R.W.C.D. 2 Extension

Engineering Data

BID SCHEDULE NO. 1
WILLIAMS-CHANDLER, WPP, ARIZONA
RWCD FLOODWAY - REACH 2 EXTENSION

Item	Work or Material	Spec. No.	Quantity	Unit	Unit Price	Amount
25.	Clearing and Grubbing	2		Acres	$_____	$_____
26.	Water	10		M.Gal.	$_____	$_____
27.	Channel Excavation, Common	21		C. Y.	$_____	$_____
28.	Basin Excavation, Common	21		C. Y.	$_____	$_____
29.	Structure Excavation, Common	21		C. Y.	$_____	$_____
30.	Structure Backfill	23		C. Y.	$_____	$_____
31.	Earth Fill	23		C. Y.	$_____	$_____
32.	Drain Fill	24		C. Y.	$_____	$_____
33.	24-Inch Diameter Reinforced Concrete Pipe, Cl. III	42		L. F.	$_____	$_____
34.	Loose Rock Riprap	61		C. Y.	$_____	$_____
35.	Grouted Rock Riprap	62		C. Y.	$_____	$_____
36.	Surveys	8		L. S.	$_____	$_____

BID SCHEDULE NO. 2
WILLIAMS-CHANDLER, WPP, ARIZONA
RWCD FLOODWAY - REACH 2 EXTENSION
DIP CROSSING AND QUEEN CREEK EARTHFILL

Item	Work or Material	Spec. No.	Quantity	Unit	Unit Price	Amount
11.	Dip Crossing Excavation, Common	21		C. Y.	$_____	$_____
12.	Structure Excavation, Common	21		C. Y.	$_____	$_____
13.	Structure Backfill Common	23		C. Y.	$_____	$_____
14.	Concrete, Class 4000X Common	31		C. Y.	$_____	$_____
15.	Cement	31		Rbls.	$_____	$_____
16.	Steel Reinforcement	34		Lbs.	$_____	$_____
17.	Loose Rock Riprap	61		C. Y.	$_____	$_____
18.	Asphalt Concrete Pavement	400		S. Y.	$_____	$_____
				TOTAL	$_____	$_____

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 25 Clearing and Grubbing

(1) This item shall consist of clearing and grubbing of all areas shown on the drawings and staked in the field.

(2) If waste materials are disposed of by burying, they shall be buried a minimum of 18 inches below the existing ground surface in the waste disposal areas shown on the drawings. When disposal is complete, the waste disposal areas shall be smoothed and graded to blend into the surrounding terrain.

(3) If materials removed from the cleared and grubbed area are to be burned, burning must be carried out in accordance with Pinal County Health Department regulations.

(4) 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 26, Water

(1) This item shall consist of furnishing and applying all water necessary for performance of the work described.

(2) Water may be obtained from the Roosevelt Water Conservation District Higley, Arizona (Grant Ward Telephone 963-3414).

(3) Measurement and payment shall be in accordance with Section 6.

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, Removal of Water

(1) This item shall consist of the removal of surface and ground water from the construction area shown on the drawings.

(2) No advance plan of dewatering will be required.

(3) No separate payment will be made for the removal of water. Compensation for this work will be included in the payment for Bid Items 27, 28, 29, 30, and 31.

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, Removal of Water

(1) This item shall consist of the removal of surface and ground water from the construction area shown on the drawings.

(2) No advance plan of dewatering will be required.

(3) No separate payment will be made for the removal of water. Compensation for this work will be included in the payment for Bid Items 11, 12, 13, 14, and 17.

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 27, Earth Channel Excavation, Common

(1) This item shall consist of all excavation required to construct:

(a) The floodway, including entrance channel, between Stations 976+00± and 982+50±, as shown on the drawings.

(b) Stripping of the top 6 inches below original ground surface on surfaces where earth fill is to be placed in construction of the floodway.

(2) In Section 5, Use of Excavated Material, Method 1 shall apply. Suitable materials resulting from this excavation and not required for Bid Item 30, Structure Backfill, and Bid Item 31, Earth Fill, will be spoiled in the areas shown on the drawings.

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

(4) Measurement and payment will be by Method 2, and will include compensation for Subsidiary Item, Removal of Water, and Subsidiary Item, Spoil Disposal.

b. Bid Item 28, Basin Excavation, Common

(1) This item shall consist of all excavation required for construction of the Sediment Basin and basin inlet channel as shown on the drawings, including stripping of the top 6 inches below original ground surface on surfaces where earth fill is to be placed in construction of the basin or basin inlet channels.

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

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

(4) Measurement and payment will be by Method 2.

c. Bid Item 29, Structure Excavation, Common

(1) This item shall consist of all excavation required for the installation of the sediment basin outlet structure and pipe, the side inlet at RWCD STA 980+75, the basin inlet structure and side inlet structure for channel #3, as 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.

(4) Measurement and payment will be by Method 1, and will include compensation for Subsidiary Item, Removal of Water.

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 11, Dip Crossing Excavation, Common

(1) This item shall consist of all excavation between Station 976+75± and Station 981+00±, centerline Floodway, in excess of specified channel excavation required to construct the Dip Crossing, except structure excavation for the concrete cutoff walls, as shown on the drawings and staked in the field.

(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) Measurement and payment will be by Method 2 and will include compensation for Subsidiary Item, Removal of Water.

b. Bid Item 12, Structure Excavation, Common

(1) This item shall consist of all excavation required to construct concrete cutoff walls for the Dip Crossing as shown on the drawings and staked in the field.

(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) Measurement and payment will be by Method 4 and will include compensation for Subsidiary Item, Removal of Water.

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 30, Structure Backfill

(1) This item shall consist of placing and compacting backfill around the sediment basin outlet pipe.

(2) Backfill material shall consist of suitable CL's, ML's, SC's and SM's (Unified Soil Classification System) obtained from the required excavation as approved by the Engineer. The material shall contain a minimum of 15 percent passing the #200 sieve when determined on a dryweight basis, in accordance with ASTM D 1140.

(3) 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 Method A, ASTM D 698 (Standard Proctor Test) or the Rapid Compaction Test (Test No. S-6) S.C.S. National Engineering Handbook, Section 19.

(4) The maximum size of rock fragments incorporated in the fill shall be three (3) inches.

(5) The maximum thickness of a layer before compaction shall be six (6) inches.

(6) The moisture content of the material incorporated in the fill shall be maintained within the range of three (3) percentage points below to one (1) percentage point above the optimum moisture content.

(7) Measurement and payment will be by Methods 4 and 7, and will include compensation for Subsidiary Item, Removal of Water. Deduction in volume will be made for embedded conduit and appurtenances.

b. Bid Item 31, Earth Fill

(1) This item shall consist of placing and compacting all earth fill required to construct the floodway between Stations 976+00± and 982+50±, the sediment basin dikes, and fill adjacent to the basin inlet channel.

(2) Fill material shall consist of suitable CL's, ML's, SC's, and SM's (Unified Soil Classification System) obtained from the required excavation, as approved by the Engineer.

(3) 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) or Rapid Compaction. Test (Test No. S-6) S.C.S. National Engineering Handbook, Section 19.

(4) The maximum size of rock fragments incorporated in the fill shall be six (6) inches.

(5) The maximum thickness of a layer before compaction shall be nine (9) inches.

(6) The moisture content of the material incorporated in the fill shall be maintained within the range of three (3) percentage points below to one (1) percentage point above the optimum moisture content.

(7) Measurement and payment will be by Methods 1 and 7, and will include compensation for Subsidiary Item, Removal of Water.

c. Subsidiary Item, Spoil Disposal

(1) This item shall consist of placing or stockpiling all spoil in the spoil disposal areas, as shown on the drawings.

(2) Spoil material shall consist of all material resulting from the required excavations not needed to construct the floodway or basin dikes.

(3) Section 6, Compaction, does not apply to this item.

(4) Spoil material shall be placed in layers not to exceed two (2) feet in depth.

(5) The finished surface shall not vary more than one half (0.5) foot, plus or minus, from the average grade.

(6) Spoil shall be placed in the area between the dip crossing and the basin to the minimum elevation shown on the drawings, and in the area between the RWCD Flooding and the RWCD Canal as shown on the drawings. Excess spoil may be placed in these areas as directed by the engineer or shall, at the direction of the engineer, be placed in the spoil disposal areas shown on the RWCD Flooding Reach 2 drawings.

(7) Fill slopes resulting from the deposition of spoil in the disposal areas shown on the Reach 2 drawings shall not be steeper than 2:1 on the east and west sides and 4:1 on the north and south ends.

(8) No special moisture content of spoil material will be required.

(9) No separate payment will be made for spoil disposal. Compensation for this work will be included in the payment for Bid Item 27, Channel Excavation, Common and Bid Item 28, Basin Excavation, Common.

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 13, Structure Backfill

(1) This item shall consist of placing and compacting backfill around the concrete cutoff walls for the Dip Crossing, as shown on the drawings.

(2) Backfill material shall consist of suitable CL's, ML's, SC's and SM's (Unified Soil Classification System) obtained from the required excavation as approved by the Engineer. The material shall contain a minimum of 15 percent passing the #200 sieve when determined on a dry weight basis, in accordance with ASTM D 1140.

(3) 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), or Rapid Compaction Test (Test No. S-6) S.C.S. National Engineering Handbook, Section 19.

(4) The maximum size of rock fragments incorporated in the fill shall be three (3) inches.

(5) The maximum thickness of a layer before compaction shall be six (6) inches.

(6) The moisture content of the material incorporated in the fill shall be maintained within the range of three (3) percentage points below to one (1) percentage point above the optimum moisture content.

(7) Measurement and payment will be by Methods 4 and 7 and will include compensation for Subsidiary Item, Removal of Water.

b. Subsidiary Item, Spoil Disposal

(1) This shall consist of placing and smoothing all spoil placed in the spoil disposal areas.

(2) Spoil material shall consist of all material resulting from the required excavations not needed to construct the floodway and Dip Crossing.

(3) Section 6, Compaction, does not apply to this item.

(4) The maximum thickness of each layer before smoothing the surface shall not exceed two (2) feet.

(5) The finished surface shall not vary more than one-half (0.5) foot, plus or minus, from the average grade.

(6) Fill slopes resulting from the deposition of spoil in the disposal areas shown on the Reach 2 drawings shall not be steeper than 2:1 on the east and west sides and 4:1 on the north and south ends.

(7) Spoil shall be placed in the area between the dip crossing and the basin to the minimum elevations shown on the drawings and in the area between the RWCD canal and RWCD Floodway as shown on the drawings. Excess spoil may be placed in these areas as directed by the engineer or shall, at the direction of the engineer, be placed in the spoil disposal areas shown on the RWCD Floodway Reach 2 drawings.

(8) No special moisture content of spoil material will be required.

(9) No separate payment will be made for spoil disposal. Compensation for this work will be included in the payment for Bid Item 11, Dip Crossing Excavation, Common.

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 32, Drain Fill

(1) This item shall consist of furnishing and placing the drain fill materials in the locations shown on the drawings.

(2) In Section 2, Materials, Method 1 shall apply.

(3) The gradation of the drain fill shall meet the following requirements:

Sieve Size	Percent Passing (Dry Weight Basis)
2"	100
1"	90 - 100
1/2"	80 - 98
3/8"	70 - 95
#4	50 - 78
#10	12 - 44
#20	0 - 14
#30	0 - 9
#200	0 - 3

(4) Drain fill shall be placed in horizontal layers not to exceed 18 inches deep.

(5) In Section 6, Compaction, Class III shall apply.

(6) The moisture content shall be maintained in a range, as determined by the engineer, that will minimize segregation.

(7) The material passing the #200 sieve shall be non-plastic.

(8) Measurement and payment will be in accordance with Section 8.

26. 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, Concrete, Class 3000

(1) This item shall consist of furnishing, forming and placing all items required to construct the basin outlet structure.

(2) In Section 3, Classes of Concrete, and Section 5, Design of the Concrete Mix, Method 1 shall apply. Concrete shall be Class 3000.

(3) Coarse aggregate shall be size No. 67, in accordance with ASTM C 33.

(4) Cement shall be Type II or IIA.

(5) In Section 15, Construction Joints, Method 1 shall apply.

(6) In Section 18, Removal of Forms, Method 1 shall apply.

(7) Curing compound shall be Type 2 conforming to Material Specification 534 and ASTM C 309.

(8) No separate payment will be made for Class 3000 concrete. Compensation for this work will be included in the payment for Bid Item 33, 24-inch Diameter Reinforced Concrete Pipe, Class III.

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 5, Concrete, Class 4000X

(1) This item shall consist of furnishing, forming and placing all concrete required to construct the Dip Crossing.

(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. 67, in accordance with ASTM C 33.

(4) In Section 15, Construction Joints, Method 1 shall apply.

(5) In Section 18, Removal of Forms, Method 1 shall apply.

(6) All exposed surfaces shall be finished in the following manner:

Upon patching and pointing all holes as directed in Section 19, the surface shall be promptle covered with polyethylene film, wet burlap or wet cotton mats. If polyethylene film is used, the film shall be help securely to the surface by means of weights, adhesive or other suitable means. only white polyethylene film for covering will be acceptable. When the mortar used in patching and pointing has set sufficiently, the surface shall be uncovered and thoroughly rubbed with either a float or a carborundum stone until the surface is covered with a lather. Cork, wood or rubber floats shall be used only on the surfaces sufficiently green to work up such lather; otherwise a thin grout composed of one (1) part cement and one (1) part of fine sand may be sued to facilitate producing a satisfactory lather; however, this grout shall not be used in quantities sufficient to cause a plaster coating to be left on the finished surface. A portion of the required cement for the grout shall be white, as required to match the color of the surrounding concrete. Rubbing shall continue until irregularities are removed and there is no excess material. At the time a light dust appears, the surface shall be brushed or sacked. Brushing or sacking shall be carried in one direction so as to produce a uniform texture.

(7) Curing compound shall be Type 2 conforming to Material Specification, ASTM C 309.

(8) Measurement and payment will be by Method 2 and will include compensation for Subsidiary Item, Cleaning and Painting Metal Work.

b. Bid Item 6, Cement

(1) This item shall consist of furnishing and handling all cement required to construct the concrete items in Bid Item 14.

(2) Cement shall be Type II or IIA.

(3) 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. Subsidiary Item, Steel Reinforcement

(1) This item shall consist of furnishing and installing all steel reinforcement required in the construction of the basin outlet structure.

(2) No separate payment will be made for steel reinforcement. Compensation for this work will be included in payment for Bid Item 33, 24-inch Diameter Reinforced Concrete Pipe, Class III.

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 16, Steel Reinforcement

(1) This item shall consist of furnishing and installing all steel reinforcement required in the construction of reinforced concrete for the dip crossing.

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

11. ITEMS OF WORK AND CONSTRUCTION DETAILS

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

a. Bid Item 33, 24-inch Diamenter Reinforced Concrete Pipe, Class III

(1) This item shall consist of furnishing and installing all pipe for the basin outlet at RWCD Floodway STA 981+80+, as shown on the drawings.

(2) Pipe shall conform to the requirements of Material Specification 542 and ASTM C 76. The pipe shall be Class III.

(3) Pipe shall be furnished with bell and spigot joints equipped with endless "o" ring type gaskets of circular cross-section.

(4) Cement shall be Type II.

(5) In Section 5, Joining Bell and Spigot Pipe, Method 1 shall apply.

(6) In Section 9, Pressure Testing, Method 1 shall apply.

(7) Measurement and payment will be by Method 1 and will include payment for subsidiary items concrete, Class 3000; Metalwork, and cleaning and painting metalwork.

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 34, Loose Rock Riprap

(1) This item shall consist of furnishing and placing all loose rock riprap, including bedding, in the floodway, and inlets as follows:

(a) Floodway

Station 976+00 to Station 977+25
Station 979+45+ to Station 982+04+

(b) Side inlet at RWCD Floodway Station 980+75, including bedding material placed over the side inlet weir as shown on the drawings.

(c) The side inlet for Channel #3.

(d) The basin inlet structure.

(e) The basin inlet channel.

(2) The rock shall be graded as follows:

Particle Size (inch)	Percent Passing (by Dry Wt.)
15	100
12	75 - 100
9	60 - 85
6	25 - 40
4	10 - 25
3	0 - 10

(3) Rock shall be either hand or equipment placed.

(4) Bedding beneath riprap shall be graded as follows:

U. S. Sieve Size	Percent Passing (by Dry Wt.)
1"	100
3/4"	85 - 100
#4	60 - 80
#16	40 - 60
#40	22 - 44
#200	0 - 3

Size No. 67 blended with fine aggregates in accordance with ASTM C 33 meets these requirements.

(5) 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 17, Loose Rock Riprap

(1) This item shall consist of furnishing and placing of loose rock riprap, including bedding, adjacent to the Dip Crossing At Hunt Highway, as shown on the drawings and staked in the field.

(2) The rock shall be graded as follows:

Particle Size (inches)	Percent Passing (by Dry Weight)
15	100
12	75 - 100
9	60 - 85
6	25 - 40
4	10 - 25
<3	0 - 10

(3) Rock shall be either hand or equipment placed.

(4) Bedding beneath riprap shall be graded as follows:

US Sieve Size	Percent Passing (by Dry Weight)
1"	100
3/4"	85 - 100
#4	60 - 80
#16	40 - 60
#40	22 - 44
#200	0 - 3

Size No. 67 blended with fine aggregates in accordance with ASTM C 33 meets these requirements.

(5) Measurement and payment will be by Method 1 and shall include compensation for Subsidiary Item, Removal of Water.

13. 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 35, Grouted Rock Riprap

(1) This item shall consist of the furnishing and placing of grouted rock riprap and bedding at the side inlet at RWCD Floodway Station 980+75, the side inlet for Ch. #3, and the basin inlet structure, as shown on the drawings and staked in the field.

(2) The rock shall be graded as follows:

Particle Size (inch)	Percent Passing (by Dry Weight)
15	100
12	75 - 100
9	60 - 85
6	25 - 40
4	10 - 25
3	0 - 10

(3) Rock shall be either hand or equipment placed.

(4) Bedding beneath riprap shall be graded as follows:

U. S. Sieve Size	Percent Passing (by Dry Weight)
1"	100
3/4"	85 - 100
#4	60 - 100
#16	40 - 60
#40	22 - 44
#200	0 - 3

Size No. 67 blended with fine aggregates in accordance with ASTM C 33 meets these requirements.

(5) In Section 6, Design of the Grout Mix, the Contractor shall be responsible for proportioning the mix. The grout shall consist of Portland cement, fine and coarse aggregate, water and an air-entraining agent. The cement content shall be 5 1/2 bags per cubic yard of concrete. The maximum nominal size of coarse aggregate shall be 3/4 inch. The slump shall be within the range of 6 to 10 inches. The air content (by volume) of the grout mixture at the time of placement shall be five (5) to seven (7) percent. At least five (5) days prior to placement of grout, the Contractor shall furnish the Engineer with a statement of the mix proportions for approval.

(6) Cement shall be Type II of IIA.

(7) 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. Subsidiary Item, Metal Work

(1) This item shall consist of fabricating and installing the basin outlet trash rack and drain grates as shown on drawings.

(2) The trash rack and drain grates shall be fabricated of structural steel conforming to the requirements of ASTM A 36.

(3) The trash rack and drain grates shall be painted in the manner specified in Construction Specification 82.

(4) Equal quality manufactured drain grates may be substituted witb approval of engineer.

(5) No separate payment will be made for this item. Compensation will be included in Bid Item 33, 24-inch Diameter Reinforced Concrete Pipe, Class III.

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, Metal Work

(1) This item shall consist of the fabrication and installation of depth gauges as shown on the drawings and directed by the Engineer.

(2) Painting shall be in accordance with Construction Specification 82.

(3) No separate payment will be made for metal work. Compensation for this work will be included in the payment for Bid Item 14, Reinforced Concrete Clss 4000X.

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 Items, Cleaning and Painting Metal Work

(1) This item shall consist of cleaning and painting the basin outlet trash rack and drain grates as shown on the drawings.

(2) In Section 3, Surface Preparation, Method 2 shall apply.

(3) In Section 4, Painting Systems, Paint System C shall apply for the trash rack and drain grate in Bid Item 33, except that Type 4 paint shall be used in place of Type 2 or 3 paint for the priming coat.

(4) No separate payment will be made for this item. Compensation will be included in Bid Item 33, 24-inch Diameter Reinforced Concrete Pipe, Class III.

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 Metal Work

(1) This item shall consist of cleaning and painting the depth guages.

(2) In Section 3, Surface Preparation, Method 2 shall apply.

(3) In Section 4, Paint Systems E (except that Type 4 paint shall be used in place of Type 2 paint for the priming coat) shall apply. The two top coats of enamel paint on the depth guages shall alternate white background with green numbers, and green background with white numbers.

(4) No separate payment will be made for cleaning and painting. Compensation for this work will be included in the payment for Bid Item 14, Concrete, Class 4000X.

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, Asphalt Concrete Pavement

(1) This item shall consist of furnishing and installing the asphalt concrete pavement, including the untreated base and preservative seal for the following work:

(a) The dip crossing between Station 976+75± and Station 981+00± centerline floodway.

(2) Payment will be made in accordance with Section 7.

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 36, Surveys

(1) This item shall consist of furnishing personnel, equipment, materials and performing surveys required for:

(a) Construction layout

(b) Computation of quantities

(c) "As-Built" construction drawings.

(2) The Contractor shall provide the Government Representative a statement of qualifications, including specific experience of each of the survey personnel assigned to the job.

(3) The Contractor shall provide the Government Representative schedule of surveys to be performed each month.

(4) In Section 5, Construction Surveys and Measurements, all entries in the bound field notebooks shall follow the format shown on pages 2-40 and 2-42 of the Soil Conservation Service National Engineering Handbook, Section 19.

(5) In Section 6, Staking, the location and marking of stakes shall follow the format shown on pages 2-13, 2-15, 2-17 and 2-20 of the Soil Conservation Service National Engineering Handbook, Section 19.

(6) Payment will be in accordance with Section 8.

	Unit Price	
25	650.00	4550.00
26	13,812.50	13812.50
27	1.90	53,200.00
28	2.65	~~80,200.00~~ 31,196.5
29	2.00	6,996.00
30	5.00	155.00
31	.60	3,325.20
32	20.00	180.00
33	72.00	4,608.00
34	18.00	29,952.00
35	40.00	52,560.00
36	7500.00	[illegible]

11	2.15	2044.65	[illegible]
12	3.00	1251.00	-29 00[illegible]
13	5.00	360.00	
14	100.00	9800.00	[illegible]
15	20.00	2940.00	7.70
16	.50	5050.00	
17	18.00	13680.00	
18	10.00	10760.00	
		45,915.65	47,768.50

253,953.85

$253,953.55

AR
MHE 4-20-83

PWCD REACH 2 EXTENSION

ESTIMATED QUANTITIES

This summary modifies "Quantities Summary" sheet 164/210 in the design folder for the extension. Quantities calculated in the design folder began @ Sta 982+50. The change reflected below moves the beginning sta to 981+80.

WORK OR MATERIAL	UNIT	QUANTITY
CLEARING & GRUBBING.	ACRES	7
WATER	M. GAL.	5,525
CHANNEL EXCAV, COMMON	C.Y.	28,000
BASIN EXCAV, COMMON	C.Y.	14,510
STRUCTURE EXCAV, COMMON	C.Y	2,332
STRUCTURE BACKFILL	C.Y.	31
EARTHFILL	C.Y.	5,547
DRAINFILL	C.Y	9
24-IN. DIA R/C PIPE, C76 Class III	L.F.	64
LOOSE ROCK RIP-RAP	C.Y.	1664
GROUTED ROCK RIP-RAP	C.Y.	1314
SURVEYS	L.S.	XXXX

Case 580 D

SCS-AS-140 REV. 2-73 SHEET 1 OF 6 SHEETS

ABSTRACT OF PROPOSALS RECEIVED

AT Phoenix Arizona (PLACE OF OPENING)

DATE OPENED 9-8-82 INV. NO. SCS-5 AZ-82

ADDENDA TO BE ACKNOWLEDGED:

NOS. 1,2 & 3

	Name and Address of Bidder: M. M. Sundt Const Co. 4101 East Irvington Rd P.O. Box 27507 Tucson, Arizona 85726	Name and Address of Bidder: K.E.C. Company 200 N. Sherman Ave. P.O. Box 607 Corona, CA 91720	Name and Address of Bidder: Ball, Ball and Brosamer Inc. 300 Camille Ave P.O. Box 1007 Danville, CA. 94526	Name and Address of Bidder: Peter Kiewit Sons Co Box 1055 Glendale, Arizona 85311	Name and Address of Bidder: OWL Constructors 2465 Campus Drive Irvine, CA 92715
Total Bid	$4,866,337.00	$5,064,801.11	$5,076,342.20	$5,335,000.00	$5,362,342.40
ACCEPTANCE PERIOD (Days)	60	60	60	60	60
ADDENDA NUMBERS ACKNOWLEDGED	1-2-3	1-2-3	1-2-3	1-2-3	1-2-3
BID GUARANTEE (Type and Amount)	SF-24-(20%)	SF-24-(20%)	SF-24(20%)	SF-24 (20%)	SF-24 (20%)
DELIVERY PERIOD Calendar Days	470	470	470	470	470
DISCOUNT	0	0	0	0	0

ITEM NO.	WORK OR MATERIAL	QUANTITY AND UNIT	UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT
	Schedule 1*											
1	Clearing & Crubbing	169AC	500.00	84,500.00	300.00	50,700.00	500.00	84,500.00	88.00	14,872.00	1,060.00	179,140.00
2	No work											
3	Mobilization	L.S.	XXX	85,000.00	XX	150,000.00	XX	280,000.00	XX	60,457.90	XX	135,000.00
4	Water	200,000m gal	2.50	500,000.00	2.50	500,000.00	2.50	500,000.00	250	500,000.00	2.50	500,000.00
5	Channel Ex., Common	1,900,000CY	0.77	1,463,000.00	0.85	1,615,000.00	0.60	1,140,000.00	1.15	2,185,000.00	0.90	1,710,000.00
6	R/C Channel Ex., Comm.	106,120 CY	0.85	90,202.00	0.55	58,366.00	0.90	95,508.00	1.15	122,038.00	1.00	106,120.00
7	Structure Ex, Comm.	5,200 CY	5.00	26,000.00	4.00	20,800.00	7.00	36,400.00	0.40	2,080.00	3.00	15,600.00
8	No Work											
9	Structure Backfill	8,000 CY	5.00	40,000.00	3.50	28,000.00	15.00	120,000.00	4.75	38,000.00	5.00	40,000.00
10	Earth Fill	200,000 CY	0.60	120,000.00	020	40,000.00	0.20	40,000.00	0.10	20,000.00	0.50	100,000.00
11	Drain Fill	2,200 CY	20.00	44,000.00	35.00	77,000.00	10.00	22,000.00	25.00	55,000.00	22.00	48,400.00
12	Concrete, Class 4000X	11,077 CY	79.00	875,083.00	89.00	985,853.00	110.00	1,218,470.00	82.00	908,314.00	75.00	830,775.00
13	Cement	16,615 Bbls	17.00	282,455.00	16.00	265,846.00	17.00	282,455.00	16.00	265,840.00	19.00	315,685.00
14	Steel reinforcement	1,597,896Lb	0.30	479,308.80	0.31	495,285.76	0.30	479,308.80	0.30	479,308.80	0.20	319,539.20
15	4" AC pipe	545 LF	10.00	5,450.00	10.00	5,450.00	8.00	4,360.00	8.00	4,360.00	12.00	6,540.00

SCS-AS-146a
Rev. 9-73

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET 2 OF 6 SHEETS

CONTINUATION SHEET

ABSTRACT OF PROPOSALS RECEIVED

INV. NO. SCS-5-AZ-82

ITEM NO.	WORK OR MATERIAL	QUANTITY AND UNIT	Name and Address of Bidder: M. M. Sundt Construction Company		Name and Address of Bidder: K.E.C. Company		Name and Address of Bidder: Ball, Ball & Brosamer, Inc.		Name and Address of Bidder: Peter Kiewit Sons' Co.		Name and Address of Bidder: OWL Constructors	
			UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT
16	6" AC Pipe	318 L.F.	15.40	4,897.20	25.00	7,950.00	10.00	3,180.00	11.00	3,498.00	14.00	4,452.00
17	18" CMP	64 L.F.	25.00	1,600.00	42.00	2,688.00	25.00	1,600.00	16.00	1,024.00	30.00	1,920.00
18	36" CMP	104 L.F.	40.00	4,160.00	62.00	6,448.00	40.00	4,160.00	24.50	2,548.00	50.00	5,200.00
19	Special Fittings	L.S.	XX	10,000.00	XX	2,278.00	XX	2,000.00	XX	600.00	XX	3,000.00
20	Loose Rock Riprap	45,500 CY	10.00	455,000.00	11.00	500,500.00	10.00	455,000.00	10.00	455,000.00	13.00	591,500.00
21	Grouted Rock Riprap	726 CY	30.00	21,780.00	45.00	32,670.00	50.00	36,300.00	41.00	29,766.00	35.00	25,410.00
22	Metal Work	L.S.	XX	500.00	XX	1,000.00	XX	1,000.00	XX	2,550.00	XX	1,000.00
23	Surveys	L.S.	XX	70,000.00	XX	74,000.00	XX	50,000.00	XX	80,000.00	XX	70,000.00
24	Guardrail	528 L.F.	15.00	7,920.00	22.63	11,950.00	25.00	13,200.00	21.50	11,352.00	17.00	8,976.00
	TOTAL SCHEDULE #1			$4,670,856.00		$4,931,784.76		$4,869,441.80		$5,241,608.70		$5,018,257.20
	Bid Schedule # 2											
1	Dip Crossing Excav.	876 CY	1.00	876.00	2.50	2190.90	1.00	876.00	1.50	1,314.00	2.00	1,752.00
2	Structure Excav. Comm	160 CY	5.00	200.00	6.00	960.00	7.00	1,120.00	7.00	1,120.00	3.00	480.00
3	Structure BAckfill	72 CY	5.00	360.00	1200	864.00	15.00	1,080.00	6.25	450.00	8.00	576.00
4	Queen Creek Earthfill	380,000 CY	0.40	152,000.00	0.25	95,000.00	0.40	152,000.00	0.12	45,600.00	0.75	285,000.00
5	Concrete, Class 4000X	88 CY	100.00	8,800.00	100.00	8,800.00	150.00	13,200.00	200.00	17,600.00	250.00	22,000.00
6	Cement	132 Bbls	18.00	2,376.00	16.00	2,112.00	17.00	2,244.00	16.00	2,112.00	19.00	2,508.00
7	Steel Reinforcement	14,601 Lbs	0.50	7,300.50	0.35	5,110.35	0.40	5,840.40	0.30	4,380.30	0.20	2,920.20
8	Loose Rock Riprap	797 CY	10.50	8,368.50	15.00	11,955.00	20.00	15,940.00	15.00	11,955.00	17.00	13,549.00
9	Asphalt Concrete Paveme	1,320 SY	10.00	13,200.00	2.00	2,640.00	10.00	13,200.00	6.50	8,580.00	10.00	13,200.00
10	Road Relocation	700 L.F.	2.00	1,400.00	5.00	3,500.00	2.00	1,400.00	0.40	280.00	3.00	1,100.00
	TOTAL SCHEDULE #2			$195,431.00		$133,131.35		206,900.40		$93,391.30		$344,085.20

SCS-AS-146
REV. 2-73

SHEET 3 OF 6 SHEETS

ABSTRACT OF PROPOSALS RECEIVED

AT Phoenix Arizona
(PLACE OF OPENING)

DATE OPENED 9-8-82 INV. NO. SCS-5 AZ-82

ADDENDA TO BE ACKNOWLEDGED:
NOS. 1,2 & 3

	Name and Address of Bidder:	Name and Address of Bidder:	Name and Address of Bidder:	Name and Address of Bidder:	Name and Address of Bidder:
	Police Construction Inc. 2035 West Mountain View Road Phoenix, Arizona 85021	BRUTOCO Eng, Const Inc. P.O. Box 429 Fontana, Ca. 82835	Mid State Landscape Co P.O. Box 3073 Lexington, Ohio 44904	Richard P. Murray Co. Inc. P.O. Drawer G Chandler, Arizona 85224	S.J. Groves & Sons Company 1000 W. Hwy #55 P.O. Box 35666 Phoenix, Arizona 85069
Total Bid $	5,493,124.63	5,563,130.21	5,576,713.96	5,619,816.25	5,948,330.04
ACCEPTANCE PERIOD (Days)	60	60	60	60	60
ADDENDA NUMBERS ACKNOWLEDGED	1-2-3	1-2-3	1-2-3	1-2-3	1-2-3
BID GUARANTEE (Type and Amount)	SF-24 (20%)	SF-24 (20%)	SF-24 (20%)	SF-24 (20%)	SF-24 (20%)
DELIVERY PERIOD (Calendar Days)	470	470	470	470	470
DISCOUNT	0	0	0	0	0

ITEM NO.	WORK OR MATERIAL	QUANTITY AND UNIT	UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT
	Schedule 1*											
1	Clearing & Crubbing	169 AC	216	36,504.00	350.00	59,150.00	527.00	89,063.00	762.00	128,778.00	500.00	84,500.00
2	No work											
3	Mobilization	L.S.	XX	57,000.00	XX	50,000.00	XX	87,000.00	XX	136,000.00	XX	270,000.00
4	Water	200,000 Mgal	2.50	500,000.00	2.50	500,000.00	2.50	500,000.00	2.50	500,000.00	2.50	500,000.00
5	Channel Ex., Common	1,900,000CY	0.90	1,710,000.00	1.00	1,900,000.00	1.04	1,976,000.00	0.75	1,425,000.00	1.00	1,900,000.00
6	R/C Channel Ex., Comm.	106,120 CY	0.95	100,814.00	1.40	148,568.00	1.15	122,038.00	1.29	136,894.80	1.00	106,120.00
7	Structure Ex, Comm.	5,200 CY	1.25	6,500.00	6.00	31,200.00	2.75	14,300.00	5.00	26,000.00	4.00	20,800.00
8	No Work											
9	Structure Backfill	8,000 CY	3.50	28,000.00	5.00	40,000.00	4.90	39,200.00	8.00	64,000.00	7.50	60,000.00
10	Earth Fill	200,000 CY	0.40	80,000.00	0.80	160,000.00	0.29	58,000.00	0.33	66,000.00	0.50	100,000.00
11	Drain Fill	2,200 CY	14.00	30,800.00	15.00	33,000.00	11.00	24,200.00	14.00	30,800.00	32.00	70,400.00
12	Concrete, Class 4000X	11,077 CY	90.00	996,930.00	90.00	996,930.00	82.00	908,314.00	127.00	1,406,779.00	100.00	1,107,700.00
13	Cement	16,615 Bbls	24.00	398,760.00	15.00	249,225.00	17.00	282,455.00	25.19	418,531.85	18.00	299,070.00
14	Steel reinforcement	1,597,896Lb	0.30	479,308.80	0.28	447,354.88	0.32	511,262.72	0.305	487,297.28	0.32	511,262.72
15	4" AC pipe	545 LF	6.00	3,270.00	9.00	4,905.00	5.00	2,725.00	7.00	3,815.00	8.00	4,360.00

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET 4 OF 6 SHEETS

CONTINUATION SHEET

ABSTRACT OF PROPOSALS RECEIVED · INV. NO. SCS-5-AZ-82

ITEM NO.	WORK OR MATERIAL	QUANTITY AND UNIT	Name and Address of Bidder: Police Construction, Inc. UNIT PRICE	AMOUNT	Name and Address of Bidder. BRUTOCO Eng & Const. Inc. UNIT PRICE	AMOUNT	Name and Address of Bidder: Mid State Landscape UNIT PRICE	AMOUNT	Name and Address of Bidder: Richard P. Murray Co. Inc. UNIT PRICE	AMOUNT	Name and Address of Bidder: S.J. Groves & Sons Co. Inc. UNIT PRICE	AMOUNT
16	6" AC Pipe	318 L.F.	10.50	3,339.00	10.00	3,180.00	16.00	5,088.00	12.00	3,816.00	8.00	2,544.00
17	18" CMP	64 LF	52.00	3,328.00	24.00	1,536.00	20.00	1,280.00	16.50	1,056.00	37.00	2,368.00
18	36" CMP	104 L.F.	32.00	3,328.00	50.00	5,200.00	38.00	3,952.00	35.00	3,640.00	40.00	4,160.00
19	Special Fittings	L.S.	XX	600.00	XX	2,000.00	XX	1,700.00	XX	2,000.00	XX	1,500.00
20	Loose Rock Riprap	45,500 CY	12.50	568,750.00	12.00	546,000.00	11.75	534,625.00	10.00	455,000.00	11.00	500,500.00
21	Grouted Rock Riprap	726 CY	54.00	39,204.00	30.00	21,780.00	32.00	23,232.00	30.00	21,780.00	30.00	21,780.00
22	Metal Work	LS	XX	575.00	XX	1,000.00	XX	450.00	xx	2,000.00	XX	400.00
23	Surveys	LS	XX	95,500.00	XX	55,000.00	XX	115,000.00	XX	80,000.00	XX	95,000.00
24	Guardrail	528 L.F.	17.50	9,240.00	16.50	8,712.00	18.00	9,504.00	25.00	13,200.00	18.00	9,504.00
	TOTAL SCHEDULE #1			$5,151,750.80		$5,264,740.88		$5,309,388.72		$5,412,387.93		$5,671,968.72
	Bid Schedule # 2											
1	Dip Crossing Excav.	876 CY	0.75	657.00	6.00	5,256.00	1.62	1,419.12	3.00	2,628.00	1.00	876.00
2	Structure Excav. Comm	160 CY	5.50	880.00	5.00	800.00	6.50	1,040.00	5.00	800.00	4.00	640.00
3	Structure BAckfill	72 CY	9.00	648.00	20.00	1,440.00	4.90	352.80	8.00	576.00	7.50	540.00
4	Queen Creek Earthfill	380,000 CY	0.80	304,000.00	0.65	247,000.00	0.58	220,400.00	0.43	163,400.00	0.60	228,000.00
5	Concrete, Class 4000X	88 CY	60.00	5,280.00	110.00	9,680.00	148.00	13,024.00	92.00	8,096.00	100.00	8,800.00
6	Cement	132 Bbls	24.00	3.168.00	15.00	1,980.00	17.20	2,270.40	15.50	2,046.00	18.00	2,376.00
7	Steel Reinforcement	14,601 Lbs	0.33	4,818.33	0.33	4,818.33	0.32	4,672.32	0.32	4,672.32	0.32	4,672.32
8	Loose Rock Riprap	797 CY	12.50	9,962.50	15.00	11,955.00	13.80	10,998.60	10.00	7,970.00	11.00	8,767.00
9	Asphalt Concrete Pavement	1,320 SY	8.00	10,560.00	8.00	10,560.00	8.90	11,748.00	12.00	15,840.00	15.00	19,800.00
10	Road Relocation	700 LF	2.00	1,400.00	7.00	4,900.00	2.00	1,400.00	2.00	1,400.00	2.70	1,890.00
	TOTAL SCHEDULE #2			$341,373.83		$298,389.33		$267,325.24		$207,428.32		$276,361.32

SCS-AS-146
REV. 2-73

SHEET 5 OF 6 SHEETS

ABSTRACT OF PROPOSALS RECEIVED

AT Phoenix Arizona
(PLACE OF OPENING)

SCS-5

DATE OPENED 9-8-82 INV. NO. AZ-82

ADDENDA TO BE ACKNOWLEDGED:

NOS. 1,2 & 3

	Name and Address of Bidder:	Name and Address of Bidder:	Name and Address of Bidder:	Name and Address of Bidder:	Name and Address of Bidder:
	TGK Constructors, Inc. 2502 E. University Suite 100 P.O. Box 2300 Phoenix, AZ 85002	Carver Corporation 517 W. Bradley El Cajon, CA 92020			
	Total Bid $ 6,252,783.15	Total Bid $ 6,302,854.66	Total Bid $	Total Bid $	Total Bid $
ACCEPTANCE PERIOD (Days)	60	60	60	60	60
ADDENDA NUMBERS ACKNOWLEDGED	1-2-3	1-2-3	1-2-3	1-2-3	1-2-3
BID GUARANTEE (Type and Amount)	SF-24 (20%)	SF-24 (20%)	SF-24 (20%)	SF-24 (20%)	SF-24 (20%)
DELIVERY PERIOD (Calendar Days)	470	470	470	470	470
DISCOUNT	0	0	0	0	0

ITEM NO.	WORK OR MATERIAL	QUANTITY AND UNIT	UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT
	Schedule 1*											
1	Clearing & Grubbing	169 AC	150.00	25,350.00	1200.00	202,800.00						
2	No work											
3	Mobilization	L.S.	XX	198,615.00	XX	100,000.00						
4	Water	200,000 Mga	2.50	500,000.00	2.50	500,000.00						
5	Channel Ex., Common	1,900,000CY	1.20	2,280,000.00	1.20	2,280,000.00						
6	R/C Channel Ex., Comm.	106,120 CY	1.50	159,180.00	1.20	127,344.00						
7	Structure Ex, Comm.	5,200 CY	10.00	52,000.00	4.00	20,800.00						
8	No Work											
9	Structure Backfill	8,000 CY	10.00	80,000.00	5.00	40,000.00						
10	Earth Fill	200,000 CY	0.25	50,000.00	0.36	72,000.00						
11	Drain Fill	2,200 CY	15.00	33,000.00	10.00	22,000.00						
12	Concrete, Class 4000X	11,077 CY	85.00	941,545.00	78.00	864,006.00						
13	Cement	16,615 Bbls	18.00	299,070.00	19.00	315,685.00						
14	Steel reinforcement	1,597,896Lb	0..39	479,308.80	0.40	639,078.40						
15	4" AC pipe	545 LF	5.00	2,725.00	5.00	2,725.00						

SCS-AS-106a
Rev. 9-73

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET 6 OF 6 SHEETS

CONTINUATION SHEET

ABSTRACT OF PROPOSALS RECEIVED

INV. NO. SCS-5-AZ-82

ITEM NO.	WORK OR MATERIAL	QUANTITY AND UNIT	Name and Address of Bidder: TGK Constructor Inc. UNIT PRICE	AMOUNT	Name and Address of Bidder: Carver Corporation UNIT PRICE	AMOUNT	Name and Address of Bidder: UNIT PRICE	AMOUNT	Name and Address of Bidder: UNIT PRICE	AMOUNT	Name and Address of Bidder: UNIT PRICE	AMOUNT
16	6" AC Pipe	318 L.F.	5.00	1,908.00	8.00	2,544.00						
17	18" CMP	64 LF	20.00	1,280.00	19.00	1,216.00						
18	36" CMP	104 L.F.	40.00	4,160.00	36.00	3,744.00						
19	Special Fittings	L.S.	XX	3,200.00	XX	2,500.00						
20	Loose Rock Riprap	45,500 CY	14.00	637,000.00	16.00	728,000.00						
21	Grouted Rock Riprap	726 CY	30.00	21,780.00	33.00	23,958.00						
22	Metal Work	LS	XX	1,000.00	XX	450.00						
23	Surveys	LS	XX	100,000.00	XX	87,200.00						
24	Guardrail	528 L.F.	17.00	8,976.00	9.00	4,752.00						
	TOTAL SCHEDULE #1			$8,880,097.80		6,040,802.40						
	Bid Schedule # 2											
1	Dip Crossing Excav.	876 CY	1.50	1,314.00	1.06	928.56						
2	Structure Excav. Comm	160 CY	6.50	1,040.00	4.70	752.00						
3	Structure BAckfill	72 CY	10.00	720.00	7.80	561.60						
4	Queen Creek Earthfill	380,000 CY	0.80	304,000.00	0.50	190,000.00						
5	Concrete, Class 4000X	88 CY	350.00	30,800.00	190.00	16,720.00						
6	Cement	132 Bbls	18.00	2,376.00	19.00	2,508.00						
7	Steel Reinforcement	14,601 Lbs	0.35	5,110.35	0.40	5,840.40						
8	Loose Rock Riprap	797 CY	15.00	11,955.00	16.10	12,831.70						
9	Asphalt Concrete Pavene	1,320 SY	10.00	13,200.00	22.00	29,040.00						
10	Road Relocation	700 LF	3.10	2,170.00	4.10	2,870.00						
	TOTAL SCHEDULE #2			$372,685.35		$262,052.26						

EXTENSION

CONCRETE BOX STRUCTURE TOTAL LABOR & MAT O.H.&P. = $1550.00

OUTER DIMENSIONS - 4'4" x 4'4" x 4'2"

8" WALLS & FLOOR

MATERIAL

3000 psi CONC.

CONCRETE:

FLOOR

3'x3'x 2/3' = +6

FRONT WALL

4'4" x 4'4" x 2/3' = +12.6

BACK WAL

5'-10" x 4'4" x 2/3' = +16.9

2 SIDES

4'4" x 3' x 2/3' = +8.7

MINUS PIPE

$\pi(1)^2$ 2/3' = -2.1

Σ ÷ 27 = 1.6 C.Y. CONCRETE

STEEL: REIN.

ALL @ 5'S

200'± = 210 LBS

10 MOTOR GRATES 6"x6"x1/4"

W/ 2 5/8"x6" ANCHOR BOLTS =

PVC = 25' L.F.

TRASH RACK

MATERIAL SUMMARY

CONCRETE	1.6 C.Y.	@ $50.00	= $80.00
REBAR	210 Lbs	@ 0.50	= $105.00
PVC - 4" + FITTINGS	25' L.F.		= $25.00
? TRASH RACK	1		= $250.00
METAL GRATE W/ANCHOR	10 Sq	@ 10.00	= $100.00
STRUCTULE EXC.	12 C.Y.	@ 5.00	= 60.00
			$620.00

LABOR:

FORMING CONCRETE - 2 CARPENTERS

SLAB - 2 HRS

WALLS - 8 HRS

10 HRS x 2 MEN = 20 HRS

MOUNT GRATES & PVC & TRASH RACK

3 HRS x 2 = 6 HRS

PLACE CONCRETE

1 - VIBRATOR

1 - LABOR

1 - FOREMAN

2 HR EACH FOR SLAB & WALL

CARPENTER	25	@ 13 ±	= 325.00	391
LABOR	4	@ 12 ±	= 48.00	63
FOREMAN	4	@ 14.35	= 57.40 / 430.00 x 1.5	115 = 645 / 852
PICK UP	1 DAY	@ 9.12	= 73.00	109

MATERIAL COST $620.00

LABOR * 1.5 $645.00 852

PICKUP $ 73.00 109

SAY $ 1350.00 1581

+15% 200

$1550.00 1818

1026 1865

COST INTO ↓

64 L.F. 24" CONC. PIPE

$\frac{1550}{64}$ = $24.20 Per L.F. Added ONTO 24" PIPE COST.

29.15 SAY .30.00

EXTENSION

CLEAR & GRUBBING

7 ACRES.

TIMES FOR GROUP & ACRES OBTAINED FROM MIKE SMITH

EQUIPMENT: 41,800

GRADER	23 HRS	13 ACRES	= 1 3/4 HR-AC.
LOADER			
PUSH CAT D-8 or 9	36 HR		= 2 3/4 HR-AC.
651's or 623's	66 HR		= 5 1HR-AC.
BEE-GEE	44 1/2 HRS		= 3.4 HR-AC.

ASSUMING SCRAPER PAY LIMITS FOR EARTH EXC.

JUST USING GRADER AND DOZER FOR CLR & GRUB

	WORK RATE	ACRES	TIMES	UNIT COST	EQUIP COST	LABOR	LABOR COST
GRADER	2 HR/AC	7	14	64.92	908.88	13.85	193.90
DOZER	3 HR/AC	7	21	114.43	2403.03	13.85	290.85
					3311.91		484.75
							x 1.5
							727

4039.03

x 1.15 4644.89

x .65(.04) 4765.66

4765.66 / 7 = $680.00 ACRE

EXTENSION

WATER

5,525 M. Gal.

NO PROJECT

PREVIOUS ASSUMPTION - 18,600 M GAL FOR DUST CONTROL ORIG. CONTRACT

~~ABOUT 80 M. GAL PER DAY~~

18,600 ÷ 8 mos. ÷ 176 HR/MO

13.2 M. GAL per HOUR

106 M. GAL per DAY

ASSUME 20 CONSTRUCTION DAYS

20 (106) = 2120 M. GAL.

FILL 5,650 C.Y.

USING MOD. 3 FIGURES

15.7 lb/ft³ WATER ADDED

15.7 × 27 ÷ 8.33 = 50.9 gal/C.Y.

5,650 × 50.9 = 287.5 M. GAL

15% EVAP., WASTE ETC 43

331 M. GAL +

TOTAL 2450 M. GAL

SAY 2500 M. GAL.

~~WATER TRUCKS~~ USE WATERPULL →D

M100(3) HOURLY RATE FOR 1 TRUCK + OPER. = 42.50

$

COSTS FOR WATER:

WATER 2,500 M.GAL X .475 = 1187.50

TRUCKS 42.5 × 20 × 8 = 6,800.00

$7987.50

OH&P +15% $9,185 =

+ 6

$15,000 =

BID SCHEDULE NO. 2
WILLIAMS-CHANDLER, WPP, ARIZONA
RWCD FLOODWAY - REACH 2 EXTENSION
DIP CROSSING AND QUEEN CREEK EARTHFILL

Item	Work or Material	Spec. No.	Quantity	Unit	Unit Price	Amount	
17 ~~11.~~	Dip Crossing Excavation, Common	21	951	C. Y.	$ 2.00 1.00	$ 1902	951
18 ~~12.~~	Structure Excavation, Common	21	427	C. Y.	$ 5.00	$ 2135	2135
19 ~~13.~~	Structure Backfill Common	23	72	C. Y.	$ 7.00 5.00	$ 504	360
20 ~~14.~~	Concrete, Class 4000X Common	31	98	C. Y.	$ 150.00 100.00	$ 14,700	9800
21 ~~15.~~	Cement	31	147	Bbls.	$ 18.00	$ 2,646	2646
22 ~~16.~~	Steel Reinforcement	34	10,100	Lbs.	$ 0.60 .50	$ 6,060	5050
23 ~~17.~~	Loose Rock Riprap	61	760	C. Y.	$ 12.50 10.00	$ 9,500	7,600
24 ~~18.~~	Asphalt Concrete Pavement	400	1,076	S. Y.	$ 10.00	$ 10,760	10,760
				TOTAL	$	$ 48,207	41,202
						166,934.60	131,445.20
						215,141.60	172,647
							1400
							170,747

$\frac{170,747.20}{215,141.60} = 79\%$

21% INCREASE

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 ~~25~~ 28, Clearing and Grubbing

(1) This item shall consist of clearing and grubbing of all areas shown on the drawings and staked in the field.

(2) If waste materials are disposed of by burying, they shall be buried a minimum of 18 inches below the existing ground surface in the waste disposal areas shown on the drawings. When disposal is complete, the waste disposal areas shall be smoothed and graded to blend into the surrounding terrain.

(3) If materials removed from the cleared and grubbed area are to be burned, burning must be carried out in accordance with Pinal County Health Department regulations.

(4) 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 26, Water

(1) This item shall consist of furnishing and applying all water necessary for performance of the work described.

(2) Water may be obtained from the Roosevelt Water Conservation District Higley, Arizona (Grant Ward Telephone 963-3414).

(3) Measurement and payment shall be in accordance with Section 6.

BCWS

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, Removal of Water

(1) This item shall consist of the removal of surface and ground water from the construction area shown on the drawings.

(2) No advance plan of dewatering will be required.

(3) No separate payment will be made for the removal of water. Compensation for this work will be included in the payment for Bid Items ~~27~~, ~~28~~, ~~29~~, ~~30~~, and ~~31~~. 30, 31, 32, 33, 34

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, Removal of Water

(1) This item shall consist of the removal of surface and ground water from the construction area shown on the drawings.

(2) No advance plan of dewatering will be required.

(3) No separate payment will be made for the removal of water. Compensation for this work will be included in the payment for Bid Items ~~11~~, ~~12~~, ~~13~~, ~~14~~, and ~~17~~. 17, 18, 19, 20, 23

BCWC

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 ~~27~~ 30, Earth Channel Excavation, Common

(1) This item shall consist of all excavation required to construct:

(a) The floodway, including entrance channel, between Stations 976+00± and 982+50±, as shown on the drawings.

(b) Stripping of the top 6 inches below original ground surface on surfaces where earth fill is to be placed in construction of the floodway.

(2) In Section 5, Use of Excavated Material, Method 1 shall apply. Suitable materials resulting from this excavation and not required for Bid Item ~~30~~ 33, Structure Backfill, and Bid Item ~~31~~ 34, Earth Fill, will be spoiled in the areas shown on the drawings.

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

(4) Measurement and payment will be by Method 2, and will include compensation for Subsidiary Item, Removal of Water, and Subsidiary Item, Spoil Disposal.

b. Bid Item ~~28~~ 31, Basin Excavation, Common

(1) This item shall consist of all excavation required for construction of the Sediment Basin and basin inlet channel as shown on the drawings, including stripping of the top 6 inches below original ground surface on surfaces where earth fill is to be placed in construction of the basin or basin inlet channels.

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

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

(4) Measurement and payment will be by Method 2.

BLUE

c. Bid Item ~~29~~ 32, Structure Excavation, Common

(1) This item shall consist of all excavation required for the installation of the sediment basin outlet structure and pipe, the side inlet at RWCD STA 980+75, the basin inlet structure and side inlet structure for channel #3, as 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.

(4) Measurement and payment will be by Method 1, and will include compensation for Subsidiary Item, Removal of Water.

CLEAN

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 17, Dip Crossing Excavation, Common

(1) This item shall consist of all excavation between Station 976+75± and Station 981+00±, centerline Floodway, in excess of specified channel excavation required to construct the Dip Crossing, except structure excavation for the concrete cutoff walls, as shown on the drawings and staked in the field.

(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) Measurement and payment will be by Method 2 and will include compensation for Subsidiary Item, Removal of Water.

b. Bid Item 18, Structure Excavation, Common

(1) This item shall consist of all excavation required to construct concrete cutoff walls for the Dip Crossing as shown on the drawings and staked in the field.

(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) Measurement and payment will be by Method 4 and will include compensation for Subsidiary Item, Removal of Water.

BLUE

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 30 (33), Structure Backfill

(1) This item shall consist of placing and compacting backfill around the sediment basin outlet pipe.

(2) Backfill material shall consist of suitable CL's, ML's, SC's and SM's (Unified Soil Classification System) obtained from the required excavation as approved by the Engineer. The material shall contain a minimum of 15 percent passing the #200 sieve when determined on a dryweight basis, in accordance with ASTM D 1140.

(3) 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 Method A, ASTM D 698 (Standard Proctor Test) or the Rapid Compaction Test (Test No. S-6) S.C.S. National Engineering Handbook, Section 19.

(4) The maximum size of rock fragments incorporated in the fill shall be three (3) inches.

(5) The maximum thickness of a layer before compaction shall be six (6) inches.

(6) The moisture content of the material incorporated in the fill shall be maintained within the range of three (3) percentage points below to one (1) percentage point above the optimum moisture content.

(7) Measurement and payment will be by Methods 4 and 7, and will include compensation for Subsidiary Item, Removal of Water. Deduction in volume will be made for embedded conduit and appurtenances.

b. Bid Item 31 (34), Earth Fill

(1) This item shall consist of placing and compacting all earth fill required to construct the floodway between Stations 976+00± and 982+50±, the sediment basin dikes, and fill adjacent to the basin inlet channel.

(2) Fill material shall consist of suitable CL's, ML's, SC's, and SM's (Unified Soil Classification System) obtained from the required excavation, as approved by the Engineer.

BLUE

(3) 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) or Rapid Compaction. Test (Test No. S-6) S.C.S. National Engineering Handbook, Section 19.

(4) The maximum size of rock fragments incorporated in the fill shall be six (6) inches.

(5) The maximum thickness of a layer before compaction shall be nine (9) inches.

(6) The moisture content of the material incorporated in the fill shall be maintained within the range of three (3) percentage points below to one (1) percentage point above the optimum moisture content.

(7) Measurement and payment will be by Methods 1 and 7, and will include compensation for Subsidiary Item, Removal of Water.

c. Subsidiary Item, Spoil Disposal

(1) This item shall consist of placing or stockpiling all spoil in the spoil disposal areas, as shown on the drawings.

(2) Spoil material shall consist of all material resulting from the required excavations not needed to construct the floodway or basin dikes.

(3) Section 6, Compaction, does not apply to this item.

(4) Spoil material shall be placed in layers not to exceed two (2) feet in depth.

(5) The finished surface shall not vary more than one half (0.5) foot, plus or minus, from the average grade.

(6) Spoil shall be placed in the area between the dip crossing and the basin to the minimum elevation shown on the drawings, and in the area between the RWCD Flooding and the RWCD Canal as shown on the drawings. Excess spoil may be placed in these areas as directed by the engineer or shall, at the direction of the engineer, be placed in the spoil disposal areas shown on the RWCD Flooding Reach 2 drawings.

(7) Fill slopes resulting from the deposition of spoil in the disposal areas shown on the Reach 2 drawings shall not be steeper than 2:1 on the east and west sides and 4:1 on the north and south ends.

(8) No special moisture content of spoil material will be required.

(9) No separate payment will be made for spoil disposal. Compensation for this work will be included in the payment for Bid Item 27, Channel Excavation, Common and Bid Item 28, Basin Excavation, Common.

GROUT

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 19, Structure Backfill

(1) This item shall consist of placing and compacting backfill around the concrete cutoff walls for the Dip Crossing, as shown on the drawings.

(2) Backfill material shall consist of suitable CL's, ML's, SC's and SM's (Unified Soil Classification System) obtained from the required excavation as approved by the Engineer. The material shall contain a minimum of 15 percent passing the #200 sieve when determined on a dry weight basis, in accordance with ASTM D 1140.

(3) 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), or Rapid Compaction Test (Test No. S-6) S.C.S. National Engineering Handbook, Section 19.

(4) The maximum size of rock fragments incorporated in the fill shall be three (3) inches.

(5) The maximum thickness of a layer before compaction shall be six (6) inches.

(6) The moisture content of the material incorporated in the fill shall be maintained within the range of three (3) percentage points below to one (1) percentage point above the optimum moisture content.

(7) Measurement and payment will be by Methods 4 and 7 and will include compensation for Subsidiary Item, Removal of Water.

GROUND

b. Subsidiary Item, Spoil Disposal

(1) This shall consist of placing and smoothing all spoil placed in the spoil disposal areas.

(2) Spoil material shall consist of all material resulting from the required excavations not needed to construct the floodway and Dip Crossing.

(3) Section 6, Compaction, does not apply to this item.

(4) The maximum thickness of each layer before smoothing the surface shall not exceed two (2) feet.

(5) The finished surface shall not vary more than one-half (0.5) foot, plus or minus, from the average grade.

(6) Fill slopes resulting from the deposition of spoil in the disposal areas shown on the Reach 2 drawings shall not be steeper than 2:1 on the east and west sides and 4:1 on the north and south ends.

(7) Spoil shall be placed in the area between the dip crossing and the basin to the minimum elevations shown on the drawings and in the area between the RWCD canal and RWCD Floodway as shown on the drawings. Excess spoil may be placed in these areas as directed by the engineer or shall, at the direction of the engineer, be placed in the spoil disposal areas shown on the RWCD Floodway Reach 2 drawings.

(8) No special moisture content of spoil material will be required.

(9) No separate payment will be made for spoil disposal. Compensation for this work will be included in the payment for Bid Item ~~11~~ 17, Dip Crossing Excavation, Common.

BLUE

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 ~~32~~ 35, Drain Fill

(1) This item shall consist of furnishing and placing the drain fill materials in the locations shown on the drawings.

(2) In Section 2, Materials, Method 1 shall apply.

(3) The gradation of the drain fill shall meet the following requirements:

Sieve Size	Percent Passing (Dry Weight Basis)
2"	100
1"	90 - 100
1/2"	80 - 98
3/8"	70 - 95
#4	50 - 78
#10	12 - 44
#20	0 - 14
#30	0 - 9
#200	0 - 3

40 IN

#200 18

(4) Drain fill shall be placed in horizontal layers not to exceed 18 inches deep.

(5) In Section 6, Compaction, Class III shall apply.

(6) The moisture content shall be maintained in a range, as determined by the engineer, that will minimize segregation.

(7) The material passing the #200 sieve shall be non-plastic.

(8) Measurement and payment will be in accordance with Section 8.

BLUE

26. 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, Concrete, Class 3000

(1) This item shall consist of furnishing, forming and placing all items required to construct the basin outlet structure.

(2) In Section 3, Classes of Concrete, and Section 5, Design of the Concrete Mix, Method 1 shall apply. Concrete shall be Class 3000.

(3) Coarse aggregate shall be size No. 67, in accordance with ASTM C 33.

(4) Cement shall be Type II or IIA.

(5) In Section 15, Construction Joints, Method 1 shall apply.

(6) In Section 18, Removal of Forms, Method 1 shall apply.

(7) Curing compound shall be Type 2 conforming to Material Specification 534 and ASTM C 309.

(8) No separate payment will be made for Class 3000 concrete. Compensation for this work will be included in the payment for Bid Item 33, 24-inch Diameter Reinforced Concrete Pipe, Class III.

36

GREEN

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 5, Concrete, Class 4000X

(1) This item shall consist of furnishing, forming and placing all concrete required to construct the Dip Crossing.

(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. 67, in accordance with ASTM C 33.

(4) In Section 15, Construction Joints, Method 1 shall apply.

(5) In Section 18, Removal of Forms, Method 1 shall apply.

(6) All exposed surfaces shall be finished in the following manner:

Upon patching and pointing all holes as directed in Section 19, the surface shall be promptle covered with polyethylene film, wet burlap or wet cotton mats. If polyethylene film is used, the film shall be help securely to the surface by means of weights, adhesive or other suitable means. only white polyethylene film for covering will be acceptable. When the mortar used in patching and pointing has set sufficiently, the surface shall be uncovered and thoroughly rubbed with either a float or a carborundum stone until the surface is covered with a lather. Cork, wood or rubber floats shall be used only on the surfaces sufficiently green to work up such lather; otherwise a thin grout composed of one (1) part cement and one (1) part of fine sand may be sued to facilitate producing a satisfactory lather; however, this grout shall not be used in quantities sufficient to cause a plaster coating to be left on the finished surface. A portion of the required cement for the grout shall be white, as required to match the color of the surrounding concrete. Rubbing shall continue until irregularities are removed and there is no excess material. At the time a light dust appears, the surface shall be brushed or sacked. Brushing or sacking shall be carried in one direction so as to produce a uniform texture.

(7) Curing compound shall be Type 2 conforming to Material Specification, ASTM C 309.

(8) Measurement and payment will be by Method 2 and will include compensation for Subsidiary Item, Cleaning and Painting Metal Work.

b. Bid Item 6, Cement

(1) This item shall consist of furnishing and handling all cement required to construct the concrete items in Bid Item 14.

(2) Cement shall be Type II or IIA.

(3) Measurement and payment will be by Method 2.

BCUC

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, Steel Reinforcement

(1) This item shall consist of furnishing and installing all steel reinforcement required in the construction of the basin outlet structure.

(2) No separate payment will be made for steel reinforcement. Compensation for this work will be included in payment for Bid Item 33, 24-inch Diameter Reinforced Concrete Pipe, Class III.

36

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 16, Steel Reinforcement

(1) This item shall consist of furnishing and installing all steel reinforcement required in the construction of reinforced concrete for the dip crossing.

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

BLUE

11. ITEMS OF WORK AND CONSTRUCTION DETAILS

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

a. Bid Item ~~33~~ 36, 24-inch Diamenter Reinforced Concrete Pipe, Class III

(1) This item shall consist of furnishing and installing all pipe for the basin outlet at RWCD Floodway STA 981+80+, as shown on the drawings.

(2) Pipe shall conform to the requirements of Material Specification 542 and ASTM C 76. The pipe shall be Class III.

(3) Pipe shall be furnished with bell and spigot joints equipped with endless "o" ring type gaskets of circular cross-section.

(4) Cement shall be Type II.

(5) In Section 5, Joining Bell and Spigot Pipe, Method 1 shall apply.

(6) In Section 9, Pressure Testing, Method 1 shall apply.

(7) Measurement and payment will be by Method 1 and will include payment for subsidiary items concrete, Class 3000; Metalwork, and cleaning and painting metalwork.

SECTION 42 NOT IN SPECS

BLUE

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 ~~34~~ 37, Loose Rock Riprap

(1) This item shall consist of furnishing and placing all loose rock riprap, including bedding, in the floodway, and inlets as follows:

(a) Floodway

Station 976+00 to Station 977+25
Station 979+45± to Station 982+04±

(b) Side inlet at RWCD Floodway Station 980+75, including bedding material placed over the side inlet weir as shown on the drawings.

(c) The side inlet for Channel #3.

(d) The basin inlet structure.

(e) The basin inlet channel.

(2) The rock shall be graded as follows:

Particle Size (inch)	Percent Passing (by Dry Wt.)
15	100
12	75 - 100
9	60 - 85
6	25 - 40
4	10 - 25
3	0 - 10

(3) Rock shall be either hand or equipment placed.

(4) Bedding beneath riprap shall be graded as follows:

U. S. Sieve Size	Percent Passing (by Dry Wt.)
1"	100
3/4"	85 - 100
#4	~~60~~ 50 - 80
#16	~~40~~ 21 - ~~60~~ 56
#40	~~22~~ 11 - ~~44~~ 38
#200	0 - ~~3~~ 6

MOD 10

Size No. 67 blended with fine aggregates in accordance with ASTM C 33 meets these requirements.

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

GIBSON

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~~ 23, Loose Rock Riprap

(1) This item shall consist of furnishing and placing of loose rock riprap, including bedding, adjacent to the Dip Crossing At Hunt Highway, as shown on the drawings and staked in the field.

(2) The rock shall be graded as follows:

Particle Size (inches)	Percent Passing (by Dry Weight)
15	100
12	75 - 100
9	60 - 85
6	25 - 40
4	10 - 25
<3	0 - 10

(3) Rock shall be either hand or equipment placed.

(4) Bedding beneath riprap shall be graded as follows:

US Sieve Size	Percent Passing (by Dry Weight)
1"	100
3/4"	85 - 100
#4	~~60~~ 50 - 80
#16	~~40~~ 21 - ~~60~~ 56
#40	~~22~~ 11 - ~~44~~ 38
#200	0 - ~~3~~ 16

mod 10

Size No. 67 blended with fine aggregates in accordance with ASTM C 33 meets these requirements.

(5) Measurement and payment will be by Method 1 and shall include compensation for Subsidiary Item, Removal of Water.

BLU6

13. 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 35, Grouted Rock Riprap

(1) This item shall consist of the furnishing and placing of grouted rock riprap and bedding at the side inlet at RWCD Floodway Station 980+75, the side inlet for Ch. #3, and the basin inlet structure, as shown on the drawings and staked in the field.

(2) The rock shall be graded as follows:

Particle Size (inch)	Percent Passing (by Dry Weight)
15	100
12	75 - 100
9	60 - 85
6	25 - 40
4	10 - 25
3	0 - 10

(3) Rock shall be either hand or equipment placed.

(4) Bedding beneath riprap shall be graded as follows:

U. S. Sieve Size	Percent Passing (by Dry Weight)
1"	100
3/4"	85 - 100
#4	60 - 100
#16	40 - 60
#40	22 - 44
#200	0 - 3

Size No. 67 blended with fine aggregates in accordance with ASTM C 33 meets these requirements.

(5) In Section 6, Design of the Grout Mix, the Contractor shall be responsible for proportioning the mix. The grout shall consist of Portland cement, fine and coarse aggregate, water and an air-entraining agent. The cement content shall be 5 1/2 bags per cubic yard of concrete. The maximum nominal size of coarse aggregate shall be 3/4 inch. The slump shall be within the range of 6 to 10 inches. The air content (by volume) of the grout mixture at the time of placement shall be five (5) to seven (7) percent. At least five (5) days prior to placement of grout, the Contractor shall furnish the Engineer with a statement of the mix proportions for approval.

(6) Cement shall be Type II of IIA.

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

BLUS

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, Metal Work

(1) This item shall consist of fabricating and installing the basin outlet trash rack and drain grates as shown on drawings.

(2) The trash rack and drain grates shall be fabricated of structural steel conforming to the requirements of ASTM A 36.

(3) The trash rack and drain grates shall be painted in the manner specified in Construction Specification 82.

(4) Equal quality manufactured drain grates may be substituted witb approval of engineer.

(5) No separate payment will be made for this item. Compensation will be included in Bid Item ~~33~~ 34, 24-inch Diameter Reinforced Concrete Pipe, Class III.

GROUT

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, Metal Work

(1) This item shall consist of the fabrication and installation of depth gauges as shown on the drawings and directed by the Engineer.

(2) Painting shall be in accordance with Construction Specification 82.

(3) No separate payment will be made for metal work. Compensation for this work will be included in the payment for Bid Item ~~14~~ 20, Reinforced Concrete Clss 4000X.

BLJG

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 Items, Cleaning and Painting Metal Work

(1) This item shall consist of cleaning and painting the basin outlet trash rack and drain grates as shown on the drawings.

(2) In Section 3, Surface Preparation, Method 2 shall apply.

(3) In Section 4, Painting Systems, Paint System C shall apply for the trash rack and drain grate in Bid Item 33, except that Type 4 paint shall be used in place of Type 2 or 3 paint for the priming coat.

(4) No separate payment will be made for this item. Compensation will be included in Bid Item 33, 24-inch Diameter Reinforced Concrete Pipe, Class III.

Gloom

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 Metal Work

(1) This item shall consist of cleaning and painting the depth guages.

(2) In Section 3, Surface Preparation, Method 2 shall apply.

(3) In Section 4, Paint Systems E (except that Type 4 paint shall be used in place of Type 2 paint for the priming coat) shall apply. The two top coats of enamel paint on the depth guages shall alternate white background with green numbers, and green background with white numbers.

(4) No separate payment will be made for cleaning and painting. Compensation for this work will be included in the payment for Bid Item 14, Concrete, Class 4000X.

20

GROUND

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 24, Asphalt Concrete Pavement

(1) This item shall consist of furnishing and installing the asphalt concrete pavement, including the untreated base and preservative seal for the following work:

(a) The dip crossing between Station 976+75± and Station 981+00± centerline floodway.

(2) Payment will be made in accordance with Section 7.

BLUE

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 ~~36~~ 39, Surveys

(1) This item shall consist of furnishing personnel, equipment, materials and performing surveys required for:

(a) Construction layout

(b) Computation of quantities

(c) "As-Built" construction drawings.

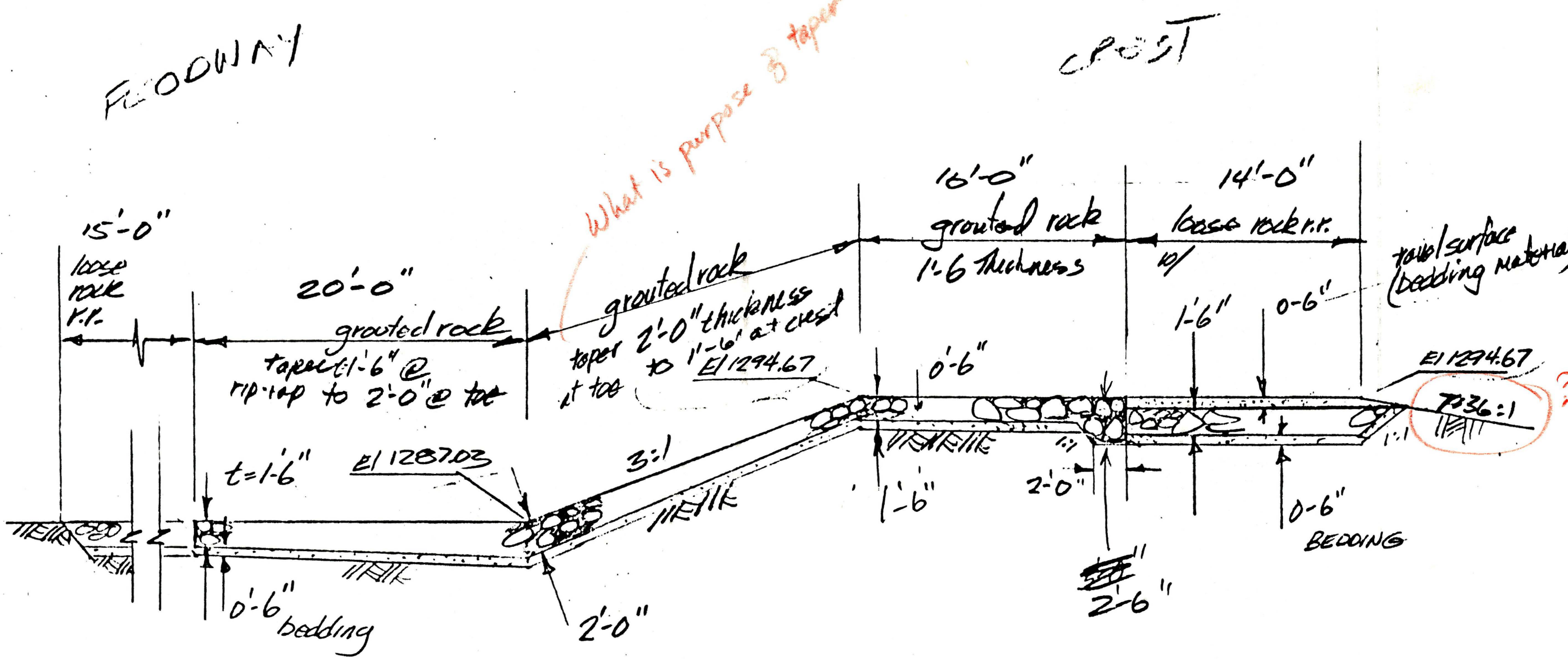
(2) The Contractor shall provide the Government Representative a statement of qualifications, including specific experience of each of the survey personnel assigned to the job.

(3) The Contractor shall provide the Government Representative schedule of surveys to be performed each month.

(4) In Section 5, Construction Surveys and Measurements, all entries in the bound field notebooks shall follow the format shown on pages 2-40 and 2-42 of the Soil Conservation Service National Engineering Handbook, Section 19.

(5) In Section 6, Staking, the location and marking of stakes shall follow the format shown on pages 2-13, 2-15, 2-17 and 2-20 of the Soil Conservation Service National Engineering Handbook, Section 19.

(6) Payment will be in accordance with Section 8.



SECTION ON ℄ SIDE INLET RWCD STA 980+75

(LOOKING UPSTREAM)

REVERSE F.F

ARIZ.
O.T.

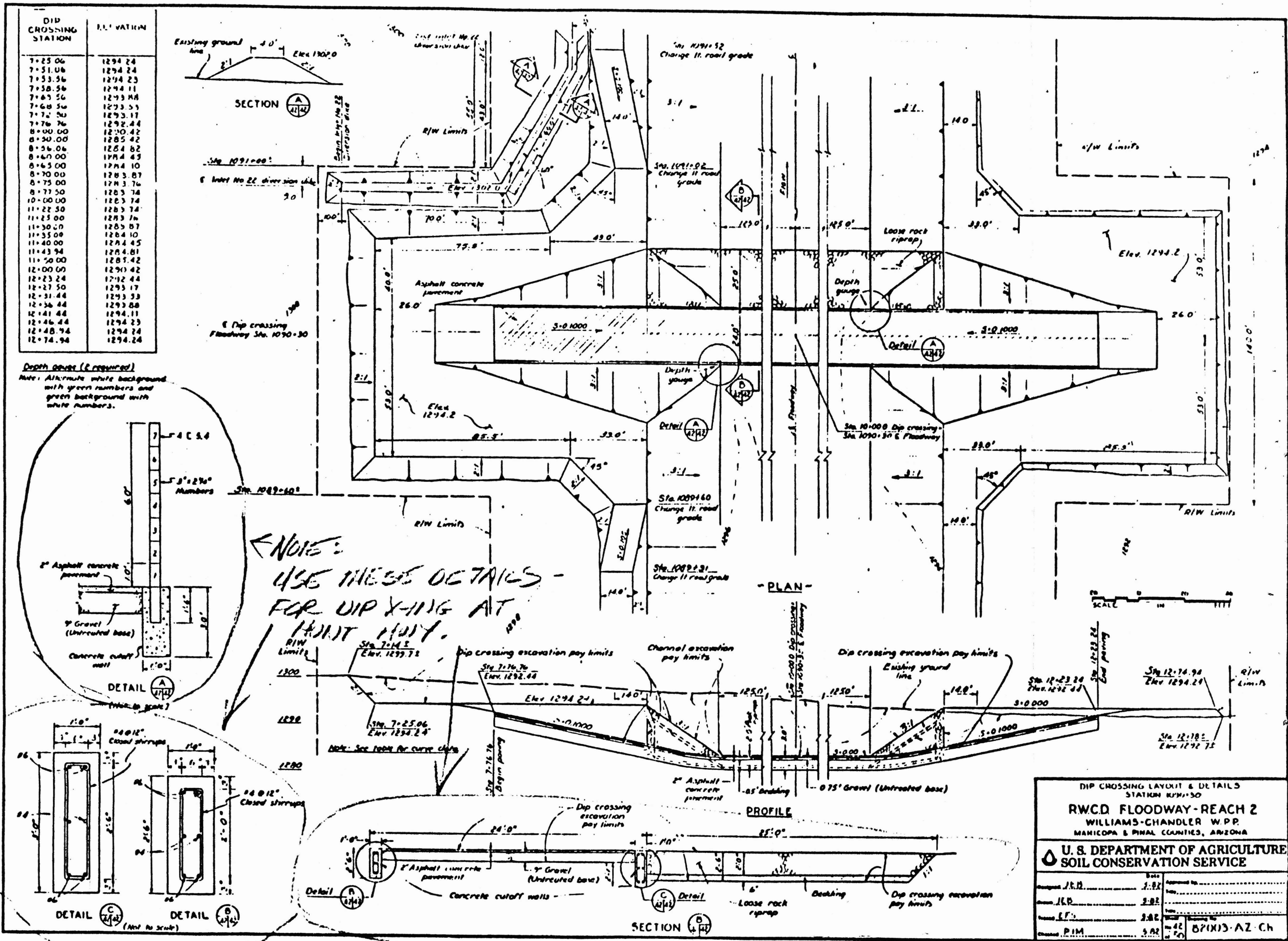
3/29/83

RWCD REACH 2 EXT

PRELIMINARY
APR 01 1983
Subject to Revision

1/10

DIP CROSSING STATION	ELEVATION
7+25.06	1294.24
7+51.06	1294.24
7+53.56	1294.23
7+58.56	1294.11
7+63.56	1293.88
7+68.56	1293.53
7+72.50	1293.17
7+76.76	1292.44
8+00.00	1290.42
8+50.00	1285.42
8+56.06	1284.82
8+60.00	1284.45
8+65.00	1284.10
8+70.00	1283.87
8+75.00	1283.76
8+77.50	1283.74
10+00.00	1283.74
11+22.50	1283.74
11+25.00	1283.76
11+30.00	1283.87
11+35.00	1284.10
11+40.00	1284.45
11+43.94	1284.81
11+50.00	1285.42
12+00.00	1290.42
12+23.24	1292.44
12+27.50	1293.17
12+31.44	1293.53
12+36.44	1293.88
12+41.44	1294.11
12+46.44	1294.23
12+48.94	1294.24
12+74.94	1294.24



DIP CROSSING LAYOUT & DETAILS
STATION 1090+30

R.W.C.D. FLOODWAY - REACH 2

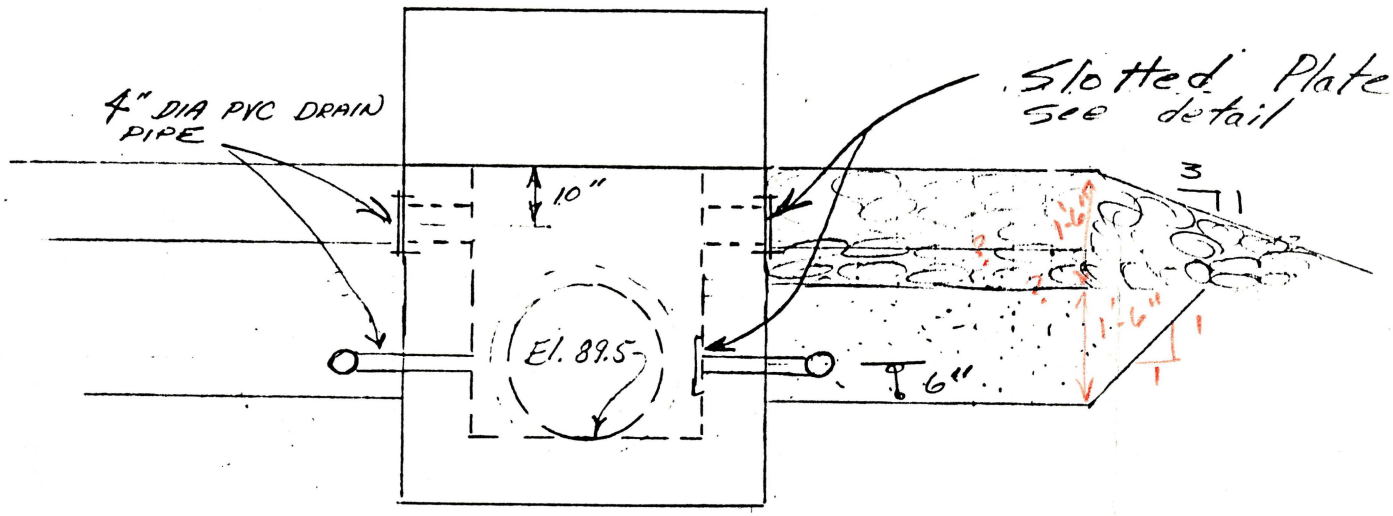
WILLIAMS-CHANDLER W.P.P.

MARICOPA & PINAL COUNTIES, ARIZONA

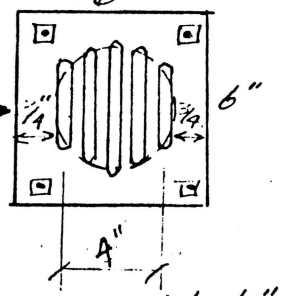
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed J.C.D. 5-82
Drawn J.C.D. 5-82
Traced C.F. 5-82
Checked P.I.M. 5-82

Sheet 42 of 50 — Drawing No. 87(X)13-AZ-Ch



GALV.
1/4" Steel Plate



5 slots, ½" wide
DRAIN Cover Plate
or
Manufactured equil.
as approved by Eng.
12 required

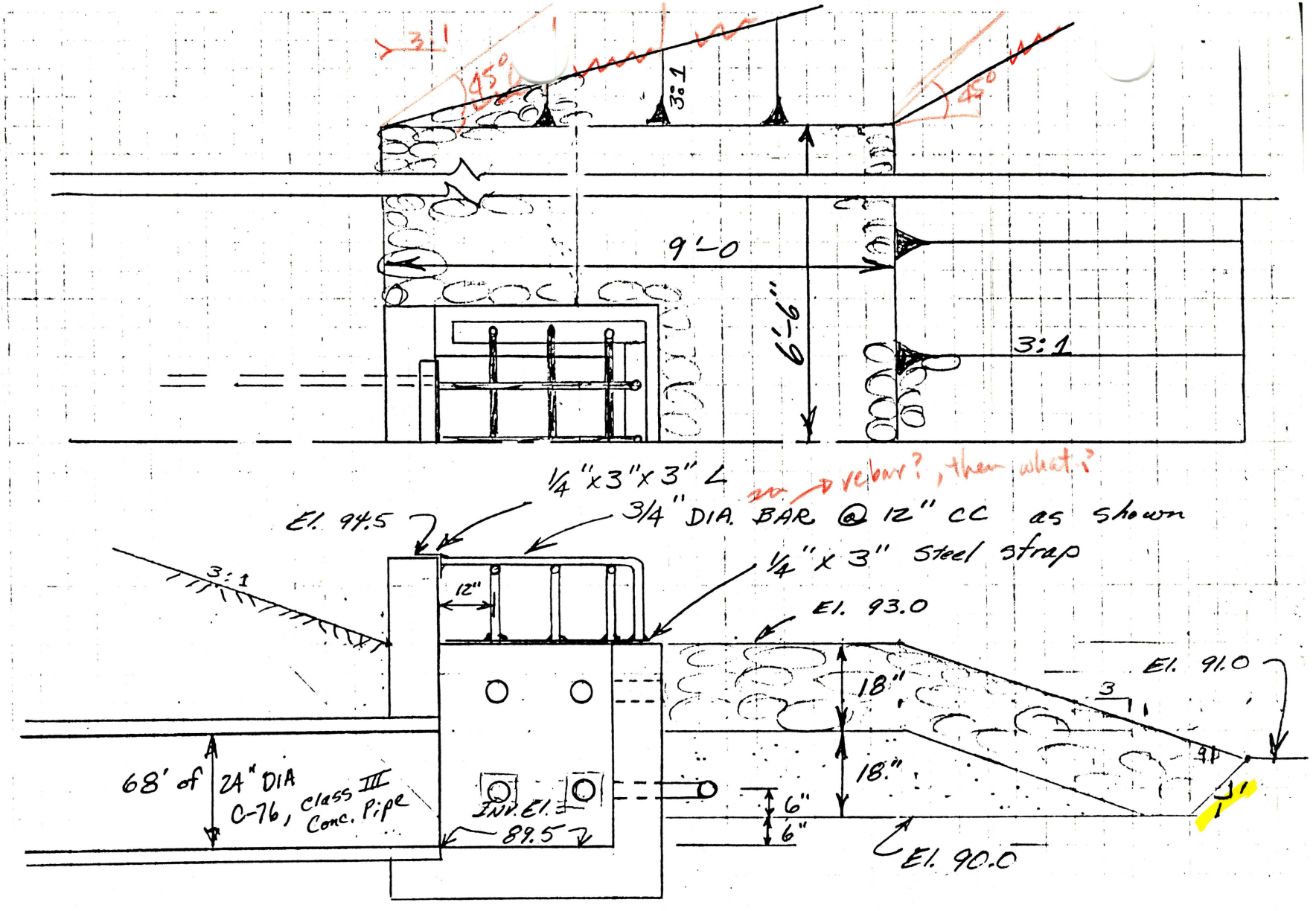
Suggest mesh screen as in concrete channel 8x8 per inch. (calls for bronze - may not be commercially available) at least against rock

⟹ Rock riprap
Gradation used for Reach 2 is satisfactory $D_{100} \leq 15"$

Rock riprap bedding (Reach 2)
D_{10} = #60 — #140 .25mm — 0.1mm
Could have low perm rate

⟹ Use Drain Fill Gradation (R-2 Specs.)
$D_{85} \geq 7.5$ mm
D_{10} 0.85 — 1.3 mm

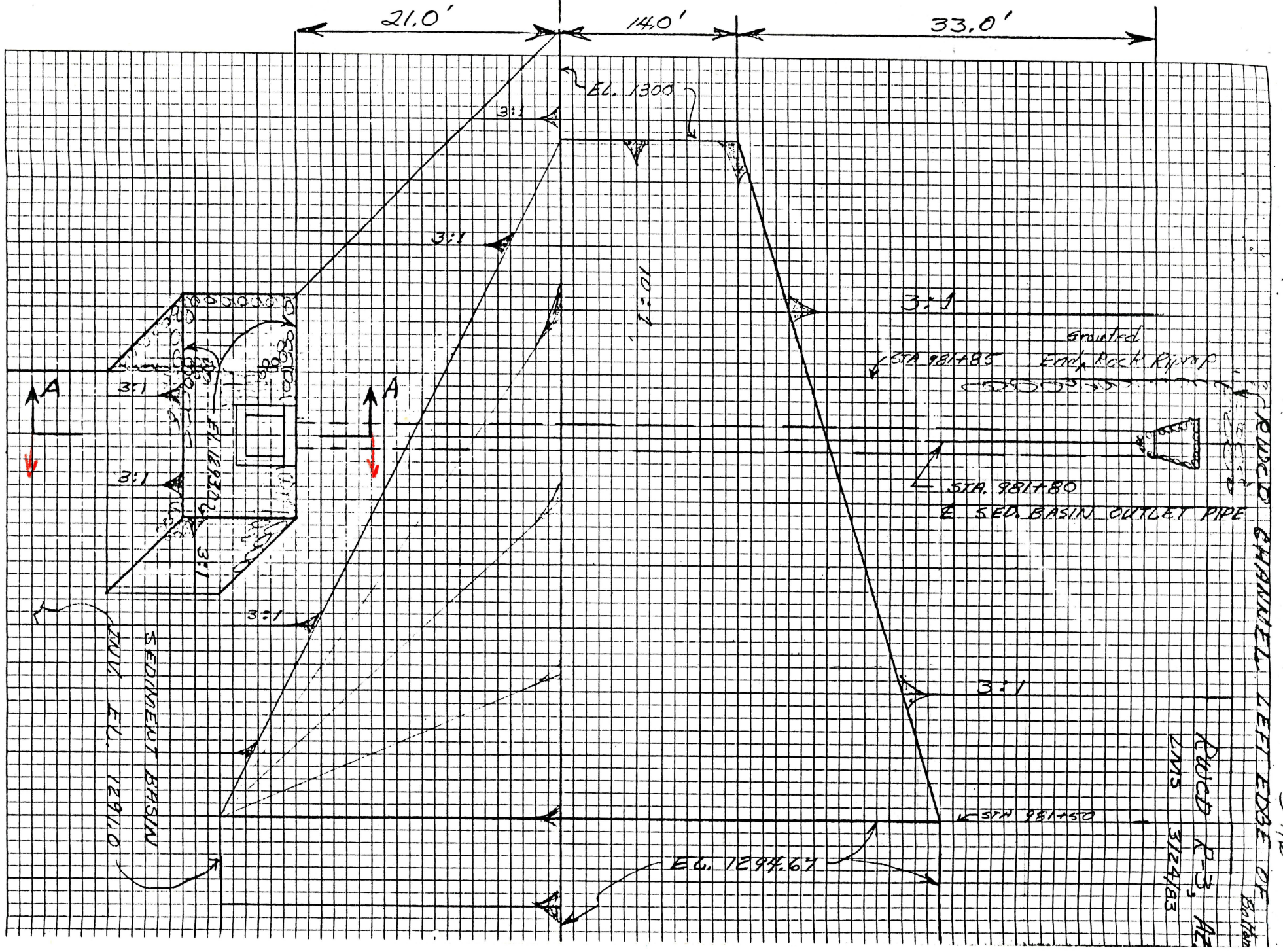
3



SECTION A-A

Design: By inspection use 8" walls & floor, #5 @ 12, both directions, single grid. 2 mts.

@ center of wall?



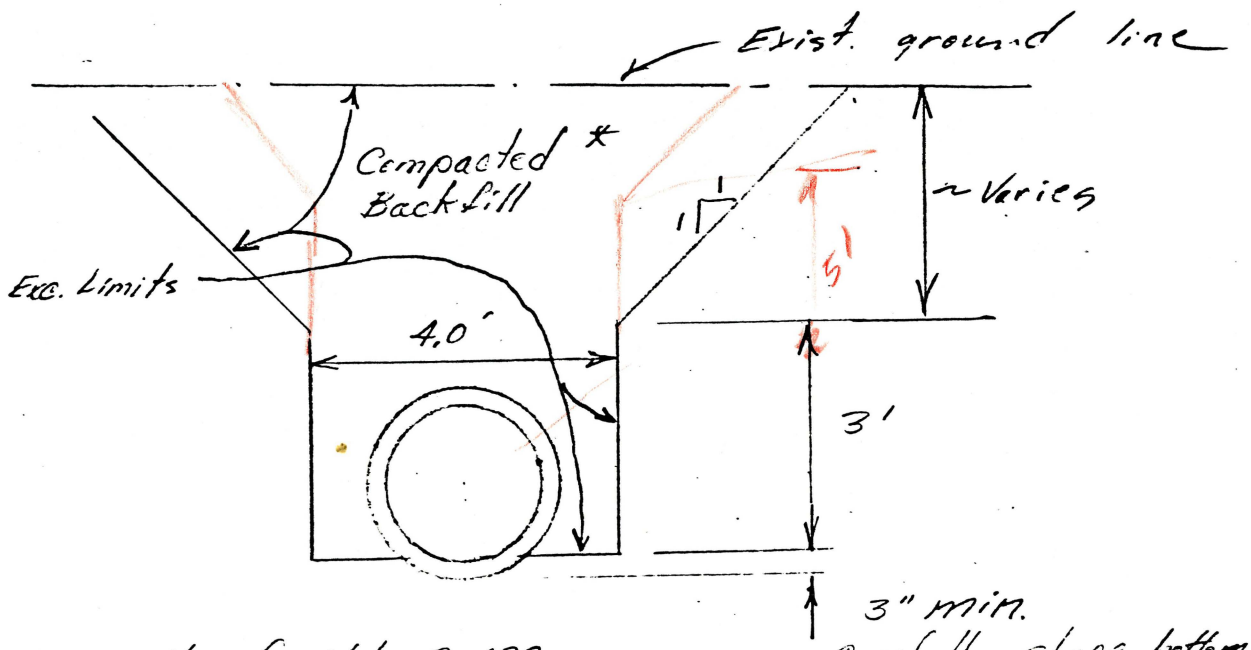
6/116

AZ. RWCD R-2 Ext.

LMS 3/83

Side Inlet STA. 981+80 (Sediment Basin outlet)

Pipe trench excavation



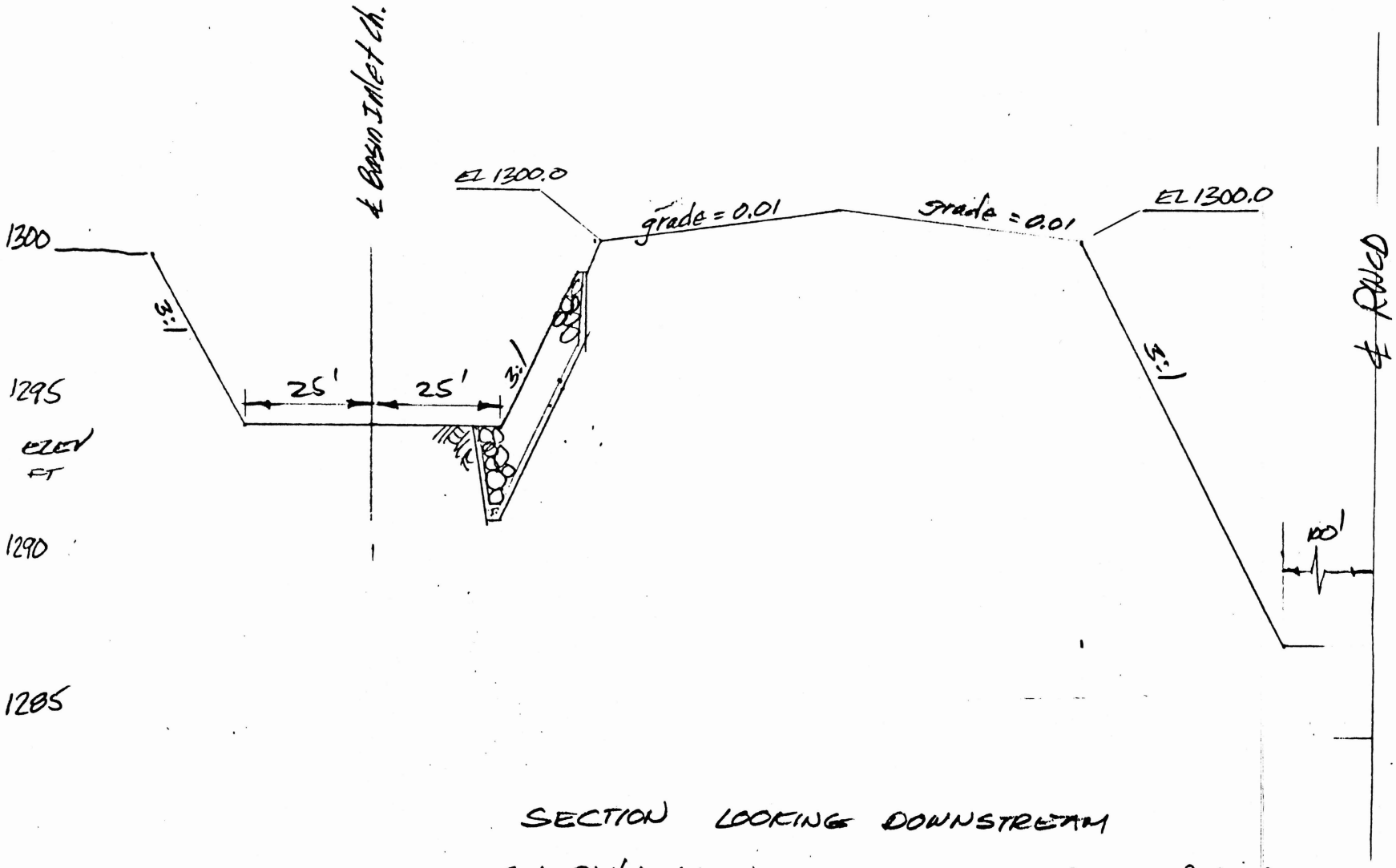
* 90% of Std. D-698 within 3% of Opt. Moisture.

Carefully shape bottom of trench to fit pipe use drainfill? or bedding?

Pipe: R/C C-76, Class III, Wall A or B

68' required.

Form grouted rock basin at outlet of pipe. ?



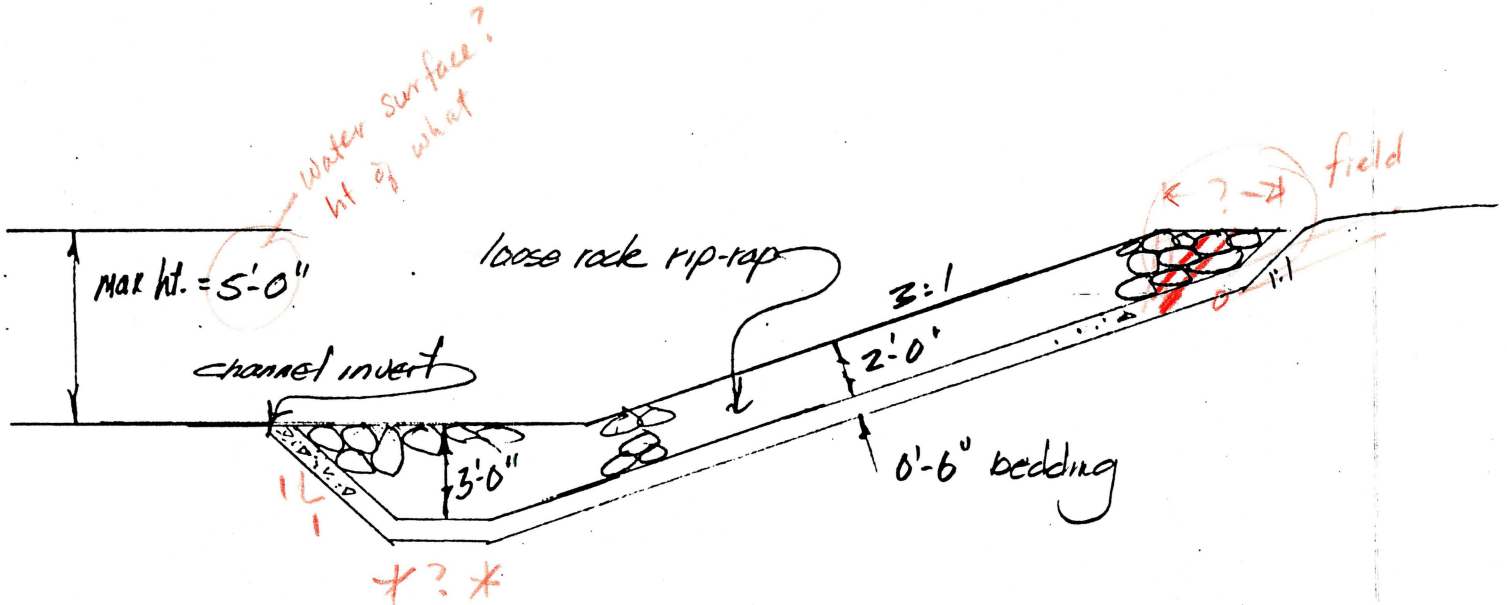
SECTION LOOKING DOWNSTREAM

STA 9+40 BASIN INLET = STA 978+58.3 RWCD FWY

E-E

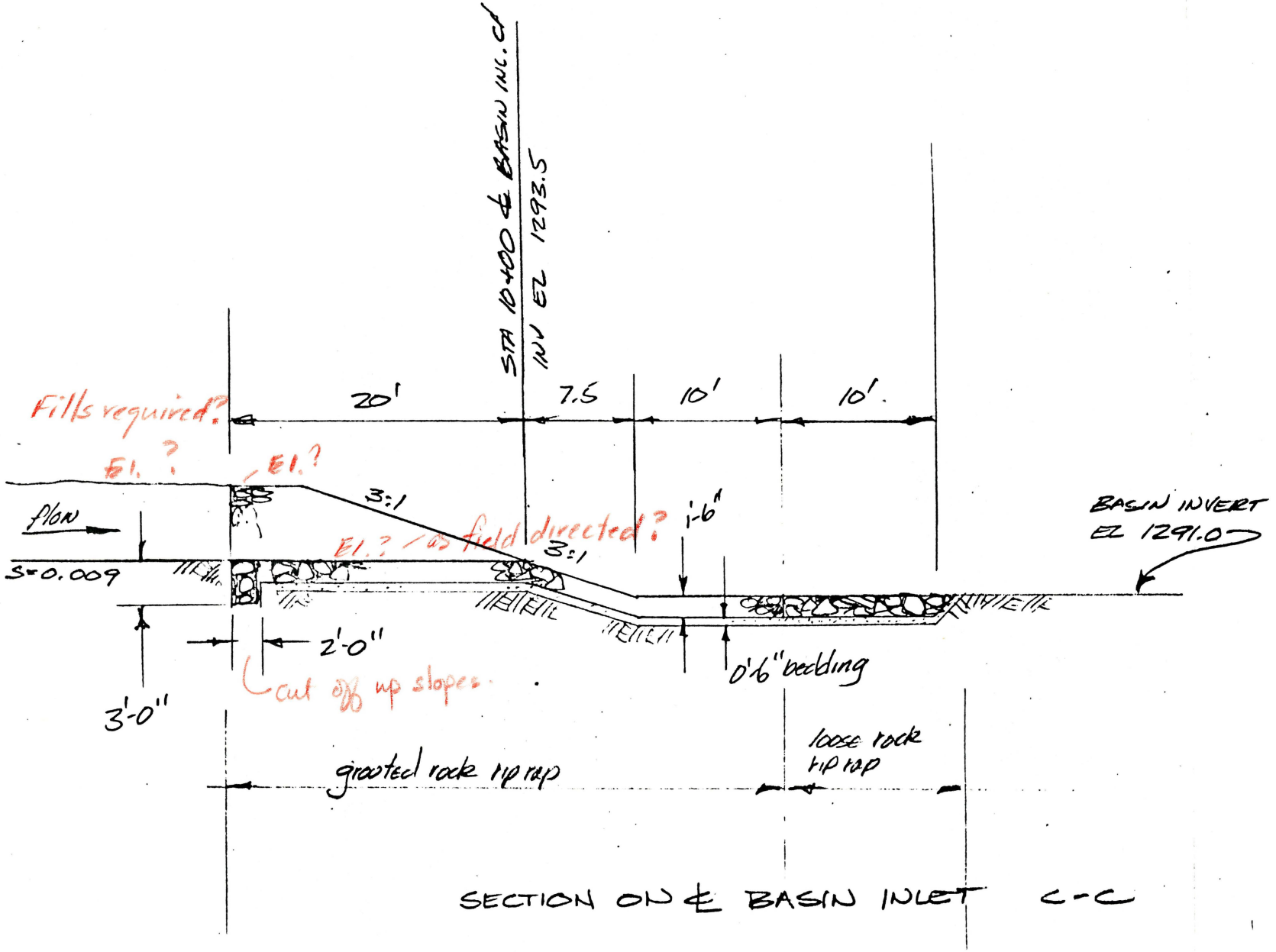
ARIZ.
D.T.
3/29/03
RWCD REACH 2 EXT.
7/10

AR12
D.T.
3/29/83
RWCD REACH 2 EXT.
9/10



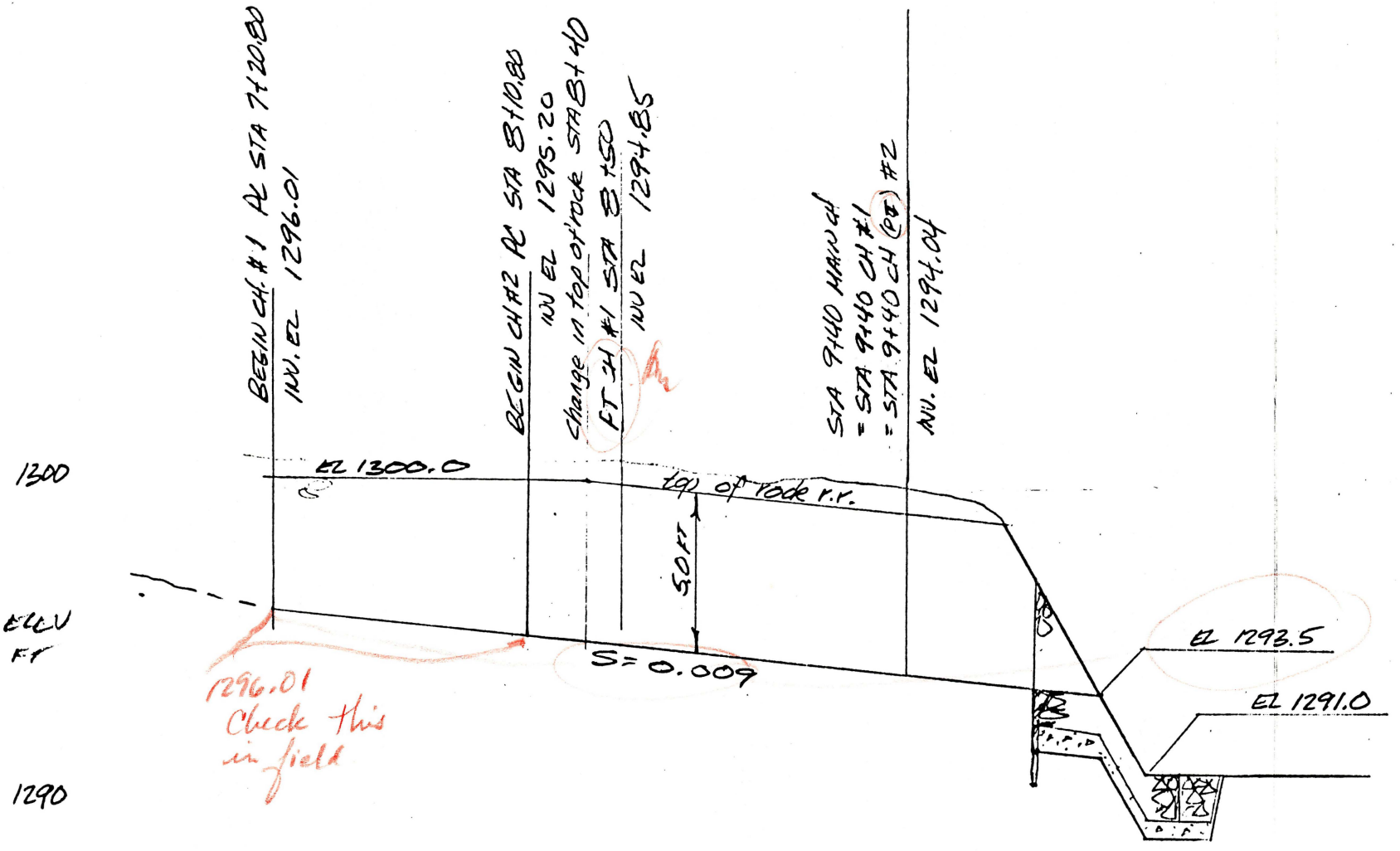
TYPICAL SECTION
ROCK RIP-RAP SED BASIN INLET CH.

A-A



SECTION ON ℄ BASIN INLET C-C

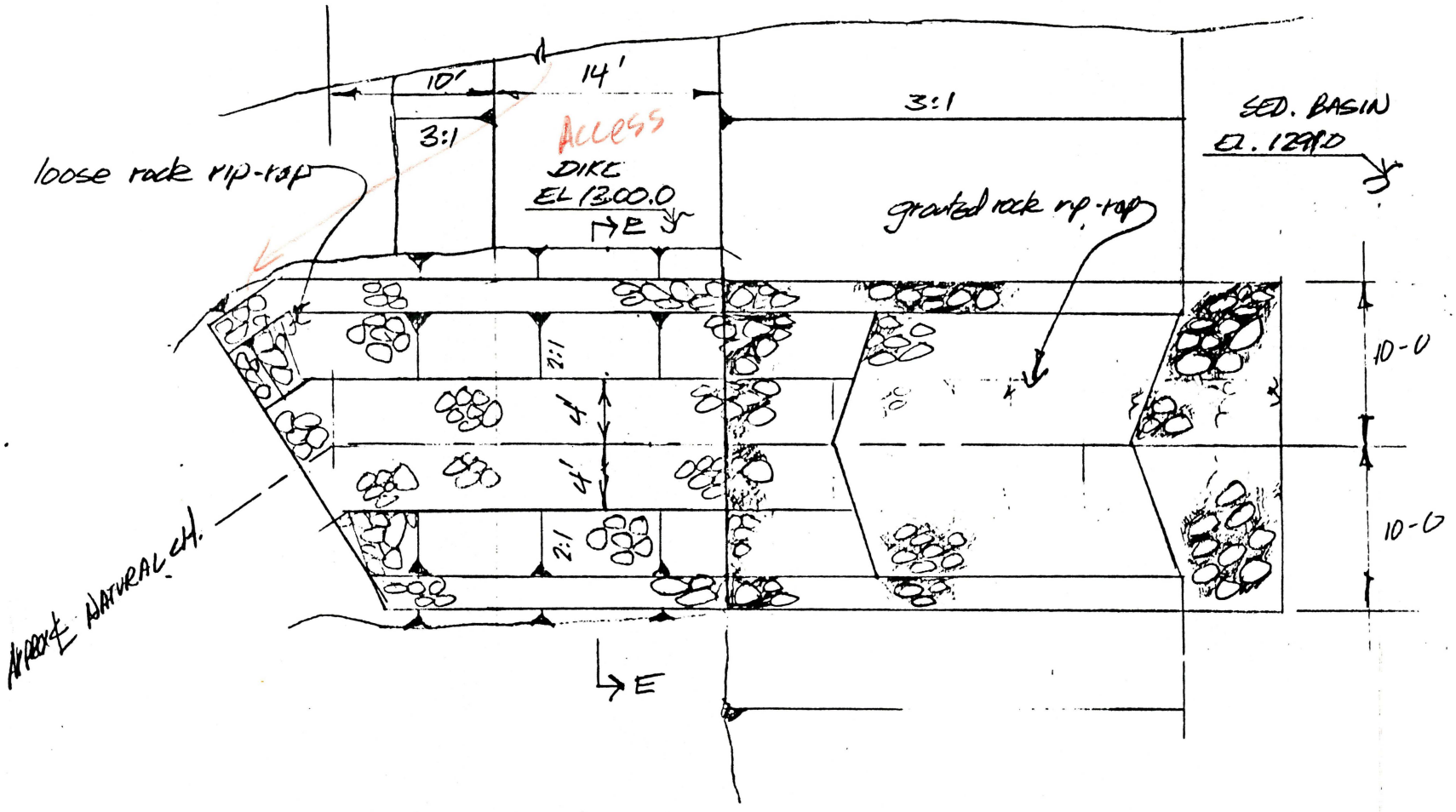
ARIZ.
O.T.
3/29/83
RWCD REACH 3 EXT
9/16



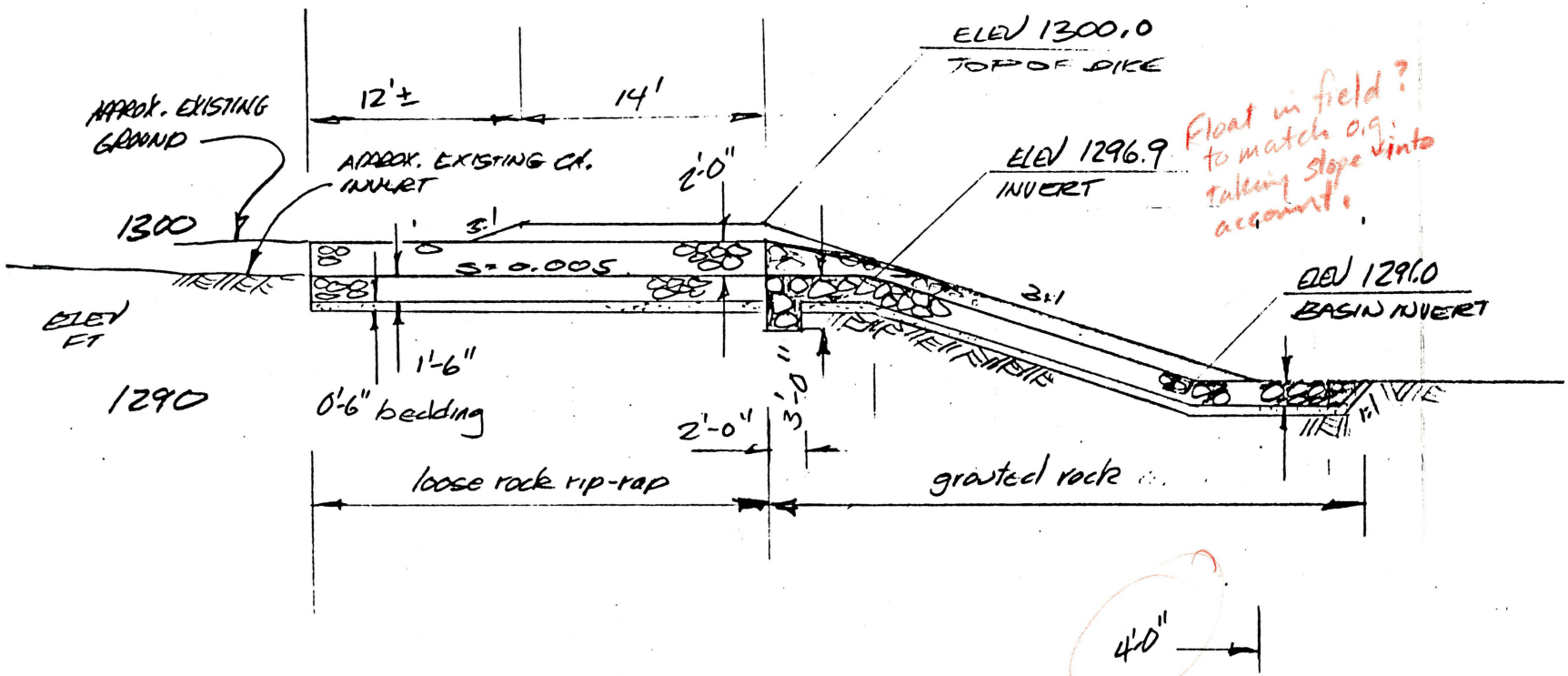
PROFILE ON ℄ SED. BASIN INLET CH.
MAIN CH, C.I #1, CH #2

ADD'L O.T. 3/29/83 RIPRAP RETAINING WALL EXT. 10/16

ARIZONA
D.T.
3/29/83
RWCD EXHIBIT EXT.
11/16



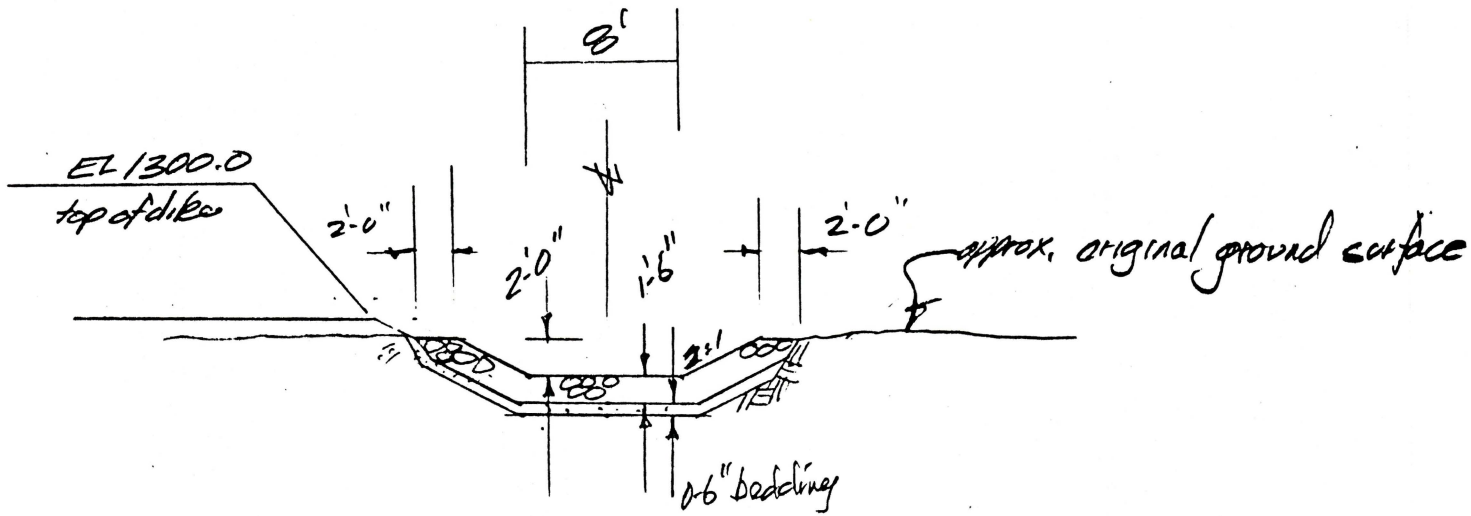
PLAN SIDE INLET CHANNEL #3



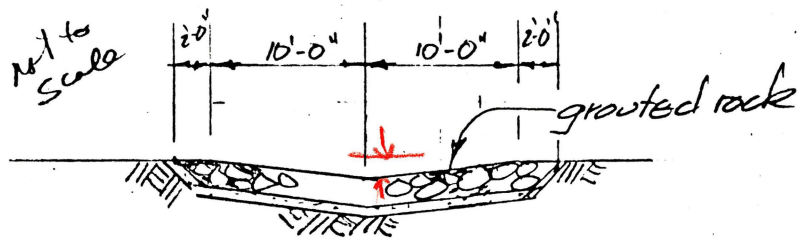
PROFILE ON ℄ CHANNEL #3 INLET TO BASIN

D-D

AR12
D.T.
3/30/23
RWCD DETAILS EXT
12/15



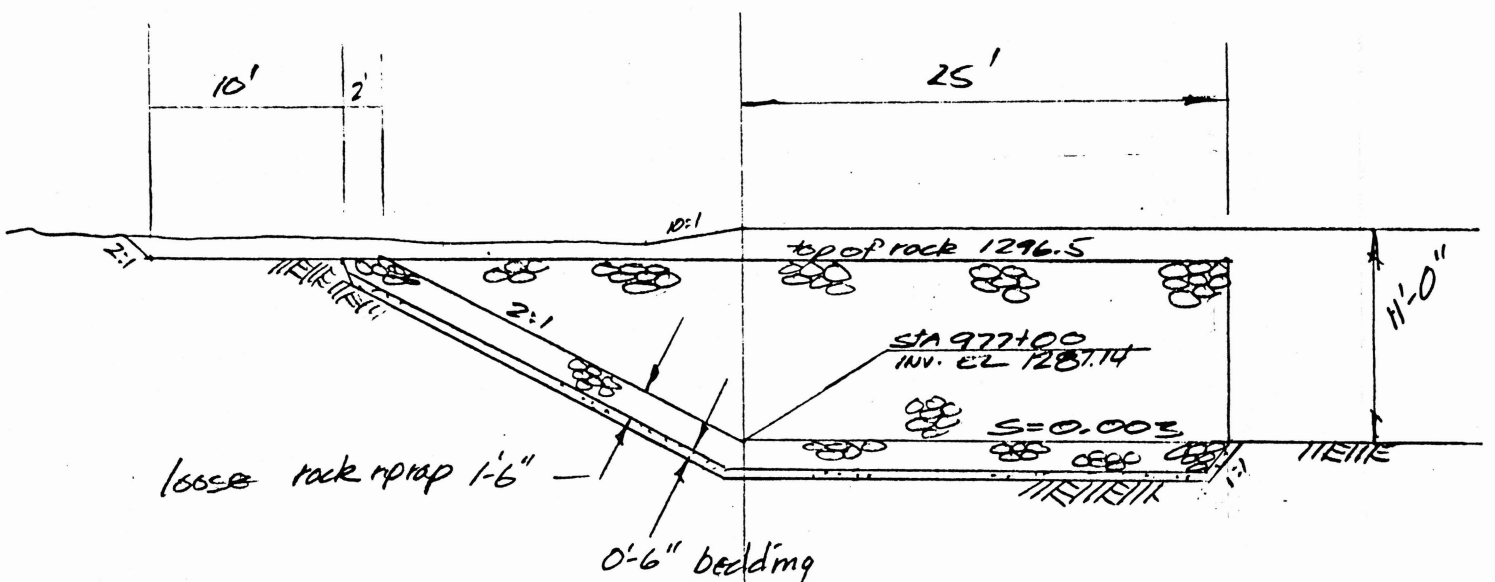
SECTION EE ON ℄ SIDE INLET CH #3



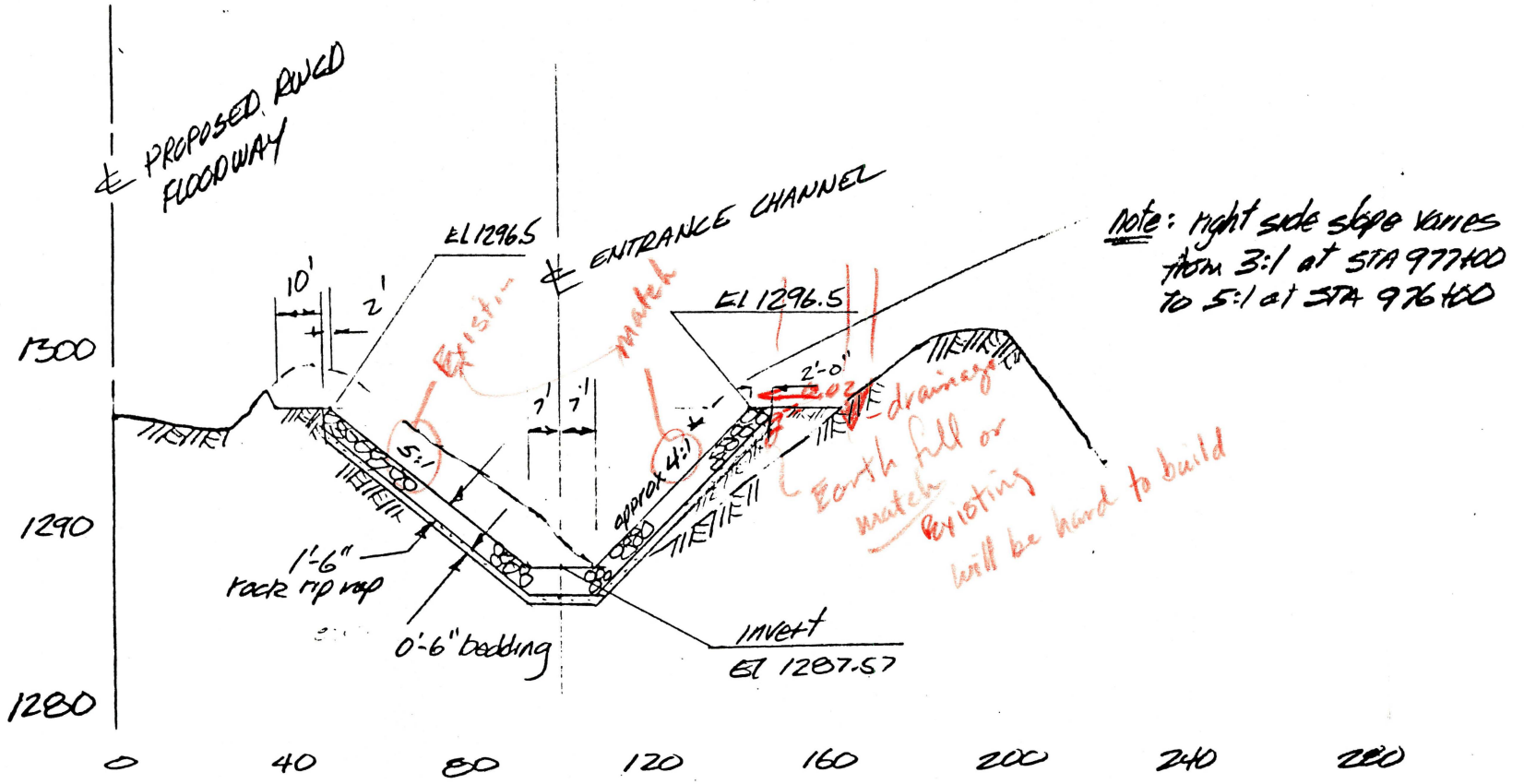
SECTION E'-E' ON ℄ SIDE INLET CH. #3

LOOKING DOWNSTREAM

ARIZ.
D.T.
3/20/
PUCO REACH 2 EXT.
13/16



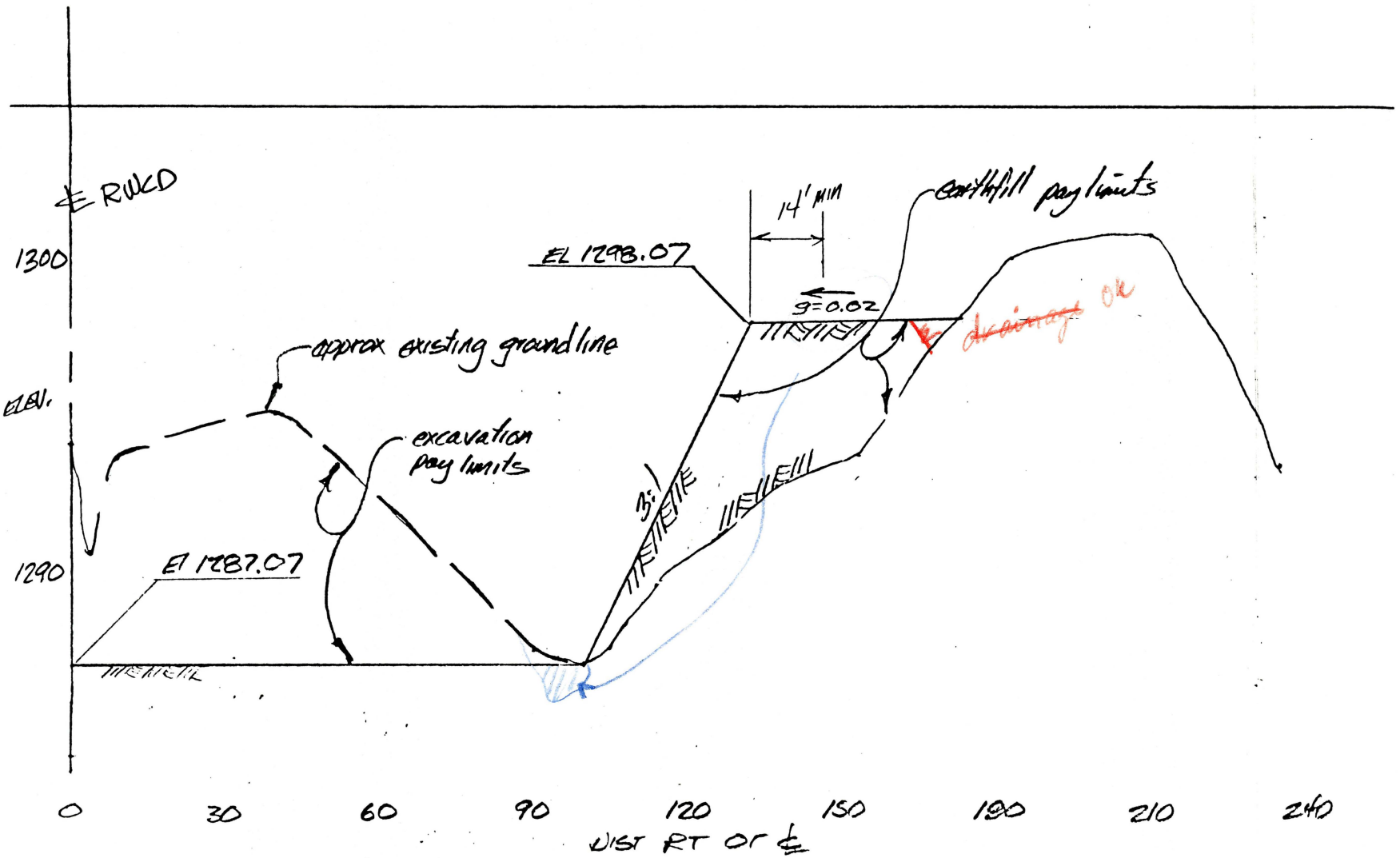
SECTION K-K RWCD ENTRANCE CHANNEL



SECTION J-J RWCD ENTRANCE CHANNEL - RWCD STA 976+50

LOOKING DOWNSTREAM

ARIZONA D.T. 3 sheets RWCD REACH 2 EXT 15/16



SECTION G1 STA 979+17 LOOKING DOWNSTREAM

RWCD REACH 2 EXT.

3/20/83

APPR. O. Thackeray

16 1110

United States Department of Agriculture

Soil Conservation Service

West National Technical Center
511 N. W. Broadway, Rm. 510
Portland, Oregon 97209

Subject: ENG - Design Assistance, RWCD Floodway Reach 2 Extension, Williams Chandler Watershed, Arizona

Date: April 15, 1983

To: Ralph Arrington, State Conservation Engineer,
SCS, Phoenix, Arizona

We have completed and co-approved the design of RWCD Floodway, Reach 2 Extension, as requested in letter from Verne Bathurst to Charles Lemon dated March 8, 1983.

Attached are the following:

1. Three copies of the Design Report.

2. One original copy and two color coded copies of the Construction Specifications including bid schedule.

3. Two copies of Design Computations including estimate of quantities.

4. One set of original Construction Drawings.

5. One set of blueline Construction Drawings.

We have signed the cover sheet and added your signature as authorized by Remote Message Transmittal dated April 14, 1983.

We have not prepared a cost estimate for the work. We believe that your staff being close to the work in progress on Reach 2 is better prepared for developing a cost estimate. There are a couple of items that should be noted:

1. The quantities are based on the work ending at STA 982+50. This overlaps Reach 2 work and will require an adjustment in Reach 2 quantities or the Reach 2 Extension quantities.

2. The estimate for quantity of water was based on the estimate for Reach 2. It seems high and should be checked against actual usage for Reach 2.

If there are any questions concerning other aspects of the design or drawings and specifications, please give us a call.

Gordon M Strang for
JACK C. STEVENSON
Head, Engineering Staff

cc:
Verne Bathurst, State Conservationist,
SCS, Phoenix, Arizona
Donald E. Wallin, Head, Design Unit
Engineering, WNTC, Portland, Oregon

Attachments

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Design Unit
Portland, Oregon
April 10, 1983

DESIGN REPORT

Job : RWCD Floodway Reach 2 Extension
Project : Williams-Chandler W.P.P.
Location : Maricopa and Pinal Counties, Arizona
Authority: WF-08
Phase : Final Design

Summary: The design, construction drawings, and specifications for this job were prepared by the WNTC Design Staff at the request of the Arizona State Conservationist.

Description of Job: The job includes: extension of the RWCD Floodway upstream from the current beginning of RWCD Reach 2 and covering the work between STA 976+000 and STA 982+50, an excavated basin for collection of bedload sediment from the Hunt Highway diversion, a dip crossing for access across the RWCD Floodway at Hunt Highway, a temporary entrance structure between the existing flood channel and the enlarged floodway, a 24 inch diameter R/C sediment basin drain, a grouted rock weir inlet to the floodway from the basin, grouted rock structures at the two inlets to the sediment basin, and construction of channels connecting the basin and the Hunt Highway diversion channels.

Design Objectives

1. Provide for economic removal of bedload sediment from the Hunt Highway diversion before its entry to the RWCD Floodway.

2. Provide a low cost, low maintenance junction of the Hunt Highway diversion with the RWCD Floodway.

3. Provide a dip crossing at the Hunt Highway which aligns with existing access roads, requires minimal additional right-of-way, and does not interfere with the existing RWCD canal.

Basis for Design

1. TR-25, NEH 5, TR5
2. NEM
3. U. S. Army Corps of Engineers
   Chart for "Stone Stability-Velocity vs. Stone Dia."
   Hydraulic Design Chart 712-1.
4. Chow, "Open Channel Hydraulics"
5. Design Report RWCD Floodway Reach 2
6. Construction Drawings and Specifications RWCD Floodway Reach 2
7. Construction Drawings and Specifications RWCD Floodway Reach 1

8. RWCD Floodway Hydrology Studies, 11/76 and 5/77
9. Geologic Investigation Report - RWCD Floodway Reach 3
10. Topographic Survey, SCS Arizona, 2/83

Location and Layout

Considerations in the location and layout of the work were:

Floodway - follows the preliminary design grade and alignment shown on RWCD Floodway Reach 2 and Reach 3 photo base maps (1"=100 ft. scale).

Sediment Basin - located within the 300' x 400' R/W area adjacent to the 330' floodway R/W width a shown on the RWCD Floodwlay Reach 2 drawings.

Basin Inlet Channels - located to provide a smooth transition from the existing channels to the sediment basin with minimal additional right-of-way needed.

Dip Crossings - aligns with existing roadways.

Entrance - located in close proximity upstream of the dip crossing.

Hydrology

Peak design flows determined in the RWCD Floodway hydrology studies of November 1975 and May 1976 by Bartels and McArthur were used. These are the same flows used for design of Reach 2. Peak 100-year design flow in the RWCD Floodway at this location is 8700 cfs, including the routed flow of 600 cfs contributed by the Hunt Highway diversion. The Hunt Highway diversion peak 100 year design flow of 2250 cfs occurs in these studies with virtually no flow in RWCD floodway from the reaches above the Hunt Highway.

Sedimentation Design

The need for a basin to remove sediment at the Hunt Highway diversion was established in the RWCD Floodway Reach 2 Geologic Investigation report and supported by visual observation of the amount of loose cohesionless material available for transport in the diversion channels.

A value of 1 ac. ft. of bedload sediment was used for design. This was selected as a reasonable, conservative value based on the sediment quantities predicted in the above report for a 100-year event in the side drainages along the Santan front adjacent to this site. Considering the time required to make a more rigorous determination of sediment quantity and the uncertainty of even a more rigorously obtained value, further studies were not made.

The basin was dimensioned to keep average velocity at peak design flow under 2 ft/sec with an assumed 1 ft depth of sediment accumulation.

Velocity in the constructed inlet channels is approximately 10 ft/s at peak design flows. This is the same as in the existing diversion channels. The velocity is maintained at this high level to limit sediment deposition in the basin inlet channels. Some deposition is likely to occur, however, at lesser flows due to backwater effect from the basin pool.

Sediment should be removed from both the lower inlet channels and basin when significant deposition occurs.

Hydraulic Design

A. Floodway - The 500 foot floodway extension is designed to the same grade (s=0.0003 ft/ft) and cross section (b=200, z=3) as the adjacent Reach 2 floodway channel. Design Q is 8700 cfs downstream of the sediment basin outlet. Design flow depth is 9.41 feet and design channel depth is 11 feet, providing freeboard equal to 17% of flow depth.

No channel lining will be required in the extended floodway. Geologic investigations show material in the excavated flow area of the floodway extension to have erosion resistance equal to that of adjacent unlined Reach 2 floodway channel. Portions of the constructed channel will require compacted earthfill to meet the design cross section.

B. Floodway Inlet at STA 980+75 - The loose and grouted rock weir, chute, and apron carry flow from the sediment basin to the floodway.

The weir section has 10:1 side slopes for vehicle travel. The 150 feet width compromises between the lesser erosion potential in the floodway of a wider weir and the lesser material cost of a narrower weir.

Maximum velocity in the chute is 17 ft/sec. A submerged hydraulic jump will occur at the chute toe for tailwater depth in the RWCD floodway equal to normal depth for Q=2250 cfs, the design weir flow. Rock and grouted rock are used as shown on the drawings to protect areas of expected high velocity flow. Some local scour adjacent to the apron should be expected during flows approaching design values.

Velocity at the upstream side of the weir crest is approximately 5 ft/sec at design flows. Protection of the adverse slope approaching this point for this velocity was considered unnecessary.

Momentum methods were used to check effect on flow depth in the floodway for peak Q in the floodway with routed flow of 600 cfs in the inlet: floodway flow depth was increased by 0.10 feet.

C. Basin Inlet Structures - Rock and grouted rock structures were used at the channel inlets to the debris basin. These are of similar design to the side inlets used in RWCD Reach 2. Experience with the Reach 2 structures led to the addition of grouted rock cutoffs at the upstream end to reduce piping potential under the rock.

D. Basin Inlets Channels - Inlet channels 1 and 2 were assumed to each carry one-half of the 100 year, 2250 cfs flow. Channel slope of 0.009 ft/ft is maintained. The outside transition curves are protected with rock riprap. Channel 3 will carry the approximate bankfull flow of 30 cfs.

E. Basin Outlet Structure - A 24 inch dia. R/C, ASTM C76, pipe with concrete box inlet was selected for the basin outlet to provide long life and access for maintenance. Hydraulic capacity did not control the design. Flow will be

essentially non-pressure. The conduit is placed on a 0.022 ft/ft grade, providing for flushing of sediment in the pipe.

The box crest is at EL 1293.0 and the basin invert is at EL 1291.0. Drainage below EL 1293.0 is provided though 4" PVC perforated drains placed in a berm of drain fill and rock riprap as shown on the drawings. The basin outlet is located in the SW corner of the basin away from likely heavier sediment deposition. The pipe outlets into the RWCD channel in grouted rock riprap.

F. Entrance - The temporary rock riprap floodway entrance is essentially the same design as proposed for RWCD Reach 2, modified to provide smooth transition from the existing flood channel alignment.

Structural Design

A. Rock and Grouted Rock: The rock sections and thicknesses used are consistent with those used on RWCD Floodway Reach 2: The gradations are identical to those used on Reach 2.

B. Dip Crossing: Dip crossing details are adapted directly from Reach 1 and Reach 2 crossings.

C. Basin Outlet Box: Temperature steel provides sufficient reinforcement.

Construction

Considerations During Construction:

1. Spoil Disposal: The area between the sediment basin and the dip crossing and between the RWCD Floodway and RWCD canal will be filled with spoil to the minimum elevations shown on the drawings. Additional spoil may be placed in these locations at the direction of the Engineer.

2. Floodway Channel: The project engineer will need to verify that the material in the excavated floodway is the erosion resistant material indicated on soil logs and that no compacted earth lining is needed.

Specifications:

Specifications were adapted from those prepared for the Reach 2 contract. Bid items are numbered following the Reach 2 sequence. Dip crossing items were added to Schedule 2, the remainder to schedule 1.

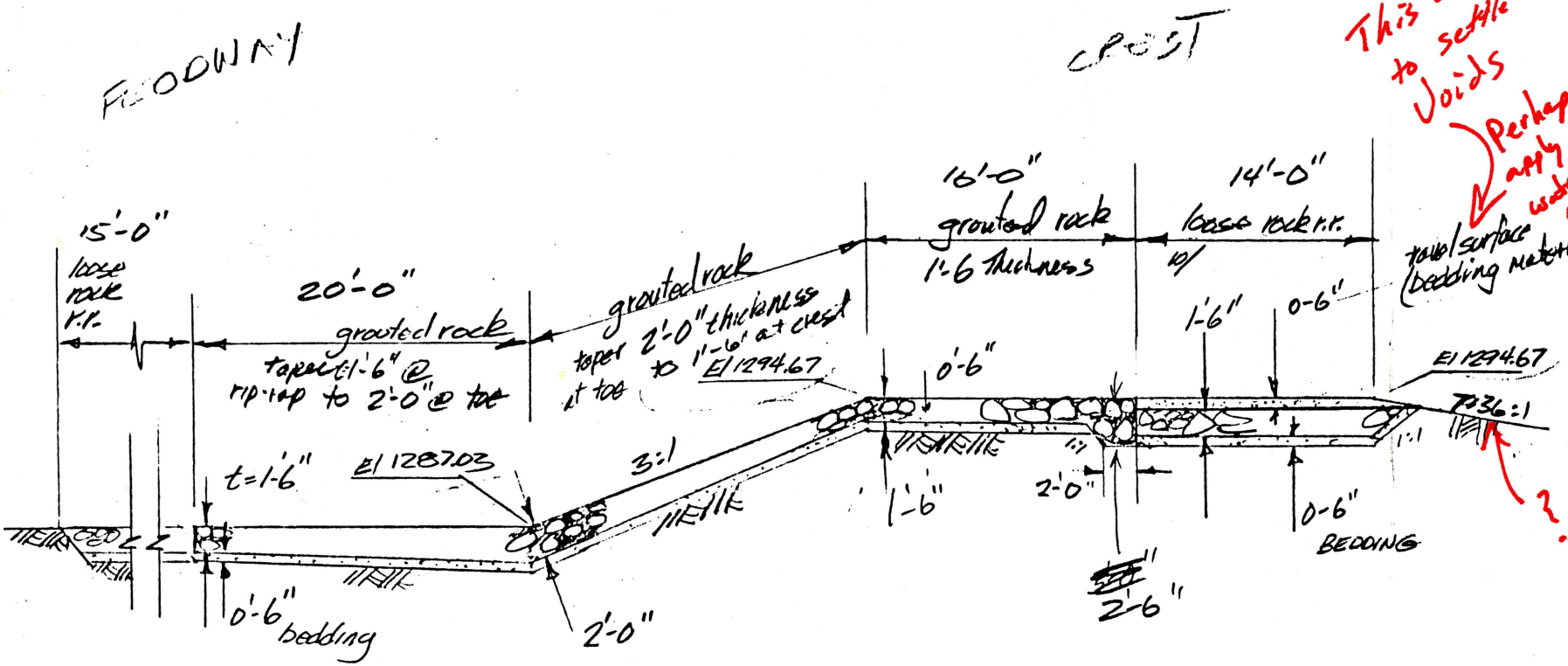
David D Zachary
Submitted

Edward M Beale
Recommended

Edward M Beale
Approved

4-15-83
Date

Acting for DEW



SECTION ON ℄ SIDE INLET RWCD STA 980+75

(LOOKING UPSTREAM)

REVERSE F.F

RWCD REACH 2 EXT

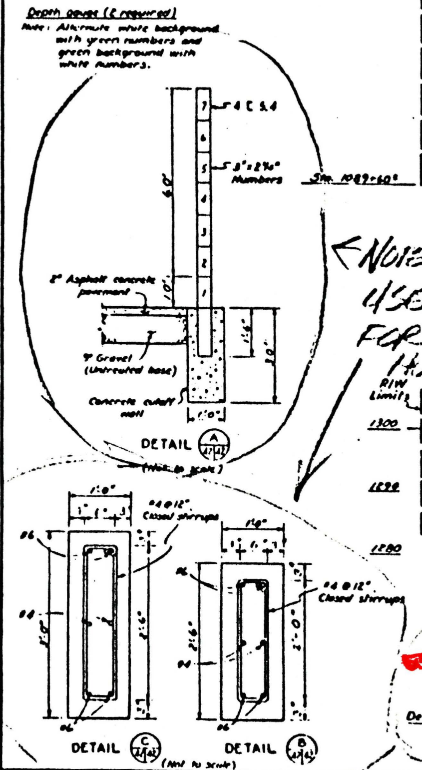
ABIZ. D.T. 3/29/83

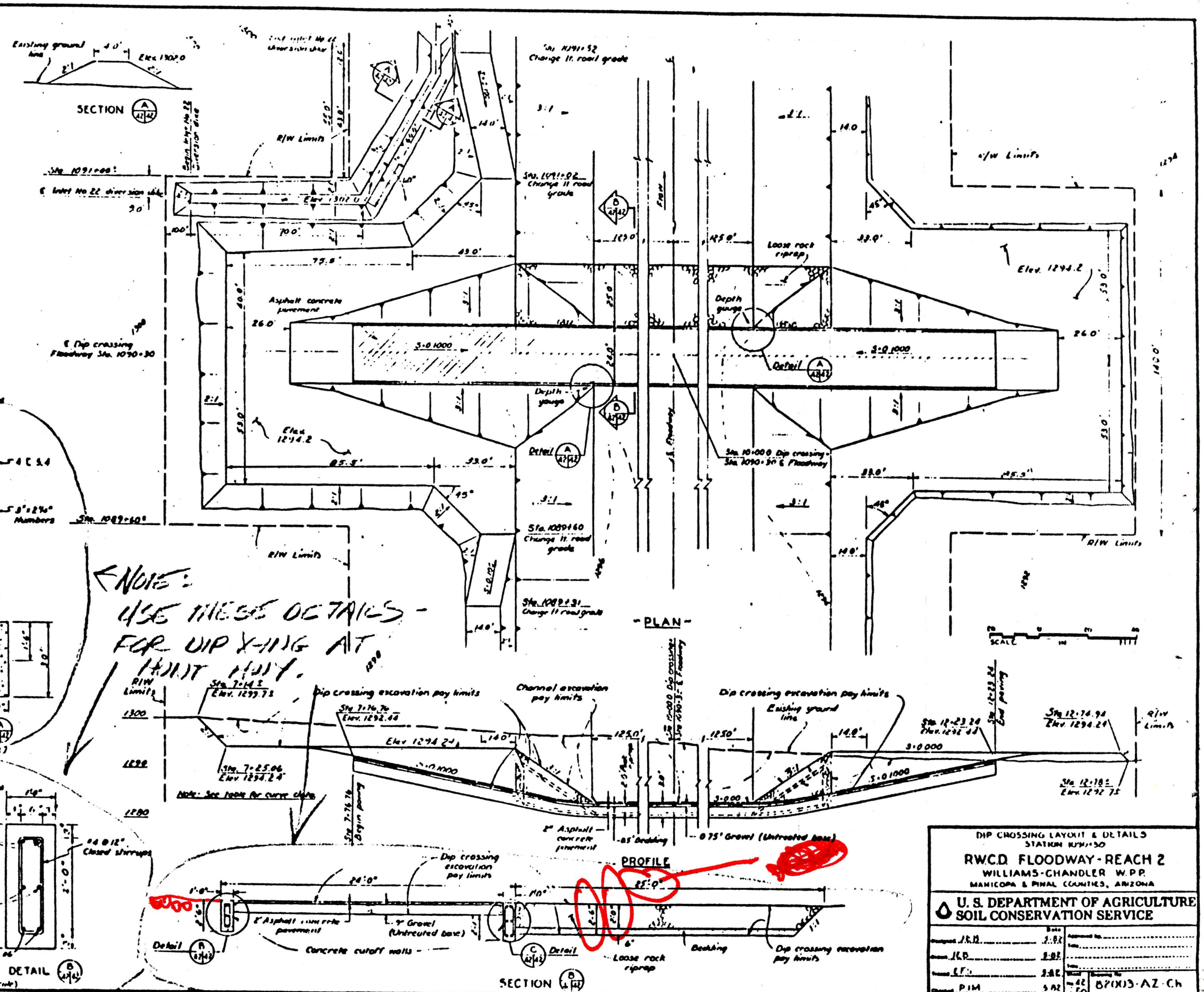
1/16

APR 01 1983

Subject to Revision

DIP CROSSING STATION	ELEVATION
7+25.06	1294.24
7+51.06	1294.24
7+53.56	1294.23
7+58.56	1294.11
7+63.56	1293.88
7+68.56	1293.53
7+72.50	1293.17
7+76.76	1292.44
8+00.00	1290.42
8+50.00	1285.42
8+56.06	1284.82
8+60.00	1284.45
8+65.00	1284.10
8+70.00	1283.87
8+75.00	1283.76
8+77.50	1283.74
10+00.00	1283.74
11+22.50	1283.74
11+25.00	1283.76
11+30.00	1283.87
11+35.00	1284.10
11+40.00	1284.45
11+43.94	1284.81
11+50.00	1285.42
12+00.00	1290.42
12+23.24	1292.44
12+27.50	1293.17
12+31.44	1293.53
12+36.44	1293.88
12+41.44	1294.11
12+46.44	1294.23
12+48.94	1294.24
12+74.94	1294.24



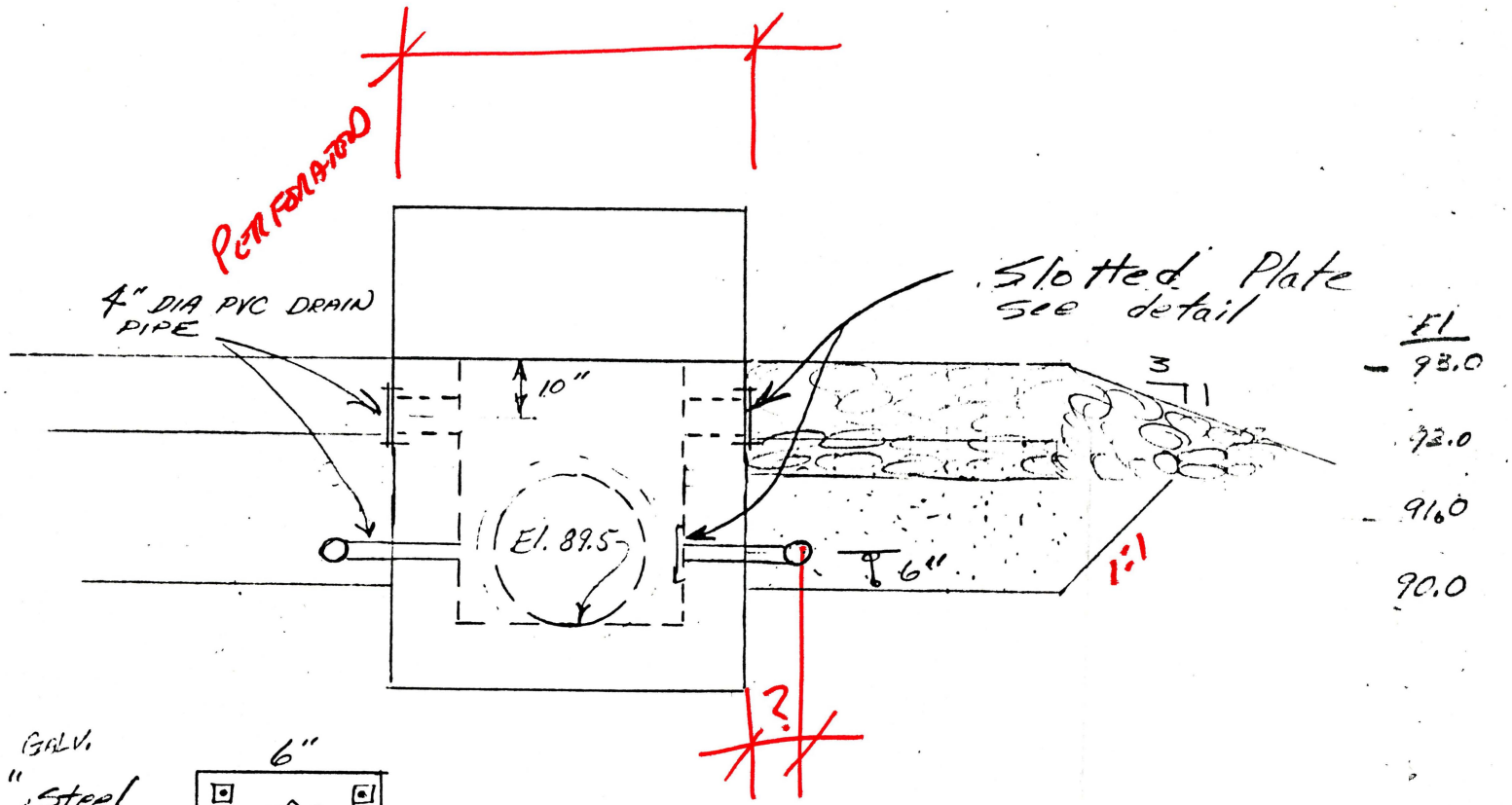


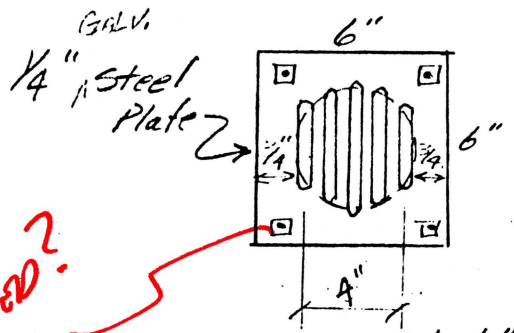
DIP CROSSING LAYOUT & DETAILS
STATION 1090+30

RWCD FLOODWAY-REACH 2
WILLIAMS-CHANDLER W.P.P.
MARICOPA & PINAL COUNTIES, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

87(X)3-AZ-Ch





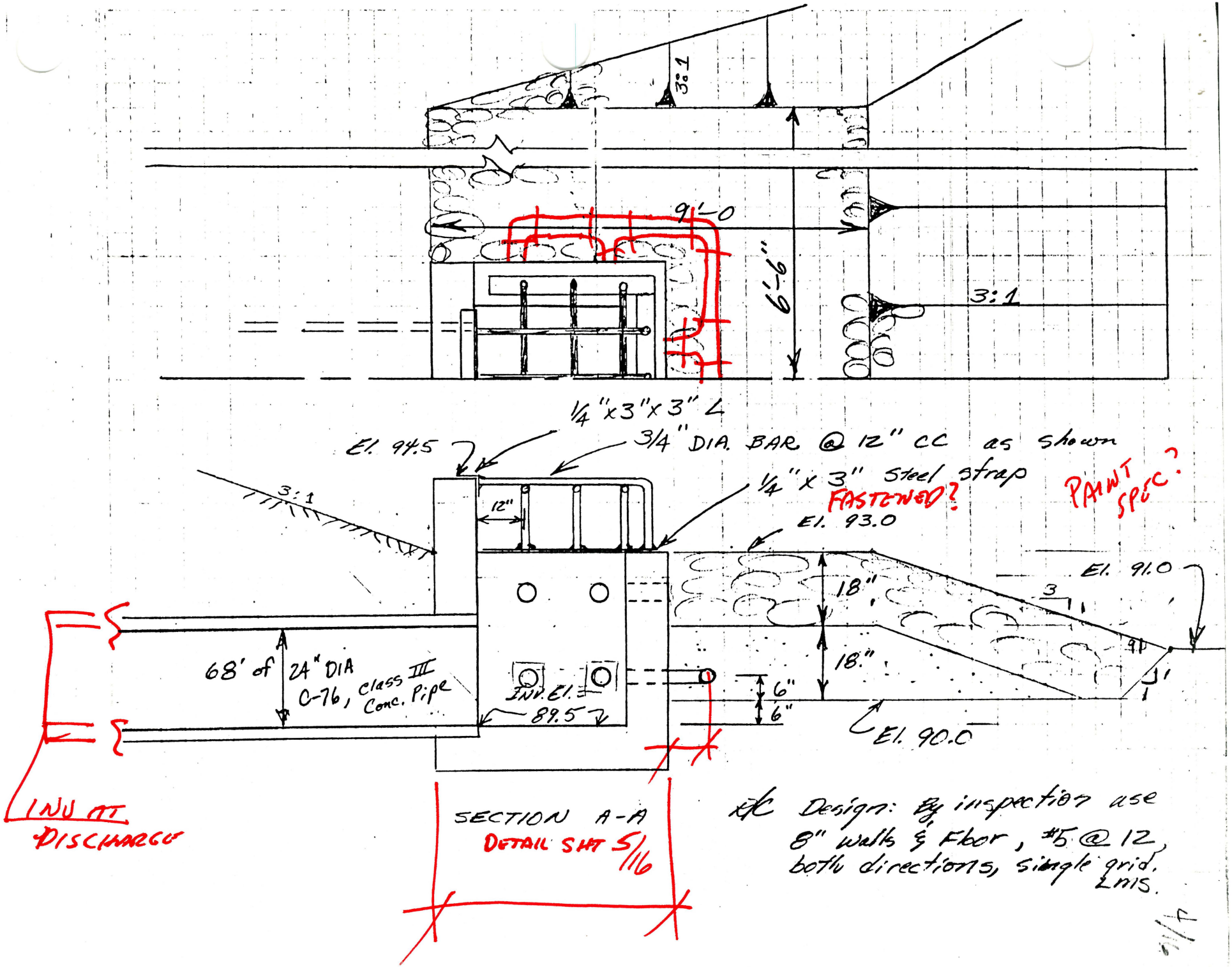
5 slots, ½" wide
DRAIN Cover Plate
or
Manufactured equil.
as approved by Eng.
12 required

⇒ Rock riprap
Gradation used for Reach 2
is satisfactory $D_{100} \leq 15"$

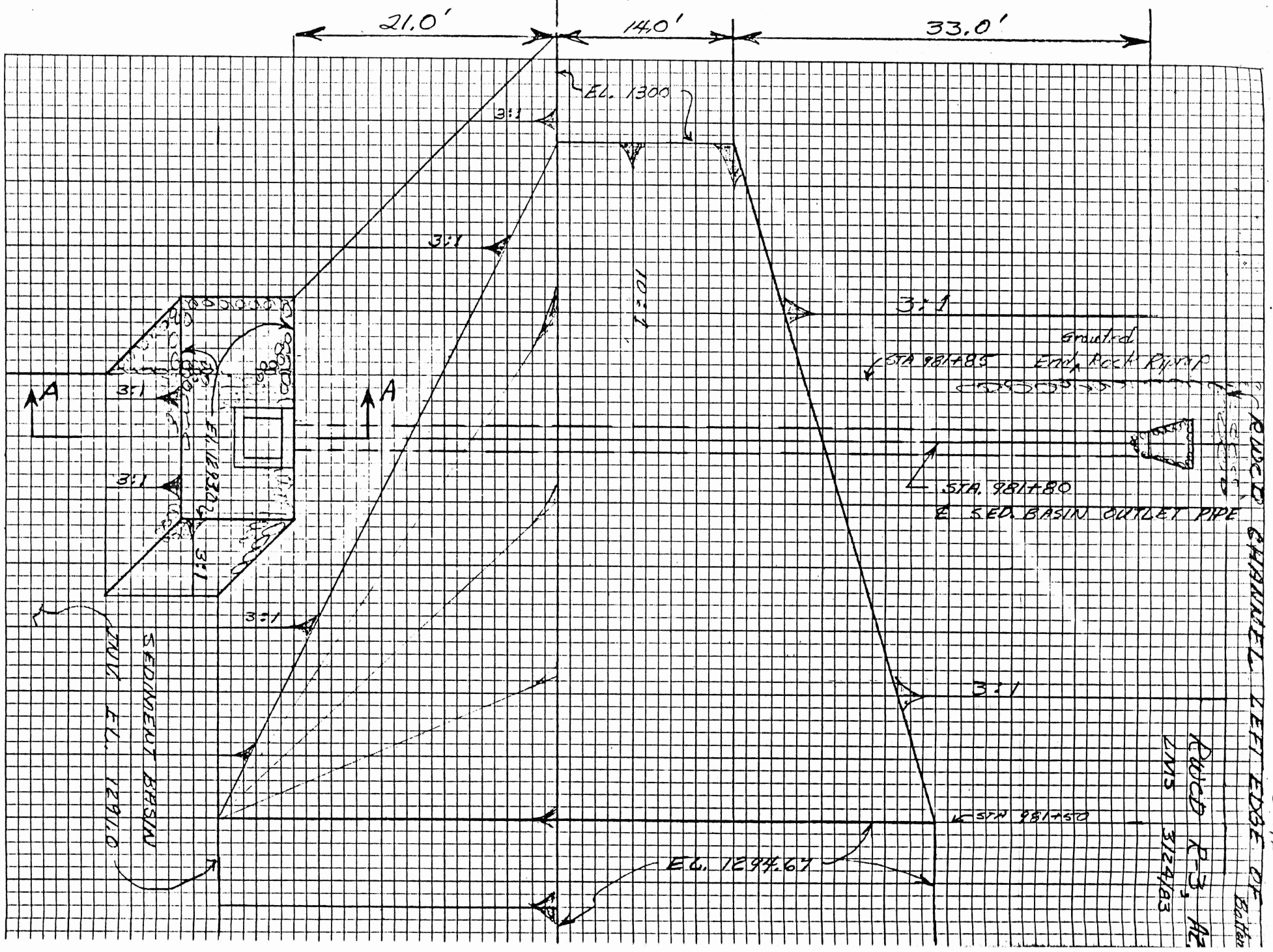
Rock riprap bedding (Reach 2)
D_{10} = #60 — #140 .25mm — 0.1mm
Could have low perm rate

⇒ Use Drain Fill Gradation (R-2 Spec.)
$D_{85} \geq 7.5$ mm
D_{10} 0.85 — 1.3 mm

3


3:1
9'-0
6'-6"
3:1
1/4"x3"x3" ∠
El. 94.5
3/4" DIA. BAR @ 12" CC as shown
1/4" x 3" Steel strap
FASTENED?
PAINT SPEC?
3:1
12"
El. 93.0
El. 91.0
18"
3
18."
68' of 24" DIA C-76, Class III Conc. Pipe
INV. El. 89.5
6"
6"
El. 90.0
INLET
DISCHARGE
SECTION A-A
DETAIL SHT S/16
Design: By inspection use 8" walls & floor, #5 @ 12, both directions, single grid. 2 mts.

46 0862



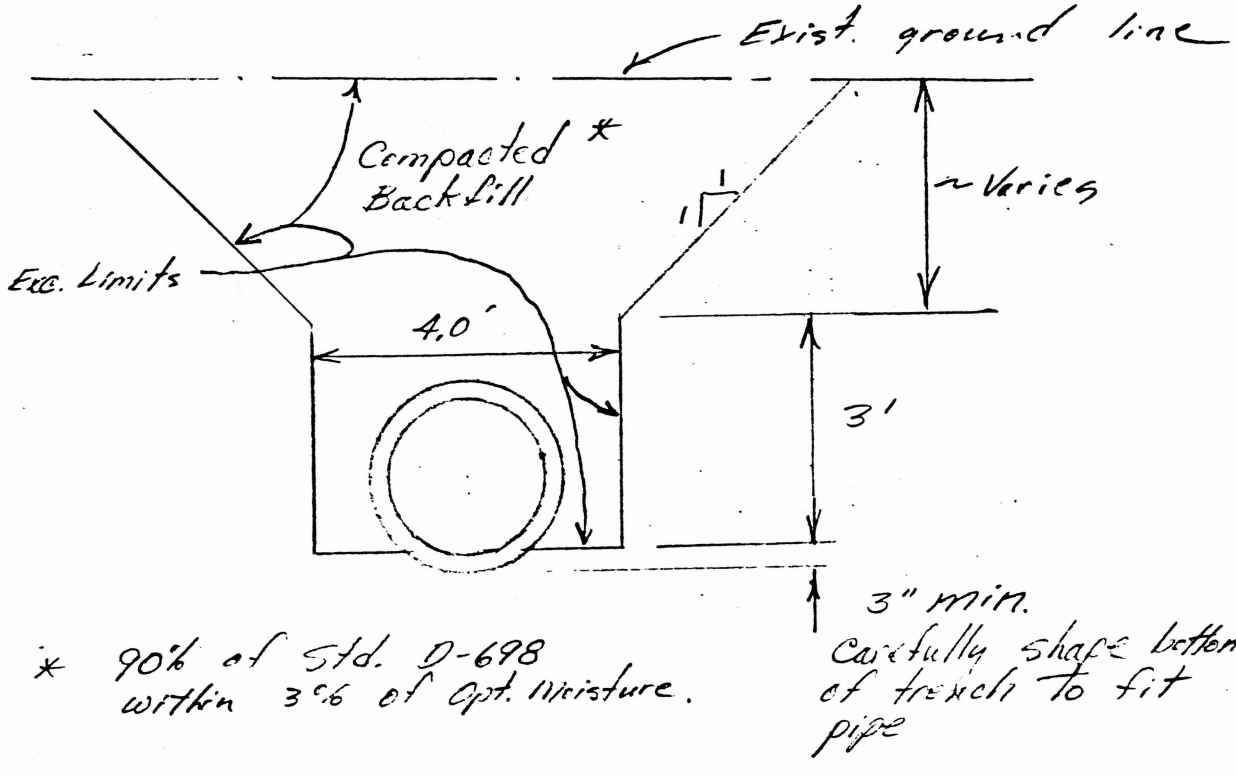
6/16

AZ. RWCD R-2 Ext.

LMS 3/83

Side Inlet STA. 981+80 (Sediment Basin outlet)

Pipe trench excavation

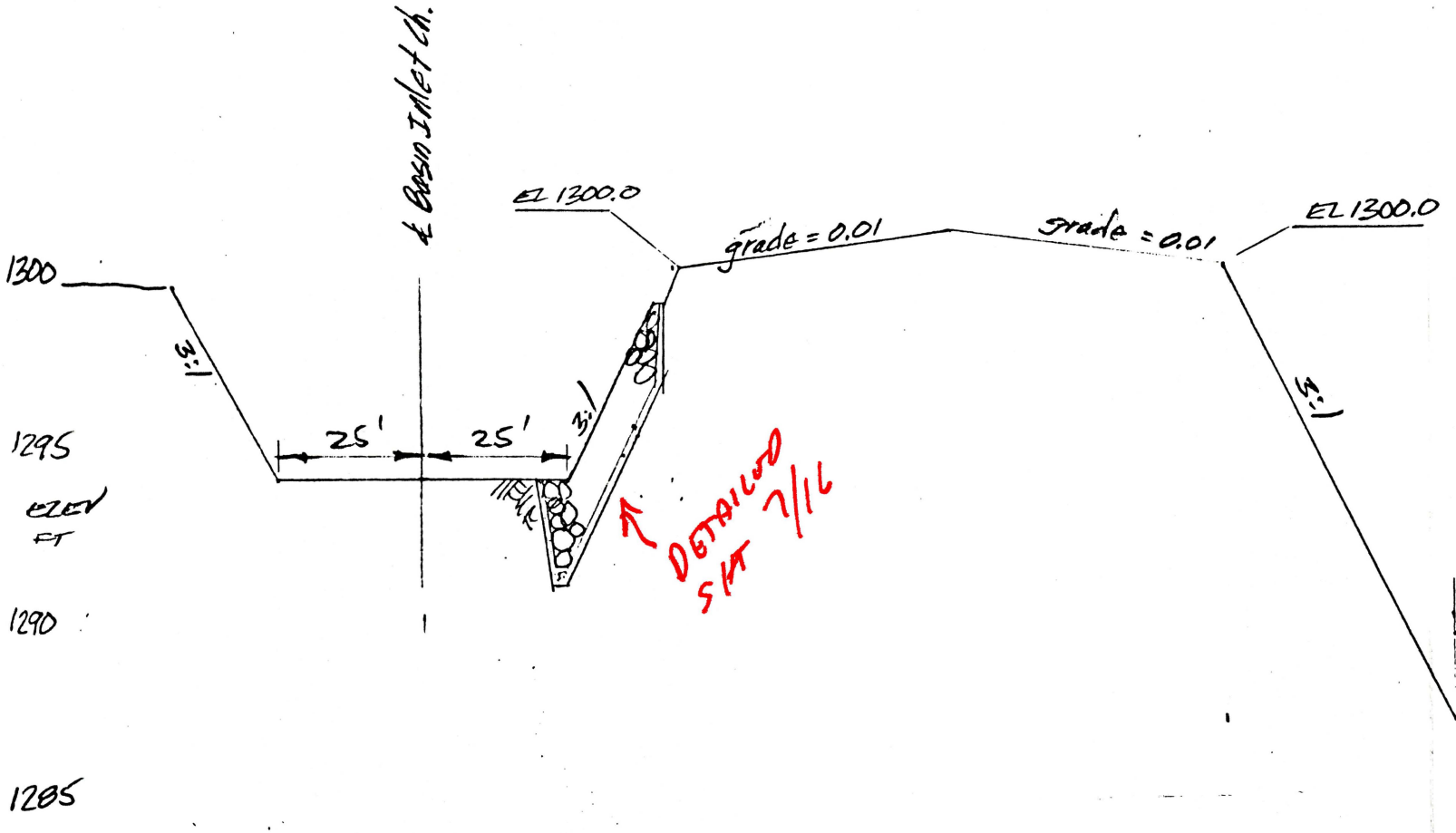


* 90% of Std. D-698 within 3% of Opt. Moisture.

Pipe: R/C C-76, Class III, Wall A or B

68' required.

Form grouted rock basin at outlet of pipe.



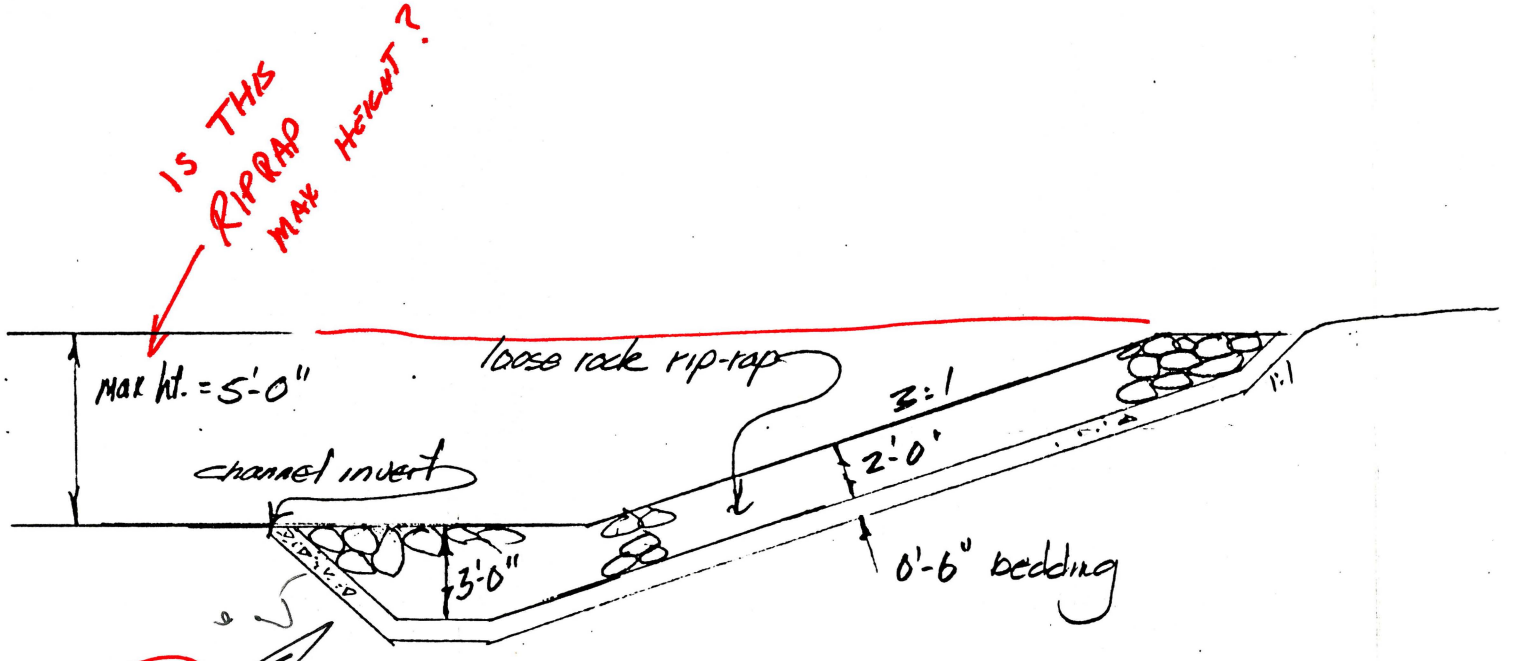
SECTION LOOKING DOWNSTREAM

STA 9+40 BASIN INLET = STA 978+58.3 RWCD FWY

E-E

7/16

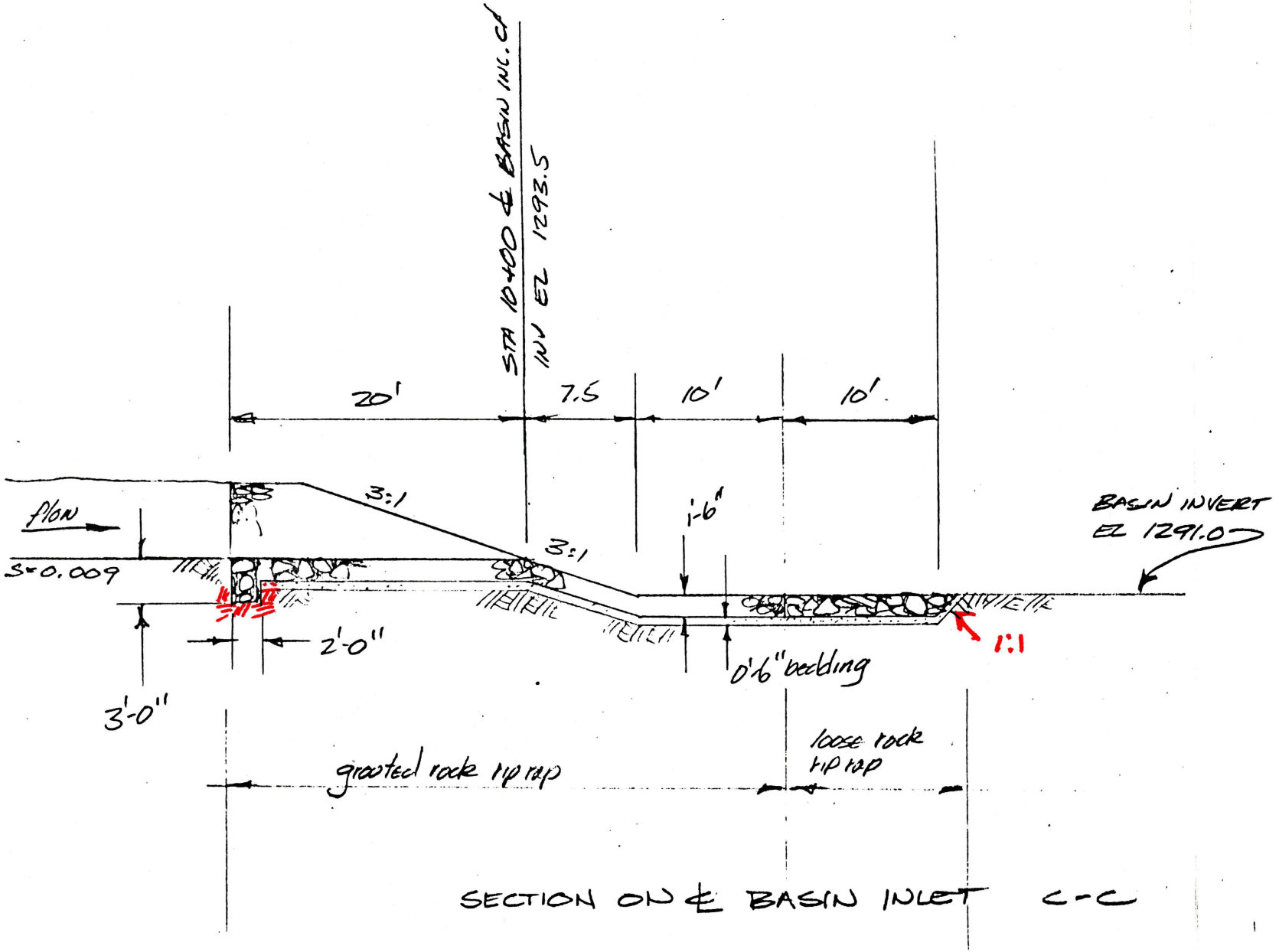
AR12
D.T.
3/29/83
RWCD REACH 2 EXT.



TYPICAL SECTION
ROCK RIP-RAP SED BASIN INLET CH.

A-A

9/16



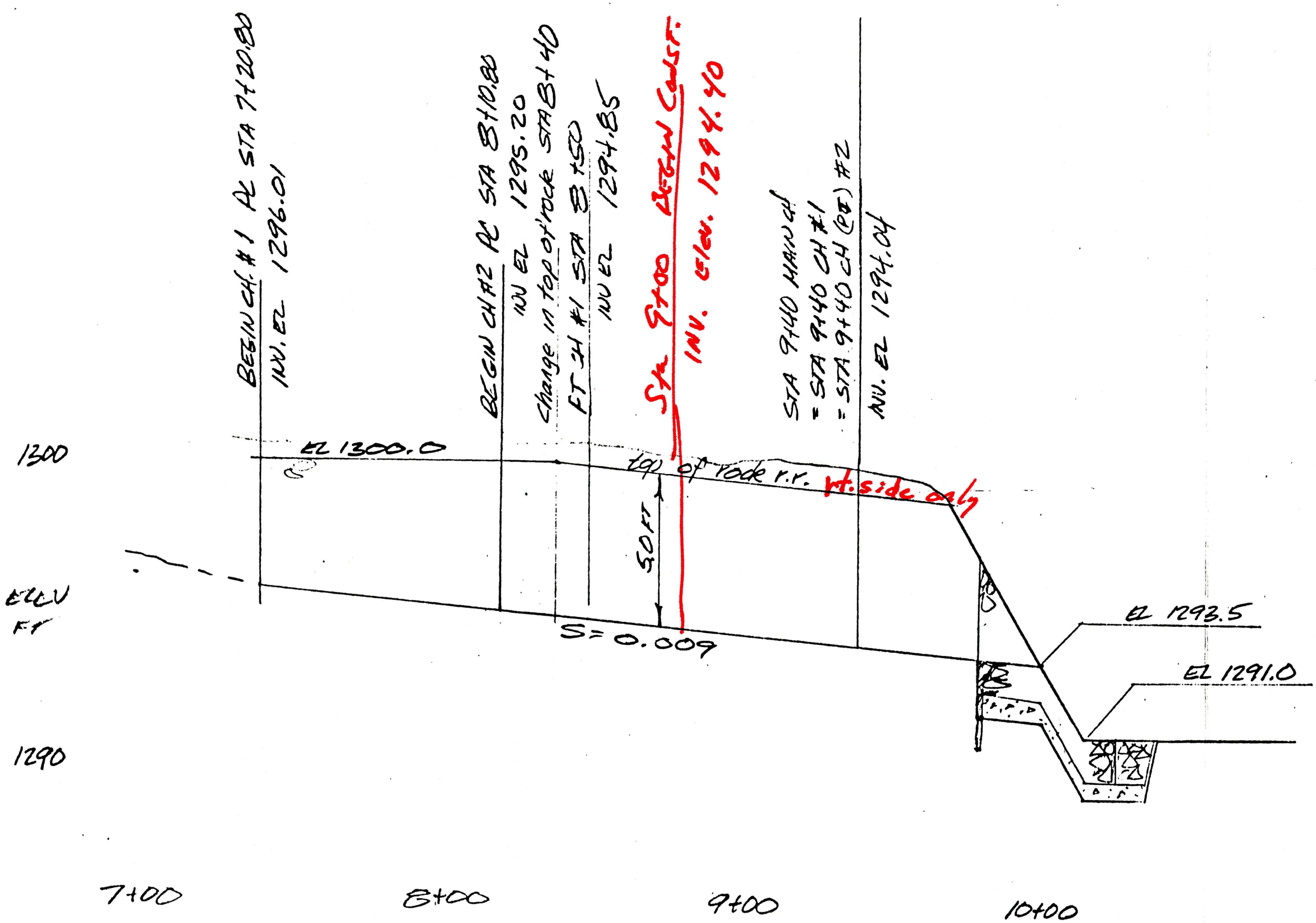
SECTION ON ℄ BASIN INLET C-C

ARIZ.
D.T.
3/29/83
RWCD REACH B EXT
9/15

ARIZ.
D.T.

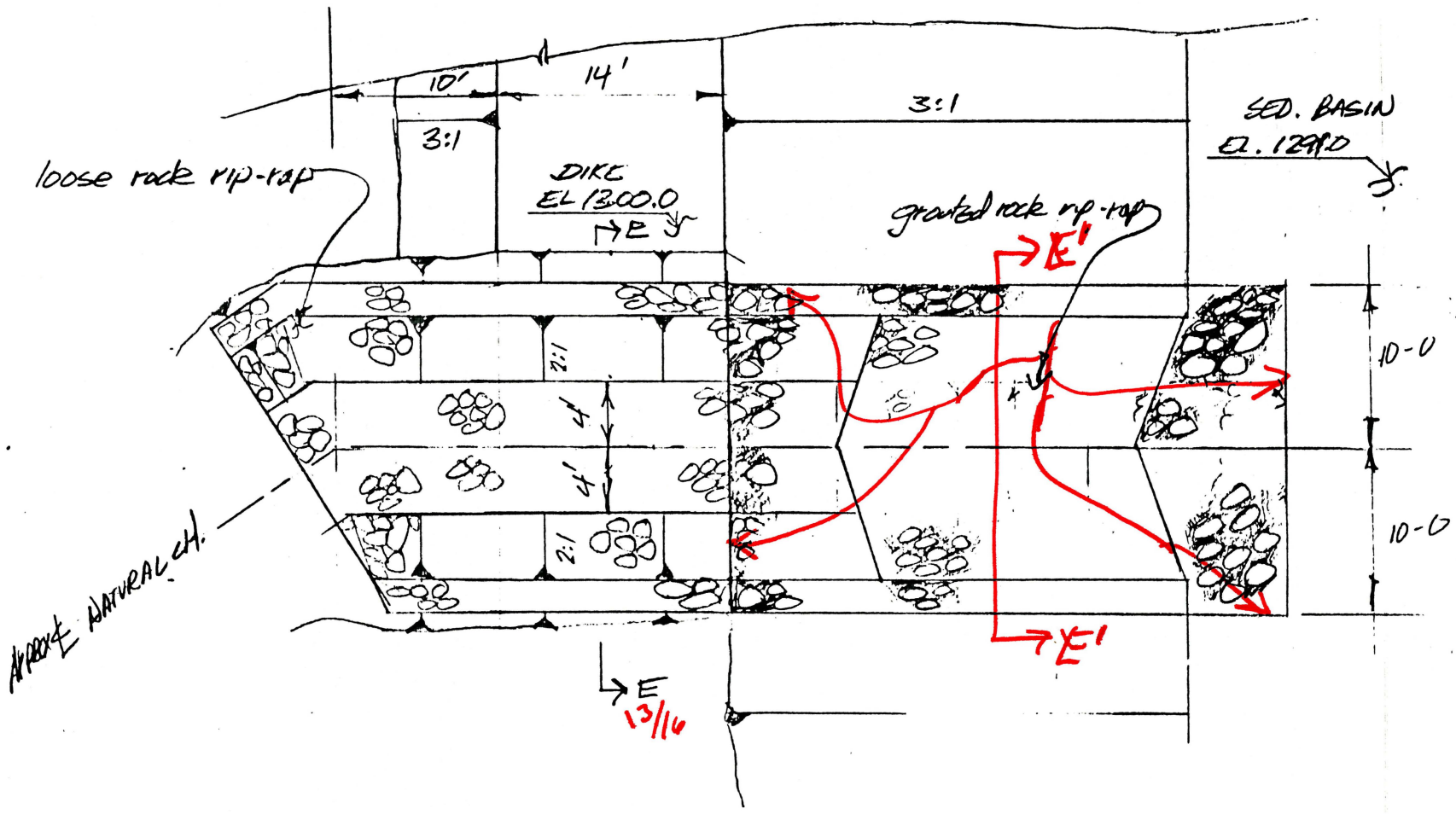
3/29/83

RWCD REACH 2 EXT.



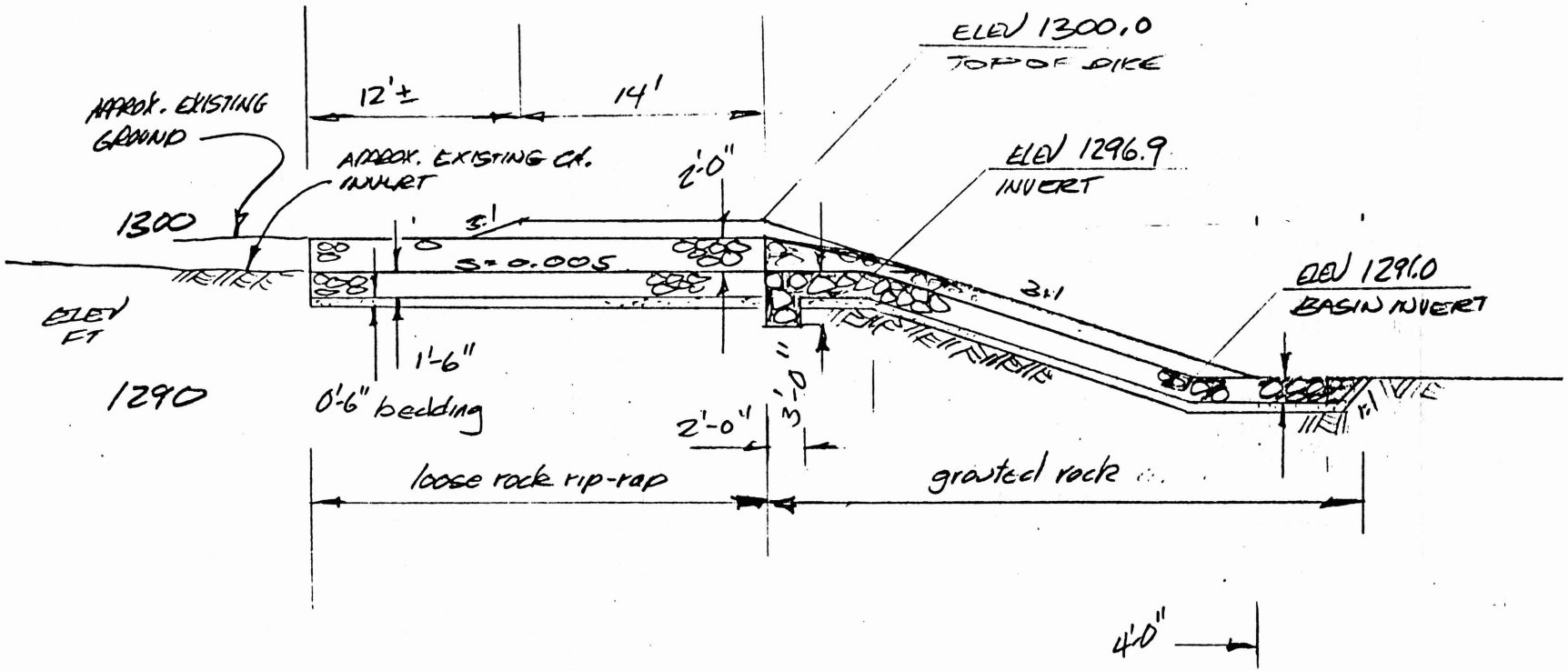
PROFILE ON ℄ SED. BASIN INLET CH.
MAIN CH, CH #1, CH #2

10/16



PLAN SIDE INLET CHANNEL #3

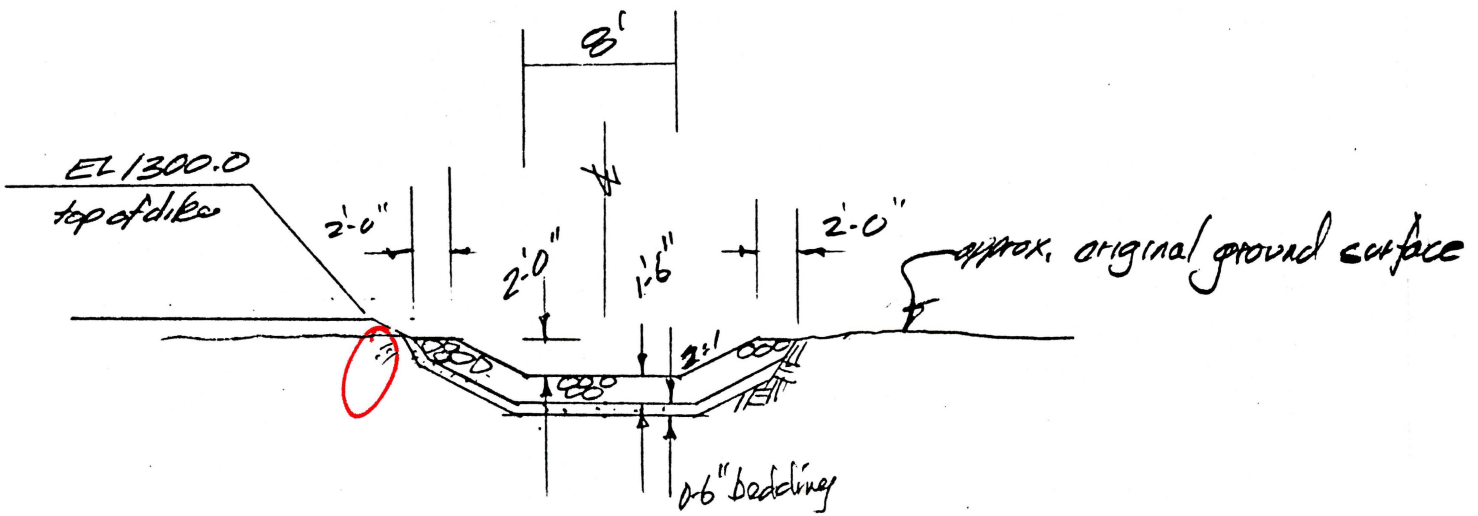
ARIZONA D.O.T. 3/29/83 BWCD EXHIBIT 11/16



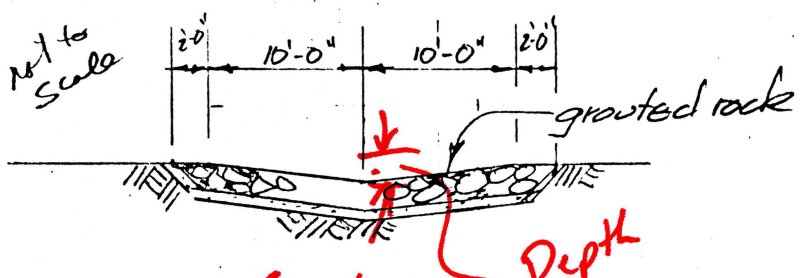
PROFILE ON ℄ CHANNEL #3 INLET TO BASIN

D-D

AR12
D.T.
3/30/93
RWCD DETAILS EXT
12/15



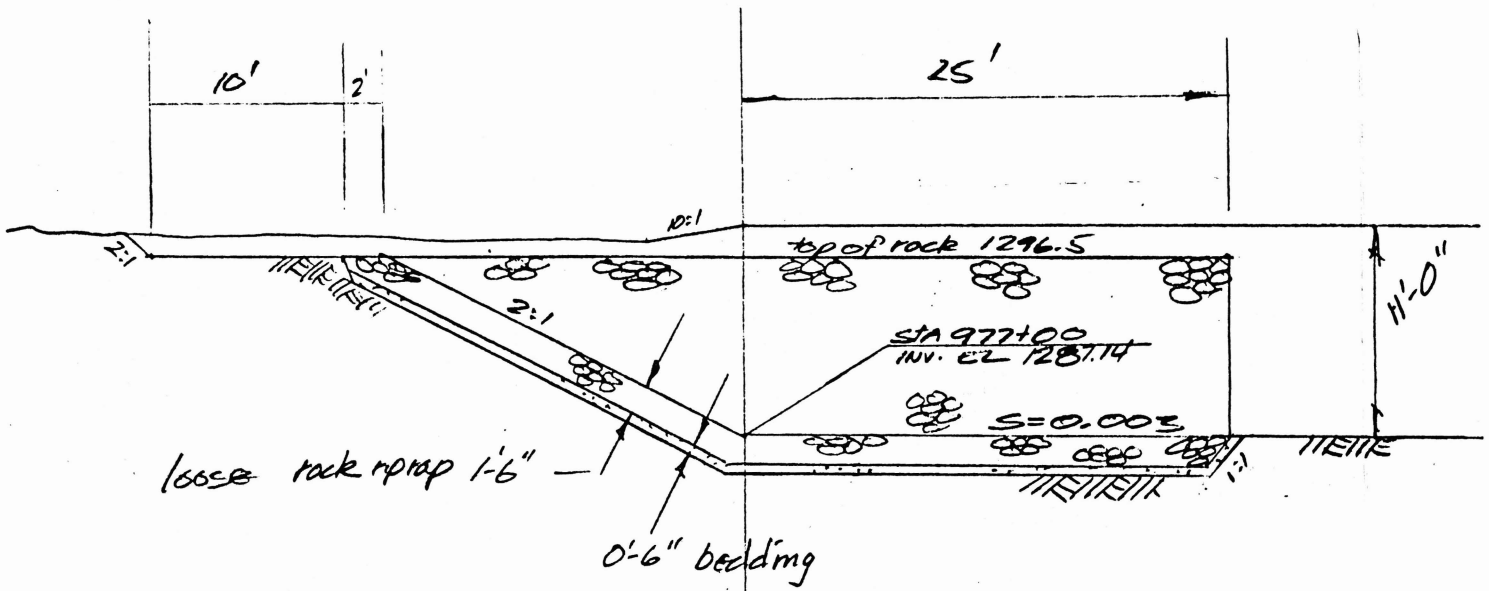
SECTION EE ON ℄ SIDE INLET CH #3



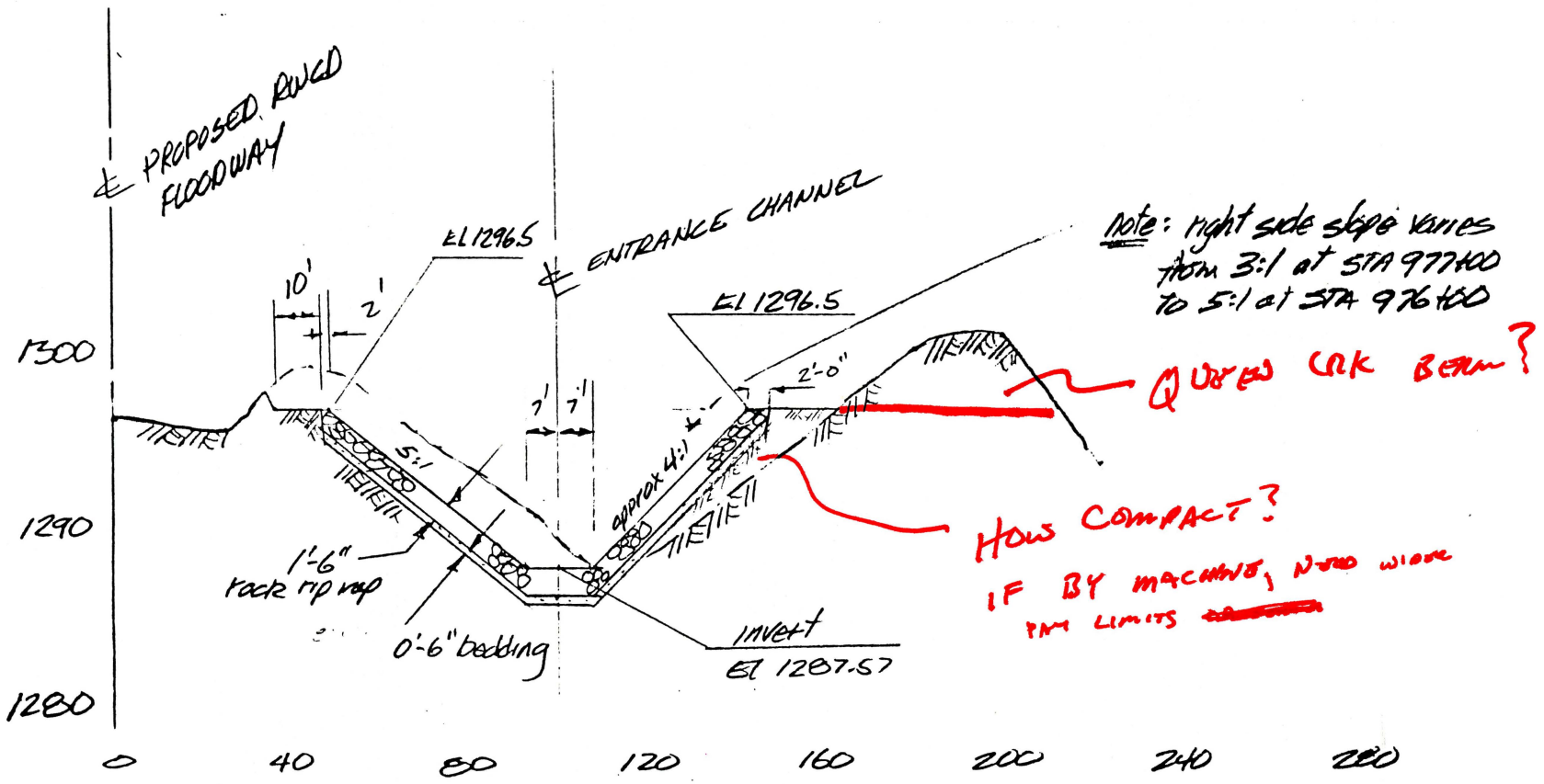
SECTION ~~E1-E1'~~ ON ℄ SIDE INLET CH. #3

LOOKING DOWNSTREAM

AR12.
D.T.
3/30/
RWCD REACH 2 EXT.
13/16



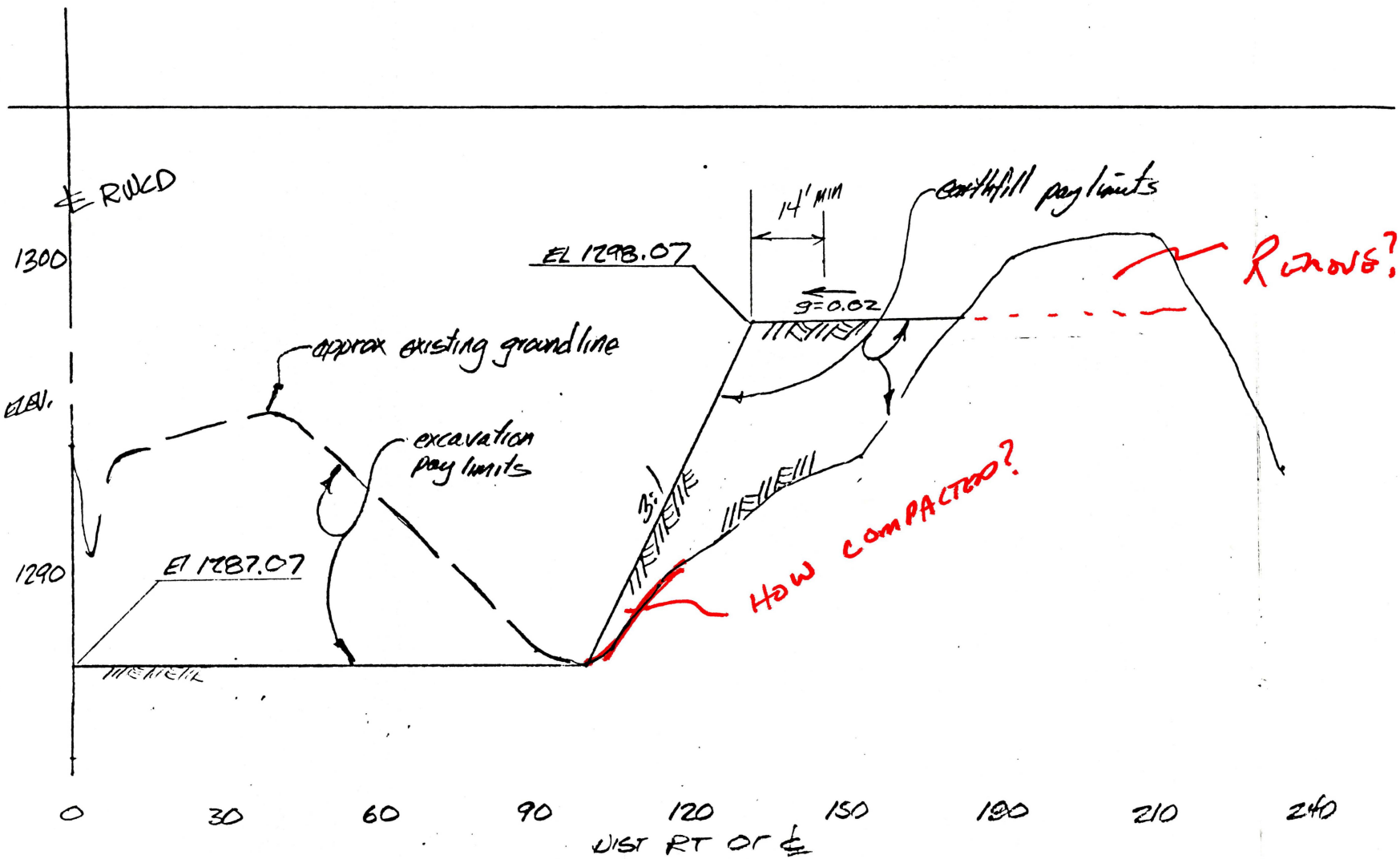
SECTION K-K RWCD ENTRANCE CHANNEL



SECTION J-J RWCD ENTRANCE CHANNEL - RWCD STA 976+50

LOOKING DOWNSTREAM

ARIZONA D.T. 3/30/93 RWCD REACH 2 EXT 15/16



SECTION G1 STA 979+17 LOOKING DOWNSTREAM

RWCD RETAIN EX.

O. Thackeray 3/30/83

16 1110

BID SCHEDULE NO. 1
WILLIAMS-CHANDLER, WPP, ARIZONA
RWCD FLOODWAY - REACH 2 EXTENSION

Item	Work or Material	Spec. No.	Quantity	Unit	Unit Price	Amount
28	Clearing and Grubbing	2	7	Acres	$650.00	$ 4,550.00
29	Water	10	XXXX	L.S.	$XXXXXX	$ 13,812.50
30	Channel Excavation, Common	21	28,000	C.Y.	$ 1.90	$ 53,200.00
31	Basin Excavation, Common	21	14,510	C.Y.	$ 2.15	$ 31,196.50
32	Structure Excavation, Common	21	2,332	C.Y.	$ 3.00	$ 6,996.00
33	Structure Backfill	23	31	C.Y.	$ 5.00	$ 155.00
34	Earth Fill	23	5,547	C.Y.	$ 0.60	$ 3,328.20
35	Drain Fill	24	9	C.Y.	$ 20.00	$ 180.00
36	24-Inch Diameter Reinforced Concrete Pipe, Class III	42	64	L.F.	$ 72.00	$ 4,608.00
37	Loose Rock Riprap	61	1,664	C.Y.	$ 18.00	$ 29,952.00
38	Grouted Rock Riprap	62	1,314	C.Y.	$ 40.00	$ 52,560.00
39	Surveys	8	XXXX	L.S.	$XXXXXX	$ 7,500.00
				SUBTOTAL		$208,038.20

BID SCHEDULE NO. 1
WILLIAMS-CHANDLER, WPP, ARIZONA
RWCD FLOODWAY - REACH 2 EXTENSION

Item	Work or Material	Spec. No.	Quantity	Unit	Unit Price	Amount
28	Clearing and Grubbing	2	7	Acres	$650.00	$ 4,550.00
29	Water	10	XXXX	L.S.	$XXXXXX	$ 13,812.50
30	Channel Excavation, Common	21	28,000	C.Y.	$ 1.90	$ 53,200.00
31	Basin Excavation, Common	21	14,510	C.Y.	$ 2.15	$ 31,196.50
32	Structure Excavation, Common	21	2,332	C.Y.	$ 3.00	$ 6,996.00
33	Structure Backfill	23	31	C.Y.	$ 5.00	$ 155.00
34	Earth Fill	23	5,547	C.Y.	$ 0.60	$ 3,328.20
35	Drain Fill	24	9	C.Y.	$ 20.00	$ 180.00
36	24-Inch Diameter Reinforced Concrete Pipe, Class III	42	64	L.F.	$ 72.00	$ 4,608.00
37	Loose Rock Riprap	61	1,664	C.Y.	$ 18.00	$ 29,952.00
38	Grouted Rock Riprap	62	1,314	C.Y.	$ 40.00	$ 52,560.00
39	Surveys	8	XXXX	L.S.	$XXXXXX	$ 7,500.00
				SUBTOTAL		$208,038.20

BID SCHEDULE NO. 2
WILLIAMS-CHANDLER, WPP, ARIZONA
RWCD FLOODWAY - REACH 2 EXTENSION
DIP CROSSING

Item	Work or Material	Spec. No.	Quantity	Unit	Unit Price	Amount
17	Dip Crossing Excavation, Common	21	951	C.Y.	$ 2.15	$ 2,044.65
18	Structure Excavation, Common	21	427	C.Y.	$ 3.00	$ 1,281.00
19	Structure Backfill, Common	23	72	C.Y.	$ 5.00	$ 360.00
20	Concrete, Class 4000X, Common	31	98	C.Y.	$100.00	$ 9,800.00
21	Cement	31	147	Bbls.	$ 20.00	$ 2,940.00
22	Steel Reinforcement	34	10,100	Lbs.	$ 0.50	$ 5,050.00
23	Loose Rock Riprap	61	760	C.Y.	$ 18.00	$ 13,680.00
24	Asphalt Concrete Pavement	400	1,076	S.Y.	$ 10.00	$ 10,760.00
				SUBTOTAL SCHEDULE NO. 1		$208,038.20
				SUBTOTAL SCHEDULE NO. 2		$ 45,915.65
				TOTAL		$253,953.85

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 ~~25~~ 28, Clearing and Grubbing

(1) This item shall consist of clearing and grubbing of all areas shown on the drawings and staked in the field.

(2) If waste materials are disposed of by burying, ~~they shall be buried a minimum of 18 inches below the existing ground surface in the waste disposal areas shown on the drawings. When disposal is complete, the waste disposal areas shall be smoothed and graded to blend into the surrounding terrain.~~ they shall meet requirements specified in Contract Modification No. 2.

(3) If materials removed from the cleared and grubbed area are to be burned, burning must be carried out in accordance with Pinal County Health Department regulations.

(4) Measurement and payment will be by Method 1, and will include compensation for Subsidiary Item, Structure Removal.

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, Structure Removal

(1) This item shall consist of the removal and disposal of the 30 inch concrete pipe, including headwalls at station 978+50± and the masonery retaining wall at station 980+20±, 340 feet right of centerline.

(2) In Section 2, Marking, Method 2 shall apply.

(3) In Section 3, Removal, Method 2 shall apply.

(4) No separate payment will be made for this item. Compensation for this work will be included in the payment for Bid Item 28, 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. Bid Item ~~26~~ 29, Water

(1) This item shall consist of furnishing and applying all water necessary for performance of the work described.

~~(2) Water may be obtained from the Roosevelt Water Conservation District Higley, Arizona (Grant Ward Telephone 963-3414).~~

~~(3) Measurement and payment shall be in accordance with Section 6.~~

(2) The work will not be measured, payment will be lump sum and progress payments will be based on percentage of work completed.

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, Removal of Water

(1) This item shall consist of the removal of surface and ground water from the construction area shown on the drawings.

(2) No advance plan of dewatering will be required.

(3) No separate payment will be made for the removal of water. Compensation for this work will be included in the payment for Bid Items ~~27~~, ~~28~~, ~~29~~, ~~30~~, and ~~31~~. 30, 31, 32, 33, and 34

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, Removal of Water

(1) This item shall consist of the removal of surface and ground water from the construction area shown on the drawings.

(2) No advance plan of dewatering will be required.

(3) No separate payment will be made for the removal of water. Compensation for this work will be included in the payment for Bid Items ~~11~~, ~~12~~, ~~13~~, ~~14~~, and ~~17~~. 17, 18, 19, 20, 23

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 ~~27~~ 30, Earth Channel Excavation, Common

(1) This item shall consist of all excavation required to construct:

(a) The floodway, including entrance channel, between Stations 976+00± and ~~982+50±~~ 982+00±, as shown on the drawings.

(b) Stripping of the top 6 inches below original ground surface on surfaces where earth fill is to be placed in construction of the floodway.

(2) In Section 5, Use of Excavated Material, Method 1 shall apply. Suitable materials resulting from this excavation and not required for Bid Item ~~30~~ 33, Structure Backfill, and Bid Item ~~31~~ 34, Earth Fill, will be spoiled in the areas shown on the drawings. in addition requirement of Contract Modification for the top 3ft apply.

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

(4) Measurement and payment will be by Method 2, and will include compensation for Subsidiary Item, Removal of Water, and Subsidiary Item, Spoil Disposal.

b. Bid Item ~~28~~ 31, Basin Excavation, Common

(1) This item shall consist of all excavation required for construction of the Sediment Basin and basin inlet channel as shown on the drawings, including stripping of the top 6 inches below original ground surface on surfaces where earth fill is to be placed in construction of the basin or basin inlet channels.

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

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

(4) Measurement and payment will be by Method 2.

c. Bid Item ~~29~~ 32, Structure Excavation, Common

(1) This item shall consist of all excavation required for the installation of the sediment basin outlet structure and pipe, the side inlet at RWCD STA 980+75, the basin inlet structure and side inlet structure for channel #3, as 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.

(4) Measurement and payment will be by Method 1, and will include compensation for Subsidiary Item, Removal of Water.

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 ~~11~~ 17, Dip Crossing Excavation, Common

(1) This item shall consist of all excavation between Station 976+75± and Station 981+00±, centerline Floodway, in excess of specified channel excavation required to construct the Dip Crossing, except structure excavation for the concrete cutoff walls, as shown on the drawings and staked in the field.

(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) Measurement and payment will be by Method 2 and will include compensation for Subsidiary Item, Removal of Water.

b. Bid Item ~~12~~ 18, Structure Excavation, Common

(1) This item shall consist of all excavation required to construct concrete cutoff walls for the Dip Crossing as shown on the drawings and staked in the field.

(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) Measurement and payment will be by Method 4 and will include compensation for Subsidiary Item, Removal of Water.

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 ~~30~~ 33, Structure Backfill

(1) This item shall consist of placing and compacting backfill around the sediment basin outlet pipe.

(2) Backfill material shall consist of suitable CL's, ML's, SC's and SM's (Unified Soil Classification System) obtained from the required excavation as approved by the Engineer. The material shall contain a minimum of 15 percent passing the #200 sieve when determined on a dryweight basis, in accordance with ASTM D 1140.

(3) 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 Method A, ASTM D 698 (Standard Proctor Test) or the Rapid Compaction Test (Test No. S-6) S.C.S. National Engineering Handbook, Section 19.

(4) The maximum size of rock fragments incorporated in the fill shall be three (3) inches.

(5) The maximum thickness of a layer before compaction shall be six (6) inches.

(6) The moisture content of the material incorporated in the fill shall be maintained within the range of three (3) percentage points below to one (1) percentage point above the optimum moisture content.

(7) Measurement and payment will be by Methods 4 and 7, and will include compensation for Subsidiary Item, Removal of Water. Deduction in volume will be made for embedded conduit and appurtenances.

b. Bid Item ~~31~~ 34, Earth Fill

(1) This item shall consist of placing and compacting all earth fill required to construct the floodway between Stations 976+00± and ~~982+50±~~ 982+66±, the sediment basin dikes, and fill adjacent to the basin inlet channel.

(2) Fill material shall consist of suitable CL's, ML's, SC's, and SM's (Unified Soil Classification System) obtained from the required excavation, as approved by the Engineer.

(3) 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) or Rapid Compaction. Test (Test No. S-6) S.C.S. National Engineering Handbook, Section 19.

(4) The maximum size of rock fragments incorporated in the fill shall be six (6) inches.

(5) The maximum thickness of a layer before compaction shall be nine (9) inches.

(6) The moisture content of the material incorporated in the fill shall be maintained within the range of three (3) percentage points below to one (1) percentage point above the optimum moisture content.

(7) Measurement and payment will be by Methods 1 and 7, and will include compensation for Subsidiary Item, Removal of Water.

c. Subsidiary Item, Spoil Disposal

(1) This item shall consist of placing or stockpiling all spoil in the spoil disposal areas, as shown on the drawings.

(2) Spoil material shall consist of all material resulting from the required excavations not needed to construct the floodway or basin dikes.

(3) Section 6, Compaction, does not apply to this item.

(4) Spoil material shall be placed in layers not to exceed two (2) feet in depth.

(5) The finished surface shall not vary more than one half (0.5) foot, plus or minus, from the average grade.

(6) Spoil shall be placed in the area between the dip crossing and the basin to the minimum elevation shown on the drawings, and in the area between the RWCD Flooding and the RWCD Canal as shown on the drawings. Excess spoil may be placed in these areas as directed by the engineer or shall, at the direction of the engineer, be placed in the spoil disposal areas shown on the RWCD Flooding Reach 2 drawings.

(7) Fill slopes resulting from the deposition of spoil in the disposal areas shown on the Reach 2 drawings shall not be steeper than 2:1 on the east and west sides and 4:1 on the north and south ends.

(8) No special moisture content of spoil material will be required.

(9) No separate payment will be made for spoil disposal. Compensation for this work will be included in the payment for Bid Item ~~27~~ 30, Channel Excavation, Common and Bid Item ~~28~~ 31, Basin Excavation, Common.

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 ~~13~~ 19, Structure Backfill

(1) This item shall consist of placing and compacting backfill around the concrete cutoff walls for the Dip Crossing, as shown on the drawings.

(2) Backfill material shall consist of suitable CL's, ML's, SC's and SM's (Unified Soil Classification System) obtained from the required excavation as approved by the Engineer. The material shall contain a minimum of 15 percent passing the #200 sieve when determined on a dry weight basis, in accordance with ASTM D 1140.

(3) 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), or Rapid Compaction Test (Test No. S-6) S.C.S. National Engineering Handbook, Section 19.

(4) The maximum size of rock fragments incorporated in the fill shall be three (3) inches.

(5) The maximum thickness of a layer before compaction shall be six (6) inches.

(6) The moisture content of the material incorporated in the fill shall be maintained within the range of three (3) percentage points below to one (1) percentage point above the optimum moisture content.

(7) Measurement and payment will be by Methods 4 and 7 and will include compensation for Subsidiary Item, Removal of Water.

b. Subsidiary Item, Spoil Disposal

(1) This shall consist of placing and smoothing all spoil placed in the spoil disposal areas.

(2) Spoil material shall consist of all material resulting from the required excavations not needed to construct the floodway and Dip Crossing.

(3) Section 6, Compaction, does not apply to this item.

(4) The maximum thickness of each layer before smoothing the surface shall not exceed two (2) feet.

(5) The finished surface shall not vary more than one-half (0.5) foot, plus or minus, from the average grade.

(6) Fill slopes resulting from the deposition of spoil in the disposal areas shown on the Reach 2 drawings shall not be steeper than 2:1 on the east and west sides and 4:1 on the north and south ends.

(7) Spoil shall be placed in the area between the dip crossing and the basin to the minimum elevations shown on the drawings and in the area between the RWCD canal and RWCD Floodway as shown on the drawings. Excess spoil may be placed in these areas as directed by the engineer or shall, at the direction of the engineer, be placed in the spoil disposal areas shown on the RWCD Floodway Reach 2 drawings.

(8) No special moisture content of spoil material will be required.

(9) No separate payment will be made for spoil disposal. Compensation for this work will be included in the payment for Bid Item ~~11~~ 17, Dip Crossing Excavation, Common.

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 ~~32~~ 35, Drain Fill

(1) This item shall consist of furnishing and placing the drain fill materials in the locations shown on the drawings.

(2) In Section 2, Materials, Method 1 shall apply.

(3) The gradation of the drain fill shall meet the following requirements:

Sieve Size	Percent Passing (Dry Weight Basis)
2"	100
1"	90 - 100
1/2"	80 - 98
3/8"	70 - 95
#4	40 ~~50~~ - 78
#10	12 - 44
#20	0 - 14
#30	0 - 9
#200	0 - 3

(4) Drain fill shall be placed in horizontal layers not to exceed 18 inches deep.

(5) In Section 6, Compaction, Class III shall apply.

(6) The moisture content shall be maintained in a range, as determined by the engineer, that will minimize segregation.

(7) The material passing the #200 sieve shall be non-plastic.

(8) Measurement and payment will be in accordance with Section 8.

26. 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, Concrete, Class 3000

(1) This item shall consist of furnishing, forming and placing all items required to construct the basin outlet structure.

(2) In Section 3, Classes of Concrete, and Section 5, Design of the Concrete Mix, Method 1 shall apply. Concrete shall be Class 3000.

(3) Coarse aggregate shall be size No. 67, in accordance with ASTM C 33.

(4) Cement shall be Type II or IIA.

(5) In Section 15, Construction Joints, Method 1 shall apply.

(6) In Section 18, Removal of Forms, Method 1 shall apply.

(7) Curing compound shall be Type 2 conforming to Material Specification 534 and ASTM C 309.

(8) No separate payment will be made for Class 3000 concrete. Compensation for this work will be included in the payment for Bid Item ~~33~~ 36, 24-inch Diameter Reinforced Concrete Pipe, Class III.

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 ~~5~~ 20, Concrete, Class 4000X

(1) This item shall consist of furnishing, forming and placing all concrete required to construct the Dip Crossing.

(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. 67, in accordance with ASTM C 33.

(4) In Section 15, Construction Joints, Method 1 shall apply.

(5) In Section 18, Removal of Forms, Method 1 shall apply.

(6) All exposed surfaces shall be finished in the following manner:

Upon patching and pointing all holes as directed in Section 19, the surface shall be promptle covered with polyethylene film, wet burlap or wet cotton mats. If polyethylene film is used, the film shall be help securely to the surface by means of weights, adhesive or other suitable means. only white polyethylene film for covering will be acceptable. When the mortar used in patching and pointing has set sufficiently, the surface shall be uncovered and thoroughly rubbed with either a float or a carborundum stone until the surface is covered with a lather. Cork, wood or rubber floats shall be used only on the surfaces sufficiently green to work up such lather; otherwise a thin grout composed of one (1) part cement and one (1) part of fine sand may be sued to facilitate producing a satisfactory lather; however, this grout shall not be used in quantities sufficient to cause a plaster coating to be left on the finished surface. A portion of the required cement for the grout shall be white, as required to match the color of the surrounding concrete. Rubbing shall continue until irregularities are removed and there is no excess material. At the time a light dust appears, the surface shall be brushed or sacked. Brushing or sacking shall be carried in one direction so as to produce a uniform texture.

(7) Curing compound shall be Type 2 conforming to Material Specification, ASTM C 309.

(8) Measurement and payment will be by Method 2 and will include compensation for Subsidiary Item, Cleaning and Painting Metal Work.

b. Bid Item ~~6~~ 21, Cement

(1) This item shall consist of furnishing and handling all cement required to construct the concrete items in Bid Item ~~14~~ 20.

(2) Cement shall be Type II or IIA.

(3) 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. Subsidiary Item, Steel Reinforcement

(1) This item shall consist of furnishing and installing all steel reinforcement required in the construction of the basin outlet structure.

(2) No separate payment will be made for steel reinforcement. Compensation for this work will be included in payment for Bid Item ~~33~~ 36, 24-inch Diameter Reinforced Concrete Pipe, Class III.

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 ~~16~~ 22, Steel Reinforcement

(1) This item shall consist of furnishing and installing all steel reinforcement required in the construction of reinforced concrete for the dip crossing.

(2) 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.

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 laid 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 construction details are:

a. Bid Item ~~33~~ 36, 24-inch Diamenter Reinforced Concrete Pipe, Class III

(1) This item shall consist of furnishing and installing all pipe for the basin outlet at RWCD Floodway STA 981+80+, as shown on the drawings.

(2) Pipe shall conform to the requirements of Material Specification 542 and ASTM C 76. The pipe shall be Class III.

(3) Pipe shall be furnished with bell and spigot joints equipped with endless "o" ring type gaskets of circular cross-section.

(4) Cement shall be Type II.

(5) In Section 5, Joining Bell and Spigot Pipe, Method 1 shall apply.

(6) In Section 9, Pressure Testing, Method 1 shall apply.

(7) Measurement and payment will be by Method 1 and will include payment for subsidiary items concrete, Class 3000; Metalwork, and cleaning and painting metalwork.

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 ~~34~~ 37, Loose Rock Riprap

(1) This item shall consist of furnishing and placing all loose rock riprap, including bedding, in the floodway, and inlets as follows:

(a) Floodway

Station 976+00 to Station 977+25
Station 979+45± to Station 982+04±

(b) Side inlet at RWCD Floodway Station 980+75, including bedding material placed over the side inlet weir as shown on the drawings.

(c) The side inlet for Channel #3.

(d) The basin inlet structure.

(e) The basin inlet channel.

(2) The rock shall be graded as follows:

Particle Size (inch)	Percent Passing (by Dry Wt.)
15	100
12	75 - 100
9	60 - 85
6	25 - 40
4	10 - 25
3	0 - 10

(3) Rock shall be either hand or equipment placed.

(4) Bedding beneath riprap shall be graded as follows:

U. S. Sieve Size	Percent Passing (by Dry Wt.)
1"	100
3/4"	85 - 100
#4	50 ~~60~~ - 80
#16	21 ~~40~~ - ~~60~~ 56
#40	11 ~~22~~ - ~~44~~ 38
#200	0 - ~~8~~ 6

Size No. 67 blended with fine aggregates in accordance with ASTM C 33 meets these requirements.

(5) 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 ~~17~~ 23, Loose Rock Riprap

(1) This item shall consist of furnishing and placing of loose rock riprap, including bedding, adjacent to the Dip Crossing At Hunt Highway, as shown on the drawings and staked in the field.

(2) The rock shall be graded as follows:

Particle Size (inches)	Percent Passing (by Dry Weight)
15	100
12	75 - 100
9	60 - 85
6	25 - 40
4	10 - 25
<3	0 - 10

(3) Rock shall be either hand or equipment placed.

(4) Bedding beneath riprap shall be graded as follows:

US Sieve Size	Percent Passing (by Dry Weight)
1"	100
3/4"	85 - 100
#4	50 ~~60~~ - 80
#16	21 ~~40~~ - ~~60~~ 56
#40	11 ~~22~~ - ~~44~~ 30
#200	0 - ~~8~~ 6

Size No. 67 blended with fine aggregates in accordance with ASTM C 33 meets these requirements.

(5) Measurement and payment will be by Method 1 and shall include compensation for Subsidiary Item, Removal of Water.

13. 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 ~~35~~ 36, Grouted Rock Riprap

(1) This item shall consist of the furnishing and placing of grouted rock riprap and bedding at the side inlet at RWCD Floodway Station 980+75, the side inlet for Ch. #3, and the basin inlet structure, as shown on the drawings and staked in the field.

(2) The rock shall be graded as follows:

Particle Size (inch)	Percent Passing (by Dry Weight)
15	100
12	75 - 100
9	60 - 85
6	25 - 40
4	10 - 25
3	0 - 10

(3) Rock shall be either hand or equipment placed.

(4) Bedding beneath riprap shall be graded as follows:

U. S. Sieve Size	Percent Passing (by Dry Weight)
1"	100
3/4"	85 - 100
#4	50 ~~60~~ - ~~100~~ 80
#16	21 ~~40~~ - ~~60~~ 56
#40	11 ~~22~~ - ~~44~~ 38
#200	0 - ~~8~~ 6

Size No. 67 blended with fine aggregates in accordance with ASTM C 33 meets these requirements.

(5) In Section 6, Design of the Grout Mix, the Contractor shall be responsible for proportioning the mix. The grout shall consist of Portland cement, fine and coarse aggregate, water and an air-entraining agent. The cement content shall be 5 1/2 bags per cubic yard of concrete. The maximum nominal size of coarse aggregate shall be 3/4 inch. The slump shall be within the range of 6 to 10 inches. The air content (by volume) of the grout mixture at the time of placement shall be five (5) to seven (7) percent. At least five (5) days prior to placement of grout, the Contractor shall furnish the Engineer with a statement of the mix proportions for approval.

(6) Cement shall be Type II of IIA.

(7) 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. Subsidiary Item, Metal Work

(1) This item shall consist of fabricating and installing the basin outlet trash rack and drain grates as shown on drawings.

(2) The trash rack and drain grates shall be fabricated of structural steel conforming to the requirements of ASTM A 36.

(3) The trash rack and drain grates shall be painted in the manner specified in Construction Specification 82.

(4) Equal quality manufactured drain grates may be substituted witb approval of engineer.

(5) No separate payment will be made for this item. Compensation will be included in Bid Item ~~33~~ 36, 24-inch Diameter Reinforced Concrete Pipe, Class III.

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, Metal Work

(1) This item shall consist of the fabrication and installation of depth gauges as shown on the drawings and directed by the Engineer.

(2) Painting shall be in accordance with Construction Specification 82.

(3) No separate payment will be made for metal work. Compensation for this work will be included in the payment for Bid Item ~~14~~ 20, Reinforced Concrete Clss 4000X.

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 Items, Cleaning and Painting Metal Work

(1) This item shall consist of cleaning and painting the basin outlet trash rack and drain grates as shown on the drawings.

(2) In Section 3, Surface Preparation, Method 2 shall apply.

(3) In Section 4, Painting Systems, Paint System C shall apply for the trash rack and drain grate in Bid Item ~~35~~ 36, except that Type 4 paint shall be used in place of Type 2 or 3 paint for the priming coat.

(4) No separate payment will be made for this item. Compensation will be included in Bid Item ~~35~~ 36, 24-inch Diameter Reinforced Concrete Pipe, Class III.

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 Metal Work

(1) This item shall consist of cleaning and painting the depth guages.

(2) In Section 3, Surface Preparation, Method 2 shall apply.

(3) In Section 4, Paint Systems E (except that Type 4 paint shall be used in place of Type 2 paint for the priming coat) shall apply. The two top coats of enamel paint on the depth guages shall alternate white background with green numbers, and green background with white numbers.

(4) No separate payment will be made for cleaning and painting. Compensation for this work will be included in the payment for Bid Item ~~14~~ 20, Concrete, Class 4000X.

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~~ 24, Asphalt Concrete Pavement

(1) This item shall consist of furnishing and installing the asphalt concrete pavement, including the untreated base and preservative seal for the following work:

(a) The dip crossing between Station 976+75± and Station 981+00± centerline floodway.

(2) Payment will be made in accordance with Section 7.

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 ~~36~~ 39, Surveys

(1) This item shall consist of furnishing personnel, equipment, materials and performing surveys required for:

(a) Construction layout

(b) Computation of quantities

(c) "As-Built" construction drawings.

(2) The Contractor shall provide the Government Representative a statement of qualifications, including specific experience of each of the survey personnel assigned to the job.

(3) The Contractor shall provide the Government Representative schedule of surveys to be performed each month.

(4) In Section 5, Construction Surveys and Measurements, all entries in the bound field notebooks shall follow the format shown on pages 2-40 and 2-42 of the Soil Conservation Service National Engineering Handbook, Section 19.

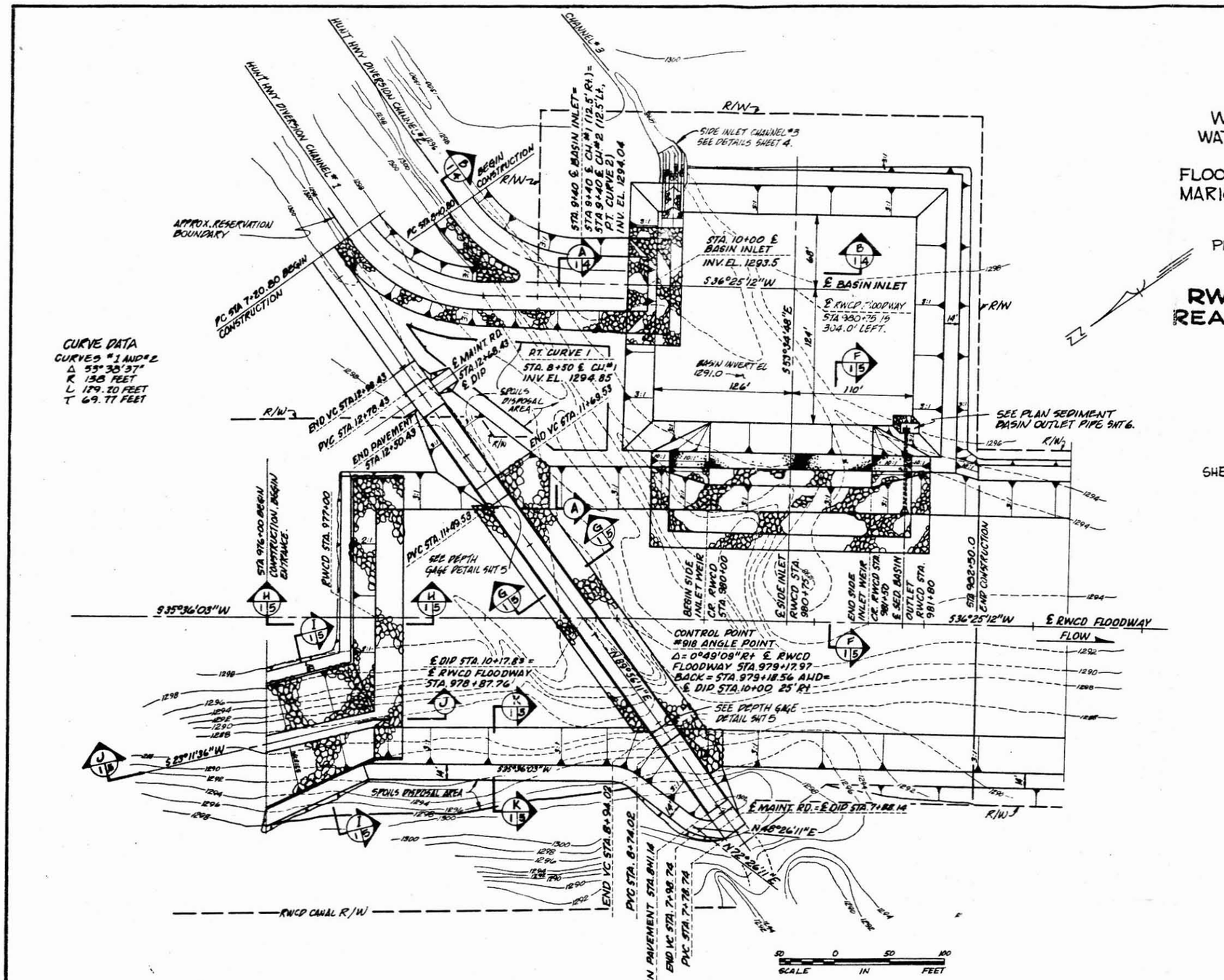
(5) In Section 6, Staking, the location and marking of stakes shall follow the format shown on pages 2-13, 2-15, 2-17 and 2-20 of the Soil Conservation Service National Engineering Handbook, Section 19.

(6) Payment will be in accordance with Section 8.

WILLIAMS - CHANDLER WATERSHED PROTECTION AND FLOOD PREVENTION PROJECT MARICOPA AND PINAL COUNTIES ARIZONA

PLANS FOR THE CONSTRUCTION OF

RWCD FLOODWAY REACH 2 EXTENSION



CURVE DATA
CURVES #1 AND #2
Δ 55°38'37"
R 138 FEET
L 189.20 FEET
T 69.77 FEET

INDEX

SHEET 1. SITE PLAN
2. PLAN AND PROFILE FLOODWAY
3. PLAN AND PROFILE DIP CROSSING AT HUNT HIGHWAY
4. SECTIONS AND DETAILS
5. SECTIONS AND DETAILS
6. BASIN OUTLET STRUCTURE

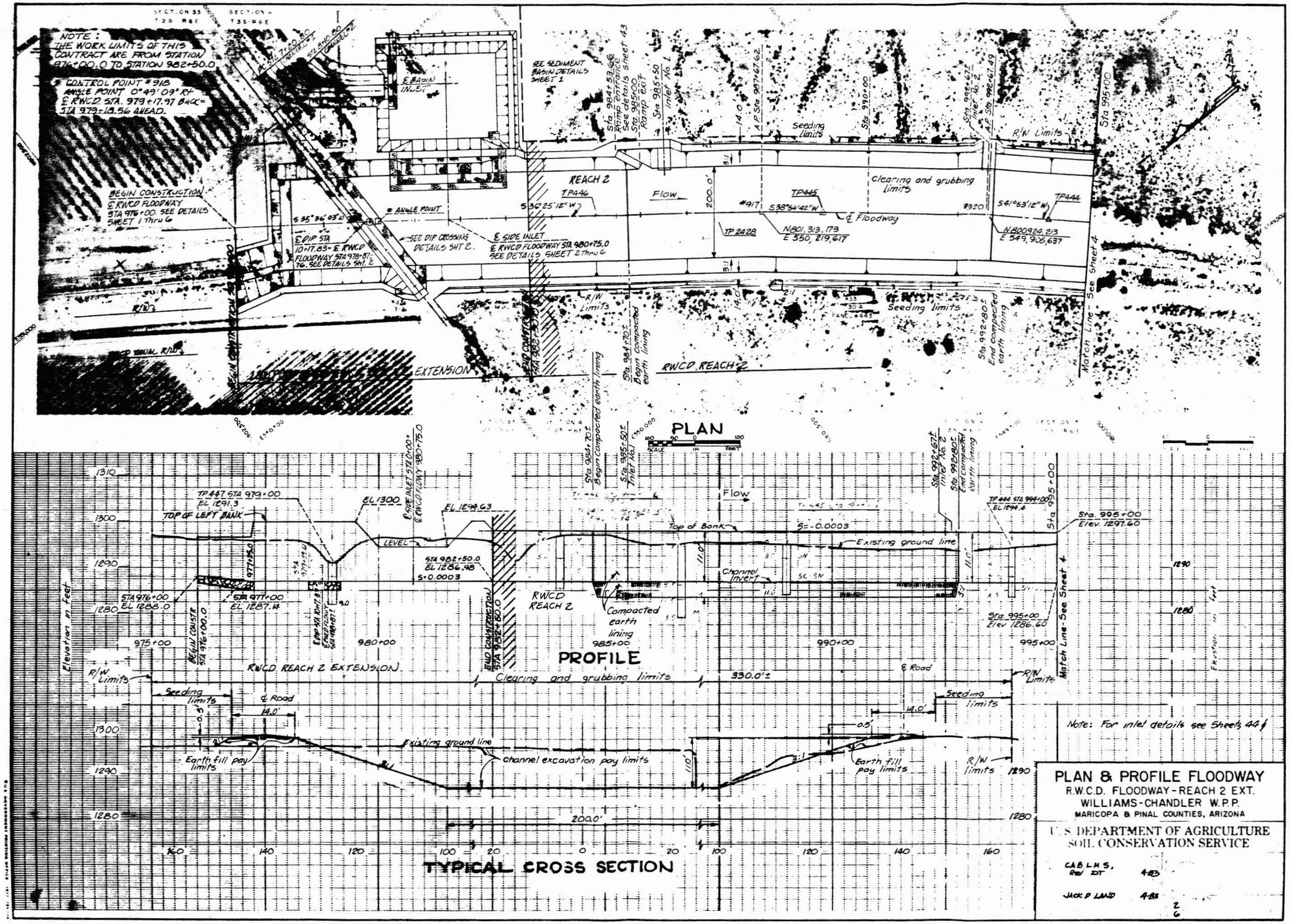
SITE PLAN

R.W.C.D. FLOODWAY - REACH 2 EXT.
WILLIAMS-CHANDLER W.P.P.
MARICOPA & PINAL COUNTIES, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

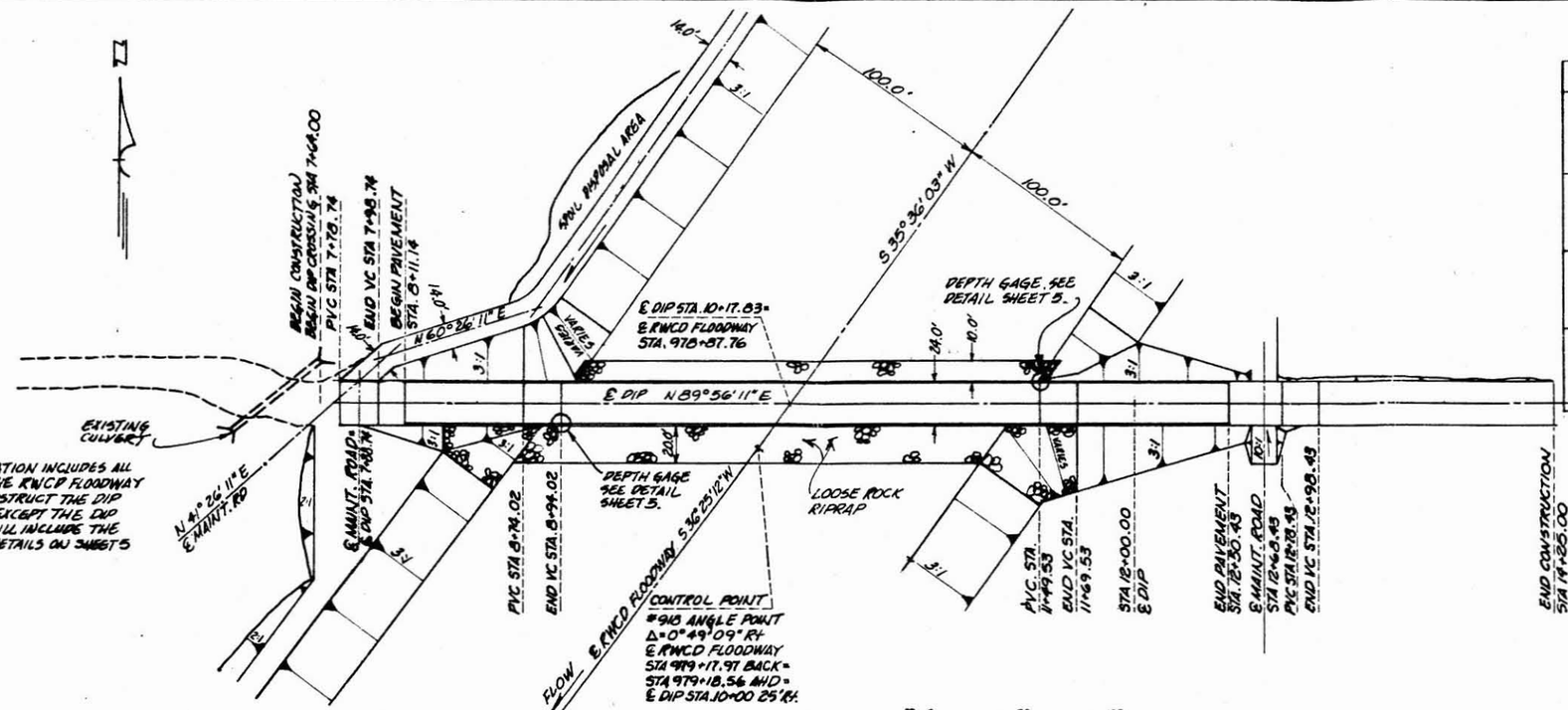
Designed DAVID THACKERAY	4-83	Approved	Date 4-15-83
Drawn JOHN ACKERS	4-83	Title STATE CONSERVATIONIST	
Traced		Title AREA CONSERVATIONIST	
Checked L.M.S.	4-83	Title HEADQ. STAFF	
		Sheet No. 1 of 6	Drawing No.

SCS-ENG-313-S Rev. 10-75


NOTE: THE WORK LIMITS OF THIS CONTRACT ARE FROM STATION 976+00.0 TO STATION 982+50.0
CONTROL POINT #918 ANGLE POINT 0°49'09" Rt ℄ RWCD STA. 979+17.97 BACK= STA 979+18.56 AHEAD.
BEGIN CONSTRUCTION ℄ RWCD FLOODWAY STA 976+00. SEE DETAILS SHEET 1 Thru 6
℄ DIP STA 10+17.83 = ℄ RWCD FLOODWAY STA 978+87.76. SEE DETAILS Sht. 2
SEE DIP CROSSING DETAILS SHT 2.
℄ SIDE INLET ℄ RWCD FLOODWAY STA 980+75.0 SEE DETAILS SHEET 2 Thru 6
℄ BASIN INLET
SEE SEDIMENT BASIN DETAILS SHEET 1
ANGLE POINT
REACH 2
Flow
200.0'
TP446
TP445
TP444
TP 2428
#917 S38°54'42"W
N801,313.173 E 550,219,617
#920 S41°53'12"W
N800924.213 E 549,905,637
℄ Floodway
Clearing and grubbing limits
Seeding limits
R/W Limits
EXTENSION
RWCD REACH 2
Match Line - See Sheet 4
Sta 995+00
PLAN
TOP OF LEFT BANK
TP447 STA 979+00 EL 1291.3
EL 1300
EL 1294.63
LEVEL
STA 982+50.0 EL 1286.98 S=0.0003
STA 976+00 EL 1288.0
STA 977+00 EL 1287.14
BEGIN CONSTR STA 976+00.0
END CONSTRUCTION STA 982+50.0
RWCD REACH 2
Compacted earth lining
Top of Bank
S=-0.0003
Existing ground line
Channel Invert
Sta. 995+00 Elev. 1297.60
Sta. 995+00 Elev. 1286.60
Elevation in Feet
975+00
980+00
985+00
990+00
995+00
PROFILE
RWCD REACH 2 EXTENSION
R/W Limits
Seeding limits
℄ Road
14.0'
Clearing and grubbing limits
330.0'±
Earth fill pay limits
Channel excavation pay limits
11.0'
200.0'
Note: For inlet details see Sheets 44 &
TYPICAL CROSS SECTION
PLAN & PROFILE FLOODWAY
R.W.C.D. FLOODWAY - REACH 2 EXT.
WILLIAMS-CHANDLER W.P.P.
MARICOPA & PINAL COUNTIES, ARIZONA
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
JACK P LAND

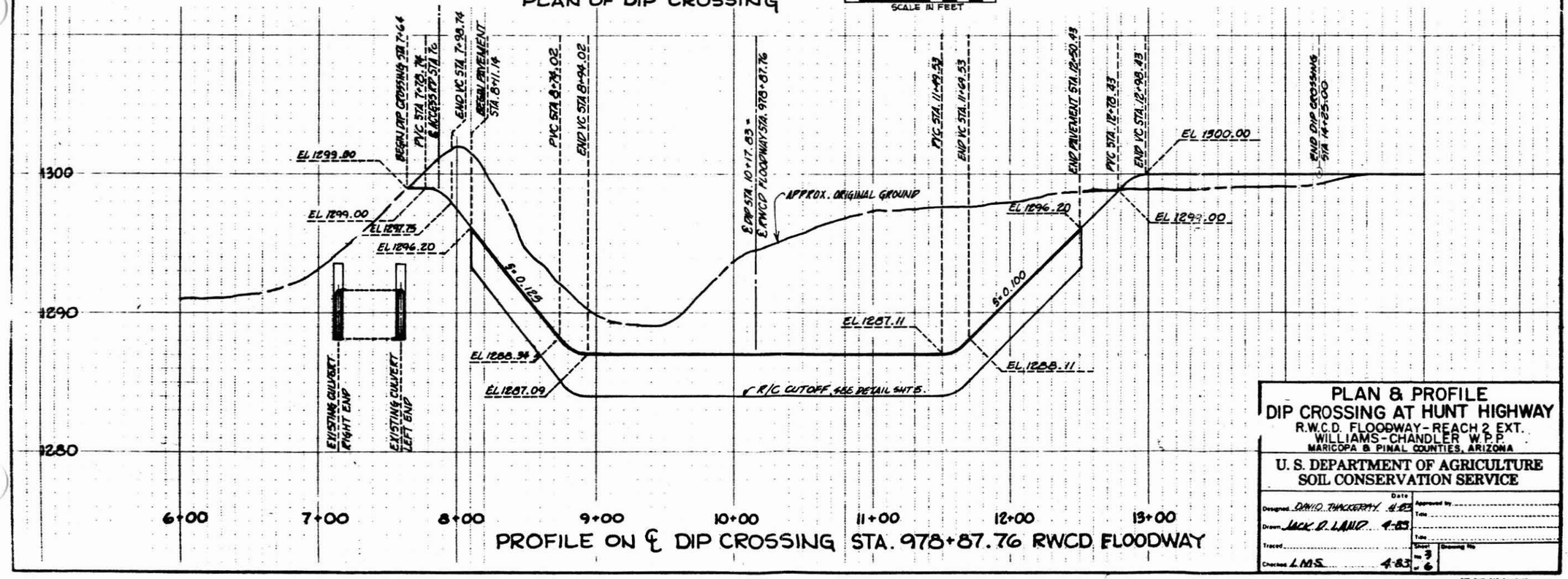
VERTICAL CURVE DATA			
PVC STA	7+78.74	ELEV	1299.00
	7+83.74		1298.92
	7+88.74		1298.69
	7+93.74		1298.30
END VC STA	7+98.74		1297.75
PVC STA	8+74.02	ELEV.	1288.34
	8+79.02		1287.79
	8+84.02		1287.40
	8+89.02		1287.17
END VC STA	8+94.02	ELEV	1287.09
PVC STA	11+44.53	ELEV	1287.11
	11+54.53		1287.17
	11+59.53		1287.36
	11+64.53		1287.67
END VC STA	11+69.53	℄	1288.11
PVC STA	12+78.43	ELEV	1299.00
	12+83.43		1299.44
	12+88.43		1299.75
	12+93.43		1299.98
END VC STA	12+98.43		1300.00

NOTE:
DIP CROSSING EXCAVATION INCLUDES ALL EXCAVATION BEYOND THE RWCD FLOODWAY PRISM NEEDED TO CONSTRUCT THE DIP CROSSING AS SHOWN, EXCEPT THE DIP CROSSING STR. EXCA. WILL INCLUDE THE AREAS SHOWN IN THE DETAILS ON SHEETS OF THESE DRAWINGS.



PLAN OF DIP CROSSING

SCALE IN FEET

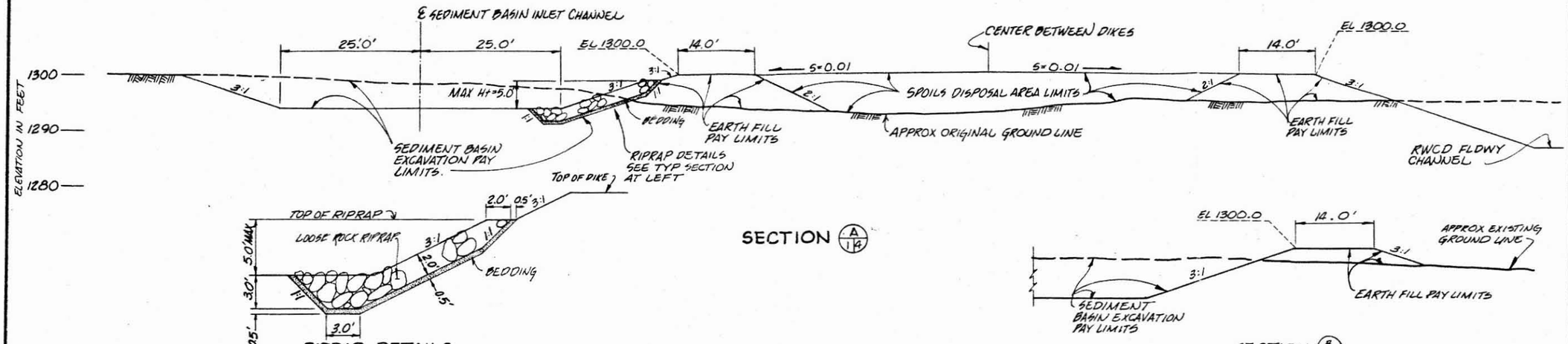


PROFILE ON ℄ DIP CROSSING STA. 978+87.76 RWCD FLOODWAY

PLAN & PROFILE
DIP CROSSING AT HUNT HIGHWAY
R.W.C.D. FLOODWAY - REACH 2 EXT.
WILLIAMS-CHANDLER W.P.P.
MARICOPA & PINAL COUNTIES, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

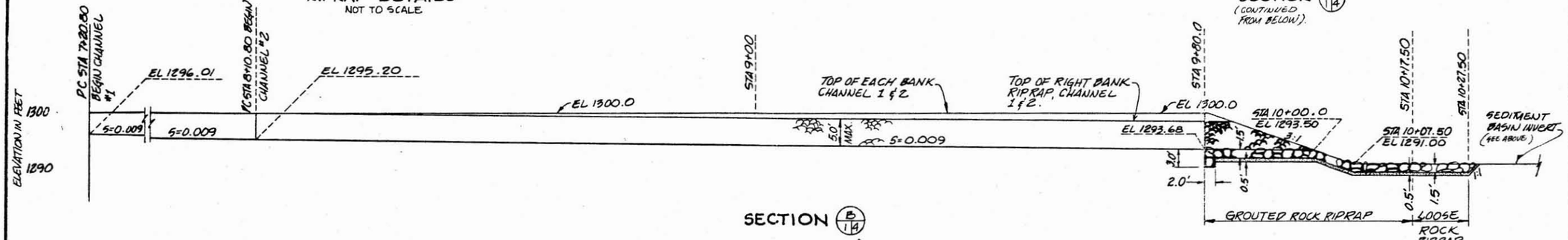
		Date	Approved by
Designed	DAVID THACKERAY	4-83	Title
Drawn	JACK D. LAND	4-83	Title
Traced			Sheet No. 3 of 6
Checked	L.M.S.	4-83	Drawing No.



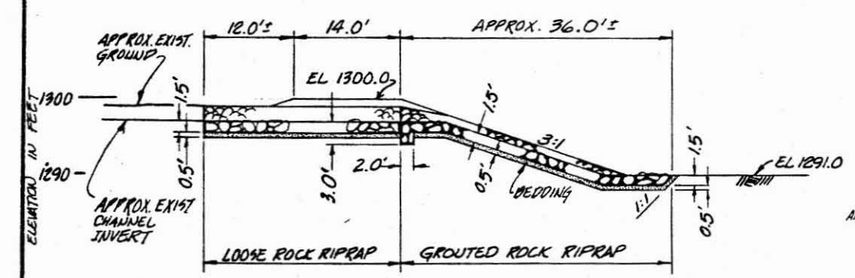
RIPRAP DETAILS
NOT TO SCALE

SECTION (A/14)

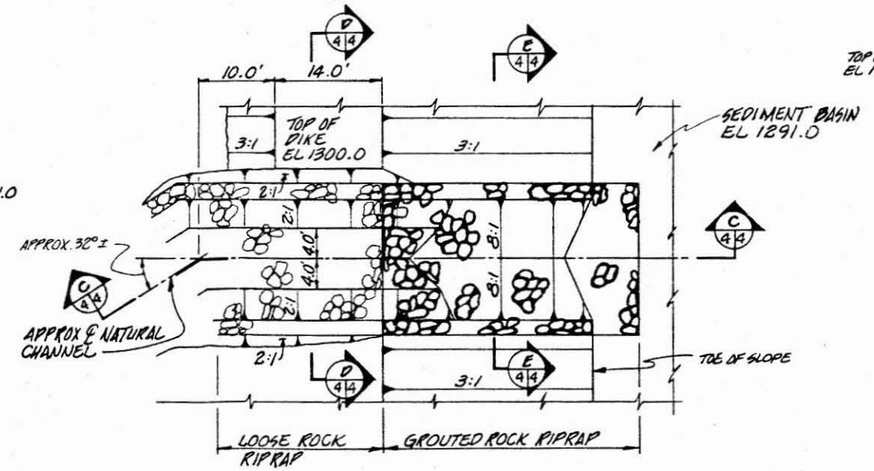
SECTION (B/14)
(CONTINUED FROM BELOW).



SECTION (B/14)

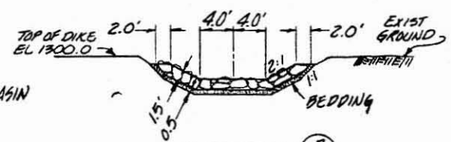


SECTION (C/4|4)

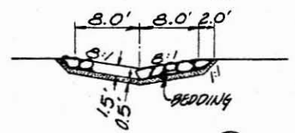


PLAN SIDE INLET CHANNEL #3

10 5 0 10 20
SCALE IN FEET



SECTION (D/4|4)



SECTION (E/4|4)

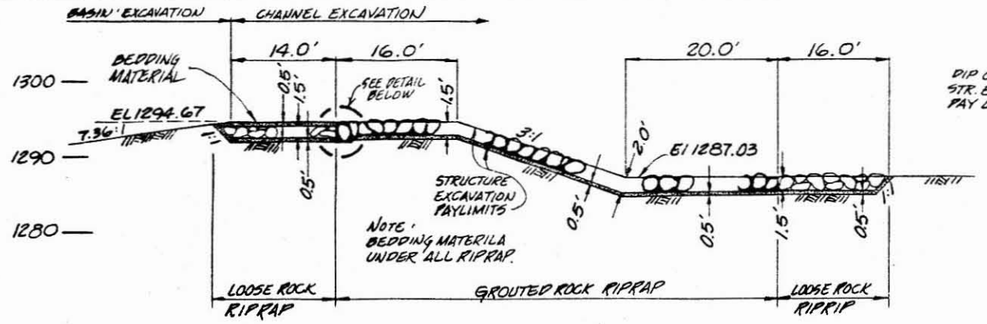
SECTIONS & DETAILS

R.W.C.D. FLOODWAY - REACH 2 EXT.
WILLIAMS-CHANDLER W.P.P.
MARICOPA & PINAL COUNTIES, ARIZONA

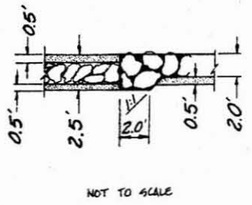
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed DAVID THACKERAY	Date 4-83	Approved by	
Drawn JACK LAND	4-83	Title	
Traced		Title	
Checked LMS	4-83	Sheet No. 4 of 6	Drawing No.

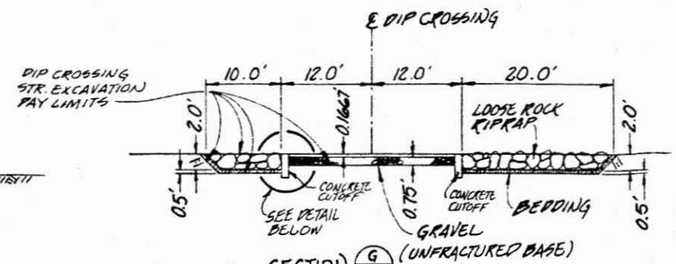
SCS-ENG-313-B Rev. 10-75



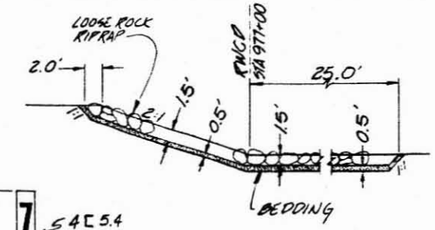
SECTION (F/15)



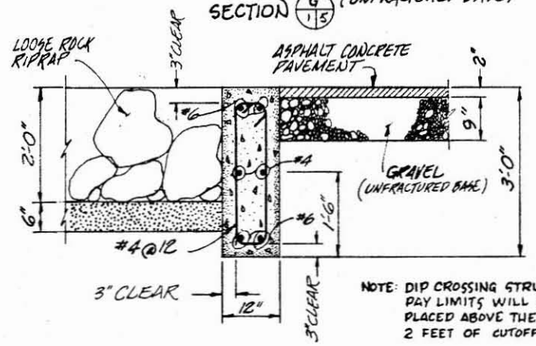
NOT TO SCALE



SECTION (G/15)

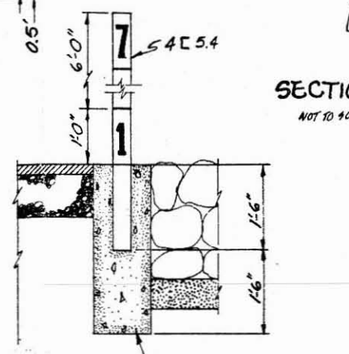


SECTION (H/15)
NOT TO SCALE

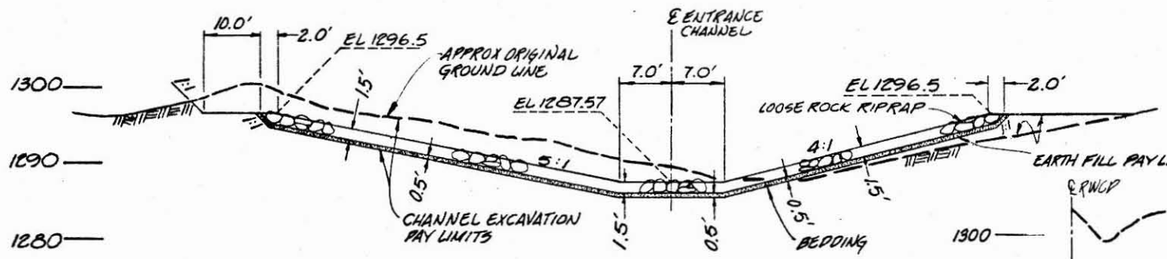


NOTE: DIP CROSSING STRUCTURE BACKFILL PAY LIMITS WILL INCLUDE EARTHFILL PLACED ABOVE THE BASE AND WITHIN 2 FEET OF CUTOFF WALL.

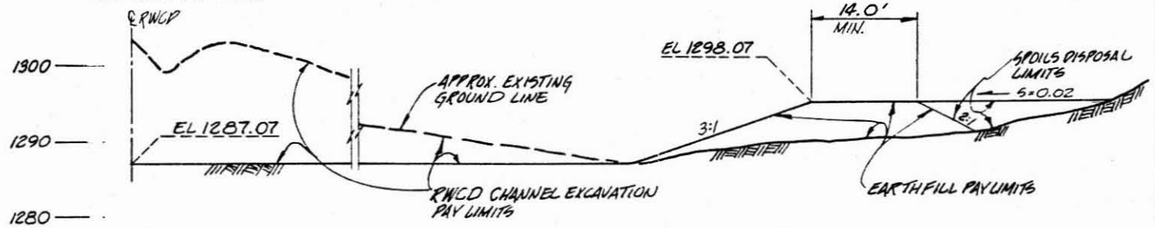
CONCRETE CUTOFF DETAIL



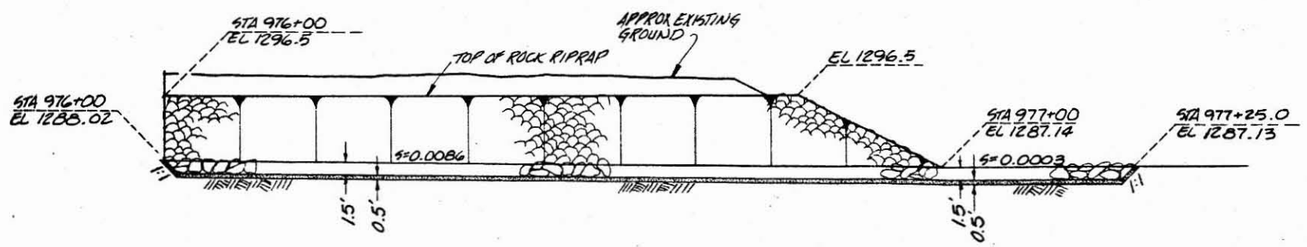
DEPTH GAGE DETAIL



SECTION (I/15)



SECTION (K/1)



SECTION (J/15)

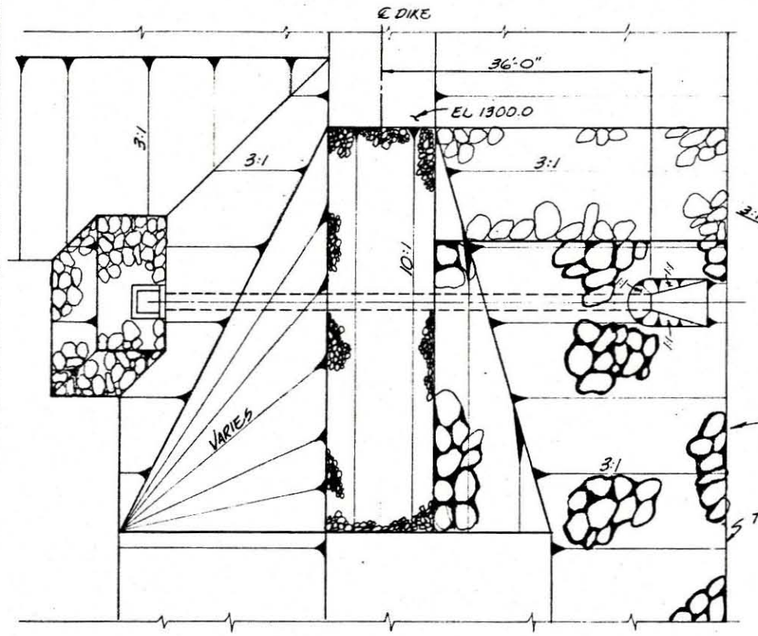
SCALE IN FEET

SECTIONS & DETAILS
R.W.C.D. FLOODWAY - REACH 2 EXT.
WILLIAMS-CHANDLER W.P.P.
MARICOPA & PINAL COUNTIES, ARIZONA

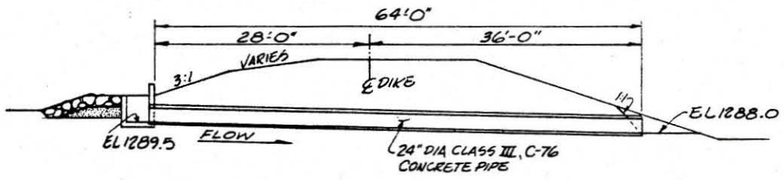
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed RWD TRACEWAY	Date 4-83	Approved by	
Drawn JACK D. LAND	4-83	Title	
Traced		Title	
Checked L.M.S.	4-83	Sheet No. 5 of 6	Drawing No.

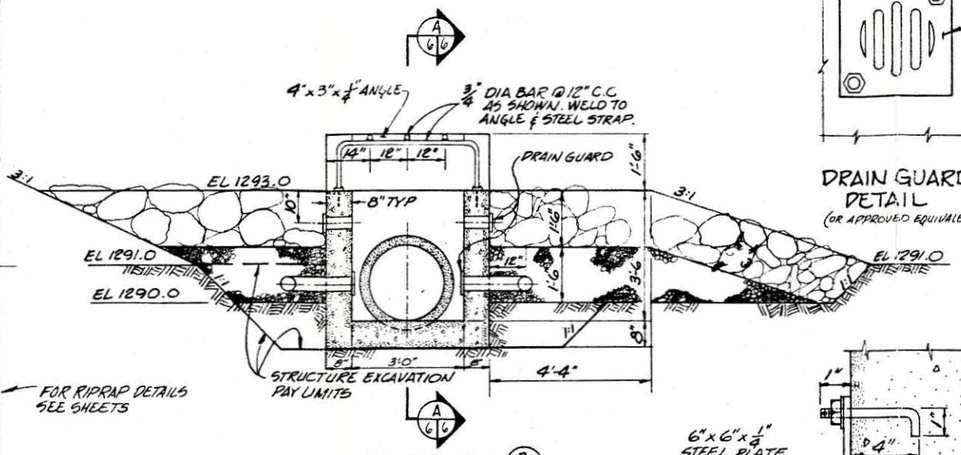
SCS-ENG-313-B Rev. 10-75



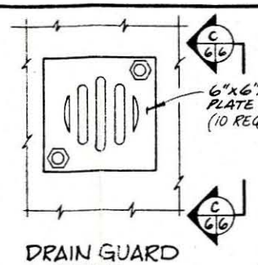
PLAN SEDIMENT BASIN OUTLET PIPE



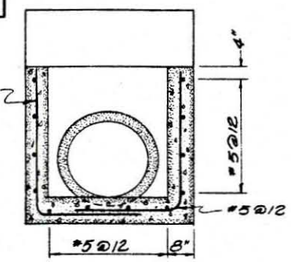
PROFILE ON ℄ OUTLET PIPE



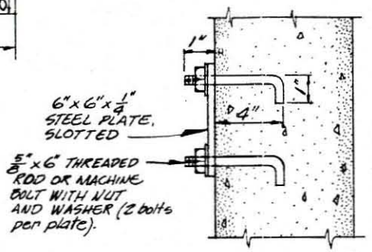
SECTION (A/6/6)



DRAIN GUARD DETAIL (OR APPROVED EQUIVALENT)

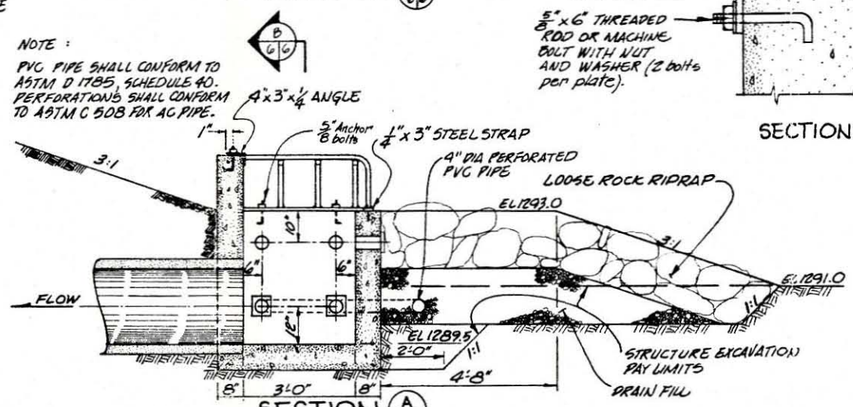


SECTION (B/6/6)

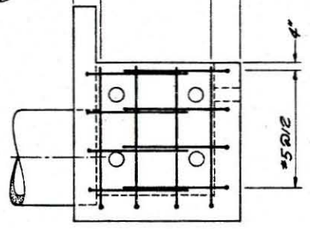


SECTION (C/6/6)

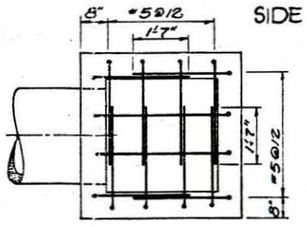
NOTE :
PVC PIPE SHALL CONFORM TO ASTM D 1785, SCHEDULE 40. PERFORATIONS SHALL CONFORM TO ASTM C 508 FOR AC PIPE.



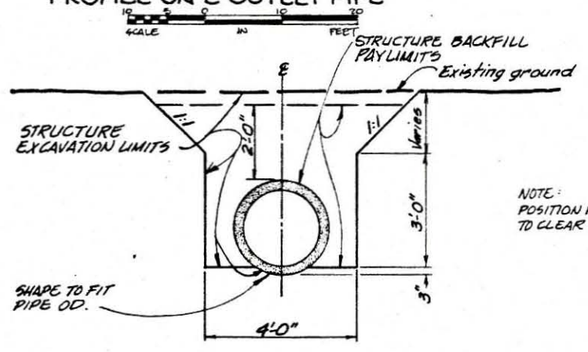
SECTION (A/6/6)



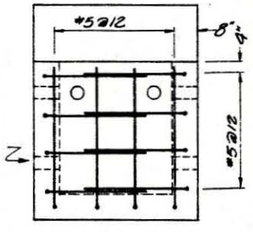
SIDE ELEVATION



PLAN

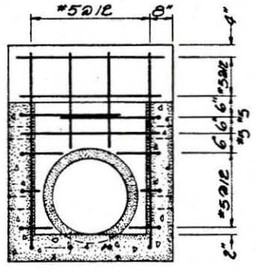


TYPICAL SECTION



NOTE:
POSITION REINFORCEMENT TO CLEAR DRAIN OPENING.

UPSTREAM ELEVATION



SECTION (D/6/6)

SCALE 0 1 2 3 4 IN FEET

BASIN OUTLET STRUCTURE

R.W.C.D. FLOODWAY - REACH 2 EXT.
WILLIAMS-CHANDLER W.P.P.
MARICOPA & PINAL COUNTIES, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date	
Designed LEONARD M. SOELF	4-83	Approved by:
Drawn JACK R. LAND	4-83	Title:
Traced		Title:
Checked DAVID THACKERAY	4-83	Sheet No. 6 of 6 — Drawing No.

SCS-ENG-313-B Rev. 10-75

United States Department of Agriculture

Soil Conservation Service

West National Technical Center
511 N. W. Broadway, Rm. 510
Portland, Oregon 97209

Subject: ENG - Design Assistance, RWCD Floodway Reach 2 Extension, Williams Chandler Watershed, Arizona

Date: April 15, 1983

To: Ralph Arrington, State Conservation Engineer, SCS, Phoenix, Arizona

We have completed and co-approved the design of RWCD Floodway, Reach 2 Extension, as requested in letter from Verne Bathurst to Charles Lemon dated March 8, 1983.

Attached are the following:

1. Three copies of the Design Report.

2. One original copy and two color coded copies of the Construction Specifications including bid schedule.

3. Two copies of Design Computations including estimate of quantities.

4. One set of original Construction Drawings.

5. One set of blueline Construction Drawings.

We have signed the cover sheet and added your signature as authorized by Remote Message Transmittal dated April 14, 1983.

We have not prepared a cost estimate for the work. We believe that your staff being close to the work in progress on Reach 2 is better prepared for developing a cost estimate. There are a couple of items that should be noted:

1. The quantities are based on the work ending at STA 982+50. This overlaps Reach 2 work and will require an adjustment in Reach 2 quantities or the Reach 2 Extension quantities.

2. The estimate for quantity of water was based on the estimate for Reach 2. It seems high and should be checked against actual usage for Reach 2.

If there are any questions concerning other aspects of the design or drawings and specifications, please give us a call.

Gordon M Strang for
JACK C. STEVENSON
Head, Engineering Staff

cc:
Verne Bathurst, State Conservationist, SCS, Phoenix, Arizona
Donald E. Wallin, Head, Design Unit Engineering, WNTC, Portland, Oregon

Attachments

BID SCHEDULE NO. 1
WILLIAMS-CHANDLER, WPP, ARIZONA
RWCD FLOODWAY - REACH 2 EXTENSION

Item	Work or Material	Spec. No.	Quantity	Unit	Unit Price	Amount	
28 ~~25.~~	Clearing and Grubbing	2	7	Acres	$ 500.00	$ 3,500	3500
29 ~~26.~~	Water	10	5,525	M.Gal.	$ 5.00 (2.50)	$ 27,625	13,812.50
30 ~~27.~~	Channel Excavation, Common	21	28,000	C. Y.	$ 0.90 (.86)	$ 25,200	24,080
31 ~~28.~~	Basin Excavation, Common	21	14,510	C. Y.	$ 1.00 (.86)	$ 14,510	12,478.60
32 29.	Structure Excavation, Common	21	2,332	C. Y.	$ 5.00	$ 11,660	11660
33 30.	Structure Backfill	23	31	C. Y.	$ 7.00 (5.00)	$ 217	155
34 ~~31.~~	Earth Fill	23	5,547	C. Y.	$ 0.80 (.60)	$ 4,437.60	3328.20
35 32.	Drain Fill	24	9	C. Y.	$ 25.00 (20.00)	$ 225	180
36 ~~33.~~	24-Inch Diameter Reinforced Concrete Pipe, Cl. III	42	64	L. F.	$ 50.00	$ 3,200	3200
37 ~~34.~~	Loose Rock Riprap	61	1664	C. Y.	$ 12.50 (10.00)	$ 20,800	16,640
38 ~~35.~~	Grouted Rock Riprap	62	1314	C. Y.	$ 40.00 (30.00)	$ 52,560	39,420
39 36.	Surveys	~~8~~ 401		L. S.	$ 3,000	$ 3,000	3000
						166,934.60	131,445.70

BID SCHEDULE NO. 1
WILLIAMS-CHANDLER, WPP, ARIZONA
RWCD FLOODWAY - REACH 2 EXTENSION

	Item	Work or Material	Spec. No.	Quantity	Unit	Unit Price MARK	Amount	
28	~~25.~~	Clearing and Grubbing	2	7	Acres	$ ~~680~~ 650	$ 4550.00	
29	~~26.~~	Water	10		~~M.Gal.~~ L.S.	$ XXXX	$ 13,812.50	
30	~~27.~~	Channel Excavation, Common	21	28,000	C. Y.	$ 1.90 2.02	$ 53,200.00	56,840
31	~~28.~~	Basin Excavation, Common	21	14,510	C. Y.	$ 2.15 1.85	$ 31,196.50	26,843.50
32	~~29.~~	Structure Excavation, Common	21	2,332	C. Y.	$ 3.00 3.06	$ 6,996.00	7,135.92
33	~~30.~~	Structure Backfill	23	31	C. Y.	$ 5.00 4.93	$ 155.00	
34	~~31.~~	Earth Fill	23	5,547	C. Y.	$ 0.60 .60	$ 3,328.20	
35	~~32.~~	Drain Fill	24	9	C. Y.	$ 20.00 11.00	$ 180.00	
36	~~33.~~	24-Inch Diameter Reinforced Concrete Pipe, Cl. III	42	64	L. F.	$ 72.00	$ 4,608.00	
37	~~34.~~	Loose Rock Riprap	61	1,664	C. Y.	$ 18.00 17.00	$ 29,952.00	28,298
38	~~35.~~	Grouted Rock Riprap	62	1,314	C. Y.	$ 40.00 39.00	$ 52,560.00	51,246
39	~~36.~~	Surveys	8		L. S.	$ XXXX	$ 7,500.00	

Subtotal = $ 208,038.20

204,489.12

Material cost of 24" RCP
$15.60
7½ joints
67 L.F.

BID SCHEDULE NO. 2
WILLIAMS-CHANDLER, WPP, ARIZONA
RWCD FLOODWAY - REACH 2 EXTENSION
DIP CROSSING

Item	Work or Material	Spec. No.	Quantity	Unit	Unit Price	Amount
17	Dip Crossing Excavation, Common	21	951	C.Y.	$ 2.15	$ 2,044.65
18	Structure Excavation, Common	21	427	C.Y.	$ 3.00 (3.06)	$ 1,281.00
19	Structure Backfill, Common	23	72	C.Y.	$ 5.00 (4.93)	$ 360.00
20	Concrete, Class 4000X, Common	31	98	C.Y.	$100.00	$ 9,800.00
21	Cement	31	147	Bbls.	$ 20.00	$ 2,940.00
22	Steel Reinforcement	34	10,100	Lbs.	$ 0.50	$ 5,050.00
23	Loose Rock Riprap	61	760	C.Y.	$ 18.00	$ 13,680.00
24	Asphalt Concrete Pavement	400	1,076	S.Y.	$ 10.00	$ 10,760.00

SUBTOTAL SCHEDULE NO. 1	$208,038.20
SUBTOTAL SCHEDULE NO. 2	$ 45,915.65
TOTAL	$253,953.85

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Design Unit
Portland, Oregon
April 10, 1983

DESIGN REPORT

Job : RWCD Floodway Reach 2 Extension
Project : Williams-Chandler W.P.P.
Location : Maricopa and Pinal Counties, Arizona
Authority: WF-08
Phase : Final Design

Summary: The design, construction drawings, and specifications for this job were prepared by the WNTC Design Staff at the request of the Arizona State Conservationist.

Description of Job: The job includes: extension of the RWCD Floodway upstream from the current beginning of RWCD Reach 2 and covering the work between STA 976+000 and STA 982+50, an excavated basin for collection of bedload sediment from the Hunt Highway diversion, a dip crossing for access across the RWCD Floodway at Hunt Highway, a temporary entrance structure between the existing flood channel and the enlarged floodway, a 24 inch diameter R/C sediment basin drain, a grouted rock weir inlet to the floodway from the basin, grouted rock structures at the two inlets to the sediment basin, and construction of channels connecting the basin and the Hunt Highway diversion channels.

Design Objectives

1. Provide for economic removal of bedload sediment from the Hunt Highway diversion before its entry to the RWCD Floodway.

2. Provide a low cost, low maintenance junction of the Hunt Highway diversion with the RWCD Floodway.

3. Provide a dip crossing at the Hunt Highway which aligns with existing access roads, requires minimal additional right-of-way, and does not interfere with the existing RWCD canal.

Basis for Design

1. TR-25, NEH 5, TR5
2. NEM
3. U. S. Army Corps of Engineers
   Chart for "Stone Stability-Velocity vs. Stone Dia."
   Hydraulic Design Chart 712-1.
4. Chow, "Open Channel Hydraulics"
5. Design Report RWCD Floodway Reach 2
6. Construction Drawings and Specifications RWCD Floodway Reach 2
7. Construction Drawings and Specifications RWCD Floodway Reach 1

8. RWCD Floodway Hydrology Studies, 11/76 and 5/77
9. Geologic Investigation Report - RWCD Floodway Reach 3
10. Topographic Survey, SCS Arizona, 2/83

Location and Layout

Considerations in the location and layout of the work were:

Floodway - follows the preliminary design grade and alignment shown on RWCD Floodway Reach 2 and Reach 3 photo base maps (1"=100 ft. scale).

Sediment Basin - located within the 300' x 400' R/W area adjacent to the 330' floodway R/W width a shown on the RWCD Floodwlay Reach 2 drawings.

Basin Inlet Channels - located to provide a smooth transition from the existing channels to the sediment basin with minimal additional right-of-way needed.

Dip Crossings - aligns with existing roadways.

Entrance - located in close proximity upstream of the dip crossing.

Hydrology

Peak design flows determined in the RWCD Floodway hydrology studies of November 1975 and May 1976 by Bartels and McArthur were used. These are the same flows used for design of Reach 2. Peak 100-year design flow in the RWCD Floodway at this location is 8700 cfs, including the routed flow of 600 cfs contributed by the Hunt Highway diversion. The Hunt Highway diversion peak 100 year design flow of 2250 cfs occurs in these studies with virtually no flow in RWCD floodway from the reaches above the Hunt Highway.

Sedimentation Design

The need for a basin to remove sediment at the Hunt Highway diversion was established in the RWCD Floodway Reach 2 Geologic Investigation report and supported by visual observation of the amount of loose cohesionless material available for transport in the diversion channels.

A value of 1 ac. ft. of bedload sediment was used for design. This was selected as a reasonable, conservative value based on the sediment quantities predicted in the above report for a 100-year event in the side drainages along the Santan front adjacent to this site. Considering the time required to make a more rigorous determination of sediment quantity and the uncertainty of even a more rigorously obtained value, further studies were not made.

The basin was dimensioned to keep average velocity at peak design flow under 2 ft/sec with an assumed 1 ft depth of sediment accumulation.

Velocity in the constructed inlet channels is approximately 10 ft/s at peak design flows. This is the same as in the existing diversion channels. The velocity is maintained at this high level to limit sediment deposition in the basin inlet channels. Some deposition is likely to occur, however, at lesser flows due to backwater effect from the basin pool.

Sediment should be removed from both the lower inlet channels and basin when significant deposition occurs.

Hydraulic Design

A. Floodway - The 500 foot floodway extension is designed to the same grade (s=0.0003 ft/ft) and cross section (b=200, z=3) as the adjacent Reach 2 floodway channel. Design Q is 8700 cfs downstream of the sediment basin outlet. Design flow depth is 9.41 feet and design channel depth is 11 feet, providing freeboard equal to 17% of flow depth.

No channel lining will be required in the extended floodway. Geologic investigations show material in the excavated flow area of the floodway extension to have erosion resistance equal to that of adjacent unlined Reach 2 floodway channel. Portions of the constructed channel will require compacted earthfill to meet the design cross section.

B. Floodway Inlet at STA 980+75 - The loose and grouted rock weir, chute, and apron carry flow from the sediment basin to the floodway.

The weir section has 10:1 side slopes for vehicle travel. The 150 feet width compromises between the lesser erosion potential in the floodway of a wider weir and the lesser material cost of a narrower weir.

Maximum velocity in the chute is 17 ft/sec. A submerged hydraulic jump will occur at the chute toe for tailwater depth in the RWCD floodway equal to normal depth for Q=2250 cfs, the design weir flow. Rock and grouted rock are used as shown on the drawings to protect areas of expected high velocity flow. Some local scour adjacent to the apron should be expected during flows approaching design values.

Velocity at the upstream side of the weir crest is approximately 5 ft/sec at design flows. Protection of the adverse slope approaching this point for this velocity was considered unnecessary.

Momentum methods were used to check effect on flow depth in the floodway for peak Q in the floodway with routed flow of 600 cfs in the inlet: floodway flow depth was increased by 0.10 feet.

C. Basin Inlet Structures - Rock and grouted rock structures were used at the channel inlets to the debris basin. These are of similar design to the side inlets used in RWCD Reach 2. Experience with the Reach 2 structures led to the addition of grouted rock cutoffs at the upstream end to reduce piping potential under the rock.

D. Basin Inlets Channels - Inlet channels 1 and 2 were assumed to each carry one-half of the 100 year, 2250 cfs flow. Channel slope of 0.009 ft/ft is maintained. The outside transition curves are protected with rock riprap. Channel 3 will carry the approximate bankfull flow of 30 cfs.

E. Basin Outlet Structure - A 24 inch dia. R/C, ASTM C76, pipe with concrete box inlet was selected for the basin outlet to provide long life and access for maintenance. Hydraulic capacity did not control the design. Flow will be

essentially non-pressure. The conduit is placed on a 0.022 ft/ft grade, providing for flushing of sediment in the pipe.

The box crest is at EL 1293.0 and the basin invert is at EL 1291.0. Drainage below EL 1293.0 is provided though 4" PVC perforated drains placed in a berm of drain fill and rock riprap as shown on the drawings. The basin outlet is located in the SW corner of the basin away from likely heavier sediment deposition. The pipe outlets into the RWCD channel in grouted rock riprap.

F. Entrance - The temporary rock riprap floodway entrance is essentially the same design as proposed for RWCD Reach 2, modified to provide smooth transition from the existing flood channel alignment.

Structural Design

A. Rock and Grouted Rock: The rock sections and thicknesses used are consistent with those used on RWCD Floodway Reach 2: The gradations are identical to those used on Reach 2.

B. Dip Crossing: Dip crossing details are adapted directly from Reach 1 and Reach 2 crossings.

C. Basin Outlet Box: Temperature steel provides sufficient reinforcement.

Construction

Considerations During Construction:

1. Spoil Disposal: The area between the sediment basin and the dip crossing and between the RWCD Floodway and RWCD canal will be filled with spoil to the minimum elevations shown on the drawings. Additional spoil may be placed in these locations at the direction of the Engineer.

2. Floodway Channel: The project engineer will need to verify that the material in the excavated floodway is the erosion resistant material indicated on soil logs and that no compacted earth lining is needed.

Specifications:

Specifications were adapted from those prepared for the Reach 2 contract. Bid items are numbered following the Reach 2 sequence. Dip crossing items were added to Schedule 2, the remainder to schedule 1.

David D Zachary
Submitted

Edward M Laird
Recommended

Edward M Laird
Approved

4-15-83
Date

Acting for DEW

24" RCP (INCLUDES BOX STRUCTURE)

TRENCH EXCAVATION IS INCLUDED IN STRUCTURE EXCAVATION — NOT 24" RCP.
BACK FILL ALSO IS NOT INCLUDED - IT IS IN STRUCTURE BACKFILL.

MATERIAL COSTS

PIPE - ~~$~~ 1560 L.F. in 7½ lengths
Buy 67 FT (3' EXTRA) = 1045.20

CONCRETE BOX

CONCRETE - 1.6 C.Y. - 0.5 MIN.
ORDER OF 4 C.Y. @ 50.00 = 200.00
REBAR - 210 lbs @ 50¢ = 105.00
4" PVC & FITTINGS 15 L.F.
SMALL QUANTITY - PERFORATIONS
SPECIAL MADE SAT 50 = 50.00
TRASH RACK = ~~250~~ 400.00
METAL GRATES 10 @ 10 = 100.00
~~705~~ 855 = 705.00

MATERIALS $1,750.20
$1,900.20

MATERIAL $1750.20

LABOR -

CONCRETE BOX

① CARPENTERS	32 HR	13.-	=	416	
LABORER	8 HR	12.67	=	101.36	
FOREMAN	8 HR	14.35	=	114.80	
				632.16	
		OVER BURDEN X 1.5		=$950.00	$950.00
② PICKUP	12 HR	@ 9.12	=	109.44	$109.44

PIPE

① LABORERS	16 HR	12.67	=	202.72	
FOREMAN	8 HR	14.35	=	114.80	
				317.52	
		OVER BURDEN X 1.5		476.28	$476.28
② BACKHOE	8 HR	18.07		144.56	
PICK-UP	8 HR	9.12		72.96	
				217.52	$217.52

$3503.44

OH&P X 1.15 $4,028.96

TAX X 1.026 $4,133.71

$\frac{4133}{64} = \$64.59$ per L.F.

Schedule No. 1

SUMMARY

WORK OR MATERIAL	UNIT	QUANTITY	SCS Est. Unit price	Cost
CLEARING & GRUBBING.	ACRES	7 → 2500 to 3000	680	4,760
WATER	M. GAL.	5,525 L.S.	xxx	15,000
CHANNEL EXCAV, COMMON	C.Y.	28,000	2.0	56,000
BASIN EXCAV, COMMON	C.Y.	14,510	2.0	29,020
STRUCTURE EXCAV, COMMON	C.Y	2,332	3.06	7,136
STRUCTURE BACKFILL	C.Y.	31	4.93	153
EARTHFILL	C.Y.	5,547	0.60	3,328
DRAINFILL	C.Y	9	11.00	99
24-IN. DIA R/C PIPE, C76 Class III	L.F.	64	74	4,736
LOOSE ROCK RIP-RAP	C.Y.	1664	17.00	28,288
GROUTED ROCK RIP-RAP	C.Y.	1314	39.00	51,246
SURVEYS	L.S.	xxxx	xxxx	7800 ← 3 pc @ 40 hr/wk @ $65/hr.
				$207,566

STATE AZ. BY DATE PROJECT CHECKED BY DATE SUBJECT JOB. NO. SHEET OF

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
GPO 1978—O-725-733

COMPUTATION SHEET
SCS-ENG-522A
Rev. 8-69

STATE | PROJECT | BY | DATE | CHECKED BY | DATE | SUBJECT | JOB NO. | SHEET | OF

Bid Schedule No. 2

Work or Material	Quantity	Unit.	Unit Price	AMT.
Diversion Excav. com.	951	c.y	2.00	1,902
Structure Excav. com.	427	c.y	5.00	2,135
Structure Backfill	72	c.y.	4.93 (Cost)	355
Concrete Class 4000 x	98	c.y.	100	9,800
see Abstract 2, Cement	147	Bbl.	$17	2,499
Steel Reinforcement	10,100	lb.	0.40	4,040
Loose Rock Rip Rap	760	c.y.	17.00	12,920
Asphalt concrete PVMT	1,076	s.y.	10.00	10,760
			Subtotal =	44,411

For Schedule #1 = 207,566

251,977

Dependent Cost Estimate:

Channel Excav. Common 28,000 c.y.

Assume 651 scapers, Pushcats, 14G blade, waterpull, b.g.

Production: Assume cats capable of 60 lds / hr.

cycle time: length of haul = 1.2 miles = 6300'

load * =	0.7 min say	1.0 min due to small area & sand
haul ** =		2.4 min
maneuver & spread * =		0.7 min
return *** =		2.3 min,
cycle time =		6.4 min.

* table p. 160 cat handbook 10th ed.
** table p. 194 " " " "
*** " p. 195 " " " "

$$\text{cycles/hr.} = \frac{60\text{ min}}{6.4} = 9.4$$

$$\#\text{scraper required} = \frac{60\text{ lds/hr}}{9.4} = 6.38 \text{ use } \underline{7 \text{ scrapers}}$$

optimum production = 7 x 9.4 = 65.8 use 60 lds/hr
60 lds/hr @ 26 c.y./ld. = 1560 c.y./hr.

Efficiency 50 min/60 min. (low because short duration of haul.)

Actual Production = 1560 c.y./hr x 5/6 = 1300 c.y./hr.

Item	Quantity	Base Unit Labor Price	Labor Price	Unit equipment price	equipment price
'cat' 651 B Scrapers	7	13.44	94.08	177.85	1,244.95
'cat' 14-G Grader	1	13.85	13.85	64.92	64.92
'cat' D-9 Dozer	1	13.44	13.44	114.43±	114.43
'cat' D-8L Dozer	1	13.44	13.44	107.97 (1)	107.97
Waterpull	1	13.44	13.44	129.82 (2)	129.82
B-G	1	13.44	13.44	75	75.00
Forman w/ Pick-up	1	14.35	14.35	9.12	9.12
Dumpman -	1	12.42	12.42	—	—
Field Supt w/ Pickup	½	14.35	7.18	9.12	4.56
Grade checker.	1	12.42	12.42	—	—
			208.06		1,750.77
		add 50% L.B=	312.09		1,750.77
		add 15% O/H =		$2372.29	

(1) Straight Dozer = 1,000 operating expense = 1.45

Monthly Blue Book = $12,845, Area factor = -8, operating expense = 34.15

$\frac{\$12,845/mo}{176\ hrs/mo} \times (100 - 0.08) + 35.60 = 107.97$

(2) see back.

Channel Ex common (cont)

Quantity Est. = 28,000 c.y.

No. hrs required = $\frac{28{,}000 \text{ c.y.}}{1300 \text{ c.y./hr}}$ = 21.5 hrs.

No. days = $\frac{21.5}{8}$ = 2.69 say 3 days @ 8 hrs/day = 24 hrs.

Cost = 24 hrs x 2370 /hr = $56,880

Unit price = $\frac{\$56{,}880}{28{,}000 \text{ c.y.}}$ = $2.03 /c.y.

Basin Excavation, Common

Assume: 623 paddlewheels, 14G blade, 4000 gal. water truck, b.g.

Production: 4 paddlewheels available

haul distance 1.2 mi. ~ 6300 ft.

cycle time

Load	= 0.9 say	1.0 min
haul	=	2.5 min
dump	=	0.7 min.
return	=	2.4 min

6.6 min. → optimistic say 7.5 min to take into account rough and sandy terrain.

$$\text{cycles/hr} = 4 \text{ scrapers} \times \frac{60 \text{ min/hr}}{7.5 \text{ min/cycle/scraper}} = 32 \text{ cycles/hr}$$

Production = 32 cycles/hr × 24 c.y./cycle = 768 c.y./hr.

Assume. 90% efficiency ⇒ 768 × 0.90 = 691 c.y./hr.

$$\text{Time required} = \frac{14{,}510 \text{ c.y.}}{691 \text{ c.y./hr}} = 21 \text{ hrs. say } 24 \text{ hrs.}$$

$$\text{Adj. production } \frac{14{,}510}{24} = 605 \text{ c.y/hr}$$

Item	Quantity	Base Unit Labor Price	Labor Price	Unit equipment price	equipment price
'cat' 623 scraper	4	13 44	53.76	105.60 ±	422.40
'cat' 14G blade	1	13.25	13.25	64.92	64.92
4000 gal. water truck	1	11 18	11.18	20.19	20.19
B.G.	1/2	13 44	6.72	75.00	37.50
Forman w/pick-up	1	14 35	14.35	9.12	9.12
Dumpman	1	12 42	12.42	—	—
Grade Checker	1/2	12 42	6.21	—	—
Field Supt w/ Pick-up	1/2	14 35	7.18	9.12	4.56
			125.67		358.69

Add 50% L.B = 188.51 → 747.20

Add 15% O/H = $1120.79/hr.

$$\text{cost/cy} = \frac{\$1120.79/\text{hr}}{605\ \text{c.y./hr}} = \$1.85/\text{c.y.}$$

Structure Backfill :

From April 22

~ 500 to 600 c.y placed → say $\frac{500 \text{ cy}}{8 \text{ hr}}$ = 62.5 say $\frac{60 \text{ c.y.}}{\text{hr.}}$

Item	Quantity	Base Unit Labor Price	Labor Price	Unit equipment price	equipment price
'cat' 14G Grader	1	$13\frac{44}{}$	$13\frac{44}{}$	64.92	64.92
Laborer	6	$10.\frac{15}{}$	60.90	—	—
Vibrating rollers (10hp.) Mikasa MDR 96.0-7A	2	—	—	6.50	13.00
Forman w/ Pick-up	1	$14\frac{35}{}$	14.35	9.12	9.12
4000 gal. water truck.	1	$11\frac{18}{}$	11.18	20.19	20.19
			99.87		107.23

Add 50% L.B. 149.81

$257.04/hr

Add 15% O/H = $295.59/hr.

unit price = $\frac{296}{60}$ = $4.93/c.y.

Structure Excavation

Assume same spread as for Basin Ex. with following exceptions

Add 2 mins to loading time (backing up & complicated maneuvering)

∴ cycle time = 9.5 min

$$\text{Cycles/hr.} = \frac{4 \times 60}{9.5} = 25 \text{ cycles/hr.}$$

$$\text{Production} = 25 \frac{\text{cycles}}{\text{hr}} \times 24 \text{ c.y./cycle} = 600 \text{ c.y./hr.}$$

Efficiency 90% ⇒ $600 \times 0.90 = 540$ c.y./hr

$$\text{Time required} = \frac{2332}{540} = 4.3 \text{ hrs. say}$$

say 6 hrs due to short duration (efficiency will drop)

Add a D-6 Dozer @ $38.72/hr w/ op. @ 13.44/hr.

$$\text{increase/hr} = \{(13.44 \times 1.5) + 38.72\} 1.15$$
$$= \$67.71/\text{hr.}$$

From Basin Exc. spread = $1120.79/hr

add 67.71

new spread = $1188.50/hr

Cost for 6 hrs = $6(1188.50) = \$7131$

$$\text{unit cost} = \frac{\$7131}{2{,}332} = \$3.06/\text{c.y.}$$

Drainfill:

on 4-22-83 (better than average day)

439 tons @ 1.5 tons/c.y. = 293 c.y. ⇒ 37 c.y./hr.

Item	Quantity	Base Unit Labor Price	Labor price	Unit equipment price	equipment price
case 580 D backhoe	1	13.85	13.85	17.06	17.06
laborers	2	10.15	20.30	—	—
4000 gal. water truck	1	11.18	11.18	20.19	20.19
Forman w/ P.U.	1/2	14.35	7.18	9.12	4.56
Supt. w/ P.U.	1/4	14.35	3.59	9.12	2.28
			$56.10		$44.09

50% Add L.B 84.15

128.24

add 15% O/P $147.48/hr

Materials ⇒ 37 c.y. × $7/c.y = $259/hr

$406/hr

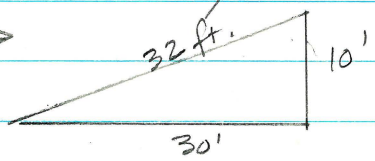
unit price = $406/hr ÷ 37 c.y./hr = $11.00/c.y.

Earth fill:

From Mod #8 cales. $.60/cy.

Loose Rock Riprap

on one day according to Rutledge.
Contractor placed on the slope
300 lineal ft. →



$$\text{rate} = \frac{300 \times 1.5 \times 32}{27 \times 8} = 67 \text{ cy./hr.}$$

(1.5 = thickness)

using a Gradall @ $125/hr operated and a D-6 'cat'

ITEM	Quantity	Base Unit Labor Price	Labor Price	Unit equipment price	equipment price
Gradall	1	—	—	125	125
'Cat' D-6 dozer	1	13.44	13.44	38.72	38.72
grade checker	1	12.42	12.42	—	—
laborer	1	10.15	10.15	—	—
Forman	1	14.35	14.35	9.12	9.12
4000 gal. Water truck	1	11.18	11.18	20.19	20.19
			61.54		193.03
		+ 50%	= 92.31		193.03

total hourly Equipment + Labor = $285.34/hr

Materials = $\frac{67 \text{ c.y}}{\text{hr}} \times \$7.00/\text{hr}$ = $469.00/hr

$754.34/hr

add 15% = $867.49/hr

Unit price = $\frac{\$867.49/\text{hr}}{67 \text{ c.y/hr}}$ = 12.95 say 13

However, material supply is not consistent - efficiency is low → use 75% → $13/0.75 = $\boxed{\$17.00/\text{c.y}}$

Grouted Rock Riprap:

on 1st day (8hr) 72 c.y. of grout

Estimate 30% voids, then $\frac{72}{0.30}$ = 240 c.y. grouted R.R.

Add the following to loose rock @ $17.00 c.y.:

materials cost $\frac{72 \text{ cy/day}}{8} \times \$40.00$/c.y. grout = $2880/8 = $360/hr.

Item	Quantity	Base Unit Labor Price	Labor Price	unit equipment price	equipment price
pump truck (operated)	1	—	—	~100.00	100.00
laborers.	4	10.15	40.60	—	—
grade checker	1	10.15	10.15	—	—
Forman w/ P.U.	1	14.35	14.35	9.12	9.12
			65.10		109.12
add L.B @ 50%			97.65		

$206.77/hr.

Total material + Labor + equipment = $566.77/hr
to add to $17.00/c.y.

240 c.y./day ⇒ 30 c.y./hr. → $\frac{566}{30} = 18.87$
add 15% o&p + add to $17 = $38.70 say $39/hr. c.y.

INDEPENDENT COST ESTIMATE FOR MODIFICATION NO. 21 RWCD FLOODWAY REACH 2 EXTENSION

CLEARING and GRUBBING

Quantity : 7 acres

Based on experience with this job, clearing and grubbing costs are as follows :

ITEM	HRS/ACRE	UNIT EQUIP COSTS	EQUIP. COSTS PER ACRE	UNIT LABOR COSTS	LABOR COSTS PER ACRE
CAT. 14-G Grader	2	64.92	129.84	13.85	27.70
CAT. D-9 Dozer	3	114.43	343.29	13.44	40.32
			473.13		68.02
				LABOR BURDEN	X 1.5
					102.03
				EQUIP. COSTS	+ 473.13
					575.16
				OH & P	X 1.15
					661.43
				BUSI. TAX	X 1.026
					$678.63

UNIT COSTS TO CLEAR AND GRUB $680.00 per acre

CONTRACTORS BID $650.00 per acre

WATER

Quantity : Lump Sum.

Using the detailed analysis from Modification No. 3 :

A) DUST CONTROL :

ORIGINAL CONTRACT — 18,600 M. GAL TOTAL
for 240 days of construction

18,600 MGAL ÷ 240 DAYS = 77.5 MGAL PER DAY.

Estimated construction time for Modification 21 - 4wks

28 DAYS x 77.5 MGAL PER DAY = 2170 MGAL

B) WATER FOR FILL

From Mod. 3 water reqd	50.9 gal/C.Y.	
Total Fill Mod. 21	x 5650	C.Y.
	287.5 MGAL	
Add 15% Evap., waste etc.	x 1.15	
	331 MGAL	

TOTAL WATER REQUIRED:

Dust Control	2170	MGAL
Compaction	331	MGAL
	2501	MGAL
FINAL UNIT COST FROM MOD. 3	x 3.00	#/MGAL
	#7,500.00	