

WICKENBURG  
PROJECT

A240 50

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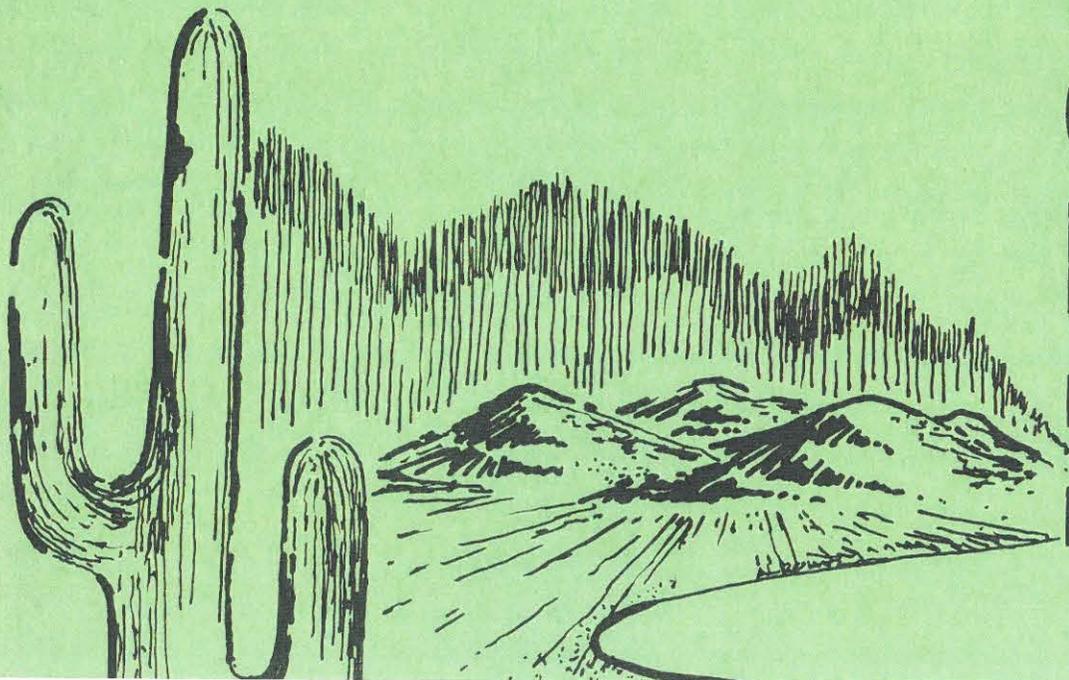
BIDDER

1. Peter Kiewit Sons' Co.	\$ 924,573.00
2. J. D. Dutton, Inc.	829,904.99
3. Anderson Contracting	1,100,369.05
4. New Pueblo Constructors	1,008,474.25
5. Lester E. Jackson	1,334,743.20
6. Tiffany Construction	1,272,169.16
7. Hunter Contracting	1,108,848.50
8. M. M. Sundt	766,738.00

Engineer's Estimate  
\$723,809.85

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

**CONSTRUCTION  
PLANS &  
SPECIFICATIONS**



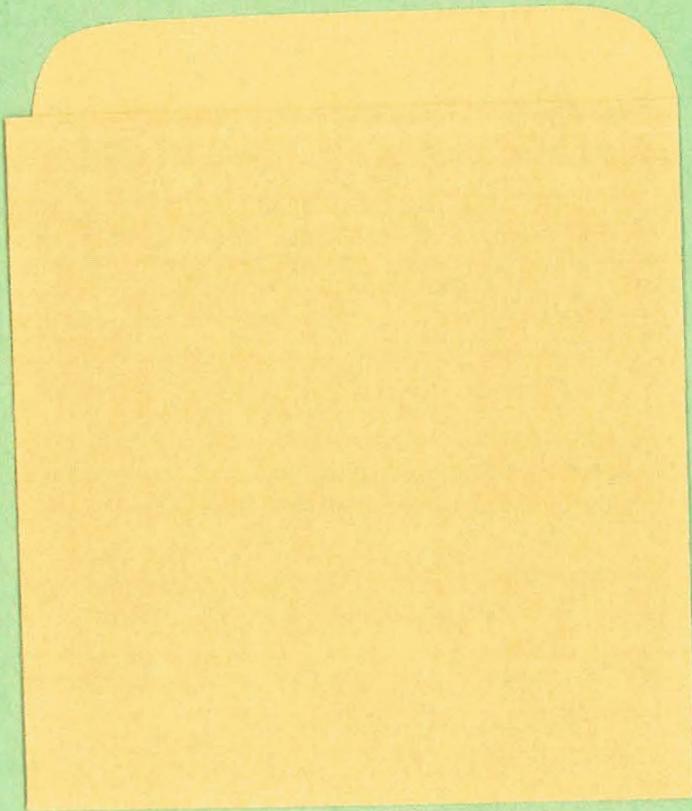
**WICKENBURG**  
ARIZONA



**ENGINEERS TESTING LABORATORIES, INC.**

3737 E. Broadway  
Phoenix, Arizona 85040  
(602) 268-1381

**H. LEE MYERS, P.E.**  
President



FLOOD CONTROL DISTRICT  
OF  
MARICOPA COUNTY

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

3325 West Durango Road  
Phoenix, Arizona 85009  
January 26, 1976

ADDENDUM NO. 1 TO INVITATION NO. FCD-76-1 SCHEDULED TO BE OPENED AT 2:00 P.M. LOCAL TIME AT THE PLACE OF BID OPENING, FEBRUARY 2, 1976, COVERING TWO EARTH FILLED FLOODWATER RETARDING STRUCTURES AND OUTLET PIPELINES IN THE WICKENBURG WATERSHED PROJECT.

1. Prospective bidders are hereby advised of the following changes in the Special Provisions:

Add the following paragraph as Special Provision No. 31.

31. Termination for convenience of the contracting local organization.

The Contracting Officer, by written notice, may terminate this contract in whole or in part, when it is in the interest of the Contracting Local Organization. If this contract is so terminated, the Contractor shall be compensated for all necessary and reasonable direct costs of performing the work actually accomplished. In addition, the Contractor shall be paid 10 percent for overhead expenses based on said direct costs, and 5 percent for profit based on the total of direct costs and overhead costs. From this will be deducted any payments or reimbursements previously paid and salvage value of materials paid for by the Contracting Local Organization, but not used, provided, however, no profit shall be paid if the Contractor would have incurred a loss had the entire contract been completed.

2. Prospective bidders are hereby advised of the following changes in the specifications and on the drawings:
  - (a) Sheet 22, double drive gate detail, Type I-A, and typical walk gate, Type I-B on Sunset Dam, the vertical pipes on gates, and gate posts may be extended to replace the vertical barbed wire extensions.
  - (b) Page (81-4) Sunset FRS and Sunny Cove FRS, Items of Work and Construction Details, Change 7.a.(3) to read as follows:

The trash racks on both low and high stage inlets including the top 60-inch CMP coupling band and steel grating shall be painted in the manner specified in Construction Specification 82. The top 60-inch CMP coupling band will be painted after all welding is completed.

- (c) Page (402-1) Construction Specification Pavement Replacement, change Section 2, "Applicable Standard Specifications" to read as follows:

All the work specified shall comply with the requirements of the following reference specifications except as modified.

Maricopa Association of Government Uniform Standard Specifications for Public Works Construction Sections 336,321, 601, 710.

City of Phoenix Standard Details.

- (d) Page (403-1) Construction Specification, Utility Line Crossing, Change Section 2, "Applicable Standard Specifications" to read as follows:

All the work specified shall comply with the requirements of the following referenced specifications except as modified:

City of Phoenix Standard Details.

Maricopa Association of Government Uniform Standard Specifications for Public Works Construction.

- (e) Page (21-7), Section 12, Items of Work and Construction Details, Bid Item 2, Change the reference in Sections 12.a.(4) (a) and 12.a.(4) (c) from Standard Specification No. 600, City of Phoenix, Arizona to Section No. 601 of the Maricopa Association of Government Uniform Standard Specifications for Public Works Construction.
- (f) Pages (23-8) and (23-9), Section 10, Items of Work and Construction Details, Bid Item 4 and Bid Item 5, change the reference in Sections 10.a.(3) and 10.b(3) from Standard Specification No. 600 City of Phoenix, Arizona to Section No. 601 of the Maricopa Association of Government Uniform Standard Specifications for Public Works Construction.
- (g) Page (23-10) Bid Item 6, Pipeline Backfill, Random, Section 10.(c) (6), change Method 4 to Method 6.

(h) Borrow of embankment earth fill, Zone III, Bid Item 8, Section 10.b.(3) refers to an additional borrow area (Section 14) located approximately one mile south of Sunnycove FRS. The Contractor is alerted that the equipment and noise disturbance is critical to the nesting of wildlife natural to this area. Borrow excavation is limited to consecutive work days for a single period of time to cause minimum disturbance during the construction schedule. Periodic removal schedules will not be allowed.

3. All other conditions of this Invitation for Bids remain the same.
4. Bidders must acknowledge receipt of this addendum. Acknowledgement must be shown in the spaces provided herein or on the bid form in the Invitation for Bids, and must be received before the time set for receiving bids, 2:00 p.m., local time, at the place of bid opening, February 2, 1976.
5. FAILURE TO ACKNOWLEDGE RECEIPT OF THIS ADDENDUM WILL CAUSE REJECTION OF BID.

*Jack A. Leauth*

Contracting Officer

ACKNOWLEDGED:

BIDDER: \_\_\_\_\_

BY: \_\_\_\_\_

TITLE: \_\_\_\_\_

INVITATIONS FOR BIDS

Wickenburg Watershed Project

Adjacent to the South-Western  
Portion of the Town of  
Wickenburg, Maricopa County,  
Arizona

Invitation No. FCD-76-1  
Date: January 5, 1976  
Issued by the Contracting  
Local Organization:  
Flood Control District  
of Maricopa County

SEALED BIDS, IN SINGLE COPY FOR THE WORK DESCRIBED HEREIN WILL BE RECEIVED UNTIL 2 P.M., LOCAL TIME AT THE PLACE OF BID OPENING, FEBRUARY 2, 1976, IN THE OFFICE OF THE FLOOD CONTROL DISTRICT, MARICOPA COUNTY HIGHWAY DEPARTMENT BUILDING, 3325 WEST DURANGO STREET, PHOENIX, ARIZONA 85009 AND AT THAT TIME PUBLICLY OPENED.

PROSPECTIVE BIDDERS MAY ASSEMBLE IN THE WICKENBURG TOWN HALL, CONFERENCE ROOM, 120 EAST APACHE, WICKENBURG, ARIZONA ON TUESDAY, JANUARY 20 & 27 1976, FOR A GROUP SHOWING OF THE WORK SITE. THE GROUP WILL LEAVE TOWN HALL AT 10:00 A.M., ON EACH OF THE ABOVE DAYS. IF YOU ARE UNABLE TO ATTEND ONE OF THE GROUP SHOWINGS, ARRANGEMENTS TO INSPECT THE SITE MAY BE MADE WITH HERBERT P. DONALD, CONTRACTING OFFICER FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY, 3325 WEST DURANGO STREET, PHOENIX, ARIZONA 85009 (PHONE 278-7682).

BID SECURITY IN AN AMOUNT OF NOT LESS THAN TWENTY PERCENT (20%) OF THE TOTAL BID PRICE, MUST BE SUBMITTED WITH EACH BID EXCEEDING \$25,000. SECURITY MAY BE IN THE FORM OF A BID BOND, CASHIERS CHECK, POSTAL MONEY ORDER, OR CASH. IF A BID BOND IS USED IT MUST BE EXECUTED ON FORM SCS-AS-158 (COPIES ENCLOSED). IF A CHECK OR MONEY ORDER IS USED, IT MUST BE MADE PAYABLE TO THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY. BID SECURITY, OTHER THAN BID BOND SUBMITTED BY UNSUCCESSFUL BIDDERS WILL BE RETURNED AS SOON AS PRACTICABLE AFTER AWARD OF CONTRACT.

THE SUCCESSFUL BIDDER WILL BE REQUIRED TO EXECUTE CONTRACT, FORM SCS-AS-41. IF A BID EXCEEDS \$25,000, HE WILL BE REQUIRED TO FURNISH TO THE CONTRACTING LOCAL ORGANIZATION A PERFORMANCE BOND ON FORM SCS-AS-161 AND A PAYMENT BOND ON FORM SCS-AS-160 IN PENAL SUMS OF NOT LESS THAN ONE HUNDRED PERCENT (100%) AND FIFTY PERCENT (50%), RESPECTIVELY, OF THE ORIGINAL AMOUNT OF THE CONTRACT. PROVIDED HOWEVER, IF THE AMOUNT OF THE BID EXCEEDS \$100,000, THE PAYMENT BOND SHALL BE NOT LESS THAN ONE HUNDRED PERCENT (100%) OF THE ORIGINAL AMOUNT OF THE CONTRACT.

DESCRIPTION OF WORK: CONSTRUCTION OF TWO FLOODWATER RETARDING STRUCTURES INCLUDING OUTLET PIPELINE, FENCING AND SEEDING INVOLVING THE ESTIMATED QUANTITIES SHOWN IN THE ATTACHED BID SCHEDULE.

THE WORK SHALL BE COMMENCED WITHIN TWENTY (20) CALENDAR DAYS AND BE COMPLETED WITHIN TWO HUNDRED AND TEN (210) CALENDAR DAYS AFTER THE DATE OF RECEIPT OF THE NOTICE TO PROCEED.

NOTICE: THE BID SCHEDULE, GENERAL PROVISIONS, SPECIAL PROVISIONS, EQUAL OPPORTUNITY CLAUSE, CERTIFICATION OF NONSEGREGATED FACILITIES, INSTRUCTIONS TO CONTRACTORS, CONTRACTOR'S AFFIRMATIVE ACTION PLAN, SPECIFICATIONS, AND DRAWINGS LISTED UNDER CONTENTS WILL BE INCORPORATED IN AND BECOME A PART OF THIS RESULTANT CONTRACT.

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## INSTRUCTIONS TO BIDDERS (LOCAL 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 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 Contracting Local Organization 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 Contracting Local Organization 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, or cashier's check. 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 Contracting Local Organization 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) No bid will be considered unless all items in the bid schedule are priced. In case of error in the extension of price, the unit price shall

## 5. PREPARATION OF BIDS—Continued

govern. The quantities listed in the bid schedule on which unit prices are requested are estimates only.

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

(d) *Modification 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

(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 Contracting Local Organization 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 Contracting Local Organization that the late receipt was due solely to mishandling by the Contracting Local Organization after receipt at the Contracting Local Organization 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 Contracting Local Organization

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

#### **10. AWARD OF CONTRACT—Continued**

invitation for bids, is most advantageous to the Contracting Local Organization, price and other factors considered.

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

(c) Only one contract will be awarded and the award will be based on the total bid, corrected if necessary, for errors in price extensions and/or addition.

#### **11. CONTRACT, BONDS AND INSURANCE**

The bidder whose bid is accepted will, within the time established in the bid, enter into a written contract with the Contracting Local Organization, and if required, furnish performance and payment bonds on forms furnished by the Contracting Officer in the amounts indicated

in the invitation for bids or the specifications. The bidder whose bid is accepted will secure and maintain such insurance as is required by statute and/or ordinance.

#### **12. SPECIFICATIONS**

Specifications referred to herein shall include all revisions and amendments in effect on the date of issuance of the invitation for bids. Information as to where these specifications may be obtained can be acquired from the office issuing this invitation.

#### **13. RECORDS**

Records of the site investigation and soil mechanics testing report may be reviewed by prospective bidders by contacting the office issuing this invitation.

SPECIAL INSTRUCTIONS

Prior to commencement of any work on or adjacent to railroad property, the successful bidder will be required to comply with liability insurance requirements established by the Atchison, Topeka and Santa Fe Railway Company. These insurance requirements are detailed in paragraphs 17(a), 17(b) and 18 of the attached "Rider A." A set of instructions for obtaining the insurance is also attached.

Any questions concerning these insurance requirements should be referred to:

The Atchison, Topeka and Santa Fe Railway Company  
121 East Sixth Street  
Los Angeles, California 90014  
ATTN: Mr. H. D. Fish, General Manager  
Tel. 213/628-0111, Extension 22519

Railway representatives will be required to be present when working on railroad right-of-way. Arrangements for this shall be made by contacting the following:

The Atchison, Topeka and Santa Fe Railway Company  
Winslow, Arizona 86047  
ATTN: Mr. R. V. Ketring, Office Engineer  
Tel. 602/289-4615

Important: Any additional expenses incurred by the contractor in complying with insurance requirements of the railroad shall not be included in the price bid on work to be performed. When additional costs, if any, are determined, the contractor shall submit a separate billing to the contracting officer.

THE ATCHISON, TOPEKA AND SANTA FE RAILWAY COMPANY

and

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

13. In cases where Licensee is permitted under paragraph 2 hereof to use the PIPE LINE for non-flammable substances, the PIPE LINE shall be constructed, installed and thereafter maintained in conformity with plans and specifications set forth in the American Railway Engineering Association, Specification for Pipe Line Crossings under Railway Track for non-flammable substances, Revised 1964, or Specification for the placement of Concrete Culvert Pipe, Revised 1966, whichever may apply.

14. Any work performed on Licensor's right of way by Licensee or Licensee's contractor shall be done in a satisfactory workmanlike manner and in accordance with plans and specifications approved by Licensor, including plans covering any falsework, bracing or cribbing that may be necessary to use over, under or adjacent to Licensor's track, and no work shall be permitted until said plans and specifications have been approved by Licensor.

15. Licensee or Licensee's contractor shall not be permitted to commence work on Licensor's right of way without having first received written notification from Licensor's Division Superintendent of permission to proceed.

16. Any contractor or subcontractor performing work on or in connection with the PIPE LINE shall for the purposes of this agreement, and particularly for the purposes of Section 6 of this agreement, be conclusively deemed to be the servant and agent of Licensee acting on behalf and within the scope of such contractors' or subcontractors' employment for Licensee.

17. Licensee agrees to furnish and keep in force or arrange to have furnished and keep in force insurance of all kinds and amounts specified below during the initial term of construction of the PIPE LINE and during any subsequent term or terms during which maintenance is performed on the PIPE LINE.

(a) The Licensee shall, with respect to the operations which it performs upon, beneath or adjacent to Licensor's right of way and/or track, furnish or arrange to have furnished (i) regular Contractors' Public Liability Insurance with limits of not less than Five Hundred Thousand Dollars (\$500,000) for all liability arising out of bodily injuries to or death of one person, and subject to that limit for each person, One Million Dollars (\$1,000,000) for all liability arising out of bodily injuries to or death of two or more persons in one accident or occurrence and (ii) regular Contractors' Property Damage Liability Insurance with limits of not less than One Million Dollars (\$1,000,000) for each occurrence for all liability arising out of damage to or loss or destruction of property. Licensee and all its contractors and subcontractors shall be named insureds either in a single policy of insurance complying with the requirements of this subparagraph (a) or in separate policies maintained during such periods as such contractors and/or subcontractors shall perform any work hereunder. The policy or policies insuring Licensee shall insure Licensee's contractual liability in favor of Licensor contained in paragraph 6 of the printed provisions of this license.

(b) The Licensee shall, with respect to the operations it or any of its contractors or subcontractors perform upon, beneath or adjacent to Licensor's right of way and/or track, furnish or arrange to have furnished in Licensor's favor (i) policy or policies of insurance satisfactory to Licensor which shall protect Licensor against liability for injuries to or death of person or persons, INCLUDING LICENSOR'S EMPLOYEES, occasioned by or resulting, in whole or in part, from the operations of the Licensee or any of its subcontractors, on or continuous to Licensor's property (except liability due solely to Licensor's negligence), with limits of not less than Five Hundred Thousand Dollars (\$500,000) for all damages arising out of bodily injuries to or death of one person and subject to such limitation, One Million Dollars (\$1,000,000) for all damages arising out of bodily injuries to or death of two or more persons in any one accident or occurrence; and (ii) policy or policies of insurance satisfactory to Licensor which will protect Licensor against liability for damage to or loss or destruction of property, including property in Licensor's care, custody or control, occasioned by or resulting, in whole or in part, from the operations of the Licensee, its contractors or subcontractors (except liability due solely to Licensor's negligence) with limits of not less than One Million Dollars (\$1,000,000) for each occurrence.

18. Licensee agrees to furnish or arrange to have furnished to Licensor certificates reflecting the insurance coverage and a certified copy of insurance policy, if requested by Licensor, as required by subparagraph (a) of paragraph 17 hereof and to furnish, or arrange to have furnished, the original policy required by subparagraph (b) of paragraph 17. Certificates reflecting the coverage required by subparagraph (a) shall unqualifiedly require 30 days written notice to Licensor of cancellation or modification of the insurance referred to in such certificates.

19. Licensee shall not be permitted to exercise the license and permission granted hereunder until notified by the Licensor that insurance furnished pursuant to paragraph 17 hereof is satisfactory.

NO 11.00

INSTRUCTIONS FOR OBTAINING INSURANCE FOR PIPELINE LICENSE

Paragraph 17-a

SALIENT ITEMS

- ① Furnish certificate in duplicate.
- ② Amounts as shown.
- ③ Contractual liability.
- ④ Description and location of project.
- ⑤ Additional Insured - Name of Licensee when contractor performs work.
- ⑥ Not less than 30 days cancellation notice.

Name of Insurance Company

- ① Policy No. \_\_\_\_\_  
Name of Insured: (Name of contractor or Licensee if no contractor involved)

	Effective Date	Each Occurrence	Limit
Public Liability	(Actual Date)	\$ 500,000	\$1,000,000
Property Damage Liability	(Actual Date)	1,000,000	1,000,000

- ②
- ③ Liability includes Contractual liability as per written agreement.
- ④ Description and location of project: (brief description including street, city, state, etc.)
- ⑤ Additional Insured: (Name of Licensee - when contractor involved)
- ⑥ At least 30 days cancellation notice in writing.

Paragraph 17-b

SALIENT ITEMS

- ① Furnish original policy.
- ② Railway Company as Insured.
- ③ Not less than 30 days cancellation.

Note: For train operation over tracks involved call:

Needles to Barstow & So. Calif. area  
San Bernardino  
(714) 884-2111 Ext. 258

North of Barstow area  
Elysian  
(209) 486-0400 Ext. 256

*R.V. Netring, Ofc ENGR*  
East of Needles - Arizona & New Mexico  
Winslow, Arizona  
(602) 283-4615 Ext. 259

*his file: AP-32053*  
Metropolitan Los Angeles - Long Beach  
(213) 624-0111 Ext. 33438

Name of Insurance Company  
RAILROAD PROTECTIVE

- ① Policy No. \_\_\_\_\_
- ② Name of Insured: The Atchison, Topeka and Santa Fe Railway Company  
121 E. 6th Street  
Los Angeles, CA 90014

	Effective Date	Each Occurrence	Limit
Public Liability	(Actual Date)	\$ 500,000	\$1,000,000
Property Damage Liability	(Actual Date)	1,000,000	1,000,000

Description and location of project: (brief description including street, city, state, etc.)

Name of contractor:

- ③ At least 30 days cancellation notice in writing.

Detail plans required if jacking pit within \_\_\_\_\_ of center line of track.

SPECIAL INSTRUCTION (Continued)

Workweek - Construction Schedule

The Contractor shall, within 10 days after receipt of a written request from the Contracting Officer, and prior to award, submit in writing for approval: (a) a construction schedule showing the order in which he proposes to carry on the work indicating the periods during which he will perform work on each item listed in the bid schedule; and (b) the hours and days he proposes to carry out the work. The maximum workweek that will be approved is 10 hours a day, Monday through Saturday. The Contractor's proposed hours of work shall include daily starting and stopping times. Failure to submit the proposed construction schedule, and days and hours of work, within the time specified may be cause for rejection of the bid.

12. EQUAL EMPLOYMENT OPPORTUNITY - AFFIRMATIVE ACTION REQUIREMENTS ARIZONA  
"HOMETOWN" PLAN.

BID CONDITIONS  
AFFIRMATIVE ACTION REQUIREMENTS  
EQUAL EMPLOYMENT OPPORTUNITY

For all Non-Exempt Federal and Federally-Assisted Construction Contracts to be Awarded in the Area of Jurisdiction of the Phoenix Building and Construction Trades Council.

Part I: The provisions of this Part I apply to bidders, contractors and subcontractors with respect to those construction trades for which they are parties to collective bargaining agreements with a labor organization or organizations and who together with such labor organizations have agreed to the Arizona Plan on minority employment dated November 24, 1970, (but only as to those trades as to which there are commitments by labor organizations to specific goals of minority manpower utilization) among the Phoenix Building and Construction Trades Council, general and specialty contractors associations and representatives of the minority community, together with all implementing agreements that have been and may hereafter be developed pursuant thereto, all of which documents are incorporated herein by reference and are hereinafter cumulatively referred to as the Arizona Plan.

Any bidder, contractor or subcontractor using one or more trades of construction employees must comply with either Part I or Part II of these Bid Conditions as to each such trade. Thus, a bidder, contractor or subcontractor may be in compliance with these conditions by its inclusion, with its union, in the Arizona Plan as to trade "A", provided there is set forth in the Arizona Plan a specific commitment by that union to a goal of minority manpower utilization for such trade "A", thereby meeting the provisions of this Part I, and by its commitment to Part II in regard to trade "B" in the instance in which it is not included in the Arizona Plan and, therefore, cannot meet the provisions of this Part I.

To be eligible for award of a contract under Part I of this Invitation for Bids, a bidder must execute and submit as part of its bid the following certification, which will be deemed a part of the resulting contract:

(See Over)

certifies that:

\_\_\_\_\_  
(Name of Bidder)

(a) it intends to use the following listed construction trades in the work under the contract, either itself or through subcontractors at any tier \_\_\_\_\_

\_\_\_\_\_  
(b) the labor organizations with whom it has collective bargaining agreements who are signatories to the Arizona Plan and as to which trades there are set forth in the Arizona Plan specific commitments to goals of minority manpower utilization are as follows: \_\_\_\_\_

\_\_\_\_\_  
(c) the labor organizations with whom it has collective bargaining agreements who are not signatories to the Arizona Plan or who are signatories thereto but with respect to trades for which no specific commitments to goals of minority manpower utilization are set forth in the Arizona Plan are as follows: \_\_\_\_\_

\_\_\_\_\_  
(d) the following is a full list of all present construction work or contracts (both federal and non-federal) to which it is a party in any capacity in the area of jurisdiction of the Phoenix Building and Construction Trades Council: \_\_\_\_\_

\_\_\_\_\_  
(e) it will comply, and require its subcontractors to comply, with all of the terms of the Arizona Plan on all work (both federal and non-federal) in the area described in the preceding paragraph (d) hereof, in any trade as set forth in paragraph (b) hereof for which it or its subcontractors are committed to the Arizona Plan, and will be bound by the provisions of Part II of these Bid Conditions on all work in such area, for all other trades as set forth in paragraph (c) hereof; and (f) in the event the bidder is no longer participating in an affirmative action plan acceptable to the Director of the Office of Federal Contract Compliance, including the Arizona Plan, or it or the union with whom it maintains a collective bargaining agreement ceases to be a participating signatory to the Arizona Plan, the bidder will comply with Part II of these Bid Conditions.

\_\_\_\_\_  
(Signature of authorized representative of bidder.)

The bidder shall cause the following certification to be included in all bid invitations to prospective subcontractors, regardless of whether they are signatories to the Arizona Plan and regardless of tier; and shall cause the following certification, as executed, to be made a part of all subcontracts, regardless of tier:

\_\_\_\_\_ certifies that  
(Name of Subcontractor)  
it understands the equal employment opportunity requirements of the Arizona Plan regarding equal employment opportunity in the construction industry in the area of jurisdiction of the Phoenix Building and Construction Trades Council; that it either individually or through an association and the labor organizations with whom it has collective bargaining agreements are signatories and agree to comply with the Arizona Plan and there are set forth in the Arizona Plan specific commitments to goals of minority manpower utilization as to such trades or if such is not the case it agrees to comply with the requirements of Part II of the Bid Conditions; that in the event the subcontractor is no longer participating in an affirmative action plan acceptable to the Director of the Office of Federal Contract Compliance, including the Arizona Plan, the subcontractor will comply with Part II of these Bid Conditions; that it shall require the execution of this certification by any of its subcontractors, regardless of tier; and that this certification shall be a part of any subcontract.

(Signature of authorized representative of subcontractor)  
In order to ensure that the said subcontractor certification becomes a part of all subcontracts under the prime contract of a prime contractor with respect to whom this Part I is applicable, no subcontract shall be executed until an authorized representative of the Flood Control District has determined, in writing, that the said certification has been incorporated in such subcontract, regardless of tier. Any subcontract executed without such written approval shall be void.

Part II: A. Coverage. The provisions of this Part II shall be applicable to those bidders, contractors and subcontractors, who, in regard to such construction trades:

(See Over)

1. Are not or hereafter cease to be signatories to the Arizona Plan referred to in Part I hereof;

2. Are signatories to the Arizona Plan but are not parties to collective bargaining agreements;

3. Are signatories to the Arizona Plan but are parties to collective bargaining agreements with labor organizations who are not or hereafter cease to be signatories to the Arizona Plan;

4. Are signatories to the Arizona Plan but as to which no specific commitment to goals of minority manpower utilization by labor organization have been executed pursuant to the Arizona Plan; or

5. Are no longer participating in an affirmative action plan acceptable to the Director, OFCC, including the Arizona Plan.

B. Requirement -- An Affirmative Action Plan. The bidders, contractors and subcontractors described in paragraphs 1 through 5 above will not be eligible for award of a contract under this Invitation for Bids, unless it has submitted as part of its bid, and has had approved by the Flood Control District a written affirmative action plan, embodying both (1) goals and timetables of minority manpower utilization, 1/ and (2) specific affirmative action steps directed at increasing minority manpower utilization by means of applying good faith efforts to carrying out such steps or is deemed to have submitted such a program pursuant to Section 3 of this Part II. Both the goals and timetables, and the affirmative action steps must meet the requirements of this Part II as set forth below for all trades which are to be utilized on the project, whether subcontracted or not.

1. Goals and Timetables. The plan must set forth goals of minority manpower utilization for the bidder and all contractors and subcontractors for those trades not otherwise bound by the provisions of Part I hereof in terms of manhours, within at least the following ranges, for the following time periods, for each trade which will be used on the project within the area of jurisdiction of the Phoenix Building and Construction Trades Council (hereinafter referred to as the Phoenix area).

1/ "Minority" is defined as including Negroes, Spanish Surnamed Americans, Orientals and American Indians.

Until 11/30/71	5.0% - 10.0%
From 12/1/71 Until 11/30/72	10.0% - 15.0%
From 12/1/72 Until 11/30/73	15.0% - 20.0%
From 12/1/73 Until 11/30/74	20.0% - 25.0%
From 12/1/74 Until 11/30/75	25.0% - 30.0%

In the event that under a contract which is subject to these Bid Conditions any work is performed in a year later than the latest year for which acceptable ranges of minority manpower utilization have been determined herein, the ranges for 1974-1975 shall be applicable to such work.

The percentages of minority manpower utilization above are expressed in terms of manhours of training and employment as a proportion of the total manhours to be worked by the bidder's, contractor's and subcontractor's entire work force in that trade on all projects (both federal and non-federal) in the Phoenix area during the performance of its contract or subcontract. The manhours for minority work and training must be substantially uniform throughout the length of the contract, on all projects and for each of the trades. Further, the transfer of minority employees or trainees from employer-to-employer or from project-to-project for the sole purpose of meeting the contractor's or subcontractor's goal shall be a violation of these conditions.

In reaching the goals of minority manpower utilization required of bidders, contractors and subcontractors pursuant to this Part II, every effort shall be made to find and employ qualified journeymen. However, where minority journeymen are not available, minority trainees in pre-apprenticeship, apprenticeship, journeyman training or other training programs may be used.

In order that the nonworking training hours of trainees may be counted in meeting the goal, such trainees must be employed by the contractor during the training period, the contractor must have made a commitment to employ the trainees at the completion of their training and the trainees must be trained pursuant to established training programs which must be the equivalent of the training programs now or hereafter provided for in the Arizona Plan with respect to the nature, extent and duration of training offered.

(See Over)

A contractor or subcontractor shall be deemed to be in compliance with the terms and requirements of this Part II by the employment and training of minorities in the appropriate percentage of his aggregate work force in the Phoenix area for each trade for which it is committed to a goal under this Part II.

However, no contractor or subcontractor shall be found to be in noncompliance solely on account of its failure to meet its goals within its timetables, but such contractor shall be given the opportunity to demonstrate that it has instituted all of the specific affirmative action steps specified in this Part II and has made every good faith effort to make these steps work toward the attainment of its goals within its timetables, all to the purpose of expanding minority manpower utilization on all of its projects in the Phoenix area.

In all cases, the compliance of a bidder, contractor or subcontractor will be determined in accordance with its respective obligations under the terms of these Bid Conditions. Therefore, contractors or subcontractors who are governed by the provisions of this Part II shall be subject to the requirements of that Part regardless of the obligations of its prime contractor or lower tier subcontractors.

All bidders and all contractors and subcontractors performing or to perform work on projects subject to these Bid Conditions hereby agree to inform their subcontractors of their respective obligations under the terms and requirements of these Bid Conditions, including the provisions relating to goals of minority employment and training.

2. Specific Affirmative Action Steps. The plans for the bidders, contractors and subcontractors must set forth specific affirmative action steps directed at increasing minority manpower utilization, which steps must be at least as extensive and as specific as the following:

a. The contractor shall notify community organizations that the contractor has employment opportunities available and shall maintain records of the organizations' responses.

b. The contractor shall maintain a file of the names and addresses of each minority worker referred to him and what action was taken with respect to each such referred worker, and if the worker was not employed, the reasons therefor. If such worker was not sent to the

union hiring hall for referral or if such worker was not employed by the contractor, the contractor's file shall document this and the reasons therefor.

c. The contractor shall promptly notify the Flood Control District when the union or unions with whom the contractor has a collective bargaining agreement has not referred to the contractor a minority worker sent by the contractor or the contractor has other information that the union referral process has impeded him in his efforts to meet his goal.

d. The contractor shall participate in training programs in the area, especially those funded by the Department of Labor.

e. The contractor shall disseminate his EEO policy within his own organization by including it in any policy manual; by publicizing it in company newspapers, annual reports, etc.; by conducting staff, employee and union representatives' meetings to explain and discuss the policy; by posting of the policy; and by specific review of the policy with minority employees.

f. The contractor shall disseminate his EEO policy externally by informing and discussing it with all recruitment sources; by advertising in news media, specifically including minority news media; and by notifying and discussing it with all subcontractors and suppliers.

g. The contractor shall make specific and constant personal (both written and oral) recruitment efforts directed at all minority organizations, schools with minority students, minority recruitment organizations and minority training organizations, within the contractor's recruitment area.

h. The contractor shall make specific efforts to encourage present minority employees to recruit their friends and relatives.

i. The contractor shall validate all man specifications, selection requirements, tests, etc.

j. The contractor shall make every effort to promote after-school, summer and vacation employment to minority youth.

k. The contractor shall develop on-the-job training opportunities and participate and assist in any association or employer-group training programs relevant to the contractor's employee needs consistent with its obligations under this Part II.

(See Over)

1. The contractor shall continually inventory and evaluate all minority personnel for promotion opportunities and encourage minority employees to seek such opportunities.

m. The contractor shall make sure that seniority practices, job classifications, etc., do not have a discriminatory effect.

n. The contractor shall make certain that all facilities and company activities are non-segregated.

o. The contractor shall continually monitor all personnel activities to ensure that his EEO policy is being carried out.

p. The contractor shall solicit bids for subcontracts from available minority subcontractors engaged in the trades covered by these Bid Conditions, including circulation to minority contractor associations.

3. Contractors and Subcontractors Deemed to be Bound by Part II.

In the event a contractor or subcontractor, who is at the time of bidding eligible under Part I of these Bid Conditions, is no longer participating in an affirmative action plan acceptable to the Director of the Office of Federal Contract Compliance, including the Arizona Plan, he shall be deemed to be committed to Part II of these Bid Conditions. Further, whenever a contractor or subcontractor, who at the time of bidding is eligible under Part II of these Bid Conditions, uses trades not contemplated at the time he submits his bid, he shall be committed to Part II for those trades. Whenever a contractor or subcontractor is deemed to be committed to Part II of these Bid Conditions, he shall be considered to be committed to a manpower utilization goal of the minimum percentage range for that trade for the appropriate year.

4. Subsequent Signatory to the Arizona Plan. Any contractor or subcontractor subject to the requirements of this Part II for any trade at the time of the submission of his bid who together with the labor organization with whom it has a collective bargaining agreement subsequently becomes a signatory to the Arizona Plan, either individually or through an association, may meet its requirements under these Bid Conditions for such trade, if such contractor or subcontractor executes and submits the appropriate certification required by Part I of these Bid Conditions. No contractor or subcontractor shall be deemed to be

subject to the requirements of Part I until such certification is executed and submitted.

5. Non-discrimination. In no event may a contractor or subcontractor utilize the goals, timetables or affirmative action steps required by this Part II in such a manner as to cause or result in discrimination against any person on account of race, color, religion, sex or national origin.

6. Contractors and Subcontractors Bound. The affirmative action plan required by Part II shall be deemed a part of the resulting contract specifications. A successful bidder as to whom Part II is applicable, shall cause the affirmative action plan as established and approved, to be a part of all subcontracts, where necessary, regardless of tier, under his contract. No subcontract shall be executed until an authorized representative of the Flood Control District has determined, in writing, that such subcontractor has executed the certification required by Part I hereof, or that the affirmative action plan required by Part II, as applicable, has been incorporated into such subcontract, regardless of tier. Any subcontract executed without such written approval shall be void.

Part III: Materiality and Responsiveness

Any equal employment opportunity submission required to be made by the prospective contractor pursuant either to Part I or Part II of these Bid Conditions which is material and which will govern the contractor's performance on the project shall be made a part of his bid. Failure to submit a Part I certification or a Part II affirmative action plan, as applicable, will render the bid nonresponsive.

Part IV: Compliance and Enforcement

Contractors are responsible for informing their subcontractors (regardless of tier) as to their respective obligations under Parts I and II hereof (as applicable). Bidders, contractors and subcontractors hereby agree to refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a contractor debarred from, or who is determined not to be a "responsible" bidder for, Government contracts and federally assisted

(See Over)

construction contracts pursuant to the Executive Order. The bidder, contractor or subcontractor shall carry out such sanctions and penalties for violation of the equal opportunity clause including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered by the administering agency, the contracting agency or the Office of Federal Contract Compliance pursuant to the Executive Order. Any bidder, or contractor or subcontractor who shall fail to carry out such sanctions and penalties shall be deemed to be in noncompliance with these Bid Conditions and Executive Order 11246.

Nothing herein is intended to relieve any contractor or subcontractor during the term of its contract on this project from compliance with Executive Order 11246 and the Equal Employment Opportunity Clause of its contract, with respect to matters not covered in the Arizona Plan or in Part II of these Bid Conditions.

Violation of any substantial requirement in the Arizona Plan by a contractor or subcontractor covered by Part I of these Bid Conditions including the failure of such contractor or subcontractor to make a good faith effort to meet its fair share of the trade's goals of minority manpower utilization, or of the terms of the Affirmative Action Plan by a contractor or subcontractor who is covered by Part II hereof shall be deemed to be noncompliance by such contractor or subcontractor with the Equal Opportunity Clause of the contract, and shall be grounds for imposition of the sanctions and penalties provided at Section 209(a) of Executive Order 11246.

Each agency shall review its contractors' and subcontractors' employment practices during the performance of the contract. If the agency determines that the Arizona Plan no longer represents effective affirmative action, it shall so notify the Office of Federal Contract Compliance which shall be solely responsible for any final determination of that question and the consequences thereof.

In regard to Part II of these conditions if the contractor or subcontractor meets its goals or if the contractor or subcontractor can demonstrate that it has made every good faith effort to meet these goals, the contractor or subcontractor shall be presumed to be in compliance with Executive Order 11246, the implementing regulations and its obligations

under these Bid Conditions and no formal sanctions or proceedings leading toward sanctions shall be instituted unless the agency otherwise determines that the contractor or subcontractor is not providing equal employment opportunities. In judging whether a contractor or subcontractor has met its goals, the agency will consider each contractor's or subcontractor's minority manpower utilization and will not take into consideration the minority manpower utilization of its subcontractors. Where the agency finds that the contractor or subcontractor has failed to comply with the requirements of Executive Order 11246, the implementing regulations and its obligations under these Bid Conditions, the agency shall take such action and impose such sanctions as may be appropriate under the Executive Order and the regulations. When the agency proceeds with such formal action it has the burden of proving that the contractor has not met the requirements of these Bid Conditions, but the contractor's failure to meet his goals shall shift to him the requirement to come forward with evidence to show that he has met the "good faith" requirements of these Bid Conditions by instituting at least the Specific Affirmative Action steps listed above and by making every good faith effort to make those steps work toward the attainment of its goals within its timetables. The pendency of such formal proceedings shall be taken into consideration by Federal agencies in determining whether such contractor or subcontractor can comply with the requirements of Executive Order 11246 and is therefore a "responsible prospective contractor" within the meaning of the Federal procurement regulations.

It shall be no excuse that the union with which the contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees.

The procedures set forth in these conditions shall not apply to any contract when the head of the contracting or administering agency determines that such contract is essential to the national security and that its award without following such procedures is necessary to the national security. Upon making such a determination, the agency head will notify, in writing, the Director of the Office of Federal Contract Compliance within thirty days.

(See Over)

Requests for exemptions from these Bid Conditions must be made in writing, with justification, to the Director, Office of Federal Contract Compliance, U. S. Department of Labor, Washington, D.C. 20210, and shall be forwarded through and with the endorsement of the agency head.

Contractors and subcontractors must keep such records and file such reports relating to the provisions of these Bid Conditions as shall be required by the contracting or administering agency or the Office of Federal Contract Compliance.

For the information of bidders, a copy of the Arizona Plan may be obtained from the contracting officer.

NOTICE TO PROSPECTIVE FEDERALLY ASSISTED CONSTRUCTION CONTRACTORS

(a) A Certification of Nonsegregated Facilities must be submitted prior to the award of a federally assisted construction contract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity clause.

(b) Contractors receiving federally assisted construction contract awards exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause will be required to provide for the forwarding of the following notice to prospective subcontractors for supplies and construction contracts where the subcontracts exceed \$10,000 and are not exempt from the provisions of the Equal Opportunity clause.

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT FOR  
CERTIFICATIONS OF NONSEGREGATED FACILITIES

(a) 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.

(b) Contractors receiving subcontract awards exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause will be required to provide for the forwarding of this notice to prospective subcontractors for supplies and construction contracts where the subcontracts exceed \$10,000 and are not exempt from the provisions of the Equal Opportunity clause.



(1) That 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; that he ( ) has, ( ) has not, filed all required compliance reports; and that representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained prior to subcontract awards. ( The above representation need not be submitted in connection with contracts or subcontracts which are exempt from the clause.)

(2) That he operates as an  individual,  partnership,  joint venture,  corporation, incorporated in State of \_\_\_\_\_

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):

ENCLOSED IS BID GUARANTEE, IF REQUIRED, 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)		
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: Contracting Officer  
Flood Control District of Maricopa County  
3325 West Durango Street  
Phoenix, Arizona 85009

INVITATION FOR BIDS NO. FCD-76-1 for opening February 2, 1976 at 2:00 p.m.  
~~local time.~~

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

BID FORM (CONSTRUCTION CONTRACT), CONTINUED

3. AFFIRMATIVE ACTION PROGRAM

The bidder (or offeror) represents that (1) he  has developed and has on file  has not developed and does not have on file at each establishment affirmative action programs as required by the rules and regulations of the Secretary of Labor (41 CFR 60-1 and 60-2), or (2) he  has not previously had contracts subject to the written affirmative action program requirement of the rules and regulations of the Secretary of Labor.

THE FOLLOWING MUST BE CERTIFIED, IF APPLICABLE:

4. CLEAN AIR AND WATER CERTIFICATION

(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. 1857c08(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 had , had 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.

## CLEAN AIR AND WATER CLAUSE

(Applicable only if the contract, grant or agreement exceeds \$100,000, or the Contracting or Grant Award 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 USC 1857c-8(c)(1)) or the Federal Water Pollution Control Act (33 USC 1319(c) and is listed by EPA or the contract is not otherwise exempt).

A. The Grantee, Cooperator or Contractor agrees as follows:

(1) To comply with all the requirements of section 114 of the Clean Air Act (42 USC 1857, et seq., as amended by Public Act (33 USC 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 grant, agreement, or contract.

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

(3) To use his best efforts to comply with clean air standards and clean water standards at the facilities in which the grant, agreement or contract is being performed.

(4) To insert the substance of the provisions of this clause in any nonexempt subgrant, subagreement or subcontract, including this subparagraph (4).

BID SCHEDULE NO. 1  
Sunset FRS

<u>Item</u>	<u>Spec</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Amount</u>
1. Mobilization	8	1	Job	XXXXXX	\$ _____
2. Clearing and Grubbing	2	6.5	Ac.	\$ _____	\$ _____
3. Foundation Excavation, Common	21	41,468	C.Y.	\$ _____	\$ _____
4. Trench Excavation, Common	21	1,792	C.Y.	\$ _____	\$ _____
5. Structure Excavation, Common	21	975	C.Y.	\$ _____	\$ _____
6. Spillway Channel Excavation, Common	21	1,030	C.Y.	\$ _____	\$ _____
7. Earth Fill, Zone I	23	63,104	C.Y.	\$ _____	\$ _____
8. Earth Fill, Zone III	23	2,344	C.Y.	\$ _____	\$ _____
9. Structure Backfill, Zone I and Zone III	23	580	C.Y.	\$ _____	\$ _____
10. Drain Fill, Zone II	24	2,401	C.Y.	\$ _____	\$ _____
11. Concrete, Class 4000X	31	386	C.Y.	\$ _____	\$ _____
12. Cement	31	580	Bbl.	\$ _____	\$ _____
13. Steel Reinforcement	34	51,375	Lbs.	\$ _____	\$ _____
14. 30-Inch Diameter R/C Pressure Pipe	41	183	L.F.	\$ _____	\$ _____
15. 6-Inch Diameter Perforated A-C Pressure Pipe	44	491	L.F.	\$ _____	\$ _____
16. 6-Inch Diameter Non-Perforated A/C Pressure Pipe	44	396	L.F.	\$ _____	\$ _____
17. Loose Rock Riprap	61	896	C.Y.	\$ _____	\$ _____
18. Filter Material	61	318	C.Y.	\$ _____	\$ _____
19. 18-Inch Slide Gate Assembly	71	1	Each	\$ _____	\$ _____
20. Metalwork	81	1	Job	XXXXXXXX	\$ _____
21. Identification Sign	81	1	Job	XXXXXXXX	\$ _____

22. Chain Link Fence	91	550	L.F.	\$ _____	\$ _____
23. Barbed Wire Fence	92	1,000	L.F.	\$ _____	\$ _____
24. Seeding	400	6.5	Ac.	XXXXXXXXX	\$ _____

Total Bid Schedule No. 1 \$ \_\_\_\_\_

BID SCHEDULE NO. 2  
Sunnycove FRS

<u>Item</u>	<u>Spec</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Amount</u>
1. Not Used					
2. Clearing and Grubbing	2	13	Ac.	\$ _____	\$ _____
3. Emergency Spillway Excavation, Unclassified	21	30,250	C.Y.	\$ _____	\$ _____
4. Foundation Excavation, Common	21	24,750	C.Y.	\$ _____	\$ _____
5. Trench Excavation, Unclassified	21	1,880	C.Y.	\$ _____	\$ _____
6. Structure Excavation, Unclassified	21	225	C.Y.	\$ _____	\$ _____
7. Earth Fill, Zone I	23	12,780	C.Y.	\$ _____	\$ _____
8. Earth Fill, Zone III	23	77,535	C.Y.	\$ _____	\$ _____
9. Earth Fill, Zone IV	23	17,305	C.Y.	\$ _____	\$ _____
10. Structure Backfill, Zone I and Zone III	23	292	C.Y.	\$ _____	\$ _____
11. Drain Fill, Zone II	24	3,845	C.Y.	\$ _____	\$ _____
12. Concrete, Class 4000X	31	135	C.Y.	\$ _____	\$ _____
13. Cement	31	203	Bbl.	\$ _____	\$ _____
14. Steel Reinforcement	34	11,944	Lbs.	\$ _____	\$ _____
15. 30-Inch Diameter R/C Pressure Pipe	41	288	L.F.	\$ _____	\$ _____
16. 6-Inch Diameter Perforated A-C Pressure Pipe	44	566	L.F.	\$ _____	\$ _____
17. 6-Inch Diameter Non-perforated A-C Pressure Pipe	44	331	L.F.	\$ _____	\$ _____
18. 18-Inch Slide Gate Assembly	71	1	Each	\$ _____	\$ _____

	<u>Item</u>	<u>Spec</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Amount</u>
19.	Metalwork	81	1	Job	\$ _____	\$ _____
20.	Identification Sign	81	1	Job	\$ _____	\$ _____
21.	Barbed Wire Fence	92	2,400	L.F.	\$ _____	\$ _____
22.	Seeding	400	15	Ac.	\$ _____	\$ _____
23.	Plant Salvage & Transplanting	401	100	Each	\$ _____	\$ _____
Total Bid Schedule No. 2					\$ _____	

BID SCHEDULE NO. 3  
Sunset & Sunnycove Pipelines

	<u>Spec</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Amount</u>
1. Not Used					
2. Pipe Trench Excavation, Common	21	11,064	C.Y.	\$ _____	\$ _____
3. Structure Excavation, Unclassified	21	1,154	C.Y.	\$ _____	\$ _____
4. Pipe Backfill, Class I	23	1,682	C.Y.	\$ _____	\$ _____
5. Pipe Backfill, Class II	23	7,836	C.Y.	\$ _____	\$ _____
6. Pipe Backfill, Random	23	1,474	C.Y.	\$ _____	\$ _____
7. Structure Backfill	23	226	C.Y.	\$ _____	\$ _____
8. Concrete, Class 4000X	31	17	C.Y.	\$ _____	\$ _____
9. Cement	31	26	Bbl.	\$ _____	\$ _____
10. Steel Reinforcement	34	1,330	Lbs.	\$ _____	\$ _____
11. 15-Inch Diameter R/C Pipe	42	2,144	L.F.	\$ _____	\$ _____
12. 18-Inch Diameter R/C Pipe	42	2,817	L.F.	\$ _____	\$ _____
13. 21-Inch Diameter R/C Pipe	42	1,016	L.F.	\$ _____	\$ _____
14. 24-Inch Diameter R/C Pipe	42	912	L.F.	\$ _____	\$ _____
15. 27-Inch Diameter R/C Pipe	42	927	L.F.	\$ _____	\$ _____
16. 60-Inch Diameter Precast Reinforced Concrete Manholes	42	9	Each	\$ _____	\$ _____
17. Loose Rock Riprap & Filter	61	16	C.Y.	\$ _____	\$ _____
18. Metalwork	81	1	Job	\$ _____	\$ _____
19. Pavement Replacement	402	1,125	S.Y.	\$ _____	\$ _____
20. Utility Crossings					
a. Water Lines	403	8	Each	\$ _____	\$ _____
b. Gas Lines	403	11	Each	\$ _____	\$ _____
c. Sewer Lines	403	9	Each	\$ _____	\$ _____

Total Bid Schedule No. 3      \$ \_\_\_\_\_

# GENERAL PROVISIONS

## (CONSTRUCTION CONTRACT)

### 1. DEFINITIONS

Terms used or referred to herein are defined as follows:

(a) Contracting Local Organization: The organization or agency awarding the contract.

(b) Contracting Officer: The person who is designated and authorized to enter into and administer this contract on behalf of the Contracting Local Organization or his duly appointed successor or authorized representative.

(c) Engineer: The person or his representative who is responsible for determining that the construction work conforms to the technical requirements as set forth in the drawings and specifications.

### 2. SPECIFICATIONS AND DRAWINGS

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.

### 3. CHANGES

(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:

- (1) In the specifications (including drawings and designs);
- (2) In the method or manner of performance of the work;
- (3) In the Contracting Local Organization-furnished facilities, equipment, materials, services, or site; or
- (4) 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 Contracting Local Organization 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 Contracting Officer. 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.

### 4. DIFFERING SITE CONDITIONS

(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 Contracting Officer.

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

##### **5. TERMINATION FOR DEFAULT—DAMAGES FOR DELAY—TIME EXTENSIONS**

(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 Contracting Local Organization 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 Contracting Local Organization 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 Contracting Local Organization 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 Contracting Local Organization 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 Contracting Local Organization in completing the work.

(c) If fixed and agreed liquidated damages are provided in the contract and if the Contracting Local Organization 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 Contracting Local

Organization in its contractual capacity, acts of another contractor in the performance of a contract with the Contracting Local Organization, 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, such an extension is justified.

(e) The rights and remedies of the Contracting Local Organization provided in this clause are in addition to any other rights and remedies provided by law or under this contract.

(f) As used in paragraph (d)(1) of this clause, the term 'Subcontractors and Suppliers' means Subcontractors and Suppliers at any tier.

##### **6. CLAIMS**

Any claim by the Contractor arising by virtue of this contract which is not disposed of by agreement shall be submitted in writing, together with any written and oral evidence in support thereof, to the Contracting Officer for decision. Before making a decision the Contracting Officer shall notify the Contractor that any additional written and/or oral evidence in support of the claim may be presented to the Contracting Officer within 30 days from receipt by the Contractor of such notification, or within such further period of time as may be granted by the Contracting Officer. The Contracting Officer shall make his decision in writing and mail or otherwise furnish a signed copy thereof to the Contractor. Pending the decision of the Contracting Officer the Contractor shall proceed diligently with the performance of this contract.

##### **7. PAYMENTS TO CONTRACTOR**

(a) The Contracting Local Organization will pay the contract price as hereinafter provided.

(b) The Contracting Local Organization 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, at any time after 50 percent of the work has been completed, finds that satisfactory progress is being made, he may authorize any of the remaining progress payments to be made in full. Also, whenever the work is substantially complete, the Contracting Officer, if he considers the amount retained to be in excess of the amount adequate for the protection of the Contracting Local Organization, at his discretion, may release to the Contractor all or a portion of such 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 Contracting Local Organization, 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 Contracting Local Organization to require the fulfillment of all of the terms of the contract.

(e) Upon completion and acceptance of all work, the amount due the Contractor under this contract shall be paid after the Contractor shall have furnished the Contracting Local Organization with a release of all claims against the Contracting Local Organization 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, a release may also be required of the assignee.

## **8. MATERIAL AND WORKMANSHIP**

(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 manu-

facturer, 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.

## **9. INSPECTION AND ACCEPTANCE**

(a) Except as otherwise provided in this contract, inspection and test by the Contracting Local Organization of material and workmanship required by this contract shall be made at reasonable times and at the site of the work, unless the Contracting Officer determines that such inspection or test of material which is to be incorporated in the work shall be made at the place of production, manufacture or shipment of such material. To the extent specified by the Contracting Officer at the time of determining to make off-site inspection or test, such inspection or test shall be conclusive as to whether the material involved conforms to the contract requirements. Such off-site 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 Contracting Local Organization 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 Contracting Local Organization not to conform to the contract requirements, unless in the public interest the Contracting Local Organization 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 Contracting Local Organization (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 Clause 5 of these General Provisions.

(d) The Contractor shall furnish promptly, without additional charge, all facilities, labor, and material reasonably needed for performing such safe and convenient inspec-

tion and test as may be required by the Contracting Officer. All inspection and test by the Contracting Local Organization 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 Contractor shall be charged with any additional cost of inspection when material and workmanship are not ready at the time specified by the Contractor for its inspection.

(e) Should it be considered necessary or advisable by the Contracting Local Organization 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 Contracting Local Organization shall be made as promptly as practicable after completion and inspection of all work required by this contract. 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 Contracting Local Organization's rights under any warranty or guarantee.

## **10. SUPERINTENDENCE BY CONTRACTOR**

The Contractor shall give his personal superintendence to the work or have a competent foreman or superintendent, satisfactory to the Contracting Officer, on the work at all times during progress, with authority to act for him.

## **11. PERMITS AND RESPONSIBILITIES**

The Contractor shall, without additional expense to the Contracting Local Organization, 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.

## **12. CONDITIONS AFFECTING THE WORK**

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 Contracting Local Organization. The Contracting Local Organization 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 Contracting Local Organization are expressly stated in the contract.

## **13. OTHER CONTRACTS**

The Contracting Local Organization may undertake or award other contracts for additional work, and the Contractor shall fully cooperate with such other contractors and Contracting Local Organization 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 Contracting Local Organization employees.

## **14. PATENT INDEMNITY**

Except as otherwise provided, the Contractor agrees to indemnify the Contracting Local Organization 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 Contracting Local Organization of supplies furnished or construction work performed hereunder.

## **15. ADDITIONAL BOND SECURITY**

If any surety upon any bond furnished in connection with this contract becomes unacceptable to the Contracting Local Organization, or if any such surety fails to furnish reports as to his financial condition from time to time as requested by the Contracting Local Organization, the Contractor shall promptly furnish such additional security as may be required from time to time to protect the interests of the Contracting Local Organization and of persons supplying labor or materials in the prosecution of the work contemplated by this contract.

## **16. LAND RIGHTS**

(a) Adequate land rights needed in order to perform the work under this contract have been acquired by or on behalf of the Contracting Local Organization. The right to enter, remove, or otherwise make use of adjacent property, roads, utility lines, fences, and other improvements not included within the land rights provided shall be the sole responsibility of the Contractor.

(b) Where ingress and egress is not defined on the drawings, the Contracting Officer shall designate the right-of-way to be used.

## **17. RECORDS OF TEST PITS AND BORINGS**

The Contracting Local Organization does not represent that the available records show completely the existing conditions and does not guarantee any interpretation of these records. The Contractor assumes all responsibility for deductions and conclusions as to the nature of rock and other materials to be excavated, the difficulties of making and maintaining the required excavations and of doing other work affected by the geology of the site of the work, and for the final preparation of the foundations for the spillway, dikes, and other structures.

## **18. MATERIALS TO BE FURNISHED BY THE CONTRACTOR**

(a) Unless otherwise specified in this contract, the Contractor shall furnish all materials required for the completion of the contract.

(b) Unless otherwise waived in writing by the Contracting Officer, the Contractor shall furnish the Contracting Local Organization with certifications dated and signed by the manufacturer and/or supplier to the effect that the items listed therein meet the requirements of this contract. Such certifications shall be furnished prior to the use of the material in any part of the construction and shall identify the project on which the material is to be used.

## **19. WATER**

Unless otherwise specified in this contract, the Contractor shall provide and maintain at his own expense an adequate supply of water suitable for construction purposes.

## **20. WORKWEEK—CONSTRUCTION SCHEDULE**

(a) Unless furnished prior to contract award, the Contractor shall, prior to commencement of work, submit to the Contracting Officer for approval (1) a construction schedule showing the order in which he proposes to carry on the work indicating the periods during which he will perform work on each item listed in the bid schedule; and (2) the hours and days in which he proposes to carry on the work.

(b) If, in the opinion of the Contracting Officer, the Contractor falls behind the approved construction schedule, the Contractor shall take such steps as may be

necessary to improve his progress and the Contracting Officer may require him to either increase the number of shifts, days or hours of work, or the amount of construction plant, or all of them, and to submit for approval such revised construction schedule as may be deemed necessary to show the manner in which the agreed rate of progress will be regained, all without additional cost to the Contracting Local Organization. If the Contractor fails to submit a revised construction schedule within the time specified by the Contracting Officer, the Contracting Officer may withhold approval of progress payments and/or take such other actions as provided in this contract until such time as the Contractor submits the required construction schedule.

(c) Failure of the Contractor to comply with the requirements of the Contracting Officer under this clause 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 Clause 5 of these General Provisions.

## **21. SUBCONTRACTORS**

(a) Work shall not be subcontracted in whole or in part without the prior written approval of the Contracting Officer. The request shall be in writing with the name of the proposed subcontractor and a description of the work to be done.

(b) If at any time the Contracting Officer determines that any subcontractor is incompetent or undesirable, he shall notify the Contractor accordingly and the Contractor shall take immediate steps for cancellation of the subcontract.

(c) Subcontracting by subcontractors shall be subject to the above requirements.

(d) Nothing contained in this contract shall create any contractual relationship between any subcontractor and the Contracting Local Organization.

## **22. SURVEYS**

(a) Unless otherwise stated in the Invitation for Bids, only the basic staking shall be done by the Contracting Local Organization. If the Contracting Local Organization does the staking, the Contractor shall notify the Contracting Officer in advance of any staking required in order that such work can be properly scheduled.

(b) Bench marks shall be preserved by the Contractor, and in the case of their destruction or removal by him or his employees they shall be replaced by the Contracting Local Organization at the Contractor's expense.

(c) Survey stakes destroyed or removed by the carelessness of the Contractor or his employees shall be replaced by the Contracting Local Organization at the Contractor's expense. Stakes removed or destroyed in the due course of the work shall be replaced by the Contracting Local Organization without cost to the Contractor.

(d) If the Contractor finds any errors or omissions in the layout as given by survey points or staking, he shall immediately inform the Contracting Officer in writing.

### **23. SUSPENSION OF WORK**

(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 Contracting Local Organization.

(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.

### **24. CLEANUP WORK**

(a) During construction the Contractor shall keep the work site, areas adjacent to the work site and access roads in an orderly condition, free and clear from debris and discarded materials. Care shall be taken to prevent spillage when hauling is being done. Any spillage or debris resulting from the Contractor's operations shall be immediately removed.

(b) Upon completion of the work the Contractor shall remove from the work site, areas adjacent to the work site and access roads: all plant, buildings, debris, unused materials, concrete forms and other like material belonging to him or used under his direction during the construction. He shall grade all access roads, other than public, removing wheel tracks and smoothing up such roads.

### **25. ASSIGNMENT**

The Contractor shall not assign in whole or in part this contract without the prior written consent of the Contracting Local Organization. The Contractor shall not

assign any moneys due or to become due to him under this contract without the prior written consent of the Contracting Local Organization.

### **26. WEATHER**

(a) The Contracting Officer may order suspension of the work in whole or in part, commencing with the day after receipt of the Notice to Proceed by the Contractor, due to weather or the effects of weather at the site, for such time as he considers it unfavorable for satisfactory prosecution of the work.

(b) When the Contracting Officer orders suspension under (a) of this clause, the contract completion date shall be extended a full calendar day for each calendar day during suspension of the work if:

(1) All work is suspended except minor items as may be designated in this contract (work of an emergency, protective or maintenance nature may be performed at any time); and

(2) The hours lost in any one workday of the authorized workweek through suspension equal one-half or more of the hours of an authorized workday.

(c) If the Contracting Officer orders suspension of work as provided in (b) of this clause and the hours lost in the workday immediately preceding a nonworkday equal one-half or more of the hours in an authorized workday, the contract completion date shall be extended a full calendar day for each nonworkday during suspension of the work.

(d) When the Contracting Officer orders any suspension of the work under this clause, the Contractor shall not be entitled to any cost or damages resulting from such suspension.

(e) When the contract completion date is extended under this clause, the contract shall be modified in writing accordingly.

### **27. NONCOMPLIANCE WITH CONTRACT REQUIREMENTS**

(a) The Contracting Officer may order suspension of the work in whole or in part for such time as he deems necessary because of the failure of the Contractor to comply with any of the requirements of this contract, and the contract completion date shall not be extended on account of any such suspension of the work.

(b) When the Contracting Officer orders any suspension of the work under (a) of this clause, the Contractor shall not be entitled to any costs or damages resulting from such suspension.

(c) The rights and remedies of the Contracting Local Organization provided in this clause are in addition to any other rights and remedies provided by law or under this contract.

### **28. QUANTITY VARIATIONS**

(a) Where the quantity of work shown for an item in the bid schedule, including any modification thereof, is estimated, no adjustment of the contract price nor of the

performance time shall be made for overruns or underruns which are within 25 percent of the estimated quantity of any such item.

(b) For overruns of more than 25 percent, the Contracting Officer shall re-estimate the quantity for the item, establish an equitable contract price for the overrun of more than 25 percent, adjust contract performance time equitably, and modify the contract in writing accordingly; this clause to thereafter be applicable to the total re-estimated item quantity.

(c) For underruns of more than 25 percent, the Contracting Officer shall determine the quantity for the item, establish an equitable contract price therefor, adjust contract performance time equitably, and modify the contract in writing accordingly.

#### **29. FEDERAL, STATE, AND LOCAL TAXES**

Except as otherwise provided, contract unit prices shall include all applicable Federal, State, and local taxes.

## SPECIAL PROVISIONS

1. Liquidated Damages: If the work, or any part thereof, is not completed within the time agreed upon in this contract or any extension thereof, the contractor shall be liable to the Contracting Local Organization in the amount of \$892.00 per day for each and every calendar day the completion of the work is delayed beyond the time provided in this contract, as fixed and agreed liquidated damages and not as a penalty; and the Contracting Local Organization shall have the right to deduct from and retain out of moneys which may be then due or which may become due and payable to the Contractor, the amount of such liquidated damages; and if the amount so retained by the Contracting Local Organization is insufficient to pay in full such liquidated damages, the Contractor shall pay to the Contracting Local Organization the amount necessary to effect payment in full of such liquidated damages.
2. Accident Prevention and Safety Measures: The Contractor shall comply with the manual, Safety and Health Regulations for Construction, published by the United States Department of the Interior, Bureau of Reclamation, in effect on the date of issuance of the invitation for bids, with the following modifications:
  - (a) Reference to the Bureau of Reclamation shall be interpreted as reference to the Contracting Local Organization.
  - (b) Paragraph 3B, page ii, is changed by the addition of: "Requests shall be made in writing supported by evidence that every reasonable effort has been made to comply with the contractual requirements. The Contractor shall hold and save the Contracting Local Organization free from any claims or causes of action whatsoever resulting from the Contractor or his subcontractors proceeding under a waiver or approved adaptation."
  - (c) Subsection 9.7.1 of Part II is applicable regardless of the year in which the equipment was manufactured. Subsection 9.9.1 of Part II is applicable regardless of the year in which the equipment was manufactured or the struck capacity of the equipment. Subsection 9.9.4 of Part II is applicable regardless of the struck capacity of the equipment.
  - (d) Subsection 9.9.5 of Part II is deleted in its entirety.
  - (e) Subparagraph 1518.550(a) (3) of Part I is changed to "A boom angle indicator in good working order shall be provided."
3. Clause 5, Termination for Default - (Damages for Delay-Time Extensions of the General Provisions) is amended by adding the following:
  - (a) Delay in completion of the work due to unavailability of fuel from suppliers because of a general fuel shortage will be considered unforeseeable.

Special Provisions

2.

4. Minor Item of Work: The following bid items are designated as minor items of work. These items may be performed without charge to performance time during periods when all other work is suspended if such items are excepted in the Suspend Work Order.
  - (a) Sunset Floodwater Retarding Structure
    - Item No. 1 - Mobilization
    - Item No. 2 - Clearing and Grubbing
  - (b) Sunnycove Floodwater Retarding Structure
    - Item No. 1 - Clearing and Grubbing
5. Order of Work: The Contractor shall pursue all work under the contract in an orderly manner. However, the Contractor's schedule of operations for construction shall be guided by the following criteria:
  - (a) The Sunnycove pipeline shall not be installed from Station 9+10.36 to Station 37+18.6 until the borrow of Zone III material from Sunset Reservoir Area has been placed in Sunnycove Dam and until after completion of borrow and disposal work in borrow area 2, Sunnycove FRS.
  - (b) Mountain Bell Company will relocate a 2 $\frac{1}{4}$ -inch diameter 24-gage cable and a 1-inch diameter, 7-quad cable at Station 24+20 $\pm$  centerline of Sunset Dam. The Contractor shall not commence work on Sunset Dam until the two Mountain Bell cables are relocated.
  - (c) The time allowed to excavate the loose fill material and backfill with Zone 1 compacted fill on the north abutment of Sunset FRS shall be fifteen working days. See Section A, page 3 of Sunset FRS.
6. Dust Abatement and Haul Road Maintenance: Water shall be applied to haul roads and other dust-producing areas as needed to prevent excessive dust and to maintain the roads in good condition for efficient operation while they are in use.
7. Utilities:
  - (a) Utilities designated for removal will be relocated by the owners. The Contractor shall give the utility companies and the Town of Wickenburg three weeks' advance notice before doing any construction work on or near the utilities to be removed.
  - (b) Utilities Along Sunset and Sunnycove Pipelines: The Contractor shall give the utility companies and the Town of Wickenburg three weeks' advance notice before doing any construction work on or near the following utilities:
    - (1) Town of Wickenburg water lines at the following stations. Four (4) inch lines at Sta. 18+88 $\pm$ , Sta. 31+23 $\pm$ , Sta. 42+33 $\pm$ , Sta. 49+47 $\pm$ , Sta. 52+25 $\pm$ , and Sta. 57+23 $\pm$ . Two (2)-inch lines at Sta. 42+47 $\pm$ , and Sta. 63+27 $\pm$ .

- (2) Town of Wickenburg sewer lines at the following stations. Six (6)-inch lines at Sta. 31+47±, Sta. 42+59±, 43+60±, Sta. 51+88±, and Sta. 53+70±. Eight (8)-inch lines at Sta. 49+33±, Sta. 57+57±, Sta. 60+56±, and Sta. 61+97±.
- (c) Arizona Public Service gas lines at the following stations: 1½-inch diameter lines at Sta. 21+47±, Sta. 42+51±, Sta. 45+16±, Sta. 52+30±, Sta. 61+20±, and 61+70±. Two (2)-inch diameter lines at Sta. 31+60±, Sta. 49+44±, and Sta. 53+45±. One (1)-inch diameter lines at Sta. 51+90±, and Sta. 51+98±.
- (d) Town of Wickenburg electric power and telephone lines at Sta. 17+34±, Sta. 24+80±, Sta. 30+85± on west edge of Kellis Road, and Sta. 53+35±. Town of Wickenburg electric power lines at Sta. 31+60±, Sta. 44+02±, Sta. 44+50±, Sta. 44+65±, and Sta. 61+95±. All stationing along the Sunset-Sunnycove pipeline.
8. Protection and Restoration of Existing Improvements: The Contractor shall conduct his operations in such a manner as to avoid damage to adjacent property and existing improvements or facilities. Property and existing improvements or facilities that are damaged or destroyed shall be reinstalled or reconstructed to the same condition existing prior to road closures, or road construction within the city limits.
9. The Contractor shall terminate construction on Sunnycove FRS one half hour prior to, during, and one half hour after graveside services taking place at Wickenburg's town cemetery, as directed by the Engineer.
10. The Contractor shall notify the AT&SF Railroad Company, Winslow, Arizona, 86047, (in care of Ray Ketrang) 15 days prior to doing any construction on the railroad rights-of-way. An AT&SF Railroad inspector shall be present while any construction is taking place in the railroad rights-of-way.
11. Waste fill on Sunset Dam will be disposed of according to the locations, lines and grades as shown in the plans. At least three (3) weeks' advance notice will be given to Thomas G. Jones of Jones Ford-Mercury, Inc., Wickenburg, Arizona 85358, before any waste material is placed.
- (a) Compaction, including moisture requirements for the LDS Church disposal area, shall be arranged for and provided by others. Contractor shall spread the material uniformly to enable others to properly compact the material. Material disposed of in the church property will come from the Sunset site. The Contractor shall coordinate the time of placing waste material in Disposal Area B with the Bishop of the LDS church.
12. No bid will be accepted or contract awarded unless the Contractor is registered under the applicable provision of Arizona statutes with the Registrar of Contractors of the State of Arizona.
13. In no event will the five percent differential be allowed in evaluating bids as provided by Arizona revised statutes 34-241; the provisions of Arizona revised statutes 34-244 being applicable.

Special Provisions (continued)

14. The Contractor shall not disturb Legal Survey Monuments during construction unless otherwise authorized by the Contracting Officer and after Witness Markers have been set by the Engineer.
15. Preservation of Historical and Archaeological Data:
  - (a) Public Law 93-291, May 24, 1974, provides for the preservation of historical and archaeological data (including relics and specimens) which might otherwise be lost due to alterations of the terrain as a result of any Federal or Federally-assisted construction project.
  - (b) The Contractor agrees that should he or any of his employees in the performance of this contract discover evidence of possible historical or archaeological data he will notify the Contracting Officer immediately in writing, giving the location and nature of the findings.
  - (c) Where appropriate by reason of a discovery, the Contracting Officer may order delays in performance and/or changes in the work. The contract completion date and contract price shall be adjusted in accordance with other applicable provisions of this contract.
  - (d) The Contractor agrees to insert this clause in all subcontracts which involve the performance of work on the terrain of the site.
16. Prospective bidders are hereby advised of the following changes in design:
  - (a) The steel grating for the Type 1 manholes Sta. 13+97± and Sta. 9+10± and the outlet structure Sta. 64+32± is changed to a hooded cover as shown on the sheet A-7-EZ 3091.
  - (b) Sunset and Sunnycove Pipelines Sheet 81-4 of construction specifications Sections 7a(1) and 7a(3) change the wording in these two sections to read hooded cover in place of steel grating. Also, replace Section 7a(2) with the following:

7a(2) - The hooded cover shall be fabricated of structural steel conforming to the requirements of ASTM Specification A 36 to the size and dimensions shown on the enclosed drawing. The hooded cover shall be furnished complete with approved hasp and lock.
  - (c) Sheet A drawing No. 7-E-23091 hooded cover details (attached).
17. The following changes are hereby made in the waste disposal and borrow areas.
  - (a) Attached sheet B drawing No. 7-E-23090, location of Borrow Area Section 14, replaces sheet 18 drawing No. 7-E-23090 of Sunnycove FRS.

Special Provisions (continued)

- (b) Borrow for zone III material, after using that available at the Sunnycove Borrow Areas No. 1 and No. 2, shall first be obtained in the large wash 3/4 miles southwest of Sunnycove FRS (Borrow Area Section 14) as shown on sheet B-7-E-23090. Thereafter, zone III material will be obtained from Sunset FRS reservoir area. It is estimated that approximately 25,000 cubic yards of borrow will be needed from the above locations.
  - (c) No measurement or separate payment will be made for dikes (Borrow Area Section 14) as shown on sheet B-7E-23090. Compensation will be included in the payment for earth fill, Bid Item 7 through 10, as appropriate.
18. Work Week.
- The work week shall consist of five (5) eight (8)-hour days unless otherwise approved by the Contracting Officer.
19. All haul and access roads constructed by the Contractor shall be ripped and seeded. The construction equipment yard shall be cleaned, with all trash and debris disposed of as designated by the Engineer.
20. "Sta. 12+05.0 Zone II drain grade change" and "Sta. 11+55.0 Zone II drain grade change" on each side of the emergency spillway as shown on sheet 3 of 25, drawing No. 7-E-23089, in "profile on center line dam," Sunset FRS, is changed as follows:
- (a) "Sta. 12+05.0 Zone II drain grade change" is changed to "Sta. 12+20.2 Zone II drain grade change."
  - (b) "Sta. 11+55.0 Zone II drain grade change" is changed to "Sta. 11+39.8 Zone II drain grade change."
21. The elevation of the top of the Zone II drain fill shown in "Profile on C<sub>L</sub> Principal Spillway" for Sunset FRS, sheet 4 of 25, drawing No. 7-E-23089, is changed from elevation 2127.0 to 2135.0.
22. The elevation of the top of Zone II drain fill shown in "Profile on C<sub>L</sub> AC outlet pipe, Sta. 12+10.5" for Sunset FRS sheet 5 of 25, drawing No. 7-E-23089, is changed from elevation 2127.0 to 2135.0
23. On Sunset FRS elevation 2135.0 top of Zone II drain fill shown at the elevation of the top of Zone II drain fill shown in Sta. 10+59 centerline Dam in "Profile on C<sub>L</sub> AC Outlet Pipe," sheet 5, "Profile on C<sub>L</sub> AC Outlet Pipe, Sta. 10+59" for Sunset FRS, sheet 5 of 25, drawing No. 7-E-23089, is changed from elevation 2135.0 to 2127.0.
24. Upstream wingwalls of emergency spillway as shown on sheet No. 14 of 25, Sunset FRS, in half plan view, are at an angle of 45 degrees with the sidewalls.

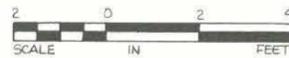
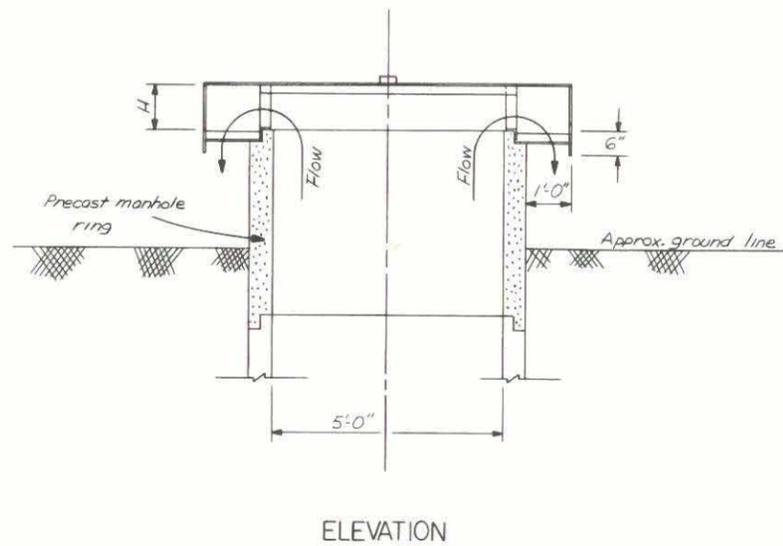
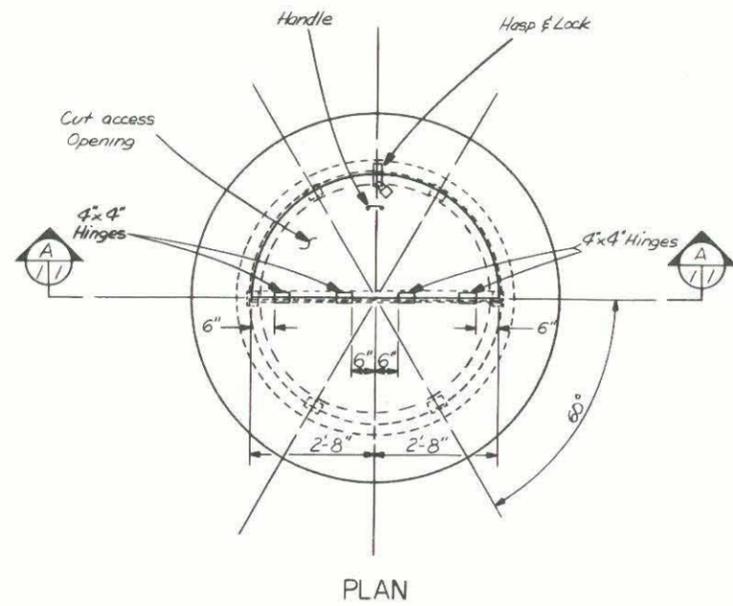
Special Provisions (Continued)

25. The upstream face of the Zone II embankment drain fill is located 7 feet downstream from the centerline of the dam on Sunset FRS. See sheet No. 4 of 25, drawing No. 7-E-23089.
26. The Contractor is advised that the Soil Conservation Service will be under contract to an A&E firm for the engineering services for this project, including but not limited to: earth and concrete inspection, materials testing, and layout and construction surveys.
27. Construction requirements for the property of Jacob T. Young and Bernice Young on Sunset FRS, left abutment are as follows:
  - (a) Seven (7) days notice will be given the Youngs prior to starting any construction on their property.
  - (b) An eighteen (18) foot wide access and parking strip will be left undisturbed parallel and adjacent to the rear of the building on Youngs' property during construction.
28. The Contractor is advised that the Town of Wickenburg requires all contractors and subcontractors to obtain an "occupation license."
29. The Contractor is advised that land parcel No.-2116, owned by Emory Benjamin and included on sheet 2A of 25, drawing No. 7-E-23089, as part of the reservoir area upstream of Mariposa Drive, was not purchased as ROW because of elevation, and is not accessible to the Contractor for construction work.
30. Geological Report: The test pits and borings made for the geological investigations are shown on the drawings. The complete geological investigation is available for inspection at the Soil Conservation Service, Construction Office, at 3556 West Buckeye Road, Phoenix, Arizona. Attached is a Standard List of Geological Abbreviations on the Geological Sheets of the Drawings.

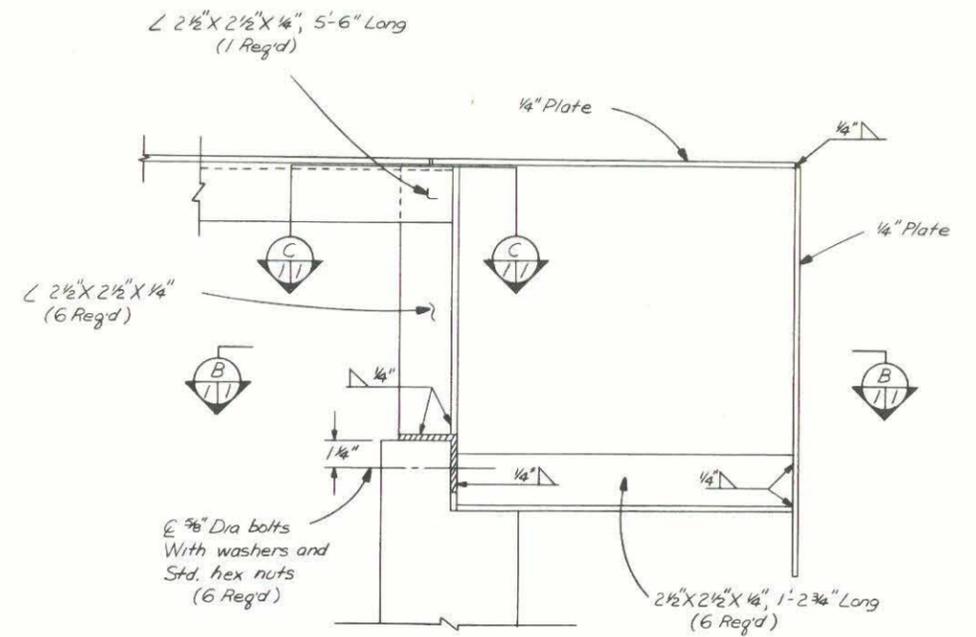
ARIZONA STATE  
STANDARD LIST OF GEOLOGIC ABBREVIATIONS

\* National Standards

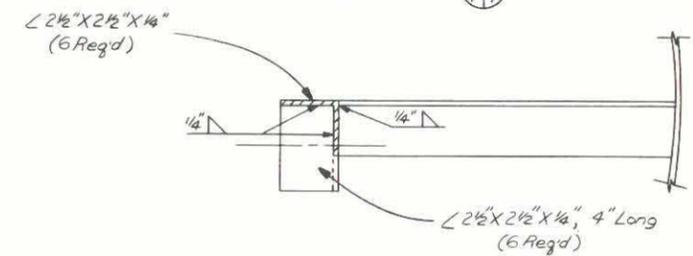
* ang.	-	angular	* grn.	-	grain	S.L.	-	Shrinkage Limit
aq.	-	aquifer	G	-	gravel	* M	-	silt
* bld.	-	boulder	* gyp.	-	gypseous	Ms	-	siltstone
* calc.	-	calcareous	* hd.	-	hard	* sl/.	-	slightly
* cali.	-	caliche	* h.	-	highly	* sft.	-	soft
* cav.	-	cavities	* lam.	-	laminated	* s/.	-	some
* cmt.	-	cemented	L.L.	-	Liquid Limit	* slo.	-	slowly
<sup>C</sup> L	-	centerline	ls.	-	limestone	Sta.	-	Station
* C	-	clay	* lse.	-	loose	* stf.	-	stiff
* cse.	-	coarse	* mas.	-	massive	* T.B.	-	thin bedded
bl.	-	cobble	* med.	-	medium	TD	-	total depth
* cpt.	-	compact	* mic.	-	micaceous	t.	-	tough
* con.	-	concretion	* mod.	-	moderately	tr.	-	trace
cong.	-	conglomerate	* n.r.	-	no recovery	* tuff.	-	tuffaceous
* xln.	-	crystalline	* O	-	organic	* U.	-	Undisturbed Sample
* dns.	-	dense	* per.	-	permeable	* u.s.	-	upstream
* dip.	-	dipping	P.L.	-	Plastic Limit	* var.	-	variable
* D.	-	disturbed sample	P.I.	-	Plasticity Index	* v/.	-	very
* d.s.	-	downstream	* po.	-	poorly	vug.	-	vugular
* fn.	-	fine	* p	-	poorly graded	* w.l.	-	water level
* frm.	-	firm	qtz.	-	quartz	* wea.	-	weathered
flg.	-	flagstone	qtzite.	-	quartzite	* W	-	well graded
* frac.	-	fractured	* rdd.	-	rounded	* w/.	-	with
* frg.	-	fragment	* S	-	sand			
* fri.	-	friable	ss	-	sandstone			
grad.	-	graded	sh.	-	shale			



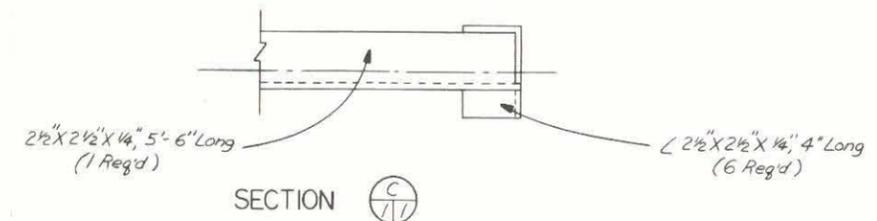
LOCATION	H
SUNSET OUTLET	1'-6"
SUNNYCOVE OUTLET	2'-0"
PIPELINE OUTLET	1'-0"



SECTION A-A



SECTION B-B



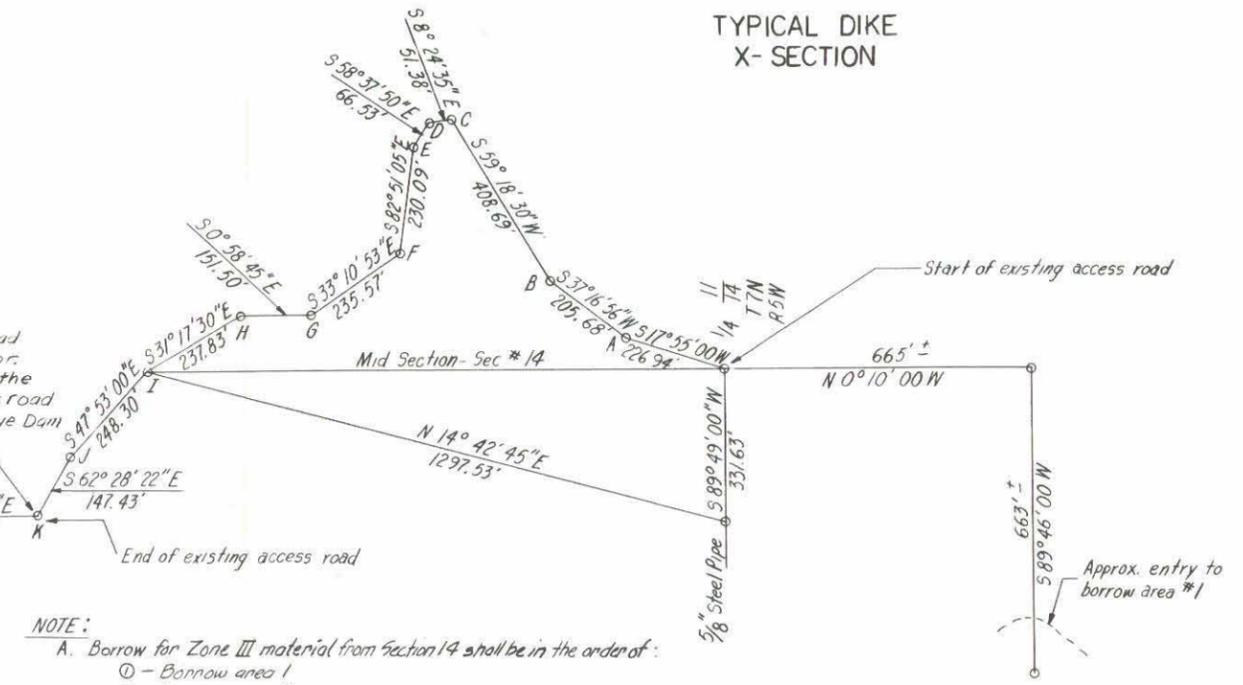
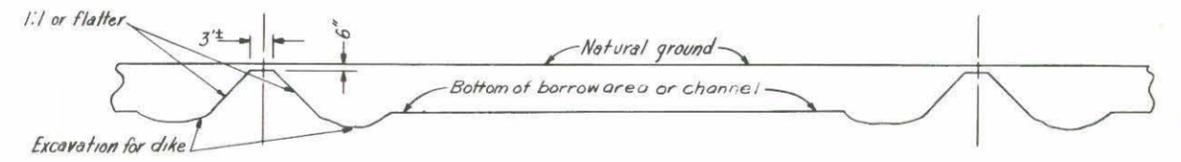
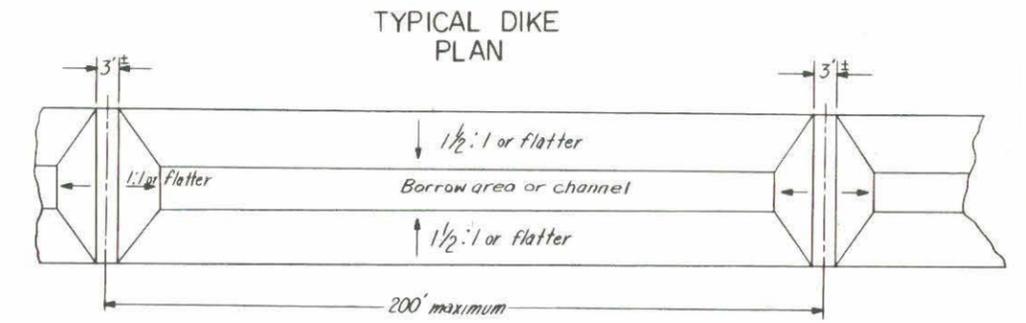
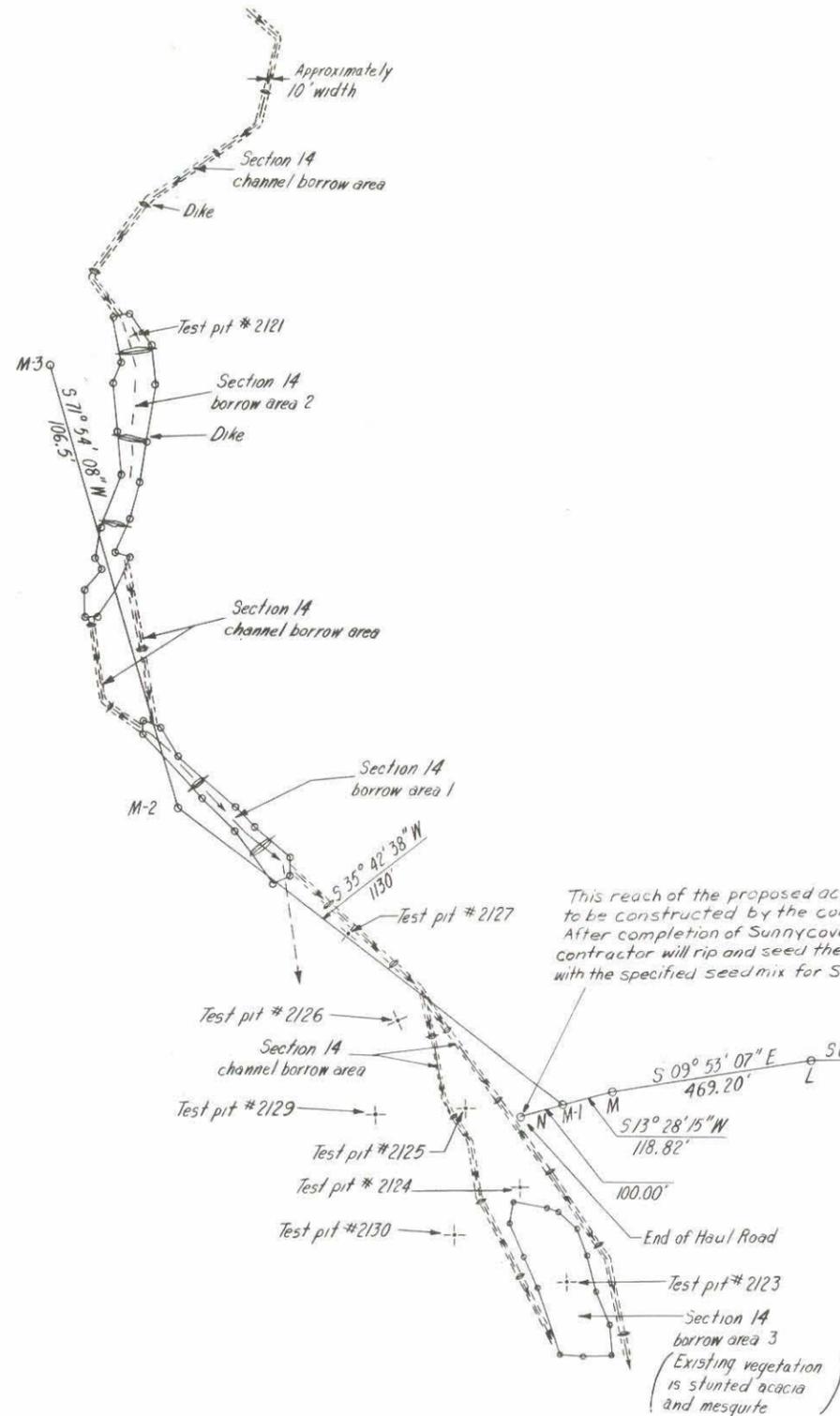
SECTION C-C



HOODED COVER DETAIL  
SUNSET AND SUNNYCOVE PIPELINES  
WICKENBURG W.P.P.  
MARICOPA COUNTY, ARIZONA  
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

Designed	Date	Approved by
T. JAYO	7-75	<i>Paul P. Peltus</i>
Drawn	8-75	<i>Paul P. Peltus</i>
Traced	8-75	<i>Paul P. Peltus</i>
Checked		

Sheet No. A  
Drawing No. 7-E-2309/1



- NOTE:**
- A. Borrow for Zone III material from Section 14 shall be in the order of:
    - ① - Borrow area 1
    - ② - Borrow area 2
    - ③ - Channel borrow area
    - ④ - Borrow area 3
  - B. Borrow excavation shall be a maximum of five feet deep in Section 14, borrow areas 1, 2, and 3, and three feet deep in Section 14 channel borrow area.
  - C. Care shall be taken to prevent damage to, or removal of trees and shrubs outside the borrow area and channel limits.
  - D. Equipment shall travel in the channel bottom or in the borrow areas, and turn arounds shall be in borrow areas, as directed or approved by the Engineer.
  - E. Final locations of dikes will be determined by the Engineer. Dikes will be at 200 foot maximum spacing. Compaction of the dikes is not required.
  - F. Before any vegetation is removed from Section 14 borrow area 3, approval shall be obtained from the Engineer, and removal shall be as directed by the Engineer.
  - G. The lateral extent of all Section 14 borrow areas will be as staked in the field by the Engineer.

<b>LOCATION OF BORROW AREA SECTION 14 SUNNYCOVE F.R.S. WICKENBURG W.P.P. MARICOPA COUNTY, ARIZONA</b>			
<b>U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE</b>			
Designed T. JAYO	Date 7-75	Approved by <i>Paul T. Bell</i>	
Drawn D. LAMBSON	7-75	Title <i>Head, E.S. &amp; W.P. Unit</i>	
Traced TESINC	8-75	Title <i>State Conservation Engineer</i>	
Checked		No. B of	Drawing No. 7-E-23090



APPLICABILITY OF THE EQUAL OPPORTUNITY CLAUSE

Equal Opportunity (Federally Assisted Construction) is applicable in any contract which exceeds \$10,000 and any contract for less than \$10,000 which is later increased by modification to more than \$10,000.

EQUAL OPPORTUNITY (FEDERALLY ASSISTED CONSTRUCTION)

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 setting forth the provisions of this Equal Opportunity (Federally Assisted Construction) 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 advising the said labor union or workers' representative of the Contractor's commitments under this section, 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, 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, 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 administering 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 (Federally Assisted Construction) 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 or federally assisted construction contracts in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as provided by law.
7. The Contractor will include this Equal Opportunity (Federally Assisted Construction) clause in every subcontract or purchase order unless exempted by the rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 Executive Order No. 11246 of September 24, 1965, 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 administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, That in the event a Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

CERTIFICATION OF NONSEGREGATED FACILITIES

(Applicable to federally assisted construction contracts and related sub-contracts exceeding \$10,000 which are not exempt from the Equal Opportunity clause.)

The federally assisted construction contractor 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. The federally assisted construction contractor 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 federally assisted construction contractor 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, restrooms and washrooms, restaurants and other eating areas, timeclocks, 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. The federally assisted construction contractor 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, and that he will retain such certifications in his files.

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

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Contractor

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Signature

---

Title

---

Date

UNITED STATES DEPARTMENT OF AGRICULTURE

INSTRUCTIONS TO CONTRACTORS (CONSTRUCTION)

FOR COMPLIANCE WITH EQUAL EMPLOYMENT OPPORTUNITY REQUIREMENTS UNDER EXECUTIVE ORDER 11246 AND EXECUTIVE ORDER 11375 FOR FEDERAL PROCUREMENT OF CONSTRUCTION, AND FEDERALLY-ASSISTED CONSTRUCTION.

Your obligation under the Equal Opportunity clause of Executive Order 11246, as amended by Executive Order 11375, is to take affirmative action in providing equal employment opportunity. Reviews made by this Department as the Equal Employment Opportunity Compliance Agency for your Company or by the Office of Federal Contract Compliance, U. S. Department of Labor, may disclose the need for special commitments on your part to achieve equal employment opportunity compliance. Their proper discharge will be essential to performance of your contract.

As a minimum, your obligations under the Equal Opportunity clause of your contract requires you to observe the following:

1. NOTICE. The notice "Equal Employment Opportunity is the Law" is to be displayed in conspicuous places, available to all employees and applicants for employment. It must be similarly displayed by you in the performance of your contract. The notice is available from the contracting officer.

2. EQUAL OPPORTUNITY POLICY. Your equal employment opportunity policy is to be put in writing and communicated to all employees, offices, plants or other facilities. It is most important that this policy be fully understood by supervisory personnel and effectively implemented.

3. NOTICE TO LABOR UNIONS AND OTHER ORGANIZATIONS OF WORKERS. The requirement in paragraph (c) of the Equal Opportunity clause that you will send a notice to each labor union or representative of workers with which you have a collective bargaining agreement or other contract or understanding, will be satisfied whenever you or your subcon-

tractors, post a copy of the notice "Equal Opportunity is the Law" in conspicuous places.

4. CERTIFICATE OF NON-SEGREGATED FACILITIES. If your contract exceeds \$10,000 you must certify that you do not maintain or allow in a workplace under your control employee facilities which are segregated on basis of race, color, religion, sex, or national origin, whether by directive or through custom.

5. INCLUSION OF EQUAL OPPORTUNITY CLAUSE IN SUBCONTRACTS. If your contract is in excess of \$10,000 you are required to include the Equal Opportunity clause in subcontracts and purchase orders in excess of \$10,000. If the subcontract is less than \$50,000 the clause may be incorporated by reference.

6. APPLICATION FORMS. Application forms used in employment must not request or record information which can be used to identify an applicant's race, color, religion, sex, or national origin.

7. AFFIRMATIVE ACTION. The Equal Opportunity clause of your contract obligates you to take affirmative action to assure applicants and employees that there will be no discrimination on account of race, color, religion, sex, or national origin. Guidelines for the requirements are contained in the applicable Federal EEO Bid Conditions for the geographical area where the work is to be performed. In the absence of Federal EEO Bid Conditions the contractor's obligations are limited to the applicable EEO clause found in the contract.

8. REPORTS. If you employ 50 or more persons, are non-exempt, and if your contract amounts to \$50,000 or more you are required to file annually, on or before the 31st day of March, complete and accurate reports on Standard Form 100-(EEO-1). A prime contractor is responsible for seeing that his non-exempt first tier subcontractors file the report and each prime subcontractor shall cause its subcontractors to file the report.

<b>BID BOND</b> (See Instructions on reverse)					Date Bond Executed (Must not be later than bid opening date)	
Principal (Legal name and business address)					Type of Organization ("X" one) <input type="checkbox"/> Individual <input type="checkbox"/> Partnership <input type="checkbox"/> Joint <input type="checkbox"/> Corporation <input type="checkbox"/> Venture <input type="checkbox"/> Corporation	
Surety(ies) (Name and business address)						
Penal Sum of Bond					Bid Identification	
Percent of Bid Price	Amount not to exceed				Bid Date	Invitation No.
	Million(s)	Thousand(s)	Hundred(s)	Cents	For (Construction, Supplies or Services)	
KNOW ALL MEN BY THESE PRESENTS, That we, the Principal and Surety(ies) hereto, are firmly bound to the _____, hereinafter called the Contracting						
(Name of Contracting Local Organization)						
Local Organization, in the above penal sum for the payment of which we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally: Provided, That where the Sureties are corporations acting as co-sureties, we, the Sureties, bind ourselves in such sum "jointly and severally" as well as "severally" only for the purpose of allowing a joint action or actions against any or all of us, and for all other purposes each Surety binds itself, jointly and severally with the Principal, for the payment of such sum only as is set forth opposite the name of such Surety, but if no limit of liability is indicated, the limit of liability shall be the full amount of the penal sum.						
THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has submitted the bid identified above.						
NOW, THEREFORE, if the Principal, upon acceptance by the Contracting Local Organization of his bid identified above, within the period specified therein for acceptance (sixty (60) days if no period is specified), shall 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 (10) days if no period is specified) after receipt of the forms by him, or in the event of failure so to execute such further contractual documents and give such bonds, if the Principal shall pay the Contracting Local Organization for any cost of procuring the work which exceeds the amount of his bid, then the above obligation shall be void and of no effect.						
Each Surety executing this instrument hereby agrees that its obligation shall not be impaired by any extension(s) of the time for acceptance of the bid that the Principal may grant to the Contracting Local Organization, notice of which extension(s) to the Surety(ies) being hereby waived; provided that such waiver of notice shall apply only with respect to extensions aggregating not more than sixty (60) calendar days in addition to the period originally allowed for acceptance of the bid.						
IN WITNESS WHEREOF, the Principal and Surety(ies) have executed this bid bond and have affixed their seals on the date set forth above.						
<b>Principal</b>						
Signature(s)	1.		2.		(Seal)	
Name(s) & Title(s) (Typed)	1.		2.		(Seal)	

Corporate Surety(ies)				
SURETY A	Name & Address		State of Inc.	Liability Limit
	Signature(s)	1.	2.	(Seal)
	Name(s) & Title(s) (Typed)	1.	2.	(Seal)
SURETY B	Name & Address		State of Inc.	Liability Limit
	Signature(s)	1.	2.	(Seal)
	Name(s) & Title(s) (Typed)	1.	2.	(Seal)
SURETY C	Name & Address		State of Inc.	Liability Limit
	Signature(s)	1.	2.	(Seal)
	Name(s) & Title(s) (Typed)	1.	2.	(Seal)
SURETY D	Name(s) & Address		State of Inc.	Liability Limit
	Signature(s)	1.	2.	(Seal)
	Name(s) & Title(s) (Typed)	1.	2.	(Seal)
SURETY E	Name(s) & Address		State of Inc.	Liability Limit
	Signature(s)	1.	2.	(Seal)
	Name(s) & Title(s) (Typed)	1.	2.	(Seal)

#### INSTRUCTIONS

1. The full legal name and business address of the Principal shall be inserted in the space designated "Principal" on the face of this form. The bond shall be signed by an authorized person. Where such person is signing in a representative capacity (e.g., an attorney-in-fact), but is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved, evidence of his authority must be furnished.

2. The penal sum of the bond may be expressed as a percentage of the bid price if desired. In such cases, a maximum dollar limitation may be stipulated (e.g., 20% of the bid price but the amount not to exceed \_\_\_\_\_ dollars).

3. The name of each person signing this bid bond should be typed in the space provided.

4. The person signing the bond for the surety must submit evidence of his authority to act for the surety.

5. The corporate surety must be approved by the state in which the services or supplies are to be delivered or in which construction is to be performed.

## CONSTRUCTION SPECIFICATION

### 2. CLEARING AND GRUBBING

#### 1. SCOPE

The work shall consist of the clearing and grubbing of designated areas by removal and disposal of trees, snags, logs, stumps, shrubs and rubbish.

#### 2. MARKING

The limits of the areas to be cleared and grubbed will be marked by means of stakes, flags, tree markings or other suitable methods. Trees to be left standing and uninjured will be designated by special markings placed on the trunks at a height of about six feet above the ground surface.

#### 3. REMOVAL

All trees not marked for preservation and all snags, logs, brush, stumps, shrubs and rubbish shall be removed from within the limits of the marked areas. Unless otherwise specified, all stumps, roots and root clusters having a diameter of one inch or larger shall be grubbed out to a depth of at least two feet below subgrade elevation for concrete structures and one foot below the ground surface at embankment sites and other designated areas.

#### 4. DISPOSAL

Unless otherwise specified, all materials removed from the cleared and grubbed areas shall be burned or buried at locations approved by the Engineer or otherwise disposed of as approved by the Engineer.

#### 5. MEASUREMENT AND PAYMENT

(Method 1) For items of work for which specific unit prices are established in the contract, the cleared and grubbed area will be measured to the nearest 0.1 acre. Payment for clearing and grubbing will be made for the total area within the designated limits at the contract unit price. Such payment will constitute full compensation for all labor, equipment, tools and all other items necessary and incidental to the completion of the work.

(Method 2) For items of work for which specific unit prices are established in the contract, the length of the cleared and grubbed area will be measured to the nearest full station (100 feet) along the line designated on the drawings or in the specifications. Payment for clearing and grubbing will be made for the total length within the designated limits at the contract unit price. Such payment will constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to completion of the work.

(Method 3) For items of work for which specific unit prices are established in the contract, each tree, stump and snag having a diameter of 4 inches or greater and each log having a diameter of 4 inches or greater and a length of 10 feet or greater will be measured prior to removal. The size of each tree and snag will be determined by measuring its trunk at breast height above the natural ground surface. The size of each log will be determined by measuring the butt and by measuring its length from butt to tip. The size of each stump will be measured at the top. Diameter shall be determined by dividing the measured circumference by 3.14.

Payment for clearing and disposal of each tree, stump and snag having a diameter of 4 inches or greater and each log having a diameter of 4 inches or greater and a length of 10 feet or greater will be made at the contract unit price for its size designation as determined by the following schedule:

<u>Measured Diameter</u>	<u>Size Designation</u>
4 inches to 8 inches	6-inch size
Over 8 inches to 12 inches	10-inch size
Over 12 inches to 24 inches	18-inch size
Over 24 inches to 36 inches	30-inch size
Over 36 inches to 60 inches	48-inch size
Over 60 inches	60-inch size

The sum of such payments shall constitute full compensation for all labor, equipment, tools and all other items necessary and incidental to the work of completely clearing and grubbing the designated areas, including clearing, grubbing and disposal of smaller trees, stumps, snags and logs and brush, shrubs, roots and rubbish.

(Method 4) For items of work for which specific lump sum prices are established in the contract, payment for clearing and grubbing will be made at the contract lump sum price. Such payment shall constitute full compensation for all labor, equipment, tools and all other items necessary and incidental to completion of the work.

(Use with all Methods) Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 6 of this specification.

6. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 2, Clearing and Grubbing

- (1) This item shall consist of clearing and grubbing within the limits of the dam, emergency spillway channel, principal spillway downstream to Station 14+00 and borrow areas No. I, I-A, and II as shown on the drawings and staked in the field.
- (2) Measurement and payment will be by Method 1.

6. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 2, Clearing and Grubbing

- (1) This item shall consist of clearing and grubbing within the limits of the dam, emergency spillway channel, principal spillway downstream to Station 11+36± and borrow areas No. 1 and 2 and borrow area (section 14) as shown on the drawings and staked in the field.
- (2) Measurement and payment will be by Method 1.

6. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Subsidiary Item, Clearing and Grubbing

- (1) This item shall consist of clearing, grubbing the following areas within the right-of-way and construction easement limits as shown on the drawings and staked in the field:
  - (a) Sunset pipeline from Station 13+97± centerline principal spillway to Station 64+47±; end of project.
  - (b) Sunnycove pipeline from Station 9+10± centerline principal spillway to junction with Sunset pipeline at Station 37+18± centerline of Sunnycove pipeline.
- (2) In addition to the materials described in Section 1, Scope, clearing and grubbing shall be defined as removing all objectionable matter from within the designated areas.
- (3) No separate payment will be made for clearing and grubbing. Compensation for this work will be included with the payment for Bid Item 2, Pipe Trench Excavation, Common, and Bid Item 3, Structure Excavation, Unclassified.

CONSTRUCTION SPECIFICATION

3. STRUCTURE REMOVAL

1. SCOPE

The work shall consist of the removal, salvage and disposal of structures (including fences) from the designated areas.

2. MARKING

(Method 1) Each structure unit to be removed will be marked by means of stakes, flags, painted markers or other suitable methods.

(Method 2) The limits of the areas from which structures must be removed will be marked by means of stakes, flags or other suitable methods. Structures to be preserved in place or salvaged will be designated by special markings.

3. REMOVAL

(Method 1) All structures designated in the contract for removal shall be removed to the specified extent and depth.

(Method 2) Within the areas so marked all visible structures and attachments and all buried structures located and identified by survey stakes shall be removed to the specified extent and depth.

4. SALVAGE

Structures that are designated to be salvaged shall be carefully removed and neatly placed in the specified storage areas. Salvaged structures that are capable of being disassembled shall be dismantled into individual members or sections. Such structures shall be neatly matchmarked with paint prior to disassembly. All pins, nuts, bolts, washers, plates and other loose parts shall be marked or tagged to indicate their proper locations in the structure and shall be fastened to the appropriate structural member or packed in suitable containers. Materials from fences designated to be salvaged shall be placed outside the work area on the property from which they were removed. Wire shall be rolled into uniform rolls of convenient size. Posts and rails shall be neatly piled.

5. DISPOSAL OF REFUSE MATERIALS

Unless otherwise specified, refuse materials resulting from structure removal shall be burned or buried at locations approved by the Engineer or otherwise disposed of as specified or as approved by the Engineer.

6. MEASUREMENT AND PAYMENT

(Method 1) For items of work for which specific unit prices are established in the contract, payment for the removal of each structure unit, except fences, will be made at the contract unit price. Fences removed or removed and salvaged will be measured to the nearest linear foot. Payment for fence removal or removal and salvage will be made at the contract unit prices appropriate to each type and size of fence. Such payment will constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work.

(Method 2) For items of work for which specific lump sum prices are established in the contract, payment for structure removal will be made at the contract lump sum price. Such payment will constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work.

(Use with Either Method) Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 7 of this specification.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Subsidiary Item, Telephone Cable Removal

- (1) This item shall consist of removing and disposing of the buried telephone cable from within the permanent right-of-way as shown on the drawings and staked in the field.
- (2) In Section 2, Marking, Method 2 shall apply.
- (3) In Section 3, Removal, Method 2 shall apply. The cable and any appurtenances shall be completely removed from the site.
- (4) In Section 4, Salvage, no salvage of materials is required. All materials resulting from this item shall become the property of the Contractor.
- (5) In Section 5, Disposal of Refuse Materials, all materials resulting from this item shall be disposed of by the Contractor at sites of his own choosing away from the work site.
- (6) No separate payment will be made for telephone cable removal. Compensation for this work will be included in the payment for Bid Item 2, Clearing and Grubbing.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Subsidiary Item, Structure Removal

- (1) This item shall consist of removing and disposing of four (4) concrete slabs as shown on sheet 2 of the drawings and staked in the field.
- (2) In Section 2, Marking, Method 1 shall apply.
- (3) In Section 3, Removal, Method 1 shall apply. All concrete shall be completely removed.
- (4) No separate payment will be made for structure removal. Compensation for this work will be included in the payment for the excavation items, Bid Items 4 through 6, as appropriate.

## CONSTRUCTION SPECIFICATION

### 8. MOBILIZATION

#### 1. SCOPE

The work shall consist of the mobilization of the Contractor's forces and equipment necessary for performing the work required under the contract.

It shall include the purchase of contract bonds; transportation of personnel, equipment, and operating supplies to the site; establishment of offices, buildings, and other necessary facilities at the site; and other preparatory work at the site.

It shall not include mobilization for any specific item of work for which payment for mobilization is provided elsewhere in the contract.

The specification covers mobilization for work required by the contract at the time of award. If additional mobilization costs are incurred during performance of the contract as a result of change or added items of work for which the Contractor is entitled to an adjustment in contract price, compensation for such costs will be included in the price adjustment for the items of work changed or added.

#### 2. PAYMENT

Payment will be made as the work proceeds, after presentation of invoices by the Contractor showing his own mobilization costs and evidence of the charges of suppliers, subcontractors, and others for mobilization work performed by them. If the total of such payments is less than the contract lump sum for mobilization, the unpaid balance will be included in the final contract payment. Total payment will be the lump sum contract price for mobilization, regardless of actual cost to the Contractor.

Payment will not be made under this item for the purchase costs of materials having a residual value, the purchase costs of materials to be incorporated in the project, or the purchase costs of operating supplies.

Payment of the lump sum contract price for mobilization will constitute full compensation for all labor, materials, equipment, and all other items necessary and incidental to completion of the work.

Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 3 of this specification.

3. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 1, Mobilization

- (1) This item shall consist of the mobilization of the Contractor's equipment and forces as outlined in Section 1 of this specification required to construct:
  - (a) Sunset FRS (Bid Schedule 1).
  - (b) Sunnycove FRS (Bid Schedule 2).
  - (c) Sunset & Sunnycove Pipeline (Bid Schedule 3).
- (2) Measurement and payment will be in accordance with Section 2.

• CONSTRUCTION SPECIFICATION

11. REMOVAL OF WATER

1. SCOPE

The work shall consist of the removal of surface water and ground water as needed to perform the required construction in accordance with the specifications. It shall include (1) building and maintaining all necessary temporary impounding works, channels, and diversions, (2) furnishing, installing and operating all necessary pumps, piping and other facilities and equipment, and (3) removing all such temporary works and equipment after they have served their purposes.

2. DIVERTING SURFACE WATER

The Contractor shall build, maintain, and operate all cofferdams, channels, flumes, sumps, and other temporary diversion and protective works needed to divert streamflow and other surface water through or around the construction site and away from the construction work while construction is in progress. Unless otherwise specified, a diversion must discharge into the same natural drainageway in which its headworks are located.

Unless otherwise specified, the Contractor shall furnish to the Engineer, in writing, his plan for diverting surface water before beginning the construction work for which the diversion is required. Acceptance of this plan will not relieve the Contractor of responsibility for completing the work as specified.

3. DEWATERING THE CONSTRUCTION SITE

Foundations, cutoff trenches and other parts of the construction site shall be dewatered and kept free of standing water or excessively muddy conditions as needed for proper execution of the construction work. The Contractor shall furnish, install, operate and maintain all drains, sumps, pumps, casings, wellpoints, and other equipment needed to perform the dewatering as specified. Dewatering methods that cause a loss of fines from foundation areas will not be permitted.

Unless otherwise specified, the Contractor shall furnish to the Engineer, in writing, his plan for dewatering before beginning the construction work for which the dewatering is required. Acceptance of this plan will not relieve the Contractor of responsibility for completing the work as specified.

4. DEWATERING BORROW AREAS

Unless otherwise specified in Section 7, the Contractor shall maintain the borrow areas in drainable condition or otherwise provide for timely and effective removal of surface waters that accumulate, for any reason, within the borrow areas.

5. REMOVAL OF TEMPORARY WORKS

After the temporary works have served their purposes, the Contractor shall remove them or level and grade them to the extent required to present a sightly appearance and to prevent any obstruction of the flow of water or any other interference with the operation of or access to the permanent works.

Except as otherwise specified, pipes and casings shall be removed from temporary wells and the wells shall be filled to ground level with gravel or other material approved by the Engineer.

6. MEASUREMENT AND PAYMENT

For items of work for which specific lump sum prices are established in the contract, payment for diverting surface water, dewatering construction sites, and dewatering borrow areas will be made at the contract lump sum prices. Such payment will constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work.

Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 7 of this specification.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Subsidiary Item, Dewatering

- (1) This item shall consist of dewatering the work site, including the borrow areas, to the extent that construction operations can be performed under dry, stable conditions.
- (2) Dewatering operations shall include diverting surface water, if required, and removing subsurface waters.
- (3) No advance plan of dewatering will be required.
- (4) No separate payment will be made for dewatering. Compensation for dewatering will be included in the payment for excavation, Bid Items 3 through 6; and in payment for the other bid items as applicable.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Subsidiary Item, Dewatering

- (1) This item shall consist of dewatering the work site, including the borrow areas, to the extent that construction operations can be performed under dry, stable conditions.
- (2) Dewatering operations shall include diverting surface waters, if required, and removing subsurface waters.
- (3) No advance plan of dewatering will be required.
- (4) No separate payment will be made for dewatering. Compensation for dewatering will be included in the payment for the excavation items, Bid Items 4 through 6, as appropriate.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Subsidiary Item, Dewatering

- (1) This item shall consist of dewatering the work site, including the borrow areas, to the extent that construction operations can be performed under dry, stable conditions.
- (2) Dewatering operations shall include diverting surface waters, if required, and removing subsurface waters.
- (3) No advance plan of dewatering will be required.
- (4) No separate payment will be made for dewatering. Compensation for this work will be included with the payment for the other bid items as applicable.

## CONSTRUCTION SPECIFICATION

### 21. EXCAVATION

#### 1. SCOPE

The work shall consist of the excavation required by the drawings and specifications and disposal of the excavated materials.

#### 2. CLASSIFICATION

Excavation will be classified as common excavation or rock excavation in accordance with the following definitions or will be designated as unclassified.

Common excavation shall be defined as the excavation of all materials that can be excavated, transported, and unloaded by the use of heavy ripping equipment and wheel tractor-scrappers with pusher tractors or that can be excavated and dumped into place or loaded onto hauling equipment by means of excavators having a rated capacity of one cubic yard and equipped with attachments (such as shovel, bucket, backhoe, dragline or clam shell) appropriate to the character of the materials and the site conditions.

Rock excavation shall be defined as the excavation of all hard, compacted or cemented materials the accomplishment of which requires blasting or the use of excavators larger than defined for common excavation. The excavation and removal of isolated boulders or rock fragments larger than one cubic yard in volume encountered in materials otherwise conforming to the definition of common excavation shall be classified as rock excavation.

Excavation will be classified according to the above definitions by the Engineer, based on his judgment of the character of the materials and the site conditions.

The presence of isolated boulders or rock fragments larger than one cubic yard in size will not in itself be sufficient cause to change the classification of the surrounding material.

For the purpose of this classification, the following definitions shall apply:

Heavy ripping equipment shall be defined as a rear-mounted, heavy duty, single-tooth, ripping attachment mounted on a tractor having a power rating of 200-300 net horsepower (at the flywheel).

Wheel tractor-scraper shall be defined as a self-loading (not elevating) and unloading scraper having a struck bowl capacity of 12-20 yards.

Pusher tractor shall be defined as a track type tractor having a power rating of 200-300 net horsepower (at the flywheel) equipped with appropriate attachments.

3. UNCLASSIFIED EXCAVATION

Items designated as "Unclassified Excavation" shall include all materials encountered regardless of their nature or the manner in which they are removed. When excavation is unclassified, none of the definitions or classifications stated in Section 2 of this specification shall apply.

4. BLASTING

The transportation, handling, storage, and use of dynamite and other explosives shall be directed and supervised by a person of proven experience and ability in blasting operations.

Blasting shall be done in such a way as to prevent damage to the work or unnecessary fracturing of the foundation and shall conform to any special requirements in Section 12 of this specification.

5. USE OF EXCAVATED MATERIALS

(Method 1) To the extent they are needed, all suitable materials from the specified excavations shall be used in the construction of required permanent earth fill or rock fill. The suitability of materials for specific purposes will be determined by the Engineer. The Contractor shall not waste or otherwise dispose of suitable excavated materials.

(Method 2) Suitable materials from the specified excavations may be used in the construction of required earth fill or rock fill. The suitability of materials for specific purposes will be determined by the Engineer.

6. DISPOSAL OF WASTE MATERIALS

(Method 1) All surplus or unsuitable excavated materials will be designated as waste and shall be disposed of at the locations shown on the drawings.

(Method 2) All surplus or unsuitable excavated materials will be designated as waste and shall be disposed of by the Contractor at sites of his own choosing away from the site of the work.

7. BRACING AND SHORING

Excavated surfaces too steep to be safe and stable if unsupported shall be supported as necessary to safeguard the work and workmen, to prevent sliding or settling of the adjacent ground, and to avoid damaging existing improvements. The width of the excavation shall be increased if necessary to provide space for sheeting, bracing, shoring, and other supporting installations. The Contractor shall furnish, place and subsequently remove such supporting installations.

8. STRUCTURE AND TRENCH EXCAVATION

Structure or trench excavation shall be completed to the specified elevations and to sufficient length and width to include allowance for forms, bracing and supports, as necessary, before any concrete or earth fill is placed or any piles are driven within the limits of the excavation.

9. BORROW EXCAVATION

When the quantities of suitable materials obtained from specified excavations are insufficient to construct the specified fills, additional materials shall be obtained from the designated borrow areas. The extent and depth of borrow pits within the limits of the designated borrow areas shall be as directed by the Engineer.

Borrow pits shall be excavated and finally dressed in a manner to eliminate steep or unstable side slopes or other hazardous or unsightly conditions.

10. OVEREXCAVATION

Excavation in rock beyond the specified lines and grades shall be corrected by filling the resulting voids with portland cement concrete made of materials and mix proportions approved by the Engineer. Concrete that will be exposed to the atmosphere when

construction is completed shall contain not less than 6 sacks of cement per cubic yard of concrete. Concrete that will be permanently covered shall contain not less than 4½ sacks of cement per cubic yard. The concrete shall be placed and cured as specified by the Engineer.

Excavation in earth beyond the specified lines and grades shall be corrected by filling the resulting voids with approved compacted earth fill, except that, if the earth is to become the subgrade for riprap, rock fill, sand or gravel bedding, or drain fill, the voids may be filled with material conforming to the specifications for the riprap, rock fill, bedding or drain fill.

#### 11. MEASUREMENT AND PAYMENT

For items of work for which specific unit prices are established in the contract, the volume of each type and class of excavation within the specified pay limits will be measured and computed to the nearest cubic yard by the method of average cross-sectional end areas. Regardless of quantities excavated, the measurement for payment will be made to the specified pay limits, except that excavation outside the specified lines and grades directed by the Engineer to remove unsuitable material will be included, but only to the extent that the unsuitable condition is not a result of the Contractor's operations.

(Method 1) The pay limits shall be as designated on the drawings.

(Method 2) The pay limits shall be defined as follows:

- a. The upper limit shall be the original ground surface as it existed prior to the start of construction operations except that where excavation is performed within areas designated for previous excavation or fill the upper limit shall be modified ground surface resulting from the specified previous excavation or fill.
- b. The lower and lateral limits shall be the neat lines and grades shown on the drawings.

(Method 3) The pay limits shall be defined as follows:

- a. The upper limit shall be the original ground surface as it existed prior to the start of construction operations except that where excavation is performed within areas designated

for previous excavation or fill the upper limit shall be the modified ground surface resulting from the specified previous excavation or fill.

- b. The lower and lateral limits shall be the true surface of the completed excavation as authorized by the Engineer.

**(Method 4)** The pay limits shall be defined as follows:

- a. The upper limit shall be the original ground surface as it existed prior to the start of construction operations except that where excavation is performed within areas designated for previous excavation or fill the upper limit shall be the modified ground surface resulting from the specified previous excavation or fill.
- b. The lower limit shall be at the bottom surface of the proposed structure.
- c. The lateral limits shall be 18 inches outside of the outside surfaces of the proposed structure or shall be vertical planes 18 inches outside of and parallel to the footings, whichever gives the larger pay quantity, except as provided in d, below.
- d. For trapezoidal channel linings or similar structures that are to be supported upon the sides of the excavation without intervening forms, the lateral limits shall be at the under side of the proposed lining or structure.
- e. For the purpose of the definitions in b, c, and d, above, any specified bedding or drain fill directly beneath or beside the structure will be considered to be a part of the structure.

**(Use with all Methods)** Payment for each type and class of excavation will be made at the contract unit price for that type and class of excavation. Such payment will constitute full compensation for all labor, materials, equipment, and all other items necessary and incidental to the performance of the work, except that extra payment for backfilling required overexcavation will be made in accordance with the following provisions:

- a. Payment for backfilling overexcavation, as specified in Section 10 of this specification, will be made only if the excavation outside specified lines and grades is directed by the Engineer to remove unsuitable material and if the unsuitable condition is not a result of the Contractor's operations.

Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 12 of this specification.

12. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 3, Foundation Excavation, Common

- (1) This item shall consist of all foundation excavation required within the base area of the dam between Station 10+00± and Station 15+60±, as shown on the drawings and staked in the field.
- (2) Excavation shall consist of the removal and disposal of all materials resulting from:
  - (a) Stripping the foundation to a depth of approximately 0.5 foot of topsoil, grass, roots and other undesirable materials. Unsuitable material shall be disposed of in Disposal Area B.
  - (b) Foundation excavation of all material above the weak and moderately cemented caliche materials. Unsuitable material shall be disposed of in Disposal Area B.
  - (c) Excavating weakly and moderately cemented caliche materials unsuitable for foundation for the dam. Unsuitable material shall be disposed of in Disposal Area A.
  - (d) An unknown amount of rubbish (bricks, lumber, loose soil, etc.) on the left abutment. This material shall be disposed of in Disposal Area A or B as approved by the Engineer.

Approximate depths are shown on the drawings. Final depths will be determined by the Engineer after examination of the materials encountered.

- (3) In Section 5, Use of Excavated Materials, Method 1 shall apply.
- (4) In Section 6, Disposal of Waste Materials, Method 1 shall apply. The caliche materials and rubbish shall be wasted. After waste operations are completed, the waste fill area shall be smoothed and dressed to blend with the surrounding terrain and not interfere with the natural drainage pattern. Disposal Area A shall have a finished slope not steeper than one and one-half (1.5) horizontal to one (1) vertical. Disposal Area B shall have a finished slope not steeper than two (2) horizontal to one (1) vertical.
- (5) Measurement and payment will be by Method 3.

b. Bid Item 4, Trench Excavation, Common

- (1) This item shall consist of all common excavation outside the limits of foundation excavation, common, required to construct the cutoff trench and drain trenches to the lines and grades shown on the drawings.
- (2) In Section 5, Use of Excavated Materials, Method 1 shall apply.
- (3) In Section 6, Disposal of Waste Materials, Method 1 shall apply. Waste material shall be disposed of in Disposal Area A. After waste operations are completed, the waste fill area shall be smoothed and dressed to blend with the surrounding terrain and not interfere with the natural drainage pattern.
- (4) Measurement and payment will be by Method 2.

c. Bid Item 5, Structure Excavation, Common

- (1) This item shall consist of all common excavation outside the limits of foundation excavation, common, required for the installation of the structures shown on sheets 4 and 13 of the drawings.
- (2) In Section 5, use of Excavated Materials, Method 1 shall apply.
- (3) In Section 6, Disposal of Waste Materials, Method 1 shall apply. After waste operations are completed, the waste fill area shall be smoothed and dressed to blend with the surrounding terrain and not interfere with the natural drainage pattern.
- (4) Measurement and payment will be by Method 2.

d. Bid Item 6, Spillway Channel Excavation, Common

- (1) This item shall consist of all common excavation required to construct the emergency spillway outlet channel downstream from Station 11+10±, including excavation for rock riprap placement to the lines and grades shown on the drawings.

- (2) In Section 5, Use of Excavated Materials, Method 1 shall apply.
- (3) In Section 6, Disposal of Waste Materials, Method 1 shall apply. After waste operations are completed, the waste fill area shall be smoothed and dressed to blend with the surrounding terrain and not interfere with the natural drainage pattern.
- (4) Measurement and payment will be by Method 2.

e. Subsidiary Item, Borrow Excavation, Common

- (1) This item shall consist of all excavation required for obtaining fill materials not available from required excavations to complete the construction of the permanent works.
- (2) In Section 5, Use of Excavated Materials, Method 1 shall apply.
- (3) In Section 6, Disposal of Waste Materials, Method 1 shall apply.
- (4) The borrow areas shall be graded to prevent the ponding of water and be in harmony with the natural drainage pattern. The finished slopes of borrow areas shall not be steeper than four (4) horizontal to one (1) vertical.
- (5) No separate payment will be made for borrow excavation. Compensation for borrow excavation will be included in the payment for earth fill, Bid Item 7 through 12 as appropriate.

12. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 3, Emergency Spillway Excavation, Unclassified

- (1) This item shall consist of all excavation, including stripping, and the disposal of all excavated materials required to construct the emergency spillway from Station 7+20± to Station 10+42± as shown on the drawings and staked in the field.
- (2) Excavation for the emergency spillway will be in caliche type materials and in weathered to hard fanglomerate materials.
- (3) In Section 5, Use of Excavated Materials, Method 1 shall apply.
- (4) In Section 6, Disposal of Waste Materials, Method 1 shall apply. The caliche materials shall be wasted. The waste materials shall be disposed of in approved locations within Borrow Area 2 after borrow area operations are completed. After waste operations are completed, waste fill area shall be smoothed and dressed to blend with the surrounding terrain and are not to interfere with the natural drainage pattern.
- (5) Measurement and payment will be by Method 2.

b. Bid Item 4, Foundation Excavation, Common

- (1) This item shall consist of all foundation excavation required within the base area of the dam between Station 10+05± and Station 17+14± as shown on the drawings and staked in the field.
- (2) Excavation shall consist of the removal and disposal of all materials resulting from:
  - (a) Stripping the foundation to a depth of approximately 0.5 foot of topsoil, grass, roots and other undesirable materials.
  - (b) Excavating alluvial sands and gravels down to firm fanglomerate.
  - (c) Excavating fanglomerate materials down to required excavation lines.
  - (d) Excavating isolated concentrations of caliche materials mingled with fanglomerate.

Approximate depths are shown on the drawings. Final depths will be determined by the Engineer after examination of the materials encountered.

- (3) In Section 5, Use of Excavated Materials, Method 1 shall apply.
- (4) In Section 6, Disposal of Waste Materials, Method 1 shall apply. Caliche materials shall be wasted. After waste operations are completed, the waste fill area shall be smoothed and dressed to blend with the surrounding terrain and not interfere with the natural drainage pattern.
- (5) Measurement and payment will be by Method 3.

c. Bid Item 5, Trench Excavation, Unclassified

- (1) This item shall consist of all excavation outside the limits of foundation excavation, common, required to construct the cutoff trench and drain channel to the lines and grades shown on the drawings.
- (2) In Section 5, Use of Excavated Materials, Method 1 shall apply.
- (3) In Section 6, Disposal of Waste Materials, Method 1 shall apply. After waste operations are completed, the waste fill area shall be smoothed and dressed to blend with the surrounding terrain and not to interfere with the natural drainage pattern.
- (4) Measurement and payment will be by Method 2.

d. Bid Item 6, Structure Excavation, Unclassified

- (1) This item shall consist of all excavation outside the limits of foundation excavation, common, required for the installation of the following structures as shown on the drawings:
  - (a) Principal spillway riser.
  - (b) Principal spillway outlet conduit and appurtenances from Station 8+47± to Station 11+36±.
- (2) In Section 5, Use of Excavated Materials, Method 1 shall apply.
- (3) In Section 6, Disposal of Waste Materials, Method 1 shall apply. After waste operations are complete, the waste fill area shall be smoothed and dressed to blend with the surrounding terrain and not interfere with the natural drainage pattern.
- (4) Measurement and payment will be by Method 2.

e. Subsidiary Item, Borrow Excavation, Common

- (1) This item shall consist of all excavation required for obtaining fill materials not available from required excavations to complete the construction of the permanent works.
- (2) In Section 5, Use of Excavated Materials, Method 1 shall apply.
- (3) In Section 6, Disposal of Waste Materials, Method 1 shall apply. After waste operations are complete, the waste fill area shall be smoothed and dressed to blend with the surrounding terrain and not interfere with the natural drainage pattern.
- (4) The borrow areas shall be graded to prevent the ponding of water and be in harmony with natural surface drainage. The finished slopes of borrow areas shall not be steeper than four (4) horizontal to one (1) vertical.
- (5) No separate payment will be made for borrow excavation. Compensation for borrow excavation will be included in the payment for earth fill, Bid Items 7 through 10, as appropriate.

12. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 2, Pipe Trench Excavation, Common

- (1) This item shall consist of all common excavation required for the installation of all 15-inch, 18-inch, 21-inch, 24-inch and 27-inch diameter reinforced concrete pipe as shown on the drawings and staked in the field as follows:
  - (a) Sunset pipeline from Station 13+97± centerline principal spillway to Station 64+28± outlet structure, end of project.
  - (b) Sunnycove pipeline from Station 9+10± centerline principal spillway to Station 37+18± intersection Sunset pipeline.
- (2) In Section 5, Use of Excavated Materials, Method 1 shall apply.
- (3) In Section 6, Disposal of Waste Materials, Method 1 shall apply.
- (4) The Contractor's attention is directed to areas where additional requirements shall apply as follows:
  - (a) Within the city limits of Wickenburg, all applicable portions of Standard Specification No. 600, City of Phoenix, Arizona, shall apply in addition to the requirements of this specification.
  - (b) Within the railroad right-of-way on Sunset pipeline from Station 63+47± to Station 64+47±, all construction shall comply with the requirements of A.T.&S.F. Railroad Company. The Contractor shall be responsible for obtaining these details from:

The Atchison, Topeka and Santa Fe Railway Company  
Winslow, Arizona 86047  
R. V. Ketring, Office Engineer
  - (c) Within the right-of-way limits of any existing utility, the applicable provisions of Standard Specification No. 600, City of Phoenix, Arizona, Engineering Department, shall apply in addition to the requirements of this specification.
  - (d) In areas where the pipe trench bottoms in rock or other unsuitable materials, the Contractor shall overexcavate to a depth of 6 inches or as directed by the Engineer. Over-excavated areas shall be backfilled with approved minus 1-inch materials.

(5) The maximum amount of open trench that will be allowed at any given time is 600 feet, unless proof of prior approval by the Engineer can be shown.

(6) Measurement and payment will be by Method 1.

b. Bid Item 3, Structure Excavation, Unclassified

(1) This item shall consist of all excavation outside the limits of pipe trench excavation, common, required to install the manholes and outlet structure for the Sunset and Sunnycove pipelines as shown on the drawings.

(2) The provisions of items 12.a.(2), 12.a.(3), 12.a.(4) and 12.a.(5) above shall apply to structure excavation, unclassified, as applicable.

(3) Measurement and payment will be by Method 1.

c. Subsidiary Item, Borrow Excavation

(1) This item shall consist of all common excavation required to obtain fill material not available from the required excavations to complete the construction of the permanent works.

(2) In Section 5, Use of Excavated Materials, Method 1 shall apply.

(3) In Section 6, Disposal of Waste Materials, Method 1 shall apply.

(4) The borrow area shall be graded to provide drainage to prevent ponding of water and be in harmony with the natural drainage pattern. The final lines and grades will be as directed by the Engineer. All final slopes shall not be steeper than 4 horizontal to 1 vertical.

(5) No separate payment will be made for borrow excavation. Compensation will be included in the payment for Bid Items 4, 5 and 6 as applicable.

## CONSTRUCTION SPECIFICATION

### 23. EARTH FILL

#### 1. SCOPE

The work shall consist of the construction of earth embankments and other earth fills required by the drawings and specifications.

#### 2. MATERIALS

All fill materials shall be obtained from required excavations and designated borrow areas. The selection, blending, routing and disposition of materials in the various fills shall be subject to approval by the Engineer.

Fill materials shall contain no sod, brush, roots or other perishable materials. Rock particles larger than the maximum size specified for each type of fill shall be removed prior to compaction of the fill.

The types of materials used in the various fills shall be as listed and described in the specifications and drawings.

#### 3. FOUNDATION PREPARATION

Foundations for earth fill shall be stripped to remove vegetation and other unsuitable materials or shall be excavated as specified.

Except as otherwise specified, earth foundation surfaces shall be graded to remove surface irregularities and shall be scarified parallel to the axis of the fill or otherwise acceptably scored and loosened to a minimum depth of 2 inches. The moisture content of the loosened material shall be controlled as specified for the earth fill, and the surface materials of the foundation shall be compacted and bonded with the first layer of earth fill as specified for subsequent layers of earth fill.

Earth abutment surfaces shall be free of loose, uncompacted earth in excess of two inches in depth normal to the slope and shall be at such a moisture content that the earth fill can be compacted against them to effect a good bond between the fill and the abutments.

Rock foundation and abutment surfaces shall be cleared of all loose materials by hand or other effective means and shall be

free of standing water when fill is placed upon them. Occasional rock outcrops in earth foundations for earth fill, except in dams and other structures designed to restrain the movement of water, shall not require special treatment if they do not interfere with compaction of the foundation and initial layers of the fill or the bond between the foundation and the fill.

Foundation and abutment surfaces shall be not steeper than 1 horizontal to 1 vertical unless otherwise specified. Test pits or other cavities shall be filled with compacted earth fill conforming to the specifications for the earth fill to be placed upon the foundation.

#### 4. PLACEMENT

Fill shall not be placed until the required excavation and foundation preparation have been completed and the foundation has been inspected and approved by the Engineer. Fill shall not be placed upon a frozen surface, nor shall snow, ice, or frozen material be incorporated in the fill.

Fill shall be placed in approximately horizontal layers. The thickness of each layer before compaction shall not exceed the maximum thickness specified. Materials placed by dumping in piles or windrows shall be spread uniformly to not more than the specified thickness before being compacted. Hand compacted fill, including fill compacted by manually directed power tampers, shall be placed in layers whose thickness before compaction does not exceed the maximum thickness specified for layers of fill compacted by manually directed power tampers.

Adjacent to structures, fill shall be placed in a manner which will prevent damage to the structures and will allow the structures to assume the loads from the fill gradually and uniformly. The height of the fill adjacent to a structure shall be increased at approximately the same rate on all sides of the structure.

Earth fill in dams, levees and other structures designed to restrain the movement of water shall be placed so as to meet the following additional requirements:

- a. The distribution of materials throughout each zone shall be essentially uniform, and the fill shall be free from lenses, pockets, streaks or layers of material differing substantially in texture or gradation from the surrounding material.

- b. If the surface of any layer becomes too hard and smooth for proper bond with the succeeding layer, it shall be scarified parallel to the axis of the fill to a depth of not less than 2 inches before the next layer is placed.
- c. The top surfaces of embankments shall be maintained approximately level during construction, except that a crown or cross-slope of not less than 2 percent shall be maintained to insure effective drainage, and except as otherwise specified for drain fill zones. If the drawings or specifications require or the Engineer directs that fill be placed at a higher level in one part of an embankment than another, the top surface of each part shall be maintained as specified above.
- d. Dam embankments shall be constructed in continuous layers from abutment to abutment except where openings to facilitate construction or to allow the passage of stream flow during construction are specifically authorized in the contract.
- e. Embankments built at different levels as described under c or d above shall be constructed so that the slope of the bonding surfaces between embankment in place and embankment to be placed is not steeper than 3 feet horizontal to 1 foot vertical. The bonding surface of the embankment in place shall be stripped of all loose material, and shall be scarified, moistened and recompacted when the new fill is placed against it as needed to insure a good bond with the new fill and to obtain the specified moisture content and density in the junction of the in place and new fill.

5. CONTROL OF MOISTURE CONTENT

During placement and compaction of fill, the moisture content of the materials being placed shall be maintained within the specified range.

The application of water to the fill materials shall be accomplished at the borrow areas insofar as practicable. Water may be applied by sprinkling the materials after placement on the fill, if necessary. Uniform moisture distribution shall be obtained by discing, blading or other approved methods prior to compaction of the layer.

Material that is too wet when deposited on the fill shall either be removed or be dried to the specified moisture content prior to compaction.

If the top surface of the preceding layer of compacted fill or a foundation or abutment surface in the zone of contact with the fill becomes too dry to permit suitable bond it shall be scarified and moistened by sprinkling to an acceptable moisture content prior to placement of the next layer of fill.

## 6. COMPACTION

Earth fill shall be compacted according to the following requirements for the class of compaction specified:

Class A compaction. Each layer of fill shall be compacted as necessary to make the density of the fill matrix not less than the minimum density specified. The fill matrix is defined as the portion of the fill material finer than the maximum particle size used in the compaction test method specified.

Class B compaction. Each layer of fill shall be compacted to a mass density not less than the minimum density specified.

Class C compaction. Each layer of fill shall be compacted by the specified number of passes of the type and weight of roller or other equipment specified, or by an approved equivalent method. Each pass shall consist of at least one passage of the roller wheel or drum over the entire surface of the layer.

Fill adjacent to structures shall be compacted to a density equivalent to that of the surrounding fill by means of hand tamping if permitted by the Contracting Officer, or manually directed power tampers or plate vibrators. Heavy equipment shall not be operated within 2 feet of any structure. Vibrating rollers shall not be operated within 5 feet of any structure. Compaction by means of drop weights operating from a crane or hoist will not be permitted.

The passage of heavy equipment will not be allowed: (1) over cast-in-place conduits prior to 14 days after placement of the concrete; (2) over cradled precast conduits prior to 7 days after placement of the concrete cradle; or (3) over any type of conduit until the backfill has been placed above the top surface of the structure to a height equal to one-half the clear span width of the structure or pipe or 2 feet, whichever is greater.

Compacting of fill adjacent to structures shall not be started until the concrete has attained the strength specified in Section 10 for this purpose. The strength will be determined by compression testing of test cylinders cast by the Engineer for this purpose and cured at the work site in the manner specified in ASTM Method C 31 for determining when a structure may be put into service.

When the required strength of the concrete is not specified as described above, compaction of fill adjacent to structures shall not be started until the following time intervals have elapsed after placement of the concrete.

<u>Structure</u>	<u>Time Interval</u>
Retaining walls and counterforts	14 days
Walls backfilled on both sides simultaneously	7 days
Conduits and spillway risers, cast-in-place (with inside forms in place)	7 days
Conduits and spillway risers, cast-in-place (inside forms removed)	14 days
Conduits, precast, cradled	2 days
Conduits, precast, bedded	1 day
Antiseep collars and cantilever outlet bents	3 days

7. REMOVAL AND PLACEMENT OF DEFECTIVE FILL

Fill placed at densities lower than the specified minimum density or at moisture contents outside the specified acceptable range of moisture content or otherwise not conforming to the requirements of the specifications shall be reworked to meet the requirements or removed and replaced by acceptable fill. The replacement fill and the foundation, abutment and fill surfaces upon which it is placed shall conform to all requirements of this specification for foundation preparation, approval, placement, moisture control and compaction.

8. TESTING

During the course of the work, the Engineer will perform such tests as are required to identify materials, to determine compaction characteristics, to determine moisture content, and to determine density of fill in place. These tests performed by the Engineer will be used to verify that the fills conform to the requirements of the specifications. Such tests are not intended to provide the Contractor with the information required by him for the proper execution of the work and their performance shall not relieve the Contractor of the necessity to perform tests for that purpose.

Densities of fill requiring Class A compaction will be determined by the Engineer in accordance with ASTM Method D 1556 (or by equivalent methods), except that the volume and moist weight of included rock particles larger than those used in the compaction test method specified for the type of fill will be determined and deducted from the volume and moist weight of the total sample prior to computation of density. The density so computed will be used to determine the percent compaction of the fill matrix.

9. MEASUREMENT AND PAYMENT

For items of work for which specific unit prices are established in the contract, the volume of each type and compaction class of earth fill within the specified zone boundaries and pay limits will be measured and computed to the nearest cubic yard by the method of average cross-sectional end areas. Unless otherwise specified, no deduction in volume will be made for embedded conduits and appurtenances.

The pay limits shall be as defined below, with the further provision that earth fill required to fill voids resulting from overexcavation of the foundation, outside the specified lines and grades, will be included in the measurement for payment only where such overexcavation is directed by the Engineer to remove unsuitable material and where the unsuitable condition is not a result of the Contractor's operations.

(Method 1) The pay limits shall be as designated on the drawings.

(Method 2) The pay limits shall be the measured surface of the foundation when approved for placement of the fill and the specified neat lines of the fill surface.

(Method 3) The pay limits shall be the measured surface of the foundation when approved for placement of the fill and the measured surface of the completed fill.

(Method 4) The pay limits shall be the specified pay limits for excavation and the specified neat lines of the fill surface.

(Method 5) The pay limits shall be the specified pay limits for excavation and the measured surface of the completed fill.

(Use method 6 or 7 with all methods 1 through 5)

(Method 6) Payment for each type and compaction class of earth fill will be made at the contract unit price for that type and compaction class of fill. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the performance of the work.

(Method 7) Payment for each type and compaction class of earth fill will be made at the contract unit price for that type and compaction class of fill. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the performance of the work, except furnishing, transporting, and applying water to the foundation and fill materials.

Water applied to the foundation and fill materials will be measured and payment will be made as specified in Construction Specification 10.

(Use with All Methods) Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 10 of this specification.

10. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in accordance with this specification and the construction details are:

a. Bid Item 7, Embankment Earth Fill, Zone I

- (1) This item shall consist of placing and compacting the required embankment Zone I materials in the embankment, including the foundation and the cutoff trench within the limits shown on the drawings.
- (2) Material for the embankment Zone I shall consist of gravelly clayey sands and gravelly silty sands containing a minimum of 10 percent passing the No. 200 sieve when determined on a dry weight basis in accordance with ASTM D 1140.
- (3) The main source of Zone I materials for the cutoff and central portion of the zone (within 7 feet of centerline of dam) shall be suitable materials from Borrow Area I until depleted, then Borrow Area I-A and II.
- (4) In Section 6, Compaction, Class A shall apply. The fill matrix shall be compacted to at least 95 percent of the maximum density obtained in compaction tests of the fill materials performed by Method A, ASTM D 698 (Standard Proctor Test).
- (5) The maximum size of rock fragments incorporated in the fill shall be six (6) inches.
- (6) The maximum thickness of a layer before compaction shall be nine (9) inches.
- (7) The moisture content of the material incorporated in the embankment Zone I shall be maintained within the range of three (3) percentage points below to one (1) percentage point above optimum moisture content.
- (8) When the compaction equipment leaves the fill surface too smooth for proper bonding, the surface shall be scarified to a depth of two inches before placing the succeeding layer.
- (9) Measurement and payment will be by Method 2 and Method 6.

b. Bid Item 8, Embankment Earth Fill, Zone III

- (1) This item shall consist of placing and compacting the earth fill required in Zone III of the embankment within the limits designated on the drawings.
- (2) Materials for the embankment Zone III shall consist of gravelly sands and sandy gravels containing less than ten (10) percent fines passing the No. 200 sieve when determined on a dry weight basis in accordance with ASTM D 1140.
- (3) The source of materials for Zone III shall be the suitable materials from Borrow Area I-A, Borrow Area II or other approved sources.
- (4) In Section 6, Compaction, Class C shall apply. Materials shall be compacted by one of the following methods:
  - (a) Two passes per layer of fill of a pneumatic tired roller exerting a pressure of not less than 75 pounds per square inch.
  - (b) At least four passes over the entire surface of a track or crawler type tractor weighing not less than 20 tons.
- (5) The maximum size of rock fragments incorporated in the fill shall be nine (9) inches. All rock exceeding this size shall be raked to the outer limits of the Zone III embankment where they shall be deposited to provide slope protection.
- (6) The maximum thickness of a layer before compaction shall be twelve (12) inches.
- (7) The moisture content of the material to be incorporated in the embankment Zone III shall be that percent necessary to insure a dense fill without bulking or dilatance of the material under the action of hauling or compaction equipment.
- (8) The outside slopes of Zone III shall be finished in such a manner that there shall not be any apparent deviation from the neat lines shown on the drawings.
- (9) Measurement and payment shall be by Method 2 and Method 6.

c. Bid Item 9, Structure Backfill, Zone I and Zone III

- (1) This item shall consist of placing and compacting structure backfill within the limits shown on sheets 4 and 13 of the drawings.

- (2) Backfill materials shall be materials meeting the requirements of Bid Item 7, Embankment Earth Fill, Zone I, or Bid Item 8, Embankment Earth Fill, Zone III, as applicable except as noted in 10.c. (5) and 10.c.(6) below.
- (3) Compaction for Zone I materials shall be in accordance with the requirements of Bid Item 7, Embankment Earth Fill, Zone I.
- (4) Compaction for both Zone I and Zone III materials shall be accomplished by use of manually directed power tampers or plate vibrators approved by the engineer. A minimum of four passes per layer of fill shall be made before depositing the succeeding layer.
- (5) The maximum size of rock fragments to be incorporated in the backfill shall be two (2) inches for Zone I and three (3) inches for Zone III.
- (6) The maximum thickness of a layer before compaction shall be four (4) inches.
- (7) The moisture content shall be in accordance with the requirements of Bid Item 7, Embankment Earth Fill, Zone I, and Bid Item 8, Embankment Earth Fill, Zone III, as applicable.
- (8) Measurement and payment will be by Method 4 and Method 6. A deduction in volume will be made for embedded conduit and appurtenances.

10. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 7, Embankment Earth Fill, Zone I

- (1) This item shall consist of placing and compacting the required embankment Zone I materials in the embankment, including the foundation and the cutoff trench within the limits shown on the drawings and staked in the field.
- (2) Material for the embankment Zone I shall consist of clayey sands, sandy clays and sandy silts containing a minimum of 20 percent passing the No. 200 sieve when determined on a dry weight basis in accordance with ASTM D 1140.
- (3) The main source of Zone I materials for the cutoff, foundation, and central portion of the dam shall be suitable materials from Borrow Area 2 or other approved sources.
- (4) In Section 6, Compaction, Class A shall apply. The fill matrix shall be compacted to at least 95 percent of the maximum density obtained in compaction tests of the fill materials performed by Method A, ASTM D 698 (standard proctor test).
- (5) The maximum size of rock fragments incorporated in the fill shall be six (6) inches.
- (6) The maximum thickness of a layer before compaction shall be nine (9) inches.
- (7) The moisture content of the material incorporated in the embankment Zone I shall be maintained within the range of two (2) percentage points below to two (2) percentage points above optimum moisture content.
- (8) When the compaction equipment leaves the fill surface too smooth for proper bonding, the surface shall be scarified to a depth of two inches before placing the succeeding layer.
- (9) Measurement and payment will be by Method 2 and Method 6.

b. Bid Item 8, Embankment Earth Fill, Zone III

- (1) This item shall consist of placing and compacting the earth fill required in Zone III of the embankment within the limits designated on the drawings and staked in the field.

- (2) Materials for the embankment Zone III shall consist of gravelly sands or sandy gravels containing less than fifteen (15) percent fines passing the No. 200 sieve when determined on a dry weight basis in accordance with ASTM D 1140.
- (3) The source of materials for Zone III shall be the suitable materials from the excavations, Borrow Area 1 or 2, or other approved sources. If needed, an additional borrow area (Section 14) is located approximately one mile south of Sunnycove FRS.
- (4) In Section 6, Compaction, Class C shall apply. Materials shall be compacted by one of the following methods:
  - (a) Two passes per layer of fill of a pneumatic tired roller exerting a pressure of not less than 75 pounds per square inch.
  - (b) At least four passes over the entire surface of a track or a crawler type tractor weighing not less than 20 tons.
- (5) The maximum size of rock fragments incorporated in the fill shall be nine (9) inches. All rock exceeding this size shall be raked to the outer limits of the Zone III embankment where they shall be deposited to provide slope protection.
- (6) The maximum thickness of a layer before compaction shall be twelve (12) inches.
- (7) The moisture content of the material to be incorporated in the embankment Zone III shall be that percent necessary to insure a dense fill without bulking or dilatance of the materials under the actions of the hauling or compaction equipment.
- (8) The outside slopes of Zone III shall be finished in such a manner that there shall not be any apparent deviation from the neat lines shown on the drawings.
- (9) Measurement and payment will be by Method 2 and Method 6.

d. Bid Item 9, Embankment Earth Fill, Zone IV

- (1) This item shall consist of placing and compacting the earth fill required in Zone IV of the embankment within the limits shown on the drawings and staked in the field.
- (2) Materials for Zone IV shall consist of mixtures of sands, silts or clays with up to 35% gravels.

- (3) The source of materials shall be the approved materials from Borrow Area 1, Borrow Area 2, required excavations or other approved sources.
- (4) In Section 6, Compaction, Class A shall apply. The fill matrix shall be compacted to at least 95 percent of the maximum density obtained in compaction tests of the fill materials performed by Method A, ASTM D 698 (standard proctor test).
- (5) The maximum size of rock fragments incorporated in the fill shall be six (6) inches.
- (6) The maximum thickness of a layer before compaction shall be nine (9) inches.
- (7) The moisture content of the material to be incorporated in the embankment Zone IV shall be maintained within the range of two (2) percentage points below to two (2) percentage points above optimum moisture content.
- (8) Measurement and payment will be by Method 2 and Method 6.

d. Bid Item 10, Structure Backfill, Zone I and Zone III

- (1) This item shall consist of placing and compacting structure backfill adjacent to the riser, conduit and cradle and anti-seep collars within the limits shown on sheet 4 of the drawings.
- (2) Backfill materials shall be materials meeting the requirements of Bid Item 7, Embankment Earth Fill, Zone I, or Bid Item 8, Embankment Earth Fill, Zone III, as applicable except as noted in 10.d.(5) and 10.d.(6) below.
- (3) Compaction for Zone I materials shall be in accordance with the requirements of Bid Item 7, Embankment Earth Fill, Zone I.
- (4) Compaction for both Zone I and Zone III materials shall be accomplished by use of manually directed power tampers or plate vibrators approved by the Engineer. A minimum of four passes per layer of fill shall be made before depositing the succeeding layer.
- (5) The maximum size of rock fragments to be incorporated in the backfill shall be two (2) inches for Zone I and three (3) inches for Zone III.
- (6) The maximum thickness of a layer before compaction shall be four (4) inches.

- (7) The moisture content shall be in accordance with the requirements of Bid Item 7, Embankment Earth Fill, Zone I, and Bid Item 8, Embankment Earth Fill, Zone III, as applicable.
- (8) Measurement and payment will be by Method 4 and Method 6. A deduction in volume will be made for embedded conduit and appurtenances.

10. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 4, Pipe Backfill - Class I

- (1) This item shall consist of furnishing or processing (if required) all pipe backfill - Class I required to construct the Sunset Pipeline from Station 53+30± to Station 62+30± including utility crossings as shown on the drawings and staked in the field.
- (2) Pipe backfill - Class I materials and compaction shall conform to the following criteria:
  - (a) Adjacent to the pipe or any utility and to a depth of at least two (2) feet above the pipe or utility, materials shall be mixtures of gravels, sands, silts, and clays with a maximum size of one (1) inch. The maximum plasticity index (P.I.) shall be fifteen (15). Placement of materials shall be by hand shoveling or other methods approved by the Engineer. Compaction shall be by a vibrating compactor weighing at least 200 pounds and at 3500 vpm. Maximum lift thickness shall be four (4) inches before compaction.
  - (b) The remaining backfill required to reach the finished elevation shall be the same as for 10.a.(2) (a) above except the maximum size of materials shall be two (2) inches; maximum lift thickness shall be six (6) inches; placement and compaction may be by any equipment approved by the Engineer.
- (3) Within the city limits of Wickenburg, all applicable portions of Standard Specification No. 600, City of Phoenix, Arizona, that are more restrictive shall apply in addition to the requirements of this specification.
- (4) The source of materials for pipe backfill - Class I shall be the suitable materials resulting from the required excavations or from Borrow Area 2, Sunnycove FRS. Careful selection or screening will be necessary to meet the gradation requirements.
- (5) The soil matrix of all pipe backfill - Class I materials shall be compacted to at least ninety-five (95) percent of the maximum density obtained when the materials are tested in accordance with ASTM D 698, Method A.
- (6) The moisture content of the fill matrix at time of compaction shall be maintained within the range of three percentage points below to two percentage points above optimum moisture content.

- (7) Measurement and payment will be by Methods 1 and 6 and shall exclude the volume occupied by the pipe.

b. Bid Item 5, Pipe Backfill - Class II

- (1) This item shall consist of furnishing or processing (if required) all pipe backfill - Class II, including utility crossings required to construct the following portions of the pipelines as shown on the drawings and staked in the field:
- (a) Station 9+10± to Station 37+18± Sunnycove Pipeline.
  - (b) Station 13+97± to Station 53+30± and Station 62+30± to Station 64+28± Sunset Pipeline.
- (2) Pipe Backfill - Class II materials and compaction shall conform to the following criteria:
- (a) Adjacent to the pipe or any utility and to a depth of at least two (2) feet above the pipe or utility, materials shall be mixtures of gravels, sands, silts and clays with a maximum size of one (1) inch. The maximum plasticity index (P.I.) shall be fifteen (15). Placement of materials shall be by hand shoveling or other methods approved by the Engineer. Compaction shall be by a vibrating compactor weighing at least 200 pounds and at 3500 vpm. Maximum lift thickness shall be four (4) inches before compaction.
  - (b) The remaining backfill required to reach the finished elevation shall be the same as for 10.b.(2)(a) above except the maximum size of materials shall be two (2) inches; maximum lift thickness shall be six (6) inches; placement and compaction may be by any equipment approved by the Engineer.
- (3) Within the city limits of Wickenburg, all applicable portions of Standard Specification No. 600, City of Phoenix, Arizona that are more restrictive shall apply in addition to the requirements of this specification.
- (4) Within the railroad right-of-way, all construction operation requirements of the A.T.&S.F. Railroad Company shall apply in addition to the requirements of this specification.
- (5) The source of materials for pipe backfill - Class II shall be the suitable materials resulting from the required excavations or from Borrow Area 2, Sunnycove FRS. Careful selection or screening will be necessary to meet the gradation requirements.

- (6) The soil matrix of all pipe backfill - Class II materials shall be compacted to at least eighty-five (85) percent of the maximum density obtained when the materials are tested in accordance with ASTM D 698, Method A, except adjacent to utilities and under roads. Adjacent to utilities and under roads the materials shall be compacted to ninety-five (95) percent of the maximum density.
- (7) The moisture content of the fill matrix at time of compaction shall be maintained within the range of three percentage points below to two percentage points above optimum moisture content.
- (8) Measurement and payment will be by Methods 1 and 6 and shall exclude the volume occupied by the pipe.

(c) Bid Item 6, Pipeline Backfill, Random

- (1) This item shall consist of placing and compacting all random pipeline backfill in the trench from Station 9+10 to Station 33+00± on Sunnycove pipeline as shown on the drawings and staked in the field.
- (2) Backfill material shall be suitable silts, sandy clays and gravels obtained from the required excavations.
- (3) Section 6, Compaction, does not apply to this item.
- (4) The maximum size of rock fragments incorporated in the fill shall be three (3) inches.
- (5) No special moisture content of backfill materials will be required.
- (6) Measurement and payment will be by Method 1 and Method 4.

(d) Bid Item 7, Structure Backfill

- (1) This item shall consist of the placement and compaction of the earth fill required for backfilling the manholes and outlet structure as shown on the drawings and staked in the field.
- (2) Backfill material shall be suitable silty sands and sandy silts obtained from the required excavation or from Borrow Area 2, Sunnycove FRS.
- (3) The maximum size of rock fragments to be incorporated in the backfill shall not exceed two (2) inches.

- (4) Compaction shall be Class A. The fill matrix shall be compacted to at least 95 percent of the maximum dry density when the soils are compacted in accordance with Method A, ASTM D 698.
- (5) The moisture content of the fill matrix at the time of compaction shall be maintained within the range of three percentage points below to two percentage points above optimum moisture content.
- (6) The thickness of each layer of fill material shall not exceed six (6) inches before compaction.
- (7) Measurement and payment will be by Method 1 and 6. Such payment will not include the volume occupied by the manholes and structures.

e. Subsidiary Item, Waste Fill

- (1) This item shall consist of the disposal of excess or unsuitable materials from the required excavations as shown on the drawings or staked in the field.
- (2) No compaction will be required.
- (3) The fill shall be placed in Borrow Area 2, Sunnycove FRS, or in Disposal Area B as shown on the drawings or as directed by the Engineer.
- (4) Maximum fill height including waste fill above the top of the pipe shall not exceed twenty (20) feet.
- (5) Before the job is completed, all waste areas will be graded so as to blend in with the surrounding area to prevent the ponding of water and be in harmony with the natural drainage pattern.
- (6) No separate payment will be made for waste fill. Compensation will be included in the payment for Bid Items 2 through 7, as applicable.

## CONSTRUCTION SPECIFICATION

### 24. DRAIN FILL

#### 1. SCOPE

The work shall consist of furnishing, placing and compacting drain fill required in the construction of structure drains and filters.

#### 2. MATERIALS

(Method 1) Drain fill materials shall conform to the requirements of Material Specification 521. At least 30 days prior to delivery of the materials to the site the Contractor shall inform the Contracting Officer in writing of the source from which he intends to obtain them. The Contractor shall provide the Engineer free access to the source for the purpose of obtaining samples for testing.

(Method 2) Drain fill materials shall be sand, gravel or crushed stone or mixtures thereof obtained from the specified sources. They shall be selected as necessary to avoid the inclusion of organic matter, clay balls, excessive fine particles or other substances that would interfere with their free-draining properties.

#### 3. BASE PREPARATION

Foundation surfaces and trenches shall be clean and free of organic matter, loose soil, foreign substances, and standing water when the drain fill is placed. Earth surfaces upon or against which drain fill will be placed shall not be scarified.

#### 4. PLACEMENT

Drain fill shall not be placed until the subgrade has been inspected and approved by the Engineer. Drain fill shall not be placed over or around pipe or drain tile until the installation of the pipe or tile has been inspected and approved.

Drain fill shall be placed uniformly in layers not more than 12 inches deep before compaction. When compaction is accomplished by manually controlled equipment, the layers shall be not more than 8 inches deep. The material shall be placed in a manner to avoid segregation of particle sizes and to insure the continuity and integrity of all zones. No foreign materials shall be allowed to become intermixed with or otherwise contaminate the drain fill.

(24-1)

Traffic shall not be allowed to cross over drains at random. Equipment crossovers shall be maintained, and the number and location of such crossovers shall be established and approved prior to the beginning of drain fill placement. Each crossover shall be cleaned of all contaminating materials and shall be inspected and approved by the Engineer before additional drain fill is placed.

Any damage to the foundation surface or to the sides or bottoms of trenches occurring during placement of drain fill shall be repaired before drain fill placement is continued.

The upper surface of drain fill constructed concurrently with adjacent zones of earth fill shall be maintained at an elevation at least one foot above the upper surface of the adjacent fill.

Drain fill over or around pipe or drain tile shall be placed in a manner to avoid any displacement of the pipe or tile in line or grade.

5. CONTROL OF MOISTURE

The moisture content of drain fill materials shall be controlled as specified in Section 8. When the addition of water is required, it shall be applied in such a way as to avoid excessive wetting of adjacent earth fill. Except as specified in Section 8, control of the moisture content will not be required.

6. COMPACTION

Drain fill shall be compacted according to the following requirements for the class of compaction specified:

Class A compaction. Each layer of drain fill shall be compacted to a relative density of not less than 70 percent as determined by ASTM Method D 2049-64T.

Class I compaction. Each layer of drain fill shall be compacted by at least 2 passes, over the entire surface, of a steel-drum vibrating roller weighing not less than 5 tons and exerting a vertical vibrating force of not less than 20,000 pounds at least 1200 times per minute, or by an approved equivalent method.

Class II compaction. Each layer of drain fill shall be compacted by one of the following methods or by an approved equivalent method:

- a. At least 2 passes, over the entire surface, of a pneumatic-tired roller exerting a pressure of not less than 75 pounds per square inch.
- b. At least 4 passes, over the entire surface, of the track of a crawler-type tractor weighing not less than 20 tons.
- c. Controlled movement of the hauling equipment so that the entire surface is traversed by not less than one tread track of the loaded equipment.

Class III compaction. No compaction will be required beyond that resulting from the placing and spreading operations.

When compaction other than Class III compaction is specified materials placed in trenches or other locations inaccessible to heavy equipment shall be compacted by means of manually controlled pneumatic or vibrating tampers or by approved equivalent methods.

#### 7. MEASUREMENT AND PAYMENT

For items of work for which specific unit prices are established in the contract, the volume of drain fill within the neat lines shown on the drawings or limits established by the Engineer will be measured and computed to the nearest cubic yard. Where the Engineer directs placement of drain fill outside the neat lines to replace unsuitable foundation material, the volume of such drain fill will be included, but only to the extent that the unsuitable condition is not a result of the Contractor's operations.

Payment for drain fill will be made at the contract unit price for each type of drain fill, complete in place. Except as otherwise specified in Section 8, such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the performance of the work.

Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 8 of this specification.

9. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 10, Drain Fill, Zone II

- (1) This item shall consist of furnishing and placing all the Zone II drain fill materials required to construct the following portions of the permanent works as shown on the drawings:
  - (a) In the embankment drain.
  - (b) Adjacent to two of the asbestos-cement outlet pipes.
  - (c) Adjacent to the principal spillway conduit downstream of the embankment drain.
  - (d) Adjacent to the side walls of the emergency spillway structure.
- (2) In Section 2, Materials, Method 1 shall apply.
- (3) The required gradation of Zone II drain fill shall be:

<u>Sieve Size</u>	<u>Percent Passing (Dry weight basis)</u>
3 inches	100
1-1/2 inches	75-100
3/4 inch	55-85
3/8 inch	25-60
No. 4	0-40
No. 10	0-15
No. 20	0-5

Size No. 57 in accordance with ASTM C 33 meets these gradation requirements.

- (4) In Section 6, Compaction, Class II - Method a or b, shall apply. Drain fill within two (2) feet of concrete structures or pipes shall be compacted by manually controlled equipment approved by the engineer.
- (5) The moisture content shall be maintained in a range to accomplish the specified compaction without bulking or dilatance.
- (6) Measurement and payment will be made in accordance with Section 8.

9. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 11, Drain Fill, Zone II

- (1) This item shall consist of furnishing and placing all the Zone II drain fill materials required to construct the following portions of the permanent works as shown on the drawings:
  - (a) In the embankment drain.
  - (b) Adjacent to one of the asbestos-cement outlet pipes.
  - (c) Adjacent to the principal spillway conduit downstream of the embankment drain.
- (2) In Section 2, Materials, Method 1 shall apply.
- (3) The required gradation of Zone II drain fill shall be:

<u>Sieve Size</u>	<u>Percent Passing (Dry Weight Basis)</u>
3 inches	100
1 1/2 inches	85-100
3/4 inch	70- 95
3/8 inch	55- 75
No. 4	40- 60
No. 10	20- 40
No. 20	0- 20
No. 40	0- 5

- (4) In Section 6, Compaction, Class II, Method a or b shall apply. Drain fill within two (2) feet of embedded pipes or concrete structures shall be compacted by manually controlled equipment approved by the engineer.
- (5) The moisture control shall be maintained in a range to accomplish the specified compaction without bulking or dilatance.
- (6) Measurement and payment will be made in accordance with Section 8.

## CONSTRUCTION SPECIFICATION

### 31. CONCRETE

#### 1. SCOPE

The work shall consist of furnishing, forming, placing, finishing and curing portland cement concrete as required to build the structures named in Section 26 of this specification.

#### 2. MATERIALS

Portland cement shall conform to the requirements of Material Specification 531 for the specified type. One brand only of any type of cement shall be used in any single structure as defined in Section 26.

Aggregates shall conform to the requirements of Material Specification 522 unless otherwise specified. The grading of coarse aggregates shall be as specified in Section 26.

Water used in mixing or curing concrete shall be clean and free from injurious amounts of oil, salt, acid, alkali, organic matter or other deleterious substances.

Air-entraining admixtures shall conform to the requirements of Material Specification 532. If air-entraining cement is used, any additional air-entraining admixture shall be of the same type as that in the cement.

Water-reducing, set-retarding admixtures shall conform to the requirements of Material Specification 533.

Shear plates shall conform to the requirements of Material Specification 581 for structural quality or commercial or merchant quality steel. Structural quality shall be used if specifically designated in the drawings or specifications.

Preformed expansion joint filler shall conform to the requirements of Material Specification 535.

Waterstops shall conform to the requirements of Material Specifications 537 and 538 for the specified kinds.

Curing compound shall conform to the requirements of Material Specification 534.

### 3. CLASSES OF CONCRETE

#### (Method 1)

Concrete shall be classified according to the required compressive strength. The strength of the concrete at 28 days shall equal or exceed the Minimum Compressive Strength tabulated below for the class of concrete specified.

<u>Class of Concrete</u>	<u>Minimum Compressive Strength at 28 days (psi)</u>
5000	5000
4000	4000
3000	3000
2500	2500

#### (Method 2)

Concrete shall be classified as follows:

<u>Class of Concrete</u>	<u>Maximum Net Water Content (gallons/bag)</u>	<u>Minimum Cement Content (bags/cu. yd.)</u>
5000X	5	7
4000X	6	6
3000X	7	5
2500X	8	4 1/2

### 4. AIR CONTENT AND CONSISTENCY

Unless otherwise specified the air content (by volume) of the concrete at the time of placement shall be:

<u>Maximum Size Aggregate</u>	<u>Air Content (%)</u>
3/8 inch to 1/2 inch	6 to 9
Over 1/2 inch to 1 inch	5 to 8
Over 1 inch to 2 1/2 inches	4 to 7

The consistency of the concrete shall be such as to allow it to be worked into place without segregation or excessive laitance. Unless otherwise specified, the slump shall be:

<u>Type of Structure</u>	<u>Slump (inches)</u>
Massive sections, pavements, footings	2 ± 1/2
Heavy beams, thick slabs, thick walls (over 12 in.)	3 ± 1/2
Columns, light beams, thin slabs, thin walls (12 in. or less)	4 ± 1

5. DESIGN OF THE CONCRETE MIX

(Method 1) (For use with Method 1 in Section 3.)

The Contractor will be responsible for the design of the concrete mixtures. At least 5 days prior to any placement of concrete he shall furnish the Contracting Officer a statement of the materials and mix proportions (including admixtures, if any) he intends to use for each specified class of concrete. The statement shall include evidence satisfactory to the Engineer that the materials and proportions selected will produce concrete of the quality, consistency and strength specified.

The materials and proportions so stated shall constitute the "job mix." After a job mix has been designated, neither the source, character or grading of the aggregates nor the type or brand of cement or admixture shall be changed without prior notice to the Engineer and establishment of a new job mix supported by evidence, as required for the initial job mix, that the proposed new materials and mix proportions will produce concrete of the quality, consistency, and strength specified.

When specified, a water-reducing, set-retarding admixture shall be used. When conditions are such that the temperature of the concrete at the time of placement is consistently above 75°F, a water-reducing, set-retarding admixture may be used, at the option of the Contractor. The cement content shall be same as that required in the mix without the admixture.

The use of calcium chloride or other accelerators or antifreeze compounds will not be allowed.

Before placing concrete containing a water-reducing, set-retarding admixture, the Contractor shall furnish test results to the Engineer showing that its performance in the job mix meets the requirements of Material Specification 533, Section 4.

(Method 2) (For use with Method 2 in Section 3.)

At least 35 days prior to any placement of concrete the Contractor shall inform the Contracting Officer in writing of the source and grading of aggregates and the brand and type of cement and the brand and type of admixture, if any, he proposes to use for each class of concrete, and shall furnish certifications or other

evidence satisfactory to the Engineer that the proposed materials meet the requirements of the specifications.

When acceptable sources, types and gradings of aggregates are designated in the contract, certifications for such aggregates will not be required.

Job mix proportions and batch weights will be determined by the Engineer. During the course of the work, the Engineer will adjust the job mix proportions and batch weights whenever necessary.

After the job mix has been designated, neither the source, character or grading of the aggregates nor the type or brand of cement or admixture shall be changed without prior notice to the Engineer.

If such changes are necessary, no concrete containing such new or altered materials shall be placed until the Engineer has designated a revised job mix.

When specified, a water reducing, set-retarding admixture shall be used. When conditions are such that the temperature of the concrete at the time of placement is consistently above 75°F, a water-reducing, set-retarding admixture may be used, at the option of the Contractor. The cement content shall be same as that required in the mix without the admixture.

The use of calcium chloride or other accelerators or antifreeze compounds will not be allowed.

When it is anticipated that a water-reducing, set-retarding admixture will be used, the Contractor shall furnish to the Engineer a sample of the admixture he proposes to use sufficient for the tests required by Material Specification 533, Section 4. Concrete containing the admixture shall not be placed until test results have been obtained showing that its performance in the job mix meets the requirements of Material Specification 533, Section 4.

#### 6. INSPECTING AND TESTING

The following tests will be performed by the methods indicated:

<u>Test</u>	<u>Method</u> <u>(ASTM Designation)</u>
Sampling	C 172 <sup>1</sup>
Slump Test	C 143 <sup>1</sup>

<u>Test</u>	<u>Method</u> <u>(ASTM Designation)</u>
Air Content	C 231 <sup>1</sup> or C 173 <sup>1</sup>
Compression Test Specimens	C 31 <sup>1</sup> or C 42
Compressive Strength	C 39 <sup>2</sup> or C 42
Unit Weight	C 138

<sup>1</sup>Tests of a portion of a batch may be made on samples representative of that portion for any of the following purposes:

- (1) Determining uniformity of the batch.
- (2) Checking compliance with requirements for slump and air content when the batch is discharged over an extended period of time.
- (3) Checking compliance of the concrete with the specifications when the whole amount being placed in a small structure, or a distinct portion of a larger structure, is less than full batch.

<sup>2</sup>For each strength test of specimens made according to ASTM Designation C 31, 3 standard test specimens shall be made. The test result shall be the average of the strengths of the 3 specimens, except that if one specimen in the test shows manifest evidence of improper sampling, molding or testing, it shall be discarded and the strengths of the remaining 2 specimens shall be averaged. Should more than one specimen representing a test show such defects, the entire test shall be discarded.

The Engineer shall have free entry to the plant and equipment furnishing concrete under the contract. Proper facilities shall be provided for the Engineer to inspect materials, equipment and processes and to obtain samples of the concrete. All tests and inspections will be conducted so as not to interfere unnecessarily with the manufacture and delivery of the concrete.

#### 7. HANDLING AND MEASUREMENT OF MATERIALS

Aggregates shall be stored or stockpiled in such a manner that separation of coarse and fine particles of each size will be avoided and that various sizes will not become intermixed before proportioning. Methods of handling and transporting aggregates shall be such as to avoid contamination, excessive breakage, segregation or degradation, or intermingling of various sizes.

8. MIXERS AND MIXING

Concrete may be furnished by batch mixing at the site of the work or by ready-mix methods.

Scales for weighing aggregates and cement shall be beam type or springless dial type. They shall be accurate within 1 percent under operating conditions. All exposed fulcrums, clevises and similar working parts of scales shall be kept clean.

The quantities of cement and aggregates in each batch of concrete, as indicated by the scales, shall be within the following percentages of the required batch weights:

Cement - plus or minus 1.0 percent

Aggregates - plus or minus 2.0 percent

Measuring tanks for mixing water shall be of adequate capacity to furnish the maximum amount of mixing water required per batch and shall be equipped with outside taps and valves to provide for checking their calibration unless other means are provided for readily and accurately determining the amount of water in the tank.

Except at otherwise provided in Section 8, cement and aggregates shall be measured as follows:

Cement shall be measured by weight or in bags of 94 lbs. each. When cement is measured by weight, it shall be weighed on a scale separate from that used for other materials, and in a hopper entirely free and independent of the hopper used for weighing the aggregates. When cement is measured in bags, no fraction of a bag shall be used unless weighed.

Aggregates shall be measured by weight. Mix proportions shall be based on saturated, surface-dry weights. The batch weight of each aggregate shall be the required saturated, surface-dry weight plus the weight of surface moisture it contains.

Mixing water shall consist of water added to the batch, ice added to the batch, water occurring as surface moisture on the aggregates and water introduced in the form of admixtures. The added water shall be measured by weight or volume to an accuracy of 1 percent of the required total mixing water. Added ice shall be measured by weight. Wash water shall not be used as a portion of the mixing water for succeeding batches.

Dry admixtures shall be measured by weight, and paste or liquid admixtures by weight or volume, within a limit of accuracy of 3 percent.

## 8. MIXERS AND MIXING

Concrete may be furnished by batch mixing at the site of the work or by ready-mix methods.

Mixers shall be capable of thoroughly mixing the concrete ingredients into a uniform mass within the specified mixing time and of discharging the mix without segregation. Each mixer or agitator shall bear a manufacturer's rating plate indicating the rated capacity and recommended speeds of rotation, and shall be operated in accordance with these recommendations.

Concrete shall be uniform and thoroughly mixed when delivered to the work. Variations in slump of more than 1 inch within a batch will be considered evidence of inadequate mixing and shall be corrected by changing batching procedures, increasing mixing time, changing mixers or other means. Mixing time shall be within the limits specified below unless the Contractor demonstrates by mixer performance tests that adequate uniformity is obtained by different times of mixing. For this purpose the testing program and uniformity requirements shall be as set forth in ASTM Designation C 94.

No mixing water in excess of the amount called for by the job mix shall be added to the concrete during mixing or hauling or after arrival at the delivery point.

Batch mixing at the site. For concrete mixed at the site of the work with paving mixers or stationary construction mixers, the time of mixing after all cement and aggregates are in the mixer drum shall be not less than 1-1/2 minutes.

The batch shall be so charged into the mixer that some water will enter in advance of the cement and aggregates and all mixing water shall be introduced into the drum before one-fourth of the mixing time has elapsed.

Controls shall be provided to insure that the batch cannot be discharged until the required mixing time has elapsed.

If truck mixers are used, the requirements below for truck mixers and truck-mixed concrete shall apply.

Volumetric batching and continuous mixing at the site. Unless otherwise specified, volumetric batching and continuous mixing at the construction site will be permitted if approved by the Contracting Officer. The batching and mixing equipment shall conform to the requirements of ASTM Specification C 685 and shall be demonstrated prior to placement of concrete, by tests with the job mix, to produce concrete meeting the specified proportioning and uniformity requirements. Concrete made by this method shall be produced, inspected, and certified in conformance with sections 6., 7., 8., 13., and 14. of ASTM Specification C 685.

Ready-mixed concrete. Ready-mixed concrete shall be mixed and delivered to the site of the work by one of the following methods:

- a. Truck-mixed concrete--Mixed completely in a truck mixer.
- b. Shrink-mixed concrete--Mixed partially in a stationary mixer, and the mixing completed in a truck mixer.
- c. Central-mixed concrete--Mixed completely in a stationary mixer and the mixed concrete transported to the point of delivery in a truck agitator or in a truck mixer operating at agitating speed or in nonagitating equipment.

Truck mixers and agitators shall be equipped with revolution counters by which the number of revolutions of the drum or blades may be readily verified.

When ready-mixed concrete is furnished, the Contractor shall furnish the Engineer a statement-of-delivery ticket showing the time of loading, the revolution counter reading at the time of loading and the quantities of materials used for each load of concrete.

Truck-mixed concrete. When concrete is mixed in a truck mixer loaded to its maximum capacity, the number of revolutions of the drum or blades at mixing speed shall be not less than 70 nor more than 100. If the batch is at least 1/2 cubic yard less than maximum capacity, the number of revolutions at mixing speed may be reduced to not less than 50. Mixing in excess of 100 revolutions shall be at the speed designated by the manufacturer of the equipment as agitating speed. The mixing operation shall begin within 30 minutes after the cement has been added to the aggregates and the water shall be added during mixing. When mixing is begun during or immediately after charging, a portion of the mixing water shall be added ahead of, or with, the other ingredients.

Shrink-mixed concrete. When concrete is partially mixed at a central plant and the mixing is completed in a truck mixer, the mixing time in the central plant mixer shall be the minimum required to intermingle the ingredients and shall be not less than 30 seconds. The mixing shall be completed in a truck mixer and the number of revolutions of the drum or blades at mixing speed shall be not less than 50 nor more than 100. Mixing in excess of 100 revolutions shall be at the speed designated by the manufacturer of the equipment as agitating speed.

Central-mixed concrete. For central-mixed concrete, mixing in the stationary mixer shall meet the same requirements as batching mixing at the site.

When an agitator, or truck mixer used as an agitator, transports concrete that has been completely mixed in a stationary mixer, mixing during transportation shall be at the speed designated by the manufacturer of the equipment as agitating speed.

The use of nonagitating equipment to transport concrete to the site of the work will be permitted only if the consistency and uniformity of the concrete as discharged at the point of delivery meet the requirements of this specification. Bodies of nonagitating hauling equipment shall be so constructed that leakage of the concrete mix, or any part thereof, will not occur. Concrete hauled in open-top vehicles shall be protected against access of rain, and against exposure to the sun of more than 20 minutes when the air temperature is above 75° F.

#### 9. FORMS

Forms shall be of wood, plywood, steel or other approved material and shall be mortar tight. The forms and associated falsework shall be substantial and unyielding and shall be constructed so that the finished concrete will conform to the specified dimensions and contours. Form surfaces shall be smooth and free from holes, dents, sags or other irregularities. Forms shall be coated with a nonstaining form oil before being set into place.

Metal ties or anchorages within the forms shall be equipped with cones, she-bolts or other devices that permit their removal to a depth of at least one inch without injury to the concrete. Ties designed to break off below the surface of the concrete shall not be used without cones.

All edges that will be exposed to view when the structure is completed shall be chamfered, unless finished with molding tools as specified in Section 20.

#### 10. PREPARATION OF FORMS AND SUBGRADE

Prior to placement of concrete the forms and subgrade shall be free of chips, sawdust, debris, water, ice, snow, extraneous oil, mortar or other harmful substances or coatings. Any oil in the reinforcing steel or other surfaces required to be bonded to the concrete shall be removed. Rock surfaces shall be cleaned by air-water cutting, wet sandblasting or wire brush scrubbing, as necessary, and shall be wetted immediately prior to placement of concrete. Earth surfaces shall be firm and damp. Placement of concrete on mud, dried earth, uncompacted fill or frozen subgrade will not be permitted.

Unless otherwise specified, when concrete is to be placed over drain fill, the contact surface of the drain fill shall be covered with a layer of asphalt-impregnated building paper or polyvinyl sheeting prior to placement of the concrete. Forms for weepholes shall extend through this layer into the drain fill.

Items to be embedded in the concrete shall be positioned accurately and anchored firmly.

Weepholes in walls or slabs shall be formed with nonferrous materials.

#### 11. CONVEYING

Concrete shall be delivered to the site and discharged into the forms within 1-1/2 hours after the introduction of the cement to the aggregates. In hot weather or under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 85° F or above, the time between the introduction of the cement to the aggregates and discharge shall not exceed 45 minutes. The Engineer may allow a longer time, provided the setting time of the concrete is increased a corresponding amount by the addition of an approved set-retarding admixture. In any case, concrete shall be conveyed from the mixer to the forms as rapidly as practicable, by methods that will prevent segregation of the aggregates or loss of mortar. Concrete shall not be dropped more than 5 feet vertically unless suitable equipment is used to prevent segregation.

#### 12. PLACING

Concrete shall not be placed until the subgrade, forms and steel reinforcement have been inspected and approved.

The Contractor shall have all equipment and materials required for curing available at the site ready for use before placement of concrete begins.

No concrete shall be placed except in the presence of the Engineer. The Contractor shall give reasonable notice to the Engineer each time he intends to place concrete. Such notice shall be far enough in advance to give the Engineer adequate time to inspect the subgrade, forms, steel reinforcement and other preparations for compliance with the specifications before concrete is delivered for placing.

The concrete shall be deposited as closely as possible to its final position in the forms and shall be worked into the corners and angles of the forms and around all reinforcement and embedded items in a manner to prevent segregation of aggregates or excessive laitance. The depositing of concrete shall be regulated so that the concrete may be consolidated with a minimum of lateral movement.

Internal stays and braces, serving temporarily to hold the forms in correct shape and alignment prior to placement of concrete at their locations, shall be removed when the concrete has been placed to an elevation such as to render their service unnecessary.

### 13. LAYERS

Unless otherwise specified, slab concrete shall be placed to design thickness in one continuous layer. Formed concrete shall be placed in horizontal layers not more than 20 inches thick. Hoppers and chutes, pipes or "elephant trunks" shall be used as necessary to prevent splashing of mortar on the forms and reinforcing steel above the layer being placed.

Successive layers shall be placed at a fast enough rate to prevent the formation of "cold joints." If the surface of a layer of concrete in place sets to the degree that it will not flow and merge with the succeeding layer when vibrated, the Contractor shall discontinue placing concrete and shall make a construction joint according to the procedure specified in Section 15.

If placing is discontinued when an incomplete layer is in place, the unfinished end of the layer shall be formed by a vertical bulkhead.

### 14. CONSOLIDATING

Unless otherwise specified, concrete shall be consolidated with internal type mechanical vibrators capable of transmitting vibration to the concrete at frequencies not less than 6000 impulses per minute.

The location, manner and duration of the application of the vibrators shall be such as to secure maximum consolidation of the concrete without causing segregation of the mortar and coarse aggregate, and without causing water or cement paste to flush to the surface.

The Contractor shall provide a sufficient number of vibrators to properly consolidate the concrete immediately after it is placed in the work. Vibration shall be applied in the freshly deposited concrete by slowly inserting and removing the vibrator at points uniformly spaced and not farther apart than twice the radius over which the vibration is visibly effective. The vibrator shall extend into the previously placed layer of fresh concrete, at all points, to insure effective bond between layers.

Vibration shall not be applied directly to the reinforcement steel or the forms nor to concrete that has hardened to the degree that it does not become plastic when vibrated.

The use of vibrators to transport concrete in the forms or conveying equipment will not be permitted.

Vibration shall be supplemented by spading and hand tamping as necessary to insure smooth and dense concrete along form surfaces, in corners and around embedded items.

15. CONSTRUCTION JOINTS

Construction joints shall be made at the locations shown on the drawings. If construction joints are needed which are not shown on the drawings, they shall be placed in locations approved by the Engineer.

Where a feather edge would be produced at a construction joint, as in the top surface of a sloping wall, an insert form shall be used so that the resulting edge thickness on either side of the joint is not less than 6 inches.

In walls and columns as each lift is completed, the top surfaces shall be immediately and carefully protected from any condition that might adversely affect the hardening of the concrete.

Steel tying and form construction adjacent to concrete in place shall not be started until the concrete has cured at least 12 hours. Before new concrete is deposited on or against concrete that has hardened, the forms shall be retightened. New concrete shall not be placed until the hardened concrete has cured at least 12 hours.

(Method 1)

Surfaces of construction joints shall be cleaned of all unsatisfactory concrete, laitance, coatings, stains or debris by either wet sandblasting after the concrete has gained sufficient strength to resist excessive cutting, or air-water cutting as soon as the concrete has hardened sufficiently to prevent the jet from displacing the coarse aggregates, or both. The surface of the concrete in place shall be cut to expose clean, sound aggregate but not so deep as to undercut the edges of larger particles of the aggregate. After cutting, the surface shall be thoroughly washed to remove all loose material. If the surface is congested by reinforcing steel, is relatively inaccessible, or it is considered undesirable to disturb the concrete before it is hardened, cleaning of the joint by air-water jets will not be permitted and the wet sandblasting method will be required after the concrete has hardened.

(Method 2)

Surfaces of construction joints shall be cleaned of all unsatisfactory concrete, laitance, coatings, stains, or debris by washing and scrubbing with a wire brush or wire broom or by other means approved by the Engineer.

(Use with Either Method)

The surfaces shall be kept moist for at least one hour prior to placement of new concrete. The new concrete shall be placed directly on the cleaned and washed surface.

16. EXPANSION AND CONTRACTION JOINTS

Expansion and contraction joints shall be made only at locations shown on the drawings.

Exposed concrete edges at expansion and contraction joints shall be carefully tooled or chamfered, and the joints shall be free of mortar and concrete. Joint filler shall be left exposed for its full length with clean and true edges.

When open joints or weakened plane "dummy" joints are specified, the joints shall be constructed by the insertion and subsequent removal of a wood strip, metal plate or other suitable template in such a manner that the corners of the concrete will not be chipped or broken. The edges of the concrete at the joints shall be finished with an edging tool prior to removal of the joint strips.

Preformed expansion joint filler shall be held firmly in the correct position as the concrete is placed.

17. WATERSTOPS

Waterstops shall be held firmly in the correct position as the concrete is placed. Joints in metal waterstops shall be brazed or welded. Joints in rubber or plastic waterstops shall be cemented, welded or vulcanized as recommended by the manufacturer.

18. REMOVAL OF FORMS

Forms shall be removed only when the Engineer is present and shall not be removed without his approval. Forms shall be removed in such a way as to prevent damage to the concrete. Supports shall be removed in a manner that will permit the concrete to take the stresses due to its own weight uniformly and gradually.

(Method 1)

Forms shall not be removed sooner than the following minimum times after the concrete is placed. These periods represent cumulative number of days and fractions of days, not necessarily consecutive, during which the temperature of the air adjacent to the concrete is above 50°F.

<u>Element</u>	<u>Time</u>
Beams, arches - supporting forms and shoring	14 days
Conduits, deck slabs - supporting (inside) forms and shoring	7 days
Conduits (outside forms), sides of beams, small structures	24 hours

<u>Element</u>	<u>Time</u>
Columns, walls, spillway risers - with side or vertical load	7 days
Columns, walls, spillway risers - with no side or vertical load:	
Concrete supporting more than 30 feet of wall in place above it	7 days
Concrete supporting 20 to 30 feet of wall in place above it <sup>1</sup>	3 days
Concrete supporting not more than 20 feet of wall in place above it <sup>1</sup>	24 hours

<sup>1</sup>Age of stripped concrete shall be at least 7 days before any load is applied other than the weight of the column or wall itself and the forms and scaffolds for succeeding lifts.

(Method 2)

Forms, supports and housings shall not be removed until the concrete has attained the strength specified in Section 26 for this purpose. The strength will be determined by compression testing of test cylinders cast by the Engineer for this purpose and cured at the work site in the manner specified in ASTM Method C 31 for determining form removal time.

19. FINISHING FORMED SURFACES

All concrete surfaces shall be true and even, and shall be free from open or rough spaces, depressions or projections.

Immediately after the removal of forms:

All bulges, fins, form marks or other irregularities which in the judgment of the Engineer will adversely affect the appearance or function of the structure shall be removed. All form bolts and ties shall be removed to a depth at least 1 inch below the surface of the concrete. The cavities produced by form ties and all other holes of similar size and depth shall be thoroughly cleaned and, after the interior surfaces have been kept continuously wet for at least 3 hours, shall be carefully packed with a dry patching mortar (preshrunk) mixed not richer than 1 part cement to 3 parts sand.

Holes left by form bolts or straps which pass through the wall shall be filled solid with mortar.

Patching mortar shall be thoroughly compacted into place to form a dense, well-bonded unit, and the in-place mortar shall be sound and free from shrinkage cracks.

All patched areas shall be cured as specified in Section 21.

20. FINISHING UNFORMED SURFACES

All exposed surfaces of the concrete shall be accurately screeded to grade and then float finished, unless specified otherwise.

Excessive floating or troweling while the concrete is soft will not be permitted.

The addition of dry cement or water to the surface of the screeded concrete to expedite finishing will not be allowed.

Joints and edges on unformed surfaces that will be exposed to view shall be chamfered or finished with molding tools.

21. CURING

Concrete shall be prevented from drying for a curing period of at least 7 days after it is placed. Exposed surfaces shall be kept continuously moist for the entire period or until curing compound is applied as specified below. Moisture shall be maintained by sprinkling, flooding or fog spraying, or by covering with continuously moistened canvas, cloth mats, straw, sand or other approved material. Wood forms (except plywood) left in place during the curing period shall be kept wet. Formed surfaces shall be thoroughly wetted immediately after forms are removed and shall be kept wet until patching and repairs are completed. Water or covering shall be applied in such a way that the concrete surface is not eroded or otherwise damaged.

Water for curing shall be clean and free from any substances that will cause discoloration of the concrete.

Except as otherwise specified in Section 24, and except for construction joint surfaces, concrete may be coated with curing compound in lieu of the continued application of moisture.

The compound shall be sprayed on the moist concrete surfaces as soon as free water has disappeared, but shall not be applied to any surface until patching, repairs and finishing of that surface are completed.

The curing compound shall be thoroughly mixed immediately before applying, and shall be applied at a uniform rate of not less than one gallon per 150 square feet of surface. It shall form a uniform, continuous, adherent film that shall not check, crack or peel, and shall be free from pin holes or other imperfections.

Curing compound shall not be applied to surfaces requiring bond with subsequently placed concrete, such as construction joints, shear plates, reinforcing steel and other embedded items.

Surfaces subjected to heavy rainfall or running water within 3 hours after the compound has been applied, or surfaces damaged by subsequent construction operations during the curing period shall be resprayed in the same manner as for the original application.

22. REMOVAL OR REPAIR

When concrete is honeycombed, damaged or otherwise defective, the Contractor shall remove and replace the structure or structural member containing the defective concrete, or correct or repair the defective parts. The Engineer will determine the required extent of removal, replacement or repair.

Prior to starting repair work the Contractor shall obtain the Engineer's approval of his plan for making the repair. Such approval shall not be considered a waiver of the Contracting Officer's right to require complete removal of defective work if the completed repair does not produce concrete of the required quality and appearance.

Repair work shall be performed only when the Engineer is present.

Repair of formed surfaces shall be started within 24 hours after removal of the forms.

Except as otherwise approved by the Engineer, the appropriate methods described in Chapter VII of the Concrete Manual, Bureau of Reclamation, U. S. Department of the Interior, shall be used. If approved in writing by the Contracting Officer, proprietary compounds for adhesion or as patching ingredients may be used. Such compounds shall be used in accordance with the manufacturer's recommendations.

Curing as specified in Section 21 shall be applied to repaired areas immediately after the repairs are completed.

23. CONCRETING IN COLD WEATHER

When the atmospheric temperature may be expected to drop below 40°F at the time concrete is delivered to the work site, during placement, or at any time during the curing period, the following provisions also shall apply:

- a. The temperature of the concrete at time of placing shall not be less than 50°F nor more than 90°F. The temperature of neither aggregates nor mixing water shall be more than 100°F just prior to mixing with the cement.

- b. When the daily minimum temperature is less than 40°F, concrete structures shall be insulated or housed and heated after placement. The temperature of the concrete and air adjacent to the concrete shall be maintained at not less than 50°F nor more than 90°F for the duration of the curing period.
- c. Methods of insulating, housing and heating the structure shall conform to "Recommended Practice for Cold Weather Concreting," ACI Standard 306.
- d. When dry heat is used to protect concrete, means of maintaining an ambient humidity of at least 40 percent shall be provided unless the concrete has been coated with curing compound as specified in Section 21 or is covered tightly with an approved impervious material.

24. CONCRETING IN HOT WEATHER

When climatic or other conditions are such that the temperature of the concrete may reasonably be expected to exceed 90°F at the time of delivery at the work site, during placement, or during the first 24 hours after placement, the following provisions also shall apply;

- a. The Contractor shall maintain the temperature of the concrete below 90°F during mixing, conveying, and placing. Methods used shall conform to "Recommended Practice for Hot Weather Concreting," ACI Standard 305.
- b. The concrete shall be placed in the work immediately after mixing. Truck mixing shall be delayed until only time enough remains to accomplish it before the concrete is placed.
- c. Exposed concrete surfaces which tend to dry or set too rapidly shall be continuously moistened by means of fog sprays or otherwise protected from drying during the time between placement and finishing, and after finishing.
- d. Finishing of slabs and other exposed surfaces shall be started as soon as the condition of the concrete allows and shall be completed without delay.

- e. Concrete surfaces exposed to the air shall be covered as soon as the concrete has hardened sufficiently and shall be kept continuously wet for at least the first 24 hours of the curing period, and for the entire curing period unless curing compound is applied as specified in subsection g, below.
- f. Formed surfaces shall be kept completely and continuously wet for the duration of curing period (prior to, during and after form removal) or until curing compound is applied as specified in subsection g, below.
- g. If moist curing is discontinued before the end of the curing period, white pigmented curing compound shall be applied immediately, following the procedures specified in Section 21.

25. MEASUREMENT AND PAYMENT

For items of work for which specific unit prices are established in the contract, concrete will be measured to the neat lines or pay limits shown on the drawings, and the volume of concrete will be computed to the nearest 0.1 cubic yard. No deduction in volume will be made for chamfers, rounded or beveled edges, or for any void or embedded item that is less than five cubic feet in volume. Where concrete is placed against the sides or bottom of an excavation without intervening forms, drain fill, or bedding, the volume of concrete required to fill voids resulting from overexcavation outside the neat lines or pay limits will be included in the measurement for payment where such overexcavation is directed by the Engineer to remove unsuitable foundation material; but only to the extent that the unsuitable condition is not a result of the Contractor's operations.

(Method 1)

Payment for each item of concrete will be made at the contract unit price for that item. The payment for concrete will constitute full compensation for all labor, materials, equipment, transportation, tools, forms, falsework, bracing and all other items necessary and incidental to completion of the concrete work, such as joint fillers, waterstops, dowels or dowel assemblies and shear plates, but not including reinforcing steel or other items listed for payment elsewhere in the contract.

Measurement and payment for furnishing and placing reinforcing steel will be made as specified in Construction Specification 34.

(Method 2)

Payment for each item of concrete will be made at the contract unit price for that item. The payment for concrete will constitute full compensation for all labor, materials, equipment, transportation, tools, forms, falsework, bracing and all other items necessary and incidental to completion of the concrete work, such as joint fillers, waterstops, dowels or dowel assemblies, and shear plates, but not including furnishing and placing reinforcing steel or furnishing and handling cement or other items listed for payment elsewhere in the contract.

Measurement and payment for furnishing and placing reinforcing steel will be made as specified in Construction Specification 34.

Cement will be measured by dividing the volume of concrete accepted for payment by the yield of the applicable job mix. The yield will be determined by the procedure specified in ASTM Designation C 138. If the amount of cement actually used per batch exceeds the amount in the job mix specified by the Engineer, the measurement will be based on the latter. One barrel of cement will be considered equal to 4 bags or 376 pounds. Payment for each type of cement will be made at the contract unit price for furnishing and handling that type of cement and such payment will constitute full compensation for all materials, labor, equipment, storage, transportation and all other items necessary and incidental to furnishing and handling the cement.

(Use with Either Method)

Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 26 of this specification.

26. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 11, Concrete, Class 4000X

- (1) This item shall consist of furnishing, forming and placing all concrete required to construct the following:
  - (a) The principal spillway riser at Station 12+06± centerline principal spillway.
  - (b) The pipe cradle, yokes and anti-seep collars for the principal spillway.
  - (c) The gate stem and gate lift pedestals.
  - (d) The emergency spillway and SAF outlet structure.
- (2) Preformed expansion joint filler shall conform to Material Specification 535 and ASTM D 1752 and shall be either Type I or Type II.
- (3) Waterstops shall be Class II, Type B or Type E, size designation 16.
- (4) In Section 3, Classes of Concrete, and Section 5, Design of the Concrete Mix, Method 2 shall apply. Concrete shall be Class 4000X.
- (5) Coarse aggregate shall be Size No. 467 in accordance with ASTM C 33.
- (6) In Section 15, Construction Joints, Method 1 shall apply.
- (7) In Section 18, Removal of Forms, Method 1 shall apply.
- (8) Measurement and payment will be by Method 2.

b. Bid Item 12, Cement

- (1) This item shall consist of furnishing and handling all cement required to construct the concrete items in Bid Item 11.
- (2) Cement shall be Type II.
- (3) Measurement and payment will be by Method 2.

26. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 12, Concrete, Class 4000X

- (1) This item shall consist of furnishing, forming and placing all concrete required to construct the following:
  - (a) The principal spillway riser.
  - (b) The pipe cradle, yokes and anti-seep collars for the principal spillway from Station 8+47± to Station 11+36±.
  - (c) The gate stem and gate lift pedestals.
- (2) Preformed expansion joint filler shall conform to Material Specification 535 and ASTM D 1752 and shall be either Type I or Type II.
- (3) Waterstops shall be Class II, Type B or Type E, size designation 16.
- (4) In Section 3, Classes of Concrete, and Section 5, Design of the Concrete Mix, Method 2 shall apply. Concrete shall be Class 4000X.
- (5) Coarse aggregate shall be size No. 467 in accordance with ASTM C 33.
- (6) In Section 15, Construction Joints, Method 1 shall apply.
- (7) In Section 18, Removal of Forms, Method 1 shall apply.
- (8) Measurement and payment will be by Method 2.

b. Bid Item 13, Cement

- (1) This item shall consist of furnishing and handling all cement required to construct the concrete items in Bid Item 12.
- (2) Cement shall be Type II.
- (3) Measurement and payment will be by Method 2.

26. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 8, Concrete, Class 4000X

- (1) This item shall consist of furnishing, forming, and placing all concrete required to construct the manhole bases as shown on the drawings.
- (2) In Section 3, Classes of Concrete, and Section 5, Design of the Concrete Mix, Method 2 shall apply. Concrete shall be Class 4000X.
- (3) Coarse aggregate shall be size No. 467 in accordance with ASTM C 33.
- (4) Section 15, Construction Joints, shall not apply.
- (5) In Section 18, Removal of Forms, Method 1 shall apply.
- (6) Measurement and payment will be by Method 2.

b. Bid Item 9, Cement

- (1) This item shall consist of furnishing and handling all cement required to construct the concrete items in Bid Item 8.
- (2) Cement shall be Type II.
- (3) Measurement and payment will be by Method 2.

## CONSTRUCTION SPECIFICATION

### 34. STEEL REINFORCEMENT

#### 1. SCOPE

The work shall consist of furnishing and placing steel reinforcement for reinforced concrete or pneumatically applied mortar.

#### 2. MATERIALS

Steel reinforcement shall conform to the requirements of Material Specification 539. Before reinforcement is placed the surfaces of the bars and fabric and any metal supports shall be cleaned to remove any loose, flaky rust, mill scale, oil, grease or other coatings or foreign substances. After placement the reinforcement shall be maintained in a clean condition until it is completely embedded in the concrete.

#### 3. BAR SCHEDULE, LISTS AND DIAGRAMS

Any supplemental bar schedules, bar lists or bar-bending diagrams required to accomplish the fabrication and placement of reinforcement shall be provided by the Contractor. Prior to placement of reinforcement, the Contractor shall furnish three prints or copies of any such lists or diagrams to the Contracting Officer. Acceptance of the reinforcement will not be based on approval of these lists or diagrams but will be based on inspection of the reinforcement after it has been placed.

#### 4. BENDING

Reinforcement shall be cut and bent in compliance with the requirements of the American Concrete Institute Standard 315. Bars shall not be bent or straightened in a manner that will injure the material. Bars with kinks, cracks or improper bends will be rejected.

#### 5. SPLICING BAR REINFORCEMENT

Unless otherwise specified on the drawings, splices of reinforcing bars shall provide an overlap equal to at least 30 times the diameter of the smaller bar in the splice but not less than 12 inches.

## 6. SPLICING WELDED WIRE FABRIC

Welded wire fabric shall be spliced in the following manner:

a. Adjacent sections shall be spliced end to end by either:

- (1) Overlapping the two pieces of fabric one full mesh (measured from the ends of the longitudinal wires in one piece to the ends of the longitudinal wires in the other piece) and securing the two pieces together with wire ties placed at intervals of 18 inches; or,
- (2) Overlapping the two pieces of fabric so that the end crosswire of each piece comes in contact with the next-to-end crosswire of the other piece and securing the two pieces together only as required to keep the fabric in place and to prevent it from curling.

b. Adjacent sections of fabric shall be spliced side to side by either:

- (1) Placing the two selvage wires (the longitudinal wires at the edges of the fabric) one along side and overlapping the other and securing the two pieces together with wire ties placed at intervals of 3 feet; or,
- (2) Placing each selvage wire in the middle of the first mesh of the other section of fabric and securing it to the other section at intervals of 10 feet by means of wire ties placed on the selvage wires alternately at intervals of 5 feet.
- (3) Placing each selvage wire in contact with the next-to-edge longitudinal wire and securing them together only as required to keep the fabric in place or to prevent it from curling.

## 7. PLACING

Reinforcement shall be accurately placed and secured in position in a manner that will prevent its displacement during the placement of concrete. Tack welding of bars will not be permitted. Metal chairs, metal hangers, metal spacers and concrete chairs

may be used to support the reinforcement. Metal hangers, spacers and ties shall be placed in such a manner that they will not be exposed in the finished concrete surface. The legs of metal chairs that may be exposed at the lower face of slabs or beams shall be galvanized as specified for iron and steel hardware in Material Specification 582. Precast concrete chairs shall be manufactured of the same class of concrete as that specified for the structure and shall have tie wires securely anchored in the chair or a V-shaped groove at least 3/4 inch in depth molded into the upper surface to receive the steel bar at the point of support. Precast concrete chairs shall be moist at the time concrete is placed.

Reinforcement shall not be placed until the prepared site has been inspected and approved by the Engineer. After placement of the reinforcement, concrete shall not be placed until the reinforcement has been inspected and approved by the Engineer.

#### 8. MEASUREMENT AND PAYMENT

(Method 1) For items of work for which specific unit prices are established in the contract, the weight of reinforcement placed in the concrete in accordance with the drawings will be determined to the nearest pound by computation from the placing drawings. Measurement of hooks and bends will be based on the requirements of ACI Standard 315. Computation of weights of reinforcement will be based on the unit weights established in Tables 34-1, 34-2, and 34-3. The area of welded wire fabric reinforcement placed in the concrete in accordance with the drawings will be determined to the nearest square foot by computation from the placing drawings with no allowance for laps. The weight of steel reinforcing in extra splices or extra-length splices approved for the convenience of the Contractor or the weight of supports and ties will not be included in the measurement for payment.

Payment for furnishing and placing reinforcing steel will be made at the contract unit price. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the work including preparing and furnishing bar schedules, lists or diagrams; furnishing and attaching ties and supports; and furnishing, transporting, cutting, bending, cleaning and securing all reinforcement.

(Method 2) For items of work for which specific unit prices are established in the contract, the weight of bar reinforcement placed in the concrete in accordance with the drawings will be determined

to the nearest pound by computation from the placing drawings. Measurement of hooks and bends will be based on the requirements of ACI Standard 315. Computation of weights of bar reinforcement will be based on the unit weights established in Table 34-1. The weight of steel reinforcing in extra splices or extra-length splices approved for the convenience of the Contractor or the weight of supports and ties will not be included in the measurement for payment.

The area of welded wire fabric reinforcement placed in the concrete in accordance with the drawings will be determined to the nearest square foot by computation from the placing drawings with no allowance for laps.

Payment for furnishing and placing bar reinforcing steel will be made at the contract unit price for bar reinforcement. Payment for furnishing and placing welded wire fabric reinforcing steel will be made at the contract unit price for welded wire fabric reinforcement. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the work including preparing and furnishing bar schedules, lists or diagrams; furnishing and attaching ties and supports; and furnishing, transporting, cutting, bending, cleaning and securing all reinforcement.

(Use with Either Method) Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and items to which they are made subsidiary are identified in Section 9 of this specification.

TABLE 34-1. STANDARD REINFORCING BARS

Bar Size No.	2	3	4	5	6	7	8	9	10	11
Wt. (lb./ft.)	0.167	0.376	0.668	1.043	1.502	2.044	2.670	3.400	4.303	5.313

TABLE 34-2. RECTANGULAR WELDED WIRE FABRIC <sup>1</sup>

Style Designation	Wt. in Lb. Per 100 Sq. Ft.	Style Designation	Wt. in Lb. Per 100 Sq. Ft.	Style Designation	Wt. in Lb. Per 100 Sq. Ft.
24-1414	16	312- 711	39	48- 912	23
212- 04	169	312- 812	32	48-1012	20
212- 15	144	412- 26	69	48-1112	17
212- 26	124	412- 37	59	48-1212	14
212- 37	107	412- 48	51	48-1214	12
212- 48	91	412- 59	43	612-3/04	51
212- 59	77	412- 610	36	612-2/04	78
212- 610	66	412- 711	31	612- 00	81
212- 711	56	412- 810	27	612- 03	72
312- 04	119	412- 812	25	612- 11	69
312- 15	102	412- 912	22	612- 14	61
312- 26	87	412-1012	19	612- 22	59
312- 37	75	412-1112	16	612- 25	52
312- 48	64	412-1212	13	612- 33	51
312- 59	54	48- 711	33	612- 44	44
312- 610	46	48- 812	27	612- 66	32
				612- 77	27

<sup>1</sup>Style designation is defined in ACI Standard 315 of the American Concrete Institute.

TABLE 34-3. SQUARE WELDED WIRE FABRIC<sup>1</sup>

Style Designation	Wt. in Lb. Per 100 Sq. Ft.	Style Designation	Wt. in Lb. Per 100 Sq. Ft.
2 x 2 - 10/10	60	4 x 4 - 14/14	11
2 x 2 - 12/12	37	6 x 6 - 0/0	107
2 x 2 - 14/14	21	6 x 6 - 1/1	91
2 x 2 - 16/16	13	6 x 6 - 2/2	78
3 x 3 - 8/8	58	6 x 6 - 3/3	68
3 x 3 - 10/10	41	6 x 6 - 4/4	58
3 x 3 - 12/12	25	6 x 6 - 4/6	50
3 x 3 - 14/14	14	6 x 6 - 5/5	49
4 x 4 - 4/4	85	6 x 6 - 6/6	42
4 x 4 - 6/6	62	6 x 6 - 7/7	36
4 x 4 - 8/8	44	6 x 6 - 8/8	30
4 x 4 - 10/10	31	6 x 6 - 9/9	25
4 x 4 - 12/12	19	6 x 6 - 10/10	21
4 x 4 - 13/13	14		

<sup>1</sup>Style designation is defined in ACI Standard 315 of the American Concrete Institute.

9. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 13, Steel Reinforcement

- (1) This item shall consist of furnishing and installing all steel bar reinforcement required in the construction of reinforced concrete under this contract.
- (2) Measurement and payment will be by Method 1.

9. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 14, Steel Reinforcement

- (1) This item shall consist of furnishing and installing all steel bar reinforcement required in the construction of reinforced concrete under this contract.
- (2) Measurement and payment will be by Method 1.

9. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 10, Steel Reinforcement

- (1) This item shall consist of furnishing and installing all steel bar reinforcement required in the construction of reinforced concrete for Bid Item 8.
- (2) Measurement and payment will be by Method 1.

## CONSTRUCTION SPECIFICATION

### 41. REINFORCED CONCRETE PRESSURE PIPE SPILLWAY CONDUITS

#### 1. SCOPE

The work shall consist of furnishing and installing reinforced concrete pressure pipe, fittings and accessories in principal spillway conduits appurtenant to earth dams.

#### 2. MATERIALS

Reinforced concrete pressure pipe, fittings and accessories shall conform to the requirements of Material Specification 541.

Portland cement concrete for bedding and cradles shall conform to the requirements of Construction Specification 31 for the specified class of concrete.

Joint sealing compound shall conform to the requirements of Material Specification 536.

Preformed expansion joint filler shall conform to the requirements of Material Specification 535.

#### 3. LAYING THE PIPE

The pipe shall be set to the specified line and grade and temporarily supported on precast concrete blocks or wedges. Bell and spigot pipe shall be laid with the bell upstream.

Just before each joint is connected the connecting surfaces of the bell and spigot or spigots and sleeve shall be thoroughly cleaned and dried, and the rubber gasket and the inside surface of the bell or sleeve shall be lubricated with a light film of soft vegetable soap compound (flax soap). The rubber gasket shall be stretched uniformly as it is placed in the spigot groove to insure a uniform volume of rubber around the circumference of the pipe.

(Method 1) The joint shall be connected by means of a pulling or jacking force so applied to the pipe that the spigot enters squarely into the bell.

(Method 2) The joint shall be connected in accordance with the manufacturer's instructions.

(Use with Either Method) When the spigot has been seated to within 1/2-inch of its final position, the position of the gasket in the joint shall be checked around the entire circumference of the pipe by means of a metal feeler gage. In any case where the gasket is found to be displaced, the joint shall be disengaged and properly reconnected. After the position of the gasket has been checked, the spigot shall be completely pulled into the bell and the section of pipe shall be adjusted to line and grade.

#### 4. FILLING JOINTS

Before the placement of the bedding or cradle, the exterior annular space between the ends of the pipe sections shall be cleaned and completely filled with joint sealing compound. Before the compound is applied, the surfaces against which it is to be placed shall be cleaned of all dust, lubricant and other substances that would interfere with a bond between the compound and the pipe. If recommended by the manufacturer of the compound, the concrete surfaces shall be coated with a primer in accordance with the manufacturer's recommendations. Primers shall be applied to the concrete surfaces only and shall not come in contact with the gasket or gasket sealing surfaces. Unless the compound or primer is specifically recommended for use on moist concrete, the surfaces shall be dry when it is applied.

The joint sealing compound shall be allowed to cure until it is sufficiently firm to prevent the entry of concrete or earth into the joint before concrete, bedding or backfill is placed against it. Unless otherwise specified, where bedding or backfill (other than concrete) containing particles larger than one-fourth inch in maximum dimension is to be placed within 6 inches of the joint sealing compound, the compound shall be covered before the bedding or backfill is placed with a strip of 16-gage to 24-gage metal at least 2 inches wider than the space between the ends of the pipe sections.

#### 5. PRESSURE TESTING

(Method 1) Pressure testing of the completed conduit will not be required.

(Method 2) Prior to the placement of any concrete or earth fill around the conduit or filling of the pipe joints, the conduit shall be tested for leaks in the following manner: The ends of the conduit shall be plugged and a standpipe with a minimum diameter of two (2) inches shall be attached to the upstream plug. The conduit shall be braced at each end to prevent slippage. The conduit and the standpipe shall be filled with water. The water level in the standpipe shall be maintained by continuous pumping a minimum of

10 feet above the invert of the upstream end of the conduit for a period of not less than two hours. Any leaks that occur during this period shall be repaired by a method satisfactory to the Engineer. After repair, the conduit shall be tested again as described above and the procedure shall be repeated until the conduit is accepted as watertight by the Engineer.

The pipe joints shall show no leakage. Damp spots developing on the surface of the pipe will not be considered as leakage.

6. MEASUREMENT AND PAYMENT

(Method 1) For items of work for which specific unit prices are established in the contract, the quantity of each size, type and class of pipe will be determined to the nearest 0.1 foot by measurement of the laid length of pipe along the invert centerline of the conduit. Payment for each size, type and class of reinforced concrete pressure pipe will be made at the contract unit price for that size, type and class of pipe. Such payment will constitute full compensation for furnishing, transporting and installing the pipe complete in place including accessories such as wall fittings, joint gaskets, coupling bands, sleeves or collars and all other items necessary and incidental to the completion of the work.

(Method 2) For items of work for which specific unit prices are established in the contract, the quantity of each size, type and class of pipe will be determined as the sum of the nominal laying lengths of the pipe sections used. Payment for each size, type and class of reinforced concrete pressure pipe will be made at the contract unit price for that size, type and class of pipe. Such payment will constitute full compensation for furnishing, transporting and installing the pipe complete in place including accessories such as wall fittings, joint gaskets, coupling bands, sleeves or collars and all other items necessary and incidental to the completion of the work.

(Use with Either Method) Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 7 of this specification.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 14, 30-Inch Diameter Reinforced Concrete Pressure Pipe

- (1) This item shall consist of furnishing and installing all pipe for the principal spillway between Station 12+13± and Station 13+97± as shown on the drawings.
- (2) The pipe shall conform to the requirements of Material Specification 541 and AWWA Standard C301 or AWWA Standard C300.
- (3) The pipe shall be capable of withstanding a minimum external load in pounds per foot length of pipe as shown on the drawings simultaneously with the applied head of water shown.
- (4) The pipe shall be furnished with joint lengths that permit extensibility not less than that given on sheet 12 of the drawings.
- (5) Pipe shall be furnished with bell and spigot joints equipped with endless "O" ring type gaskets or circular cross section.
- (6) The metal strips covering the pipe joints as outlined in Section 4, shall be fabricated from galvanized 24-gage metal, 6 inches wide.
- (7) Cement shall be Type II.
- (8) In Section 3, Laying the Pipe, Method 1 shall apply.
- (9) In Section 5, Pressure Testing, Method 2 shall apply.
- (10) Measurement and payment will be by Method 1.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 15, 30-Inch Diameter Reinforced Concrete Pressure Pipe

- (1) This item shall consist of furnishing and installing all pipe for the principal spillway between Station 8+47± and Station 11+36± as shown on the drawings.
- (2) The pipe shall conform to the requirements of Material Specification 541 and AWWA Standard C301 or AWWA Standard C 300.
- (3) The pipe shall be capable of withstanding a minimum external load in pounds per foot length of pipe as shown on the drawings simultaneously with the applied head of water shown.
- (4) The pipe shall be furnished with joint lengths that permit extensibility not less than that given on sheet 12 of the drawings.
- (5) Pipe shall be furnished with bell and spigot joints equipped with endless "O" ring type gaskets of circular cross section.
- (6) The metal strips covering the pipe joints as outlined in Section 4, shall be fabricated from galvanized 24-gage metal, 6 inches wide.
- (7) Cement shall be Type II.
- (8) In Section 3, Laying the Pipe, Method 1 shall apply.
- (9) In Section 5, Pressure Testing, Method 2 shall apply.
- (10) Measurement and payment will be by Method 1.

CONSTRUCTION SPECIFICATION

42. CONCRETE PIPE CONDUITS AND DRAINS

1. SCOPE

The work shall consist of furnishing and installing concrete pipe or concrete drain tile and the necessary fittings as shown on the drawings.

2. MATERIALS

Reinforced concrete pressure pipe shall conform to the requirements of Material Specification 541 for the type and strength specified.

Concrete culvert pipe shall conform to the requirements of Material Specification 542 for the kind of pipe specified.

Concrete irrigation pipe, drainage pipe and drain tile shall conform to the requirements of Material Specification 543 for the kind of pipe or tile specified.

Pipe fittings shall conform to the requirements of the applicable pipe specifications.

Sealing compound for filling rubber gasket joints shall conform to the requirements of Material Specification 536.

Hot-pour joint sealer shall conform to the requirements of Federal Specification SS-S-169.

Cold-applied sealing compound shall conform to the requirements of Federal Specification SS-S-168.

Preformed sealing compound shall conform to the requirements of Interim Federal Specification SS-S-00210.

Joint packing shall conform to the requirements of Federal Specification HH-P-119 for mastic sealed joints and Federal Specification HH-P-117 for cement mortar sealed joints.

Preformed expansion joint filler shall conform to the requirements of Material Specification 535.

### 3. LAYING AND BEDDING

Pipe and tile shall be laid to the line and grade shown on the drawings. Pipe shall be laid with the bell or groove at the upstream end of each section.

- a. Concrete Cradles or Bedding. Pipe to be cradled or bedded on concrete shall be set to the specified line and grade and temporarily supported on precast concrete blocks or wedges until the cradle or bedding concrete is placed. Concrete blocks or wedges used to temporarily support the pipe during placement of bedding or cradle shall be of a class of concrete equal to or better than that used in the bedding or cradle.
- b. Earth, Sand, or Gravel Bedding. The pipe shall be firmly and uniformly bedded throughout its entire length to the depth and in the manner specified on the drawings. The pipe shall be loaded sufficiently during backfilling around the sides to prevent its being lifted from the bedding.

Perforated pipe shall be laid with the perforations down and oriented symmetrically about a vertical centerline. Perforations shall be clear of any obstructions when the pipe is laid.

Elliptical pipe and pipe with elliptical or quadrant reinforcement shall be layed so that the vertical axis, as indicated by markings on the pipe, is in a vertical position.

### 4. JOINTS

Pipe joints shall conform to the details shown on the drawings and to the requirements of Section 5 and 6 of this specification applicable to the type of joint specified. Except where unsealed joints are indicated, pipe joints shall be sound and watertight at the pressure specified.

### 5. JOINING BELL AND SPIGOT PIPE

- a. Rubber Gasket Joint, Pressure Pipe. Just before the joint is connected the connecting surfaces of the spigot and the bell or coupling band, sleeve or collar shall be thoroughly cleaned and dried, and the rubber gasket and the inside surface of the bell or coupling band, sleeve or collar shall be lubricated with a light film of soft vegetable soap compound (flax soap). The rubber gasket shall be stretched uniformly as it is placed in the spigot groove to insure a uniform volume of rubber around the circumference of the pipe.

(Method 1) The joint shall be connected by means of a pulling or jacking force so applied to the pipe that the spigot enters squarely into the bell.

(Method 2) The joint shall be connected in accordance with the manufacturer's recommendations.

(Use with Either Method) When the spigot has been seated to within 1/2 inch of its final position, the position of the gasket in the joint shall be checked around the entire circumference of the pipe by means of metal feeler gage. In any case where the gasket is found to be displaced, the joint shall be disengaged and properly reconnected. After the position of the gasket has been checked, the spigot shall be completely pulled into the bell and the section of the pipe shall be adjusted to line and grade.

- b. Rubber Gasket Joints, Sewer and Culvert Pipe or Irrigation Pipe. The pipe shall be joined in accordance with the gasket manufacturer's recommendations except as otherwise specified.
- c. Mastic Sealed Joints. At the time of assembly the inside surfaces of the bell and the outside surfaces of the spigot shall be clean, dry and primed as recommended by the manufacturer of the sealing compound. A closely twisted gasket of joint packing of the diameter required to support the spigot at the proper grade and to make the joint concentric shall be made in one piece of sufficient length to pass around the pipe and lap at the top. The gasket shall be laid in the bell throughout the lower third of the circumference. The end of the spigot shall be laid on the gasket and the spigot shall be fully inserted into the bell so that the pipe sections are closely fitted and aligned. The gasket then shall be lapped at the top of the pipe and thoroughly packed into the annular space between the bell and the spigot.
  - (1) Hot-Pour Joint Sealer. The sealing compound shall be heated to within the temperature range recommended by the manufacturer and shall not be overheated or subjected to prolonged heating. After the joint is assembled, with the pipe in its final location, a suitable joint runner shall

be placed around the joint with an opening left at the top. Molten sealing compound shall be poured into the joint as rapidly as possible without entrapping air until the annular space between bell and spigot is completely filled. After the compound has set, the runner may be removed. Alternate joints may be poured before the pipe is lowered into the trench. In this case, the joint shall be poured with the pipe in a vertical position without the use of the runner. The compound shall have thoroughly set before the pipe is placed in the trench, and the pipe shall be handled so as to cause no deformation of the joint during placement.

- (2) Cold-Applied Sealing Compound. The annular space between bell and spigot shall be completely filled with the sealing compound. The compound shall be mixed on the job in accordance with the manufacturer's recommendations and in relatively small quantities so that setting will not be appreciable before application.
- (3) Preformed Sealing Compound. Joint packing will not be required, except as recommended by the manufacturer of the sealing compound. Preformed strips or bands of the sealing compound shall be applied to the bell and spigot prior to assembly of the joint in accordance with the manufacturer's recommendations. Any compound extruded from the interior side of the joint during assembly shall be trimmed even with the interior surface of the pipe.

d. Cement Mortar Sealed Joints. Cement mortar for joints shall consist of one part by weight of portland cement and two parts by weight of fine sand with enough water added to produce a workable consistency. At the time of assembly the inside surface of the bell and the outside surface of the spigot shall be clean and moist.

- (1) With Packing. A closely twisted gasket of joint packing of the diameter required to support the spigot at the proper grade and to make the joint concentric shall be made in one piece of sufficient

length to pass around the pipe and lap at the top. The gasket shall be saturated with neat cement grout, laid in the bell throughout the lower third of the circumference and covered with mortar. The end of the spigot shall be fully inserted into the bell so that the pipe sections are closely fitted and aligned. A small amount of mortar shall be placed in the annular space throughout the upper two-thirds of the circumference. The gasket then shall be lapped at the top of the pipe, and thoroughly packed into the annular space between the bell and the spigot. The remainder of the annular space then shall be filled completely with mortar and beveled off at an angle of approximately forty-five (45) degrees with the outside of the bell. If the mortar is not sufficiently stiff to prevent appreciable slump before setting, the outside of the joint thus made shall be wrapped with cheesecloth. After the mortar has set slightly, the joint shall be wiped inside the pipe. In pipe too small for a man to work inside, wiping may be done by dragging an approved swab through the pipe as the work progresses.

- (2) Without Packing. The lower portion of the bell shall be filled with stiff mortar of sufficient thickness to make the inner surface of the abutting sections flush. The spigot end of the pipe to be joined shall be fully inserted into the bell so that the sections are closely fitted and aligned. The remaining annular space between the bell and spigot shall then be filled with mortar and the mortar neatly beveled off at an angle of approximately forty-five (45) degrees with the outside of the bell. After the mortar has set slightly, the joint shall be wiped inside the pipe. In pipe too small for a man to work inside, wiping may be done by dragging an approved swab through the pipe as the work progresses.

- e. Unsealed Joints. When unsealed joints are specified, they shall conform to the details shown on the drawings.

6. JOINING TONGUE AND GROOVE PIPE

- a. Cement Mortar Sealed Joint. Mortar shall be as specified for bell and spigot joints. The tongue end of the section

being placed shall be covered with mortar and firmly pressed into the groove of the laid section in such a manner that the tongue fits snugly and truly in the groove and that mortar is squeezed out both on the interior and exterior of the joint. Care shall be taken that no mortar falls from the groove end during the abutting operation. Immediately after the pipe sections have been abutted, exposed external surface mortar shall be pressed into the joint and any excess mortar removed, after which the interior surface of the joint shall be carefully pointed and brushed smooth, and all surplus mortar removed.

- b. Mastic Sealed Joints. Strips or bands of preformed sealing compound shall be applied to the tongue and groove prior to assembly of the joint in accordance with the manufacturer's recommendations. Any compound extruded from the interior side of the joint during assembly shall be trimmed even with the interior surface of the pipe.
- c. Rubber Gasket Joints. The pipe shall be joined in accordance with the gasket manufacturer's recommendations except as otherwise specified.
- d. Unsealed Joints. When unsealed joints are specified, they shall conform to the details shown on the drawings.

7. BANDING

When external mortar bands are specified, they shall conform to the details shown on the drawings.

8. CURING MORTAR JOINTS AND BANDS

The external surfaces of mortar joints shall be covered with moist earth, sand, canvas, burlap or other approved materials and shall be kept moist for 10 days or until the pipe is backfilled.

Water shall not be turned into the conduit within 24 hours after the joints are finished. Hydrostatic pressure shall not be applied to the conduit prior to 14 days after the joints are finished.

9. PRESSURE TESTING

(Method 1) Pressure testing of the completed conduit will not be required.

(Method 2) Prior to the placement of concrete or earth fill around the conduit, the conduit shall be tested for leaks in the following manner: The ends of the conduit shall be plugged and a standpipe with a minimum diameter of two (2) inches shall be attached to the upstream plug. The conduit shall be braced at each end to prevent slippage. The conduit and the standpipe shall be filled with water. The water level in the standpipe shall be maintained, by continuous pumping, a minimum of 10 feet above the invert of the upstream end of the conduit for a period of not less than two hours. Any leaks shall be repaired and the conduit shall be retested as described above. The procedure shall be repeated until the conduit is watertight.

The pipe joints shall show no leakage. Damp spots developing on the surface of the pipe will not be considered as leaks.

(Method 3) Prior to the placement of concrete or earth fill around the conduit, the conduit shall be tested at the specified test pressure for a period of at least 2 hours. Any leaks shall be repaired and the conduit shall be retested. The procedure shall be repeated until the conduit is watertight.

The pipe joints shall show no leakage. Damp spots developing on the surface of the pipe will not be considered as leaks.

#### 10. MEASUREMENT AND PAYMENT

(Method 1) For items of work for which specific unit prices are established in the contract, the quantity of each kind, size, and class of pipe or tile will be determined to the nearest foot by measurement of the laid length along the invert centerline of the conduit. Payment for each kind, size, and class of pipe or tile will be made at the contract unit price for that kind, size, and class. Such payment will constitute full compensation for furnishing, transporting and installing the pipe or tile complete in place.

(Method 2) For items of work for which specific unit prices are established in the contract, the quantity of each kind, size, and class of pipe or tile will be determined as the sum of the nominal laying lengths of the sections used. Payment for each kind, size, and class of pipe or tile will be made at the contract unit price for that kind, size, and class. Such payment will constitute full compensation for furnishing, transporting and installing the pipe or tile complete in place.

**(Use with Either Method)** Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 11 of this specification.

11. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

- a. Bid Item 11, 15-Inch Diameter Reinforced Concrete Pipe  
Bid Item 12, 18-Inch Diameter Reinforced Concrete Pipe  
Bid Item 13, 21-Inch Diameter Reinforced Concrete Pipe  
Bid Item 14, 24-Inch Diameter Reinforced Concrete Pipe  
Bid Item 15, 27-Inch Diameter Reinforced Concrete Pipe

- (1) These items shall consist of furnishing and installing all pipe for the Sunset Pipeline from Station 13+97± to Station 64+28± and the Sunnycove Pipeline from Station 9+10± to Station 37+18± intersection with Sunset Pipeline as shown on the drawings and staked in the field.
- (2) Pipe shall conform to the requirements of Material Specification 542 and ASTM C 76. The pipe shall be of the classes designated on the drawings.
- (3) Joint deflection shall not exceed the pipe manufacturer's recommendations. Where the curvature cannot be obtained by deflection, radius pipe will be required.
- (4) Pipe shall be furnished with tongue and groove or bell and spigot joints equipped with endless "O" ring type rubber gaskets of circular cross section.
- (5) Cement shall be Type II.
- (6) If bell and spigot pipe is furnished, Method 1 in Section 5 shall apply. All pipe shall be laid so that there is no reversal of grade across joints unless shown on the drawings.
- (7) In Section 9, Pressure Testing, Method 1 shall apply.
- (8) Measurement and payment will be by Method 1.

- b. Bid Item 16, Precast Reinforced Concrete Manholes

- (1) This item shall consist of furnishing and installing the precast reinforced concrete manholes at the locations shown on the drawings as follows:
  - (a) Type 1 without cone - 2 each
  - (b) Type 2 with cone - 5 each
  - (c) Type 3 with cone - 1 each
  - (d) Type 4 outlet - 1 each

- (2) The precast reinforced concrete riser sections and appurtenances shall conform to ASTM C 478. Cement shall be Type II. Galvanized steel or cast iron steps shall be as shown on the drawings.
- (3) The manhole sections shall be connected as recommended by the manufacturer.
- (4) In Section 9, Pressure Testing, Method 1 shall apply.
- (5) The work will not be measured. Payment for furnishing and installing the precast reinforced concrete manholes will be made at the contract lump sum price. Such payment will constitute full compensation for furnishing and installing the precast reinforced concrete manholes.

## CONSTRUCTION SPECIFICATION

### 44. ASBESTOS-CEMENT PIPE CONDUITS AND DRAINS

#### 1. SCOPE

The work shall consist of furnishing and installing asbestos-cement pipe and the necessary fittings as shown on the drawings.

#### 2. MATERIALS

Pipe, fittings, and gaskets shall conform to the requirements of Material Specification 545 for the kind of pipe specified.

#### 3. LAYING AND BEDDING

Pipe shall be laid to the line and grade shown on the drawings.

- a. Concrete Cradle or Bedding. Pipe to be cradled or bedded on concrete shall be set to the specified line and grade and temporarily supported on concrete blocks or wedges until the cradle or bedding concrete is placed.
- b. Earth, Sand, or Gravel Bedding. The pipe shall be firmly and uniformly bedded throughout its entire length to the depth and in the manner specified on the drawings. The pipe shall be loaded sufficiently during backfilling around the sides to prevent its being lifted from the bedding.

Perforated pipe shall be laid with the perforations down and oriented symmetrically about the vertical centerline. Perforations shall be clear of any obstructions when the pipe is laid.

#### 4. JOINTS

Pipe joints shall conform to the details shown on the drawings and, except where unsealed joints are indicated, shall be sound and watertight at the pressures specified.

Pipe shall be installed and joined in accordance with the manufacturer's recommendations except as otherwise specified.

#### 5. PRESSURE TESTING

(Method 1) Pressure testing of the completed conduit will not be required.

(Method 2) Prior to the placement of concrete or earth fill around the conduit, the conduit shall be tested for leaks in the following manner: The ends of the conduit shall be plugged and a standpipe with a minimum diameter of two (2) inches shall be attached to the upstream plug. The conduit shall be braced at each end to prevent slippage. The conduit and the standpipe shall be filled with water. The water level in the standpipe shall be maintained by continuous pumping, a minimum of 10 feet above the invert of the upstream end of the conduit for a period of not less than two hours. Any leaks shall be repaired and the conduit shall be retested as described above. The procedure shall be repeated until the conduit is watertight.

The pipe joints shall show no leakage. Damp spots developing on the surface of the pipe will not be considered as leaks.

(Method 3) Prior to the placement of concrete or earth fill around the conduit, the conduit shall be tested at the specified test pressure for a period of at least 2 hours. Any leaks shall be repaired and the conduit shall be retested. The procedure shall be repeated until the conduit is watertight.

The pipe joints shall show no leakage. Damp spots developing on the surface of the pipe will not be considered as leaks.

#### 6. MEASUREMENT AND PAYMENT

(Method 1) For items of work for which specific unit prices are established in the contract, the quantity of each kind, size, and class of pipe will be determined to the nearest foot by measurement of the laid length of pipe along the invert centerline of the conduit. Payment for each kind, size, and class of pipe will be made at the contract unit price for that kind, size, and class of pipe. Such payment will constitute full compensation for furnishing, transporting and installing the pipe complete in place.

(Method 2) For items of work for which specific unit prices are established in the contract, the quantity of each kind, size, and class of pipe will be determined as the sum of the nominal laying lengths of the pipe sections used. Payment for each kind, size, and class of pipe will be made at the contract unit price for that kind, size, and class of pipe. Such payment will constitute full compensation for furnishing, transporting and installing the pipe complete in place.

(Use with Either Method) Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 7 of this specification.

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7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in accordance with this specification and the construction details are:

a. Bid Item 15, 6-Inch Diameter Asbestos-Cement Pressure Pipe, Perforated

Bid Item 16, 6-Inch Diameter Asbestos-Cement Pressure Pipe, Non-Perforated

- (1) These items shall consist of furnishing and installing all the 6-inch diameter perforated and non-perforated asbestos-cement pipe for drain and outlet pipes as shown on the drawings.
- (2) All pipe shall be asbestos-cement pressure pipe conforming to Material Specification 545 and ASTM C 296; Type I or II, Class 200.
- (3) In Section 5, Pressure Testing, Method 1 shall apply.
- (4) Measurement and payment will be by Method 2.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 16, 6-Inch Diameter Asbestos-Cement Pressure Pipe, Perforated

Bid Item 17, 6-Inch Diameter Asbestos-Cement Pressure Pipe, Non-Perforated

- (1) These items shall consist of furnishing and installing all the 6-inch diameter perforated and non-perforated asbestos-cement pipe for drain and outlet pipes as shown on the drawings.
- (2) All pipe shall be asbestos-cement pressure pipe conforming to Material Specification 545 and ASTM C 296; Type I or II Class 200.
- (3) In Section 5, Pressure Testing, Method 1 shall apply.
- (4) Measurement and payment will be by Method 2.

## CONSTRUCTION SPECIFICATION

### 61. LOOSE ROCK RIPRAP

#### 1. SCOPE

The work shall consist of the construction of loose rock riprap revetments and blankets, including filter layers or bedding where specified.

#### 2. MATERIALS

Rock for loose rock riprap shall conform to the requirements of Material Specification 523 or, if so specified, shall be obtained from designated sources.

Rock from designated sources shall be excavated, selected and handled as necessary to meet the quality and grading requirements in Section 9 of this specification. The rock shall conform to the specified grading limits when installed in the riprap.

Filter material shall conform to the requirements of Material Specification 521 unless otherwise specified.

Bedding shall be obtained from the designated sources and shall be selected to meet the quality and grading requirements in Section 9 of this specification.

At least 30 days prior to delivery of material from other than designated sources, the Contractor shall notify the Contracting Officer in writing of the sources from which he intends to obtain the material. The Contractor shall provide the Engineer free access to the sources for the purpose of obtaining samples for testing.

#### 3. SUBGRADE PREPARATION

The subgrade surfaces on which the riprap or bedding course is to be placed shall be cut or filled and graded to the lines and grades shown on the drawings. When fill to subgrade lines is required, it shall consist of approved materials and shall conform to the requirements of the specified class of fill.

Riprap shall not be placed until the foundation preparation is completed and the subgrade surfaces have been inspected and approved by the Engineer.

4. EQUIPMENT-PLACED ROCK RIPRAP

The rock shall be placed by equipment on the surfaces and to the depths specified. The riprap shall be constructed to the full course thickness in one operation and in such a manner as to avoid serious displacement of the underlying materials. The rock shall be delivered and placed in a manner that will insure that the riprap in place shall be reasonably homogeneous with the larger rocks uniformly distributed and firmly in contact one to another with the smaller rocks and spalls filling the voids between the larger rocks.

Riprap shall be placed in a manner to prevent damage to structures. Hand placing will be required to the extent necessary to prevent damage to the permanent works.

5. HAND-PLACED RIPRAP

The rock shall be placed by hand on the surfaces and to the depths specified. It shall be securely bedded with the larger rocks firmly in contact one to another. Spaces between the larger rocks shall be filled with smaller rocks and spalls. Smaller rocks shall not be grouped as a substitute for larger rock. Flat slab rock shall be laid on edge.

6. FILTER LAYERS OR BEDDING

When the drawings specify filter layers or bedding beneath riprap the filter or bedding material shall be spread uniformly on the prepared subgrade surfaces to the depth specified. Compaction of filter layers or bedding will not be required, but the surface of such layers shall be finished reasonably free of mounds, dips or windrows.

7. TESTING

The Engineer will perform such tests as are required to verify that the riprap, filter, and bedding materials and the completed work meet the requirements of the specifications. These tests are not intended to provide the Contractor with the information he needs to assure that the materials and workmanship meet the requirements of the specifications, and their performance will not relieve the Contractor of the responsibility of performing his own tests for that purpose.

8. MEASUREMENT AND PAYMENT

(Method 1) For items of work for which specific unit prices are established in the contract, the volume of each type of riprap, including filter layers and bedding, will be measured within the specified limits and computed to the nearest cubic yard by the method of average cross-sectional end areas. Payment for each type of riprap, including filter layers and bedding, will be made at the contract unit price for that type of riprap. Such payment will be considered full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the riprap, filter layers and bedding.

(Method 2) For items of work for which specific unit prices are established in the contract, the volume of each type of riprap and the volume of each type of filter layer or bedding will be measured within the specified limits and computed to the nearest cubic yard by the method of average cross-sectional end areas. Payment for each type of riprap will be made at the contract unit price for that type of riprap. Payment for each type of filter or bedding will be made at the contract unit price for that type of filter or bedding. Such payment will be considered full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the riprap, filter layers and bedding.

(Method 3) For items of work for which specific unit prices are established in the contract, the quantity of each type of riprap placed within the specified limits will be measured to the nearest ton by actual weight, and the volume of each type of filter layer or bedding will be measured within the specified limits and computed to the nearest cubic yard by the method of average cross-sectional end areas. For each load of rock placed as specified, the Contractor shall furnish to the Engineer a statement-of-delivery ticket showing the weight, to the nearest 0.1 ton, of rock in the load.

Payment for each type of riprap will be made at the contract unit price for that type of riprap. Payment for each type of filter or bedding will be made at the contract unit price for that type of filter or bedding. Such payment will be considered full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the riprap, filter layers and bedding.

(Method 4) For items of work for which specific unit prices are established in the contract, the quantity of each type of riprap placed within the specified limits will be measured to the nearest ton by actual weight, and the volume of each type of filter

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material or bedding delivered and placed within the specified limits will be measured to the nearest cubic yard by measurement of the hauling equipment. For each load of material placed as specified, the Contractor shall furnish to the Engineer a statement-of-delivery ticket showing the weight, to the nearest 0.1 ton, of rock in the load; or the volume, to the nearest 0.1 cubic yard, of filter material or bedding in the load.

Payment for each type of riprap will be made at the contract unit price for that type of riprap. Payment for each type of filter or bedding will be made at the contract unit price for that type of filter or bedding. Such payment will be considered full compensation for all labor, materials, equipment and all other items necessary and incidental to completion of the riprap, filter layers and bedding.

(Use with All Methods) Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 9 of this specification.

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9. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 17, Loose Rock Riprap

Bid Item 18, Filter Material

(1) These items shall consist of furnishing and placing all loose rock riprap and filter material downstream from the emergency spillway SAF outlet as shown on the drawings.

(2) Gradation of loose rock riprap shall be as follows:

<u>Size Opening (Inches)</u>	<u>Percent Passing (Dry weight basis)</u>
24	100
18	60-95
12	31-65
6	10-30
3	0-15

(3) Gradation of filter material shall be the same as for Drain Fill, Zone II, Bid Item 10.

(4) Riprap and filter materials shall be equipment placed in accordance with Section 4 and Section 6.

(5) Measurement and payment will be by Method 2.

9. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 17, Loose Rock Riprap and Filter

- (1) This item shall consist of furnishing and placing all loose rock riprap and filter material adjacent to the pipeline outlet structure as shown on the drawings, including the required excavation.
- (2) Within the railroad right-of-way, all construction operations shall comply with the requirements of the A.T. and S.F. Railroad Company. The Contractor shall be responsible for obtaining these details from:

The Atchison, Topeka and Santa Fe Railway Company  
Winslow, Arizona 86047  
R. V. Ketring, Office Engineer

- (3) Gradation of loose rock riprap shall be as follows:

<u>Size Opening (Inches)</u>	<u>Percent Passing (Dry Weight Basis)</u>
24	100
18	60-95
12	31-65
6	10-30
3	0-15

- (4) The required gradation of filter materials shall be:

<u>Sieve Size</u>	<u>Percent Passing (Dry Weight Basis)</u>
3 inches	100
1-1/2 inches	75-100
3/4 inch	55- 85
3/8 inch	25- 60
No. 4	0- 40
No. 10	0- 15
No. 20	0- 5

- (5) Riprap and filter materials shall be equipment placed in accordance with Section 4 and Section 6. Some hand placement adjacent to the manhole shall be required as directed by the Engineer.
- (6) Measurement and payment will be by Method 2.

## CONSTRUCTION SPECIFICATION

### 71. WATER CONTROL GATES

#### 1. SCOPE

The work shall consist of furnishing and installing water control gates including gate stems, hoists, lifts and other appurtenances.

#### 2. MATERIALS

The gates furnishes shall conform to the requirements specified in Section 8 or on the drawings. All gates shall be furnished complete with hoisting equipment and other specified appurtenances.

#### 3. INSTALLING GATES

The Contractor shall install the gates in a manner that will prevent leakage around the seats and binding of the gates during operation.

Surfaces of metal against which concrete will be placed shall be free from oil, grease, loose mill scale, loose paint, surface rust, and other debris or objectionable coatings.

Anchor bolts, thimbles and spigot frames shall be secured in true position in the forms and held in alignment during the placement of concrete.

Concrete surfaces against which rubber seals will bear or against which flat frames or plates are to be installed shall be finished to provide a smooth and uniform contact surface.

When a flat frame is installed against concrete, a layer of bedding mortar shall be placed between the frame and the concrete.

When a gate is attached to a wall thimble, a mastic or resilient gasket shall be applied between the gate frame and the thimble, in accordance with the recommendation of the gate manufacturer.

For radial gates, wall plates, sills and pin brackets shall be adjusted and fastened by grouting and bolting after the gates have been completely assembled in place.

4. INSTALLING HOISTS AND LIFTS

Gate stems, stem guides and gate lifts shall be carefully aligned so that the stem shall be parallel to the guide bars or angles on the gate frame after installation.

Radial gate hoists shall be installed in correct alignment with relation to the gate shaft.

5. RADIAL GATE SEALS

The rubber seals on radial gates shall be installed so that the seals contact the walls or wall plates throughout their entire length when the gates are closed.

6. OPERATIONAL TESTS

After the gate and hoist (or lift) have been installed, they shall be cleaned, lubricated and otherwise serviced by the Contractor in accordance with the manufacturer's instructions. The Contractor shall test the gate and hoist by operating the system several times throughout its full range of operation. He shall make any changes and adjustments necessary to insure satisfactory operation of the gate system.

7. MEASUREMENT AND PAYMENT

The number of each type, size and class of gate will be counted. Payment for furnishing and installing each type, size and class of gate shall be made at the contract unit price for that type, size and class of gate. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the work including furnishing and installing anchor bolts and all specified appurtenances and fittings.

Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and items to which they are made subsidiary are identified in Section 8 of this specification.

8. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 19, 18-Inch Slide Gate Assembly

- (1) This item shall consist of furnishing and installing the 18-inch diameter slide gates and appurtenances as shown on the drawings.
- (2) The slide gate assembly shall be defined as including
  - (a) Gate, complete with frame and anchor bolts.
  - (b) Stem, stem splices, encasement, weather seals, oil, straps, supports, anchor bolts and all other miscellaneous hardware required to complete the installation of the stem assembly.
  - (c) Handwheel, gate lift, anchor bracket, anchor bolts and all other miscellaneous hardware required to complete the installation of the lift assembly.
- (3) The gate shall be flat back type slide gate and shall conform to the requirements specified in Material Specification 572. The gate shall be Type MMS-2, Class 50-10.
- (4) The thimble shall be the square flange, round opening type and shall conform to the requirements specified in Material Specification 572.
- (5) The stem shall be a rising stem of the length shown on the drawings.
- (6) The stem encasement shall be galvanized pipe.
- (7) In Section 15 of Material Specification 572, Painting, painting of the slide gate assembly will not be required.
- (8) Measurement and payment will be made in accordance with Section 7.

8. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 18, 18-Inch Slide Gate Assembly

- (1) This item shall consist of furnishing and installing the 18-inch diameter slide gates and appurtenances as shown on the drawings.
- (2) The slide gate assembly shall be defined as including:
  - (a) Gate, complete with frame and anchor bolts.
  - (b) Stem, stem splices, encasement, weather seals, oil, straps, supports, anchor bolts and all other miscellaneous hardware required to complete the installation of the stem assembly.
  - (c) Handwheel, gate lift, anchor brackets, anchor bolts and all other miscellaneous hardware required to complete the installation of the lift assembly.
- (3) The gate shall be flat back type slide gate and shall conform to the requirements specified in Material Specification 572. The gate shall be Type MMS-2, Class 50-10.
- (4) The thimble shall be the square flange, round opening type and shall conform to the requirements specified in Material Specification 572.
- (5) The stem shall be a rising stem of the length shown on the drawings.
- (6) The stem encasement shall be galvanized pipe.
- (7) In Section 15 of Material Specification 572, Painting, painting of the slide gate assembly will not be required.
- (8) Measurement and payment will be made in accordance with Section 7.

## CONSTRUCTION SPECIFICATION

### 81. METAL FABRICATION AND INSTALLATION

#### 1. SCOPE

The work shall consist of furnishing, fabricating and erecting metalwork, including the metal parts of composite structures.

#### 2. MATERIALS

Unless otherwise specified, materials shall conform to the requirements of Material Specification 581. Steel shall be structural quality unless otherwise specified. Castings shall be thoroughly cleaned and subjected to careful inspection before installation. Finished surfaces shall be smooth and true to assure proper fit. Galvanizing shall conform to the requirements of Material Specification 582.

#### 3. FABRICATION

Fabrication of structural steel shall conform to the requirements of Section 1.23 of the "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings (Riveted, Bolted and Arc-Welded Construction)," American Institute of Steel Construction.

Fabrication of structural aluminum shall conform to the requirements in the Aluminum Construction Manual, "Specifications for Aluminum Structures," Section 6 and Section 7, The Aluminum Association, November 1967.

#### 4. ERECTION

The frame of metal structures shall be carried up true and plumb. Temporary bracing shall be placed wherever necessary to resist all loads to which the structure may be subjected, including those applied by the installation and operation of equipment. Such bracing shall be left in place as long as may be necessary for safety.

As erection progresses the work shall be securely bolted up, or welded, to resist all dead load, wind and erection stresses. The Contractor shall furnish such fitting up bolts, nuts and washers as may be required.

No riveting or welding shall be done until as much of the structure as will be stiffened thereby has been properly aligned.

Rivets driven in the field shall be heated and driven with the same care as those driven in the shop.

All field welding shall be done in conformance to the requirements for shop fabrication, except those that expressly apply to shop conditions only.

Galvanized items shall not be cut, welded or drilled after the zinc coating is applied.

5. PROTECTIVE COATINGS

Items specified to be galvanized shall be completely fabricated for field assembly before the application of the zinc coatings.

Items specified to be painted shall be painted in conformance to the requirements of Construction Specification 82 for the specified paint systems.

6. MEASUREMENT AND PAYMENT

(Method 1) The work will not be measured. Payment for metal fabrication and installation will be made at the contract lump sum price. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the work, including connectors and appurtenances such as rivets, bolts, nuts, pins, studs, washers, hangers and weld metal.

(Method 2) The weight of metal installed complete in place shall be determined to the nearest pound. Unless otherwise provided, the weight of metal shall be computed by the method specified in Section 3 of the "Code of Standard Practice for Steel Buildings and Bridges," American Institute of Steel Construction, except that the following unit weights shall also be used, as appropriate, as the basis of computation:

<u>Material</u>	<u>Unit Weight</u> <u>Pounds per Cubic Foot</u>
Aluminum alloy	173.0
Bronze or copper alloy	536.0
Iron, malleable	470.0
Iron, wrought	487.0

Payment for furnishing, fabricating and installing metalwork will be made at the contract unit price for the specified types of metals. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the work.

(Method 3) The work will not be measured. Payment for furnishing, fabricating and installing each item of metalwork will be made at the contract price for that item. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the work, including connectors and appurtenances such as rivets, bolts, nuts, pins, studs, washers, hangers and weld metal.

(Use with all Methods) Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 7 of this specification.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 20, Metalwork

- (1) This item shall consist of supplying, fabricating and installing the following:
  - (a) Trash racks, perforated gate well complete with bands, steel grating, 30-inch diameter manhole frame and cover for the principal spillway riser.
  - (b) The small animal guards.
- (2) The trash racks and steel grating shall be fabricated of structural steel conforming to the requirements of ASTM Specification A 36 to the size and dimensions shown on the drawings.
- (3) The trash racks and steel grating shall be painted in the manner specified in Construction Specification 82.
- (4) The perforated gate well shall be fabricated from Type II carbon steel sheets conforming to the requirements of Federal Specification QQ-S-775. The nominal thickness of the material shall be No. 8 gage (0.1681 inch).
- (5) The manhole frame and lid shall be a light duty, Class 30 gray iron casting for precast reinforced concrete manhole sections type installation conforming to the requirements of ASTM Specification A 48.
- (6) The frame shall have a 30-inch diameter clear opening and be furnished with a strap iron lock.
- (7) The lid shall be solid and furnished with a ring handle.
- (8) The small animal guards shall be fabricated as shown on the drawings and shall be galvanized after fabrication.
- (9) Measurement and payment will be by Method 1.

b. Bid Item 21, Identification Sign

- (1) This item shall consist of the fabrication and installation of the identification sign as shown on sheet 24 of the drawings and as directed by the Engineer.

(2) Painting shall be in accordance with Construction Specification 82.

(3) Measurement and payment will be by Method 3.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 19, Metalwork

- (1) This item shall consist of supplying, fabricating and installing the following:
  - (a) Trash racks, perforated gate well complete with bands, steel grating, 30-inch diameter manhole frame and cover for the principal spillway riser.
  - (b) The Type I and Type II small animal guards.
- (2) The trash racks and steel grating shall be fabricated of structural steel conforming to the requirements of ASTM Specification A 36 to the sizes and dimensions shown on the drawings.
- (3) The trash racks and steel grating shall be painted in the manner specified in Construction Specification 82.
- (4) The perforated gate well shall be fabricated from Type II carbon steel sheets conforming to the requirements of Federal Specification QQ-S-775. The nominal thickness of the material shall be No. 8 gage (0.1681 inch).
- (5) The manhole frame and lid shall be a light duty, Class 30 gray iron casting for precast reinforced concrete manhole sections type installation conforming to the requirements of ASTM Specification A 48
- (6) The frame shall have a 30-inch diameter clear opening and be furnished with a strap iron lock.
- (7) The lid shall be solid and furnished with a ring handle.
- (8) The Type I and Type II small animal guards shall be fabricated as shown on the drawings and shall be galvanized after fabrication.
- (9) Measurement and payment will be by Method 1.

b. Bid Item 20, Identification Sign

- (1) This item shall consist of the fabrication and installation of the identification sign as shown on sheet 15 of the drawings and as directed by the Engineer.
- (2) Painting shall be in accordance with Construction Specification 82.
- (3) Measurement and payment will be by Method 3.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 18, Metalwork

- (1) This item shall consist of supplying, fabricating and installing the steel gratings, 24-inch diameter manhole frames and cover for the manholes and outlet as shown on the drawings.
- (2) The steel grating shall be in accordance with Federal Specification RR-G-661a and be of the sizes and dimensions shown on the drawings.
- (3) The steel grating shall be painted in accordance with Construction Specification 82.
- (4) The manhole frame and cover shall be a light duty, Class 30 gray iron casting for precast reinforced concrete manhole sections type installation conforming to the requirements of ASTM Specification A 48.
- (5) The frame shall have a 24-inch diameter clear opening and be furnished with a strap iron lock.
- (6) The cover shall be solid and furnished with a ring handle.
- (7) Measurement and payment will be by Method 1.

CONSTRUCTION SPECIFICATION

82. CLEANING AND PAINTING METALWORK

1. SCOPE

The work shall consist of cleaning metal surfaces and applying paints and protective coatings.

2. PAINTS

For the purposes of this specification paints shall be designated by types as defined below:

Type 1 paint shall conform to the requirements of Federal Specification TT-P-86, Type IV, Red Lead Base Paint.

Type 2 paint shall conform to the requirements of Federal Specification TT-P-86, Type II or Type III, Red Lead Base Paint.

Type 3 paint shall conform to the requirements of Federal Specification TT-P-86, Type I, Red Lead Base Paint.

Type 4 paint shall conform to the requirements of Federal Specification TT-P-636, Synthetic Primer.

Type 5 paint shall be prepared by mixing aluminum paste conforming to the requirements of Federal Specification TT-P-320, Type II, Class 2 with phenolic resin spar varnish conforming to the requirements of Federal Specification TT-V-119 at the rate of two pounds of aluminum paste per gallon of varnish. The paint shall be mixed at the time of use.

Type 6 paint shall be prepared by mixing aluminum paste conforming to Federal Specification TT-P-320, Type II, Class 2 with mixing varnish conforming to the requirements of Federal Specification TT-V-81, Type II, Class B (Class 2) at the rate of two pounds of aluminum paste per gallon of varnish. The paint shall be mixed at the time of use.

Type 7 paint shall conform to the requirements of Federal Specification TT-E-489, Class A, Alkyd Gloss Enamel.

Type 8 paint shall conform to the requirements of Federal Specification TT-E-529, Alkyd Semi-Gloss Enamel.

Type 9 paint shall conform to the requirements of Federal Specification TT-P-641, Type I or Type II, Zinc Dust-Zinc Oxide Primer.

Type 10 paint shall conform to the requirements of Federal Specification TT-P-641, Type III, Zinc Dust-Zinc Oxide Primer.

Type 11 paint shall conform to the requirements of Material Specification 583. The paint shall be mixed at the time of use.

Paints of Types 1, 2, 3, 5 and 6 may be thinned with mineral spirits as necessary for proper application but the amount of thinner used shall not exceed one pint per gallon of paint. Other paints may be thinned in accordance with the manufacturer's instructions only if such thinning is approved by the Engineer.

When tinting is required, it shall be accomplished by the addition of pigment-in-oil tinting colors conforming to the requirements of Federal Specification TT-P-381.

Mineral spirits shall conform to the requirements of Federal Specification TT-T-291, Grade 1, Light Thinner.

### 3. SURFACE PERPARATION

Surfaces to be painted shall be thoroughly cleaned prior to the application of the paint. For the purposes of this specification methods of surface preparation shall be designated as defined below:

Method 1 surface preparation shall consist of the removal of all grease and oil by means of steam cleaning or solvent cleaning methods and removal of all dirt, rust, mill scale and other coatings by means of sandblasting, grit blasting or pickling. The finished surface shall uniformly expose the base metal and shall present an etched, but not polished or peened, appearance. Not more than 5 percent of the surface may exhibit very light shadows, light streaks, or slight discolorations caused by rust stain, mill scale oxides, or slight, tight residues of paint or coating.

Method 2 surface preparation shall consist of the removal of all grease and oil by means of steam cleaning or solvent cleaning and the removal of all dirt, surface rust and loose scale by means of wire brushing, flame cleaning, use of rotary abrading tools or light sandblasting.

Method 3 surface preparation shall consist of the treatment of the surface with a dilute acid solution. The surface shall be thoroughly wetted with a dilute (about 5 percent strength) phosphoric acid solution. After the acid has dried, the surface shall be thoroughly rinsed with clear water and allowed to dry. Dirt, grease and oil shall be removed from the surface by solvent cleaning prior to the acid treatment.

Cleaning solvent shall be mineral spirits. Cleaning cloths and solvents shall be discarded before they become contaminated to the extent that a greasy film would remain on the surface being cleaned. The final cleaning and wiping shall be done with clean solvent and clean cloths. Grit blasting shall be accomplished using compressed air blast nozzles and grit made of steel, malleable iron or cast iron crushed shot. Abrasives used shall have a maximum particle size that will pass the No. 16 sieve (U. S. Standard) and a minimum size that will be retained on the No. 50 sieve (U. S. Standard). The equipment used for sandblasting shall be equipped with adequate separators and traps to insure that the compressed air shall be free of detrimental amounts of water and oil. Blast cleaned surfaces shall be brushed, blown or vacuum cleaned to remove any trace of blast products or abrasives prior to painting.

Surfaces that are not to be painted immediately after cleaning shall be treated with one brush coat of metal conditioner conforming to the requirements of Military Specification MIL-M-10578, except that surfaces cleaned by pickling in phosphoric acid solution shall not require such treatment.

Surfaces shall be thoroughly dry when paint is applied.

No field coats of paint shall be applied until the prepared surfaces have been inspected and approved by the Engineer.

#### 4. PAIN T SYSTEMS

For the purposes of this specification, systems of preparing and painting metalwork will be designated as defined below:

Paint System A shall consist of the preparation of the surfaces to be painted by Method 1 and the application of two priming coats of Type 1 paint and two or more top coats of Type 5 paint as necessary to provide a total dry paint film thickness of 6 mils.

Paint System B shall consist of the preparation of the surfaces to be painted by Method 1 and the application of one priming coat of Type 1 paint and two top coats of Type 5 paint.

Paint System C shall consist of the preparation of the surfaces to be painted by Method 2 and the application of one priming coat of Type 2, Type 3 or Type 4 paint and two top coats of Type 6 paint.

Paint System D shall consist of the preparation of the surfaces to be painted by Method 2 and the application of one priming coat of Type 2 paint and two top coats of Type 7 paint.

Paint System E shall consist of the preparation of the surfaces to be painted by Method 2 and the application of one priming coat of Type 2 paint and two top coats of Type 8 paint.

Paint System F shall consist of the preparation of the surfaces to be painted by Method 3 and the application of two coats of Type 9 paint.

Paint System G shall consist of the preparation of the surfaces to be painted by Method 3 and the application of two coats of Type 10 paint.

Paint System H shall consist of the preparation of the surfaces to be painted by Method 1 and the application of four or more coats of Type 1 paint as necessary to provide a total dry paint film thickness of 6 mils.

Paint System I shall consist of the preparation of the surfaces to be painted by Method 1 and the application of two or more coats of Type 11 paint as necessary to provide a total dry paint film thickness of at least 16 mils.

## 5. APPLICATION OF PAINT

Surfaces shall be painted immediately after preparation (or within two days after preparation and treatment with metal conditioner) with at least one coat of the type of priming paint required by the specified paint system. Surfaces not required to be painted shall be protected against contamination and damage during the cleaning and painting operation.

Paints shall be thoroughly mixed at the time of application.

After erection or installation of the metalwork, all damage to shop applied coats shall be repaired and all bolts, nuts, welds and field rivet heads shall be cleaned and painted with one coat of the specified priming paint.

Except on surfaces accessible only to spray equipment, initial priming coats shall be applied by brush. All other coats may be applied by brush or spray. Each coat shall be applied in such a manner as to produce a paint film of uniform thickness with a rate of coverage within the limits recommended by the paint manufacturer.

The drying time between coats shall be as prescribed by the manufacturer of the paint but not less than that required for the paint film to dry through. The elapsed time between the application of the first and second prime coats of Paint System A shall not exceed 60 hours. In the application of Paint System I, if, for any reason, the first coat dries hard before the second coat is applied or the elapsed time between coats exceeds 48 hours, the method of application must be modified in any of the following ways: (1) the first coat must be wiped down with MIBK with the application of the second coat following the wipedown by not more than 6 feet; or (2) the first coat must be lightly brush blasted or given a fog coat of the paint before application of the full second coat; or (3) a special bonding additive supplied by the paint manufacturer must be mixed with the paint applied in the second coat.

The finished surface of each coat shall be free from runs, drops, ridges, laps or excessive brushmarks and shall present no variation in color, texture and finish.

The surface of each dried coat shall be cleaned as necessary before application of the next coat.

Except for Paint System I, the first coat of each two-coat system shall be tinted for contrast. The first coat of red-lead paint shall be tinted by the addition of 3 ounces per gallon of 1B

black pigment. The first coat of machinery paint shall be tinted off color with 3 ounces per gallon of a pigment suitable to the color of the paint.

6. ATMOSPHERIC CONDITIONS

Paint shall not be applied when the temperature of the item to be painted or of the surrounding air is less than 50°F. For Paint System I, the temperature of the coated surface must be maintained at not less than 50°F for 6 hours after the application of each coat. Painting shall be done only when the humidity and temperature of the surrounding air and the temperature of the metal surfaces are such that evaporation rather than condensation will result during the period of time required for application and drying. Surfaces protected from adverse atmospheric conditions by special cover, heating or ventilation shall remain so protected until the paint is dry.

7. TESTS

Acceptance of dry paint film thickness for Paint Systems A, H, and I will be based on the measurement of paint film thickness by means of an Elcometer or other suitable dry film thickness gage.

8. PAYMENT

For items of work for which specific lump sum prices are established in the contract, payment for painting metalwork will be at the contract lump sum price. Such payment will constitute full compensation for furnishing, preparing and applying all materials and for the cleaning, painting and coating of metalwork including labor, tools, equipment and all other items necessary and incidental to the completion of the work.

Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 9 of this specification.

9. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Subsidiary Item, Cleaning and Painting

- (1) This item shall consist of cleaning and painting the designated metal items in Bid Item 20 and the Identification Sign, Bid Item 21.
- (2) In Section 3, Surface Preparation, Method 2 shall apply.
- (3) In Section 4, Paint Systems, Paint System C shall apply for the trash racks and steel grating in Bid Item 20, and Paint System B (except that type 4 paint shall be used in place of type 2 paint for the priming coat) shall apply for the Identification Sign, Bid Item 21. The two top coats of paint on the Identification Sign shall be white and the letters painted with a dark green enamel.
- (4) No separate payment will be made for cleaning and painting. Compensation for this work will be included in the payment for Bid Item 20, Metalwork, and Bid Item 21, Identification Sign.

9. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Subsidiary Item, Cleaning and Painting

- (1) This item shall consist of cleaning and painting the designated metal items in Bid Item 19 and the Identification Sign, Bid Item 20.
- (2) In Section 3, Surface Preparation, Method 2 shall apply.
- (3) In Section 4, Paint Systems, Paint System C shall apply for the trash racks and steel grating in Bid Item 19 and Paint System B (except that type 4 paint shall be used in place of type 2 paint for the priming coat) shall apply for the Identification Sign, Bid Item 20. The two top coats of paint on the Identification Sign shall be white and the letters painted with a dark green enamel.
- (4) No separate payment will be made for cleaning and painting. Compensation for this work will be included in the payment for Bid Item 19, Metalwork, and Bid Item 20, Identification Sign.

9. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Subsidiary Item, Cleaning and Painting Metalwork

- (1) This item shall consist of the cleaning and painting of the metalwork specified in Bid Item 18, Metalwork.
- (2) In Section 4, Paint Systems, Paint System C shall apply.
- (3) No separate payment will be made for cleaning and painting. Compensation for this work will be included in the payment for Bid Item 18, Metalwork.

## CONSTRUCTION SPECIFICATION

### 91. CHAIN LINK FENCE

#### 1. SCOPE

The work shall consist of furnishing and installing chain link fencing complete with all posts, braces, gates and all other appurtenances.

#### 2. MATERIALS

Chain-link fence fabric, fence posts, top rails, braces, gates and accessories shall conform to the requirements of Federal Specification RR-F-191. Types, classes, and materials shall be as follows except as otherwise specified.

Fabric: Type I, 2-inch mesh, 9-gage, minimum weight of zinc coating - 1.8 ounces per square foot.

Barbed Wire: Zinc-coated steel.

Posts: Type I, Class 1, zinc-coated.

Top Rails: Type II, Class 1, zinc-coated.

Braces: Zinc-coated steel.

Gates: Type I, zinc-coated steel.

#### 3. INSTALLING FENCE POSTS

Unless otherwise specified, line posts shall be placed at intervals of 10 feet measured from center to center of adjacent posts. In determining the post spacing, measurement will be made parallel with the ground surface.

Post will be set in concrete backfill in the manner shown on the drawings.

Posts set in the tops of concrete walls shall be grouted into preformed holes to a depth of 12 inches.

All corner posts, end posts, gate posts, and pull posts shall be embedded, braced and trussed as shown on the drawings.

#### 4. INSTALLING WIRE FABRIC

Fencing fabric shall not be stretched until at least 4 days after the posts are grouted into walls or 14 days after the posts are set in the concrete backfill.

Fencing shall be installed on the side of the posts designated on the drawings.

The fabric shall be stretched taut and securely fastened, by means of tie clips, to the posts at intervals not exceeding 15 inches and to the top rails or tension wires at intervals not exceeding 2 feet. Care shall be taken to equalize the tension on each side of each post.

Barbed wire shall be installed as shown on the drawings and shall be pulled taut and fastened to each post with tie wires or metal tie clips.

5. MEASUREMENT AND PAYMENT

(Method 1) The length of fence will be measured to the nearest 0.1 foot along the fence, including gates. Payment will be made at the contract unit price for the specified height of fence. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the work.

(Method 2) The length of fence will be measured to the nearest 0.1 foot along the fence, excluding gate openings. Payment will be made at the contract unit price for the specified height of fence. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the work except furnishing, fabricating and installing gates. Payment for furnishing, fabricating and installing each type and size of gate will be made at the contract unit price for that type and size of gate.

(Use with Either Method) Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 6 of this specification.

6. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 22, Chain Link Fence

- (1) This item shall consist of furnishing and installing the chain link fence, including all concrete anchors, gates and appurtenances, around the emergency spillway as shown on sheets 2A, 13, 22 and 23 of the drawings.
- (2) The chain link fencing shall be 9-gage, Type I, Grade A, having a two-inch mesh and a nominal height of six feet. The fence shall have an industrial type top with three (3) lines of zinc-coated steel barbed wire which is to be of the four-point pattern composed of two (2) strands of 12 1/2-gage line wires with 14-gage barbs spaced on approximately five (5) inch centers.
- (3) The concrete for post anchors shall be Class 4000X.
- (4) Measurement and payment will be by Method 1. Such payment shall include compensation for Class 4000X concrete for post anchors.

CONSTRUCTION SPECIFICATION

92. FARM FIELD FENCES

1. SCOPE

The work shall consist of furnishing and installing farm field fences, including gates and fittings.

2. MATERIALS

Materials for farm field fences shall conform to the requirements of Material Specification 591. All wooden posts shall be of the same species.

3. SETTING POSTS

Concrete or wood posts shall be set in holes and backfilled with earth except where otherwise specified. Steel posts shall be driven unless otherwise specified.

Posts holes shall be at least 6 inches larger than the diameter or side dimension of the posts.

Earth backfill around posts shall be thoroughly tamped in layers not thicker than 4 inches and shall completely fill the post hole up to the ground surface. Concrete backfill around posts shall be rodded into place in layers not thicker than 12 inches and shall completely fill the post hole up to the ground surface. Backfill, either earth or concrete, shall be crowned up around posts at the ground surface.

No stress shall be applied to posts set in concrete until at least 24 hours after the concrete has set.

4. CORNER ASSEMBLY

Unless otherwise specified, corner assemblies shall be installed at all points where the fence alignment changes 15 degrees or more.

5. END PANELS

End panels shall be built at gates and fence ends.

6. PULL POST ASSEMBLY

Pull post assemblies shall be installed at the following locations:

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- a. In straight fence sections, at intervals of no more than 660 feet.
- b. At any point where the vertical angle described by two adjacent reaches of wire is upward and exceeds 10 degrees (except as provided in Section 9 of this specification).
- c. At the beginning and end of each curve.

7. ATTACHING FENCING TO POSTS

The fencing shall be stretched and attached to posts as follows:

- a. The fencing shall be placed on the side of the post opposite the area being protected, except on curves.
- b. The fencing shall be placed on the outside of curves.
- c. The fencing shall be fastened to each end post, corner post and pull post by wrapping each horizontal strand around the post and tying it back on itself with not less than three tightly wound wraps.
- d. The fencing shall be fastened to wooden line posts by means of staples. Woven wire fencing shall be attached at alternate horizontal strands. Each strand of barbed wire shall be attached to each post. Staples shall be driven diagonally with the grain of the wood and at a slight downward angle and shall not be driven so tightly as to bind the wire against the post.
- e. The fencing shall be fastened to steel or concrete line posts with either two turns of 14 gage galvanized steel or iron wire or the post manufacturer's special wire clips.
- f. Wire shall be spliced by means of a Western Union splice or by suitable splice sleeves applied with a tool designed for the purpose. The Western Union splice shall have not less than 8 wraps of each end about the other. All wraps shall be tightly wound and closely spaced. Splices made with splice sleeves shall have a tensile strength not less than 80 percent of the strength of the wire.

8. STAYS

Stays shall be attached to the fencing in a manner to insure maintenance of the proper spacing of the fence wire strands.

9. CROSSINGS AT DEPRESSIONS AND WATERCOURSES

Where fencing is installed across small depressions or watercourses, either of the following methods of installation shall be used:

- a. If the fence wire is installed parallel to the ground surface, the line posts subject to upward pull shall be anchored by means of extra embedment or by special anchors as detailed on the drawings.
- b. If the wire fence is installed with the top wire straight and parallel to the ground surface on either side of the depression, extra length posts shall be used to allow normal post embedment. Unless otherwise specified, excess space between the bottom of the fence and the ground shall be closed with extra strands of barbed wire.

10. MEASUREMENT AND PAYMENT

(Method 1) The length of each type and kind of fence will be measured to the nearest foot along the profile of the fence, including gate openings. Payment for each type and kind of fence will be made at the contract unit price for that type and kind of fence. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the performance of the work including fabricating and installing gates.

(Method 2) The length of each type and kind of fence will be measured to the nearest foot along the profile of the fence, excluding gate openings. Payment for each type and kind of fence will be made at the contract unit price for that type and kind of fence. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the work, except fabricating and installing gates. Payment for each type and size of gate will be made at the contract price each for fabricating and installing that type and size of gate.

(Use with Either Method) Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 11 of this specification.

11. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 23, Barbed Wire Fence

- (1) This item shall consist of furnishing and installing the barbed wire fence including all concrete anchors, gates and appurtenances around the dam as shown on sheets 2A, 13 and 23 of the drawings and staked in the field.
- (2) The barbed wire shall be Type I, with two (2) strands of 12 1/2 gage line wires with 14-gage barbs spaced on approximately five (5) inch centers in accordance with Material Specification 591 and Federal Specification RR-F-221/1.
- (3) Gates, corner, pull and end post assemblies shall be as shown on sheet 23 of the drawings. Line posts shall be Type 1, Style 1, painted in accordance with Material Specification 591 and Federal Specification RR-F-221/3.
- (4) The concrete for post anchors shall be Class 4000X.
- (5) Measurement and payment will be by Method 1. Such payment shall include compensation for Class 4000X concrete post anchors.

11. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 21, Barbed Wire Fence

- (1) This item shall consist of furnishing and installing the barbed wire fence including all concrete anchors, gates and appurtenances around the dam as shown on sheets 2A and 14 of the drawings and staked in the field.
- (2) The barbed wire shall be Type I, with two (2) strands of 12-1/2 gage line wires with 14-gage barbs spaced on approximately five (5) inch centers in accordance with Material Specification 591 and Federal Specification RR-F-221/1.
- (3) Gates, corner and end post assemblies shall be as shown on sheet 14 of the drawings. Line posts shall be Type 1, Style 1, painted in accordance with Material Specification 591 and Federal Specification RR-F-221/3.
- (4) The concrete for post anchors shall be Class 4000X.
- (5) Measurement and payment will be by Method 1. Such payment shall include compensation for Class 4000X concrete post anchors.

## CONSTRUCTION SPECIFICATION

### 400. SEEDING

#### 1. SCOPE

The work shall consist of furnishing and placing the seed and mulch on the designated areas of the work site.

#### 2. MATERIALS

Seed The seed shall consist of the following mixture of annuals and perennials.

	<u>Lbs./Ac.</u>	<u>%</u>
Filaree ( <i>Erodium cicutarium</i> )	4.5	17.3
Indian wheat ( <i>Plantago insularis</i> )	0.3	1.2
Purple heliotrope ( <i>Phacelia tenacifolia</i> )	1.2	4.6
Annual brome ( <i>Bromus rubens</i> )	1.0	4.0
Big galleta ( <i>Hilaria rigida</i> )	11.7	45.0
Desert needlegrass ( <i>Stipa speciosa</i> )	1.4	5.4
Sand dropseed ( <i>Sporobolus cryptandrus</i> )	0.2	0.8
Four-wing saltbush ( <i>Atriplex canescens</i> )	3.0	11.5
Catclaw acacia ( <i>Acacia greggii</i> )	1.4	5.4
Bush muhly ( <i>Muhlenbergia porteri</i> ) *	0.3	1.2
Plains bristlegrass ( <i>Setaria macrostachya</i> )	0.5	1.9
Creosote bush ( <i>Larrea divaricata</i> )	0.5	1.9

\*If Bush muhly is not available, use Arizona cottontop (*Trichachne californica*) or Black grama (*Bouteloua eriopoda*). The percentages given are by weight on a pure live seed (PLS) basis conforming to prohibited and restricted noxious weeds listed on page 10, Arizona State Seed Law.

#### Fertilizer

Fertilizer shall be commercial grade fertilizer designated as ammonium sulfate (21% elemental nitrogen) or its equivalent. Where fertilizer is required, rate of application shall be as stated in Section 3.

#### Mulch

Mulch materials shall consist of any fine-stemmed perennial native hay such as alkali sacaton, grama grasses, etc. The hay shall be chopped or broken to maximum lengths of ten (10) inches.

#### 3. SITE PREPARATION

(Method 1) The area to be seeded shall be chiseled to a minimum depth of three (3) inches. The fertilizer (Ammonium sulfate or its equivalent) shall be broadcast uniformly at the rate of 80 lbs. per acre after the chiseling operation.

(Method 2) The area to be seeded shall be chiseled to a minimum depth of five (5) inches. Large soil clods, stones or foreign material brought to the surface by chiseling and which would interfere with the operation of the seeding equipment shall be raked, removed, and disposed of at areas designated by the Engineer.

4. SEED APPLICATION

Seeding operations shall be performed immediately following the completion of construction.

(Method 1) Immediately after construction, the areas shall be seeded by broadcast method at a rate of twenty-six (26) pounds of Pure Live Seed (PLS) per acre.

(Method 2) Immediately following the site preparation, the areas shall be seeded by the drill method to a minimum depth of one-quarter (1/4) inch and a maximum depth of one-half (1/2) inch.

5. MULCH APPLICATION

(Method 1) Mulching shall not be required.

(Method 2) Mulch shall be spread evenly at a rate of two (2) tons per acre. The mulch shall be tuckered into the soil to a minimum depth of two and one-half (2 1/2) inches with a mulch-anchoring disk or comparable type of equipment.

6. MEASUREMENT AND PAYMENT

The surface areas seeded will be measured to the nearest 0.1 acre. Payment for seeding will be made at the contract unit price established in the bid schedule and shall constitute full compensation for all labor, materials, including fertilizer, seed, equipment, and incidentals necessary to the completion of the work.

Compensation for any items of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 7 of this specification.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 24, Seeding

- (1) This item shall consist of furnishing and placing fertilizer and seed on the following areas within the limits shown on the drawings and staked in the field:
  - (a) The upstream and downstream slopes of the dam.
  - (b) Borrow Areas No. I, I-A and II.
- (2) In Section 3, Site Preparation, Method 1 shall apply.
- (3) In Section 4, Seed Application, Method 1 shall apply.
- (4) In Section 5, Mulch Application, Method 1 shall apply. In addition, after seeding the area seeded shall be dragged once with a spike tooth harrow.
- (5) Mesquite seed shall be inoculated and scarified. Two (2) pounds of mesquite seed, one-half (1/2) pound of desert broom, and one-half (1/2) pound of desert willow seed shall also be seeded on borrow areas I, I-A and II, but not on the slopes or the top of the dam.
- (6) Measurement and payment will be in accordance with Section 6.

CONSTRUCTION SPECIFICATION

400. SEEDING

1. SCOPE

The work shall consist of furnishing and placing the seed and mulch on the designated areas of the work site.

2. MATERIALS

Seed The seed shall consist of the following mixture of annuals and perennials.

	<u>Lbs./Ac.</u>	<u>%</u>
Filaree ( <i>Erodium cicutarium</i> )	4.5	17.3
Indian wheat ( <i>Plantago insularis</i> )	0.3	1.2
Purple heliotrope ( <i>Phacelia tenacifolia</i> )	1.2	4.6
Annual brome ( <i>Bromus rubens</i> )	1.0	4.0
Big galleta ( <i>Hilaria rigida</i> )	11.7	45.0
Desert needlegrass ( <i>Stipa speciosa</i> )	1.4	5.4
Sand dropseed ( <i>Sporobolus cryptandrus</i> )	0.2	0.8
Four-wing saltbush ( <i>Atriplex canescens</i> )	3.0	11.5
Catclaw acacia ( <i>Acacia greggii</i> )	1.4	5.4
Bush muhly ( <i>Muhlenbergia porteri</i> ) *	0.3	1.2
Plains bristlegrass ( <i>Setaria macrostachya</i> )	0.5	1.9
Creosote bush ( <i>Larrea divaricata</i> )	0.5	1.9

\*If Bush muhly is not available, use Arizona cottontop (*Trichachne californica*) or Black grama (*Bouteloua eriopoda*). The percentages given are by weight on a pure live seed (PLS) basis conforming to prohibited and restricted noxious weeds listed on page 10, Arizona State Seed Law.

Fertilizer

Fertilizer shall be commercial grade fertilizer designated as ammonium sulfate (21% elemental nitrogen) or its equivalent. Where fertilizer is required, rate of application shall be as stated in Section 3.

Mulch

Mulch materials shall consist of any fine-stemmed perennial native hay such as alkali sacaton, grama grasses, etc. The hay shall be chopped or broken to maximum lengths of ten (10) inches.

3. SITE PREPARATION

(Method 1) The area to be seeded shall be chiseled to a minimum depth of three (3) inches. The fertilizer (Ammonium sulfate or its equivalent) shall be broadcast uniformly at the rate of 80 lbs. per acre after the chiseling operation.

(Method 2) The area to be seeded shall be chiseled to a minimum depth of five (5) inches. Large soil clods, stones or foreign material brought to the surface by chiseling and which would interfere with the operation of the seeding equipment shall be raked, removed, and disposed of at areas designated by the Engineer.

4. SEED APPLICATION

Seeding operations shall be performed immediately following the completion of construction.

(Method 1) Immediately after construction, the areas shall be seeded by broadcast method at a rate of twenty-six (26) pounds of Pure Live Seed (PLS) per acre.

(Method 2) Immediately following the site preparation, the areas shall be seeded by the drill method to a minimum depth of one-quarter ( $1/4$ ) inch and a maximum depth of one-half ( $1/2$ ) inch.

5. MULCH APPLICATION

(Method 1) Mulching shall not be required.

(Method 2) Mulch shall be spread evenly at a rate of two (2) tons per acre. The mulch shall be tuckered into the soil to a minimum depth of two and one-half ( $2\ 1/2$ ) inches with a mulch-anchoring disk or comparable type of equipment.

6. MEASUREMENT AND PAYMENT

The surface areas seeded will be measured to the nearest 0.1 acre. Payment for seeding will be made at the contract unit price established in the bid schedule and shall constitute full compensation for all labor, materials, including fertilizer, seed, equipment, and incidentals necessary to the completion of the work.

Compensation for any items of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 7 of this specification.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 22, Seeding

- (1) This item shall consist of furnishing and placing fertilizer and seed on the following areas within the limits shown on the drawings and staked in the field:
  - (a) The upstream and downstream slopes of the dam.
  - (b) Borrow Areas No. 1 and 2.
- (2) In Section 3, Site Preparation, Method 1 shall apply.
- (3) In Section 4, Seed Application, Method 1 shall apply.
- (4) In Section 5, Mulch Application, Method 1 shall apply. In addition, after seeding, the area seeded shall be dragged once with a spike tooth harrow.
- (5) Mesquite seed shall be inoculated and scarified. Four (4) pounds of mesquite seed, one-half (1/2) pound of desert broom, and one-half (1/2) pound of desert willow seed shall also be seeded on borrow areas 1 and 2, but not on the slopes or the top of the dam.
- (6) Measurement and payment will be in accordance with Section 6.

CONSTRUCTION SPECIFICATION

401. PLANT SALVAGE AND TRANSPLANTING

1. SCOPE

The work shall consist of salvaging, storage and transplanting cactus and other native plants at designated areas.

2. MATERIALS

Plants to be salvaged and transplanted are as follows:

Cereus giganteus	-	Saguaro cactus	10 each
Echinocereus SPP	-	Hedgehog cactus	34 each
Ferocactus	-	Barrel cactus	24 each
Fouquieria splendens	-	Ocotillo	12 each
Opuntia SPP	-	Prickly pear cactus, Cholla cactus	20 each

Plants to be salvaged will be marked with a white paint spot on the north side.

3. PLANT REMOVAL

Plant removal shall consist of hand shovel or backhoe excavation. Care shall be taken to remove as much root as possible with the plant. Removal shall be done in a manner to prevent scarring or bruising of the plant.

As soon as each plant is removed, all soil remaining on the roots shall be removed. Roots and the plant base shall be carefully inspected for evidence of borers, rot, nematodes and broken or bruised roots. If, in the opinion of the Engineer, a plant cannot be treated and salvaged, it shall be discarded and an alternate plant selected. Ocotillo roots shall be wrapped in burlap and kept wet from the time of removal to time of storage and planting.

All broken or bruised roots on cactus shall be cut off immediately above the break or bruise with a clean, sharp knife or pruner and the cuts liberally dusted with agricultural dusting sulphur.

The tap root growing directly beneath the column of saguaros shall be 18 inches minimum length after the plant is removed. An adequately cushioned support cradle is to be placed against the plant to prevent scarring or scraping during handling as shown on sheet 16 of the drawings.

4. STORING

Plants shall be stored by temporarily planting within a fenced area. They shall be planted in a trench or individual pits, in an upright position with

the white paint spot to the north, and in soil similar in composition to that from which they were removed. Watering shall be according to Table I on sheet 16 of the drawings. Drainage shall be provided to prevent any standing water around the plants (except ocotillo).

The planting area shall be as shown on the drawings or as staked in the field. It shall be located to provide shade during afternoon hours. It shall be temporarily fenced with a six-foot high chain link fence, barb wire top, and lockable chain link gate.

Support cradles shall be removed from saguaro cactus immediately after planting and shall not be replaced during the storage period.

#### 5. PLANTING

Plants shall be placed at locations staked in the field. Care shall be taken to avoid damage (including root breakage) to the plants during removal from storage, transporting, and planting. Saguaros shall be cradled for handling as shown on sheet 16 of the drawings. All plants shall be placed in individual pits in a vertical position, white paint spot to the north, and provided with basins and watered, if applicable, according to Table 1 as shown on sheet 16 of the drawings. If medium or heavy-textured soils are found in the pits, the removed soils shall be blended with sand, pea gravel or decomposed granite in sufficient quantity to insure good drainage. Support for saguaros and large barrel cactus shall be provided. Individual supports shall be placed for each two and one-half foot increment of height for saguaros. They shall be planted a maximum of one foot lower than former growing depth. Barrel cactus support shall be as shown on sheet 16 of the drawings. Ocotillo shall be planted to former growing depth or slightly deeper and stones shall be placed over the roots (no rock to root contact) at random in the backfill as shown on sheet 16 of the drawings. All other plants shall be planted at original growing depth. Mounds of earth shall be placed at the base of barrel, prickly pear and cholla to provide drainage and support.

#### 6. MEASUREMENT AND PAYMENT

Transplanted plants will be counted after completion of the work. Payment will be made at the contract unit price established in the bid schedule and shall constitute full compensation for all labor, materials, equipment and incidentals necessary to the completion of the work, including water. No payment will be made for any plants damaged during removal, transplanting, storing, or planting operations to the extent it would not be expected to live, as determined by the Engineer.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 23, Plant Salvaging and Transplanting

- (1) This item shall consist of salvaging, storing and transplanting ten (10) saguaro, twenty-four (24) barrel cactus, thirty-four (34) hedgehog cactus, twenty (20) prickly pear cactus and/or cholla cactus and twelve (12) ocotillo on the Sunnycove Reservoir, dam and Borrow Area 2 as marked in the field.
- (2) The Contractor shall provide a plan and time schedule for removal and transplanting to be approved by the Engineer. Notice shall be provided the Engineer one week in advance of removal and transplanting.
- (3) Measurement and payment will be made in accordance with Section 6.

CONSTRUCTION SPECIFICATION

402. PAVEMENT REPLACEMENT

1. SCOPE

The work shall consist of replacement of existing road pavement after the installation of the permanent works.

2. APPLICABLE STANDARD SPECIFICATIONS

All the work specified shall comply with the requirements of the following reference specifications except as modified.

City of Phoenix Standard Specifications  
Maricopa Association of Government  
Uniform Standard Specifications for Government Work  
Division of Engineering  
Standard Specifications 501, 553, 558, and 600

3. GENERAL

Type and time of construction required at roads subject to interference by the contract work shall be determined by those authorities responsible for maintenance of such roads. The authority within the project limits is:

Town of Wickenburg  
Public Works Department  
P.O. Box 1269  
Wickenburg, Arizona 85358  
Coney Orosco, Public Works Director 684-5451

It shall be the responsibility of the Contractor to determine the nature and extent of all such requirements.

4. EARTHWORK

Base material shall be compacted to the grading plane of the existing road base or to the grading plane of the road base as shown on the drawings, whichever depth is greater. Embankment for shoulders and other untraveled portions of the roadway shall be compacted to the lines and grades as shown on the drawings or as directed by the Engineer.

5. AGGREGATE BASE COURSE

Aggregate base course shall be the same material as pipe backfill, Class I in Construction Specification 23. Compensation for aggregate base course shall be included in payment for Bid Item 4, Pipe Backfill, Class I.

6. ROAD SURFACING

The road surfacing shall be asphalt concrete.

7. MEASUREMENT AND PAYMENT

For items of work for which specific unit prices are established in the contract, the dimensions of the surface of the asphaltic concrete will be measured to the neat lines shown on the drawing and the surface area will be computed to the nearest square yard. Payment will be made at the contract unit price for pavement replacement. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the work.

Compensation for any item of work described in the contract, but not listed in the bid schedule, will be included in the payment for the item of work to which it is made subsidiary.

8. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 19, Pavement Replacement

- (1) This item shall consist of furnishing and placing all asphalt concrete required for replacement of existing pavement on Sunset Pipeline between Station 53+03± and Station 62+30± as shown on the drawings and staked in the field.
- (2) Measurement and payment will be made in accordance with Section 7.

CONSTRUCTION SPECIFICATION

403. UTILITY LINE CROSSINGS

1. SCOPE

The work shall consist of supplying all shoring, bracing or other materials for supporting, protecting and making the utility line crossings in conjunction with installation of other portions of the permanent works.

2. APPLICABLE STANDARD SPECIFICATIONS

All the work specified shall comply with the requirements of the following referenced specifications except as modified:

City of Phoenix Standard Specifications,  
Maricopa Association of Government Uniform  
Standard Specifications for Government Work

3. GENERAL

Type and time of notification and construction required at utility crossings subject to interference by the contract work shall be determined by those authorities responsible for maintenance of such utilities. The authority within the project limits are:

Town of Wickenburg = Water and Sewer Lines  
Public Works Department  
P.O. Box 1269  
Wickenburg, Arizona 85358  
Coney Orosco, Public Works Director, 684-5451

Arizona Public Service = Gas and Electric Lines  
Arizona Public Service  
P.O. Box 158  
Goodyear, Arizona 85338  
Angelo Ossanna, 932-2300

Mountain Bell Telephone Company = Telephone Lines  
Mountain Bell Telephone Company  
Wickenburg, Arizona 85358  
Roger Kirschman, 684-5476

It shall be the responsibility of the Contractor to determine the nature and extent of such requirements as necessary to complete the work.

4. EXCAVATION

All excavation performed within the rights-of-way of the utilities shall be made in accordance with and paid for under Construction Specification 21, Excavation.

5. EARTH FILL

All earth fill required to restore the utility crossings shall be made in accordance with and paid for under Construction Specification 23, Earth Fill.

6. MEASUREMENT AND PAYMENT

The number of each utility crossing will be counted. Payment for furnishing all materials for supporting the utilities in place or replacing as required by the utility companies shall be made at the contract unit price for that type of crossing. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to completion of the work.

Compensation for any item of work described in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and items to which they are made subsidiary are identified in Section 7 of this specification.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 20, Utility Crossings

(1) This item shall consist of furnishing all labor, materials and equipment except excavation and backfill required to make the utility crossings for the Sunset and Sunnycove Pipelines as follows:

- (a) Water lines - 8 each
- (b) Gas Lines - 11 each
- (c) Sewer Lines - 9 each

(2) Measurement and payment will be made in accordance with Section 6.

## MATERIAL SPECIFICATION

### 521. AGGREGATES FOR DRAIN FILL AND FILTERS

#### 1. SCOPE

This specification covers the quality of mineral aggregates for the construction of drain fill and filters.

#### 2. QUALITY

Drain fill and filter aggregates shall be sand, gravel or crushed stone or mixtures thereof. They shall be composed of clean, hard, durable mineral particles free from organic matter, clay balls, soft particles or other substances that would interfere with their free-draining properties. Not more than 15 percent, by weight, shall be flat, elongated particles.

Aggregates of crushed limestone shall be thoroughly washed and screened. Coarse aggregates containing crushed limestone shall have not more than 3 percent, by weight, of particles finer than the No. 4 sieve. Crushed limestone shall not be used for fine aggregates except in combination with other materials such that not more than 5 percent of the portion finer than the No. 4 sieve shall be crushed limestone.

Aggregates shall be tested for soundness according to ASTM Method C 88, and shall have a weighted average loss in five cycles of not more than 12 percent when sodium sulfate is used or 18 percent when magnesium sulfate is used.

#### 3. GRADING

Drain fill and filter aggregates shall conform to the specified grading limits after being placed in the work, and after being compacted if compaction is specified. Grading shall be determined by ASTM Method C 136, but the percentage of material finer than a No. 200 sieve shall be not more than 3 percent when determined by ASTM Method C 117.

#### 4. STORING AND HANDLING

Drain fill and filter aggregates shall be stored and handled by methods that prevent segregation of particle sizes or contamination by mixing with other materials.

MATERIAL SPECIFICATION

522. AGGREGATE FOR PORTLAND CEMENT CONCRETE

1. SCOPE

This specification covers the quality of fine aggregate and coarse aggregate for use in the manufacture of portland cement concrete.

2. QUALITY

Aggregate shall conform to the requirements of ASTM Specification C-33 for the specified sizes. Aggregates that fail to meet any requirement may be accepted only when: (1) the specified alternate conditions of acceptance can be proved prior to the use of the aggregates on the job and within a period of time such that no work under the contract will be delayed by the requirements of such proof; or, (2) the specification for concrete expressly contains a provision of special mix requirements to compensate for the effects of the deficiencies.

3. REACTIVITY WITH ALKALIES

The potential reactivity of aggregates with the alkalis in cement shall be evaluated by petrographic examination and, where applicable, the chemical method of test, ASTM Designation C 289, or by the results of previous tests or service records of concrete made from similar aggregates from the same source. The standards for evaluating potential reactivity shall be as described in ASTM Specification C 33, Appendix A1.

Aggregates indicated by any of the above to be potentially reactive shall not be used, except under one of the following conditions:

- a. Applicable test results of mortar bar tests, made according to ASTM Method C 227, are available which indicate an expansion of less than 0.10 percent at six months in mortar bars made with cement containing not less than 0.8 percent alkalis expressed as sodium oxide; or
- b. Concrete made from similar aggregates from the same source has been demonstrated to be sound after 3 years or more of service under conditions of exposure to moisture and weather similar to those anticipated for the concrete under these specifications.

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Aggregates indicated to be potentially reactive, but within acceptable limits as determined by mortar bar test results or service records, shall be used only with "low alkali" cement, containing less than 0.60 percent alkalis expressed as sodium oxide.

4. STORING AND HANDLING

Aggregate of each class and size shall be stored and handled by methods that prevent segregation of particle sizes or contamination by intermixing with other materials.

## MATERIAL SPECIFICATION

### 523. ROCK FOR RIPRAP

#### 1. SCOPE

This specification covers the quality of rock to be used in the construction of rock riprap.

#### 2. QUALITY

Individual rock fragments shall be dense, sound and free from cracks, seams and other defects conducive to accelerated weathering. The rock fragments shall be angular to subrounded in shape. The least dimension of an individual rock fragment shall be not less than one-third the greatest dimension of the fragment.

Except as provided below, the rock shall have the following properties:

- a. Bulk specific gravity (saturated surface-dry basis) not less than 2.5.
- b. Absorption not more than 2 percent.
- c. Soundness: Weight loss in 5 cycles not more than 10 percent when sodium sulfate is used or 15 percent when magnesium sulfate is used.

The bulk specific gravity and absorption shall be determined by ASTM Method C 127. The test for soundness shall be performed by ASTM Method C 88 for coarse aggregate modified as follows:

The test sample shall not be separated into fractions. It shall consist of  $5000 \pm 300$  grams of rock fragments, reasonably uniform in size and shape and weighing approximately 100 grams each, obtained by breaking the rock and selecting fragments of the required size.

After the sample has been dried, following completion of the final test cycle and washing to remove the sodium sulfate or magnesium sulfate, the loss of weight shall be determined by subtracting from the original weight of the sample the final weight of all fragments which have not broken into three or more pieces.

The report shall show the percentage loss of weight and the results of the qualitative examination.

Rock that fails to meet the requirements stated in a, b, and c above, may be accepted only if similar rock from the same source has been demonstrated to be sound after 5 years or more of service under conditions of weather, wetting and drying, and erosive forces similar to those anticipated for the rock to be installed under this specification..

3. GRADING

The rock shall conform to the specified grading limits after it has been placed in the riprap.

## MATERIAL SPECIFICATION

### 531. PORTLAND CEMENT

#### 1. SCOPE

This specification covers the quality of portland cements.

#### 2. QUALITY

Portland cement shall conform to the requirements of ASTM Specification C 150 for the specified types of cement, except that, when Type I portland cement is specified, Type IS portland blast-furnace slag cement or Type IP portland-pozzolan cement conforming to the requirements of ASTM Specification C 595 may be used unless prohibited in the specifications.

If air-entraining cement is to be used, the Contractor shall furnish the manufacturer's written statement giving the source, amount and brand name of the air-entraining addition.

#### 3. STORAGE AT THE CONSTRUCTION SITE

Cement shall be stored in such a manner as to be protected from weather, dampness or other destructive agencies. Cement that is partially hydrated or otherwise damaged will be rejected.

MATERIAL SPECIFICATION

532. AIR-ENTRAINING ADMIXTURES  
(FOR CONCRETE)

1. SCOPE

This specification covers the quality of air-entraining admixtures for concrete.

2. QUALITY

Air-entraining admixtures shall conform to the requirements of ASTM Specification C 260, except that the relative durability factor in the freezing and thawing test shall be not less than 95.

MATERIAL SPECIFICATION

534. CURING COMPOUND (FOR CONCRETE)

1. SCOPE

This specification covers the quality of liquid membrane-forming compounds suitable for spraying on concrete surfaces to retard the loss of water during the curing process.

2. QUALITY

The curing compound shall meet the requirements of ASTM Specification C 309.

Unless otherwise specified the compound shall be Type 2.

3. DELIVERY AND STORAGE

All curing compound shall be delivered to the site of the work in the original container bearing the name of the manufacturer and the brand name. The compound shall be stored in a manner to prevent damage to the containers and to protect water-emulsion types from freezing.

MATERIAL SPECIFICATION

535. PREFORMED EXPANSION JOINT FILLER

1. SCOPE

This specification covers the quality of preformed expansion joint fillers for concrete.

2. QUALITY

Preformed expansion joint filler shall conform to the requirements of ASTM Specification D 1752, Type I, Type II or Type III, unless bituminous type is specified. Bituminous type preformed expansion joint filler shall conform to the requirements of ASTM Specification D 994.

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## MATERIAL SPECIFICATION

### 536. SEALING COMPOUND FOR JOINTS IN CONCRETE AND CONCRETE PIPE

#### 1. SCOPE

This specification covers the quality of sealing compound for filling joints in concrete pipe and concrete structures.

#### 2. TYPE

The compound shall be a cold-application mastic, single component or multiple component type.

The single component type shall be a ready-mixed nondrying compound furnished in troweling consistency or in preformed rope or strip form.

The multiple component type shall be composed of two or more substances that are to be mixed prior to application.

#### 3. QUALITY

Sealing compound shall conform to the requirements of one of the following specifications:

ASTM Specification D 1850; Concrete Joint Sealer, Cold-Application Type. Penetration, determined as specified in ASTM D 1850, shall be not greater than 120.

Federal Specification SS-S-00210; Sealing Compound, Preformed Plastic, for Expansion Joints and Pipe Joints.

Federal Specification TT-S-227; Sealing Compound; Rubber Base, Two Component (For Calking, Sealing and Glazing in Building Construction), Type II.

#### 4. COMPOSITION AND PROPERTIES

The compound, if used for pipe having rubber gaskets, shall have a composition such that it will not cause deterioration of the rubber gaskets.

The compound shall be capable of being applied at a temperature of 70°F and shall be of such nature that it will adhere to dry, dust free concrete when applied either directly or over a suitable primer. After curing it shall be a resilient, adhesive material that is capable of filling joints to prevent the entry of concrete or earth during the bedding, cradling or backfilling operations.

(536-2)

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## MATERIAL SPECIFICATION

### 537. NON-METALLIC WATERSTOPS

#### 1. SCOPE

This specification covers non-metallic waterstops for use in joints of concrete structures.

#### 2. CLASSIFICATION

- a. Classes. Non-metallic waterstops shall be of the following classes, as specified:

Class I shall be made of either natural or synthetic rubber.

Class II shall be made of vinyl chloride polymer or copolymer.

- b. Types. Non-metallic waterstops may be either split or solid and shall conform to the following types, as specified (see Figure 1):

Type A shall have ribbed anchor flanges and a smooth web. Flanges may be of uniform thickness or may have either a converging or a diverging taper toward the edges.

Type B shall have ribbed anchor flanges and a smooth web containing a hollow tubular center bulb having: (1) a wall thickness equal to at least one-half the web thickness and (2) the inside diameter (D) specified in the contract. Flanges may be of uniform thickness or may have either a converging or a diverging taper toward the edges.

Type C shall have a single, circular, bulb-type anchor flange at each edge and a smooth web.

Type D shall have a single, circular, bulb-type anchor flange at each edge and a smooth web containing a hollow tubular center bulb having: (1) a wall thickness equal to at least one-half the thickness of the web and (2) the inside diameter (D) specified in the contract.

Type E shall have ribbed anchor flanges and a web molded or extruded in the form of a round or U-shaped bulb of the dimensions specified in the contract. The web bulb shall be connected at the open end of the "U" by a thin membrane (having a thickness of not less than 1/64-inch or more than 1/5 the web thickness) designed to: (1) prevent infiltration of wet concrete into the bulb and (2) tear when expansion of the joint occurs. Flanges may be of uniform thickness or may have either a converging or a diverging taper toward the edges. Auxilliary positioning or nailing flanges may be provided so long as they do not interfere with the functioning of the web bulb.

Type F shall have ribbed anchor flanges with at least two extra heavy ribs (designed to resist displacement of the waterstop during placement of concrete) on each flange and a smooth web having a positioning or nailing flange attached at the center.

Type G shall be of special design conforming to the details shown on the drawings.

- c. Sizes. Waterstops of Types A through F shall be of the sizes listed herein, as specified (see Table 1). Type G waterstops shall have the dimensions shown on the drawings.

### 3. PHYSICAL REQUIREMENTS

The extruded or molded materials shall exhibit the properties specified herein when tested by the methods specified in Section 4 of this specification.

#### a. Class I Waterstops

- (1) The hardness (Shore A durometer) shall be not less than 60.
- (2) The specific gravity shall be not more than 1.2.
- (3) The tensile strength shall be not less than 2500 pounds per square inch.
- (4) The ultimate elongation shall be not less than 450 percent.

- (5) The compression set shall be not more than 30 percent.
- (6) The water absorption (by weight) shall be not more than 5 percent.
- (7) The decrease in tensile strength and ultimate elongation after aging shall be not more than 20 percent.
- (8) There shall be no sign of failure due to brittleness at a temperature of minus 35°F.

b. Class II Waterstops

- (1) The hardness (Shore A durometer) shall be not less than 60.
- (2) The specific gravity shall be not more than 1.4.
- (3) The tensile strength shall be not less than 1400 pounds per square inch.
- (4) The ultimate elongation of the web shall be not less than 280 percent and that of the flanges shall be not less than 200 percent.
- (5) The water absorption (by weight) shall be not more than one percent.
- (6) There shall be no sign of failure due to flange brittleness at a temperature of 0°F. nor of web brittleness at a temperature of minus 35°F.
- (7) The decrease in either tensile strength or ultimate elongation after accelerated extraction shall be not greater than 15 percent.
- (8) As a result of the effects of alkalies:
  - (a) After immersion for 7 days, the sample shall exhibit no loss of weight and not more than 0.25 percent increase in weight, and the hardness (Shore A) of the treated sample shall differ from that of the untreated sample by not more than plus 5 points or minus 5 points.

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- (b) After immersion for 30 days, the sample shall exhibit no loss of weight and not more than 0.40 percent increase in weight, and the dimensions of the treated sample shall not differ from those of the untreated sample by more than one percent.

#### 4. TEST METHODS

Testing shall be done by the methods cited herein. All cited test methods are included in Federal Test Method Standard No. 601.

- a. Hardness shall be determined by Method 3021.
- b. Specific gravity shall be determined by Method 14011.
- c. Tensile strength shall be determined by Method 4111.
- d. Ultimate elongation shall be determined by Method 4121.
- e. Compression set shall be determined by Method 3311.
- f. Water absorption shall be determined by Method 6631.
- g. Tensile strength and ultimate elongation after aging shall be determined by Method 7111.
- h. Brittleness shall be determined by Method 5311.
- i. Accelerated extraction shall be accomplished by Method 6111 under the following conditions:
  - (1) Samples shall be not less than 1/16-inch nor more than 1/8-inch in thickness;
  - (2) The immersion medium shall be a solution made by dissolving 5 grams of chemically pure sodium hydroxide and 5 grams of chemically pure potassium hydroxide in one liter of distilled water;
  - (3) The samples shall be immersed in the medium for 14 days at a temperature of  $145^{\circ} \pm 5^{\circ}\text{F}$ ;
  - (4) During the immersion period, air shall be gently bubbled through the medium from a 1/4-inch glass tube at a rate of about one bubble per second;

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(5) Fresh medium shall be substituted every day;

(6) Samples need not be dipped in acetone.

j. The effects of alkalies shall be determined by Method 6251 under the following conditions:

(1) Samples shall be not more than 1/4-inch in thickness;

(2) The immersion medium shall be as described in (i), above;

(3) Fresh medium shall be substituted every 7 days.

(4) The samples shall be immersed in the medium for a period of 30 days;

(5) Samples need not be dipped in acetone.

5. CONDITION

Waterstops shall be extruded or molded in such a manner that the material is dense and homogeneous throughout and free from voids, tears, thins, indentations, or other imperfections. Unless otherwise specified, waterstops shall be symmetrical in shape and uniform in dimensions and shall be furnished in continuous strips at least 50 feet long. Factory splices shall have a tensile strength equal to at least one-half that of the unspliced section.

6. PACKAGING AND STORING

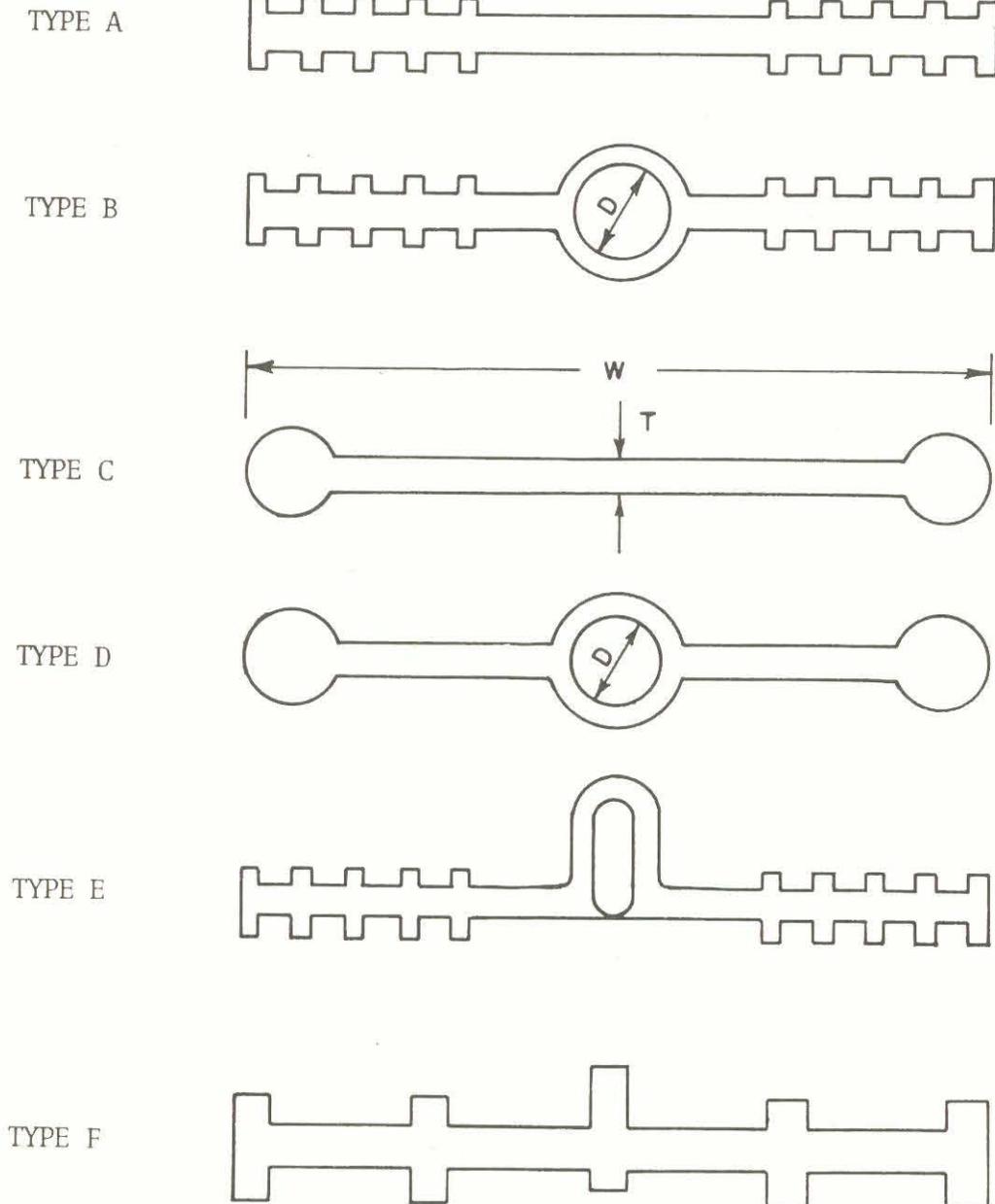
Waterstops shall be package and stored by methods that will protect them from prolonged exposure to direct sunlight or excessive heat.

TABLE 1. SIZES OF WATERSTOPS

<u>Size Designation</u>	<u>Web Thickness (T) (Inches)</u>	<u>Width (W) (Inches)</u>
1	1/16	5 1/4
2	3/32	3 3/4
3	3/32	4
4	3/32	5 1/4
5	3/32	6
6	1/8	4
7	1/8	5 1/4
8	1/8	6
9	5/32	4
10	5/32	4 1/2
11	5/32	9
12	3/16	4
13	3/16	5
14	3/16	6
15	3/16	9
16	1/4	6
17	1/4	9
18	3/8	5
19	3/8	6
20	3/8	9
21	1/2	6
22	1/2	9
23	1/2	12

FIGURE 1

TYPES OF NON-METALLIC WATERSTOPS



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(539-1)

539. STEEL REINFORCEMENT (FOR CONCRETE)

MATERIAL SPECIFICATION

- 1. SCOPE  
This specification covers the quality of steel reinforcement for reinforced concrete.
- 2. QUALITY  
All reinforcement shall be free from rust, oil, grease, paint or other deleterious matter.

Steel bars for concrete reinforcement requiring bending shall be deformed billet-steel bars conforming to ASTM Specification A 615, Grade 40 or Grade 60.

Straight steel bars shall be deformed bars conforming to one of the following specifications:

Deformed Billet-Steel Bars for Concrete Reinforcement (Grade 40 or Grade 60) - ASTM Designation A 615.

Rail-Steel Deformed Bars for Concrete Reinforcement (Grade 50 or Grade 60) - ASTM Designation A 616.

Axis-Steel Deformed Bars for Concrete Reinforcement (Grade 40 or Grade 60) - ASTM Designation A 617.

Fabricated steel bars shall conform to the requirements of ASTM Specification A 184.

Welded steel wire fabric reinforcement shall conform to the requirements of ASTM Specification A 185.

Welded deformed steel wire fabric for concrete reinforcement shall conform to the requirements of ASTM Specification A 497.

Cold-drawn steel wire reinforcement shall conform to the requirements of ASTM Specification A 82.

Deformed steel wire for concrete reinforcement shall conform to the requirements of ASTM Specification A 496.

**3. DIMENSIONS OF WELDED WIRE FABRIC**

Gages, spacing and arrangement of wires in welded steel wire fabric shall be as defined in ACI Standard 315 of the American Concrete Institute for the specified style designations.

**4. STORAGE**

Steel reinforcement stored at the site of the work shall be stored above the ground surface on platforms, skids or other supports and shall be protected from mechanical injury and corrosion.

## MATERIAL SPECIFICATION

### 541. REINFORCED CONCRETE PRESSURE PIPE

#### 1. SCOPE

This specification covers the quality of reinforced concrete pressure pipe and fittings.

#### 2. DESIGN AND FABRICATION

The pipe and fittings shall be designed to withstand the specified external load and internal pressure. The pipe, the materials used in its manufacture, and the methods of fabrication shall conform to the requirements of the following specifications applicable to the specified type of pipe.

- a. Steel Cylinder Type, Prestressed: AWWA Standard C301 for Prestressed Concrete Pressure Pipe, Steel Cylinder Type, for Water and Other Liquids.
- b. Steel Cylinder Type, Not Prestressed: AWWA Standard C300, except that Section 2.6, Steel for Cylinders, paragraph 2.6.1 shall be:

2.6.1 Steel sheets for cylinders may be in coils or cut lengths, and shall meet the requirements of (1) the "Specification for Hot-Rolled Carbon Steel Sheets and Strip, Commercial Quality" (ASTM Designation A 569), except that the maximum carbon content may be 0.25 percent and the minimum yield point shall be 27,000 psi or (2) the "Specification for Hot-Rolled Carbon Steel Sheets and Strip, Structural Quality," Grade B or C (ASTM Designation A 570).

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c. Noncylinder Type, Not Prestressed: AWWA Standard C302;

d. Low Head Pressure Pipe: ASTM Specifications C 361.

Sections 1.6 and 1.7 of AWWA Standards C300, C301 and C302 shall not apply.

### 3. STEEL REINFORCEMENT

The steel reinforcements shall conform to the requirements of the specifications cited in Section 2 for the specified type of pipe, except that elliptical reinforcing cages or other reinforcements that require special orientation of the pipe during placement will not be allowed.

### 4. JOINTS

The pipe joints shall conform to the requirements of the applicable specification for the pipe. They shall be bell-and-spigot type or double-spigot-and-sleeve type and shall have a positive groove in the spigot to contain the rubber gasket. The size and shape of the groove shall be such that it will prevent displacement of the gasket by either internal or external water pressure when the joint is in any position within the required range of movement capability. Joint sleeves, also referred to as "collars" or "coupling bands," shall conform to the requirements for bell rings in the applicable pipe specification.

The joints shall be constructed so as to permit relative movement of the adjoining pipe sections with no reduction of watertightness. The joint length and the limiting angle defining the required capability of relative movement at each joint shall be no less than specified.

Joint length refers to the permissible axial movement in the joint, and is defined as the maximum distance through which the spigot can move, relative to the bell or sleeve, from the fully engaged to the fully extended condition of the joint when the adjoining pipe sections are in parallel, concentric alignment. The joint is considered to be fully engaged when the spigot is inserted as far as it will go into the bell or sleeve, and fully extended when it is inserted the least amount that will insure full confinement of the gasket and complete watertightness. Joint length specified for double-spigot joints refers to the permissible movement in each of the spigot-to-sleeve connections, not the sum of the two.

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The limiting angle of the joint is defined as the maximum deflection angle between adjoining pipe sections the joint will permit before the outer surface of the spigot comes into direct contact with inside of the mating bell or sleeve. If both spigot-to-sleeve connections of a double-spigot joint permit angular movement, the limiting angle of the joint is the sum of the two deflection angles permitted by the two connections.

5. GASKETS

The pipe joint gaskets shall conform to the requirements of the specifications cited in Section 2 of this specification. They shall be endless rubber gaskets having circular cross section. The cross-sectional diameter of the gaskets shall conform to the pipe manufacturer's recommendation for the type and size of pipe furnished.

6. MARKING

All pipe sections and special fittings shall be marked by the manufacturer with the manufacturer's name or trademark, the date of manufacture, the nominal size, design head, design external load and the structure site for which it was designed and manufactured.

7. INSPECTION, TESTING AND CERTIFICATION

The pipe shall be inspected by methods prescribed in the specifications cited herein, except that external crushing strength tests required as a basis for certification shall be performed by the three-edge bearing method described in ASTM Methods C 497.

The three-edge bearing load shall be defined as:

- a. For pipe conforming to ASTM Specifications C 361, AWWA Standard C300 for AWWA Standard C302, the load required to produce a 0.01-inch crack one foot long; or,
- b. For pipe conforming to AWWA Standard C301, the load required to produce a 0.001-inch crack one foot long.

The material certification will include:

- a. The pipe manufacturer's certified statement of the design strength of the pipe, consisting of:
  - (1) For types of pipe for which design curve have been approved by the Soil Conservation Service,
    - (a) a copy of the appropriate design curve marked

to show the resultant concrete core stress and corresponding three-edge bearing load of the pipe furnished; and (b) a specification sheet for the pipe furnished showing all data and dimensions needed to compute the resultant concrete core stress; or

- (2) Results of typical external crushing strength tests performed on pipe of equivalent size and design and composed of equivalent materials; or
  - (3) Results of external crushing strength tests performed on a specimen (at least two feet in length) of pipe identical in design and construction to the pipe furnished.
- b. The pipe manufacturer's certified statement of results of the hydrostatic tests required by the reference specification appropriate to the type of pipe furnished.
  - c. The pipe manufacturer's certified statement of current typical test reports on steel and steel wire reinforcing and compression tests of the concrete used in the manufacture of the pipe.
  - d. Such drawings and descriptions of the pipe joint as may be necessary to show that the joint conforms to the specified requirements.

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MATERIAL SPECIFICATION

542. CONCRETE CULVERT PIPE

1. SCOPE

This specification covers the quality of nonreinforced and reinforced concrete culvert pipe.

2. NONREINFORCED PIPE

Nonreinforced concrete culvert pipe shall conform to the requirements of ASTM Specifications C 14 for the class of pipe specified.

3. REINFORCED PIPE

a. Round pipe. Round reinforced concrete culvert pipe shall conform to the requirements of ASTM Specifications C 76 for the class of pipe specified.

b. Arch pipe. Reinforced concrete arch culvert pipe shall conform to the requirements of ASTM Specifications C 506 for the class of pipe specified.

c. Elliptical pipe. Reinforced concrete elliptical culvert pipe shall conform to the requirements of ASTM Specifications C 507 for the class of pipe specified.

4. RUBBER GASKET JOINTS

When rubber gasket joints are specified, the joints and gaskets shall conform to the requirements of ASTM Specifications C 443.

## MATERIAL SPECIFICATION

### 542. CONCRETE CULVERT PIPE

#### 1. SCOPE

This specification covers the quality of nonreinforced and reinforced concrete culvert pipe.

#### 2. NONREINFORCED PIPE

Nonreinforced concrete culvert pipe shall conform to the requirements of ASTM Specifications C 14 for the class of pipe specified.

#### 3. REINFORCED PIPE

a. Round pipe. Round reinforced concrete culvert pipe shall conform to the requirements of ASTM Specifications C 76 for the class of pipe specified.

b. Arch pipe. Reinforced concrete arch culvert pipe shall conform to the requirements of ASTM Specifications C 506 for the class of pipe specified.

c. Elliptical pipe. Reinforced concrete elliptical culvert pipe shall conform to the requirements of ASTM Specifications C 507 for the class of pipe specified.

#### 4. RUBBER GASKET JOINTS

When rubber gasket joints are specified, the joints and gaskets shall conform to the requirements of ASTM Specifications C 443.

MATERIAL SPECIFICATION

545. ASBESTOS-CEMENT PIPE

1. SCOPE

This specification covers the quality of asbestos-cement pipe and fittings.

2. PRESSURE PIPE

Pressure pipe and couplings shall conform to the requirements of ASTM Specification C 296 for the specified class and type of pipe. Type I or Type II pipe shall be furnished unless otherwise specified.

Fittings other than couplings shall: (1) be cast iron or ductile iron pressure fittings compatible with the type of pipe furnished, (2) be of the all-bell, rubber-ring-connecting type with gasket retainer grooves cast or machined in the inner surfaces of the bells, and (3) otherwise conform to the requirements of AWWA Standard C110 (American National Standard A21.10). Gaskets shall conform to the requirements of ASTM Specification D 1869.

When perforated pressure pipe is specified, the number, size, location and spacing of perforations shall conform to the requirements of ASTM Specification C 508.

3. IRRIGATION PIPE

Irrigation pipe and couplings shall conform to the requirements of ASTM Specification C 296, except that lower strength will be allowed, as follows: The rated working pressure shall be not less than 75 pounds per square inch, the hydrostatic proof pressure shall be not less than 225 pounds per square inch, and the flexural proof loads and minimum crushing strengths shall be as tabulated below. Pipe and asbestos-cement fittings shall meet the chemical requirements for Type I or Type II pipe unless otherwise specified.

<u>Applied Flexural Proof Loads</u>		<u>Minimum Crushing Loads</u>	
<u>Nominal Size inches</u>	<u>Total Applied Load, lb.</u>	<u>Nominal Size inches</u>	<u>Crushing Strength per Lin. Ft., lb.</u>
4	1000	4	1900
6	2000	6	1400
8	3700	8	1650
		10	1900
		12	2200
		14	2600
		16	2750
		18	2900
		20	3100
		24	3500
		30	4100
		36	5000

4. NONPRESSURE PIPE

Nonpressure pipe and couplings shall conform to the requirements of ASTM Specification C 428 or C 644 for the specified class and type of pipe. Type I or Type II pipe shall be furnished unless otherwise specified.

Fittings other than couplings shall meet the same physical and chemical requirements as the pipe and couplings.

When perforated nonpressure pipe is specified, the number, size, location and spacing of perforations shall conform to the requirements of ASTM Specification C 508.

5. PERFORATED UNDERDRAIN PIPE

Perforated underdrain pipe, couplings and fittings shall conform to the requirements of ASTM Specification C 508, except that flexible couplings recommended by the pipe manufacturer will be allowed unless otherwise specified.

## MATERIAL SPECIFICATION

### 572. SLIDE GATES (SLUICE GATES), METAL, MODERATE DUTY

#### 1. SCOPE

This specification covers the quality of moderate duty, metal slide gates (sluice gates) for water control.

#### 2. CLASS AND TYPE OF GATE

The class of gate will be expressed as a numerical symbol composed of the seating head and unseating head which the gate must be built to withstand. The two numbers will be separated by a hyphen with the seating head listed first. For this purpose the heads shall be expressed in terms of feet of water.

The gates shall be of the specified types as defined below:

Type MMS-1 gates shall be cast iron with bronze seat facings, cast iron or galvanized structural steel guides, and galvanized steel, bronze, or stainless steel fasteners.

Type MMS-2 gates shall be cast iron with bronze seat facings, cast iron or stainless steel guides, and bronze or stainless steel fasteners. Guides and fasteners shall be stainless steel when so specified.

#### 3. QUALITY OF MATERIALS

Materials in slide gates and appurtenances shall conform to the requirements of the applicable specifications listed below for the alloy, grade, type, or class of material and the condition and finish appropriate to the structural and operational requirements:

<u>Material</u>	<u>Specification</u> (ASTM)
Cast iron	A 48, Class 30, or A 126, Class B
Structural steel shapes, plates, and bars	A 36
Carbon steel bars	A 108 or A 575
Stainless steel	A 167, A 276 or A 582, Type 302, 303, 304 or 304L
Bronze bar, rods, shapes	B 21 or B 98

<u>Material</u>	<u>Specification</u> (ASTM)
Cast bronze	B 584
Rubber for gaskets and seals	D 2000

Galvanizing (zinc coating) shall conform to the requirements of Material Specification 582.

4. FRAME (OR SEAT)

The frame shall be cast iron and of the specified type. The front face shall be machined to receive the gate guides and the rear face shall be machined as required to match the specified attaching means.

5. GATE SLIDE

The gate slide shall be cast iron, rectangular in shape and shall have horizontal and vertical stiffening ribs of sufficient section to withstand the seating and unseating heads expressed by the gate class designation, as defined in Section 2 of this specification.

Tongues or grooves shall be cast or machined on the vertical sides of the slide along its entire height to match the guide grooves or angles.

A nut pocket with reinforcing ribs shall be integrally cast on the vertical centerline and above the horizontal centerline of the slide. The pocket shall be of a shape adequate to receive a flat-backed thrust nut or stem block and shall be built to withstand the opening and closing thrust of the stem.

6. GATE GUIDES

The gate guides shall be built to withstand the total thrust of the gate slide due to water pressure and wedge action.

Grooves shall be machined in cast iron guides to receive the tongue on the gate slide throughout the entire length of the guide.

The guides shall be of such length as to retain at least one-half the height of the gate slide when the gate is fully opened.

7. WEDGES AND WEDGE SEATS (OR BLOCKS)

Pads for supporting wedges, wedge seats and wedge loops (or stirrups) shall be cast as integral parts of the slide, frame or guides.

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Wedges and wedge seats shall have smooth bearing surfaces. Wedges may be cast as integral parts of the slide. Removable wedges and wedge seats shall be fastened to the slide, frame or guides by means of suitable studs, screws, or bolts and shall be firmly locked in place after adjustment. Each interacting set of wedge and wedge seat shall be adjustable as needed to insure accurate and effective contact.

8. SEAT FACINGS

Seat facings shall be machined to a smooth finish to insure proper watertight contact. Bronze facings shall be securely attached by welding or by another approved method.

9. YOKE

When a self-contained gate is specified, the yoke shall be galvanized structural steel or cast iron and of such design as to capably withstand the loads resulting from operation of the gate. Cast iron yokes shall be provided with machined pads for connecting to the ends of the gate guides and to receive the stem thrust cap or handwheel lift.

10. GATE STEM AND LIFT (OR HOIST)

The gate stem and lift (or hoist) shall be of the specified type, size and capacity and, if hand operated, shall be capable of moving the gate slide under normal conditions, after it is unseated from its wedging device, with a pull on the handwheel or crank of not more than 25 pounds with the specified seating or unseating head of water against the gate.

Unless otherwise specified, the stem shall be carbon steel and shall be furnished in sections as necessary to permit reasonable ease in installation. Couplings shall be bolted, pinned or keyed to the stem. The stem shall be furnished with rolled or machine-cut ~~right-hand~~ 29° Acme threads of sufficient length to completely open the gate. The threads shall be smooth and of uniform lead and cross section, such that the nut can travel the full length without binding or excessive friction. The stem shall be threaded for connection to the stem block or thrust nut on the gate slide.

The lift shall be compatible with the type of stem furnished. Unless otherwise specified, the lift nut shall be cast bronze and shall be fitted with ball or roller thrust bearings designed to withstand the normal thrust developed during opening and closing

of the gate at the maximum operating heads. All gears, sprockets and pinions shall be machine-cut, with ratios and strength adequate to withstand operating loads. Sufficient grease fittings shall be provided to allow lubrication of all moving parts. An arrow and the word "open" shall be cast on the rim of the headwheel or on the lift housing to indicate the direction of opening. Unless otherwise specified, the lift for a non-rising-stem gate shall be provided with an indicator capable of showing both when the gate is fully open and when it is fully closed.

Provision shall be made to prevent stem rotation within the thrust nut at the connection with the gate slide.

Stop collars shall be provided on rising stems to prevent over-travel in opening and closing the gate.

11. STEM GUIDES

Unless otherwise specified, stem guides shall be cast iron with bronze bushed collars and adjustable in two directions.

12. WALL THIMBLE

When a wall thimble is specified it shall be cast iron and of the section, type and depth specified. The front flange shall be machined to match the gate frame and drilled and tapped to accurately receive the gate attachment studs.

Gaskets or mastic to be installed between the thimble and the gate frame shall conform to the recommendation of the gate manufacturer and shall be furnished with the thimble.

13. FASTENERS

All anchor bolts and other fasteners shall be galvanized or stainless steel or bronze, according to the type of gate specified as defined in Section 2 of this specification.

14. INSTALLATION INSTRUCTIONS

The Contractor shall supply the manufacturer's complete installation data, instructions for adjustments and drawings or templates showing the location of anchor bolts for each gate.

15. PAINTING

When specified, gates and accessories shall be painted by the designated systems.

16. CERTIFICATION

The material certification shall include the name of the manufacturer, and manufacturer's model number (for standard catalog items) or the seating and unseating heads for which the gate is designed together with such drawings and specifications as may be necessary to show that the gate conforms to the requirements of this specification.

(572-5)

SCS-WEST

3-5-75

MATERIAL SPECIFICATION

581. METAL

1. SCOPE

This specification covers the quality of steel and aluminum alloys.

2. STRUCTURAL STEEL

Structural steel shall conform to the requirements of ASTM Specification A 36.

High-strength low-alloy structural steel shall conform to ASTM Specification A 242 or A 588.

Carbon steel plates of structural quality to be bent or formed cold shall conform to ASTM Specification A 283, Grade C.

Carbon steel sheets of structural quality shall conform to ASTM Specification A 570, Grade D or A 611, Grade D.

Carbon steel strip of structural quality shall conform to ASTM Specification A 570, Grade C.

3. COMMERCIAL OR MERCHANT QUALITY STEEL

Commercial or merchant quality steel shall conform to the requirements of the applicable ASTM specifications listed below:

<u>Product</u>	<u>ASTM Specification</u>
Carbon steel bars	A 575, Grade M 1015 to Grade M 1031
Carbon steel sheets	A 569
Carbon steel strip	A 569
Zinc-coated carbon steel sheets	A 526

4. ALUMINUM ALLOY

Aluminum alloy products shall conform to the requirements of the applicable ASTM specifications listed below. Unless otherwise specified, Alloy 6061-T6 shall be used.

(581-1)

<u>Product</u>	<u>ASTM Specification</u>
Standard structural shapes	B 308
Extruded structural pipe and tube	B 429
Extruded bars, rods, shapes and tubes	B 221
Drawn seamless tubes	B 210
Rolled or cold-finished bars, rods and wire	B 211
Sheet and plate	B 209

#### 5. BOLTS

Steel bolts shall conform to the requirements of ASTM Specification A 307. If high-strength bolts are specified they shall conform to the requirements of ASTM Specification A 325.

When galvanized or zinc-coated bolts are specified, the zinc coating shall conform to the requirements of ASTM Specification A 153; except that bolts 1/2 inch or less in diameter may be coated with electrodeposited zinc or cadmium coating conforming to the requirements of ASTM Specification A 164, Type RS, or ASTM Specification A 165, Type TS, unless otherwise specified.

#### 6. RIVETS

Unless otherwise specified, steel rivets shall conform to the requirements of ASTM Specification A 502, Grade 1.

Unless otherwise specified, aluminum alloy rivets shall be Alloy 6061-T6 conforming to the requirements of ASTM Specification B 316.

#### 7. WELDING ELECTRODES

Steel welding electrodes shall conform to the requirements of American Welding Society specification AWS A5.1, "Specification for Mild Steel Covered Arc-Welding Electrodes," except that they shall be uniformly and heavily coated (not washed) and shall be of such a nature that the coating will not chip or peel while being used with the maximum amperage specified by the manufacturer.

Aluminum welding electrodes shall conform to the requirements of American Welding Society specification AWS A5.10, "Specification for Aluminum and Aluminum-Alloy Welding Rods and Bare Electrodes."

## MATERIAL SPECIFICATION

### 582. GALVANIZING

#### 1. SCOPE

This specification covers the quality of zinc coatings applied to iron and steel products.

#### 2. QUALITY

Zinc coatings shall conform to the requirements of the following specifications.

Zinc coatings on products fabricated from rolled, pressed, and forged steel shapes, plates, bars, and strip, 1/8 inch thick and heavier shall conform to ASTM Specification A 123.

Zinc coatings on assembled steel products shall conform to the requirements of ASTM Specification A 386 and shall be applied in conformance with the Recommended Practice for Providing High Quality Zinc Coatings (Hot-Dip) on Assembled Products (ASTM Designation A 385).

Zinc coatings on iron and steel hardware shall conform to the requirements of ASTM Specification A 153 except that bolts, screws and other fasteners 1/2 inch or less in diameter may be coated with electrodeposited zinc or cadmium coating conforming to the requirements of ASTM Specification A 164, Type RS, or ASTM Specification A 165, Type TS, unless otherwise specified.

## MATERIAL SPECIFICATION

### 591. FARM FIELD FENCING MATERIALS

#### 1. SCOPE

This specification covers the quality of materials used in the construction of farm field fences.

#### 2. WIRE GAGE

When the size of steel wire is designated by gage number, the diameter shall be as defined for U. S. Steel Wire Gage.

#### 3. FENCING

Barbed wire, woven wire and wire netting fencing shall conform to the requirements of Federal Specification RR-F-221 for the specified types and styles of fencing. Barbed wire and woven wire shall have zinc coating of at least 0.50 ounce per square foot of wire surface unless otherwise specified.

#### 4. STAYS, FASTENERS, AND TENSION WIRE

Stays and fasteners shall conform to the requirements of Federal Specification RR-F-221 unless otherwise specified. Tension wires shall have a tensile strength not less than 58,000 pounds per square inch. Stays, fasteners and tension wire shall have Class 3 zinc coating as specified in ASTM Specification A 641.

#### 5. WOOD FENCE POSTS AND BRACES

Wood posts shall be of black locust, red cedar, osage orange (Bois d'Arc), redwood, pressure treated pine or other wood of equal life or strength. At least half the diameter or diagonal dimension of red cedar or redwood posts shall be in heartwood. Pressure treatment shall conform to Material Specification 585. The posts shall be sound, new, free from decay, with all limbs trimmed substantially flush with the body. They shall be substantially straight throughout their length.

Wood braces shall be of material equal to or better than construction grade Douglas fir. They shall be pressure treated in conformance with Material Specification 585.

6. STEEL FENCE POSTS AND BRACES

Steel fence posts and braces shall conform to the requirements of Federal Specification RR-F-221. Posts with punched tabs for fastening the wires shall not be used.

7. CONCRETE FENCE POSTS

Concrete fence posts shall be manufactured to the specified requirements of size, shape, and strength.

8. PANEL GATES

Panel gates shall be the specified types, sizes, and quality and shall include the necessary fittings. The fittings shall consist of not less than two hinges and two latches or galvanized chains for fastening. Latches shall be of such design that a padlock may be used for locking. All fittings shall be equivalent to the gate manufacturer's standard.

9. WIRE GATES

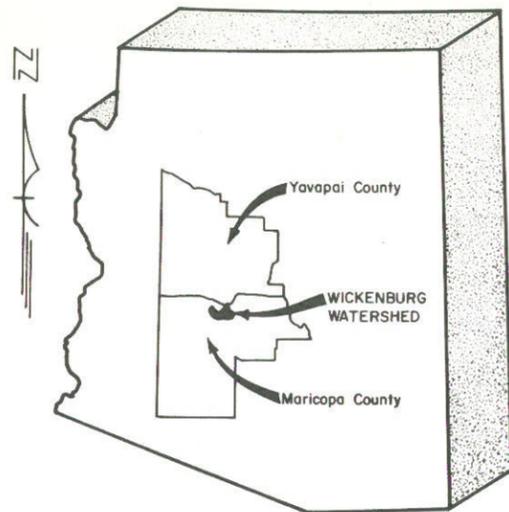
Wire gates shall be the type shown on the drawings, constructed in accordance with these specifications at the locations and to the dimensions shown on the drawings. The materials shall conform to the kinds, grades, and sizes specified for new fence, and shall include the necessary fittings and stays.

10. STAPLES

Staples used to fasten fence wire to wood posts shall be 9-gage galvanized wire with a minimum length of  $1\frac{1}{2}$  inches for soft woods and a minimum length of one inch for close-grain hardwoods.

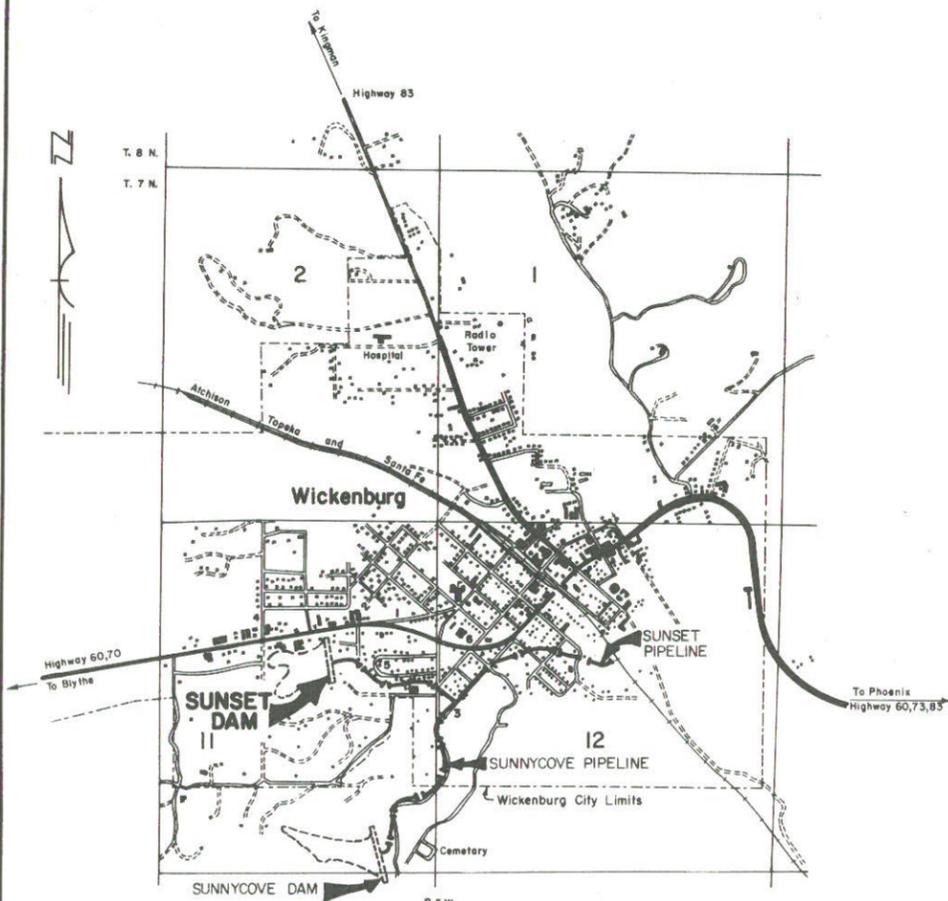
11. GALVANIZING

All iron and steel fencing materials, except as otherwise specified, shall be zinc coated by the hot dip process, except that clips, bolts, and other small hardware may be protected by electrodeposited zinc or cadmium coating.



# WICKENBURG WATERSHED PROTECTION AND FLOOD PREVENTION PROJECT MARICOPA AND YAVAPAI COUNTIES, ARIZONA PLANS FOR THE CONSTRUCTION OF **SUNSET FLOODWATER RETARDING STRUCTURE**

PREPARED FOR THE  
MARICOPA COUNTY FLOOD CONTROL DISTRICT  
TRIANGLE NATURAL RESOURCE CONSERVATION DISTRICT  
WICKENBURG NATURAL RESOURCE CONSERVATION DISTRICT  
YAVAPAI COUNTY BOARD OF SUPERVISORS  
AND  
TOWN OF WICKENBURG  
BY  
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE



- 1. Savage Street
- 2. Mohave Street
- 3. Center Street
- 4. Mariposa Drive
- 5. Ox Bow Drive
- 6. Apache Street

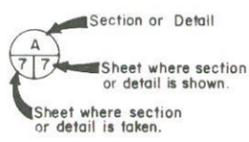
LOCATION MAPS

### INDEX OF DRAWINGS

SHT. NO.	TITLE
1.	INDEX OF DRAWINGS
2.	PLAN OF DAM AND RESERVOIR
2A.	ALIGNMENT LOCATION MAP
3.	PROFILE ON DAM AND EXCAVATION SCHEDULES
4.	PROFILE ON PRINCIPAL SPILLWAY & TYPICAL CROSS SECTION
5.	DRAIN LAYOUT DETAILS
6.	RISER LAYOUT DETAILS
7.	TRASH GUARD DETAILS
8.	RISER DETAILS
9.	RISER DETAILS
10.	RISER DETAILS
11.	GATE CONTROL DETAILS
12.	PRINCIPAL SPILLWAY CONDUIT DETAILS
13.	EMERGENCY SPILLWAY PLAN, PROFILE AND PAYLINES
14.	EMERGENCY SPILLWAY LAYOUT
15.	EMERGENCY SPILLWAY LAYOUT
16.	EMERGENCY SPILLWAY LAYOUT
17.	EMERGENCY SPILLWAY INLET DETAILS
18.	EMERGENCY SPILLWAY INLET DETAILS
19.	EMERGENCY SPILLWAY CHUTE DETAILS
20.	EMERGENCY SPILLWAY S. A. F. DETAILS
21.	EMERGENCY SPILLWAY S. A. F. DETAILS
22.	FENCING DETAILS
23.	FENCING DETAILS
24.	SIGN DETAILS
25.	SOIL LOGS

- #### GENERAL NOTES
- Elevations are in feet above mean sea level datum.
  - All stationing refers to centerline of construction and is the measured horizontal distance.
  - All cross sections are taken looking in the direction of increasing stations unless otherwise shown.
  - Soil logs on these drawings show general condition at the site and are the basis for this design. Log of foundation investigation borings and test pits are contained in the exploration data report. A complete set of all soils investigation logs and geology report is available at the project office for reference.
  - Unified soil descriptions are based on field identifications except where an asterisk is shown the classification has been based on laboratory analysis.

- #### STRUCTURAL NOTES
- All exposed concrete edges shall be chamfered one inch or rounded.
  - Spacing of reinforcement bars is measured center to center of bars. Bar cover is the clear distance between surface of bar and face of concrete, and unless otherwise shown is two inches for formed and top surfaces and three inches for surfaces against earth.
  - All bar splices not shown on these drawings shall be staggered with bars lapped a minimum of 30 diameters of the smaller bar in the splice.
  - All nuts, bolts, washers, etc., used in the permanent works of this project shall be galvanized steel unless otherwise noted.



### INDEX OF DRAWINGS

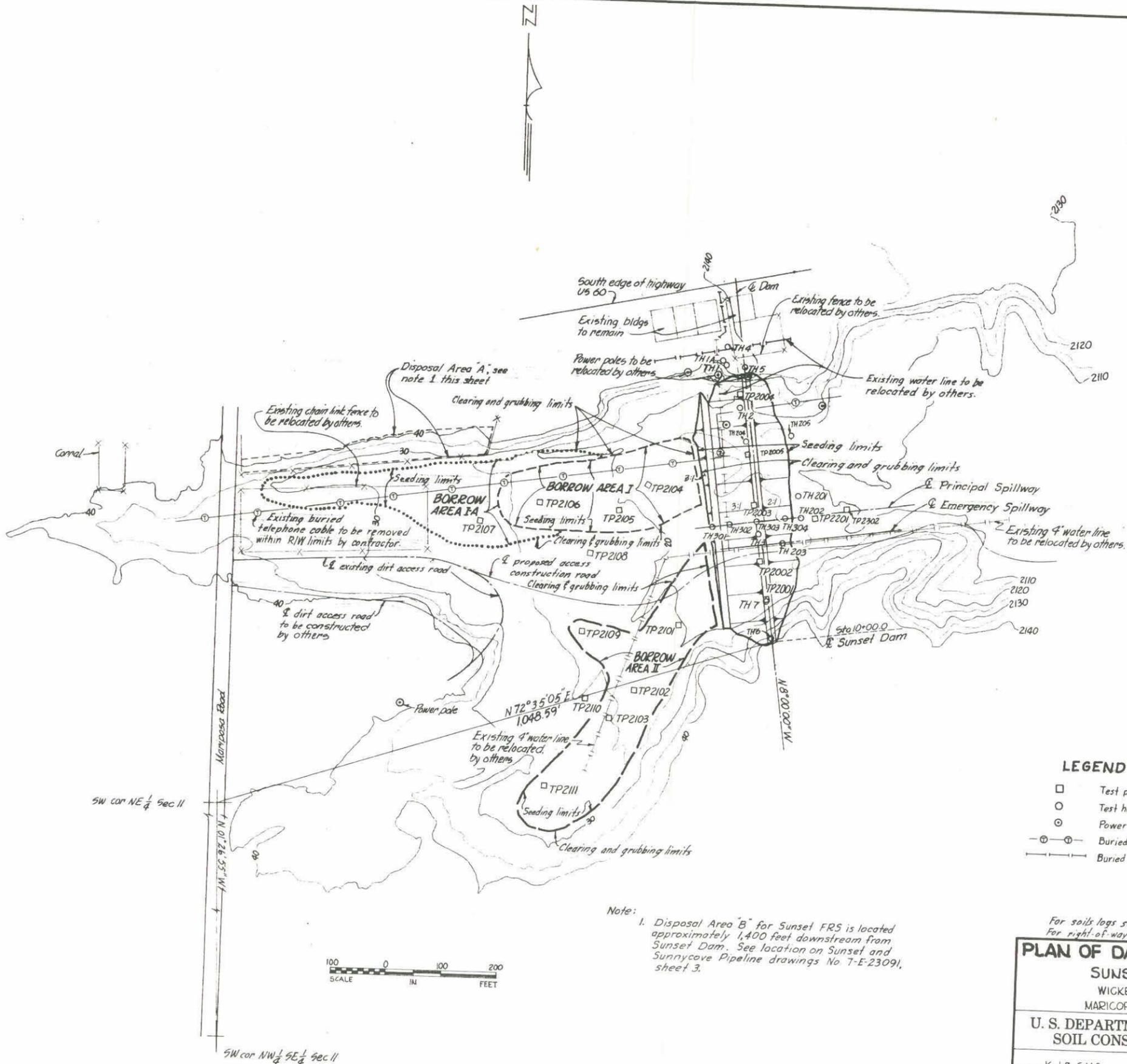
SUNSET F.R.S.

MARICOPA AND YAVAPAI COUNTIES, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

Designed Soil Conservation Service	Date	Approved by <i>[Signature]</i>
Drawn Soil Conservation Service	3-75	<i>Ralph M. Covington</i>
Traced	3-75	Title: State Conservation Engineer
Checked	No. 1 of 25	Drawing No. 7-E-23089

TOWN OF WICKENBURG <b>APPROVED</b> DATE 6-16-75 <i>[Signature]</i> Mayor	YAVAPAI COUNTY BOARD OF SUPERVISORS <b>APPROVED</b> DATE 6/16/75 <i>[Signature]</i> Chairman	WICKENBURG NATURAL RESOURCE CONSERVATION DISTRICT <b>APPROVED</b> DATE 6-12-75 <i>[Signature]</i> Secretary - Treasurer	TRIANGLE NATURAL RESOURCE CONSERVATION DISTRICT <b>APPROVED</b> DATE 6/16/75 <i>[Signature]</i> Chairman	MARICOPA COUNTY FLOOD CONTROL DISTRICT <b>APPROVED</b> DATE 6/13/75 <i>[Signature]</i> Chief Engineer
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**LEGEND**

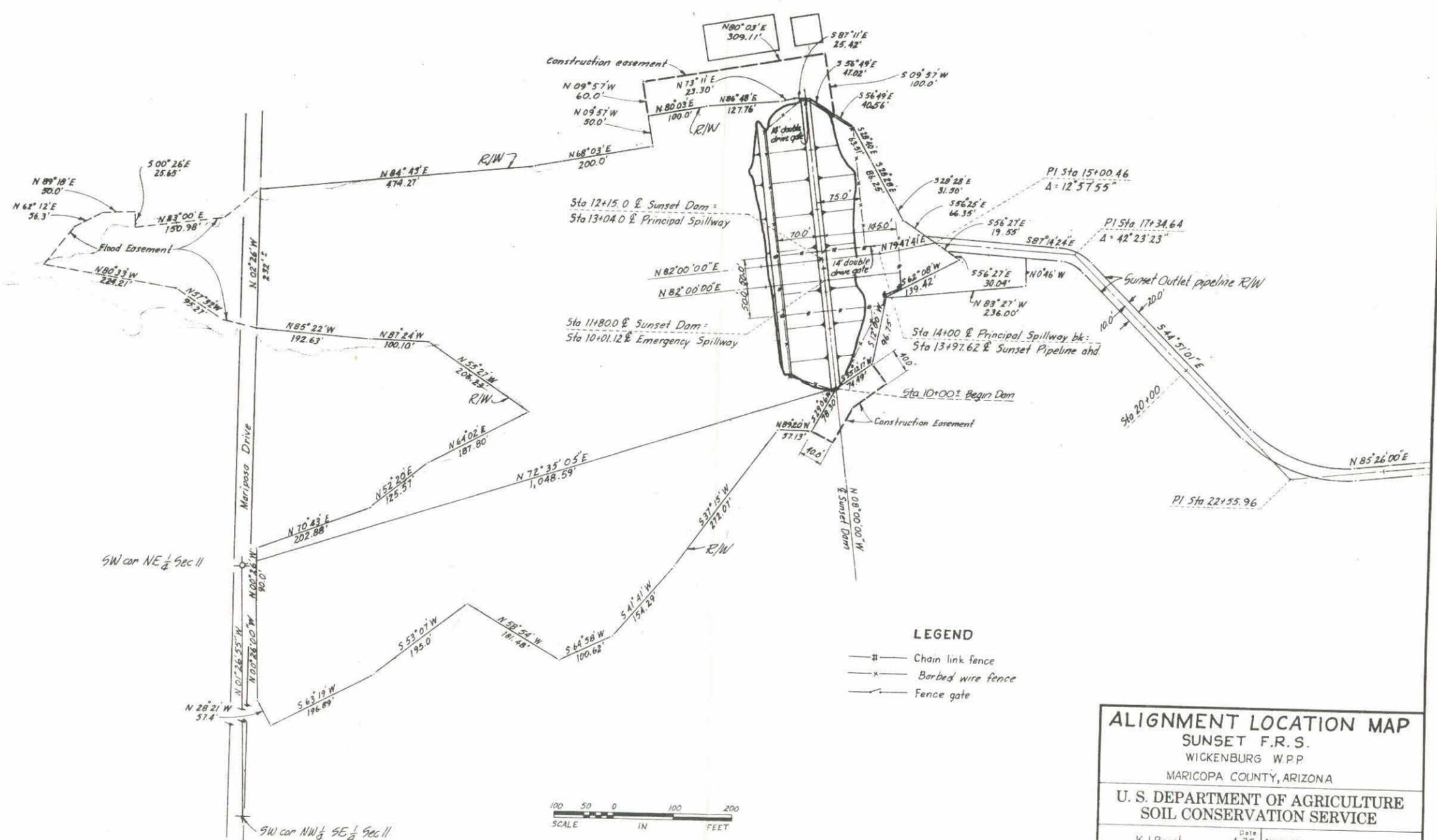
- Test pit
- Test hole
- ⊙ Power pole
- ⊕ Buried telephone cable
- Buried pipeline

Note:  
 1. Disposal Area B for Sunset FRS is located approximately 1,400 feet downstream from Sunset Dam. See location on Sunset and Sunnycove Pipeline drawings No 7-E-2309, sheet 3.

For soils logs see sheets 3 and 25  
 For right-of-way limits see sheet 2A

**PLAN OF DAM AND RESERVOIR**  
 SUNSET F.R.S.  
 WICKENBURG W.P.P.  
 MARICOPA COUNTY, ARIZONA  
 U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

Designed K.J.B.G.M.C.	Date 2-75	Approved by
Drawn Jack D. Land	2-75	Title
Traced		Title
Checked		Sheet No 2 of 25
		Drawing No 7-E-23089



**LEGEND**

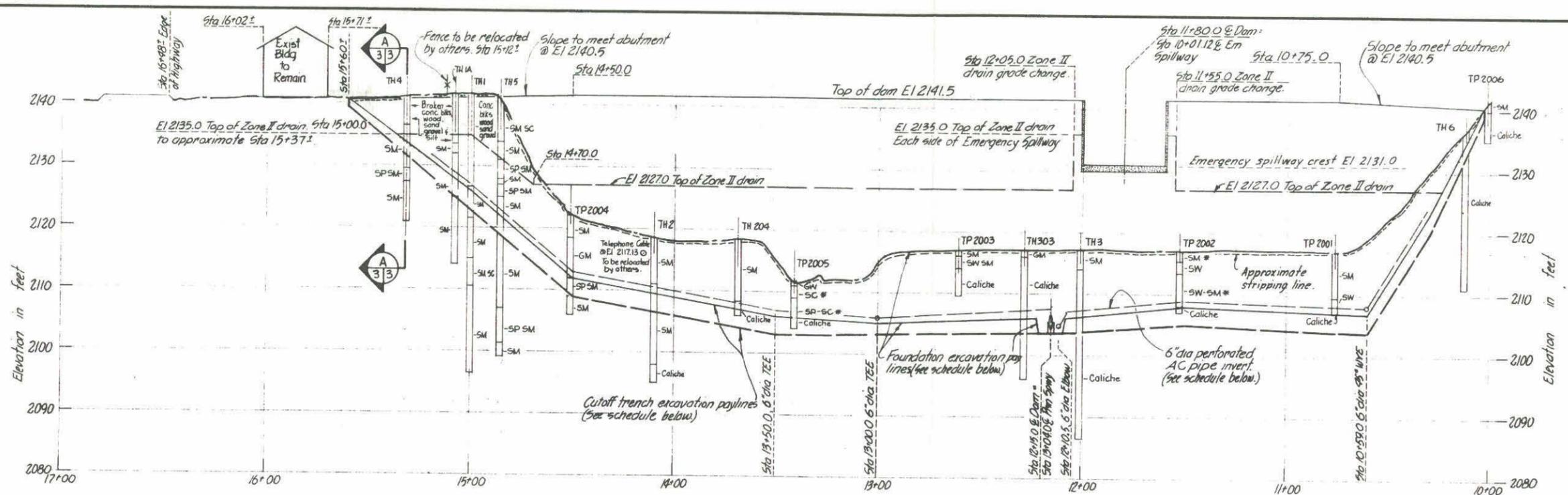
- #— Chain link fence
- x— Barbed wire fence
- /— Fence gate

**ALIGNMENT LOCATION MAP**  
 SUNSET F.R.S.  
 WICKENBURG W.P.P.  
 MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

Designed	K.J. Brust	Date	4-75	Approved by	
Drawn	J.D. Land	Title	4-75		
Traced	L.W. McClintock	Sheet	4-75		
Checked		No. 2A			
		of 25			
				Drawing No.	7-E-23089





**PROFILE ON E OF DAM**  
(Looking downstream)

**SCHEDULES**

I. FOUNDATION EXCAVATION	
STATION	ELEVATION
10+00 ±	2140.5
10+30	2123.0
10+59	2107.0
11+50	2108.0
12+06.4	2106.0
12+09	2103.4
12+21	2103.4
12+23.6	2106.0
13+00	2105.0
13+50	2106.0
14+50	2112.0
15+00	2126.0
15+60 ±	2140.5

I. Elevation at E of Dam.

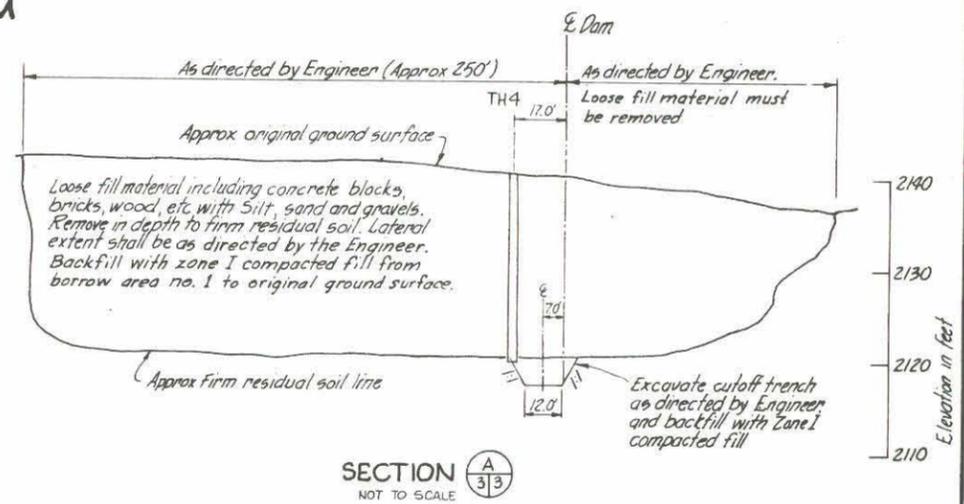
II. CUTOFF TRENCH EXCAVATION	
STATION	ELEVATION
10+00 ±	2139.0
10+30	2121.0
10+59	2104.0
11+50	2105.0
12+00	2103.4
13+50	2109.0
15+00	2124.0
15+60 ±	2139.0

II. Elevation at 70' upstream from E of Dam.

I. DRAIN PIPE PLACEMENT		
STATION	ELEVATION	REMARKS
10+30.0	2124.0	Plug beginning end with mortar, or AC cap
10+59.0	2108.0	CI 45° WYE, 6" dia non-perf AC outlet pipe.
11+50.0	2109.0	Plug beginning ends with mortar (2 ends) or AC caps
12+06.4	2107.0	Grade change, 45° CI Elbow
12+10.5	2106.3	CI 90° Elbow to 6" dia non-perf AC outlet pipe.
12+15.0	2107.1	Plug beginning end with mortar, or AC cap
13+00.0	2106.0	CI TEE to 6" dia non-perf AC outlet pipe.
13+50.0	2107.0	Grade change.
14+50.0	2113.0	Grade change.
15+00.0	2127.0	Grade change.
15+20.0	10' Above foundation excavation line approved by Engineer.	Plug beginning end with mortar, or AC cap

I. Elevation at 100' downstream from E of Dam.

II. All elevations and stations are approximate and may be adjusted by the Engineer during construction.



**SECTION A-3-3**  
NOT TO SCALE

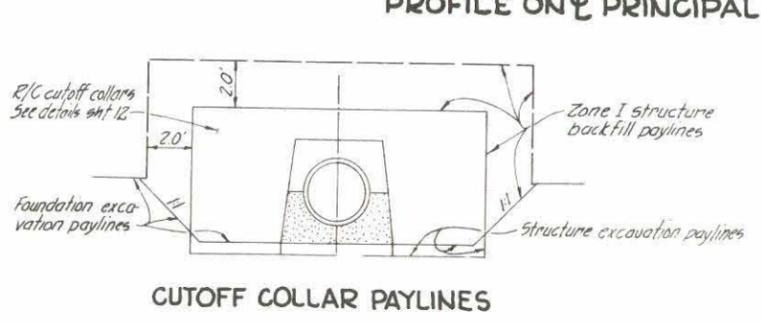
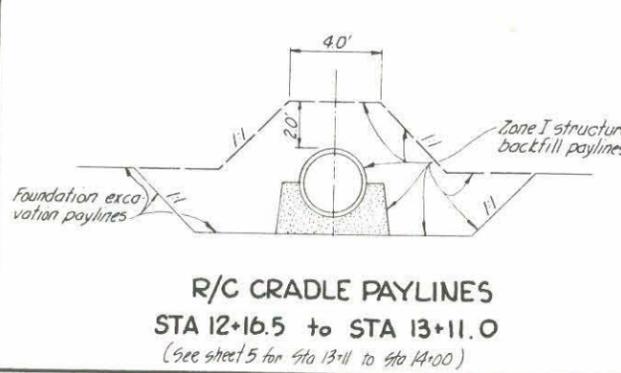
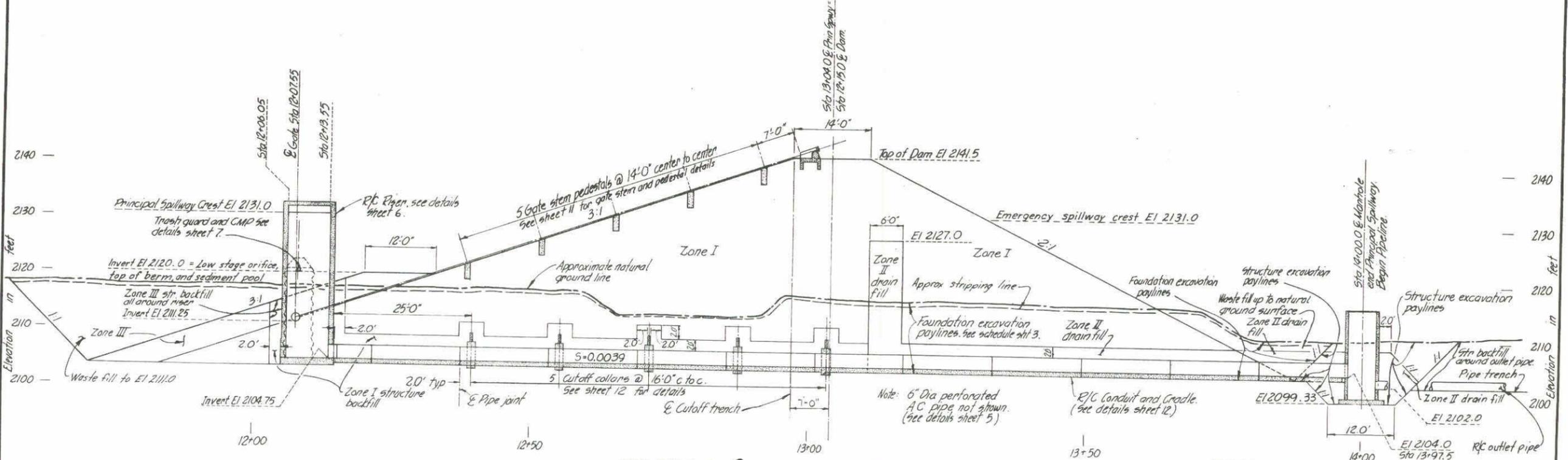
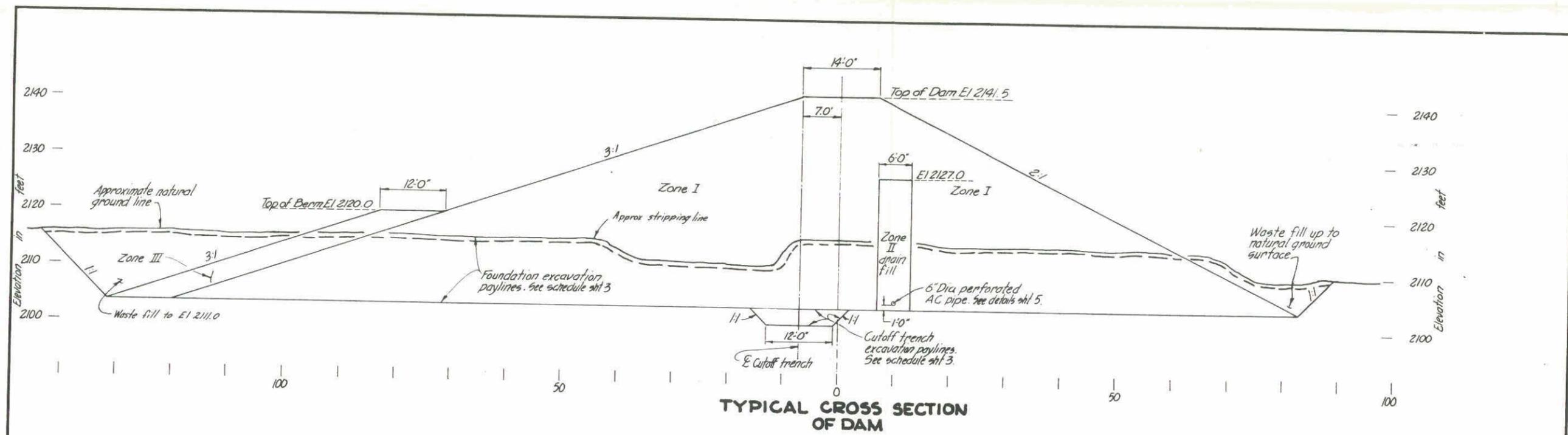
**Notes**

1. Unified soil descriptions are based on field identifications except where an asterisk is shown the classification has been based on laboratory analysis.
2. Complete field logs, laboratory test data and geologic report are available for review in the project office at Wickenburg Arizona.
3. For locations of Test pits and Test holes see sheet 2.

**PROFILE ON E OF DAM AND EXCAVATION SCHEDULES**  
SUNSET F.R.S.  
WICKENBURG W.P.P.  
MARICOPA COUNTY, ARIZONA

**U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE**

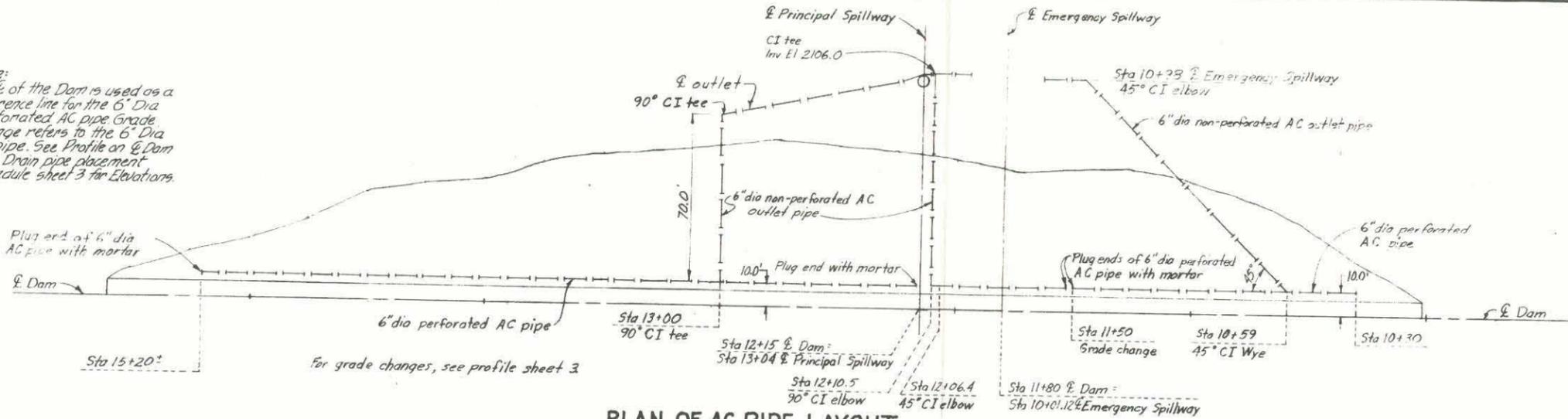
Designed: Greg Cunningham	Date: 3-75	Approved by: _____
Drawn: Jack Land	Date: 3-75	Title: _____
Traced: _____	Sheet: No. 3 of 25	Drawing No: 7-E-23089
Checked: _____		



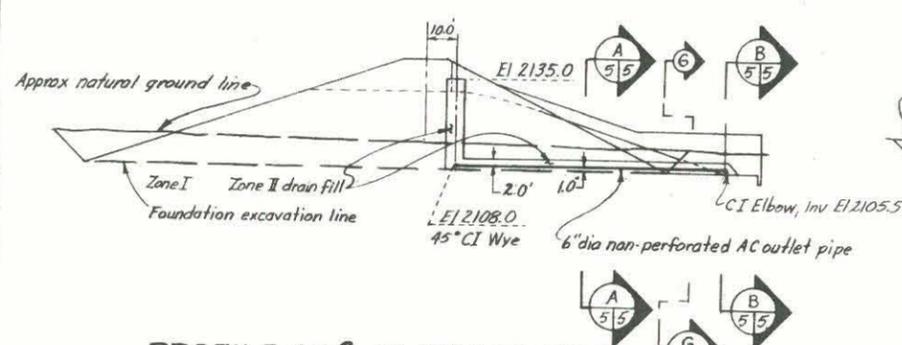
R/C manhole, Pipe trench, R/C outlet pipe and structure backfill around outlet pipe are part of bid schedule 3.

PROFILE ON & PRINCIPAL SPILLWAY AND TYPICAL CROSS SECTION OF DAM			
SUNSET F.R.S			
WICKENBURG W.P.P			
MARICOPA COUNTY, ARIZONA			
U. S. DEPARTMENT OF AGRICULTURE			
SOIL CONSERVATION SERVICE			
Designed	Greg Cunningham	Date	3-75
Drawn	Jack Land	Date	3-75
Traced		Date	
Checked		Date	
		Sheet	No 4
		Drawing No	7-E-23089

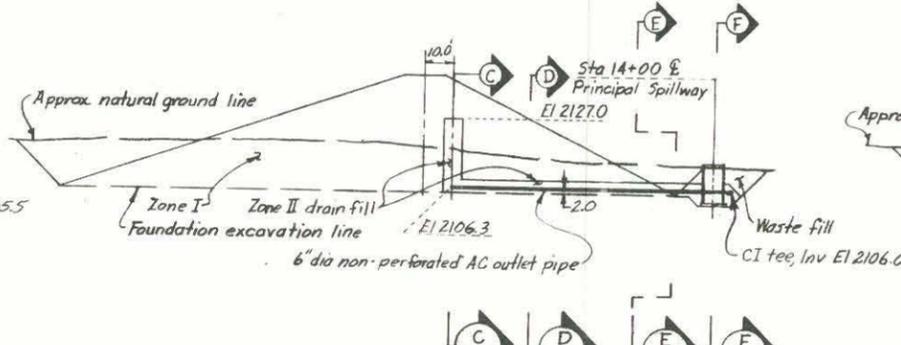
Note:  
The  $\mathcal{E}$  of the Dam is used as a reference line for the 6" Dia perforated AC pipe. Grade change refers to the 6" Dia AC pipe. See Profile on  $\mathcal{E}$  Dam and Drain pipe placement schedule sheet 3 for Elevations.



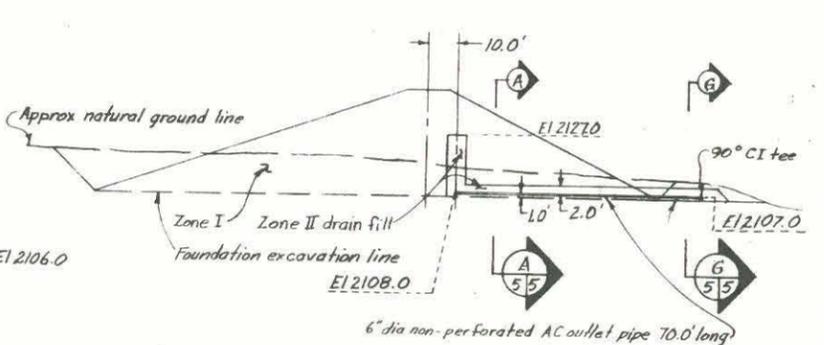
PLAN OF AC PIPE LAYOUT



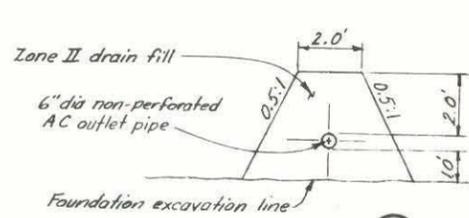
PROFILE ON  $\mathcal{E}$  AC OUTLET PIPE STA 10+59  $\mathcal{E}$  DAM



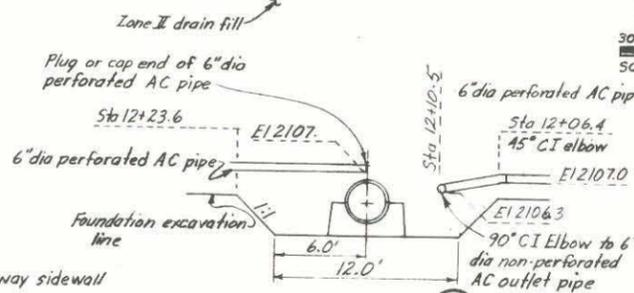
PROFILE ON  $\mathcal{E}$  AC OUTLET PIPE STA 12+10.5



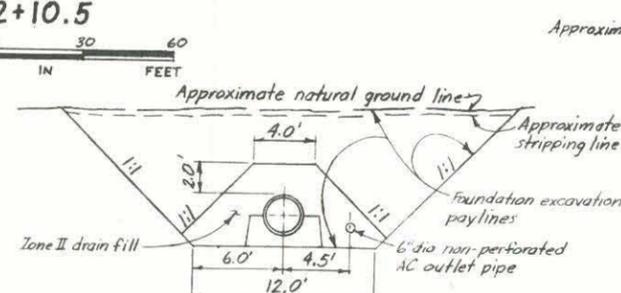
PROFILE ON  $\mathcal{E}$  AC OUTLET PIPE STA 13+00



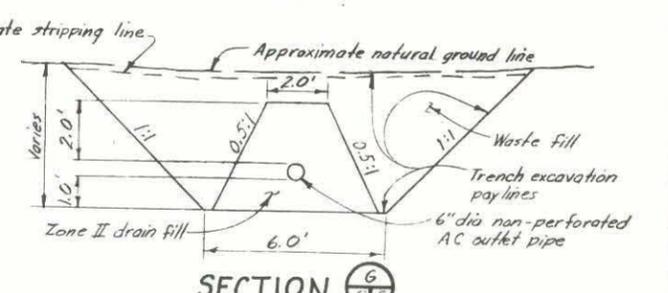
SECTION A-5/5



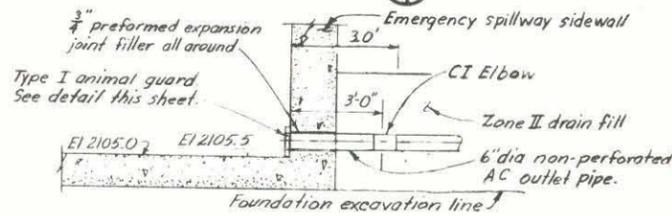
SECTION C-5/5



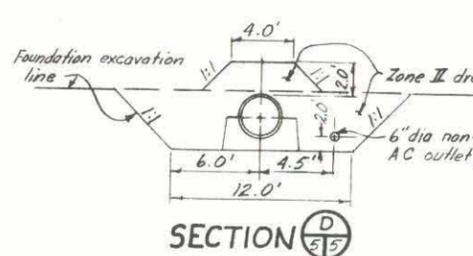
SECTION E-5/5



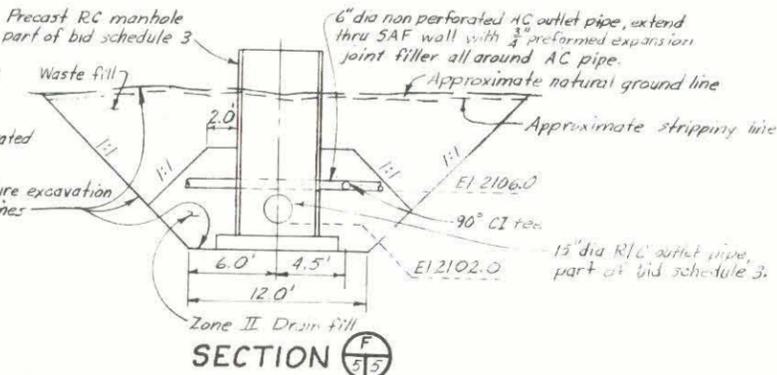
SECTION G-5/5



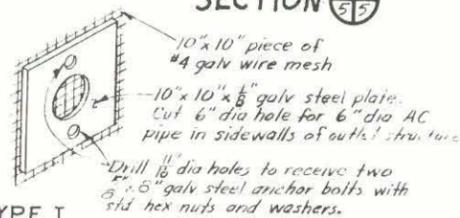
SECTION B-5/5



SECTION D-5/5



SECTION F-5/5

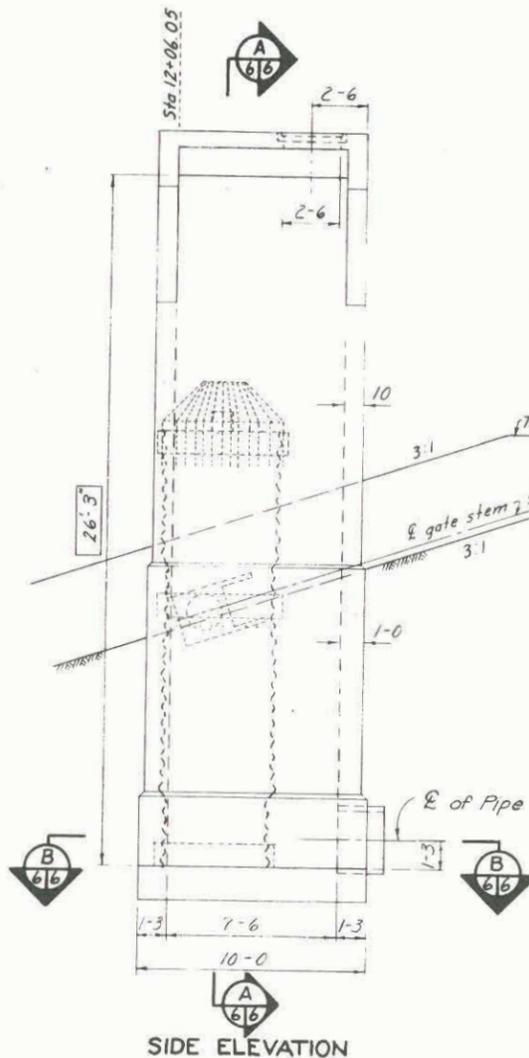
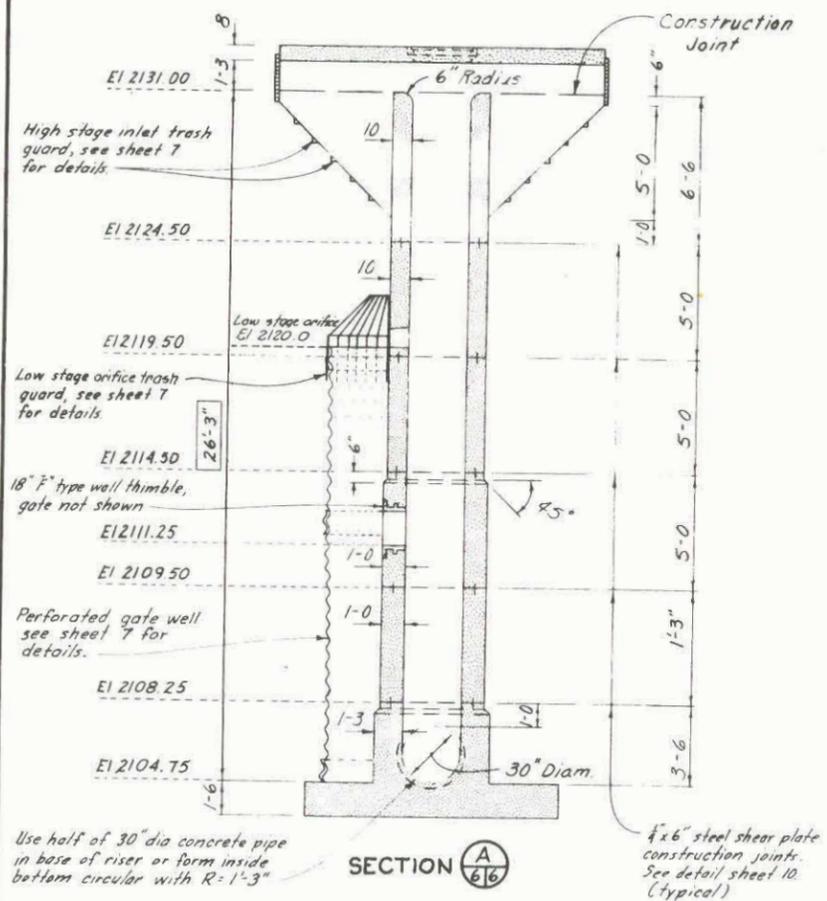
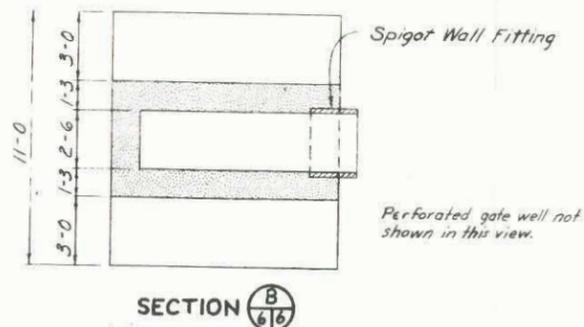
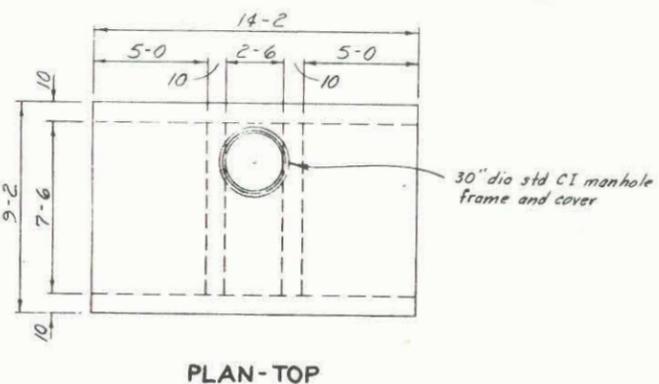


TYPE I (2 Req'd)

ANIMAL GUARD DETAILS (NOT TO SCALE)

**DRAIN LAYOUT AND DETAILS**  
SUNSET F.R.S.  
WICKENBURG W.P.P.  
MARICOPA COUNTY, ARIZONA  
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

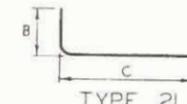
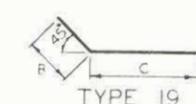
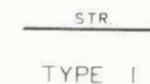
Designed	G.M. Cunningham	Date	3-75	Approved by	
Drawn	L.W.M. Clintock	Title			
Traced		Sheet	5	Drawing No.	
Checked		at	25		7-E-23089



STEEL SCHEDULE

Mark	Size	Quantity	Length	Type	B	C	Total Length	Mark	Size	Quantity	Length	Type	B	C	Total Length
B1	# 7	11	10-6	1			115-6								
B2	# 6	12	9-6	1			114-0								
B3	# 6	38	7-6	21	3-5	4-1	285-0								
B4	# 6	12	9-6	1			114-0								
B5	# 6	10	10-6	1			105-0								
B6	# 6	2	4-6	1			9-0								
B7	# 6	6	5-3	21		4-1	31-6	T1	# 5	18	6-0	1			108-0
B8	# 6	19	7-3	21	1-1	6-2	137-9	T2	# 5	6	8-0	1			48-0
B9	# 5	10	8-6	1			85-0	T3	# 5	4	4-9	1			19-0
B10	# 6	5	3-6	1			17-6	T4	# 5	4	3-6	1			14-0
B11	# 6	3	2-3	1			6-9	T5	# 5	4	2-3	1			9-0
B12	# 6	2	2-3	1			4-6	T6	# 5	4	9-0	19	2-0	7-0	36-0
B13	# 6	24	4-0	1			96-0	T7	# 5	12	8-3	1			99-0
B14	# 5	10	6-6	21	0-10	5-8	65-0	T8	# 5	2	3-3	1			6-6
B15	# 5	14	8-9	21	3-1/2	5-7/8	122-6	T9	# 5	2	5-9	1			11-6
B16	# 5	4	8-3	21	2-10/8	5-4/8	33-0	T10	# 5	2	10-9	1			21-6
								T11	# 5	2	13-3	1			26-6
								T12	# 5	14	6-3	1			87-6
								T13	# 5	6	8-0	1			48-0
								T14	# 5	4	6-0	1			24-0
								T15	# 5	4	4-9	1			19-0
								T16	# 5	4	3-6	1			14-0
								T17	# 5	4	2-3	1			9-0
								T18	# 5	4	9-0	19	2-0	7-0	36-0
								T19	# 5	24	8-0	21	2-9	5-3	192-0
								T20	# 5	2	3-3	1			6-6
R1	# 5	22	8-0	1			176-0	T21	# 5	2	5-9	1			11-6
R2	# 5	6	8-6	1			51-0	T22	# 5	2	8-3	1			16-6
R3	# 5	4	3-6	1			14-0	T23	# 5	2	10-9	1			21-6
R4	# 5	26	5-9	1			149-6	T24	# 5	2	13-3	1			26-6
R5	# 6	6	8-9	21	3-1	5-8	52-6	T25	# 5	4	13-9	1			55-0
R6	# 4	20	8-3	1			165-0	T26	# 5	4	13-9	1			55-0
R7	# 5	10	3-6	1			35-0	T27	# 4	14	8-3	1			115-6
R8	# 5	20	3-8	1			73-4	T28	# 4	2	4-9	1			9-6
R9	# 5	36	8-3	21	2-10/8	5-4/8	297-0	T29	# 4	7	13-9	1			96-3
R10	# 5	4	8-0	21	2-9	5-3	32-0	T30	# 4	4	5-3	1			21-0
R11	# 5	20	11-9	1			235-0	T31	# 5	24	6-9	21	1-6	5-3	162-0
R12	# 5	14	8-3	1			115-6	T32	# 5	2	6-6	21	1-6	5-0	13-0
R13	# 5	8	3-3	1			26-0	T33	# 5	2	2-6	21	1-6	1-0	5-0
R14	# 5	20	11-9	1			235-0	T34	# 4	7	13-9	1			96-3
R15	# 6	8	8-3	21	2-10/8	5-4/8	231-0	T35	# 4	4	5-3	1			21-0
R16	# 5	8	8-3	1			66-0								
R17	# 5	8	3-3	1			26-0								
R18	# 5	20	8-0	21	2-9	5-3	161-0								

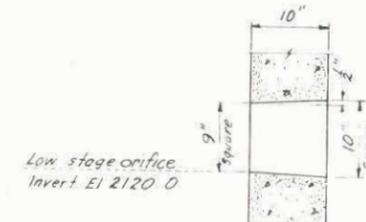
BAR TYPES



Notes:

1. Bar dimensions are out to out of bar.
2. Radius of bends equals 3 bar diameters for sizes equal to or less than #7.
3. The 2" and 3" dimensions from face of concrete to steel are clear distances.

0 2 4 6  
Scale in Feet



ORIFICE DETAIL  
(NOT TO SCALE)

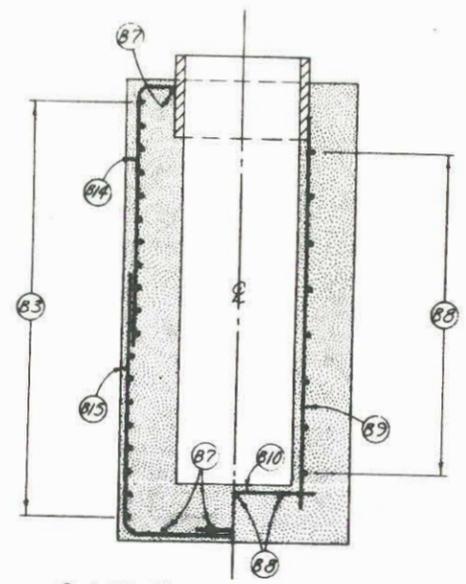
RISER LAYOUT DETAILS

SUNSET F.R.S.  
WICKENBURG W.P.P.  
MARICOPA COUNTY, ARIZONA

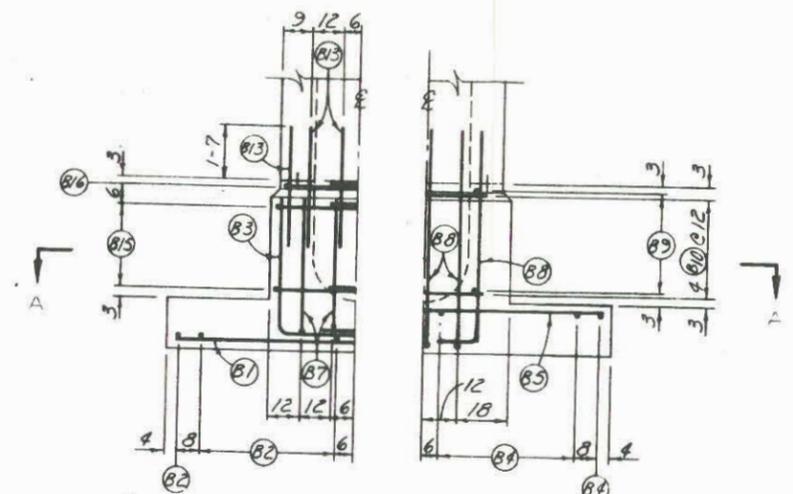
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

Designed: KJ Brust	Date: 3-75	Approved by:
Drawn: L.W. McClintock	Date: 3-75	Title:
Scale:	Sheet No: 6	Drawing No: 7-E-23089
Checked:	of 25	

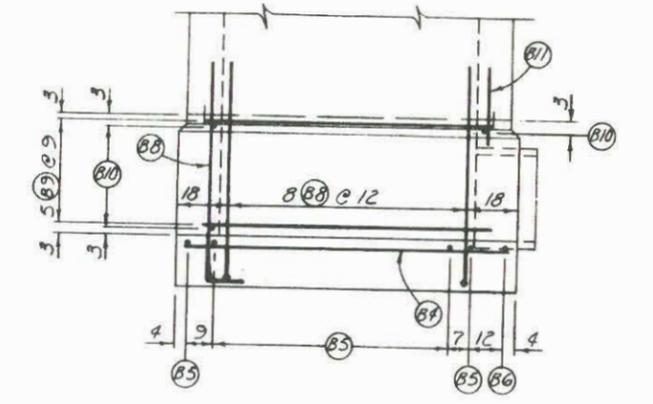




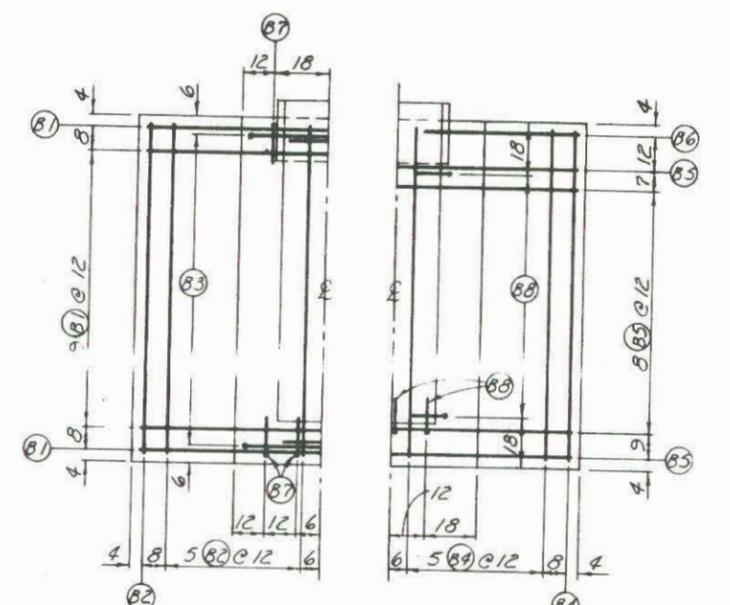
Outside Steel Inside Steel  
SECTION A-A  
0 1 2 3  
Scale in Feet

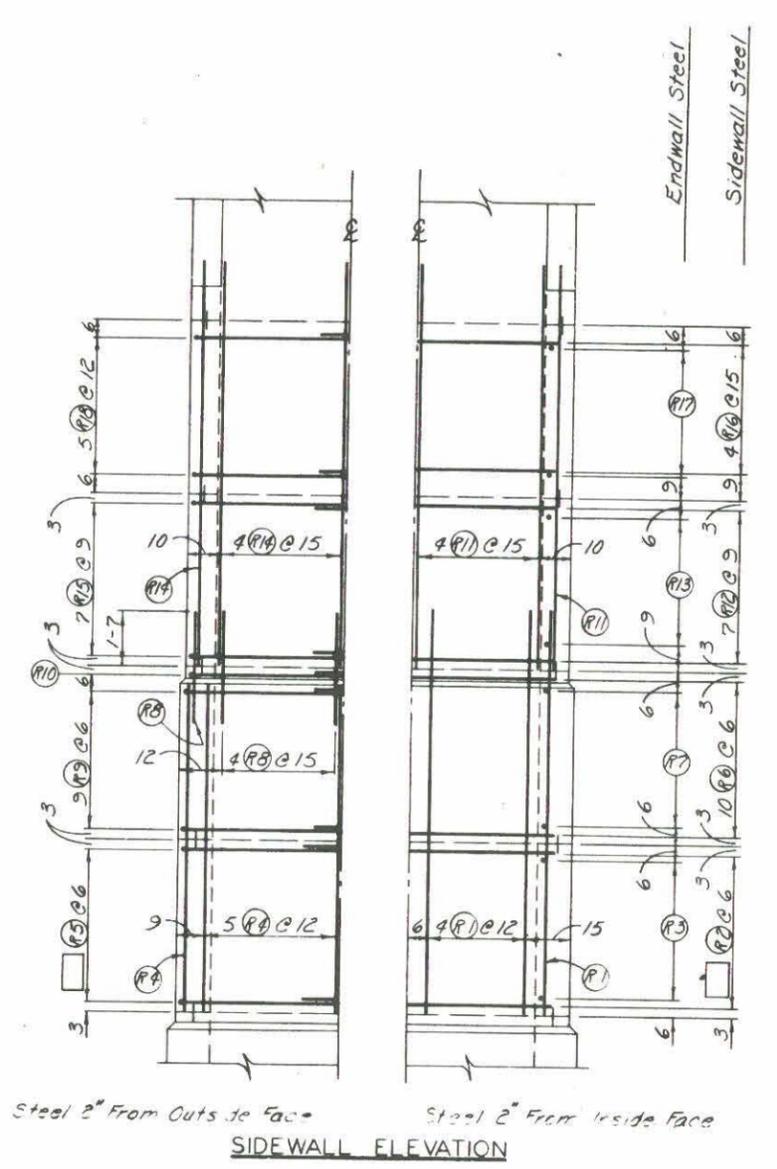
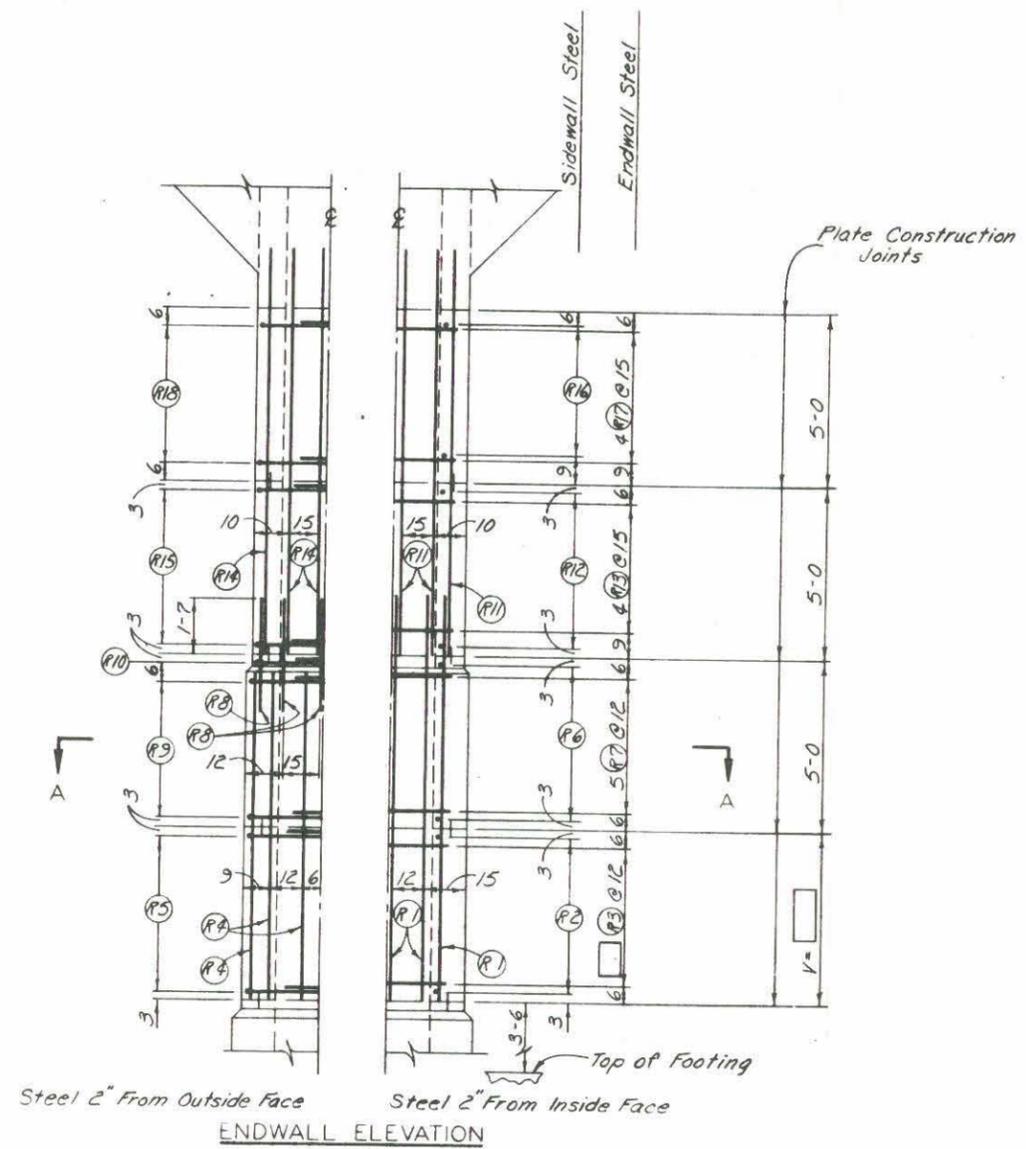
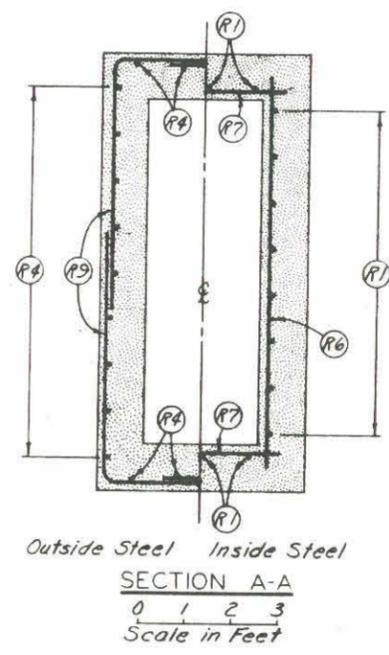


Steel 2" From Outside Face Steel 2" From Inside Face  
UPSTREAM ELEVATION



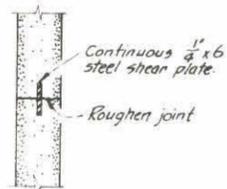
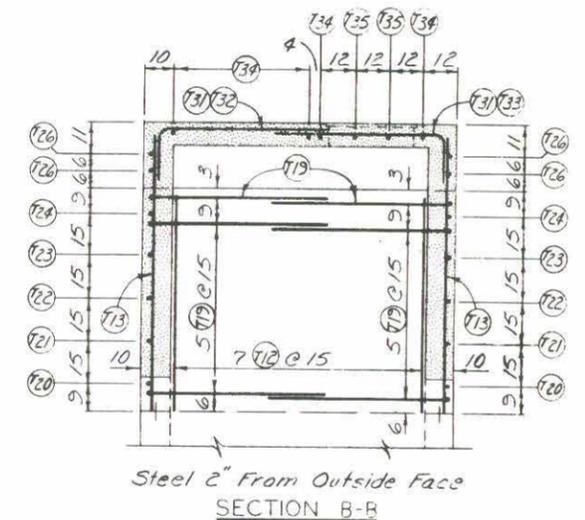
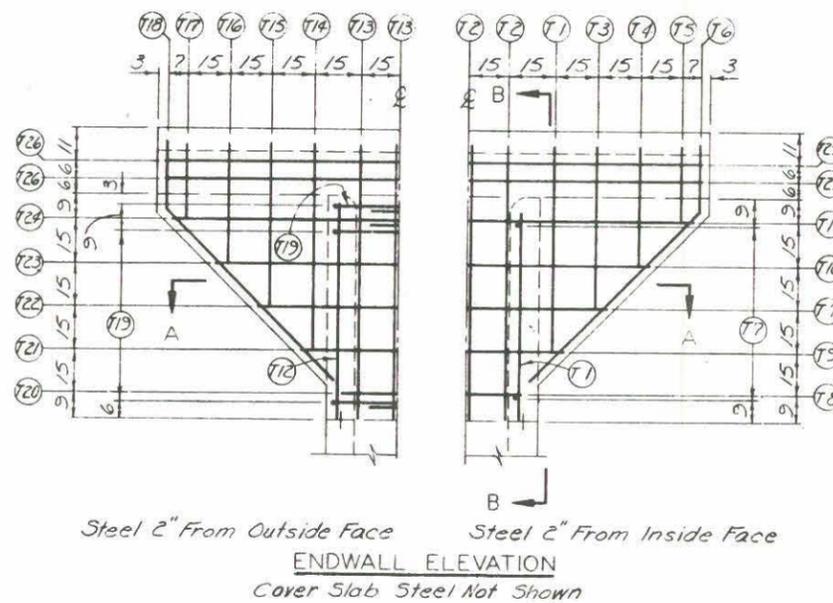
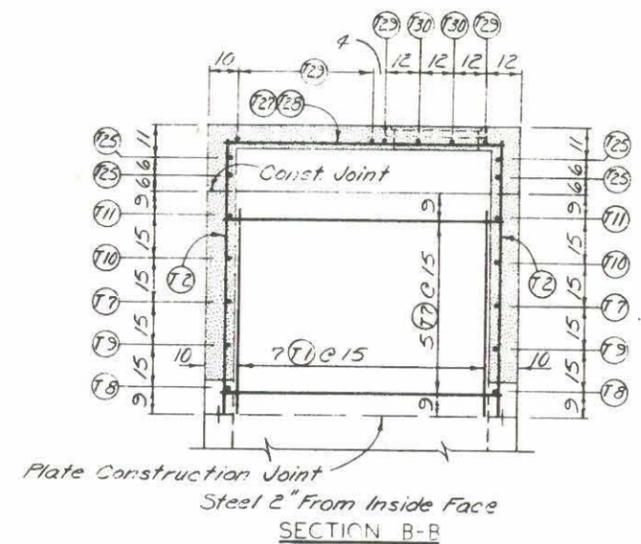
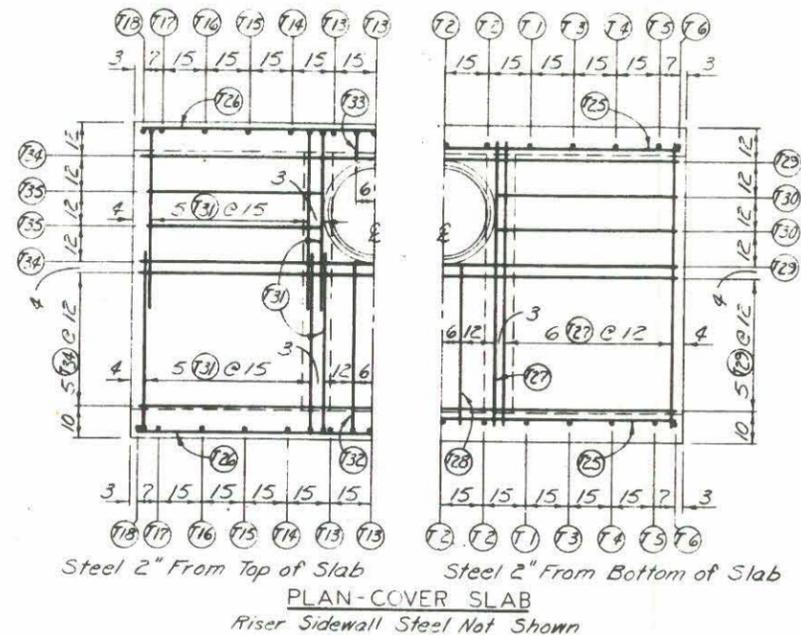
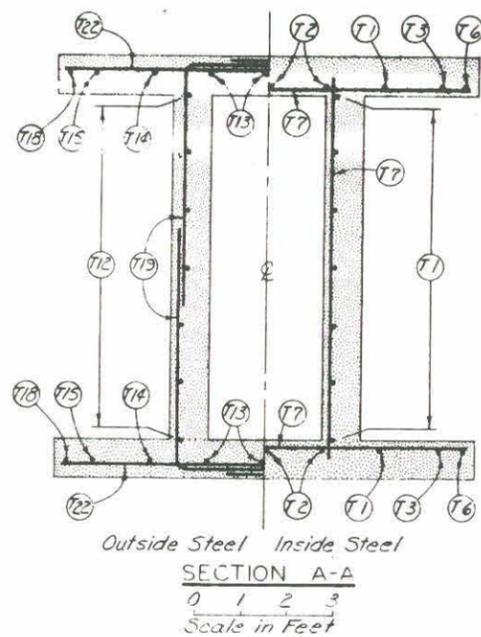
Steel 2" From Inside Face and 2" From Top of Footing  
SIDEWALL ELEVATION





0 2 4  
Scale in Feet  
Unless Otherwise Shown

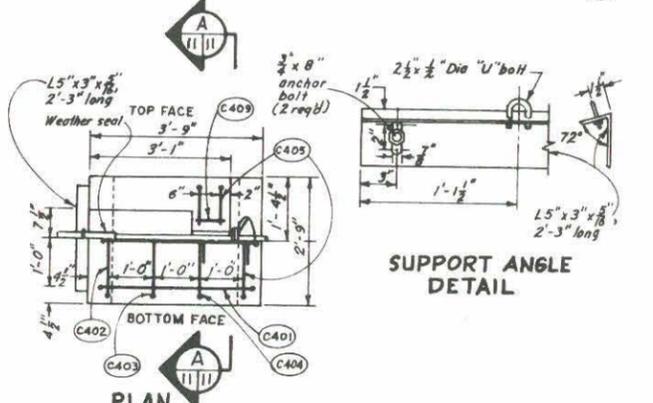
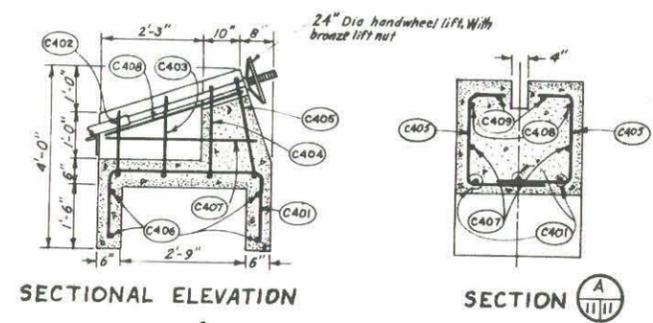
<b>RISER DETAILS</b>	
SUNSET F.R.S. WICKENBURG W.P.P. MARICOPA COUNTY, ARIZONA	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
Designed <i>K.J. Brust</i>	Date <i>3-75</i>
Drawn _____	Approved by _____
Traced _____	Title _____
Checked _____	Sheet No. <i>9</i> of <i>25</i>
	Drawing No. <b>7-E-23089</b>



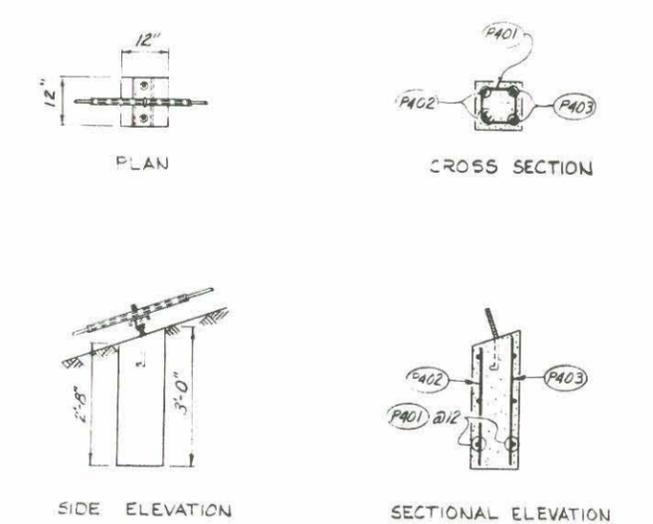
TYPICAL CONST JOINT DETAIL  
(Not to scale.)

0 2 4  
Scale in Feet  
Unless Otherwise Shown

<b>RISER DETAILS</b>	
SUNSET F.R.S. WICKENBURG W.P.P. MARICOPA COUNTY, ARIZONA	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
Designed <i>K.J. Brust</i>	Date <i>3-75</i>
Drawn	Approved by
Traced	Title
Checked	Sheet <i>10</i> of <i>23</i>
	Drawing No. <b>7-E-23089</b>



GATE LIFT PEDESTAL DETAILS

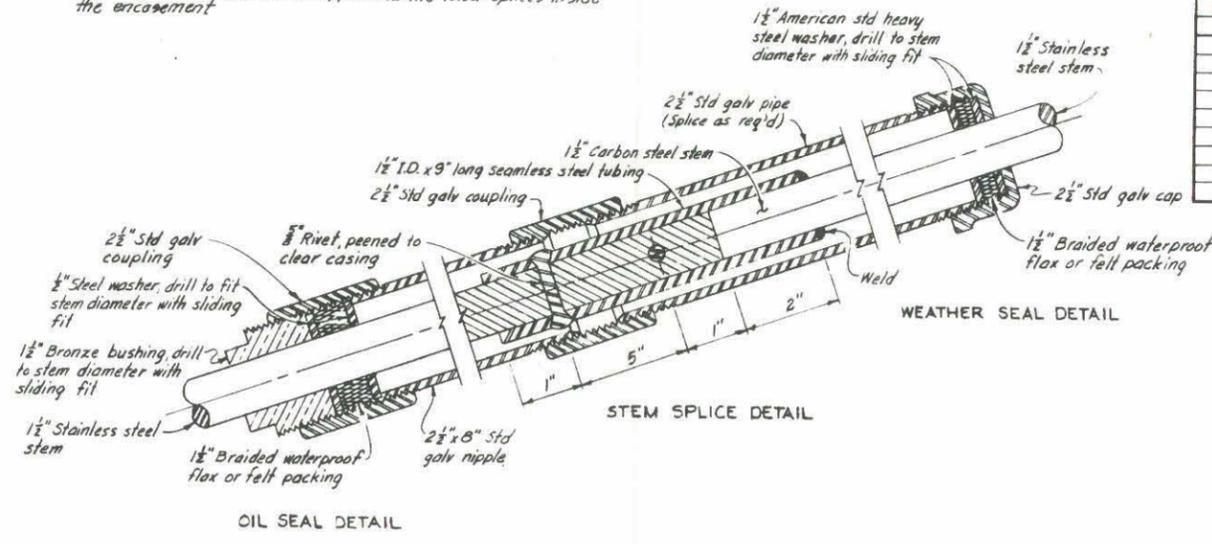


GATE STEM PEDESTAL

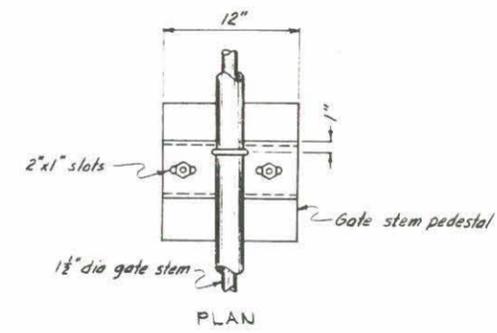


Notes  
Fill stem encasement with approximately 14.0 gallons of SAE 20 motor oil.

The stainless steel portion of the gate stem shall extend a sufficient length on each end so that no part of the carbon steel stem is exposed during operation of the gate. A carbon steel stem will be used between the upper and the lower splices inside the encasement.



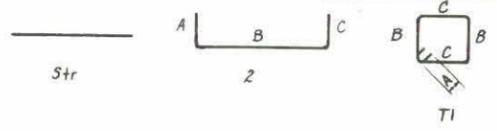
GATE STEM SPLICE



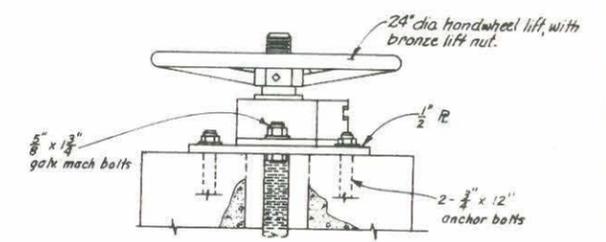
GATE STEM GUIDE



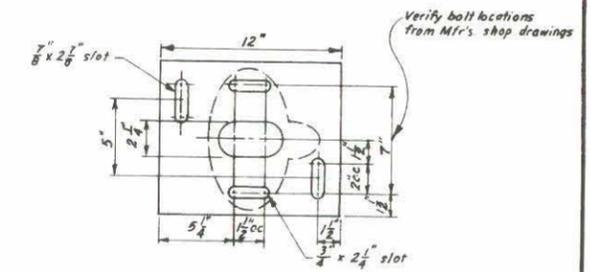
STEEL SCHEDULES									
LOCATION	MARK	SIZE	QUAN	LENGTH	TYPE	A	B	C	TOTAL LENGTH
GATE STEM PEDESTALS (5 req'd)									
	P401	4	15	3'-0"	Ti	0'-2"	0'-8"	0'-8"	45'-0"
	P402	4	10	2'-3"	str				22'-6"
	P403	4	10	2'-9"	str				27'-6"
GATE LIFT PEDESTAL									
	C401	4	3	6'-3"	2	1'-6"	3'-3"	1'-6"	18'-9"
	C402	4	1	4'-6"	2	1'-2"	2'-2"	1'-2"	4'-6"
	C403	4	1	5'-0"	2	1'-5"	2'-2"	1'-3"	5'-0"
	C404	4	2	4'-0"	2	1'-6"	1'-9"	0'-9"	8'-0"
	C405	4	2	4'-3"	2	1'-6"	2'-0"	0'-9"	8'-6"
	C406	4	4	2'-3"	Str				9'-0"
	C407	4	2	3'-0"	Str				6'-0"
	C408	4	2	2'-9"	Str				5'-6"
	C409	4	2	0'-6"	Str				1'-0"



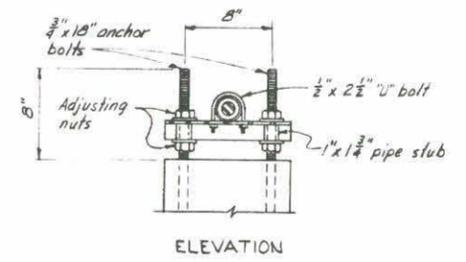
BAR TYPES



ELEVATION

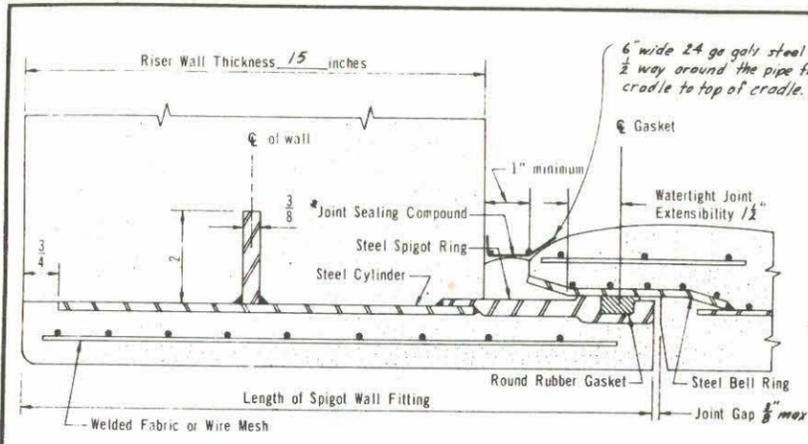


PLAN  
BASE PLATE  
(For gate lift pedestal)  
(Not to scale)



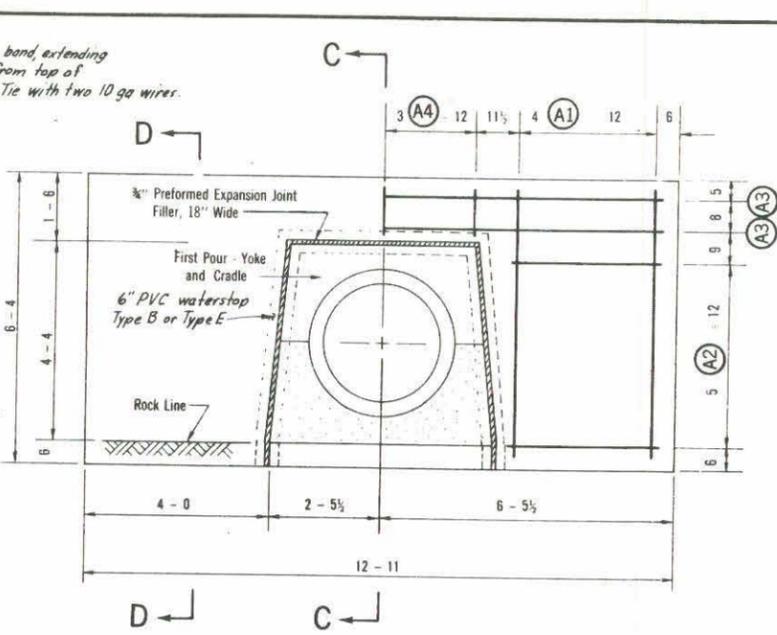
ELEVATION

GATE CONTROL DETAILS			
SUNSET F.R.S.			
WICKENBURG W.P.P.			
MARICOPA COUNTY, ARIZONA			
U. S. DEPARTMENT OF AGRICULTURE			
SOIL CONSERVATION SERVICE			
Designed	K.J. Brust	Date	3-75
Drawn	L.W. McClintock	Date	3-75
Checked		Approved by	
Project		Title	
Sheet	No. 11	Drawing No.	7-E-23089
Revised	25		



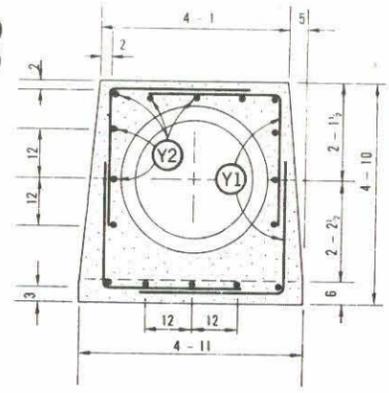
DETAIL A

\* 3/4" dia circular cross section, Butyl rubber sealer, Federal Specification SS-5-00210 applied over manufacturer's recommended primer.

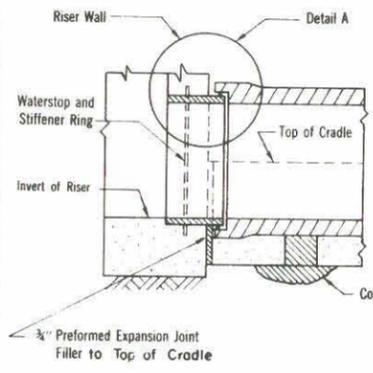


DETAIL OF ANTI-SEEP COLLAR

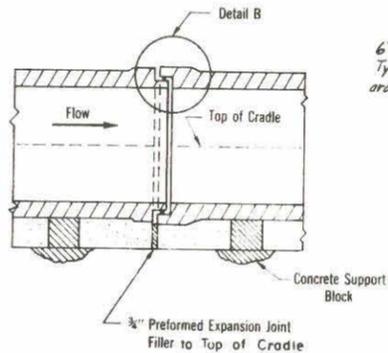
Yoke steel not shown.



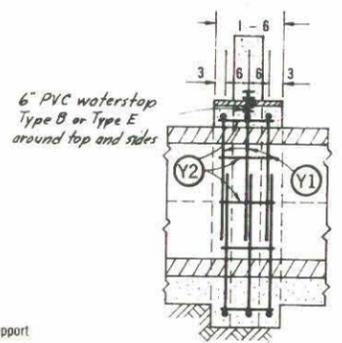
DETAIL OF ANTI-SEEP COLLAR YOKE



DETAIL OF SPIGOT WALL FITTING

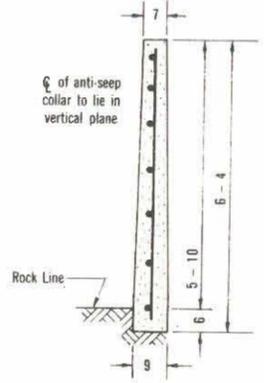


DETAIL OF PIPE JOINT

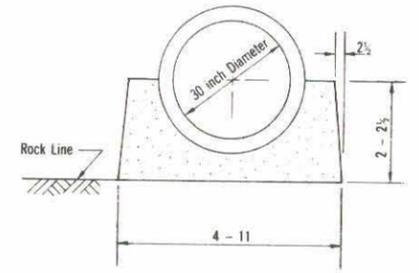


SECTION C-C

Anti-seep collar steel not shown.



SECTION D-D

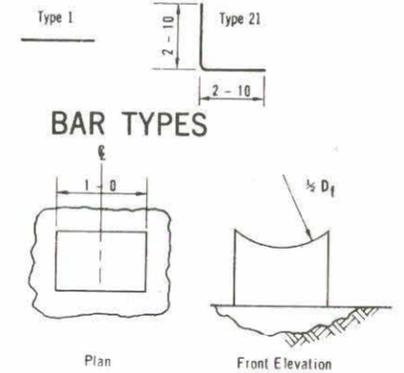


DETAIL OF CRADLE

STEEL SCHEDULE						
Anti-seep Collar and Yoke, 15 Required.						
Mark	Size	Quantity per Collar	Length	Type	Total Quantity	Total Length
A1	4	8	5-10	1	40	233-4
A2	4	10	3-6	1	50	175-0
A3	4	2	12-5	1	10	124-2
A4	4	5	1-0	1	25	25-0
Y1	4	12	5-8	21	60	340-0
Y2	4	16	1-2	1	80	93-4

QUANTITIES	
Concrete	Cu. Yds.
Anti-seep Collar including Yoke	
* Each, Additional to Cradle	1.91
Total	9.55
Cradle	
** Per Lineal Foot of Cradle	0.26
Total	47.6
Steel	Pounds
Anti-seep Collar including Yoke	662
Cradle	

Concrete quantities are based on an outside diameter of pipe of 35 inches. Steel quantities do not change with outside diameter of pipe.  
 \* This quantity is given by  $1.875 - 0.0001515 (D_f + 38) (D_f - 38)$  cu. yds.  
 \*\* This quantity is given by  $0.2392 - 0.0001010 (D_f + 38) (D_f - 38)$  cu. yds.  
 $D_f$  = outside diameter of pipe furnished, inches.



SUGGESTED SUPPORT BLOCKS

Sufficient blocks shall be provided to support the pipe to the required line and grade. The Contractor shall determine the number and size of blocks required. Wedges may be used as an alternate.

1-73	Waterstop added to anti-seep collar	LWM
DATE	REVISION	BY
STANDARD CONDUIT DETAILS		
FOR REINFORCED CONCRETE PRESSURE PIPE PRINCIPAL SPILLWAY		
STANDARD DWG. NO. ES-5030-CR		
DATE	2-70	SHEET 1 OF 1

DETAIL B

Joint length equals watertight joint extensibility plus joint gap.  
 The pipe shall be drawn together so that the maximum joint gap does not exceed 1/8 inch for pipe laid on a straight line. For cambered pipe or pipe laid on a curved line, the joint gap at the closest point shall not exceed 3/8 inch.

JOINT REQUIREMENTS			
Length of Pipe Section	Minimum Joint Length	Minimum Joint Limiting Angle	
		radians	degrees
feet	inches		
16.0	1 7/8		0°45'

For pipe length other than shown, joint requirements will be determined by the Engineer.  
 Where pipes of different length are connected, adjoining pipes shall meet the requirements of the longer pipe.  
 Prior to delivery of pipe, the pipe joint detail proposed for use shall be submitted to the Engineer for approval.

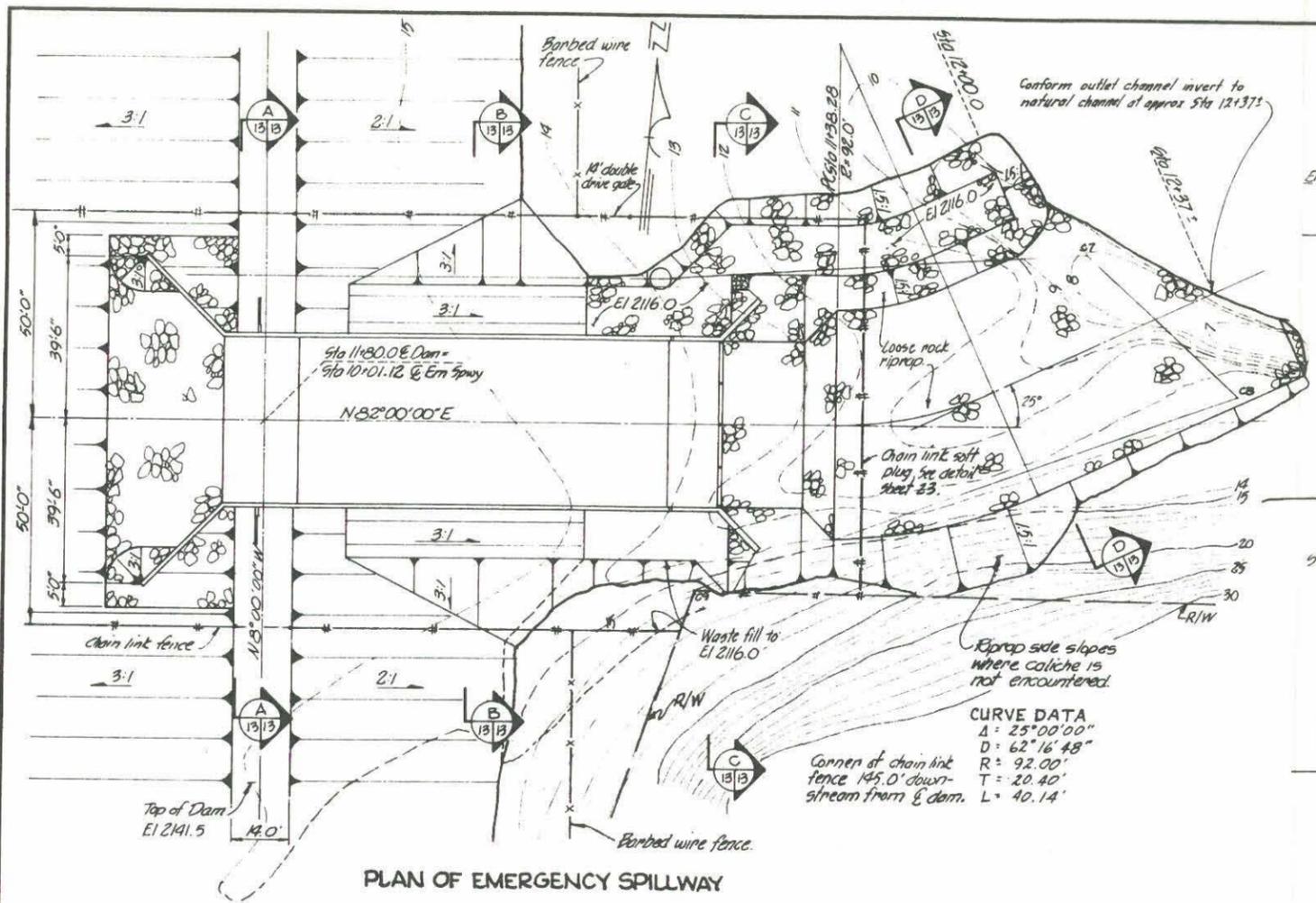
STRENGTH REQUIREMENTS			
Inside Diameter of Pipe	Internal Load	External Load *	
		Hydrostatic Pressure:	Minimum 3-Edge Bearing Strength in Pounds per Lineal Foot of Pipe
inches	feet	Applicable Standard Specification	
		AWWA C-301	AWWA C-300
30.0	37	Load to produce 0.001 inch crack one foot long	Load to produce 0.01 inch crack one foot long
		6200	8200

The outside diameter of pipe assumed in design is 35 inches. Where the pipe furnished has an outside diameter greater than assumed in design, the three-edge bearing strength of the pipe furnished must not be less than the specified three-edge bearing strength multiplied by the ratio of the outside diameter of the pipe furnished to the outside diameter assumed in design.

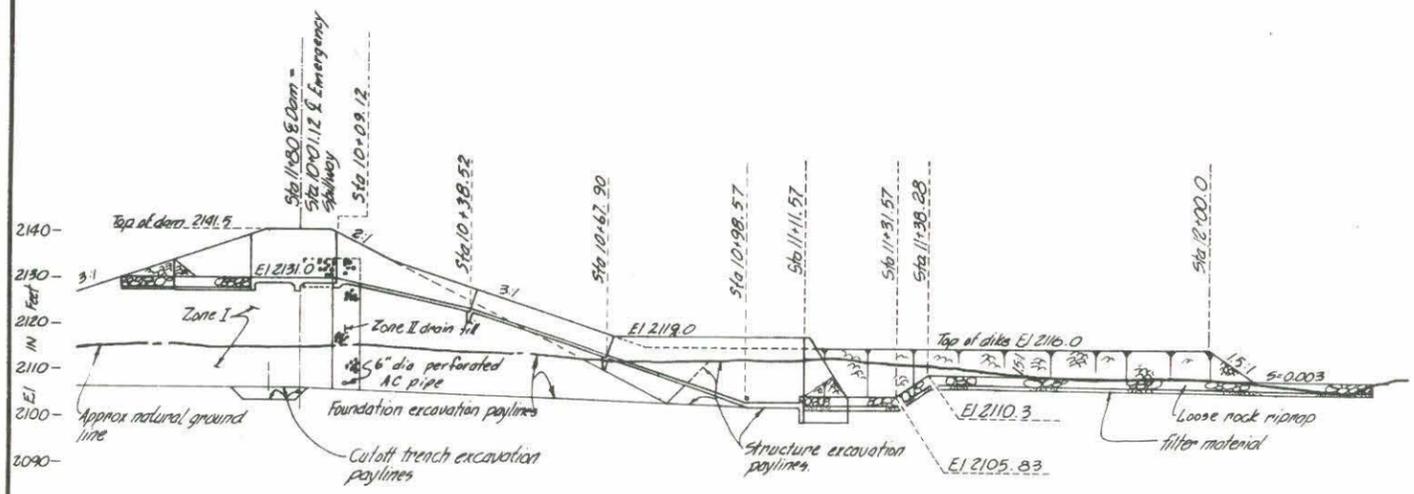
**PRINCIPAL SPILLWAY CONDUIT DETAILS**  
**SUNSET F.R.S**  
 WICKENBURG, W.P.P.  
 MARICOPA COUNTY, ARIZONA

**U.S. DEPARTMENT OF AGRICULTURE**  
**SOIL CONSERVATION SERVICE**

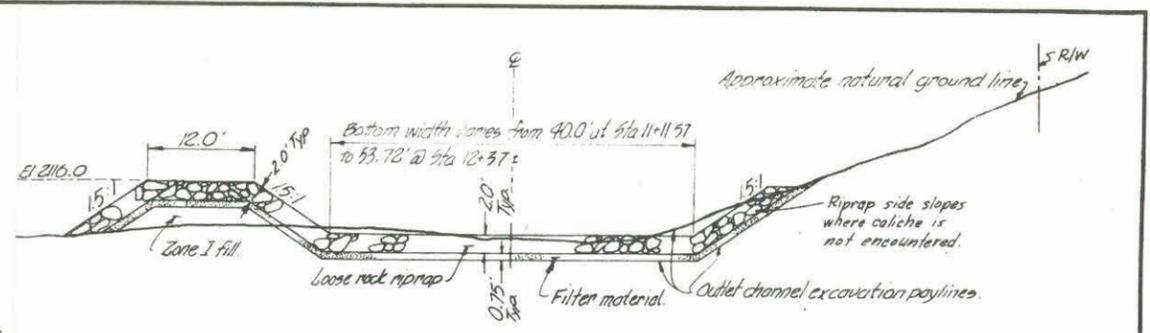
Designed K.J. Brust, GMC	Date 3-75	Approved by Title
Drawn L.W. McClintock	Date 3-75	Title
Traced		Title
Checked G.M.C.	Date 4-75	Sheet No. 12 of 25
		Drawing No. 7-E-23089



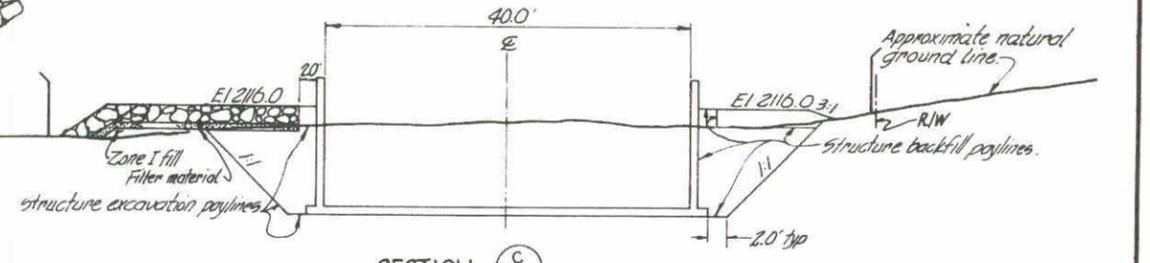
PLAN OF EMERGENCY SPILLWAY



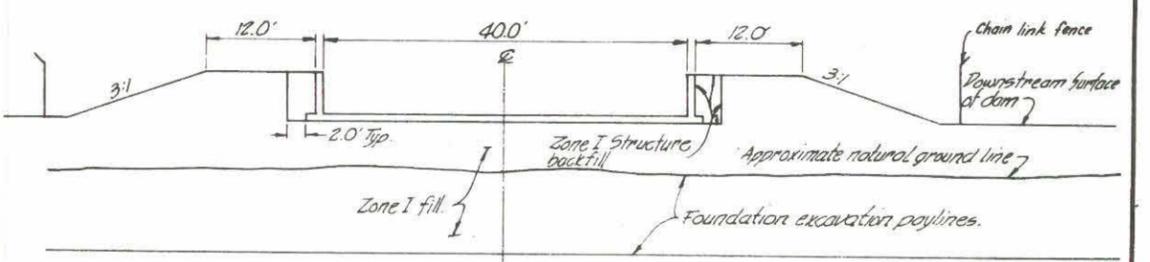
PROFILE OF EMERGENCY SPILLWAY



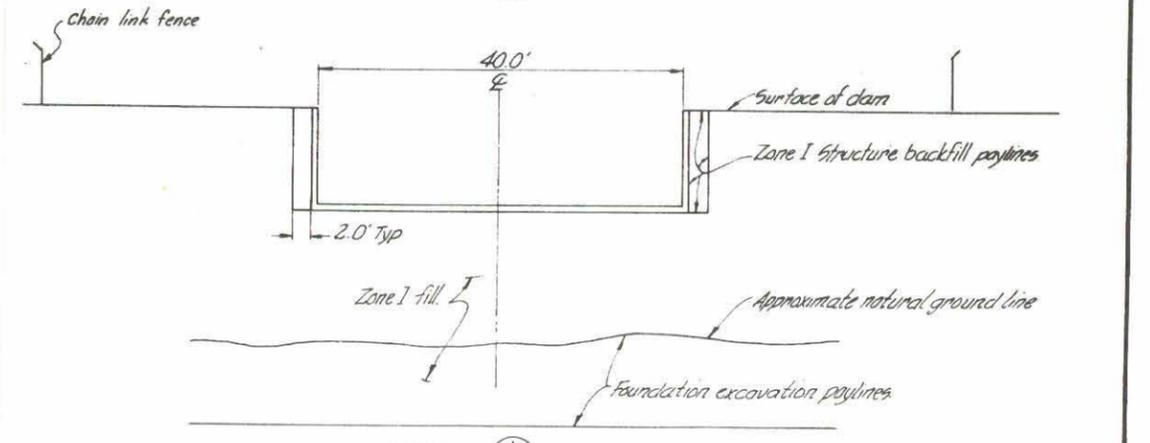
SECTION D (13/13)



SECTION C (13/13)



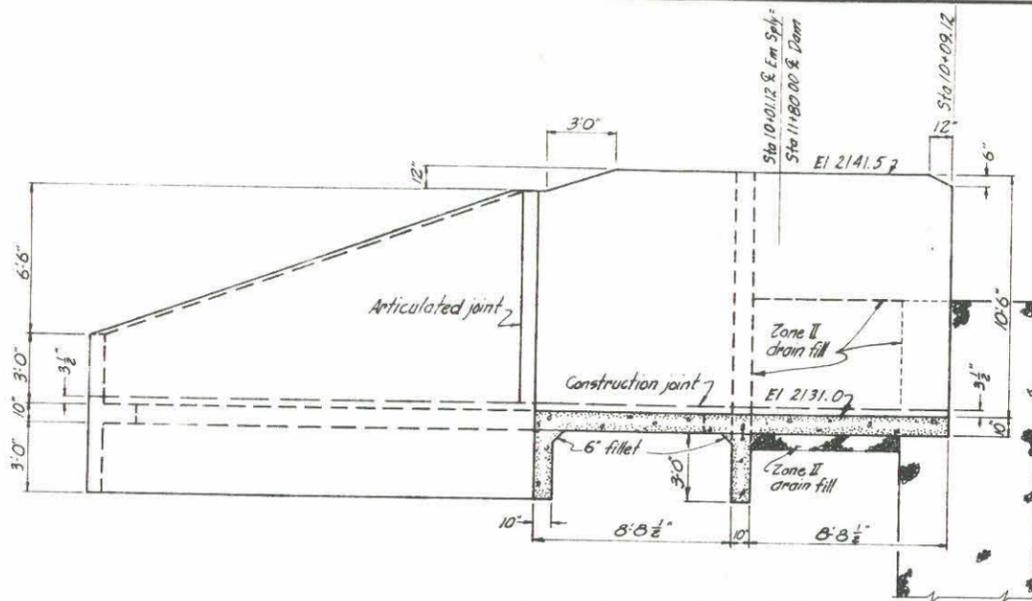
SECTION B (13/13)



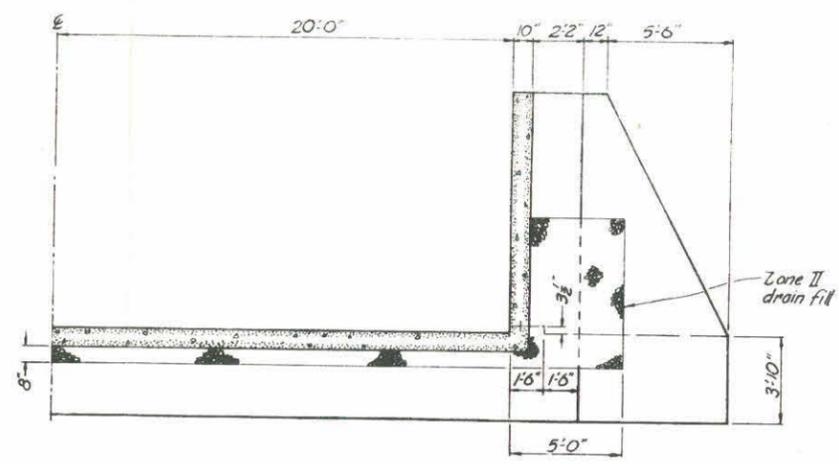
SECTION A (13/13)



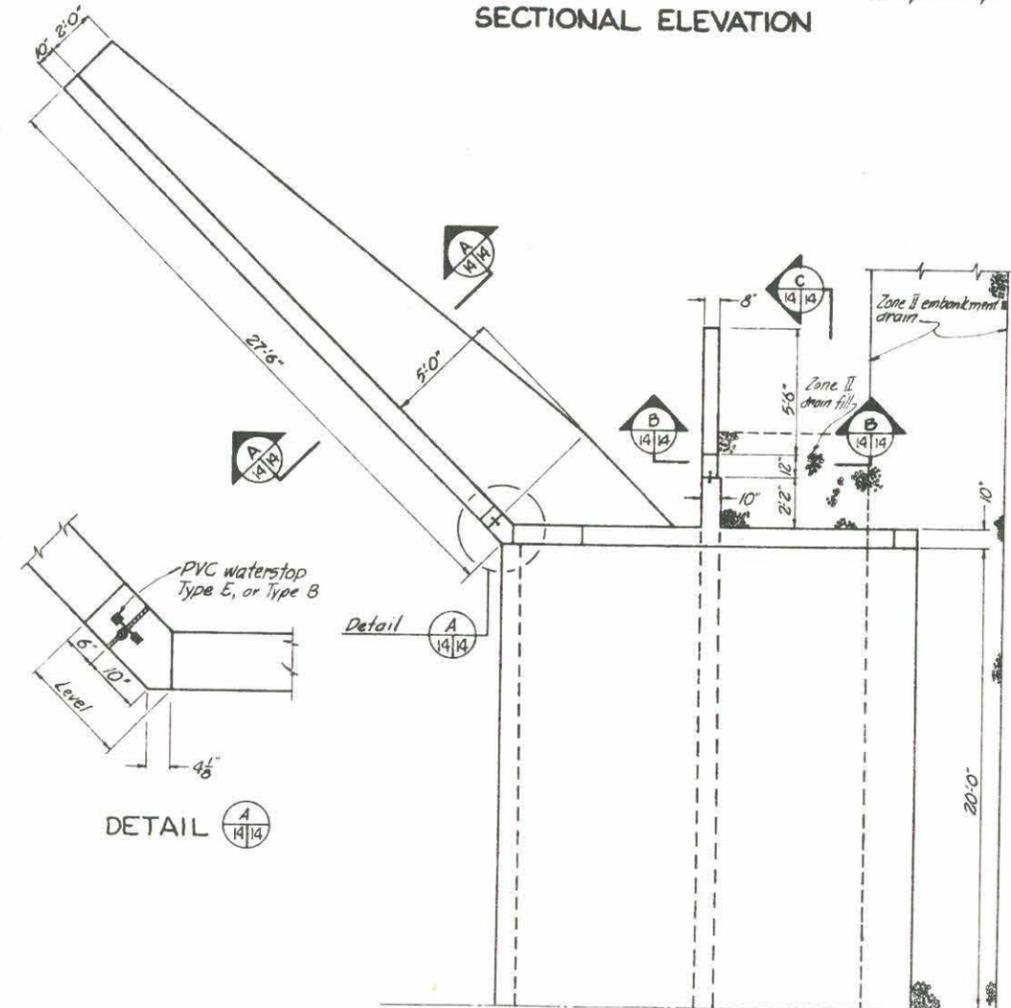
<b>EMERGENCY SPILLWAY PLAN PROFILE AND PAYLINES SUNSET F.R.S. WICKENBURG W.P.P. MARICOPA COUNTY, ARIZONA</b>			
<b>U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE</b>			
Designed	KEN J. BRUST	Date	3-75
Drawn	JACK LAND	Date	3-75
Traced		Title	
Checked		Sheet	No. 13
		Drawing No.	7-E-23089
		of 23	



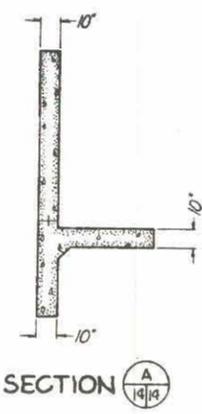
SECTIONAL ELEVATION



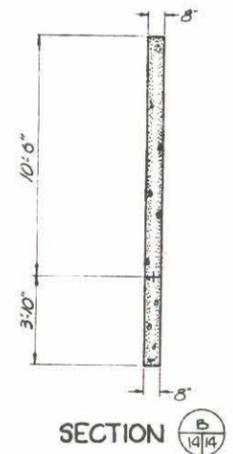
SECTION C



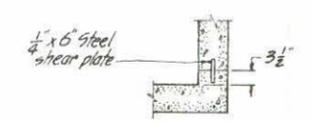
HALF PLAN



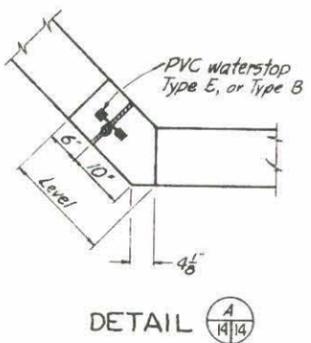
SECTION A



SECTION B



TYPICAL CONSTRUCTION JOINT DETAIL

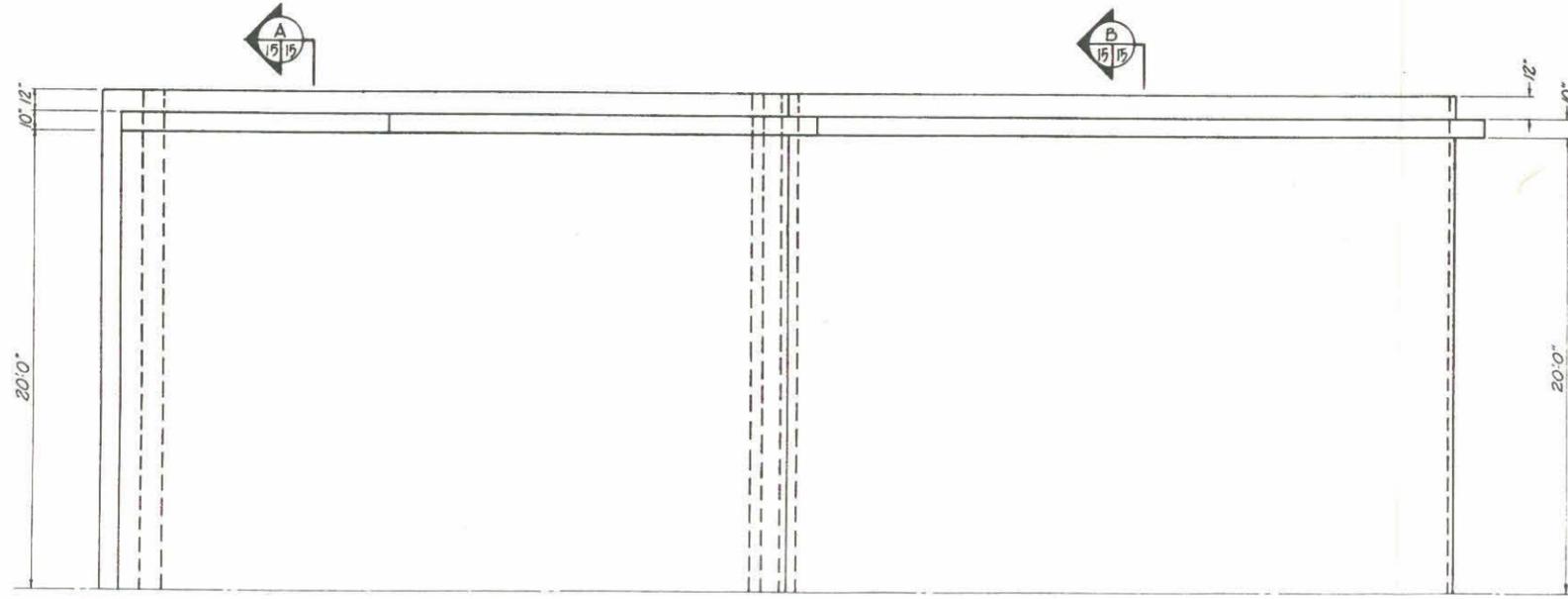
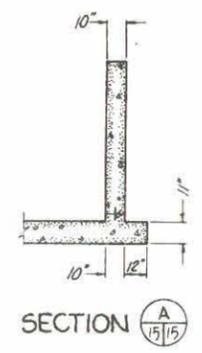
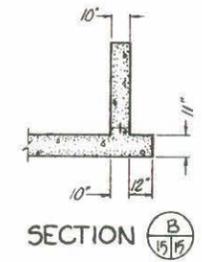
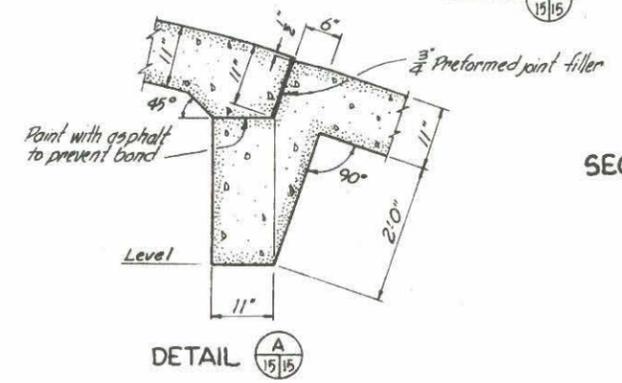
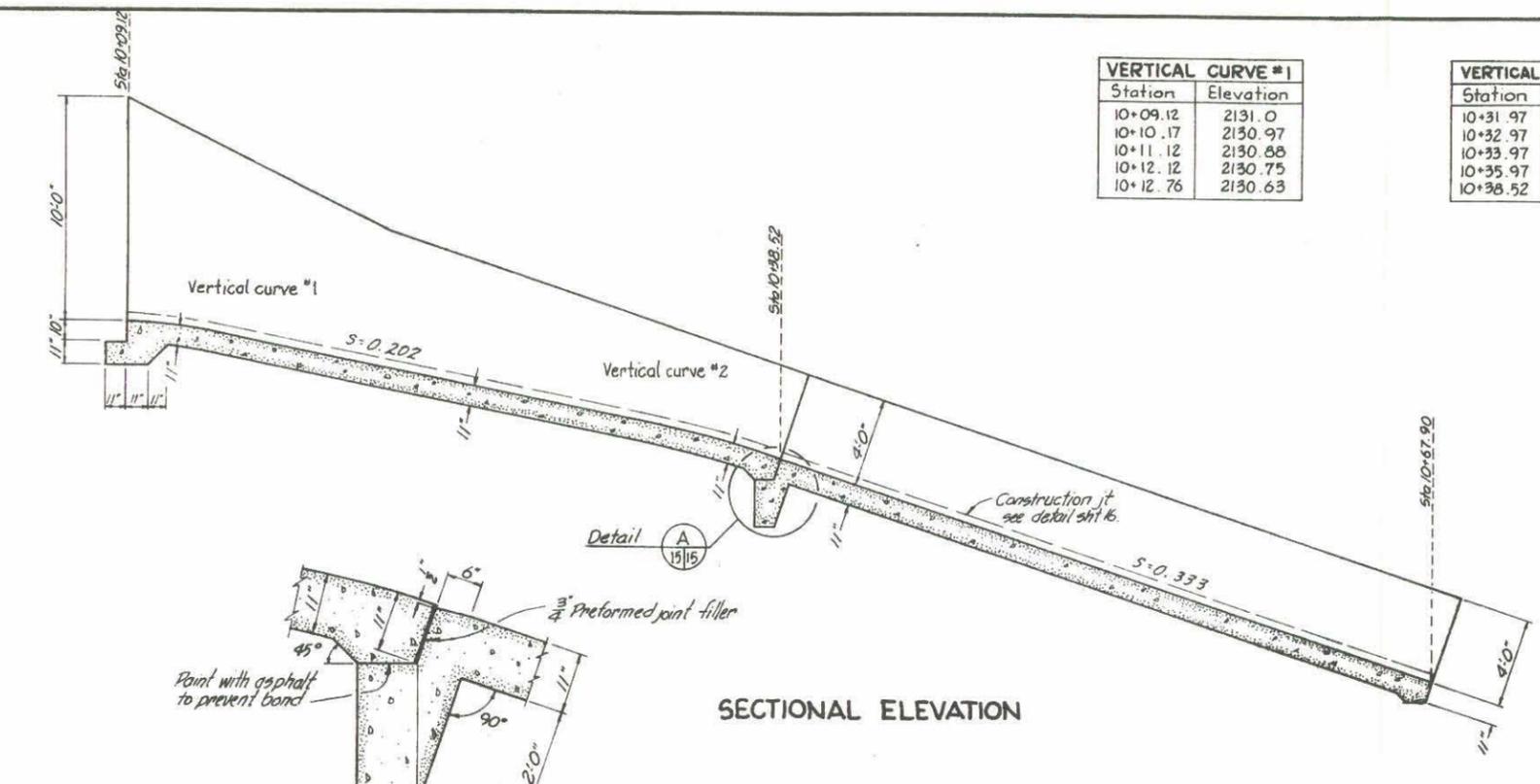


DETAIL A

EMERGENCY SPILLWAY LAYOUT			
SUNSET F.R.S.			
WICKENBURG W.P.P.			
MARICOPA COUNTY, ARIZONA			
U. S. DEPARTMENT OF AGRICULTURE			
SOIL CONSERVATION SERVICE			
Designed: Dick Helm	Date: 4-75	Approved by:	
Drawn: JACK LAND	Date: 4-75	Title:	
Checked:		Sheet:	No 14 of 25
		Drawing No:	7-E-23089

VERTICAL CURVE #1	
Station	Elevation
10+09.12	2131.0
10+10.17	2130.97
10+11.12	2130.88
10+12.12	2130.75
10+12.76	2130.63

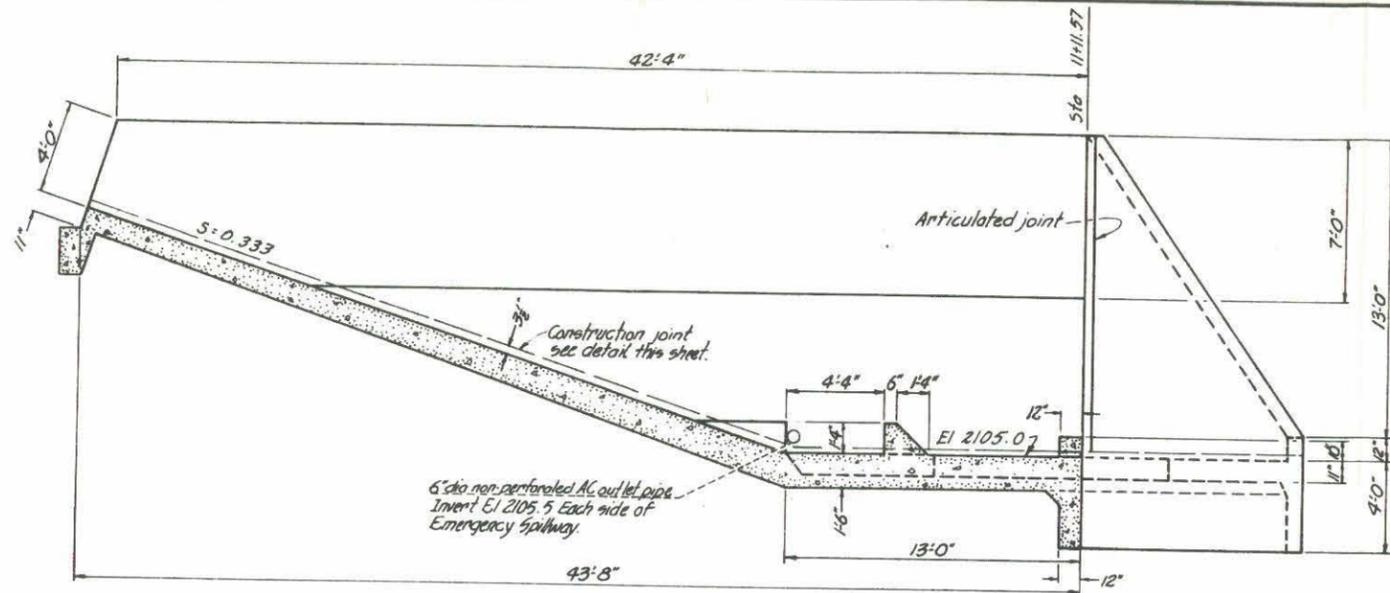
VERTICAL CURVE #2	
Station	Elevation
10+31.97	2126.75
10+32.97	2126.54
10+33.97	2126.31
10+35.97	2125.78
10+38.52	2125.0



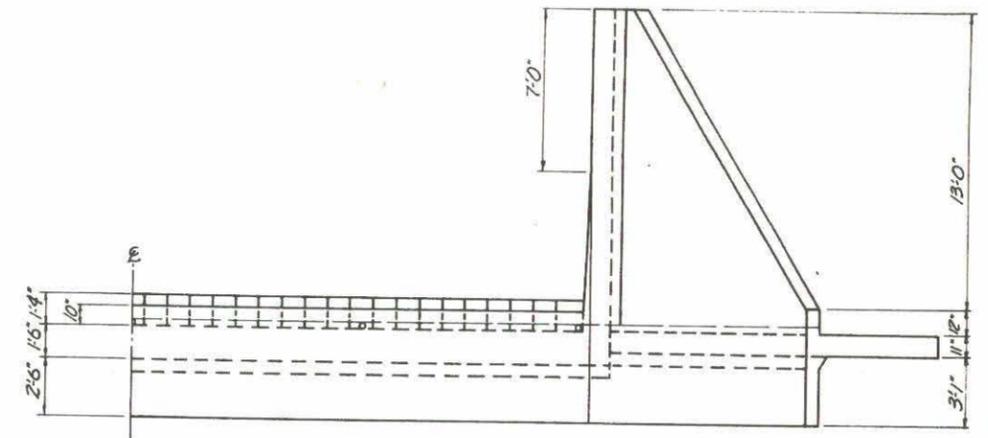
**EMERGENCY SPILLWAY LAYOUT**  
**SUNSET F.R.S.**  
 WICKENBURG W.P.P.  
 MARICOPA COUNTY, ARIZONA

**U. S. DEPARTMENT OF AGRICULTURE**  
**SOIL CONSERVATION SERVICE**

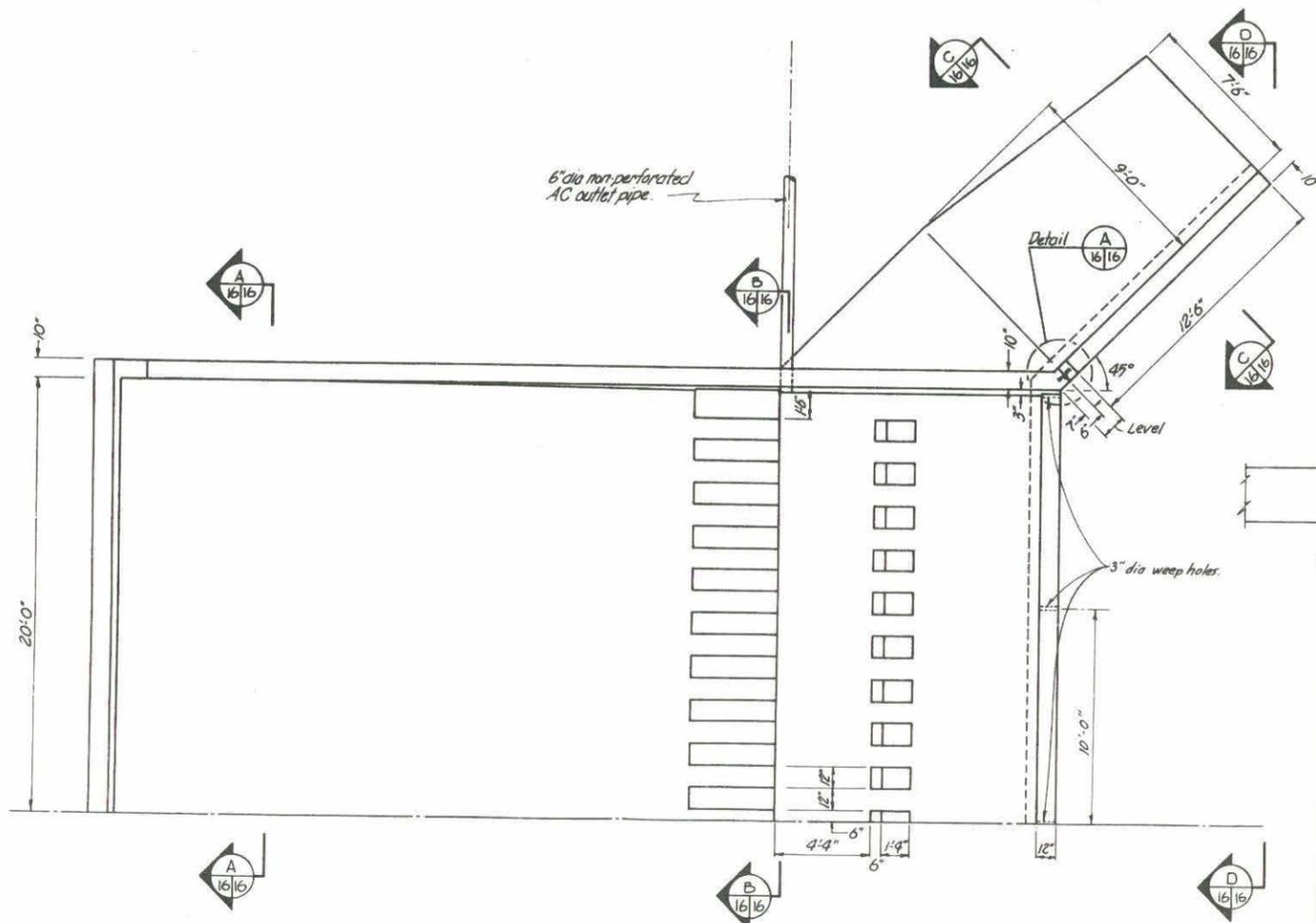
Designed: <b>KEN BRUST</b>	Date: <b>4-75</b>	Approved by: _____
Drawn: <b>JACK LAND</b>	Date: <b>4-75</b>	Title: _____
Traced: _____	Sheet No: <b>15</b>	Drawing No: <b>7-E-23089</b>
Checked: _____	of <b>25</b>	



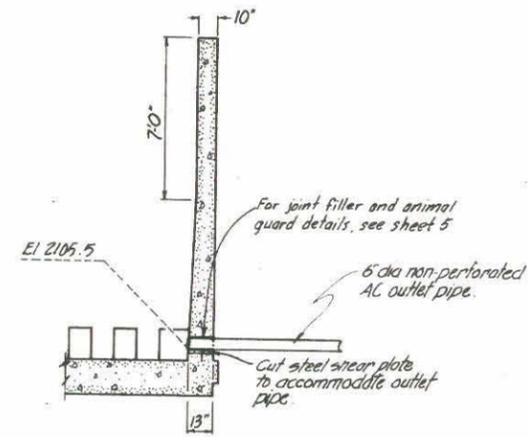
SECTIONAL ELEVATION



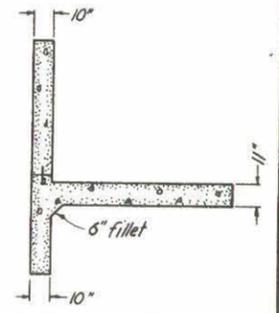
SECTION D



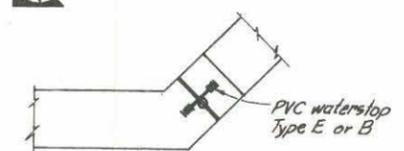
HALF PLAN



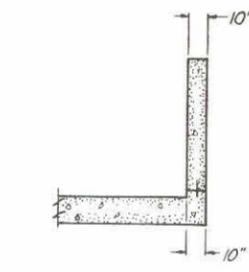
SECTION B



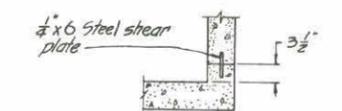
SECTION C



DETAIL A

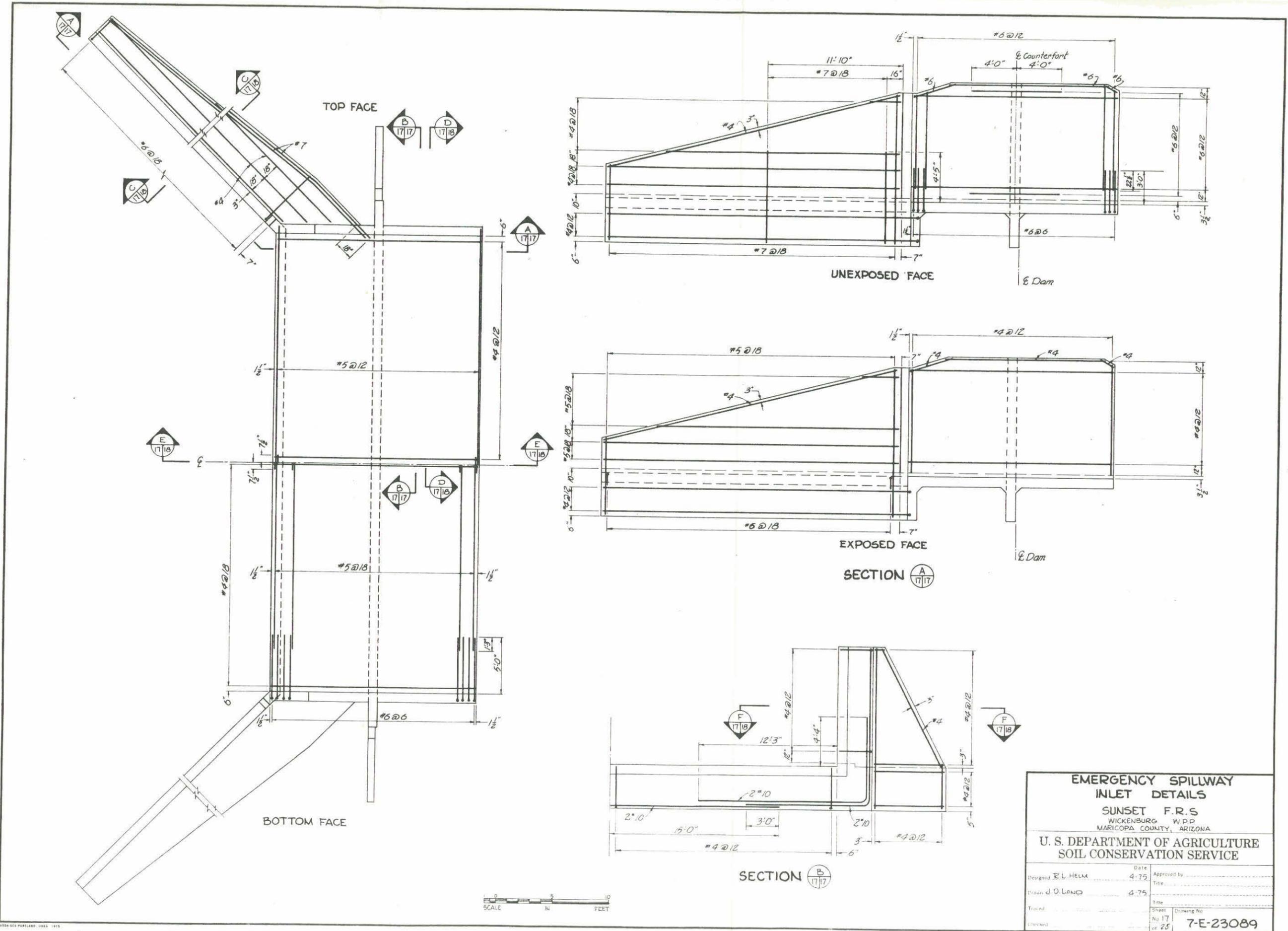


SECTION A

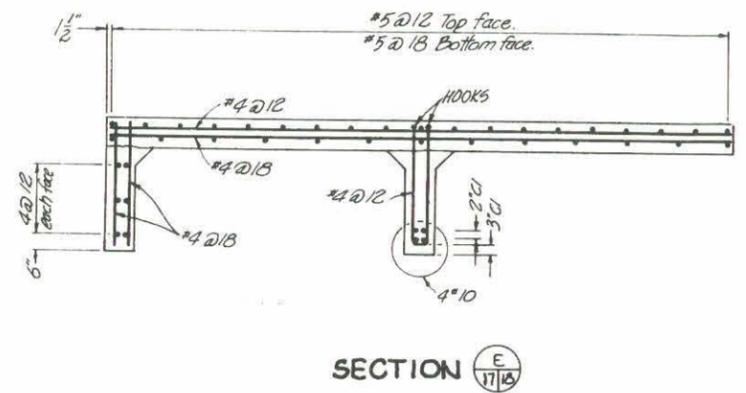


TYPICAL CONSTRUCTION JOINT DETAIL

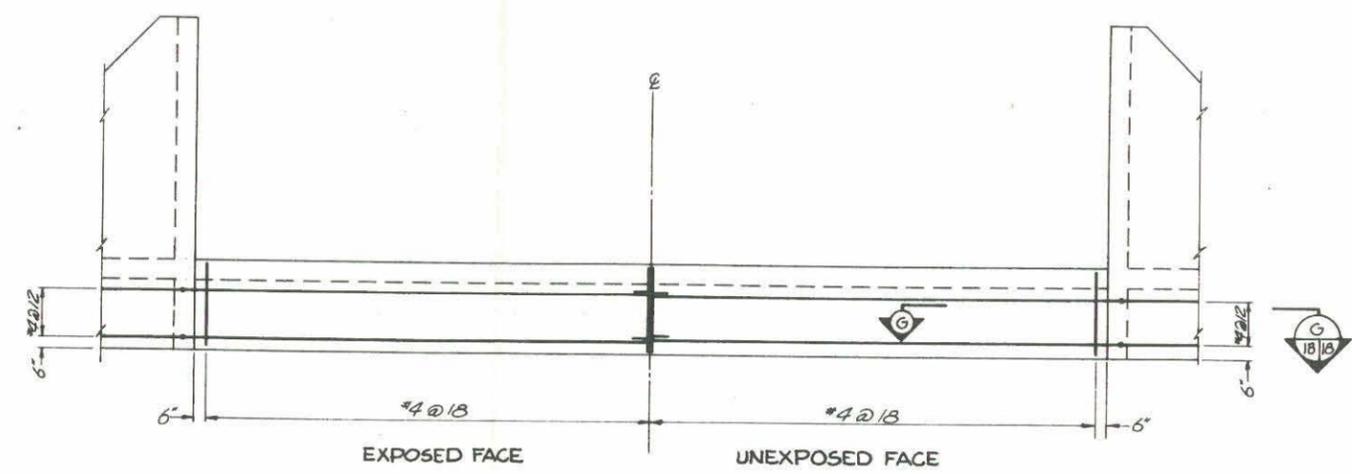
<b>EMERGENCY SPILLWAY LAYOUT</b>			
SUNSET F. R. S.			
WICKENBURG W.P.P.			
MARICOPA COUNTY, ARIZONA			
U. S. DEPARTMENT OF AGRICULTURE			
SOIL CONSERVATION SERVICE			
Designed: KEN BRUST	Date: 3-75	Approved by:	
Drawn: JACK LAND	Date: 4-75	Title:	
Traced:		Sheet: 16	Drawing No: 7-E-23089
Checked:		No. 16 of 25	



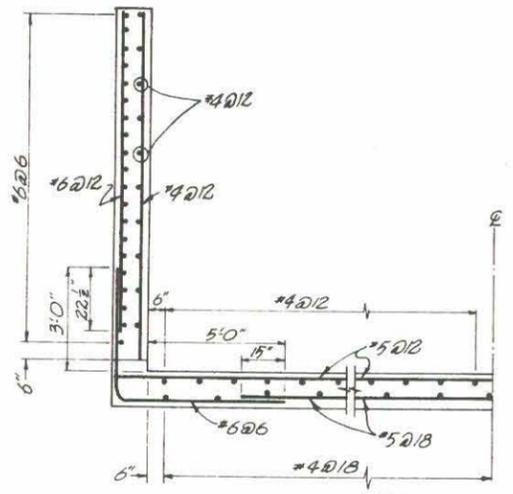
<b>EMERGENCY SPILLWAY INLET DETAILS</b>			
SUNSET F.R.S WICKENBURG W.P.D. MARICOPA COUNTY, ARIZONA			
<b>U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE</b>			
Designed	R.L. HELM	Date	4-75
Drawn	D. LAND	Date	4-75
Traced		Title	
Checked		Sheet	No. 17
		Drawing No.	7-E-23089
		of	25



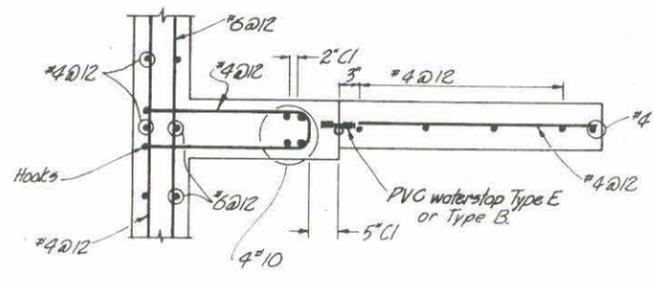
SECTION E  
17/18



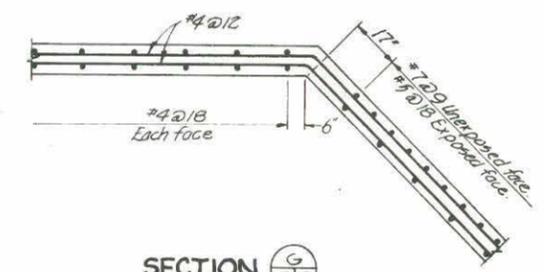
UPSTREAM ELEVATION



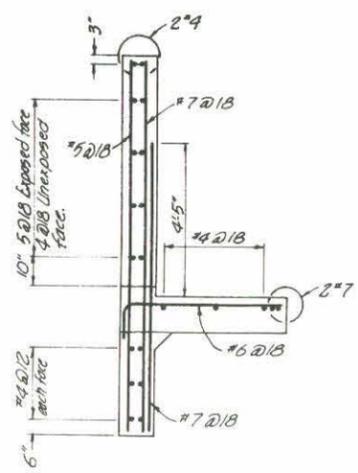
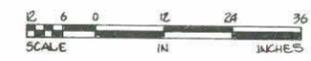
SECTION D  
17/18



SECTION F  
17/18



SECTION G  
18/18

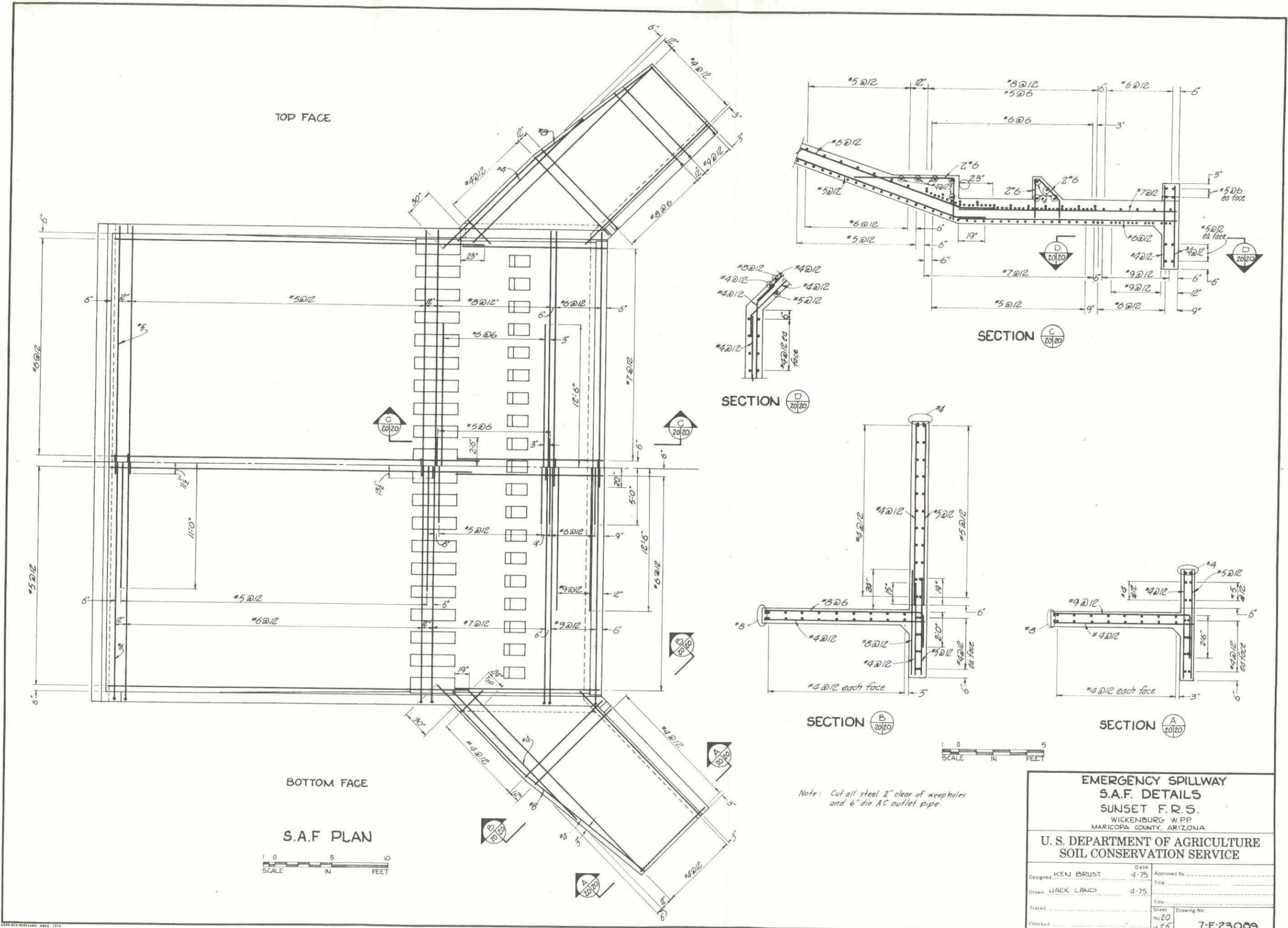


SECTION C  
17/18



<b>EMERGENCY SPILLWAY INLET DETAILS</b>			
SUNSET F.R.S. WICKENBURG W.P.P. MARICOPA COUNTY, ARIZONA			
<b>U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE</b>			
Designed	R.L. Helm	Date	4-75
Drawn	J.D. Land	Date	4-75
Traced		Sheet	No 18
Checked		of	25
Approved by		Drawing No	
		7-E-23089	





TOP FACE

BOTTOM FACE

S.A.F. PLAN

SCALE 1" = 5'

SECTION C-C

SECTION D-D

SECTION B-B

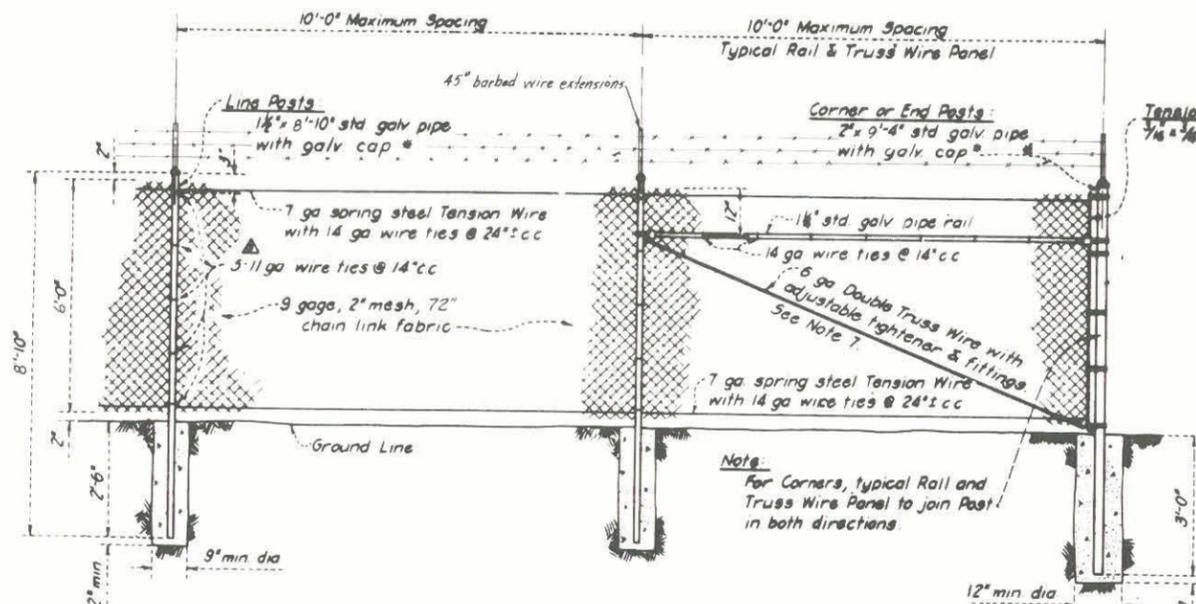
SECTION A-A

SCALE 1" = 5'

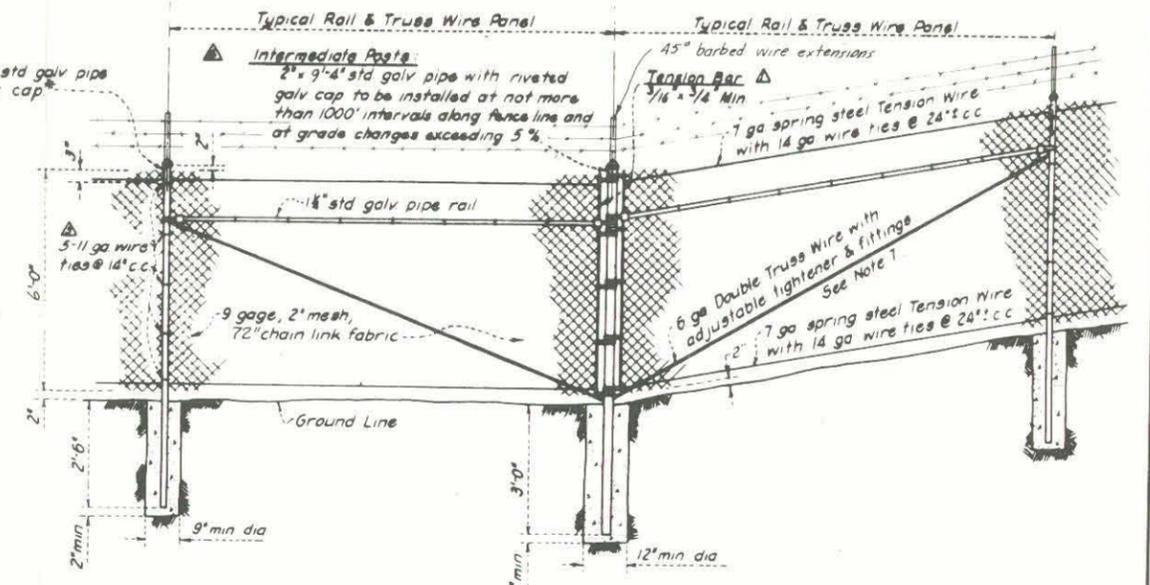
Note: Cut all steel 2" clear of weepholes and 6" dia AC outlet pipe.

<p><b>EMERGENCY SPILLWAY</b>  <b>S.A.F. DETAILS</b>  <b>SUNSET F.R.S.</b>          WICKENBURG W.P.P.          MARICOPA COUNTY, ARIZONA</p>			
<p><b>U. S. DEPARTMENT OF AGRICULTURE</b>  <b>SOIL CONSERVATION SERVICE</b></p>			
Designed	KEN BRUST	Date	4-75
Drawn	JACK LAND	Date	4-75
Traced		Sheet	No 20
Checked		Drawing No.	7-E-23009

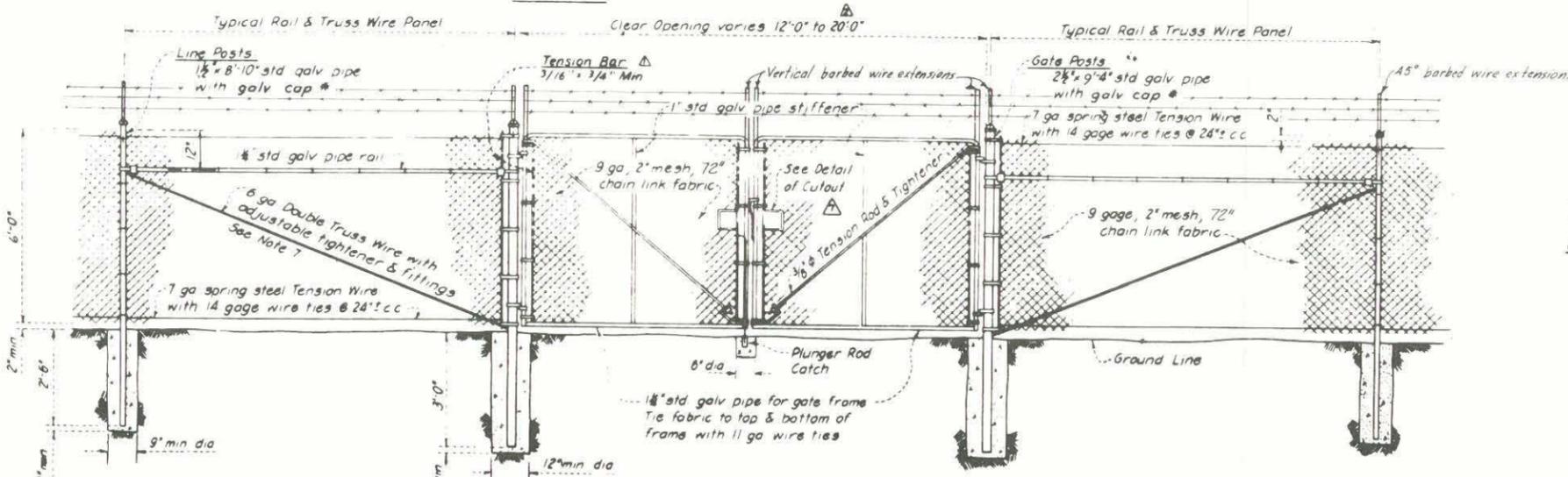




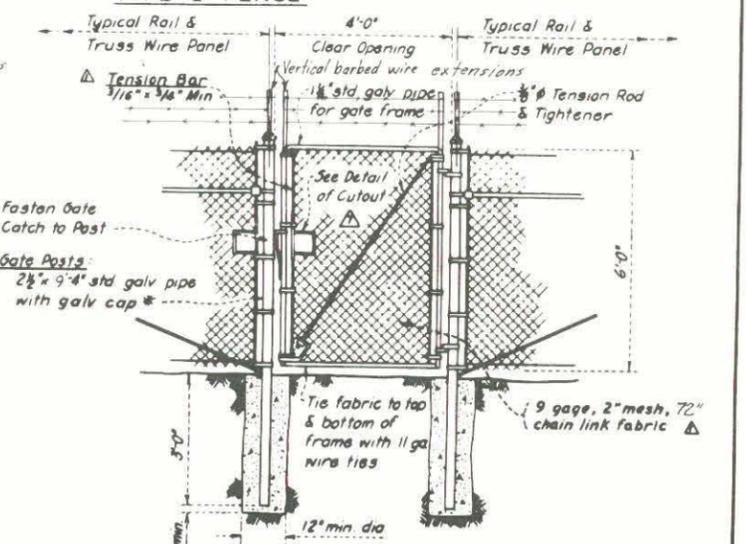
**TYPICAL FENCE ELEVATION  
TYPE I**



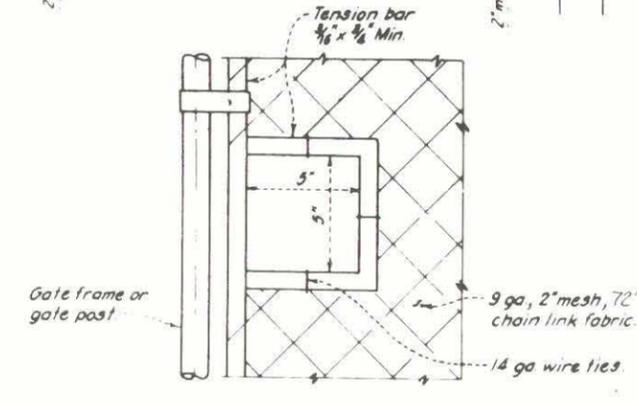
**INTERMEDIATE POST DETAIL  
TYPE I FENCE**



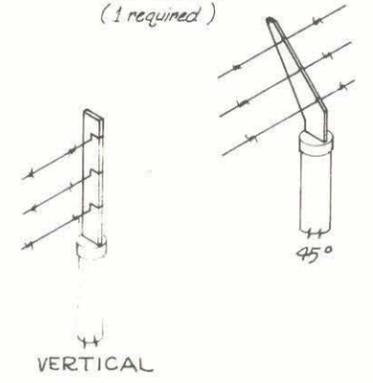
**DOUBLE DRIVE GATE DETAIL  
TYPE I-A  
(1 required)**



**TYPICAL WALK GATE  
TYPE I-B**



**DETAIL OF CUTOUT  
FOR CHAIN AND LOCK  
SCALE: NONE**



**BARBED WIRE EXTENSION  
ARM DETAILS**

- GENERAL NOTES**
- 1- 1" std pipe shall be of minimum weight of 168 lbs per lin ft before galvanizing
  - 2- 1 1/2" std pipe shall be of minimum weight of 227 lbs per lin ft before galvanizing
  - 3- 1 3/4" std pipe shall be of minimum weight of 272 lbs per lin ft before galvanizing
  - 4- 2" std pipe shall be of minimum weight of 365 lbs per lin ft before galvanizing
  - 5- 2 1/2" std pipe shall be of minimum weight of 579 lbs per lin ft before galvanizing
  - 6- Steel tubing may be used in lieu of standard pipe, provided that: it shall be electric welded or seamless; the weight per foot shall be not less than weights shown on the drawing; the O.D. of the tubing shall not exceed that of standard pipe by more than 1/8 inch, and the weight of galvanizing by the hot dip process shall be not less than 2 oz per sq ft total coated surface.
  - 7- Adjustable tighteners shall be turnbuckle or equivalent, having 6-inch min. take up.
  - 8- All gate hinges shall be heavy duty, malleable iron or steel, industrial service type 270 degree swing of approved quality and design.
  - 9- Secure galv cap to Post with 1/4 inch round head rivets.

**FENCING DETAILS**  
SUNSET F.R.S.  
WICKENBURG WPP  
MARICOPA COUNTY, ARIZONA

**U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE**

Designed	K.J. Brust	Date	3-75	Approved By	
Drawn		Title			
Traced		Sheet	no 22	Drawing No	
Checked		of 25			7-E-23089



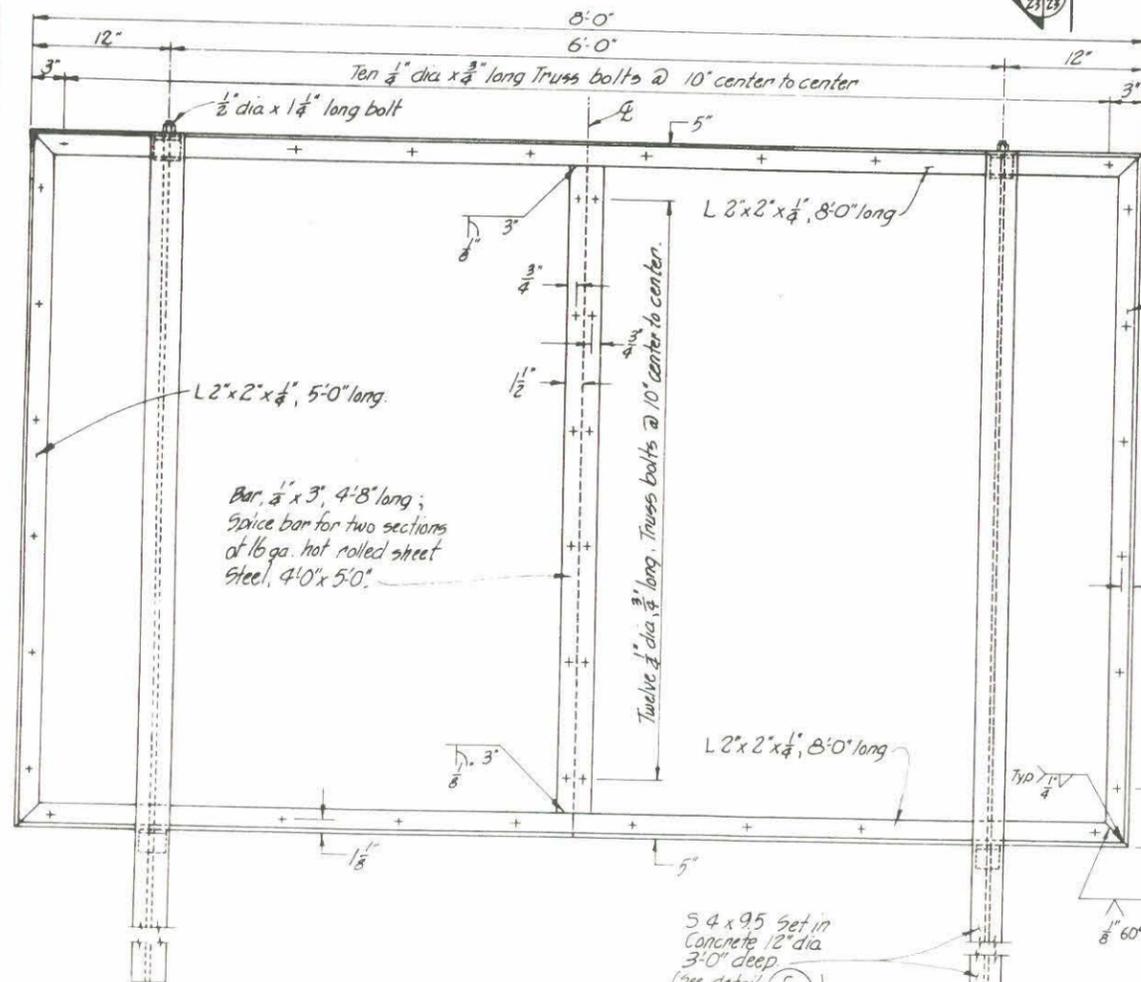
# WICKENBURG WATERSHED PROJECT FLOODWATER RETARDING DAM

DRAINAGE AREA 384.0 ACRES  
 FLOOD WATER RETARDING STORAGE 55.0 ACRE FT.  
 WATER SURFACE AREA 8.6 ACRES  
 HEIGHT OF DAM 30.5 FEET  
 VOLUME OF FILL 67,800.0 CUBIC YD.

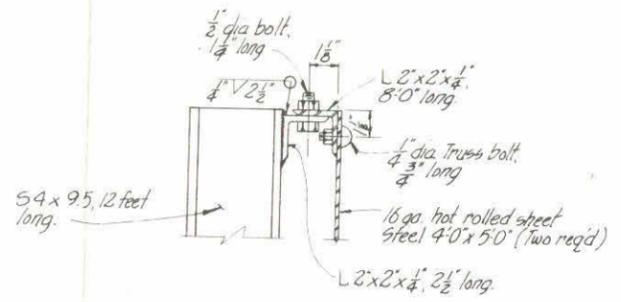
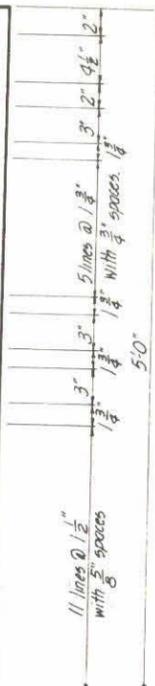
## BUILT UNDER THE WATERSHED PROTECTION AND FLOOD PREVENTION ACT

BY  
 FLOOD CONTROL DISTRICT OF MARICOPA COUNTY  
 TRIANGLE NATURAL RESOURCE CONSERVATION DISTRICT  
 WICKENBURG NATURAL RESOURCE CONSERVATION DISTRICT  
 YAVAPAI COUNTY BOARD OF SUPERVISORS  
 TOWN OF WICKENBURG  
 WITH THE ASSISTANCE OF  
 SOIL CONSERVATION SERVICE  
 OF THE  
 U.S. DEPARTMENT OF AGRICULTURE  
 1975

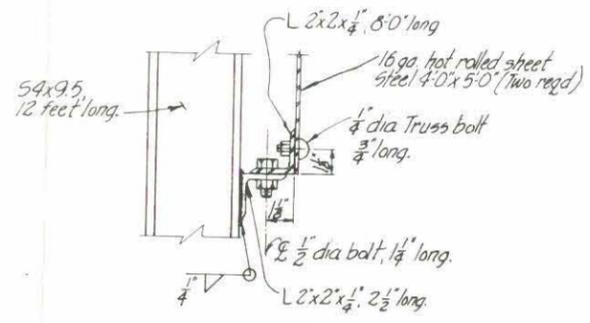
### LETTERING LAYOUT



REAR ELEVATION



DETAIL B 23/23



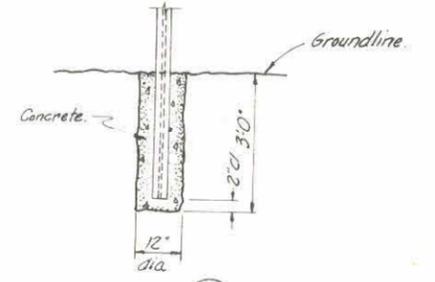
DETAIL A 23/23



Detail B 23/23



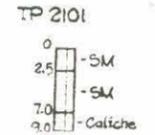
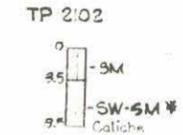
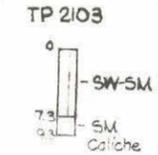
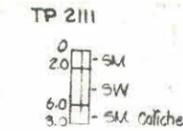
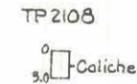
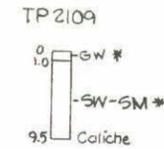
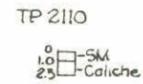
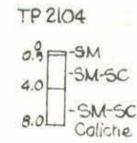
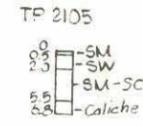
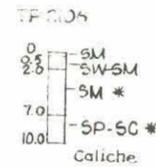
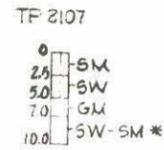
Detail A 23/23



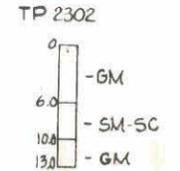
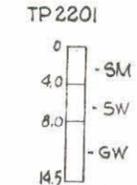
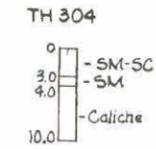
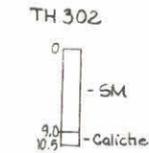
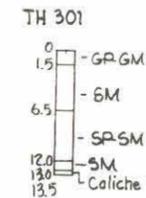
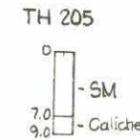
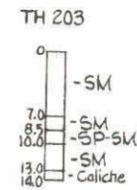
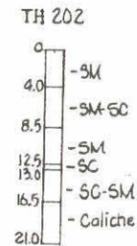
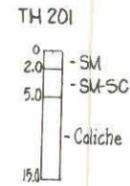
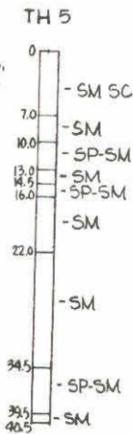
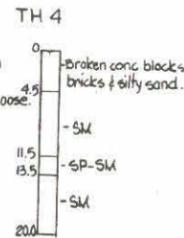
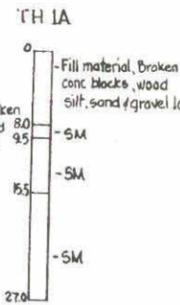
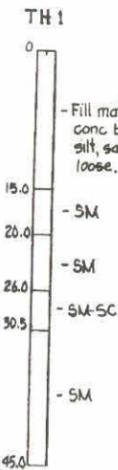
DETAIL C 24/24

- Notes:
1. All bolts shall be installed with lock washers.
  2. All bolts, nuts and washers to be galvanized steel.
  3. Approved spot welding or tack welding may be substituted for truss bolts in securing sheet steel sign sections to frame.

SIGN DETAILS SUNSET F.R.S. WICKENBURG W.P.P. MARICOPA COUNTY, ARIZONA			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
Designed: K.J. Brust	Date: 3-75	Approved by:	
Drawn: J.D. Land	Date: 3-75	Title:	
Drawn:	Sheet No. 24	Drawing No.:	
Checked:	of 25		7-E-23089



**BORROW AREA**

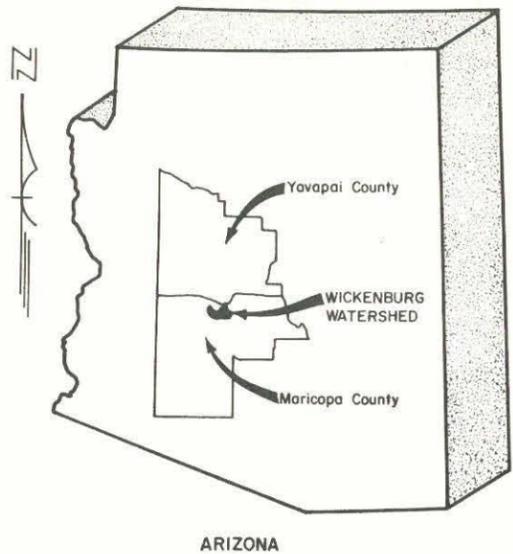


**DAM SITE AREA**

Notes:

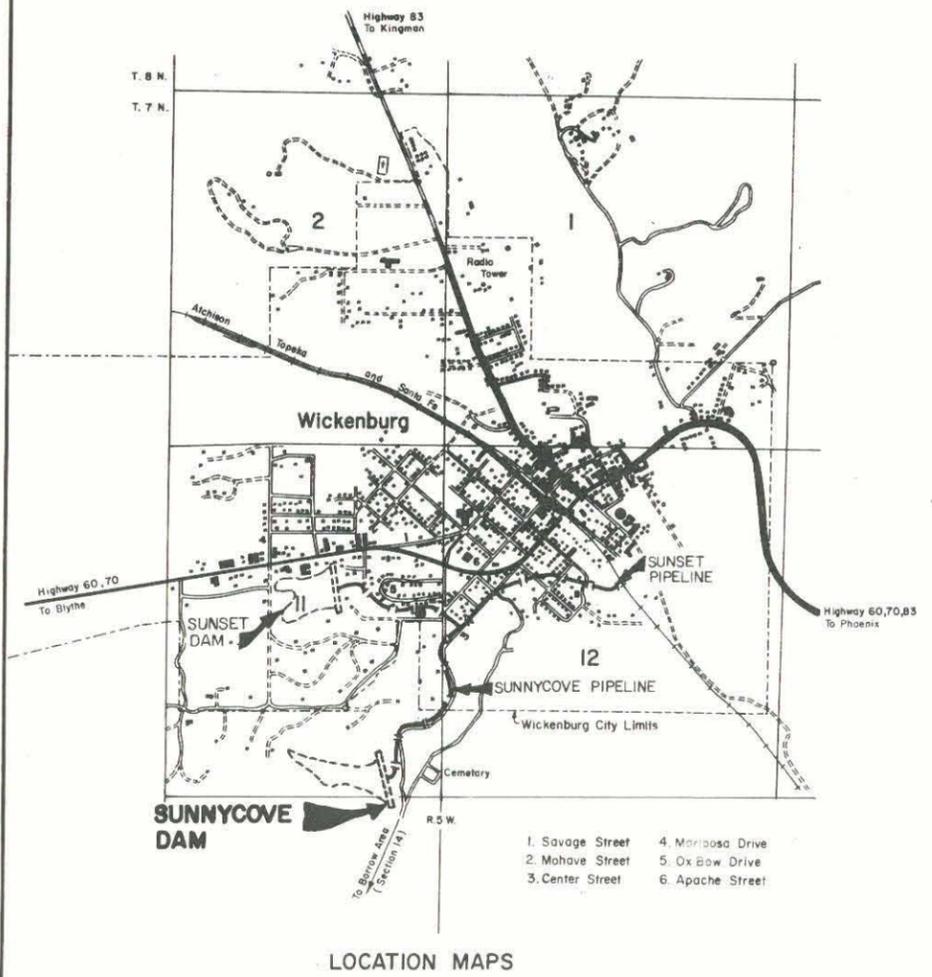
1. Unified soil descriptions are based on field identifications except where an asterisk is shown the classification has been based on laboratory analysis.
2. Complete field logs, laboratory test data and geologic report are available for review in the project office.
3. For locations of Test pits and Testholes see sheet 2.

<b>SOIL LOGS</b>			
SUNSET F.R.S.			
WICKENBURG W.P.P.			
MARICOPA COUNTY, ARIZONA			
<b>U. S. DEPARTMENT OF AGRICULTURE</b>			
<b>SOIL CONSERVATION SERVICE</b>			
Logged <i>A. Sanders</i>	Date 9-74	Approved by _____	Title _____
Drawn <i>Jack D. Land</i>	3-75	Title _____	_____
Traced _____	_____	_____	_____
Checked <i>G.M.C.</i>	4-75	Sheet N 25 of 25	Drawing No. 7-E-23089



# WICKENBURG WATERSHED PROTECTION AND FLOOD PREVENTION PROJECT MARICOPA AND YAVAPAI COUNTIES, ARIZONA PLANS FOR THE CONSTRUCTION OF **SUNNYCOVE FLOODWATER RETARDING STRUCTURE**

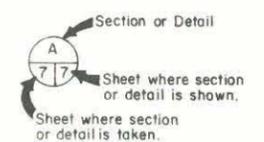
PREPARED FOR THE  
MARICOPA COUNTY FLOOD CONTROL DISTRICT  
TRIANGLE NATURAL RESOURCE CONSERVATION DISTRICT  
WICKENBURG NATURAL RESOURCE CONSERVATION DISTRICT  
YAVAPAI COUNTY BOARD OF SUPERVISORS  
AND  
TOWN OF WICKENBURG  
BY  
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE



### INDEX OF DRAWINGS

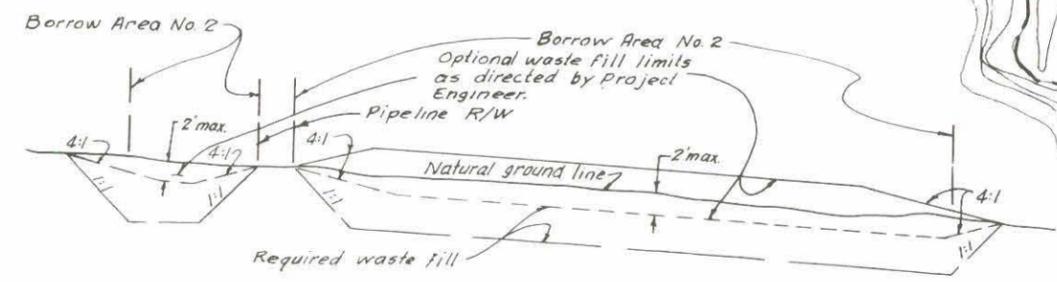
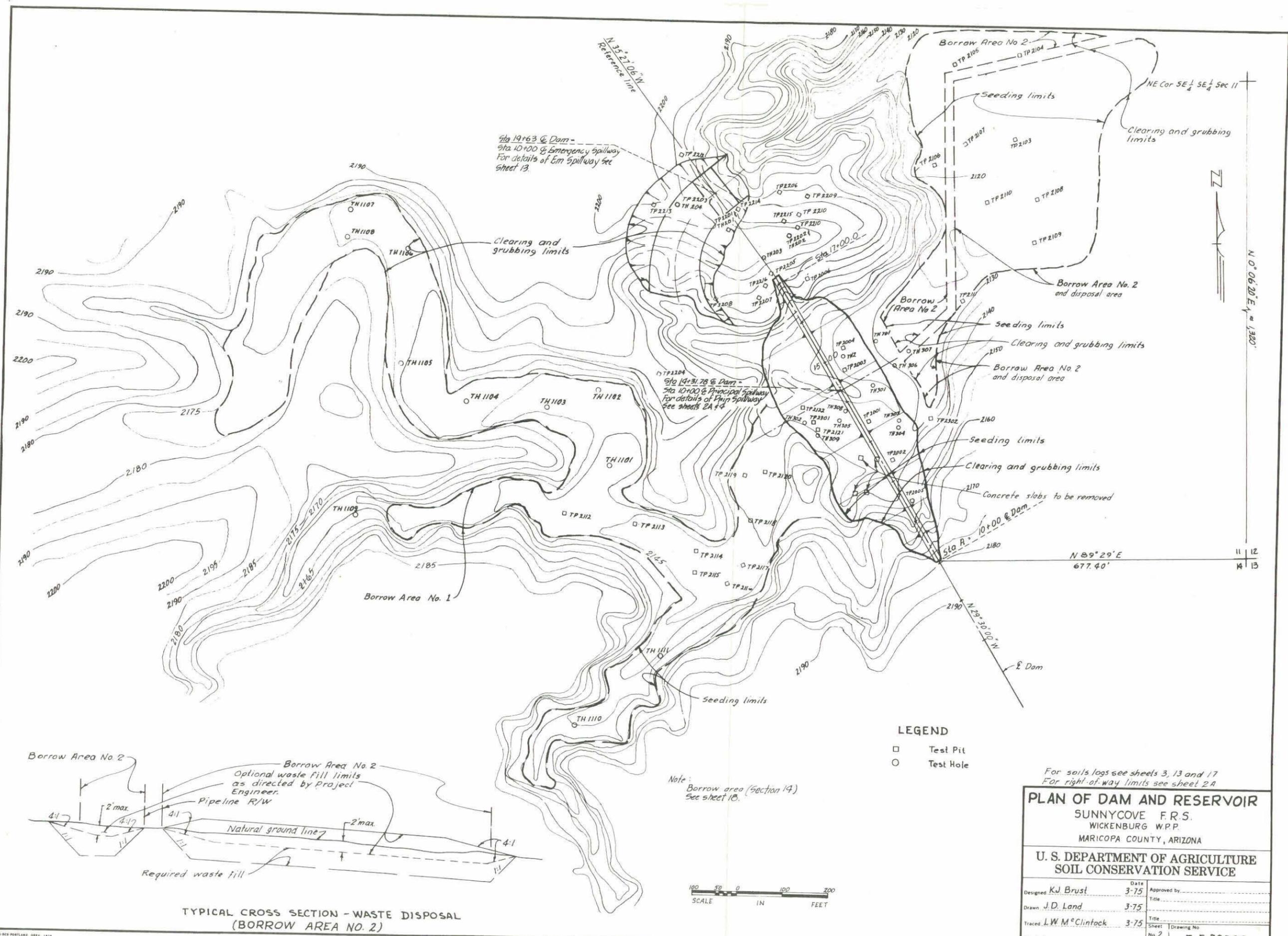
SHT. NO.	TITLE
1.	INDEX OF DRAWINGS
2.	PLAN OF DAM AND RESERVOIR
2A.	ALIGNMENT LOCATION MAP
3.	PROFILE ON $\frac{1}{2}$ DAM AND EXCAVATION SCHEDULES
4.	PROFILE ON $\frac{1}{2}$ PRINCIPAL SPILLWAY & TYPICAL CROSS SECTION
5.	DRAIN LAYOUT DETAILS
6.	RISER LAYOUT DETAILS
7.	TRASH GUARD DETAILS
8.	RISER DETAILS
9.	RISER DETAILS
10.	RISER DETAILS
11.	GATE CONTROL DETAILS
12.	PRINCIPAL SPILLWAY CONDUIT DETAILS
13.	EMERGENCY SPILLWAY PLAN, PROFILE AND PAYLINES
14.	FENCING DETAILS
15.	SIGN DETAILS
16.	CACTUS SALVAGING DETAILS
17.	SOIL LOGS
18.	LOCATION OF BORROW AREA (SECTION 14)

- | GENERAL NOTES  | STRUCTURAL NOTES  |
|--|---|
| 1. Elevations are in feet above mean sea level datum.  | 1. All exposed concrete edges shall be chamfered one inch or rounded.   |
| 2. All stationing refers to centerline of construction and is the measured horizontal distance.  | 2. Spacing of reinforcement bars is measured center to center of bars. Bar cover is the clear distance between surface of bar and face of concrete, and unless otherwise shown is two inches for formed and top surfaces and three inches for surfaces against earth. |
| 3. All cross sections are taken looking in the direction of increasing stations unless otherwise shown.  | 3. All bar splices not shown on these drawings shall be staggered with bars lapped a minimum of 30 diameters of the smaller bar in the splice.  |
| 4. Soil logs on these drawings show general condition at the site and are the basis for this design. Log of foundation investigation borings and test pits are contained in the exploration data report. A complete set of all soils investigation logs and geology report is available at the project office for reference. | 4. All nuts, bolts, washers, etc., used in the permanent works of this project shall be galvanized steel unless otherwise noted.  |
| 5. Unified soil descriptions are based on field identifications except where an asterisk is shown the classification has been based on laboratory analysis.  |   |



INDEX OF DRAWINGS	
SUNNYCOVE FRS.	
MARICOPA AND YAVAPAI COUNTIES, ARIZONA	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
Date Designed Soil Conservation Service ... 3-75 Drawn Soil Conservation Service ... 3-75 Traced Checked	Approved by: <i>Ralph M. Arington</i> Title: State Conservation Engineer Date: 6/12/75 Sheet No. 1 of 18 Drawing No. 7-E-23090

TOWN OF WICKENBURG <b>APPROVED</b> DATE: 6-16-75 <i>E. Curtis Smith</i> Mayor	YAVAPAI COUNTY BOARD OF SUPERVISORS <b>APPROVED</b> DATE: 6/16/75 <i>R. Bruce Evans</i> Chairman	WICKENBURG NATURAL RESOURCE CONSERVATION DISTRICT <b>APPROVED</b> DATE: 6-12-75 <i>Vito Giorgio</i> Secretary - Treasurer	TRIANGLE NATURAL RESOURCE CONSERVATION DISTRICT <b>APPROVED</b> DATE: 6/16/75 <i>Curtis Ritter</i> Chairman	MARICOPA COUNTY FLOOD CONTROL DISTRICT <b>APPROVED</b> DATE: 6/12/75 <i>Superintendent</i> Chief Engineer
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TYPICAL CROSS SECTION - WASTE DISPOSAL  
(BORROW AREA NO. 2)

Note:  
Borrow area (Section 14)  
See sheet 10.

LEGEND

- Test Pit
- Test Hole

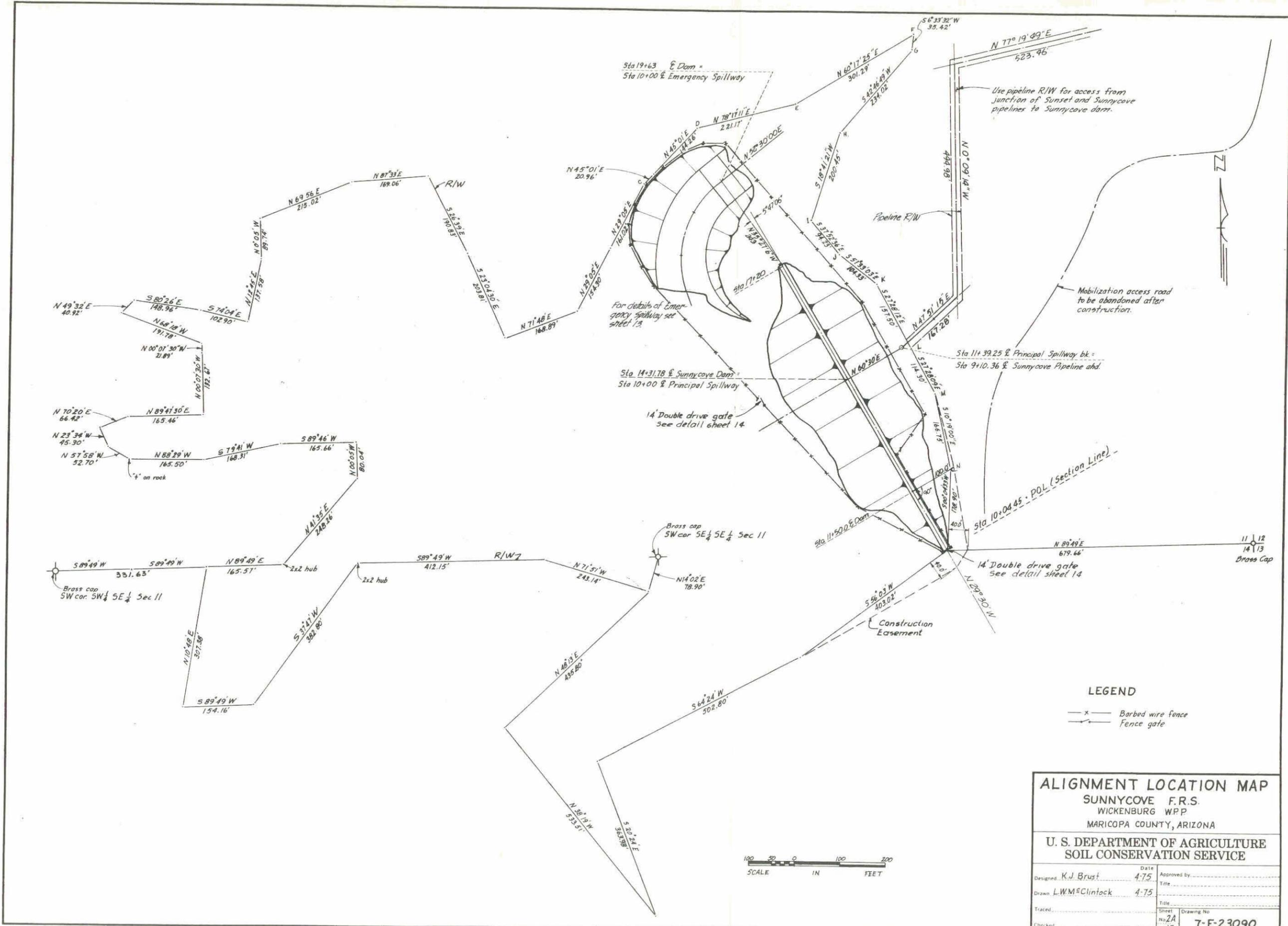


For soils logs see sheets 3, 13 and 17  
For right-of-way limits see sheet 2A

**PLAN OF DAM AND RESERVOIR**  
SUNNYCOVE F.R.S.  
WICKENBURG W.P.P.  
MARICOPA COUNTY, ARIZONA

**U. S. DEPARTMENT OF AGRICULTURE**  
**SOIL CONSERVATION SERVICE**

Designed <b>K.J. Brust</b>	Date <b>3-75</b>	Approved by _____
Drawn <b>J.D. Land</b>	Date <b>3-75</b>	Title _____
Traced <b>L.W.M. Clintock</b>	Date <b>3-75</b>	Title _____
Checked _____	Sheet <b>No. 2</b>	Drawing No. _____
	of <b>8</b>	<b>7-E-23090</b>



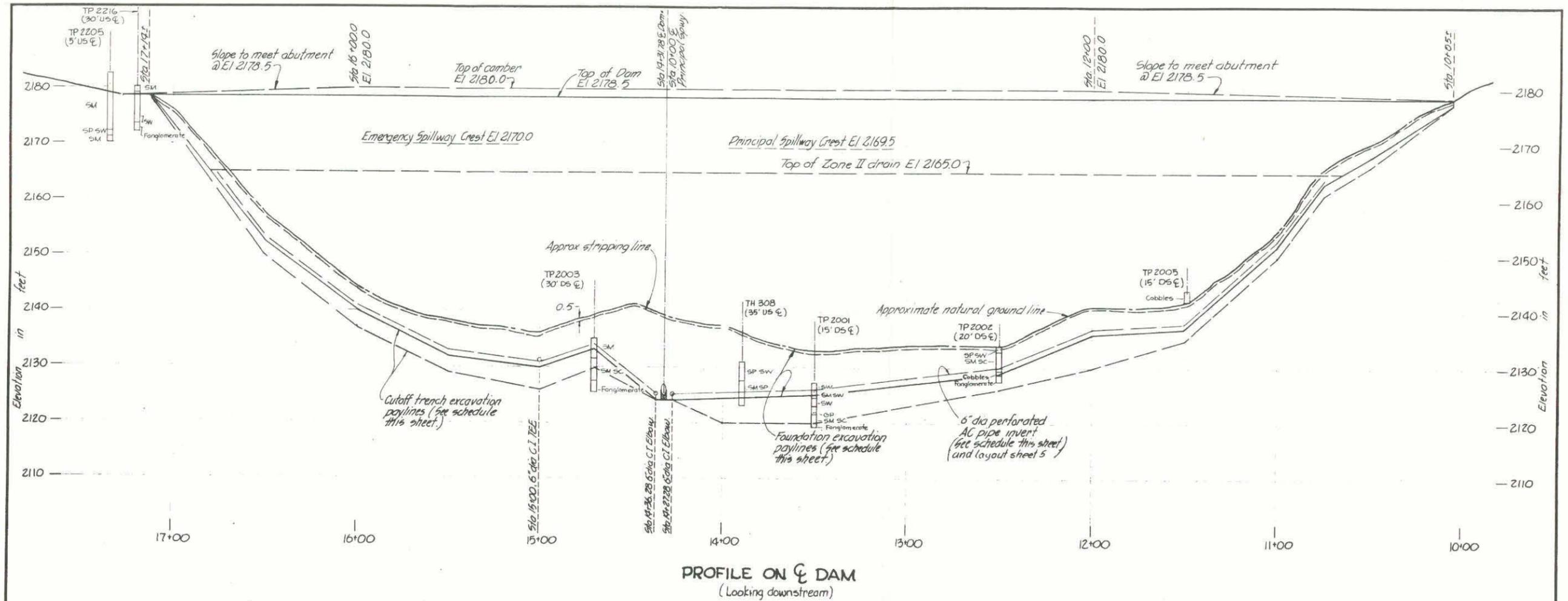
**LEGEND**  
 x — Barbed wire fence  
 — Fence gate

**ALIGNMENT LOCATION MAP**  
 SUNNYCOVE F.R.S.  
 WICKENBURG W.P.P.  
 MARICOPA COUNTY, ARIZONA

**U. S. DEPARTMENT OF AGRICULTURE**  
**SOIL CONSERVATION SERVICE**

Designed <i>K.J. Brust</i>	Date <i>4-75</i>	Approved by _____
Drawn <i>L.W.M. Clintock</i>	Date <i>4-75</i>	Title _____
Traced _____	Sheet <i>2A</i>	Drawing No _____
Checked _____	of <i>18</i>	<b>T-E-23090</b>





**SCHEDULES**

FOUNDATION EXCAVATION	
STATION	ELEVATION
10+05 ±	2177.5
10+50	2168.0
10+75	2163.0
11+00	2152.0
11+50	2137.0
12+00	2136.0
12+50	2129.0
13+50	2125.0
14+27.28	2124.1
14+36.28	2124.1
14+70	2133.0
15+00	2130.0
15+50	2132.0
16+00	2140.0
16+50	2153.0
17+00	2174.0
17+14 ±	2177.5

Ⓛ Elevations at E Dam. Excavated surface in cross sections shall be to firm conglomerate except from Sta 13+50 to Sta 14+50 where foundation excavation shall be uniformly sloped to the foundation excavation lines required for Principal Spillway. See Profile on E Principal Spillway sheet 4.

CUTOFF TRENCH EXCAVATION	
STATION	ELEVATION
10+05 ±	2177.5
10+50	2166.0
10+75	2161.0
11+00	2150.0
11+50	2135.0
12+00	2130.0
12+50	2126.0
13+50	2120.0
14+00	2120.0
14+27.28	2124.1
14+36.28	2124.1
14+70	2130.0
15+00	2126.0
15+60	2129.0
16+00	2137.0
16+50	2150.0
17+00	2172.0
17+14 ±	2177.5

Ⓛ Elevations at 70' upstream from E of Dam.

Ⓛ All Elevations and Stations are approximate and may be adjusted by Engineer.

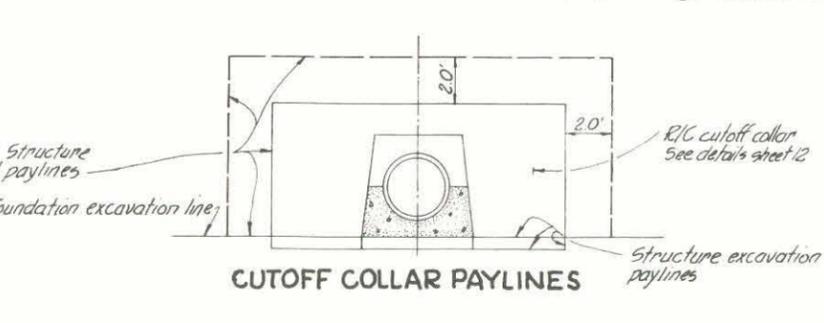
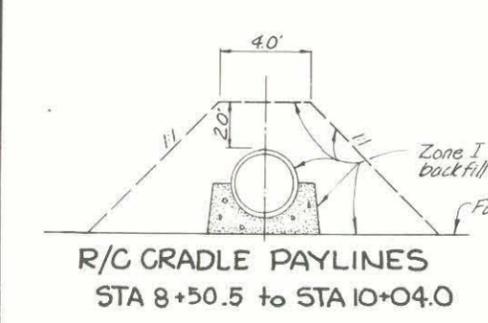
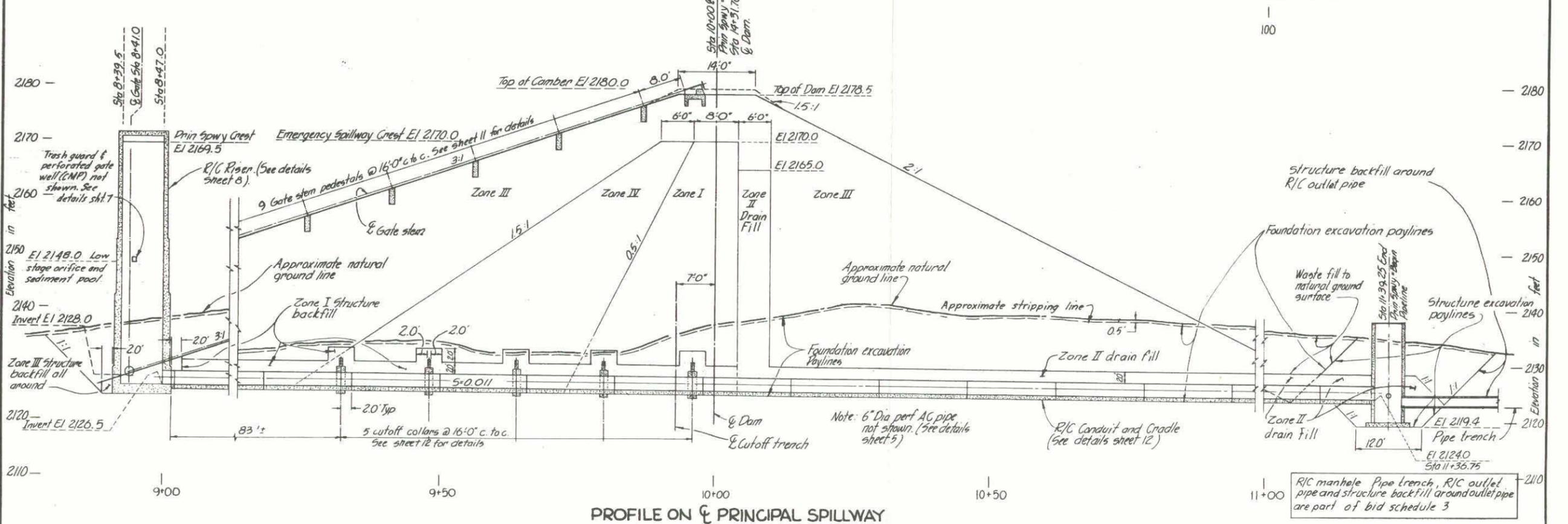
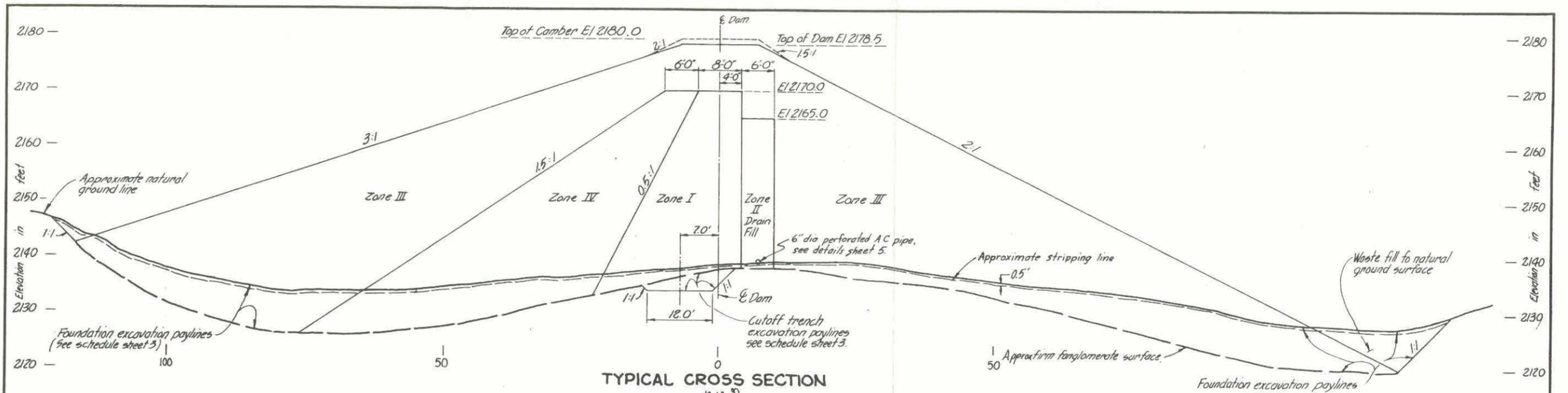
DRAIN PIPE PLACEMENT		
STATION	ELEVATION	REMARKS
10+75	2164.0	Plug beginning end with mortar or AC cap.
11+00	2153.0	Grade change
11+50	2138.0	Grade change
12+00	2137.0	Grade change
12+50	2130.0	Grade change
13+50	2126.0	Grade change
14+27.28	2125.1	CI Elbow to 6" dia non-perforated AC outlet pipe.
14+36.28	2125.1	CI Elbow to 6" dia non-perforated AC outlet pipe.
14+70	2134.0	Grade change. Plug beginning ends with mortar or two AC caps.
15+00	2131.0	CI Tee to 6" dia non-perforated AC outlet pipe.
15+50	2133.0	Grade change
16+00	2141.0	Grade change
16+50	2154.0	Grade change
16+75	2164 ±	Plug beginning end with mortar or AC cap

Ⓛ Elevation at 70' Downstream from E of Dam.

**Notes:**

1. Unified soil descriptions are based on field identifications except where an asterisk is shown the classification has been based on laboratory analysis.
2. Complete field logs, laboratory test data and geologic report are available for review in the project office.
3. For locations of test pits and test holes see sheet 2.
4. Test pit or test hole location D5 = Downstream from E Dam and U5 = Upstream from E Dam.

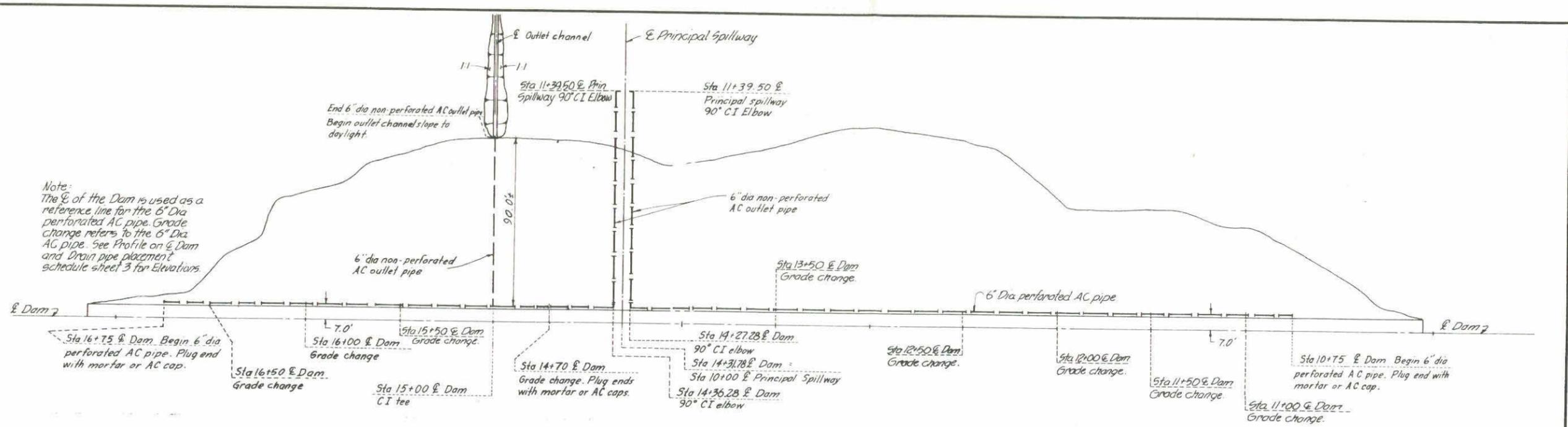
<b>PROFILE ON E DAM AND EXCAVATION SCHEDULES</b>	
SUNNYCOVE F.R.S. WICKENBURG, W.P.P. MARICOPA COUNTY, ARIZONA	
<b>U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE</b>	
Designed Greg Cunningham	Date 3-75
Drawn Jack Long	4-75
Traced	Sheet No. 3
Checked	Drawing No. 7-E-23090
Approved by	Title



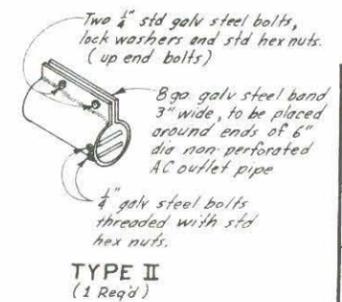
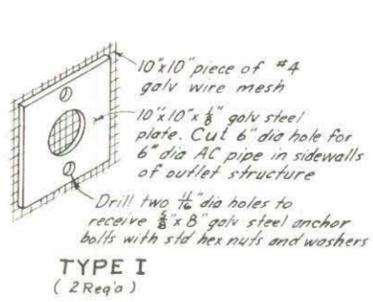
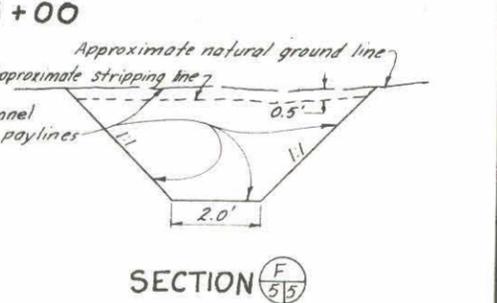
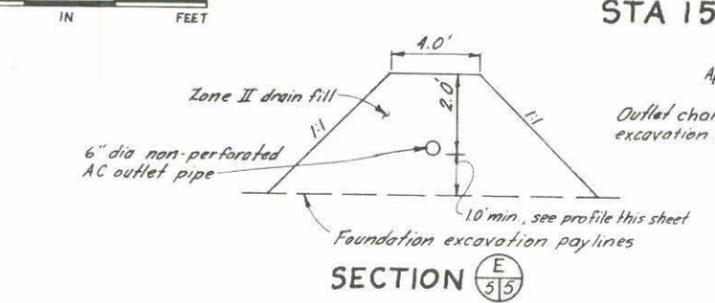
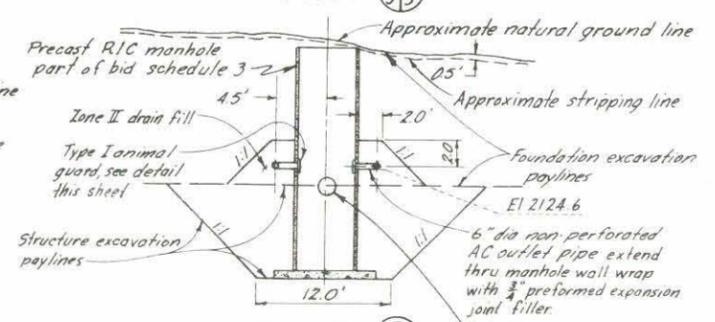
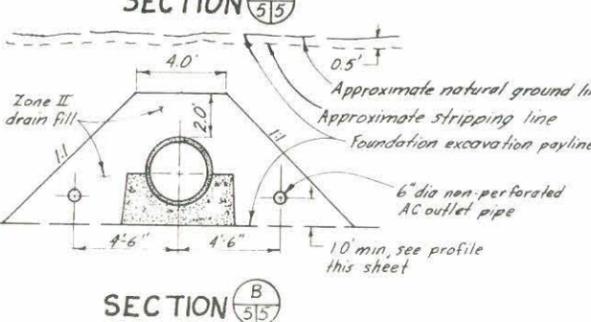
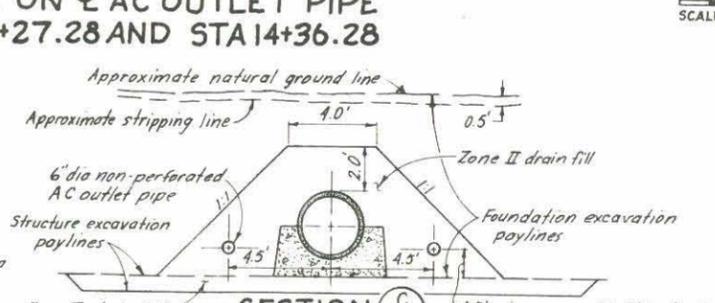
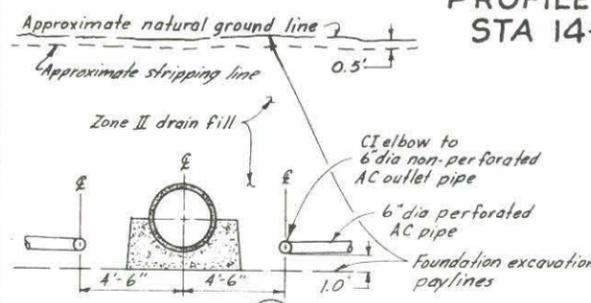
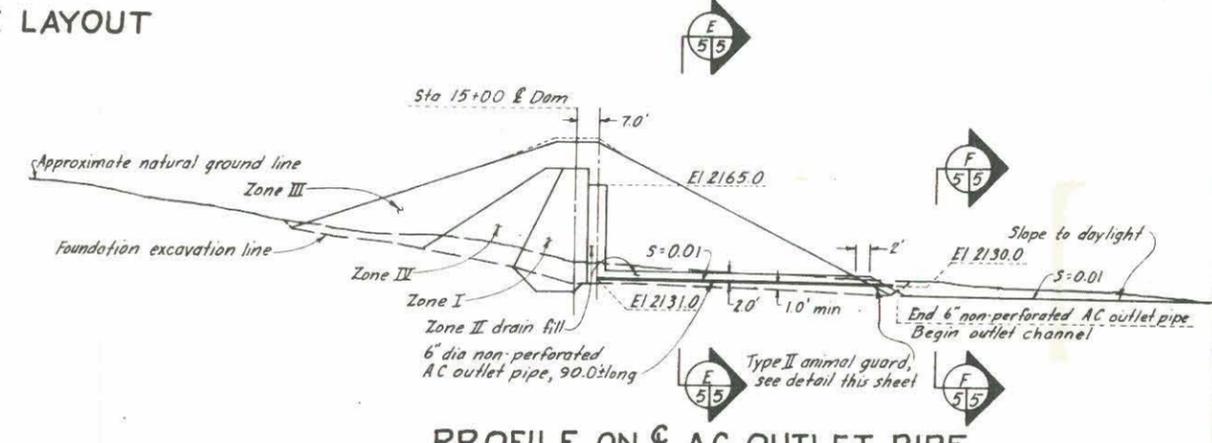
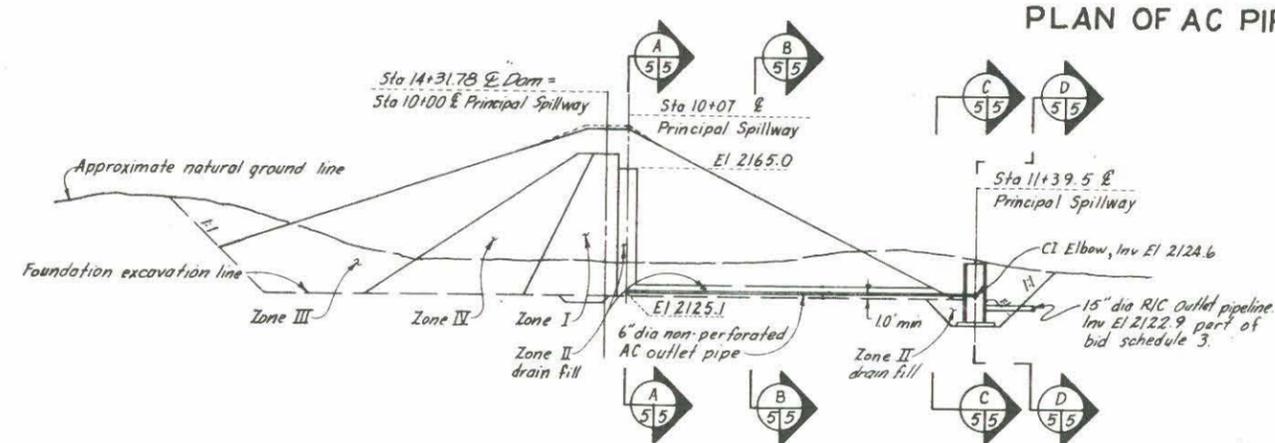
**PROFILE ON C PRINCIPAL SPILLWAY AND TYPICAL CROSS SECTION OF DAM SUNNYCOVE FR 5 WICKENBURG W.P.P. MARICOPA COUNTY, ARIZONA**

**U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE**

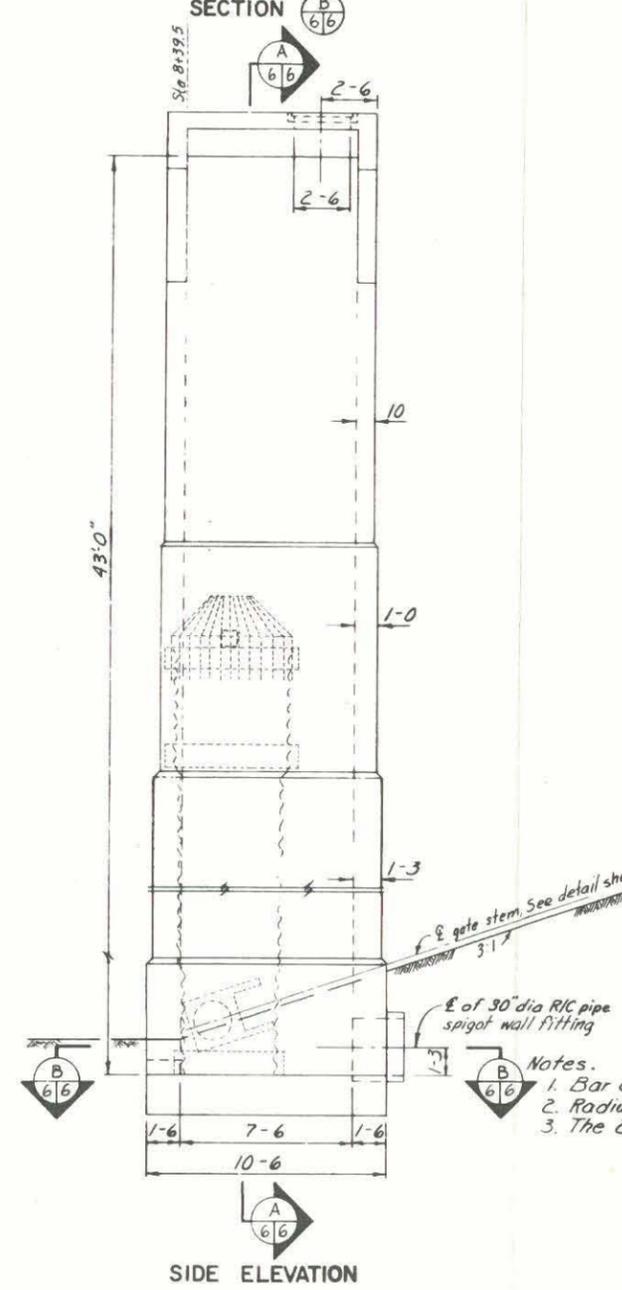
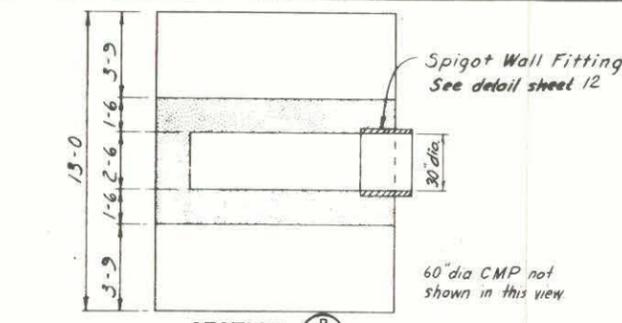
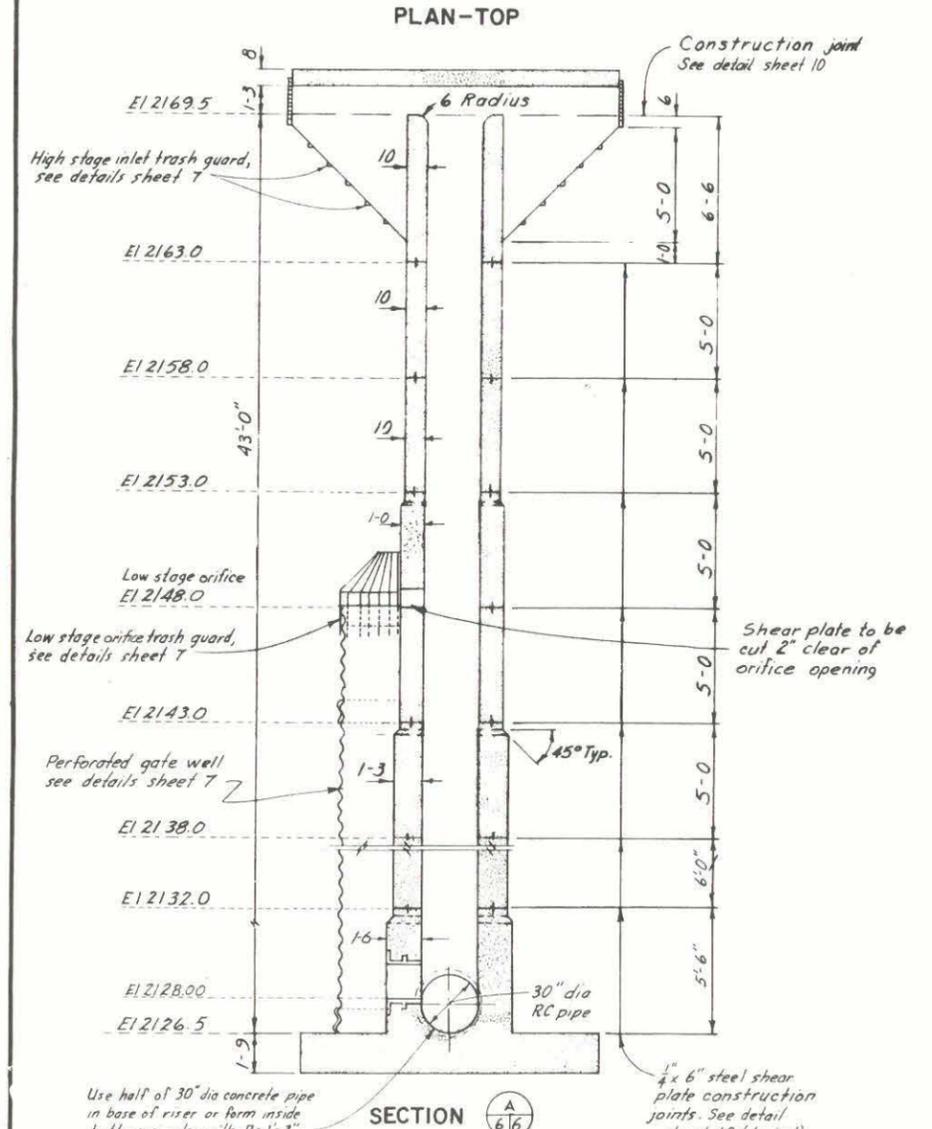
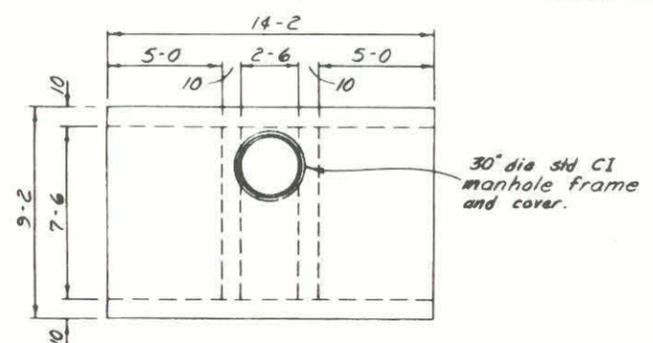
Designed Greg Cunningham	Date 3-75	Approved by	
Drawn slack Land	Date 3-75	Title	
Traced		Sheet No. 4	Drawing No. 7-E-23090
Checked		of 18	



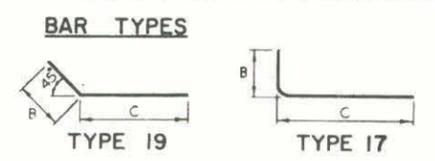
Note:  
The  $\mathcal{E}$  of the Dam is used as a reference line for the 6" Dia perforated AC pipe. Grade change refers to the 6" Dia AC pipe. See Profile on  $\mathcal{E}$  Dam and Drain pipe placement schedule sheet 3 for Elevations.



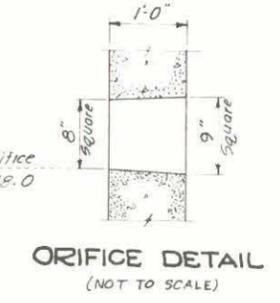
DRAIN LAYOUT AND DETAILS			
SUNNYCOVE F.R.S.			
WICKENBURG W/P/P			
MARICOPA COUNTY, ARIZONA			
U. S. DEPARTMENT OF AGRICULTURE			
SOIL CONSERVATION SERVICE			
Designed	G.M. Cunningham	Date	3-75
Drawn	L.W. McClintock	Date	3-75
Traced		Sheet	No 5
Checked		Sheet	No 18
		Title	7-E-23090
		Drawing No	



STEEL SCHEDULE															
Mark	Size	Quantity	Length	Type	B	C	Total Length	Mark	Size	Quantity	Length	Type	B	C	Total Length
B1	#7	14	12-6	1			175-0	R28	#5	28	8-0	21	2-9	5-3	224-0
B2	#6	13	10-0	1			130-0								
B3	#7	40	8-0	17	3-8	4-4	320-0								
B4	#6	14	10-0	1			140-0								
B5	#6	10	12-6	1			125-0								
B6	#6	4	5-6	1			22-0								
B7	#6	7	5-6	17	1-2	4-4	38-6	T1	#5	18	6-0	1			108-0
B8	#6	19	7-9	17	1-0	6-9	147-3	T2	#5	6	8-0	1			48-0
B9	#5	14	8-6	1			119-0	T3	#5	4	4-9	1			19-0
B10	#6	5	3-6	1			17-6	T4	#5	4	3-6	1			14-0
B11	#6	3	2-6	1			7-6	T5	#5	4	2-3	1			9-0
B12	#6	2	2-6	1			5-0	T6	#5	4	9-0	19	2-0	7-0	36-0
B13	#6	6	4-4	1			26-0	T7	#5	12	8-3	1			99-0
B14	#7	20	4-8	1			93-4	T8	#5	2	3-3	1			6-6
B15	#6	10	7-3	17	1-1	6-2	72-6	T9	#5	2	5-3	1			11-6
B16	#6	14	9-9	17	3-7	6-2	136-6	T10	#5	2	10-3	1			21-6
B17	#6	4	9-3	17	3-4	5-11	37-0	T11	#5	2	13-3	1			26-6
								T12	#5	14	6-3	1			87-6
								T13	#5	6	8-0	1			48-0
								T14	#5	4	6-0	1			24-0
								T15	#5	4	4-9	1			19-0
								T16	#5	4	3-6	1			14-0
R1	#6	22	14-9	1			324-6	T17	#5	4	2-3	1			9-0
R2	#5	32	8-6	1			272-0	T18	#5	4	9-0	19	2-0	7-0	36-0
R3	#6	16	3-6	1			56-0	T19	#5	24	8-0	17	2-9	5-3	192-0
R4	#6	28	12-6	1			350-0	T20	#5	2	3-3	1			6-6
R5	#7	64	9-6	17	3-6	6-0	608-0	T21	#5	2	5-9	1			11-6
R6	#5	20	8-6	1			170-0	T22	#5	2	8-3	1			16-6
R7	#6	10	3-6	1			35-0	T23	#5	2	10-9	1			21-6
R8	#6	26	4-0	1			104-0	T24	#5	2	13-3	1			26-6
R9	#6	36	9-3	17	3-4	5-11	333-0	T25	#5	4	13-9	1			55-0
R10	#6	4	8-9	17	3-1	5-8	35-0	T26	#5	4	13-9	1			55-0
R11	#5	22	11-9	1			256-6	T27	#4	14	8-3	1			115-6
R12	#5	20	8-6	1			170-0	T28	#4	2	4-9	1			9-6
R13	#5	10	3-6	1			35-0	T29	#4	7	13-9	1			96-3
R14	#5	26	9-6	1			247-0	T30	#4	4	5-3	1			21-0
R15	#7	40	9-0	17	3-3	5-9	360-0	T31	#5	24	6-9	17	1-6	5-3	162-0
R16	#6	14	8-3	1			115-6	T32	#5	2	6-6	17	1-6	5-0	13-0
R17	#5	10	3-6	1			35-0	T33	#5	2	2-6	17	1-6	1-0	5-0
R18	#5	20	3-8	1			73-4	T34	#4	7	13-3	1			96-3
R19	#5	36	8-3	17	2-10 1/2	5-4 1/2	297-0	T35	#4	4	5-3	1			21-0
R20	#5	4	8-0	17	2-9	5-5	32-0								
R21	#5	20	11-9	1			235-0	S1	#5	88	2-0	1			176-0
R22	#6	14	8-3	1			115-6								
R23	#5	8	3-3	1			26-0								
R24	#5	20	11-9	1			235-0								
R25	#5	40	8-0	17	2-9	5-3	320-0								
R26	#5	10	8-3	1			82-6								
R27	#5	8	3-3	1			26-0								



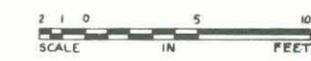
- Notes.
1. Bar dimensions are out to out of bar.
  2. Radius of bends equals 3 bar diameters for sizes equal to or less than #7.
  3. The 2" and 3" dimensions from face of concrete to steel are clear distances.

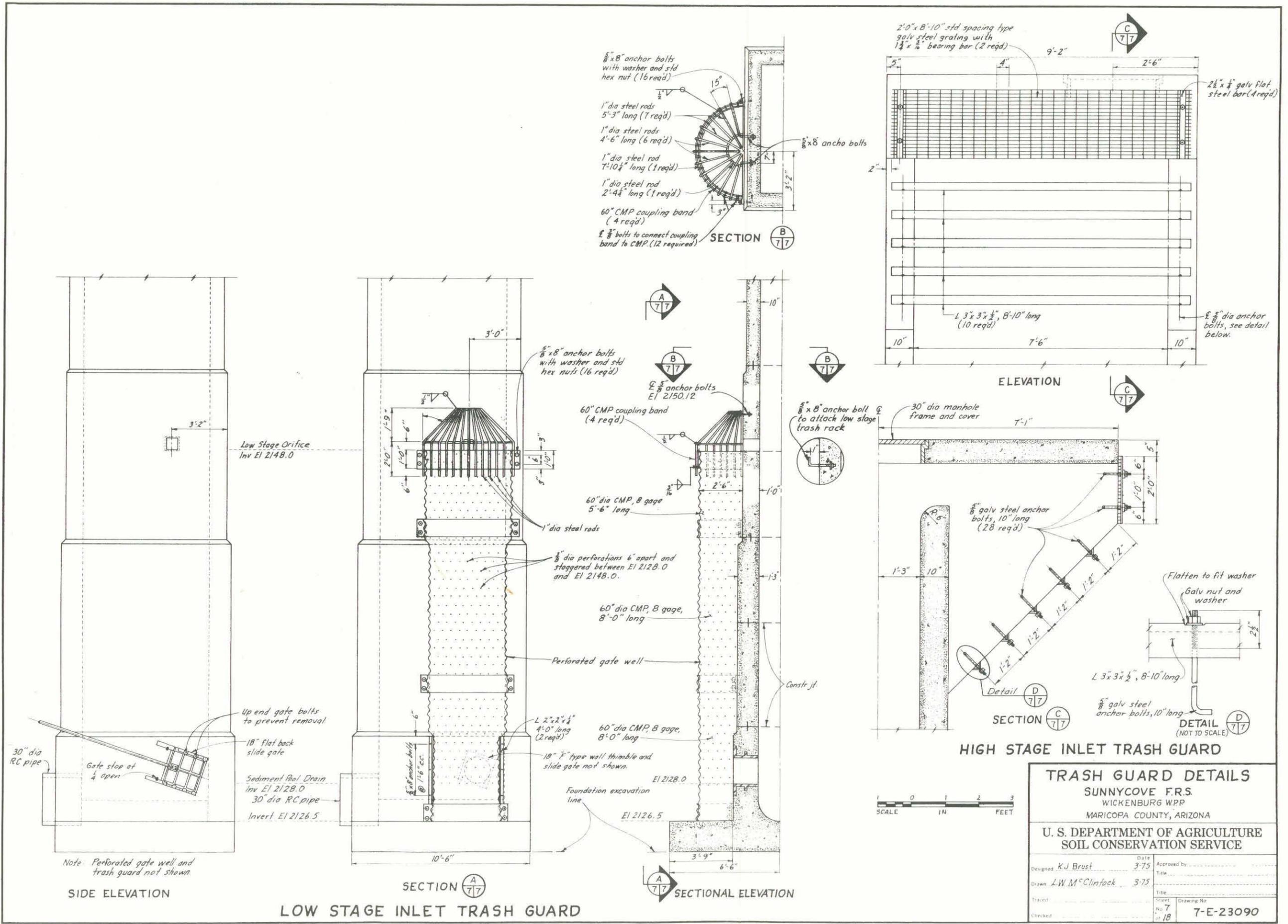


**RISER LAYOUT DETAILS**  
 SUNNYCOVE F.R.S.  
 WICKENBURG W.P.P.  
 MARICOPA COUNTY, ARIZONA

**U. S. DEPARTMENT OF AGRICULTURE**  
**SOIL CONSERVATION SERVICE**

Designed	K.J. Brust	Date	3-75	Approved by	
Drawn	L.W.M. Clinch	Date	3-75	Title	
Traced		Sheet	No. 6	Drawing No.	
Checked		of 18			7-E-23090





$\frac{5}{8}$ " x 8" anchor bolts with washer and std hex nut (16 req'd)  
 1" dia steel rods 5'-3" long (7 req'd)  
 1" dia steel rods 4'-6" long (6 req'd)  
 1" dia steel rod 7'-10 $\frac{1}{4}$ " long (1 req'd)  
 1" dia steel rod 2'-4 $\frac{1}{4}$ " long (1 req'd)  
 60" CMP coupling band (4 req'd)  
 $\frac{5}{8}$ " bolts to connect coupling band to CMP. (12 required)

2'-0" x 8'-10" std spacing type galv steel grating with 1 $\frac{1}{4}$ " x  $\frac{1}{8}$ " bearing bar (2 req'd)  
 2 $\frac{1}{2}$ " x  $\frac{1}{4}$ " galv flat steel bar (4 req'd)  
 L 3 x 3 x  $\frac{1}{2}$ ", 8'-10" long (10 req'd)  
 $\frac{5}{8}$ " dia anchor bolts, see detail below.

Low Stage Orifice  
Inv El 2148.0

$\frac{5}{8}$ " x 8" anchor bolts with washer and std hex nuts (16 req'd)  
 60" CMP coupling band (4 req'd)

60" dia CMP, 8 gage 5'-6" long  
 1" dia steel rods  
 $\frac{3}{8}$ " dia perforations 6" apart and staggered between El 2128.0 and El 2148.0.

60" dia CMP, 8 gage, 8'-0" long

L 2 x 2 x  $\frac{1}{4}$ " 4'-0" long (2 req'd)  
 60" dia CMP, 8 gage, 8'-0" long

18" F type wall thimble and slide gate not shown.

Foundation excavation line  
 El 2128.0  
 El 2126.5

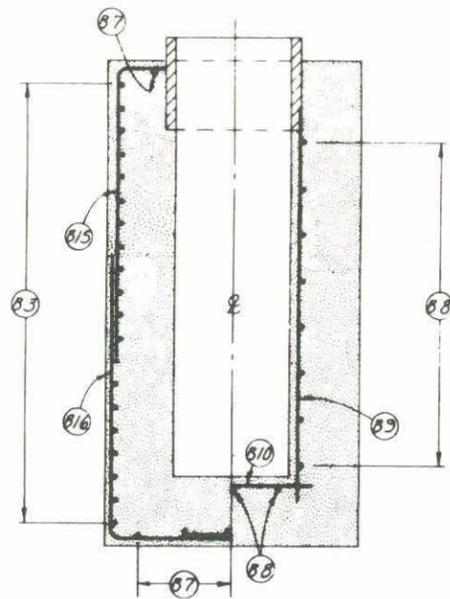
30" dia manhole frame and cover  
 $\frac{5}{8}$ " galv steel anchor bolts, 10" long (28 req'd)  
 L 3 x 3 x  $\frac{1}{2}$ ", 8'-10" long  
 5" galv steel anchor bolts, 10" long  
 Flatten to fit washer  
 Galv nut and washer  
 Detail (NOT TO SCALE)

30" dia RC pipe  
 Gate stop at  $\frac{1}{4}$  open  
 Up end gate bolts to prevent removal.  
 18" flat back slide gate  
 Sediment Pool Drain  
 Inv El 2128.0  
 30" dia RC pipe  
 Invert El 2126.5

Note: Perforated gate well and trash guard not shown.

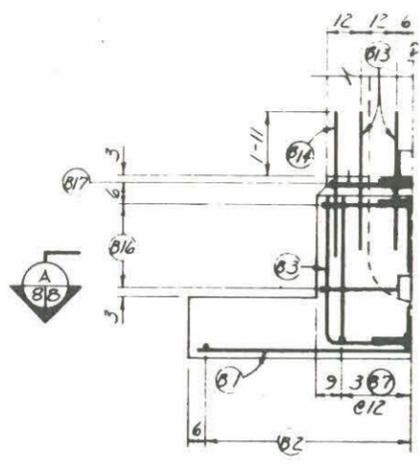
SCALE 0 1 2 3 IN FEET

TRASH GUARD DETAILS			
SUNNYCOVE F.R.S.			
WICKENBURG W.P.P.			
MARICOPA COUNTY, ARIZONA			
U. S. DEPARTMENT OF AGRICULTURE			
SOIL CONSERVATION SERVICE			
Designed	K.J. Brust	Date	3-75
Drawn	L.W.M. Clintock	Date	3-75
Traced		Title	
Checked		Sheet	No 7 of 18
Approved by		Drawing No	7-E-23090

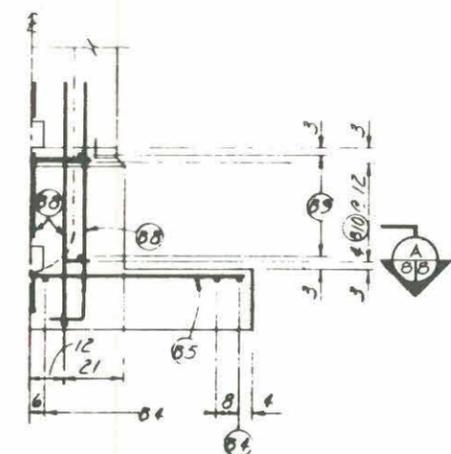


Outside Steel Inside Steel

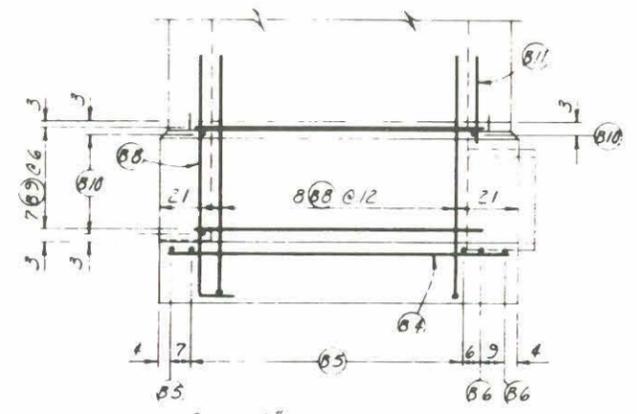
SECTION A-B  
(NOT TO SCALE)



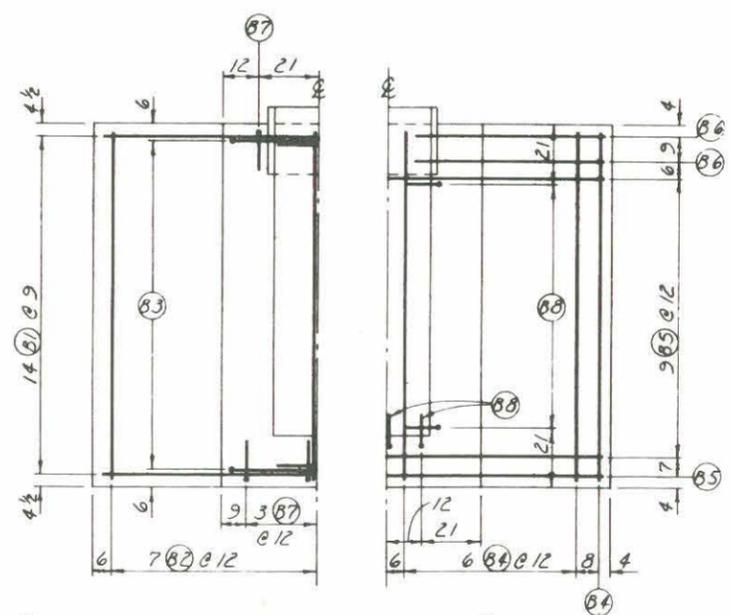
Steel 2" From Outside Face  
UPSTREAM ELEVATION



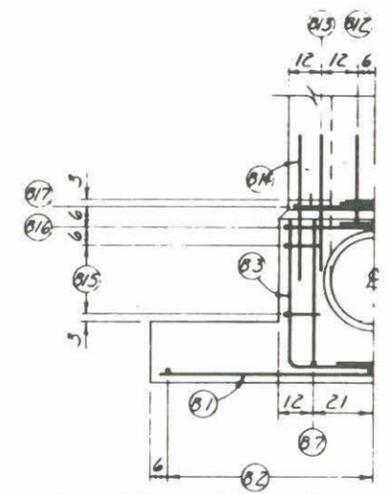
Steel 2" From Inside Face  
UPSTREAM ELEVATION



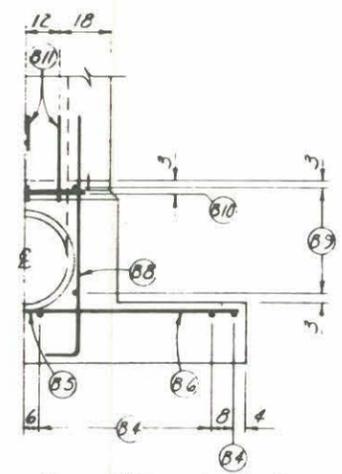
Steel 2" From Inside Face  
and 2" From Top of Footing  
SIDEWALL ELEVATION



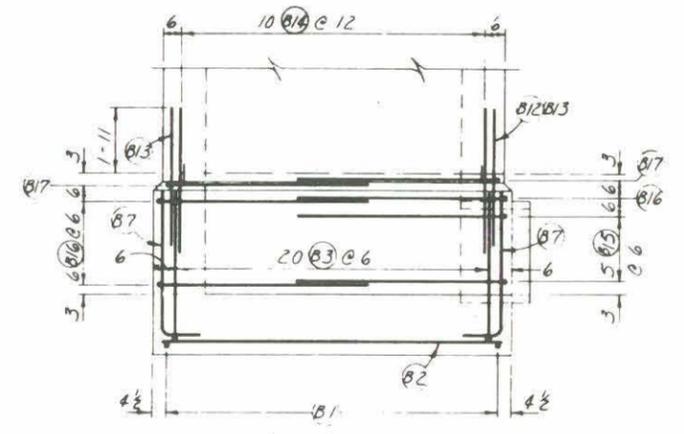
Steel 3" From Bottom of Footing  
Steel 2" From Top of Footing  
PLAN-FOOTING



Steel 2" From Outside Face  
DOWNSTREAM ELEVATION



Steel 2" From Inside Face  
DOWNSTREAM ELEVATION



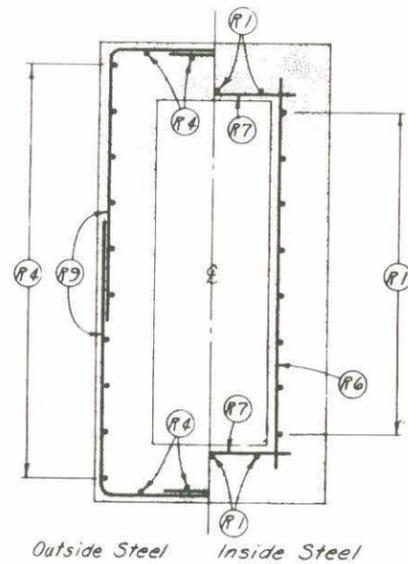
Steel 2" From Outside Face  
and 3" From Bottom of Footing  
SIDEWALL ELEVATION



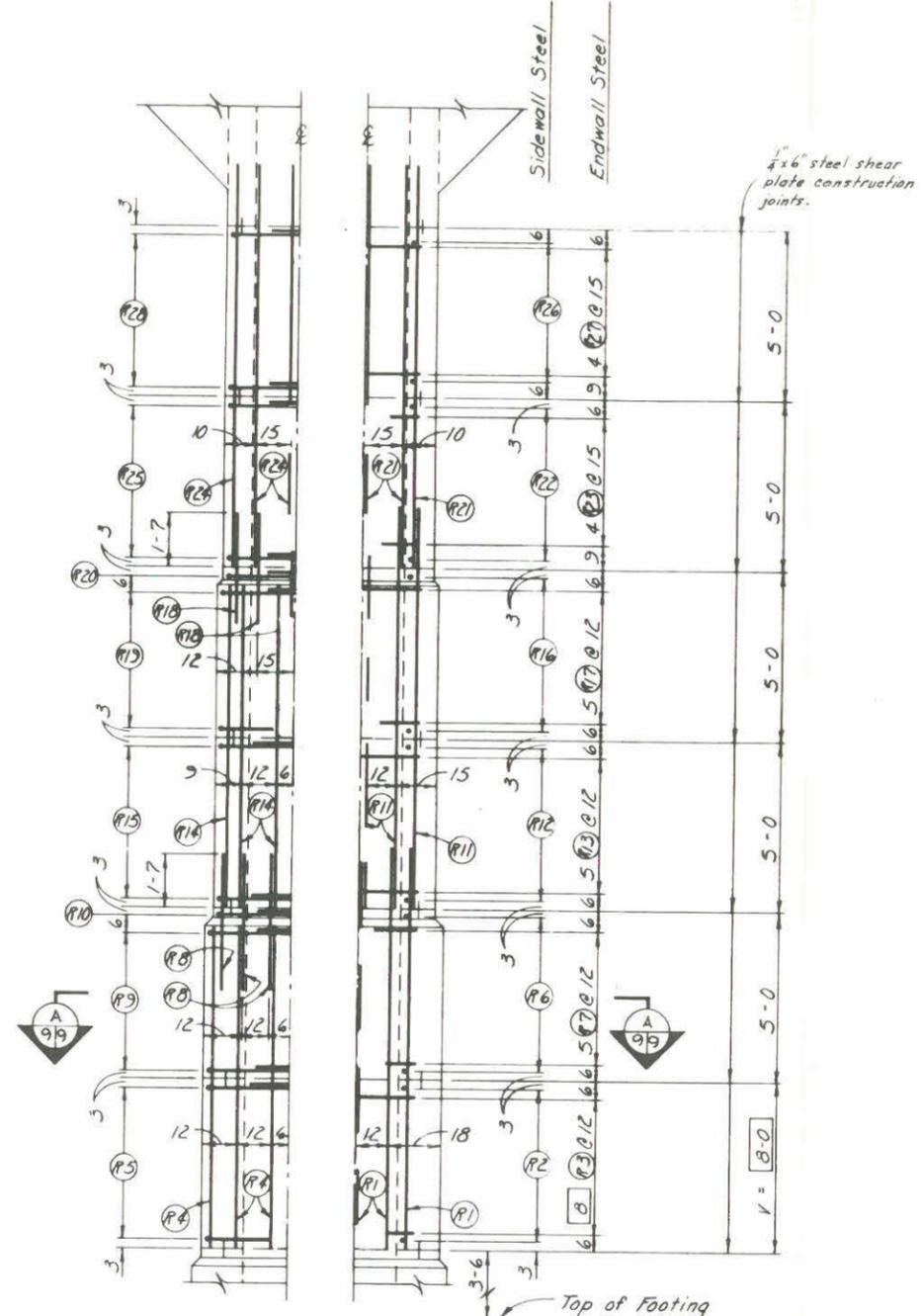
**RISER DETAILS**  
SUNNYCOVE F.R.S.  
WICKENBURG W.P.P.  
MARICOPA COUNTY, ARIZONA

**U. S. DEPARTMENT OF AGRICULTURE**  
**SOIL CONSERVATION SERVICE**

Designed <u>K.J. Brust</u>	Date <u>3-75</u>	Approved by _____
Drawn _____		Title _____
Traced _____		Title _____
Checked _____	Sheet No. <u>8</u>	Drawing No. _____
	of <u>10</u>	<b>7-E-23090</b>

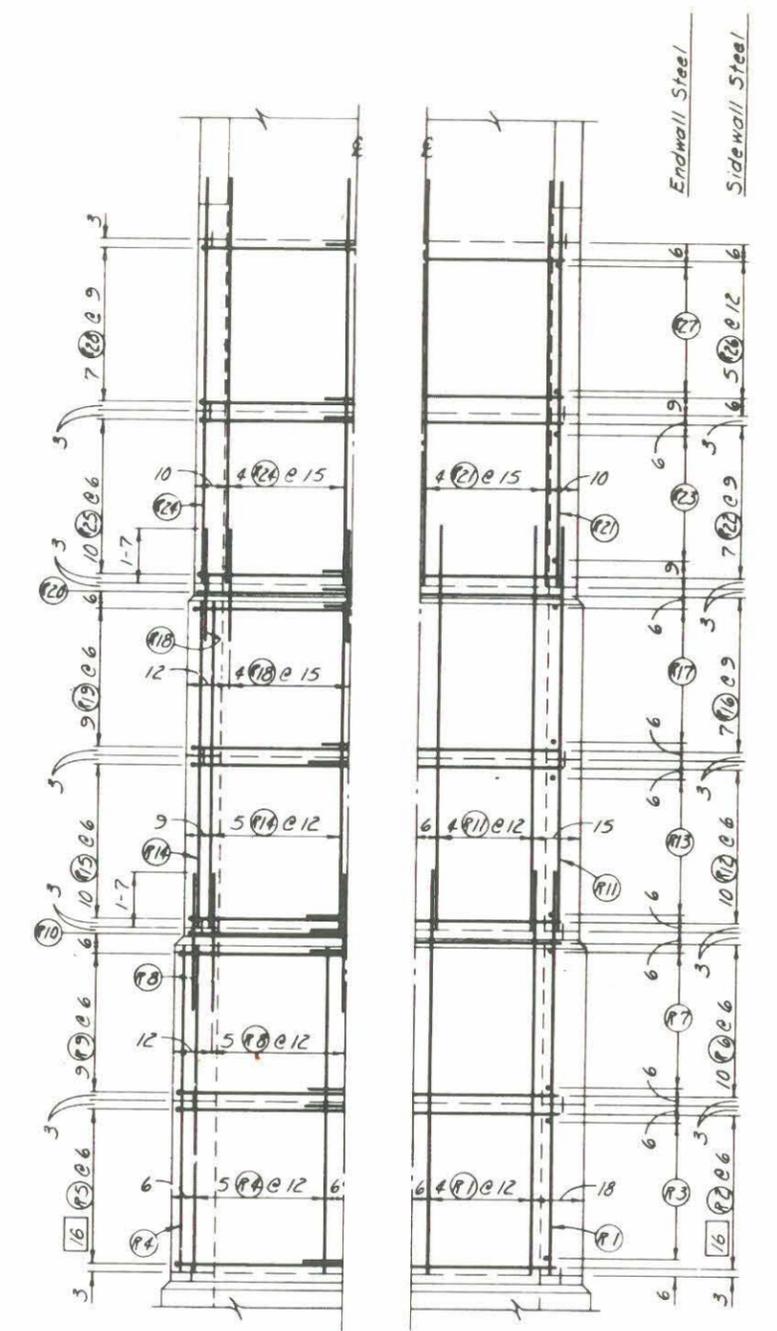


SECTION A-99  
(NOT TO SCALE)



Steel 2" From Outside Face  
ENDWALL ELEVATION

Steel 2" From Inside Face  
ENDWALL ELEVATION

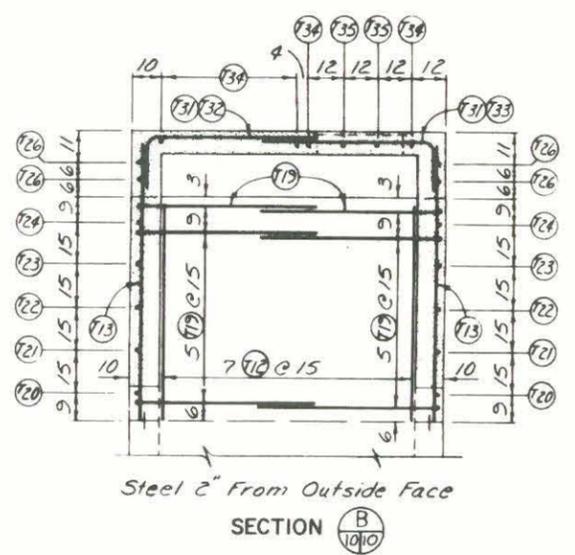
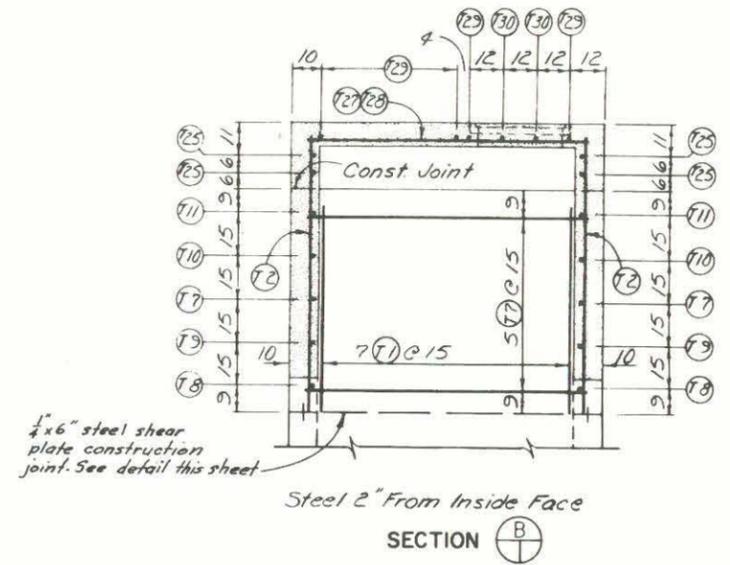
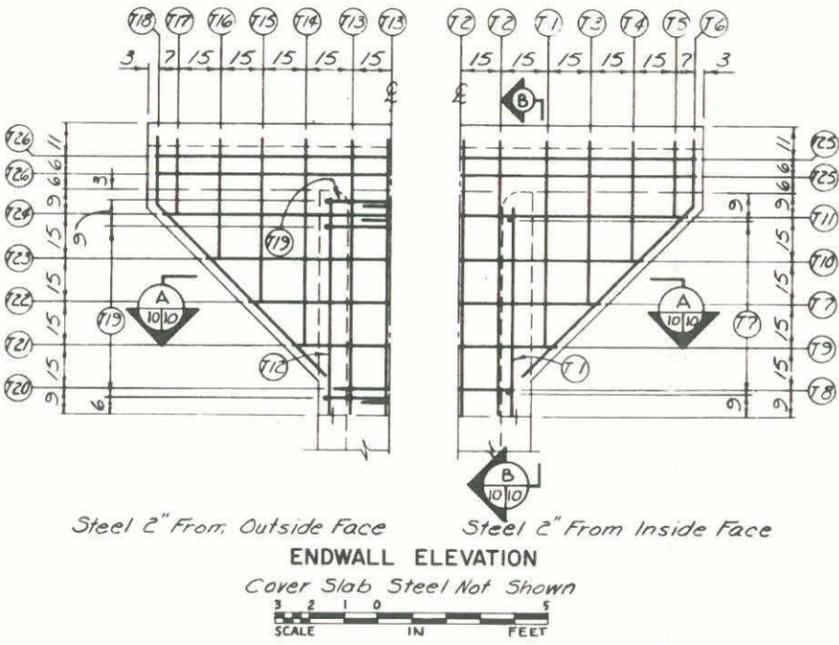
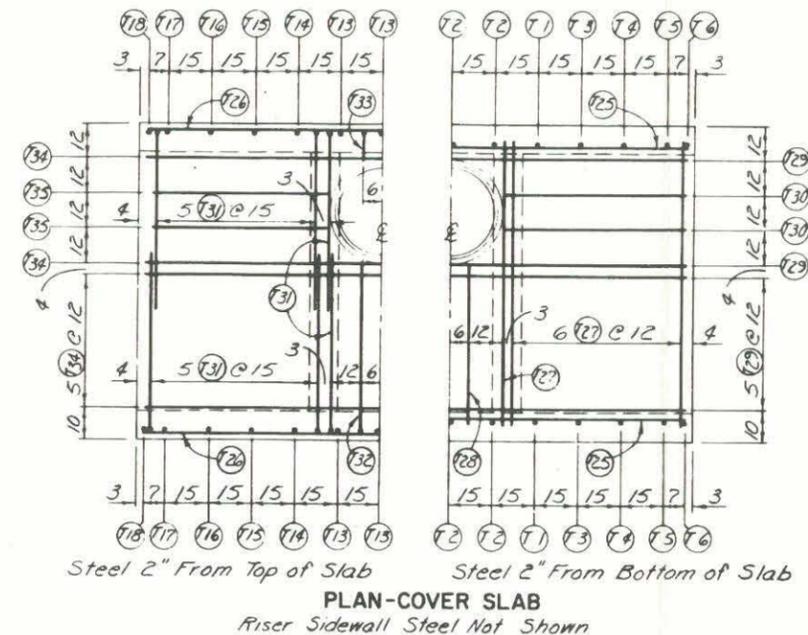
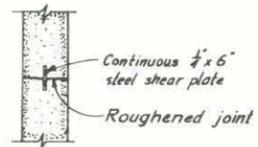
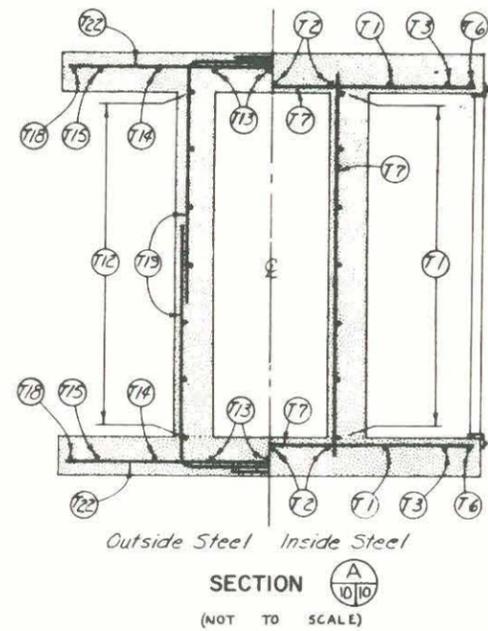


Steel 2" From Outside Face  
SIDEWALL ELEVATION

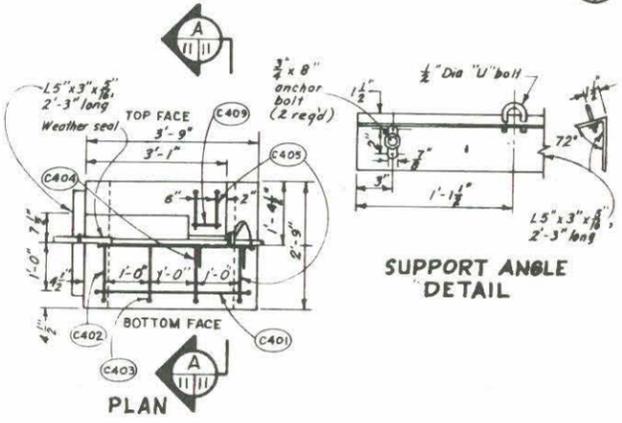
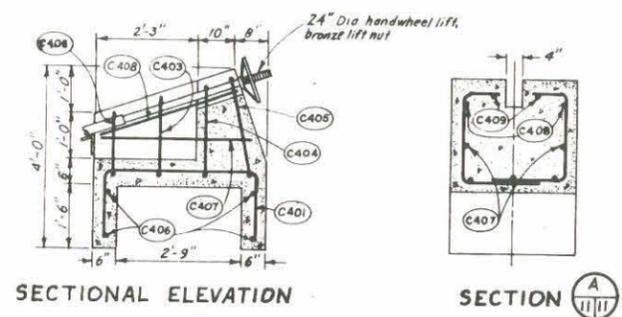
Steel 2" From Inside Face  
SIDEWALL ELEVATION



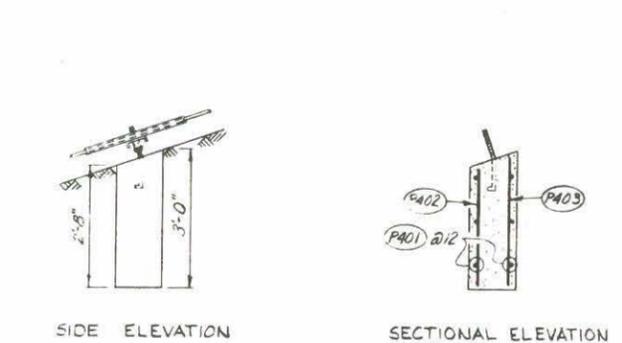
<b>RISER DETAILS</b>			
SUNNYCOVE F.R.S.			
WICKENBURG W.P.P.			
MARICOPA COUNTY, ARIZONA			
<b>U. S. DEPARTMENT OF AGRICULTURE</b>			
<b>SOIL CONSERVATION SERVICE</b>			
Designed	K.J. Brust	Date	3-75
Drawn		Approved by	
Traced		Title	
Checked		Sheet No.	9
		of	18
		Drawing No.	T-E-23090



<b>RISER DETAILS</b>			
SUNNYCOVE F.R.S.			
WICKENBURG W.P.P.			
MARICOPA COUNTY, ARIZONA			
<b>U. S. DEPARTMENT OF AGRICULTURE</b>			
<b>SOIL CONSERVATION SERVICE</b>			
Designed	K.J. Brust	Date	3-75
Drawn		Approved by	
Traced		Sheet	No. 10
Checked		Drawing No.	7-E-23090

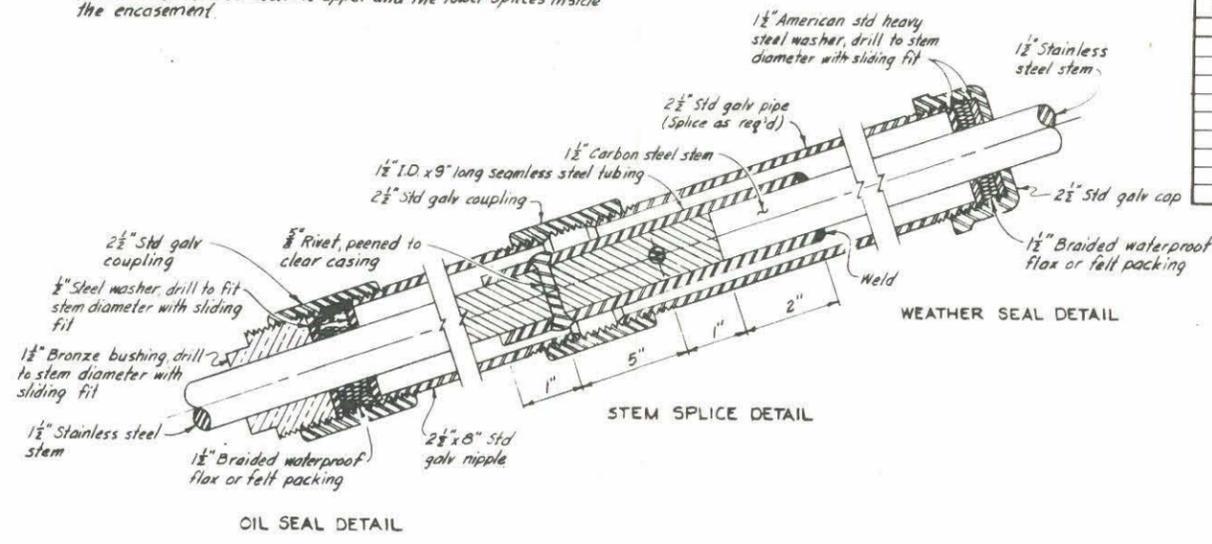


GATE LIFT PEDESTAL DETAILS

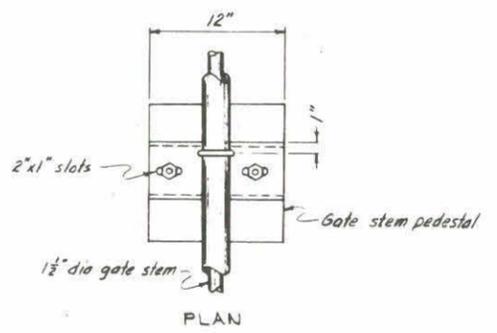


GATE STEM PEDESTAL

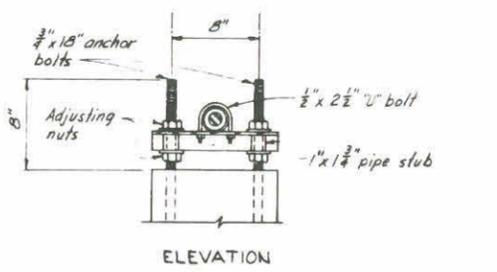
**Notes**  
 Fill stem encasement with approximately 14.0 gallons of SAE 20 motor oil.  
 The stainless steel portion of the gate stem shall extend a sufficient length on each end so that no part of the carbon steel stem is exposed during operation of the gate. A carbon steel stem will be used between the upper and the lower splices inside the encasement.



GATE STEM SPLICE



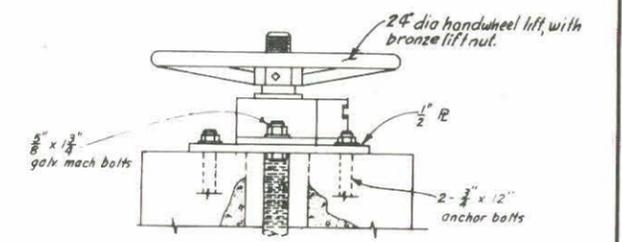
GATE STEM GUIDE



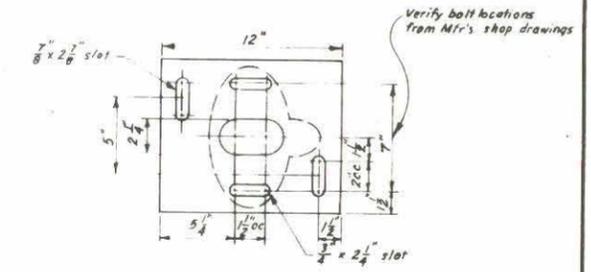
STEEL SCHEDULES									
LOCATION	MARK	SIZE	QUAN	LENGTH	TYPE	A	B	C	TOTAL LENGTH
<b>GATE STEM PEDESTALS (9 req'd)</b>									
	P401	4	27	3'-0"	TI	0'-2"	0'-8"	0'-8"	81'-0"
	P402	4	18	2'-3"	str				40'-6"
	P403	4	18	2'-9"	str				49'-6"
<b>GATE LIFT PEDESTAL</b>									
	C401	4	3	6'-3"	2	1'-6"	3'-3"	1'-6"	18'-9"
	C402	4	1	4'-6"	2	1'-2"	2'-2"	1'-2"	4'-6"
	C403	4	1	5'-0"	2	1'-5"	2'-2"	1'-5"	5'-0"
	C404	4	2	4'-0"	2	1'-6"	1'-9"	0'-9"	8'-0"
	C405	4	2	4'-3"	2	1'-6"	2'-0"	0'-9"	8'-6"
	C406	4	4	2'-3"	str				9'-0"
	C407	4	2	3'-0"	str				6'-0"
	C408	4	2	2'-9"	str				5'-6"
	C409	4	2	0'-6"	str				1'-0"



BAR TYPES

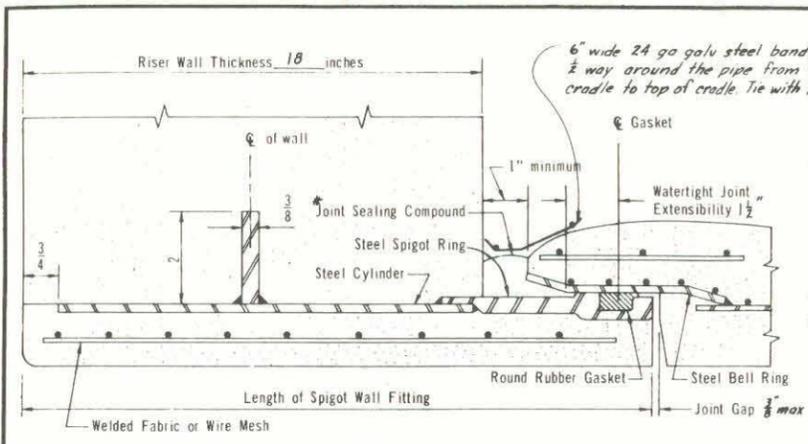


ELEVATION



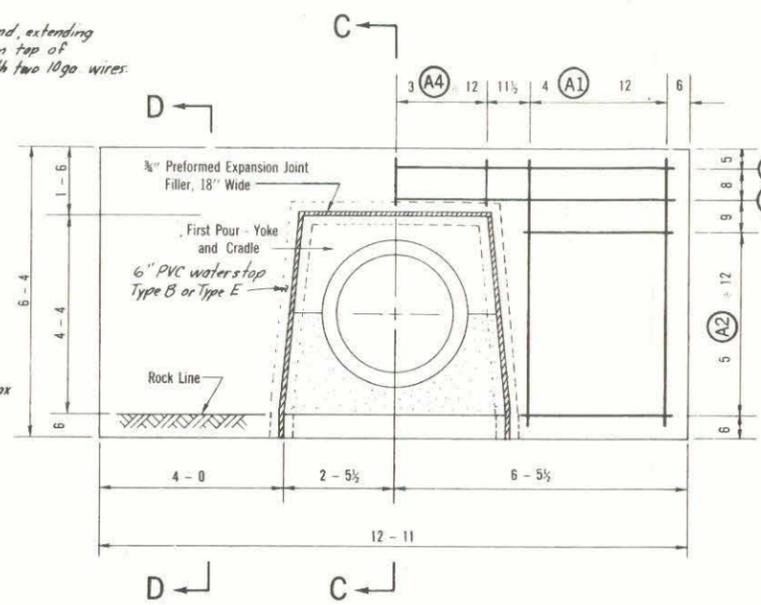
PLAN  
 BASE PLATE  
 (For gate lift pedestal)

GATE CONTROL DETAILS			
SUNNYCOVE F.R.S. WICKENBURG WPP MARICOPA COUNTY, ARIZONA			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
Designed: KJ Brust	Date: 3-75	Approved by:	
Drawn: L.W.M. Clintock	Date: 3-75	Title:	
Checked:		Sheet No.:	11
		Drawing No.:	7-E-230 90



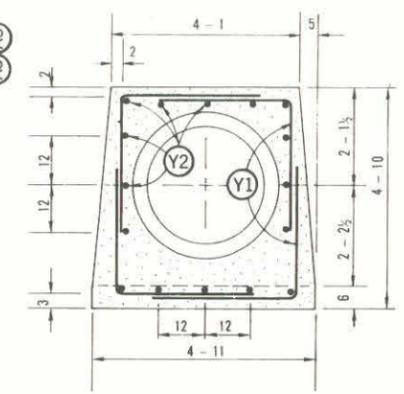
DETAIL A

3/4" dia circular cross section, Butyl rubber sealer, Federal Specification 55-5-00210 applied over the manufactures recommended primer.

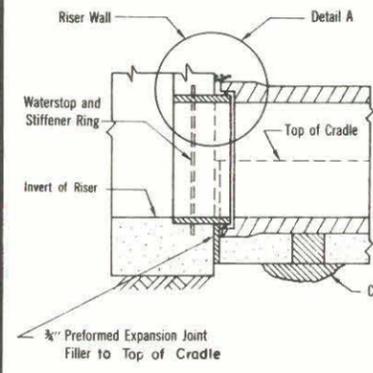


DETAIL OF ANTI-SEEP COLLAR

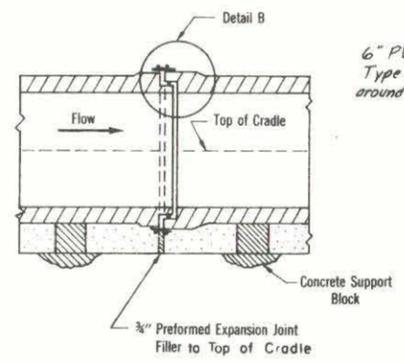
Yoke steel not shown.



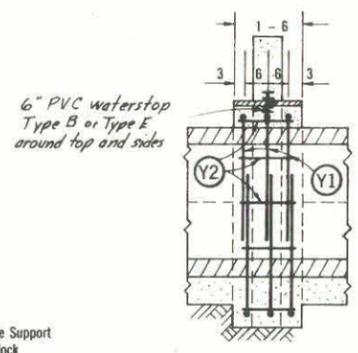
DETAIL OF ANTI-SEEP COLLAR YOKE



DETAIL OF SPIGOT WALL FITTING

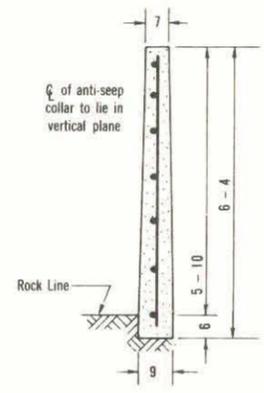


DETAIL OF PIPE JOINT

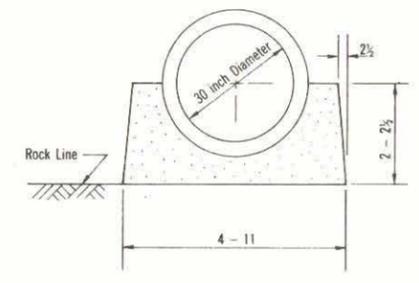


SECTION C-C

Anti-seep collar steel not shown.



SECTION D-D

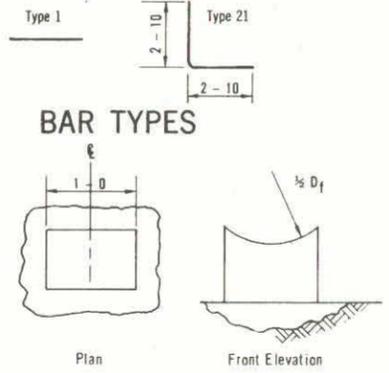


DETAIL OF CRADLE

STEEL SCHEDULE						
Anti-seep Collar and Yoke, 5' Required.						
Mark	Size	Quantity per Collar	Length	Type	Total Quantity	Total Length
A1	4	8	5-10	1	40	233-4
A2	4	10	3-6	1	50	175-0
A3	4	2	12-5	1	10	124-2
A4	4	5	1-0	1	25	25-0
Y1	4	12	5-8	21	60	340-0
Y2	4	16	1-2	1	80	93-4

QUANTITIES	
Concrete	Cu. Yds.
Anti-seep Collar including Yoke	
* Each, Additional to Cradle	1.91
Total	9.55
Cradle	
** Per Lineal Foot of Cradle	0.26
Total	75.0
Steel	Pounds
Anti-seep Collar including Yoke	662
Cradle	

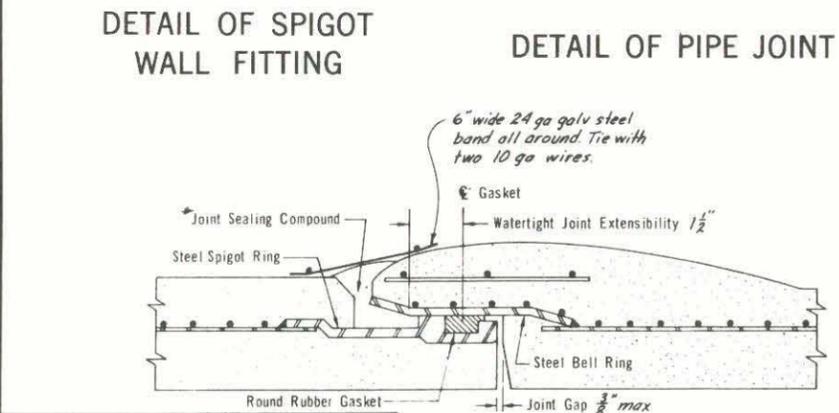
Concrete quantities are based on an outside diameter of pipe of 35 inches. Steel quantities do not change with outside diameter of pipe. This quantity is given by 1.875 - 0.0001515 (Df + 38) (Df - 38) cu. yds. This quantity is given by 0.2392 - 0.0001010 (Df + 38) (Df - 38) cu. yds. Df = outside diameter of pipe furnished, inches.



BAR TYPES

SUGGESTED SUPPORT BLOCKS

Sufficient blocks shall be provided to support the pipe to the required line and grade. The Contractor shall determine the number and size of blocks required. Wedges may be used as an alternate.



DETAIL B

Joint length equals watertight joint extensibility plus joint gap. The pipe shall be drawn together so that the maximum joint gap does not exceed 1/4 inch for pipe laid on a straight line. For cambered pipe or pipe laid on a curved line, the joint gap at the closest point shall not exceed 1/4 inch.

JOINT REQUIREMENTS			
Length of Pipe Section feet	Minimum Joint Length inches	Minimum Joint Limiting Angle	
		radians	degrees
16.0	1 1/2		0°45'

For pipe length other than shown, joint requirements will be determined by the Engineer.

Where pipes of different length are connected, adjoining pipes shall meet the requirements of the longer pipe.

Prior to delivery of pipe, the pipe joint detail proposed for use shall be submitted to the Engineer for approval.

STRENGTH REQUIREMENTS			
Inside Diameter of Pipe	Hydrostatic Pressure	External Load	
		Minimum 3-Edge Bearing Strength in Pounds per Lineal Foot of Pipe	
	Head of Water	Applicable Standard Specification	
		AWWA C-301	AWWA C-300
inches	feet	Load to produce 0.001 inch crack one foot long	Load to produce 0.01 inch crack one foot long
30	55	9200	12,500

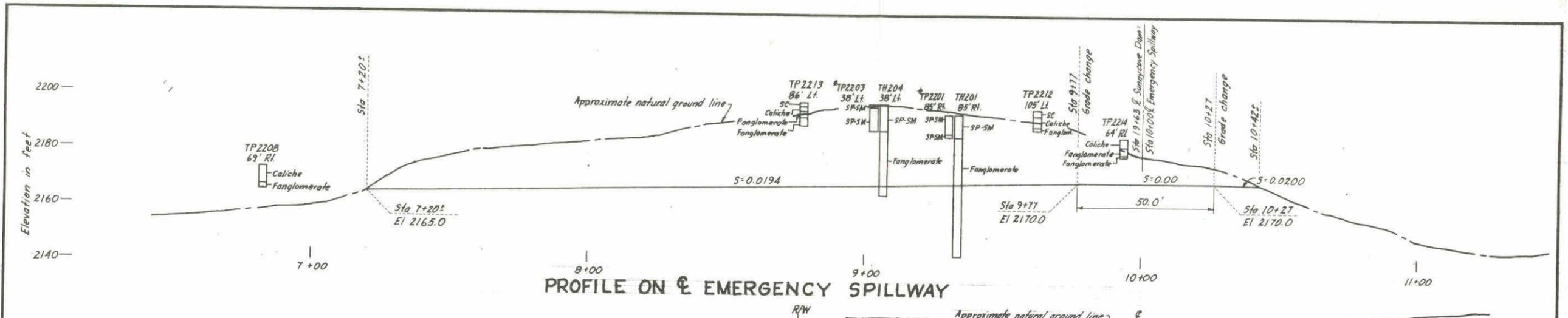
The outside diameter of pipe assumed in design is 35 inches. Where the pipe furnished has an outside diameter greater than assumed in design, the three-edge bearing strength of the pipe furnished must not be less than the specified three-edge bearing strength multiplied by the ratio of the outside diameter of the pipe furnished to the outside diameter assumed in design.

1-73	Waterstop added to anti-seep collar	L.W.M.
DATE	REVISION	BY
STANDARD CONDUIT DETAILS		
FOR REINFORCED CONCRETE PRESSURE PIPE PRINCIPAL SPILLWAY		
STANDARD DWG. NO. ES-5030-CR		
DATE 2-70	SHEET 1	OF 1

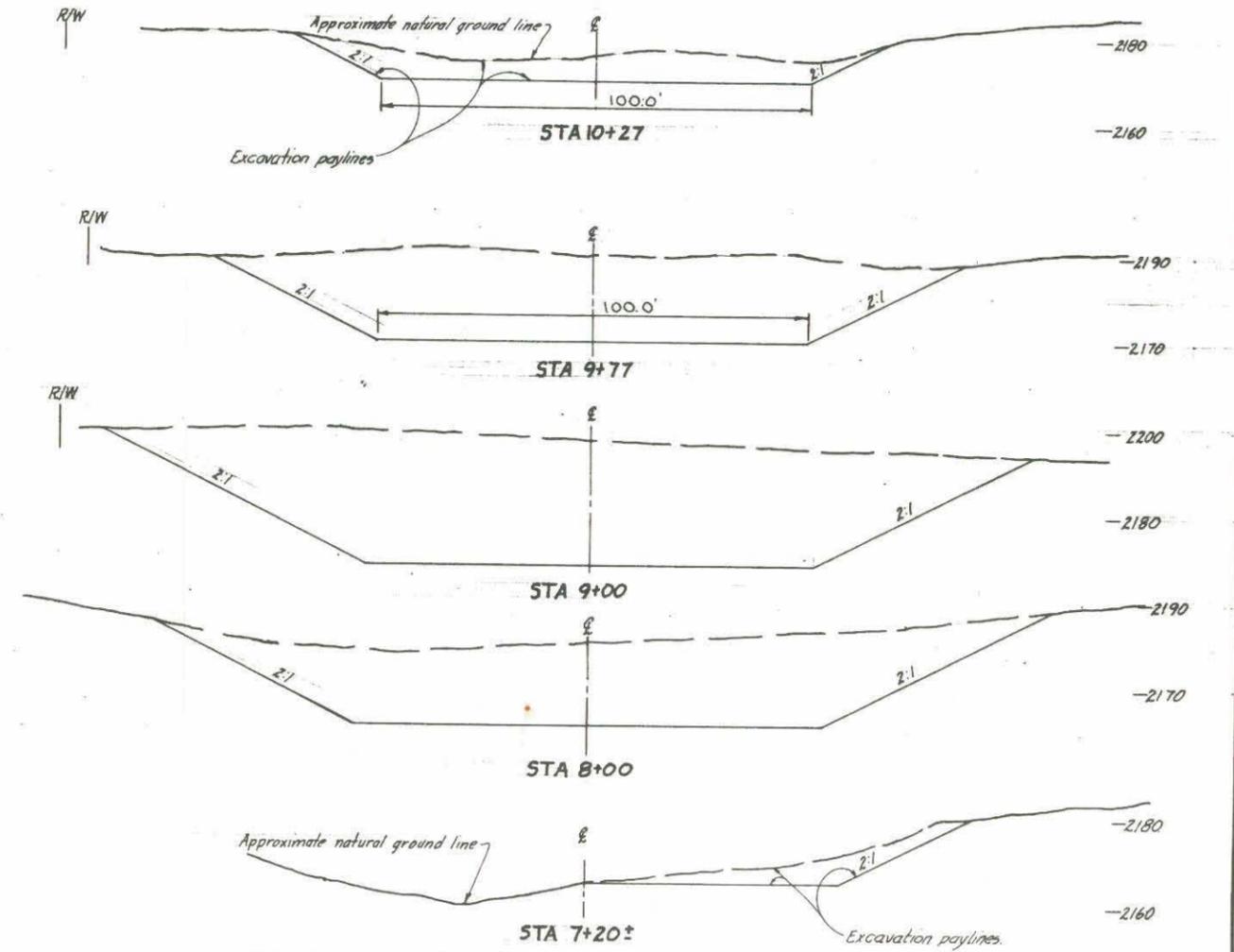
**PRINCIPAL SPILLWAY CONDUIT DETAILS**  
**SUNNYCOVE F.R.S.**  
 WICKENBURG W.P.P.  
 MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

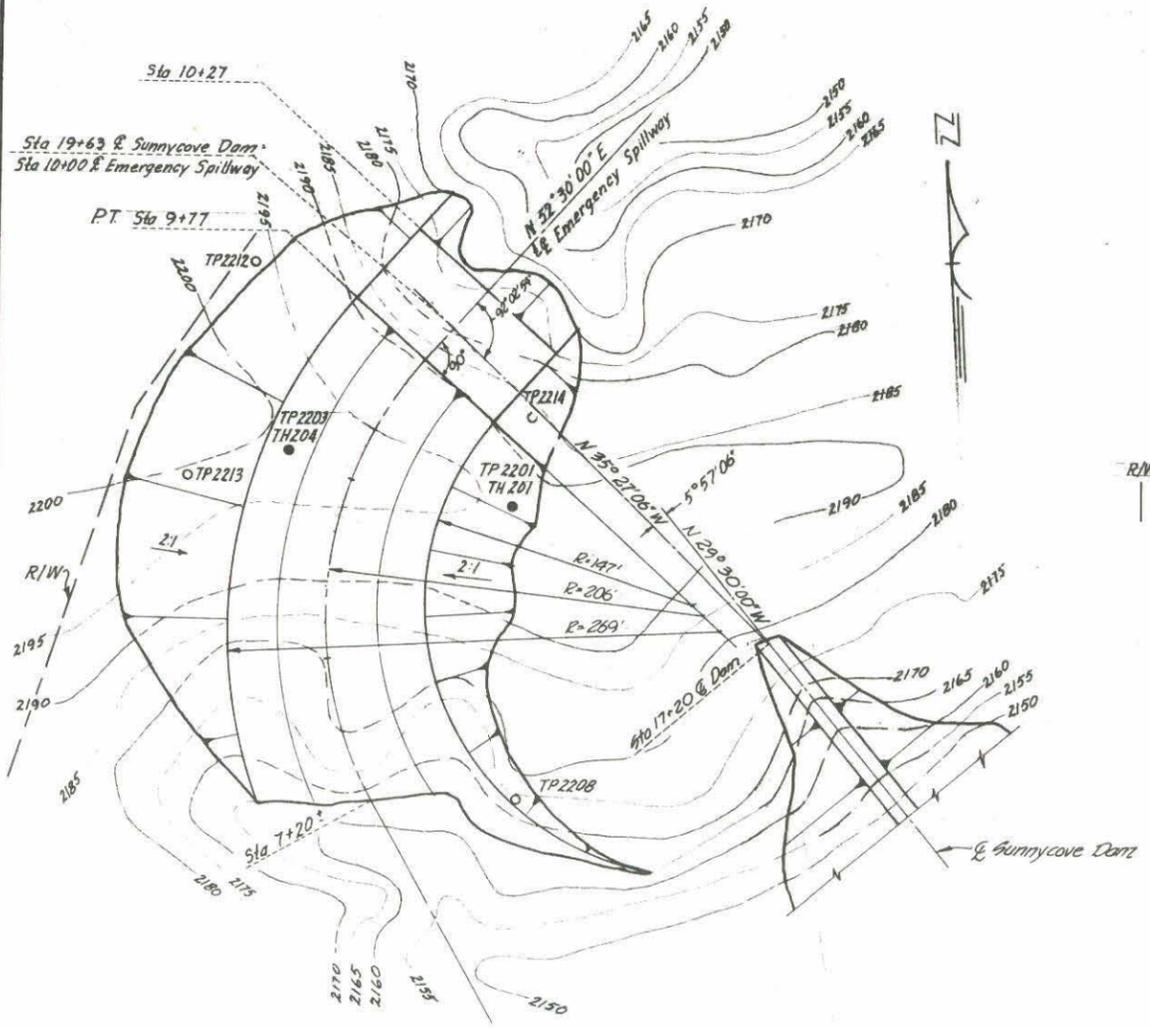
Designed K.J. Brust G.M.C.	Date 3-75	Approved by
Drawn L.W.M. & Clintock	Date 3-75	Title
Traced		
Checked	Sheet No 12 of 18	Drawing No 7-E-23090



PROFILE ON E EMERGENCY SPILLWAY



EMERGENCY SPILLWAY CROSS SECTIONS

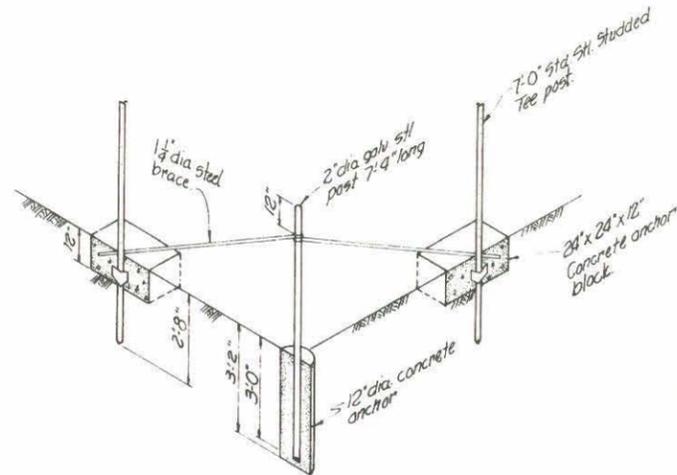


PLAN OF EMERGENCY SPILLWAY

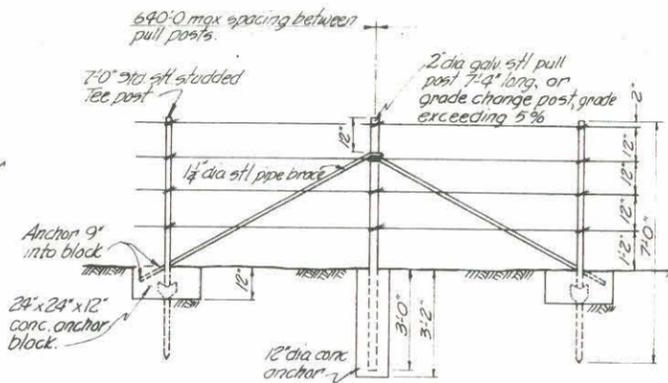


- Notes:
1. Unified soil descriptions are based on field identifications except where an asterisk is shown, the classification has been based on laboratory analysis.
  2. Complete field logs, laboratory test data and geologic report are available for review in the project office.

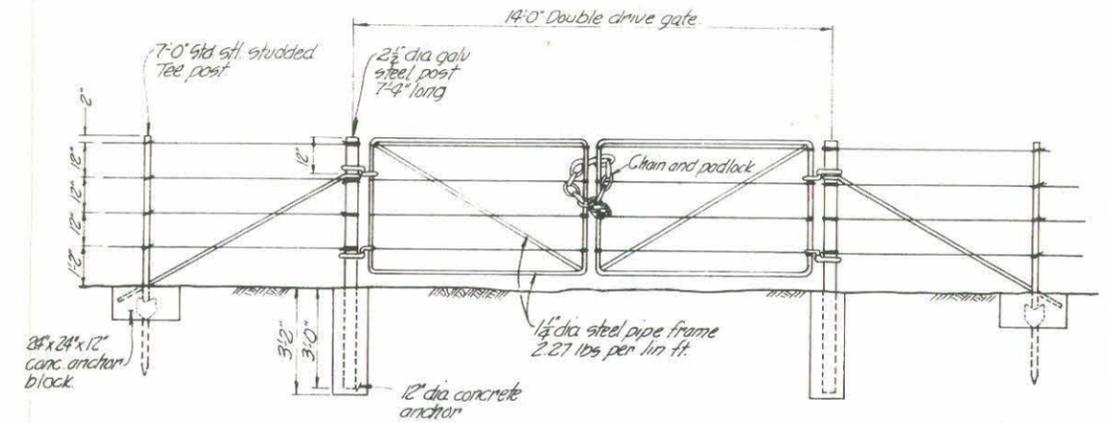
<b>EMERGENCY SPILLWAY PLAN PROFILE AND PAYLINES</b>			
SUNNYCOVE F.P.S. WICKENBURG W.P.D. MARICOPA COUNTY, ARIZONA			
<b>U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE</b>			
Designed K.J. Brust	Date 4-75	Approved by	
Drawn L.W. McClintock	Date 4-75	Title	
Traced	Sheet No 13	Drawing No.	
Checked	c 18		<b>7-E-23090</b>



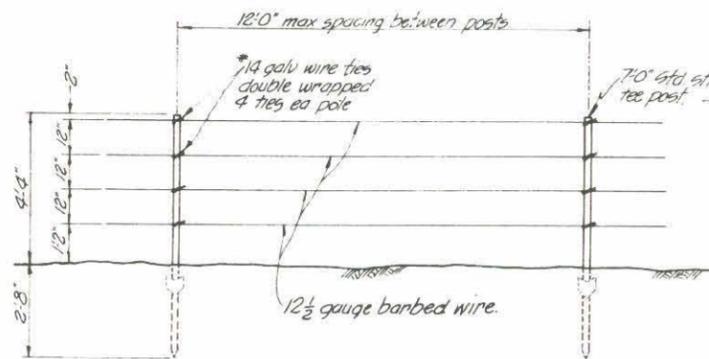
END OR CORNER POST ASSEMBLY



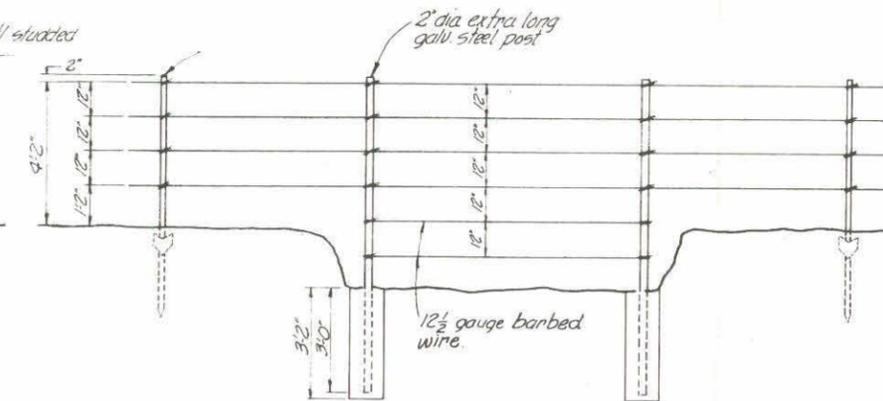
PULL POST OR CHANGE IN GRADE ASSEMBLY



GATE AND POST ASSEMBLY  
(2 required)



LINE POST ASSEMBLY



WATERCOURSE OR DEPRESSION CROSSING ASSEMBLY

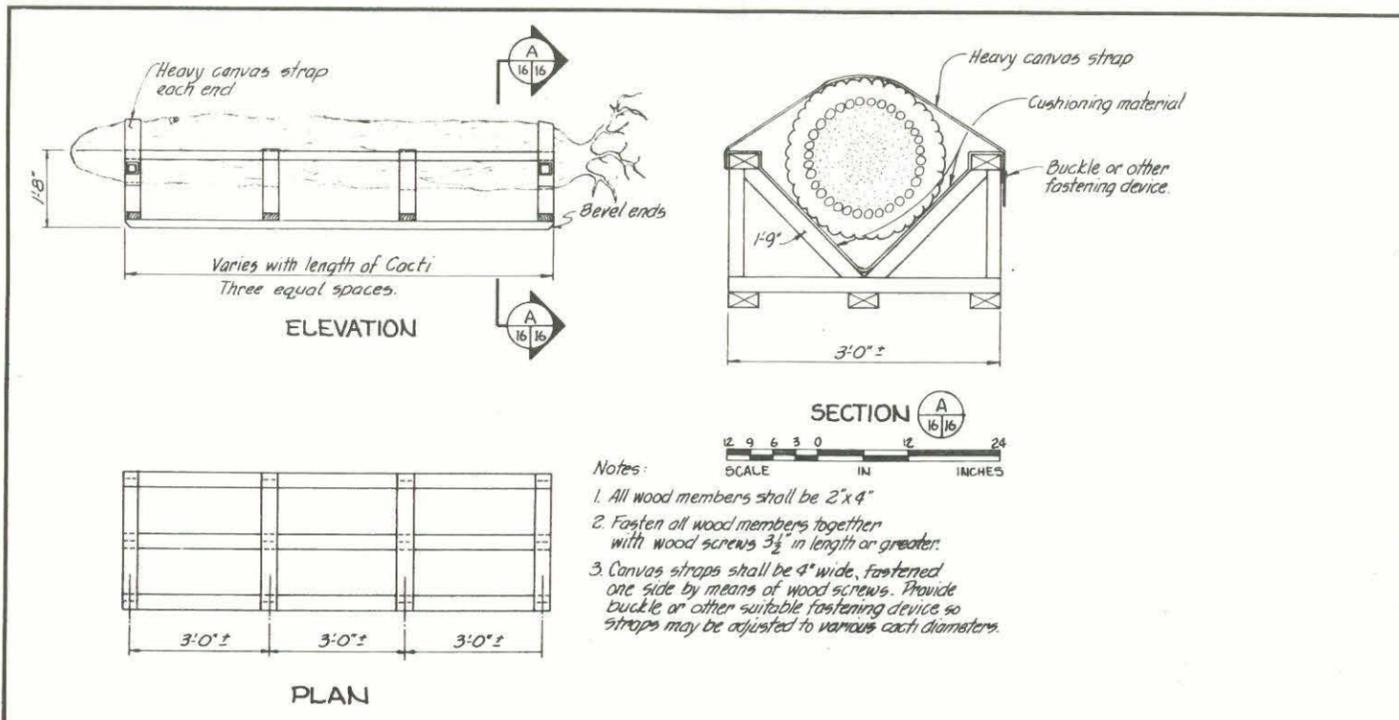
Drawings on this sheet not to scale.

Notes:

1. 1/2" dia std pipe shall be a minimum weight of 2.27 lbs per lin ft before galvanizing.
2. 1 1/2" dia std pipe shall be a minimum weight of 2.72 lbs per lin ft before galvanizing.
3. 2" dia std pipe shall be a minimum weight of 3.65 lbs per lin ft before galvanizing.
4. 2 1/2" dia std pipe shall be a minimum weight of 5.79 lbs per lin ft before galvanizing.
5. Steel tubing may be used in lieu of standard pipe, provided that: it shall be electric welded or seamless, the weight per lin ft shall be not less than the weights shown on the drawings; the OD of the tubing shall not exceed that of standard pipe by more than 1/8 inch; and the weight of galvanizing by the hot dip process shall be not less than 0.03 per lin foot total coated surface.
6. All gate hinges shall be heavy duty type, malleable iron or steel, industrial service type 270 degree swing of approved quality and design.
7. G. of fence posts or gate posts shall be a minimum of 6 inches inside of Rights of Way lines.

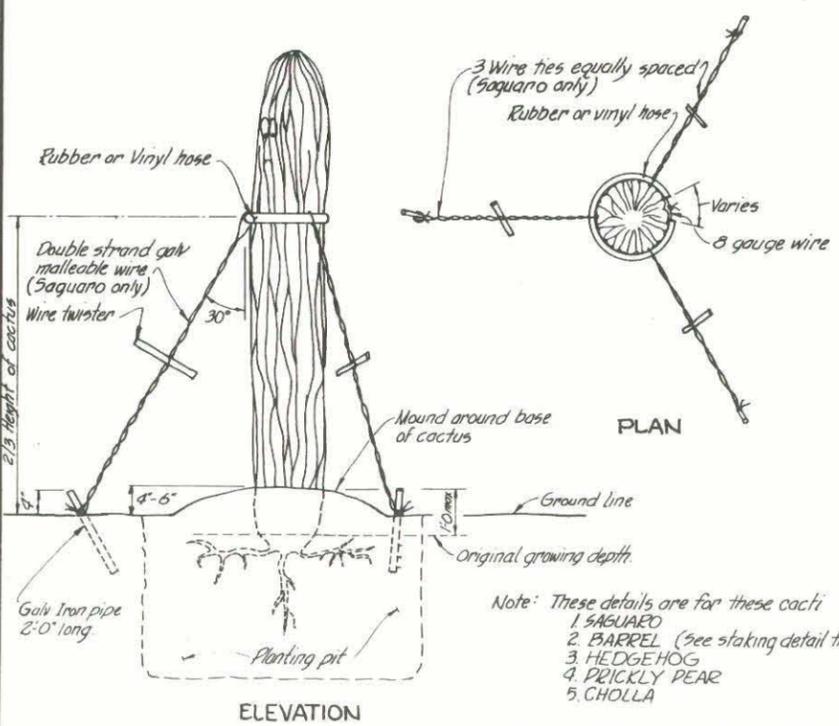
<b>FENCING DETAILS</b>			
SUNNYCOVE F.R.S. WICKENBURG, WDP MARICOPA COUNTY, ARIZONA			
<b>U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE</b>			
Designed K. J. Brust	Date 5-75	Approved by	
Drawn J. D. Land	Date 6-75	Title	
Traced		Sheet No. 14	Drawing No. 7-E-23090
Checked		of 18	





- Notes:**
1. All wood members shall be 2"x4"
  2. Fasten all wood members together with wood screws 3 1/2" in length or greater.
  3. Canvas straps shall be 4" wide, fastened one side by means of wood screws. Provide buckle or other suitable fastening device so straps may be adjusted to various cacti diameters.

**CACTUS CARRYING DEVICE**



- PLANTING NOTES**
1. Planting pits shall be a minimum of 1'-0" deeper than tap roots, and 1'-0" wider than lateral roots.
  2. Build a mound around base of cacti 4" to 6" in height and at least 1'-0" greater in diameter than base of plant.
  3. Cactus may be set a max. of 1'-0" lower than original growing depth if required for support.

- GUYING NOTES (Saguaro only)**
1. Rubber or vinyl hose shall be 3/4" I.D. and shall be of sufficient length to protect saguaro, but shall allow room for wire to be tightened in case of plant shrinkage.
  2. Guys shall be 8 gauge galvanized malleable wire, double strand, tightened by twisting the two wires together.
  3. Stakes shall be 1" I.D. galvanized iron pipe set at an angle as shown on detail.

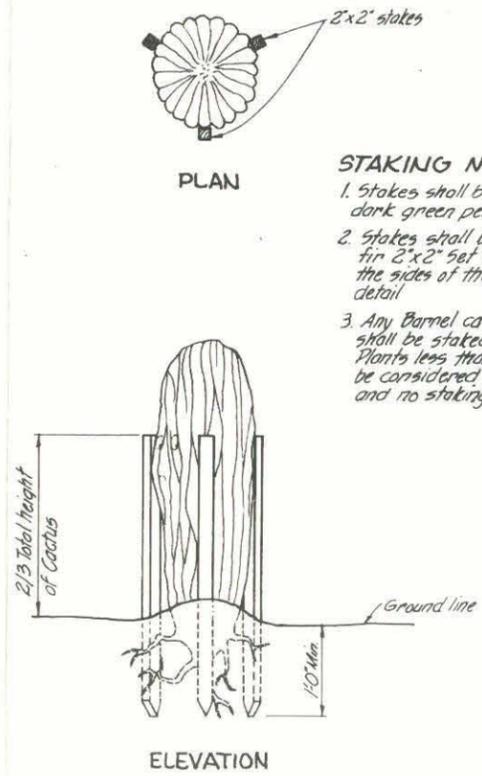
- Note: These details are for these cacti
1. SAGUARO
  2. BARREL (see staking detail this sheet.)
  3. HEDGEHOG
  4. PRICKLY PEAR
  5. CHOLLA

**CACTI PLANTING DETAILS**

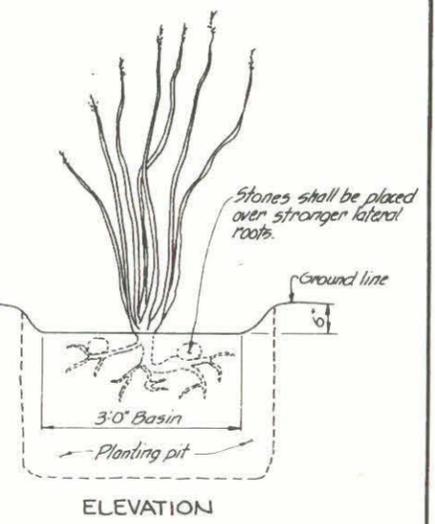
TRANSPLANTING CACTUS AND LISTED NATIVE MATERIAL				
SCIENTIFIC NAME	COMMON NAME	ROOT PRUNING	6 MONTHS WATER SCHEDULE	WATER BASIN 3'-0" DIA. 6" DEEP
Cereus giganteus	Saguaro	Reduce to 1" per foot of plant height, measured from base of plant	No irrigation needed	No
Echinocereus species	Hedgehog	Retain sufficient 6' long to anchor plant.	when planted only	No
Echinocactus	Barrel cactus	Retain sufficient 6' long to anchor plant.	When planted only	No
Opuntia species	Prickly-pear	Retain sufficient 6' long to anchor plant.	When planted only	No
Opuntia species	Cholla	Retain sufficient 6' long to anchor plant.	When planted only	No
Fouquieria Splendens	Ocotillo	Prune roots to 1" per foot of plant height.	When planted - Weekly in hot weather; Every two weeks cool weather; None October - April.	Yes
Agave species	Century, Maquey etc.	Retain all strong roots; keep roots damp until planted.	When planted - Weekly in hot weather; Every two weeks cool weather; None October - April.	Yes
Dasyliion Species	Sotol, Desert Spoon	Retain sufficient 6' long to anchor plant.	When planted only	Yes
Nolina Bigelovii	Bear Grass	Retain sufficient 6' long to anchor plant.	When planted only	Yes
Yucca Brevifolia	Joshua Tree	Retain sufficient 6' long to anchor plant.	When planted only	Yes
Yucca Elata	Sagebrush Yucca	Retain sufficient 6' long to anchor plant.	When planted only	Yes

**TABLE I**

- PLANTING NOTES**
1. Ocotillo may be planted 6" lower than original growing depth to furnish support.
  2. Planting pits shall be a minimum of 1'-0" deeper than tap roots, and 1'-0" wider than lateral roots.



- STAKING NOTES**
1. Stakes shall be stained with a dark green penetrating stain.
  2. Stakes shall be sound Douglas fir 2"x2" set vertically against the sides of the cactus as per detail.
  3. Any Barrel cactus over 3'-0" tall shall be staked when planted. Plants less than 3'-0" tall shall be considered self supporting and no staking shall be required.



**OCOTILLO PLANTING DETAIL**

Not to scale

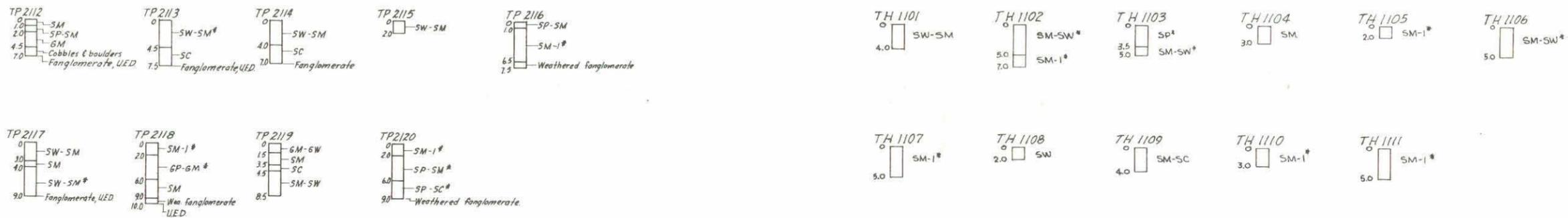
**CACTUS SALVAGING DETAILS**

SUNNYCOVE FR.5  
WICKENBURG W.S  
MARICOPA COUNTY, ARIZONA

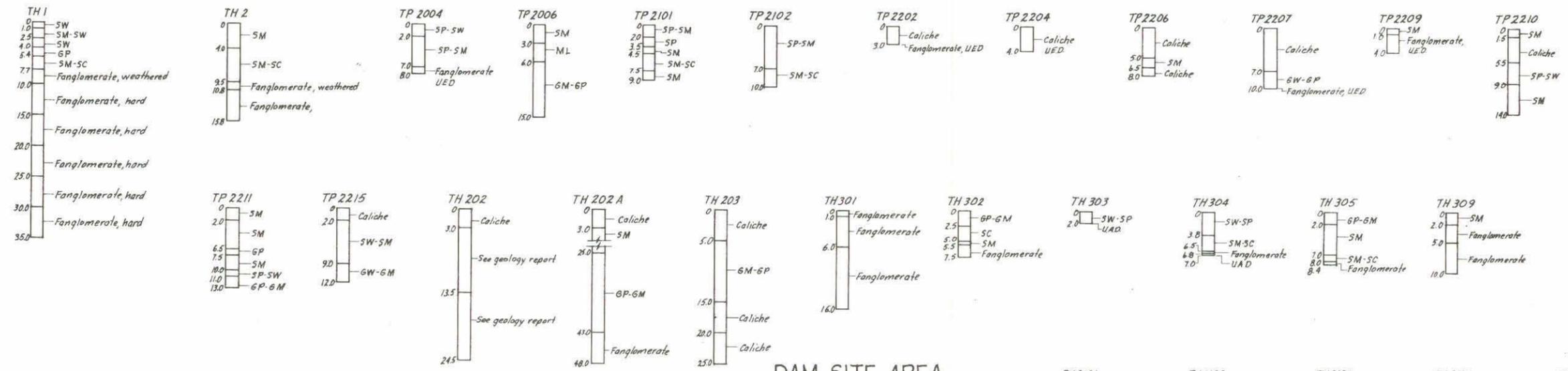
**U. S. DEPARTMENT OF AGRICULTURE**  
**SOIL CONSERVATION SERVICE**

Designed: Biddulph	Date: 5-66	Approved by: _____
Drawn: Jack Land	Date: 6-75	Title: _____
Traced: _____	Sheet: No 16 of 18	Drawing No: 7-E-23090
Checked: _____		

**BARREL CACTUS STAKING DETAIL**



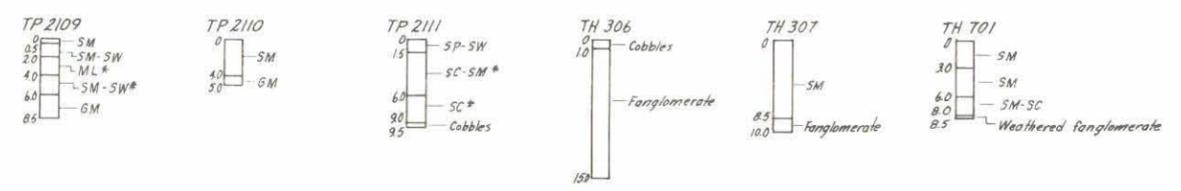
BORROW AREA NO. 1



DAM SITE AREA



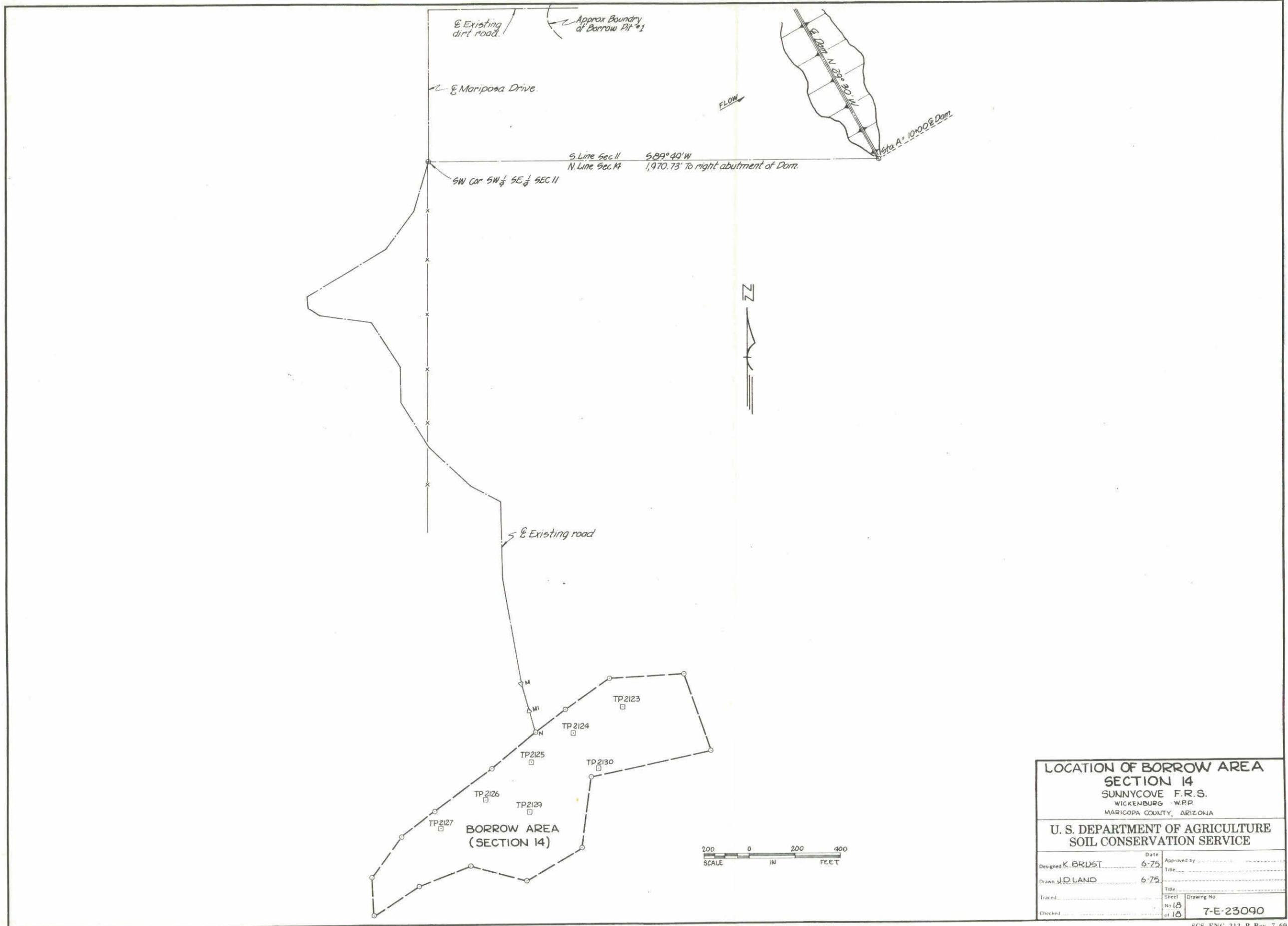
BORROW AREA (SECTION 14)



BORROW AREA NO. 2

- Notes:
- Unified soils descriptions are based on field identifications except where an asterisk is shown the classification has been based on laboratory analysis.
  - Complete field logs, laboratory test data and geologic report are available for review in the project office.
  - For locations of test pits and test holes see sheets 1, 2 and 18.

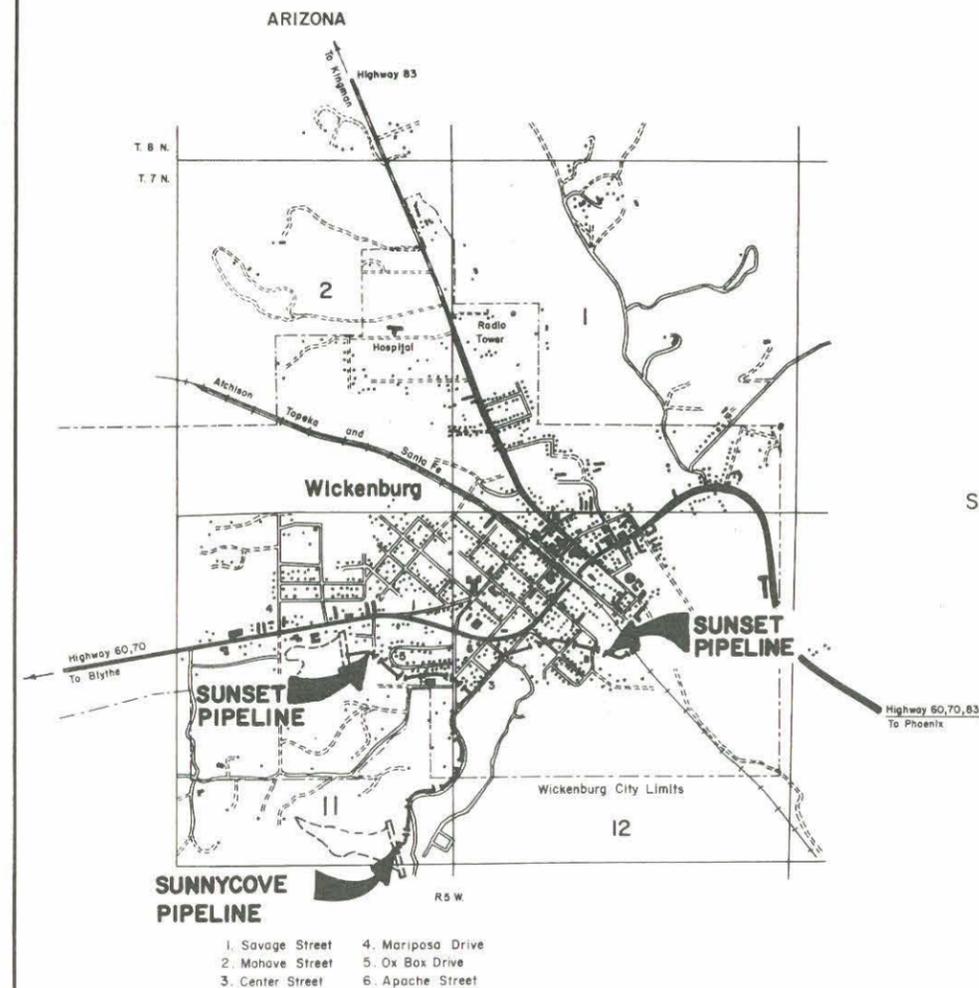
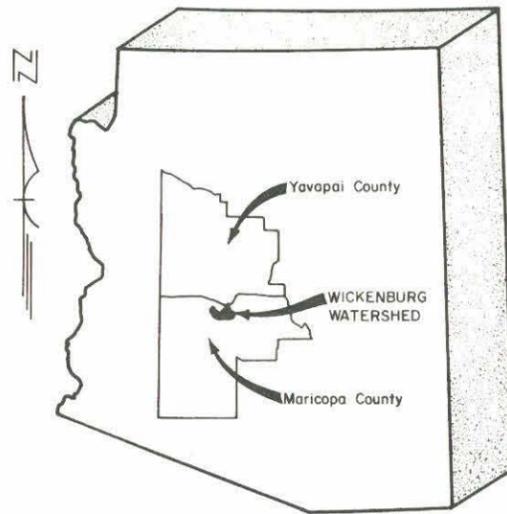
<b>SOIL LOGS</b>	
SUNNYCOVE F.R.S.	
WICKENBURG W.P.P.	
MARICOPA COUNTY, ARIZONA	
<b>U. S. DEPARTMENT OF AGRICULTURE</b>	
<b>SOIL CONSERVATION SERVICE</b>	
Logged by: A Sanders	Date: 4-75
Drawn: L.W.M. Clintock	Date: 4-75
Traced: _____	Title: _____
Checked: _____	Sheet No: 17
	Drawing No: 7-E-23090



<b>LOCATION OF BORROW AREA</b> <b>SECTION 14</b> SUNNYCOVE F.R.S. WICKENBURG W.P.P. MARICOPA COUNTY, ARIZONA			
<b>U. S. DEPARTMENT OF AGRICULTURE</b> <b>SOIL CONSERVATION SERVICE</b>			
Designed K. BRUST	Date 6-75	Approved by	Title
Drawn J.D. LAND	6-75		
Traced		Sheet No. 18	Drawing No.
Checked		of 18	7-E-23090

# WICKENBURG WATERSHED PROTECTION AND FLOOD PREVENTION PROJECT MARICOPA AND YAVAPAI COUNTIES, ARIZONA PLANS FOR THE CONSTRUCTION OF **SUNSET AND SUNNYCOVE PIPELINES**

PREPARED FOR THE  
MARICOPA COUNTY FLOOD CONTROL DISTRICT  
TRIANGLE NATURAL RESOURCE CONSERVATION DISTRICT  
WICKENBURG NATURAL RESOURCE CONSERVATION DISTRICT  
YAVAPAI COUNTY BOARD OF SUPERVISORS  
AND  
TOWN OF WICKENBURG  
BY  
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

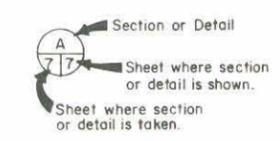


### INDEX OF DRAWINGS

SHT. NO.	TITLE	GENERAL NOTES	STRUCTURAL NOTES
1.	INDEX OF DRAWINGS		
2.	ALIGNMENT LOCATION MAP	1. Elevations are in feet above mean sea level datum.	1. All exposed concrete edge shall be chamfered one inch or rounded.
3.	PLAN AND PROFILE SUNSET PIPELINE	2. All stationing refers to centerline of construction and is the measured horizontal distance.	2. Spacing of reinforcement bars is measured center to center of bars. Bar cover is the clear distance between surface of bar and face of concrete, and unless otherwise shown is two inches for formed and top surfaces and three inches for surfaces against earth.
4.	PLAN AND PROFILE SUNSET PIPELINE	3. All cross sections are taken looking in the direction of increasing stations unless otherwise shown.	3. All bar splices not shown on these drawings shall be staggered with bars lapped a minimum of 30 diameters of the smaller bar in the splice.
5.	PLAN AND PROFILE SUNNYCOVE PIPELINE	4. Soil logs on these drawings show general condition at the site and are the basis for this design. Log of foundation investigation borings and test pits are contained in the exploration data report. A complete set of all soils investigation logs and geology report is available at the project office for reference.	4. All nuts, bolts, washers, etc., used in the permanent works of this project shall be galvanized.
6.	PLAN AND PROFILE SUNNYCOVE PIPELINE	5. Unified soil descriptions are based on field identifications except where an asterisk is shown the classification has been based on laboratory analysis.	
7.	MANHOLE DETAILS		
8.	OUTLET STRUCTURE DETAILS		
9.	TYPICAL PAYLINES AND DETAILS		

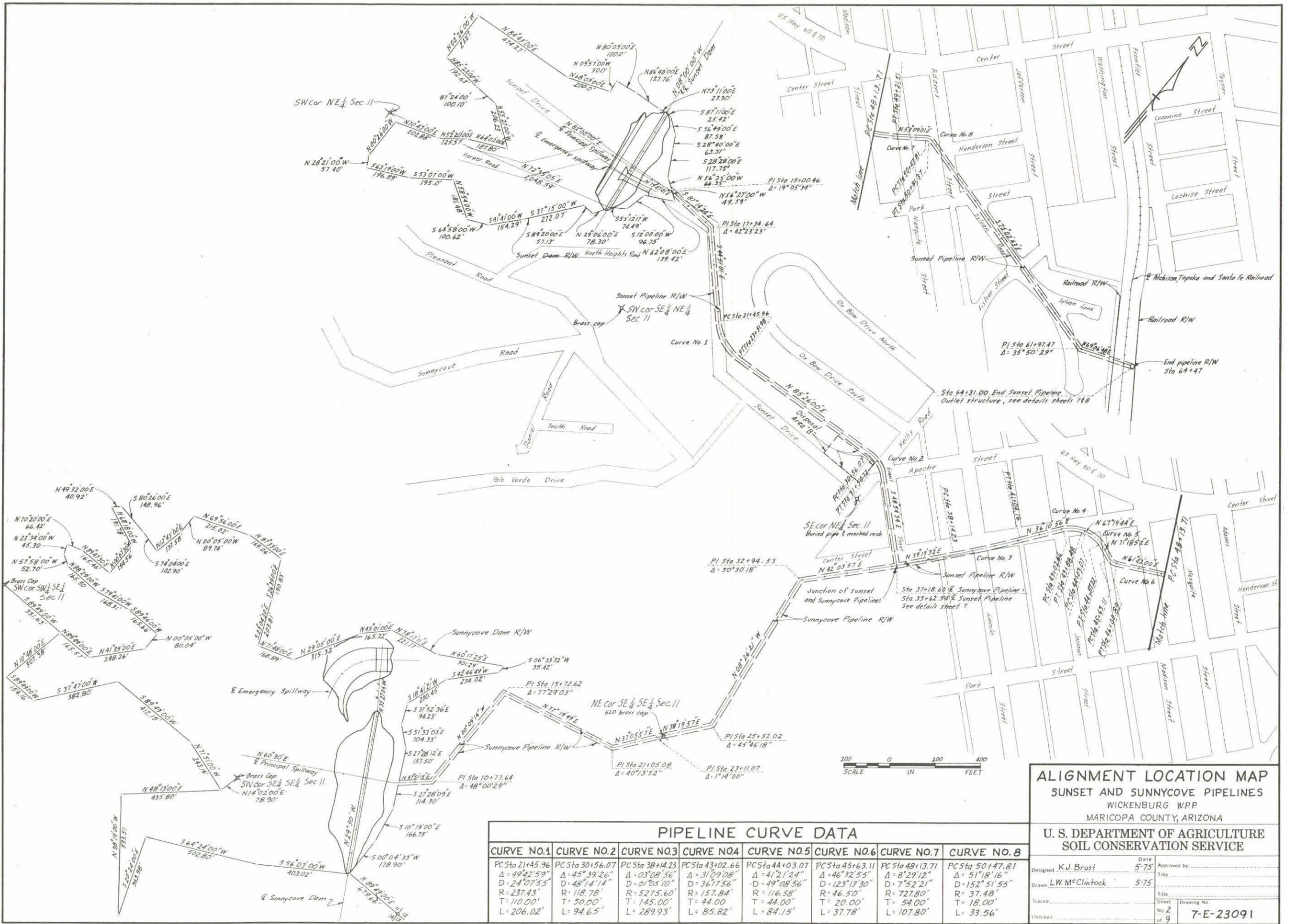
### LEGEND

- Test pit
- Manhole
- P—T— Power and telephone lines
- T— Telephone line
- G— Gas line
- P— Power line
- S— Sewer line
- W— Water line



INDEX OF DRAWINGS	
SUNSET AND SUNNYCOVE PIPELINE	
MARICOPA AND YAVAPAI COUNTIES, ARIZONA	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
Date: 3-75 Approved by: <i>[Signature]</i> Title: Chief Engineer	Date: 3-75 Approved by: <i>[Signature]</i> Title: Site Conservation Engineer
Sheet No. 1 of 9	Drawing No. 7-E-23091

TOWN OF WICKENBURG <b>APPROVED</b> DATE: 6-16-75 <i>[Signature]</i> Mayor	YAVAPAI COUNTY BOARD OF SUPERVISORS <b>APPROVED</b> DATE: 6/16/75 <i>[Signature]</i> Chairman	WICKENBURG NATURAL RESOURCE CONSERVATION DISTRICT <b>APPROVED</b> DATE: 6-12-75 <i>[Signature]</i> Secretary - Treasurer	TRIANGLE NATURAL RESOURCE CONSERVATION DISTRICT <b>APPROVED</b> DATE: 6/16/75 <i>[Signature]</i> Chairman	MARICOPA COUNTY FLOOD CONTROL DISTRICT <b>APPROVED</b> DATE: 4/13/75 <i>[Signature]</i> Chief Engineer
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**ALIGNMENT LOCATION MAP**  
**SUNSET AND SUNNYCOVE PIPELINES**  
 WICKENBURG WPP  
 MARICOPA COUNTY, ARIZONA  
 U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

CURVE NO.1	CURVE NO.2	CURVE NO.3	CURVE NO.4	CURVE NO.5	CURVE NO.6	CURVE NO.7	CURVE NO.8
PC Sta 21+45.96	PC Sta 30+56.07	PC Sta 38+14.23	PC Sta 43+02.66	PC Sta 44+03.07	PC Sta 45+63.11	PC Sta 48+13.71	PC Sta 50+47.81
$\Delta = 49^{\circ}42'59''$	$\Delta = 45^{\circ}39'26''$	$\Delta = 03^{\circ}08'56''$	$\Delta = 31^{\circ}09'08''$	$\Delta = 41^{\circ}21'24''$	$\Delta = 46^{\circ}32'55''$	$\Delta = 8^{\circ}29'12''$	$\Delta = 51^{\circ}18'16''$
$D = 24^{\circ}07'55''$	$D = 48^{\circ}14'14''$	$D = 01^{\circ}05'10''$	$D = 36^{\circ}17'56''$	$D = 49^{\circ}08'56''$	$D = 123^{\circ}19'30''$	$D = 7^{\circ}52'21''$	$D = 152^{\circ}51'55''$
$R = 237.43'$	$R = 118.78'$	$R = 5275.60'$	$R = 157.84'$	$R = 116.58'$	$R = 46.50'$	$R = 727.80'$	$R = 37.48'$
$T = 110.00'$	$T = 50.00'$	$T = 145.00'$	$T = 44.00'$	$T = 44.00'$	$T = 20.00'$	$T = 54.00'$	$T = 18.00'$
$L = 206.02'$	$L = 94.65'$	$L = 289.93'$	$L = 85.82'$	$L = 84.15'$	$L = 37.78'$	$L = 107.80'$	$L = 33.56'$

Designed: K.J. Brust  
 Drawn: L.W. McClintock  
 Traced: \_\_\_\_\_  
 Checked: \_\_\_\_\_

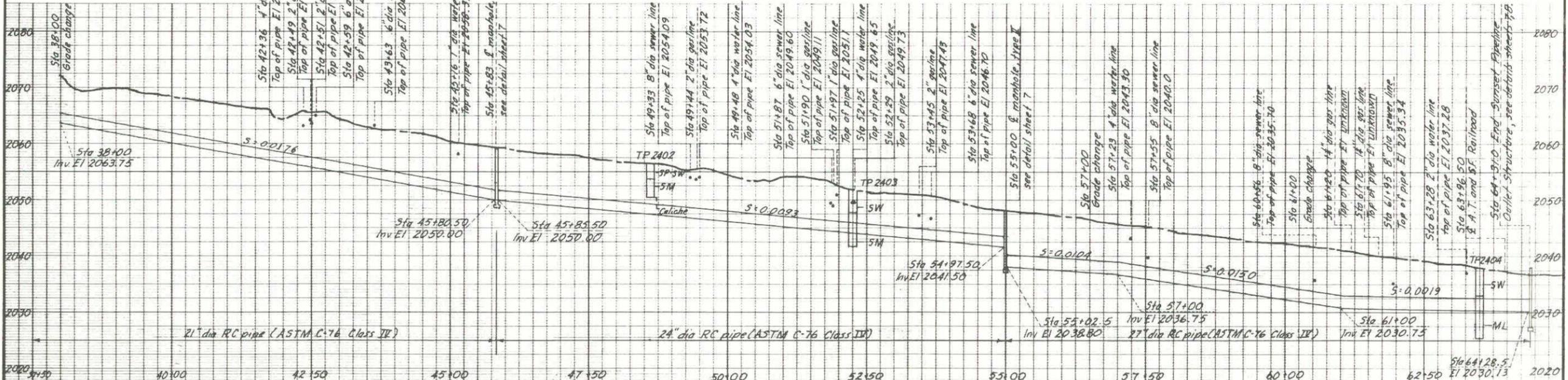
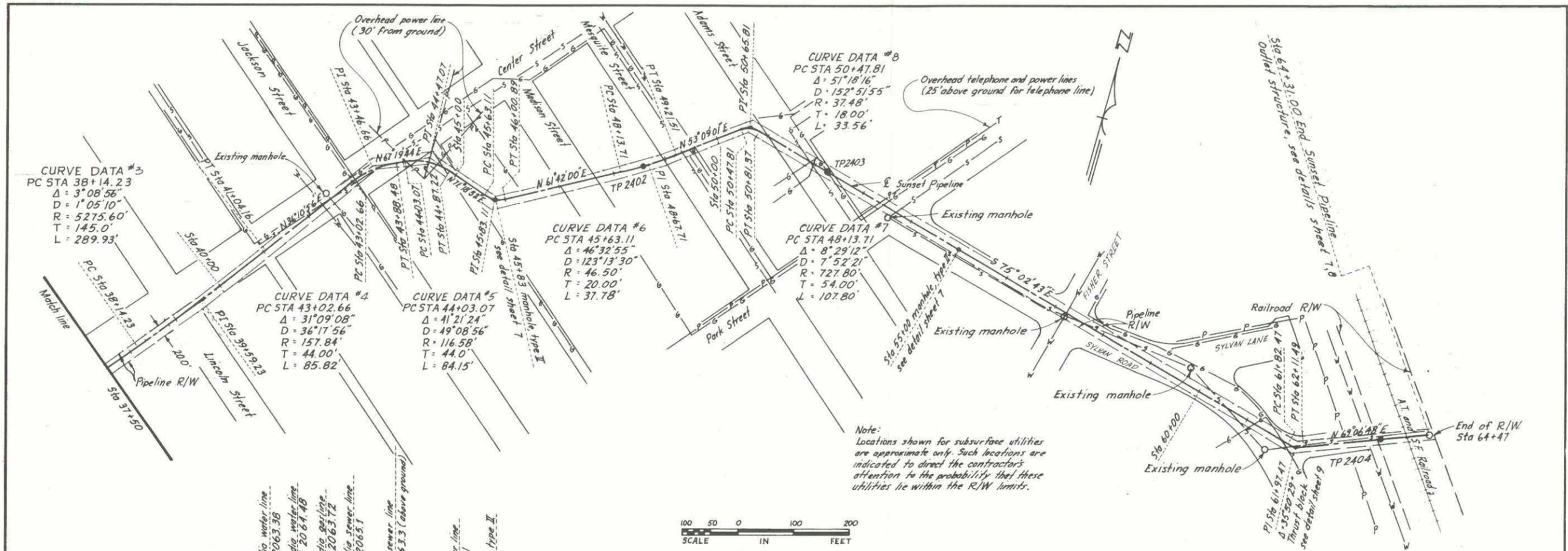
Date: 5-75  
 Title: \_\_\_\_\_  
 Sheet No. 2 of 9  
 Drawing No. 7-E-23091

MARICOPA COUNTY, ARIZONA

U.S. GOVERNMENT PRINTING OFFICE: 1989 O-354-162

SCS-ENG-313-B Rev. 7-69

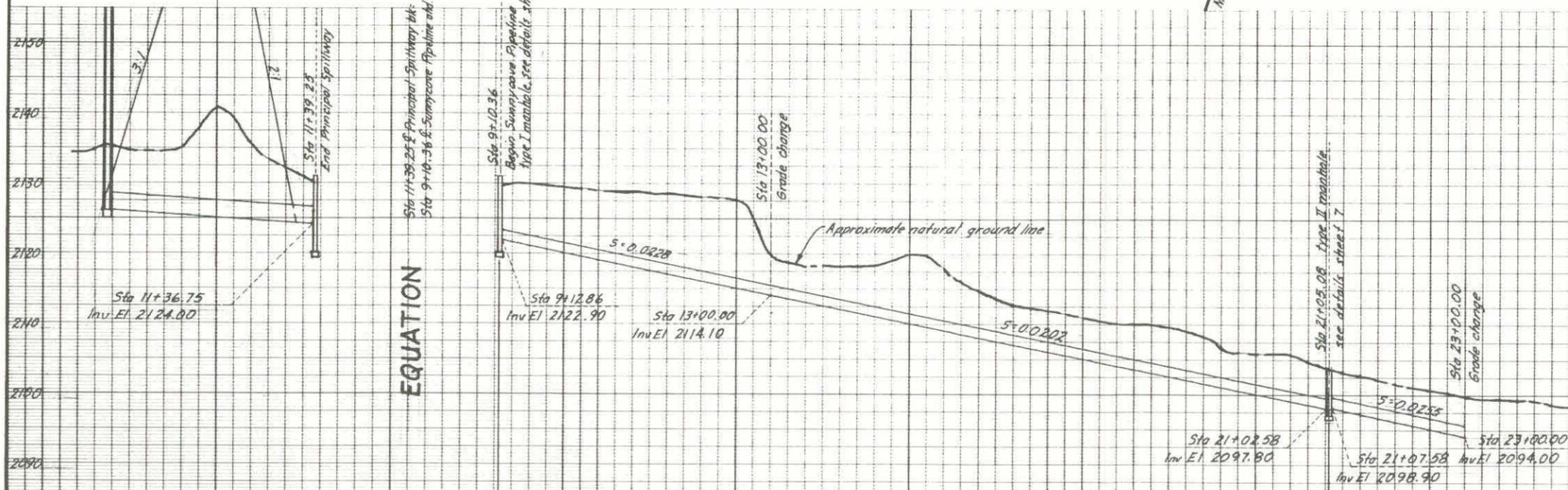
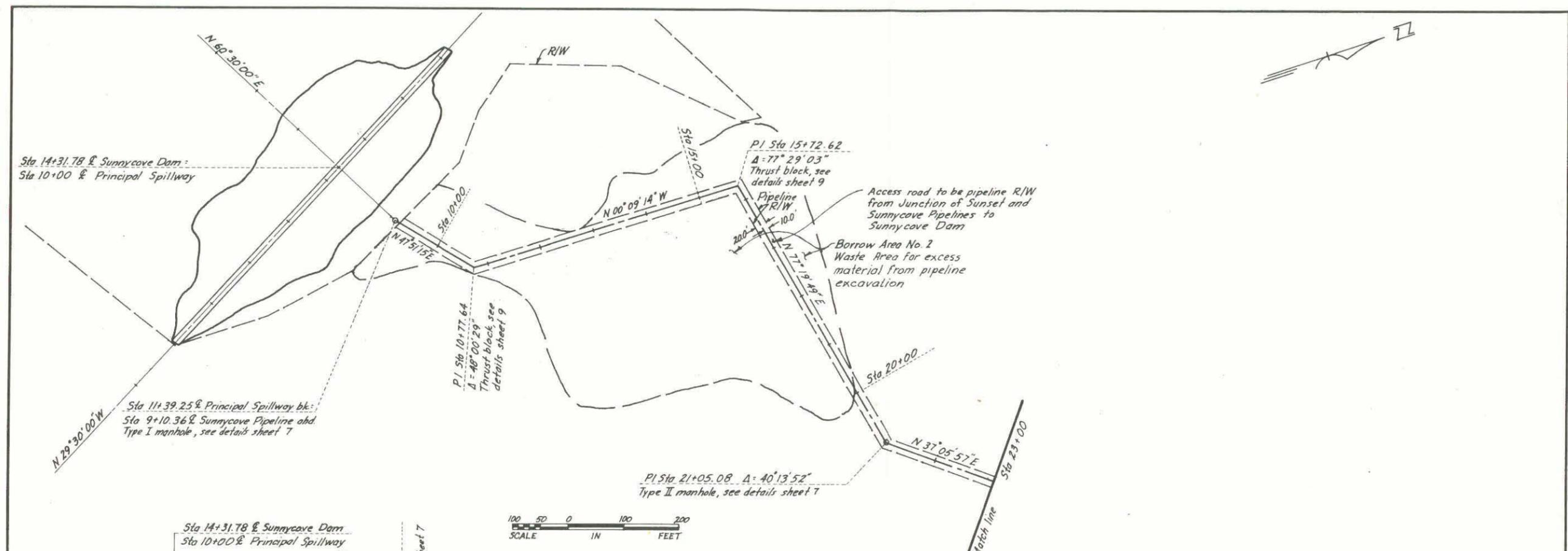




**PLAN AND PROFILE**  
**SUNSET PIPELINE**  
 WICKENBURG WPP  
 MARICOPA COUNTY, ARIZONA

**U. S. DEPARTMENT OF AGRICULTURE**  
**SOIL CONSERVATION SERVICE**

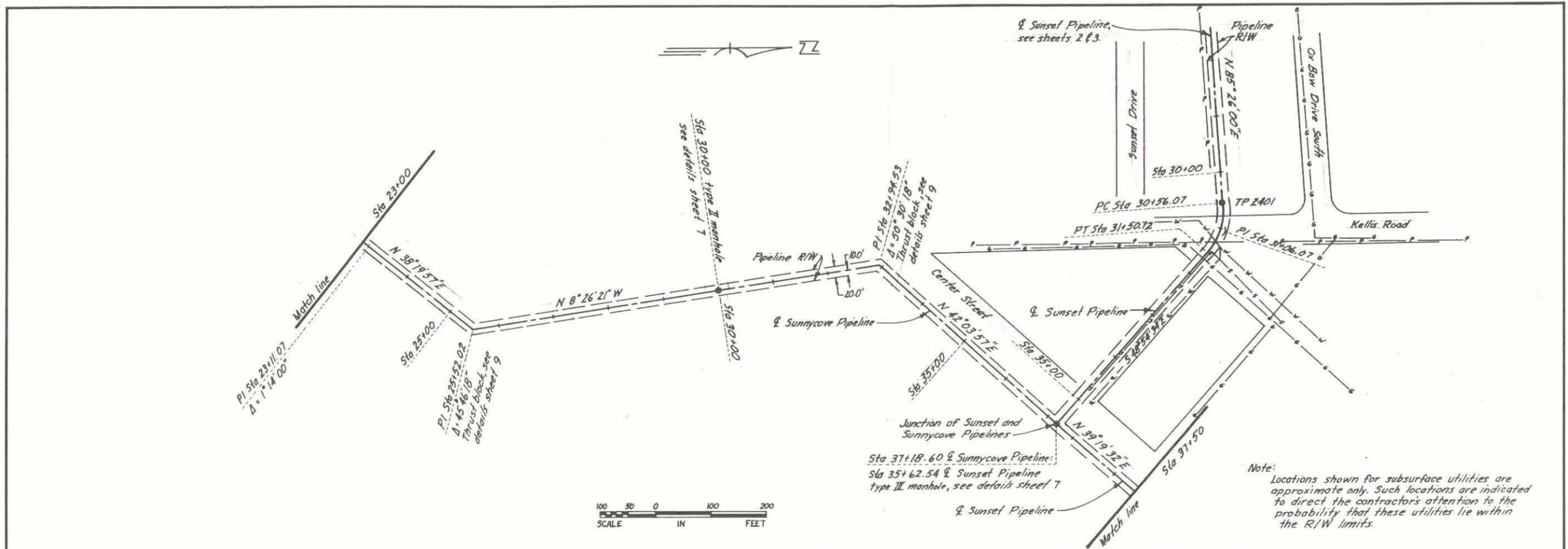
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Drawn <i>L.W.M. Clintock</i>	Date <i>4.75</i>	Title _____
Traced _____	Sheet No. <i>4</i>	Drawing No. _____
Checked _____	of <i>9</i>	<b>7-E-23091</b>



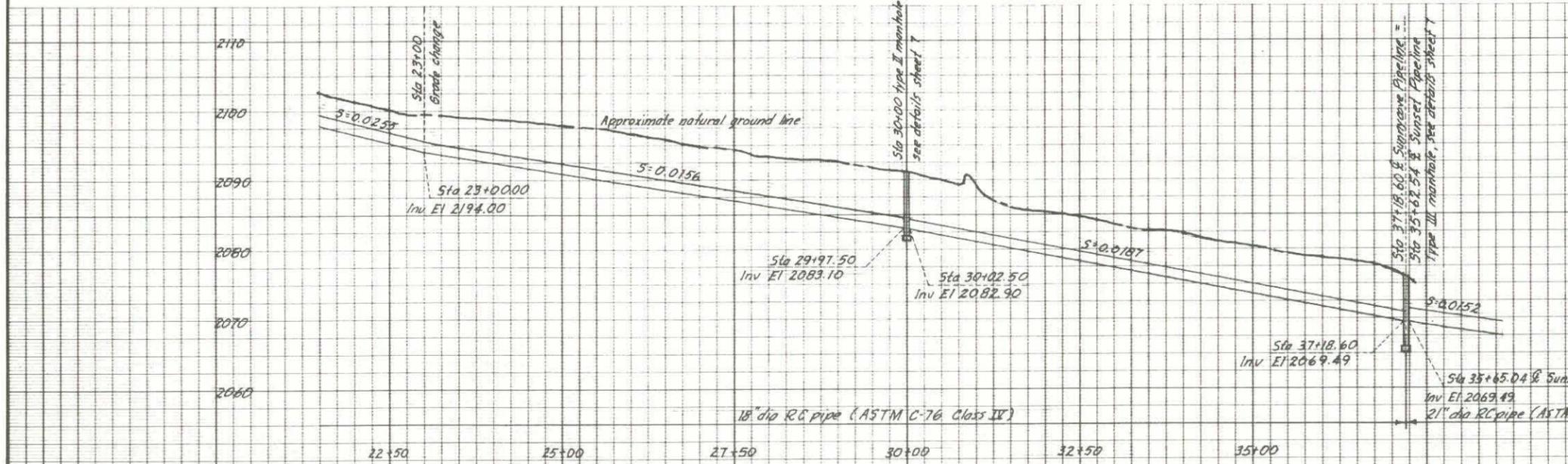
**PLAN AND PROFILE**  
**SUNNYCOVE PIPELINE**  
 WICKENBURG W.P.P.  
 MARICOPA COUNTY, ARIZONA

**U. S. DEPARTMENT OF AGRICULTURE**  
**SOIL CONSERVATION SERVICE**

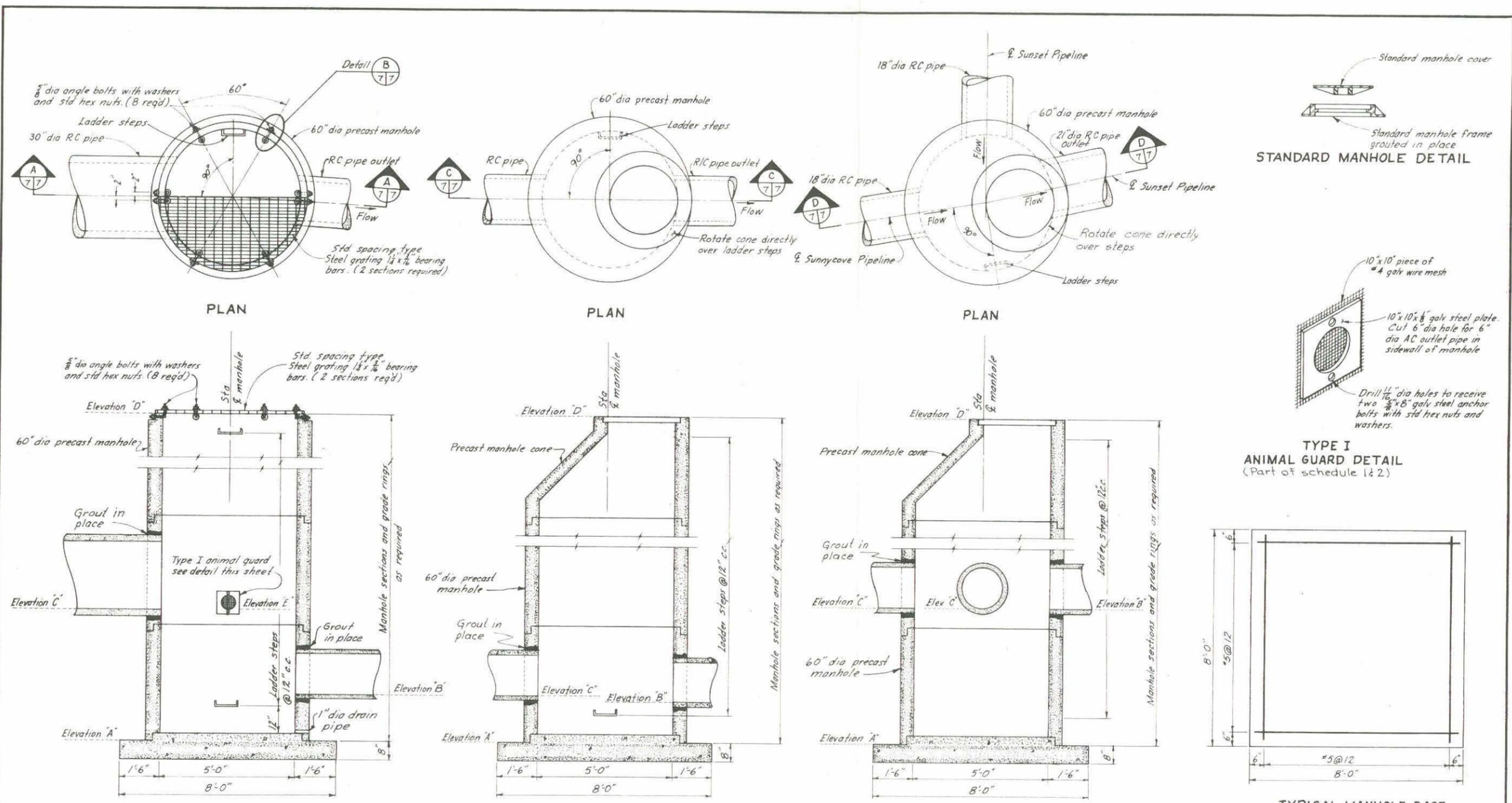
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Drawn	L.W. McClintock	Date	4-75	Title	
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Checked		of	9		7-E-23091



Note: Locations shown for subsurface utilities are approximate only. Such locations are indicated to direct the contractor's attention to the probability that these utilities lie within the R/W limits.



<b>PLAN AND PROFILE</b>			
<b>SUNNYCOVE PIPELINE</b>			
WICKENBURG WPP			
MARICOPA COUNTY, ARIZONA			
<b>U. S. DEPARTMENT OF AGRICULTURE</b>			
<b>SOIL CONSERVATION SERVICE</b>			
Designed <b>K.V. Brust</b>	Date <b>4-75</b>	Approved by _____	Title _____
Drawn <b>L.W. McClintock</b>	Date <b>4-75</b>	Checked _____	Title _____
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Sheet <b>6</b>		Drawing No. <b>7-E-23091</b>	
of <b>9</b>			

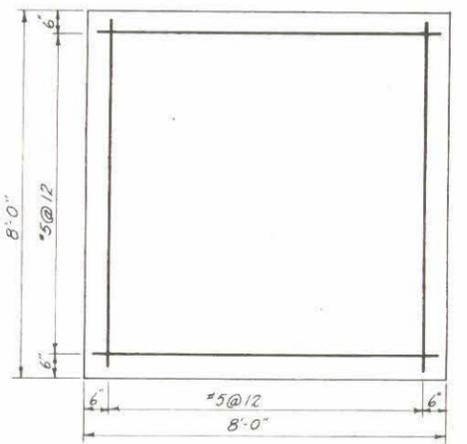


SECTION A  
TYPE I MANHOLE

SECTION C  
TYPE II MANHOLE

SECTION D  
TYPE III MANHOLE

TYPE I ANIMAL GUARD DETAIL  
(Part of schedule 1 & 2)



TYPICAL MANHOLE BASE

OUTLET PIPE SCHEDULE			
SUNSET PIPELINE		SUNNYCOVE PIPELINE	
STATION	ELEV "E"	STATION	ELEV "E"
13+97.62	N.A.	9+10.36	2124.6

RC MANHOLE SCHEDULE											
SUNSET PIPELINE						SUNNYCOVE PIPELINE					
STATION	TYPE	ELEV "A"	ELEV "B"	ELEV "C"	ELEV "D"	STATION	TYPE	ELEV "A"	ELEV "B"	ELEV "C"	ELEV "D"
13+97.62	I	2100.00	2102.00	2104.00	2116.00	9+10.36	I	2120.00	2122.90	2124.00	2138.00
23+52.00	II	2082.50	2084.80	2083.50	2092.50	21+05.08	II	2096.80	2098.90	2097.80	2103.50
35+62.54	III	2066.00	2069.50	2069.50	2076.00	30+00.00	II	2081.90	2082.90	2083.10	2091.00
45+83.00	II	2049.00	2050.00	2050.00	2059.50	37+18.60	III	2066.00	2069.50	2069.50	2076.00
55+00.00	II	2037.80	2038.80	2041.50	2047.50						
64+31.00	Outlet	2026.13	NA	2030.13	2038.13						

**MANHOLE DETAILS**  
SUNSET AND SUNNYCOVE PIPELINES  
WICKENBURG WPP  
MARICOPA COUNTY, ARIZONA

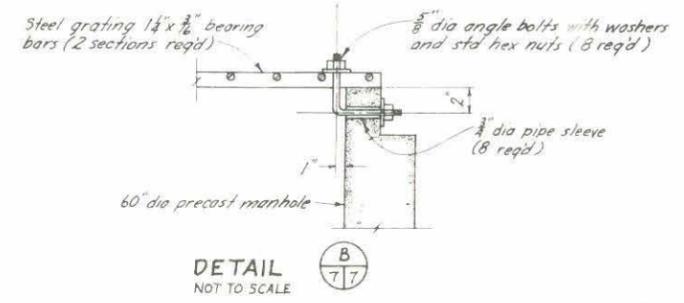
**U. S. DEPARTMENT OF AGRICULTURE**  
**SOIL CONSERVATION SERVICE**

Designed: K.J. Brust  
Date: 4-75  
Approved by: \_\_\_\_\_  
Title: \_\_\_\_\_

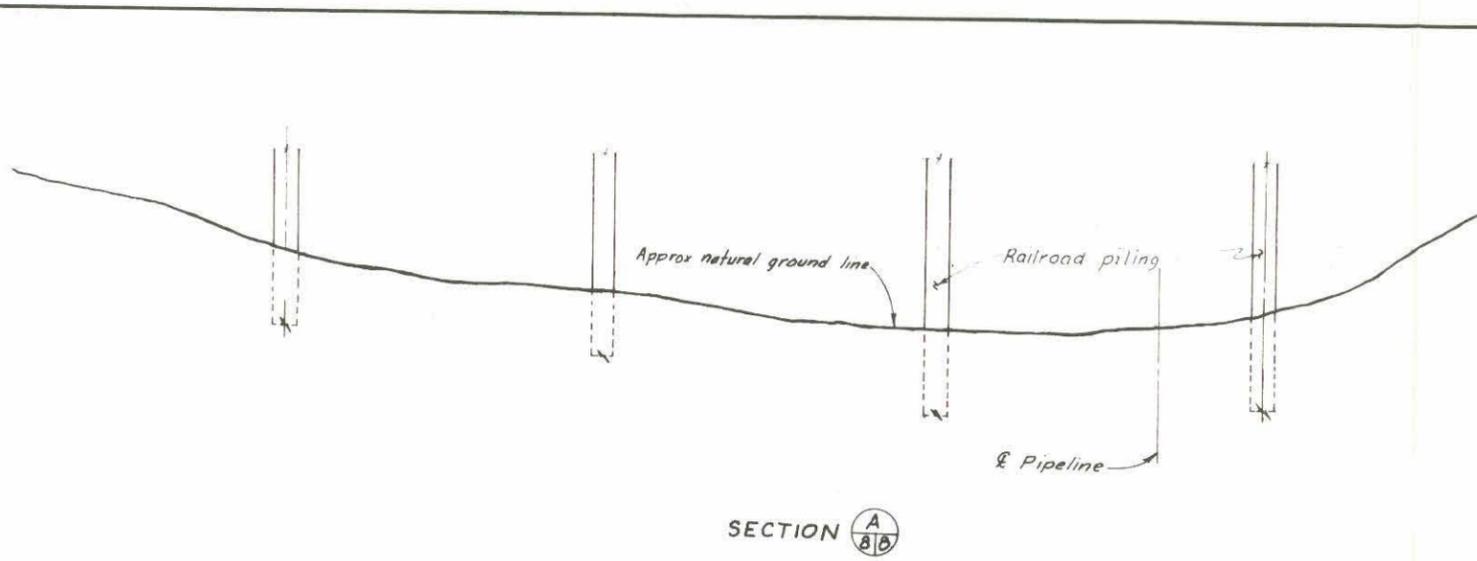
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Drawing No: 7-E-23091

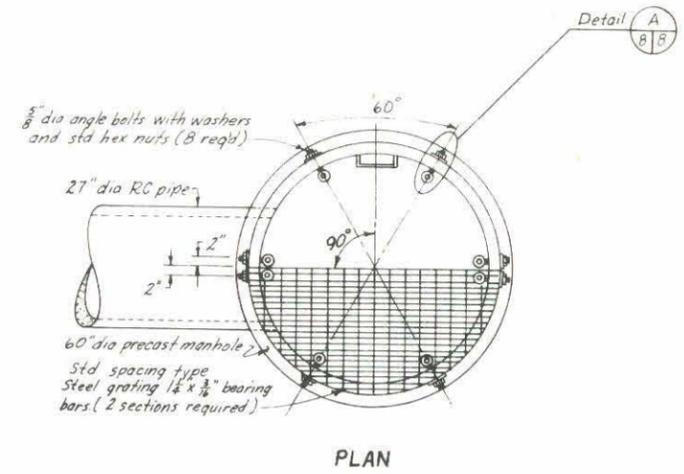
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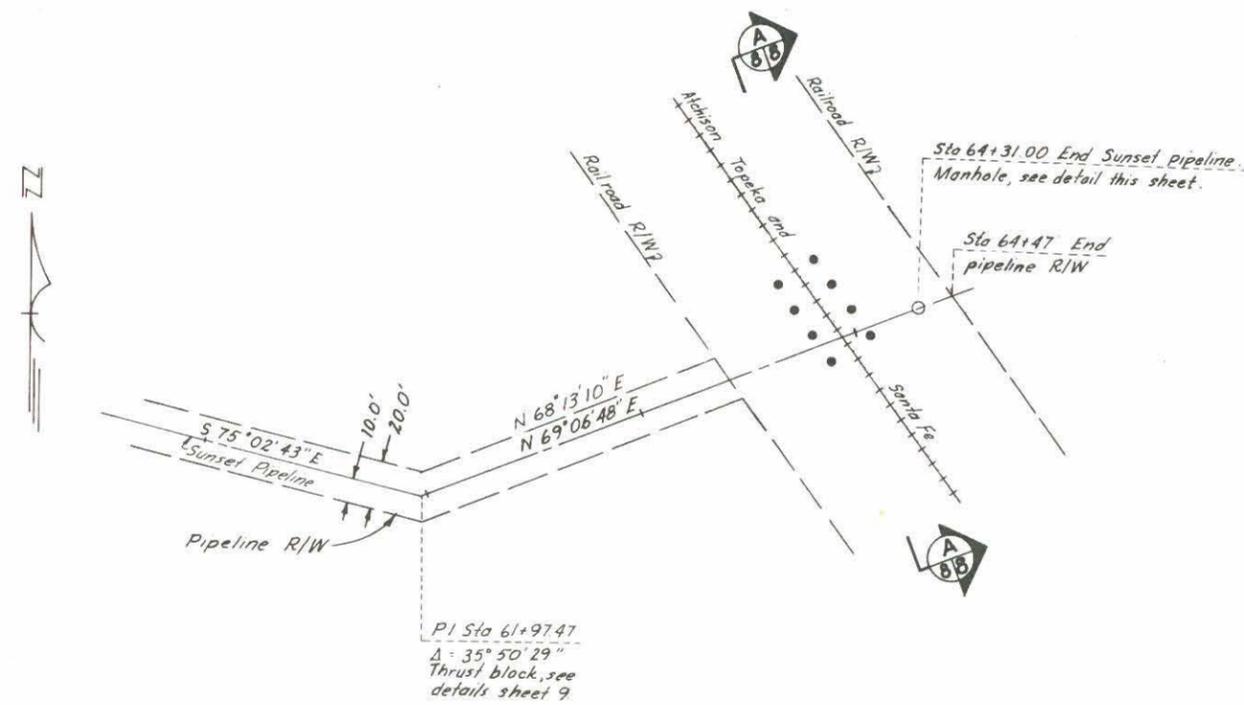
DETAIL B  
NOT TO SCALE



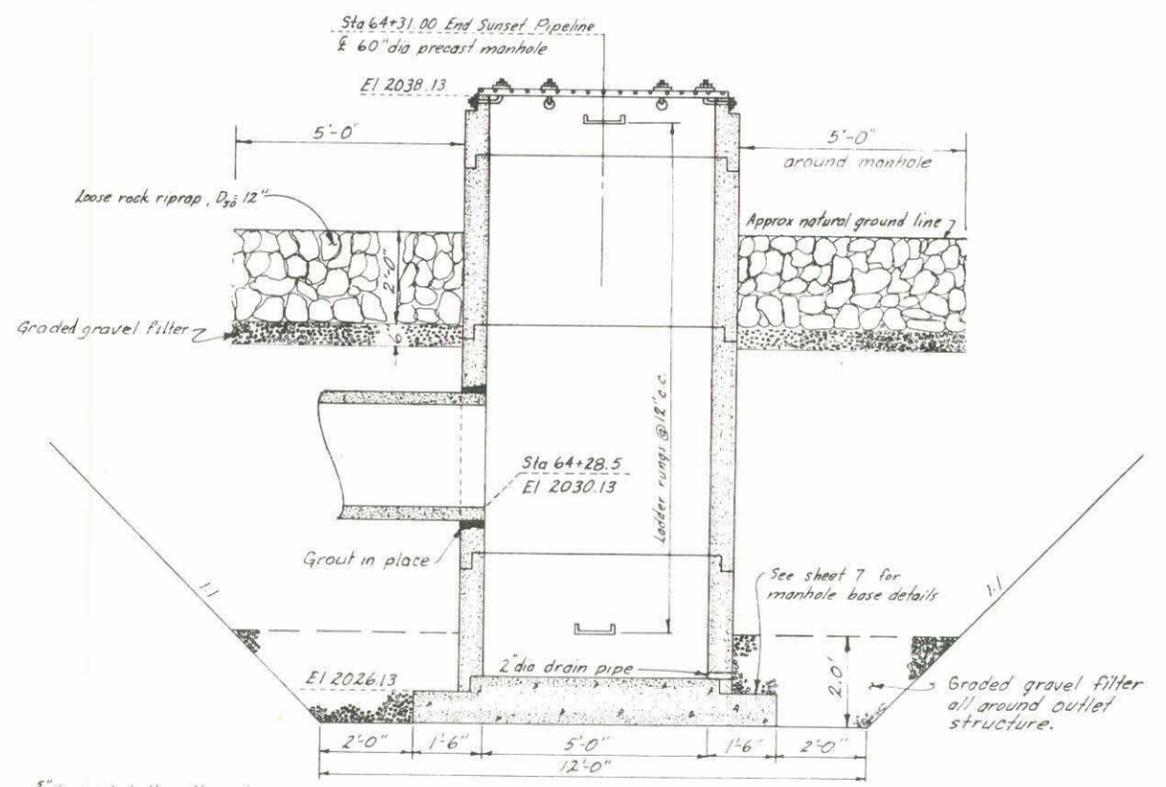
SECTION  $\frac{A}{B}$



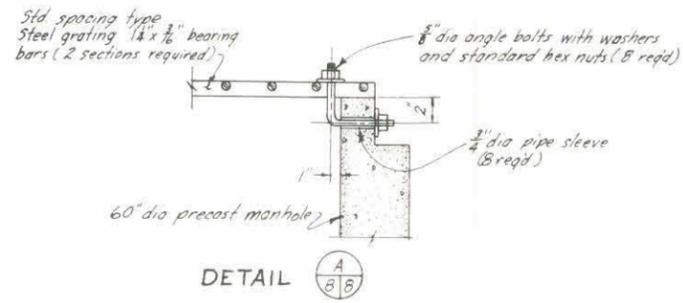
PLAN



PLAN



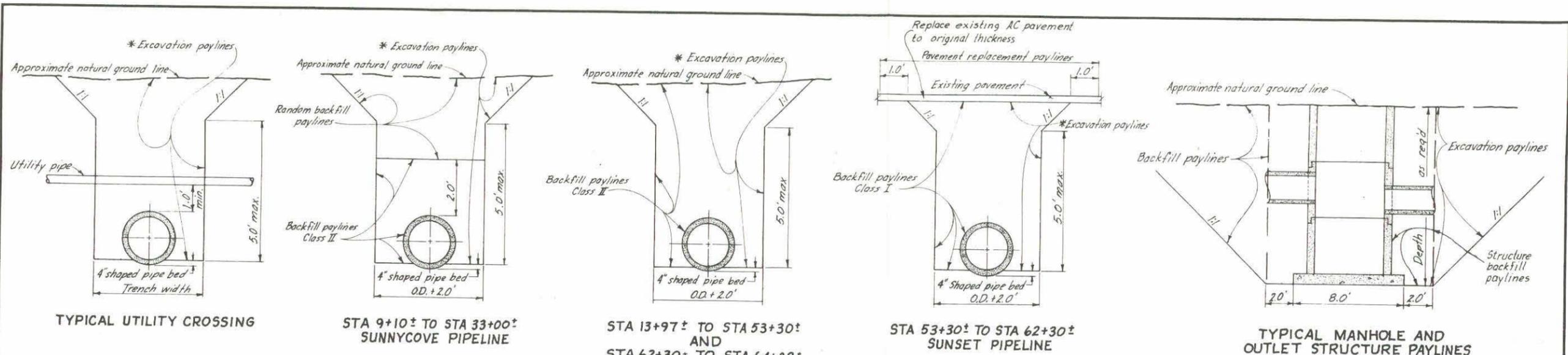
SECTIONAL ELEVATION  
OUTLET STRUCTURE



DETAIL  $\frac{A}{B}$

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<b>OUTLET STRUCTURE DETAILS</b>			
SUNSET AND SUNNYCOVE PIPELINES			
WICKENBURG WPP			
MARICOPA COUNTY, ARIZONA			
<b>U. S. DEPARTMENT OF AGRICULTURE</b>			
<b>SOIL CONSERVATION SERVICE</b>			
Designed <i>K.J. Brust</i>	Date <i>5-75</i>	Approved by _____	
Drawn <i>L.W. McClintock</i>	Date <i>5-75</i>	Title _____	
Sheet No. <i>8</i>	Sheet No. <i>8</i>	Drawing No. <i>7-E-23091</i>	
of 9			



TYPICAL UTILITY CROSSING

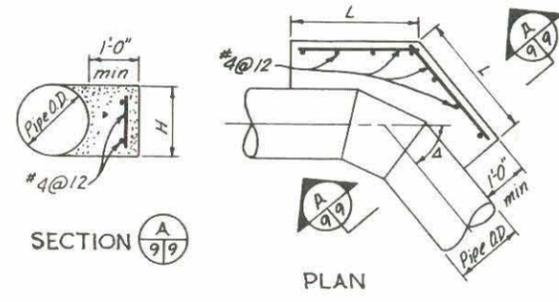
STA 9+10± TO STA 33+00±  
SUNNYCOVE PIPELINE

STA 13+97± TO STA 53+30±  
AND  
STA 62+30± TO STA 64+28±  
SUNSET PIPELINE  
STA 33+00± TO STA 37+18±  
SUNNYCOVE PIPELINE

STA 53+30± TO STA 62+30±  
SUNSET PIPELINE

TYPICAL MANHOLE AND  
OUTLET STRUCTURE PAYLINES

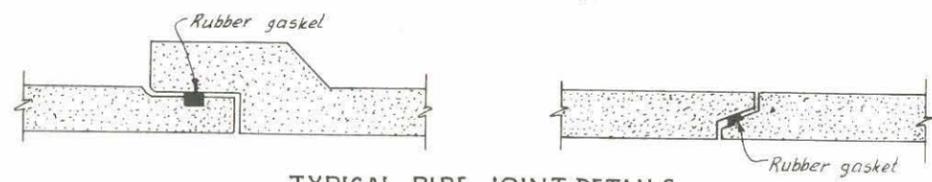
\* Pipe trench excavation lines shall comply with the "Accident Prevention and Safety Measures" section of the Special Provisions.



THRUST BLOCK DETAIL

THRUST BLOCK SCHEDULE			
STATION	PIPE ID	L	H
SUNSET	15"	1'-0"	Pipe OD
17+34.60	27"	1'-3"	Pipe OD
61+97.50			
SUNNYCOVE	15"	1'-0"	Pipe OD
10+77.60	15"	3'-0"	Pipe OD
15+72.60	18"	1'-0"	Pipe OD
25+52.00	18"	1'-0"	Pipe OD
32+94.50			

Note: When pulling joint for change in alignment maximum joint openings shall be that recommended by the pipe manufacturer.



TYPICAL PIPE JOINT DETAILS

PIPE SCHEDULE				
PIPELINE	STATION TO STATION	DIA.	C-76 CLASS	
SUNSET	13+97.62 — 23+52.00	15"	V	
"	23+52.00 — 35+62.54	18"	IV	
"	35+62.54 — 45+83.00	21"	IV	
"	45+83.00 — 55+00.00	24"	IV	
"	55+00.00 — 64+28.50	27"	IV	
SUNNYCOVE	9+10.36 — 21+05.08	15"	V	
"	21+05.08 — 37+18.60	18"	IV	

This sheet not to scale

TYPICAL PAYLINES & DETAILS SUNSET AND SUNNYCOVE PIPELINES WICKENBURG WPP MARICOPA COUNTY, ARIZONA			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
Designed	K.J. Brust	Date	5-75
Approved by		Title	
Drawn	L.W. McClintock	Date	5-75
Traced		Title	
Checked		Sheet	No 9 of 9
		Drawing No	7-E-23091