

(a) Any facility to be utilized in the performance of this proposed contract has , has not , been listed on the Environmental Protection Agency List of Violating Facilities.

(b) He will promptly notify the contracting officer, prior to award, of the receipt of any communication from the Director, Office of Federal Activities, Environmental Protection Agency, indicating that any facility which he proposes to use for the performance of the contract is under consideration to be listed on the EPA List of Violating Facilities.

(c) He will include substantially this certification, including this paragraph (c), in every nonexempt subcontract.

Alterations to Standard Form 19-B, REPRESENTATIONS AND CERTIFICATIONS

Delete Item No. 2, MINORITY BUSINESS ENTERPRISE and insert the following:

2. SMALL DISADVANTAGED BUSINESS CONCERN

(a) He is, is not, a small business concern owned and controlled by socially and economically disadvantaged individuals. The term "small business concern" means 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" means a small business concern-

(1) that is at least 51 per centum 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 or economically disadvantaged individuals; and

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

(b) The offeror shall presume that socially and economically disadvantaged individuals include Black Americans, Hispanic Americans, Native Americans (such as American Indians, Eskimos, Aleuts, and native Hawaiians), and other minorities or any other individuals found to be disadvantaged by the Small Business Administration pursuant to Section 8(a) of the Small Business Act.

After Item No. 3, CONTINGENT FEE, the following clause has been added:

"If the offeror/quoter, by checking the appropriate box provided therefor, has represented that he has employed or retained a company or person (other than a full-time bona fide employee working solely for the offeror/quoter) to solicit or secure this contract, or that he has paid or agreed to pay any fee, commission, percentage, or brokerage fee to any company or person contingent upon or resulting from the award of this contract, he shall furnish, in duplicate, a complete Standard Form 119, Contractor's Statement of Contingent or Other Fees. If offeror/quoter has previously furnished a completed Standard Form 119 to the office issuing this solicitation, he may accompany his proposal/quotation with a signed statement (a) indicating when such completed form was previously furnished, (b) identifying by number the previous solicitation or contract, if any, in connection with which such form was submitted, and (c) representing that the statement in such form is applicable to this proposal/quotation."
(ASPR 7-2002.1)

Standard Form 19-B, REPRESENTATIONS AND CERTIFICATIONS (continued)

The bidder makes the following representations and certifications as a part of the bid identified hereinbefore. (Check appropriate boxes).

10. WOMAN-OWNED BUSINESS.

He is, is not, a woman-owned business. A woman-owned business is a business which is, at least, 51 percent owned, controlled and operated by a woman or women. Controlled is defined as exercising the power to make policy decisions. Operated is defined as actively involved in the day-to-day management. For the purposes of this definition, businesses which are publicly owned, joint stock associations, and business trusts are exempted. Exempted businesses may voluntarily represent that they are, or are not, women-owned if this information is available.

11. PERCENT FOREIGN CONTENT.

Approximately _____ percent of the proposed contract price represents foreign content or effort.

12. CERTIFICATION-WAGE AND PRICE STANDARDS.

(Applicable to awards in excess of \$5 million, and awards of indefinite delivery type contracts under which cumulative orders are expected to exceed \$5 million.)

(a) By submission of this bid or offer, the bidder or offeror certifies that he is in compliance with the Wage and Price Standards issued by the Council on Wage and Price Stability (6 CFR Part 705, Appendix, and Part 706).

(b) The clause entitled, "Certification - Wage and Price Standards," set forth elsewhere in this solicitation, shall be incorporated in any resulting contract except where waived by agency head involved.

STANDARD FORM 23
JANUARY 1961 EDITION
GENERAL SERVICES ADMINISTRATION
FFD PROC REG (41 CFR) 1-16.401

CONSTRUCTION CONTRACT
(See instructions on reverse)

CONTRACT NO.

DATE OF CONTRACT

Rev. LAD Nov. 70

NAME AND ADDRESS OF CONTRACTOR

CHECK APPROPRIATE BOX

- Individual
 Partnership
 Joint Venture
 Corporation, incorporated in the
State of _____

DEPARTMENT OR AGENCY

CONTRACT FOR (*Work to be performed*)

PLACE

CONTRACT PRICE (*Express in words and figures*)

ADMINISTRATIVE DATA (*Optional*)

The United States of America (hereinafter called the Government), represented by the Contracting Officer executing this contract, and the individual, partnership, joint venture, or corporation named above (hereinafter called the Contractor), mutually agree to perform this contract in strict accordance with the General Provisions, and the following designated specifications, schedules, drawings, and conditions:

WORK SHALL BE STARTED

WORK SHALL BE COMPLETED

Alterations. The following alterations were made in this contract before it was signed by the parties hereto:

In witness whereof, the parties hereto have executed this contract as of the date entered on the first page hereof.

THE UNITED STATES OF AMERICA

CONTRACTOR

By _____

(Name of Contractor)

(Official title)

By _____
(Signature)

(Title)

INSTRUCTIONS

1. The full name and business address of the Contractor must be inserted in the space provided on the face of the form. The Contractor shall sign in the space provided above with his usual signature and typewrite or print his name under the signature.

2. An officer of a corporation, a member of a partnership, or an agent signing for the Contractor shall place his signature and title after the word "By" under the name of the Contractor. A contract executed by an attorney or agent on behalf of the Contractor shall be accompanied by two authenticated copies of his power of attorney or other evidence of his authority to act on behalf of the Contractor.

INDEX OF GENERAL PROVISIONS
(Construction Contract)
Edition of 29 July 1980

- 1.1 Definitions
- 1.2 Definitions
2. Specifications and Drawings
3. Changes
4. Differing Site Conditions
5. Termination for Default-Damages for Delay-Time Extensions
6. Disputes
7. Payments to Contractor
8. Assignment of Claims
9. Material and Workmanship
10. Inspection and Acceptance
11. Superintendence by Contractor
12. Permits and Responsibilities
13. Conditions Affecting the Work
14. Other Contracts
15. Shop Drawings
16. Use and Possession Prior to Completion
17. Suspension of Work
18. Termination for Convenience of the Government-Construction
19. Pricing of Adjustments
20. Patent Indemnity
21. Additional Bond Security
22. Examination of Records by Comptroller General
23. Buy American Act
24. Equal Opportunity

25. Covenant Against Contingent Fees
26. Officials Not to Benefit
27. Convict Labor
28. Utilization of Small Business and Small Disadvantaged Business Concerns
29. Federal, State and Local Taxes
30. Davis-Bacon Act
31. Contract Work Hours and Safety Standards Act-Overtime Compensation
32. Apprentices and Trainees
33. Payrolls and Basic Records
34. Compliance with Copeland Regulations
35. Withholding of Funds
36. Subcontracts
37. Contract Termination-Debarment
38. Disputes Concerning Labor Standards
39. Contractor Inspection System
40. Gratuities
41. Subcontracting Plan for Small Business and Small Disadvantaged Business Concerns (Formally Advertised)
42. Notice and Assistance Regarding Patent and Copyright Infringement
43. Authorization and Consent
44. Composition of Contractor
45. Site Investigation
46. Protection of Existing Vegetation, Structures, Utilities, and Improvements
47. Operations and Storage Areas
48. Modification Proposals-Price Breakdown
49. Subcontractors
50. Cleaning Up
51. Additional Definitions

52. Accident Prevention
53. Government Inspectors
54. Rights in Shop Drawings
55. Affirmative Action for Disabled Veterans and Veterans of the Vietnam Era
56. Value Engineering Incentive--Construction
57. Affirmative Action for Handicapped Workers
58. Clean Air and Water
59. Notice to the Government of Labor Disputes
60. Contract Prices-Bidding Schedule
61. Priorities, Allocations, and Allotments
62. Price Reduction for Defective Cost or Pricing Data-Price Adjustments
63. Interest
64. Audit by Department of Defense
65. Subcontractor Cost or Pricing Data-Price Adjustments
- 66.1 Government-Furnished Property (Short Form)
- 66.2 Government Property (Fixed Price)
67. Variations in Estimated Quantities
68. Progress Charts and Requirements for Overtime Work
69. Certification of Requests for Adjustment or Relief Exceeding \$100,000
70. Affirmative Action Compliance Requirements for Construction
71. Utilization of Women-Owned Business Concerns (Over \$10,000)
72. Environmental Litigation

GENERAL PROVISIONS
(Construction Contract)
(Edition of 29 July 1980)

Issued By: Department of the Army, Corps of Engineers

(General Provisions 1 through 29 and 30 through 38 are those prescribed by the General Services Administration in Standard Form 23-A, April 1975 edition and Standard Form 19-A, January 1979 edition, respectively, as amended pursuant to the latest revisions of the Defense Acquisition Regulation and Engineer Contract Instructions, ER 1180-1-1.)

1.1 DEFINITIONS

(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) The term "Contracting Officer" as used herein means the person executing this contract on behalf of the Government and includes a duly appointed successor or authorized representative. (DAR 7-602.1 & ECI 7-070)

1.2 DEFINITIONS (1964 JUN)

(The following clause is applicable if the procurement instrument identification number is prefixed by the letters "DACA")

(a) The term "head of the agency" or "Secretary" as used herein means the Secretary, the Under Secretary, any Assistant Secretary, or any other head or assistant head of the executive or military department or other Federal agency; and the term "his duly authorized representative" means any person or persons or board (other than the Contracting Officer) authorized to act for the head of the agency or the Secretary.

(b) The term "Contracting Officer" as used herein means the person executing this contract on behalf of the Government and includes a duly appointed successor or authorized representative. (DAR 7-602.1)

2. SPECIFICATIONS AND DRAWINGS (1964 JUN)

The Contractor shall keep on the work 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 either 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 his own risk and expense. The Contracting Officer shall furnish from time to time such detail drawings and other information as he may consider necessary, unless otherwise provided. (DAR 7-602.2)

3. CHANGES (1968 FEB)

(a) The Contracting Officer may, at any time, without notice to the sureties, by written order designated or indicated to be a change order, make any change in the work within the general scope of the contract, including but not limited to changes:

- (i) in the specifications (including drawings and designs);
- (ii) in the method or manner of performance of the work;
- (iii) in the Government-furnished facilities, equipment, materials, services, or site; or
- (iv) directing acceleration in the performance of the work.

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

(c) Except as herein provided, 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 hereunder.

(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 order, an equitable adjustment shall be made and the contract modified in writing accordingly: Provided however, That except for claims based on defective specifications, no claim for any change under (b) above shall be allowed for any costs incurred more than 20 days before the Contractor gives written notice as therein required: And provided further, That 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 such defective specifications.

(e) If the Contractor intends to assert a claim for an equitable adjustment under this clause, he must, within 30 days after receipt of a written change order under (a) above or the furnishing of a written notice under (b) above, submit to the Contracting Officer a written statement setting forth the general nature and monetary extent of such claim, unless this period is extended by the Government. The statement of claim hereunder may be included in the notice under (b) above.

(f) No claim by the Contractor for an equitable adjustment hereunder shall be allowed if asserted after final payment under this contract. (DAR 7-602.3)

4. DIFFERING SITE CONDITIONS (1968 FEB)

(a) The Contractor shall promptly, and before such conditions are disturbed, notify the Contracting Officer in writing of: (1) subsurface or latent physical conditions at the site differing materially from those indicated in this contract, or (2) unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in this contract. The Contracting Officer shall promptly investigate the conditions, and if he finds that such conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performance of any part of the work under this contract, whether or not changed as a result of such conditions, an equitable adjustment shall be made and the contract modified in writing accordingly.

(b) No claim of the Contractor under this clause shall be allowed unless the Contractor has given the notice required in (a) above; provided, however, the time prescribed therefor may be extended by the Government.

(c) No claim by the Contractor for an equitable adjustment hereunder

shall be allowed if asserted after final payment under this contract. (DAR 7-602.4)

5. TERMINATION FOR DEFAULT - DAMAGES FOR DELAY - TIME EXTENSIONS (1969 AUG)

(a) If the Contractor refuses or fails to prosecute the work, or any separable part thereof, with such diligence as will insure its completion within the time specified in this contract, or any extension thereof, or fails to complete said work within such time, the Government may, by written notice to the Contractor, terminate his right to proceed with the work or such part of the work as to which there has been delay. In such event the Government may take over the work and prosecute the same to completion, by contract or otherwise, and may take possession of and utilize in completing the work such materials, appliances, and plant as may be on the site of the work and necessary therefor. Whether or not the Contractor's right to proceed with the work is terminated, he and his sureties shall be liable for any damage to the Government resulting from his refusal or failure to complete the work within the specified time.

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

(c) If fixed and agreed liquidated damages are provided in the contract and if the Government does not so terminate the Contractor's right to proceed, the resulting damage will consist of such liquidated damages until the work is completed or accepted.

(d) The Contractor's right to proceed shall not be so terminated nor the Contractor charged with resulting damage if:

(1) The delay in the completion of the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including but not restricted to, acts of God, acts of the public enemy, acts of the Government in either its sovereign or contractual capacity, acts of another contractor in the performance of a contract with the Government, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, unusually severe weather, or delays of subcontractors or suppliers arising from unforeseeable causes beyond the control and without the fault or negligence of both the Contractor and such subcontractors or suppliers; and

(2) The Contractor, within 10 days from the beginning of any such delay (unless the Contracting Officer grants a further period of time before the date of final payment under the contract), notifies the Contracting Officer in writing of the causes of delay. The Contracting Officer shall ascertain the facts and the extent of the delay and extend the time for completing the work when, in his judgment, the findings of fact justify such an extension, and his findings of fact shall be final and conclusive on the parties, subject only to appeal as provided in the "Disputes" clause of this contract.

(e) If, after notice of termination of the Contractor's right to proceed under the provisions of this clause, it is determined for any reason that the Contractor was not in default under the provisions of this clause, or that the delay was excusable under the provisions of this clause, the rights and obligations of the parties shall, if the contract contains a clause providing for termination for convenience of the Government, be the same as if the notice of termination had been issued pursuant to such clause. If, in the foregoing circumstances, this contract does not contain a clause providing for

termination for convenience of the Government, the contract shall be equitably adjusted to compensate for such termination and the contract modified accordingly; failure to agree to any such adjustment shall be a dispute concerning a question of fact within the meaning of the clause of this contract entitled "Disputes."

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

(g) As used in paragraph (d)(1) of this clause, the term "subcontractors or suppliers" means subcontractors or suppliers at any tier. (DAR 7-602.5)

6. DISPUTES (1980 JUN)

(a) This contract is subject to the Contract Disputes Act of 1978 (P.L. 95-563).

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

(c) (i) As used herein, "claim" means a written demand or assertion by one of the parties seeking, as a matter of right, the payment of money, adjustment or interpretation of contract terms, or other relief, arising under or relating to this contract. However, a written demand by the contractor seeking the payment of money in excess of \$50,000 is not a claim until certified in accordance with (d) below.

(ii) A voucher, invoice, or other routine request for payment that is not in dispute when submitted is not a claim for the purposes of the Act. However, where such submission is subsequently disputed either as to liability or amount or not acted upon in a reasonable time, it may be converted to a claim pursuant to the Act by complying with the submission and certification requirements of this clause.

(iii) A claim by the contractor shall be made in writing and submitted to the contracting officer for decision. A claim by the Government against the contractor shall be subject to a decision by the Contracting Officer.

(d) For contractor claims of more than \$50,000, the contractor shall submit with the claim a certification that the claim is made in good faith; the supporting data are accurate and complete to the best of the contractor's knowledge and belief; and the amount requested accurately reflects the contract adjustment for which the contractor believes the Government is liable. The certification shall be executed by the contractor if an individual. When the contractor is not an individual, the certification shall be executed by a senior company official in charge at the contractor's plant or location involved, or by an officer or general partner of the contractor having over-all 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 in excess of \$50,000 the Contracting Officer must decide the claim within 60 days or notify the contractor of the date when 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) Interest on the amount found due on a contractor claim shall be paid from the date the contracting officer receives the claim, or from the date payment otherwise would be due, if such date is later, until the date of payment.

(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. (DAR 7-103.12(a))

7. PAYMENTS TO CONTRACTOR (1979 MAR)

(a) The Government will pay the contract price as hereinafter provided.

(b) The Government will 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, at his discretion, 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 (1) if such consideration is specifically authorized by the contract and (2) if the Contractor furnishes satisfactory evidence that he has acquired title to such material and that it will be utilized on the work covered by this contract.

(c) In making such 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, he may authorize such payment to be made in full without retention of a percentage. Also, whenever the work is substantially complete, the Contracting Officer shall retain an amount he considers adequate for the protection of the Government, and, at his discretion, may release to the Contractor all or a portion of any excess amount. Furthermore, on completion and acceptance of each separate building, public work, or other division of the contract, on which the price is stated separately in the contract, payment may be made therefor without retention of a percentage.

(d) All material and work covered by progress payments made shall thereupon become the sole property of the Government, but this provision shall not be construed as 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 as waiving the right of the Government to require the fulfillment of all of the terms of the contract.

(e) The Contractor shall, upon request, be reimbursed 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) Upon completion and acceptance of all work, the amount due the Contractor under this contract shall be paid upon the presentation of a properly executed voucher and after the Contractor shall have furnished the Government with a release of all claims against the Government arising by virtue of this contract, other than claims in stated amounts as may be specifically excepted by the Contractor from the operation of the release. If the Contractor's claim to amounts payable under the contract has been assigned under the Assignment of Claims Act of 1940, as amended (31 U.S.C. 203, 41 U.S.C. 15), a release may also be required of the assignee. (DAR 7-602.7)

8. ASSIGNMENT OF CLAIMS (1976 OCT)

(a) Pursuant to the provisions of the Assignment of Claims Act of 1940, as amended (31 U.S.C. 203, 41 U.S.C. 15), if this contract provides for

payments aggregating \$1,000 or more, claims for moneys due or to become due the Contractor from the Government under this contract may be assigned to a bank, trust company, or other financing institution, including any Federal lending agency, and may thereafter be further assigned and reassigned to any such institution. Any such assignment or reassignment shall cover all amounts payable under this contract and not already paid, and shall not be made to more than one party, except that any such assignment or reassignment may be made to one party as agent or trustee for two or more parties participating in such financing. Unless otherwise provided in this contract, payments to assignee of any moneys due or to become due under this contract shall not, to the extent provided in said Act, as amended, be subject to reduction or setoff. (The preceding sentence applies only if this contract is made in time of war or national emergency as defined in said Act and is with the Department of Defense, the General Services Administration, the Energy Research and Development Administration, the National Aeronautics and Space Administration, the Federal Aviation Administration, or any other department or agency of the United States designated by the President pursuant to Clause 4 of the provision of section 1 of the Assignment of Claims Act of 1940, as amended by the Act of May 15, 1951, 65 Stat. 41.)

(b) In no event shall copies of this contract or of any plans, specifications, or other similar documents relating to work under this contract, if marked "Top Secret," "Secret," or "Confidential," be furnished to any assignee of any claim arising under this contract or to any other person not entitled to receive the same. However, a copy of any part or all of this contract so marked may be furnished, or any information contained therein may be disclosed, to such assignee upon the prior written authorization of the Contracting Officer. (DAR 7-602.8)

9. MATERIAL AND WORKMANSHIP (1964 JUN)

(a) Unless otherwise specifically provided in this contract, all equipment, material, and articles incorporated in the work covered by this contract are to be new and of the most suitable grade for the purpose intended. Unless otherwise specifically provided in this contract, reference to any equipment, material, article, or patented process, by trade name, make, or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition, and the Contractor may, at his option, use any equipment, material, article, or process which, in the judgment of the Contracting Officer, is equal to that named. The Contractor shall furnish to the Contracting Officer for his approval the name of the manufacturer, the model number, and other identifying data and information respecting the performance, capacity, nature, and rating of the machinery and mechanical and other equipment which the Contractor contemplates incorporating in the work. When required by this contract or when called for by the Contracting Officer, the Contractor shall furnish the Contracting Officer for approval full information concerning the material or articles which he contemplates incorporating in the work. When so directed, samples shall be submitted for approval at the Contractor's expense, with all shipping charges prepaid. Machinery, equipment, material, and articles installed or used without required approval shall be at the risk of subsequent rejection.

(b) All work under this contract shall be performed in a skillful and workmanlike manner. The Contracting Officer may, in writing, require the Contractor to remove from the work any employee the Contracting Officer deems incompetent, careless, or otherwise objectionable. (DAR 7-602.9)

10. INSPECTION AND ACCEPTANCE (1976 OCT)

(a) All work (which term includes but is not restricted to materials, workmanship, and manufacture and fabrication of components) shall be subject to inspection and test by the Government at all reasonable times and at all places prior to acceptance. Any such inspection and test is for the sole benefit of the Government and shall not relieve the Contractor of the responsibility of providing quality control measures to assure that the work strictly complies with the contract requirements. No inspection or test by the Government shall be construed as constituting or implying acceptance. Inspection or test shall not relieve the Contractor of responsibility for damage to or loss of the material prior to acceptance, nor in any way affect the continuing rights of the Government after acceptance of the completed work under the terms of paragraph (f) of this clause, except as hereinabove provided.

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

(c) If the Contractor does not promptly replace rejected material or correct rejected workmanship, the Government (1) may, by contract or otherwise, replace such material or correct such workmanship and charge the cost thereof to the Contractor, or (2) may terminate the Contractor's right to proceed in accordance with the clause of this contract entitled "Termination for Default - Damages for Delay - Time Extensions."

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

(e) Should it be considered necessary or advisable by the Government at any time before acceptance of the entire work to make an examination of work already completed, by removing or tearing out same, the Contractor shall, on request, promptly furnish all necessary facilities, labor and material. If such work is found to be defective or nonconforming in any material respect, due to the fault of the Contractor or his subcontractors, he shall defray all the expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the contract, an equitable adjustment shall be made in the contract price to compensate the Contractor for the additional services involved in such examination and reconstruction and, if completion of the work has been delayed thereby, he shall, in addition, be granted a suitable extension of time.

(f) Unless otherwise provided in this contract, acceptance by the Government shall be made as promptly as practicable after completion and inspection of all work required by this contract, or that portion of the work that the Contracting Officer determines can be accepted separately. Acceptance shall be final and conclusive except as regards latent defects, fraud, or such gross mistakes as may amount to fraud or as regards the Government's rights under any warranty or guarantee. (DAR 7-602.11)

11. SUPERINTENDENCE BY CONTRACTOR (1976 OCT)

The Contractor, at all times during performance and until the work is completed and accepted, shall give his personal superintendence to the work or have on the work a competent superintendent, satisfactory to the Contracting Officer and with authority to act for the Contractor. (DAR 7-602.12)

12. PERMITS AND RESPONSIBILITIES (1964 JUN)

The Contractor shall, without additional expense to the Government, be responsible for obtaining any necessary licenses and permits, and for complying with any applicable Federal, State, and municipal laws, codes, and regulations, in connection with the prosecution of the work. He shall be similarly responsible for all damages to persons or property that occur as a result of his fault or negligence. He shall take proper safety and health precautions to protect the work, the workers, the public, and the property of others. He shall also be responsible for all materials delivered and work performed until completion and acceptance of the entire construction work, except for any completed unit of construction thereof which theretofore may have been accepted. (DAR 7-602.13)

13. CONDITIONS AFFECTING THE WORK (1964 JUN)

The Contractor shall be responsible for having taken steps reasonably necessary to ascertain the nature and location of the work, and the general and local conditions which can affect the work or the cost thereof. Any failure by the Contractor to do so will not relieve him from responsibility for successfully performing the work without additional expense to the Government. The Government assumes no responsibility for any understanding or representations concerning conditions made by any of its officers or agents prior to the execution of this contract, unless such understanding or representations by the Government are expressly stated in the contract. (DAR 7-602.14)

14. OTHER CONTRACTS (1964 JUN)

The Government may undertake or award other contracts for additional work, and the Contractor shall fully cooperate with such other contractors and Government employees and carefully fit his own work to such additional work as may be directed by the Contracting Officer. The Contractor shall not commit or permit any act which will interfere with the performance of work by any other contractor or by Government employees. (DAR 7-602.15)

15. SHOP DRAWINGS (1976 OCT)

(a) The term, "shop drawings", 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.

(b) 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 his 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 his approval or disapproval of the shop drawings and if not approved as submitted shall indicate his reasons therefor. Any work done prior to 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 (c) below.

(c) 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(s), he shall issue an appropriate contract modification, except that, if the variation is minor and does not involve a change in price or in time of performance, a modification need not be issued.

(d) The Contractor shall submit to the Contracting Officer for approval four copies (unless otherwise indicated herein) of all shop drawings as called for under the various headings of these specifications. Three sets (unless otherwise indicated herein) of all shop drawings will be retained by the Contracting Officer and one set will be returned to the Contractor. (DAR 7-602.54(a))

16. USE AND POSSESSION PRIOR TO COMPLETION (1976 OCT)

The Government shall have the right to take possession of or use any completed or partially completed part of the work. Prior to such possession or use, the Contracting Officer shall furnish the Contractor an itemized list of work remaining to be performed or corrected on such portions of the project as are to be possessed or used by the Government, provided that failure to list any item of work shall not relieve the Contractor of responsibility for compliance with the terms of the contract. Such possession or use shall not be deemed an acceptance of any work under the contract. While the Government has such possession or use, the Contractor, notwithstanding the provisions of the clause of this contract entitled "Permits and Responsibilities," shall be relieved of the responsibility for the loss or damage to the work resulting from the Government's possession or use. If such prior possession or use by the Government delays the progress of the work or causes additional expense to the Contractor, an equitable adjustment in the contract price or the time of completion will be made and the contract shall be modified in writing accordingly. (DAR 7-602.39)

17. SUSPENSION OF WORK (1968 FEB)

(a) The Contracting Officer may order the Contractor in writing to suspend, delay, or interrupt all or any part of the work for such period of time as he may determine to be 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 by an act of the Contracting Officer in the administration of this contract, or by his failure to act within the time specified in this contract (or if no time is specified, within a reasonable time), an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) necessarily caused by such 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 (1) that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor or (2) for which an equitable adjustment is provided for or excluded under any other provision of this contract.

(c) No claim under this clause shall 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 such suspension, delay, or interruption, but not later than the date of final payment under the contract. (DAR 7-602.46)

18. TERMINATION FOR CONVENIENCE OF THE GOVERNMENT-CONSTRUCTION (1974 APR)

(a) The performance of work under this contract may be terminated by the Government in accordance with this clause in whole, or from time to time in part, whenever the Contracting Officer shall determine that such termination is in the best interest of the Government. Any such termination shall be effected by delivery to the Contractor of a Notice of Termination specifying the extent to which performance of work under the contract is terminated, and the date upon which such termination becomes effective.

(b) After receipt of a Notice of Termination, and except as otherwise directed by the Contracting Officer, the Contractor shall:

- (i) stop work under the contract on the date and to the extent specified in the Notice of Termination;
- (ii) place no further orders or subcontracts for materials, services or facilities, except as may be necessary for completion of such portion of the work under the contract as is not terminated;
- (iii) terminate all orders and subcontracts to the extent that they relate to the performance of work terminated by the Notice of Termination;
- (iv) assign to the Government, in the manner, at the times, and to the extent directed by the Contracting Officer, all of the right, title, and interest of the Contractor under the orders and subcontracts so terminated, in which case the Government shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts;
- (v) settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, with the approval or ratification of the Contracting Officer, to the extent he may require, which approval or ratification shall be final for all the purposes of this clause;
- (vi) transfer title and deliver to the Government, in the manner, at the times, and to the extent, if any, directed by the Contracting Officer, (A) the fabricated or unfabricated parts, work in process, completed work, supplies, and other material produced as a part of, or acquired in connection with the performance of, the work terminated by the Notice of Termination, and (B) the completed or partially completed plans, drawings, information, and other property which, if the contract had been completed, would have been required to be furnished to the Government;
- (vii) use his best efforts to sell, in the manner, at the times, to the extent, and at the price or prices directed or authorized by the Contracting Officer, any property of the types referred to in (vi) above; provided however, that the Contractor (A) shall not be required to extend credit to any purchaser, and (B) may acquire any such property under the conditions prescribed by and at a price or prices approved by the Contracting Officer; and provided further, that the proceeds of any such transfer or disposition shall be applied in

reduction of any payments to be made by the Government to the Contractor under this contract or shall otherwise be credited to the price or cost of the work covered by this contract or paid in such other manner as the Contracting Officer may direct;

- (viii) complete performance of such part of the work as shall not have been terminated by the Notice of Termination; and
- (ix) take such action as may be necessary, or as the Contracting Officer may direct, for the protection and preservation of the property related to this contract which is in the possession of the Contractor and in which the Government has or may acquire an interest.

At any time after expiration of the plant clearance period, as defined in Section VIII, Defense Acquisition Regulation, as it may be amended from time to time, the Contractor may submit to the Contracting Officer a list, certified as to quantity and quality, of any or all items of termination inventory not previously disposed of, exclusive of items the disposition of which has been directed or authorized by the Contracting Officer, and may request the Government to remove such items or enter into a storage agreement covering them. Not later than fifteen (15) days thereafter, the Government will accept title to such items and remove them or enter into a storage agreement covering the same; provided, that the list submitted shall be subject to verification by the Contracting Officer upon removal of the items, or if the items are stored, within forty-five (45) days from the date of submission of the list, and any necessary adjustment to correct the list as submitted shall be made prior to final settlement.

(c) After receipt of a Notice of Termination, the Contractor shall submit to the Contracting Officer his termination claim, in the form and with certification prescribed by the Contracting Officer. Such claim shall be submitted promptly but in no event later than one year from the effective date of termination, unless one or more extensions in writing are granted by the Contracting Officer, upon request of the Contractor made in writing within such one year period or authorized extension thereof. However, if the Contracting Officer determines that the facts justify such action, he may receive and act upon any such termination claim at any time after such one year period or any extension thereof. Upon failure of the Contractor to submit his termination claim within the time allowed, the Contracting Officer may determine, on the basis of information available to him, the amount, if any, due to the Contractor by reason of the termination and shall thereupon pay to the Contractor the amount so determined.

(d) Subject to the provisions of paragraph (c), the Contractor and the Contracting Officer may agree upon the whole or any part of the amount or amounts to be paid to the Contractor by reason of the total or partial termination of work pursuant to this clause, which amount or amounts may include a reasonable allowance for profit on work done; provided, that such agreed amount or amounts, exclusive of settlement costs, shall not exceed the total contract price as reduced by the amount of payments otherwise made and as further reduced by the contract price of work not terminated. The contract shall be amended accordingly, and the Contractor shall be paid the agreed amount. Nothing in paragraph (e) of this clause, prescribing the amount to be paid to the Contractor in the event of failure of the Contractor and the Contracting Officer to agree upon the whole amount to be paid to the Contractor by reason of the termination of work pursuant to this clause, shall be deemed to limit, restrict, or otherwise determine or affect the amount or amounts which may be agreed upon to be paid to the Contractor pursuant to this paragraph (d).

(e) In the event of the failure of the Contractor and the Contracting Officer to agree, as provided in paragraph (d), upon the whole amount to be paid to the Contractor by reason of the termination of work pursuant to this clause, the Contracting Officer shall pay to the Contractor the amounts determined by the Contracting Officer as follows, but without duplication of any amounts agreed upon in accordance with paragraph (d):

(i) with respect to all contract work performed prior to the effective date of the Notice of Termination, the total (without duplication of any items) of:

(A) the cost of such work;

(B) the cost of settling and paying claims arising out of the termination of work under subcontracts or orders as provided in paragraph (b)(v) above, exclusive of the amounts paid or payable on account of supplies or materials delivered or services furnished by the subcontractor prior to the effective date of the Notice of Termination of Work under this contract, which amounts shall be included in the cost on account of which payment is made under (A) above; and

(C) a sum, as profit on (A) above, determined by the Contracting Officer pursuant to 8-303 of the Defense Acquisition Regulation, in effect as of the date of execution of this contract, to be fair and reasonable; provided, however, that if it appears that the Contractor would have sustained a loss on the entire contract had it been completed, no profit shall be included or allowed under this subdivision (C) and an appropriate adjustment shall be made reducing the amount of the settlement to reflect the indicated rate of loss; and

(ii) the reasonable cost of the preservation and protection of property incurred pursuant to paragraph (b)(ix); and any other reasonable cost incidental to termination of work under this contract, including expense incidental to the determination of the amount due to the Contractor as the result of the termination of work under this contract. The total sum to be paid to the Contractor under (i) above shall not exceed the total contract price as reduced by the amount of payments otherwise made and as further reduced by the contract price of work not terminated. Except for normal spoilage, and except to the extent that the Government shall have otherwise expressly assumed the risk of loss, there shall be excluded from the amounts payable to the Contractor under (i) above, the fair value, as determined by the Contracting Officer, of property which is destroyed, lost, stolen, or damaged so as to become undeliverable to the Government, or to a buyer pursuant to paragraph (b)(vii).

(f) Costs claimed, agreed to, or determined pursuant to (c), (d), (e), and (i) hereof shall be in accordance with Section XV of the Defense Acquisition Regulation as in effect on the date of this contract.

(g) The Contractor shall have the right of appeal, under the clause of this contract entitled "Disputes", from any determination made by the Contracting Officer under paragraph (c), (e), or (i) hereof, except that if the Contractor has failed to submit his claim within the time provided in paragraph (c) or (i) hereof, and has failed to request extension of such time,

he shall have no such right of appeal. In any case where the Contracting Officer has made a determination of the amount due under paragraph (c), (e) or (i) hereof, the Government shall pay to the Contractor the following: (i) if there is no right of appeal hereunder or if no timely appeal has been taken, the amount so determined by the Contracting Officer, or (ii) if an appeal has been taken, the amount finally determined on such appeal.

(h) In arriving at the amount due the Contractor under this clause there shall be deducted (i) all unliquidated advance or other payments on account theretofore made to the Contractor, applicable to the terminated portion of this contract, (ii) any claim which the Government may have against the Contractor in connection with this contract, and (iii) the agreed price for, or the proceeds of sale of, any materials, supplies, or other things acquired by the Contractor or sold, pursuant to the provisions of this clause, and not otherwise recovered by or credited to the Government.

(i) If the termination hereunder be partial, the Contractor may file with the Contracting Officer a claim for an equitable adjustment of the price or prices specified in the contract relating to the continued portion of the contract (the portion not terminated by the Notice of Termination), and such equitable adjustment as may be agreed upon shall be made in such price or prices. Any claim by the Contractor for an equitable adjustment under this clause must be asserted within ninety (90) days from the effective date of the termination notice, unless an extension is granted in writing by the Contracting Officer.

(j) The Government may from time to time, under such terms and conditions as it may prescribe, make partial payments and payments on account against costs incurred by the Contractor in connection with the terminated portion of this contract whenever in the opinion of the Contracting Officer the aggregate of such payments shall be within the amount to which the Contractor will be entitled hereunder. If the total of such payments is in excess of the amount finally agreed or determined to be due under this clause, such excess shall be payable by the Contractor to the Government upon demand, together with interest computed at the rate established by the Secretary of the Treasury pursuant to Public Law 92-41, 85 STAT 97 for the Renegotiation Board, for the period from the date such excess payment is received by the Contractor to the date on which such excess is repaid to the Government; provided, however, that no interest shall be charged with respect to any such excess payment attributable to a reduction in the Contractor's claim by reason of retention or other disposition of termination inventory until ten days after the date of such retention or disposition, or such later date as determined by the Contracting Officer by reason of the circumstances.

(k) Unless otherwise provided for in this contract, or by applicable statute, the Contractor shall - from the effective date of termination until the expiration of three years after final settlement under this contract - preserve and make available to the Government at all reasonable times at the office of the Contractor but without direct charge to the Government, all his books, records, documents and other evidence bearing on the costs and expenses of the Contractor under this contract and relating to the work terminated hereunder, or, to the extent approved by the Contracting Officer, photographs, microphotographs, or other authentic reproductions thereof. (DAR 7-602.29(a))

19. PRICING OF ADJUSTMENTS (1970 JUL)

When costs are a factor in any determination of a contract price adjustment pursuant to the "Changes" clause or any other provision of this contract, such costs shall be in accordance with Section XV of the Defense Acquisition Regulation as in effect on the date of this contract. (DAR 7-103.26)

20. PATENT INDEMNITY (1964 JUN)

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 Letters Patent of the United States (except Letters Patent issued upon an application which is now or may hereafter be, for reasons of national security, ordered by the Government to be kept secret or otherwise withheld from issue) arising out of the performance of this contract or out of the use or disposal by or for the account of the Government of supplies furnished or construction work performed hereunder. (DAR 7-602.16(a))

21. ADDITIONAL BOND SECURITY (1976 OCT)

If any surety upon any bond furnished in connection with this contract becomes unacceptable to the Government, or if any such surety fails to furnish reports as to his financial condition from time to time as requested by the Government, or if the contract price is increased to such an extent that the penal sum of any bond becomes inadequate in the opinion of the Contracting Officer, the Contractor shall promptly furnish such additional security as may be required from time to time to protect the interests of the Government and of persons supplying labor or materials in the prosecution of the work contemplated by this contract. (DAR 7-602.17)

22. EXAMINATION OF RECORDS BY COMPTROLLER GENERAL (1975 JUN)

(a) This clause is applicable if the amount of this contract exceeds \$10,000 and was entered into by means of negotiation, including small business restricted advertising but is not applicable if this contract was entered into by means of formal advertising.

(b) The Contractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of three years after final payment under this contract or such lesser time specified in either Appendix M of the Defense Acquisition Regulation or the Federal Procurement Regulations Part 1-20, as appropriate, have access to and the right to examine any directly pertinent books, documents, papers, and records of the Contractor involving transactions related to this contract.

(c) The Contractor further agrees to include in all his subcontracts hereunder a provision to the effect that the subcontractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of three years after final payment under the subcontract or such lesser time specified in either Appendix M of the Defense Acquisition Regulation or the Federal Procurement Regulations Part 1-20, as appropriate, have access to and the right to examine any directly pertinent books, documents, papers, and records of such subcontractor, involving transactions related to the subcontract. The term "subcontract" as used in this clause excludes (i) purchase orders not exceeding \$10,000 and (ii) subcontracts or purchase orders for public utility services at rates established for uniform applicability to the general public.

(d) The periods of access and examination described in (b) and (c) above for records which relate to (i) appeals under the "Disputes" clause of this contract, (ii) litigation or the settlement of claims arising out of the performance of this contract, or (iii) costs and expenses of this contract as to which exception has been taken by the Comptroller General or any of his duly authorized representatives, shall continue until such appeals, litigation, claims or exceptions have been disposed of. (DAR 7-104.15)

23. BUY AMERICAN ACT (1966 OCT)

(a) Agreement. In accordance with the Buy American Act (41 U.S.C. 10a-10d), 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 nondomestic construction material listed in the "Nondomestic Construction Materials" clause, if any, of this contract.

(b) Domestic construction material. "Construction material" means any article, material, or supply brought to the construction site for incorporation in the building or work. An unmanufactured construction material is a "domestic construction material" if it has been mined or produced in the United States. A manufactured construction material is a "domestic construction material" if it has been manufactured in the United States and if the cost of its components which have been mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. "Component" means any article, material, or supply directly incorporated in a construction material.

(c) Domestic component. A component shall be considered to have been "mined, produced, or manufactured in the United States" (regardless of its source in fact) if the article, material, or supply in which it is incorporated was manufactured in the United States and the component is of a class or kind determined by the Government to be not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities and of a satisfactory quality. (DAR 7-602.20)

24. EQUAL OPPORTUNITY (1978 SEP)

(If, during any twelve (12) month period (including the 12 months preceding the award of this contract), the Contractor has been or is awarded Federal contracts and/or subcontracts which have an aggregate value in excess of \$10,000, the Contractor shall comply with (1) through (7) below. Upon request, the Contractor shall provide information necessary to determine the applicability of this clause.)

During the performance of this contract, the Contractor agrees as follows:

(1) The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor will 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. Such action shall include but not be limited to the following: Employment, upgrading, demotion, or transfer, recruitment or recruitment advertising; layoff or termination, rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Contracting Officer setting forth the provisions of this Equal Opportunity clause.

(2) The Contractor will, in all solicitations or advertisements 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.

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

(4) The Contractor will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended by Executive Order No. 11375 of October 13, 1967, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(5) The Contractor will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, as amended by Executive Order No. 11375 of October 13, 1967, and by the rules, regulations, and orders of the Secretary of Labor or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations and orders.

(6) In the event of the Contractor's noncompliance with the Equal Opportunity clause of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated or suspended in whole or in part, and the Contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, as amended by Executive Order No. 11375 of October 13, 1967, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, as amended by Executive Order No. 11375 of October 13, 1967, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(7) The Contractor will include the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, as amended by Executive Order No. 11375 of October 13, 1967, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the contracting agency may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that in the event the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the contracting agency, the Contractor may request the United States to enter into such litigation to protect the interests of the United States. (DAR 7-103.18(a))

25. COVENANT AGAINST CONTINGENT FEES (1958 JAN)

The Contractor warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the Contractor for the purpose of securing business. 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 such commissions, percentage, brokerage or contingent fee. (DAR 7-103.20)

26. OFFICIALS NOT TO BENEFIT (1949 JUL)

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 that may arise therefrom; but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit. (DAR 7-103.19)

27. CONVICT LABOR (1975 OCT)

In connection with the performance of work under this contract, the Contractor agrees not to employ any person undergoing sentence of imprisonment

except as provided by Public Law 89-176, September 10, 1965 (18 U.S.C. 4082(c)(2)) and Executive Order 11755, December 29, 1973. (DAR 7-104.17)

28. UTILIZATION OF SMALL BUSINESS AND SMALL DISADVANTAGED BUSINESS CONCERNS (1980 AUG)

(a) It is the policy of the United States that small business and small business concerns owned and controlled by socially and economically disadvantaged individuals shall have the maximum practicable opportunity to participate in the performance of 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 the efficient performance of this contract. The term "subcontract" means any agreement (other than one involving an employer-employee relationship) to be entered into by a Federal Government prime contractor or subcontractor calling for supplies or services required for the performance of the original contract or subcontract. 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," hereafter referred to as disadvantaged business, shall mean a small business concern -

(1) which is at least 51 per centum 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 are 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 (i.e., American Indians, Eskimos, Aleuts and Native Hawaiians), Asian-Pacific Americans (i.e., U.S. citizens whose origins are from Japan, China, the Philippines, Vietnam, Korea, Samoa, Guam, the U.S. Trust Territories of the Pacific, Northern Marianas, Laos, Cambodia, and Taiwan, and other minorities, or any individuals 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. (DAR 7-104.14(a))

29. FEDERAL, STATE, AND LOCAL TAXES (1971 NOV)

(a) Except as may be otherwise provided in this contract, the contract price includes all applicable Federal, State, and local taxes and duties.

(b) Nevertheless, with respect to any Federal excise tax or duty on the transactions or property covered by this contract, if a statute, court decision, written ruling, or regulation takes effect after the contract date, and -

(1) results in the Contractor being required to pay or bear the burden of any such Federal excise tax or duty or increase in the rate thereof which would not otherwise have been payable on such transactions or property, the contract price shall be increased by the amount of such tax or duty or rate increase, 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; or

(2) results in the Contractor not being required to pay or bear the burden of, or in his obtaining a refund or drawback of, any such Federal excise tax or duty which would otherwise have been payable on such transactions or property or which was the basis of an increase in the contract price, the contract price shall be decreased by the amount of the relief, refund, or drawback, or that amount shall be paid to the Government, as directed by the Contracting Officer. The contract price shall be similarly decreased if the Contractor, through his fault or negligence or his failure to follow instructions of the Contracting Officer, is required to pay or bear the burden of, or does not obtain a refund or drawback of, any such Federal excise tax or duty.

(c) Paragraph (b) above shall not be applicable to social security taxes or to any other employment tax.

(d) No adjustment of less than \$100 shall be made in the contract price pursuant to paragraph (b) above.

(e) As used in paragraph (b) above, the term "contract date" means the date set for bid opening, or if this is a negotiated contract, the contract date. As to additional supplies or services procured by modification to this contract, the term "contract date" means the date of such modification.

(f) Unless there does not exist any reasonable basis to sustain an exemption, the Government upon the request of the Contractor shall, without further liability, furnish evidence appropriate to establish exemption from any Federal, State, or local tax; provided that, evidence appropriate to establish exemption from any Federal excise tax or duty which may give rise to either an increase or decrease in the contract price will be furnished only at the discretion of the Government.

(g) The Contractor shall promptly notify the Contracting Officer of matters which will result in either an increase or decrease in the contract price and shall take action with respect thereto as directed by the Contracting Officer. (DAR 7-103.10(a))

30. DAVIS-BACON ACT (40 U.S.C. 276a to a-7) (1977 DEC)

(If this contract is with a State or political subdivision thereof, the Contractor agrees to comply with the requirements of the Contract Work Hours Standards Acts and to insert this clause in all subcontracts hereunder with private persons or firms)

(a) All mechanics and laborers, including apprentices and trainees, employed or working directly upon the site of the work shall 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 the Copeland Regulations (29 CFR, Part 3)), the full amounts due at time of payment computed at wage rates not less than the aggregate of the basic hourly rates and the rates of payments, contributions, or costs for any fringe benefits contained in the wage determination decision 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 or subcontractor and such laborers and mechanics. A copy of such wage determination decision shall be kept posted by the Contractor at the site of the work in a prominent place where it can be easily seen by the workers. The term mechanics and laborers shall be deemed to include apprentices and trainees not covered by an approved program as provided by the apprentice and trainee clause of the contract.

(b) The Contractor may discharge his obligation under this clause to workers in any classification for which the wage determination decision contains:

(1) Only a basic hourly rate of pay, by making payment at not less than such basic hourly rate, except as otherwise provided in the Copeland Regulations (29 CFR, Part 3); or

(2) Both a basic hourly rate of pay and fringe benefits payments, by making payment in cash, by irrevocably making contributions pursuant to a fund, plan, or program for, and or by assuming an enforceable commitment to bear the cost of, bona fide fringe benefits contemplated by the Davis-Bacon Act, or by any combination thereof. Contributions made, or costs assumed, on other than a weekly basis shall be considered as having been constructively made or assumed during a weekly period to the extent that they apply to such period. Where a fringe benefit is expressed in a wage determination in any manner other than as an hourly rate and the Contractor pays a cash equivalent or provides an alternative fringe benefit, he shall furnish information with his payrolls showing how he determined that the cost incurred to make the cash payment or to provide the alternative fringe benefit is equal to the cost of the wage determination fringe benefit. In any case where the Contractor provides a fringe benefit different from any contained in the wage determination, he shall similarly show how he arrived at the hourly rate shown therefor. In the event of disagreement between or among the interested parties as to an equivalent of any fringe benefit, the Contracting Officer shall submit the question, together with his recommendation, to the Secretary of Labor for final determination.

(c) The assumption of an enforceable commitment to bear the cost of fringe benefits, or the provision of any fringe benefits not expressly listed in section 1(b)(2) of the Davis-Bacon Act or in the wage determination decision forming a part of the contract, may be considered as payment of wages only with the approval of the Secretary of Labor pursuant to a written request by the Contractor. The Secretary of Labor may require the Contractor to set aside assets, in a separate account, to meet his obligations under any unfunded plan or program.

(d) The Contracting Officer shall require that any class of laborers or mechanics, including apprentices and trainees, which is not listed in the wage determination decision and which is to be employed under the contract shall be classified or reclassified conformably to the wage determination decision, and shall report the action taken to the Secretary of Labor. If the interested parties cannot agree on the proper classification or reclassification of a particular class of laborers or mechanics, including apprentices and trainees, to be used, the Contracting Officer shall submit the question, together with his recommendation, to the Secretary of Labor for final determination.

(e) In the event it is found by the Contracting Officer that any laborer or mechanic, including all apprentices and trainees, employed by the Contractor or any subcontractor directly on the site of the work covered by this contract has been or is being paid at a rate of wages less than the rate of wages required by paragraph (a) of this clause, or by the "Apprentices and Trainees" clause of this contract, the Contracting Officer may (i) by written notice to the Government Prime Contractor terminate his right to proceed with the work, or such part of the work as to which there has been a failure to pay said required wages, and (ii) prosecute the work to completion by contract or otherwise, whereupon such Contractor and his sureties shall be liable to the Government for any excess costs occasioned the Government thereby.

(f) Paragraphs (a) through (e) of the clause shall apply to this contract to the extent that it is (i) a prime contract with the Government subject to

the Davis-Bacon Act or (ii) a subcontract also subject to the Davis-Bacon Act under such prime contract. (DAR 7-602.23(a)(i))

31. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT - OVERTIME COMPENSATION (40 U.S.C. 327-333) (1977 DEC)

(If this contract is with a State or political subdivision thereof, the Contractor agrees to comply with the requirements of the Contract Work Hours Standards Act and to insert this clause in all subcontracts hereunder with private persons or firms)

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) The Contractor shall not require or permit any laborer or mechanic, including apprentices, trainees, watchmen, and guards in any workweek in which he is employed on any work under this contract to work in excess of eight (8) hours in any calendar day or in excess of forty (40) hours in such workweek on work subject to the provisions of the Contract Work Hours and Safety Standards Act unless such laborer or mechanic, including apprentices, trainees, watchmen, and guards, receives compensation at a rate not less than one and one-half times his basic rate of pay for all such hours worked in excess of eight (8) hours in any calendar day or in excess of forty (40) hours in such workweek, whichever is the greater number of overtime hours. The "basic rate of pay," as used in this clause, shall be the amount paid per hour, exclusive of the Contractor's contribution or cost for fringe benefits and any cash payment made in lieu of providing fringe benefits, or the basic hourly rate contained in the wage determination, whichever is greater.

(b) In the event of any violation of the provisions of paragraph (a), the Contractor shall be liable to any affected employee for any amounts due, and to the United States for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including an apprentice, trainee, watchman, or guard, employed in violation of the provisions of paragraph (a) in the sum of \$10 for each calendar day on which such employee was required or permitted to be employed on such work in excess of eight (8) hours or in excess of the standard workweek of forty (40) hours without payment of the overtime wages required by paragraph (a). (DAR 7-602.23(a)(ii))

32. APPRENTICES AND TRAINEES (1977 DEC)

(If this contract is with a State or political subdivision thereof, the Contractor agrees to comply with the requirements of the Contract Work Hours Standards Act and to insert this clause in all subcontracts hereunder with private persons or firms)

(a) Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed 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 first ninety (90) days of 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 in any craft classification employed on this contract shall not be greater than the ratio permitted to the Contractor as to his entire work force under the register

program. Any employee listed on a payroll at an apprentice wage rate, who is not a trainee as defined in paragraph (b) of this clause or is not registered or otherwise employed as stated above, shall be paid the wage rate determined by the Secretary of Labor for the classification of work he actually performed. The Contractor or subcontractor shall furnish to the Contracting Officer written evidence of the registration of his program and apprentices as well as the appropriate ratios and wage rates (expressed in percentages of the journeyman hourly rates), for the area of construction prior to using apprentices on the contract work. The wage rate paid apprentices shall be not less than the appropriate percentage of the journeyman's rate contained in the applicable wage determination.

(b) Trainees will be permitted to work at less than the predetermined rate for the work performed when 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, Bureau of Apprenticeship and Training. The ratio of trainees to journeymen on this contract shall not be greater than permitted under the plan approved by the Bureau of Apprenticeship and Training. Every trainee must be paid at not less than the rate specified in the approved program for his level of progress. Any employee listed on the payroll at a trainee rate who is not registered and not participating in a training plan approved by the Bureau of Apprenticeship and Training shall be paid not less than the wage rate determined by the Secretary of Labor for the classification of work he actually performed. The Contractor or subcontractor shall furnish the Contracting Officer written evidence of the certification of his program, the registration of the trainee, and the ratios and wage rates prescribed in that program. In the event the Bureau of Apprenticeship and Training withdraws the approval of a training program, the Contractor shall 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) The utilization of apprentices, trainees, and journeymen under this clause shall be in conformity with the equal employment opportunity requirements of this contract. (DAR 7-602.23(a)(iii))

33. PAYROLLS AND BASIC RECORDS (1977 DEC)

(If this contract is with a State or political subdivision thereof, the Contractor agrees to comply with the requirements of the Contract Work Hours Standards Act and to insert this clause in all subcontracts hereunder with private persons or firms)

(a) The Contractor shall maintain payrolls and basic records relating thereto during the course of the work and shall preserve them for a period of three (3) years thereafter for all laborers and mechanics, including apprentices, trainees, watchmen, and guards, working at the site of the work. Such records shall contain the name and address of each such employee, his correct classification, rate of pay (including rates of contributions for, or costs assumed to provide, fringe benefits), daily and weekly number of hours worked, deductions made and actual wages paid. (NOTE: Watchmen and guards are reflected on payroll records for Contract Work Hours and Safety Standards Act purposes only.) Whenever the Contractor has obtained approval from the Secretary of Labor as provided in paragraph (c) of the clause entitled "Davis-Bacon Act," he shall maintain records which show the commitment, its approval, written communication of the plan or program to the laborers or mechanics affected, and the costs anticipated or incurred under the plan or program.

(b) The Contractor shall submit weekly a copy of all payrolls to the Contracting Officer. The Government Prime Contractor shall be responsible for the submission of copies of payrolls of all subcontractors. The copy shall be accompanied by a statement signed by the Contractor indicating that the payrolls are correct and complete, that the wage rates contained therein are not less than those determined by the Secretary of Labor, and that the classifications set forth for each laborer or mechanic, including apprentices and trainees, conform with the work he performed. Weekly submission of the "Statement of Compliance" required under this contract and the Copeland Regulations of the Secretary of Labor (29 CFR, Part 3) shall satisfy the requirement for submission of the above statement. The Contractor shall submit also a copy of any approval by the Secretary of Labor with respect to fringe benefits which is required by paragraph (c) of the clause entitled "Davis-Bacon Act."

(c) The Contractor shall make the records required under this clause available for inspection by authorized representatives of the Contracting Officer and the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. (DAR 7-602.23(a)(iv))

34. COMPLIANCE WITH COPELAND REGULATIONS (1964 JUN)

(If this contract is with a State or political subdivision thereof, the Contractor agrees to comply with the requirements of the Contract Work Hours Standards Act and to insert this clause in all subcontracts hereunder with private persons or firms)

The Contractor shall comply with the Copeland Regulations of the Secretary of Labor (29 CFR, Part 3) which are incorporated herein by reference. (DAR 7-602.23(a)(v))

35. WITHHOLDING OF FUNDS (1977 DEC)

(If this contract is with a State or political subdivision thereof, the Contractor agrees to comply with the requirements of the Contract Work Hours Standards Act and to insert this clause in all subcontracts hereunder with private persons or firms)

(a) The Contracting Officer may withhold or cause to be withheld from the Government Prime Contractor so much of the accrued payments or advances as may be considered necessary (i) to pay laborers and mechanics, including apprentices, trainees, watchmen, and guards, employed by the Contractor or any subcontractor on the work the full amount of wages required by the contract, and (ii) to satisfy any liability of the Contractor and any subcontractor for liquidated damages under paragraph (b) of the clause entitled "Contract Work Hours and Safety Standards Act-Overtime Compensation."

(b) If the Contractor or any subcontractor fails to pay any laborer, mechanic, apprentice, trainee, watchman, or guard employed or working on the site of the work, all or part of the wages required by the contract, the Contracting Officer may, after written notice to the Government Prime Contractor, take such action as may be necessary to cause suspension of any further payments or advances until such violations have ceased. (DAR 7-602.23(a)(vi))

36. SUBCONTRACTS (1972 FEB)

(If this contract is with a State or political subdivision thereof, the Contractor agrees to comply with the requirements of the Contract Work Hours Standards Act and to insert this clause in all subcontracts hereunder with private persons or firms)

The Contractor agrees to insert the clauses hereof entitled "Davis-Bacon Act," "Contract Work Hours and Safety Standards Act-Overtime Compensation," "Apprentices and Trainees," "Payrolls and Basic Records," "Compliance with Copeland Regulations," "Withholding of Funds," "Subcontracts," and "Contract Termination-Debarment" in all subcontracts. The term "Contractor" as used in such clauses in any subcontract shall be deemed to refer to the subcontractor except in the phrase "Government Prime Contractor." (DAR 7-602.23(a)(vii))

37. CONTRACT TERMINATION - DEBARMENT (1972 APR)

(If this contract is with a State or political subdivision thereof, the Contractor agrees to comply with the requirements of the Contract Work Hours Standards Act and to insert this clause in all subcontracts hereunder with private persons or firms)

A breach of the clauses hereof entitled "Davis-Bacon Act," "Contract Work Hours and Safety Standards Act-Overtime Compensation," "Apprentices and Trainees," "Payrolls and Basic Records," "Compliance with Copeland Regulations," "Withholding of Funds," and "Subcontracts" may be grounds for termination of the contract, and for debarment as provided in 29 CFR 5.6. (DAR 7-602.23(a)(viii))

38. DISPUTES CONCERNING LABOR STANDARDS (1977 DEC)

(If this contract is with a State or political subdivision thereof, the Contractor agrees to comply with the requirements of the Contract Work Hours Standards Act and to insert this clause in all subcontracts hereunder with private persons or firms)

Disputes arising out of the labor standards provisions of this contract shall be subject to the Disputes clause except to the extent such disputes involve the meaning of classifications or wage rates contained in the wage determination decision of the Secretary of Labor or the applicability of the labor provisions of this contract which questions shall be referred to the Secretary of Labor in accordance with the procedures of the Department of Labor. (DAR 7-602.23(a)(ix))

39. CONTRACTOR INSPECTION SYSTEM (1964 NOV)

The Contractor shall (i) maintain an adequate inspection system and perform such inspections as will assure that the work performed under the contract conforms to contract requirements, and (ii) maintain and make available to the Government adequate records of such inspections. (DAR 7-602.10(a))

40. GRATUITIES (1952 MAR)

(a) The Government may, by written notice to the Contractor, terminate the right of the Contractor to proceed under this contract if it is found, after notice and hearing, by the Secretary or his duly authorized representative, that gratuities (in the form of entertainment, gifts, or otherwise) were offered or given by the Contractor, or any agent or representative of the Contractor, to any officer or employee of the Government with a view toward securing a contract or securing favorable treatment with respect to the awarding or amending, or the making of any determinations with respect to the performing of such contract; provided, that the existence of the facts upon which the Secretary or his duly authorized representative makes such findings shall be in issue and may be reviewed in any competent court.

(b) In the event this contract is terminated as provided in paragraph (a) hereof, the Government shall be entitled (i) to pursue the same remedies against the Contractor as it could pursue in the event of a breach of the

contract by the Contractor, and (ii) as a penalty in addition to any other damages to which it may be entitled by law, to exemplary damages in an amount (as determined by the Secretary or his duly authorized representative) which shall be not less than three nor more than ten times the costs incurred by the Contractor in providing any such gratuities to any such officer or employee.

(c) 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. (DAR 7-104.16)

41. SUBCONTRACTING PLAN FOR SMALL BUSINESS AND SMALL DISADVANTAGED BUSINESS CONCERNS (FORMALLY ADVERTISED) (1980 AUG)

(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 DAR 7-104.14(a))

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

(b) The apparent low bidder, upon request by the Contracting Officer, shall submit a subcontracting plan which addresses separately subcontracting with small business concerns and small disadvantaged business concerns, and which shall be included in and made a material 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 award of a contract. As a minimum, the subcontracting plan shall include -

(1) Separate percentage goals (expressed in terms of percentage of total planned subcontracting dollars) for the utilization as subcontractors of small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals. For the purposes of the subcontracting plan, the Contractor shall include all subcontracts to be awarded for the specific purpose of performing this contract and may include a proportionate share of supplies and services whose costs are normally allocated as indirect or overhead costs when reasonably determined to be attributable to this contract.

a. A statement of: (i) total dollars planned to be subcontracted; (ii) total dollars planned to be subcontracted to small business; and (iii) total dollars planned to be subcontracted to small disadvantaged business.

b. A description of the principal supply and service areas to be subcontracted and an identification of those areas where it is planned to use (i) small business subcontractors, and (ii) small disadvantaged business subcontractors.

c. A statement of the method used in developing proposed subcontracting goals for small business and small disadvantaged business concerns.

d. If the offeror includes indirect and overhead costs as an element in establishing the goals in the subcontracting plan, the method used in determining the proportionate share of indirect and overhead costs incurred with (i) small business, and (ii) small disadvantaged business subcontractors shall be explained.

e. A statement of the method used for solicitation purposes (e.g., did the offeror use company source lists, the small business and disadvantaged small business source identification system provided by the Small Business Administration's Procurement Automated Source System, the National Minority Purchasing Council Vendor Information Service, or the services provided by the U.S. Department of Commerce Minority Business

Development Agency's Research and Information Division, and the facilities of small business and disadvantaged business trade associations?).

(2) The name of an individual within the employ of the bidder who will administer the subcontracting plan of the bidder and a description of the duties of such individual;

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

(4) Assurances that the bidder will include the clause entitled "Utilization of Small Business and Small Disadvantaged Business Concerns" in all subcontracts which offer further subcontracting possibilities in the United States and that the bidder will require all subcontractors (except small business concerns) who receive subcontracts in excess of \$1,000,000 in the case of a contract for the construction of any public facility, or in excess of \$500,000 in the case of all other contracts, to adopt a plan in consonance with this clause;

(5) Assurances that the bidder will submit such periodic reports and cooperate in any studies or surveys as may be required by the contracting agency or the Small Business Administration in order to determine the extent of compliance by the bidder with the subcontracting plan; and

(6) A recitation of the types of records the successful bidder will maintain to demonstrate procedures which have been adopted to comply with the requirements and goals set forth in the plan, including the establishment of source lists of small business concerns and small disadvantaged business concerns; and efforts to identify and award subcontracts to such small business concerns. The records shall include at least the following (these records may be maintained on a plant-wide or company-wide basis unless otherwise indicated):

a. Small and disadvantaged business source lists, guides, and other data identifying small and small disadvantaged business vendors.

b. Organizations contacted for small and disadvantaged business sources.

c. On a contract-by-contract basis, records on all subcontract solicitations over \$100,000, indicating on each solicitation (i) whether small business was solicited and if not, why not; (ii) whether small disadvantaged business was solicited and if not, why not; and (iii) reasons for the failure of responding small businesses or small disadvantaged businesses to receive the subcontract award.

d. Records to support such efforts as:

(i) contacts with disadvantaged and small business trade associations;

(ii) contacts with business development organizations; and

(iii) attendance at small and disadvantaged business procurement conferences and trade fairs.

e. Records to support internal activities to guide and encourage buyers such as:

(i) workshops, seminars, training programs, etc.;

and
(ii) monitoring activities to evaluate compliance.

f. On a contract-by-contract basis, records to support award data submitted to the Government to include name, address, and size status of subcontractor.

(c) In order to effectively implement this plan, the Contractor shall:

(1) Issue and promulgate company-wide policy statements in support of this effort, develop written procedures and work instructions, and assign specific responsibilities regarding the requirements of this clause.

(2) Demonstrate continuing management interest and involvement in support of these programs through such actions as regular reviews of progress and establishment of overall corporate and divisional goals and objectives.

(3) Train and motivate Contractor personnel in support of these programs.

(4) 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 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.

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

(6) Counsel and discuss subcontracting opportunities with representatives of small and disadvantaged business firms as are referred by the Small and Disadvantaged Business Utilization Specialist responsible for monitoring performance under this program and representatives of the SBA.

(d) The Contractor shall submit SF 295 in accordance with instructions provided on the form.

(e) The bidder understands that:

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

(2) The failure of any Contractor or subcontractor to comply in good faith with (i) the clause entitled "Utilization of Small Business and Small Disadvantaged Business Concerns", or (ii) the terms of any subcontracting plan required by this "Small Business and Small Disadvantaged Business Subcontracting Plan (Advertised)" provision, will be a material breach of the contract or subcontract.

(f) In the acquisition of commercial products, the bidder further understands that:

(1) If a commercial product (defined below) is offered, the required subcontracting plan may cover the company's production generally, both for Government contracts and for regular commercial sales, rather than just this acquisition. In such cases, the Contractor may request approval from the Contracting Officer to submit one company-wide, or division-wide, annual plan. If such request is deemed appropriate, the offeror shall submit a proposed company-wide, or division-wide, annual plan for acceptance.

(2) Upon approval by the Contracting Officer, the plan will remain in effect for the company's entire fiscal year. During this period, Government contracts for commercial products of the affected company or division will not be required to contain individual subcontracting plans relating only to the supply or services being acquired, unless the Contracting Officer determines for a particular contract that there are unforeseen possibilities for small business and small disadvantaged business subcontracting.

(3) At least 60 days before the scheduled termination of the company or division-wide plan, the Contractor may submit to the Contracting Officer a proposed company or division-wide subcontracting plan for its commercial products for the succeeding fiscal year. If the plan would

otherwise terminate prior to approval of the succeeding fiscal year's plan, it will remain in effect until the succeeding plan is accepted or rejected, but no longer than 60 days after the end of the company's fiscal year.

(4) For the purpose of this program, the term "commercial product" means a product in regular production sold in substantial quantities to the general public and/or industry at established catalog or market prices. A product which, in the opinion of the Contracting Officer, differs only insignificantly from the Contractor's commercial product may be regarded for the purpose of this clause as a commercial product. (DAR 7-104.14(c))

42. NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT (1965 JAN)

(The provisions of this clause shall be applicable only if the amount of this contract exceeds \$10,000.)

(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 hereunder, 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) This clause shall be included in all subcontracts. (DAR 7-103.23)

43. AUTHORIZATION AND CONSENT (1964 MAR)

The Government hereby gives its authorization and consent (without prejudice to any rights of indemnification) for all use and manufacture, in the performance of this contract or any part hereof or any amendment hereto or any subcontract hereunder (including any lower-tier subcontract), of any invention described in and covered by a patent of the United States (i) embodied in the structure or composition of any article the delivery of which is accepted by the Government under this contract, or (ii) utilized in the machinery, tools, or methods the use of which necessarily results from compliance by the Contractor or the using subcontractor with (a) specifications or written provisions now or hereafter forming a part of this contract, or (b) 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 clauses, 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. (DAR 7-103.22)

44. COMPOSITION OF CONTRACTOR (1965 JAN)

If the Contractor hereunder is comprised of more than one legal entity, each such entity shall be jointly and severally liable hereunder. (DAR 7-602.32)

45. SITE INVESTIGATION (1965 JAN)

The Contractor acknowledges that he has investigated and satisfied himself as to the conditions affecting the work, including but not restricted to those

bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, river stages, tides or similar physical conditions at the site, the conformation and conditions of the ground, the character of equipment and facilities needed preliminary to and during prosecution of the work. The Contractor further acknowledges that he has satisfied himself 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 information presented by the drawings and specifications made a part of this contract. Any failure by the Contractor to acquaint himself with the available information will not relieve him from responsibility for estimating properly the difficulty or cost of successfully performing the work. The Government assumes no responsibility for any conclusions or interpretations made by the Contractor on the basis of the information made available by the Government. (DAR 7-602.33)

46. PROTECTION OF EXISTING VEGETATION, STRUCTURES, UTILITIES, AND IMPROVEMENTS (1965 JAN)

(a) The Contractor will preserve and protect all existing vegetation such as trees, shrubs, and grass on or adjacent to the site of work which is not to be removed and which does not unreasonably interfere with the construction work. Care will be taken in removing trees authorized for removal to avoid damage to vegetation to remain in place. Any limbs or branches of trees broken during such operations or by the careless operation of equipment, or by workmen, shall be trimmed with a clean cut and painted with an approved tree pruning compound as directed by the Contracting Officer.

(b) The Contractor will protect from damage all existing improvements or utilities at or near the site of the work, the location of which is made known to him, and will repair or restore any damage to such facilities resulting from failure to comply with the requirements of this contract or the failure to exercise reasonable care in the performance of the work. If the Contractor fails or refuses to repair any such damage promptly, the Contracting Officer may have the necessary work performed and charge the cost thereof to the Contractor. (DAR 7-602.34)

47. OPERATIONS AND STORAGE AREAS (1965 JAN)

(a) All operations of the Contractor (including storage of materials) upon Government premises shall be confined 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 his operations.

(b) Temporary buildings (storage sheds, shops, offices, etc.) 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. Such temporary buildings and utilities shall remain the property of the Contractor and shall be removed by him at his expense upon the completion of the work. With the written consent of the Contracting Officer, such 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 construct and use such temporary roadways as may be authorized by the Contracting Officer. Where materials are transported in the prosecution of 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, protection against damage shall be provided by the Contractor and any damaged roads, curbs, or sidewalks shall be repaired by, or at the expense of the Contractor. (DAR 7-602.35)

48. MODIFICATION PROPOSALS - PRICE BREAKDOWN (1968 APR)

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 therefor 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. (DAR 7-602.36)

49. SUBCONTRACTORS (1979 MAR)

(In construction contracts to be performed in United States possessions (as defined in DAR 18-703.2) and in Puerto Rico, the second sentence is modified to refer only to the clauses required by DAR 18-703.2)

Within seven days after the award of any subcontract either by himself or a subcontractor, the Contractor shall deliver to the Contracting Officer a completed DD Form 1566. The form shall include the subcontractor's acknowledgement of the inclusion in his subcontract of the clauses of this contract entitled "Davis-Bacon Act," "Contract Work Hours and Safety Standards Act-Overtime Compensation," "Apprentices and Trainees," "Compliance with Copeland Regulations," "Withholding of Funds," "Subcontracts," "Contract Termination-Debarment," and "Payrolls and Basic Records." Nothing contained in this contract shall create any contractual relation between the subcontractor and the Government. (DAR 7-602.37)

50. CLEANING UP (1965 JAN)

The Contractor shall at all times keep the construction area, including storage areas used by him, free from accumulations of waste material or rubbish and prior to completion of the work remove any rubbish from the premises and all tools, scaffolding, equipment, and materials not the property of the Government. Upon completion of the construction the Contractor shall leave the work and premises in a clean, neat and workmanlike condition satisfactory to the Contracting Officer. (DAR 7-602.40)

51. ADDITIONAL DEFINITIONS (1965 JAN)

(a) 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," "ordered," "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.

(b) 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 "provided complete in place," that is "furnished and installed." (DAR 7-602.41)

52. ACCIDENT PREVENTION (1981 AUG)

(a) In order to provide safety controls for protection to the life and health of employees and other persons; for prevention of damage to property, materials, supplies, and equipment; and for avoidance of work interruptions in the performance of this contract, the Contractor shall comply with all pertinent provisions of Corps of Engineers Manual, EM 385-1-1, dated 1 April 1981, entitled "Safety and Health Requirements Manual", and will also take or cause to be taken such additional measures as the Contracting Officer may determine to be reasonably necessary for the purpose.

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

(c) The Contracting Officer will notify the Contractor of any noncompliance with the foregoing provisions and the action to be taken. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor or his representative at the site of the work, shall be deemed sufficient for the purpose. 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 claim for extension of time or for excess costs or damages by the Contractor.

(d) Compliance with the provisions of this clause by subcontractors will be the responsibility of the Contractor.

(e) Prior to commencement of the work the Contractor will:

- (1) submit in writing his proposals for effectuating this provision for accident prevention;
- (2) meet in conference with representatives of the Contracting Officer to discuss and develop mutual understandings relative to administration of the over-all safety program. (DAR 7-602.42(a) & (b))

53. GOVERNMENT INSPECTORS (1965 JAN)

The work will be conducted under the general direction of the Contracting Officer and is subject to inspection by his appointed inspectors to insure strict compliance with the terms of the contract. No inspector is authorized to change any provision of the specifications without written authorization of the Contracting Officer, nor shall the presence or absence of an inspector relieve the Contractor from any requirements of the contract. (DAR 7-602.43)

54. RIGHTS IN SHOP DRAWINGS (1966 APR)

(Applicable to all contracts calling for the delivery of shop drawings)

(a) Shop drawings for construction means drawings, submitted to the Government by the Construction Contractor, subcontractor or any lower tier subcontractor pursuant to a construction contract, showing in detail (i) the proposed fabrication and assembly of structural elements and (ii) the installation (i.e., form, fit, and attachment details) of materials or equipment. The Government may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.

(b) This clause, including this paragraph (b), shall be included in all subcontracts hereunder at any tier. (DAR 7-602.47)

55. AFFIRMATIVE ACTION FOR DISABLED VETERANS AND VETERANS OF THE VIETNAM ERA (1976 JUL)

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

(a) The Contractor will not discriminate against any employee or applicant for employment because he or she is a disabled veteran or veteran of the Vietnam era in regard to any position for which the employee or applicant for employment is qualified. The Contractor agrees to take affirmative action to employ, advance in employment and otherwise treat qualified disabled veterans and veterans of the Vietnam era without discrimination based upon their disability or veterans status in all employment practices such as the following: employment upgrading, demotion or transfer, recruitment, advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.

(b) The Contractor agrees that all suitable employment openings of the Contractor which exist at the time of the execution of this contract and those which occur during the performance of this contract, including those not generated by this contract and including those occurring at an establishment of the Contractor other than the one wherein the contract is being performed but excluding those of independently operated corporate affiliates, shall be listed at an appropriate local office of the State employment service system wherein the opening occurs. The Contractor further agrees to provide such reports to such local office regarding employment openings and hires as may be required.

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, but are not required to provide those reports set forth in paragraphs (d) and (e).

(c) Listing of employment openings with the employment service system pursuant to this clause shall be made at least concurrently with the use of any other recruitment source or effort and shall involve the normal obligations which attach to the placing of a bona fide job order, including the acceptance of referrals of veterans and nonveterans. The listing of employment openings does not require the hiring of any particular job applicant or from any particular group of job applicants, and nothing herein is intended to relieve the Contractor from any requirements in Executive Orders or regulations regarding nondiscrimination in employment.

(d) The reports required by paragraph (b) of this clause shall include, but not be limited to, periodic reports which shall be filed at least quarterly with the appropriate local office or, where the Contractor has more than one hiring location in a State, with the central office of that State employment service. Such reports shall indicate for each hiring location (1) the number of individuals hired during the reporting period, (2) the number of nondisabled veterans of the Vietnam era hired, (3) the number of disabled veterans of the Vietnam era hired, and (4) the total number of disabled veterans hired. The reports should include covered veterans hired for on-the-job training under 38 U.S.C. 1787. The Contractor shall submit a report within 30 days after the end of each reporting period wherein any performance is made on this contract identifying data for each hiring location. The Contractor shall maintain at each hiring location copies of the reports submitted until the expiration of one year after final payment under the contract, during which time these reports and related documentation shall

be made available, upon request, for examination by any authorized representatives of the Contracting Officer or of the Secretary of Labor. Documentation would include personnel records respecting job openings, recruitment and placement.

(e) Whenever the Contractor becomes contractually bound to the listing provisions of this clause, it shall advise the 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 provisions and has so advised the State system, there is no need to advise the State system of subsequent contracts. The Contractor may advise the State system when it is no longer bound by this contract clause.

(f) This clause does not apply to the listing of employment openings which occur and are filled outside of the 50 States, the District of Columbia, Puerto Rico, Guam, and the Virgin Islands.

(g) The provisions of paragraphs (b), (c), (d) and (e) of this clause do not apply to openings which the Contractor proposes to fill from within his own organization or to fill pursuant to 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 his own organization or employer-union arrangement for that opening.

(h) As used in this clause:

(1) "All suitable employment openings" includes, but is not limited to, openings which occur in the following job categories: production and nonproduction; plant and office; laborers and mechanics; supervisory and nonsupervisory; technical; and executive, administrative, and professional openings as are compensated on a salary basis of less than \$25,000 per year. This term includes full-time employment, temporary employment of more than three (3) days duration, and part-time employment. It does not include openings which the Contractor proposes to fill from within his own organization or to fill pursuant to a customary and traditional employer-union hiring arrangement nor openings in an educational institution which are restricted to students of that institution. Under the most compelling circumstances an employment opening may not be suitable for listing, including such situations where the needs of the Government cannot reasonably be otherwise supplied, where listing would be contrary to national security, or where the requirement of listing would otherwise not be for the best interest of the Government.

(2) "Appropriate office of the State employment service system" means the local office of the Federal-State national system of public employment offices with assigned responsibility for serving the area where the employment opening is to be filled, including the District of Columbia, Guam, Puerto Rico, and the Virgin Islands.

(3) "Openings which the Contractor proposes to fill from within his own organization" means employment openings for which no consideration will be given to persons outside the Contractor's organization (including any affiliates, subsidiaries, and the parent companies) and includes any openings which the Contractor proposes to fill from regularly established "recall" lists.

(4) "Openings which the Contractor proposes to fill pursuant to a customary and traditional employer-union hiring arrangement" means employment openings which the Contractor proposes to fill from union halls, which is part of the customary and traditional hiring relationship which exists between the Contractor and representatives of his employees.

(i) The Contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Vietnam Era Veterans' Readjustment Assistance Act, hereinafter referred to as the "Act" (38 U.S.C. 2012).

(j) In the event of the Contractor's noncompliance with the requirements of this clause, actions for noncompliance may be taken in accordance with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Act.

(k) The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices in a form to be prescribed by the Director, Office of Federal Contract Compliance Programs, provided by or through the Contracting Officer. Such notice shall state the Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified disabled veterans and veterans of the Vietnam era for employment, and the rights of applicants and employees.

(1) The Contractor will 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 disabled veterans and veterans of the Vietnam era.

(m) The Contractor will include the provisions of this clause in every subcontract or purchase order of \$10,000 or more unless exempted by rules, regulations, or orders of the Secretary issued pursuant to the Act, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the Director of the Office of Federal Contract Compliance Programs may direct to enforce such provisions, including action for noncompliance. (DAR 7-103.27)

56. VALUE ENGINEERING INCENTIVE--CONSTRUCTION (1980 DEC)

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

(a) Applicability. This clause applies to any Contractor developed, prepared, and submitted Value Engineering Change Proposal (VECP).

(b) Definitions.

(1) "Contractor's development and implementation costs" means those costs incurred on a VECP before Government acceptance and those costs the Contractor incurs specifically to make the changes required by Government acceptance of a VECP.

(2) "Government costs" means those agency costs that result directly from developing and implementing the VECP and any net increases in the cost of testing, operations, maintenance, and logistic support. They do not include the normal administrative costs of processing the VECP.

(3) "Instant contract savings" means the estimated reduction in Contractor cost of performance resulting from acceptance of the VECP, minus allowable Contractor's development and implementation costs (including subcontractor's development and implementation costs). (See paragraph (g).)

(4) "Value Engineering Change Proposal (VECP)" means a proposal that:

- (i) requires a change to this, the instant contract, to implement; and
- (ii) results in reducing the contract price or estimated cost without impairing essential functions or characteristics, provided that it does not involve a change in deliverable end-item quantities only.

(c) VECP Preparation. As a minimum, the Contractor shall include the information described in (1) through (6) in each VECP. If the proposed change affects contractually required configuration management procedures, the instructions in the 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 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 both the affected portions of the existing contract requirement and 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 (g). The Contractor shall also include a description and estimate of costs the Government may incur in implementing the VECP, such as test and evaluation and operating and support costs.

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

(5) 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.

(6) 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) Submissions.

(1) The Contractor shall submit VECPs to the Resident Engineer at the worksite, with a copy to the Contracting Officer. 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 because of extenuating circumstances, the Contractor shall be notified within the 45-day period and provided the reason for the delay and the expected date of the Contracting Officer's decision. VECPs shall be processed expeditiously; however, the Government shall not be liable for any delay in acting upon a VECP.

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

(e) Acceptance. 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 all or part of any VECP shall be final and not subject to the Disputes clause.

(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 55 percent for fixed-price contracts and 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 in (f)(1) to the contract price or fee.

(g) Subcontract. The Contractor shall include appropriate VE clauses in an subcontract of \$50,000 or more and may include them in subcontracts of lesser value. To compute any adjustment in the contract price under paragraph (f), the Contractor's VECP development and implementation costs shall include any subcontractor's development and implementation costs that clearly result from the VECP, but shall exclude any VE incentive payments to subcontractors. The Contractor may choose any arrangement for subcontractor VE incentive payments, provided that these payments are not made from the Government's share of the savings resulting from the VECP.

(h) 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 Incentive--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 VECP 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. (DAR 7-602.50)

57. AFFIRMATIVE ACTION FOR HANDICAPPED WORKERS (1976 MAY)

(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) The Contractor will not discriminate against any employee or applicant for employment because of physical or mental handicap in regard to any position for which the employee or applicant for employment is qualified. 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 the following: employment, upgrading, demotion or transfer, recruitment, advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.

(b) The Contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Act.

(c) In the event of the Contractor's noncompliance with the requirements of this clause, action for noncompliance may be taken in accordance with the rules, regulations and relevant orders of the Secretary of Labor issued pursuant to the Act.

(d) The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices in a form to be prescribed by the Director, provided by or through the Contracting Officer. Such notices shall state the Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified handicapped employees and applicants for employment, and the rights of applicants and employees.

(e) The Contractor will 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 Rehabilitation Act of 1973, and is committed to take affirmative action to employ and advance in employment physically and mentally handicapped individuals.

(f) The Contractor will include the provisions of this clause in every subcontract or purchase order of \$2,500 or more unless exempted by rules, regulations, or orders of the Secretary issued pursuant to section 503 of the Act, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the Director of the Office of Federal Contract Compliance Programs may direct to enforce such provisions, including action for noncompliance. (DAR 7-103.28)

58. CLEAN AIR AND WATER (1975 OCT)

(Applicable only if the contract exceeds \$100,000, or the contracting officer has determined that orders under an indefinite quantity contract in any one year will exceed \$100,000, or a facility to be used has been the subject of a conviction under the Clean Air Act (42 U.S.C. 1857c-8(c)(1) or the Federal Water Pollution Control Act (33 U.S.C. 1319(c)) and is listed by EPA, or the contract is not otherwise exempt.)

(a) The Contractor agrees as follows:

(i) To comply with all the requirements of section 114 of the Clean Air Act, as amended (42 U.S.C. 1857, et seq., as amended by Public Law 91-604) and section 308 of the Federal Water Pollution Control Act (33 U.S.C. 1251, as amended by Public Law 92-500), respectively, 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, respectively, and all regulations and guidelines issued thereunder before the award of this contract;

(ii) 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 this contract was awarded unless and until the EPA eliminates the name of such facility or facilities from such listing;

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

(iv) To insert the substance of the provisions of this clause in any nonexempt subcontract, including this paragraph (iv).

(b) The terms used in this clause have the following meanings.

(i) The term "Air Act" means the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Public Law 91-604).

(ii) The term "Water Act" means Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by Public Law 92-500).

(iii) The term "clean air standards" means any enforceable rules, regulations, guidelines, standards, limitations, orders, controls, prohibitions, or other requirements which are contained in, issued under, or otherwise adopted pursuant to the Air Act or Executive Order 11738, an applicable implementation plan as described in section 110(d) of the Clean Air Act (42 U.S.C. 1857c-5(d), an approved implementation procedure or plan under section 111(c) or section 111(d), respectively, of the Air Act (42 U.S.C. 1857c-6(c) or (d)), or an approved implementation procedure under section 112(d) of the Air Act (42 U.S.C. 1857c-7(d)).

(iv) The term "clean water standards" means any enforceable limitation, control, condition, prohibition, standard or other requirement which is promulgated pursuant to 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 a local government to ensure compliance with pretreatment regulations as required by section 307 of the Water Act (33 U.S.C. 1317)

(v) The term "compliance" means compliance with clean air or water standards. Compliance shall also mean compliance with 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 in accordance with the requirement of the Air Act or Water Act and regulations issued pursuant thereto.

(vi) The term "facility" means any building, plant, installation, structure, mine, vessel or other floating craft, location, or site of operations, owned, leased, or supervised by a contractor, subcontractor, to be utilized in the performance of a contract or subcontract. Where a location or site of operations contains or includes more than one building, plant, installation, or structure, the entire location or site shall be deemed to be a facility except where the Director, Office of Federal Activities, Environmental Protection Agency, determines that independent facilities are collocated in one geographical area.

(vii) The term "nonexempt contract or subcontract" means a contract or subcontract of more than \$100,000 which is not otherwise exempted pursuant to the EPA regulations implementing the Air Act and Water Act (40 CFR 15.5), as further implemented in DAR 1-2302.4 or in FPR 1-1.2302-4 (whichever is applicable) and the procedures of the Department awarding the contract. (DAR 7-103.29)

59. NOTICE TO THE GOVERNMENT OF LABOR DISPUTES (1958 SEP)

(a) Whenever 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 thereof, including all relevant information with respect thereto, to the Contracting Officer.

(b) The Contractor agrees to insert the substance of this clause, including this paragraph (b), in any subcontract hereunder as to which a labor dispute may delay the timely performance of this contract; except that each such 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 his next higher tier subcontractor, or the prime contractor, as the case may be, of all relevant information with respect to such dispute. (DAR 7-104.4)

60. CONTRACT PRICES - BIDDING SCHEDULE (1968 APR)

(The following clause is applicable to contracts containing unit prices)

Payment for the various items listed in the Bidding Schedule shall constitute full compensation for furnishing all plant, labor, equipment, appliances, and materials, and for performing all operations required to complete the work in conformity with the drawings and specifications. All costs for work not specifically mentioned in the Bidding Schedule shall be included in the contract prices for the items listed. (DAR 7-603.5)

61. PRIORITIES, ALLOCATIONS, AND ALLOTMENTS (1975 OCT)

(The following clause is applicable to ratable contracts)

The Contractor shall follow the provisions of DMS Reg. 1 or DPS Reg. 1 and all other applicable regulations and orders of the Bureau of Domestic Commerce in obtaining controlled materials and other products and materials needed to fill this order. (DAR 7-104.18)

62. PRICE REDUCTION FOR DEFECTIVE COST OR PRICING DATA - PRICE ADJUSTMENTS (1970 JAN)

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

(a) This clause shall become operative only with respect to any modification of this contract which involves aggregate increases and/or decreases in costs plus applicable profits in excess of \$500,000 unless the modification is priced on the basis of adequate 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 right to price reduction under this clause is limited to defects in data relating to such modification.

(b) If any price, including profit, or fee, negotiated in connection with any price adjustment under this contract was increased by any significant sums because:

- (i) the Contractor furnished cost or pricing data which was not complete, accurate and current as certified in the Contractor's Certificate of Current Cost or Pricing Data;
- (ii) a subcontractor, pursuant to the clause of this contract entitled "Subcontractor Cost or Pricing Data" or "Subcontractor Cost or Pricing Data - Price Adjustments" or any subcontract clause therein required, furnished cost or pricing data which was not complete, accurate and current as certified in the subcontractor's Certificate of Current Cost or Pricing Data;
- (iii) a subcontractor or prospective subcontractor furnished cost or pricing data which was required to be complete, accurate and current and to be submitted to support a subcontract cost estimate furnished by the Contractor but which was not complete, accurate and current as of the date certified in the Contractor's Certificate of Current Cost or Pricing Data; or
- (iv) the Contractor or a subcontractor or prospective subcontractor furnished any data, not within (i), (ii) or (iii) above, which was not accurate, as submitted;

the price shall be reduced accordingly and the contract shall be modified in writing as may be necessary to reflect such reduction. However, any reduction in the contract price due to defective subcontract data of a prospective subcontractor, when the subcontract was not subsequently awarded to such subcontractor, will be limited to the amount (plus applicable overhead and profit markup) by which the actual subcontract, or actual cost to the

Contractor if there was no subcontract, was less than the prospective subcontract cost estimate submitted by the Contractor, provided the actual subcontract price was not affected by defective cost or pricing data.

Note: Since the contract is subject to reduction under this clause by reason of defective cost or pricing data submitted in connection with certain subcontracts, it is expected that the contractor may wish to include a clause in each such subcontract requiring the subcontractor to appropriately indemnify the contractor. However, the inclusion of such a clause and the terms thereof are matters for negotiation and agreement between the contractor and the subcontractor, provided that they are consistent with DAR 23-203 relating to Disputes provisions in subcontracts. It is also expected that any subcontractor subject to such indemnification will generally require substantially similar indemnification for defective cost or pricing data required to be submitted by his lower tier subcontractors. (DAR 7-104.29(b))

63. INTEREST (1972 MAY)

Notwithstanding any other provision of this contract, unless paid within thirty (30) days, 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) shall bear interest from the date due until paid and shall be subject to adjustments as provided by Part 6 of Appendix E of the Defense Acquisition Regulation, as in effect on the date of this contract. The interest rate per annum shall be the interest rate in effect which has been established by the Secretary of the Treasury pursuant to Public Law 92-41; 85 STAT 97 for the Renegotiation Board, as of the date the amount becomes due as herein provided. Amounts shall be due upon the earliest one of (i) the date fixed pursuant to this contract; (ii) the date of the first written demand for payment, consistent with this contract, including demand consequent upon default termination; (iii) the date of transmittal by the Government to the Contractor of a proposed supplemental agreement to confirm completed negotiations fixing the amount; or (iv) 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 in connection with a negotiated pricing agreement not confirmed by contract supplement. (DAR 7-104.39)

64. AUDIT BY DEPARTMENT OF DEFENSE (1978 AUG)

(The following clause is applicable unless this contract was entered into by formal advertising and is not in excess of \$100,000)

(a) General. The Contracting Officer or his representatives shall have the audit and inspection rights described in the applicable paragraphs (b), (c) and (d) below.

(b) Examination of Costs. If this is a cost reimbursement type, incentive, time and materials, labor hour, or price redeterminable contract, or any combination thereof, the Contractor shall maintain, and the Contracting Officer or his representatives shall have the right to examine books, records, documents, and other evidence and accounting procedures and practices, sufficient to reflect properly all direct and indirect costs of whatever nature claimed to have been incurred and anticipated to be incurred for the performance of this contract. Such right of examination shall include inspection at all reasonable times of the Contractor's plants, or such parts thereof, as may be engaged in the performance of this contract.

(c) Cost or Pricing Data. If the Contractor submitted cost or pricing data in connection with the pricing of this contract or any change or modification thereto, unless such 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 his representatives who are employees of the United States Government shall have the right to examine all books, records, documents and other data of the Contractor related to the negotiation, pricing or performance of such contract, change or modification, for the purpose of evaluating the accuracy, completeness and currency of the cost or pricing data submitted. Additionally, in the case of pricing any change or modification exceeding \$100,000 to formally advertised contracts, the Comptroller General of the United States or his representatives who are employees of the United States Government shall have such rights. The right of examination shall extend to all documents necessary to permit adequate evaluation of the cost or pricing data submitted, along with the computations and projections used therein.

(d) Reports. If the Contractor is required to furnish Contractor Cost Data Reports (CCDR), Contract Fund Status Reports (CFSR), or Cost Performance Reports (CPR) the Contracting Officer or his representatives shall have the right to examine books, records, other documents, and supporting materials, for the purpose of evaluating (i) the effectiveness of the Contractor's policies and procedures to produce data compatible with the objectives of these reports, and (ii) the data reported.

(e) Availability. The materials described in (b), (c) and (d) above shall be made available at the office of the Contractor, at all reasonable times, for inspection, audit, or reproduction, until the expiration of three years from the date of final payment under this contract or such lesser time specified in Appendix M of the Defense Acquisition Regulation, and for such longer period, if any, as is required by applicable statute, or by other clauses of this contract, or by (1) and (2) below:

(1) If this contract is completely or partially terminated, the records relating to the work terminated shall be made available for a period of three years from the date of any resulting final settlement.

(2) Records which relate to appeals under the "Disputes" clause of this contract, or litigation or the settlement of claims arising out of the performance of this contract, shall be made available until such appeals, litigation, or claims have been disposed of.

(f) The Contractor shall insert a clause containing all the provisions of this clause, including this paragraph (f), in all subcontracts exceeding \$10,000 hereunder, except altered as necessary for proper identification of the contracting parties and the Contracting Officer under the Government prime contract. (DAR 7-104.41(a))

65. SUBCONTRACTOR COST OR PRICING DATA - PRICE ADJUSTMENTS (1970 JAN)

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

(a) Paragraphs (b) and (c) of this clause shall become operative only with respect to any modification made pursuant to one or more provisions of this contract which involves aggregate increases and/or decreases in costs plus applicable profits expected to exceed \$500,000. The requirements of this clause shall be limited to such modifications.

(b) The Contractor shall require subcontractors hereunder to submit cost or pricing data under the following circumstances: (i) prior to the award of any subcontract the amount of which is expected to exceed \$500,000 when entered into; (ii) prior to the pricing of any subcontract modification which involves aggregate increases and/or decreases in costs plus applicable profits expected to exceed \$500,000; except where the price is 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.

(c) The Contractor shall require subcontractors to certify that to the best of their knowledge and belief the cost and pricing data submitted under (b) above is accurate, complete, and current as of the date of agreement on the negotiated price of the subcontract or subcontract change or modification.

(d) The Contractor shall insert the substance of this clause including this paragraph (d) in each subcontract which exceeds \$500,000. (DAR 7-104.42(b))

66.1 GOVERNMENT-FURNISHED PROPERTY (SHORT FORM) (1964 NOV)

(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, for use only in connection with this contract, the property described in the schedule or specifications (hereinafter referred to as "Government-furnished property"), at the times and locations stated therein. If the Government-furnished property, suitable for its intended use, is not so delivered to the Contractor, the Contracting Officer shall, upon timely written request made by the Contractor, and if the facts warrant such action, equitably adjust any affected provision of this contract pursuant to the procedures of the "Changes" clause hereof.

(b) Title to Government-furnished property shall remain in the Government. The Contractor shall maintain adequate property control records of Government-furnished property in accordance with sound industrial practice.

(c) Unless otherwise provided in this contract, the Contractor, upon delivery to him of any Government-furnished property, assumes the risk of, and shall be responsible for, any loss thereof or damage thereto except for reasonable wear and tear, and except to the extent that such property is consumed in the performance of this contract.

(d) The Contractor shall, upon completion of this contract, prepare for shipment, deliver f.o.b. origin, or dispose of all Government-furnished property not consumed in the performance of this contract or not theretofore delivered to the Government, 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 paid in such other manner as the Contracting Officer may direct. (DAR 7-104.24(f))

66.2 GOVERNMENT PROPERTY (FIXED PRICE) (1968 SEP)

(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. The Government shall deliver to the Contractor, for use in connection with and under the terms of this contract, the property described as Government-furnished property in the Schedule or specifications, together with such related data and information as the Contractor may request and as may reasonably be required for the intended use of such property (hereinafter referred to as "Government-furnished property"). The delivery or performance dates for the supplies or services to be furnished by the Contractor under this contract are based upon the expectation that Government-furnished property suitable for use (except for such 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 such delivery or performance dates. In the event that Government-furnished property is not delivered to the Contractor by such time or times, the Contracting Officer shall, upon timely written request made by the Contractor, make a determination of the delay, if any, occasioned the Contractor thereby, and shall equitably adjust the delivery or performance dates or the contract price, or both, and any other contractual provision affected by any such delay, in accordance with the procedures provided for in the clause of this contract entitled "Changes." Except for Government-furnished property furnished "as is," in the event the Government-furnished property is received by the Contractor in a condition not suitable for the intended use the Contractor shall, upon receipt thereof, notify the Contracting Officer of such fact and, as directed by the Contracting Officer, either (i) return such property at the Government's expense or otherwise dispose of the property, or (ii) effect repairs or modifications. Upon the completion of (i) or (ii) above, the Contracting Officer upon written request of the Contractor shall equitably adjust the delivery or performance dates or the contract price, or both, and any other contractual provision affected by the rejection or disposition, or the repair or modification, in accordance with the procedures provided for in the clause of this contract entitled "Changes." The foregoing provisions for adjustment are exclusive and the Government shall not be liable to suit for breach of contract by reason of any delay in delivery of Government-furnished property or delivery of such property in a condition not suitable for its intended use.

(b) Changes in Government-furnished Property.

- (1) By notice in writing, the Contracting Officer may (i) decrease the property provided or to be provided by the Government under this contract, or (ii) substitute other Government-owned property for 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 with respect to the removal and shipping of property covered by such notice.
- (2) In the event of any decrease in or substitution of property pursuant to subparagraph (1) above, or any withdrawal of authority to use property provided under any other contract or lease, which property the Government had agreed in the Schedule to make available for the performance of this contract, the Contracting Officer, upon the written request of the Contractor (or, if the substitution of property causes a decrease in the cost of performance, on his own initiative), shall equitably adjust such contractual provisions as may be affected by the decrease, substitution, or withdrawal, in accordance with the procedures provided for in the "Changes" clause of this contract.

(c) Title. Title to all property furnished by the Government shall remain in the Government. In order to define the obligations of the parties under this clause, 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 pursuant to this contract shall pass to and vest in the Government when its use in the performance of this contract commences, or upon payment therefor by the Government, whichever is earlier, whether or not title previously vested. All Government-furnished property, together with all property acquired by the Contractor title to which vests in the Government under this paragraph, is subject to the provisions of this clause and is hereinafter collectively referred to as "Government

property." Title to Government property shall not be affected by the incorporation or attachment thereof to any property not owned by the Government, nor shall such Government property, or any part thereof, be or become a fixture or lose its identity as personalty by reason of affixation to any realty.

(d) Property Administration. The Contractor shall comply with the provisions of Appendix B, Defense Acquisition Regulation, as in effect on the date of the contract, which is hereby incorporated by reference and made a part of this contract. Material to be furnished by the Government shall be ordered or returned by the Contractor, when required, in accordance with the "Manual for Military Standard Requisitioning and Issue Procedure (MILSTRIP) for Defense Contractors" (Appendix H, Defense Acquisition Regulation) as in effect on the date of this contract, which Manual is hereby incorporated by reference and made a part of this contract.

(e) Use of Government Property. The Government property shall, unless otherwise provided herein or approved by the Contracting Officer, be used only for the performance of this contract.

(f) Utilization, Maintenance and Repair of Government Property. The Contractor shall maintain and administer, in accordance with sound industrial practice, and in accordance with applicable provisions of Appendix B, a program for the utilization, maintenance, repair, protection, and preservation of Government property until disposed of by the Contractor in accordance with this clause. In the event that any damage occurs to Government property the risk of which has been assumed by the Government under this contract, the Government shall replace such items or the Contractor shall make such repair of the property as the Government directs; provided however, that if the Contractor cannot effect such repair within the time required, the Contractor shall dispose of such property in the manner directed by the Contracting Officer. The contract price includes no compensation to the Contractor for the performance of any repair or replacement for which the Government is responsible, and an equitable adjustment will be made in any contractual provisions affected by such repair or replacement of Government property made at the direction of the Government, in accordance with the procedures provided for in the "Changes" clause of this contract. Any repair or replacement for which the Contractor is responsible under the provisions of this contract shall be accomplished by the Contractor at his own expense.

(g) Risk of Loss. Unless otherwise provided in this contract, the Contractor assumes the risk of, and shall be responsible for, any loss of or damage to Government property provided under this contract upon its delivery to him or upon passage of title thereto to the Government as provided in paragraph (c) hereof, except for reasonable wear and tear and except to the extent that such property is consumed in the performance of this contract.

(h) Access. The Government, and any persons designated by it, shall at all reasonable times have access to the premises wherein any Government property is located, for the purpose of inspecting the Government property.

(i) Final Accounting and Disposition of Government Property. Upon the completion of 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 not consumed in the performance of this contract (including any resulting scrap) or not theretofore delivered to the Government, and 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 in such other manner as the Contracting Officer may direct.

(j) Restoration of Contractor's Premises and Abandonment. Unless otherwise provided herein, the Government:

- (i) may abandon any Government property in place, and thereupon all obligations of the Government regarding such abandoned property shall cease; and
- (ii) has no obligation to the Contractor with regard to restoration or rehabilitation of the Contractor's premises, neither in case of abandonment (paragraph (j)(i) above), disposition on completion of need or of the contract (paragraph (i) above), nor otherwise, except for restoration or rehabilitation costs which are properly included in an equitable adjustment under paragraph (b) above.

(k) Communications. All communications issued pursuant to this clause shall be in writing or in accordance with the "Manual for Military Standard Requisitioning and Issue Procedure (MILSTRIP) for Defense Contractors" (Appendix H, Defense Acquisition Regulation). (DAR 7-104.24(a))

67. VARIATIONS IN ESTIMATED QUANTITIES (1968 APR)

(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.)

Where the quantity of a pay item in this contract is an estimated quantity and where the actual quantity of such pay item varies more than fifteen percent (15%) above or below the estimated quantity stated in this contract, 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 one hundred fifteen percent (115%) or below eighty-five percent (85%) of the estimated quantity. If the quantity variation is such as to cause an increase in the time necessary for completion, the Contracting Officer shall, upon receipt of a written request for an extension of time within ten (10) days from the beginning of such delay, or within such further period of time which may be granted by the Contracting Officer prior to the date of final settlement of the contract, ascertain the facts and make such adjustment for extending the completion date as in his judgment the findings justify. (DAR 7-603.27)

68. PROGRESS CHARTS AND REQUIREMENTS FOR OVERTIME WORK (1965 JAN)

(a) The Contractor shall within 5 days or within such time as determined by the Contracting Officer, after date of commencement of work, prepare and submit to the Contracting Officer for approval a practicable schedule, showing the order in which the Contractor proposes to carry on the work, the date on which he will start the several salient features (including procurement of materials, plant and equipment) and the contemplated dates for completing the same. The schedule shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion at any time. The Contractor shall enter on the chart the actual progress at such intervals as directed by the Contracting Officer, and shall immediately deliver to the Contracting Officer three copies thereof. If the Contractor fails to submit a progress schedule within the time herein prescribed, the Contracting Officer may withhold approval of progress payment estimates until such time as the Contractor submits the required progress schedule.

(b) If, in the opinion of the Contracting Officer, the Contractor falls behind the progress schedule, the Contractor shall take such steps as may be necessary to improve his progress and the Contracting Officer may require him

to increase the number of shifts, or overtime operations, days of work, or the amount of construction plant, or all of them, and to submit for approval such supplementary schedule or schedules in chart form as may be deemed necessary to demonstrate the manner in which the agreed rate of progress will be regained, all without additional cost to the Government.

(c) Failure of the Contractor to comply with the requirements of the Contracting Officer under this provision shall be grounds for determination by the Contracting Officer that the Contractor is not prosecuting the work with such diligence as will insure completion within the time specified. Upon such determination the Contracting Officer may terminate the Contractor's right to proceed with the work, or any separable part thereof, in accordance with the clause of the contract entitled "Termination for Default - Damages for Delay - Time Extensions." (DAR 7-603.48)

69. CERTIFICATION OF REQUESTS FOR ADJUSTMENT OR RELIEF EXCEEDING \$100,000 (1980 FEB)

(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 certificate 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:

(i) 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;

(ii) 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. (DAR 7-104.102)

70. AFFIRMATIVE ACTION COMPLIANCE REQUIREMENTS FOR CONSTRUCTION (1982 FEB)

(a) As used in this clause:

(1) "Covered area" means the geographical area described in the solicitation from which this contract resulted;

(2) "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;

(3) "Employer identification number" means the Federal social security number used on the employer's quarterly federal tax return, U.S. Treasury Department Form 941.

(4) "Minority" includes:

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

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

(iii) 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

(iv) 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).

(b) Whenever the Contractor, or any subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of this clause and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitation from which this contract resulted.

(c) If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO 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 covered Contractor's or subcontractor's failure to take good faith efforts to achieve the Plan goals.

(d) The Contractor shall implement the specific affirmative action standards provided in subparagraphs (g)(1) through (16) of this clause. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization 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 (whether or not it is Federal or Federally assisted) in a geographical area located outside of the covered area, it shall apply the goals established for the geographical area where such work is actually performed. The Contractor is expected to make substantially uniform progress toward its goal in each craft.

(e) Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under this clause, Executive Order 11246, or the regulations promulgated pursuant thereto.

(f) In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such 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 specific affirmative actions 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 shall implement affirmative action steps at least as extensive as the following:

(1) Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site 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 such sites or in such facilities.

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

(3) Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.

(4) Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person 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 which 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 (g)(2) above.

(6) Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority

and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

(7) Review, at least annually, the company's EEO policy and affirmative action obligations under this clause with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any 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 EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and subcontractors with whom the Contractor does or anticipates doing business.

(9) Direct its 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 one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall 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 other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's workforce.

(11) Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

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

(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 EEO policy and the Contractor's obligations under this clause 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) Document and maintain a record of all solicitations of offers for subcontracts from 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 EEO policies and affirmative action obligations.

(h) Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations ((g)(1) through (16)). The efforts of a contractor association, joint contractor-union, contractor-community, or other

similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under (g)(1) through (16) of this clause provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, 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 have been established. The Contractor, however, 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 non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

(j) The Contractor shall not use the 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 pursuant to Executive Order 11246.

(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 pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of this clause and Executive Order 11246, as amended.

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

(n) The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, 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, contractors shall not be required to maintain separate records.

(o) Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of 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). (DAR 7-603.60)

71. UTILIZATION OF WOMEN-OWNED BUSINESS CONCERNS (OVER \$10,000) (1980 AUG)

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

(b) The Contractor agrees to use its best efforts to carry out this policy in the award of subcontracts to the fullest extent consistent with the efficient performance of this contract. As used in this contract, a "women-owned business" concern means a 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 and that is a small business as defined pursuant to Section 3 of the Small Business Act and relevant regulations promulgated pursuant thereto. "Control" in this context means exercising the power to make policy decisions. "Operate" in this context means being actively involved in the day-to-day management.

(c) Contractors acting in good faith may rely on written representations by their subcontractors regarding their status as women-owned business concerns. (DAR 7-104.52)

72. ENVIRONMENTAL LITIGATION (1974 NOV)(OCE)

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

(b) The term "environmental litigation", as used herein, means a lawsuit alleging that the work will have an adverse effect on the environment or that the Government has not duly considered, either substantively or procedurally, the effect of the work on the environment. (ECI 7-671.10)

SUPERSEDES DECISION

STATE: Arizona
 DECISION NUMBER: A282-5109
 Supersedes Decision No. AZ81-5142 dated August 14, 1981, in 46 PR 41299
 DESCRIPTION OF WORK: Building Projects (does not include single family homes and apartments up to and including 4 stories), Heavy and Highway Projects

COUNTIES: Statewide
 DATE: Date of Publication

DECISION NO. AZ82-5109

Page 2

AREA and ZONE DEFINITIONS

ASBESTOS WORKERS:

- Zone 1: Area lying 0-25 miles radius from the City Hall in Phoenix or Tucson
- Zone 2: Area lying 25-50 miles radius from the City Hall in Phoenix or Tucson
- Zone 3: Area lying over 50 miles from City Hall in Phoenix and Tucson

BRICKLAYERS; STONEMASONS:

Northern Area: Apache, Coconino and Gila Counties; Graham County (west and north of the San Francisco River to the Gila River); Greenlee County (west and north of the San Francisco River to the Gila River); Maricopa, Mohave, and Navajo Counties; Pinal County (north of a boundary line drawn west along the Gila River to the western city limits of Florence, a straight line from the extreme southwestern city limits of Florence to the extreme southern city limits of Coolidge, then a straight line to the extreme southern city limits of Casa Grande, with the line extending to the Maricopa/Pinal County Line); Yavapai, and Yuma Counties:

- ZONE A: 0-40 road miles from the City Hall in Phoenix
- ZONE B: 40-50 road miles from the City Hall in Phoenix
- ZONE C: 50-75 road miles from the City Hall in Phoenix
- ZONE D: 75-100 road miles from the City Hall in Phoenix
- ZONE E: 100-200 road miles from the City Hall in Phoenix
- ZONE F: 200 road miles and over from the City Hall in Phoenix

Southern Area: Cochise County; Graham County (east and south of the San Francisco River to the Gila River); Greenlee County (east and south of the San Francisco River to the Gila River); Pima County; Pinal County (south of a boundary line drawn west along the Gila River to the western city limits of Florence, a straight line from the extreme southwestern city limits of Florence to the extreme southern city limits of Coolidge, then a straight line to the extreme southern city limits of Casa Grande, with the line extending to the Maricopa/Pinal County Line); Santa Cruz Counties:

- Zone A: 0-15 road miles from Tucson City limits
- Zone B: 15-30 road miles from Tucson City limits
- Zone C: 30-40 road miles from Tucson City limits
- Zone D: Over 40 road miles from Tucson City limits

	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
ASBESTOS WORKERS:*					
Zone 1	\$17.04	.75	\$ 1.49		.03
Zone 2	19.04	.75	1.49		.03
Zone 3	21.04	.75	1.49		.03
BOILERMAKERS	19.01	1.30	1.25	1.00	.04
BRICKLAYERS; Stonemasons:*					
Northern Area:*					
Zone A	15.18	1.07	1.50		.17
Zone B	16.39	1.07	1.50		.17
Zone C	17.15	1.07	1.50		.17
Zone D	17.91	1.07	1.50		.17
Zone E	18.52	1.07	1.50		.17
Zone F	19.73	1.07	1.50		.17
Southern Area:*					
Zone A:					
Bricklayers; Stonemasons	13.68	1.00	.95		.06
Manhole Builders	13.93	1.00	.95		.06
Zone B:					
Bricklayers; Stonemasons	14.05	1.00	.95		.06
Manhole Builders	14.30	1.00	.95		.06
Zone C:					
Bricklayers; Stonemasons	14.43	1.00	.95		.06
Manhole Builders	14.68	1.00	.95		.06
Zone D:					
Bricklayers; Stonemasons	15.18	1.00	.95		.06
Manhole Builders	15.43	1.00	.95		.06

*See AREA and ZONE Descriptions - Page 2

RW-1

AREA and ZONE DEFINITIONS

CARPENTERS:

Northern Area: Area north of a straight line drawn between a point 35 miles due north of the City Hall in Flagstaff and a point 35 miles due north of the City Hall in Kingman, extending to the Arizona/Nevada State Line on the west, and connecting to a point 35 miles due north of the City Hall in Holbrook, thence due east to the intersection of the Arizona/New Mexico State Line

Central and Southern Areas: All areas not included in the Northern Area

CEMENT MASONS:

Zone 1: Apache, Coconino, and Gila Counties; Graham County (north of Sentinel-Casa Grande-Safford Line); Greenlee County (north of Sentinel-Casa Grande-Safford Line); Maricopa County (north of Sentinel-Casa Grande-Safford Line); Mohave, and Navajo Counties; Pinal County (north of Sentinel-Casa Grande-Safford Line); Yavapai and Yuma Counties

Northern Area: Area north of a straight line drawn between a point 35 miles due north of the City Hall in Flagstaff and a point 35 miles due north of the City Hall in Kingman, extending to the Arizona/Nevada State Line on the west and connecting to a point 35 miles due north of the City Hall in Holbrook, thence due east to the intersection of the Arizona/New Mexico State Line.

Central and Southern Areas: All Areas not included in the Northern Area.

Zone 2: Southern parts of Cochise, Graham, Greenlee, Maricopa, and Pinal Counties; Pima and Santa Cruz Counties

DRYWALL TAPERS:

Zone A: 0-40 road miles from Courthouse in Phoenix; Also Luke and William Air Force Bases
Zone B: 41-60 road miles from Courthouse in Phoenix
Zone C: 61 road miles and over from Courthouse in Phoenix

	Basic Hourly Rates	Fringe Benefits Payments			
		H&W	Pensions	Vacation	Education and/or Appr. Tr.
CARPENTERS:*					
Northern Area:					
Carpenters; Drywall Applicator; Saw Filer; Shingler	\$15.06	\$1.335	\$1.115		.08
Floorlayers (finish); Piledriversmen	15.405	1.335	1.115		.08
Millwrights	15.565	1.335	1.115		.08
Central and Southern Areas:					
Carpenters; Saw Filers; Floorlayers (finish); Piledriversmen	12.935	1.335	1.115		.08
Millwrights	13.28	1.335	1.115		.08
	13.44	1.335	1.115		.08
CEMENT MASONS:*					
Zone 1:					
Northern Area:					
Cement Masons	15.035	.95	1.40		.05
Concrete Troweling Machine; Sawing and Scoring Machine; Curb and Gutter Machine	15.225	.95	1.40		.05
Central & Southern Areas:					
Cement Masons	12.91	.95	1.40		.05
Concrete Troweling Machine; Sawing and Scoring Machine; Curb and Gutter Machine	13.10	.95	1.40		.05
Zone 2:					
Cement Masons	12.84	1.12	1.30		.05
Concrete Troweling Machine; Sawing and Scoring Machine; Curb and Gutter Machine; Clary and similar type of power screed Operator	13.03	1.12	1.30		.05
DRYWALL TAPERS:*					
Zone A	13.79	.60	.50		.10
Zone B	14.79	.60	.50		.10
Zone C	16.29	.60	.50		.10

*See AREA and ZONE Descriptions - Page 4

RW-2

1772A

Federal Register / Vol. 47, No. 79 / Friday, April 23, 1982 / Notices

AREA and ZONE DEFINITIONS

ELECTRICIANS:

Area 1: Apache County (north of Highway #66)

Area 2: Coconino County; Navajo County (north and west of a boundary line beginning at a point where Clear Creek crosses the Coconino/Navajo County Line and then extending in a northeasterly direction along Clear Creek and northeasterly to Cottonwood Wash, along Cottonwood Wash extending northeasterly to where it intersects the Navajo Indian Reservation, then easterly along the Navajo Indian Reservation boundary line to a point where it intersects the Navajo/Apache County Line):

- Zone A: 5 miles north-south, east and west of the Post Offices of Williams, Sedona, and Winslow
- Zone B: Remainder of Area 2 not covered by Zone A

Area 3: Apache County (south of Highway #66); Gila County; Navajo County (south and east of a boundary beginning at a point where Clear Creek crosses the Coconino/Navajo County Line, then extending in a northeasterly direction along Clear Creek and northeasterly to Cottonwood Wash, along Cottonwood Wash extending northeasterly to where it intersects the Navajo Indian Reservation, then easterly along the Navajo Indian Reservation boundary line to a point where it intersects the Navajo/Apache County Line); Pinal County (north of the line, "First Standard Parallel South" and east of the line "Second Guide Meridian East"):

- Zone A: Area within 16 road miles beginning where the Southern Pacific Railroad intersects Highway 60-70 at Kaiser Crossing; Area within 12 miles radius from the school in Lakeside, Arizona
- Zone B: Area within 16-28 road miles from point where the Southern Pacific Railroad intersects Highway 60-70 at Kaiser Crossing
- Zone C: Area within 28-46 road miles from point where the Southern Pacific Railroad intersects Highway 60-70 at Kaiser Crossing
- Zone D: Area 46 road miles and over from point where the Southern Pacific Railroad intersects Highway 60-70 at Kaiser Crossing; Area over 12 miles radius from school in Lakeside, Arizona

Federal Register / Vol. 47, No. 79 / Friday, April 23, 1982 / Notices

	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
ELECTRICIANS:*					
Area 1:					
Electricians	\$16.81	.60	3%+.70		3/4%
Cable Splicers	18.16	.60	3%+.70		3/4%
Area 2:					
Electricians; Technicians; and Cable Splicers:					
Zone A	17.00	.96	3%+.93		1/2%
Zone B	20.12	.96	3%+.93		1/2%
Area 3:					
Zone A:					
Electricians; Technicians	17.24	.60	1%		1%
Cable Splicers	17.49	.60	1%		1%
Zone B:					
Electricians; Technicians	18.74	.60	1%		1%
Cable Splicers	18.99	.60	1%		1%
Zone C:					
Electricians; Technicians	19.24	.60	1%		1%
Cable Splicers	19.49	.60	1%		1%
Zone D:					
Electricians; Technicians	20.24	.60	1%		1%
Cable Splicers	20.49	.60	1%		1%
Area 4:					
Electricians	17.95	.96	3%+.93		.10
Area 5:					
Zone A:					
Electricians	16.44	.60	1%		1%
Cable Splicers	16.69	.60	1%		1%
Zone B:					
Electricians	17.24	.60	1%		1/2%
Cable Splicers	17.49	.60	1%		1/2%
Zone C:					
Electricians	17.94	.60	1%		1/2%
Cable Splicers	18.19	.60	1%		1/2%
Zone D:					
Electricians	18.94	.60	1%		1/2%
Cable Splicers	19.19	.60	1%		1/2%

*See AREA and ZONE Descriptions - Pages 6 and 7

RW-3

AREA and ZONE DEFINITIONS (Cont'd)

ELECTRICIANS: (Cont'd)

Area 4: Maricopa and Mohave Counties; Pinal County (north and west of the boundary line beginning at a point where the Papago Indian Reservation Road #15 crosses the Pima/Pinal County Line, then extending in a northeasterly direction on the Papago Indian Reservation Road #15 to the intersection with the Florence Canal, north and east on the Florence Canal to the intersection with the line, "Second Guide Meridian East", then north to the Pinal/Maricopa County Line); Yavapai County

Area 5: Cochise, Graham, Greenlee, and Pima Counties, Pinal County (south and east of the boundary line beginning at a point where the Papago Indian Reservation Road #15 crosses the Pima/Pinal County Line, then extending in a northeasterly direction on the Papago Indian Reservation Road #15 to the intersection with the Florence Canal, north and east on the Florence Canal to the intersection with the line, "Second Guide Meridian East", then north to the line, "First Standard Parallel South", and along that line to the Graham/Pinal County Line); Santa Cruz and Yuma Counties:

- Zone A: Area within 16 miles radius from the City Hall in Tucson or Yuma; Area within 16 road miles from center of Town in Douglas, Nogales or Sierra Vista; Area within the boundaries of the incorporated city limits of Parker, plus an area extending from the south city limits of Parker in a northeasterly direction to Milepost No. 150 located on State Highway #95, northeast of Parker from the Colorado River on the west, an area 1 mile wide paralleling the Colorado River
- Zone B: Area lying beyond the limits of Zone A extending to and including 12 road miles excluding area near Douglas, Nogales and Sierra Vista
- Zone C: Area lying beyond the limits of Zone B extending up to and including 18 road miles, excluding area near Douglas, Nogales and Sierra Vista
- Zone D: Area lying beyond the limits of Zone C; for area near the Cities of Douglas, Nogales, Sierra Vista, the area lying beyond the limits of Zone A

RW-4

ELEVATOR CONSTRUCTORS:
 Elevator Constructors
 Helpers
 Probationary Helpers
 GLAZIERS:
 Statewide excluding
 Bullhead City
 Bullhead City
 IRONWORKERS:*
 Northern Area
 Southern Area
 LATHERS:*
 Area 1
 Area 2
 LINE CONSTRUCTION:*
 Zone 1:
 Groundmen
 Equipment Operators;
 Powdermen; Mechanics
 Linemen; Technicians;
 Crane Operators
 Cable Splicers
 Zone 1-A:
 Groundmen
 Equipment Operators;
 Powdermen; Mechanics
 Linemen; Technicians;
 Crane Operators
 Cable Splicers
 Zone 2:
 Groundmen
 Equipment Operators;
 Powdermen; Mechanics
 Linemen; Technicians
 Crane Operators
 Cable Splicers
 MARBLE, TILE, and TERRAZZO
 FINISHERS

*See AREA and ZONE Descriptions - Page 9

Basic Hourly Rates*	Fringe Benefits Payments			
	H & W	Pensions	Vacation	Education and/or Appr. Tr.
\$17.595	\$1.345	\$ 1.085	a	.035
12.32	1.345	1.085	a	.035
8.80				
14.71	.95	.60		.08
17.02	.75	.40		.08
19.25	1.44	3.07		.11
16.25	1.44	3.07		.11
14.325	1.00			.06
14.32	1.00			.06
12.81	1.00	3 1/2+2.75		1/2 1/2
15.13	1.00	3 1/2+2.75		1/2 1/2
17.05	1.00	3 1/2+2.75		1/2 1/2
17.56	1.00	3 1/2+2.75		1/2 1/2
13.81	1.00	3 1/2+2.75		1/2 1/2
16.04	1.00	3 1/2+2.75		1/2 1/2
18.03	1.00	3 1/2+2.75		1/2 1/2
18.63	1.00	3 1/2+2.75		1/2 1/2
14.75	1.00	3 1/2+2.75		1/2 1/2
16.99	1.00	3 1/2+2.75		1/2 1/2
18.97	1.00	3 1/2+2.75		1/2 1/2
19.52	1.00	3 1/2+2.75		1/2 1/2
11.02	1.19	.30		.10

Federal Register / Vol. 47, No. 79 / Friday, April 23, 1982 / Notices

AREA and ZONE DEFINITIONS

IRONWORKERS:

Northern Area: Area north from a line 10 miles north of and parallel to Highway #66, North to the Arizona-Utah border and from the Arizona-California border east to the Arizona-New Mexico border

Southern Area: All areas not included in the Northern Area

LATHERS:

Area 1: North of a line crossing the State drawn through Ajo, Randolph and Springerville; except as follows: northeast of a line drawn from Springerville to a point 4 miles northeast of Keams Canyon

Area 2: South of a line crossing the State drawn through Ajo, Randolph and Springerville

LINE CONSTRUCTION:

Zone 1: Phoenix and Tucson 30 mile radius from the center of Town; Area within 10 mile radius from the City Hall of Yuma

Zone 1-A: Flagstaff, Globe, and Kingman; and 10 mile radius from the center of Town

Zone 2: Other Areas not covered by Zone 1 and Zone 1-A

MARBLE WORKERS:*

Area 1

MASON TENDERS

PAINTERS:*

Area 1:

Zone A:

Brush

Brush, steel and bridge

Spray

Spray, steel and bridge

Zone B:

Brush

Brush, steel and bridge

Spray

Spray, steel and bridge

Zone C:

Brush

Brush, steel and bridge

Spray

Spray, steel and bridge

Zone D:

Brush

Brush, steel and bridge

Spray

Spray, steel and bridge

Area 2:

Zone A:

Brush and Roller; Sand-

blaster (Nozzleman);

Sheetrock Taper; Floor

Coverer; Sandblaster

(Pot Tender)

Spray; Paperhanger

Creosote Applier

Swing Stage:

Brush; Sandblaster

Spray

Steeplejack

Basic Hourly Rates	Fringe Benefits Payments			
	H & W	Pensions	Vacation	Education and/or Appr. Tr.
\$13.71	.90	\$ 1.10		.19
11.00	1.12	1.30		.06
11.60	.90	.80		.20
12.10	.90	.80		.20
12.05	.90	.80		.20
12.60	.90	.80		.20
12.35	.90	.80		.20
12.85	.90	.80		.20
12.80	.90	.80		.20
13.35	.90	.80		.20
13.35	.90	.80		.20
13.85	.90	.80		.20
13.80	.90	.80		.20
14.35	.90	.80		.20
13.60	.90	.80		.20
14.10	.90	.80		.20
14.05	.90	.80		.20
14.60	.90	.80		.20
13.54	.60	.60		.10
13.79	.60	.60		.10
13.87	.60	.60		.10
13.94	.60	.60		.10
14.19	.60	.60		.10
14.40	.60	.60		.10

*See AREA and ZONE Descriptions - Page 14

RW-5

	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
PAINTERS:* (Cont'd)					
Area 2: (Cont'd)					
Zone A: (Cont'd)					
Steel and bridge, brush; Nozzleman and Pot Tender; Steel (steam cleaner); Electric and air tool Operator; Steel Sandblaster	\$14.47	.60	.60	.10	
Steel and bridge, spray	14.67	.60	.60	.10	
Zone B:					
Brush and Roller; Sandblaster (Nozzleman); Sheet Rock Taper; Floor Coverer; Sandblaster (Pot Tender)	14.54	.60	.60	.10	
Spray; Paperhangers	14.79	.60	.60	.10	
Creosote Applier	14.87	.60	.60	.10	
Swing Stage:					
Brush; Sandblaster	14.94	.60	.60	.10	
Spray	15.19	.60	.60	.10	
Steeplejack	15.40	.60	.60	.10	
Steel and bridge, Brush; Nozzleman and Pot Tender; Steel (steam cleaner); Electric and air tool Operator; Steel Sandblaster	15.47	.60	.60	.10	
Steel and bridge, Spray	15.67	.60	.60	.10	
Zone C:					
Brush and Roller; Sandblaster (Nozzleman); Sheet Rock Taper; Sandblaster (Pot Tender)	16.04	.60	.60	.10	
Spray; Paperhangers	16.29	.60	.60	.10	
Creosote Applier	16.37	.60	.60	.10	
Swing Stage:					
Brush; Sandblaster	16.44	.60	.60	.10	
Spray	16.69	.60	.60	.10	
Steeplejack	16.90	.60	.60	.10	

*See AREA and ZONE Descriptions - Page 14

RM-6

	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
PAINTERS:* (Cont'd)					
Area 2: (Cont'd)					
Zone C: (Cont'd)					
Steel and bridge, Brush; Nozzleman and Pot Tender; Steel (steam cleaner); Electric air tool Operator; Steel Sandblaster	\$16.97	.60	.60	.10	
Steel and bridge, Spray	17.17	.60	.60	.10	
Area 3:					
Zone A:					
Brush	11.62	.97	.55	.10	
Spray; Sandblaster	12.22	.97	.55	.10	
Paperhanger	11.75	.97	.55	.10	
Swing Stage, under 40 ft.:					
Brush	11.92	.97	.55	.10	
Spray	12.52	.97	.55	.10	
Swing Stage, over 40 ft.:					
Brush	12.37	.97	.55	.10	
Spray	12.97	.97	.55	.10	
Structural Steel and Tanks:					
Brush	12.62	.97	.55	.10	
Spray and Sandblasters	13.22	.97	.55	.10	
Creosote Base and Bituminous Material	12.02	.97	.55	.10	
Zone B:					
Brush	12.37	.97	.55	.10	
Spray and Sandblasters	12.99	.97	.55	.10	
Paperhangers	12.50	.97	.55	.10	
Swing Stage, under 40 ft.:					
Brush	12.67	.97	.55	.10	
Spray	12.97	.97	.55	.10	
Swing Stage, over 40 ft.:					
Brush	13.72	.97	.55	.10	
Spray	13.72	.97	.55	.10	
Structural Steel and Tanks:					
Brush	13.37	.97	.55	.10	
Spray and Sandblasters	13.97	.97	.55	.10	
Creosote Base and Bituminous Materials	12.77	.97	.55	.10	

*See AREA and ZONE Descriptions -Page 14

Public Register / Vol 47, No: 79 / Friday, April 23, 1982 / Notices

AREA and ZONE DEFINITIONS

PAINTERS:* (Cont'd)

Area 3: (Cont'd)

Zone C:

	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
Brush	\$13.12	.97	.55		.10
Spray	13.72	.97	.55		.10
Paperhangers	14.25	.97	.55		.10
Swing Stage, under 40 ft.:					
Brush	13.42	.97	.55		.10
Spray	14.02	.97	.55		.10
Swing Stage, over 40 ft.:					
Brush	13.87	.97	.55		.10
Spray	14.47	.97	.55		.10
Structural Steel and Tanks:					
Brush	14.12	.97	.55		.10
Spray and Sandblasters	14.72	.97	.55		.10
Zone D:					
Brush	14.37	.97	.55		.10
Spray	14.97	.97	.55		.10
Paperhangers	14.50	.97	.55		.10
Swing Stage, under 40 ft.:					
Brush	14.67	.97	.55		.10
Spray	15.27	.97	.55		.10
Swing Stage, over 40 ft.:					
Brush	15.12	.97	.55		.10
Spray	15.72	.97	.55		.10
Structural Steel and Tanks:					
Brush	15.37	.97	.55		.10
Spray and Sandblasters	15.97	.97	.55		.10

See AREA and ZONE Descriptions - Page 14

MARBLE WORKERS:

Area 1: Apache, Coconino, and Gila Counties; Graham County (west and north of San Francisco River to Gila River); Greenlee County (west and north of San Francisco River to Gila River); Maricopa, Mohave, and Navajo Counties; Pinal County (north of a boundary line drawn west along the Gila River to the western city limits of Florence, a straight line from the extreme southwestern city limits of Florence to the extreme southern city limits of Coolidge, then a straight line to the extreme southern city limits of Casa Grande with the line extending to the Maricopa/Pinal County Line); Yavapai and Yuma Counties

PAINTERS:

Area 1: Apache, Coconino, Navajo, and Yavapai Counties (north of Woodruff/Camp Wood Line); Mohave County (north of a line following the Geodetic Hualapai Boundary Line to the Colorado River, a distance of 23 miles east of Pierce Ferry and then intersecting the Arizona/Nevada State Line);

- Zone A: 0-20 road miles from Courthouse in Flagstaff
- Zone B: 20-35 road miles from Courthouse in Flagstaff
- Zone C: 35-80 road miles from Courthouse in Flagstaff
- Zone D: 80 road miles and over from Courthouse in Flagstaff

Area 2: Apache, Coconino, Navajo, and Yavapai Counties (south of the Woodruff/Camp Wood Line); Gila, Graham, Greenlee, Maricopa, and Pinal Counties (north of 33rd Parallel); Mohave County (south of a line following the Geodetic Hualapai Boundary Line to the Colorado River, a distance of 23 miles east of Pierce Ferry and then intersecting the Arizona/Nevada State Line);

- Zone A: 0-40 paved road miles from Courthouse in Phoenix; also, Luke and Williams Air Force Bases
- Zone B: 41-60 paved road miles from Courthouse in Phoenix
- Zone C: 61 paved road miles and over from Courthouse in Phoenix

Area 3: Cochise County; Graham, Greenlee, Maricopa and Pinal Counties (south of 33rd Parallel); Pima, Santa Cruz, and Yuma Counties:

- Zone A: 0-30 paved road miles from Stone and Congress in Tucson or from the County Courthouse in Yuma
- Zone B: 31-40 paved road miles from Stone and Congress in Tucson or from the County Courthouse in Yuma
- Zone C: 41-50 paved road miles from Stone and Congress in Tucson or from the County Courthouse in Yuma
- Zone D: 51 paved road miles and over from Stone and Congress in Tucson or from the County Courthouse in Yuma

RM-7

PLASTERERS:*

Area 1:

Zone A

Zone B

Zone C

Area 2:

Zone A

Zone B

Zone C

PLASTERER TENDERS

PLUMBERS:*

Zone 1

Zone 2

Zone 3

Zone 4

ROOFERS:*

Area 1:

Roofers

Pitch and Enamel

Area 2:

Zone A:

Roofers and Water-prooferers; Shinglers (asbestos, wood and asphalt)

Pitch and Enamel

Zone B:

Roofers and Water-prooferers; Shingler (asbestos, wood and asphalt)

Pitch and Enamel

SHEET METAL WORKERS:*

Area 1:

Zone 1

Zone 2

Zone 3

Area 2:

Zone A

Zone B

Zone C

SOFT FLOOR LAYERS

SPRINKLER FITTERS

TERRAZZO WORKERS; TILE

SETTERS:*

Area-1

Basic Hourly Rates	Fringe Benefits Payments			
	H & W	Pensions	Vacation	Education and/or Appr. Tr.
\$11.77	.95	\$1.30		.06
12.52	.95	1.30		.06
13.645	.95	1.30		.06
12.67	1.02	1.20		
13.92	1.02	1.20		
14.67	1.02	1.20		
11.55	1.12	1.30		.10
18.34	1.20	1.35		.23
18.74	1.20	1.35		.23
19.19	1.20	1.35		.23
21.34	1.20	1.35		.23
13.46	1.095	.95		.05
14.71	1.095	.95		.05
12.17	1.095	.35		.03
13.67	1.095	.35		.03
14.67	1.095	.35		.03
16.17	1.095	.35		.03
17.39	1.10	1.92		.13
18.64	1.10	1.92		.13
21.39	1.10	1.92		.13
16.74	1.20	1.92		.07
17.96	1.20	1.92		.07
20.62	1.20	1.92		.07
12.46	.60	.12		.21
16.65	.95	1.40		.08
13.71	.90	1.10		.09

*See AREA and ZONE Descriptions - Pages 16 and 17

FOOTNOTE:

a. Employer contributes 8% of basic hourly rate for 5 years' service and 6% of basic hourly rate for 6 months' to 5 years' service as Vacation Pay Credit. Seven Paid Holidays: A through G

PAID HOLIDAYS:

A-New Year's Day; B-Memorial Day; C-Independence Day; D-Labor Day; E-Thanksgiving Day; F-Friday after Thanksgiving; G-Christmas Day

AREA and ZONE DEFINITIONS

PLASTERERS:

Area 1: Apache, Coconino, and Gila Counties; Graham, Greenlee, Maricopa, and Pinal Counties (north of Sentinel - Casa Grande - Safford Line); Mohave, Navajo, Yavapai, and Yuma Counties:

Zone A: 0-35 miles from Phoenix

Zone B: 35-60 miles from Phoenix

Zone C: 60 miles and over from Phoenix

Area 2: Cochise County; Graham, Greenlee, Maricopa, and Pinal Counties (south of Sentinel - Casa Grande - Safford Line); Santa Cruz County:

Zone A: 0-30 miles radius from Tucson

Zone B: 30-50 miles radius from Tucson

Zone C: 50 miles radius and over from Tucson

PLUMBERS:

Zone 1: Area within 15 road miles from either the intersection of Central Avenue and Jefferson Street in Phoenix or the Old Main Building of the University of Arizona in Tucson or the Main Post Office Building in either Douglas, Flagstaff or Yuma; Also, all areas within the City limits of Havasu City, Holbrook, Kingman, Prescott, and Winslow; Also, that area bordered by the Apache Trail on the north, Higley Road on the east, Elliott Road on the south and Arizona Avenue on the west

Zone 2: Over 15 and up to 30 road miles from either the intersection of Central Avenue and Jefferson Street in Phoenix or the Old Main Building of the University of Arizona in Tucson

RW-8

17730

Federal Register / Vol. 47, No. 79 / Friday, April 23, 1982 / Notices

Over 30 and up to 40 road miles from either the intersection of Central Avenue and Jefferson Street in Phoenix or the Old Main Building of the University of Arizona in Tucson

Zone 4: Over 40 road miles from either the intersection of Central Avenue and Jefferson Street in Phoenix or the Old Main Building of the University of Arizona in Tucson

ROOFERS:

Area 1: Apache, Coconino, Gila, Maricopa, Mohave, Navajo, Pinal, Yavapai, and Yuma Counties

Area 2: Cochise, Graham, Greenlee, Pima and Santa Cruz Counties:

Zone A: Area less than 44 road miles from City Hall in Tucson

Zone B: Area from 44 to 100 road miles from City Hall in Tucson

SHEET METAL WORKERS:

Area 1: Apache, Coconino, and Gila Counties; Graham, Greenlee, and Pinal Counties (north of 33rd Parallel); Maricopa, Mohave, Navajo, Yavapai, and Yuma Counties:

Zone 1: 0-25 miles radius, excluding Luke and Williams Air Force Bases, from the following base points: the intersection of 56th Street and Indian School Road in Phoenix, and the City Hall in Flagstaff, Kingman, Prescott and Yuma

Zone 2: 25-50 miles radius from the base points listed in Zone 1; also Luke and Williams Air Force Bases

Zone 3: 50 miles radius and over from the base points listed in Zone 1

Area 2: Cochise, Graham, Greenlee, and Pinal Counties (south of 33rd Parallel); Pima and Santa Cruz Counties:

Zone A: 0-25 miles radius from Tucson City Hall or Douglas City Hall

Zone B: 25-50 miles radius from Tucson City Hall or Douglas City Hall

Zone C: Over 50 miles radius from Tucson City Hall or Douglas City Hall; also San Manuel and vicinity

TERRAZZO WORKERS; TILE SETTERS:

Area 1: Apache, Coconino, and Gila Counties; Graham and Greenlee Counties (west and north of San Francisco River to Gila River); Maricopa, Mohave, and Navajo Counties; Pinal County (north of a boundary line drawn west along the Gila River to the western City limits of Florence, a straight line from the extreme southwestern City limits of Florence to the extreme southern city limits of Coolidge, then a straight line to the extreme southern city limits of Casa Grande, with the line extending to the Maricopa/Pinal County Line); Yavapai and Yuma Counties

LABORERS:

Group 1
Group 2
Group 3
Group 4
Group 5
Group 6
Group 7

(Tunnel and Shaft Work)

Group 1
Group 2
Group 3
Group 4
Group 5
Group 5-A

Basic Hourly Rates	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
N AREA	C and S AREAS				
Group 1	\$12.275	\$10.15	\$1.12	\$1.30	.10
Group 2	12.435	10.31	1.12	1.30	.10
Group 3	12.605	10.48	1.12	1.30	.10
Group 4	12.735	10.61	1.12	1.30	.10
Group 5	12.945	10.82	1.12	1.30	.10
Group 6	13.41	11.285	1.12	1.30	.10
Group 7	14.18	12.055	1.12	1.30	.10
Group 1	12.57	10.445	1.12	1.30	.10
Group 2	12.57	10.65	1.12	1.30	.10
Group 3	12.935	10.81	1.12	1.30	.10
Group 4	13.365	11.24	1.12	1.30	.10
Group 5	13.60	11.475	1.12	1.30	.10
Group 5-A	13.90	11.775	1.12	1.30	.10

AREA DEFINITIONS

NORTHERN AREA:

Area north of a straight line drawn between a point 35 miles due north of the City Hall in Flagstaff and a point 35 miles due north of the City Hall in Kingman, extending to the Arizona/Nevada State Line on the west; and connecting to a point 35 miles due north of the City Hall in Holbrook, thence due east to the intersection of the Arizona/New Mexico State Line

CENTRAL and SOUTHERN AREAS:

All Areas not included in the Northern Area

RM-9

LABORERS

Group 1: Laborer, general or construction; Manually-controlled Signal Operator; Fence Builder, Guard Rail Builder - highway; Chat Box Man; Dumpman and/or Spotter; Rip Rap Stone Man; Form Stripper; Landscape Gardener and Nurseryman; Packing Rod Steel and Pans; Window Cleaners; Cesspool Diggers and Installers; Concrete Dump Man - belt; Pipe and/or Hoseman; Astro-turf Layers; Clean-up, Bull Gang and Trackman - railroad; Chipper (clearing and grubbing)

Group 2: Cement Finisher Tender; Concrete Curer (Impervious Membrane); Cutting Torch Operator; Fine Grader (highway, engineering and sewer work only); Kettleman - Tarman; Power-type Concrete Buggy

Group 3: Chuck Tender (except tunnel); Sandblaster (Pot Tender); Powderman Tender; Spikers and Wrenchers; Rip Rap Stone Pavers; Creosote Tie-man; Guinea Chaser; Bander

Group 4: Operator and Tenders of pneumatic and electric tools; Concrete Vibrating Machines; Chain Saw Machines (on clearing and grubbing); Floor Sanders - concrete; Hydraulic Jacks and similar mechanical tools not separately herein classified; Cement Dumpers (skip-type Mixer or handling bulk cement); Pipe Caulker and/or Backup Man (pipeline); Rigger/Signalman (pipeline); Pipe Wrapper; Cribber and Shorer (except tunnel); Pneumatic Gopher

Group 5: Grade Setter (pipeline); Driller; Jackhammer and/or Pavement Breakers; Pipe Layer (including but not limited to non-metallic, transite and plastic pipe, water pipe, sewer pipe, drain pipe, underground tile and conduit); Rock Slinger; Asphalt Rakers and Ironers; Air and water Wash-out Nozzleman; Scaler (using Bos'n's Chair or Safety Belt); Tampers (mechanical, all types); Hand-guided Trencher and similar operated equipment; Precast Manhole Erector

Group 6: Driller (Core, Diamond, Wagon or Air Track); Sandblaster (Nozzleman); Concrete Saw (hand-guided); Concrete Cutting Torch; Drill Doctor and/or Air Tool Repairman; Gunman and Mixerman (Gunité)

Group 7: Gunité Nozzleman or Rodman; Scaler (Drillers); Form Setter and/or Builder; Welders and/or Pipe Layers, installing process piping; Drillers, Joy Mustang, PR 143, 220 Gardener-Denver, Hydrasonic; Powder Man

LABORERS (cont'd)
(Tunnel and Shaft Workers)

Group 1: Bull Gang, Muckers, Trackman; Dumpmen; Concrete Crew (includes Rodders and Spreaders); Grout Crew; Swamper (Brakeman and Switchmen on tunnel work)

Group 2: Nipper; Chucktender, Cabletender; Vibratorman, Jackhammer, Pneumatic Tools (except Driller)

Group 3: Grout Gunman

Group 4: Timberman, Retimberman - wood or steel blaster, Driller, Powderman; Cherry Pickerman; Powderman - Primer House; Steel Form Raiser and Setter; Kemper and other pneumatic concrete placer Operator; Miner - Finisher; Miners - Tunnel (hand or machine)

Group 5: Diamond Drill

Group 5A: Shaft and Raise Miner Welder

RW-10

**POWER EQUIPMENT OPERATORS
(Except Piledriving and
Steel Erection)**

- Group 1
- Group 2
- Group 3
- Group 4
- Group 5
- Group 5A
- Group 6
- Group 7

Basic Hourly Rates	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
N AREA	C and S AREAS				
\$12.875	\$10.75	\$1.40	\$1.30		.08
13.335	11.21	1.40	1.30		.08
13.885	11.76	1.40	1.30		.08
14.545	12.42	1.40	1.30		.08
15.185	13.06	1.40	1.30		.08
15.565	13.44	1.40	1.30		.08
15.975	13.85	1.40	1.30		.08
16.715	14.59	1.40	1.30		.08

AREA DESCRIPTIONS

NORTHERN AREA:

Area north of a straight line drawn between a point 35 miles due north of the City Hall in Flagstaff and a point 35 miles due north of the City Hall in Kingman, extending to the Arizona/Nevada State Line on the west; and connecting to a point 35 miles due north of the City Hall in Holbrook, thence due east to the intersection of the Arizona/New Mexico State Line

CENTRAL and SOUTHERN AREAS:

All Areas not included in the Northern Area

RW-11

**POWER EQUIPMENT OPERATORS
(Except Piledriving and Steel Erection)**

Group 1: Air Compressor Operator; Field Equipment Servicemen Tender; Heavy-duty Repair Tender; Heavy-duty Welder Tender; Oiler; Pump Operator

Group 2: Conveyor Operator; Generator Operator - portable; Power Grizzly Operator; Self-propelled Chip Spreading Machine Conveyor Operator; Watch Fireman; Welding Machine Operator - gasoline and diesel power

Group 3: Concrete Mixer Operator - skip-type; Driver; Moto-paver, Slurry Seal Machine and similar type equipment; Dinky Operator (under 20 tons wt.); Motor Crane Driver; Power Sweeper Operator, self-propelled; Ross Carrier or Forklift Operator; Skip Loader Operator, all types with rated capacity 1 1/2 cu. yds. or less; Wheel-type Tractor Operator (Ford, Ferguson, or similar type) with attachments such as Fresno, Push Blade, Post Hole Auger, Mover, etc. excluding compacting equipment

Group 4: A-Frame Boom Truck or Winch Truck Operator; Asphalt Plant Fireman; Elevator Hoist Operator (including Tuskey Hoist or similar type); Grade Checker (excluding Civil Engineer); Multiple power Concrete Saw Operator; Pavement Breaker; Mechanical Compactor Operator, power propelled; Roller Operator, all types, except as otherwise classified; Scream Operator; Self-propelled Chip Spreading Machine Operator (including Slurry Seal Machine Operator; Stationary Pipe Wrapping and Cleaning Machine Operator; Tugger Operator

Group 5: Aggregate Plant Operator (including Crushing, Screening and Sand Plants, etc.); Asphalt Laydown Machine Operator; Asphalt Plant Mixer Operator; Beltcrete Operator; Boring Machine Operator; Concrete Mechanical Tamping, Spreading or Finishing Machine (including Clary, Johnson or similar types); Concrete Pump Operators; Concrete Batch Plant Operator, all types and sizes; Conductor, Brakeman or Handler; Drilling Machine; Elevating Grader Operator, all types and sizes (except as otherwise classified); Highline Cableway Signalman; Field Equipment Serviceman; Kolman Belt Loader Operator or similar with belt width 48" or over; Locomotive Engineer (including Dinky, 20 tons wt. and over); Moto-paver and similar type equipment Operator; Operating Engineer Rigger; Pneumatic-tired Scraper Operator (Turnapull, Euclid, Cat, D-W, Hancock and similar equipment) up to and including 12 cu. yds.; Power Jumbo Form Setter Operator; Pressure Grout Machine Operator (as used in heavy engineering construction); Road Oil Mixing Machine Operator; Roller Operator, on all types asphalt pavement; Self-propelled Compactor, with blade; Skip Loader Operator, all types rated capacity, over 1 1/2 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 Pipewrapping Machine Operator

Federal Register / Vol. 47, No. 79 / Friday, April 23, 1982 / Notices

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); Tifeman

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 8B: Heavy-duty Mechanic/Welder Tender

Group 8C: Field Equipment Serviceman or Fuel Truck Drivers

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)).

[FR Doc. 82-10928 Filed 4-22-82; 8:45 am]

BILLING CODE 4510-27-C

SPECIFICATIONS

for

INDIAN BEND WASH

SCOTTSDALE BIKE STOP

and

GREENBELT TRAIL SYSTEM

**SCOTTSDALE AND VICINITY
MARICOPA COUNTY, ARIZONA**

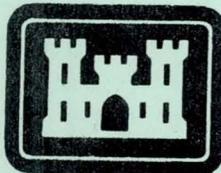
Authority:

**Energy and Water Development
Appropriation Act of FY 82
(PL 97-88)**

Appropriation:

**96x3122 Construction General
Corps of Engineers, Civil**

96x8862 Contributed Funds, Other



**US Army Corps
of Engineers**
Los Angeles District

T A B L E O F C O N T E N T S

PART I SPECIAL PROVISIONS

PART II TECHNICAL PROVISIONS

<u>Section</u>	<u>Title</u>
1A	General Requirements
1B	Measurement and Payment
1D	Environmental Protection
2A	Clearing Site and Removing Obstructions
2B	Fills and Subgrade Preparation
2C	Excavation
2D	Aggregate Base
2E	Prime Coat and Weed Killer
2F	Asphalt Concrete
2G	Excavation, Trenching and Backfilling for Utilities System
2H	Stone Protection
2I	Fence
2K	Concrete Sidewalks, Bike Paths, Curbs and Gutters
2M	Miscellaneous Items of Work
2O	Trees, Shrubs
2Q	Pavement Markings
2S	Irrigation System
2U	Desert Granite and Miscellaneous Aggregates
3A	Concrete
3B	Formwork For Concrete
3C	Steel Bars, Welded Wire Fabric and Accessories For Concrete Reinforcement
3E	Pneumatically Placed Concrete
3F	Grouting Stone Protection
4A	Reinforced Masonry
5A	Structural Steel
5B	Miscellaneous Metal
6A	Rough Carpentry
7A	Roofing, Strip Shingles
7B	Sheet Metalwork
7C	Calking and Sealants
8A	Steel Doors and Frames
8C	Hardware; Builders' (General Purpose)
9A	Painting, General
10A	Metal Toilet Partition Doors
10B	Toilet Accessories
11K	Miscellaneous Items
13A	Prefabricated Structures
15A	Plumbing, General Purpose
15E	Sewers; Sanitary, Gravity
15F	Waterlines
16A	Electrical Distribution and Street Lighting System; Underground

Amz

PART I
SPECIAL PROVISIONS

Equipment ownership

Index

- | | |
|--|---------------------------------------|
| 1. Commencement Prosecution and Completion of Work | 6. Salvage Materials and Equipment |
| 2. Liquidated Damages | 7. Layout of Work |
| 3. Contract Drawings, Maps and Specifications | 8. Quantity Surveys |
| 4. Contractor Submittals | 9. Damage to Work |
| 5. Physical Data | 10. Performance of Work by Contractor |
| | 11. Contractor Quality Control |
| | 12. Progress Schedule |

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 ~~360~~ calendar days after the date of receipt of notice to proceed, except seeding shall be accomplished as soon as practicable within time limits stated in 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 sums 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.

Drawing No.

(District File No.)

Title

244/174	Index to Contract Drawings
244/175	Reach 1
244/176	Reach 2
244/177	Reach 3
244/178	Reach 3 and 4
244/179	Bike Trail-Typical Sections/Details
244/180	Bike Trail Bridge and Terraced Slope Details
244/181	Bike Trail Bridge Details
244/182	Electrical Schedule and Lighting Details
244/183	Site Plan
244/184	Layout Plan
244/185	Grading Plan
244/186	Utility Plan

244/187	Tree and Shrub Plan
244/188	Ground Cover Plan
244/189	Irrigation Plan
244/190	Bike Stop Gate, Bike Parking, and Fire Ring Details
244/191	Bike Stop Planting Details and Details of Ramada
244/192	Bike Stop Amenities-Details
244/193	Bike Stop Restroom Plan, Sections and Details
244/194	Bike Stop Restrooms-Foundation and Roofing Plans and Sections
244/195	Septic Tank Details
244/196	McDonald Underpass Layout and Details

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 General Provision 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.

5.3 Weather Conditions. Meteorological 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
April	83	53	68	104	32
May	92	60	76	113	40
June	102	69	85	117	50
July	104	78	91	118	61
August	102	76	89	117	60
September	98	69	84	118	47
October	87	57	72	105	34
November	75	45	60	92	25
December	66	39	52	88	22

* 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 Street, Los Angeles, California.

5.4 Transportation Facilities. The Southern Pacific Company serves the area adjacent to the site of the work. The Contractor shall investigate the availability of sidings and shall make all arrangements with the railroad company for any siding, spurs, or other facilities necessary for the delivery of materials to be used on the work. The Contractor shall make his own investigation of the condition of available public and private roads and of clearances, restrictions, bridge load limits, and other limitations affecting transportation and ingress and egress at the site of work. It shall be the Contractor's responsibility to construct and maintain at his own expense, any haul roads required for construction operations.

5.5 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, Foundation and Materials 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 (1965 APR OCE).

7.1 ~~The Government will establish the control points and bench marks at the site of the work:~~

Necessary additional information relating to lines and grades will be made available to the Contractor.

7.2 From the ~~information~~ and bench marks established by the Government 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, templates, platforms, equipment, tools and material, and all labor as may be required in laying out any part of the work from the 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. QUANTITY SURVEYS (1979 MAR).

8.1 The Contractor shall make such surveys and computations as are necessary to determine the quantities of work performed or placed during each period for which a progress payment is to be made. The Contractor shall also make original and final surveys. The Government will make such computations as are necessary to determine the quantities of work performed or finally in place. Unless waived by the Contracting Officer in each specific case, quantity surveys made by the Contractor shall be made under the direction of a representative of the Contracting Officer.

8.2 All original field notes, computations and other records of the Contractor for the purposes of layout, original, progress and final surveys shall be furnished promptly to the representative of the Contracting Officer at the site of the work and shall be used by the Contracting Officer to the extent necessary in determining the proper amounts of progress and final payments. A copy of the original notes, computations and records furnished to the Contracting Officer shall be retained by the Contractor.

9. 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.

10. PERFORMANCE OF WORK BY CONTRACTOR (1965 JAN). The Contractor shall perform on the site, and with his own organization, work equivalent to at least 35 percent 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.

11. CONTRACTOR QUALITY CONTROL. The Contractor shall provide and maintain an effective quality control program that complies with the General Provision clause of the contract entitled "Contractor Inspection System."

11.1 The Contractor shall establish a quality control system to perform sufficient inspection and tests of all items of work, including that of his subcontractors, to ensure conformance to applicable specifications and drawings with respect to the materials, workmanship, construction, finish, functional performance, and identification. This control will be established for all construction except where the Technical Provisions of the contract provide for specific Government control by inspections, tests or other means. The Contractor's control system will specifically include the surveillance and tests required in the Technical Provisions of the contract specifications.

11.2 The Contractor's quality control system is the means by which he assures himself that his construction complies with the requirements of the contract plans and specifications. The controls shall be adequate to cover all construction operations and should be keyed to the proposed construction sequence.

11.3 The Contractor's job supervisory staff may be used for quality control, supplemented as necessary by additional personnel for surveillance, special technicians, or testing facilities to provide capability for the controls required by the Technical Provisions of the specifications. Prior approval is required for facilities, equipment, and personnel used by the Contractor in performing the specified tests.

11.4 After the contract is awarded and before construction operations are started, the Contractor shall meet with the Contracting Officer, or his representative, and discuss quality control requirements. The meeting shall develop mutual understanding relative to details of the system, including the forms to be used for recording the quality control operations, inspections, administration of the system, and the interrelationship of Contractor and Government inspection.

11.5 The Contractor shall submit for approval within 7 days after the receipt of the Notice to Proceed a quality control plan which shall include the procedures, instructions, and reports to be used. This document will include as a minimum:

- (1) The quality control organization.
- (2) Number and qualifications of personnel to be used for this purpose.
- (3) Authority and responsibilities of quality control personnel.
- (4) Methods of quality control including that for his subcontractor's work.
- (5) Test methods including, as specified, name of qualified testing laboratory to be used.
- (6) Method of documenting quality control operation, inspection, and testing.
- (7) A copy of a letter of direction to the Contractor's representative responsible for the quality control, outlining his duties and responsibilities, and signed by a responsible officer of the firm.

11.6 Unless specifically authorized in writing no construction shall be started until the Contractor's quality control plan is approved.

11.7 All compliance inspection will be recorded on an approved form, including but not limited to the specific items required in the Technical Sections of the Specifications. This form, to include records of corrective action taken, will be furnished to the Government as required by the Contracting Officer.

11.8 If recurring deficiencies in an item or items indicate that the quality control system is not adequate, such corrective actions will be taken as directed by the Contracting Officer.

11.9 In the event the Contractor fails to satisfactorily perform any required inspections and tests; to submit timely, complete, and factual reports and test data; or otherwise comply with the quality control provisions, the Contracting Officer may provide these services from another source and all costs for providing these services will be deducted from payments due the Contractor.

12. PROGRESS SCHEDULE.

12.1 Reference is made to the General Provision entitled "Progress Charts and Requirements for Overtime Work."

12.2 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.

13 Equipment Ownership * * * * *

Amr

PART II
TECHNICAL PROVISIONS
SECTION 1A
GENERAL REQUIREMENTS

Index

- Am-2*
1A-2
- | | |
|---|---|
| 1. Applicable Publications | 8. Archeological Findings During Construction |
| 2. Project Facilities | 9. Public Utilities, Notices, and Restrictions |
| 3. Construction Signs | 10. Public Safety |
| 4. Bulletin Board | 11. Occupational Safety and Health Act (OSHA) Standards |
| 5. Maintenance and Disposal of Project Facilities | 12. Quality Control |
| 6. Scrap Material | |
| 7. Salvage Materials | |

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 Bulletin Board at the Contractor's office.

2.3 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. 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.

5. MAINTENANCE AND DISPOSAL OF PROJECT FACILITIES. The Contractor shall maintain the project facilities in good condition throughout the life of the project. Upon completion of work under this contract, the facilities covered under this section

will remain the property of the Contractor and shall be removed from the site at his expense.

6. 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.

7. 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.

8. 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.

9. PUBLIC UTILITIES, NOTICES, AND RESTRICTIONS.

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

9.2 Relocation or Removal. Utilities to be relocated or removed not as part of this contract are designated "To be Relocated by Others" or "To be Removed by Others," respectively. Utilities shown on the plans and not so designated will be left in place and be subject to the provisions of the clause: PROTECTION OF EXISTING VEGETATION, STRUCTURES, UTILITIES, AND IMPROVEMENTS of the General Provisions. 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.

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

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

9.5 Notices.

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

City of Scottsdale
Utility Billing
3939 Civic Center Plaza
Scottsdale, Arizona 85251
Attention: Cindy Ely
Telephone: 994-2463

Mountain Bell Telephone
3629 N. Wells Fargo
Scottsdale, Arizona 82561
Attention: Ev Hall
Telephone:

Carl Beck - 994-7269
Cable Repair - 994-9181

Salt River Project
Transmission and Distribution Department
P.O.Box 1980
Phoenix, Arizona 85001
Attention: Tom Allison
Telephone: 273-5946

Arizona Public Service, Station 1138
P.O.Box 21666
Phoenix, Arizona 85036
Attention: Bill Peck
Telephone: 271-7874
Operation Specialist

9.5.1.1 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.

9.5.1.2 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.

9.5.2 Existing Bench Marks and R/W Markers. The Contractor shall notify the Contracting Officer, in writing, 7 days in advance of the time he proposes to remove any bench mark or right-of-way marker.

9.5.3 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.

9.6 Restrictions.

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

10. PUBLIC SAFETY. Attention is invited to the general provision: 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. 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 Manual, EM 385-1-1, specified in the General Provision: ACCIDENT PREVENTION are both applicable to this contract. The most stringent requirement of the two standards will be applicable.

12. QUALITY CONTROL. The Contractor shall inspect the work of his own forces and the work of all subcontractors for compliance with the contract requirements and record the results of the inspections. Legible copies of the daily inspection reports shall be maintained by the Contractor at the project site at all times and the original copies of the "Construction Quality Control Report" shall be

delivered to the Contracting Officer on the work day following the date of the report.

12.1 Control of on-site construction. The Contractor's control shall include three phases of inspection for all definable features of work, as follows.

12.1.1 Preparatory inspection shall be performed prior to beginning any work on any definable feature of work. It shall include a review of contract requirements; a check to assure that all materials and/or equipment have been tested, submitted, and approved; a check to assure that provisions have been made to provide required control testing; examination of the work area to ascertain that all preliminary work has been completed; and a physical examination of material and equipment to assure that they conform to approved shop drawings or submittal data and that all material and/or equipment are on hand.

12.1.2 Initial inspection shall be performed as soon as work begins on a representative portion of the particular feature of work and shall include examination of the quality of workmanship as well as a review of control testing for compliance with contract requirements.

12.1.3 Follow-up inspections shall be performed daily to assure continuing compliance with contract requirements, including control testing, until completion of the particular feature of work.

12.2 The specified reports must be factual records of the Contractor's daily quality control activities and resulting actions. As such, they shall stress as major components of the report, the following:

(a) Phase(s) of construction underway during the time frame of the report. (i.e. earthwork, concrete work, structural steel erection, etc.)

(b) Phase (preparatory, initial, or follow-up), and locations of inspections and/or check tests that were made.

(c) Results of inspection, including nature of deficiencies observed and corrective actions taken or to be taken. If no inspections are listed on the report, it must be assumed that no inspections were made and that CQC is not being implemented.

(d) Report of tests performed, including those specified, with the results of the tests, including failures and remedial action to be taken. Test results, including all computations should be attached to the report form. Where test results cannot be completed by the time the report is submitted, a notation should be made that the test was performed and the approximate date test results will be available. Delayed test results should be submitted with the report form on the date received.

(e) Monitoring of materials and equipment upon arrival at the jobsite and prior to incorporation into the work for compliance with submittal approvals, damage and proper storage.

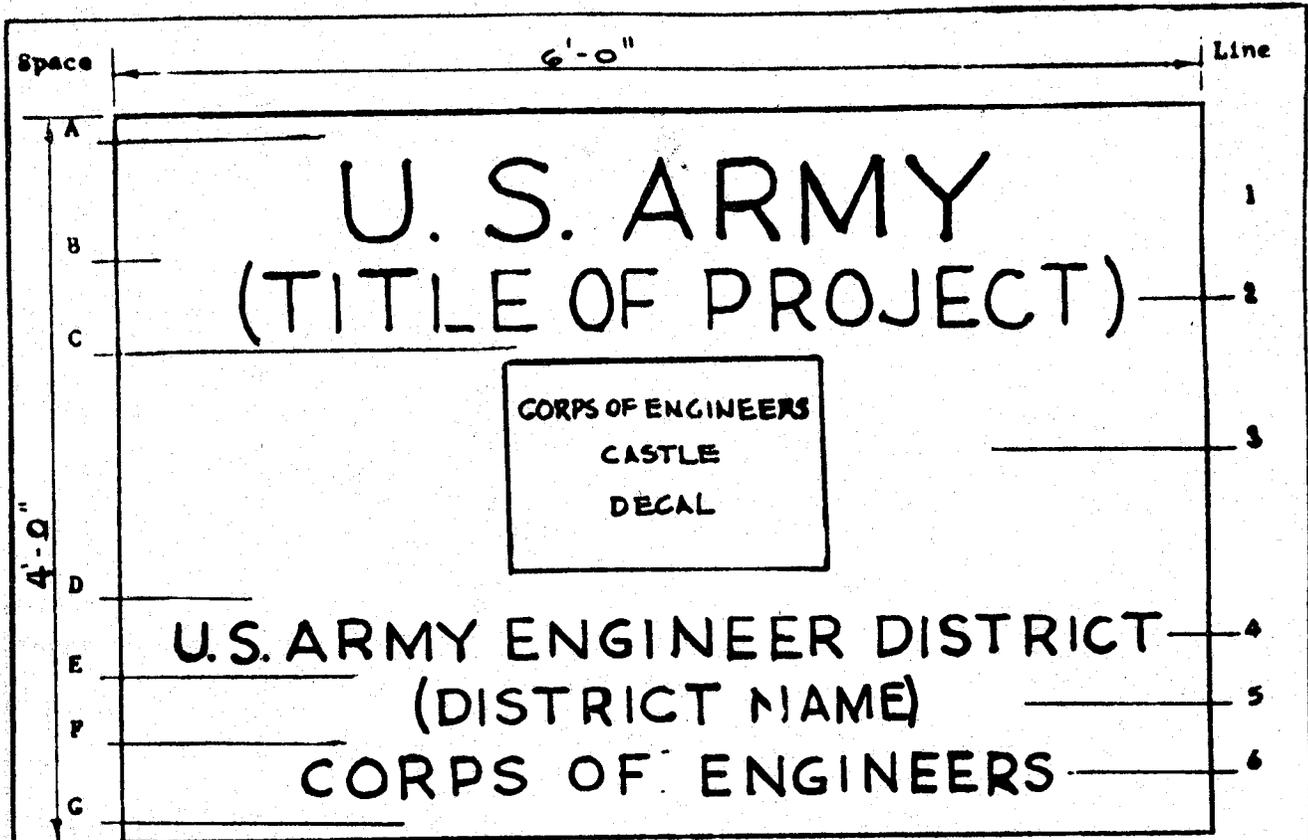
(f) Offsite surveillance activities.

(g) Job Safety.

12.3 The report must contain a record of inspections and tests for all work accomplished subsequent to the previous report. Separate reports in different phases of the work may be submitted by the responsible CQC inspectors or they may be combined into one consolidated report if all CQC activities and results are covered and the responsible CQC inspectors are identified.

13.4 In all cases, the report or reports must be verified and signed by the one person delegated this responsibility by the Contractor. The verification should contain the statement that all supplies and materials incorporated in the work are in compliance with the terms of the contract except as noted.

* * * * *



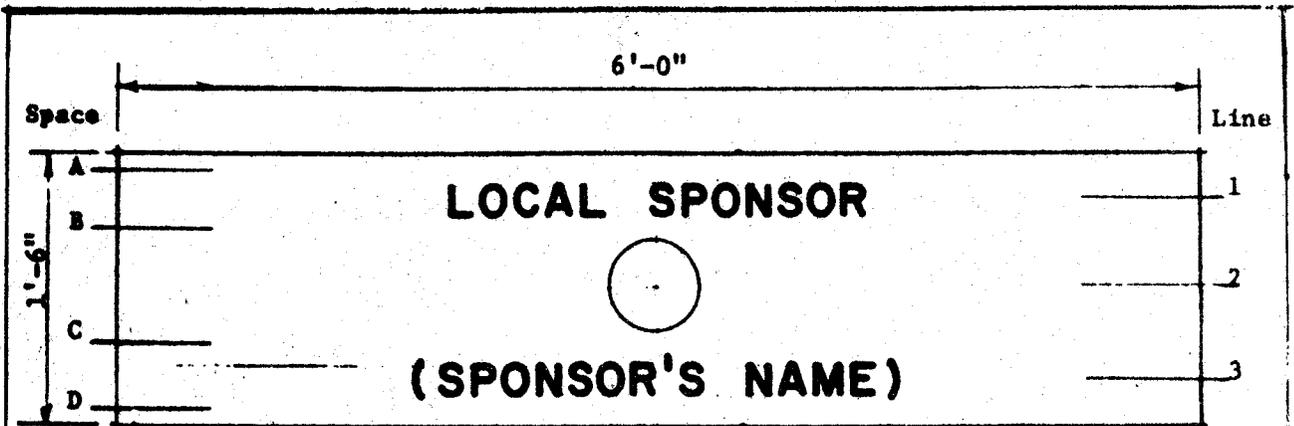
SCHEDULE

<u>Space</u>	<u>Height</u>	<u>Line</u>	<u>Description</u>	<u>Letter Height</u>	<u>Stroke</u>
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)	1 1/4"	--
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"				

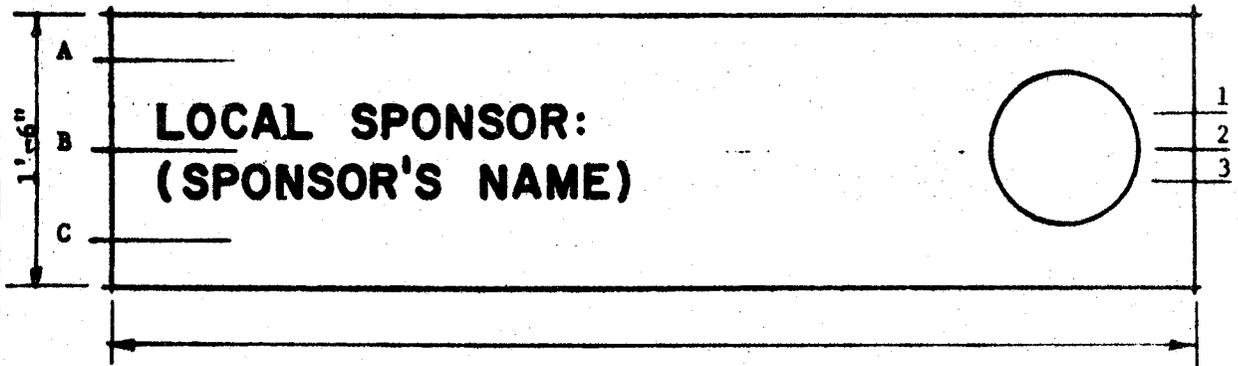
Lettering Color -- Black

PROJECT SIGN
(Army-Civil Works)

Figure 1
14 August 1972



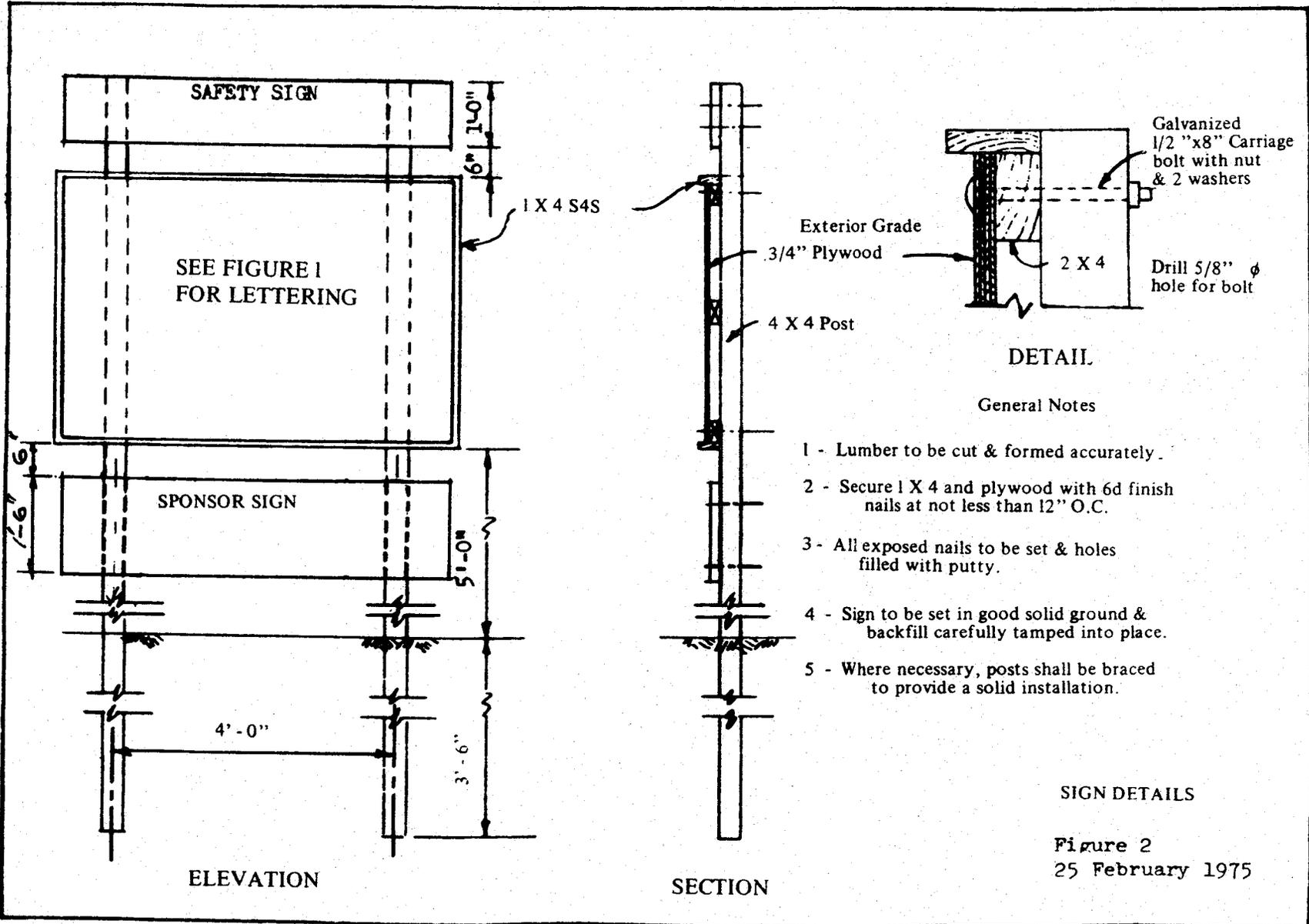
<u>Space</u>	<u>Height</u>	<u>Line</u>	<u>Description</u>	<u>Letter Height</u>	<u>Stroke</u>
A	2"				
B	2" Min.	1	LOCAL SPONSOR	2"	3/8"
C	2" Min.	2	SPONSOR'S EMBLEM (DECAL)		
D	2"	3	SPONSOR'S NAME	2"	3/8"



<u>Space</u>	<u>Height</u>	<u>Line</u>	<u>Description</u>	<u>Letter Height</u>	<u>Stroke</u>
A	6"				
B	2"	1	LOCAL SPONSOR	2"	3/8"
C	6"	2	SPONSOR'S EMBLEM (DECAL)		
		3	SPONSOR'S NAME	2"	3/8"

Lettering Color -- Black

Figure 1A
21 February 1975



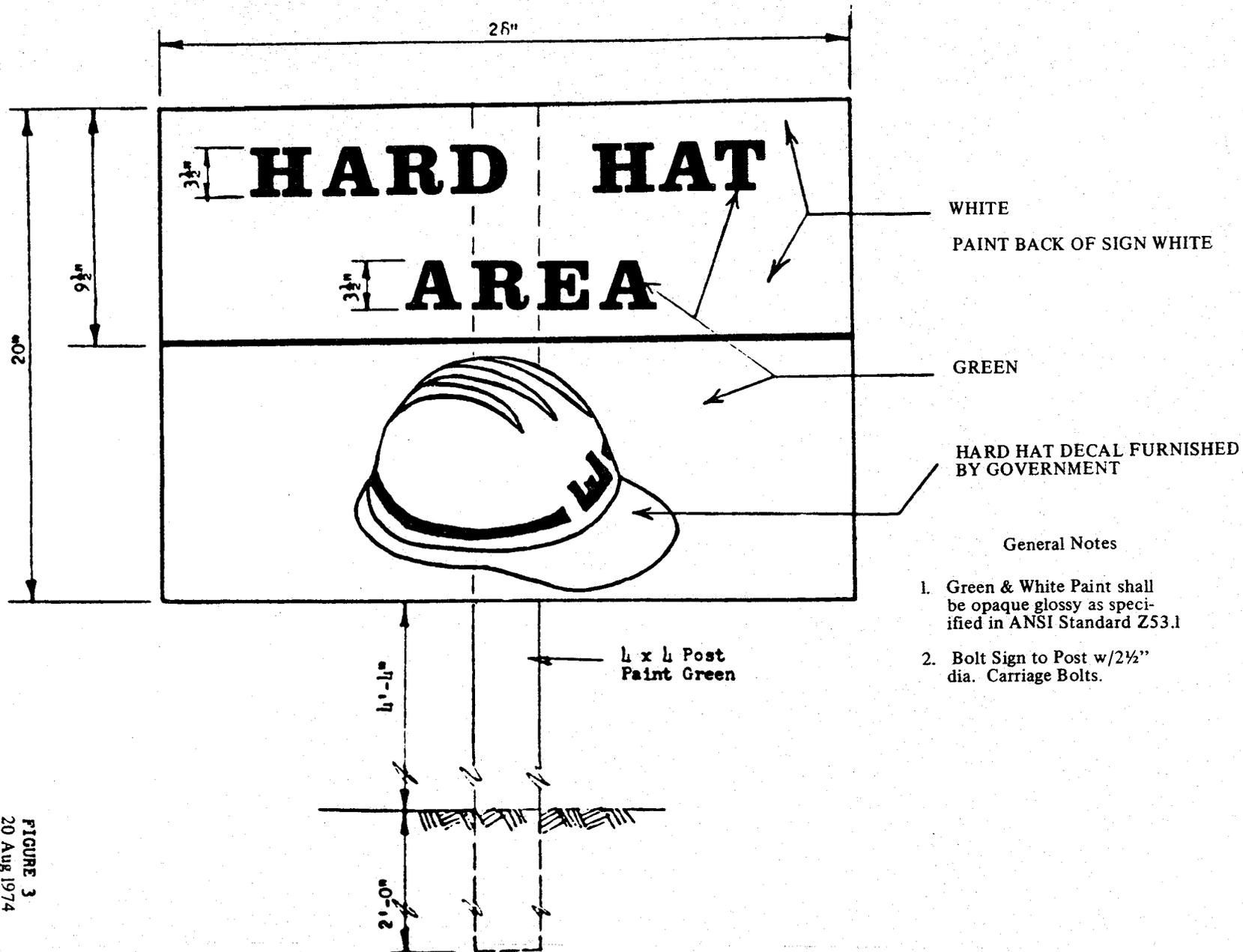


FIGURE 3
20 Aug 1974

SECTION 1B

MEASUREMENT AND PAYMENT

Index

- Am 2*
1A
- | | |
|--|--|
| 1. Clearing Site and Removing Obstructions | 14. Concrete Curb |
| 2. Earthwork | 15. Slope Paving |
| 3. Restroom | 16. Asphalt Concrete Pavement |
| 4. Ramada | 17. Modification of Existing Bike Path |
| 5. Prefabricated Metal Truss Bridge | 18. Maintenance Gate and Road |
| 6. Bike Trail Bridge | 19. Drainage Structures |
| 7. McDonald Underpass | 20. Trash Enclosure |
| 8. Waterline | 21. Bicycle Parking Area |
| 9. Electrical Work for Bike Stop | 22. Entry Gate |
| 10. Irrigation System | 23. Sidewalk Ramp |
| 11. Post and Chain Fence | 24. Ground Cover |
| 12. Concrete Bike Path and Walk | 25. Trees and Shrubs |
| 13. Lakeside Bike Path | 26. Signs |
| | 27. Site Furnishings |
| | 28. Trail Lighting |
| | 29. Pavement Marking |

1. CLEARING SITE AND REMOVING OBSTRUCTIONS. Payment for Clearing Site and Removing Obstructions, will be made at the applicable contract price, which payment shall constitute full compensation for clearing, obstruction removal and protection work, complete. Payment will also include all costs for removal of existing obstructions within the project work area, stock pile sites, and the obstructions indicated for removal; removal of materials for salvage; protection of existing trees, vegetation, undergrowth, utilities and features indicated to remain; and the disposal of all trash, debris, and removed materials.

Am 2
2. EARTHWORK.

2.1 Measurement. A survey of the site shall be made prior to commencement of work, and all measurements will be based on this survey. The unit of measurement for earthwork will be the cubic yard, computed by the average end area method from cross sections taken before and after the earthwork operations. The quantity paid for will be the number of cubic yards of material, measured between the original ground survey and the plotted cross sections taken immediately after the earthwork operations. The measurement will include the excavation below grade of unsatisfactory material where ordered and allowance will be made on the same basis for selected backfill ordered as replacement. The measurement will not include yardage excavated without authorization or the yardage of any material used for other than authorized purposes. Yardage of overburden stripped from borrow pits, unless used as borrow material, will not be paid for. The measurement will not include the yardage of any excavation performed prior to the taking of elevations and measurements of the undisturbed grade. No measurements will be made of earthwork required for bike path, sidewalks, pavement, utility and structure excavation which excavation will be paid for under the lump sum or unit price for the applicable item.

2.2 Payment.

2.2.1 Payment for Earthwork will be made at the applicable contract price, which payment shall constitute full compensation for excavation, fill, and disposal of

excavated materials, complete. Payment will also include haul, borrow, disposal, compaction, subgrade preparation and grading of surfaces to the new elevations and contours indicated.

2.2.2 Unsuitable Soils. No separate payment will be made for the excavation and disposal of unsuitable soils. When such excavation is directed, payment therefore will be included in the applicable contract price for the items of work under which the unsuitable soils are encountered. When there is no applicable contract item an adjustment will be made.

2.2.3 No separate payment will be made for excavation and backfill for structures, pavement, paths and utilities. All costs therefore shall be included in the applicable contract prices for the items to which the work applies.

3. RESTROOM. Payment for the Restroom will be made at the applicable contract price, which payment shall constitute full compensation for the building including earthwork, foundation, concrete slab, framing, roofing, interior finishes and fixtures, painting, plumbing, and appurtenant work, complete. Payment includes water service to a point 5 feet outside the building line and sewer service including the septic tank, cleanout, distribution box and lines, and seepage pits.

4. RAMADA. Payment for Ramada will be made at the applicable contract price, which payment shall constitute full compensation for ramada structure including earthwork, foundation, concrete slab, masonry work, framing and trim, finishes, painting, and appurtenant work, complete. Payment will not include picnic tables or barbeques for which separate payments are provided.

5. PREFABRICATED METAL TRUSS BRIDGE. Payment for the Prefabricated Metal Truss Bridge will be made at the applicable contract price, which payment shall constitute full compensation for the bridge including earthwork, abutment, cast-in place concrete deck, finishes, painting, and appurtenant work, complete.

6. BIKE TRAIL BRIDGE. Payment for Bike Trail Bridge will be made at the applicable contract price, which payment shall constitute full compensation for the concrete bridge and abutments, welded steel handrails and appurtenant work, complete.

7. McDONALD UNDERPASS. Payment for McDonald Underpass will be made at the applicable contract price, which payment shall constitute full compensation for the underpass from bike trail Station 61+05 to Station 69+60, complete.

8. WATERLINE. Payment for Waterline will be made at the applicable contract price, which payment shall constitute full compensation for trenching, backfilling, valves, fittings, and connection to the existing meter from a point 5 feet outside the restroom building line. Payment will also include drinking fountains, drywells, and appurtenant work.

9. ELECTRICAL WORK FOR BIKE STOP.

9.1 Payment for Electrical Work for Bike Stop waterline will be made at the applicable contract price, which payment shall constitute full compensation for trenching, backfilling and constructing electrical work; including connection to new service pedestal, pullbox, conduits and wiring, poles and fixtures, complete.

10. IRRIGATION SYSTEM. Payment for Irrigation System will be made at the applicable contract price, which payment shall constitute full compensation for

trenching, backfilling and constructing the drip irrigation system; including pressure regulators, controllers, emitters, valves, fittings, vacuum breaker, and appurtenant work, complete.

11. POST AND CHAIN FENCE.

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

11.2 Payment for Post and Chain Fence will be made at the applicable contract price, which payment will constitute full compensation for the fencing, complete.

12. CONCRETE BIKE PATH AND WALKS.

12.1 Measurement of Concrete Bike Path and Exposed Aggregate Walk will be in square yards in place.

12.2 Payment for Concrete Bike Path, 4-Inch will be made at the applicable contract price, which payment shall constitute full compensation for the 4-inch thick bike paths including cutoff walls, expansion joints, crack control joints, handicap ramp, parking area walks, earthwork, subgrade preparation, and appurtenant work, complete.

12.3 Payment of Exposed Aggregate Walk will be made at the applicable contract price, which payment shall constitute full compensation for the concrete walks with exposed aggregate surfacing, applicable earthwork, subgrade preparation, and appurtenant work, complete. Payment will not include exposed aggregate surfacing at bicycle parking are for which separate payment is provided.

13. LAKESIDE BIKE PATH. Payment for Lakeside Bike Path will be made at the applicable contract price, which payment shall constitute full compensation for concrete bike path north of Murray Lane, reinforcing, handrail, and appurtenant work, complete.

14. CONCRETE CURB.

14.1 Measurement of Concrete Curb will be based on the actual linear feet measured horizontally from end-to-end of concrete curb acceptably constructed, complete. Measurement of depressed curbs and handicap ramps will also be included.

14.2 Payment for Concrete Curb will be made at the applicable contract price, which payment shall constitute full compensation for curb construction including subgrade preparation, concrete materials, placing, finishing and curing, complete.

15. SLOPE PAVING.

15.1 Measurement of Slope Paving will be made on the sloped surface and be based on the actual number of square yards of concrete, or shotcrete, acceptably constructed.

15.2 Payment for Slope Paving will be made at the applicable contract price, which payment shall constitute full compensation for subgrade preparation, concrete materials, placing, finishing and curing, complete.

16. ASPHALT CONCRETE PAVEMENT.

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

16.2 Payment for Asphalt Concrete Parking Lot will be made at the applicable contract price, which payment shall constitute full compensation for asphalt concrete pavement, complete, in place, including subgrade preparation, base course, prime coat, weed killer, and all incidentals.

16.3 Payment for Asphalt Concrete Bike Path will be made at the applicable contract price, which price shall constitute full compensation for asphalt concrete path including subgrade preparation, base course, prime coat, weed killer, and all incidentals.

17. MODIFICATION OF EXISTING BIKE PATH. Payment for Modification of Existing Bike Path will be made at the applicable contract price, which payment shall constitute full compensation for the modification of the existing grouted stone bike path, including surface preparation and reinforced concrete overlay, complete.

18. MAINTENANCE GATE AND ROAD. Payment for Maintenance Gate and Road will be made at the applicable contract price, which payment shall constitute full compensation for preparation of subgrade, furnishing, placing and compacting crushed rock surfacing, driveway, redwood headers, footing, post, chain, and lock, complete.

19. DRAINAGE STRUCTURES.

19.1 Payment for Drainage Channel will be made at the applicable contract price, which payment shall constitute full compensation for the grouted stone used for the drainage channel, including applicable earthwork, complete.

19.2 Payment for Drainage Pipe will be made at the applicable contract price, which payment shall constitute full compensation for drainage pipe, including earthwork, gravel, and sawcutting, complete.

19.3 Payment for Drainage Scupper will be made at the applicable contract price, which payment shall constitute full compensation for concrete scupper, including earthwork, steel plate, frame, and applicable work complete.

20. TRASH ENCLOSURE. Payment for Trash Enclosure will be made at the applicable contract price, which payment shall constitute full compensation for reinforced masonry enclosure, footings, slab and posts, complete.

21. BICYCLE PARKING AREA. Payment for Bicycle Parking Area will be made at the applicable contract price, which payment shall constitute full compensation for concrete apron, exposed aggregate parking area, and bicycle racks in place.

22. ENTRY GATE. Payment for Entry Gate will be made at the applicable contract price, which payment shall constitute full compensation for earthwork, footings, posts, gate and lock, complete.

23. SIDEWALK RAMP. Payment for sidewalk ramp will be made at the applicable contract price, which payment shall constitute full compensation for removal of concrete sidewalk, curb and gutter, and installation of sidewalk ramp, complete.

24. GROUND COVER. Payment for Ground Cover will be made at the applicable contract price, which payment shall constitute full compensation for all furnishing, and placing ground covers including desert granite surfacing, complete.

25. TREES AND SHRUBS. Payment for Trees and Shrubs will be made at the applicable contract price, which payment shall constitute full compensation for planting trees, shrubs, application of sprays, pruning, care and protection of existing vegetation, and maintenance, complete.

26. SIGNS. Payment for Sign A, Sign B, and Trail Signs will be made at the applicable contract price, per each, which payment shall constitute full compensation for obtaining materials, fabrication and installation of signs, complete, exclusive of furnishing signage messages indicated to be furnished by the Government and installed by Contractor. Payment shall also include construction of supporting construction, appurtenant metal, wood, concrete, and earthwork as required for each type of sign and post.

27. SITE FURNISHINGS. Payment for Litter Receptacles, Benches, Picnic Tables, and Barbeques will be made at the applicable contract prices, per each, which payments shall constitute full compensation for furnishing and installing site furniture, as indicated and applicable work, complete.

28. TRAIL LIGHTING. Payment for Trail Lighting will be made at the applicable contract price, which payment shall constitute full compensation for lighting and fixtures including connections to existing electrical system, service pedestal, fixture bases, ground rods, conduit, wiring, pull boxes, and appurtenant work, complete.

29. PAVEMENT MARKING. Payment for Pavement Marking will be made at the applicable contract price, which payment shall constitute full compensation for preparation and application of markings for paved parking lot, complete.

* * * * *

SECTION 1D

ENVIRONMENT PROTECTION

Index

- | | |
|--|---|
| 1. Scope | 9. Protection of Water Resources |
| 2. Reference | 10. Protection of Fish and
Wildlife |
| 3. General | 11. Disposal of Cleared and
Grubbed Material and Other
Debris |
| 4. Notification | 12. Dust Control |
| 5. Subcontractors | 13. Maintenance of Pollution
Control Facilities During
Construction |
| 6. Implementation | |
| 7. Protection of Land Resources | |
| 8. Recording and Preserving
Historical and Archeological
Finds | |

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 and 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.

7.3 Restoration of Landscape Damage. Any trees, shrubs, 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, shrubs, and other landscape features shall be performed in an approved manner by experienced workmen. Items damaged beyond restoration shall be removed and disposed of under requirements of clearing and grubbing. Trees and shrubs that are to be removed because of damage shall be replaced at the Contractor's expense by mature, acceptably grown, trees of the same species or a species approved by the Contracting Officer. The size and quality of all replacements shall also be approved by the Contracting Officer.

7.4 Location of Campsites, Storage and Housing Facilities. Contractor's camps, 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 campsites, storage, and housing facilities shall be submitted for approval of the Contracting Officer. Where buildings or tent 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 ARCHEOLOGICAL FINDS. All items having any apparent historical or archeological interest which are discovered in the course of any construction activities shall be carefully preserved. The Contractor shall leave the archeological 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, water courses, 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 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 waterflows 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. Disposal of cleared and grubbed materials shall conform to section: CLEARING SITE AND REMOVING OBSTRUCTIONS.

11.2 Burning: No burning will be permitted.

12. DUST CONTROL. The Contractor will be required to maintain all excavations, embankments, stockpiles, 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 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.

* * * * *

SECTION 2A

CLEARING SITE AND REMOVING OBSTRUCTIONS

Index

- | | |
|---|--|
| 1. Requirements | 4. Protection and Support of Utilities |
| 2. Disposal of Cleared and Grubbed Material | 5. Tree or Plant Relocation |
| 3. Easement Obstructions | |

1. REQUIREMENTS.

1.1 General. Except as otherwise specified, and/or indicated areas to be cleared and grubbed will be limited to actual excavation area 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.

1.2 Existing Structures and Obstructions. The Contractor shall clear the site, including all fill and excavation areas, and remove and dispose of all existing structures and obstructions for trail construction, except as otherwise noted on the drawings. Obstructions which are designated or specified to be removed by others shall not be removed by the Contractor. Except as otherwise specified, obstructions designated to be removed by others will be removed in sufficient time to preclude interference with the Contractor's operations. Utility relocations are not considered obstructions. 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, and shall be removed from the site.

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.

1.4 Grubbing shall consist of removing all stumps, roots, logs, and other objectionable vegetable matter in the required fills, foundation areas, and all excavation areas.

1.5 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.

1.6 Concrete and asphalt pavement in existing construction, which will join new concrete or new construction, shall be saw cut to a depth of 2 inches and shall be removed in a manner to provide plane surfaces to which new bike path shall be bonded, unless otherwise specified.

1.7 Paving or grouted stonework within the limits of the work shall be removed to the neat lines indicated, to the full section depth of the surfacing and existing base, and shall be removed to a vertical plane. All excess pavement removed shall be replaced at the expense of the Contractor.

1.8 The removal of materials for salvage 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 lieu of salvaging such material. Such new materials shall be the equivalent of existing materials.

1.9 Existing Structures within construction areas to remain shall be protected and supported as necessary during removal and construction operations.

2. DISPOSAL OF CLEARED AND GRUBBED 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. EASEMENT OBSTRUCTIONS.

3.1 General. Within the limits of the Contractor's work area, except the area required for excavation for the trails and related appurtenances, existing improvements shall remain. If such improvements are removed or damaged by the Contractor, they shall be restored by the Contractor at no cost to the Government.

3.2 Trees located outside of the excavation limits and within the limits of Contractor's work area, shall remain in place.

4. PROTECTION AND SUPPORT OF UTILITIES.

4.1 General. The Contractor shall adequately support and protect from damage all existing utilities which are located within, or close to the construction area and which are to remain in place.

5. TREE OR PLANT RELOCATION. Trees or plants to be relocated shall be removed, protected, and maintained until replanted. Removal, pruning, and planting shall be accomplished by experienced nurserymen. The Contractor shall maintain replanted trees or plants for a period of 90 days. Damaged or destroyed trees or plants shall be replaced with equal size and type of trees or plants.

* * * * *

SECTION 2B

FILLS AND SUBGRADE PREPARATION

Index

- | | |
|---|---|
| 1. Applicable Publications | 4. Compacted Fill, Bike Path and Street |
| 2. Equipment | 5. Backfills |
| 3. General Requirements for Compacted Fills and Compacted Backfills | 6. 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) Standards.

- | | |
|--------------------|--|
| D 698-78 | Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using a 5.5-Lb. (2.49 kg) Rammer and a 12-In. (305-mm) Drop |
| D 1556-64 (R 1974) | Density of Soil In Place by the Sand-Cone Method |
| D 1557-78 | Moisture-Density Relations of Soils Soils, and Soil-Aggregate Mixtures Using a 10-Lb. (4.5-Kg) Rammer and 18-In. (457-mm) Drop |

1.2 American Association of State Highway and Transportation Officials (AASHTO) Standards.

- | | |
|-----------------|--|
| T 99-74 | Moisture-Density Relations of Soils 5.5-Lb. (2.5 Kg) Rammer and a 12-In. (305mm) Drop |
| T 180-74 | Moisture-Density Relations of Soils Using a 10-Lb. (4.54 Kg) Rammer and an 18-In. Drop |
| T 191-61 (1974) | Density of Soil In Place by the Sand-Cone Method |

2. EQUIPMENT. All equipment, tools, and machines shall be maintained in satisfactory working condition at all times. Compaction equipment shall be suitable for consistently producing uniform soil densities.

3. GENERAL REQUIREMENTS FOR COMPACTED FILLS AND COMPACTED BACKFILLS.

3.1 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 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 compaction of any material in the work. The moisture-density relations shall be determined in a laboratory in accordance with the following requirements.

3.1.1.1 Outside of Street, Road, and Highway Rights-of-Way. AASHTO T 99, Method D or ASTM D 698, Method D, modified as specified hereafter.

3.1.1.2 Within Street, Road, and Highway Rights-of-Way. AASHTO Standard T 180, Method D, or ASTM Specifications D 1557, Method D, modified as specified hereafter.

3.1.1.2.1 All material over 3/4 inch in size will be removed and replaced with an equal portion of material between 0.187 inch, No. 4 sieve, and 3/4 inch in size.

3.1.1.2.2 A separate batch of materials will be used for each compaction test specimen. No materials will be re-used.

3.1.1.2.3 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 50 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.

3.1.3 Moisture-Density Curves for Cohesionless and Cohesive Materials. Cohesionless materials include gravels, gravel-sand mixtures, sands, and gravelly sands. Cohesive materials include clayey and silty gravels, gravel-silt mixtures, clayey and silty sands, sand-clay mixtures, clays, silts, and very fine sands. When results of compaction tests for moisture-density relations are recorded on graphs, cohesionless soils will show straight lines or reverse-shaped moisture-density curves, and cohesive soils will show normal moisture-density curves.

3.2 Settling of Fills or Backfills with Water will not be permitted.

3.3 Material.

3.3.1 Material used for fill shall be obtained from the required excavation 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 inches or more than 3/4 of the layer thickness.

3.3.2 Materials used for fill shall be free of clays and adobe materials and shall have a coefficient of expansion less than 3 percent from air dry to saturation under a surcharge of 60 pounds per square foot at 90 percent compaction.

3.4 Placement. Fill material shall not be placed against concrete which has not been in place at least 14 days or until the concrete has attained a strength of 2,500 psi when tested in accordance with the section: CONCRETE. 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 requirements of the paragraph BACKFILL, PIPE TRENCHES. Compacted fill and backfill shall be placed with suitable equipment in horizontal layers which after compaction, shall not exceed 12 inches in depth for rubber-tired or vibratory rollers, 6 inches in depth for tamping rollers, and 4 inches in depth when mechanical tampers are used. The Contractor may vary the layer thickness within these limits for most efficient operations. Material containing stones shall be placed in a manner to prevent the stones from striking the concrete structures and to prevent the formation of voids.

3.5 Moisture Content. Material shall have a uniform moisture content while being placed and compacted. Water shall be added at the source, if required, or by sprinkling each layer of material during placement. Uniform distribution of moisture shall be obtained by disking, harrowing, or otherwise manipulating the soil during and after time water is added. Material containing an excess of moisture shall be manipulated with suitable implements to facilitate maximum aeration and shall be permitted to dry to the proper consistency before being compacted. Fill shall have a maximum moisture content of not more than 3 percent above optimum and a minimum moisture content of not less than 3 percent below optimum.

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

4. PVIOUS BACKFILL.

4.1 Placement. The pervious backfill material shall be placed behind bridge abutments in horizontal layers which shall not exceed 12 inches in depth before compaction.

4.2 Compaction. Each layer of pervious backfill shall be compacted to not less than 95 percent of maximum density.

5. COMPACTED FILL, BIKE PATH.

5.1 Location. Compacted bike paths fill shall consist of fill placed for bridge approaches, new road and bike path construction, and all other fill and backfill within the right-of-way. The bike path and bridge approach work includes fill and backfill for bike path, curbs, and driveways.

5.2 Placing. The fill in back of or around bike path and bridge approaches shall not be placed until 14 days after the top slab or deck has been placed or until the concrete has attained the required strength of 3,000 pounds per square inch when tested in accordance with the section: CONCRETE.

5.3 Compaction. Each layer of bike path fill shall be compacted to not less than 90 percent of maximum density, except the upper 2.5 feet of fill shall be compacted to not less than 95 percent of maximum density.

5.4 Trimming. All shoulders and side slopes shall be neatly and accurately trimmed to the cross section indicated.

6. BACKFILLS.

6.1 Backfill and Fill About Structures.

6.1.1 Location. Backfill and fill shall consist of all fill against and/or around structures except backfill for pipe trenches.

6.1.2 Material. Backfill and fill material shall be obtained from the required excavation as approved by the Contracting Officer. In general, the best material available will be designated as backfill and fill about structures. Backfill may consist of sand, gravelly sand, 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.

6.2 Backfill, Pipe Trenches.

6.2.1 Location. Backfill for pipe trenches shall consist of all fill placed in pipe trench or open excavation for pipes, drains and sewers.

6.2.2 Material shall conform to the requirements in paragraph: BACKFILL AND FILL ABOUT STRUCTURES except that the material placed around the pipe and until the pipe has a cover of 2 feet, shall not contain any stone larger than 3/4 inch. Bedding under the pipe shall consist of compacted sand.

6.2.3 Placing. Backfill shall be placed in 4-inch layers.

6.2.4 Compaction of the material around the pipe, and until a pipe has a cover of 2 feet, shall be not less than 90 percent of maximum density. The compaction of the remainder of backfill shall be not less than 95 percent of maximum density.

7. SUBGRADE PREPARATION.

7.1 Subgrade Preparation for Bike Path Pavement Parking, Trails, 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 subgrade 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.

* * * * *

SECTION 2C

EXCAVATION

Index

- | | |
|------------------------------|------------------------------------|
| 1. General | 5. Excavation for Pipelines |
| 2. Blasting | 6. Removal of Unsatisfactory Soils |
| 3. Preservation of Property | 7. Disposal of Excavated Materials |
| 4. Excavation for Structures | 8. 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, sand, 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 pressure 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. Excavation for bridge footings shall be performed by hand methods. 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. Care shall be exercised when excavating for abutment subgrade elevations at footings exposed subgrade material shall be over excavated 8" (inches) and recompacted to 95 percent relative density. Subgrade material unsuitable for proper compaction shall be removed and replaced with granular material compacted to 95 percent

relative density or 2000 p.s.i. concrete. All subgrade preparation work shall be approved by the contracting officer.

5. EXCAVATION FOR BIKE PATHS will include excavation for curbs, sidewalks, depression, and driveways, including materials unsuitable for subgrade.

6. EXCAVATION FOR PIPELINES. All excavations shall be made by open cut unless otherwise specified. The banks of trenches shall be kept as nearly vertical as practicable. Unless otherwise indicated, trenches shall be not less than 12 inches wider nor more than 16 inches wider than the outside diameter of the pipe to be laid therein, and shall be excavated true to line, so that a clear space not less than 6 inches nor more than 8 inches in width is provided on each side of the pipe. The maximum width of trench specified applies to the width of and below the level of the top of the pipe; the width of the trench above the level may be made as wide as necessary for sheathing and bracing; and the proper installation of the work. The bottom of trenches shall be accurately graded to provide uniform bearing and support for each section of the pipe at every point along its entire length, except for portions of the pipe sections where it is necessary to excavate for the proper sealing of pipe joints. If soft, spongy, unsuitable material, or material which by reason of its nature cannot be properly shaped or finished to a true pipe subgrade is encountered, it shall be removed and replaced with compacted fill.

7. REMOVAL OF UNSATISFACTORY SOILS. The removal of soils which are unsatisfactory for foundations of the structures, bike path subgrade, 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.

8. DISPOSAL OF EXCAVATED MATERIALS. Excavated materials suitable for required fills shall be placed in temporary stock piles or used directly in the work. Excavated material not suitable for fills, all excess excavated material, organic and inorganic trash and unsatisfactory materials shall become the property of the Contractor and 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 disposal and 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 a manner to preclude ponding of water.

9. 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, and concreting occasioned thereby shall be by the Contractor at no additional cost to the Government.

* * * * *

SECTION 2D

AGGREGATE BASE

Index

- | | |
|--------------------------------------|-----------------------------------|
| 1. Applicable Publications | 8. Mixing and Placing Materials |
| 2. Materials | 9. Layer Thickness |
| 3. Sampling and Testing | 10. Compaction |
| 4. Equipment | 11. Smoothness Test |
| 5. Weather Limitations | 12. Thickness Control |
| 6. Preparation of Underlying Surface | 13. Maintenance |
| 7. Grade Control | 14. 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 No. 75-um (200) 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 131-80	Sieve 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 (1974)	Density of Soil in Place by the Sand-Cone Method
D 1557-78	Moisture-Density Relations of Soils, and Soils Aggregates Mixtures Using 10-lb. (4.5-kg) (Rammer and 18-in. (457-mm) Drop
E 11-81	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 known 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 shall 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 to thickness greater than 3, and an elongated particle is one having a ratio of length to width greater than 3.

2.1.1 Coarse 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 the 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 screening, 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 any component that is blended to meet the required gradation and shall also apply to the completed course. The portion of any component or of the completed 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 have a maximum size of one inch and shall be continuously graded within the limits specified below:

Sieve Designation	Percentage by Weight Passing Square-Mesh Sieve
1 inch	100
3/4 inch	90-100
1/4 inch	45-75
No. 200	2-9

The values are based on aggregate 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 shall be submitted for approval three (3) days 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 other 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 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, C136, and D 422, Sieves shall conform to ASTM E 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 50 cubic yards or fraction thereof, of material produced and results shall be submitted on a daily basis. Deviations from specifications requirements shall be corrected immediately upon discovery. After the material has been placed and compacted, one field density test for each square yards or fraction thereof of finished base course and one additional gradation, liquid-limit, and plasticity index test for each square yards of base course or fraction thereof shall be performed. Maximum-density moisture relations shall be established for each 50 cubic yards of base course material. The location of the after-placement tests shall be as directed. One copy 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 shall be 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 Material. The source of the material shall be selected three 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 of both the source and the materials will be based on specified tests performed on samples taken from the completed base course.

4. **EQUIPMENT.** All plant, equipment, and tools used in the performance of the work covered by this section will be subjected 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. **WEATHER LIMITATIONS.** Aggregate base courses shall be constructed when the atmospheric 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.

6. **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 the subgrade shall be inspected by the Contractor for adequate compaction and surface tolerances. The subgrade shall conform to section: **FILL 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 specifications 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.

7. **GRADE CONTROL.** During construction the lines and grades including 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.

8. **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, to minimize segregation and degradation, to reduce to accelerate loss or increase of water, and to insure a satisfactory aggregate base course meeting all the requirements of this specification.

9. **LAYER THICKNESS.** The compacted thickness of the aggregate base course shall be as indicated. When a compacted layer of 3 inches is indicated, the material may be placed in a single layer.

10. **COMPACTION.** Each layer of the aggregate base course 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 minimize segregation and degradation, to reduce or accelerate loss or gain of water, and to insure a satisfactory aggregate base course. Unsatisfactory materials shall be reworked to produce a satisfactory material.

11. SMOOTHNESS TEST. The surface of each layer 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.

12. THICKNESS CONTROL. The completed thickness of the base course shall be within 1/4 inch, plus or minus, of the thickness indicated. Thickness test shall be made and recorded by the Contractor. The thickness of the base course shall be measured at intervals in such manner that there will be a thickness measurement for at least 100 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 1/4 inch deficient in thickness, the Contractor, at no additional expense to the Government, shall correct such areas by scarifying, adding mixture of proper gradation, reblading, and recompacting, as directed. Where the measured thickness of the base course is more than 1/4 inch thicker than that indicated, it shall be considered as conforming with the specified thickness requirements plus 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.

13. MAINTENANCE. The Contractor shall maintain the aggregate base course in a satisfactory condition until the completed work is accepted.

14. WAYBILLS AND DELIVERY TICKETS. Copies of waybills or delivery tickets shall be attached to the Daily Contractor Quality Control 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.

* * * * *

SECTION 2E

PRIME COAT AND WEED KILLER

Index

- | | |
|----------------------------|---------------------------------------|
| 1. Applicable Publications | 6. Equipment |
| 2. Bituminous Materials | 7. Preparation of Surface |
| 3. Sampling and Testing | 8. Weed Killer |
| 4. Quantity To Be Applied | 9. Application of Bituminous Material |
| 5. Weather Limitations | 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) Standards.

D 140-70 (R 1976)	Sampling Bituminous Materials
D 1250-80	Petroleum Measurement Tables
D 2027-76	Cutback Asphalt (Medium-Curing Type)

2. BITUMINOUS MATERIAL. The bituminous material for the prime coat shall be liquid asphalt, conforming to ASTM D 2027, designation MC-70.

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.

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 0.15 gallon nor more than 0.4 gallon per squared yard of the surface to be primed. Application of prime coat shall be divided, if necessary, into a 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.

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. Prime coat shall be applied only when the ambient temperature is 50 degrees F or above and the temperature has not been below 35 degrees F. for 12 hours immediately prior to application.

6. EQUIPMENT.

6.1 General. All equipment, tools, and machines, used in the performance of the work required by this section shall be subject to the approval and shall be maintained in satisfactory working conditions.

6.2 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 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 shall be capable of heating bituminous material, under effective and positive control of all times, to the required temperature. Heating shall be accomplished by steam coils and equipment for producing steam, so designed that steam cannot get into the material or by hot oil or electricity. 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 material, an inspection of the area to be treated shall be made by the Contractor to determine the fitness of the area to receive the material. The Contracting Officer shall be notified 24 hours in advance of application of the material. To assure a uniform spread of the 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 all paved areas 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, or dry, free flowing borax. The sodium chlorate-sodium borate mixture shall be applied in a water 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 or material is in the mixing/application tank. 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 surfaces.

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 within the range of 25 to 75 pounds per square inch 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 application, 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 to the Government. No smoking, fires, or flames other than heaters that are a part of the equipment shall be permitted in the vicinity of 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 ranges, except that appropriate changes should be made when the ranges of viscosity is raised or lowered.

MC-70

120-190 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.

* * * * *

SECTION 2F

ASPHALT CONCRETE

Index

- | | |
|------------------------------------|---|
| 1. Applicable Publications | 10. Transportation of Bituminous Material |
| 2. Description | 11. Placing |
| 3. Aggregates | 12. Compaction of Mixture |
| 4. Bituminous Material | 13. Joints |
| 5. Aggregate Gradation | 14. Protection of Pavement |
| 6. Composition of Mixture | 15. Surface Requirements |
| 7. Mixing Plant | 16. Sampling |
| 8. Other Equipment | 17. Testing |
| 9. Treatment of Underlying Surface | |

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) Standards.

C 117-80

Materials Finer Than No. 76 um (200) 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 Analysis of Fine and Coarse Aggregates

D 242-70 (R 1980)

Mineral Filler for Bituminous Paving Mixtures

D 1559-76

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 subgrade.

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-80 Table 3.

5. AGGREGATE GRADATION. The aggregate gradation as determined by ASTM C 117 and C 136 and as selected by the Contracting Officer shall conform to one of the following:

Sieve Openings	Percentage by Weight, Passing
	b
1 inch	-
3/4 inch	100
1/2 inch	90-100
3/8 inch	80-95
No. 4	55-72
No. 8	40-55
No. 50	14-27
No. 200	4-8

6. COMPOSITION OF MIXTURE.

6.1 Job-Mix Formula shall be submitted by the Contractor, 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 8.5 percent. 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	50-Blow Compaction
Stability, minimum, pounds	500
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 when 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.

7. MIXING PLANT shall be a weigh-batch or continuous-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 Saw 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 2 1/2 tons 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.

8.6 Pneumatic-Tired Rollers shall be self-propelled and shall consist of two axles on which are mounted multiple pneumatic-tired wheels in such manner that the rear group of wheels will not follow in the tracks of the forward group but spaced to give essentially uniform coverage with each pass. Axles shall be mounted in a rigid frame provided with a loading platform or body suitable for ballast loading. Tires shall be smooth and capable of being inflated to at least 90 p.s.i. Construction of roller shall be such that each wheel can be loaded to a minimum of 4,500 pounds.

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 and a tack coat conforming to the requirements of the section: PRIME COAT AND WEED KILLER.

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 asphalt.

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 Government.

16. **SAMPLING.** Sampling for the determination of thickness and density of the completed pavements will be performed by the Contracting Officer. The Contractor shall replace the pavement where samples are removed at his expense.

17. **TESTING.** All tests necessary to determine conformance with the specified requirements will be performed by the Contracting Officer without cost to the Contractor. No payment will be made for areas of pavement deficient in composition, density, or thickness until they are removed and replaced by the Contractor as directed by the Contracting Officer.

* * * * *

SECTION 2G

EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS

Index

- | | |
|----------------------------|-----------------------------|
| 1. Applicable Publications | 4. Removal of Utility Lines |
| 2. General | 5. Backfilling |
| 3. Excavation | |

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.

a. Military Standard.

MIL-STD-621A
& Notices 1 & 2

Test Method for Pavement Subgrade,
Subbase, and Base-Course Materials

2. GENERAL. This section covers the excavation, trenching, and backfilling for utilities systems to the points of connection with the building utilities 5 feet the building to be served.

3. EXCAVATION.

3.1 General. All excavation of every description and of whatever substances encountered shall be performed to the depths indicated or as otherwise specified. During excavation, material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins. All excavated materials not required or suitable for backfill shall be removed and wasted as indicated or as directed. Grading shall be done as may be necessary to prevent surface water from flowing into trenches or other excavations, and any water accumulating therein shall be removed by pumping or by other approved methods. Sheet piling and shoring shall be done as may be necessary for the protection of the work and for the safety of personnel. Unless otherwise indicated, excavation shall be by open cut except that short sections of a trench may be tunneled if, in the opinion of the Contracting Officer, the pipe, cable, or duct can be safely and properly installed and backfill can be properly tamped in such tunnel sections. Earth excavation shall comprise all materials not classified as rock excavation. Rock excavation shall comprise the following: boulders measuring 1/3 cubic yard or more in volume; rock material in ledges, bedded deposits, unstratified masses, and conglomerate deposits so firmly cemented as to possess the characteristics of solid rock that cannot be removed without systematic drilling and blasting; and concrete or masonry structures except sidewalks and paving.

3.2 Trench excavation. Trenches shall be of the necessary width for proper laying of pipe, cables, or ducts. The banks of pipe trenches shall be as nearly vertical as practicable. Care shall be taken not to overexcavate. The bottom of the trenches shall be accurately graded to provide uniform bearing and support for each section of the pipe on undisturbed soil at every point along entire length, except for the portions of the pipe sections where it necessary to excavate for bell holes and for the proper sealing of pipe joints, and as hereinafter specified. Bell holes and depressions for joints shall be dug after the trench bottom has been graded, and, in order that the pipe rest on the prepared bottom

for as nearly its full length as practicable, bell holes and depressions shall be only of such length, depth, and width as required for properly making the particular type of joint. Stones shall be removed as necessary to avoid point bearing. Where rock excavation, as defined hereinbefore, is required in trenches for pipe, the rock shall be excavated to a minimum overdepth of 6 inches below the trench depths indicated or specified and replaced with suitable material as provided in paragraph: BACKFILLING. Whenever wet or otherwise unstable material that is incapable of properly supporting the pipe is encountered in the bottom of the trench, and overdepth is not indicated on the drawings, such material shall be overexcavated to a depth to allow for construction of a stable pipe bedding. The trench shall be backfilled to the proper grade with suitable approved materials.

3.2.1 Sanitary Sewers. The width of the trench at and below the top of the pipe shall be such that the clear space between the barrel of the pipe and the trench wall shall not exceed 8 inches on either side of the pipe. The width of the trench above that level shall be as wide as necessary for sheeting and bracing and the proper performance of the work. The bottom of the trench shall be rounded so that at least the bottom quadrant of the pipe shall rest firmly on undisturbed soil for as nearly the full length of the barrel as proper jointing operations will permit. This part of the excavation shall be done manually only a few feet in advance of the pipe laying by men skilled in this type of work.

3.2.2 Water-supply and-distribution lines. Unless otherwise indicated, trenches shall be graded to avoid high points with the necessity of placing vacuum and relief valves in the waterlines. Trenches shall be of a depth to provide a minimum cover over the top of the pipe of 2.5 feet from the existing ground surface or the indicated finished grade whichever is lower, and to avoid interference of the waterlines with other utilities.

3.2.3 Electrical system. The banks of trenches for (electrical cables and duct lines) need not be kept vertical but may be sloped or widened to such general limits as may be set by the Contracting Officer, provided there is no interference with other utilities. Overexcavating and backfilling with suitable selected material where rock is encountered will not be required except for a gradual cushioning towards points of abrupt dropoff of the rock to levels considerably below the grade of the duct. Special trenching requirements for direct-buried electrical cables and conduit or duct lines are specified in section: ELECTRICAL-DISTRIBUTION AND STREET-LIGHTING SYSTEM; UNDERGROUND.

3.3 Excavation for appurtenances. Excavation for manholes and similar structures shall be sufficient to leave at least 12 inches in the clear between the outer surfaces and the embankment or timber that may be used to hold and protect the banks. Any overdepth excavation below such appurtenances that has not been directed will be considered unauthorized and shall be refilled with sand, gravel, or concrete, as directed, at no additional cost to the Government.

4. REMOVAL OF UTILITY LINES. When utility lines that are to be removed are encountered within the area of operations, the Contracting Officer shall be notified in ample time for the necessary measures to be taken to prevent interruption of the service.

5. BACKFILLING. The trenches shall not be backfilled until all required pressure tests are performed and until the utilities systems as installed conform to the requirements specified in the several sections covering the installation of the various utilities. Where, in the opinion of the Contracting Officer, damage is likely to result from withdrawing sheeting, the sheeting shall be left in place

and the contract price will be adjusted accordingly. Trenches shall be backfilled to the ground surface with selected material that is suitable for the specified compaction and as hereinafter specified. Trenches improperly backfilled shall be reopened to the depth required for proper compaction, then refilled and compacted as specified, or the condition shall be otherwise corrected as approved. The meaning of "density of the adjacent soil" when the adjacent formation is rock shall be interpreted as maximum density in accordance with Military Standard MIL-STD-621, Method 100, CE 55. The surface shall be restored to its original condition as near as practicable and as hereinafter specified. Pavement, base course, and compacted subgrade disturbed by trenching operations shall be replaced in an acceptable manner with materials equal to the adjacent compacted subgrade, base course, and pavement for a minimum distance of 12 inches on each side of the trench.

5.1 Lower portion of trench. Backfill material shall be deposited in 6-inch-maximum-thickness layers and compacted with suitable tampers to the density of the adjacent soil or graded as hereinafter specified until there is a cover of not less than 2 feet over sewers and one foot over other utility lines. The backfill material in this portion of the trench shall consist of a selected material at a moisture content that will facilitate compaction, free from stones larger than 3 inches in any dimension and hard clods and frozen conglomerates larger than 6 inches in any dimension, except that where the pipe is coated or wrapped for protection against corrosion the backfill material shall be free from stones larger than one inch in any dimension. If any portion of the cover in the lower portion of the trench is in the depth of special compaction and materials requirements under pavement, the special requirements shall control. Special care shall be taken not to damage the coating or wrapping of pipes.

5.2 Remainder of trench. Except for special materials for pavements and railroads, the remainder of the trench shall be backfilled with material that is free of stones larger than 6 inches or 1/2 the layered thickness, whichever is smaller, in any dimension. Backfill material shall be deposited in layers not exceeding the thickness specified, and each layer shall be compacted to the minimum density specified as applicable to the particular area except that in areas other than under roadways, parking areas, shoulders of roadways and parking areas, and other paved areas subject to vehicular movement, settling of granular, noncohesive material with water will be permitted. Degree of compaction shall be as follows, expressed as a percentage of the maximum density obtained by the test procedure presented in Military Standard MIL-STD-621, compaction effort designation CE 55, abbreviated hereinafter as percent CE 55 maximum density.

5.2.1 Under pavements. Six-inch layers, 90 percent CE 55 maximum density for cohesive soils and 95 percent CE 55 maximum density for cohesionless soils up to the elevations at which the requirements for pavement subgrade materials and compaction control.

5.2.2 Under desert granite areas and sidewalks. Twelve-inch layers, 85 percent CE 55 maximum density for cohesive soils and 90 percent CE 55 maximum density for cohesionless soils.

5.2.3 Under other areas. Two-foot layers, density equal to the adjacent soil.

5.3 Determination of density. Testing shall be the responsibility of the Contractor and shall be performed at no additional cost to the Government. Testing shall be performed by an approved commercial testing laboratory or may be tested by the Contractor subject to approval. Tests shall be performed in

sufficient number to insure that the specified density is being obtained. Laboratory tests for moisture-density relations shall be determined in accordance with Military Standard MIL-STD-621, Method 100, compaction effort designation CE 55. Determination of density shall be in conformity with the requirements of SECTION: FILLS AND SUBGRADE PREPARATION. MIL-STD-621, Method 106, in the field, and the moisture-density relations shall be determined in accordance with Military Standard MIL-STD-621, Method 100, CE 55. Copies of the test results shall be furnished to the Contracting Officer.

* * * * *

SECTION 2H

STONE PROTECTION

1. MATERIALS.

1.1 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(s) from which the Contractor proposes to obtain the material shall be approved by the Contracting officer.

1.2 Cobblestone may be river run, obtained from required excavation or from any other source approved by the Contracting Officer and shall be reasonably well graded between 4 and 6 inches with not less than 40 nor more than 70 percent 6 inches in size.

1.3 Existing stone protection shall be salvaged where indicated. Stone shall be sorted and prepared for reuse. Stone shall be clean, free from earth, concrete, refuse, and adherent coating. Stone removed and found of a quality unsuitable for refuse shall be disposed of as directed. Stone in excess of the amount required for the work shall be disposed of by the Contractor.

2. FOUNDATION PREPARATION. Areas on which bedding material or stone is to be placed shall be trimmed and dressed to conform to cross sections indicated or as directed by Contracting Officer. 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.

3. PLACEMENT.

3.1 Cobblestone shall be placed to produce a surface in which the tops of the individual stones do not vary more than 1-1/2 inches from true grade. Double decking of thin flat stones to bring the surface up to the required grade will not be permitted.

4. 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.

* * * * *

SECTION 2I

FENCING

Index

- | | |
|----------------------------|------------------|
| 1. Applicable Publications | 3. Installation |
| 2. Materials | 4. Bridge Fences |

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 and shall be polyvinylchloride coated steel as indicated.

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 8 foot height, and shall be polyvinylchloride coated steel fabric of color indicated.

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 Reinforcing of 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 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. Fencing details shall conform to the attached sketch No. 1.

3.1.1 The fence alinement shall be cleared and graded to a uniform grade within the minimum limits outside and inside the indicated fence alinement. Graded areas shall be sloped to drain.

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 or holes excavated in bedrock. Concrete shall be thoroughly 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 or rock shall be set with a minimum of 1 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 full length of chain-link fencing.

3.5 Top and Bottom Reinforcing 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 and to the bottom wire close to both sides of each post and at intervals of not more than 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, and pull, 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.

3.8 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 conforming to the requirements of ASTM B 32.

4. LINK TYPE CHAIN FENCE, Precast concrete bollard posts with link type chains at top of existing grouted stone slope is specified in section: MISCELLANEOUS ITEMS OF WORK.

* * * * *

SECTION 2K

CONCRETE SIDEWALKS BIKE PATH, CURBS AND GUTTERS

Index

- | | |
|-----------------------------------|--|
| 1. Applicable Publications | 6. Subgrade Preparation |
| 2. Field-Control Tests | 7. Form Setting |
| 3. Materials | 8. Concrete Placement
and Finishing |
| 4. Concrete Strength
and Usage | 9. Curing and Protection |
| 5. Forms | |

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.).

SS-S-1401B

Sealing Compound, Hot Applied, for
Concrete and Asphalt Pavements

1.2 American Association of State Highway and Transportation Officials (AASHTO) Publications.

M 182-60
(R 1974)

Burlap Cloth Made From Jute
or Kenaf

1.3 American Society for Testings and Materials (ASTM) Publications.

C 94-81

Ready-Mixed Concrete

A 185-79

Welded Wire Fabric for Concrete
Steel Reinforcement

C 171-69
(R 1980)

Sheet Materials for Curing
Concrete

C 173-78

Air Content of Freshly Mixed
Concrete by the Volumetric Method

C 231-81

Air Content of Freshly Mixed
Concrete by the Pressure Method

C 309-81

Liquid Membrane-Forming Compounds
for Curing Concrete

D 1751-73
(R 1978)

Preformed Expansion Joint Filler
for Concrete Paving and Structural
Construction (Nonextruding and
Resilient Bituminous Types

D 1752-67
(R 1978)

Preformed Sponge Rubber and Cork
Expansion Joint Fillers for
Concrete. Paving and Structural
Construction

2. **FIELD-CONTROL TESTS.** Preparation of field-control samples and testing of samples shall be by the Contractor at no additional cost to the Government. The taking of samples, the making of test specimens, and the testing thereof shall be performed under the supervision of the Contracting Officer.

3. **MATERIALS.** Materials shall conform to the respective publications and other requirements specified herein.

3.1 Concrete Curing Materials.

3.1.1 Burlap. AASHTO M 182 having a weight of 14 ounces or more per square yard when dry.

3.1.2 Impervious Sheeting. ASTM C 171.

3.1.3 Liquid Membrane Curing Compound. ASTM C 309 (Type 1D) (Type 2). Compound shall be free of paraffin or petroleum.

3.2 Concrete Protection Materials. Linseed oil mixture shall be equal parts, by volume, of linseed oil and either mineral spirits, naphtha, or turpentine. At the option of the Contractor, commercially prepared linseed oil mixtures formulated specifically for application to concrete to provide protection against the action of deicing chemicals may be used except that emulsified mixtures are not acceptable.

3.3 Joint Materials.

3.3.1 Expansion Joint Fillers. ASTM D 1751 or ASTM D 1752.

3.3.2 Joint Sealers. ASTM D 1850.

4. **CONCRETE STRENGTH AND USAGE.**

4.1 Sidewalk and Bike Path Concrete. Concrete and materials therefor shall conform to the applicable requirements of section: **CONCRETE** except as specified below. Concrete shall have a minimum compressive strength of 2,500 psi. The maximum size of aggregate shall be 1-1/2 inches. Concrete shall have a slump of not more than 3 inches. The concrete mixture shall have air content by volume of concrete 5 to 7 percent, based on measurements made immediately after discharge from the mixer. Air content shall be determined in accordance with ASTM C 173 or ASTM C 231. ASTM C 231 shall be used with concretes and mortars made with relatively dense natural aggregates.

4.2 Curb and Gutter Concrete. Concrete and equipment, workmanship and materials therefor shall conform to the applicable requirements of section: **CONCRETE CONSTRUCTION** except as specified below. Concrete shall have a minimum compressive strength of 3,000 psi. The maximum size of aggregate shall be 1-1/2 inches. Concrete shall have a slump of not more than 3 inches. The concrete mixtures have air content by volume of concrete of 5 to 7 percent, based on measurements made immediately after discharge from the mixer.

5.1 FORMS.

5.1.1 Side and Bike Path. Sidewalk and Bike Path forms shall be of wood or steel, straight of sufficient strength to resist springing during depositing and consolidating concrete, and of a height equal to the full depth of the finished sidewalk. Wood forms shall be surfaced plank, 2-inch nominal thickness, straight and free from warp, twist, loose knots, splits or other defects. Wood forms shall have a nominal length of 10 feet, with a minimum of three stakes per form, at maximum spacing at 4 feet. Corners, deep sections, and radius bends shall have additional stakes and braces, as required. Radius bends may be formed with 3/4-inch boards, laminated to the required thickness. Steel forms shall be channel-formed sections with a flat top surface and with welded braces at each end and at not less than two intermediate points. Form ends shall be interlocked and self-aligning. Forms shall include flexible forms for radius forming, corner forms, form spreaders, and fillers. Forms shall have a nominal length of 10 feet, with a minimum of two welded stake pockets per form. Stake pins shall be solid steel rods with chamfered heads and pointed tips, designed for use with steel forms.

5.7.2 Curb and Gutter. Curb and gutter forms shall be of wood or steel, straight, and of sufficient strength to resist springing during depositing and consolidating the concrete. The outside forms shall have a height equal to the full depth of the curb or gutter. The inside form of curb shall have batter as indicated and shall be securely fastened to and supported by the outside form. Straight forms of wood shall be surfaced plank, 2-inch nominal thickness, straight and free from warp, twist, loose knots, splits, or other defects. Wood forms shall have a nominal length of 10 feet, with a minimum of three stakes per form, at maximum spacing of 4 feet. Corners, deep sections, and radius bends shall have additional stakes and braces, as required. Radius bends may be formed with 3/4-inch boards, laminated to the required thickness. Steel forms shall be channel-formed sections with a flat top surface and with welded braces at each end and at not less than two intermediate points. Form ends shall be interlocked and self-aligning. Forms shall include flexible forms for radius forming, corner forms, form spreaders, and fillers. Forms shall have a nominal length of 10 feet, with a minimum of two welded stake pockets per form. Stake pins shall be solid steel rods with chamfered heads and pointed tips, designed for use with steel forms. Rigid forms shall be provided for curb returns, except that benders of thin plank forms may be used for curb or curb returns with a radius of 10 feet or more, where grade changes occur in the return, or where the radius of 10 feet or more, where grade changes occur in the return, or where the central angle is such that a rigid form with a central angle of 90 degrees cannot be used. Back forms for curb returns may be made of 1-1/2-inch benders, for the full height of the curb, cleated together.

6. SUBGRADE PREPARATION. The subgrade shall be constructed to grade and cross section.

6.1 Sidewalk Subgrade. The subgrade shall be thoroughly wetted than compacted with two passes of a 500-pound roller. Yielding material deflecting more than 1/2 inch under the specified roller shall be removed to a depth of not less than 4 inches below subgrade elevation and replaced with an approved granular material. The material shall then be compacted as described above. The completed subgrade shall be tested for grade and cross section with a template extending the full width of the sidewalk and supported between side forms.

6.2 Curb and Gutter Subgrade. The subgrade shall be of materials equal in bearing quality to the subgrade under the adjacent roadway, street or open storage area and shall be placed and compacted to conform with applicable requirements of section: EXCAVATION, AND FILLS AND PREPARATION OF SUBGRADE, The subgrade shall be tested for grade and cross section by means of a template extending the full width of the curb and gutter.

6.3 Maintenance of Subgrade. The subgrade shall be maintained in a smooth, compacted condition, in conformity with the required section and established grade until the concrete is placed. The subgrade shall be in a moist condition when concrete is placed. The subgrade shall be prepared and protected so as to produce a subgrade free from frost when the concrete is deposited.

7. FORM SETTING.

7.1 Sidewalk and Bike Path. Forms for sidewalks and Bike Path shall be set with the upper edge true to line and grade and shall be held rigidly in place by stakes placed at intervals not to exceed 4 feet. After forms are set, grade and alinement shall be checked with a 10-foot straightedge. Forms shall conform to line and grade with an allowable tolerance of 1/8 inch in any 10-foot long section. Forms shall have a transverse slope as indicated with the low side adjacent to the roadway. Forms shall be coated with form oil each time before concrete is placed. Wood forms may, instead, be thoroughly wetted with water before concrete is placed. Side forms shall not be removed for less than 12 hours after finishing has been completed.

7.2 Curbs. Forms for curbs shall be carefully set to alinement and grade and to conform to the dimension of the curb. Forms shall be held rigidly in place by the use of stakes placed at intervals not to exceed 4 feet. Clamps, spreaders, and bracers shall be used where required to insure rigidity in the forms. The forms on the front of the curb shall be removed not less than 2 hours nor more than 6 hours after concrete has been placed. Forms back of curb shall remain in place until the face and top of the curb have been finished as specified for concrete finishing. Gutter forms shall not be removed while the concrete is sufficiently plastic to slump in any direction. Forms shall be cleaned and coated with form oil each time before concrete is placed. Wood forms may, instead, be thoroughly wetted with water before concrete is placed, except that with probable freezing temperatures, oiling is mandatory.

8. CONCRETE PLACEMENT AND FINISHING.

8.1 Sidewalk and Bike Path Concrete. Concrete shall be placed in the forms in one layer of such thickness that when compacted and finished the sidewalk and Bike Path will be of thickness indicated. After concrete has been placed in the forms, a strike-off guided by side forms shall be used to bring the surface to proper section to be compacted. The concrete shall be tamped and consolidated with a suitable wood or metal tamping bar, and the surface shall be finished to grade with a wood float. Finished surface of the walk shall not vary more than 3/16 inch from the testing edge of a 10 foot-straightedge. Irregularities exceeding the above shall be satisfactorily corrected. The surface shall be divided into rectangular areas by means of contraction joints spaced at not more than 5 feet on centers.

8.1.1 Concrete Finishing. After straightedging, when most of the water sheen has disappeared, and just before the concrete hardens, the surface shall be finished to a smooth and uniformly fine granular or sandy texture free of waves,

irregularities, or tool marks. A scored surface shall be produced by brooming with a soft-bristled broom except where exposed aggregate finish is indicated.

8.1.2 Edge and Joint Finishing. All slab edge, including those at formed joints, shall be finished carefully with an edger having a radius of 1/8 inch. When brooming is selected for the final surface finish, the transverse joint shall be edged before brooming, and the brooming shall eliminate the flat surface left by the surface face of the edger. Corners and edges which have crumbled and areas which lack sufficient mortar for proper finishing shall be cleaned and filled solidly with properly proportioned mortar mixture and then finished.

8.1.3 Contraction Joints. The contraction joints shall be formed in the fresh concrete by cutting a groove in the top portion of the slab to a depth of at least one-fourth of the sidewalk and bike path slab thickness, using a jointer to cut the groove, or by sawing a groove in the hardened concrete with a power-driven saw, unless otherwise approved. Sawed joints shall be constructed by sawing a groove in the concrete with a 1/8-inch blade to the depth indicated. The time of sawing shall be varied, depending on existing and anticipated weather conditions, and such sawing shall be at the required rate. An ample supply of saw blades shall be available on the job before concrete placement is started, and at least on standby sawing unit in good working order shall be available at the jobsite at all times during the sawing operations.

8.1.4 Expansion Joints. Transverse expansion joints shall be installed at sidewalk and returns and opposite expansion joints in adjoining curbs. Where the sidewalk and bike path is not in contact with the curb, transverse expansion joints shall be installed as indicated. Transverse expansion joints shall be filled with 1/2-inch joint filler strips. Joint filler shall be placed with top edge 1/4 inch below the surface and shall be placed with top edge 1/4 inch below the surface and shall be held in place with steel pins or other devices to prevent warping of the filler during floating and finishing. Immediately after finishing operations are completed, joint edges shall be rounded with an edging tool having a radius of 1/8 inch, and concrete over the joint filler shall be removed. Expansion joints shall be formed about structures and features that project through or into the sidewalk and bike path pavement, using joint filler of the type, thickness, and width indicated. The filler shall be installed in such manner as to form a complete, uniform separation between the structure and sidewalk and bike path pavement. At the end of the curing period, expansion joints shall be carefully cleaned and filled with joint sealer. Concrete at the joint shall be surface dry, and the atmospheric and pavement temperatures shall be above 50 degrees F. at the time of application of joint-sealing materials. Joints shall be filled with flush with the concrete surface in such a manner as to minimize spilling on the walk surface. Spilled sealing material shall be removed immediately and the surface of the walk cleaned. Dummy groove joints shall not be sealed.

8.1.5 Surface Uniformity. The completed surface shall be uniform in color and free of surface blemishes and tool marks.

8.2 Curb and Gutter Concrete. Concrete shall be placed in layers not to exceed 6 inches. Concrete shall be thoroughly consolidated by tamping and spading or with approved mechanical vibrators.

8.2.1 Concrete Finishing. The edges of the gutter and top of the curb shall be rounded with an edging tool to a radius of 1/2-inch and the surfaces shall be floated and finished with a smooth wood until true to grade and section and

uniform in texture. Floated surface shall then be brushed with fine-hair brush with longitudinal strokes. Immediately after removing the front curb form, the face of the curb shall be rubbed with a wood or concrete rubbing block and water until blemishes, form marks, and tools marks have been removed. The surface while still wet, shall be brushed in the same manner as the gutter and curb top. The top surface of gutter and entrance shall be finished to grade with a wood float. Except at grade changes or cuves, finished surfaces shall not vary, from the testing edge of 10-foot straightedge, more than 1/8 inch for gutter and entrance and 1/4 inch for top and face of curb. Irregularities exceeding the above shall be satisfactorily corrected. Visible surfaces and edges of finished curb and gutter shall be free of blemishes and form and tool marks, and shall be uniform in color, shape, and appearance.

8.2.2 Joints. Expansion joints and construction joints shall be constructed at right angles to the line of curb and gutter.

8.2.2.1 Contraction Joints. Contraction joints shall be constructed by means of 1/8-inch thick separators, of a section conforming to the cross section of the curb and gutter. Contraction joints shall be constructed directly opposite contraction joints in abutting Portland-cement-concrete pavements. Where curb and gutter do not abut Portland-cement-concrete pavements. Where curbs and gutter do not abut Portland-cement-concrete pavements, contraction joints shall be so placed that monolithic sections between curb returns will not be less than 5 feet nor greater than 15 feet in length. Separators shall be removed as soon as practicable after concrete has set sufficiently to preserve the width and shape of the joint. Separators shall be removed prior to finishing.

8.2.2.2 Expansion Joints. Expansion joints shall be formed by means of preformed expansion-joint filler material cut and shaped to the cross section of curb and gutter. Expansion joints shall be provided in curb at the end of all returns. Expansion joints shall be provided in curb and gutter directly opposite expansion joints of abutting Portland-cement-concrete pavement and shall be of the same type and thickness as joints in the pavement. Where curb and gutter do not abut Portland-cement-concrete pavement, expansion joints at least 1/2-inch in width shall be provided at intervals not exceeding 30 feet. Expansion joints shall be provided in non-reinforced concrete gutter at locations indicated.

8.3 Curb-Forming Machines. Curb-forming machines for constructing curb and gutter will be approved based on trial use on the job. Use of the equipment shall be discontinued at any time during construction if the equipment produces unsatisfactory results, and the work shall be accomplished as specified above. Unsatisfactory work shall be removed and reconstructed for the full length between regularly scheduled joints. Removed portions shall be disposed of as directed.

9. CURING AND PROTECTION.

9.1 Curing. Immediately after the finishing operations, exposed concrete surfaces shall be cured by one of the following methods as the Contractor may elect.

9.1.1 Mat Method. The entire exposed surface shall be covered with two or more layers of burlap. Mat shall overlap each other at least 6 inches. The mat shall be thoroughly wetted with water prior to placing on concrete surface and shall be kept continuously in a saturated condition and in intimate contact with concrete for not less than 7 days.

9.1.2 Impervious Sheeting Method. The entire exposed surface shall be wetted with a fine spray of water and then covered with impervious sheeting material. Sheets shall be laid directly on the concrete surface with the light-colored side up and overlapped 12 inches when a continuous sheet is not used. The curing medium shall not be less than 18 inches wider than the concrete surface to be cured, and shall be securely weighted down by heavy wood planks, or by placing a bank of moist earth along edges and laps in sheets. Sheets shall be satisfactorily repaired or replaced if torn or otherwise damaged during curing. The curing medium shall remain on the concrete surface to be cured for not less than 7 days.

9.1.3 Membrane-Curing Method. The entire exposed surface shall be covered with membrane-forming curing compound. Where type 1 curing compound is used, the concrete surface shall be shaded from the direct rays of the sun during the curing period. Curing compound shall be applied in two coats by hand-operated pressure sprayers at a coverage of approximately 200 square feet per gallon for both coats. The second coat shall be applied in a direction approximately at right angles to the direction of application of the first coat. The compound shall form a uniform continuous, coherent film that will not check, crack, or peel and shall be free from pinholes or other imperfections. Apply an additional cost to all surfaces showing discontinuity, pinholes or other defects. Concrete surfaces showing discontinuity, pinholes or other defects. Concrete surfaces that are subjected to heavy rainfall within 3 hours after curing compound has been applied shall be resprayed by the above method and at the above coverage at no additional cost to the Government. Expansion-joint openings shall be sealed at the top by inserting moistened paper or fiber rope or covering with strips of waterproof paper prior to application of the curing compound, in a manner to prevent the curing compound entering the joint. Concrete surfaces to which membrane-curing compounds have been applied shall be adequately protected for 7 days from pedestrian and vehicular traffic and from any other action that might disrupt the continuity of the membrane. Any area covered with curing compound and damaged by subsequent construction operations within the 7-day curing period shall be resprayed as specified above at no additional expense to the Governments.

9.2 Backfilling. After curing, debris shall be removed and the area adjoining the sidewalk shall be backfilled, graded, and compacted to conform to the surrounding area in accordance with lines and grades indicated.

9.3 Protection. Completed sidewalk shall be protected from damage until accepted. The Contractor shall repair damaged concrete and clean concrete discolored during construction. Sidewalk that is damaged shall be removed and reconstructed for the entire length between regularly scheduled joints. Refinishing the damaged portion that will not be acceptable. Removed damaged portions shall be disposed of as directed.

* * * * *

SECTION 20

TREES, SHRUBS

Index

- | | |
|------------------------------------|-------------------------------|
| 1. Applicable Publications | 6. Materials |
| 2. Source Inspections | 7. Installation |
| 3. Submittals | 8. Pruning |
| 4. Delivery, Storage, and Handling | 9. Plant Establishment Period |
| 5. Environmental Protection | 10. 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. Specs.).

O-F-241D Fertilizers, Mixed Commercial

Q-P-166E Peat, Moss; Peat, Humus; and Peat,
Reed-Sedge

1.2 American National Standards Institute (ANSI) Publication.

Z60. 1-1980 American Standard for Nursery Stock

1.3 American Joint Committee on Horticultural Nomenclature (AJCHN) Publication.

Standardized Plant Names (1942-
Second Edition-1942)

1.4 American Society for Testing and Materials (ASTM) Publications.

C 136-81 Sieve Analysis of Fine and Course
Aggregates

D 2607-69 Peats, Mosses, Humus and Related Products

1.5 American Wood Preserver's Association (AWPA) Publication.

C2-80 Lumber, Timbers, Bridge Ties and Mine Ties-
Preservative Treatment by Pressure
Processes

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. Such inspection does not preclude right of rejection at the project site.

2.2 Topsoil. The source of topsoil will be inspected by the Contracting Officer to determine the acceptability of the topsoil and the depth to which it is to be stripped.

3. SUBMITTALS.

3.1 Samples. The following samples shall be submitted for approval before work is started.

a. Topsoil--representative samples shall be taken from several locations on the area under consideration.

b. Inert Mulch--10 pounds of each type to be used in the project.

c. Organic Mulch--10 pounds of each type to be used in the project.

3.2 Certificates of Conformance or Compliance. Before delivery, notarized certificates attesting that the following materials meet the requirements specified, shall be submitted in triplicate for approval.

a. Plant Materials.

b. Fertilizers.

3.3 Certified Laboratory Test Reports. In addition to the submittal of certificates specified herein, certified copies, in triplicate of the reports of all tests listed below and required in reference publications for the following materials shall be submitted for approval.

a. Offsite topsoil--for pH.

b. Fir Bark - for classification total nitrogen, moisture ash and organic matter, sand content, pH.

The testing shall have been performed by an independent laboratory approved by the Contracting Officer within 10 days of submittal of reports for approval. Test reports on a previously tested material shall be accompanied by notarized certificates from the manufacturer certifying that the material is of the same type, quality, manufacture, and make to be used for this contract.

3.4 Manufacturer's Literature. Manufacturer's literature on the following materials shall be submitted.

a. Antidesiccant.

3.5 Maintenance Instruction. Prior to the end of the contract maintenance period, 3 copies of written instructions for year round maintenance and care of installed plants shall be furnished to the Contracting Officer.

3.6 Licenses. Licenses shall be submitted , in 3 copies, to the Contracting Officer.

4. DELIVERY, STORAGE, AND HANDLING.

4.1 Delivery.

4.1.1 The Contractor shall notify the Contracting Officer of the delivery schedule in advance so the plant material may be inspected upon arrival at the job site. Unacceptable plant material shall be removed from the job site immediately.

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 Fertilizer shall be delivered to the site in the original, unopened containers bearing the manufacturer's guaranteed chemical analysis, name, trade name or trademark, and in conformance to state and Federal law. In lieu of containers, fertilizer may be furnished in bulk and a certificate indicating the above information shall accompany each delivery.

4.2 Storage.

4.2.1 Plants not installed on the day of arrival at the site shall be stored and protected as follows.

a. Outside storage shall be shaded and protected from the wind.

b. Plants, including those in containers, shall be kept in a moist condition until planted by watering with a fine mist spray.

4.2.2 Fertilizer shall be kept in dry storage away from contaminants.

4.2.3 Storage of materials shall be in areas designated or as approved by the Contracting Officer.

4.3 Handling. Care shall be taken to avoid damaging plants being moved from the nursery or storage area to the planting site. Plants shall be protected from drying out. Plants shall not be handled by the trunk or stems. Damaged plants will be rejected and shall be removed from the site.

5. ENVIRONMENTAL PROTECTION. All work and Contractor operations shall comply with the requirements of section: ENVIRONMENTAL PROTECTION.

6. MATERIALS.

6.1 Plants.

6.1.1 Plants shall conform to the varieties specified in the plant list and be true to botanical names as listed in AJCHN Standardized Plant Names. Plants shall be in accordance with ANSI Z60.1 except as otherwise stated in the specifications or shown on the plans. Where the drawings or specifications are in conflict with ANSI Z60.1, the drawings and specifications shall prevail.

6.1.2 Planting stock shall be well-branched and well-formed, sound, vigorous, healthy, and free from disease, sun-scald, windburn, abrasion, and harmful insects or insects eggs and shall have healthy, normal and unbroken root systems. Deciduous trees and shrubs 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 anti-desiccant at the nursery.

6.1.3 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 with the approval of the Contracting Officer with no change in the contract price. If larger plants are used, the ball of earth or spread of roots shall be increased in accordance with ANSI Z60.1.

6.1.4 The Contractor shall facilitate inspection and identifications by labeling trees and bundles or containers of the same shrub, or ground cover with a durable waterproof label and weather-resistant ink. Labels shall state the correct plant name and size as specified in the list of required plants. Labels shall be securely attached to plants, bundles, and containers of plants and shall be legible for 60 days after delivery to the planting site.

6.1.5 Plant material shall be nursery grown unless otherwise indicated and shall conform to the requirements and recommendations of ANSI Z60.1. Plants shall be dug and prepared for shipment in a manner that will not cause damage to branches, shape, and future development after planting.

6.1.5.1 Container grown plants shall have sufficient root growth to hold the earth intact when removed from containers but shall not be root bound.

6.1.6 Substitutions shall be made only when a plant (or its alternates as specified) is not obtainable and the Contracting Officer authorizes a change order providing for use of the nearest equivalent obtainable size or variety of plant having the same essential characteristics with an equitable adjustment of the contract price.

6.2 Topsoil.

6.2.1 Topsoil shall be the existing surface soil stripped and stockpiled on the site.

6.2.2 If additional topsoil is required, it shall be furnished by the Contractor from borrow areas approved by Contracting Officer. The pH shall be 6.50 to 8.00. Topsoil that does not meet this pH range shall be amended by the addition of pH adjusters.

6.3 pH Adjusters.

6.4 Soil Conditioners.

6.4.1 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.

6.5 Planting Soil Mixture. The planting soil mixture shall be composed of 2 parts topsoil, and 1 parts Fir Bark.

6.6 Granular Fill for Plant Pit and Bed Drainage. Granular fill for filling over excavations and for bedding of pipes shall consist of uniformly graded sand, stone, gravel, or stone screenings free from an excess of soft or unsound particles or other objectionable matter. When tested in accordance with ASTM C 136, the material shall conform to the following gradation limits.

<u>Sieve Size</u>	<u>Percent Passing</u>
3/8-inch	100
No. 4	85 - 100
No. 16	45 - 80
No. 50	10 - 30
No. 100	0 - 10
No. 200	0 - 3

6.6 Mulch. Mulch shall be free from deleterious materials and shall be stored so as to prevent inclusion of foreign materials.

6.6.1 Organic mulch materials shall be ground or shredded bark.

6.7 Staking Material.

6.7.1 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 a minimum of 2-1/2 inches in diameter, and pointed at one end, and of length indicated on the drawings.

6.7.2 Guying wire shall be 12 gage annealed galvanized steel.

6.7.3 Hose chafing guards shall be new or used 2-ply reinforced rubber or plastic hose and shall be all the same color on the project.

6.8 Water. Water shall not contain elements toxic to plant life. It shall be obtained at no cost to the Contractor.

6.9 Antidesiccant. Antidesiccant shall be an emulsion that will provide a film over plant surfaces permeable enough to permit transpiration.

6.10 Herbicides, Insecticides, Fungicides, and Other Pesticides. Contractor to submit a list of brand name products to the Contracting Officer.

6.11 Herbicide control shall be under all decomposed granite.

- a. Pre-emergence application.
- b. Post-emergence application.

6.12 Insect control shall be:

- a. Post-emergence application.

6.13 Fungicide control shall be:

- a. Post-emergence application shall be as per manufacturer specifications.

6.14 Tree Wound Dressing. Tree wound dressing shall be a black asphalt base antiseptic paint.

7. INSTALLATION.

7.1 Planting Seasons and Conditions.

Planting shall be done with the approval of the Contracting Officer only when the ground is in suitable condition for planting. If special conditions exist that may warrant a variance in the above planting conditions, a written request shall be submitted to the Contracting Officer stating the special conditions and proposed variance.

7.2 Layout. Plant material locations and bed outlines shall be staked on the project site by the Contractor and approved by the Contracting Officer before any plant pits or beds are dug. The Contracting Officer may adjust plant material locations to meet field conditions.

7.3 Excavation for Planting.

7.3.1 Prior to excavating for plant pits the area shall conform to the lines and grades shown on the plans and the locations of any underground utilities shall be verified by the Contractor and the Contracting Officer. Damage to utility lines shall be repaired at the Contractor's expense. Existing trees, shruberry, and beds that are to be preserved shall be barricaded in a manner that will effectively protect them during planting operations.

7.3.2 Rocks and other underground obstructions shall be removed to a depth necessary to permit proper planting according to plans and specifications. If underground utilities, construction, or solid rock ledges are encountered, other locations may be selected by the Contracting Officer.

7.3.3 Plant pits may be dug by any method approved by the Contracting Officer provided that the pits have vertical sides and flat 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 on the plans. The minimum allowable dimensions of plant pits shall be 12 inches deeper than the depth of ball or the depth of base roots; pit diameters shall be 24 inches wider than the root ball.

7.3.4 Depressed watering basins shall be used around all plants, as specified herein.

7.4 Setting Plants. Container-grown plants shall be handled and moved only by the container. Plants shall be set plumb and held in position until sufficient soil has been firmly placed around roots. Plants shall be set in relation to surrounding grade so that they are 4 inches below the depth at which they were grown in the nursery or container.

7.5 Container grown stock shall be removed from containers in such a way so as to prevent damage to plant or root system. Planting shall be completed as specified herein under balled and burlapped plants.

7.6 Mulch shall be kept out of the crowns of shrubs.

7.7. Staking.

7.7.1 Plants shall be staked.

7.8 Standard stakes shall be driven vertically into the ground to a depth of 2-1/2 to 3 feet in such a manner as not to injure the ball or roots.

7.8.1 Ground stakes shall be driven into the firm ground outside of the plant pit and the top of the stake shall be flush with the ground.

8. PRUNING.

8.1 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 foliage 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 insure 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. Trimmings shall be removed from the site. Cuts 1/2 inch in diameter and larger shall be painted with the specified tree wound dressing.

8.2 Existing trees to be treated are as indicated by tags on the site. Tree pruning and cavity work shall be performed by a licensed arborist. 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 clean cut made flush with parent trunk. In removing large dead limbs, the initial cut shall be made on the underside at a safe distance from the trunk or lateral, to prevent ripping of bark. The Contractor shall exercise care to ensure that branches or trimmings do not endanger traffic or cause damage to property when they are removed. 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. Any damage resulting from the Contractor's negligence during pruning shall be repaired by him without any additional compensation. 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 in order to promote proper healing. 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.

8.3 Restoration and Clean-Up. Excess and waste material shall be removed daily. When planting in an area has been completed, the shall be cleared of all debris, spoil piles, and containers.

8.4 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 by the Contractor during the installation period and needed maintenance performed promptly.

9. PLANT ESTABLISHMENT PERIOD. Final acceptance of all work and materials under this section shall be at the end of a period of establishment to be determined as follows.

9.1 Beginning of the Plant Establishment Period. The period of establishment shall begin on the date that an inspection by the Contracting Officer shows that all plants are in place and have been installed in accordance with the specifications and plans. Replacement of plants that were not supplied by the

Contractor but were relocated under this contract and that die for any reason other than improper handling during transplanting and/or lack of proper care will not be required. Loss through Contractor negligence, however, shall require replacement in kind and size per specification and shall be at the Contractor's expense.

9.2 During the Plant Establishment Period.

9.2.1 During the plant establishment period, the Contractor shall water all plants 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 one inch 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.

9.2.2 Plants shall be pruned and mulch replaced as required.

9.2.3 Stakes and eroded plant saucers shall be replaced as required.

9.2.4 Other work, such as spraying with approved insecticides and fungicides to control pests, shall be done to ensure plant survival in a healthy growing condition.

9.2.5 Dead plants shall be removed immediately at the Contractor's expense. The Contractor will not be responsible for theft or damage to plants by vehicles or vandalism following completion and approval of the installation portion of the planting contract.

9.3 Termination of the Plant Establishment Period.

9.3.1 A preliminary inspection by the Contractor and the Contracting Officer will be held 90 days from the date of the beginning of the plant establishment period to determine plant acceptability and the number of replacements. Alternate or substituted varieties of plants shall be used only if approved by the Contracting Officer.

9.3.2 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. The establishment period will end on the date of this inspection and said inspection will be considered final acceptance provided the Contractor has complied with the following requirements.

a. Dead, missing, and defective plant material shall have been replaced as directed by the Contracting Officer otherwise, final acceptance will be delayed until such replacements have been satisfactorily accomplished.

b. Plant saucers shall be free of weeds.

c. Stakes and guys shall be in good condition.

d. Remedial measures directed by the Contracting Officer to ensure plant survival shall have been carried out.

e. Plant material shall have been fertilized as required prior to acceptance.

10. FINAL ACCEPTANCE.

10.1 General. At conclusion of the installation portion of the contract an inspection will be made by the Contracting Officer, upon written notice requesting inspection submitted by the Contractor at least 10 days prior to the anticipated date. The purpose of the inspection will be for the acceptance of the contract work, including maintenance but exclusive of replacement. After inspection, the Contractor will be notified in writing of acceptance of the plants subject to guarantee. If there are any deficiencies in the maintenance, the Contractor will be notified and the work subject to re-inspection before acceptance.

10.2 Replacement. At the end of the guarantee period the Contracting Officer will make another inspection to determine the condition of plants. Plants not in healthy growing condition, as determined by the Contracting Officer 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 sizes as originally specified. Such replacements shall be made in the same manner as specified for the original plantings, and at no cost to the Government. The guarantee on plants will be limited to one replacement.

* * * * *

SECTION 2Q

PAVEMENT MARKINGS

Index

- | | |
|----------------------------|------------------------|
| 1. Applicable Publications | 4. Equipment |
| 2. Materials | 5. Surface Preparation |
| 3. Sampling and Testing | 6. 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-P-115E	Paint, Traffic, Highway, White and Yellow
-----------	---

1.2 Federal Standard (Fed. Std.).

No. 141B & Change Notice 5	Paint, Varnish, Lacquer, and Related Materials; Methods for Sampling, and Testing
-------------------------------	---

2. MATERIALS. Paint shall be in sealed containers that plainly show the designated name, formula or specification number, batch number, color, date of manufacturer, 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.

2.1 Paints. Paints shall conform to Fed. Spec. TT-P-115, color as required.

3. 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 quart sample of each batch, paint 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 showing that the proposed batch 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, drying time, and gradation. Testing

procedures and reports shall be as specified in paragraph 5 of Method 1031.2 of Fed. Std. 141. 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.

c. Written approval of material by the Scottsdale Traffic Engineering Department shall be furnished to the Contracting Officer.

4. EQUIPMENT. All machines, tools and equipment used in the performance of the work shall be approved and maintained in satisfactory operating condition. Hand-operated push-type machines of a type commonly used for application of paint to pavement surfaces shall be acceptable for marking small street, bike paths and parking areas. Applicator machine shall be equipped with the necessary paint tanks and spraying nozzles, and shall be capable of applying paint uniformly at coverage specified. Sandblasting equipment shall be provided as required for cleaning surfaces to be painted. Hand-operated spray guns shall be provided for use in areas where push-type machines cannot be used.

4.2 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 c.f.m. of air at a pressure of not less than 90 psi at the nozzle for each nozzle used.

5. SURFACE PREPARATION. New pavement surfaces shall be allowed to cure for a period of not less than 30 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.

6. APPLICATION.

6.1 Rate of Application. Paint shall be applied evenly to the pavement surface to be coated at a rate of 105 plus or minus 5 square feet per gallon.

6.2 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. All 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.

6.3 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.

* * * * *

SECTION 2S

IRRIGATION SYSTEM

Index

- | | |
|--------------------------------------|--|
| 1. Applicable Publications | 7. Disinfection |
| 2. General | 8. Tools |
| 3. Materials | 9. Cleanup |
| 4. Installation | 10. Variation in Arrangement of Emitters |
| 5. Connection to Existing Waterlines | 11. Guarantee |
| 6. Tests | |

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.).

WW-U-531E Unions, Pipe, Steel or Malleable Iron, Threaded Connection, 150 lbs and 250 lbs

WW-V-51F Valve, Angle, Check, and Globe, Bronze, (125, 150 and 200 Pound, Threaded End, Flanged Ends, Solder Ends, and Brazed End, for Land Use)

WW-V-54D Valve, Gate, Bronze (125, 150 and 200 Pound, Threaded Ends, Flanged Ends, Solder End and Brazed Ends, for Land Use)
& Int. Am-3

1.2 American National Standards Institute, Inc. (ANSI) Standards.

A 21.11-1980 Rubber-Gasket Joints for Cast-Iron and Ductile-Iron Pressure Pipe and Fittings

B 16.3-1977 Malleable-Iron Threaded Fittings, 150 and 300 lb

1.3 American Society for Testing and Materials (ASTM) Standards.

A 120-80 Pipe, Steel Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless for Ordinary Uses

D-1785-76 Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120

D 2241-80 Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR)

D 2464-76 Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80

D 2466-78

Poly (Vinyl Chloride) (PVC) Plastic Pipe
Fittings, Schedule 40

D 2564-80

Solvent Cements for Poly (Vinyl Chloride)
(PVC) Plastic Pipe and Fittings

1.4 American Water Works Association (AWWA) Standards.

C 601-68

Disinfecting Water Mains

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, FILLS AND SUBGRADE PREPARATION and EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.

2.1 Aboveground piping shall be galvanized steel or as shown on drawings.

2.2 Below Ground Piping. Pipe smaller than 4-inch shall be plastic. Pipe for sleeving shall be plastic pipe. 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.

3. MATERIALS shall conform to the respective specifications and other requirements specified below.

3.1 Pipe.

3.1.1 Galvanized Steel Pipe shall conform to ASTM A 120, standard weight.

3.1.2 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.

3.2.1 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.

3.2.2 Insulation Joints. A rubber-gasketed or other suitable type of insulating joint shall be provided to effectively prevent metal-to-metal contact between adjacent dissimilar metallic pipes or fittings.

3.3 Fittings and Specials.

3.3.1 For Galvanized Steel Pipe. Steel fittings shall be galvanized. Threaded fittings shall conform to ANSI B 16.3.

3.3.2 For Plastic Pipe. Fittings shall conform to ASTM D 2464 or D 2466.

3.4 Gate Valves shall be designed for a working pressure of not less than 150 psi. Valve connections shall be as required for the piping in which they are installed. Valves shall have a clear waterway equal to the full nominal diameter of the valve, and shall be opened by turning counterclockwise. The operating nut or wheel shall have an arrow, cast in the metal, indicating the direction of opening.

3.4.1 Valves smaller than 3 inches shall be all bronze and shall conform to Fed. Spec. WW-V-54, type I.

3.5 Valve Boxes shall be plastic. Plastic boxes shall be a standard catalog product of a manufacturer regularly engaged in the manufacture of valve boxes. Boxes housing control valves shall have lockable covers. Plastic shall be rigid combination of polyolefin and fibrous inorganic materials having the following physical properties.

ASTM Test	Method	Value
Tensile Strength (2.0 in. Min.)	D-638	3,400 psi
Impact Strength, Izod	D-256	0.5 ft-lb/in
Shore-D Hardness	D-2240	63
Deflection Temp. @ 66 psi stress	D-648	230 degrees F
Specific Gravity	D-792	1.15

3.6 Backflow Prevention Units.

3.6.1 General. Backflow prevention unit(s) of the type(s) indicated shall be installed aboveground at the location(s) shown on the drawings. Where union connections are not provided as part of the unit, the Contractor shall provide and install a union or sleeve type coupling between the control valve and the inlet side of the unit. Pipe and fittings for backflow prevention units shall be galvanized steel.

3.6.2 Reduced Pressure Backflow Prevention Unit. The reduced pressure backflow prevention unit shall be a factory assembled unit consisting of two independently acting spring-loaded check valves with a differential pressure relief valve controlled-reduced-pressure zone in between and shall be complete with test cocks and drain. The first check valve shall reduce the supply pressure a predetermined amount so that during normal flow and the cessation of normal flow the pressure between the checks is less than the supply pressure. The pressure differential relief valve shall automatically discharge to atmosphere to maintain the pressure in the reduced pressure zone below the supply pressure. All parts shall be removeable or replaceable without removal of the unit from the line. The unit shall be suitable for a working pressure of 125 pounds per square inch and shall be the product of a manufacturer regularly engaged in the production of backflow prevention units of the reduced pressure type.

3.8 Sprinkler Control Valves and Valve Accessories.

3.8.1 Remote Control Valves shall be completely serviceable while installed in line or shall have a union connection on the downstream side; shall have brass bodies, a flow control device; shall be operated on approximately 24 volts, be normally closed, be slow closing globe type; and be compatible with the manufacturer of the automatic controller used in the work.

3.8.2 Valves shall be angle pattern with integral union on the discharge (horizontal) end and shall conform in essential requirements to Fed. Spec. WW-V-51, Type II, Class A, with a cross on the valve stem for key operation. Valve stem protectors shall be cast iron or cut from steel pipe. Inside diameter shall be approximately 2-1/4 inches. Length shall be such to provide protection from valve body to ground surface.

3.8.3 Quick Coupling Valves shall be two piece, spring-loaded, compression type, normally closed, opening against line pressure, and actuated by downward thrust against the valve. Body shall be of cast red bronze. Machined parts shall be fabricated from red brass. Valve washers and sealers for key stems shall be of a semi-rigid, non-metallic, material and shall be easily replaceable. Inlets shall be tapped for National Standard pipe thread of the pipe riser size or sizes shown on the drawings. Valves shall be suitable for a maximum operation pressure of 150 psi and shall be the standard product of a reputable manufacturer of quick coupling valves for lawn sprinkling systems. The Contractor shall furnish coupler keys for operating the valves in the amount required for assembly with each portable, single nozzle, rotary sprinkler. The Contractor shall furnish coupler keys for operating the valves with hose swivels. Rubber sleeves shall be the standard product of the manufacturer of quick coupling valves and when required they shall replace the hinged cover as regularly furnished. Each sleeve shall have a cover.

3.9 Unions shall conform to the requirements of Fed. Spec. WW-V-531, Type B.

3.10 Automatic Controllers. Controllers shall be the product of a manufacturer regularly engaged in the production of turf sprinkler systems and shall be specifically designed for drip irrigation. Controller shall be suitable for operation on the available electrical supply and shall be capable of complete automatic and manual operation of 1 station each.

3.10.1 Housing. Each controller shall be inclosed in a tamper-proof lockable metal housing. WALL mounted controllers shall be weatherproof. Where more than one controller is installed in an irrigation system, a single key shall open all cabinets. Two keys for each system shall be furnished.

3.10.2 Twenty-Four Hours Programming. Timing for each station shall be viable up to 24 hours. The programming cycle shall be not less than 7 calendar days. Each station shall be independently timed, scheduled, or omitted. Programming shall be changeable without special tools and without disassembling controller.

3.10.3 Charts. A chart, encased in plastic, showing clearly the areas serviced by each remote control valve shall be provided at each controller.

3.10.4 Electrical Work shall conform to the requirements of section: ELECTRICAL DISTRIBUTION AND STREET LIGHTING SYSTEM; UNDERGROUND. Electrical wiring shall be solid, single conductor, copper wire, type UF, size recommended by the controller manufacturer except that minimum wire size shall be No. 16. Common wire shall be a different color from all others. Regardless of the number of location of valves connected to a single controller station, separate control wires shall be run from the controller station to each valve. Electrical wires shall be installed at this time in order to facilitate a future conversion to electric controllers. Electrical wires shall be run from each battery operated valve to a central location near the backflow unit. This location shall be designated by the Contracting Officer.

3.11 Gravel shall be crushed or natural material, washed and uniformly graded between 3/8 and 1-inch size.

3.12 Pipe Bedding and Backfill Material. Sand bedding material not less than 2 inches thick shall be placed under pipe where trench excavation is in rock. Where sand bedding is not required, the bottom of trenches shall be accurately graded to provide uniform bearing and support for each section of pipe on undisturbed soil at every point along its entire length. Backfill material shall be suitable for the required compaction and free from stones larger than 1-inch in any dimension.

4. INSTALLATION.

4.1 General. Unless otherwise specified, installation of emitters, backflow prevention units, control valves, and boxes 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. Wheel cutters shall be used when practicable.

4.3.1 Plastic Pipe shall be cut square and all burrs, particles and curls shall be removed.

4.4 Joint Deflection.

TABLE I

Deflection in Inches

Diameter in Inches	Push-on Joint Pipe	Mechanical- Joint Pipe
3	19	31
4	19	31
6	19	27
8	19	20
10	19	20

If the alignment required deflection in excess of the above limitations, special bends or a sufficient number of shorter lengths of pipe shall be furnished to provide angular deflections within the limit set forth.

4.5 Placing and Laying. Pipe and accessories shall be carefully lowered into the trench by means of derrick, ropes, belt slings, or other authorized equipment. Under no circumstances shall any of the materials be dropped or dumped into the trench. The full length of each section of pipe shall rest solidly upon the pipe bed, with recesses excavated to accommodate joints. Pipe that has the grade or joint disturbed after laying shall be taken up and relaid. Pipe shall not be laid

in water or when trench conditions are unsuitable for the work. Water shall be kept out of the trench until jointing is completed. When work is not in progress, open ends of pipe, fitting, and valves shall be securely closed so that no trench water, earth, or other substance will enter the pipes or fittings.

4.5.1 Plastic Pipe shall be installed in accordance with the procedures recommended in ASTM D 2774 and as herein specified.

4.5.2 Tracer Wire of No. 12, type TW plastic coated copper wire, or Tracer Tape shall be installed with non-metallic (or plastic) irrigation pressure lines.

a. The tracer wire shall be placed on the bottom of the trench under the vertical projections of the pipe with spliced joints soldered and covered with insulating tape.

b. Tracer tape shall be taped to the pipe for the entire length of the pipe, spliced joints shall be soldered and covered with insulating tape.

c. Tracer wire or tracer tape shall follow the mainline pipelines and terminate in the yard box with the gate valve that controls these main irrigation lines. Provide enough length of wire or tape to make a loop and attach a plastic label with the designation "Tracer Wire."

4.6 Jointing.

4.6.1 Galvanized Steel Pipe. Threaded joints shall be made tight with a stiff mixture of graphite and oil, inert filler and oil, or with an approved graphite compound, applied with a brush to the male threads only. Compounds shall not contain lead.

4.6.2 Connections between different types of pipe and accessories shall be made with transition fittings approved by the Contracting Officer.

4.7 Pipe Sleeves shall be installed with a minimum of off-set at the joints to permit easy installation and removal of the irrigation lines. All plastic lines shall be installed in sleeves under paved areas. Sleeves shall extend at least 12 inches beyond the edges of the pavement. Sizes of sleeves shall be as follows:

Pipe Size (inches)	Minimum Sleeve Size (inches)
1/2	2
3/4	2-1/2
1, 1-1/4 and 1-1/2	3
2 and 2-1/2	4
3 and 4	6

4.8 Setting of Valves, and Boxes. Valves and valve boxes shall be installed where shown or directed, and shall be set plumb. Valve boxes shall be centered on the valves. Valves shall be located outside the area of roads and streets. Earthfill shall be carefully tamped around each valve or meter box to a distance of 4 feet on all sides of the box, or to the undisturbed trench face if less than 4 feet. Valves shall have the interiors cleaned of all foreign matter before installation. Stuffing boxes shall be tightened and the valve shall be inspected in open and closed positions to insure that all parts are in working condition.

4.9 Reaction Backing.

4.9.1 Thrust blocks shall be concrete mixed not leaner than 1 cement: 2-1/2 sand: 5 gravel. Blocks shall be placed between solid ground and the fitting to be anchored. The area of bearing shall be as indicated or as approved.

4.10 Remote Control Wiring for Electric Controller. Connections of wiring, shall be made with epoxy encapsulated connectors. Where more than one wire is placed in trench, the wiring shall be taped together at maximum intervals of 10 feet.

5. CONNECTION TO EXISTING WATERLINES and required permits. The Contractor shall make all necessary arrangements with the City of Scottsdale.

5.1 Supply Line (larger than 2 inches) shall be connected to the main by rigid connection and shall have a gate valve located below the frostline.

6. TESTS.

6.1 After completion of the piping system and prior to backfilling and the installation of emitters, the entire system shall be tested for leaks and thoroughly flushed under pressure to remove any dirt, scale or other material. Mainlines shall be tested at 150 psi for 1 hour duration. All emitter lines shall be tested at line pressure for 8 hours. Cracked or defective pipe, fittings, or accessories disclosed in the pressure 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.

6.1.1 No line shall be covered until inspection and approval has been given by the Contracting Officer.

6.1.2 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 elapsed 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.

6.2 Coverage Test. When the irrigation system is completed the entire system shall be adjusted and operated to demonstrate 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 and/or workmanship shall be corrected at no additional cost to the Government. In the event any modifications to the system or deviation from the approved plans and specifications are directed, an adjustment in contract price will be made.

7. DISINFECTION. The completed line from the backflow prevention unit to the connection to the existing waterline shall be disinfected as prescribed by AWWA C 601.

8. TOOLS. Three sets of special wrenches for removal and/or installation of sprinkler heads shall be provided at locations designated by the Contracting Officer.

9. **CLEANUP.** Upon completion of the installation of the irrigation system and appurtenances, all debris and surplus materials resulting from the work shall be removed.

10. **VARIATION IN ARRANGEMENT OF EMITTERS** from those shown on drawings 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 calculations and reasons shall be submitted as soon as practicable for written approval of the Contracting Officer. Hydraulic calculations shall include application rate per hour, design flow rate and pressure, loss allowance and friction loss thru pipe fittings, valves and accessories.

11. **GUARANTEE.** The following equipment 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:

Backflow prevention units

Control valves

Automatic controller

Emitter heads

* * * * *

SECTION 2U

DESERT GRANITE AND MISCELLANEOUS AGGREGATES

Index

- | | |
|----------------------------------|---------------------------|
| 1. Applicable Publications | 4. Sand Backfill Material |
| 2. Gravel Placement and Material | 5. Herbicides |
| 3. Desert Granite | |

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.

C33-80

Concrete Aggregates

C131-76

Resistance to abrasion of Small Size
Coarse Aggregate by Use of the Los
Angeles Machine

2. GRAVEL PLACEMENT AND MATERIAL. Gravel shall be placed on the service road as shown on the drawings in accordance with the following requirements: Gravel shall be clean, hard, used durable, uniform in quality, and free of any detrimental quantity of soft, friable, thin, elongated, or laminated pieces, disintegrated material, organic matter, oil, alkali, or other deleterious substance.

2.1 Abrasion. The loss of abrasion in the Los Angeles abrasion machine, determined as prescribed in ASTM C 131 Grading A, shall not exceed 10 percent, by weight, after 100 revolutions nor 40 percent after 500 revolutions.

2.2 Gravel Composition. Gravel shall be composed entirely of particles that are either fully or partially rounded and water-worn. Crushed rock may be combined provided it is uniformly distributed throughout and blended with the gravel. The quality and gradation requirements shall be as follows: ASTM C33, 3/4-inch maximum size as indicated in Grading Table for coarse aggregates.

3. DESERT GRANITE. Decomposed granite shall be placed on the areas as shown on the drawings in accordance with the following requirements.

3.1 Desert granite shall be any granitoid igneous rock which has been weathered in place and which has as principal constituents granular fragments of quartz and feldspar. It may also contain fragments of granite rock not yet broken down into the component minerals. The material shall remain stable when saturated with water.

3.2 Material shall be free from all foreign objects, lumps, irregularities and shall be consistent in color.

3.3 Desert granite shall have a maximum size of not more than 3/4", have not more than 20 percent of the material passing the No. 200 sieve, and shall have a plasticity index of less than 10 for the materials passing the No. 40 sieve.

4. SAND BACKFILL MATERIAL. Sand backfill material shall be placed behind wing walls and retaining walls as shown on the plans and in accordance with the following requirements.

4.1 Sand backfill material and sacked drain material shall consist of gravel, crushed rock, natural sands, manufactured sand, or combinations thereof. Sand backfill material shall conform to the following gradation requirements.

Sieve Size	Percent Passing
No. 4	95-100
No. 8	80- 90
No. 16	55- 75
No. 30	30- 60
No. 50	10- 30
No. 100	2- 10

4.1.2 Sacked drain material shall be placed at weep holes where indicated and shall conform to the following gradation requirements.

Sieve Size	Percent Passing
1-inch	100
3/4-inch	90- 100
3/8-inch	20- 55
No. 4	0- 10
No. 8	0- 5

4.2 Sand backfill material shall be placed in layers along with and by the same methods specified for structure backfill.

5. HERBICIDES. Areas to be covered with desert granite or gravel shall be treated with a commercial compound of Dimethyl ester of tetrachloroterephthalic acid applied at maximum manufacturer's approved rates for pre-emergent herbicides. Material shall be applied to ground in a slurry mix through a 50 mesh or larger screen prior to and following installation of decomposed granite.

* * * * *

SECTION 3A

CONCRETE

Index

- | | |
|-------------------------------------|--------------------------------|
| 1. Related Work Specified Elsewhere | 8. Preparation for Placing |
| 2. Reference Standards | 9. Placing |
| 3. Quality Assurance | 10. Finishing |
| 4. Evaluation and Acceptance | 11. Curing and Protection |
| 5. Submittals | 12. Contractor Quality Control |
| 6. Materials | 13. Payment |
| 7. Production of Concrete | |

1. RELATED WORK SPECIFIED ELSEWHERE.

- 1.1 Bike Paths Section: 3D. Concrete Sidewalks, Bike Path, Curbs and Gutters.
- 1.2 Concrete Reinforcement. Section: Steel bars, welded wire fabric and accessories for concrete reinforcement.
- 1.3 Formwork for Concrete. Section: Formwork for Concrete.
- 1.4 Pneumatically Placed Concrete. Section: Pneumatically Placed Concrete.

2. REFERENCE STANDARDS.

2.1 American Society for Testing and Materials (ASTM) with Corresponding U.S. Army Corps of Engineers Handbook for Cement and Concrete (CRD) Standard Indicated Where Available.

C 31-(CRD-C 11)	Making and Curing Concrete Test Specimens in the Field
C 33-(CRD-C 133)	Concrete Aggregates
C 39-(CRD-C 14)	Compressive Strength of Cylindrical Concrete Specimens
C 94-(CRD-C 31)	Ready-Mixed Concrete
C 143-(CRD-C 5)	Slump of Portland Cement Concrete
C 150-(CRD-C 201)	Portland Cement
C 171-(CRD-C 310)	Sheet Materials for Curing Concrete
C 172-(CRD-C 4)	Sampling Fresh Concrete
C 231-(CRD-C 41)	Air Content of Freshly Mixed Concrete by the Pressure Method
C 260-(CRD-C 13)	Air-Entraining Admixtures for Concrete
C 309-	Liquid Membrane - Forming Compounds for Curing Concrete

C 494-(CRD-C 87)	Chemical Admixtures for Concrete
C 595-(CRD-C 203)	Blended Hydraulic Cements
C 685-(CRD-C 98)	Concrete Made By Volumetric Batching Continuous Mixing
D 98-(CRD-C 505)	Calcium Chloride

2.2 Concrete Plant Manufacturer's Bureau (CPMB).

6th Edition (CRD-C 95) Concrete Plant Standards

3. QUALITY ASSURANCE.

3.1 Construction testing by Government. The Government will sample and test aggregates and concrete to determine compliance with the specifications. The Contractor shall provide facilities and labor as may be necessary for procurement of representative test samples. Samples of aggregates will be obtained at the point of batching. Concrete will be sampled in accordance with ASTM C 172. Slump and air content will be determined in accordance with ASTM C 143 and ASTM C 231, respectively. Compression test specimens will be made and cured in accordance with ASTM C 31 and compression test specimens tested in accordance with ASTM C 39. Samples for strength tests will be taken not less than once each shift in which concrete is produced from each class of concrete required. Three specimens will be made from each sample, two will be tested at 28 days for acceptance and one will be tested at 7 days for information. The acceptance test results will be the average of the strengths of the two specimens tested at 28 days.

4. EVALUATION AND ACCEPTANCE.

4.1 Strength. The strength of the concrete will be considered satisfactory so long as the average of all sets of three consecutive individual strength tests (average of two cylinders) equal or exceed the required specified strength $f'c$ and no individual strength test (average of two cylinders) falls below the specified strength $f'c$ by more than 500 pounds per square inch.

5. SUBMITTALS.

5.1 Test Reports.

5.1.1 Cementitious Material will be accepted on the basis of a manufacturer's certificate of compliance.

5.1.2 Aggregates will be accepted on the basis of test reports that show the material meeting the requirements of the specifications under which it is furnished.

5.2 Manufacturers Literature. Literature from suppliers which demonstrates compliance with applicable specifications for the following materials:

Air-entraining agent

Retarding admixture

Water reducing admixture

Curing materials

Accelerating

5.3 Batching and Mixing Equipment will be accepted on the basis of manufacturer's data which demonstrates compliance with the applicable specifications.

5.4 Concrete Proportions. The proportions of the concrete materials in the mix shall be the responsibility of the Contractor. Prior to placement of concrete, the Contractor shall submit for approval, mixture proportions shall include dry weights of cement, saturated surface-dry weights of fine and coarse aggregates, and quantities, type and name of admixture (if any) and quantity of water per cubic yard of concrete. Also satisfactory evidence shall be given that the materials to be used and the proportions selected will produce concrete of the quality specified. All materials included in the mixture proportions shall be of the same type and from the same source as will be used on the project.

6. MATERIALS.

6.1 Cement shall be Portland cement and shall conform to appropriate specifications listed below:

6.1.1 Portland Cement. ASTM C 150 Type low alkali.

6.2 Aggregates shall comply with ASTM C 33.

6.3 Admixtures to be used, when required or approved, shall comply with the appropriate specification listed below:

6.3.1 Air-entraining admixture. ASTM C 260.

6.3.2 Accelerating admixture. ASTM C 260.

6.3.3 Water-reducing or retarding admixtures. ASTM C 494, Type A, B.

6.3.4 Construction Adhesive. "Concresive 1001-LPL" as manufactured by Adhesive Engineering or approved equal.

6.4 Curing Materials.

6.4.1 Impervious sheet materials ASTM C 171, type optional except polyethylene film, if used, shall be white opaque.

6.4.2 Membrane - forming curing compound ASTM C 309, Type 1-D or Type 2.

6.5 Water for mixing shall be fresh, and free from injurious amounts of oil, acid, salt, alkali, organic matter or other deleterious substances.

6.6 Concrete Quality. Specified compressive strength f'_c shall be 2500 pounds per square inch at 28 days for bike path and 3000 psi for all other construction. The maximum nominal size coarse aggregate shall be 1 1/2 inches. The air content shall be 6.0 ± 1.5 percent. The slump shall not vary more than $\pm 1 \frac{1}{2}$ inches from 3 1/2 inches.

7. PRODUCTION OF CONCRETE.

7.1 Ready - Mixed Concrete shall conform to ASTM C 94 except as otherwise specified.

7.2 Volumetric Batching and Continuous Mixing shall conform to ASTM C 685 except as otherwise specified.

7.3 On-site Batching and Mixing. If the Contractor elects to provide an on-site batching and mixing plant a batch-type plant will be provided of sufficient capacity to prevent cold joints. The method of measuring materials, the batching plant, and the mixer shall comply with the applicable provisions of ASTM C 94 except as otherwise specified.

8. PREPARATION FOR PLACING. Construction joints shall be prepared to expose coarse aggregate and the surface shall be clean, damp and free of laitance. Formwork shall be complete and mortar tight. Ramps and walkways, as necessary, shall be constructed to allow safe and expeditious access for concrete and workmen. Standing or flowing water, loose particles, debris and foreign matter shall have been removed. Earth foundations shall be satisfactorily compacted. Reinforcement shall be secured in place; joints, anchors and other embedded items shall have been positioned. Where concrete is to be placed over existing pavement, or grouted riprap the existing surface shall be sandblasted to remove all grease, dirt and all other unsound material. Treat the cleaned surface with a two component low viscosity construction adhesive for bonding the new concrete to existing surface. Follow manufacturers instructions for applications. All equipment needed to place and consolidate the concrete shall be at the placement site and in good operating condition. Spare vibrators shall be available. The entire preparation shall be accepted by the Government prior to placing.

9. PLACING. Concrete placement shall not be permitted when weather conditions prevent proper placement and consolidation. Concrete shall be conveyed from the mixer to the forms as rapidly as practicable, by methods which prevent segregation or loss of ingredients. Concrete shall be in place within 15 minutes after discharge from the mixer. Concrete shall be deposited as close as possible to its final position in the forms and be so regulated that it may be effectively consolidated in horizontal layers 18 inches or less in thickness. The placement shall be carried on at such a rate that the formation of cold joints will be prevented. Each layer of concrete shall be consolidated by internal vibrating equipment. Vibration shall be systematically accomplished by inserting the vibrator through the fresh concrete into the layer below at a uniform spacing over the entire area of placement. The distance between insertions shall be approximately 1 1/2 times the radius of action of the vibrator and overlay the adjacent, just vibrated area by a few inches. The vibrator shall penetrate rapidly to the bottom of the layer and at least 6 inches into the layer below if such exists. It shall be held stationary until the concrete is consolidated (normally 4 to 6 seconds but some mixes may require more time) and then withdrawn slowly.

10. FINISHING.

10.1 General. No finishing or repairs will be done when either the concrete or the ambient temperature is below 50°F.

10.2 Finishing Formed Surfaces. Beginning no more than 24 hours after from removal, all fins and loose materials shall be removed and surface defects including tie holes shall be filled. All honeycomb and other defects shall be

repaired. All unsound concrete shall be removed from areas to be repaired. Surface defects greater than 1/2 inch in diameter and holes left by removal of tie rods in all surfaces not to receive additional concrete shall be reamed or chipped and filled with dry pack mortar. Areas to be repaired shall be dampened, brush-coated with a neat cement grout and filled with mortar or concrete. The cement used in mortar or concrete for repairs to all surfaces permanently exposed to view shall be a blend of Portland cement and white cement so that the final color when cured will be the same as adjacent concrete. Forms shall hold a tolerance of 1/4 inch in 10 feet for finished formed surfaces.

10.3 Finishing Unformed Surfaces. All unformed surfaces that are not to be covered by additional concrete or backfill shall be float finished to elevations shown on the drawings. Surfaces to receive additional concrete or backfill shall be brought to the elevations shown on the drawing and left as a true and regular surface. Exterior surfaces shall be sloped for drainage unless otherwise shown on the drawings. Joints shall be carefully made with a jointing tool. Unformed surfaces shall be finished to a tolerance of 1/4 inch for a float and broom finish as determined by a 10-foot straightedge placed on surfaces shown on the plans to be level, or having a constant slope. Finishing shall not be performed while there is excess moisture or bleeding water on the surface.

10.3.1 Floated finish. Surfaces to be float finished shall be screeded and darried or bullfloated to eliminate the ridges and fill in the voids left by the screed. In addition, the darby or bullfloat shall fill all surface voids and only slightly embed the coarse aggregate. When the water sheen disappears and the concrete will support a man, floating should be completed. Floating should embed large aggregates just beneath the surface, remove slight imperfections, humps and voids to produce a plane surface and compact the concrete and consolidate mortar at the surface.

10.3.1.2 Broom finish. A stiff broom finish will be applied to the following surfaces: bridge decks. Brooming shall be done immediately following floating to provide a smooth, even, dense finish free from blemishes including edger marks. Finished surfaces shall be protected from damage during the construction period.

11. CURING AND PROTECTION. Beginning immediately after placement, and continuing for at least 7 days all concrete shall be cured and protected from premature drying, extremes in temperature, rapid temperature change, freezing, mechanical damage and exposure to rain or flowing water. All materials and equipment needed for adequate curing and protection shall be available and at the site of the placement prior to start of concrete placement. Preservation of moisture for concrete surfaces not in contact with forms shall be accomplished by one of the following methods:

- (1) Ponding or continuous sprinkling.
- (2) Application of absorptive mats or fabrics kept continuously wet.
- (3) Application of sand kept continuously wet.
- (4) Application of impervious sheet material conforming to ASTM C 171.
- (5) Application of membrane forming curing compound conforming to ASTM C 309, Type 1-D on surfaces permanently exposed to view and Type 2 on other surfaces shall be applied in accordance with manufacturer's instructions.

The preservation of moisture for concrete surfaces placed against wooden forms shall be accomplished by keeping the forms continuously wet for 7 days. If forms are removed prior to 7 days other curing methods shall be used for the balance of the 7 day period. During the period of protection removal, the temperature of the air in contact with the concrete shall not be allowed to drop more than 25⁰D in 24 hours.

12. CONTRACTOR QUALITY CONTROL.

12.1 General. Contractor quality control is that system by which a Contractor regulates, tests, and inspects his procedures, equipment, materials, and personnel so that the completed project will comply with the requirements of the project specifications.

12.2 Inspection Details and Frequency of Testing.

12.2.1 Preparations for Placing. Foundation or construction joints, forms and embedded items shall be inspected in sufficient time prior to each concrete placement by the Contractor in order to certify to the Contracting Officer that it is ready to receive concrete.

12.2.2 Air Content. Entrained air content will be checked at least once during each shift that concrete is placed. Samples will be obtained in accordance with ASTM C 172 and tested in accordance with ASTM C 231.

12.2.3 Slump. Slump will be checked twice during each shift that concrete is produced. Slump will be checked in accordance with ASTM C 143.

12.2.4 The Contractor shall insure that the concrete is properly consolidated, finished, protected and cured.

12.3 Reports. The results of all tests and inspections conducted at the project site shall be reported, in writing weekly and shall be delivered to a designated representative of the Contracting Officer within 3 days after the end of each weekly reporting period. The Contracting Officer has the right to examine all Contractor quality control records.

13. PAYMENT. Payment will be made for the following minor structures of this contract as indicated in measurement and payment section 1B: CONCRETE BIKE PATH BRIDGE, PREFABRICATED METAL BIKE PATH BRIDGE, concrete retaining wall and scuppers. No separate payment will be made for concrete used for these minor structures.

* * * * *

SECTION 3B

FORMWORK FOR CONCRETE

Index

- | | |
|----------------------------|--------------------------|
| 1. Applicable Publications | 6. Chamfering |
| 2. Submittals | 7. Coating |
| 3. Design | 8. Removal |
| 4. Materials | 9. Field Quality Control |
| 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 the basic designation only.

1.1 American Concrete Institute (ACI) Standards.

ACI 347-78	Recommended Practice for Concrete Formwork.
------------	---

1.2 American Society for Testing Materials (ASTM).

C 31-69 (R 1975)	Making and Curing Concrete Test Specimens in the Field
------------------	--

C 39-72 (R 1979)	Compressive Strength of Cylindrical Concrete Specimens
------------------	--

1.3 U.S. Department of Commerce, National Bureau of Standards (NBS) Product Standard.

PS 1-74	Construction and Industrial Plywood
---------	-------------------------------------

2. SUBMITTALS.

2.1 Shop Drawings. Drawings for all formwork required shall be submitted at least 14 days before either fabrication on site or before delivery of prefabricated forms. The drawing and data submitted shall include the type, size, quantity and strength of all materials of which the forms are made, the plan for jointing of facing panels, details affecting the appearance, and the assumed design values and loading conditions.

2.2 Manufacturer's Literature shall be submitted for plywood, concrete form hardboard, form accessories, prefabricated forms, and form coating.

3. DESIGN. The design and engineering of the formwork, as well as its construction, shall be the responsibility of the Contractor. The formwork shall be designed for loads, lateral pressure and allowable stresses in accordance with Chapter 1 of ACI Standard 347. Forms shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete and shall have sufficient rigidity to maintain specified tolerances.

4. MATERIALS.

4.1 Forms shall be fabricated with facing materials that produce the specified construction tolerance and surface requirements of section: CONCRETE.

4.1.1 The finish shall apply to all formed surfaces that will be permanently exposed to view. The sheathing shall be composed of tongue-and-groove or shiplap lumber, plywood conforming to NBS Product Standard PS-1 exterior type, grade B-B plyform, High Density Overlay, Exterior Type or Structural I, Grade B-B, Plyform, High Density Overlay, all Exterior Type.

4.1.2 Class "B" Finish. This class of finish shall apply to all surfaces except those specified to receive Class A, Class C, or Class D. The sheathing shall be composed of tongue-and-groove or shiplap lumber, plywood conforming to NBS Product Standards PS-1 exterior type, grade B-B plyform, tempered concrete form hardboard, or steel. Steel lining on wood sheathing will not be permitted.

4.1.3 Class "C" Finish. This class of finish shall apply to bike path and slope paving. The sheathing may be of either tongue-and-groove lumber, plywood, concrete form hardboard, or steel. Wood sheathing for curved or warped surfaces shall be composed of splines of lumber which can be bent to the required shape without splitting or cracking to form a smooth tight form.

4.1.4 Class "D" Finish. This class of finish shall apply to below grade surfaces. The sheathing may be of wood or steel.

4.2 Form Accessories. Ties and other similar form accessories to be partially or wholly embedded in the concrete shall be of a commercially manufactured type. After the ends or end fasteners have been removed, the embedded portion of metal ties shall terminate not less than 2-inches from any concrete surface either exposed to view or exposed to water. Plastic snap ties may be used in locations where the surface will not be exposed to view. Form ties shall be constructed so that the ends or end fasteners can be removed without spalling the concrete.

4.3 Form Coating shall be a commercial formulation of satisfactory and proven performance that will not bond with, stain or adversely affect concrete surfaces and will not impair subsequent treatment of concrete surfaces depending upon bond or adhesion nor impede the wetting of surfaces to be cured with water or curing compounds.

5. INSTALLATION. Forms shall be mortar tight, properly alined and adequately supported to produce concrete surfaces meeting the surface requirements and construction requirements of section: CONCRETE. Where concrete surfaces are to be permanently exposed to view, joints in form panels shall be arranged to provide a pleasing appearance. Where forms for continuous surfaces are placed in successive units, care shall be taken to fit the forms over the completed surface so as to obtain accurate alinement of the surface and to prevent leakage of mortar. Forms shall not be re-used if there is any evidence of surface wear and tear or defects which would impair the quality of the surface. All surfaces of forms and embedded materials shall be cleaned of any mortar from previous concreting and of all other foreign material before concrete is placed in them.

6. CHAMFERING. All exposed joints, edges, and external corners shall be chamfered by molding placed in the forms unless the drawings specifically state that chamfering is to be omitted or as otherwise specified. Chamfered joints shall not be permitted where earth or rockfill is placed in contact with concrete

surfaces. Chamfered joints shall be terminated a sufficient distance outside the limit of the earth or rockfill so that the end of the joints will be clearly visible.

7. COATING. Forms for exposed or painted surfaces shall be coated with form oil or a form-release agent before the form or reinforcement is placed in final position. The coating shall be used as recommended in the manufacturer's printed or written instructions. Forms for unexposed surfaces may be wet with water in lieu of coating immediately before placing concrete, except that in cold weather with probable freezing temperatures coating shall be mandatory. Surplus coating on form surfaces and coating on reinforcing steel and construction joints shall be removed before placing concrete.

8. REMOVAL. Forms shall not be removed without approval and all removal shall be accomplished in a manner which will prevent injury to the concrete. Forms shall not be removed before the expiration of the minimum time indicated below, except as otherwise directed or specifically authorized. When conditions of the work are such as to justify the requirements, forms will be required to remain in place for a longer period.

8.1 Unsupported Concrete. Formwork for walls, columns, sides of beams, gravity structures and other vertical type forms not supporting the weight of concrete shall not be removed in less than 24 hours. The time depends on temperature, lift heights and type and amount of cementitious material in the concrete. Where forms for columns, walls and sides of beams also support formwork for slabs or beam soffits, the removal time of the latter shall govern.

8.2 Supported Concrete. Supporting forms and shoring shall not be removed until structural members have acquired sufficient strength to support safely their own weight and any construction load to which concrete may be subjected. In no case shall forms and shoring be removed until both minimum time and sufficient strength have been attained.

	Concrete with Type or II Portland Cement or Portland Pozzolan Cement	Concrete with Blends of Portland Cement with other Cementitious Material
Beams, deck-type slabs, or girder soffits where clear structural span between support is		
under 10 feet	4 Days	6 Days
10 to 20 feet	7	10
over 20 feet	14	21

In addition to minimum times above, results of control tests conducted in accordance with ASTM C-31 and C-39 will be used as evidence that concrete has attained sufficient strength to permit removal of forms. Concrete cylinders shall be stored in the structure or as near the structure as possible, shall receive insofar as possible the same curing and protection as given those portions of the structure they represent, and shall be tested with 24 hours after removal from the structure. Cylinders will be tested by and at the expense of the Government. Supporting forms shall not be removed until after minimum time and control test specimens have attained at least 100 percent of strength required for the

structure in accordance with quality and location requirements of section:
CONCRETE.

9. FIELD QUALITY CONTROL. 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 that they are ready to receive concrete. The results of each inspection shall be reported in writing.

* * * * *

SECTION 3C

STEEL BARS, WELDED WIRE FABRIC AND ACCESSORIES FOR CONCRETE REINFORCEMENT

Index

- | | |
|----------------------------|-----------------|
| 1. Applicable Publications | 4. Materials |
| 2. Quality Assurance | 5. Installation |
| 3. Submittals | |

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.

ACI 315-74	Manual of Standard Practice for Detailing Reinforced Concrete Structures
------------	--

ACI 318-77	Building Code Requirements for Reinforced Concrete
------------	---

1.2 American Society for Testing and Materials (ASTM) Standards.

A 185-79	Welded Steel Wire Fabric for Concrete Reinforcement
----------	--

A 497-79	Welded Deformed Steel Wire Fabric for Concrete Reinforcement
----------	---

A 615-80	Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
----------	--

A 706-80	Low-Alloy Steel Deformed Bars for Concrete Reinforcement
----------	---

E 8-80a	Tension Testing of Metallic Materials
---------	---------------------------------------

1.3 American Welding Society (AWS) Code.

D 1.4-79	Reinforcing Steel Welding Code
----------	--------------------------------

2. QUALITY ASSURANCE.

2.1 Materials Tests. The Contractor shall have required material tests performed by an approved laboratory to demonstrate that the materials are in conformance with the specifications. Tension tests shall be performed on full cross section specimens in accordance with ASTM E 8, using a gage length that spans the extremities of specimens with welds or sleeves included. Tests shall be at the Contractor's expense.

3. SUBMITTALS.

3.1 Shop Drawings. The Contractor shall prepare and submit complete shop drawings to the Contracting Officer for approval in accordance with specified requirements. Shop drawings shall include the following:

(1) Reinforcement steel schedules complete with the quantity, shape and size, dimensions, weight per foot and total weights, and bending details.

(2) Details of bar supports including types, sizes, spacing and sequence.

3.2 Test Reports. Certified tests reports of reinforcement steel showing that the steel will comply with the applicable specifications shall be submitted to the Contracting Officer by the Contractor. Reports shall be furnished for each steel shipment and shall be identified with specific lots prior to use of the steel in the work.

4. MATERIALS.

4.1 Steel Reinforcement shall conform to ASTM A 615, Grade 60, for bar sizes 3 through 11.

(1) Tension test specimens shall be bars of full cross section as rolled for all sizes.

(2) The bend test requirements shall be based upon 180 degree bends of full size bars. The bend diameters for bend test shall be as indicated in the following table and shall be measured on the inside of bars:

Bar Size	Maximum Diameter
No. 3, 4, and 5	3-1/2 bar diameters
No. 6, 7, and 8	5 bar diameters

The Contractor shall furnish results of all tension and bend tests performed.

4.1.1 Fabricated Bar Mats shall conform to ASTM A 184, clipped or welded mats of ASTM A 615 steel, Grade 40, 50, or 60, bar size and spacing as indicated on the drawings.

4.2 Welded Wire Fabric shall conform to ASTM A 185, gages, spacing and arrangement of wires as indicated on the drawings or ASTM A 497, sizes, spacing, deformations, and dimensions as indicated on the drawings.

4.3 Accessories.

4.3.1 Bar Supports shall conform to ACI 315. Bar supports for formed surfaces exposed to view or to be painted shall be plastic protected wire, stainless steel or precast concrete supports. Precast concrete bar supports shall be wedge-shaped, not larger than 3-1/2 x 3-1/2 inches, of thickness equal to that indicated for concrete cover and shall have an embedded hooked tie wire for anchorage. If formed surface is exposed to view, the precast concrete bar support shall be the same quality, texture, and color as the finish surface.

4.3.2 Wire Ties shall be 16-gage or heavier black annealed wire and shall have ends pointing away from the form.

5. INSTALLATION. Reinforcement steel and accessories shall be installed or placed as specified and as shown on contract and approved shop drawings. Placement details of reinforcement and accessories not specified or shown on the drawings shall be in accordance with ACI 315 or ACI 318. Reinforcement shall be fabricated to shapes and dimensions shown, placed where indicated within specified tolerances and adequately supported during concrete placement. At the time of concrete placement all reinforcement shall be free from loose, flaky rust, scale (except tight mill scale), mud, oil, grease or any other coating that might reduce the bond with the concrete.

5.1 Hooks and Bends. Reinforcement bars may be mill or field bent. All bars shall be bent cold unless otherwise authorized. No bars partially embedded in concrete shall be field bent unless indicated on the drawings or otherwise authorized. All hooks or bends shall be in accordance with ACI 318.

5.2 Welding of reinforcement bars will be permitted only where indicated on the drawings or as otherwise directed by the Contracting Officer. Welding shall be performed in accordance with AWS D 1.4.

5.3 Placing Tolerances.

5.3.1 Spacing of Bars. Bars shall be spaced as indicated on the drawings or as otherwise directed. The spacing between adjacent bars and the distance between layers may not vary from the indicated position by more than one bar diameter nor more than one inch.

5.3.2 Concrete Cover. The minimum concrete cover of main reinforcement steel shall be as indicated on the drawings. The tolerances shall be as follows:

MINIMUM COVER	VARIATION
6"	+ 1/2"
4"	+ 3/8"
3"	+ 3/8"
2"	+ 1/4"
1-1/2"	+ 1/4"
1"	+ 1/8"
3/4"	+ 1/8"

5.4 Splicing. Splices in reinforcement steel shall be as specified, shown on the drawings or as directed by the Contracting Officer. Bars may be spliced at alternate or additional locations at no additional cost to the Government, subject to the approval of the Contracting Officer. Except as provided herein, all splicing shall be in accordance with approved splicing procedures and the requirements of ACI 318.

5.4.1 Lapped Splices shall be used only for bars smaller than size no. 14. Bar laps may be placed in contact and securely tied or may be spaced transversely apart to permit the embedment of the entire surface of each bar in concrete, but shall not be spaced farther apart than one-fifth the required length of lap nor 6-inches. Lengths of laps for bars or welded wire fabric shall conform to the requirements of ACI 318, except when otherwise shown on the drawings.

* * * * *

SECTION 3E

PNEUMATICALLY PLACED CONCRETE

Index

- | | |
|-----------------------------|-------------------------------|
| 1. Applicable Publications | 6. Foundation Preparation |
| 2. Usage | 7. Placing |
| 3. Description | 8. Finishing |
| 4. Materials | 9. Contractor Quality Control |
| 5. Proportioning and Mixing | |

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 94-80	Ready Mixed Concrete
C 150-80	Portland Cement
C 33-80	Concrete Aggregates

1.2 American Concrete Institute (ACI) Standard.

ACI 304-73	Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete
------------	--

2. DESCRIPTION. Pneumatically placed concrete 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 Reinforcement shall conform to the requirements specified in section: STEEL BARS, WELDED WIRE FABRIC AND ACCESSORIES FOR CONCRETE REINFORCEMENT. Curing shall conform to the requirements specified in the section: CONCRETE.

4. MATERIALS.

4.1 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.

4.2 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.

4.3 Water for mixing and curing shall conform to the requirements specified for section: CONCRETE.

5. PROPORTIONING AND MIXING.

5.1 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 which have not been incorporated into the work shall not be used.

5.2 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.

5.3 Strength. Pneumatically placed concrete shall have a minimum compressive strength of not less than 3,000 pounds per square inch at 28 days.

6. 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.

7. PLACING.

7.1 Workmen. Only experienced foremen, gunmen, nozzle men, and rodmen shall be employed and satisfactory written evidence of such experience shall be furnished the Contracting Officer or his representative upon demand.

7.2 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.

7.3 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 produce 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.

7.4 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.

8. FINISHING. After the concrete has been placed to the required thickness the surface shall be checked with a straightedge and any low spots or depressions shall be filled. Except as otherwise specified, surfaces shall be left in a natural finish as left by the nozzle.

9. CONTRACTOR QUALITY CONTROL.

9.1 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.

9.2 Inspection Details and Frequency of Testing.

9.2.1 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.

9.2.2 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.

9.2.3 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.

* * * * *

SECTION 3F

GROUTING STONE PROTECTION

Index

- | | |
|----------------------------|------------|
| 1. Applicable Publications | 3. Placing |
| 2. Materials | 4. Curing |
| 3. Mixing | |

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 of the section: CONCRETE.

2.2 Portland Cement shall conform to the requirements of Fed. Spec. SS-C-1960/3B, Type I and/or 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. 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 2 courses to a depth equal to a maximum of 2/3 and not less than 1/2 of the depth of the stone protection. 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 to cover the entire area and to assure that all crevices are filled. Sufficient barring shall be done to loosen tight pockets of stone and otherwise aid the penetration of grout. The first course shall fully penetrate the stone blanket. The second course shall be placed as soon as the first course has sufficiently stiffened so that it will not flow when additional grout is added. All brooming shall be uphill, 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. 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.

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.

* * * * *

SECTION 4A

REINFORCED MASONRY

Index

- | | |
|-------------------------------------|--------------------------------------|
| 1. Applicable Publications | 6. Environmental Conditions |
| 2. Qualifications of Testing Agency | 7. Materials |
| 3. Definitions | 8. Mortar Mixes |
| 4. Submittals | 9. Grout Mixes |
| 5. Delivery, Storage, and Handling | 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 U.S. Army Corps of Engineers Publications.

CRD-C 619-80

Grout Fluidifier

1.2 American Concrete Institute (ACI) Standard.

315-74 (R 1978)

Manual of Standard Practice for
Detailing Reinforced Concrete
Structures (6th Ed., 3d Prtg.,
March 1977) Revised 1978

1.3 American Society for Testing and Materials (ASTM) Standards.

A 82-79

Cold-Drawn Steel Wire for Concrete
Reinforcement

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 33-80

Concrete Aggregates

C 39-72 (R 1979)

Compressive Strength of Cylindrical
Concrete Specimens

C 90-78

Hollow Load-Bearing Concrete Masonry
Units

C 91-78

Masonry Cement

C 94-80

Ready-Mixed Concrete

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 **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 Centering Clips** - 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 as directed from stockpiles for each type of 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 jobsite.

(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 end of walls; 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. Keep anchors and ties free of rust. Steel reinforcing bars shall be free of loose scale and rust. Deliver grout and mortar materials in unbroken bags, 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 grout and mortar materials 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 units 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 mixture water and/or sand. Temperature of mixing water or of water and sand introduced to cement shall not exceed 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 hereinafter.

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 404, size No. 8 or ASTM C 33, 3/4-inch maximum size as indicated in Grading Table for coarse aggregates.

7.4 Aggregate for Mortar. ASTM C 144, except that not less than 3 percent nor more than 15 percent shall pass the No. 100 sieve. Aggregate used in mortar for joints 1/4 inch or less shall have 100 percent passing the No. 8 sieve with 10 percent being retained on the No. 16 sieve.

7.5 Anchors and Centering Devices.

7.5.1 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.

7.5.1.1 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.

7.5.1.2 Wire anchors for use with embedded slots or wire inserts shall be formed from not lighter than 9 gage wire looped and closed.

7.5.2 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.

7.6 Portland Cement. ASTM C 150, Type I, II or III, including the requirements for low alkali content.

7.7 Concrete Masonry Units.

7.7.1 The linear drying shrinkage of concrete masonry units shall not exceed 0.045 percent when tested in accordance with ASTM C 426.

7.7.2 Kinds and Shapes. Concrete masonry units of the various kinds shall conform to the specifications references 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 and window jambs. All units used in exposed masonry surfaces shall have a uniform fine to medium texture and a uniform color.

7.7.3 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.

7.8 Horizontal Joint Reinforcement. Fabricated from steel wire using welded connections. Tack welding will not be permitted. The reinforcement shall conform to the following requirements.

7.8.1 Steel Wire. ASTM A 82. Wire sizes for the various types of joint reinforcement shown on the drawings shall not be less than those listed below:

Type	<u>Minimum Wire Size</u>	
	<u>Longitudinal Wire</u>	<u>Crosswires</u>
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 gag

7.8.2 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.

7.8.3 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.

7.8.3.1 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 wire and 16 inches for deformed longitudinal wires.

7.9 Mortar Coloring. Chemically inert, finely ground limeproof pigment.

7.10 Lime Paste. Lime paste shall be made with pulverized quicklime or hydrated lime. Hydrated lime processed by the steam method shall be allowed to soak not less than 24 hours. Quicklime and other hydrated lime shall be allowed to soak not less than 72 hours. In lieu of hydrated-lime paste for use in mortar, the hydrated lime may be added in the dry form.

7.10.1 Hydrated Lime. ASTM C 207, type S.

7.10.2 Pulvertized Quicklime. ASTM C 5, except 100 percent shall pass the No. 20 sieve and 90 percent shall pass the No. 50 sieve.

7.11 Reinforcing Bars. ASTM A 615, grade 40.

7.12 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 Mortar shall be Type PL in accordance with the proportion specifications of ASTM C 476 as modified below. Materials shall be Portland cement, hydrated lime or lime paste, aggregate, mortar coloring and water is 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.

8.1.1 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. GROUT MIXTURES

9.1 Proportions. Grout, as indicated, 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 I, hereinafter.

9.1.1 Fine Grout. Fine grout shall consist of Portland cement, lime paste of hydrated lime, and fine aggregate mixed with sufficient water to obtain a pouring consistency without segregation 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 of 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 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.

9.1.4 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 sandblasting, 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.

(2) In 10 feet - 1/4-inch.

11.1.1.2 Variations from the plumb for external corners.

- (1) In any story or 20 feet maximum - 1/4-inch.

11.1.1.3 Variations from the level or grades indicated on the drawings for exposed horizontal grooves, and other conspicuous lines.

- (1) In any bay or 20 feet maximum - 1/4-inch.

11.1.1.4 Variations of the linear building lines from established position in plan and related portion of columns, walls, and partitions.

- (1) In any bay or 20 feet maximum - 1/2-inch.

11.1.1.5 Variation in cross sectional dimensions of columns and in thickness of walls.

- (1) Minus - 1/4-inch.
- (2) Plus - 1/2-inch.

11.1.2 Cutting and Fitting. Wherever possible, use full units of the proper size in lieu of cut units. Cutting and fitting, including that required to accommodate the work of others, shall be done by masonry mechanics using power masonry saws. Concrete masonry units shall be wet cut. Wet cut units, before being placed in the work, shall be dried to the same surface-dry appearance as uncut units being laid in the wall. Cut edges shall be clean, true and sharp. Make openings carefully so that wall plates, cover plates or escutcheons required by the installation will completely conceal the openings and will have bottoms parallel with the masonry joints. Cut webs of hollow masonry units to the minimum required for proper installation. Provide reinforced masonry lintels above openings over 12 inches wide.

11.1.3 Embedded Items. Fill spaces around metal door frames and other built-in items with mortar. Openings around flush-mount electrical outlet boxes in wet locations, including the flush joint above the box, shall be pointed with mortar. Anchors, ties, wall plugs, accessories, flashings, pipe sleeves and other items required to be built-in shall be built-in as the masonry work progresses. Embed anchors, ties and joint reinforcement fully in the mortar.

11.1.4 Unfinished Work. Step back unfinished work for joining with new work. Do not use toothing. Remove loose mortar and thoroughly clean the exposed joints before laying new work.

11.1.5 Do not wet concrete masonry units. Do not lay units having a film of water or frost on the surface.

11.1.6 Jointing. Tool joints when the mortar is thumbprint hard. Tool horizontal joints first. Brush joints to remove all loose and excess mortar. Mortar joints shall be finished as follows.

11.1.6.1 Tooled Joints. Joints in exposed masonry surfaces shall be tooled slightly concave. Tool joints with a jointer slightly larger than the joint width so that complete contact is made along the edges of the unit. Perform tooling so that the mortar is compressed and the joint surface is sealed. Use a jointer of sufficient length to obtain a straight and true mortar joint.

11.1.6.2 Raked Joints. In exposed exterior masonry surfaces, rake joints between door frames and abutting masonry walls to a depth of 3/4-inch ready for caulking. On the interior side of exterior door frames rake joints between door frames and abutting masonry walls to a depth of 3/8-inch.

11.1.7 Joint Widths. Joint widths shall be approximately 3/8-inch wide.

11.1.8 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 sufficient 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.

11.2 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 as indicated. 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.

11.2.1 Cleanouts. Provide cleanout holes at the bottom of every pour in cores containing vertical reinforcement when the height of the grout pour exceeds 24 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. Manufacturer's 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.

11.2.2 Bond Pattern. Lay all hollow masonry units in running bond.

11.2.3 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.

11.2.4 Joint Reinforcement. Place joint reinforcement so that longitudinal wires are fully embedded 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.

11.2.5 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.

11.3 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.

11.3.1 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.

11.3.2 Splices. Locate splices only where shown on the drawings. Stagger splices in adjacent bars. Lap bars a minimum of 40 diameters 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.

11.4 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.

11.4.1 Grouting Equipment.

11.4.1.1 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.

11.4.1.2 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.

11.4.2 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 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.

11.4.3 High-Lift Method. Lay masonry to the top of a pour before placing grout. 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 the 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. Repeat 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 material 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.

11.4.4 Blowouts. Brace walls against wind and other forces during construction. Allow sufficient time between lifts to preclude 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.

11.5 Pointing and Cleaning. After mortar joints have attained their initial set but prior to hardening, completely remove mortar and grout daubs or splashes from exposed 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 bushes for cleaning.

11.5.1 Concrete Masonry Units. Dry brush exposed concrete masonry unit surfaces at the end of the work each day and after any requiring pointing. Use stiff-fiber bristled brushes only.

11.6 Field Tests:

11.6.1 Grout: 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.

11.6.2 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.

11.6.2.1 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 prism 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 dimensions of specimens in inches.

Intermediate values may be interpolated.

11.6.2.2 Prisms shall be tested in accordance with ASTM E 447. Seven day test 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.

11.6.2.3 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.

11.6.2.4 Compressive strength should be not less than 350 pounds per square inch.

TABLE I

POUR HEIGHT AND TYPE OF GROUT FOR VARIOUS GROUT SPACE DIMENSIONS

Grout Space Dimensions	Grout	Maximum	
Minimum Horizontal Dimensions of Core (inches)	Type (See Paragraph entitled "Grout")	Height of Course Aggregate	Grout Pour (inches)
2 x 3	Fine or mortar	None	8
	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	24
3 x 4	High lift	3/8-inch pea gravel	72*
3-1/2 x 4	High lift	3/8-inch pea gravel	180*
5 x 6	High lift	ASTM C 33, 3/4-inch Max.	180*

*Where only cells of hollow masonry units containing reinforcement are grouted, the maximum height of the pour shall not exceed the distance between bond beams.

* * * * *

SECTION 5A

STRUCTURAL STEEL

- | | |
|------------------------------|--------------------------------|
| 1. Applicable Publications | 6. Materials |
| 2. General | 7. Fabrication |
| 3. Submittals | 8. Erection |
| 4. Responsibility For Errors | 9. Prefabricated Metal Bridges |
| 5. Storage | |

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-86G	Paint, Red-Lead-Base, Ready-Mixed
TT-P-615d & Am 3	Primer Coating: Basic Lead Silico Chromate, Ready-Mixed
TT-P-645	Primer, Paint, Zinc-Chromate, Alkyd Type

1.2 American Institute of Steel Construction (AISC) Publications.

Specification for the Design, Fabrication & Erection of
Structural Steel for Buildings with Commentary, Nov. 1, 1978

Specification for Structural Joints Using A 325 or A 490
Bolts Apr. 26, 1978

1.3 American National Standards Institute (ANSI) Standard.

B18.22.1-1965 (R 1975)	Plain Washers
B46.1-1978	Surface Texture (Surface Roughness, Waviness and Lay)

1.4 American Society for Testing and Materials (ASTM) Specifications.

A 6-80a	General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use
A 36-77a	Structural Steel
A 53-80	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
A 242-79	High-Strength Low-Alloy Structural Steel
A 307-80	Carbon Steel Externally Threaded Standard Fasteners

3.2 Shop Drawings. Shop drawings shall be submitted for approval in accordance with the SPECIAL PROVISIONS. Drawings shall include all shop and erection details. Members and connections for any portion of the structure not shown on the contract drawings shall be detailed by the fabricator and indicated on the shop drawings. All welds shall be indicated by standard welding symbols of the AWS.

4. RESPONSIBILITY FOR ERRORS. The Contractors shall be responsible for all errors of detailing, fabrication, and for the correct fitting of the structural members.

5. STORAGE. Material shall be stored out of contact with the ground in such manner and location as will minimize contamination and deterioration.

6. MATERIALS.

6.1 Structural Steel.

6.1.1 Carbon grade steel shall conform to ASTM A 36, A 529.

6.1.2 High-strength low-alloy steel shall conform to ASTM A 441, A 572, Grade.

6.1.3 Corrosion-resistant high-strength low-alloy steel shall conform to ASTM A 242, A 588.

6.1.4 Quenched and tempered alloy steel shall conform to ASTM A 514.

6.2 Structural Tubing. Structural tubing shall conform to ASTM A 500 Grade B, A 501 or A 618.

6.3 Steel Pipe. Steel pipe shall conform to ASTM A 53.

6.4 Rivets. Rivets shall conform to ASTM A 502, Grade.

6.5 Paint. Paint shall conform to Fed. Spec. TT-P-86, Type I or II; TT-P-615, Type I, II, or V; or TT-P-645.

6.6 High-Strength Bolts. High-strength bolts including nuts and washers shall conform to ASTM A 325 or A 490.

6.7 Carbon Steel Bolts. Carbon steel bolts shall conform to ASTM A 307, Grade A.

6.8 Carbon Steel Nuts. Carbon steel nuts shall conform to ASTM A 563, Grade A, Square, Hex, Heavy Hex, Hex Thick Style.

6.9 Plain Washers. Plain washers, other than those in contact with high-strength bolt heads and nuts, shall conform to ANSI B18.22.1, Type B.

7. FABRICATION. Fabrication shall be in accordance with the applicable provisions of the AISC Specification for the Design, Fabrication and Erection of Structural Steel for Buildings. Fabrication and assembly shall be done in the shop to the greatest extent possible. Compression joints depending on contact bearing shall have a surface roughness not in excess of 500 micro inches as determined by ANSI B46.1 and ends shall be square within the tolerances for milled ends specified in ASTM A 6. Structural steelwork, except surfaces of steel to be encased in concrete surfaces to be field welded, surfaces to be fireproofed, and contact surfaces of friction-type high-strength bolted connections shall be prepared for painting in accordance with the AISC Specification for the Design,

Fabrication and Erection of Structural Steel for Buildings and primed with paint materials hereinbefore listed.

8. ERECTION. Erection of structural steel shall be in accordance with the applicable provisions of the AISC Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.

8.1 Connections. Anchor bolts and other connections between the structural steel and foundations shall be provided and shall be properly located and built into connecting work.

8.2 Base Plates and Bearing Plates. Column base plates for columns and bearing plates for beams, girders, and similar members shall be provided. Base plates and bearing plates shall be provided with full bearing after the supported members have been plumbed and properly positioned. Separate setting plates under column base plates will not be permitted. The area under the plate shall be dry-packed solidly with bedding mortar as specified in section: CONCRETE.

8.3 Field Welded Connections. Field welded structural connections shall be completed before load is applied.

8.4 Field Priming. After erection, the field bolt heads and nuts, field welds, and any abrasions in the shop coat shall be cleaned and primed with paint of the same quality as that used for the shop coat.

9. PREFABRICATED METAL BRIDGES. In addition, the prefabricated bridges shall be Wisconsin Model, as manufactured by Continental Custom Bridge Company, Route 5, Box 178, Alexandria, Minnesota 56308, or an approved equal and conform to the following applicable requirements, *Town and Country -*

9.1 SUBMITTALS.

Shop Drawings. Drawings and computations for the prefabricated bridge shall be submitted at least 30 days before fabrication of the bridge structure. The submitted data shall include the type, size, quantity and strengths of materials of which the bridge is comprised.

The drawing shall be coordinated with the contract drawings and shall locate anchor bolts and all field attachments. The computations shall indicate all loads and other pertinent design data and shall be signed by a registered professional civil or structural engineer experienced in bridge design, and registered in the State of Arizona.

9.2 Product Handling. Use all means necessary to protect the prefabricated bridge structure before, during, and after installation. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Contracting Officer at no additional cost to the Government.

9.3 DESIGN.

9.3.1 Engineering. The bridge shall be designed for the following loading conditions:

9.3.2 Dead loads: full service and erection loadings.

9.3.3 Live loads: H10-44(AASHTO) and 100 PSF.

9.3.4 Wind loads. 30 pounds per square foot on the full vertical projected surface of the bridge, as if enclosed.

9.3.5 Seismic loads. Zone 2 (UBC Standards).

9.3.6 Thermal loads. Mean temperature of 80°F with a rise and fall of 50°F.

9.3.7 Allowable design values. Design stresses shall be in accordance with the Specifications for the Design and Erection of Structural Steel for Buildings by the American Institute of Steel Construction (AISC).

9.4 MATERIALS.

9.4.1 Welding. E70 Series electrodes or equivalent.

9.4.2 Metal Decking. As designed and submitted and conforming to applicable ASTM and AISI standards.

9.4.3 Cast-in-Place Decking. Cast-in-place concrete deck shall be placed after erection in accordance with section: CONCRETE.

9.5 GEOMETRY.

9.5.1 Length. The prefabricated metal truss bridge shall be 44'0" overall in length from end to end of bridge and 14'-0" for small bridge respectively.

9.5.2 Width. Inside clear dimension at deck level shall be 8'0" unless otherwise indicated.

9.5.3 Truss Members. The vertical truss members shall be not less than 48 inches high. The truss members may be used as handrailing with a minimum dimension from the finished wearing surface to top of railing or top chord of 4'6".

9.5.4 Camber. The bridge shall have a minimum camber of 5 percent.

9.6 WORKMANSHIP.

9.6.1 Fabrication and shop connections. All connections shall be in accordance with AASHTO standards.

9.6.2 Welding. Welding operators shall be properly accredited, experienced operators, each of whom shall submit satisfactory evidence of experience and skill in welding structural steel with the kind of welding to be used in work and who has demonstrated the ability to make uniform good welds of the type required.

9.7 PAINTING.

9.7.1 Surface preparation. Structural steel surfaces shall be cleaned in accordance with Steel Structures Painting Council Surface Preparation Specification No. 4, Hot Phosphate Surface Treatment, SSPC-PT-4-64. Application of the cleaning solution shall be with a steam cleaner.

9.7.2 Secondary cleaning. Immediately after the surface preparation, all exposed surfaces of the steel shall be cleaned in accordance with Steel Structures Painting Council Surface Preparation Specification No. 6, Commercial Blast Cleaning, SSPC-SP-6-63.

9.7.3 Priming. A primer coat shall be electrostatically applied to a thickness of three (3) mills. The thickness of paint shall be measured after the primer coat has been allowed to dry.

9.7.4 Finish coats. Two finish coats of paint shall be electrostatically applied to a thickness of two (2) mills each. The thickness of paint shall be measured after the finish coat has been allowed to dry.

9.7.5 Color and touch up. The finish color shall be selected by the Contracting Officer at the time fabrication drawings are submitted. Sufficient paint shall be supplied with the structure at the time of delivery for touch-up after erection.

9.8 SITE DELIVERY.

9.8.1 Shipment. Delivery of the bridge from the shop to the site shall be by the fabricator to a location nearest the site which is accessible to over-the-road trucks, unless otherwise directed by the Contracting Officer.

9.8.2 Unloading. The Contractor will be responsible for unloading the bridge from the truck immediately after arrival. The manufacturer shall notify and coordinate with the Contractor seven (7) days in advance of the arrival date and time.

9.8.3 Coordination. The manufacturer's representative will instruct the Contractor in the proper lifting procedure for unloading of the bridge. Care shall be exercised to prevent damage to the finish of the bridge.

9.9 SITE WORK.

9.9.1 Splicing. Placing, anchoring and field splicing will be done by the Contractor.

9.9.2 Methods of Splicing. The methods of splicing or bolting in the field will be furnished by the bridge manufacturer.

9.9.3 Bridge supports. Anchors bolt spacing, location and placement will be furnished by the manufacturer and shall be coordinated by the Contractor at the time shop drawings are submitted to the Contracting Officer.

9.9.4 Anchors and supports. The Contractor shall coordinate all anchor bolt placement and layout with the bridge manufacturer prior to construction of the abutments.

* * * * *

SECTION 5B

MISCELLANEOUS METAL

Index

- | | |
|----------------------------|---------------------------------------|
| 1. Applicable Publications | 9. Floor Plates |
| 2. General Requirements | 10. Wall Vents |
| 3. Dissimilar Materials | 11. Handrail, Bike Path |
| 4. Submittals | 12. Miscellaneous Plates and Shapes |
| 5. Workmanship | 13. Safety Chains |
| 6. Finishes for Aluminum | 14. Trench Covers, Frames, and Liners |
| 7. Anchorage | 15. Shop Painting |
| 8. Gratings and Frames | |
| 9. Floor plates | |

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.

- | | |
|-----------|---|
| 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 325-80a | High Strength Bolts for Structural Steel Joints |
| A 386-78 | Zinc Coating (Hot-Dip) on Assembled Steel Products. |
| A 500-80 | Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes |
| A 525-79 | Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, General Requirements. |

1.2 American Welding Society (AWS) Standard.

- | | |
|---------|--------------------------------|
| D1.1-80 | Structural Welding Code-Steel. |
|---------|--------------------------------|

1.3 National Association of Architectural Metal Manufacturers (NAAMM) Manual.

- Metal Bar Grating Manual (1979).

1.4 American Association of State Highway and
Transportation Officials (AASHTO)
1977

Standard Specifications for
Highway Bridges (12th Edition)

Steel Structures Painting Council

SSPC-PT-4-65

Surface cleaning

SSPC-PT-6-63

Surface preparation

1.6 Woven Wire Products Association Publication

Catalog 77.

Woven Wire: Protection and
Security.

2. **GENERAL REQUIREMENTS.** The Contractor shall verify all measurements and shall take all field measurements necessary before fabrication. Welding to or on structural steel shall be in accordance with AWS D1.1. Items specified to be galvanized, when practicable and not indicated otherwise, shall be hot-dip galvanized after fabrication. Galvanizing shall be in accordance with ASTM A 123, A 386, or A 525, as applicable. Exposed fastening shall be compatible materials, shall generally match in color and finish, and shall harmonize with the material to which fastenings are applied. Materials and parts necessary to complete each item, even though such work is not definitely shown or specified, shall be included. Poor matchings of holes for fasteners shall be cause for rejection. Fastenings shall be concealed where practicable. Thickness of metal and details of assembly and supports shall give ample strength and stiffness. Joints exposed to the weather shall be formed to exclude water.

3. **DISSIMILAR MATERIALS.** Where dissimilar metals are in contact, or where aluminum is in contact with concrete, mortar, masonry, wet or pressure-treated wood, or absorptive materials subject to wetting, the surfaces shall be protected with a coat of bituminous paint or asphalt varnish.

4. **SUBMITTALS.**

4.1 **Shop Drawings.** Shop drawings shall be submitted in accordance with **SPECIAL PROVISIONS.** Shop drawings shall indicate material thickness, type, grade, and class; dimensions; and construction details. Drawings shall include catalog cuts, erection details, manufacturer's descriptive data and installation instructions, and templates.

5. **WORKMANSHIP.** Miscellaneous metalwork shall be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean true lines and surfaces. Welding shall be continuous along the entire area of contact except where tack welding is permitted. Exposed connections of work in place shall not be tack welded. Exposed welds shall be ground smooth. Exposed surfaces of work in place shall have a smooth finish, and unless other approved, exposed riveting shall be flush. Where tight fits are required, joints shall be milled. Corner joints shall be coped or mitered, well formed, and in true alignment. Work shall be accurately set to established lines and elevations and securely fastened in place. Installation shall be in accordance with manufacturer's installation instructions and approved drawings, cuts, and details.

6. FINISHES FOR ALUMINUM. Unless otherwise specified, aluminum items shall be in standard mill finish. When anodic coatings are specified hereinafter, the coatings shall conform to AA Standard for Anodized Architectural Aluminum, with treatment to a coating thickness not less than that specified for protective and decorative type finish for items used in interior locations and architectural class I type finish for items used in exterior locations in AA Designation System for Aluminum Finishes. Items to be anodized shall receive a polished-satin-finish pretreatment and a clear-lacquer overcoating conforming to AA Standards for Anodized Architectural Aluminum.

7. ANCHORAGE. Anchorage shall be provided where necessary for fastening miscellaneous metal items securely in place. Anchorage not otherwise specified or indicated shall include slotted inserts, expansion shields, and powder-driven fasteners when approved for concrete; toggle bolts and through bolts for masonry; machine and carriage bolts for steel; through bolts, lag bolts, and screw for wood. Slotted inserts shall be of types required to engage with the anchors and shall be approved.

8. GRATINGS AND FRAMES. Steel grating shall be designed in accordance with the NAAMM Metal Bar Grating Manual to meet the indicated load requirements. Edges shall be banded with bars 1/8 inch less in height than bearing bars. Bandings bars shall be flush with the top of bearing bars. Frames shall be welded steel construction finished to match the grating. Gratings and frames shall be galvanized after fabrication.

9. FLOOR PLATES. Floor plates shall be raised tread steel plate conforming to Fed. Spec. QQ-F-461, Class 1, pattern indicated 1/4-inch thick. Floor plates shall be galvanized.

10. WALL VENTS. Wall vents shall be the same size as the masonry units or sized as indicated and shall be of cast aluminum with integral water stop and sliding interior closer or damper operable from the outside. Insect screen shall be installed at the back of the vent. Louvered opening shall have top and bottom drip lips, and the net ventilating area with closer or damper open shall be at least 35 percent of the gross wall opening. The frames shall have a structural strength adequate to permit use in masonry walls without a lintel.

11. HANDRAIL, BIKE PATH

11.1 General. Metal railing (tubular) shall be of the type shown and shall be constructed and installed as indicated on the drawings. Prior to starting any construction work on a railing, detailed shop drawings showing the complete railing shall be submitted and final approval obtained. These shop drawings shall address the problem of expansion and contraction with the use of suitable joints. Railing and all parts and fittings shall be galvanized after fabrication.

11.2 Materials.

11.2.1 Tubular rails, posts, rods, bolts, and nuts shall conform to the following requirements:

Material	ASTM Designation
Tubular steel rails	A 500 or A 501
Steel posts	A 36
Steel sleeves for tubular rails	A 36
High strength bolts	A 325 or A 449
High strength threaded rods	A 449
Stud bolts	A 108, Grades 1015 to 1020
Nuts and washers	A 325
High strength bolts or threaded rods furnished in accordance with ASTM A 449 shall comply with mechanical requirements of ASTM A 449 after galvanizing	
Galvanizing	A 123

11.3 Fabrication and Erection. Metal railing shall conform closely to the horizontal and vertical lines shown on the plans or directed. The railing shall present a smooth, uniform appearance in its final position. The difference between out-to-out rail sleeve dimensions and the clear inside dimensions for the tubular steel rails shall not exceed 3/16 inch after galvanizing. Materials shall be carefully handled so that no parts will be bent broken, abraded, or otherwise damaged. Fabrication, handling, or installation methods which will injure or distort the members or damage the galvanizing shall not be used. Bearing surfaces and surface to be in permanent contact shall be cleaned before the railing parts are assembled. 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.

12. MISCELLANEOUS PLATES AND SHAPES. Miscellaneous plates and shapes for items that do not form a part of the structural steel framework, such as angles, miscellaneous mountings, and frames, shall conform to ASTM specifications A 36 and shall be provided to complete the work.

13. SAFETY CHAINS. Safety chains shall be of galvanized wrought iron, straight link style, 3/16-inch diameter, minimum 12 links per foot. Eye bolts for attachment of chains shall be galvanized 3/8-inch bolt with 3/4-inch eye, anchored as indicated. Two chains shall be furnished for each guarded opening.

14. TRENCH COVERS, FRAMES, AND LINERS. Frames and anchors shall be all welded steel construction designed to match cover. Frames and covers shall finish flush with the bike path surface. Covers shall be raised-tread, steel floor plate. Grating opening widths shall not exceed 1 inch. Trench liners shall be cast iron with integral frame for cover.

15. SHOP PAINTING. Unless otherwise specified, surfaces of ferrous metal, except galvanized surfaces, shall be cleaned and shop coated with the manufacturer's standard protective coating. Items to be finish painted shall not be given a bituminous protective coating. Surface shall be cleaned with solvents to remove grease and oil and with power wire-brushing or sandblasting to remove loose rust, loose mill scale, and other foreign substances. Surfaces of items embedded in concrete shall not be painted.

* * * * *

SECTION 6A

ROUGH CARPENTRY

Index

- | | |
|----------------------------|---|
| 1. Applicable Publications | 6. Delivery and Storage |
| 2. Materials | 7. Shop Drawings |
| 3. Grading and Marking | 8. Samples and Descriptive Data |
| 4. Sizes | 9. Preservative Treatment |
| 5. Moisture Content | 10. Installation of Framing and
Miscellaneous Wood Members |

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.).

FF-N-105B
& Am-4

Nails, Brads, Staples and Spikes: Wire
Cut and Wrought

1.2 U. S. Department of Commerce, Product Standard (Prod. Std.).

PS 1-74

Construction and Industrial
Plywood

PS 20-70

American Softwood Lumber Standard

& Am-1

1.3 American Institute of Timber Construction (AITC), publication.

AITC 109-79

Treating Standards for Structural
Timber Framing

Unnumbered (1974)

Timber Construction Manual (1974; and
Errata)

1.4 American Society for Testing and Materials (ASTM), publication.

D 226-80

Asphalt-Saturated Organic Felt Used
in Roofing and Waterproofing

1.5 American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), Publication.

ASHRAE Handbook and Product Directory, Fundamentals (1977)

1.6 American Wood Preservers Bureau (AWPB), Standard.

LP-2-80

Softwood Lumber, Timber and Plywood
Pressure Treated With Water-Borne
Preservatives for Above Ground Use
(Rev. Mar. 1980)

LP-3-78	Softwood Lumber, Timber and Plywood Pressure Treated with Light Hydrocarbon Solvent-Penta Solution for Above Ground Use (Rev. Mar. 1978)
LP-4-78	Softwood Lumber, Timber and Plywood Pressure Treated with Volatile Hydrocarbon Solvent-Penta Solution for Above Ground Use (Rev. Mar. 1978)
LP-55-78	Softwood Lumber, Timber and Plywood Pressure Treated with Creosote or Creosote-Tar Solutions for Use in Ground Contact Use (Rev. Mar. 1978)

1.7 National Forest Products Associations (NFPA), publication.

National Design Specification for wood construction (1977 Edition
& Supplement (Jun. 1978, Errata Aug. 1978).

Manual for House Framing (1970).

1.8 National Hardwood Lumber Association (NHLA), publication.

Rules for the Measurement and Inspection of Hardwood and Cypress
Lumber (January 1978).

1.9 Northeastern Lumber Manufacturers Association, Inc. (NELMA), publication.

Standard Grading Rules for Northeastern Lumber (Apr 1977)

1.10 Northern Hardwood and Pine Manufacturers Association, Inc. (NHPMA)
publication.

Standard Grading Rules for Northern and Eastern Lumber (Dec 1978)

1.11 Redwood Inspection Service (RIS), publication.

Standard Specifications for Grades of California Redwood Lumber
Suppl Nos. 1 and 2; (Jun. 1978, Supp, No. 1 Nov. 1, 1978,
Suppl. No. 2 Feb. 1979).

1.12 Southern Cypress Manufacturers' Association (SCMA), publication.

Standard Specifications for Grades of Tidewater Red Cypress
(April 15, 1975).

1.13 Southern Pine Inspection Bureau (SPIB), publication.

Grading Rules (March 15, 1977).

1.14 Truss Plate Institute (TPI), publication.

1.15 West Coast Lumber Inspection Bureau (WCLB), standard.

No. 16 Standard Grading and Dressing Rules for Douglas Fir,
Western Hemlock, Western Cedar, White Fir, Sitka Spruce
Lumber (Sep 1, 1970; Rev. Jan. 1, 1979).

1.16 Western Wood Products Association (WWP), publication.

Western Lumber Grading Rules (Jun. 1, 1979).

2. MATERIALS shall conform to the respective specifications and other requirements specified below.

2.1 Accessories and nails.

2.1.1 Anchor bolts. Steel, size as indicated, complete with nuts and washers.

2.1.2 Bolts; lag, toggle, and miscellaneous bolts, and screws. Type, size, and finish best suited for intended use.

2.1.3 Clip angles. Steel, 3/16-inch thick, size best suited for intended use; or zinc-coated steel or zinc-coated steel or iron commercial clips designed for connecting wood members.

2.1.4 Expansion shields. Type and size best suited for intended use.

2.1.5 Joist hangers. Steel or iron, zinc-coated, size to fit members where used, sufficient strength to develop the full strength of supported member, complete with any special nails required.

2.1.6 Nails and staples. Size and type best suited for purpose, in accordance with Fed. Spec. FF-N-105 when applicable to type used. For sheathing and subflooring, length of nails shall be sufficient to extend 1 inch into supports. In general, 8-penny or larger nails shall be used for nailing through 1-inch thick lumber and for toe nailing 2-inch thick lumber; 16-penny or larger nails shall be used for nailing through 2-inch thick lumber.

2.1.7 Timber connectors. Unless otherwise specified, in accordance with NFPA publication, National Design Specification for Stress-Grade Lumber and Its Fastenings; TPI-74; or AITC publication, Timber Construction Manual.

2.2 Structural and miscellaneous wood members.

2.2.1 Structural members. Species and grades listed in the NFPA publication, National Design Specification for Wood Construction. Structural lumber shall have design stresses not less than $1,500 F_b$, $1,000 F_t$, $385 F_c$ for engineered uses with $1,700,000 E$. Design of members and fastenings shall conform to AITC publication, Timber Construction Manual.

2.2.2 Nonstress graded members shall include plates, caps, bucks, studs, blocking, nailers, sleepers and grounds. Members shall be standard grade or No. 2 grade except studs may be stud grade. Nonstress member grades shall conform to the National Grading Rule for Dimension Lumber established in conformance with Section 10 of Prod. Std. PS 20 and as applied in individual grading rules of applicable grading agencies. For species graded under other grading rules, grade used shall be equivalent to grades outlined above. Sizes shall be as follows unless otherwise shown.

Member	Size (inches)
Blocking	2 x 4 or such larger size as required when applied between framing members; smaller sizes when approved for a specific use

2.2.3 General use plywood. U.S. Department of Commerce, Prod. Std. PS 1, grade and thickness as follows.

2.3 Sheathing. Plywood for roof sheathing.

2.3.1 Plywood. Prod. Std. PS 1, grade A-C with exterior glue for roof sheathing. Roof sheathing shall be 3/4-inch minimum thickness with an identification index of 48/24 or greater for supports 36 inches on center.

2.3.2 Wood. Species and grade shall be in accordance with SPECIES AND GRADE TABLE at the end of this section; center-matched, shiplapped, or square edge.

3. GRADING AND MARKING. Lumber, and plywood, and structural glued laminated members shall bear the grademark, stamp or other identifying marks indicating grades of material and rules or standards under which produced. Such identifying marks on a material shall be in accordance with the rule or standard under which the material is produced, including requirements for qualifications and authority of the inspection organization, usage of authorized identification, and information included in the identification. The inspection agency for lumber shall be certified by the Board of Review, American Lumber Standards Committee, to grade species used. Except for plywood, lumber, and structural glued laminated members, bundle marking or certificates will be permitted in lieu of marking each individual piece.

4. SIZES. Lumber sizes shall conform to Prod. Std. PS 20, and unless otherwise specified, lumber shall be surfaced on four sides. Sizes for materials other than lumber shall conform to requirements of the rules or standards under which produced. Size references unless otherwise specified are nominal sizes, and actual sizes shall be within manufacturing tolerances allowed by the standard under which the product is produced.

5. MOISTURE CONTENT. At the time lumber and other materials are delivered and when installed in the work their moisture content shall be as follows.

Treated and untreated lumber 2 inches or less in thickness, except roof planking: 19 percent maximum.

Treated and untreated lumber over 2 inches in thickness, except roof planking: 25 percent maximum.

Roof planking 2 inches or more in thickness: 15 percent maximum.

Materials other than lumber: In accordance with standard under which product is produced.

6. DELIVERY AND STORAGE. Materials shall be delivered to the site in undamaged condition, stored in fully covered, well ventilated areas, and protected from extreme changes in temperature and humidity.

7. SHOP DRAWINGS of structural glued laminated members, and other fabricated structural members shall be submitted for approval in accordance with the SPECIAL PROVISIONS. Shop drawings shall indicate materials, details of construction, methods of fastening, and erection details. Shop drawings shall be accompanied by a reference to design criteria used and stress computation's.

8. SAMPLES AND DESCRIPTIVE DATA. The following shall be submitted for approval.

Accessories and nails: Two of each accessory and four of each kind of nail with description of application for each.

Roof Sheathing: Two square feet of material to be used for each application and manufacturer's installation instructions.

Structural glued laminated members, and other fabricated structural members: Manufacturer's installation instructions and a list of successful installations of similar products.

9. PRESERVATIVE TREATMENT. To the extent indicated below, wood members and plywood shall be preservative-treated by pressure methods and so marked in accordance with the AWPB Standards. Unless otherwise specified it will include all wood members exposed to weather or in contact with soil, water, masonry or concrete.

Except as otherwise specified, treatment shall be in accordance with AWPB LP-2, LP-3, or LP-4, at the option of the Contractor. Treatment of wood to be in contact with soil or water shall be in accordance with AWPB LP-55. Treatment of wood to be painted or to make contact with painted parts, and wood to which finishing materials will be fastened, shall be in accordance with AWPB LP-2 or LP-4. Treatment of wood used in conjunction with built-up roofing shall be in accordance with AWPB LP-2. Wood treated with oil-borne preservatives shall be clean, free from surface oil, and properly seasoned for use in building construction. Wood treated with water-borne preservatives shall be air-dried or kiln-dried to the moisture content specified for lumber and marked with the word "Dry". Treated wood which is cut shall be brush-coated with the preservative used in the original treatment.

10. INSTALLATION OF FRAMING AND MISCELLANEOUS WOOD MEMBERS.

10.1 General. Members shall be closely fitted, accurately set to required lines and levels, and rigidly secured in place. Nailing shall be in accordance with the Recommended Nailing Schedule as contained in the NFPA publication, Manual for House Framing. Where detailed nailing requirements are not specified, nail size and nail spacing shall be sufficient to develop an adequate strength for the connection without splitting the members. Installation of timber connectors shall conform to applicable requirements of the NFPA publication, National Design Specification for Stress-Grade Lumber and Its Fastening. Members shall be framed

for passage of ducts and pipes and shall be cut, notched, or bored in accordance with applicable requirements of the NFPA publication, Manual for House Framing. Rafters and joists shall be set with crown edge up. Framing shall be kept at least two inches away from chimneys and four inches away from fireplace backwalls. Leveling of joists, beams, and girders on masonry or concrete shall be with slate or steel; on wood or metal leveling shall be without shims.

10.2 Roof Framing with Rafters. Tops of rafters shall form a true plane. Ridge, and hip members shall be of depth equal to cut on rafters where practicable, but in no case less than depth of rafters. Hips, and ridges shall be straight and true intersections of roof planes. Rafters, except hip rafters, shall be well spiked to wall plate and bolted by clip angles. Hip rafters shall be secured to wall plates by clip angles. Openings in roof shall be framed with headers and trimmers.

10.3 Blocking shall be provided as necessary for application of sheathing, and other materials or building items. Blocking shall be cut to fit between framing members and rigidly nailed thereto.

10.4 Nailers and nailing strips shall be provided as necessary for the attachment of finish materials and for flush with deck mounting on roof decks. Strips shall be run in lengths as long as practicable, butt jointed, cut into wood framing members when necessary, and rigidly secured in place.

10.5 Roof decking shall be laid horizontally and nailed in accordance with the recommendations of the manufacturer.

10.6 Plywood sheathing shall be applied with edges 1/8 inch apart at side joints and 1/16 inch apart at end joints, and nailed at supported edges at six inches on center and at intermediate supports 12 inches on center. Nailing of edges shall be 3/8 inch from the edges. Roof sheathing shall have face grain at right angles to supports, end joints made over supports, and end joints staggered.

SPECIES AND GRADE TABLE

SPECIES	Use (a)		NHPMA	WCLB	WWP	Rules			RIS	NHLA
		NELMA				SCMA	SPIB			
Northern White Cedar	A	No.3 Comm								
Cypress	A									
Douglas Fir - Larch	A			Standard	No.3 Comm		No.2 Comm			No. Comm
	B			No.2	No.2					
Hem - Fir	A			Standard	No.3 Comm					
	B			No.2	No.2					
Idaho White Pine	A				No.3 Comm					
Lodgepole Pine	A				No.3 Comm					
Eastern White Pine	A	Standard	No.3 Comm							
Northern Pine	A	Standard	No.3 Comm							
	B	No.2								
Ponderosa Pine	A				No.3 Comm					
Southern Pine	A									
	B						No.2 Board			
Sugar Pine	A				No.3 Comm		No.1			
Redwood	A				No.3 Comm					
Englemann Spruce	A				No.3 Comm				Const Comm	
Sitka Spruce	A			Standard						
Douglas Fir South	A				No.3 Comm					
	B				No.2					
Balsam Fir	A	No.3 Comm	No.3 Comm							
Mountain Hemlock	A			Standard	No.3 Comm					
Subalpine Fir	A				No.3 Comm					
Red Oak	B									
Eastern Hemlock -	A	No.3 Comm	No.3 Comm							No.1
Tamarack	B	No.2								
Western Cedar	A			Standard	No.3 Comm					

(a) Permitted uses are as follows:

- A - Subflooring, Roof Sheathing, Wall Sheathing, furring
- B - Wood Bumpers

* * * * *

SECTION 7A

ROOFING, STRIP SHINGLES

Index

- | | |
|--------------------------------------|----------------------------|
| 1. Applicable Publications. | 4. Materials |
| 2. General | 5. Preparation of Surfaces |
| 3. Delivery and Storage of Materials | 6. Application of Roofing |

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
SS-R-630D & Int. Am-2	Roofing Felt (Roll, Asphalt-Prepared, Mineral Surfaced)

1.2 American Society for Testing and Materials (ASTM) Publications.

D 226-80	Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
----------	---

1.3 Underwriters Laboratories Inc. (UL) Publications.

UL 55B	Class C Asphalt Organic-Felt Sheet Roofing and Shingles (October 1974; Rev. July 7, 1978)
UL 790	Test for Fire Resistance of Roof Covering Materials Dec. 15, 1978)
UL 997	Wind Resistance of Prepared Roof Covering Materials (Aug. 1973)

2. GENERAL. Asphalt strip-shingles shall be applied to the roof surfaces indicated. Metal flashings are specified in section: SHEET METALWORK, GENERAL. Metal drip edge and asphalt flashings are included in this section.

3. DELIVERY AND STORAGE OF MATERIALS. Deliver materials in manufacturer's unopened bundles and containers with the manufacturer's brand and name marked clearly thereon. Store shingles in accordance with manufacturer's printed instructions. Store roll goods on end in an upright position. Immediately before laying, felt roofs and roll roofing shall be stored for 24 hours in an area maintained at no lower temperature than 50 degrees F.

4. MATERIALS shall conform to the respective specifications and standards, and other requirements hereinafter specified.

4.1 Asphalt-Saturated-Felt Underlayment. ASTM D 226, Type I.

4.2 Bituminous Cement. Fed. Spec. SS-C-153, Type I.

4.3 Nails. Nails shall be in accordance with manufacturer's printed instructions.

4.4 Mineral-Surfaced Roll Roofing. Fed. Spec. SS-R-630, Class 1. Select color to match color of adjacent shingles.

4.5 Shingles. Shingles shall meet the requirements of Underwriters Laboratories, Inc., for Class C, wind-resistant shingles, by equaling or exceeding the requirements of UL 55B, UL 790, and UL 997. Shingle bundle wrapping shall bear the label of Underwriters Laboratories, Inc. Shingles shall be square-butt strips of uniform thickness or of thick-butt style. Size of shingles shall be approximately 12 by 36 inches. Any of the following designs are permitted: 2-tab design; 3-tab design; or no cut-out design. Shingles color shall be as noted on drawings as selected from the manufacturers standard colors.

5. PREPARATION OF SURFACES. The construction of any bay or section of roof shall be completed before roofing work is started. Roof surfaces shall be smooth, firm, dry, and free from loose boards, large cracks, and projecting ends that might injure the roofing. Vents and other projections through roofs shall be properly flashed and secured in position, and projecting nails shall be driven firmly home.

6. APPLICATION OF ROOFING. Roofing shall be applied in accordance with the manufacturer's printed instructions as they appear on the bundle wrapping and to the requirements hereinafter specified.

6.1 Metal Drip Edges. Metal drip edges, made of non-corrodile, non-staining metal shall be provided along the eaves and rakes. The metal drip edge shall be applied directly over the underlayment along the rakes and directly on the wood deck at the eaves. Metal drip edges shall extend back from the edge of the deck not more than 3-inches and shall be secured with compatible nails spaced not more than 10 inches on center along the inner edge.

6.2 Underlayment. Before any shingles are applied, asphalt saturated felt underlayment shall be applied to the roof deck sheathing. A single-layer of underlayment is required for all roof slopes 4-inches per foot and greater. A double-layer of underlayment is required for all roof slopes between 2-inches per foot and 4-inches per foot.

6.3 Flashings. Flashings shall be provided at the intersections of roofs, adjoining walls, or projections through the deck such as chimneys and vent stacks. Careful attention shall be given to the installation of all flashings. For unusual flashings conditions not covered in the manufacturers printed instructions, the Contractor shall contact the roofing manufacturer for recommendations as to details. For sloping roofs which abut vertical surfaces, metal stepped flashing shall be provided in accordance with section: SHEET METALWORK, GENERAL.

* * * * *

SECTION 7B

SHEET METALWORK

Index

- | | |
|------------------------------------|---|
| 1. Applicable Publications | 8. Soldering, Riveting, Seaming,
and Sealing |
| 2. General Requirements | 9. Covering on Minor Flat, Pitched,
or Curved Surfaces |
| 3. Submittals | 10. Edge Strip |
| 4. Delivery, Storage, and Handling | 11. Flashings |
| 5. Materials | 12. Louvers |
| 6. Sealants | |
| 7. Protection of Aluminum | |

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.).

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 209-80a

Aluminum-Alloy Sheet and Plate

B 221-79a

Aluminum-Alloy Extruded Bar, Rod,
Wire, Shape, and Tube

B 486-74
(R 1980)

Paste Solder

D 226-80

Asphalt-Saturated Organic Roofing 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 1784-78

Rigid Poly (Vinyl Chloride) (PVC)
Compounds and Chlorinated Poly
(Vinyl Chloride) (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 required to accommodate the work of other trades shall be performed by 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. 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 woven into shingle roofing before nailing. 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.

SUBMITTALS.

3.1 Shop Drawings. Shop drawings shall be submitted for approval in accordance with the SPECIAL PROVISIONS. Material 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, 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. Material shall be adequately packaged and protected during shipment and shall be inspected for damage, dampness, and wet-storage stains 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.

5.7 Sheet Metal.

5.7.1 Aluminum Alloy Sheet and Plate. ASTM B 209, form, alloy, and temper appropriate for use.

5.8 Solder. ASTM B 486, Alloy 50B, for use with copper and Alloy 60B for use with stainless steel.

5.9 Slip Sheet. Fed. Spec. UU-B-790, Type I, Style 1b, Grade A.

5.10 Nonreinforced, waterproof, impermeable extruded elastomeric single ply sheeting not less than 30-mils thick.

6. SEALANTS. Sealants and sealing compounds referred to herinafter 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 pretinned 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 made 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 side.

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. EDGE STRIP. A continuous edge strip shall be provided where indicated or specified to secure loose edges of the sheet metalwork. Butt joints shall be spaced approximately 1/8-inch apart. The strip shall be fastened to the supporting construction with nails evenly spaced not over 12 inches on centers. Where the fastening is to be made to concrete or masonry, screws shall be used and shall be driven in expansion shields set in concrete or masonry. The strip for fascia anchorage shall be installed to extend below the supporting construction to form a drip and to allow the flashing to be hooked over the lower edge at least 3/4 inch. The strip shall be of sufficient width to provide adequate bearing area to insure a rigid installation. Where horizontal nailer is vented for insulation and the strip is placed over masonry or concrete, the strip shall be installed over 1/16-inch thick metal washers placed at screws. Washers shall be of metal that is electrolytically compatible with the edge strip.

11. FLASHINGS. Flashings shall be installed at projections through roof, except that flashing for plumbing, including piping, roof, and for electrical conduit projections through roof or walls is covered in appropriate sections for such work. Cap flashings shall be sealed with No. 2 or 4 sealing compound. Perforations in flashings made by masonry anchors shall be covered up by an application of bituminous plastic cement at the perforation. Flashing shall be installed on top of joint reinforcement.

11.1 Base Flashing. Base flashing shall extend out on the roof or horizontal surface not less than 4 inches. Metal base flashing shall be installed at locations indicated and shall be coordinated with roofing work. Metal base flashing shall be set in plastic bituminous cement over the roofing felts, and nailed to nailing strip and shall be secured in place on the roof side with nails spaced not more than 3 inches on centers.

12. LOUVERS. Aluminum Louver Grilles shall be fabricated of aluminum or stainless steel to the dimensions indicated. Blades shall be accurately fitted and firmly secured to the frame by riveting and soldering if stainless steel and riveting and sealing if aluminum. The edges of louver blades shall be folded or beaded for rigidity, and baffled to exclude driving rain. Louvers shall be provided with bird screens.

TABLE 1. SHEET METAL WEIGHTS, THICKNESSES, AND GAGES.

Item Description	Copper ounce per square foot	Aluminum inch	Stainless steel, inch	Copper clad stainless steel, inch
EXPOSED SHEET METAL.				
Covering on minor flat, pitched or curved surfaces.....	20	.040	.018	.018
Edge strip.....	24	.050	.025	---
Flashings:				
Base.....	20	.040	.018	.018
NON EXPOSED SHEET METAL:				
Louvers (Width, inches):				
Up to 24 inches.....	--	.040	.025	---
24 to 36 inches.....	--	.040	.031	---
36 to 48 inches.....	--	.064	.037	---

TABLE 2. FASTENER MATERIALS

To prevent corrosion, the indicated fastener materials shall be used with the following sheet metals:

<u>Sheet Metal</u>	<u>Nails</u>	<u>Screws</u>	<u>Rivets</u>	<u>Nuts & Bolts</u>
Aluminum	Aluminum	Aluminum	Aluminum	Aluminum
Copper	Copper	Bronze	Copper	Bronze
Copper clad Stainless Steel	Copper or Stainless Steel	Bronze or Stainless Steel	Bronze or Stainless Steel	Bronze or Stainless Steel
Lead Coated Copper	Copper	Bronze	Bronze	Bronze
Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel

* * * * *

SECTION 7C

CALKING AND SEALANTS

Index

- | | |
|-------------------------------|-------------------------|
| 1. Applicable Publications | 7. Sealer |
| 2. General Requirements | 8. Primer |
| 3. Submittals | 9. Backstop Material |
| 4. Environmental Requirements | 10. Surface Preparation |
| 5. Delivery and Storage | 11. Application |
| 6. Materials | 12. 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. GENERAL REQUIREMENTS. Calking and sealants shall be provided in joints as indicated or specified. The joint design, shape, and spacing shall be as indicated. Mixing shall be in accordance with instructions provided by the manufacturer of the sealants.

3. SUBMITTALS.

3.1 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.

3.2 Descriptive Data. Manufacturer's descriptive data including backstop material, primer and sealer shall be submitted for approval. Descriptive data for elastomeric sealants shall include shelf life, curing time, and mixing instructions for two component sealants.

3.3 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.

4. ENVIRONMENTAL REQUIREMENTS. The ambient temperature shall be within the limits of 40 to 90 degrees F. when the calking and sealants are applied.

5. 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 temperature exceeding 90 degrees F. Sealant tape shall be handled and stored in a manner that will not deform the tape.

6. MATERIALS. Materials shall conform to the respective specifications and other requirements specified. Each container brought to the jobsite 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.

6.1 No. 1 Calking Compound. No. 1 calking compound shall conform to Fed. Spec. TT-C-598, Type I.

6.2 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-the-job mixing.

6.3 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.

7. SEALER. Sealer for use with No. 1 calking compound shall be aluminum paint.

8. PRIMER. Primer for Noss. 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.

9. BACKSTOP MATERIAL. Backstop material shall be resilient urethane or polyvinyl-chloride foam, closed-cell polyethylene foam, closed-cell sponge of vinyl or rubber, polychloroprene tubes or beads, polyisobutylene extrusions, oilless dry jute, or rope yarn. 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 control-joint and expansion-joint work shall be polyisobutylene or polychloroprene rubber.

10. SURFACE PREPARATION.

10.1 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.

10.2 Aluminum Surfaces. Aluminum surfaces of door frames in contact with sealants shall be cleaned of temporary protective coatings. When masking tape is used for a protective cover, the tape and any residual adhesive shall be removed just prior to applying the sealant. Solvents used to remove protective coatings shall be as recommended by the manufacturer of the aluminum work and shall be nonstaining.

1. APPLICATION.

11.1 Paper Masking Tape. Paper masking tape shall be placed on the finish surface on one or both sides of 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.

11.2 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.

11.3 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.

11.4 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 convex 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.

11.5 Nos. 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.

12. 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.

* * * * *

SECTION 8A

STEEL DOORS AND FRAMES

Index

- | | |
|----------------------------|--|
| 1. Applicable Publications | 4. General Requirements for Doors and Frames |
| 2. Submittals | 5. Installation |
| 3. Delivery and Storage | |

1. APPLICATION 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 Door and Hardware Institute (DHI) Publication.

The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames, and Builders Hardware. (1977)

1.2 National Fire Protection Association (NFPA) Publications.

- | | |
|--------------|---|
| No. 80-1977 | Fire Doors and Windows |
| No. 80A-1975 | Protection of Buildings from Exterior Fire Exposures |
| No. 101-1976 | 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 PROVISIONS. 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 of struts and anchors for frames, and thickness of metal. Shop drawings shall include catalog cuts or descriptive data for the weatherstripping and thresholds.

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 ground 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.

4.2 Weatherstripping. Weatherstripping for bottom of doors shall be of the mounted sweep type consisting of 1/8-inch thick neoprene or spring tension type of bronze or corrosion-resisting steel on an extruded aluminum or bronze bar. Spring bronze shall be not less than 0.008-inch thick and corrosion-resisting steel 0.005-inch thick.

4.3 Thresholds. Thresholds shall be extruded aluminum or bronze flat type with a fluted top, and shall provide the proper clearance and an effective seal with the specified weatherstripping.

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 and thresholds shall be installed at bottom of exterior door openings to provide a weathertight installation.

* * * * *

SECTION 8C

HARDWARE; BUILDERS' (GENERAL PURPOSE)

Index

- | | |
|-----------------------------------|--------------------------|
| 1. Applicable Publications | 9. Locks and Latches |
| 2. General | 10. Door Trim |
| 3. Templates | 11. Butts and Hinges |
| 4. Submittals | 12. Door Closing Devices |
| 5. Packing, Marking, and Labeling | 13. Smoke Detectors |
| 6. Finishes | 14. Miscellaneous |
| 7. Fastenings | 15. Application |
| 8. Keying | 16. 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 Federal Specification (Fed. Spec.).

FF-P-101E Padlocks.
& Am-2

1.2 American National Standards Institute (ANSI) Standards.

A156.1-1976 Butts and Hinges.

A156.2-1976 Locks and Lock Trim.

A156.4-1972 Door Controls - Closers.

A156.5-1978 Auxiliary Locks & Associated
Products

A156.6-1972 Architectural Door Trim.

A156.7-1972 Template Hinge Dimensions.

A156.8-1974 Door Controls - Overhead Holders.

1.3 Builders Hardware Manufacturers Association (BHMA) Standards.

1201 - 1970 Auxiliary Hardware.

1301 - 1969(Rev. 1980) Materials & Finishes.

1.4 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. **GENERAL.** Hardware shall conform to the applicable requirements of the standards listed herein, unless otherwise specified. Reinforcement for hardware in metal doors shall be as specified in SECTIONS: STEEL DOORS AND FRAMES.
3. **TEMPLATES.** The contractor shall furnish templates or information otherwise necessary to enable the door and frame manufacturer to make proper provision in his work to receive the specified hardware. Where two or more articles of hardware are to be mounted on the same door, the Contractor shall effect proper coordination between the manufacturers of the different articles. Templates of hinges shall conform to ANSI Standard A156.7.
4. **SUBMITTALS.**
- 4.1 **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 PROVISIONS. A statement that the proposed hardware items appear in the current applicable BHMA Certified Products Directory may be submitted in lieu of certificates.
- 4.2 **Hardware Schedule.** Hardware schedule shall list all of the materials to be furnished and shall be submitted to the Contracting Officer for approval. The schedule shall include for each item: the quantities, manufacturer's catalog numbers, hinge and door closer sizes, detail information and location and hardware set identification, corresponding ANSI or BHMA standard type or function number to manufacturer's catalog number, complete keying schedule, and list of abbreviations and template numbers. The keying schedule shall be developed in accordance with DHI publication "Keying Procedures, Systems and Nomenclature."
5. **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 to 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. Where double cylinder functions are used or where it is not obvious which is the key side of a door, appropriate instructions shall be included with the lock and on the hardware schedule.
6. **FINISHES** of the following types shall conform to the finishes identified under BHMA Standard 1301, and shall conform to the requirements of the standard under which the item is specified. Base materials shall be of the material identified by the finish number. Where painting of primed surfaces is required, painting is specified in SECTION: PAINTING, GENERAL.
- 6.1 **Hinges.** Hinges shall have the following finishes:
- 6.1.1 **Outswinging exterior door hinges** shall be 626.
- 6.2 **Lock and Door Trim Finishes.** Lock and door trim finishes for the following types of doors and locations shall be as follows:
- 6.2.1 **All door lock and trim** shall be 626.
- 6.3 **Door Closer Finishes:** Door closer finishes shall be 600.

7. 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, 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.

8. KEYING. Cylinder locks shall be keyed in sets or subsets as scheduled. Keys for cylinder locks shall be stamped with change number. Keys shall be supplied as follows:

Cylinder locks:	2 change keys each lock.
Master keyed sets:	2 keys each.
Grand master keys:	2 total.

The keys shall be turned over to the Contracting Officer properly tagged and designated as to location.

9. LOCKS AND LATCHES. Locksets and deadlocks shall be the products of a single manufacturer. Locks and latches shall conform to the requirements for ANSI Standard A156.2. Manufacturers' standard plain design shall be used.

9.1 Cylinder Locks. Cylinders shall have (six) pins with paracentric keyway. Cylinders for cylinder locks, and the cylinder locks, shall be the product of the same manufacturer.

9.2 Locksets and Latchsets. Locksets and latchsets shall conform to ANSI Standard A156.2, conforming to series 4,000, Grade 1.

9.3 Deadlocks. Deadlocks shall conform to ANSI A156.5, mortise type, cylinder operated, E16000 series.

9.4 Padlocks. Padlocks shall conform to Fed. Spec. FF-P-101, Type EPA, 1 1/2 inch size.

10. DOOR TRIM shall conform to ANSI Standard A156.6.

10.1 Sectional Door Pulls for Metal Doors. Sectional door pulls for metal doors shall be Type J400 brass, thru-bolted type of plain modern design.

10.2 Combination Push-Pull Plates. Combination push-pull plates shall be Type J300, 1/8 inch minimum aluminum, brass, or stainless steel.

10.3 Push Plates. Push plates shall be Type J300 stainless steel, size 4 X 16.

11. BUTTS AND HINGES. Hinges shall conform to ANSI Standard A156.1. Hinges used on metal doors and frames shall also conform to ANSI Standard 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.

11.1 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.

11.2 Contractors Option. Hinges with anti-friction bearings may be furnished in lieu of ball bearing hinges.

11.3 Outswinging Exterior Doors with Closers. Use type A8112.

11.4 Ouswinging Exterior Doors without Closers. Use type A8112.

12. DOOR CLOSING DEVICES of the following types shall conform to ANSI Standard A156.4.

12.1 Surface type Closers. Surface type closers shall be series C02000. Mounting details for the type closers specified shall be in accordance with Paragraph HARDWARE SETS. Size requirements shall conform to the manufacturer's published recommendations and shall be shown on the Contractors hardware schedule. Closers for outswinging exterior doors shall have standard or long parallel arms or shall be top jamb mounted as required for the particular opening. Surface type closers shall be the products of one manufacturer only.

13. SMOKE DETECTORS shall be battery operated and conform to applicable requirements of ANSI Standard A156.4.

14. MISCELLANEOUS.

14.1 Metal Thresholds. Thresholds for exterior metal doors Type J 600.

15. APPLICATION. Hardware shall be located on doors 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.

15.1 Door-Closing Devices. Door-closing devices shall be installed and adjusted in strict accordance with the templates and printed instructions supplied by the manufacturer of the devices.

16. HARDWARE SETS shall be as follows.

Hardware Schedule-Indian Bend Wash Bike Stop Restroom

2 Doors (to Men and Women toilets) each to have:

- 1 1/2 pr. Butts A-8112
- 1 ea. Push J-300
- 1 ea. Pull J-400
- 1 ea. Deadlock E-16061
- 1 ea. Closer C02021
- 1 ea. Sweep
- 3 ea. Silencess

1 Door (to Service Space) to have:

- 1 1/2 pr. Butts A-8112
- 1 ea. Lockset F-81
- 1 ea. Sweep
- 3 ea. Silencers

* * * * *

SECTION 9A

PAINTING, GENERAL

Index

- | | |
|-------------------------------------|-------------------------------------|
| 1. Applicable Publications | 11. Mixing and Thinning |
| 2. Definition | 12. Application |
| 3. Packaging, Labeling, and Storage | 13. Miscellaneous |
| 4. Submittals | 14. Surfaces to be Painted |
| 5. Colors and Tints | 15. Surfaces Not Requiring Painting |
| 6. Quality Assurance Provisions | 16. Cleaning |
| 7. Environmental Conditions | 17. Painting Schedule |
| 8. Materials | |
| 9. Hazardous Materials Restrictions | |
| 10. Surface Preparation | |

1. APPLICATION 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-535B & Am-2	Coating Epoxy Two Component, for Interior use on Metal Wood, Wallboard Painted Surfaces, Concrete and Masonry
TT-C-550C & Am-1	Coating System Glaze, High Performance, (Solvent Base) for Interior Surfaces
TT-E-489F & Int. Am-1	Enamel, Alkyd, Gloss (for Exterior and Interior Surfaces)
TT-E-505a & Am-3	Enamel, Odorless, Alkyd, Interior, High Gloss, White and Light Tints
TT-E-506K	Enamel, Alkyd, Gloss, Tints and White (for Interior Use)
TT-E-543a & Am-1	Enamel, Interior, Undercoat, Tints and White
TT-E-545B & Am-1	Enamel, Odorless, Alkyd, Interior-Undercoat, Flat, Tints and White
TT-E-1593B	Enamel, Silicone Alkyd Copolymer, Gloss (for Exterior and Interior Use)
TT-F-1098D	Filler, Block, Solvent-Thinned for Porous Surfaces (Concrete Block Cinder Block, Stucco, Etc.)
TT-P-19C & Am-2	Paint, Acrylic Emulsion: Exterior

TT-P-37C & Am-4	Paint, Alkyd Resin; Exterior Trim, Deep Colors
TT-P-38D & Am-1	Paint, Aluminum, Ready-Mixed
TT-P-615d & Am-3	Primer Coating: Basic Lead Silico Chromate, Ready Mixed
TT-P-641G & Am-1	Primer, Coating; Zinc Dust-Zinc Oxide (for Galvanized Surfaces)
TT-P-645	Primer, Paint, Zinc-Chromate, Alkyd Type
TT-P-1181A & Am-1	Paint Styrene-Acrylate Solvenet Type, Tints and Deep Tones (for Exterior Masonry)
TT-P-1510A & Am-1	Paint, Latex, Exterior, for Wood Surfaces, White and Tints.
TT-P-001984	Primer Coating, Latex Base, Exterior, (Undercoat for Wood), White and Tints
TT-S-708a & Am-2	Stain, Oil; Semi-Transparent, Wood, Exterior
TT-S-711C	Stain; Oil Type, Wood, Interior
TT-V-51F	Varnish: Asphalt
TT-V-119D & Am-2	Varnish, Spar, Phenolic-Resin

1.2 Federal Standards (Fed. Std.).

No. 595a & Change Notices 1, 2, 3 & 4	Colors
---	--------

1.3 Military Specifications (Mil. Spec.).

MIL-S-12935D	Sealer, Surface; for Knots
DOD-P-15328D	Primer (Wash), Pretreatment, (Formula No. 117 for Metals) (Metric)
MIL-P-26915B	Primer Coating, Zinc Dust Pigmented, for Steel Surfaces
MIL-P-28582	Primer Coating, Exterior, Lead Pigment-Free (Undercoat for Wood, Ready-Mixed, White and Tints)
MIL-P-52324	Paint, Oil, Alkyd, Exterior, White and Light Tints

1.4 American Society for Testing and Materials (ASTM) Publications.

C 150-80

Portland Cement

1.5 Steel Structures Painting Council (SSPC) Specifications.

SSPC-PA 1-64

Paint Application Specifications
No. 1 Shop, Field, and Maintenance
Painting

SSPC-SP 6-63

No. 6 Commercial Blast Cleaning

2. DEFINITION. The term "paint" as used herein, includes emulsions, enamels, paints, stains, varnishes, sealers, cement-emulsion filler, and other coatings, whether used as prime, intermediate, or finish coats.

3. PACKAGING, LABELING, AND STORAGE. Paints shall be in sealed containers that legibly show the designated name, formula or specification number, batch number, color, quantity, date of manufacture, manufacturer's formulation number, manufacturer's directions including any warnings and special precautions, and name of manufacturer. Pigmented paints shall be furnished in containers not larger than 5 gallons. Paint shall be stored on the project site or segregated at the source of supply sufficiently in advance of need to allow 30 days for testing. Emulsion paints shall be stored to prevent freezing.

4. SUBMITTALS.

4.1 Certificates of Compliance. Except for lead-based metal primers for use in concealed spaces, the Contractor shall furnish a certificate of compliance in accordance with the SPECIAL PROVISIONS attesting that all paints proposed for use contain not more than 0.06 percent lead as defined in paragraph: HAZARDOUS MATERIALS RESTRICTIONS.

4.2 Manufacturer's Instructions. Detailed mixing, thinning and application instructions, minimum and maximum application temperature, and curing time and drying time between coats shall be furnished for epoxy, moisture cure polyurethane and liquid glaze coatings. For the liquid glaze coatings the instructions shall also include surface preparation requirements and the number and types of coats required for each surface. Detailed application instructions shall be furnished for textured coatings.

4.3 Sample Panels. A complete liquid glaze coating system shall be applied to a panel of the same material as that on which the coating will be applied in the work and shall be submitted for approval for each color specified. The approved sample panels will be used for quality control of the application of the glaze coating system.

4.4 Samples. Upon notification by the Contractor that the material is at the site or source of supply, a 1-quart sample of each batch, except for small quantities approved as proprietary brands, shall be taken by random selection from the sealed containers by the Contractor in the presence of a representative of the Contracting Officer. The contents of the sampled containers shall be thoroughly mixed to render the sample representative. Samples shall be identified by designated name, specification number, batch number, project contract number, intended use, and quantity involved.

4.5 Small Quantity Substitution. The Contractor shall submit for approval the names of the proprietary brands of materials that are proposed to be substituted for the specified materials when the required quantity of a particular color is 25 gallons or less.

4.6 Test Reports. The Contractor shall furnish either one of the following reports for batches in excess of 25 gallons.

a. A test report showing that the batch meets all specification requirements.

b. A test report showing that a previous batch of the same formulation as the batch to be used met all specification requirements, and a report of test results for properties of weight per gallon, viscosity, fineness of grind, drying time, color, and gloss.

5. COLORS AND TINTS. Colors and tints shall conform to Fed. Std. 595 and shall be as listed on the drawings. Stains shall conform in shade to manufacturer's standard color. The color of the undercoats shall vary slightly from the color of the next coat.

6. QUALITY ASSURANCE PROVISIONS. Materials will be approved based on test reports furnished, except where samples are tested, approval will be based on tests of samples. If materials are approved based on test reports furnished, samples will be retained by the Government for testing should the materials appear defective during or after application. In addition to any other remedies under the contract, the actual cost of retesting materials found to be defective will be deducted from payments due the Contractor.

7. ENVIRONMENTAL CONDITIONS. Unless otherwise recommended by the paint manufacturer, the ambient temperature shall be between 45 and 95 degrees F. when applying coatings other than water-thinned, epoxy, polyester-epoxy, moisture cure polyurethane and liquid glaze coatings. Water-thinned coatings will only be applied when ambient temperature is between 50 and 90 degrees F. Epoxy, moisture cure polyurethane, and liquid glaze coatings will only be applied within the minimum and maximum temperature recommended by the coating manufacturer. Moisture cure polyurethane will not be applied when the relative humidity is below 30 percent. Paints, except water-thinned types, shall be applied only to surfaces that are completely free of surface moisture as determined by sight or touch. In no case shall paint be applied to surfaces upon which there is visible frost or ice.

8. MATERIALS.

8.1 General. Materials shall conform to the requirements of the specifications listed herein and in the PAINTING SCHEDULE except when the required quantity of a material of a particular color is 25 gallons or less, an approved proprietary brand of materials similar in intended usage and color to that specified may be used.

8.2 Cement-Emulsion Fill Coat. Fill coat shall be either an acrylic-based fill coat or a polyvinyl acetate fill coat and shall consist of the following:

White Portland Cement	- 16.5 pounds
Aggregate	- 33.5 pounds
Mixing Liquid	- 0.75 gallon

Potable Water - 1.0 gallons maximum
Exterior Emulsion Paint - 1.0 gallon

The white portland cement shall conform to ASTM C 150, Type I. The aggregate shall be washed silica sand with the following gradation:

U.S. Sieve Size	Percent Sand (by Weight) Passing Individual Sieve
20	100
30	95 - 100
50	30 - 65
100	0 - 10
200	0 - 1

The mixing liquid shall be the same resin emulsion as used in formulating the exterior emulsion paint. The acrylic mixing liquid shall contain 46 to 47 percent solids. The polyvinyl acetate mixing liquid shall consist of 92.6 percent by weight of vinyl polymer (55 percent solids), 3.7 percent by weight carbitol acetate, and 3.7 percent by weight potable water. The mixing liquid shall be factory prepared. The exterior emulsion paint shall be exterior acrylic emulsion paint conforming to Fed. Spec. TT-P-19 or exterior polyvinyl acetate emulsion paint conforming to Fed. Spec. TT-P-55, Type II. The various cement-emulsion fill coats and exterior emulsion paints shall not be interchanged.

8.3 Exterior Oil Paint. Exterior oil paint shall conform to the following Fed. or Mil. Specs.

White: TT-P-102; or MIL-P-52324, Class 1

Light Tints: TT-P-102; or MIL-P-52324, Class 2

Red or Brown: TT-P-31

Other Deep Colors: TT-P-37

8.4 Ferrous-Metal Primer. Ferrous-metal primer shall conform to Fed. Spec. TT-P-86, Type I or II; TT-P-615, Type I, II, or V; or TT-P-645.

8.5 Liquid Glaze Coating. Coating shall conform to Fed. Spec. TT-C-550, Class A, Gloss.

9. HAZARDOUS MATERIALS RESTRICTIONS.

9.1 Lead. Paint shall contain not more than 0.06 percent lead by weight (calculated as lead metal) in the total nonvolatile content of the paint except lead-based metal primers as hereinbefore specified may be used in concealed spaces.

9.2 Mercury. Mercurial fungicides shall not be used in exterior oil paints.

10. SURFACE PREPARATION.

10.1 General. Items not to be painted which are in contact with or adjacent to painted surfaces shall be removed or protected prior to surfaces be removed or protected prior to surface preparation and painting operations. Exposed ferrous

metals including nails on or in contact with surfaces to be painted with water-thinned paints shall be spot-primed with zinc dust, zinc dust-zinc oxide, zinc yellow-iron oxide, or zinc chromate primer. Surfaces to be painted shall be clean before applying paint or surface treatments. Oil and grease shall be removed with clean cloths and cleaning solvents prior to mechanical cleaning. Cleaning solvents shall be of low toxicity with a flashpoint in excess of 100 degrees F. Cleaning shall be programmed so that dust and other contaminants will not fall on wet, newly painted surfaces.

10.2 Asbestos-Cement Surfaces. Asbestos-cement surfaces shall be dry and clean prior to application of the first-coat material. Stains shall be removed with solvents. Wire brushing will not be permitted.

10.3 Concrete, Stucco and Masonry Surfaces. Surfaces shall be allowed to dry at least 30 days before painting. Glaze, efflorescence, laitance, dirt, grease, oil, asphalt, surface deposits of free iron and other foreign matter shall be removed prior to painting. Immediately before coating with cement-emulsion filler, concrete-masonry-unit surfaces to be painted shall be uniformly and thoroughly dampened, with no free surface water visible, by several applications of potable water with a fog spray, allowing time between the sprayings for water to be absorbed. Concrete surfaces to be painted with moisture-cure polyurethane and epoxy coatings shall be acid etched with 10 percent aqueous solution of muriatic acid, thoroughly rinsed with water and dried. The dry concrete surface shall then be treated with the manufacturer's recommended conditioner prior to application of the first coat.

10.4 Ferrous Surfaces. Ferrous surfaces that have not been shop-coated shall be solvent-cleaned. Surfaces that contain loose rust, loose mill scale, and other foreign substances shall be mechanically cleaned by power wire brushing or sandblasting. Minor amounts of residual rust, that cannot be removed except by thorough blast-cleaning, and tight mill scale that cannot be removed by applying a sharp knife to any edge, will be allowed to remain. After cleaning, one coat of ferrous-metal primer shall be applied to all ferrous surfaces to receive paint other than asphalt varnish and vinyl paint. The semitransparent film applied to some pipes and tubing at the mill is not to be considered as a shop coat, but shall be overcoated with the specified ferrous metal primer prior to application of finish coats. Shop coated ferrous surfaces shall be protected from corrosion by treating and touching up corroded areas immediately upon detection.

10.5 Galvanized and Non-Ferrous Surfaces. Galvanized, aluminum and aluminum-alloy, lead, copper and other non-ferrous surfaces to be painted shall be solvent-cleaned and treated with vinyl-type wash coat.

10.6 Wood Surfaces.

10.6.1 General. Wood surfaces to be painted shall be cleaned of foreign matter. Wood surfaces adjacent to surfaces to receive water-thinned paints shall be primed and/or touched up prior to the application of water-thinned paints. Small, dry, seasoned knots shall be scraped, cleaned, and given a thin coat of knot sealer, Mil. Spec. MIL-S-12935, before application of the priming coat. Pitch on large, open, unseasoned knots and all other beads or streaks of pitch shall be scraped off, or if still soft, removed with mineral spirits or turpentine and the resinous area thinly coated with knot sealer. Surfaces shall be checked to insure that finishing nails have been properly set and all holes and surface imperfections shall be primed. After priming, all holes and imperfections in finish surfaces shall be filled with putty or plastic wood filler, colored to

match the finish coat if natural finish is required, allowed to dry, and sandpapered smooth. Putty or wood filler used shall be compatible with subsequent coatings. Painting shall proceed when the moisture content of the wood does not exceed 12 percent as measured by a moisture meter, unless otherwise authorized.

11. MIXING AND THINNING.

11.1 General. Packaged paint other than cement-emulsion filler may be thinned immediately prior to application where necessary to suit conditions of surface, temperature, weather, and method of application with not more than one pint of suitable thinner per gallon. The use of thinner shall not relieve the Contractor from obtaining complete hiding. Paints of different manufacturers shall not be mixed.

11.2 Cement-Emulsion Fill Coat. Cement and aggregate shall be dry mixed so that uniform distribution and intermixing are obtained. Mixing liquid and one-half of the total amount of water shall be premixed and added gradually to the white portland cement and aggregate with constant stirring until a thick, smooth material is obtained. Emulsion paint shall then be added to the foregoing and stirred until uniformity is obtained. The blend shall have a thick, creamy consistency. The remainder of the water shall be added if necessary, to obtain a material with adequate application characteristics. Blending resin emulsion or emulsion paint with any other component shall be done with caution; too rapid agitation will cause air entrapment and foaming.

11.3 Epoxy, Moisture Cure Polyurethane and Liquid Glaze Coatings. Mixing of two component systems shall be in strict accordance with manufacturer's instructions. Thinning, if any, of the first coat to insure proper penetration and sealing will be as recommended by the manufacturer for each type of substrate.

11.4 Vinyl-Type Wash Coat. Mil. Spec. DOD-P-15328 wash coat shall be mixed by adding one volume of acid component to four volumes of resin component. The acid component shall be added slowly to the resin component with constant stirring. The wash coat shall be used within 8 hours. The material may be reduced with normal butyl alcohol or 99 percent isopropyl alcohol, if thinning is required to maintain a wet spray.

12. APPLICATION.

12.1 General. Paint may be applied by brush, roller or spray except as hereinafter specified. At time of application, paint shall show no signs of deterioration. Uniform suspension of pigments shall be maintained during application. Paint shall be applied so finished surfaces shall be free from runs, drops, ridges, waves, laps, brush marks, and variations in color, texture, and finish. Hiding shall be complete. Each coat shall be applied as a film of uniform thickness. Rollers for applying paints and enamels shall be of a type designed for the coating to be applied and the surface to be coated. Special attention shall be given to insure that all surfaces including edges, corners, crevices, welds, and rivets receive a film thickness equivalent to that of adjacent painted surfaces. Adequate ventilation shall be provided during paint application. Respirators shall be worn by all persons engaged in spray painting. Adjacent areas shall be protected by the use of drop cloths or other approved precautionary measures shall be taken. Each varnish coat shall be lightly sanded prior to application of subsequent coat. Paints, except water-thinned types, shall be applied only to surfaces that are completely free of

surface moisture as determined by sight or touch. In no case shall paint be applied to surfaces upon which there is visible frost or snow.

12.2 Coating Progress. Sufficient time shall elapse between successive coats to permit proper drying. This period shall be modified as necessary to suit adverse weather conditions. Oil base or oleoresinous solvent-type paints shall be considered dry for recoating when the paint feels firm, does not deform or feel sticky under moderate pressure of the thumb, and the application of another coat of paint does not cause lifing or loss of adhesion of the undercoat.

12.3 Epoxy, Polyester-Epoxy, Moisture Cure Polyurethane and Liquid Glaze Coatings. Manufacturer's instructions for application, curing and drying time between coats will be followed. Except for liquid glaze coatings second coats will be applied at a maximum spreading rate of 450 square feet per gallon. The total coating system thickness for liquid glaze coatings, including a top or glaze coat thickness of 3 mils, shall be not less than 8 mils.

12.4 Exterior Wood Surfaces to Receive Stain. On smooth surfaces such as planed face of bevel siding, the stain shall be applied at a spreading rate of 400 to 500 square feet per gallon. On rough surfaces such as unplanned or scarred face of bevel siding, the stain shall be spread at the rate of 200 to 250 square feet per gallon or as recommended by the manufacturer. Solvent-type stain shall be applied by brushing with the grain for the full length of the board or course of siding.

12.5 Masonry Surfaces. Masonry surfaces may be coated by brush, roller, or spray, except filler coats. Cement-emulsion filler shall be vigorously scrubbed into the surface with a stiff-bristle brush having tampico or palmyra bristles not longer than 2-1/2 inches. At least 24 hours shall elapse before applying exterior emulsion paint over cement-emulsion filler coat. When the ambient temperature is in excess of 85 degrees F., cement-emulsion filler surfaces shall be lightly dampened with a fog spray of potable water immediately prior to application of the subsequent paint coat. Solvent-thinned filler shall be applied to thoroughly dry surfaces by brush, allowed to set for 3 to 5 minutes or until the filler becomes tacky, and the excess filler material removed with a rubber squeegee. Surface voids shall be filled. Surface irregularities need not be completely filled. The material shall not be applied over calking compound.

12.6 Metal Surfaces. First coats other than vinyl paints or vinyl-type wash coats shall be applied by brush. The three coat paint systems specified for exterior and interior ferrous surfaces shall be applied so that the dry film thickness of the three coat systems at any point shall be not less than 4.0 mils with the primer having a minimum dry film thickness of 1.5 mils. Vinyl paint system for exterior ferrous surfaces subject to severe atmospheric exposures shall be applied in accordance with applicable provisions of SSPC-PA-1. The dry film thickness of the four coat system at any point shall be not less than 4.5 mils with the primer having a minimum dry film thickness of 1.2 mils.

12.7 Time Between Surface Preparation and Painting. Surfaces that have been cleaned, pretreated and otherwise prepared for painting shall be given a coat of the specified first coat as soon as practicable after such pretreatment has been completed, but prior to any deterioration of the prepared surface.

13. MISCELLANEOUS.

13.1 Color Code Marking. Color code marking for piping systems shall be as specified in Table I. Paint shall be as specified for insulated and uninsulated piping.

TABLE I - COLOR CODE SCHEDULE

Piping	Color		Location of Identification	Remarks
	Primary	Secondary		
Drinking water	White No. 17875		Restroom Bldg.	May be painted to match surroundings

13.2 Lettering. Lettering shall be provided as scheduled on the drawings, shall be of the indicated type, height, and colors. Samples shall be approved before application.

14. SURFACES TO BE PAINTED. Surfaces listed in the PAINTING SCHEDULE, other than those listed in paragraphs SURFACES NOT REQUIRING PAINTING and SURFACES FOR WHICH PAINTING IS PROHIBITED, will receive the surface preparation, paints, and number of coats prescribed in the schedule.

15. SURFACES NOT REQUIRING PAINTING. The following listed items will not require painting: factory-finished materials.

16. CLEANING. Cloths, cotton waste and other debris that might constitute a fire hazard shall be placed in closed metal containers and removed at the end of each day. Upon completion of the work, staging, scaffolding, and containers shall be removed from the site or destroyed in an approved manner. Paint and other deposits upon adjacent surfaces shall be removed and the entire job left clean and acceptable.

17. PAINTING SCHEDULE. The PAINTING SCHEDULE prescribes the surfaces to be painted, required surface preparation, and the number and types of coats of paint. Explanatory information for use with the PAINTING SCHEDULE is as follows.

18.1 Contractor's Option. The PAINTING SCHEDULE provides two types of Contractor's options as shown in the following examples.

Surface	1st Coat	2nd Coat	3rd Coat
(1) Exterior wood surfaces not otherwise specified.	TT-P-1984	TT-P-19	TT-P-19
		TT-P-1510	TT-P-1510
(2) Interior hardboard surfaces.	TT-E-543 or TT-E-545	TT-E-508 or	
		TT-E-509	

Explanation. In the first example, the Contractor must use TT-P-1984 for the first coat. The Contractor has the option of using TT-P-19 or TT-P-1510 for the 2nd and 3rd coats. The Contractor shall not mix this option by using TT-P-19 for one coat and TT-P-1510 for the other coat. In the TT-E-545 for the first coat, and either TT-E-508 or TT-E-509 for the second coat, in any of the four possible combinations.

18.2 Shop-Painted Items. Surfaces of items finish-painted by the manufacturer, or specified to be finish-painted under other sections of the specifications, are exempted from the requirements for surface preparation and painting. Shop-primed items shall receive surface preparation and finish painting as required by this section.

18.3 Surface Preparation. The statement "as previously specified" under column heading "Surface Preparation" of the PAINTING SCHEDULE refers to paragraph SURFACE PREPARATION of this section of the specification.

PAINTING SCHEDULE

Surface	Surface Preparation	1st Coat	2nd Coat	3rd Coat
Exterior concrete surfaces	As previously specified.	TT-P-19	TT-P-19	None
Exterior wood signs.	As previously specified.	TT-P-1984	TT-P-19 or TT-P-1510	TT-P-19 TT-P-1510
Exterior wood surfaces to receive stain.	Remove foreign matter.	TT-S-708	None	None
Exterior ferrous surfaces, exposed, unless otherwise specified.	As previously specified.	TT-P-38 TT-E-489, Class A or TT-E-1593	TT-P-38 TT-E-489, Class A TT-E-1593	None None
Exterior galvanized surfaces.	As previously specified.	TT-P-641, Type II or MIL-P-26915, Type I, Class A	Exterior oil paint	None
Exterior aluminum and aluminum-alloy surfaces.	As previously specified.	TT-P-645	TT-E-489, Class A or TT-E-1593	None
Exposed interior oil based calking compound.	As specified in section: CALKING AND SEALANTS.	TT-P-38	Same as adjacent areas.	
Interior concrete masonry units. service space	As stipulated in manufacturer's printed instructions.	TT-C-550	Number of coats in accordance with manufacturer's requirements.	
Interior concrete masonry-unit walls in restrooms	As previously specified. Fill surface of concrete masonry units with TT-F-1098 filler.	TT-C-535 Type II	TT-C-535 Type II	None

PAINTING SCHEDULE (Continued)

Interior unpainted
ferrous surfaces in
exposed areas having
unpainted and adjacent
surfaces and concealed
damp spaces as follows:
in Restrooms and
Service space

Solvent cleaning
and wire brushing;
no pretreatment.

TT-V-51

None

None

* * * * *

Section 10A

METAL TOILET PARTITION DOORS

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.

RR-P-1352A
& Am-2

Partitions, Toilet Doors, Complete.

2. GENERAL. Metal toilet partitions, doors, shall conform to the layouts shown. At the locations indicated, anchorage to walls shall be by through-bolting. Color of panels shall be black, as selected from the manufacturer's standard colors.

3. SHOP DRAWINGS. Shop drawings shall be submitted for approval in accordance with the SPECIAL PROVISIONS. Shop drawings shall show plans, elevations, details of construction, gages of metal, hardware, reinforcing, fittings, mountings, and anchorings.

4. TOILET ENCLOSURE DOORS shall conform to Fed. Spec. RR-P-1352, Type I, Style (A). Width of toilet enclosure doors shall be as shown. Finish surface shall be baked enamel.

5. INSTALLATION. Toilet partitions doors shall be installed straight and plumb with all horizontal lines level and rigidly anchored to the supporting construction. Drilling and cutting for installation of anchors shall be at locations that will be concealed in the finished work. Doors shall have a uniform vertical edge clearance of approximately 3/16 inch and shall rest open at approximately 30 degrees when unlatched. Baked enamel finish shall be touched-up with the same type and color of paint that was used for the finish. Toilet partition doors shall be cleaned and protected from damage until acceptance.

* * * * *

Section 10B

TOILET ACCESSORIES

Index

- | | |
|---------------------------------|--------------------|
| 1. Applicable Publications | 5. Finishes |
| 2. General | 6. Accessory Items |
| 3. Samples and Descriptive Data | 7. Installation |
| 4. Anchors and Fasteners | 8. Schedule |

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

1.1 Federal Specifications (Fed. Spec.).

WW-P-541/8A
& Am-1

Plumbing Fixtures (Accessories, Land
Use).

2. GENERAL. Toilet accessories as specified herein shall be provided in accordance with the SCHEDULE hereinafter. Each accessory item shall be complete with the necessary mounting plates, anchors, and fasteners. Concealed mounting plates shall be of sturdy construction with corrosion resistant surface.

3. SAMPLES AND DESCRIPTIVE DATA. One sample of each accessory proposed for use shall be submitted for approval. Samples shall be accompanied by descriptive data indicating materials of construction, fasteners proposed for use for each type of wall construction, and mounting instructions. Approved samples may be incorporated into the finished work provided they are identified and their locations noted.

4. ANCHORS AND FASTENERS shall be capable of developing a restraining force commensurate with the strength of the accessory to be mounted and shall be well suited for use with the supporting construction. Where exposed fasteners are permitted, they shall have oval heads and finish to match the accessory, except exposed fasteners in the restroom shall be of tamper-proof design.

5. FINISHES. Finishes on metals shall be provided as follows:

<u>Metal</u>	<u>Finish</u>
Stainless steel	No. 4 general-purpose polished
Aluminum	Satin anodic, clear
Carbon steel, copper alloy, and brass	Chromium plated, bright

6. ACCESSORY ITEMS shall conform to the respective specifications and other requirements specified below.

6.1 Grab Bar (GB). Grab bar shall conform to Fed. Spec. WW-P-541, Type IV, Class 2. Stainless steel tube, 1 1/4 inches O.D. Grab bar shall be form and length as indicated. Flange shall have screw mounting holes concealed on the lip of the flange. Grab bar shall have a smooth surface. Installed bars shall be capable of withstanding a 500 pound vertical load without becoming loose from the fastenings and without obvious permanent deformation.

6.2 Mirror, Glass 18" x 30".

6.3 Paper Towel Dispenser (PTD): Paper towel dispenser shall conform to Fed. Spec. WW-P-541, Type I, Class 3.

6.3.1 Mounting S, Surface.

6.3.1.1 Style N (Folded Towels). Style N dispenser shall not be less than 22-gage carbon steel or 0.0269-inch, stainless steel.

6.4 Sanitary Napkin and Tampon Disposer (SND): Sanitary napkin and tampon disposer shall conform to Fed. Spec. WW-P-541, Type II, Mounting P, stainless steel. Reusable liner of the type standard with the manufacturer shall be provided.

6.5 Sanitary Napkin and Tampon Dispenser (SNTD). Sanitary napkin and tampon dispenser shall conform to Fed. Spec. WW-P-541, Type I, Class 5, surface mounted. Dispenser including door shall be stainless steel and have a capacity of 20 napkins and 20 tampons. Dispensing mechanism shall be for 10-cent coin operation.

6.6 Soap Dispenser (SD). Soap dispenser shall be liquid type consisting of a vertical stainless steel tank with holding capacity of 40 fluid ounces.

6.7 Toilet Tissue Dispenser (TTD). Toilet tissue dispenser shall conform to Fed. Spec. WW-P-541, Type I, Class 1, Style A, stainless steel.

6.8 Waste Receptacle (WR). Waste receptacle shall conform to Fed. Spec. WW-P-541, Type II, stainless steel, designed for surface mounting. Reuseable liner of the type standard with the receptacle manufacturer shall be provided. Capacity shall be not less than 2 cubic feet.

6.9 Toilet Cover Dispenser (TCD) shall be of standard design approved by the Contracting Officer, for dispensing paper covers for sanitary use over toilet seats.

7. INSTALLATION. Toilet accessories shall be securely fastened to the supporting construction in accordance with the approved submittals. Accessories shall be protected from damage from the time of installation until acceptance.

8. SCHEDULE.

	GB	MM	SND	SNTD	SD	TTD	WR	PTD	TCD
MEN	2	1			1	1	1	1	1
WOMEN	2	1	1	1	1	2	1	1	1

* * * * *

SECTION 11K

MISCELLANEOUS ITEMS OF WORK

Index

- | | |
|-----------------------------|------------------------------------|
| 1. Applicable Publications | 6. Site Furniture |
| 2. Shop Drawings | 7. Bike Path Signs |
| 3. Drinking Fountains | 8. Bike Racks |
| 4. Bollards and Chain Fence | 9. Hand Rails, Grates and Scuppers |
| 5. Ramadas | 10. Entry Gate |

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 Officials (AASHO) Publications.
T 180

1.2 Arizona Department of Transportation Standard Specifications for Road and Bridge Construction

2. SHOP DRAWINGS. Shop drawings along with catalog cuts, templates, and erection and installation details as appropriate for all miscellaneous items of work shall be submitted for approval in accordance with the "General Requirements". Submittals shall be complete in detail; shall indicate type, style, and dimensions; and shall show construction details, anchorage, and installation.

3. DRINKING FOUNTAINS.

3.1 General. Drinking fountain assembly shall include the complete installation and provision of the following.

Drinking Fountain and Pedestal
Dry Well

3.2 Drinking Fountain and Pedestal. Drinking fountain and pedestal shall be manufactured Vibra-cast, reinforced concrete. They shall be finished, sized, and installed as shown on drawings. Fountains shall contain integral satin chrome-plated anti-squirt bubbler mounted on a stainless steel receptor. Receptor is recessed flush with concrete top and anchored with vandal-resistant bowl holder. Unit shall be equipped with handle operated valve with automatic stream regulator and heavy-gauge stainless steel access plate, secured with vandal-resistant screws. Units shall be plumbed and mounted as per manufacturer's instructions. Units shall be installed prior to pouring of surrounding concrete slab.

3.3 Dry Well. Concrete and Piping. Dry well shall be of size and installation shown on the drawings and gravels shall be clean, river-run and of a size shown on drawings. Piping shall conform to the applicable requirements of the section PLUMBING, GENERAL PURPOSE.

4. BOLLARDS AND CHAIN FENCE.

4.1 Installation. Bollards shall be installed as indicated on the drawings - complete with fittings and metal chain.

4.2 Specifications. Bollards shall be of size and finish as indicated on the drawings and shall be manufactured by Western Art Stone or an approved equal. Concrete shall be 5,000 psi, Vibra-cast, and finished free from blemishes holes, or irregularities. Finish shall be as indicated on the drawings. All integral metal parts shall be as shown - installed by manufacturer and be of galvanized steel. All eyes shall be mounted vertical. There shall be no eyes on outside faces of end bollard units.

4.3 Mounting. Units shall be mounted plumb, as per manufacturer's specifications and with connecting chain eyelets lined up straight. Chains shall be 3/8" proofcoil galvanized steel chain. Sag between bollards shall be a maximum of 6" from a horizontal plane between eyebolts. All chain sag shall be consistent throughout a group of bollards and chains.

4.4 Reflectors. Five inch diameter traffic light reflectors shall be installed at 5 feet on centers on chain barricade in a method that will reflect auto headlights regardless of chain twist. Reflectors shall comply with applicable requirements of Arizona Department of Transportation Standard Specifications.

4.5 Post and Cable Fence shall be realigned as shown.

5. RAMADAS.

5.1 General. Ramadas shall be a prefabricated metal structure of a design approved by the Contracting Officer, constructed and installed as indicated on the drawings.

5.2 Wood. Wood shall be dressed, select grade Douglas fir free from checks, cracks, blemishes, knot holes or irregularities. All sawn faces shall be smooth and edges shall be rounded and free from splinters.

5.3 Metal Post Holders. Metal post holders shall be sized and constructed as indicated on the drawings. All welds and corners shall be ground smooth to remove all burrs, rough spots and irregularities.

5.4 Metal Fasteners. Metal fasteners shall be galvanized steel of a size shown or needed to complete work. All connections shall be in straight patterns. All metal shall conform to section: MISCELLANEOUS METAL.

5.5 Concrete. Concrete shall meet all requirements of section: CONCRETE. All exposed parts shall be smooth trowelled, free from holes, irregularities, or patches and have smooth edges. Strength shall be 3,000 psi.

5.6 Erection. Units shall be erected plumb and assembled in all respects.

5.7 Finish. Finish shall be as per section: PAINTING GENERAL and as indicated.

6. SITE FURNITURE.

6.1 Precast concrete benches and base slab support shall be constructed as specified for precast concrete and concrete slabs in section: CONCRETE and shall be installed in the locations indicated on the drawings.

6.2 Trash receptacles shall be approximately 32 gallon size 42 inches high, round with concrete pad, fiberglass tops and liner of galvanized steel of a style and fabrication suitable for the location and intended use and approved by the Contracting Officer.

6.3 Poured in place concrete benches shall be constructed in accordance with the details shown on the drawings and as specified in section: CONCRETE.

6.4 SIGN POSTS shall all be constructed with 8 inch by 8 inch douglas fir with 2 coats of approved wood preservative treatment fabricated in accordance with details shown on drawings and constructed as specified in sections: CARPENTRY, CONCRETE AND MISCELLANEOUS METAL.

6.5 PICNIC TABLES AND BARBECUE GRILLS. Picnic tables shall be six (6) feet long, unless otherwise indicated, tops and seats shall be constructed of Douglas Fir, and frames shall be constructed of enamel-finished two-inch steel pipe. Picnic tables and benches shall be suitable for use by the handicapped. Barbecue grills shall be constructed of galvanized steel with adjustable grilling surfaces of not less than 280 square inches. Grills shall be vandal and theft proof and attached to galvanized steel pipes with concealed fasteners anchored in concrete.

7. BIKE PATH SIGNS

7.1 Materials. Redwood posts. Redwood shall be rough sawn, sand-blasted construction heart, graded in accordance with rules for grading of the Redwood Inspection Service.

Paint and stain exterior finish paint for wood shall conform to Federal Specification TT-P-105a & Am-1. Wood primer paint shall conform to Military Specification MIL-P-28582. Stain shall conform with Federal Specification TT-S-708a & AM-1.

7.2 Execution. Shape of sign shall be as shown on detail. Create bike path symbol with a router. Apply one coat of primer and two coats of paint in area as shown on detail. Apply stain as indicated on detail. Posts shall be set plumb in concrete as specified in Section 3A.

8. BIKE RACKS. Bike racks shall be Model No. 12-100 manufactured by Rally-Rack or approved equal. Units shall be of steel, factory finished and painted. Units shall be installed as per manufacturer's instructions and shall be free of blemishes, dents, scratches, or irregularities.

9. HAND RAILS, GRATES AND SCUPPERS shall be constructed as indicated and in accordance with the applicable requirements of Sections: CONCRETE AND STRUCTURAL STEEL.

9.1 Pad locks for entry gate, post and cable gate as well as park furniture shall comply with applicable requirement of Section. HARDWARE, BUILDERS.

9.2 Reflectors shall conform to requirements of the Arizona Department of Highways.

10. ENTRY GATE shall be constructed with medium gage steel tubing frame, 3/4 inch thick steel hinges, steel pipe posts set in concrete footings all as indicated in accordance with the applicable requirements of Sections: CONCRETE AND STRUCTURAL STEEL.

* * * * *

SECTION 15A

PLUMBING, GENERAL PURPOSE

INDEX

- | | |
|---|---|
| 1. Applicable Publications | 12. Unions and Flanges |
| 2. General | 13. Vacuum Breakers or Backflow Preventers for Faucets and Fixtures |
| 3. Materials | 14. Pipe Sleeves, Hangers, and Fixture Supports |
| 4. Approval of Materials, Fixtures, and Equipment | 15. Identification Systems |
| 5. Excavating, Trenching, and Backfilling | 16. Floor, Wall, and Ceiling Escutcheons |
| 6. Soil, Waste, Drain, and Vent Piping | 17. Types of Fixtures and Fixture Trimmings |
| 7. Pipe Cleanouts | 18. Inspection, Tests, and Sterilization |
| 8. Flashings | |
| 9. Traps | |
| 10. Water Pipe, Fittings, and Connections | |
| 11. Valves | |

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.).

L-P-320B & Notice 1 & Am-1	Pipe and Fittings, Plastic (Polyvinyl) Chloride, PVC, Drain, Waste and Vent DWV)
O-C-114B & Am-2	Calcium Hypochlorite, Technical
O-S-602E	Sodium Hypochlorite Solution
BB-C-120B	Chlorine, Technical: Liquid
HH-P-117	Packing; Jute, Twisted
QQ-C-40 & Am-2	Calking: Lead Wood and Lead Pig
QQ-C-576B & Am-1	Copper Flat Products with Slit, Slit and Edge Rolled, Sheared, Sawed or Machined Edges, (Plate, Bar Sheet and Strip)
QQ-L-201f & Am-2	Lead Sheet
QQ-S-571E & Am-2	Solder, Tin Alloy: Lead-Tin Alloy; and Lead Alloy

TT-C-598B & Am-2	Calking Compound, Oil and Resin Base Type (For Masonry and Other Structures)
TT-P-1536A	Plumbing Fixture Setting Compound
WW-F-406C	Flanges, Cast-Iron (Classes 125 and 250) and Bronze (Classes 150 and 300)
WW-N-351C & Int. Am-1	Nipples, Pipe, Threaded
WW-P-351a & Am-1	Pipes; Red Brass, (Copper Alloy No. 230), Seamless Standard Pipe Size, Regular and Extra Strong
WW-P-460B & Am-4	Pipe Fittings; Brass or Bronze (Threaded) 125- and 250-Pound
WW-P-541D/GEN & Am-1	Plumbing Fixtures (Land Use) (General Specification)
WW-P-541/1A & Am-1	Plumbing Fixture (Water Closets, Land Use) (Detail Specification)
WW-P-541/4A (GAS-FSS)	Plumbing Fixtures (Lavorities, Land Use) (Detail Specification)
WW-P-541/6A & Am-1	Plumbing Fixtures (Drinking Fountains, Land Use) (Detail Specification)
WW-U-516B.	Unions, Brass or Bronze, Threaded Pipe Connections and Solder-Joint Tube Connections.
WW-U-531E.	Unions, Pipe, Steel or Malleable Iron; Threaded Connection 150 Lb and 250 Lb.
WW-V-51F.	Valve, Angle, Check, and Globe, Bronze (125, 150 and 200 Pound) Threaded End, Flange Ends, Solder Ends, and Brazed End for Land Use.
WW-V-54D & Int. Am-3 (GSA-FSS).	Valve, Gate, Bronze (125, 150 and 200 Pound, Threaded Ends, Flange Ends, Solder End and Brazed Ends, for Land Use).
WW-V-58B.	Valves, Gate, Cast Iron; Threaded and Flanged (for Land Use).

1.2 Federal Standard (Fed. Std.).

H28
& Suppl 1.

Screw-Thread Standards for Federal
Services.

1.3 Military Specifications (Mil Spec.).

MIL-T-27730A

Tape, Antiseize,
Polytetrafluoroethylene, with
dispenser

1.4 American Insurance Association (AIA) publication.

National Building Code (1976; Amendments Dec. 1977)

1.5 American National Standards Institute, Inc. (ANSI) Standards.

A21.6-1980

Gray-Iron Pipe Centrifugally Cast in
Metal Molds, for Water or Other
Liquids

A21.8-1975

Cast-Iron Pipe Centrifugally Cast in
Sand-Lined Molds, for Water or Other
Liquids

A21.10-1977

Gray-Iron and Ductile-Iron Fittings,
2 in. through 48 in., or Water and
Other Liquids.

B16.22-1980

Wrought Copper and Copper Alloy Solder
Joint Pressure Fittings

B16.23-1976

Cast Copper Alloy Solder Joint
Fittings-DWV

B16.26-1976

Cast Copper Alloy Fittings for Flared
Copper Tubes

B31.1-1980
& B31.1a-1980

Power Piping

1.6 American Society for Testing and Materials (ASTM) Specifications.

A 74-80

Cast Iron Soil Pipe and Fittings

A 120-80

Pipe, Steel, Black and Hot-Dipped Zinc
Coated (Galvanized) Welded and
Seamless for Ordinary Uses

B 62-80

Composition Bronze or Ounce Metal
Castings

B 88-81

Seamless Copper Water Tube

B 306-81.

Copper Drainage Tube (DWV).

B564-70 (R 1976).

Rubber Gaskets for Cast Iron Soil
Pipe and Fittings.

- D 2661-78. Acrylonitrile-Butadiene-Styrene (ABS)
Plastic Drain, Waste, and Vent Pipe
and Fittings.
- D 2665-78. Poly(Vinyl Chloride) (PVC) Plastic
Drain, Waste and Vent Pipe and
Fittings
- 1.7 American Society of Mechanical Engineers (ASME) Publications.
- A40.8-1955 National Plumbing Code.
- Boiler and Pressure Vessel Code & Interpretations:
- Section IX. Welding and Brazing Qualifications
(1980; Addenda: Summer & Winter
1980; Summer 1981)
- 1.8 American Water Works Association (AWWA) standard:
- C203-78 Coal-Tar Protective Coatings and
Linings for Steel Water Pipelines--
Enamel and Tape--Hot-Applied.
- 1.9 Cast Iron Soil Pipe Institute (CISPI) standards.
- 301-78 Cast Iron Soil Pipe and Fittings for
Hubless Cast Iron Sanitary System.
- 310-78 Cast Iron Soil Pipe Institute's
Patented Joint for use in
Connection with Hubless Cast Iron
Sanitary System
- 1.10 Manufacturers Standardization Society of the Valve and
Fittings Industry (MSS) publications.
- SP-58 Pipe Hangars and Supports -
Materials, Design and Manufacture
(1975).
- SP-69 Pipe Hangars and Supports -
Selection and Application (1976).
- 1.11 National Association of Plumbing-Heating-Cooling Contractors (NAPHCC)
standard.
- National Standard Plumbing Code - 1978, 1979 Supplements.
- 1.12 National Fire Protection Association (NFPA) standards.
- No. 13-1980. Sprinkler Systems, Installation.
2. GENERAL. The general arrangement of the plumbing shall be as indicated.
Detailed drawings of proposed departures due to actual field conditions or other
causes shall be submitted to the Contracting officer for approval. The Contractor

shall carefully examine the drawings and shall provide for the proper fitting of materials and equipment in building, as indicated without substantial alteration. Material and equipment shall be suitable for the pressures and temperatures encountered. Installation shall be as required by (ASME A40.8, National Plumbing Code) the (NAPHCC) National Standard Plumbing Code) and as specified herein.

2.1 Utilities. Water and drainage piping shall be extended 5 feet outside the building, unless otherwise indicated, where the piping shall be connected to the exterior service lines or capped or plugged if the exterior service is not in place. Sewer and water pipes shall be laid in separate trenches, except when otherwise shown. Utilities shall be installed below the frostline. If the trenches are closed or the pipes are otherwise covered before being connected to the service lines, the location of the end of each plumbing and utility shall be marked with a stake or other acceptable means.

2.2 Cross Connections and Interconnections. No plumbing fixture, device equipment, or pipe connection shall be installed that will provide a cross connection or interconnection between a potable water supply and any source of nonpotable water, such as a drainage system, a soil or waste pipe.

2.3 Connections to Equipment and Fixtures. The Contractor shall provide all necessary material and labor to connect to the plumbing system all fixtures and equipment having plumbing connections, which are furnished by the Government or are specified in other sections of these specifications. Drainage connections shall be trapped. The supply line to each item of equipment or fixture, except faucets, flush valves, or other control valves which are supplied with an integral stop, shall be equipped with a cutoff valve to enable isolation of the item for repair and maintenance without interfering with operation of other equipment or fixtures. Supply piping to all fixtures, faucets, and flush valves shall be anchored to prevent movement. The Contractor shall be responsible specifically for the coordination and proper relation of the work to the building structure and to the work of all trades.

2.4 Drawings. Because of the small scale of the drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. The Contractor shall carefully investigate the structural and finish conditions affecting all his work and shall arrange such work accordingly, furnishing required fittings, traps, valves, and accessories to meet such conditions.

2.5 Cutting and Repairing. The work shall be carefully laid out in advance, and unnecessary cutting of construction shall be avoided. Damage to buildings, piping, wiring, or equipment as a result of cutting for installation shall be repaired by mechanics skilled in the trade involved.

2.6 Protection to Fixtures, Materials, and Equipment. Pipe openings shall be closed with caps or plugs during installation. Fixtures and equipment shall be tightly covered and protected against dirt, water, and chemical or mechanical injury. Upon completion of all work, the fixtures, materials, and equipment shall be thoroughly cleaned, adjusted, and operated. Belts, pulleys, chains, gears couplings, projecting set screws, keys, and other rotating parts located so that any person may come in close proximity thereto, shall be fully enclosed or properly guarded.

2.7 Temporary Facilities. The Contractor shall furnish, install, and keep in proper repair all temporary water lines, sewer lines, and toilet facilities required for construction purposes. After permanent plumbing fixtures are installed, toilet rooms selected by the Contracting officer shall be used, and the temporary facilities shall be removed. All temporary water and waste lines shall be removed when directed.

2.8 Welding. Welding of structural members, pipe and vessels shall be provided where specified or indicated. The Contractor is responsible for welding done by his organization and shall conduct tests required to qualify the welding procedures he uses in the construction of weldments. Welding of structural members shall be as specified in section: MISCELLANEOUS METAL. Welding of vessels and pipes shall be in compliance with the requirements of Section IX of the ASME Boiler and Pressure Vessel Code and paragraph 127.5.3 of ANSI B31.1.

3. MATERIALS, FIXTURES, AND EQUIPMENT shall conform to the respective publications and requirements specified below. Fixtures and equipment shall be products of manufacturers regularly engaged in the manufacture of such products. Fixtures and equipment differing in minor respects from that specified may be proposed, provided such differences are clearly indicated on data submitted for approval. If the Contracting Officer judges the product to be equal to or better than that specified, the product will be considered; and if based on a technical evaluation, the Contracting Officer judges the difference to be minor, he may approve the use of the product.

3.1 Calking.

3.1.1 Compound. Fed. Spec. TT-C-598, Type I

3.1.2 Lead. Fed. Spec. QQ-C-40, Type

3.2 Copper. Fed. Spec. QQ-C-576, sheet form, light cold-rolled temper.

3.3 Fittings.

3.3.1 Cast Iron Soil-Pipe Fittings. ASTM A 74.

3.3.2 Fittings for Brass or Copper Pipe. Fed. Spec. WW-P-460, Class A or B.

3.3.3 Fittings for Copper. Wrought copper and bronze solder-joint pressure fittings shall conform to ANSI B16.22. Cast copper alloy solder-joint pressure fittings shall conform to ANSI B16.18. Flared brass fittings shall conform to ANSI B16.26 and ASTM B62.

3.3.4 Unions. Fed. Spec. WW-U-516, WW-U-531, or WW-F-406, as applicable, and where used in connection with tubing modified therefor.

3.4 Pipe and Tubing.

3.4.1 Cast Iron Soil Pipe. ASTM A 74, as modified below.

3.4.2 Copper Tubing and Tube, DWV. Copper tubing for water piping shall conform to ASTM B 88, typed as specified below. Copper drainage-waste and vent tube, DWV, shall conform to ASTM B 306.

3.4.3 Pipe Hangars and Supports. Fed. Specs. WW-H-171, types as specified.

3.5 Plumbing Fixtures and Drains. Fed. Spec. WW-P-541, without chair carriers. Polyethylene floor drains with clamping device, ASTM D 1248.

3.6 Plumbing Fixture Setting Compound. Fed. Spec. TT-P-1536, Type II.

3.7 Solder. Fed Spec. QQ-S-571, composition Sn50.

3.8 Packing Twisted-Jute or oakum, dry type, for calking Type I cast Iron water pipe; tarred, type or as specified below, for calking cast iron soil pipe.

3.9 Tape.

3.9.1 For Threaded Pipe Joints. MIL. Spec. MIL-T-27730

3.9.2 For Pipe-Joint Coating. AWWA C203.

3.10 Valves.

3.10.1 Angle, Check, and Globe Valves. Fed. Spec. WW-V-51, Class A or B, type as suitable for the application, and where used in connection with tubing, modified therefor.

3.10.2 Gate Valves. Fed. spec. WW-V-54, Type I, II or III, Class A or B, for Fed. Spec. WW-V-58, Type I or II, Class 1 or 2, as applicable; and where used in connection with tubing, modified therefor.

3.11 Plastic Pipe and Fittings. Polyvinyl chloride conforming to ASTM D 2665 or acrylonitrile-butadiene-styrene (ABS) conforming to ASTM D 2661

4. APPROVAL OF MATERIALS, FIXTURES, AND EQUIPMENT. Before starting installation, the Contractor shall submit to the Contracting Officer for approval, in accordance with the SPECIAL PROVISIONS, layout drawings and lists of materials, fixtures, and equipment to be incorporated in the work. The layout drawings shall consist of plans drawn to scale, with elevations and sections to show clearly the location and size of major items of equipment and large piping, and clearances for maintenance withdrawal of removal components. If departures from the contract drawings are deemed necessary by the Contractor, details of such departures, including changes in related portions of the project and the reasons therefor, shall be submitted with the drawings. Where such departures require piping or equipment to be supported otherwise than shown, the details submitted shall include loadings and type and kinds of frames, brackets, stanchions, or other supports necessary. Approved departures shall be made at no additional cost to the Government. The lists of materials and equipment shall be supported by sufficient descriptive material, such as catalogs, cuts, diagrams, and other data published by the manufacturer, as well as evidence of compliance with safety and performance standards, to demonstrate conformance to the specifications requirement; catalogs, cuts, diagrams, and other data published by the manufacturer, as well as evidence of compliance with safety and performance standards, to demonstrate conformance to the specification requirement; catalog numbers alone will not be acceptable. The data shall include the name and address of the nearest service and maintenance organization that regularly stocks repair parts. One copy of the layout drawings and of each list will be returned, marked to indicate approval.

5. EXCAVATING, TRENCHING, AND BACKFILLING is specified in section: EXCAVATION TRENCHING AND BACKFILLING FOR UTILITIES SYSTEM.

6. SOIL, WASTE, DRAIN, AND VENT PIPING. Underground soil, waste, and drain pipe and fittings shall be service weight hub-type cast iron except that hubless cast iron pipe may be installed in locations where piping can be removed and replaced. Hubless cast iron pipe shall not be installed under concrete floor slabs on grade. Stainless steel clamps for hubless cast iron pipe installed underground shall be coated and wrapped as specified below for water piping except that coating may be field applied. Cast iron pipe and fittings installed under slab on grade shall be coated and wrapped as specified below for water piping except the coating may be field applied. Aboveground soil, waste, drain, and vent piping, shall be galvanized steel, service weight cast iron soil pipe with or without hubs. Cast iron soil pipe and fittings without hubs shall conform to the Cast Iron Soil Pipe Institute Standard 301. Fittings for above ground pipe shall be cast iron of the drainage pattern and shall be compatible with the pipe materials except where adaptors are required for interconnection of different pipe materials. Fittings on dry vents shall be regular-pattern type. PVC or ABS piping may be installed as aboveground vent piping in buildings two stories or less in height. Plastic vent piping shall not pass through roof, fire walls, fire partitions, and aboveground floors except as specified. Plastic vent piping may be installed in fire rated chases extending between floors.

6.1 Installation.

6.1.1 Drainage and Vent Pipes. Main vertical soil and waste stacks shall be extended full size to the roofline and above as vents, except where otherwise specifically indicated. Where practicable, two or more vent pipes shall be connected and extended as one pipe through the roof. Vent pipes in roof spaces shall be run as close as possible to the underside of the roof without forming traps in pipes, using fittings as required. Vertical vent pipes may be connected into one main vent riser above vented fixtures. Horizontal waste lines receiving the discharge from two or more fixtures shall be provided with end vents, unless separate venting of fixture is noted. Cast iron soil pipe hubs inside buildings shall be extended 6 inches above the lowest floor where the floor is supported on ground. Horizontal waste lines shall be sloped to drain at 1/4-inch/ft. unless otherwise indicated or approved.

6.1.2 Fittings. Changes in pipe size on soil, waste, and drain lines shall be made with reducing fittings. Changes in direction shall be made by the use of fittings.

6.1.3 Unions Connections. Slip joints will be permitted only in trap seals; or on the inlet side of the traps; and on "p" trap assemblies consisting of an adjustable "p" trap and waste tubing to wall with escutcheons as specified hereinafter. Tucker or hub drainage fittings shall be used to make union connections where practicable. Use of bushings will not be permitted.

6.2 Joints. Installation of pipe and fittings shall be made in accordance with the manufacturers' recommendation. Mitering of joints for elbows and notching of straight runs of pipe for tees will not be permitted. Threaded joints shall have American National taper pipe threads conforming to Fed. Std. H 28, with graphite or inert filler and oil, with an approved graphite compound, or with polytetrafluoroethylene tape applied to the male threads only.

6.2.1 Cast Iron Soil Pipe. Joints in hub-type cast iron soil pipe and fittings shall be firmly packed with either tarred twisted jute or a preservative-treated twisted jute covered with a braided-yarn jacket to provide a uniform rope-like strand and calked with lead at least one inch deep. Joints in cast iron soil pipe

and fittings using a double-seal, compression-type molded neoprene gasket shall be provided with a modified hub as required to provide a positive seal. Joints in cast iron soil pipe and fittings without hubs shall be made using a mechanical compression-type coupling consisting of a neoprene collar, stainless steel band with transverse corrugations and two stainless steel clamps with stainless steel setscrews all assembled to provide a positive seal, and shall conform to Standard 310 of the Cast Iron Soil Pipe Institute.

7. PIPE CLEANOUTS shall be the same size as the pipe except that cleanout plugs larger than 4 inches will not be required. A cleanout installed in connection with cast iron soil pipe shall consist of a long sweep 1/4 bend or one or 2 1/8 bends extended to the place shown. An extra-heavy cast brass or cast iron ferrule with countersunk cast brass head screw plugs shall be calked into the hub of the fitting and shall be flush with the floor. Cleanouts in connection with other pipe, where indicated, shall be T-pattern, 90-degree branch drainage fitting with cast brass screw plugs of the same size as the pipe up to and including 4 inches. Cleanout tee branches with screw plug shall be installed at the foot of soil and waste stacks. Cleanout tee branches may be omitted on stacks in single-story buildings with slab-on-grade construction. Round access covers shall be provided and secured to plugs with securing screw. Square access covers may be provided with matching frames, anchoring lugs and cover screws. Cleanouts installed in finished floors subject to foot traffic shall be provided with a chrome-plated cast brass, nickel brass, or nickel bronze cover secured to the plug or cover frame and set flush with the finished floor. Heads of fastening screws shall not project above the cover surface. Where cleanouts are provided with adjustable heads, the heads shall be cast iron.

8. FLASHINGS. Pipes passing through waterproofing membrane shall be flashed as specified per paragraph PIPE SLEEVE, HANGERS, AND FIXTURE-SUPPORTS. A sheet-lead flashing shield shall be provided for drains and pipe sleeves with integral clamping devices that penetrate a membrane. Flashing shield shall be made from sheet lead not lighter than 4-pounds, and extend not less than 8 inches from the drain or sleeve in all directions. Flashing shall be inserted into the clamping device and made watertight. Pipes passing through pitched roofs shall be flashed using lead or copper flashing with an adjustable integral flange of adequate size to extend not less than 8 inches from the pipe in all directions and lapped into the roofing to provide a watertight seal.

9. TRAPS. Each fixture and piece of equipment requiring connections to the drainage system, except grease interceptors, shall be equipped with a trap. Each trap shall be placed as near the fixture as possible, and no fixture shall be double-trapped. Traps installed on cast iron soil pipe shall be cast iron. Traps installed on steel pipe or copper tube shall be recess-drainage pattern, or brasstube type as specified below.

10. WATER PIPE, FITTINGS AND CONNECTIONS.

10.1 Water Pipe. Water-service pipe to the structure and cold-water piping underground within the structure shall be Type K copper tubing. Water-service pipe shall extend from approximately 6 inches above the lower floor or inside the structural wall to a point not less than 5 feet outside the structure into undisturbed soil. Cold-water pipe aboveground and inside the structure shall be Type L copper tubing. Exposed cold-water supply piping shall be chrome-plated brass pipe to the shutoff or stop valve of each fixture. Piping connection from the shutoff or stop valve to the fixture shall be as specified below.

10.2 Fittings. Fittings for Type K copper tubing shall be flared brass or solder-type bronze or wrought copper. Fittings for chrome-plated tubing shall be chrome-plated brass. Fittings for brass pipe shall be brass.

10.3 Installation. A gate valve and drain on the service line shall be installed inside the building as close to the floor or wall as possible. Service pipe shall be installed below the frostline. The piping shall be extended to all fixtures, outlets, and equipment from the gate valve. The cold-water piping system shall be installed so as to be drained.

10.3.1 Piping shall be installed as indicated. Pipe shall be cut accurately to measurements established at the building by the Contractor and shall be worked into place without springing or forcing. Care shall be taken not to weaken structural portions of the building. Aboveground piping shall be run parallel with the lines of the building unless otherwise indicated. Branch pipes from service lines may be taken from top, bottom, or side of main, using such crossover fittings as may be required by structural or installation conditions. Supply pipes, valves, and fittings shall be kept a sufficient distance from other work and other services to permit not less than 1/2 inch between finished covering and other work and not less than 1/2 inch between finished covering on the different services. No water pipe shall be buried in floors unless specifically indicated or approved. Changes in pipe sizes shall be made with reducing fittings. Use of bushings will not be permitted. Change in direction shall be made with fittings except that bending of pipe 4 inches and smaller will be permitted, provided a pipe bender is used and wide sweep bends are formed. The center line radius of bends shall be not less than six diameters of the pipe. Bent pipe showing kinks, wrinkles, flattening or other malformations will not be accepted.

10.3.2 Pipe drains indicated shall consist of 1/2-inch globe valves with renewable disks and 3/4-inch hose nipples. Provide 1/2-inch brass plugs or caps at all other low points. Disconnection of the supply piping at the fixture is an acceptable drain.

10.4 Joints. Connection between ferrous and nonferrous metallic pipe installed underground shall be made with dielectric union or flanges specified below. Installation of pipe and fittings shall be made in accordance with the manufacturers' recommendations. Mitering of joints for elbows and notching of straight runs of pipe for tees will not be permitted. Threaded joints shall have American National taper pipe threads conforming to Fed. Std.-H28 with graphite or inert filler and oil, with an approved graphite compound, or with polytetrafluoroethylene tape applied to the male threads only. Unions shall be provided where required for disconnection.

10.4.1 Lead joints for calked joint pipe shall be made by centering the spigot within the bell and packing the joint with closely compacted jute packing material so as to leave a 2-inch depth for the lead. The materials shall be handled with care to prevent contamination shall be dry when placed in the joint, and shall be free of oil, tar, and grease. Each joint shall be made in one continuous pouring from the ladle. Joints shall be poured full, then thoroughly calked at least three times around with calking tools of proper width. Joint material for Type II and Type III pipe shall be as specified in Fed. Spec. WW-P-421.

10.4.2 Flared or sweated tubing shall be cut square, and burs shall be removed. Flared joints shall be made using flared fittings. Joints in copper tubing shall be made as specified in paragraph SOIL, WASTE, DRAIN, AND VENT PIPING.

10.5 Protective Coating for Pipe and Fittings. The exterior surfaces of metallic pipe and fittings, except copper, that are installed underground shall be thoroughly cleaned of foreign matter by wire brushing and solvent cleaning. Using tape conforming to AWWA C203 and primer as recommended by the tape manufacturer, the pipe shall be primed and immediately wrapped with the tape applied with a 50 percent overlap. Joints and fittings shall be covered with the same primer and tape. Joints and fittings shall be coated and wrapped after piping has been tested. Pipe shall be coated and wrapped during installation. Piping system shall be tested as specified below.

11. VALVES shall be provided on supplies to equipment or fixtures if not specified in paragraph TYPES OF FIXTURES AND FIXTURE TRIMMINGS. Valves in connection with runouts, risers, branches, and mains shall be in accordance with these specifications and installed where indicated. All valves shall be gate valves unless otherwise specified or indicated. Valves up to and including 3 inches shall be bronze with threaded ends for pipe and sweat-type connections for tubing. Valves 4 inches and larger in diameter shall have iron bodies, bronze trim, and flange ends.

12. UNIONS AND FLANGES. Unions on ferrous pipe 2 inches in diameter and smaller shall be malleable iron in accordance with Fed. Spec. WW-U-531, Type B, zinc-coated. Unions on tubing 2 inches in diameter and smaller shall be composition B, conforming to Fed. Spec. WW-U-516. Gaskets for flanges shall be fiber, plastic, or other synthetic material suitable for water service. Unions and flanges shall not be concealed in walls, ceilings, or partitions. The dielectric unions shall meet the dimensional requirements and tensile strength of pipe unions in accordance with Fed. Spec. WW-U-531. The dielectric unions or flanges shall be suitable for the required operating pressures and temperature conditions. The dielectric unions shall have metal connections on both ends of union. The ends of the unions shall be threaded or soldered to match adjacent piping. The metal parts of the dielectric union or flange shall be separated to prevent current flow between the dissimilar metals.

13. VACUUM BREAKERS OR BACKFLOW PREVENTERS FOR FAUCETS AND FIXTURES shall be tested and approved in conformance with ANSI A112.1.1. They shall be installed as required by ASME A40.8 NAPHCC National Standard Plumbing Code. Vacuum breakers and backflow preventers shall have brass or bronze body with bronze or corrosion resisting steel parts and suitable disks. The breakers or preventers shall be suitable for hot or cold water service as required.

14. PIPE SLEEVES, HANGERS, AND FIXTURE SUPPORTS shall be furnished and set, and the Contractor shall be responsible for their proper and permanent location.

14.1 Pipe Sleeves. Pipes passing through concrete or masonry walls or concrete floors or roofs shall be provided with pipe sleeves fitted into place at the time of construction. Sleeves shall not be required for cast iron soil pipe passing through concrete slab on grade except where penetrating a membrane waterproof floor or for supply and waste piping through the wall supporting the fixture. The space between the pipe and wall shall not be installed in structural members except where indicated or approved. All rectangular and square openings shall be as detailed on the drawing. Each sleeve shall extend through its respective wall, floor, or roof, and shall be cut flush with each surface except where clamping flanges are used. Unless otherwise indicated, sleeves shall be of such size as to provide a minimum of 1/4-inch all-around clearance between bare pipe and sleeves or between jacket over insulation and sleeves. Sleeves in bearing walls shall be steel pipe or cast-iron pipe. Sleeves for membrane waterproof floors shall be

steel pipe, cast iron sleeves plastic pipe or approved pipe. Membrane clamping device shall be provided on pipe sleeves for waterproof floors. Sleeves in nonbearing walls, floors, or ceilings may be steel pipe, cast iron pipe, galvanized sheet metal with lock-type longitudinal seam, or moisture-resistant fiber or plastic. Except as specified below, the annular space between pipe and sleeve or between jacket over insulation and sleeve shall be sealed as indicated and specified in section: **CALKING AND SEALANTS.**

14.1.1 Pipes passing through roof of floor waterproofing membrane shall be installed through a 4-pound lead flashing or a 16-ounce copper flashing, each within an integral skirt or flange. Flashings shall be suitably formed, and the skirt or flange shall extend not less than 8 inches from the pipe and shall set over the roof or floor membrane in a solid coating of bituminous cement. The flashing shall extend up the pipe a minimum of 10 inches. For cleanouts the flashing shall be turned down into the hub and calked after placing the ferrule. The annular space between the flashing and the bare pipe or between the flashing and the metal-jacket covered insulation shall be sealed as indicated. Flashing for dry vents shall be turned down into the pipe to form a waterproof joint. At the Contractor's option, pipes up to and including 10 inches in diameter passing through roof or floor waterproofing membrane may be installed through a cast iron sleeve with calking recess, anchor lugs, flashing-clamp device, and pressure ring with brass bolts. Flashing shield shall be fitted into the sleeve clamping device.

14.1.2 Waterproofing at water closets shall be accomplished by forming a flashing guard from lead or soft tempered sheet copper. The center of the sheet shall be perforated and turned down approximately 1-1/2 inches to fit between the outside diameter of the drainpipe and the inside diameter of the cast iron or steel sleeve. The turned-down portion of the flashing guard shall be imbedded in sealant to a depth of approximately 1-1/2 inches, then the sealant finished off flush to floor level between the flashing guard and drain pipe. The flashing guard of lead or sheet copper shall extend not less than eight inches from the drainpipe and shall be lapped between the floor membrane in a solid coating of bituminous cement. At the option of the Contractor, when cast iron water closet floor flanges are used, the space between the pipe sleeve and drainpipe shall be sealed with sealant and the flashing guard shall be upturned approximately 1-1/2 inches to fit the outside diameter of the drainpipe and the inside diameter of the water closet floor flange. The upturned portion of the sheet fitted into the floor flange shall be calked with oakum and spare lead to form a seal.

14.1.3 As an alternate to turning the flashing down into a dry vent pipe or calking and sealing the annular space between the pipe and flashing or metal-jacket-covered insulation and flashing, counterflashing may be accomplished by utilizing:

- a. A standard roof coupling for threaded pipe up to 6 inches in diameter.
- b. A tack-welded or banded-metal rain shield around the pipe and sealed as indicated.

14.2 Pipe Hangars, Inserts and Supports. Hangars, inserts, and supports shall conform to MSS SP-58 and SP-69 except as specified below. Inserts shall be Type 18 and shall be installed in correct locations before the concrete is poured. Beam clamps shall be Type 20, 21, 22, 23, 28, or 29. A retainer shall be provided with Type 23. Angle iron or channel clamps shall be Type 20 with a malleable iron heel plate added. For wood construction, joists shall be bridged where necessary,

using lag screws of the same diameter as hanger rods for hanger fasteners. Pipe hangers and supports for acid-resisting pipe shall be equal to the hangars and supports specified for metal pipe, and when recommended by the manufacturer, padding shall be provided to protect the pipe and fittings. Adapter fittings used to connect acid-resisting pipe or fittings to metal shall be rigidly supported. For piping up to and including 1-1/4 inch IPS, 3/4-inch-wide, 18-gage-minimum steel strap-type, ring-type or molded thermoplastic hangers may be used and shall be secured by screw fasteners. Hangers in contact with uninsulated copper tubing or brass pipe shall be electrolytically coated and shall be sized to suit the outside diameter of the pipe. Hangers for insulated pipe shall have a diameter large enough to include the insulation. The location of hangers and supports shall be coordinated with the structural work to assure that the structural members will support the intended load. In lieu of separate hangers or supports, the Contractor shall submit for approval a detailed drawing of the type of hanger or support proposed to furnish for hanging and supporting multiple pipes.

14.2.1 Horizontal Piping. Hangers and supports shall be installed at intervals specified below, at locations not more than 3 feet from the ends of each runout and not over one foot from each change in direction of piping. Hangers shall be Type 1, 9, 10, 11, and 12 and shall be adjustable or provided with turnbuckles Type 13 or 15. Type 6 hangars may be used to support pipes from toilet rooms to mainstack when space does not permit the use of turnbuckles or adjustable clevis-type hangars. Brackets for support of piping at walls shall be Type 31, 32, 33, or 34. Metallic pipes supported on beams or brackets shall be provided with a graphite slide plate and cradle having a minimum thickness of 1/2 inch. The graphite slide plate shall be cemented to the beam or bracket and the graphite cradle shall be cemented or strapped to the pipe. Hangers and supports shall be spaced as follows.

14.2.1.1 Cast iron, soil pipe shall be supported near each hub or hubless pipe joint and at multiple fittings as required.

14.2.1.2 Pipe and tubing shall be supported as specified in MSS-69.

14.2.1.3 Underground piping shall be laid on a firm bed for its entire length, except where support is otherwise provided.

14.2.2 Vertical Piping. Pipe clamps shall be Type 8 for floor supports and Type 24 anchors at other locations. Supports shall be spaced as follows.

14.2.2.1 Cast iron, steel pipe, copper tube and tubing shall be supported at floor, and at intervals of not more than 15 feet, not more than 8 feet from end of riser, and near vent terminations as approved. Where supports are provided on intermediate floors, not in excess of 15 feet spacing between floors, no additional supports are required other than those specified for end of riser and vent terminations. Support of piping at the floor shall not be provided for slab on grade floors.

14.2.2.2 Acid-resisting pipe shall be supported as recommended by the manufacturer.

14.3 Fixture Supports. Wall-hung fixture hangar plates, supports or brackets or mounting lugs shall be fastened to the wall by through bolts where appearance of the bolts is not objectionable. Exposed bolts heads in finished areas shall be hexagonal and painted. Exposed nuts shall be chromium-plated hexagonal cap nuts. Washers shall be painted or chromium-plated to match bolt heads or nuts.

14.3.1 For Solid Masonry. Where through bolting is objectionable, fixture hanger plates, supports or brackets or mounting lugs shall be fastened with 1/4-inch minimum machine-bolt expansion shields or 1/4-inch minimum stud-type expansion bolts.

14.3.2 For cellular-masonry construction construction, fixture hanger plates, supports or brackets or mounting lugs shall be fastened with 1/4-inch minimum toggle bolts. Toggle bolts shall extend into the cell of the masonry unit and shall be of the gravity or spring-swing type. Lavatories mounted on pipe chases shall be installed with 1 or 2 steel backup plates as required. The backup plates shall be 1/8-inch thick, 4 inches minimum width, and not less than the width of the fixture. Backup plates shall be suspended on the inner side of the chase by 2 1/8-inch thick metal clips placed in the mortar joint. The metal clips and through bolts shall be tack-welded to each plate. The plates shall be installed horizontally and fastened to the top and bottom of the lavatory as required.

15. IDENTIFICATION SYSTEMS shall be provided as approved by the Contracting Officer.

15.1 PAINTING required for piping, hangers and supports is specified in section: PAINTING GENERAL.

16. FLOOR, WALL, AND CEILING ESCUTCHEONS. Escutcheons shall be provided at all finished surfaces where exposed piping, bare or insulated, passes through floors, walls, or ceilings, except in boiler, utility, or equipment rooms. Escutcheons shall be fastened securely to pipe or pipe covering and shall be corrosion resisting steel, chromium-plated zinc alloy or chromium-plated copper alloy, either one-piece or split-pattern, held in place by internal spring tension or setscrew.

17. TYPES OF FIXTURES AND FIXTURE TRIMMINGS specified herein shall be furnished and installed complete with all trimmings and fittings, unless otherwise specified under the item. The items correspond with plumbing fixtures shown on the drawings.

17.1 General Requirements. Plumbing fixture shall conform to Tables 1 and 2, PLUMBING FIXTURE SCHEDULE, and Fed. Spec. WW-P-541, unless otherwise indicated. Fixtures and trimmings not covered by Fed. Spec. WW-P-541 shall be considered special, but shall be of equal quality and material. Generally, all fixtures except water closets shall have the water supply above the rim. Fixtures with the supply discharge below the rim shall be equipped with backflow preventers. Angle stops; straight stops; stops integral with the faucets; or concealed type of lock-shield, loose-key pattern stops integral with the faucets; or concealed type of lock-shield, loose-key pattern stops for supplies shall be furnished and installed with fixtures. Piping connections from the shut off or stop valve to the fixture shall be chrome-plated brass pipe or chrome-plated copper tubing. Exposed traps and supply pipes for all fixtures and equipment shall be connected to the rough piping systems at the wall, unless otherwise specified under the item. Floor and wall escutcheon shall be as specified above. Exposed fixture trimmings and fittings shall be chromium-plated, chromium-nickel-plated, or nickel-plated brass with polished, bright surfaces. Plumbing fixtures and accessories shall be installed within the spaces shown. The Contractor shall submit drawings for approval indicating the fixture dimensions and overall clearance around fixture and accessories to assure a suitable installation. Internal parts of flush valves, pop-up stopper of lavatory waste drains may be acetal resin, fluorocarbon, nylon, acrylonitrile-butadiene-styrene (ABS) or other suitable plastic material

provided that the plastic material has provided satisfactory service under actual commercial or industrial operating conditions for a period of 2 years. Plastic in contact with hot water shall be suitable for 180 degrees F. water temperature.

17.2 Fixture Connections. Where space conditions will not permit standard fittings in conjunction with the cast iron floor flange, special short-radius fittings shall be provided. Connections between earthenware fixtures and flanges on soil pipe shall be made absolutely gastight and watertight with a closet-setting compound or with a neoprene gasket and seal. Use of natural-rubber gaskets or putty will not be permitted for these connections. Bolts shall be not less than 1/4-inch diameter and shall be equipped with chromium-plated nuts and washers. Fixtures with outlet flanges shall be set the proper distance from floor or wall to make a first-class joint with the closet-setting compound or gasket and fixture used.

17.3 Flush Valves. Flush valves shall be of the non-hold-open type. Flush valves shall be securely anchored to prevent movement with approved metal bracket fastened to wall.

17.4 Traps. Unless otherwise specified herein, traps shall be copper alloy adjustable tube type with slip joint inlet and swivel. Trap shall be without a cleanout. Tube shall be not less than 20 gage copper alloy having wall 0.032 inch thick within commercial tolerances, except on the outside of bends where the thickness may be reduced slightly in manufacture by usual commercial methods. Inlet shall have rubber washer and copper alloy nut for slip joint above the discharge leve; swivel joint shall be below the discharge level and be of metal-to-metal, or metal-to-plastic type as required for specific application. Nuts shall have flats for wrench grip. Outlet shall have internal pipe thread, except that when required or specific application, the outlet shall have socket for solder joint connections. The depth of the water seal shall be not less than two inches. The interior diameter shall be not more than 1/8-inch over or under the nominal size, and interior surfaces shall be reasonably smooth throughout. A copper alloy "P" trap assembly consisting of an adjustable "P" trap and waste tubing to wall with escutcheon may be provided for lavatories. The assembly shall be standard manufactured unit and may have a rubber gasketed swivel joint.

17.5 Height of Fixture Rims Above Floor. Lavorties shall be mounted with rims 31 inches above finished floor.

17.6 Fixtures. Fixtures shall be indicated in Tables 1 and 2 below. Lavatories shall be supplied less chair carriers and shall be mounted as described in Tables 1 and 2 below.

PLUMBING FIXTURE SCHEDULE
TABLE 1* (Reference WW-P-541)

Fixture Description

Classification

Water Closet, elongated
bowl

Part A - Type I, Style B, Class
4.
Part C - Type IV, Class 4
Part D - Type II, Style F₁, Class 4
Style T1

Lavatories

a. Straight back

Part A - Type I Class 1
Part C - Type I Class 1
Part D - Type III
Part E - Type I,
Part F - Type I, Class 1.

Drinking Fountain
Pedestal

Type II

PLUMBING FIXTURE SCHEDULE
TABLE 2

Fixture	Minimum Overall Dimension, Inches	Requirements or Remarks
Water closet	Length = 25-1/2 Width = 14 Height = 14-1/4	Seats: Molded plastic w/self sustaining check hinge of plastic covered copper alloy; plastic covered wood composition w/cadmium plated chromium dipped cold rolled carbon steel; metal steel; metal post (stud) fastening nuts; (black) (white) seat and seat bumper or back stops on (flush valve) (wall). Flush connection and coupling to be (top spud) (long flush connection for top spud). Flush valve handle shall be copper alloy.
Lavatories	All depths to be mfg. std.	Fixtures shall be first quality vitreous china. Drains and jam nuts shall be cast wrought copper alloy. Faucet handles shall be cast, formed or drop forged copper alloy. Stop Valves and handles shall be copper alloy. Waste traps and hexagonal nut for slip joints shall be copper alloy. Strainer shall be copper alloy or corrosion resisting steel.
b. Straight back	Width = 20 Front to back = 18 Back height = 3-1/2	Escutcheon shall be corrosion resisting steel or copper alloy. Fixtures shall be supported by wall hangers. Faucets shall have replaceable seats and index turn, handle. Faucet shall be provided with metal replaceable cartridge type control units or metal cartridge units with diaphragm which can be removed and replaced without special tools. Cartridge type units shall be designed to prevent dripping and replacement of washers.
Drinking Fountains		Fountains shall be as indicated and specified in section: MISCELLANEOUS ITEMS OF WORK
a. Surface-mounted	Width = 13-1/4 Front to back = 13	All accessories including bubblers, stops, stream regulator, flow controls, handles, levers and traps shall be copper zinc alloy. Strainer and drain shall be copper size alloy or corrosion-resisting steel. Automatic stream regulators or flow control shall be incorporated in the bubbler.

18. INSPECTION, TESTS, AND STERILIZATION.

18.1 Methods of Sampling, Inspecting, and Testing Fixtures. Methods shall conform to Fed Spec. WW-P-541.

18.2 Tests For Plumbing Systems. Soil, waste, vent, interior drainspout drain and water piping shall be tested by the Contractor and approved before acceptance. Underground soil and waste and water piping shall be tested before backfilling. Equipment required for test shall be furnished by the Contractor at no additional cost to the Government.

18.2.1 Drainage and Venting System Piping. Piping shall be tested with water or air before the fixture are installed. After the plumbing fixtures have been set and their traps filled with water, the entire drainage and venting system shall be submitted to a final test with smoke or peppermint.

18.2.1.1 Water Test. Water test shall be applied to the drainage and venting system either in its entirety or in sections. If the entire system is tested, all openings in the pipes shall be tightly closed except the highest opening, and the system shall be filled with water to the point of overflow. If the system is tested in sections, each opening except the highest opening of the section under test shall be tightly plugged, and each section shall be filled with water and tested with at least a 10-foot head of water. In testing successive sections, at least the upper 10 feet of the next preceding section shall be tested so that each joint or pipe in the building except the uppermost 10 feet of the system has been submitted to a test of at least a 10-foot head of water. The water shall be kept in the system, or in the portion under test, for at least 15 minutes before the inspection starts; the system shall then be tight at all joints.

18.2.1.2 Air Test. If tests are made with air, a pressure of not less than 5 psi shall be applied with a force pump and maintained at least 15 minutes without leakage. A mercury-column gage shall be used in making the air test.

18.2.1.3 Final Test. When the smoke test is employed, the smoke shall be produced by a smoke machine, and a pressure equal to one inch water column shall be maintained for 15 minutes before inspection starts. When the peppermint test is used, 2 ounces of peppermint shall be introduced into each line or stack.

18.2.2 Water System. When the roughing-in is completed and before fixtures are set, the entire water piping systems shall be tested at a hydrostatic pressure of not less than 100 lb/in², and proved tight at this pressure for not less than 30 minutes in order to permit inspection of all joints. Where a portion of the water-piping system is to be concealed before completion, this portion shall be tested separately as specified for the entire system.

18.2.3 Defective Work. If inspection or test shows defects, such defective work or material shall be replaced or repaired as necessary and inspection and tests shall be repeated. Repairs to piping shall be made with new materials. No calking of screwed joints or holes will be acceptable.

18.2.4 Cleaning and Adjusting. Equipment, pipes, valves, fittings, and fixtures shall be cleaned of grease, metal cuttings, and sludge that may have accumulated from operation of the system during the test. Any stoppage, discoloration, or other damage to the finish, furnishings, or parts of the building, due to the

Contractor's failure to clean the piping system properly, shall be repaired by the Contractor. Flush valves and automatic control devices shall be adjusted for proper operation.

18.2.5 Operational Test. Upon completion and prior to acceptance of the installation the Contractor shall subject the plumbing system to operating tests to demonstrate satisfactory functional and operational efficiency. Such operating tests shall cover a period of not less than 8 hours for each system and shall include the following information in a report with conclusion as to the adequacy of the system.

- a. Time, date, and duration of test.
- b. Water pressure at the most remote and the highest fixtures
- c. Operation of all fixtures and fixture trim.
- d. Operation of all valves, hydrants, and faucets.
- e. Pump suction and discharge pressures.
- f. Operation of all floor and roof drains by flooding with water.
- g. Operation of vacuum breaker and backflow preventers.

All indicating instruments shall be read at 1/2-hour intervals unless otherwise directed by the Contracting Officer. The report of the test shall be supplied in quadruplicate to the Contracting Officer. The Contractor shall furnish all instruments, test equipment, and test personnel required for the tests; the Government will furnish the necessary fuel, water, and electricity.

18.3 Sterilization. After pressure tests have been made, the entire domestic water-distribution system shall be thoroughly flushed with water until all entrained dirt and mud have been removed, and shall be sterilized by chlorinating material. The chlorinating material shall be either liquid chloride conforming to Fed. Spec. BB-C-120 or hypochlorite conforming to Fed. Spec. O-C-114 or Fed. Spec. O-S-602, Grade A or B. The chlorinating material shall provide a dosage of not less than 50 parts per million and shall be introduced into the system in approved manner. The treated water shall be retained in the pipe long enough to destroy all non-spore-forming bacteria. Except where a shorter period is approved, the retention time shall be at least 24 hours and shall produce not less than 10 p.p.m. of chlorine at the extreme end of the system at the end of the retention period. All valves in the system being sterilized shall be opened and closed several times during the contact period. The system shall then be flushed with clean water until the residual chlorine is reduced to less than 1.0 p.p.m. During the flushing period all valves and faucets shall be opened and closed several times. From several points in the system the Contracting Officer will take samples of water in properly sterilized containers for bacterial examination. The sterilizing shall be repeated until tests indicate the absence of pollution for at least 2 full days. The system will not be accepted until satisfactory bacteriological results have been obtained.

* * * * *

SECTION 15E

SEWERS; SANITARY, GRAVITY

Index

- | | |
|-----------------------------------|---|
| 1. Applicable Publications | 6. Wye Branches |
| 2. General | 7. New Manhole Septic Tank and
Distribution Box Construction
Standard |
| 3. Materials | 8. Building Connections |
| 4. Installation | |
| 5. Concrete Cradle and Encasement | |
| 5. Concrete Cradle and Encasement | |

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.).

HH-P-119a	Packing, Material, Sewer Joint, Asphalt-Saturated Cellulose-Fiber
QQ-C-40 & Am-2	Calking: Lead Wool and Lead Pig

1.2 American Railway Engineering Association (AREA) Publication.

Manual for Railway Engineering (Fixed Properties)
(Current to March 22, 1978)

1.3 American Society for Testing and Materials (ASTM) Publications.

A 48-76	Gray Iron Castings
A 74-80	Cast Iron Soil Pipe and Fittings
A 123-78	Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled Pressed, and Forged Steel Shapes, Plates, Bars, and Strip
C 32-73 (R 1979)	Sewer and Manhole Brick (Made from Clay or Shale)
C 33-79	Concrete Aggregates
C 62-75a	Building Brick (Solid Masonry Units Made from Clay or Shale)
C 94-74a	Ready-Mixed Concrete
C 150-78a	Portland Cement
C 270-80a	Mortar for Unit Masonry

C 564-70 (R 1976)	Rubber Gaskets for Cast Iron Soil Pipe and Fittings
D 3034-78	Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
D 3212-76	Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals

1.4 National Fire Protection Association (NFPA) Standards.

No. 49-1975	Hazardous Chemicals Data
No. 325M-1977	Flammable Liquids, Gases and Volatile Solids
No. 704-1975	Identification of the Fire Hazards of Materials

2. GENERAL. Gravity sanitary sewers shall be constructed in conformance with this section of the specifications. The construction required herein shall include appurtenant structures and building sewers to points of connection with the building drains 5 feet outside the buildings to which the sewer system is to be connected to the septic tank. Excavation and backfilling shall conform to section: EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS. Backfilling shall be accomplished after inspection by the Contracting Officer. Work covered by this section will not be accepted until backfilling connected with the work has been completed satisfactorily.

3. MATERIALS shall conform to the respective specifications and other requirements specified below.

3.1 Pipe may be of the following materials unless otherwise specified or shown.

3.1.1 Cast Iron Soil Pipe and Fittings. ASTM A 74, Class SV.

3.1.1.1 Rubber Gaskets for Compression Joints. ASTM C 564.

3.1.1.2 Calked Joints.

a. Joint Packing Material. Twisted jute or oakum, tarred type or Fed. Spec. HH-P-119. The packing shall contain no material that would coat the pipe so as to adversely affect adhesion of the joint sealing material to the pipe.

b. Lead. Fed. Spec. QQ-C-40.

3.1.2 Plastic Pipe. Plastic pipe shall not be used for sewers larger than 15 inches in diameter.

3.1.2.1 Acrylonitrile-Butadiene-Styrene (ABS) Composite Piping. ASTM D 2680, Type SC or Type OR, Size 8 inch through 15 inch diameter.

3.1.2.2 Acrylonitrile-Butadiene-Styrene (ABS) Pipe and Fittings ASTM D 2751, solvent weld or bell and spigot o-ring joint, size 12 inch or less in diameter.

3.1.2.3 Poly (Vinyl Chloride) (PVC) Pipe and Fittings. ASTM D 3034, Type PSM with a maximum SDR of 35, Size 15 inch or less in diameter, with flexible elastometric seal joint.

3.1.2.4 Joints.

3.1.2.4.1 Acrylonitrile-Butadiene-Styrene (ABS) Composite Pipe. Type SC or OR, in accordance with ASTM D 2680.

3.1.2.4.2 Acrylonitrile-Butadiene-Styrene (ABS) Pipe. Solvent cement or elastometric joint in accordance with ASTM D 2751, dimensions and tolerances in accordance with Table 2 therein.

3.1.2.4.3 Poly (Vinyl Chloride) (PVC) Pipe. Elastometric gasket joint in accordance with the requirements of ASTM D 3212.

3.1.2.5 Branch Connections. Branch connections shall be made by use of regular fittings or solvents cemented saddles as approved by the Contracting Officer. Saddles for acrylonitrile-butadiene-styrene (ABS) composite pipe shall comply with figure 2 of ASTM D 2680, saddles for acrylonitrile-butadiene-styrene (ABS) pipe shall comply with Table 3 of ASTM D 2751, and saddles for poly (vinyl chloride) (PVC) pipe shall comply with Table 4 of ASTM D 3034.

3.1.2.6 Protection of Material. Before, during, and after installation, plastic pipe and fittings shall be protected from exposure to sunlight and any environment that would result in damage or deterioration to the material. Solvent, solvent compounds, lubricants, elastomeric gaskets, and any similar materials required to install the plastic pipe shall be stored in accordance with the manufacturer's recommendation and shall be discarded if the storage period exceeds the recommended shelf life. Solvents in use will be discarded when the recommended pot life is exceeded.

3.2 Brick for Manholes. ASTM C 62, Grade SW or ASTM C 32, Grade MS.

3.3 Cement Mortar. ASTM C 270, Type M. Use Type IIA cement.

3.4 Concrete Blocks for Manholes. ASTM C 139. Blocks shall be at least 5 inches but not more than 8 inches in thickness, nor less than 8 inches in length, and of such shape that the joints can be effectively sealed and bonded with cement mortar. Cement used in concrete blocks shall conform to the requirements specified in paragraph Portland Cement for Manufacture of Concrete Pipe and Fittings.

3.5 Portland Cement. ASTM C 150, Type 11A V for concrete used in manholes and type optional with the Contractor for cement used in concrete cradle and encasement. All requirements specified in paragraph Portland Cement for Manufacture of Concrete Pipe and Fittings shall apply to other uses of portland cement except for concrete for concrete cradle and encasement and for thrust blocking.

3.6 Portland Cement Concrete. ASTM C 94, compressive strength of 4,000 pounds per square inch at 28 days, except for concrete thrust blocking, for cradle and encasement, or for concrete blocks for manholes. Concrete in place shall be protected from freezing and moisture loss for 7 days.

3.7 Precast Reinforced Concrete Manholes Sections. ASTM C 478, except that portland cement shall be as specified herein. Cement used in the manufacture of the precast units for manholes, distribution box and septic tank shall conform to the requirements of paragraph Portland Cement for Manufacture of Concrete Pipe and Fittings.

3.8 Joints for Precast Reinforced Concrete. Joints shall be mortar, or an approved mastic or rubber gasket, or an approved combination of these types.

4. INSTALLATION.

4.1 Adjacent Facilities.

4.1.1 Waterlines. Where the location of the sewer is not clearly defined by dimensions on the drawings, the sewer shall not be closer horizontally than 10 feet to a water-supply main or service line, except that where the bottom of the water pipe will be at least 12 inches above the top of the sewer pipe, the horizontal spacing may be a minimum of 6 feet. Where gravity-flow sewers cross above waterlines, the sewer pipe for a distance of 10 feet on each side of the crossing shall be fully encased in concrete or shall be acceptable pressure pipe with no joint closer horizontally than 3 feet to the crossing. The thickness of the concrete encasement including that at the pipe joints shall be not less than 4 inches.

4.2 Pipe Laying.

a. Pipe shall be protected during handling against impact shocks and free fall and the pipe interior shall be free of extraneous material.

b. Pipe laying shall proceed upgrade with the spigot ends of bell-and-spigot pipe and tongue ends of tongue-and-groove pipe pointing in the direction of the flow. Each pipe shall be laid accurately to the line and grade shown on the drawings. Pipe shall be laid and centered so that the sewer has a uniform invert. As the work progresses, the interior of the sewer shall be cleared of all superfluous material.

c. Before making pipe joints all surfaces of the portions of the pipe to be joined shall be clean and dry. Lubricants, primers, and adhesives shall be used as recommended by the pipe manufacturer. The joints shall then be placed, fitted, joined, and adjusted so as to obtain the degree of water tightness required.

d. ABS composite pipe ends with exposed truss and filler material shall be thoroughly coated with solvent weld material before making the joint to insure that there will be no water or air passage at the joint between the inner or outer wall of the pipe.

e. Installation of solvent weld joint pipe, using ABS or PVC pipe and fittings shall be installed in accordance with ASTM F 402, and all required precautions shall be taken to assure adequate trench ventilation and protection for workers installing the pipe.

4.2.1 Calked Joints. The packing material shall be well packed into the annular space so as to prevent the entrance of lead into the pipe. The remainder of the space shall be filled with molten lead that is hot enough to show a rapid change in color when stirred. Scum shall be removed before pouring. The lead shall be

calked to form a tight joint without overstraining the bell and shall have a minimum depth of one inch after calking.

4.2.2 Trenches shall be kept free of water and as dry as possible during bedding, laying, and jointing and for as long a period as required. When work is not in progress, open ends of pipe and fittings shall be satisfactorily closed so that no trench water or other material will enter the pipe or fittings.

4.2.3 Backfill. As soon as possible after the joint is made, sufficient backfill material shall be placed along the pipe to prevent pipe movement off line or grade. Plastic pipe shall be completely covered to prevent damage from ultraviolet light.

4.2.4 Width of Trench. If the maximum width of the trench at the top of the pipe, as specified in section: EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS, is exceeded for any reason other than by direction, the Contractor shall install at no additional cost to the Government such concrete cradling, pipe encasement, or other bedding as may be required to satisfactorily support the added load of the backfill.

4.2.5 Joints between different pipe materials shall be made as hereinbefore specified, using approved jointing materials.

4.2.6 Handling and Storage. Pipe, fittings and joint material shall be handled and stored in accordance with the manufacturer's recommendations. Storage facilities for plastic pipe, fittings, joint materials and solvents shall be classified and marked in accordance with NFPA Standard 704, with classification as indicated in NFPA 49 and NFPA 325M.

4.3 Leakage Tests. Lines shall be tested for leakage by either infiltration tests or exfiltration tests, as appropriate. Prior to testing for leakage the trench shall be backfilled up to at least the lower half of the pipe. If required, sufficient additional backfill shall be placed to prevent pipe movement during testing, leaving the joints uncovered to permit inspection. Visible leaks encountered shall be corrected regardless of leakage test results. When the water table is 2 feet or more above the top of the pipe at the upper end of the pipeline section to be tested, infiltration shall be measured using a suitable weir or other device acceptable to the Contracting Officer. When the Contracting Officer determines that infiltration cannot be properly tested, an exfiltration test shall be made by filling the line to be tested with water so that a head of at least 2 feet is provided above both the water table and the top of the pipe at the upper end of the pipeline to be tested. The filled line shall be allowed to stand until the pipe has reached its maximum absorption, but not less than 4 hours. After absorption, the head shall be reestablished. The amount of water required to maintain this water level during a 2-hour test period shall be measured. Leakage as measured by either the infiltration test or exfiltration test shall not exceed 0.2 gallons per inch diameter per 100 feet of pipeline per hour. When leakage exceeds the maximum amount specified, satisfactory correction shall be made and retesting accomplished. Testing, correction, and retesting shall be made at no additional cost to the Government.

4.4 Test for Deflection. When flexible pipe is used, a deflection test shall be made on the entire length of the installed pipeline on completion of all work, including the leakage test, backfill, and placement of any fill, grading, paving, concrete, or superimposed loads. Deflection shall be determined by use of a deflection device or by use of a spherical, spheroidal, or elliptical ball, a

cylinder, or circular sections fused to a common shaft. The ball, cylinder, or circular sections shall have a diameter, or minor diameter as applicable, of 95 percent of the normal inside diameter of the pipe. A tolerance of +0.5 percent will be permitted. The ball, cylinder, or circular sections shall be of a homogeneous material throughout, shall have a density greater than 1.0 as related to water at 39.2⁰F, and shall have a surface brinell hardness of not less than 150. It shall be center bored and through bolted with a 1/4 inch minimum diameter steel shaft having a yield strength of 70,000 pounds per square inch or more, with eyes at each end for attaching pulling cables. The eye or loop shall be suitably backed with flange or heavy washer such that a pull exerted on the opposite end of the shaft shall produce compression throughout the remote end of the ball, cylinder or circular sections. Circular sections shall be so spaced that the distance from the external faces of the front and back sections shall equal or exceed the diameter of the circular section. Failure of the ball, cylinder, or circular sections to pass freely through a pipe run, either by being pulled through or being flushed through with water, shall be cause for rejection of that run. When a deflection device is used for the test in lieu of the ball, cylinder, or circular sections described hereinbefore, such device shall be approved by the Contracting Officer prior to use. The device shall be sensitive to 1.0 percent of the diameter of the pipe being measured and shall be accurate to 1.0 percent of the indicated dimension. Installed pipe showing deflections of 4.5 percent of the normal diameter of the pipe shall be retested by a run from the opposite direction. If the retest indicates a deflection in excess of the 4.5 percent, the suspect pipe shall be replaced. Any pipe showing deflections in excess of 5 percent at the end of one year following installation and acceptance will be replaced at no cost to the Government.

5. CONCRETE CRADLE AND ENCASEMENT. The pipe shall be supported on a concrete cradle, or encased in concrete where indicated or directed.

6. WYE BRANCHES shall be installed where sewer connections are indicated or where directed. Cutting into piping, for connections shall not be done except in special approved cases. When conditions are such that the connecting pipe cannot be adequately supported on undisturbed earth or tamped backfill, the pipe shall be encased in concrete backfill or supported on a concrete cradle as directed. Concrete required because of conditions resulting from faulty construction methods or negligence by the Contractor shall be installed at no additional cost to the Government.

7. NEW MANHOLE, SEPTIC TANK, AND RELATED APPURTENANCES CONSTRUCTION STANDARDS.

7.1 General. Manholes, septic tank and distribution box if required, shall be constructed of brick, concrete, precast concrete rings, or precast concrete blocks, with cast iron or reinforced-concrete frames and covers, and in accordance with the drawings. Changes in direction of flow shall be made with a smooth curve of as large a radius as the size of the will permit. Changes in size and grade of the channels shall be made gradually and evenly. The invert channels shall be formed directly in the concrete of the base, or shall be built up with brick and mortar, or shall be half tile laid in concrete, or shall be constructed by laying full section sewer pipe through the manhole and breaking out the top half after the surrounding concrete has hardened. Pipe connections shall be made to manhole using water stops, standard o-ring joints, special manhole couplings, or shall be made in accordance with manufacturer's recommendation. The Contractor's proposed method of connecting list of materials selected, and specials required, shall be submitted to, and approved by, the Contracting Officer prior to installation.

7.2 Manhole Ladder. When the depth from top of cover to invert of main sewer exceeds 12 feet, manholes shall be provided with a straight-type steel ladder not less than 16 inches in width with 7/8 inch-diameter rungs spaced 12 inches apart. The rails shall be not less than 2 inches by 1/2-inch in section. The ladder shall be adequately anchored to the wall by means of steel inserts spaced not more than 6 feet apart vertically and shall be so installed as to provide at least 6-1/2 inches of toe space between the wall and the inside of the rungs. The ladder and inserts shall be galvanized after fabrication in conformance with ASTM A 123. The wall along the line of the ladder shall be vertical for its entire height.

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

7.4 Frames and Covers. Reinforced-concrete frames and covers shall conform to the drawings. Cast iron frames and covers shall conform to the drawings in all essentials of design or to Fed. Spec. RR-F-621, type as suitable for the application, circular, without vent holes. The frames and covers shall conform to ASTM A 48, Class 20B. The letter "S", at least 2 inches high, shall be stamped or cast into all covers so as to be plainly visible. The frames and covers shall be so set that the top of the cover will be as shown.

9. BUILDING CONNECTIONS shall include the lines to and connection with the building waste drainage piping at a point approximately 5 feet outside the building, unless otherwise indicated. Where building drain piping is not installed, the Contractor shall terminate the building connections approximately 5 feet from the site of the building at a point and in a manner designated by the Contracting Officer.

* * * * *

SECTION 15F

WATERLINES

Index

- | | |
|---|----------------------|
| 1. Applicable Publications | 5. Installation |
| 2. General | 6. Hydrostatic Tests |
| 3. Excavation, Trenching, and
Backfilling for Waterlines | 7. Disinfection |
| 4. Materials | 8. Cleanup |

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.).

WW-V-51E
& Int. Am-2
(GSA-FSS)

Valve, Angle, Check, and Globe,
Bronze (125, 150 and 200 Pound,
Threaded End, Flange Ends, Solder
Ends, and Brazed End for Land Use)

WW-V-54D
& Int. Am-3

Valve, Gate, Bronze (125, 150
and 200 Pound, Threaded Ends,
Flanged Ends, Solder End, and
Brazed Ends, for Land Use)

ZZ-H-451E
& Int. Am-1

Hose, Fire, Woven-Jacketed, Rubber- or
Latex or Rubber Coated Fabric-Lined
with Couplings

1.2 American National Standards Institute, Inc. (ANSI) Standards.

A21.4-1980

Cement-Mortar Lining for Cast-Iron and
Ductile-Iron and Gray-Iron Pipe
and Fittings for Water

A21.11-1980

Rubber Gasket Joints for Cast-Iron and
Ductile-Iron and Gray Iron Pressure
Pipe and Fittings

B2.1-1968

Tapered Pipe Threads

B16.1-1975

Cast-Iron Pipe Flanges and Flanged
Fittings Class 25, 125, 250 and
800

B16.3-1971

Malleable-Iron Threaded Fittings,
Class 150 and 300

B16.26-1975

Cast Copper Alloy Fittings for Flared
Copper Tubes

B36.10-1975

Welded and Seamless Wrought Steel Pipe

1.3 American Railway Engineering Association (AREA) Publication.

Manual for Railway Engineering

1.4 American Society for Testing and Materials (ASTM) Standards.

A 120-80	Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Ordinary Uses
B 88-81	Seamless Copper Water Tube
C 1784-78	Rigid Poly (Vinyl Chloride) Compounds and Chlorinated Poly(Vinyl Chloride) Compounds
D 1785-76	Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
D 2241-80	Poly (Vinyl Chloride) (PVC) and Chlorinated Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR)
D 2464-76	Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
D 2467-76A	Socket Type Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
D 2774-72 (R 1978)	Recommended Practice for Underground Installation of Thermo-plastic Pressure Piping

1.5 American Water Works Association (AWWA) Standards.

B300-80	Hypochlorites
B301-59	Liquid Chlorine
C203-78	Coal-Tar Protective Coatings and Linings for Steel Water Pipe Lines-Enamel and Tape-Hot Applied
C200-80	Steel Water Pipe 6 Inches and Larger
C207-78	Steel Pipe Flanges
C208-59	Dimensions for Steel Water Pipe Fittings
C301-79	Prestressed Concrete Pressure Pipe, Steel Cylinder Type, for Water and Other Liquids
C504-74	Rubber-Seated Butterfly Valves

C601-68	Disinfecting Water Mains
C800-66	Threads for Underground Service Line Fittings
C900-75 & Erratum	Poly (Vinyl Chloride) (PVC) Pressure Pipe 4-inch through 12-inch for Water
C901-78	Polyethylene (PE) Pressure Pipe, Tubing and Fittings, 1/2 In. Through 3 In., for Water
C902-78	Polybutylene (PB) Pressure Pipe, Tubing and Fittings, 1/2 In. Through 3 In., for Water

1.6 National Fire Protection Association (NFPA) Standard.

No. 24-1977	Outside Protection
No. 49-1975	Hazardous Chemicals Data
No. 325M-1977	Flammable Liquids, Gases and Volatile Solids
No. 704-1980	Identification of the Fire Hazards of Materials

2. GENERAL. This section covers water distribution lines and water service lines, and connections to building services at a point approximately 5 feet outside all building and structures to which service is required.

2.1 Piping for Water Service Lines Less Than 3 Inches in Diameter. Piping for water service lines less than 3 inches in diameter shall be poly (vinyl chloride) (PVC) plastic, polyethylene, polybutylene, or copper tubing, unless otherwise shown or specified.

2.2 Recommendations of the Manufacturer. The Contractor shall, as a part of the shop drawings, submit to the Contracting Officer the manufacturer's recommendations for each material or procedure to be utilized which is required to be in accordance with such recommendations. The Contractor shall have a copy of the manufacturer's instructions available at the construction site at all times.

3. EXCAVATION, TRENCHING, AND BACKFILLING FOR WATERLINES. Excavation, trenching, and backfilling shall be in accordance with the applicable provisions of section: EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS except as modified herein.

4. MATERIALS shall conform to the respective specifications and other requirements specified below.

4.1 Pipe.

4.1.1 Copper Tubing. ASTM B 88, type K, annealed.

4.1.2 Poly (Vinyl Chloride) (PVC) Plastic Pipe. All pipe, couplings, and fittings shall be manufactured of material conforming to ASTM D 1784, class 12454A, designated as PVC 1120 in ASTM D 1785.

4.1.2.1 Pipe less than 4-inch Diameter.

4.1.2.1.1 Screw-Joint. Pipe to dimensional requirements of ASTM D 1785, with joints meeting requirements of 150 psi working pressure, 200 psi hydrostatic test pressure, unless otherwise shown or specified. Pipe couplings when used must be hydrostatically tested as required by AWWA C900 or ASTM D 2467.

4.1.2.1.2 Elastomeric-Gasket Joint. Pipe shall be to dimensional requirements of ASTM D 1785, Schedule 40, with joints meeting the requirements of 150 psi working pressure, 200 hydrostatic test pressure, unless otherwise shown or specified, or it may be pipe, conforming to requirements of ASTM D 2241, elastomeric joint, with the following applications.

<u>SDR</u>	<u>Maximum Working Pressure</u>	<u>Minimum Hydrostatic Pressure</u>
26	100	133
21	120	160
17	150	200
13.5	200	266

In addition to the above requirements the pipe, couplings and fittings must be hydrostatically tested as required by AWWA C900, and must be to iron pipe or cast iron outside diameter (CIOD) size dimensions.

4.1.3 Galvanized-Steel Pipe, Less Than 3 Inches. ASTM A 120, standard weight.

4.1.4 Protective materials for steel pipe, except as hereinafter specified, shall be mechanically applied in a factory or plant especially equipped for the purpose. The materials shall, unless otherwise indicated on the drawings, consist of one of the following for the indicated pipe material and size.

4.1.4.1 Galvanized-Steel Pipe Less Than 3 Inches. Steel pipe and fittings less than 3 inches in diameter shall be thoroughly cleaned of foreign material by wire brushing and solvent cleaning, and then given one coat of coal-tar primer and two coats of coal-tar enamel conforming to AWWA C203, threaded ends of pipe and fittings shall be adequately protected prior to coating.

4.2 Joints.

4.2.1 Push-on Joints shall conform to ANSI A21.11.

4.2.2 Copper Tubing. Joints shall be compression-pattern flared and shall be made with fittings hereinafter specified.

4.2.3 Poly (Vinyl Chloride) Pipe. Joints for pipe, fittings, and couplings for pipe less than 4-inches in diameter shall be as given in paragraph MATERIALS. Joints connecting pipe of differing materials shall be made in accordance with the manufacturer's recommendation as approved by the Contracting Officer.

4.2.4 Polyethylene (PE) and Polybutylene (PB) Pipe. Joints for pipe fittings and coupling shall be strong pressure tight joints as specified for polyethylene and

polybutylene pipe in paragraph INSTALLATION. Joints connecting pipe of differing materials shall be made in accordance with the manufacturer's recommendation as approved by the Contracting Officer.

4.2.5 Steel Pipe, Not Galvanized.

4.2.5.1 Mechanical Couplings shall be as hereinafter specified.

4.2.5.2 Bell-And-Spigot Joints for use with rubber gaskets shall conform to AWWA C200, as appropriate for the type of pipe. Rubber gaskets shall conform to applicable requirements of AWWA C200.

4.2.5.3 Flanges shall conform to AWWA C207, and shall be used only where shown on the drawings or when approved.

4.2.6 Bonded Joints. Where indicated, a metallic bond shall be provided at each joint, including joints made with flexible couplings or rubber gaskets, or ferrous metallic piping to effect continuous conductivity. The bond wire shall be type RHW-USE, size 1/0 neoprene-jacketed copper conductor shaped to stand clear of the joint. The bond shall be of the thermal weld type.

4.2.7 Insulating Joints shall be installed between nonthreaded ferrous and nonferrous metallic pipe, fittings and valves. Insulating joints shall consist of a sandwich-type flange insulating gasket of the dielectric type, insulating washers, and insulating sleeves for flange bolts. Insulating gaskets shall be full faced with outside diameter equal to the flange outside diameter. Bolt insulating sleeves shall be full length. Units shall be of a shape to prevent metal-to-metal contact of dissimilar metallic piping elements.

4.3 Fittings and Specials.

4.3.1 For Copper Tubing. Fittings and specials shall be flared and shall conform to ANSI B16.26.

4.3.4 For Poly (Vinyl Chloride) (PVC) Pipe.

4.3.4.1 For Pipe Less than 4-Inch Diameter. Screw-joint conforming to the requirements of ASTM D 1785, threaded to conform to the requirements of ASTM D 2464 for use with Schedule 80 pipe and fittings only, all other pipe less than 4-inch diameter shall be elastomeric-gasket bell and socket fittings with built-in stops, pipe ends tapered to fit the socket or elastomeric-gasket couplings with built-in stops, pipe end tapered to fit the coupling. Gasket shall conform to ASTM D 1869.

4.3.5 For Galvanized Steel Pipe Less Than 3 Inches. Steel fittings shall be galvanized. Screwed fittings shall conform to ANSI B16.3. Flanged fittings shall conform to AWWA C207. Dresser-type fittings shall be suitable for use with type of pipe furnished.

4.4 Couplings.

4.4.1 Mechanical couplings for steel pipe shall be the sleeve type, or when approved, the split sleeve type and shall provide a tight flexible joint under all reasonable conditions, such as pipe movements caused by expansion, contraction, slight settling or shifting in the ground, minor variations in trench gradients, and traffic vibrations. Couplings shall be of strength not less than the adjoining pipeline.

4.4.1.1 Sleeve-Type Couplings shall be used for joining plain end pipe sections. The couplings shall consist of one steel middle ring, two steel followers, two gaskets, and the necessary steel bolts and nuts to compress the gaskets.

4.4.1.2 Split-Sleeve-Type Couplings may be used when approved in special situations and shall consist of side- and end-gaskets and a housing in two or more sections with the necessary bolts and nuts to compress the gaskets.

4.4.2 Dielectric Fittings shall be installed between threaded ferrous and nonferrous metallic pipe, fittings and valves, except where corporation stops join mains. Dielectric fittings shall prevent metal-to-metal contact of dissimilar metallic piping elements and shall be suitable for the required working pressure.

4.5 Valves.

4.5.1 Check Valves shall be designed for a minimum working pressure of 150 pounds per square inch or as indicated. Valves shall have a clear waterway equal to the full nominal diameter of the valve. Valves shall open to permit flow when inlet pressure is greater than the discharge pressure, and shall close tightly to prevent return flow when discharge pressure exceeds inlet pressure. The size of the valve, working pressure, the manufacturer's name, or initials, or trademark shall be cast on the body of each valve.

4.5.1.1 Valve 2 Inches and Smaller shall be all bronze designed for screwed fittings, and shall conform to Fed. Spec. WW-V-51, Class B, type as suitable for the application.

4.5.1.2 Valves Larger Than 2 Inches shall be iron body, bronze mounted, shall have flanged ends, and shall be the non-slam type. Flanges shall be the 125-pound type conforming to ANSI B16.1.

4.5.2 Gate Valves shall be designed for a working pressure of not less than 150 pounds per square inch. Valve connections shall be as required for the piping in which they are installed. Valves shall have a clear waterway equal to the full nominal diameter of the valve, and shall be opened by turning counterclockwise. The operating nut or wheel shall have an arrow, cast in the metal, indicating the direction of opening.

4.5.2.1 Valves Smaller Than 3 Inches shall be all bronze and shall conform to Fed. Spec. WW-V-54, Type I, Class B.

4.5.3 Rubber-Seated Butterfly Valves. Rubber-seated butterfly valves shall conform to the performance requirements of AWWA C504. Wafer type valves conforming to the performance requirements of AWWA C504 in all respects, but not meeting laying length requirements will be acceptable if supplied and installed with a spacer providing the specified laying length. All tests required by AWWA C504 must be met. Flanged-end valves shall be installed in an acceptable pit and provided with a union or sleeve-type coupling in the pit to permit removal. Mechanical-end valves 3 through 10-inch in diameter may be direct burial if provided with a suitable valve box, means for manual operation, and an adjacent pipe joint to facilitate valve removal. Valve operators shall restrict closing to a rate requiring approximately 60 seconds to fully open or fully close.

4.5.4 Pressure reducing valves shall maintain a constant downstream pressure regardless of fluctuations in demand. Valves shall be suitable for 200 pounds per square inch operating pressure on the inlet side, with outlet pressure set for 60

pounds per square inch. The valves shall be of the hydraulically operated, pilot controlled, globe or angle type, and may be actuated either by diaphragm or piston. The pilot control shall be the diaphragm operated, adjustable, spring loaded type, designed to permit flow when controlling pressure exceeds that spring setting. Ends shall be threaded or flanged as required. Valve bodies shall be bronze, cast iron or cast steel with bronze trim. Valve stem shall be stainless steel. Valve discs and diaphragms shall be synthetic rubber. Valve seats shall be bronze. Pilot controls shall be bronze with stainless steel working parts.

4.5.5 Vacuum and Air Relief Valves shall be of the size(s) shown and shall be of a type that will release air and prevent the formation of a vacuum. The valves shall automatically release air when the lines are being filled with water and shall admit air into the line when water is being withdrawn in excess of the inflow. Valves shall be iron body with bronze trim and stainless steel float.

4.5.6 Indicator Post for Valves. Each valve shown on the drawings with the designation "P.I.V." shall be equipped with indicator cost conforming to the requirements of NFPA 24. Operation shall be by wrench. One wrench shall be provided for valve operation.

4.6 Valve Boxes. Valve boxes shall be cast iron or concrete, except that concrete boxes may be installed only in locations not subjected to vehicular traffic. Cast-iron boxes shall be extension type with slide-type adjustment and with flared base. The minimum thickness of metal shall be 3/16 inch. Concrete boxes shall be the standard product of a manufacturer of precast concrete equipment. The work "WATER" shall be cast in the cover. The boxes shall be of such length as will be adapted, without full extension, to the depth of cover required over the pipe at the valve location.

4.7 Miscellaneous Items.

4.7.1 Service clamps shall have a pressure rating not less than that of the pipe to be connected and shall be either the single or double flattened strap type. Clamps shall have a galvanized malleable iron body with cadmium plated straps and nuts. Clamps shall have rubber gasket cemented to the body.

4.7.2 Corporation stops shall have standard corporation stop thread conforming to AWWA C800 on the inlet end, with flanged joints, compression pattern flared tube couplings.

4.7.3 Service stops shall be water-works inverted-ground-key type, oval or round flow way, tee handle, without drain. Pipe connections shall be suitable for the type of service pipe used. All parts shall be of bronze with female iron-pipe-size connections or compression-pattern flared tube couplings, and shall be designed for a hydrostatic test pressure not less than 200 pounds per square inch.

4.7.4 Service boxes shall be cast iron or concrete. Extension service boxes of the required length and having either screw or slide-type adjustment shall be installed at all service box locations. The boxes shall have housings of sufficient size to completely cover the service stop and shall be complete with identifying covers.

4.7.5 Disinfection. Chlorinating materials shall conform to the following.

AWWA B301 Chlorine, Liquid

AWWA B300 Hypochlorite, Calcium and Sodium

5. INSTALLATION.

5.1 Handling. Pipe and accessories shall be handled so as to insure delivery to the trench in sound, undamaged condition. Particular care shall be taken not to injure the pipe coating. If the coating or lining of any pipe or fitting is damaged, the repair shall be made by the Contractor at his expense in a satisfactory manner. No other pipe or material of any kind shall be placed inside a pipe or fitting after the coating has been applied. Pipe shall be carried into position and not dragged. Use of pinch bars and tongs for alining or turning pipe will be permitted only on the bare ends of the pipe. 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 without additional expense to the Government. Rubber gaskets that are not to be installed immediately shall be stored in a cool and dark place. Poly (vinyl chloride) RTRP and RPMP pipe and fittings shall be handled and stored in accordance with the manufacturers recommendations. Storage facilities shall be classified and marked in accordance with NFPA 704, with classification as indicated in NFPA 49 and NFPA 325M.

5.1.1 Coated and wrapped steel pipe shall be handled in conformance with AWWA C203.

5.1.2 Polyethylene (PE) pipe, fittings, and accessories shall be handled in conformance with AWWA C901; Polybutylene (PB) pipe, fittings, and accessories shall be handled in conformance with AWWA C902.

5.2 Cutting of Pipe. 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. Wheel cutters shall be used when practicable. Copper tubing shall be cut square and all burs shall be removed.

5.3 Adjacent Facilities.

5.3.1 Sewer Lines. Where the location of the water pipe is not clearly defined in dimensions on the drawings, the water pipe shall not be laid closer horizontally than 10 feet from a sewer except where the bottom of the water pipe shall be at least 12 inches above the top of the sewer pipe, in which case the water pipe shall not be laid closer horizontally than 6 feet from the sewer. Where waterlines cross under gravity-flow sewer lines, the sewer pipe for a distance of at least 10 feet each side of the crossing shall be fully encased in concrete or shall be made of pressure pipe with no joint located within 3 feet horizontally of the crossing. Waterlines shall in all cases cross above sewage force mains or inverted siphons and shall be not less than 2 feet above the sewer main. Joints in the sewer main, closer horizontally than 3 feet to the crossing, shall be encased in concrete.

5.3.2 Waterlines shall not be laid in the same trench with sewer lines, gas lines, fuel lines, or electric wiring.

5.3.3 Copper tubing shall not be installed in the same trench with ferrous piping materials.

5.3.4 Nonferrous Metallic Pipe. Where nonferrous metallic pipe, e.g., copper tubing, crosses any ferrous piping material, a minimum vertical separation of 12 inches must be maintained between pipes.

5.4 Joint Deflection.

5.4.1 Poly (Vinyl Chloride) (PVC) Pipe. Maximum offset in alinement between adjacent pipe joints shall be as recommended by the manufacturer and approved by the Contracting Officer, but in no case shall it exceed 5 degrees.

5.4.2 Steel Pipe. For pipe with bell-and-spigot rubber-gasket joints, maximum allowable deflections from a straight line or grade, as required by vertical curves, horizontal curves, or offsets will be 5 degrees unless a lesser amount is recommended by the manufacturer. Short-radius curves and closures shall be formed by short lengths of pipe or fabricated specials specified hereinbefore.

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

5.5.1 Connections. Where connections are made between new work and existing mains, the connections shall be made by using specials and fittings to suit the actual conditions. Standard methods are available for making connections to various types of pipe, either under pressure or in the dewatered condition. Where made under pressure, these connections shall be installed as approved by the Contracting Officer.

5.5.2 Pipe passing through walls of valve pits and structures shall be provided with cast-iron wall sleeves. Annular space between walls and sleeves shall be filled with rich cement mortar. Annular space between pipe and sleeves shall be filled with mastic.

5.6 Jointing.

5.6.1 Copper Tubing. Joints shall be made with flared fittings. The flared end tube shall be pulled tightly against the tapered part of the fitting by a nut which is part of the fitting, so there is metal-to-metal contact.

5.6.2 Poly (Vinyl Chloride) (PVC) Plastic Pipe.

5.6.2.1 Pipe Less Than 4-Inch Diameter. Threaded joints shall be made by wrapping the male threads with approved thread tape or applying an approved thread lubricant, then threading the joining members together. The joint shall be

tightened using strap wrenches to prevent damage to the pipe and/or fitting. To avoid excessive torque, joints shall be tightened no more than one thread past hand-tight. Preformed rubber-ring gaskets for elastomeric-gasket joints shall be made in accordance with requirements of AWWA C600 and AWWA C630, as applicable, and as required herein. All pipe ends for push-on joints shall be beveled to facilitate assembly and marked to indicate when the pipe is fully seated. The gasket shall be prelubricated to prevent displacement. Care shall be exercised to assure the gasket and ring groove in the bell or coupling match. The manufacturer of the pipe or fitting must also supply the elastomeric-gasket. Coupling shall be provided with stops or centering rings to assure that the coupling is centered on the joint.

5.6.3 Galvanized-Steel Pipe. Screw joints shall be made tight with a stiff mixture of graphite and oil, inert filler and oil, or with an approved graphite compound, applied with a brush to the male threads only. Compounds shall not contain lead.

5.6.4 Bonded joints shall be installed in accordance with details specified in subparagraph Joints under paragraph MATERIALS.

5.6.5 Insulating Joints Dielectric Fittings shall be installed in accordance with details specified in subparagraph Joints under paragraph MATERIALS. Dielectric unions shall be encapsulated in a field poured coal-tar covering with at least 1/8-inch thickness of coal tar over all fitting surfaces.

5.6.6 Connections between different types of pipe and accessories shall be made with transition fittings approved by the Contracting Officer.

5.7 Service Lines. Service lines shall include the lines to and connections with the building service at a point approximately 5 feet outside the building where such building service exists. Where building services are not installed, the Contractor shall terminate the service lines approximately 5 feet from the site of the proposed building at a point designated by the Contracting Officer. Such service lines shall be closed with plugs or caps. All service stops and valves shall be provided with extension service boxes of the lengths required by the depth of service-line stops or valves. Service lines shall be constructed in accordance with the following requirements.

5.7.1 Service lines 2 inches and smaller shall be connected to the main by a directly-tapped corporation stop or by a service clamp. A corporation stop and a lead or copper gooseneck shall be provided with either type of connection.

5.7.1.1 Service lines 1-1/2 inches and smaller shall have a service stop.

5.7.1.2 Service lines 2 inches in size shall have a gate valve.

5.7.2 Service lines larger than 2 inches shall be connected to the main by rigid connection and shall have a gate valve. Three-inch and larger lines may use rubber-seated butterfly valves as specified above, or gate valves.

5.8 Setting of Valves and Valve Boxes.

5.8.1 Valves and valve boxes shall be installed where shown or specified, and shall be set plumb. Valve boxes shall be centered on the valves. Boxes shall be installed over each outside gate valve unless otherwise shown. Where feasible, valves shall be located outside the area of roads and streets. Earth fill shall be

carefully tamped around each valve box to a distance of 4 feet on all sides of the box, or to the undisturbed trench face if less than 4 feet.

5.8.2 Service Boxes. Where waterlines are located below paved streets having curbs, the boxes shall be installed directly back of the curbs. Where no curbing exists, service boxes shall be installed in accessible locations, beyond the limits of street surfacing, walks and driveways.

5.8.3 Check valves, pressure reducing valves, vacuum and air relief valves shall be installed in valve pits as shown.

6. HYDROSTATIC TESTS. Where any section of a waterline is provided with concrete thrust blocking for fitting, the hydrostatic tests shall not be made until at least 5 days after installation of the concrete thrust blocking unless otherwise approved. The method proposed for disposal of waste water from hydrostatic tests and disinfection shall be submitted to the Contracting Officer for approval prior to performing hydrostatic tests.

6.1 Pressure Test. After the pipe is laid, the joints completed, and the trench partially backfilled leaving the joints exposed for examination, the newly laid piping or any valved section of water service piping shall, unless otherwise specified, be subjected for one hour to a hydrostatic pressure test of 150 psi pounds per square inch. Water supply lines designated on the drawings shall be subjected for one hour to a hydrostatic pressure test of 200 pound per square inch. Each valve shall be opened and closed several times during the test. Exposed pipe, joints, fittings, and valves shall be carefully examined during the partially open trench test. Joints showing visible leakage shall be replaced or remade as necessary. Cracked or defective pipe, joints, fittings or valves, discovered in consequence of this pressure test shall be removed and replaced with sound material, and the test shall be repeated until the test results are satisfactory. The requirement for the joints to remain exposed for the hydrostatic tests may be waived by the Contracting Officer when one or more of the following conditions is encountered.

6.1.1 Wet or Unstable Soil Conditions in the Trench.

6.1.2 Compliance would require maintaining barricades and walkway around and across an open trench in a heavily used area that would require continuous surveillance to assure safe conditions.

6.1.3 Maintaining the trench in an open condition would delay completion of the contract.

6.1.4 An unforeseeable cause which would result in excess cost.

The Contractor may request the waiver, setting forth in writing the reasons for the request and stating the alternative procedure proposed to comply with the required hydrostatic tests. Backfill placed prior to the tests shall be placed in accordance with the requirements of section: EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.

6.2 Leakage Test. Leakage test shall be conducted after the pressure test has been satisfactorily completed. The duration of each leakage test shall be at least 2 hours, and during the test the waterline shall be subjected to 200 pounds per square inch pressure. Leakage is defined as the quantity of water to be supplied into the newly laid pipe, or any valved or approved section thereof, necessary to

maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled. No piping installation will be accepted until the leakage is less than the number of gallons per hour as determined by the formula.

$$L = 0.00054 ND \sqrt{P}$$

In which L equals the allowable leakage in gallons per hour; N is the number of joints in the length of pipeline tested; D is the nominal diameter of the pipe in inches; and P is the average test pressure during the leakage test, in pounds per square inch gage. The allowable leakage in gallons per hour, per joint at 200 pounds per square inch average test pressure shall be as in table III.

TABLE III. ALLOWABLE LEAKAGE, LIMITS

<u>Pipe Diameter (Inches)</u>	<u>Gallons Per Hour</u>
2	0.0153

Should any test of pipe disclose leakage greater than that specified in the foregoing table, the defective joints shall be located and repaired until the leakage is within the specified allowance, without additional cost to the Government.

6.3 Time for Making Test. Except for joint material setting or where concrete reaction backing necessitates a 5-day delay, pipelines jointed with rubber gaskets, lead, mechanical or push-on joints, or couplings may be subjected to hydrostatic pressure, inspected, and tested for leakage at any time after partial completion of backfill. Asbestos-cement pipe and cement-mortar lined pipe may be filled with water as recommended by the manufacturer before being subjected to the pressure test and subsequent leakage test.

6.4 Concurrent hydrostatic Tests. The Contractor may elect to conduct the hydrostatic tests using either or both of the following procedures. Regardless of the sequence of tests employed, the results of pressure tests, leakage tests, and disinfection shall be satisfactory as specified. All replacement, repair, or retesting required shall be accomplished by the Contractor at no additional cost to the Government.

6.4.1 Pressure test and leakage test may be conducted concurrently.

6.4.2 Hydrostatic tests and disinfection may be conducted concurrently, using the water treated for disinfection to accomplish the hydrostatic tests. If water is lost when treated for disinfection and air is admitted to the unit being tested, or if any repair procedure results in contamination of the unit, disinfection shall be reaccomplished.

7. DISINFECTION. Before acceptance of potable water operation, each unit of completed water distribution line, and water service line shall be disinfected as prescribed by AWWA C601 or as specified herein. After pressure tests have been made, the unit to be disinfected shall be thoroughly flushed with water until all entrained dirt and mud have been removed before introducing the chlorinating material. The chlorinating material shall be either liquid chlorine, calcium hypochlorite, or sodium hypochlorite, conforming to paragraph MATERIALS. The chlorinating material shall provide a dosage of not less than 50 parts per million and shall be introduced into the waterlines in an approved manner. Poly (vinyl

chloride) (PVC) pipelines shall be chlorinated using only the above specified chlorinating material in solution. In no case will the agent be introduced into the line in a dry solid state. The treated water shall be retained in the pipe long enough to destroy all non-spore-forming bacteria. Except where a shorter period is approved, the retention time shall be at least 24 hours and shall produce not less than 10 ppm of chlorine throughout the line at the end of the retention period. All valves on the lines being disinfected shall be opened and closed several times during the contact period. The line shall then be flushed with clean water until the residual chlorine is reduced to less than 1.0 ppm. During the flushing period, each hydrant on the line shall be opened and closed several times. From several points in the unit, the Contracting Officer will take samples of water in properly sterilized containers for bacterial examination. The disinfection shall be repeated until tests indicate the absence of pollution for at least 2 full days. The unit will not be accepted until satisfactory bacteriological results have been obtained.

8. CLEANUP. Upon completion of the installation of the water distribution lines and water service lines, and appurtenances, all debris and surplus materials resulting from the work shall be removed.

* * * * *

SECTION 16A

ELECTRICAL-DISTRIBUTION; AND BIKE PATH LIGHTING SYSTEM; UNDERGROUND

Index

- | | |
|------------------------------------|------------------------------------|
| 1. Applicable Publications | 9. Secondary Junction Boxes |
| 2. General | 10. Lighting System |
| 3. Materials and Equipment | 11. Bike Path Lighting Poles |
| 4. List of Materials and Equipment | 12. Installation of Lighting Poles |
| 5. Shop Drawings | 13. Luminaires |
| 6. Workmanship | 14. Grounding |
| 7. Duct System | 15. Tests |
| 8. Secondary Cable System | 16. 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 basic designation only.

1.1 Federal Specifications (Fed. Spec.).

W-C-581b & Int. Am-1 (GSA-FSS)	Conduit and Fittings; Nonmetallic, Rigid, (Bituminized Homogeneous Fiber)
W-C-586C	Conduit Outlet Boxes, Bodies and Entrance Caps, Electrical: Cast Metal
W-F-408C & Am-1	Fittings for Conduit, Metal, Rigid, (Thick- Wall and Thin-Wall (EMT) Type)
W-S-610C	Splice Conductor
FF-P-101E & Am-1	Padlocks
SS-A-281b & Am-1	Aggregate; (For) Portland-Cement-Concrete
WW-C-581E	Conduit, Metal, Rigid and Intermediate; and Coupling, and Nipple, Electrical Conduit: Zinc-Coated

1.2 American Society for Testing and Materials (ASTM) Standards.

A 123-73	Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip
A 153-73	Zinc Coating (Hot-Dip) on Iron and Steel Hardware

1.3 Institute of Electrical and Electronics Engineers (IEEE) Standards.

National Electrical Safety Code (ANSI C2) (Feb 1977; Correction Sheet, Apr 1977)

1.4 National Electrical Manufacturers Association (NEMA) Standards Publications.

No. TC 6-1978

PVC and ABS Plastic Utilities Duct for
Underground Installation

WC 3-1969 (R 1974)
Rev thru Dec 1978

Rubber Insulated Wire and Cable for the
Transmission and Distribution of
Electrical Energy

1.5 National Fire Protection Association (NFPA) Publication.

No. 70-1981

National Electrical Code

1.6 Underwriters' Laboratories, Inc. (UL) Publication.

UL 854

Service-Entrance Cables (June 15, 1979, 6th
Edition; Appendix July 21, 1979, Rev.
thru Dec 21, 1980)

2. GENERAL. The contract drawings note the extent and general arrangement of the underground electrical distribution and bike path lighting systems.

2.1 Capacities of all equipment and material shall be not less than those indicated.

2.2 Codes. The installation shall comply with the applicable requirements and recommendations of the National Electrical Code and the National Electrical Safety Code.

2.3 Conformance with Agency Requirements. Where materials or equipment are specified to conform to the standards of the Underwriters' Laboratories, Inc., or to be constructed or tested, or both, in accordance with the standards of the NEMA or the ANSI, the Contractor shall submit proof that the items furnished under this section of the specifications conform to such requirements. The label of, or listing by the UL, will be acceptable as sufficient evidence that the items conform to UL, requirements. A certification or published catalog specification data statement to the effect that the item is in accordance with the referenced NEMA standard by a company listed as a member company of NEMA for the section whose standards cover the item under consideration, will be acceptable as sufficient evidence that the item conforms to the requirements of the NEMA. In lieu of such stamp, certification, label or listing, the Contractor may submit a written certificate from any nationally recognized testing agency adequately equipped and competent to perform such services, stating that the items have been tested and that the units conform to the requirements listed hereinbefore, including methods of testing of the specified agencies. Conformance with the agency requirements does not relieve the item from complying with any other requirements of the specifications.

2.4 Nameplates. Each major component of equipment shall have as a minimum the manufacturer's name, address, and catalog number, model, style, or type on a plate securely and conspicuously attached to the item of equipment. Nameplates for electrical apparatus shall conform to the referenced standards.

2.5 Prevention of Corrosion. All metallic materials shall be protected against corrosion. Exposed metallic parts of outdoor apparatus shall be given a rust-inhibiting treatment and standard finish by the manufacturer. Aluminum shall not be used in contact with the earth, and where connected to dissimilar metal shall be protected by approved fittings and treatment. All parts such as boxes, bodies, fittings, guards, and miscellaneous parts made of ferrous metals but not of corrosion-resistant steel, shall be zinc-coated in accordance with ASTM A 123 or A 153, except where other equivalent protective treatment is specifically approved in writing by the Contracting Officer. Steel conduits installed underground or under slabs on grade shall be coated with an approved asphaltic paint, plastic coating or shall be wrapped with a single layer of a pressure-sensitive plastic tape, half-lapped. Where pressure-sensitive plastic tape is used, the conduit shall be coated with a primer recommended by the tape manufacturer before applying the tape.

2.6 Spare-Parts Data. As soon as practicable after approval of materials and equipment and, if possible, not later than 2 months prior to the date of beneficial use, the Contractor shall furnish spare-parts data for each different item of equipment listed. The data shall include a complete list of parts and supplies, with current unit prices and source of supply; a list of parts and supplies that are either normally furnished at no extra cost with the purchase of the equipment, or specified hereinafter to be furnished as part of the contract; and a list of additional items recommended by the manufacturer to assure efficient operation for a period of 120 days at the particular installation. The foregoing shall not relieve the Contractor of any responsibilities under the guarantee specified hereinafter.

2.7 Standard Products. Materials and equipment shall be essentially the standard products of a manufacturer regularly engaged in the manufacture of the product, shall meet the requirements of the specification, and essentially duplicate materials and equipment that have been in satisfactory use at least 2 years.

2.8 Unusual Service Conditions. All items furnished under this section shall be specifically suitable for the following unusual service conditions:

- (1) Altitude 1200 ft.
- (2) Ambient Temperature - 20 to 50 degrees C.

2.9 Verification of Dimensions. The Contractor shall be specifically responsible for the coordination and proper relation of his work to the site and to the work of all trades. The Contractor shall visit the premises and thoroughly familiarize himself with all details of the work and working conditions, shall verify all dimensions in the field, and advise the Contracting Officer of any discrepancy before performing any work.

3. MATERIALS AND EQUIPMENT shall conform to the respective specifications and other requirements specified herein.

3.1 Cable shall have copper conductors unless otherwise indicated.

3.1.1 Wire and Cable shall be:

(a) Polyvinyl chloride insulated, polyethylene jacketed type, conforming to IPCEA Pub. No. S-61-402; or

(b) Cross-linked polyethylene insulated, and polyvinyl jacketed or polyethylene jacketed type, conforming to IPCEA Pub. No. S-61-402, except that the cross-linked polyethylene insulation shall conform to IPCEA Specification S-66-524.

3.1.2 Cross-linked polyethylene insulation for cables shall be an extruded single wall of heat-stabilized and light-stabilized, filled or unfilled, chemically cross-linked polyethylene conforming to IPCEA Specification S-66-524.

3.2 Castings.

3.2.1 Cast iron. ASTM A 48

3.2.2 Cast steel. Federal Specification QQ-S-681.

3.3 Conduit.

3.3.1 Plastic Conduit shall be single bore, and shall be styrene rubber conduit conforming to NEMA TC 1 or either acrylonitrile-butadiene-styrene or polyvinyl-chloride conduit conforming to NEMA TC 6. Conduit fittings shall conform to the applicable NEMA standards, except that where NEMA standards for conduit fittings do not exist for the type of plastic installed, fittings shall be as recommended by the conduit manufacturer. Conduit and fittings shall be free, within commercial tolerances, of objectionable lines, striations, bubbles, welds, and other manufacturing defects that would impair the service of the conduit. The bore of the conduit shall be straight and circular in cross section with smooth interior surfaces free from obstructions and rough and flaky areas. The conduit and fittings shall be free from all substances that injuriously affect any wire or cable covering such as is used on rubber-covered wire, polychloroprene-sheathed cable, weatherproof wire, and lead- or lead-alloy-covered cable. The conduit and fittings shall be corrosion-resistant and not adversely affected by chewing insects, gnawing rodents, acids, alkalis, salts, bacteria, and other organic matter that would normally be encountered in the ground. The conduit length for each size shall be the length that is standard with the manufacturer with a permissible tolerance of 1/4 inch per 10-foot length. Bends, elbows, and other fittings shall be capable of freely passing a ball that is 1/4 inch less in diameter than the nominal bore of the conduit. Fittings shall be of a type especially made for use with plastic conduit for electrical service. Conduit and fittings shall be capable of being joined, by means of a solvent welding cement, so as to provide a watertight and rootproof joint. Type II, heavy-wall conduit, for use without concrete encasement shall have dimensions for the corresponding size in accordance with the applicable NEMA standard. Sections cut from the conduit shall be calipered for wall thickness.

3.4 Conduit, Steel. Fed. Spec. WW-C-581.

3.5 Connectors. Fed. Spec. W-S-610; and electrical power connectors, NEMA Pub. No. CC 1.

3.6 Cutouts, Distribution. NEMA Pub. No. SG 2.

3.7 Fittings, Cable and Conduit. Fed. Spec. W-F-406 or W-F-408. Insulating material in bushings shall be of the thermosetting type and shall not support combustion.

3.8 Mortar shall be composed of the following materials.

3.8.1 Aggregate. Fed. Spec. SS-A-281.

3.8.2 Portland Cement. ASTM C 150.

3.8.3 Water shall be clean, fresh, and free from injurious amounts of mineral and organic substances.

3.8.4 Mixture shall be in the proportions of one part portland cement to one part sand with sufficient water added to produce a pliable and workable mortar.

3.9 Outlets, Metal, for Conduit. Fed. Spec. W-C-586.

3.10 Padlocks. Fed. Spec. FF-P-101.

3.11 Paint. As specified in section: PAINTING, GENERAL.

3.12 Panelboards: Fed. Spec W-P-115, type and class as indicated. Panelboards installed exposed to the weather shall be raintight except as otherwise indicated.

3.13 Street-lighting poles: NEMA Pub. No. SH-5

4. LIST OF MATERIALS AND EQUIPMENT. Within 30 days after notice to proceed, and before starting installation of any materials or equipment, the Contractor shall submit to the Contracting Officer for approval a complete list, in triplicate, of materials and equipment to be incorporated in the work. This list shall include manufacturer's style or catalog numbers. Cuts or other descriptive data shall be furnished when required by the Contracting Officer. No consideration will be given to partial lists submitted from time to time. Approval of materials will be based on manufacturer's published data, approval of materials and equipment will be tentative subject to submission of complete shop drawings indicating compliance with the contract documents.

5. SHOP DRAWINGS. After receiving tentative approval of the equipment on the material lists and before installation of any of these items, the Contractor shall submit complete shop drawings and such other descriptive data as the Contracting Officer may require to demonstrate compliance with the contract documents. Shop drawings shall be submitted for the following items, and such other items as the Contracting Officer may direct.

- a. Panelboards.
- b. Service pedestal.
- c. Bike path lighting luminaires, mounting brackets and poles.

If departures from the contract drawings are deemed necessary by the Contractor, details of such departures, including changes in related portions of the project and the reasons therefor, shall be submitted with the shop drawings. Approved departures shall be made at no additional cost to the Government.

6. WORKMANSHIP.

6.1 General. All materials and equipment shall be installed in accordance with the recommendations of the manufacturer as approved by the Contracting Officer to conform with the contract documents. The installation shall be accomplished by workmen skilled in this type of work.

7. DUCT SYSTEM.

7.1 General. The duct system shall consist of single round-core conduit for the electrical-distribution and lighting system. The number and size of the duct shall be as indicated. Duct lines shall be installed so that the top of concrete in encased duct lines is not less than 18 inches below, or duct in non-encased duct lines is not less than 24 inches below finished grade or finished paving at any point. Changes in direction of runs exceeding a total of 10 degrees, either vertical or horizontal, shall be accomplished by long sweep bends having a minimum radius of curvature of 25 feet, except that manufactured bends may be used at the ends of the run. The long sweep bends may be made up of one or more curved or straight sections and/or combinations thereof. Manufactured bends shall have a minimum radius of 18 inches for use with ducts of less than 3 inches in diameter. Conduit shall be thoroughly cleaned before using or laying. During construction and after the duct line is completed, the ends of the conduits shall be plugged to prevent water washing mud into the conduits or manholes. Particular care shall be taken to keep the conduits clean of concrete, dirt, and any other substance during the course of construction. Where it is necessary to cut a tapered end on a piece of conduit at the site, the cut shall be made with a tool or lathe designed to cut a taper to match the taper of the particular conduit being used. After the duct line has been completed, a standard flexible mandrel not less than 12 inches long, having a diameter approximately 1/4 inch less than the inside diameter of the conduit, shall be pulled through each conduit, after which a brush with stiff bristles shall be pulled through each conduit to make certain that no particles of earth, sand, or gravel have been left in the line. Pneumatic rodding may be used to draw in the lead wire. Where connection is made to an existing duct that is of different material and shape than the duct line being installed, a suitable coupling of a type recommended by the duct manufacturer shall be used. Conduits shall be stored to avoid warping or deterioration. Plastic conduit shall be stored on a flat surface and protected from the direct rays of the sun. Conduit joints in concrete encasement may be placed side by side horizontally but shall be staggered at least 6 inches vertically.

7.2 Materials.

7.2.1 Duct Banks for Single Conduits for Secondary Electrical-Distribution System Conductors shall be type II conduits without concrete encasement, and shall be plastic. Type II duct banks shall be concrete encased under all roads, railroads and paved or traffic areas. The type of conduit shall not be mixed on any project.

7.3 Installation of Duct Banks.

7.3.1 Duct Banks Comprising Type II Single Conduits. Conduits shall be buried directly in the earth as indicated. The width of the trench shall be approximately the width of the duct bank plus 6 inches, with depth of cover over the top of the duct bank not less than 24 inches. The bottom of the trench shall be graded toward manholes, and shall be smooth and free of stones, soft spots, and sharp objects.

Where bottom of trench comprises materials other than sand or stone-free earth, a 3-inch layer of sand, or stone-free earth shall be laid on the bottom of the trench and compacted to the approximate density of the surrounding firm soil before installing the conduits in direct-contact tiered fashion. Joints in adjacent tiers of conduit shall be vertically staggered at least 6 inches. The first layer of backfill cover shall be sand or stone-free earth, compacted as specified. Duct banks may be held in alinement with a few shovelfuls of dirt. The selected earth at the sides of the duct bank shall be thoroughly tamped in 4- to 6-inch layers.

7.4 Installation of Couplings.

7.4.1 General. Joints in all types of conduit shall be made up in accordance with the manufacturer's recommendations for the particular conduit and coupling selected and as approved by the Contracting Officer. In the absence of specific recommendations, the various types of conduit joint couplings shall be made watertight by the following method(s) as appropriate.

7.4.1.1 Plastic Conduit Joints shall be made up by brushing a plastic solvent cement on the inside of the plastic coupling fitting and on the outside of the conduit ends. The conduit and fitting shall then be slipped together, until seated, with a slight twist to set the joint tightly, and the conduit then rotated one-half turn to distribute the cement evenly. Excess cement built up on the inside surface of the conduit shall then be removed.

7.5 Concrete shall be plain, class B, or 2,500 p.s.i. at 28 days, except where reinforced concrete is specified herein or indicated on the drawings.

8. SECONDARY CABLE SYSTEM shall consist of 600-volt thermoplastic insulated wire or cross-linked polyethylene insulated wire, at the option of the Contractor. The size and number of conductors and the number of cables shall be as indicated. Conductors larger than no. 8 AWG shall be stranded. Each circuit shall be identified by means of fiber or nonferrous-metal tags, or approved equal, in each manhole, each junction box, and at each terminal. Secondary cable shall be installed in conduit. Top of conduit shall be at least 2 feet below finished grade. Where bottom of trench comprises materials other than sand or earth, a 3-inch layer of sand or stone-free earth shall be laid on the bottom of the trench and compacted to the approximate density of the surrounding firm soil. The first layer of backfill shall be of sand or stone-free earth. Where cuts are made in paving, the paving and subbase shall be restored to the original condition. Loads shall be divided as evenly as practicable on the various phases of the system.

8.1 Cable splices shall be made by qualified cable splicers in strict accordance with the cable manufacturer's recommendations, except where otherwise specified herein. A copy of the manufacturer's recommendations shall be furnished to the Contracting Officer for inspection purposes. Splices in cables shall provide insulation equal in every respect to that of the cable. In splicing nonmetallic cables, special care shall be taken to insure that all wax is removed from the section to be covered with splicing tape.

9. SECONDARY JUNCTION BOXES shall be installed where indicated, for the purpose of splicing or connecting secondary cables. Boxes and covers shall be made of precast concrete, and of the sizes indicated. Cover shall be bolt down type.

10. LIGHTING SYSTEM shall be 277/480-volt multiple as indicated. Size, type and rating of cable shall be as indicated on the drawings.

11. BIKE PATH LIGHTING POLES shall be non-tapered steel 4" square and 16' long with sufficient strength to withstand 100 mph wind including luminaire load. Poles shall be designed for use with underground supply conductors, as indicated. All poles shall be the anchor-base type. Each pole with anchor-base shall be provided with four galvanized-steel anchor bolts, threaded at the top end, and bent 90 degrees by 4 inches at the bottom. Anchor bolts shall be complete with galvanized nuts, washers, and ornamental cover.

12. INSTALLATION OF LIGHTING POLES. Lighting poles shall be adjusted as necessary to provide a permanent vertical position with the bracket arm in proper position for luminaire location. After installation, the exposed surfaces of the steel poles shall be given two finish coats of exterior oil paint of a color selected by the Contracting Officer. Paint shall meet the requirements of Federal Specification TT-P-105 as specified in section: PAINTING, GENERAL.

13. LUMINAIRES shall be of the multiple enclosed type for high pressure sodium lamps with the distribution indicated on the drawings.

13.1 Individually controlled luminaires. Where indicated, each luminaire shall be served from the secondary distribution system and shall be individually controlled by a photoelectric control element mounted on the head of the luminaire. Photoelectric control element shall be a replaceable, weatherproof, plug-in or twist-lock assembly with adjustable operation range of approximately 0.5 to 5.0 foot-candles, factory-set at approximately 1.0 foot-candle. The control relay shall be rated not less than 1,000 watts lamp load. Luminaires shall be multiple, enclosed type, as specified above, equipped with weatherproof plug-in or twist-lock receptacle to receive the photoelectric element.

14. GROUNDING shall conform to applicable requirements in the National Electrical Code, the National Electrical Safety Code, and to requirements herein. Neutral conductors, metallic conduits, junction boxes, and all non-current-carrying metallic parts of equipment, shall be grounded. Ground rods except those installed in manholes shall be made of copper, or copper-clad steel, not less than 3/4 inch by 8 feet long, and shall be driven into the earth at least 8 feet.

15. TESTS.

15.1 Operating test. After the installation has been completed, and at such time as the Contracting Officer may direct, the Contractor shall conduct an operating test for approval. The equipment shall be demonstrated to operate in accordance with the requirements of this section of the specifications. The test shall be performed in the presence of the Contracting Officer. The Contractor shall furnish the necessary instruments and personnel required for the test, and the Government will furnish the necessary electric power.

15.2 Ground-resistance measurements of each ground rod shall be taken and certified by the Contractor to the Contracting Officer. The Contractor shall submit in writing to the Contracting Officer upon completion of the project, the measured ground resistance of each ground rod and grounding system, indicating the location of the rod and grounding system, as well as the resistance and soil conditions at the time the measurements were made. Ground-resistance measurements shall be made in normally dry weather, not less than 48 hours after rainfall, and with the ground under test isolated from other grounds.

16. GUARANTEE. The following equipment furnished under this section of the specifications shall be guaranteed for a period of 1 year from the date of acceptance thereof, either for beneficial use or final acceptance, whichever is earlier, against defective materials, design, and workmanship.

Cable and wire.
Lighting control equipment.
Lighting luminaires and poles.
Panelboards and meter pedestal.
Conduit.

Upon receipt of notice from the Government of failure of any part of the guaranteed equipment during the guarantee period, new replacement parts shall be furnished and installed promptly by the Contractor at no additional cost to the Government.

* * * * *

US ARMY ENGINEER DISTRICT, LOS ANGELES
300 North Los Angeles Street
Los Angeles, California

ARMY - C. OF E. - Los Angeles

Reference: DACW09-82-B-0011-0001

Bid Opening Date: 16 June 1982

U.S. ARMY ENGINEER DISTRICT, LOS ANGELES
P. O. Box 2711
Los Angeles, California 90053

20 May 1982

AMENDMENT NO. 1

I. Specifications, Reference No. DACW09-82-B-0011, covering "Indian Bend Wash, Scottsdale Bike Stop and Greenbelt Trail System at Scottsdale and Vicinity, Maricopa County, Arizona," are modified as follows:

I. INVITATION FOR BIDS.

1.1 Delete the bid opening date "26 May 1982" and insert: 16 June 1982

II. This amendment shall be attached to and shall become a part of the specifications.

PAUL W. TAYLOR
Colonel, CE
Commanding

NOTICE: Bidders are required to acknowledge receipt of this amendment on the Bid Form, in the space provided, or by separate letter or telegram prior to opening of bids. Failure to acknowledge all amendments may cause rejection of the bid.

ged
Necessity
Verified

Reference: DACW09-82-B-0Q11-0002

Bid Opening Date: 30 June 1982

U.S. ARMY ENGINEER DISTRICT, LOS ANGELES
P. O. Box 2711
Los Angeles, California 90053

11 June 1982

AMENDMENT NO. 2

I. Specifications, Reference No. DACW09-82-B-0011, covering "Indian Bend Wash, Scottsdale Bike Stop and Greenbelt Trail System at Scottsdale and Vicinity, Maricopa County, Arizona," are modified as follows:

2. INVITATION FOR BIDS.

2.1 Page I-1. Delete the bid opening date "16 June 1982" and insert: 30 June 1982.

2.2 Page I-3

2.2.1 Paragraph 10, line 3. Delete "Room 7412" and insert: Room 1030

2.2.2 Paragraph 11. Delete lines 2,3,4, and 5 and insert:

U.S. Army Engineer District, Los Angeles Resident Office
2721 North Central Avenue
Phoenix, Arizona 85004

2.3 Page I-4.

2.3.1 Delete paragraphs 16, 16.1 and 16.2.

2.3.2 Delete paragraph 18 and insert:

18. SITE INSPECTION. Arrangements for visiting the site may be made by contacting Mr. Terry Buckley, Project Office, Indian Bend Wash, telephone (602) 241-2014.

3. BID FORM.

3.1 Page B-2. On line below "BUSINESS ADDRESS" insert: Business Telephone No.

3.2 Delete pages B-3 and B-4 and insert the inclosed pages B-3 (REVISED) and B-4 (REVISED).

4. TABLE OF CONTENTS. Delete the entire page and insert the inclosed page TABLE OF CONTENTS (REVISED).

5. SPECIAL PROVISIONS.

5.1 Page S-1.

5.1.1 Index. To the list of paragraphs add:

13. Equipment Ownership and Operating
Expense Schedule

5.1.2 Paragraph 1, line 4. Delete "360" and insert: 180

5.2 Page S-5.

5.2.1 Delete paragraph 7.1.

ARMY - C. of E. - Los Angeles Am.2

5.2.2 Paragraph 7.2, line 1. Delete "From the information *** the Government the" and insert: The

5.2.3 Paragraph 7.3.

5.2.3.1 Lines 2 and 3. Delete "From the bench marks established by the Government."

5.2.3.2 Line 5. Delete "established by the Contracting Officer"

5.3 Page S-8. After paragraph 12.2 insert:

13. EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE. (1981 JUN OCE).

13.1 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.

13.2 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.

6. SECTION 1B, MEASUREMENT AND PAYMENT.

6.1 Page 1B-1.

6.1.1 Index. After the first item insert: 1A. Diversion and Control of Water.

6.1.2 After paragraph 1 insert:

1A. DIVERSION AND CONTROL OF WATER. Payment for Diversion and Control of Water, will be made at the applicable contract price, which payment shall constitute full compensation for diversion and control of water and maintaining the work areas in a dry condition during construction.

6.1.3 Paragraph 2.1, line 15. After "pavement" insert: McDonald underpass,

6.2 Page 1B-2.

6.2.1 Paragraph 6, line 4. At end of paragraph insert: Payment will not include diversion and control of water for which separate payment is provided.

6.2.2 Paragraph 7. At the end of the paragraph add: Payment will also include bike path, earthwork, sidewalk ramp, gunite slope paving, sump dump, drainage scupper, electrical work, and related modifications.

6.2.3 Paragraph 9.1, line 1. Delete "waterline"

6.3 Page 1B-3.

6.3.1 Delete paragraph 11.1

6.3.2 Paragraph 12.1, line 2. Delete "in place" and insert: , in place, except for bike path at McDonald underpass for which separate payment is provided. Am. 2

ARMY - C. of E. - Los Angeles

6.3.3 Delete paragraph 14.1.

6.3.4 Paragraph 14.2, line 2. After "including" insert: depressed curbs,

6.3.5 Delete paragraph 15.1.

6.3.6 Paragraph 15.2. Delete line 3 and insert: concrete or shotcrete, placing, finishing and curing, except for slope paving at McDonald underpass for which separate payment is provided.

6.4 Page 1B-4.

6.4.1 Delete paragraph 16.1.

6.4.2 After paragraph 19.3 insert:

19.4 Payment for Drainage Structure Modification will be made at the applicable contract price, which payment shall constitute full compensation for modifications to existing drainage structure including new concrete retaining wall, fence relocation and appurtenant work.

6.5 Page 1B-5.

6.5.1 Paragraph 26, line 2. Delete "per each,"

6.5.2 Paragraph 27, line 1. After "Picnic Tables" insert: Regular, Handicapped Picnic Tables,

6.5.3 Paragraph 28, line 5. Delete "Complete" and insert: , complete, except for lighting at McDonald underpass for which separate payment is provided.

6.5.4 Delete paragraph 29 and insert:

29. PAVEMENT MARKING. No separate payment will be made for paint marking on pavement and all costs of such work will be included in the applicable contract price for constructing the pavement.

7. SECTION 1D, ENVIRONMENT PROTECTION.

7.1 Pages 1D-2 and 1D-3. Delete paragraph 7.4 and insert:

7.4 Location of Storage and Temporary Construction Facilities. Contractor's storage, and other construction buildings required temporarily in the performance of the work, shall be upon cleared portions of the job site 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 and temporary facilities shall be submitted for approval of the Contracting Officer.

8. AFTER SECTION 2A, insert the inclosed SECTION 2AA, DIVERSION AND CONTROL OF WATER

II. This amendment shall be attached to and shall become a part of the specifications.

2 Incl

1. Pages B-3(Revised), B-4(Revised) and Index(Revised).
2. Section 2AA

PAUL W. TAYLOR

Colonel, CE
Commanding

NOTICE: Bidders are required to acknowledge receipt of this amendment on the Bid Form, in the space provided, or by separate letter or telegram prior to opening of bids. Failure to acknowledge all amendments may cause rejection of the bid.

gcl
Necessity
Verified

Am. 2

ARMY - C. of E. - Los Angeles

BIDDING SCHEDULE

<u>Item No.</u>	<u>Description</u>	<u>Estimated Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Estimated Amount</u>
1.	CLEARING SITE AND REMOVING OBSTRUCTIONS	1	Job	L.S.	_____
1A.	DIVERSION AND CONTROL OF WATER	1	Job	L.S.	_____
2.	EARTHWORK	700	Cu.Yd.	_____	_____
3.	CONCRETE BIKE PATH, 4-INCH	5830	Sq.Yd.	_____	_____
4.	EXPOSED AGGREGATE WALK	120	Sq.Yd.	_____	_____
5.	SIDEWALK RAMP	1	Job	L.S.	_____
6.	MODIFICATION OF EXISTING BIKE PATH	1	Job	L.S.	_____
7.	LAKESIDE BIKE PATH	1	Job	L.S.	_____
8.	SLOPE PAVING	1	Job	L.S.	_____
9.	CONCRETE CURBS	1	Job	L.S.	_____
10.	DRAINAGE CHANNEL	1	Job	L.S.	_____
11.	DRAINAGE PIPE	1	Job	L.S.	_____
12.	DRAINAGE SCUPPER	1	Job	L.S.	_____
13.	MAINTENANCE GATE AND ROAD	1	Job	L.S.	_____
14.	ASPHALT CONCRETE PARKING LOT	1	Job	L.S.	_____
15.	ASPHALT CONCRETE BIKE PATH	1	Job	L.S.	_____
16.	MCDONALD UNDERPASS	1	Job	L.S.	_____
17.	POST AND CHAIN FENCE	1	Job	L.S.	_____
18.	WATERLINE	1	Job	L.S.	_____
19.	ELECTRICAL WORK FOR BIKE STOP	1	Job	L.S.	_____
20.	RESTROOM	1	Job	L.S.	_____
21.	RAMADA	4	Each	_____	_____
22.	LITTER RECEPTACLES	4	Each	_____	_____
23.	BENCHES	5	Each	_____	_____

BIDDING SCHEDULE (Continued)

<u>Item No.</u>	<u>Description</u>	<u>Estimated Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Estimated Amount</u>
24.	PICNIC TABLES, REGULAR	11	Each	_____	_____
25.	BARBEQUES	4	Each	_____	_____
26.	PREFABRICATED METAL TRUSS BRIDGE	1	Job	L.S.	_____
27.	BIKE TRAIL BRIDGE	1	Job	L.S.	_____
28.	HANDICAPPED PICNIC TABLES	3	Each	_____	_____
29.	SIGNS	1	Each	_____	_____
30.	FENCE, CHAIN LINK	160	Lin. Ft.	_____	_____
31.	TRASH ENCLOSURE	1	Job	L.S.	_____
32.	BICYCLE PARKING AREA	1	Job	L.S.	_____
33.	ENTRY GATE	1	Job	L.S.	_____
34.	IRRIGATION SYSTEM	1	Job	L.S.	_____
35.	GROUND COVER	1	Job	L.S.	_____
36.	TREES AND SHRUBS	1	Job	L.S.	_____
37.	DRAINAGE STRUCTURE MODIFICATION	1	Job	L.S.	_____
38.	TRAIL LIGHTING	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 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. If it is not stated, the bidder agrees that the lump sum adjustment shall be applied on a pro rata basis to every unit price in the bidding schedule.

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

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

T A B L E O F C O N T E N T S (R E V I S E D)

PART I SPECIAL PROVISIONS

PART II TECHNICAL PROVISIONS

<u>Section</u>	<u>Title</u>
1A	General Requirements
1B	Measurement and Payment
1D	Environmental Protection
2A	Clearing Site and Removing Obstructions
2AA	Diversion and Control of Water
2B	Fills and Subgrade Preparation
2C	Excavation
2D	Aggregate Base
2E	Prime Coat and Weed Killer
2EE	Bituminous Tack Coat
2F	Asphalt Concrete
2G	Excavation, Trenching and Backfilling for Utilities System
2H	Stone Drainage Channel
2I	Fence
2K	Concrete Sidewalks, Bike Paths, Curbs and Gutters
2O	Trees, Shrubs and Ground Cover
2Q	Pavement Markings
2S	Irrigation System
2U	Desert Granite and Miscellaneous Aggregates
3A	Concrete
3B	Formwork For Concrete
3C	Steel Bars, Welded Wire Fabric and Accessories For Concrete Reinforcement
3E	Pneumatically Placed Concrete
3F	Grouting Stone Protection
4A	Reinforced Masonry
5A	Structural Steel
5B	Miscellaneous Metal
6A	Rough Carpentry
7A	Roofing, Strip Shingles
7B	Sheet Metalwork
7C	Calking and Sealants
8A	Steel Doors and Frames
8C	Hardware; Builders' (General Purpose)
9A	Painting, General
10A	Metal Toilet Partition Doors
10B	Toilet Accessories
11K	Miscellaneous Items
15A	Plumbing, General Purpose
15E	Sewers; Sanitary, Gravity
15F	Waterlines
15G	Pumps; Sewage
16A	Electrical Distribution and Bike Path Lighting System; Underground

SECTION 2AA

DIVERSION AND CONTROL OF WATER

1. REQUIREMENT.

1.1 General. All permanent construction shall be carried on in areas free from water. Water in varying quantities may be flowing in the channel during the entire period of construction. Runoff from the watersheds is rapid and, during periods of rain, intermittent freshets may be expected. The responsibility of the Contractor for protection of work against waterflows is specified in paragraph: DAMAGE TO WORK of the SPECIAL PROVISIONS. At all locations where construction work is at a lower elevation than the elevation of the stream or groundwater 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 earthfill, 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 proposed 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.

1.2 Surface flows in Indian Bend Wash in excess of 2,000 cfs will be regarded as floodflows.

1.3 Drainage Ditches. The location and depth of any drainage ditch shall be subject to approval of the Contracting Officer. Special precaution shall be taken to avoid impairing the permanent subgrade and any excavation below the existing streambed or invert subgrade shall be refilled with compacted fill in accordance with the section: FILLS AND SUBGRADE PREPARATION by and at the expense of the Contractor.

* * * * *