#6

CONSTRUCTION SPECIFICATIONS

for

CONTRACT FCD 99-05
Phase 3, Santan Collector Channel Project
Southeast Valley Regional Drainage System
PCN 490.01.33

(Engineer's Seal)

Prepared by:

Daniel, Mann, Johnson & Mendenhall (DMJM)
2777 E. Camelback Road, Suite 200
Phoenix, Arizona 85013-4302

for

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

Recommended by: Edward A. Raleigh Jr. Date: 10/5/99
Edward A. Raleigh, P.E.
Manager Engineering Division

Issued for Public Bidding by: Michael S. Ellegood Date: 10/6/99
Michael S. Ellegood, P.E.
Chief Engineer and General Manager

SUPPLEMENTARY TO MARICOPA ASSOCIATION OF GOVERNMENTS UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION EDITION OF 1998 AND REVISIONS AND SUPPLEMENTS THERETO.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

Phase 3, Santan Collector Channel Project
Southeast Valley Regional Drainage System Project
FCD 99-05
PCN 490.01.33
ADDENDUM NO. 2
November 16, 1999

Contract FCD 99-05

To Contract Documents

Title: Phase 3, Santan Collector Channel Project
Southeast Valley Regional Drainage System

Owner: Flood Control District of Maricopa County

This Addendum No. 2 modifies or clarifies Contract FCD 99-05. All other provisions of the contract remain unchanged unless specifically modified herein. The Addendum No. 2 forms a part of the Contract Documents and modifies them as follows:

I. Revisions to Invitation for Bid – Not applicable to this Addendum.

II. Revisions to Bidding Schedule – Not applicable to this Addendum.

III. Revisions to Supplementary General Conditions – Not applicable to this Addendum.

IV. Revisions to Special Provisions

1. SP Page 19 of 59
In Subsection 505.9 – Finishing Concrete; revise the first sentence of the fourth paragraph to read as follows – "The channel lining finish, either concrete or pneumatically placed mortar, shall not deviate more than 1/8 inch in 10 feet in any direction."

V. Revisions to Construction Plans – Not applicable to this Addendum.

Note that the due date of all bids under this Invitation For Bids remains unchanged and is scheduled for November 23, 1999 at 2:00 pm. Bidders are reminded that each addenda must be acknowledged on page 5 of 29 of the bid and a copy of addenda attached to the bid package.

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

Registered Professional Engineer (Civil)
CERTIFICATE NO.
30521
DONALD J.
RERICK
Date Signed 11-16-99
ARIZONA, U.S.A.

By: _____ DEPUTY
FOR Michael S. Ellegood, P.E.
Chief Engineer and General Manager

By: _____
Donald J. Rerick, P.E.
Project Manager

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

Phase 3, Santan Collector Channel Project
Southeast Valley Regional Drainage System Project
FCD 99-05
PCN 490.01.33
ADDENDUM NO. 1
November 9, 1999

Contract FCD 99-05

To Contract Documents

Title: Phase 3, Santan Collector Channel Project
Southeast Valley Regional Drainage System

Owner: Flood Control District of Maricopa County

This Addendum No. 1 modifies or clarifies Contract FCD 99-05. All other provisions of the contract remain unchanged unless specifically modified herein. The Addendum No. 1 forms a part of the Contract Documents and modifies them as follows:

I. Revisions to Invitation for Bid

1. **Page 1 of 29**
Under BID OPENING DATE; change the date to read **"November 23, 1999 @2:00 p.m. local time."**

2. **Page 1 of 29**
Under CONTRACT TIME; change the numerical number of calendar days in parenthesis from 356 to 365.

3. **Page 29 of 29**
The existing CERTIFICATE OF INSURANCE, shall be replaced with the new CERTIFICATE OF INSURANCE, Page 29A of 29 attached and made a part of this Addendum No. 1.

II. Revisions to Bidding Schedule

4. **Page 6 of 29**
For Bid Item 107-2 – Public Information and Notification Allowance; change the unit amount and the extended amount from $15,000 to $50,000.

5. **Page 9 of 29**
For Bid Item 610-11 – 12" Gate Valve (Alternate); change the bid quantity from 5 Each to 6 Each.

6. **Page 9 of 29**
For Bid Item 610-15 – 36" Butterfly Valve (Alternate); change the bid quantity from 1 Each to 2 Each.

7. **Page 9 of 29**
For Bid Item 610-18; revise the bid item name to read - **2" WATER SERVICE LINE FOR LIFT STATION**.

8. **Page 9 of 29**
Bid Item 615-2 - Lined Ductile Iron Pipe (24"), Class 150; change this bid item to an alternate bid item and rename it "**Lined Ductile Iron Pipe (24"), Class 150 (Alternate)**".

9. **Page 10 of 29**
Add Bid Item **615-10 – Vitrified Clay Pipe (30") (Alternate)**, being bid at 6,102 LF.

10. **Page 11 of 29**
For Bid Item 625-2 – Sanitary Sewer Manhole (5' Diameter, MAG 420); change the bid quantity from 24 Each to 25 Each.

11. **Note:** Bid Schedule Pages 6 of 29 and 9 of 29 through 11 of 29 will be replaced with revised Bid Schedule Page 6A of 29 and Pages 9A of 29 through 11A of 29, attached and made a part of this Addendum No. 1.

III. Revisions to Supplementary General Conditions

12. **SGC Page 3 of 27**
In Subsection 102.7 – Irregular Proposals; revise part (J) to read – "If the statement from bidder's insurance carrier, as required by Subsection 103.6, is not included."

13. **SGC Page 11 of 27**
In the second paragraph under City of Chandler (COC) Water and Sanitary Sewer; add the following – "The Contractor will provide at least one backup pump of equal capacity for every primary pump used to bypass sewage flows. At any time that a sewage bypass system is in operation, utilizing pumps, the Contractor will provide 24-hours a day, around-the-clock personnel to operate and maintain the pump(s), and ensure that there is no interruption in the operation of the sewage bypass system. Any interruption in the bypass operation that results in any spills or off-site discharges shall be addressed in accordance with the "SEWAGE DISCHARGE PREVENTION PROGRAM" as presented beginning at the top of SGC Page 12 of 27."

14. **SGC Page 19 of 27**
In Subsection 105.7 – Cooperation Between Contractors; in the fifth paragraph revise the first sentence to read – "The Contractor will coordinate the connection of the existing sanitary sewer to the new manhole (Manhole 101A as shown on Sheet U-1.07) at the west end of the Stellar Airpark. Manhole 101A will now be installed by the Contractor as part of the sewer line installation."

15. **SGC Page 19 of 27**
In Subsection 105.7 – Cooperation Between Contractors; add the following sentence to the sixth paragraph – "At the time of the preparation of this Addendum, it was anticipated that the City of Chandler reconstruction project in the Hearthstone Subdivision would be completed by December 18, 1999."

IV. Revisions to Special Provisions

16. SP Page 16 of 59
In Subsection 420.1 – Description; revise the last sentence of the first paragraph to read – "All gates shall be double 6' wide and 6' tall swing gates in accordance with ADOT Standard Gate Detail C-12.20, Type 1."

17. SP Page 17 of 59
In Subsection 505.1 – Description; the burlap bag of No. 57 clean aggregate shall be sized to accommodate six cubic feet of aggregate while maintaining the bag dimensions shown in plan Detail D11.

18. SP Page 18 of 59:
To Subsection 505.1 – Description; add the following sentence to the fifth paragraph on SP Page 18 of 59 – "Deformed welded wire fabric (WWF) designated as 6"x 6" - D11xD11 is an acceptable WWF alternative for the channel lining as specified in Detail D10."

19. SP Page 21 of 59
In Subsection 516.2 – Specification for Monitoring Equipment; revise the second sentence of the third paragraph to read – "The sampler shall have the capability of recording rainfall data in memory to be displayed on the sampler display in both tabular and graphical x-y plots."

20. SP Page 23 of 59
In Subsection 516.2 – Specification for Monitoring Equipment; revise the first sentence of the last paragraph on SP Page 23 of 59 to read – "The sampler shall be equipped with a cellular phone modem and compatible cell phone. The modem shall be 14,400 baud; V.32bis, V.42, MNP2-4 error correction, MNP10-EC Cellular Protocol and FCC approved. The cellular phone modem shall have the capability to remotely download data, perform remote programming, and check real-time status."

21. SP Page 24 of 59
In Subsection 516.2 – Specification for Monitoring Equipment; add the following paragraph at the end of this subsection – "The sampler shall have the capability of measuring pH with a measurement range of 0 to 14 pH. The accuracy of the pH measurement shall be ±1% resolution 0.01 pH with an operating range of 0° to 176°F."

22. SP Page 25 of 59
Delete Subsection 601.1 – Description, and in Subsection 601.4 – Foundation, Bedding, Backfilling and Compaction; delete the second and third paragraphs. The Contractor shall refer to the plans for the bedding requirements for water and sewer lines.

23. SP Page 25 of 59
To Subsection 610.1 – Description; add the following sentence – "Resilient wedge type valves shall be used for water lines 24" diameter and smaller."

24. SP Page 27 of 59
In the last payment paragraph in Subsection 610.18 – Measurement and Payment; change the water line service size from 1" to 2", and revise the bid item name as follows – **ITEM 610-18 - 2" WATER SERVICE LINE FOR LIFT STATION**.

25. SP Page 27 of 59

To Subsection 615.1 – Description; add the following paragraph – "The City of Chandler has requested that consideration be given to increasing the 24" lined ductile iron pipe (DIP) sanitary sewer line (sheets U-1.06 through U-1.11) to a 30" vitrified clay pipe (VCP) sewer line. Correspondingly, both bid items, one for the 24" DIP and one for the 30" VCP sanitary sewer line will be bid as "Alternate" bid items, only one of which will be awarded. If the Alternate bid item for the 30" VCP is awarded, revised plan sheets for the sewer will be provided to the Contractor at the Pre-Construction meeting."

26. SP Page 29 of 59

To Subsection 615.4 – Measurement and Payment; revise the name of BID ITEM 615-2 to read - **LINED DUCTILE IRON PIPE (24"), CLASS 150 (ALTERNATE)**.

27. SP Page 29 of 59

To Subsection 615.4, add the following paragraph and bid item – "Payment for the installation of vitrified clay pipe (VCP) sanitary sewer will be made on the basis of the price bid per linear foot and shall be compensation in full for such work including all required equipment, labor and materials, excavation and backfill, plugs and modifications to existing manholes complete in place. **ITEM 615-10 – VITRIFIED CLAY PIPE (30") (ALTERNATE)**."

28. SP Page 34 of 59

To Subsection 650.6 – Pumps; add the following information – "Each pump shall have the following performance requirements: Rated capacity - 2900 gallons per minute, Total Dynamic Head - 32 feet (at the above rated capacity), Minimum Overall Efficiency - 64%, Maximum Pump Speed - 1155 rpm, Maximum Motor HP - 40 horsepower."

V. Revisions to Construction Plans

29. Sheet G-1.02

Add the following note to the list of General Notes – "Construction of certain project features will also be accomplished in accordance with SRP Specifications included in Appendix "A", and in accordance with City of Chandler Standard Details as referenced in the Special Provisions and on the plans."

30. Sheet G-2.01

Revise the following approximate quantities for Culvert 1: reinforcing steel from 65 to 67, Class S Concrete from 440 to 555. Revise the following approximate quantities for Culvert 6: reinforcing steel from 89 to 88, Class S Concrete from 543 to 636. The sheet approximate quantity totals change to: reinforcing steel from 743 to 744, Class S Concrete from 5138 to 5346.

31. Sheets G-2.01 and G-2.02

Change the concrete strength for the box culverts from Class S = 3,000 psi to Class S = 4,000 psi.

32. Sheet G-3.02 and G-3.05

Revise Detail D5 on G-3.02 and Detail D10 on G-3.05 as follows - The channel lining longitudinal reinforcing steel shall be changed from #4 @ 12" to #4 @ 11".

33. Sheet C-1.11 and C-1.12
Note that the "cross-hatched" pavement removal limits shown delineate pavement removal to be done by others, and not by the Contractor. This removal is expected to be completed before start of construction.

34. Sheets D-1.20, D-1.21, D-1.23, D-1.24
These sheets are revised to show the existing fence along the ADOT Basin complex and to add a note to remove and replace the existing fence per ITEM 350-1 – REMOVE AND REPLACE FENCING. These four revised sheets are attached and made a part of this Addendum No. 1.

35. Sheet U-1.04
Change the 1" Water Service Line for Sewer Lift Station to a 2" water service line.

36. Sheet U-1.06 through U-1.11
These sheets will be revised to reflect the change from a 24" lined ductile iron pipe to a 30" vitrified clay pipe (VCP) if the Alternate bid item 615-10 for the 30" VCP is awarded. These revised plans will be provided to the Contractor at the Pre-Construction meeting.

37. Sheet U-1.07
Delete the Existing Manhole 101A. Manhole 101A will now be installed by the Contractor as part of the sewer line installation.

38. Sheet U-2.01
Change the 1" Double Check Valve Assembly Per COC Dtl 89 to a 2" Reduced Pressure-Principle Backflow Prevention Assembly per COC Dtl 90. Change the 1" Water Service Line for sewer lift station to a 2" Water Service Line. The elevation for the Drainage Opening in Wall of the lift station enclosure will be Elev. = 1163.80. This revised sheet is attached and made a part of this Addendum No. 1.

39. Sheet U-2.04
Section A-A is revised to add a 2" air and vacuum relief valve assembly with a 2" bronze corporation stop on top of the blind flange per Detail U7B. The Plan View is revised to add two bollards per Detail D12. This revised sheet is attached and made a part of this Addendum No. 1.

40. Sheet U-2.09
This sheet is revised to add an expansion joint to the 8" steel air pipe and replacing the 90-degree elbow with a tee and a blind flange facing up as shown in Detail U7A. The steel pipe shall be epoxy lined. Detail U7B, per sheet U-2.04 has also been added. This revised sheet is attached and made a part of this Addendum No. 1.

41. Sheet U-3.02
Add a Note 24 to read – "All 24" gate valves shall be resilient wedge type gate valves, without bypass piping."

42. Sheet U-3.14
This sheet is revised to add a 36" service connection at Station 33+00 similar to that shown on sheet U-3.13 at water centerline station 11+34.82. Also, Note 2 has been added. This revised sheet is attached and made a part of this Addendum No. 1.

43. Sheet U-3.19

This sheet is revised to add the existing 36" CCP water line connection at Station 36+74.34 for contractor information. This revised sheet is attached and made a part of this Addendum No. 1.

Note that the due date of all bids under this Invitation For Bids has been rescheduled for November 23, 1999 at 2:00 pm. Bidders are reminded that each addenda must be acknowledged on page 5 of 29 of the bid and a copy of addenda attached to the bid package.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

By: _____
Michael S. Ellegood, P.E.
Chief Engineer and General Manager

DMJM

By: _____
Jeffrey R. Minch, P.E.
Project Manager

DATE: November 3, 1999

MEMO TO: Planholders and Attendees (see attachment)

FROM: Shelby Brown

SUBJECT: Contract FCD 99-05, Phase 3 – Santan Collector Channel Project – Pre-Bid Minutes

Don Rerick, Project Manager, discussed the location of and described the project, which is located within the City of Chandler, North of the Pecos Road Alignment from approximately 56th Street to the Price Road alignment.

This Project is sponsored by the Flood Control District, ADOT, and the City of Chandler. It involves water and sewer line relocations, construction of a flood control channel and culvert, as well as numerous large diameter storm drain and discharge pipes. The Project features include over18,000 feet of concrete channel, at least 4,000 feet of box culvert, and more than 23,000 feet of water line and sewer line as well as a sewer lift station. Some of these items are alternate bid items that may nor may not be awarded as part of this contract. These alternate items are covered in the project specifications.

Barbara Hummell, Contracts Branch Manager, discussed the MBE/WBE participation for this project, which is 10%. Any questions regarding MBE/WBE participation may be directed to the City of Phoenix at 602-262-6790.

Ms. Hummell further announced that an addendum will be available for pickup from the District office on Friday, November 5th at 10:00 a.m. Subsequent to the meeting, it was determined that the addendum will not be available until Tuesday, November 9th at 10:00 a.m. The addendum cannot be sent by fax because the attachments are too numerous. If the planholders do not pick up the addendum on Tuesday, November 9th, at 12:00 noon., it will be mailed. Ms. Hummell also requested that all questions be addressed to her in writing no later than 9:00 a.m. on Tuesday, November 9th. Questions may be faxed to Ms. Hummell at 602-506-2903.

Ms. Hummell also outlined Subsection 103.6 of the Supplementary General Conditions which requires a statement, with the bid, from the Contractor's insurance company that certifies the Contractor will be able to provide the required insurance.

Mr. Rerick emphasized that there are multiple coordination aspects of this contract, particularly sewer and irrigation facilities.

Mr. Rerick reminded the attendees that coordination with Salt River Project is critical for bypassing and reconstructing irrigation facilities. In addition, the contractor shall contact SRP to schedule a pre-construction meeting prior to any construction activities relating to the removal and to the reconstruction of the Gila Drain or irrigation laterals. This pre-construction meeting is in addition to the pre-construction meetings with the District. Mr. Rerick further advised that the contractor must pay close attention to the names and numbers of the SRP employees listed in the specifications to avoid any delays or problems working through SRP right-of-way.

The sewer lift station and the sewer line connections will all be done within the City of Chandler. Mr. Rerick also reminded the attendees to pay close attention to the Sewage Discharge Prevention Program detailed in the Supplementary General Conditions. Some of the sewer lines are surcharged, and the City is very concerned about spillage. The contractor will be responsible to implement the program in its entirety. The addendum will include information regarding the implementation of this program.

Construction of ADOT'S Kyrene South Storm Water Pump Station west of Kyrene Road will be underway at the time of construction of this project. ADOT'S contractor will be constructing a portion of the discharge line that this project will connect to.

The District will have all right-of-way for this project by award from ADOT with the exception of the permanent right-of-way strip along the East side of the Gila Drain. As indicated in the plans and specifications, the District anticipates that this right-of-way will be available after March 1, 2000.

Mr. Rerick advised the attendees that there are three utility companies involved in this project. Southwest Gas is in the process of installing the service for the pump station. In addition, SRP and US West will install a shoofly to the Hearthstone subdivision and the duct bank undercrossings for the channel. There are 8 locations that are shown in the profiles on the channel plans. The contractor must not impact these crossings. In addition, US West will be on the same shoofly as SRP. The plans indicate these overhead crossings, and the contractor will be working under some 12 KV lines. Mr. Rerick reminded the attendees that there are cautionary notes in the plans advising of these crossings, and the contractor should pay close attention to them.

Dan Cook with the City of Chandler advised the attendees that this construction will go along the back of a residential neighborhood. For many years this development has been more isolated, so this project will create concerns for the residents, particularly dust control. Therefore, the City will expect the contractor to stay in strict compliance with dust control regulations, and keep dust to a minimum. The City understands that this will be difficult on this project because of the large amount of earthwork. Nonetheless, the City will be watching dust control very close for its residents' protection.

Mr. Cook further advised the attendees that the sewers are live and most are running at or near capacity with surcharge conditions. Therefore, the contractor must be extremely careful on the tie overs and verify that everything is ready to go and all contingencies are in place before proceeding with the tie over. The City will be watching these aspects of the project very carefully, especially the tie overs being done properly and timely. The contractor must have all the equipment and manpower that will be necessary to do the job properly.

Javier Guana of ADOT emphasized that this is a joint project with the City of Chandler, Flood Control, and ADOT. Flood Control will be handling the construction administration. Eventually, however, the project will be owned and maintained by ADOT. Therefore, ADOT will be involved in the construction of this project. Mr. Guana reminded the attendees of the importance of coordinating with ADOT'S contractor at the locations listed in the plans and specifications.

Questions

Joel Felix of Felix Construction Company asked if flight pumps can be used in this project. Steve Luk of DMJM answered that the equipment used must be as stated in the specifications or an approved equal.

Jason Witmer of D.H. Blattner & Sons noted that there is a discrepancy between the plans and specifications of the required concrete strength for the box culverts. Mr. Rerick advised that the strength should be 4,000 psi, and this will be clarified in the addendum.

Mr. Witmer then stated that Detail D-11 provides all the information they need except the length of the burlap bag or the volume of gravel. Mr. Rerick advised that this will be clarified in the addendum.

Joe Macrel of Carl Larson asked if the optional joint on Detail 9 on Sheet 16 can be changed to a different location. Mr. Rerick answered that ADOT has specified that no construction joints are allowed in the channel bottom. If the low bidder wants to promote a different idea during construction, the District will review the proposal. However, the 12" minimum will not be violated.

Greg Harasha of Meadow Valley asked if geocomposite would be acceptable behind the weep holes. Mr. Rerick indicated that it would not be permitted.

Jim Johnston of Kiewit noted an apparent discrepancy between Sections 505 and 525 in the specifications. Mr. Rerick answered that there is no discrepancy, and the specifications stand as written.

Roger Eischen of Pulice Construction asked why ABC is not permissible as a bedding material, especially since Section 601.4 was modified to allow sand, pea gravel, or chips. Mr. Rerick answered that this item will be clarified in the addendum.

Jim Johnson of Kiewit asked about the removal of asphalt at 79th Street and Hearthstone. Mr. Rerick answered that there are pavement removals beyond what is going to occur in the Hearthstone area; however, Plan Sheets 46, 47, and 48 should provide clarification as to the contractor's responsibility.

Darren House of Pulice Construction requested clarification regarding removal and replacement of the fence along the channel and basin. Mr. Rerick answered that this will be clarified in the addendum.

Jerry Hine of CMX Constructors asked if the 24" by-pass gate valve indicated in the plans is like the 36" valve with the 6" by-pass. Mr. Rerick answered that this will be clarified in the addendum.

Bill Thornton of Sundt asked if there is a waste area on site. Mr. Rerick answered that there is not. However, there is information in the specifications about contacts at the Gila River Indian Reservation. In addition, there is a cost to deposit dirt on the Reservation. Mr. Rerick added that there is a copy of the soils report available at the District's front office at a cost of $4.00 per copy. It does not include the borings because they are already noted in the plans.

Jerry Hine of CMX Constructors asked if there is any way to determine the costs of the permits that will be required for this job. Mr. Rerick recommended that the contractors contact the agencies to determine the cost. The District relies on the contractors to know the job and obtain the appropriate permits.

Roger Eischen of Pulice Construction asked if restrained joints should be used for water lines in sleeves. Mr. Rerick stated that this is covered in Note 20 on Sheet 148 of the plans.

Joel Felix of Felix Construction requested a specification for the rain gauge. Steve Luk of DMJM answered that the sampler will be wired under this contract to accept a rain gauge. However, the rain gauge itself will not be provided in this contract.

Joe Macrel of Carl Larson stated that the channel lining depicted on Sheet 78 does not match the existing. Subsequent to the meeting, the coordinates for the point 51001 were checked, and were found to be correct. Therefore, there is no misalignment of the channel.

Mr. Macrel then asked if the Airpark's requirements have been determined. Mr. Rerick answered that the contractor would be responsible for contacting the Airpark to verify their requirements.

Clifford Hart of FNF asked if the City of Chandler has information regarding flows and capacity volumes of the sewer lines affected by this project. Mr. Rerick answered that Page 10 of 27 of the specifications provide the contact names at the City of Chandler to obtain this information.

Jennifer Bobiwash of Kiewit Western asked if the contractor must remove the buried utilities beyond the limits of the channel. Mr. Rerick answered that ADOT will remove the buried utilities beyond the limits identified on the plans as part of the freeway construction.

A representative from Hunter Contracting asked if the contractor will be responsible for reconstructing existing manholes. If so, there is no detail on how this should be done. Mr. Rerick answered that the contractor will be responsible for reconstructing existing manholes and following normal practice for this task. After discussion with the consultant, the District determined that this item does not require any further clarification.

Mr. Rerick reminded the attendees that an addendum is forthcoming. Some of the items that will be addressed include clarifications and additions to the sewer lift station components. A 30" clay sewer pipe will be included as an alternate bid item. The existing manhole indicated at 101A will not be existing at the time of construction. The Sewage Discharge Prevention Program will also be clarified. In addition, any questions requiring research will also be added to the addendum. Mr. Rerick then reminded the attendees of the copies of the soils report that are available at the District's front office at a cost of $4.00 per copy.

BID SCHEDULE

Contract FCD 99-05, Phase 3- Santan Collector Channel Project

ADOT Project 600-7-503

ITEM NO.	DESCRIPTION	UNIT	APPROX. QTY	UNIT AMOUNT	EXTENDED AMOUNT
105-1	Partnering	LS	1	15,000.00	15,000.00
107-1	NPDES/SWPPP Permits	LS	1		
107-2	Public Information and Notification Allowance	LS	1	50,000.00	50,000.00
107-3	Project Signs Allowance	LS	1	5,000.00	5,000.00
202-1	Mobilization	LS	1		
215-1	Drainage Excavation	CY	351,000		
220-1	Plain Riprap (12-inch D50)	CY	3,162		
220-2	Plain Riprap (18-inch D50)	CY	2,464		
310-1	Aggregate Base Course	SY	22,418		
336-1	Pavement Replacement at Kyrene Road	LS	1		
336-2	Kyrene Road Temporary Detour	LS	1		
350-1	Remove and Replace Fencing	LS	1		
350-2	Remove Pavement, Curb and Gutter, Median	LS	1		
350-3	Remove and Transport Fire Hydrants	EA	5		
350-4	Remove and Transport Street Lights	EA	3		
350-5	Remove and Transport Street Signs	EA	2		

BID SCHEDULE

Contract FCD 99-05, Phase 3- Santan Collector Channel Project

ADOT Project 600-7-503

ITEM NO.	DESCRIPTION	UNIT	APPROX. QTY	UNIT AMOUNT	EXTENDED AMOUNT
610-7	4" Gate Valve	EA	1		
610-8	6" Gate Valve	EA	1		
610-9	**8" Gate Valve (Alternate)**	**EA**	**1**		
610-10	12" Gate Valve	EA	4		
610-11	**12" Gate Valve (Alternate)**	**EA**	**6**		
610-12	**16" Gate Valve (Alternate)**	**EA**	**1**		
610-13	**24" Gate Valve (Alternate)**	**EA**	**8**		
610-14	36" Butterfly Valve	EA	2		
610-15	**36" Butterfly Valve (Alternate)**	**EA**	**2**		
610-16	Air Relief Valve	EA	1		
610-17	**Air Relief Valve (Alternate)**	**EA**	**2**		
610-18	2" Water Service Line for Lift Station	LF	430		
615-1	Lined Ductile Iron Pipe (8"), Class 150	LF	45		
615-2	**Lined Ductile Iron Pipe (24"), Class 150 (Alternate)**	**LF**	**6,102**		
615-3	Lined Ductile Iron Pipe (30"), Class 150	LF	557		
615-4	Lined Ductile Iron Pipe (36"), Class 150	LF	193		

BID SCHEDULE

Contract FCD 99-05, Phase 3- Santan Collector Channel Project

ADOT Project 600-7-503

ITEM NO.	DESCRIPTION	UNIT	APPROX. QTY	UNIT AMOUNT	EXTENDED AMOUNT
615-5	Lined Ductile Iron Pipe (24") Force Main, Class 150	LF	716		
615-6	Steel Casing Pipe (24")	LF	69		
615-7	Steel Casing Pipe (36")	LF	535		
615-8	Steel Casing Pipe (48")	LF	69		
615-9	24" DIP Replacement Sewer	LF	160		
615-10	**Vitrified Clay Pipe (30") (Alternate)**	**LF**	**6,102**		
618-1	Reinforced Concrete Pipe (18", Class III)	LF	62		
618-2	Reinforced Concrete Pipe (24", Class II)	LF	8		
618-3	Reinforced Concrete Pipe (24", Class III)	LF	22		
618-4	Reinforced Concrete Pipe (24", Class V)	LF	140		
618-5	Reinforced Concrete Pipe (36", Class III)	LF	8		
618-6	Reinforced Concrete Pipe (36", Class V)	LF	540		
618-7	Reinforced Concrete Pipe (48", Class II)	LF	44		
618-8	Reinforced Concrete Pipe (54", Class III)	LF	8		
618-9	Reinforced Concrete Pipe (60", Class III)	LF	182		
618-10	Reinforced Concrete Pipe (60", Class IV)	LF	188		

BID SCHEDULE

Contract FCD 99-05, Phase 3- Santan Collector Channel Project

ADOT Project 600-7-503

ITEM NO.	DESCRIPTION	UNIT	APPROX. QTY	UNIT AMOUNT	EXTENDED AMOUNT
618-11	Reinforced Concrete Pipe (60", Class V)	LF	1,450		
618-12	Reinforced Concrete Pipe (90", Class III)	LF	446		
618-13	Reinforced Concrete Pipe (96", Class V)	LF	82		
625-1	Drop Sewer Connection 8" (MAG 426)	EA	2		
625-2	Sanitary Sewer Manhole (5' Diameter, MAG 420)	EA	25		
625-3	Irrigation, Storm Drain and Discharge Line Manholes	EA	8		
650-1	Sanitary Sewer Lift Station	LS	1		
TOTAL BID AMOUNT WRITTEN IN NUMBERS					
TOTAL BID AMOUNT WRITTEN IN WORDS					

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

CERTIFICATE OF INSURANCE

CONTRACT FCD 99-05 **PROJECT TITLE: Phase 3 – Santan Collector Channel Project**

NAME AND ADDRESS OF INSURANCE AGENCY:	***INSURANCE COMPANIES AFFORDING COVERAGES:**		
	Company Letter	A	
	Company Letter	B	
	Company Letter	C	
NAME AND ADDRESS OF INSURED:	Company Letter	D	
	Company Letter	E	
	Company Letter	F	

This certificate of insurance certifies that policies of insurance listed below have been issued to the insured named above and are in full force at this time.

*CO. LTR.	TYPE OF INSURANCE	POLICY NUMBER	EFFECTIVE DATE (MM/DD/YY)	EXPIRATION DATE (MM/DD/YY)	LIMITS	
	COMMERCIAL GENERAL:					
	☒: LIABILITY FORM				GENERAL LIABILITY, EACH OCCURRENCE	$1,000,000
	☒: PREMISES OPERATIONS				PRODUCTS/COMPLETED OPERATIONS AGGREGATE	$2,000,000
	☒: CONTRACTURAL				GENERAL AGGREGATE	$2,000,000
	☒: BODILY INJURY					
	☒: BROAD FORM PROPERTY DAMAGE					
	☒: PERSONAL INJURY					
	☒: PRODUCTS AND COMPLETED OPERATIONS HAZARD					
	☒: EXPLOSION AND COLLAPSE					
	☒: UNDERGROUND HAZARD					
	☒: INDEPENDENT CONTRACTORS					
	COMPREHENSIVE AUTO:					
	☒: LIABILITY AND NON-OWNED				Each Occurrence	$1,000,000
	☐: EXCESS LIABILITY				NECESSARY IF UNDERLYING NOT ABOVE MINIMUM	
	☒: WORKERS' COMPRESATION AND EMPLOYERS' LIABILITY				EMPLOYER'S LIABILITY, each accident DISEASE, each employee DISEASE policy limit	$1,000,000 $1,000,000 $1,000,000
	☒: BUILDERS' RISK ALL-RISK FORM				REPLACEMENT COSTS	
	☒: OTHER:	The Flood Control District of Maricopa County, Maricopa County, City of Chandler, Salt River Project, and the Arizona Department of Transportation, their agents, representatives, officers, directors, officials, and employees are named as Additional Insured's.				

Except for Professional Liability Insurance and Workers' Compensation Insurance, the Flood Control District of Maricopa County and Maricopa County are added as additional insured's on those types of policies described herein which are required to be furnished by this contract entered into between the insured and the Flood Control District. To the extent provided in this contract, insured shall hold harmless the Flood Control District of Maricopa County and Maricopa County from liability arising out of any services provided or duty performed by insured as required by statute, law, purchase order or otherwise required, with the exception of liability for loss or damage resulting from the sole negligence of Flood Control District, its agents, employees, or indemnities. It is agreed that any insurance available to the named insured shall be primary of other sources that may be available. It is further agreed that no policy shall expire, be cancelled, or materially changed to affect the coverage available to the District without thirty (30) days written notice to the District. **THIS CERTIFICATE IS NOT VALID UNLESS COUNTERSIGNED BY AN AUTHORIZED REPRESENTATIVE OF THE INSURANCE COMPANY.**

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY **2801 WEST DURANGO STREET** **PHOENIX, ARIZONA 85009**	**DATE ISSUED:** _____ _____ **AUTHORIZED REPRESENTATIVE**

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	RAM 600-7-503			

Gila Drain Bypass
See Detail D13

TCE

Operation and Maintenance Rd
See Detail D2

Access Ramp
See Detail D6

Exst R/W and
Exst Chain Link Fence

West Channel Cst ℄ & PGL

Kyrene Pump Discharge Line
See Sheets D-1.23 & D-1.24

24" VCP

Gila Drain Cst ℄

Gila Drain Box Culvert
See Sheet IR-6 & IR-7

Gila Drain Diversion Pipe
See Sheet IR-11

Forebay Channel Cst ℄ & PGL

Gila Drain

PI 16+79.79

PI 17+20.00

PI 18+95.91

PC 19+74.40

PT 21+94.40

PI 22+40.00

CAUTION
SRP Overhead Power

Forebay Channel Cst ℄ & PGL

Exst Chain Link Fence
Remove and Replace

Future SR202L Med/Cst ℄

Basin B West Grading & Rip-Rap
See Detail D20

Weir Wall See Detail S7

Stilling Basin See Detail S6

Top of Conc
Channel Lining Lt

Top of Conc
Channel Lining Rt

NOTE:
1. For Removals See
Removal Sheet C-1.02

Sta 13+00.00
Elev 1153.86 Lt
Elev 1156.92 Rt

Top of Conc
Channel Lining Lt

Top of Conc
Channel Lining Rt

Sta 18+95.91
Elev 1154.53 Lt
Elev 1157.60 Rt

Elev 1158.10

Elev 1158.10

Top of Retaining Wall

Top of Retaining Wall
See Detail S10

Elev 1156.00

Elev 1156.00

Sta 22+07.80
Elev 1155.50 Lt
Elev 1155.00 Rt

Sta 22+40.00
Elev 1155.00 Rt (BK)
Elev 1152.70 Rt (AHD)

Sta 25+00.00
Elev 1155.18 Lt
Elev 1152.70 Rt

New Conc Channel

100-Yr Water Surface Profile

Top of Conc
Channel Lining

Gila Drain

Top of Conc Channel Lining

Forebay Weir

Exst Ground Line @ Cst ℄

0.0981%

0.8791%

15.4161%

18.3810%

50.0000%

8" Slab
See Details S11 and S17

0.1081%

Sta 13+00.00
Elev 1145.32

Forebay Channel Cst ℄ & PGL

60" Discharge Pipe
Inv Elev 1146.25

℄ Anchor Slab
Sta 18+79.91
See Detail S17

8" Slab
See Details S11
and S17

PVI 18+95.91
Elev 1146.00

PVI 19+74.40
Elev 1145.31

0.0513%

℄ Anchor Slab
Sta 22+23.80
See Detail S17

Sta 25+00.00
Elev 1141.28

PVI 20+42.90
Elev 1134.75

PVI 21+20.90
Elev 1134.79

PVI 21+94.40
Elev 1148.30

PVI 22+07.80
Elev 1141.60

Exst 24" Sewer
Remove and Replace
See Sheet C-1.02

New 24" Pipe
See Sheet D-1.24

1160 1155 1150 1145 1140 1135 1130 1125 1120 1115

15 20 25

6 3-8' x 6' x 220' CBC
S= Varies

	NAME	DATE
DESIGN	DBL	9/99
DRAWN	CPG	9/99
CHECKED	JRM	9/99

DMJM ARIZONA, INC. 2777 E. CAMELBACK RD. SUITE 200 PHOENIX, AZ. 85016-4302 (602) 337-2777

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION

FOREBAY CHANNEL
PLAN & PROFILE
Sta 13+00 to Sta 25+00

ROUTE 202L | LOCATION SANTAN CHANNEL - PHASE III

DWG. NO. D- 1.20

TRACS NO. H4314 03C | 600-7-503 | ___ OF ___

11/9/99 Remove fence

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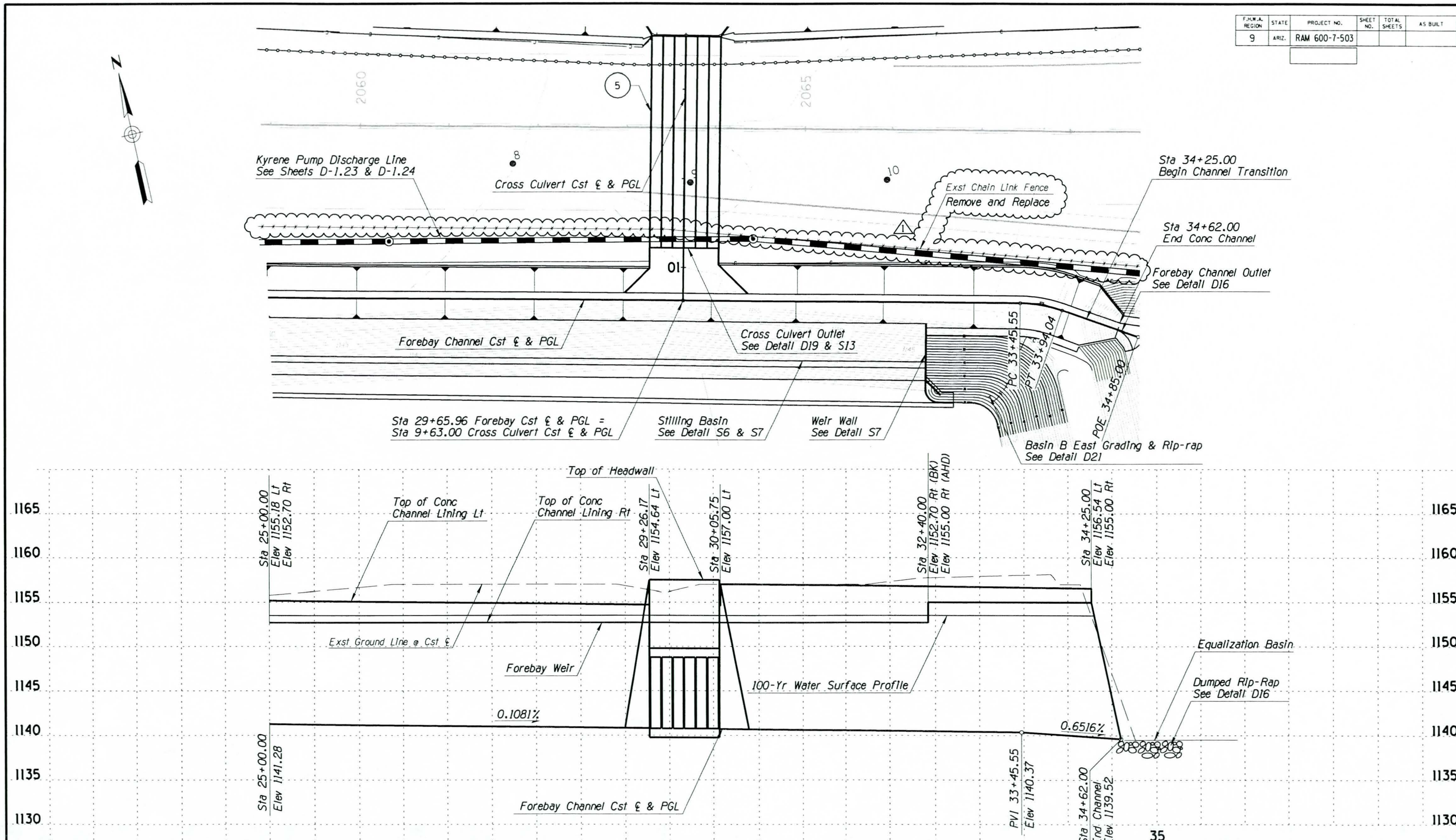

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	RAM 600-7-503			

	NAME	DATE
DESIGN	DBL	9/99
DRAWN	CPG	9/99
CHECKED	JRM	9/99

DMJM ARIZONA, INC.
2777 E. CAMELBACK RD.
SUITE 200
PHOENIX, AZ. 85016-4302
(602) 337-2777

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION

FOREBAY CHANNEL
PLAN & PROFILE
Sta 25+00 to Sta 34+76

ROUTE 202L
LOCATION SANTAN CHANNEL - PHASE III

24999
JEFFREY R. MINCH
ARIZONA U.S.A.

DWG. NO. D- 1.21

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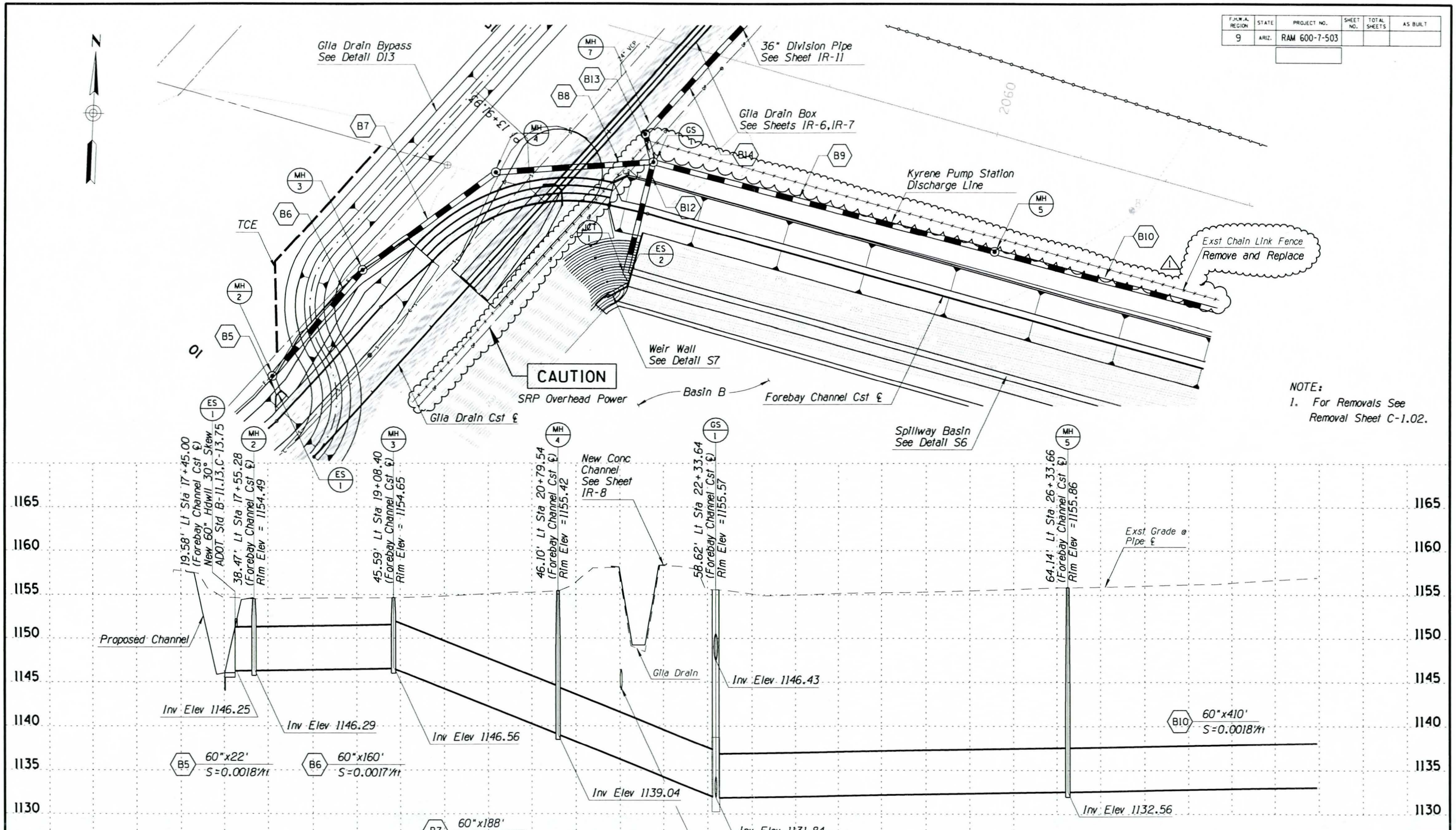

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	RAM 600-7-503			

	NAME	DATE
DESIGN	DBL	9/99
DRAWN	CPG	9/99
CHECKED	JRM	9/99

DMJM ARIZONA, INC. 2777 E. CAMELBACK RD. SUITE 200 PHOENIX, AZ. 85016-4302 (602) 337-2777

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION

KYRENE PUMP STATION
DISCHARGE LINE
PLAN & PROFILE

ROUTE 202L | LOCATION SANTAN CHANNEL - PHASE III

Registered Professional Engineer 24999 JEFFREY R. MINCH ARIZONA U.S.A. 11-3-99

DWG. NO. D- 1.23

TRACS NO. H4314 03C | 600-7-503 | OF

REVISIONS	LOCATION	DATE
Remove Fence	△1	11/9/99

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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	RAM 600-7-503			

Future SR202L Med/Cst ℄

Cross Culvert Inlet
See Detail D19

Cross Culvert Cst ℄

5

MH 6

B11

Exst Chain Link Fence
Remove and Replace

1

Exst Manhole

Exst Pipe

SD

SD

SD

01

Cross Culvert Outlet
See Detail D19

Forebay Channel Cst ℄

Equalization Basin

MH 6

Weir Wall
See Detail S7

Basin B

JCT 1

ES 2

GS 1

70.17' Lt Sta 30+42.93
(Forebay Channel Cst ℄)
Rim Elev = 1157.18

71.96' Lt Sta 34+77.96
Existing Manhole
Rim Elev = 1157.00

77.91' Rt Sta 22+36.69
(Forebay Channel Cst ℄)
See Detail S8

70.44' Rt Sta 22+30.08
(Forebay Channel Cst ℄)
New Conc Pipe Collar
ADOT Std C-13.80

58.62' Lt Sta 22+33.64
(Forebay Channel Cst ℄)
Rim Elev = 1156.47

Cross Culvert
Cst ℄

Exst Grade @
Pipe ℄

36" Diversion Pipe
See Sheet IR-11

Exst Grade @
Pipe ℄

Weir Wingwall
See Detail S7

Inv Elev 1146.43

Bottom of Basin B
Dumped Rip-Rap
See Detail D20

Inv Elev=1142.25

Inv Elev 1133.29

Inv Elev 1141.00

B11 60"x456'
S=0.0197'/ft

Inv Elev=1131.59

Inv Elev=1131.84

B12 24"x140'
S=0.0018'/ft

1165
1160
1155
1150
1145
1140
1135
1130
1125
1120

	NAME	DATE
DESIGN	DBL	9/99
DRAWN	CPG	9/99
CHECKED	JRM	9/99

DMJM ARIZONA, INC. 2777 E. CAMELBACK RD. SUITE 200 PHOENIX, AZ. 85016-4302 (602) 337-2777

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION

KYRENE PUMP STATION
DISCHARGE LINE
PLAN & PROFILE

ROUTE 202L | LOCATION SANTAN CHANNEL - PHASE III

JEFFREY R. MINCH 24999 REGISTERED PROFESSIONAL ENGINEER ARIZONA U.S.A.

DWG. NO. D- 1.24

TRACS NO. H4314 03C | 600-7-503 | OF

11/9/99 Remove Fence

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VIEW NAME:

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	RAM 600-7-503			

Valve Pit Rim Elev = 1164.50
Elect Panel & Control Cabinets Elev = 1164.71
143.35' Lt Sta 32+97.94 1" Water Service Line Hor Bend 85° Rt
8"-Dia Air Line to Scrubber See Dtl U7
¾" Meter Box Per Mag Dtl 320
2" Backflow Prevention Assembly Per COC Dtl 90
1" Hose Bibb not to Extend South of Pad For Control Panel
2" Water Service Line See Sheet U-1.04
Stand By Power Generator Elev = 1164.50
Drainage Flow
Antenna Base Elev = 1164.59
Air Scrubber Elev = 1164.83
Elev = 1164.09
Elev = 1164.42
Elev = 1163.3
Wetwell Rim Elev = 1164.50
Swale to Drain
4 Spaces at 10' = 40'
15'
1163
37.5'
U/G Power Ductbank See Sheet U-2.11
Elev = 1163.7
Elev = 1164.3
Slide Gate 16' Wide
20'
Elev = 1162.9
Elev = 1163.0
Elev = 1163.9
Elev = 1164.11
Elev = 1163.7
Service Drive
60'(±)
30'(±)
Elev = 1162.48
7.5'
Elev = 1163.7
6" ABC (Typ)
Elev = 1164.0
Swale to Drain
22'
16'(±)
7.5'
7.5'
Elev = 1163.9
Elev = 1162.7
Slide Gate 16' Wide
New 36" Sewer See Profile Sheet U-1.04
Elev = 1163.5
Drainage Opening In Wall Elev = 1163.80
10'
Exst 20' Sewer Esmt
New 30" Sewer See Profile Sheet U-1.04
New 36" Sewer See Profile Sheet U-1.04
7.5'
7.5'
Exst 30" Sewer
Elev = 1162.51
10'
10'
91'(±)
Channel Access Road
East Channel Cst ℄ & PGL
Exst 20' Sewer Esmt
Elev = 1163.0
Service Drive
Elev = 1162.66
20'
108.32' Lt Sta 33+24.00 ARV per Dtl U8 Oriented So That Vent Pipe Is Towards South Wall and Out of ABC Limits
New 24" Water Line See Profile Sheet U-3.04
New 24" Force Main See Profile Sheet U-1.05
Channel Access Road
Elev = 1162.70

℄ WALL CORNER LOCATIONS

LOCATION	OFFSET	STATION
NW Corner	134.66' Lt	32+90.25
NE Corner	157.32' Lt	33+32.84
SE Corner	116.27 Lt	33+54.69
SW Corner	93.61' Lt	33+12.09

NOTE:

1. See Detail U-2 For Concrete Pad Structural Details.
2. See Detail U-6 For Wall and Gate Details.

1163 Existing Contours

1163 New Contours

Aggregate Base Course (6" Thk)

	NAME	DATE
DESIGN	REL	9/99
DRAWN	CPG	9/99
CHECKED	STL	9/99

DMJM ARIZONA, INC. 2777 E. CAMELBACK RD. SUITE 200 PHOENIX, AZ. 85016-4302 (602) 337-2777

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION

SEWER LIFT STATION
YARD PIPING &
SITE GRADING PLAN

ROUTE 202L | LOCATION SANTAN CHANNEL - PHASE III

26498 STEPHEN T. LUK 11-3-99

DWG. NO. U- 2.01

TRACS NO. H4314 03C | 600-7-503 | ___ OF ___

10/29/99

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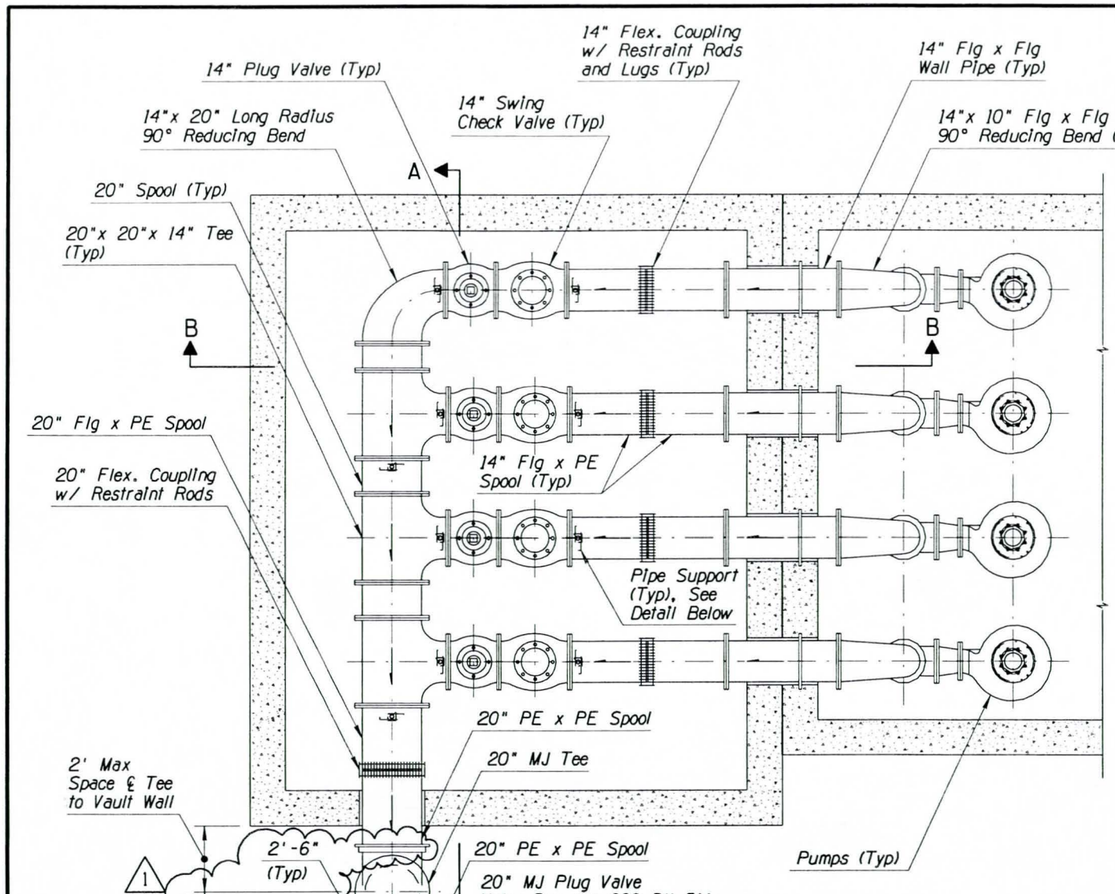
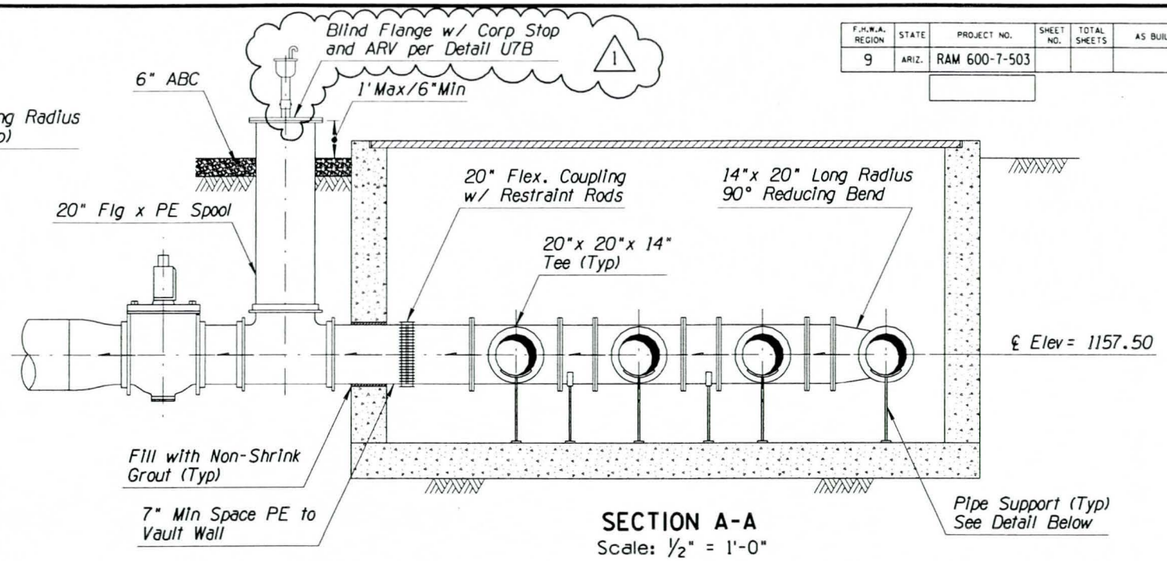
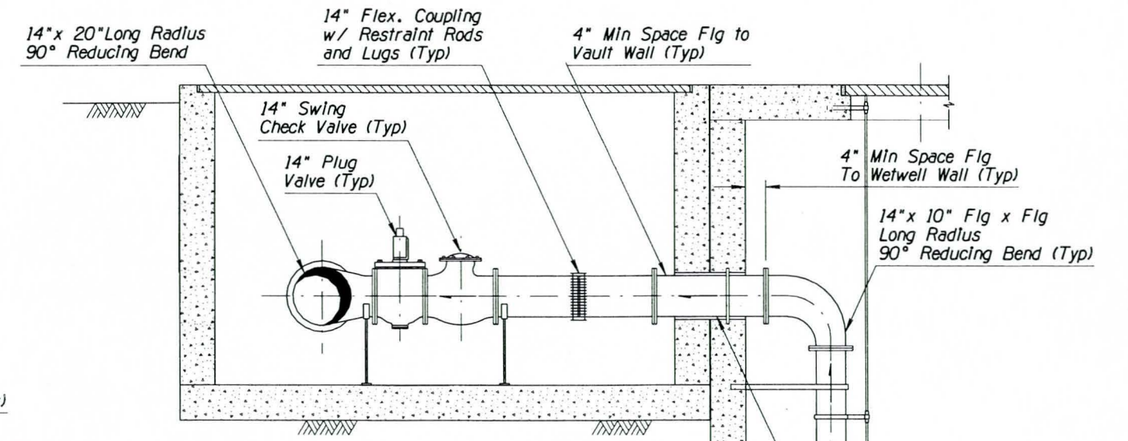
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	RAM 600-7-503			



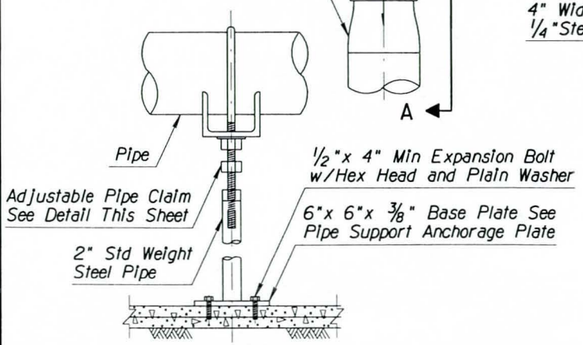
PLAN VIEW
Scale: ½" = 1'-0"



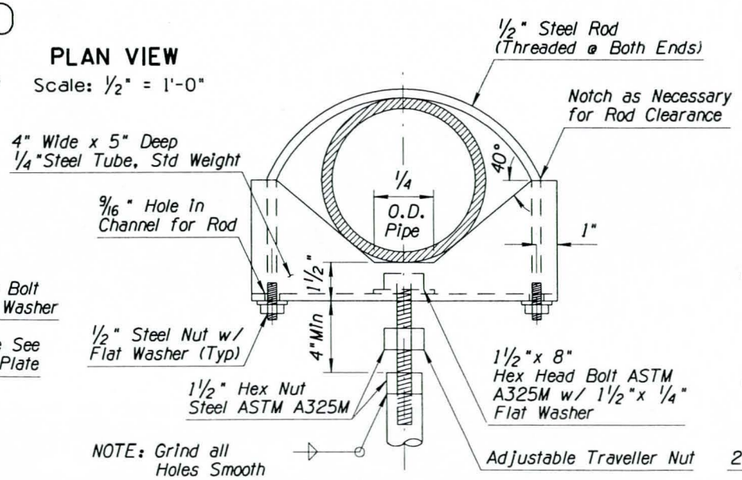
SECTION A-A
Scale: ½" = 1'-0"



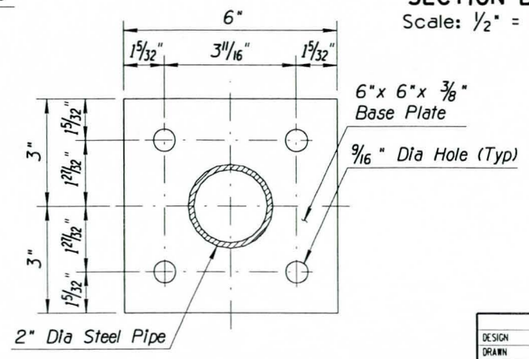
SECTION B-B
Scale: ½" = 1'-0"



PIPE SUPPORT DETAIL
Scale: ⅛" = 1"



PIPE CLAMP DETAIL
Scale: ¼" = 1"



PIPE SUPPORT ANCHORAGE PLATE
Scale: ½" = 1"

	NAME	DATE
DESIGN	REL	9/99
DRAWN	CPG	9/99
CHECKED	STL	9/99

DMJM ARIZONA, INC. — 2777 E. CAMELBACK RD. SUITE 200 PHOENIX, AZ. 85016-4302 (602) 337-2777

ROUTE 202L — LOCATION: SANTAN CHANNEL - PHASE III

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION

SEWER LIFT STATION
PIPING
PLAN AND SECTION

DWG. NO. U- 2.04

TRACS NO. H4314 03C | 600-7-503 | ___ OF ___

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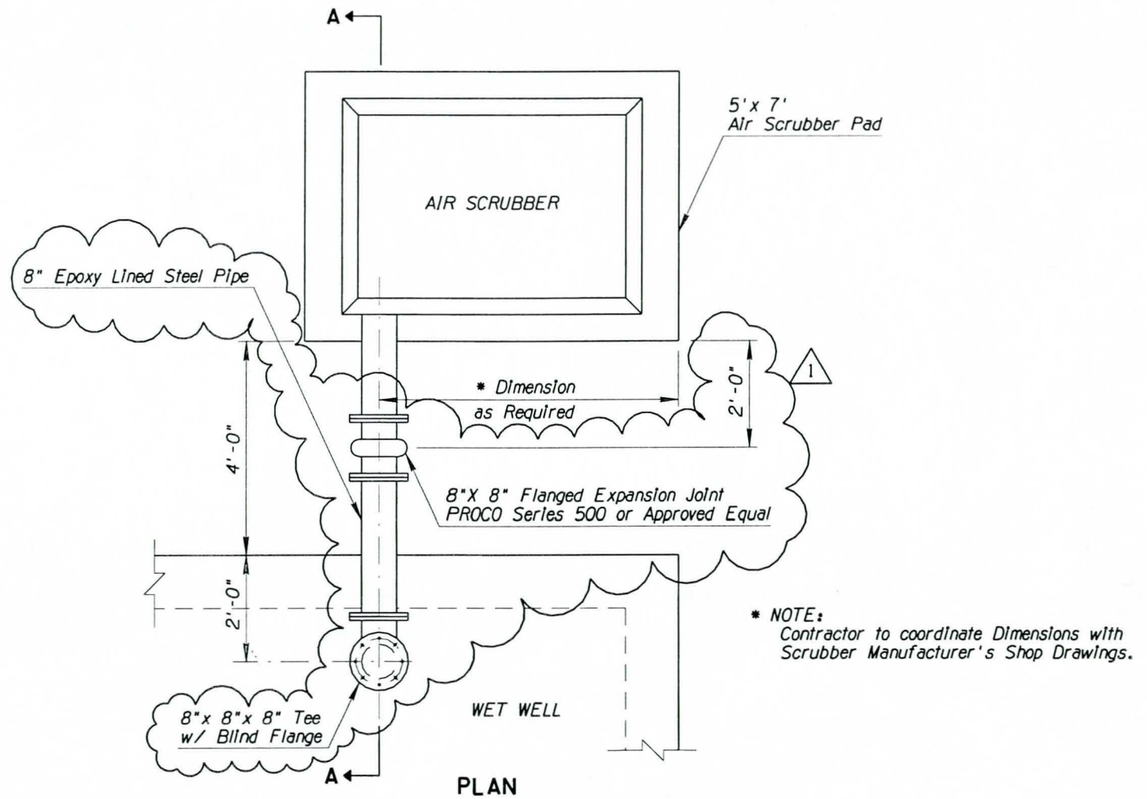
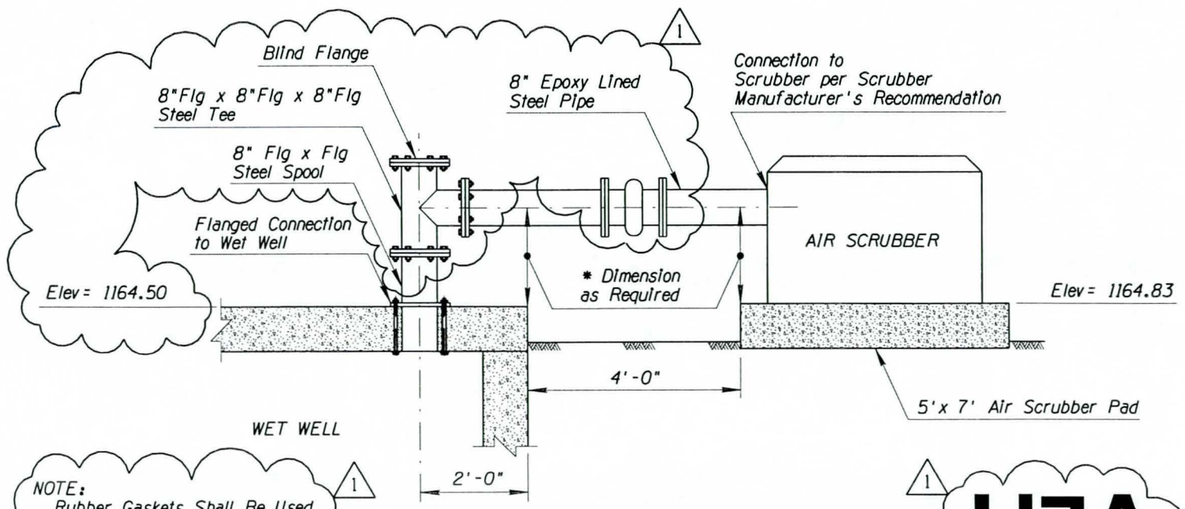
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	RAM 600-7-503			



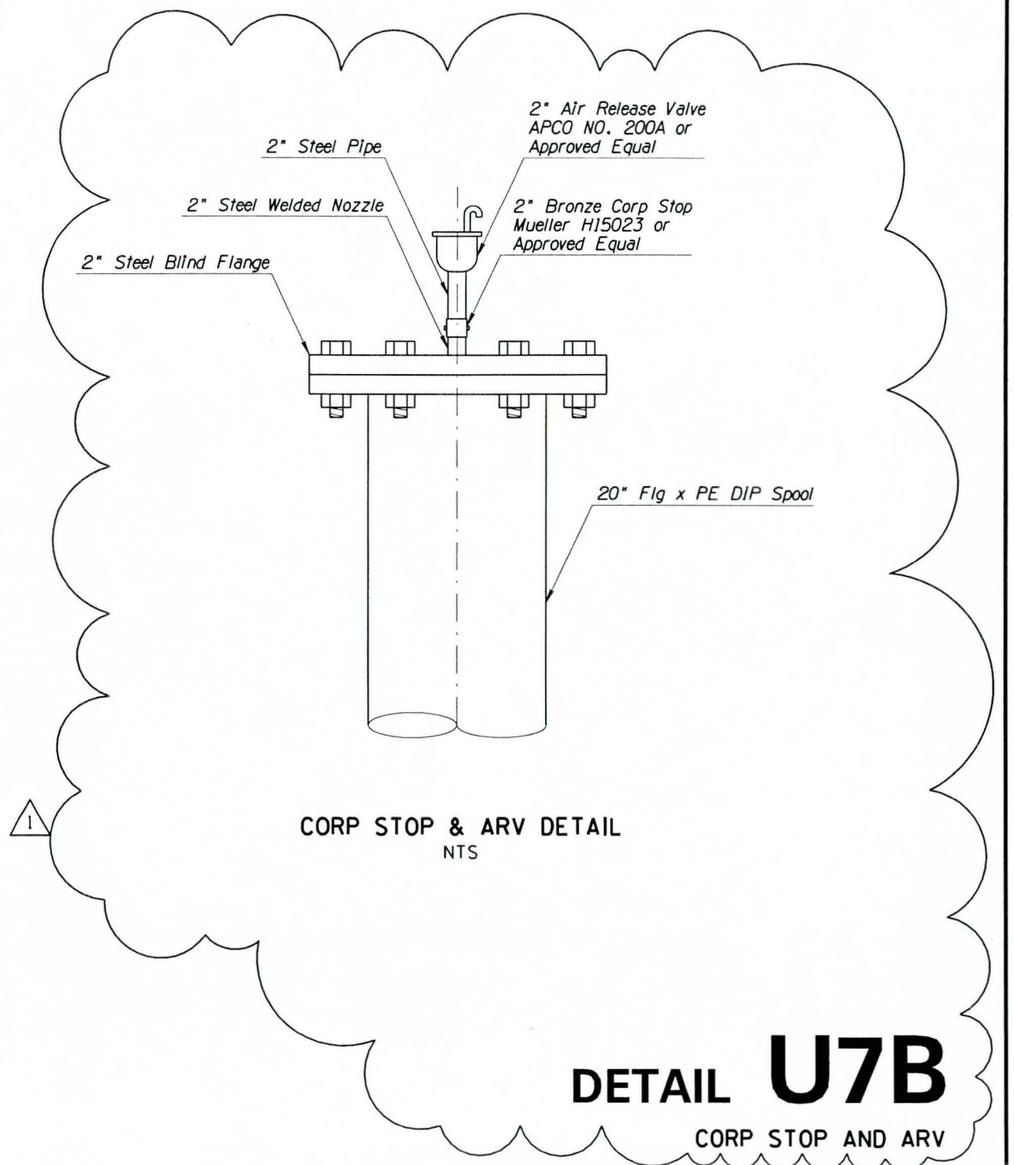
PLAN
Scale: 3/4" = 1'-0"



SECTION A-A
Scale: 3/4" = 1'-0"

DETAIL U7A

KYRENE LIFT STATION - SCRUBBER DUCT



CORP STOP & ARV DETAIL
NTS

DETAIL U7B

CORP STOP AND ARV

	NAME	DATE
DESIGN	REL	9/99
DRAWN	CPG	9/99
CHECKED	STL	9/99

DMJM ARIZONA, INC. 2777 E. CAMELBACK RD. SUITE 200 PHOENIX, AZ. 85016-4302 (602) 337-2777

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION

SEWER LIFT STATION
DETAIL U7A AND U7B

ROUTE 202L | LOCATION SANTAN CHANNEL - PHASE III

26498 STEPHEN T. LUK REGISTERED ARIZONA U.S.A. 11-2-99

DWG. NO. U- 2.09

TRACS NO. H4314 03C | 600-7-503 | ___ OF ___

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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	-			
		-			

Exst 12" DIP Water

Exst 12" PVC Forcemain

Exst 36" CCP Water

Exst 36" x 12" Tee, 36" Plug, 36" Butterfly Valve In Vault & Fire Hydrant

Exst R/W

Exst 16' SRP Easement

Exst 30" Irrigation

New Chain Link Fence

New R/W

East Channel Cst ℄/PGL

Section Line

N

NOTES:

1. Allow 2' Holzontal Separation Between Steel Casing and Vertical Bend.
2. See Detail U12 for Existing Condition of 36" Pipe Plug.

1 See Note 1

2 36" CCP x 851.27' S=0.0034'/ft

3 36" DIP x 24.00' S=0.0034'/ft

4 36" DIP x 18.87' S=-1.0000'/ft

5 36" DIP x 259.18' S=-0.0025'/ft

6 36" DIP x 22.30' S=1.0000'/ft

7 36" DIP x 10.78' S=0.0000'/ft

7 56.52' Lt Sta 176+73.55 (Channel ℄)= PC Sta 27+53.20 (Water ℄) Inv Elev=1170.56

8 56.52' Lt Sta 182+56.95 (Channel ℄)= Sta 33+00.00 (Water ℄) 36" X 12" Tee, 12" Gate Valve 12" MJ Plug and 36" Butterfly Valve Per Dtl U11

8 56.52' Lt Sta 183+09.63 (Channel ℄)= Sta 33+51.27 (Water ℄) Transition Coupling ARV In Next DIP Pipe Length Per Dtl U8

9 Inv Elev=1172.59

10 56.52' Lt Sta 183+33.16 (Channel ℄)= PI Sta 33+71.27 (Water ℄)

10 Inv Elev=1172.66

11 53.71' Lt Sta 183+36.20 (Channel ℄)= Sta 33+75.27 (Water ℄) Vertical Bend 45°, Grade Break

11 Inv Elev=1172.66

12 44.27' Lt Sta 183+46.19 (Channel ℄)= Sta 33+88.61 (Water ℄) Vertical Bend 45°, Grade Break

12 Inv Elev=1159.32

13 160.79' Rt Sta 10+43.21 (Basin G Outfall ℄)= Sta 36+47.79 (Water ℄) Vertical Bend 45°, Grade Break

13 Inv Elev=1158.67

14 173.23' Rt Sta 10+52.89 (Basin G Outfall ℄)= Sta 36+63.56 (Water ℄) Vertical Bend 45°, Grade Break

14 Inv Elev=1174.44

15 181.74' Rt Sta 10+59.51 (Basin G Outfall ℄)= PI Sta 36+74.34 (Water ℄) ARV Per Dtl U8 Remove Exst 36" Plug and Thrust Block, Connect to Exst 36" CCP Waterline w/ 11 1/4° Elbow and Transition Coupling See Note 2

15 Inv Elev=1174.44

Future Grade @ ℄ New Pipe

Proposed Grade @ ℄ New Pipe

Exst Ground Line @ ℄ New Pipe

Exst 30" Irrigation Protect in Place

48" STL x 255.18' See Dtl U9

See Note 1

1190 1185 1180 1175 1170 1165 1160

25 30 35 40

	NAME	DATE
DESIGN	FR	9-99
DRAWN	CPG	9-99
CHECKED	STL	9-99

DMJM ARIZONA, INC. 2777 E. CAMELBACK RD SUITE 200 PHOENIX, AZ. 85016-4302 (602) 337-2777

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION

36 INCH WATER
PLAN AND PROFILE
Sta 174+18.95 to Sta 184+67.70

ROUTE 202L | LOCATION SANTAN CHANNEL-PHASE III

26498 STEPHEN T. LUK REGISTERED PROFESSIONAL ENGINEER ARIZONA U.S.A. 11-3-99

DWG NO. U-3.14

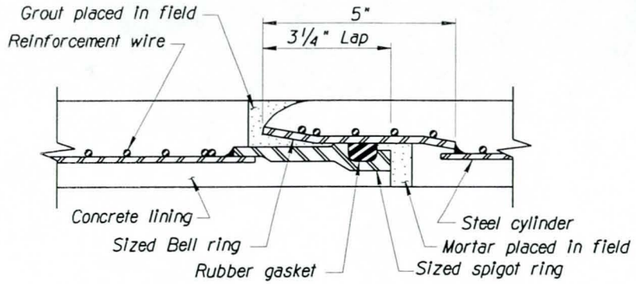
TRACS NO. H4314 03C | 600-7-503 | ___ OF ___

DATE 10/29/99

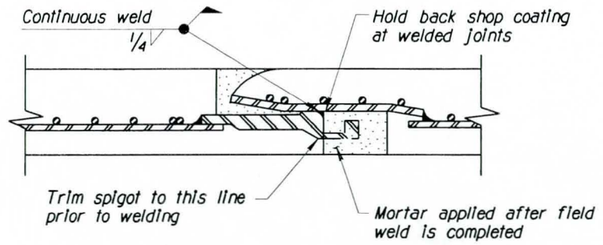
jt\sanc\prod\utl\scwppl1.dgn
11/2/1999 13:29:29

VIEW NAME:

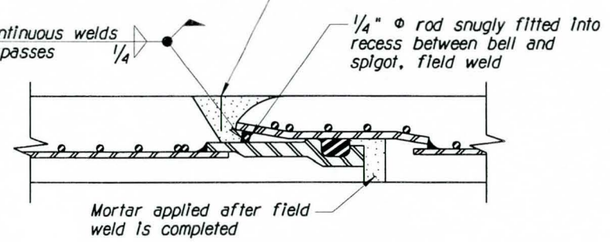
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	RAM 600-7-503			



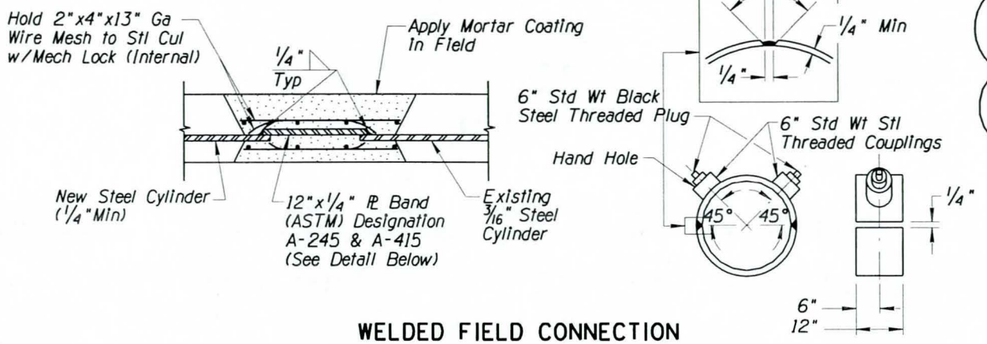
STEEL CYLINDER PIPE SINGLE WRAP PRETENSIONED



INTERNAL FIELD WELD JOINT WITH TRIMMED SPIGOT



EXTERNAL FIELD WELD JOINT

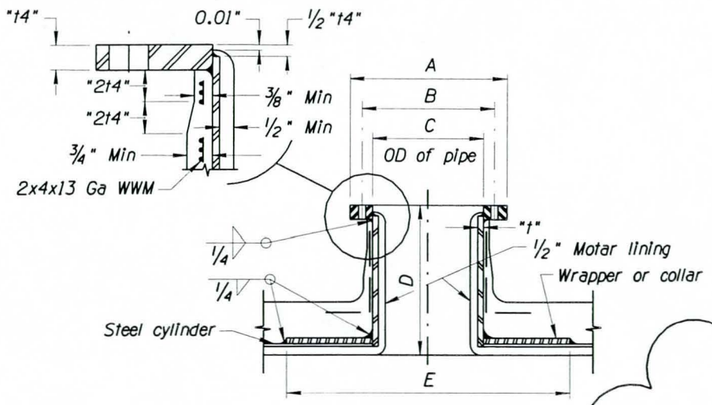


WELDED FIELD CONNECTION

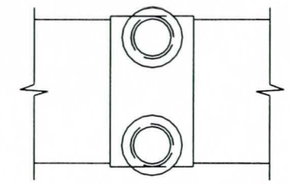
OUTLET TABULATION

NOMINAL SIZE OUTLET	NOZZLE & FLANGE A	B	C	D	"t"	COLLAR E	WRAPPER
6"	11"	9-1/2"	6-5/8"	12"	.280"	17"sqx1/4"Pt	None
8"	13-1/2"	11-3/4"	8-5/8"	12"	.322"	17"sqx1/4"Pt	None
12"	19"	17"	13-1/2"	12"	3/8"	27"sqx1/4"Pt	Required if opening is 1/2 dia of pipe or larger. Submit design with shop drawing
16"	23-1/2"	21-1/4"	16"	14"	3/8"	Submit design w/shop dwgs	
18"	25"	22-3/4"	18"	15"	3/8"		

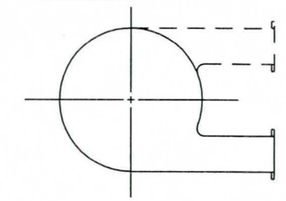
"t4" = Standard flange thickness



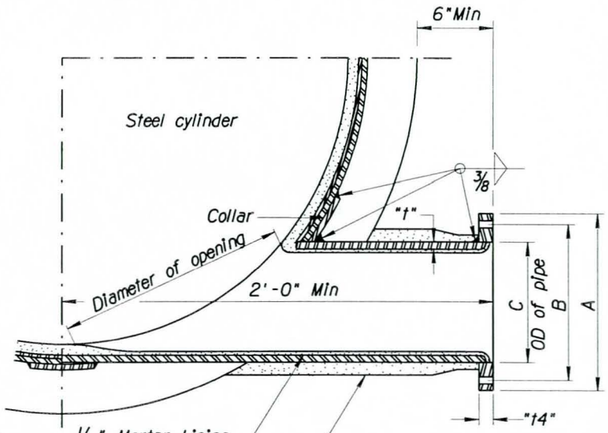
SIDE FLANGED OUTLET



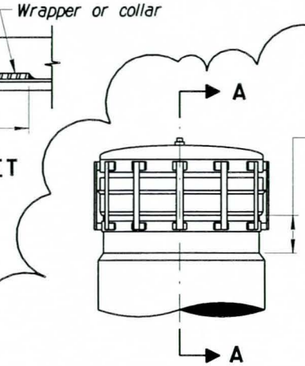
ELEVATION



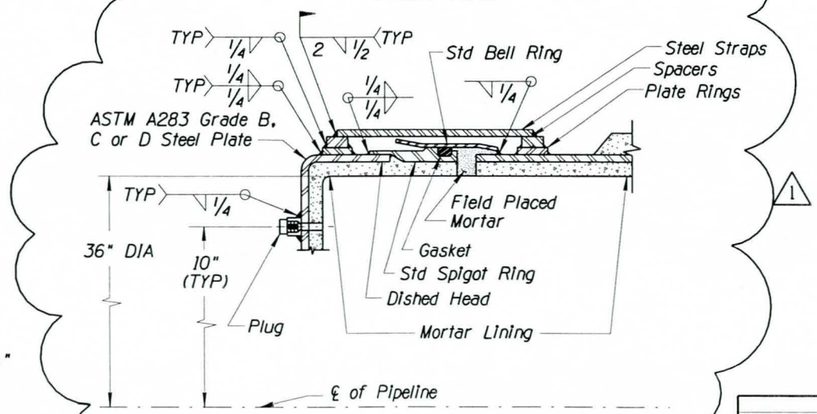
SECTION



TOP OR BOTTOM TANGENTIAL FLANGED OUTLET



PLAN VIEW



SECTION A-A

EXISTING STEEL PLATE PIPE PLUG

DETAIL U12

CONNECTIONS

	NAME	DATE
DESIGN	REL	9/99
DRAWN	CPG	9/99
CHECKED	STL	9/99

DMJM ARIZONA, INC. 2777 E. CAMELBACK RD. SUITE 200 PHOENIX, AZ. 85016-4302 (602) 337-2777

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION

DETAIL SHEET
DETAIL U12

ROUTE 202L | LOCATION SANTAN CHANNEL - PHASE III

26498 STEPHEN T. LUK REGISTERED ARIZONA U.S.A. 11-3-99

DWG. NO. U- 3.19

TRACS NO. H4314 03C | 600-7-503 | ___ OF ___

10/29/99

j:\sanc\prod\gen\scgdt22.dgn VIEW NAME:
11/2/1999 13:30:33

99-05 PLAN HOLDERS LIST

1,7,36
D. H. Blattner & Sons, Inc.
Jason Widman
21640 n. 19th Ave. Suite C-2
Phoenix, AZ 85027
Phone: 623 869-8507
Fax: 623 869-8519
Email

10
Martin K. Eby Construction
Randy Good
2601 E. Thomas Rd. Suite 130
Phx, AZ 85016
Phone: 602 381-9939
Fax: 602 381-5646
Email

4,5
Ameron
Jeff Baker
2325 S. 7th St.
Phoenix, AZ 85034
Phone: 602 252-7111
Fax: 602 258-8275
Email jeff_baker@ameron-intl.com

11,57
Archon, Inc.
Mr. Allen
1200 W. San Pedro
Gilbert, AZ 85233
Phone: 480 892-9291
Fax: 480 892-3556
Email

8,45
Sundt Corporation/Phoenix Office
Bill Thornton
2604 S. 20th Place
Phoenix, AZ 85034
Phone: 602 253-2972
Fax: 602 253-7266
Email wathornton@sundt.com

14,22
R.E. Monks Construction
Mike Claflin
16646 E. Laser Dr.
Fountain Hills, AZ 85269
Phone: 602 837-3684
Fax: 602 837-7373
Email

9,12
Pulice Construction Co.
Joy Lourance
2033 W. Mountain View Rd.
Phoenix, AZ 85021
Phone: 944-2241
Fax: 870-3395
Email

15,16,17
FNF Construction Inc.
Kristi Carpenter
115 S. 48th St.
Tempe, AZ 85281
Phone: 480 784-2910
Fax: 480 921-8720
Email

18,19,38,39
Kiewit Western Co.
Dory Pemberton
3888 E. Broadway Rd.
Phoenix, AZ 85040
Phone: 602437-7878
Fax: 602 437-7806
Email

21
D.B.A. Construction, Inc.
Tom Drysdale
P. O. Box 31886
Tucson, Az 85751-1886
Phone: 520 572-3617
Fax: 520 579-3233
Email

23
Coffman Specialties, Inc.
Danielle Coffman
4375 Jutland Dr. Ste. 260
San Dirgo, Ca 92117-3632
Phone: 619 272-9080
Fax: 619 272-3655
Email

24,25
Ames Constr. Inc.
Dan Brown
3410 E. University Ste.
Phx, Az 85034
Phone: 623 931-2111
Fax: 623 431-5973
Email

26
PCL Civil Constructors, Inc.
Betsy Hitt
1620 W. Fountainhead Pkwy., Ste. 290
Tempe, AZ 85282
Phone: 480 829-6333
Fax: 480 829-8252
Email

27
Mercury Constructors, Inc.
Fred "Stoney" Moore
21642 N. 9th Ave. Ste. 100
Phoenix, AZ 85027
Phone: 623 869-0383
Fax: 623 869-0385
Email

28
Hunter Contracting Co.
Jeff Hamiton
701 N. Cooper Rd.
Gilber, AZ 85299-0900
Phone: 602 892-0521
Fax: 602 892-4932
Email

29
Consolidated Rebar, Inc.
Bill Lucas
321 S. 27th Ave.
Phoenix, AZ 85009
Phone: 602 269-5900
Fax: 602 269-5744
Email

30
Barnard Construction
Chantelle Marhan
701 Gold Ave.
Bozeman, MT 59715-2453
Phone: 406-586-1995
Fax: 406-586-3530
Email

31
C.S. Construction Inc.
Steve Rogers or Mike Borden
22023 N. 20th Ave.
Phoenix, Az 85027
Phone: 623-780-2221
Fax: 623-780-1270
Email

32
Meadow Valley
Mark
4411 S. 40th Street, Ste. D11
Phoenix, AZ 85040
Phone: 602-437-5400
Fax: 602-437-1681
Email

33
Felix Constr. Company
Don Felix
309 East 10 th. Drive
Mesa, Az 85210
Phone: 480-464-0011
Fax: 480-464-0078
Email

34
Northwest Pipe Company
Lisa Campbell
12351 Rancho Road
Adelanto, Ca 92301
Phone: 760-246-3191
Fax: 760-246-2292
Email

35
T&T Construction
Ted Trulson
P. O. Box 17948
Fountain Hills, AZ 85269
Phone: 602 837-2192
Fax: 602 837-7099
Email

37
C.L. Construction Inc.
Carl Larson
2135 E. University Ste. 113
Mesa, Az 85213
Phone: 480-964-2460
Fax: 480-964-2521
Email

40
The Marvin Group, Inc.
R. Laine Coppola
P.O. BOX 2012
Sierra Vista, Az 85636
Phone: 520-515-0078
Fax: 520-515-0083
Email

41
Wescon Corp.
Randy Sulte
1515 W. San Angelo St.
Gilbert, Az 85233
Phone: 602-503-1671
Fax: 602-503-1674
Email

43
C.M.X. Constructors
Jerry Hine
1515 E. Missouri #115
Phoenix, Az 85014
Phone: 602-279-8436
Fax:
Email

44
C.S.W. Contractors
Tom Wible
831 E. Missouri Ave.
Phoenix, Az 85014
Phone: 602-266-7000
Fax: 602-266-7070
Email

46
Harris/Arizona Rebar, Inc.
Bill Boren
P. O. Box 6472
Phoenix, AZ 85005
Phone: 602 254-0091
Fax: 602 340-0977
Email

47
C.L. Ridgeway, L.L.C.
Howard L. Robbins
4455 E. Camelback Rd. Ste. E-160
Phx, Az 85018
Phone: 602 840-7150
Fax: 602 840-7159
Email conarch23@aol.com

48
Quackenbush Constr. Corp.
Harvey Quackenbush
4175 S. Litchfield Rd.
Avondale, Az 85323
Phone: 932-3700
Fax: 932-2228
Email

49
United Metro Materials, Inc.
Jerry McGerty
701 N. 44th. st.
Phoenix, AZ 85008
Phone: 602 220-5605
Fax: 602 220-5629
Email jerrym@metromat.com

50
Edward Kraemer & Sons
Scott Rolfe
1616 E. Indian School Rd.
Phoenix, AZ 85016
Phone: 602 263-5158
Fax: 602 263-1559
Email

51
Dana Kepner Company,Inc.
Marty Gambrel
2401 S. 19th. Ave.
Phx, Az 85009
Phone: 602 838-1356
Fax: 602 838-1587
Email hbarlow@danakepner.com

52
Pierson Construction Corporation
Phil Carosellot
222 S. 52nd St.
Tempe, AZ 85281
Phone: 966-4424
Fax: 894-1086
Email

53
Dunn Del Re Steel Inc.
Gina Vel Re
353 S. Washington St.
Chandler, Az 85225
Phone: 602 963-1424
Fax: 602 963-0051
Email

54
Alliance Service & Control Specialists, Inc.
Rodney Robertson
4846 South 40th St.
Phoenix, Az 85040
Phone: 602 431-8434
Fax: 602 431-8482
Email

55
Haydon Building Corp.
Larry Abel
222 W. Southern Ave.
Tempe, Az 85282
Phone: 408 968-0999
Fax: 480 968-1289
Email

56
Bunneys Inc.
Jeff Jones
11663 W. Bell Rd.
Surprise, Az 85374
Phone: 623 875-1201
Fax: 623 875-1120
Email

59
Concrete Reinforcements
Mike West
13450 W. Peoria Ave.
Surprise, AZ 85379
Phone: 623 975-2970
Fax: 623 975-2790
Email

60
Five G Inc.
Gail Gray
3801 E. Superior Ave.
Phoenix, AZ 85040
Phone: 602 437-0201
Fax: 602 437-4937
Email

61
Hughes Supply Inc.
Todd Teadt
3622 South 30th Street
Phoenix, Az 85040
Phone: 602 268-8781
Fax: 602 268-8973
Email

62
Capital Excavating Inc.
Pual Hollar
25 N. Cottonwood #53
Chandler, Az 85228
Phone: 480 899-6501
Fax: 480 917-0413
Email

63
American Ductile Iron Pipe
Richard Barge
4811 Chippendale Drive #707
Sacramento, Ca 95841-2554
Phone: 916 339-8151
Fax: 916 339-8161
Email

64
American Cast Iron Pipe Company
Ken May
2916 North 16th Street
Birmingham, AL 35207
Phone: 916 339-8151
Fax: 916 339-8161
Email

65
Scholten Enterprises Inc.
Marilyn Scholten
36239 Crocus Dr.
Phoenix, Az 85032
Phone: 602 867-5900
Fax: 602 485-1406
Email

66
James Cooke & Hobson, Inc.
Bruce P. Loring
4632 South 36th. st.
Phx, Az 85040
Phone: 602 243-0585
Fax: 606 276-5402
Email bpl@chinc.com

67
American Fence Company
Bill Wallis
2502 N. 27th Avenue
Phoenix, Az 85009
Phone: 602 272-2333
Fax: 602 272-0396
Email htp://www.americanfence.com

PRE-BID
ATTENDANCE ROSTER

FCD Phase 3 – Santan Collector Channel Project (also known as (SEVRDS)) **Date:** November 3, 1999

FIRM NAME	ATTENDEE PRINT NAME	TELEPHONE NUMBER	FAX NUMBER	Mark with (X) where applicable			
				Prime	Sub	Supplier	Other
HUNTER CONTRACTING	JEFF HAMILTON	(480) 892-0521	(480) 892-1932	X			
D.H. Blatner	Jason Whidman	623 869-8507	623 869-8579	X			
[redacted]							
PCL Civil Const.	Rick Cowan	(480) 829-6383	(480) 829-8252	X			
FNF CONST. INC	CLIFFORD HART	480-784-2910	480-968-7580	X			
HARRIS REBAR	Bill Boren	602-254-0081	602 340 0977		X		
CSW CONTRACTORS, INC	TODD OSTRANSKY	602 266-7000	602 266-7070	x			
Flood Control District	Barbara Hummel	602-506-4876	602-506-3890				
FCD	Fred Fuller	602-506-4728					
FCD	Robert Tannahill	602-506-4724					
FCD	Bobbie Ohler	602 506-2943					✓
DMJM	Steve Luk	602-337-2535	602-337-2624				✓
ADOT	JAVIER GUANA	602-712-8545	602-712-1630				X
MEADOW VALLEY CONTR.	MARK KRUMM	602-437-4111	602-437-4114	X			
[redacted]	[redacted]						
[redacted]	[redacted]						
MEADOW VALLEY	GREG HARASHA	602-437-4111	602-437-4114	X			

PRE-BID
ATTENDANCE ROSTER

FCD Phase 3 – Santan Collector Channel Project (also known as (SEVRDS)) **Date:** November 3, 1999

FIRM NAME	ATTENDEE PRINT NAME	TELEPHONE NUMBER	FAX NUMBER	Mark with (X) where applicable			
				Prime	Sub	Supplier	Other
ENGINEERS INT'L	LEONARD M. VIDRA	480-705-4322	480-705-4339		X		
SUNDT CONSTRUCTION	BILL THORNTON	602-253-2972	602-253-7266	X			
Sundt Construction	Steve Sepich	5207487535	5207506613	X			
Sundt Construction	Melissa Paschall	[illegible]	[illegible]	X			
CMX Constructors	Jerry Hine	602-279-8436	602-279-8498		X		
PULICE CONST INC	DARREN HOUSE	602-944-2241	602-870-3395	X			
PULICE CONST	ROBER EISCHEN	602-944-2241	602-870-3515	X			
FELIX CONSTRUCTION	JOEL FELIX	480 4640011	480 4640074		X		
WESCON CORP	RANDY SCHULTE	480-503-1671	480-503-1674		X		
Concrete Reinforcements	Mike West	623-975-2910	623 975 2790			X	
KIEWIT WESTERN	JEREMY HENSEN	602-437-7860	602-437-7119	X			
Kiewit Western Co.	Jennifer Kobrowski	602-437-7818	602-437-7751	X			
Kiewit Western	Jim Johnston	602-437-7378	602-437-7751	X			
DMJM	JEFF MINCH	602-337-2540	602-337-2620				X
City of Chandler	Ann Cook	480-782-3426	480-782-3415				X
Mercury Constructors	Steve Mouse	602-861-0383	602-861-0385		X		
R.E. MONK CONST	GENE FORTH	480-837-3694	480-837-7373	X			

PRE-BID
ATTENDANCE ROSTER

FCD Phase 3 – Santan Collector Channel Project (also known as (SEVRDS)) **Date:** November 3, 1999

FIRM NAME	ATTENDEE PRINT NAME	TELEPHONE NUMBER	FAX NUMBER	Mark with (X) where applicable			
				Prime	Sub	Supplier	Other
SRP Power	Dan Hawkins	602-[illegible]	[illegible]				X

CONSTRUCTION SPECIFICATIONS

for

CONTRACT FCD 99-05
Phase 3, Santan Collector Channel Project
Southeast Valley Regional Drainage System
PCN 490.01.33

Registered Professional Engineer (Civil)
CERTIFICATE NO. 24999
JEFFREY R. MINCH
DATE SIGNED 10-4-99
ARIZONA, U.S.A.

(Engineer's Seal)

Prepared By

Daniel, Mann, Johnson & Mendenhall (DMJM)
2777 E. Camelback Road, Suite 200
Phoenix, Arizona 85013-4302

for

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

Recommended by: ______________________ **Date:** 10/5/99
Edward A. Raleigh, P.E.
Manager Engineering Division

Issued for Public Bidding by: ______________________ **Date:** 10/6/99
Michael S. Ellegood, P.E.
Chief Engineer and General Manager

SUPPLEMENTARY TO MARICOPA ASSOCIATION OF GOVERNMENTS UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION EDITION OF 1998 AND REVISIONS AND SUPPLEMENTS THERETO.

ATTENTION

ALL PROSPECTIVE BIDDERS

A.R.S. Section 34-201 requires that construction bid proposals be accompanied by a certified check, cashiers check or surety bond for **ten percent (10%)** of the total amount of the bid.

All bonds must be executed solely by a surety company or companies holding a Certificate of Authority to transact surety business in Arizona, issued by the Director of the (State) Department of Insurance.

Bonds (bid, payment and performance) executed by an individual surety or sureties are not in compliance with the Arizona Revised Statutes. Bids received containing bid bonds not in compliance with the Arizona Revised Statutes will be considered as being non-responsive. The use of District-supplied bond forms is required.

Please submit your bids accordingly.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
CONTRACT FCD 99-05
Santan Collector Channel, Phase 3
PCN 490.01.33

TABLE OF CONTENTS

(Area to left reserved for Engineer's Seal)

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

INVITATION FOR BID

BID OPENING DATE: **November 16, 1999 @ 2:00 p.m. local time**

PROJECT LOCATION: The Project is located within the City of Chandler, North of the Pecos Road Alignment from approximately 56th Street to the Price Road alignment.

PROPOSED WORK: The Project consists of approximately 18,650 feet of concrete trapezoidal channel and 3,900 feet of box culvert, a large spillway structure, numerous large diameter storm drain and discharge pipes, large diameter water lines, sanitary sewer lines and a sewer lift station.

BIDS:

SEALED BIDS for the proposed work will be received by the Flood Control District of Maricopa County, 2801 West Durango Street, Phoenix, Arizona 85009 until **2:00 local time on November 16, 1999**, and then publicly opened and read at 2801 West Durango Street, Phoenix, Arizona 85009. All bids are to be marked in accordance with Section 102.9 of the MAG Uniform Standard Specifications and addressed to the Chief Engineer and General Manager, Flood Control District of Maricopa County, 2801 West Durango Street, Phoenix, Arizona 85009. No bids will be received after the time specified for bid opening. All bids must be submitted on proposal forms furnished by the Flood Control District and included in the Proposal Pamphlet. The Board of Directors reserves the right to reject any and all bids and to waive any informality in any bid received.

ELIGIBILITY OF CONTRACTOR:

The bidder shall be required to certify that it has the appropriate "A" Contractor's license in the State of Arizona to perform the before-mentioned type of work. Certification shall be on the form provided herein.

The bidder may be required to furnish an affidavit as evidence of previous satisfactory performance in the above-mentioned type of work.

PRE-BID CONFERENCE:

A Pre-Bid conference will be held on November 3, 1999 at 2:00 p.m. at the Flood Control District, 2801 West Durango Street, Phoenix, Arizona. All potential contractors and subcontractors are encouraged to attend this pre-bid conference and be prepared at that time to submit in writing and discuss any comments concerning this solicitation.

Questions or items for clarification may be addressed to the Contracts Manager, in writing, at least five (5) days prior to bid opening date. Questions received after this deadline may not be accepted. Responses to all questions submitted will be sent to all planholders by addenda. Verbal interpretations, unless specifically addressed by addendum, shall not be binding nor have any legal effect.

CONTRACT TIME:

All work on this Contract is to be completed within three hundred sixty-five (356) calendar days after date of Notice to Proceed.

MBE/WBE PARTICIPATION:

It is the policy of the Flood Control District of Maricopa County to endeavor to ensure in every way possible that minority and women-owned business enterprises have every opportunity to participate in providing professional services, purchased goods, and contractual services without being discriminated against on the grounds of race, religion, sex, age, disability, or national origin.

The Maricopa County Minority and Women-Owned Business Enterprise Program, effective January 1, 1992, is incorporated herein by reference.

Two Affidavits are included herein. The first form, the "M/WBE Assurances Affidavit", must be completed and submitted with the bid - **Failure to do so may be cause for rejection of the bid.** If M/WBE goals have been established, the first and second low bidders must complete and return the second form, "Actual M/WBE Participation Affidavit", to the Flood Control District, by 4:00 p.m. on the seventh calendar day after bid opening,

For this contract, a goal of ten percent (10%) is established for Disadvantaged/Minority/Women-Owned Business Enterprises. Bidders unable to meet the established goal, must submit "Good Faith" documentation. Failure to implement "good faith" efforts in accordance with the City of Phoenix-Maricopa County Consolidated Certification Program for DBE/MBE/WBE to the satisfaction of the District may result in rejection of the bid. Complete instructions and additional forms are available from the Flood Control District, Contracts Branch, telephone number 602-506-4433 or 602-506-4876.

PROJECT PLANS, SPECIAL PROVISIONS AND CONTRACT DOCUMENTS:

The bid documents include three sets of plans; i.e. one set for the channel, one set for the sewer, water, and irrigation work, and one set for cross sections.

Plans and Construction Specifications may be obtained from the Flood Control District of Maricopa County, 2801 West Durango Street, Phoenix, Arizona 85009 upon payment of **$95.00 by check, payable to the Flood Control District of Maricopa County**. This payment will not be refunded. Mail orders for project documents must include an additional $8.00 for first class U.S. postage and handling. The total $103.00 will not be refunded. Regardless of circumstances, we cannot guarantee mail delivery.

Each bid must be accompanied by a Bid Bond executed on the District-supplied bond form, cashier's or certified check or postal money order equal to 10 percent (10%) of the bid, made payable to the Flood Control District of Maricopa County as a guarantee that if the work is awarded to the bidder, the bidder will within ten (10) days of receipt of the Proposal Acceptance, enter into proper contract and bond condition for the faithful performance of the work; otherwise, said amount may be forfeited to the Flood Control District Board of Directors.

****

PRINCIPLE ITEMS AND APPROXIMATE QUANTITIES

QUANTITY	UNIT	DESCRIPTION
351,000	CY	Channel Excavation
26,000	LF	Chain Link Fence
4,000	LF	Concrete Box Culvert
145,000	SY	Concrete Channel Lining
3,100	LF	RCP Pipe
12,200	LF	Dip Water Line
3,600	LF	CCP Water Line
7,600	LF	Dip Sewer Line
1	EA	Sewer Lift

BID

TO THE BOARD OF DIRECTORS
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
PHOENIX, ARIZONA

Gentlemen:

The following Bid is made for **Contract FCD 99-05 for Phase 3 of the Santan Collector Channel Project**, in the County of Maricopa, State of Arizona.

The following Bid is made on behalf of

---

and no others. Evidence of authority to submit the bid is herewith furnished. The bid is in all respects fair and is made without collusion on the part of any person, firm, or corporation mentioned above, and no member or employee of the Board of Directors is personally or financially interested, directly or indirectly, in the bid, or in any purchase or sale of any materials or supplies for the work in which it relates, or in any portion of the profits thereof.

The Undersigned certifies that the approved Plans, Supplementary General Conditions, Special Provisions, Forms of Contract, Bonds, and Sureties authorized by the Board of Directors and constituting essential parts of the bid, have been carefully examined and also that the work site has been personally inspected.

The Undersigned declares that the amount and nature of the work to be done is understood and that at no time will misunderstanding of the Plans, Construction Specifications, Special Provisions, Supplementary General Conditions, or conditions to be overcome, be pled. On the basis of the Plans, Construction Specifications, Special Provisions, Supplementary General Conditions, the Forms of Contract, Bonds, and Sureties proposed for use, the Undersigned proposes to furnish all the necessary machinery, equipment, tools, apparatus, and other means of construction, to do all the work and to furnish all the materials in the manner specified and to finish the entire project within the time hereinafter proposed and to accept, as full compensation therefore, the sum of various products obtained by multiplying each unit price, herein bid for the work or materials, by the quantity thereof actually incorporated in the complete project, as determined by the Engineer or Architect.

The Undersigned understands that the quantities mentioned herein are approximate only and are subject to increase or decrease and hereby proposes to perform all quantities of work, as either increased or decreased, in accordance with the provisions of the Specifications, at the unit price bid in the Bidding Schedule.

The Undersigned further proposes to perform all extra work that may be required on the basis provided in the Specifications and to give such work personal attention and to secure economical performance.

The Undersigned further proposes to execute the Contract Agreement and furnish satisfactory Bonds and Sureties within ten (10) days of receipt of Notice of Bid acceptance, **TIME BEING OF THE ESSENCE.** The Undersigned further proposes to begin work as specified in the Contract attached hereto,

and to complete the work within 365 calendar days from the effective date specified in the Notice to Proceed, and maintain at all times a Payment and Performance Bond, approved by the Board of Directors, each in an amount equal to one hundred percent of the contract amount. This Bond shall serve not only to guarantee the completion of the work on the part of the Undersigned, but also to guarantee the excellence of both workmanship and material and the payment of all obligations incurred, said Bonds and Sureties to be in full force and effect until the work is finally accepted and the provisions of the Plans, Specifications, and Special Provisions fulfilled.

A bid bond in the amount and character named in the Invitation to Bid, and amounting to not less than ten (10) percent of the total bid, is enclosed. The bid bond is submitted as a guaranty of good faith that the Bidder will enter into a written contract to do the work, as provided, if successful in securing the award thereof. It is therefore agreed that if the Undersigned withdraws its bid at any time except as herein provided, or if the bid is accepted and the Undersigned fails to execute the Contract and furnish satisfactory Bonds and Sureties as herein provided, the Flood Control District of Maricopa County shall be entitled and is hereby given the right to retain the said Bid Bond as liquidated damages.

The Undersigned acknowledges receipt of the following addenda, attached these to the bid package, and has included their provisions in the bid:

Addendum No._____ Dated_____

Addendum No._____ Dated_____

Addendum No._____ Dated_____

Addendum No._____ Dated_____

Addendum No._____ Dated_____

The Undersigned has enclosed the required bid security to this Bid.

BID SCHEDULE

Contract FCD 99-05, Phase 3- Santan Collector Channel Project

ADOT Project 600-7-503

ITEM NO.	DESCRIPTION	UNIT	APPROX. QTY	UNIT AMOUNT	EXTENDED AMOUNT
105-1	Partnering	LS	1	15,000.00	15,000.00
107-1	NPDES/SWPPP Permits	LS	1		
107-2	Public Information and Notification Allowance	LS	1	15,000.00	15,000.00
107-3	Project Signs Allowance	LS	1	5,000.00	5,000.00
202-1	Mobilization	LS	1		
215-1	Drainage Excavation	CY	351,000		
220-1	Plain Riprap (12-inch D50)	CY	3,162		
220-2	Plain Riprap (18-inch D50)	CY	2,464		
310-1	Aggregate Base Course	SY	22,418		
336-1	Pavement Replacement at Kyrene Road	LS	1		
336-2	Kyrene Road Temporary Detour	LS	1		
350-1	Remove and Replace Fencing	LS	1		
350-2	Remove Pavement, Curb and Gutter, Median	LS	1		
350-3	Remove and Transport Fire Hydrants	EA	5		
350-4	Remove and Transport Street Lights	EA	3		
350-5	Remove and Transport Street Signs	EA	2		

BID SCHEDULE

Contract FCD 99-05, Phase 3- Santan Collector Channel Project

ADOT Project 600-7-503

ITEM NO.	DESCRIPTION	UNIT	APPROX. QTY	UNIT AMOUNT	EXTENDED AMOUNT
350-6	Remove and Backfill Manholes	EA	13		
350-7	Miscellaneous Removals	LS	1		
401-1	Traffic Control	LS	1		
401-2	Sign and Barricade	LS	1		
401-3	Miscellaneous Traffic Control	LS	1		
405-1	Monuments	EA	51		
420-1	Chain Link Fence	LF	25,600		
420-2	Chain Link Fence Detail D3	LF	220		
420-3	Chain Link Fence Gates	EA	9		
505-1	Transition Walls	CY	806		
505-2	Cross Culvert Wingwalls	CY	181		
505-3	Weir Walls	CY	212		
505-4	RCBC 1, West Channel Siphon Culvert	LF	178		
505-5	RCBC 2, Kyrene Road Culvert	LF	168		
505-6	RCBC 3, McClintock Drive Culvert	LF	191		
505-7	RCBC 4, Hearthstone/Country Club Way Culvert	LF	2,577		

BID SCHEDULE

Contract FCD 99-05, Phase 3- Santan Collector Channel Project

ADOT Project 600-7-503

ITEM NO.	DESCRIPTION	UNIT	APPROX. QTY	UNIT AMOUNT	EXTENDED AMOUNT
505-8	RCBC 5, Santan Freeway Cross Culvert	LF	238		
505-9	RCBC 6, Forebay Channel Siphon Culvert	LF	220		
505-10	Rectangular Channel Section	LF	82		
505-11	Gate Structure (Detail D22)	EA	1		
505-12	Concrete Channel Lining	SY	145,000		
505-13	Gila Drain Concrete Channel Lining	SY	2,200		
505-14	RCBC 7, Gila Drain Cross Culvert	LS	1		
505-15	SRP Laterals Reconstruction	LS	1		
516-1	Storm Water Monitoring Station	LS	1		
520-1	Steel Handrail	LF	1,600		
610-1	Ductile Iron Pipe (12"), Class 150	LF	1,198		
610-2	**Ductile Iron Pipe (24"), Class 150 (Alternate)**	**LF**	**11,014**		
610-3	Concrete Cylinder Pipe (36")	LF	1,299		
610-4	**Concrete Cylinder Pipe (36"), Sta. 160 to 184 (Alternate)**	**LF**	**2,351**		
610-5	**Ductile Iron Pipe (36"), Class 150, Sta. 160 to 184 (Alternate)**	**LF**	**335**		
610-6	**Steel Casing Pipe (48") (Alternate)**	**LF**	**251**		

BID SCHEDULE

Contract FCD 99-05, Phase 3- Santan Collector Channel Project

ADOT Project 600-7-503

ITEM NO.	DESCRIPTION	UNIT	APPROX. QTY	UNIT AMOUNT	EXTENDED AMOUNT
610-7	4" Gate Valve	EA	1		
610-8	6" Gate Valve	EA	1		
610-9	**8" Gate Valve (Alternate)**	**EA**	**1**		
610-10	12" Gate Valve	EA	4		
610-11	**12" Gate Valve (Alternate)**	**EA**	**5**		
610-12	**16" Gate Valve (Alternate)**	**EA**	**1**		
610-13	**24" Gate Valve (Alternate)**	**EA**	**8**		
610-14	36" Butterfly Valve	EA	2		
610-15	**36" Butterfly Valve (Alternate)**	**EA**	**1**		
610-16	Air Relief Valve	EA	1		
610-17	**Air Relief Valve (Alternate)**	**EA**	**2**		
610-18	1" Water Service Line for Lift Station	LF	430		
615-1	Lined Ductile Iron Pipe (8"), Class 150	LF	45		
615-2	Lined Ductile Iron Pipe (24"), Class 150	LF	6,102		
615-3	Lined Ductile Iron Pipe (30"), Class 150	LF	557		
615-4	Lined Ductile Iron Pipe (36"), Class 150	LF	193		

BID SCHEDULE

Contract FCD 99-05, Phase 3- Santan Collector Channel Project

ADOT Project 600-7-503

ITEM NO.	DESCRIPTION	UNIT	APPROX. QTY	UNIT AMOUNT	EXTENDED AMOUNT
615-5	Lined Ductile Iron Pipe (24") Force Main, Class 150	LF	716		
615-6	Steel Casing Pipe (24")	LF	69		
615-7	Steel Casing Pipe (36")	LF	535		
615-8	Steel Casing Pipe (48")	LF	69		
615-9	24" DIP Replacement Sewer	LF	160		
618-1	Reinforced Concrete Pipe (18", Class III)	LF	62		
618-2	Reinforced Concrete Pipe (24", Class II)	LF	8		
618-3	Reinforced Concrete Pipe (24", Class III)	LF	22		
618-4	Reinforced Concrete Pipe (24", Class V)	LF	140		
618-5	Reinforced Concrete Pipe (36", Class III)	LF	8		
618-6	Reinforced Concrete Pipe (36", Class V)	LF	540		
618-7	Reinforced Concrete Pipe (48", Class II)	LF	44		
618-8	Reinforced Concrete Pipe (54", Class III)	LF	8		
618-9	Reinforced Concrete Pipe (60", Class III)	LF	182		
618-10	Reinforced Concrete Pipe (60", Class IV)	LF	188		
618-11	Reinforced Concrete Pipe (60", Class V)	LF	1,450		

BID SCHEDULE

Contract FCD 99-05, Phase 3- Santan Collector Channel Project

ADOT Project 600-7-503

ITEM NO.	DESCRIPTION	UNIT	APPROX. QTY	UNIT AMOUNT	EXTENDED AMOUNT
618-12	Reinforced Concrete Pipe (90", Class III)	LF	446		
618-13	Reinforced Concrete Pipe (96", Class V)	LF	82		
625-1	Drop Sewer Connection 8" (MAG 426)	EA	2		
625-2	Sanitary Sewer Manhole (5' Diameter, MAG 420)	EA	24		
625-3	Irrigation, Storm Drain and Discharge Line Manholes	EA	8		
650-1	Sanitary Sewer Lift Station	LS	1		
TOTAL BID AMOUNT WRITTEN IN NUMBERS					
TOTAL BID AMOUNT WRITTEN IN WORDS					

IF BY AN INDIVIDUAL:

By: _____ _____
(Printed Name - Title) (Address)

_____ _____
(Signature) (Date) (Telephone Number)

IF BY A FIRM, PARTNERSHIP OR L.L.C. (LIMITED LIABILITY COMPANY

_____ _____
(Firm Name) (Firm Address)

By: _____ _____
(Signature - Title) (Date (Telephone Number)

** Name and Address of Each Member, or each Manager of L.L.C. per Operating Agreement

_____ _____
_____ _____
_____ _____
_____ _____

**The name and post office address of each member of the Firm or Partnership must be shown, or of each Manager of an L.L.C., also address of the registered office of the L.L.C.

IF BY A CORPORATION

_____ _____
(Corporate Name) (Corporation Address)

_____ _____
(Printed Name - Title) (Telephone Number)

By: _____
(Signature) (Date)

*Incorporated under the Laws of the State of _____ Names and Addresses of Officers:

_____ _____
(President) (Address)

_____ _____
(Secretary) (Address)

_____ _____
(Treasurer) (Address)

*The name of the State under which the Laws of the Corporation was Chartered and name, title and business address of the President, Secretary, and Treasurer must be shown.

SUBCONTRACTOR LISTING

As required in Section 102.6 of the Supplementary General Conditions, the following is a listing of Subcontractors and material suppliers (including any M/WBE participation) that are to be used in the event the undersigned should enter into contract with the Owner. Although this list will not be considered as final commitment on the part of the successful proposer, any Subcontractor changes from those listed must have Owner's written approval prior to commencement of Subcontractor work on site.

_____

_____

_____

_____

_____
(Signature)

SURETY BOND

KNOW ALL MEN BY THESE PRESENTS:

That we, _____, as Principal, (hereinafter called the Principal), and the _____, a corporation duly organized under the laws of the State of _____, as Surety, (hereinafter called the Surety), are held and firmly bound unto the Flood Control District of Maricopa County as Obligee, in the sum of **ten percent (10%)** of the total amount of the bid of Principal, submitted by him to the Flood Control District of Maricopa County, for the work described below, for the payment of which sum, well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, and administrators, successors and assigns, jointly and severally, firmly by these presents, and in conformance with the Arizona Revised Statutes.

WHEREAS, the said Principal is herewith submitting its proposal for **Contract FCD 99-05 - Phase 3 of the Santan Collector Channel Project.**

NOW, THEREFORE, if the Flood Control District of Maricopa County shall accept the proposal of the Principal and the Principal shall enter into a contract with the Flood Control District of Maricopa County in accordance with the terms of the proposal and give the Bonds and Certificates of Insurance as specified in the Standard Specifications with good and sufficient Surety for the faithful performance of the contract and for the prompt payment of labor and material furnished in the prosecution of the contract, or in the event of the failure of the Principal to enter into the contract and give such Bond and Certificate of Insurance, if the Principal pays to the Flood Control District of Maricopa County the difference not to exceed the penalty of the bond between the amount specified in the proposal and such larger amount for which the Flood Control District of Maricopa County may in good faith contract with another party to perform the work covered by the proposal then this obligation is void. Otherwise it remains in full force and effect, provided, however, that this bond is executed pursuant to the provisions of Section 34-201, Arizona Revised Statutes, and all liabilities on this bond shall be determined in accordance with the provisions of the section to the extent as if it were copied at length herein.

Signed and sealed this _____ day of _____, A.D., _____

_____
Agency of Record, State of Arizona

Agency Address and Phone Number:
_____
_____
_____

_____
Principal

By:_____
(Printed Name) (Signature)
Title:_____

_____
Surety Name
By:_____
Title:_____

Bond Number:_____

ATTACH SURETY POWER OF ATTORNEY

AFFIDAVIT BY CONTRACTOR
CERTIFYING THAT THERE WAS NO COLLUSION
IN BIDDING FOR CONTRACT

STATE OF _____)
)SS
County of _____)

_____ being first duly sworn, deposes and says:

That he/she is _____ of _____ bidding on **Contract FCD 99-05 - Phase 3 of the Santan Collector Channel Project**, in the County of Maricopa, State of Arizona.

That, in connection with the above-mentioned project, neither he/she, nor anyone associated with the aforesaid business, has, directly or indirectly, participated in any collusion, entered into any contract, combination, conspiracy or other act in restraint of trade or commerce in violation of the provisions of A.R.S. Section 34-251, Article 4, as amended.

_____
(Signature of Affiant)

Subscribed and sworn to before me this ___ day of _____, _____

_____
(Notary Public)

_____
My Commission Expires

CERTIFICATION OF LICENSE

Pursuant to A.R.S. Section 32-1169, I hereby state that I hold a current contractor's license, duly issued by the office of the Registrar of Contractors for the State of Arizona, said license has not been revoked, that the license number is:_____ that my privilege license number (as required by A.R.S. Section 42-1305) is:_____; and that, if any exemption to the above licensing requirements is claimed;

(1) The basis for the claimed exemption is:_____ and;

(2) The name(s) and license number(s) of any general, mechanical, electrical, or plumbing contractor(s) to be employed on the work are:

_____

_____

_____

IT IS UNDERSTOOD THAT THE FILING OF AN APPLICATION CONTAINING FALSE OR INCORRECT INFORMATION CONCERNING AN APPLICANT'S CONTRACTOR'S LICENSE OR PRIVILEGE LICENSE WITH THE INTENT TO VOID SUCH LICENSING REQUIREMENTS IS UNSWORN FALSIFICATION PUNISHABLE ACCORDING TO A.R.S. SECTION 13-2704.

_____

Signature of Licensee

Date:_____

Company:_____

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
MINORITY/WOMEN-OWNED BUSINESS ENTERPRISE PROGRAM
DBE/MBE/WBE ASSURANCES AFFIDAVIT

NOTE: FAILURE TO COMPLETE AND SUBMIT THIS AFFIDAVIT WITH THE BID PROPOSAL MAY BE CAUSE FOR REJECTION OF THE BID.

The undersigned, fully cognizant of the Flood Control District of Maricopa County MBE/WBE Program requirements and of the goal established, hereby certifies that in the preparation of this bid,

_____(the entity submitting the bid)

(CHECK ONE)

___ Will meet the **established** goal for participation by Disadvantaged/Minority/Women-Owned Business Enterprises.

___ Will provide the necessary documentation to the Flood Control District to establish that a good faith effort was made.

The first and second low bidders will specify their D/M/WBE participation on the Actual Participation affidavit or provide documentation of their good faith efforts not later than 4:00 p.m., the seventh calendar day following the bid opening. If participation is "None", the documentation shall provide bidder's good faith efforts to obtain the participation. The Flood Control District (District) to determine whether in fact a comprehensive "good faith" effort has been implemented will review this documentation. The required affidavit shall be obtained by the apparent first and second low bidders from the Flood Control District, 2801 West Durango Street, Phoenix, Arizona 85009, Telephone 506-1501 following the bid opening and verbal notification from the Procurement Officer of the Procurement Agency; a SAMPLE affidavit form for reference purposes follows.

_____
Name of Firm

By: _____
Signature

_____
Title

STATE OF_____)
)ss
County of _____)

Subscribed and sworn to before me this ___ day of_____ ___

_____
Notary Public

My Commission Expires:_____

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
- MINORITY/WOMEN OWNED BUSINESS ENTERPRISE PROGRAM

ACTUAL DBE/MBE/WBE PARTICIPATION AFFIDAVIT

(NOTE: COMPLETED AFFIDAVIT MUST BE SUBMITTED WITHIN SEVEN CALENDAR DAYS FOLLOWING THE BID OPENING).

Name of Contractor

Project/Contract No. 99-05 Total Amount of Contract _____

Contract M/WBE Goal: 10 %

Contact Person

Street No.

City State Zip

D/W/WBE FirmPrincipal	Address	Type of Work	Dollar Amount & Contract Percentage

TOTALS (Dollars/Percentage) _____

The undersigned has entered into a formal agreement with the MBE/WBE subconsultants/subcontractors /suppliers listed above, in the execution of this contract with Maricopa County.

Signature

Title

STATE OF _____ }
}ss
County of _____ }

Subscribed and sworn to before me this _____ day of _____ by _____
Notary Public

My commission Expires: _____

MARICOPA COUNTY
MINORITY/WOMEN-OWNED BUSINESS ENTERPRISES PROGRAM

D/M/WBE PARTICIPATION REPORT
(To be attached with Each Request for Pay)

Date: _____

General Contractor/Prime Consultant: _____
Contact Person: _____
Address: _____
Telephone Number: _____
Fax Number: _____

Project Description: _____
Contract Number: _____
For Pay Period of (indicate dates): _____

D/M/WBE Subcontractor/Subconsultant Name: _____
Contact Person: _____
Address: _____
Telephone Number: _____

Type of Firm: _____
Type of Work performed for this project: _____

Total D/M/WBE Subcontract Amount: $_____

Amount Paid to this D/M/WBE Subcontractor this invoice: $_____

Total paid to this Subcontractor to date: $_____

Total D/M/WBE Contract Goal this project = ___%

Total D/M/WBE Participation on this contract to date = ____%

cc: Flood Control District of Maricopa County
Contracts Office
2801 West Durango Street
Phoenix, Arizona 85009

CONTRACT AGREEMENT

THIS AGREEMENT, made and entered into **this** ____ **day of** _____ by and between the FLOOD CONTROL DISTRICT OF MARICOPA COUNTY, hereinafter called the Owner, acting by and through its BOARD OF DIRECTORS, and _____, hereinafter called the Contractor.

WITNESSETH: That the said Contractor, for and in the consideration of the sum of_____($) to be paid to him by the Owner, in the manner and at the times hereinafter provided, and of the other covenants and agreements herein contained, hereby agrees for himself, heirs, executors, administrators, successors, and assigns as follows:

ARTICLE I - SCOPE OF WORK: THE Contractor shall construct, and complete in a workmanlike and substantial manner and to the satisfaction of the Chief Engineer and General Manager, a project for the Flood Control District of Maricopa County, designated as **Contract FCD 99-05 - Phase 3 of the Santan Collector Channel Project,** and furnish at its own cost and expense all necessary machinery, equipment, tools, apparatus, materials, and labor to complete the work in the most substantial and workmanlike manner according to the Plans and Construction Specifications on file with the Flood Control District of Maricopa County, 2801 West Durango Street, Phoenix, Arizona, and such modifications of the same and other directions that may be made by the Flood Control District of Maricopa County as provided herein.

ARTICLE II - CONTRACT DOCUMENTS: The Construction Specifications, i.e. Invitation to Bid, Plans, Standard Specifications and Details, Supplementary General Conditions, Special Provisions, Addenda, if any, Proposal, Affidavits, Performance Bond, Payment Bond, Certificates of Insurance, and Change Orders, if any, are by this reference made a part of this Contract and shall have the same effect as though all of the same were fully inserted herein.

ARTICLE III - TIME OF COMPLETION: The Contractor further covenants and agrees at its own proper cost and expense, to do all work as aforesaid for the construction of said improvements and to completely construct the same and install the material therein, as called for by this agreement free and clear of all claims, liens, and charges whatsoever, in the manner and under the conditions specified within three hundred sixty-five (365) calendar days following notice to proceed.

ARTICLE IV - PAYMENTS: For and in consideration of the faithful performance of the work herein embraced as set forth in the Contract Documents, which are a part hereof and in accordance with the directions of the Owner, through its Engineer and to its satisfaction, the Owner agrees to pay the said Contractor the amount earned, computed from actual quantities of work performed and accepted or materials furnished at the unit bid price on the Proposal made a part hereof, and to make such payment in accordance with the requirements of A.R.S. Section 34-221, as amended. The Contractor agrees to discharge its obligations and make payments to its subcontractors and suppliers in accordance with A.R.S. Section 34-221.

ARTICLE V - TERMINATION: The Owner hereby gives notice that pursuant to A.R.S. Section 38-511(A) this contract may be canceled without penalty or further obligation within three years after execution if any person significantly involved in initiation, negotiation, securing, drafting or creating a contract on behalf of the Owner is, at any time while the contract or any extension of the contract is in effect, an employee or agent of any other party to the contract in any capacity or a consultant to any other party of the contract with respect to the subject matter of the contract. Cancellation under this section shall be effective when written notice from the Chief Engineer and General Manager of the Owner is received by all of the parties to the contract. In addition, the Owner may recoup any fee for commission paid or due to any person significantly involved in initiation, negotiation, securing, drafting or creating the contract on behalf of the Owner from any other party to the contract arising as a result of the contract.

ARTICLE VI - NEGOTIATION CLAUSE: Recovery of damages related to expenses incurred by the Contractor for a delay for which the Owner is responsible, which is unreasonable under the circumstances and which was not within the contemplation of the parties to the contract, shall be negotiated between the Contractor and the Owner. This provision shall be construed so as to give full effect to any provision in the contract which requires notice of delays, provides for arbitration or other procedure for settlement or provides for liquidated damages.

ARTICLE VII - COMPLIANCE WITH LAWS: The Contractor is required to comply with all Federal, State and local ordinances and regulation. The Contractor's signature on this contract certifies compliance with the provisions of the I-9 requirements of the Immigration Reform Control Act of 1986 for all personnel that the Contractor and any subcontractors employ to complete this project. It is understood that the Owner shall conduct itself in accordance with the provisions of the Maricopa County Procurement Code.

ARTICLE VIII - MBE/WBE PROGRAM: The Owner will endeavor to ensure in every way possible that minority and women-owned business enterprises shall have every opportunity to participate in providing professional services, purchased goods, and contractual services to the Owner without being discriminated against on the grounds of race, religion, sex, age, disability, or national origin. The City of Phoenix and Maricopa County Minority, Woman and Disadvantaged Business Enterprise Program is incorporated by reference.

ARTICLE IX - ANTI-DISCRIMINATION PROVISION: The Contractor agrees not to discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, or disability and further agrees not to engage in any unlawful employment practices. The Contractor further agrees to insert the foregoing provision in all subcontracts hereunder.

IN WITNESS WHEREOF: Five (5) identical counterparts of this Contract, each of which shall for all purposes be deemed an original thereof, have been duly executed by the parties hereinabove named, on the date and year first above written.

_____
Party of the First Part

By_____
(Printed Name) (Signature)

Title:_____

Date:_____

_____
Tax Identification Number

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
PARTY OF THE SECOND PART

RECOMMENDED BY:

_____
Chief Engineer and General Manager Date
Flood Control District of Maricopa County

By:_____
Chairman, Board of Directors Date

ATTEST:

_____
Clerk of the Board Date

LEGAL REVIEW

Approved as to form and within the powers and authority granted under the laws of the State of Arizona to the Flood Control District.

By:_____
District, General Counsel Date

STATUTORY PAYMENT BOND PURSUANT TO TITLE 34
CHAPTER 2, ARTICLE 2, OF THE ARIZONA REVISED STATUTES
(Penalty of this bond must be 100% of the Contract amount)

KNOW ALL MEN BY THESE PRESENTS:

That, _____ (hereinafter called the Principal), as Principal, and _____ a corporation organized and existing under the laws of the State of _____, with its principal office in the City of _____ (hereinafter called the Surety), as Surety, are held and firmly bound unto the Flood Control District of Maricopa County, in the County of Maricopa, State of Arizona (hereinafter called the Obligee), in the amount of _____ ($ _____), for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Flood Control District of Maricopa County, dated the _____ day of _____ for **Contract FCD 99-05 - Phase 3 of the Santan Collector Channel Project,** which contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the Principal promptly pays all monies due to all persons supplying labor or materials to the Principal or the Principal's Subcontractors in the prosecution of the work provided for in the contract, this obligation is void. Otherwise it remains in full force and effect.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of the Title 34, Chapter 2, Article 2, Arizona Revised Statutes, and all liabilities on this bond shall be determined in accordance with the provisions, conditions and limitations of Title 34, Chapter 2, Article 2, Arizona Revised Statutes, to the same extent as if they were copied at length in this agreement.

The prevailing party in a suit on this bond shall recover as a part of the judgment reasonable attorney fees that may be fixed by a judge of the court.

Witness our hands this _____ day of _____.

_____
Agency of Record, State of Arizona

Agency Address and Phone Number:
_____
_____
_____
_____

_____
Principal

By: _____
Printed Name and Signature

Title: _____

_____
Surety Seal

By: _____
Title: _____

ATTACH SURETY POWER OF ATTORNEY

STATUTORY PERFORMANCE BOND PURSUANT TO TITLE 34
CHAPTER 2, ARTICLE 2, OF THE ARIZONA REVISED STATUTES
(Penalty of this bond must be 100% of the Contract amount)

KNOW ALL MEN BY THESE PRESENTS:

That, _____ hereinafter called the Principal, as Principal, and _____ a corporation organized and existing under the laws of the State of _____, with its principal office in the City of _____ (hereinafter called the Surety), as Surety, are held and firmly bound unto the Flood Control District of Maricopa County, in the County of Maricopa, State of Arizona, in the amount of _____ ($ _____), for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Flood Control District of Maricopa County, dated the ____ day of _____, for **Contract FCD 99-05 - Phase 3 of the Santan Collector Channel Project,** which contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the Principal faithfully performs and fulfills all of the undertakings, covenants, terms, conditions and agreements of the contract during the original term of the contract and any extension of the contract, with or without notice to the Surety, and during the life of any guaranty required under the contract, and also performs and fulfills all of the undertakings, covenants, terms, conditions and agreements of all duly authorized modifications of the contract that may hereafter be made, notice of which modifications to the Surety being hereby waived; the above obligation is void. Otherwise it remains in full force and effect.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Title 34, Chapter 2, Article 2, Arizona Revised Statutes, and all liabilities on this bond shall be determined in accordance with the provisions, conditions and limitations of Title 34, Chapter 2, and Article 2, Arizona Revised Statutes, to the same extent as if they were copied at length in this agreement.

The prevailing party in a suit on this bond shall recover as part of the judgment reasonable attorney fees that may be fixed by a judge of the court.

Witness our hands this _____day of _____..

_____
Agency of Record, State of Arizona

Agency Address and Phone Number:
_____
_____
_____
_____

_____
Principal

By:_____
Printed Name and Signature

Title:_____

_____
Surety Seal

By:_____
Title:_____

_____

ATTACH SURETY POWER OF ATTORNEY

INDEMNIFICATION

To the fullest extent permitted by law, the Contractor shall defend, indemnify, and hold harmless the Flood Control District of Maricopa County (District), Maricopa County, the City of Chandler, Salt River Project, and the Arizona Department of Transportation, their agents, representatives, officers, directors, officials, and employees from and against all claims, damages, losses and expenses, including but not limited to attorney fees, court costs, expert witness fees, and the cost of appellate proceedings, relating to, arising out of, or alleged to have resulted from the acts, errors, omissions or mistakes relating to the performance of this Contract. The Contractor's duty to defend, indemnify and hold harmless the District, Maricopa County, the City of Chandler, Salt River Project, and the Arizona Department of Transportation, their agents, representatives, officers, directors, officials, and employees shall arise in connection with any claim, damage, loss or expense that is attributable to bodily injury, sickness, disease, death, or injury to, impairment, or destruction of property, including loss of use resulting therefrom, caused by any acts, errors, omissions or mistakes in the performance of this Contract including any person for whose acts, errors, omissions or mistakes, the Contractor may be legally liable.

The amount and type of insurance coverage requirements set forth herein will in no way be construed as limiting the scope of the indemnity in this paragraph.

Abrogation of Arizona Revised Statutes Section 34-226:

In the event that A.R.S. § 34-226 shall be repealed or held unconstitutional or otherwise invalid by a court of competent jurisdiction, then to the fullest extent permitted by law, the Contractor shall defend, indemnify and hold harmless the District, Maricopa County, the City of Chandler, Salt River Project, and the Arizona Department of Transportation, their agents, representatives, officers, directors, officials and employees from and against all claims, damages, losses and expenses (including but not limited to attorney fees, court costs, and the cost of appellate proceedings), relating to, arising out of, or resulting from Contractor's work or services. Contractor's duty to defend, indemnify and hold harmless the District, Maricopa County, the City of Chandler, Salt River Project, and the Arizona Department of Transportation, their agents, representatives, officers, directors, officials and employees shall arise in connection with any claim, damage, loss or expense that is attributable to bodily injury, sickness, disease, death, injury to, impairment or destruction of property including loss of use resulting therefrom, caused in whole or in part by any act or omission of the Contractor, anyone Contractor directly or indirectly employs or anyone for whose acts Contractor may be liable, regardless of whether it is caused in part by a party indemnified hereunder, including the District..

The amount and type of insurance coverage requirements set forth below willin no way be construed as limiting the scope of the indemnity in this paragraph.

The scope of this indemnification does not extend to the sole negligence of the District.

INSURANCE REQUIREMENTS

Contractor, at Contractor's own expense, shall purchase and maintain the herein stipulated minimum insurance with companies duly licensed, possessing a current A.M. Best, Inc. Rating of B++6, or approved unlicensed companies in the State of Arizona with policies and forms satisfactory to the District.

All insurance required herein shall be maintained in full force and effect until all work or service required to be performed under the terms of the Contract is satisfactorily completed and formally accepted. Failure to do so may, at the sole discretion of the District, constitute a material breach of this Contract.

The Contractor's insurance shall be primary insurance as respects the District, and any insurance or self-insurance maintained by the District shall not contribute to it.
Any failure to comply with the claim reporting provisions of the insurance policies or any breach of an insurance policy warranty shall not affect coverage afforded under the insurance policies to protect the District.

The insurance policies may provide coverage which contains deductibles or self-insured retentions. Such deductible and/or self-insured retentions shall not be applicable with respect to the coverage provided to the District under such policies. The Contractor shall be solely responsible for the deductible and/or self-insured retention and the District, at its option, may require the Contractor to secure payment of such deductibles or self-insured retentions by a surety bond or an irrevocable and unconditional letter of credit.

The District reserves the right to request and to receive, within 10 working days, certified copies of any or all of the herein required insurance policies and/or endorsements. The District shall not be obligated, however, to review such policies and/or endorsements or to advise Contractor of any deficiencies in such policies and endorsements, and such receipt shall not relieve Contractor from, or be deemed a waiver of the District's right to insist on strict fulfillment of Contractor's obligations under this Contract.

The insurance policies required by this Contract, except Workers' Compensation, shall name the District and Maricopa County, their agents, representatives, officers, directors, officials and employees as Additional Insureds.

The policies required hereunder, except Workers' Compensation, shall contain a waiver of transfer of rights of recovery (subrogation) against the District and Maricopa County, their agents, representatives, officers, directors, officials and employees.

Required Coverage

Commercial General Liability.
Contractor shall maintain Commercial General Liability insurance with a limit of not less than $1,000,000 for each occurrence with a $2,000,000 Products/Completed Operations Aggregate and a $2,000,000 General Aggregate Limit. The policy shall include coverage for bodily injury, broad form property damage, personal injury, products and completed operations and blanket contractual coverage including, but not limited to, the liability assumed under the indemnification provisions of this Contract which coverage will be at least as broad as Insurance Service Office, Inc. Policy Form CG 00011093 or any replacements thereof. The coverage shall include X, C, U.

The policy shall contain a severability of interest provision, and shall not contain a sunset provision or commutation clause, or any provision which would serve to limit third party action over claims.

The Commercial General Liability additional insured endorsement shall be at least as broad as the Insurance Service Office, Inc.'s Additional Insured, Form B, CG 20101185, and shall include coverage for Contractor's operations and products and completed operations.

If the Contractor subcontracts any part of the work, services or operations awarded to the Contractor, he shall purchase and maintain, at all times during prosecution of the work, services or operations under this Contract, an Owner's and Contractor's Protective Liability insurance policy for bodily injury and property damage, including death, which may arise in the prosecution of the Contractor's work, service or operations under this

Contract. Coverage shall be on an occurrence basis with a limit not less than $1,000,000 per occurrence, and the policy shall be issued by the same insurance company that issues the Contractor's Commercial General Liability insurance.

Automobile Liability.

Contractor shall maintain Automobile Liability insurance with an individual single limit for bodily injury and property damage of no less than $1,000,000, each occurrence, with respect to Contractor's vehicles (whether owned, hired, non-owned), assigned to or used in the performance of this Contract.

Workers' Compensation. The Contractor shall carry Workers' Compensation insurance to cover obligations imposed by federal and state statutes having jurisdiction of Contractor's employees engaged in the performance of the work or services, as well as Employer's Liability insurance of not less than $1,000,000 for each accident, $1,000,000 disease for each employee, and $1,000,000 disease policy limit.

In case any work is subcontracted, the Contractor will require the Subcontractor to provide Workers' Compensation and Employer's Liability insurance to at least the same extent as required of the Contractor.

Builders' Risk (Property) Insurance

The Contractor shall purchase and maintain, on a replacement cost basis, Builders' Risk insurance in the amount of the initial Contract amount as well as subsequent modifications thereto for the entire work at the site. Such Builders' Risk insurance shall be maintained until final payment has been made or until no person or entity other than the District has an insurable interest in the property required to be covered, whichever is earlier. This insurance shall include interests of the District, the Contractor, and all subcontractors and sub-subcontractors in the work during the life of the Contract and course of construction, and shall continue until the work is completed and accepted by the District. For new construction projects, the Contractor agrees to assume full responsibility for loss or damage to the work being performed and to the structures under construction. For renovation construction projects, the Contractor agrees to assume responsibility for loss or damage to the work being performed at least up to the full Contract amount, unless otherwise required by the Contract documents or amendments thereto.

Builders' Risk insurance shall be on an all-risk policy form and shall also cover false work and temporary buildings and shall insure against risk of direct physical loss or damage from external causes including debris removal, demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for architect's service and expenses required as a result of such insured loss and other "soft costs" as required by the Contract.

Builders' Risk insurance must provide coverage from the time any covered property comes under Contractor'S control and/or responsibility, and continue without interruption during construction, renovation, or installation, including any time during which the covered property is being transported to the construction installation site, and while on the construction or installation site awaiting installation. The policy will provide coverage while the covered premises or any part thereof are occupied. Builders' Risk insurance shall be primary and not contributory.

Required coverages may be modified by an amendment to the Contract documents.

If the Contract requires testing of equipment or other similar operations, at the option of the District, the Contractor will be responsible for providing property insurance for these exposures under a Boiler Machinery insurance policy.

Certificates of Insurance

Prior to commencing work or services under this Contract, Contractor shall furnish the District with Certificates of Insurance, or formal endorsements as required by the Contract, issued by Contractor's insurer(s), as evidence that policies providing the required coverages, conditions and limits required by this

Contract are in full force and effect. Such certificates shall identify this contract number and title.

In the event any insurance policy(ies) required by this contract is(are) written on a "claims made" basis, coverage shall extend for two years past completion and acceptance of the Contractor's work or services and as evidenced by annual Certificates of Insurance.

If a policy does expire during the life of the Contract, a renewal certificate must be sent to the District fifteen (15) days prior to the expiration date.

Cancellation And Expiration Notice

Insurance required herein shall not expire, be canceled, or materially changed without thirty (30) days prior written notice to the District.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
CERTIFICATE OF INSURANCE

CONTRACT FCD 99-05 PROJECT TITLE: Phase 3 of Santan Collector Channel Project

NAME AND ADDRESS OF INSURANCE AGENCY	INSURANCE COMPANIES AFFORDING COVERAGES		
	Company Letter	A	
	Company Letter	B	
	Company Letter	C	
NAME AND ADDRESS OF INSURED	Company Letter	D	
	Company Letter	E	
	Company Letter	F	

This is to certify that policies of insurance listed below have been issued to the insured named above and are in force at this time

CO. LTR	TYPE OF INSURANCE	POLICY NUMBER	EFFECTIVE DATE (MM/DD/YY)	EXPIRATION DATE (MM/DD/YY)	LIMITS	
	COMMERCIAL GENERAL ☒ LIABILITY FORM ☒ PREMISES OPERATIONS ☒ CONTRACTUAL ☒ BROAD FORM PROPERTY DAMAGE ☒ EXPLOSION & COLLAPSE ☒ PRODUCTS/COMPLETED OPERATIONS HAZARD ☒ UNDERGROUND HAZARD ☒ INDEPENDENT CONTRACTORS ☒ PERSONAL INJURY				GENERAL AGGREGATE PRODUCTS/COMPLETED OPERATIONS BODILY INJURY AND PROPERTY DAMAGE PERSONAL INJURY EACH OCCURRENCE	$3,000,000 3,000,000 3,000,000 2,000,000
	COMPREHENSIVE AUTO ☒ LIABILITY & NON-OWNED				EACH OCCURRENCE	$2,000,000
	☐ EXCESS LIABILITY				NECESSARY IF UNDERLYING NOT ABOVE MINIMUM	
	☒ **WORKERS' COMPENSATION AND EMPLOYERS' LIABILITY**				STATUTORY each accident	$1,000,000
	☒ **OTHER**	In addition to the Flood Control District, add Maricopa County, City of Chandler, Salt River Project, and the Arizona Department of Transportation as additional insured.				

Except for Professional Liability Insurance and Workers' Compensation Insurance, the Flood Control District of Maricopa County is added as an additional insured on those types of policies described herein which are required to be furnished by this contract entered into between the insured and the Flood Control District. To the extent provided in this contract, insured shall hold harmless the Flood Control District of Maricopa County from liability arising out of any services provided or duty performed by insured as required by statute, law, purchase order or otherwise required, with the exception of liability for loss or damage resulting from the sole negligence of Flood Control District, its agents, employees or indemnities. It is agreed that any insurance available to the named insured shall be primary of other sources that may be available. It is further agreed that no policy shall expire, be canceled, or materially changed to affect the coverage available to the District without thirty (30) days written notice to the District. THIS CERTIFICATE IS NOT VALID UNLESS COUNTERSIGNED BY AN AUTHORIZED REPRESENTATIVE OF THE INSURANCE COMPANY.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
2801 West Durango Street
Phoenix, Arizona 85009

DATE ISSUED _____

_____
AUTHORIZED REPRESENTATIVE

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PHASE 3 - SANTAN COLLECTOR CHANNEL PROJECT
SOUTHEAST VALLEY REGIONAL DRAINAGE SYSTEM

CONTRACT NO. FCD 99-05
PCN 4900133

SUPPLEMENTARY GENERAL CONDITIONS

SUPPLEMENTARY GENERAL CONDITIONS

SPECIFICATIONS

Except as otherwise amended in these Supplementary General Conditions and the Construction Special Provisions, this project shall be constructed in accordance with all applicable Maricopa Association of Governments (MAG) Uniform Standard Specifications and Uniform Standard Details, dated 1998, and including revisions through 1999, Arizona Department of Transportation (ADOT) Standard Specifications for Road and Bridge Construction, dated 1990, ADOT Stored Specifications included in this document, ADOT Standard Structure Drawings, dated June 1992, and ADOT Construction Standard Drawings, dated July 1994, including all revisions and notices through 1998.

PRECEDENCE OF CONTRACT DOCUMENTS

This Contract and its designated documents, whether taken separately or together, are to be interpreted according to full intent, meaning, and spirit, and shall be deemed to mutually explain each other and to be descriptive of any materials to be furnished and the work to be performed under this Contract. In cases of any difference or discrepancy between the Contract documents, the order of precedence shall be a) Addendum to the Invitation for Bids, b) the Contract form, c) Supplementary General Conditions, d) Construction Special Provisions, e) Project Plans, f) ADOT Standard Specifications and Standard Details and Drawings, and g) MAG Uniform Standard Specifications and Uniform Standard Details.

Subsection 101.2 - Definitions and Terms:

1. Change the definition of the phrase "Board of Supervisors" to being the Board of Directors acting under the authority of the laws of the State of Arizona and in their capacity of the Board of Directors of the Flood Control District of Maricopa County.

2. Change the definition of the phrase "Budget Project" to being a project financed by funds set aside in the annual budget or otherwise approved by the Flood Control District of Maricopa County Board of Directors.

3. Add to the definition of the phrase "Contract Documents," the phrase "Supplementary General Conditions."

4. Change the definition of the term "Engineer" to being the person appointed by the Flood Control District of Maricopa County Board of Directors to the office of Chief Engineer and General Manager of the Flood Control District of Maricopa County acting directly or through its authorized representative, the Chief of the Flood Control District of Maricopa County Planning and Project Management Division.

5. Change the definition for the phrase "Notice of Award" to a letter from the Flood Control District of Maricopa County advising Contractor that it is the successful bidder and the Flood Control District of Maricopa County has accepted its proposal.

6. Change the definition of the term "Owner" to the Flood Control District of Maricopa County, acting through its legally constituted officials, officers, or employees.

7. Whenever the word "District" is used in these Specifications, it shall mean the Flood Control District of Maricopa County.

8. Add the definition for Maricopa County Minority Business Office (MBO); the office responsible for administering the Maricopa County Minority and Women Owned Business Enterprise Program.

9. Add the definition for the Maricopa County Minority and Women Owned Business Enterprise Program as being the Program adopted by the Board of Supervisors effective January 1, 1992.

Subsection 102.4 - Examination of the Plans, Special Provisions, and Site Work: Add the following:
The soil boring logs (included in the plan set) and Geotechnical reports, including ground water conditions, are available for review at the Owner's office, and Contractors are encouraged to do so. Existing moisture conditions shall be no basis for claim for additional money or time extensions. The Contractor shall manipulate the existing soil as required to achieve stable soil conditions and the required densities, as well as safe and stable side slopes during construction activities.

Cross-sections plotted at 100 foot intervals for the Santan Outfall Channel are available for review, and also for purchase, at the Owner's office.

Subsection 102.5 - Preparation of Proposal: Add the following:
Proposals, including the Bidding Schedule, must be legibly written in ink or typed, with all prices given in numerals. In case of a conflict between the unit bid price and the extension, the unit bid price will govern.

It shall be the responsibility of prospective bidders to determine, prior to submission of a bid, if any addenda have been issued by the Flood Control District. This may be accomplished by calling 602-506-1501. Any addendum issued, if not already bound into the Special Provisions, **must be attached and included as part of the Specifications** and any quantities on the Bidding Schedule requiring change shall be adjusted to the new figure by pen and ink. **Bids which do not have appropriate addenda attached and show appropriate changes to the Bidding Schedule, and receipt of addenda acknowledged in the Proposal shall be invalid.**

The bidder's Arizona State Contractor's License number and the classification under which it proposes to perform the work shall be shown on the proposal. An **"A" General Engineering** License is required for this contract. The two lowest bidders may be required to provide certification of prior satisfactory completion for similar construction and to furnish a copy of their license and the renewal certificate.

Subsection 102.6 - Subcontractors' List: Add the following:
A list of subcontractors to be employed on the project shall be submitted with the bid, on the form provided in the Proposal. Following Notice of Award, no change of the subcontractors named therein will be made unless first approved in writing by Owner.

Subsection 102.7 - Irregular Proposals: Add the following:
(F) If the Maricopa County Minority and Women-Owned Business Enterprises Assurances Affidavit is not completed and submitted.
(G) If any addenda are not acknowledged and attached.
(H) If the Owner's bond forms are not utilized.
(I) If the entire specifications document is not returned.
(J) If the Owner's provided Certificate of Insurance form is not utilized.

Subsection 103.3 - Award of Contract: Add the following:

The Contract shall be awarded on the Total Base Bid plus all Alternates. However, the Owner reserves the right to award or not to award any one or all of the Alternates.

Subsection 103.6 - Contractor's Insurance: Add the following:
A statement from the bidder's insurance carrier shall be included in the proposal certifying that it will furnish the specified kind and amounts of insurance to the bidder if it is awarded the contract, and that it will execute the form of Certificate of Insurance included in the documents. As required by law, the statement will be from an insurance carrier or carriers authorized to do business in the State of Arizona, or countersigned by an agent of the carrier authorized to do business in the State of Arizona. Concurrently with the execution of the contract, Contractor shall furnish a Certificate of Insurance, using the included Certificate, that names the additional insureds as set out in the Certificate. The Certificate shall also name the additional insureds as Certificate Holders. The types of insurance and the limits of liability shall be as indicated on the included form.

Subsection 103.6.1(D) - Contractor's Insurance: Add the following:
Include additional insureds as indicated on the included Certificate of Insurance.

Subsection 104.1 - Work to be Done: Add the following:
All water for construction purposes, drinking water, lighting, temporary electric power, heat and telephone service shall be arranged and provided for as per requirements of the work by Contractor at his expense.

Add the following to 104.1.2:
The major facilities to be constructed include: the east and west collector channels consisting of concrete lined open channel; box culverts at Kyrene Road, McClintock Drive, Hearthstone Subdivision, Santan Freeway crossing; box culvert siphon for the forebay channel, and the west collector channel under the Gila Drain; forebay concrete lined channel; Basin B diversion weir; Basin G discharge pipe; Kyrene South Pump Station discharge line; and storm water monitoring station.

Utility relocations include the Salt River Project (SRP) Gila Drain and irrigation laterals in Kyrene Road and McClintock Drive. The Gila Drain and the two irrigation laterals must be temporarily diverted while the box culverts are under construction. After the box culvert segments are installed, the Gila Drain will be replaced in its current alignment as a box culvert and the two irrigation laterals will be replaced as slip form ditches, in accordance with the SRP plans attached to a made a part of the plans. In addition, the temporary diversion of the Gila Drain cannot be removed until after SRP has constructed the permanent Gila Drain diversion structure at the north end of the permanent Gila Drain box culvert and channel.

Other utility relocations include the relocation of an existing City of Chandler sanitary sewer in Kyrene Road; construction of a sewage lift station and force main just east of Kyrene Road; relocation of sanitary sewers and water lines from Rural Road to Country Club Way, and construction of a water line from McClintock Drive to Kyrene Road, and Country Club Way to the west of Price Road.

New rights-of-way being acquired along the east side of the Gila Drain and north of the West Collector Channel will not be available for construction activities until after March 1, 2000.

Subsection 104.2.3 - Changes: Add the following:
The Owner may at any time, by written order, and without notice to the sureties, if any, make changes within the general scope of this contract in any one or more of the following:
A) Drawings, designs, or specifications;
B) Method or manner of performance of the work;
C) Owner-furnished facilities, equipment, materials, services, or site;

D) Directing acceleration in the performance of the work.

Any other written or oral order from the Owner that causes a change shall be treated as a change order under this section provided that the Contractor gives the Owner written notification within two work days after receipt of such direction stating:

A) The date, nature, and circumstances of the conduct regarded as a change;
B) The particular elements of the contract performance for which the Contractor is seeking an equitable adjustment under this section, including any price or schedule adjustments;
C) The Contractor's estimate of the time by which the Owner must respond to the Contractor's notice to minimize cost, delay, or disruption of performance.

The Contractor shall diligently continue performance of this contract to the maximum extent possible in accordance with its provisions. Except as provided in this section, no order, statement, or conduct of the Owner shall be treated as a change or entitle the Contractor to an equitable adjustment. If any change under this section causes an increase or decrease in the Contractor=s cost of, or the time required for, the performance of any part of the work under this contract, the Owner shall make an equitable adjustment and modify the contract in writing. The equitable adjustment shall not include increased costs or time extensions for delay resulting from the Contractor's failure to provide notice or to diligently continue performance. No proposal for the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this contract.

Subsection 104.2.4 - Cost Estimates or Price Proposals:
The Contractor and any lower-tier subcontractors shall submit itemized cost estimates or price proposals for any owner-directed change order or Contractor-initiated claim.

Cost estimates or pricing proposals shall be itemized to include direct labor by man-hours, individual craft, hourly wage rate and verifiable labor burden. Other direct costs shall include rental and operator rates for rented or owned equipment, material trucking expenses and other costs clearly identified and directly allocable to contract performance. Material costs shall be itemized by item description, quantity for each item, unit price per item, including applicable sales tax markup, and extended total price per item. The Contractor shall provide copies of material supplier quote sheets, invoices or purchase orders, as appropriate.

Lump sum cost estimates or price proposals shall be rejected and returned to the Contractor for itemization as described above. Failure of the Contractor to submit properly itemized cost estimates or price proposals shall not constitute an excusable delay and will result in a change order being unilaterally priced at the Owner's fair estimated price.

Subsection 104.2.6 - Value Engineering:

A) ***General***. The Contractor is encouraged to voluntarily develop, prepare, and submit value engineering change proposals (VECPs). The Contractor shall share in any instant contract savings realized from accepted VECPs, in accordance with paragraph F below. The Owner reserves the right to make alterations to the contract, in accordance with procedures elsewhere within this contract. Such alterations will not be eligible for inclusion in any VECP.

B) ***Definitions***.
Contractor's development and implementation costs means those costs the Contractor incurs on a VECP in developing, testing, preparing, and submitting the VECP as well as those costs incurred by the Contractor to make the changes required by the Owner's acceptance of the VECP.

Owner costs means those owner costs that result directly from developing and implementing the VECP, such as any net increases in the cost of testing, operations, maintenance, and logistical support. The term does not include the normal administrative costs of processing the VECP.

Instant contract savings means the estimated reduction in Contract cost of performance resulting from acceptance of the VECP, minus the allowable Contractor's development and implementation costs, minus subcontractor's development and implementation costs (see paragraph G below).

Value engineering change proposal (VECP) means a proposal that (1) requires a change to the contract; (2) results in reducing the contract price or estimated cost without impairing essential functions or characteristics; and (3) does not involve a change in deliverable end item quantities, schedule, or a change to the contract type.

C) ***VECP Preparation***. As a minimum, the Contractor shall include in each VECP the information described in subparagraphs (1) through (7) below. If the proposed change affects contractually required schedule and cost reporting, it shall be revised to incorporate proposed VECP modifications. The VECP shall include the following:

(1) A description of the difference between the existing contract requirement and that proposed, the comparative advantages and disadvantages of each, a justification when an item's function or characteristics are being altered, and the effects of the change on the end item's performance. All design changes must be submitted on 24"x 36" standard drawing sheets along with supporting calculations. Each drawing sheet and at least the content sheet of the calculations shall be sealed by an Engineer registered in the State of Arizona.

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

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

(4) A description and estimate of costs the Owner may incur implementing the VECP, such as test and evaluation and operating and support costs. This is an estimate based only on the Contractor's understanding of additional efforts to be expended by the Owner, should the VECP be accepted. The final cost will be determined by the Owner.

(5) A prediction of any effects the proposed change would have on collateral costs to the agency, i.e., costs of operation or maintenance.

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

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

D) ***Submission***. The Contractor shall submit VECPs to the Owner's Engineer.

E) ***Owner Action***.

(1) The Owner will notify the Contractor of the status of the VECP within 15 calendar days after receipt from the Contractor. If additional time is required, the Owner will notify the Contractor within the 15-day period and provide the reason for the delay and the expected date of the decision. The Owner will process VECPs expeditiously; however, it shall not be liable for any delay in acting upon a VECP.

(2) If the VECP is not accepted, the Owner will notify the Contractor in writing, explaining the reasons for rejection.

(3) The Contractor may withdraw any VECP, in whole or in part, at any time before it is accepted by the Owner.

(4) Any VECP may be accepted, in whole or in part, by the Owner's award of a change order to this contract, citing this subsection. The Owner may accept the VECP, even though an agreement on price reduction has not been reached, by issuing the Contractor a notice to proceed with the change. Until a notice to proceed is issued or a change order incorporates a VECP to this contract, the Contractor shall perform in accordance with the existing contract. The Owner's decision to accept or reject all or any part of any VECP shall be final and not subject to disputes or otherwise subject to litigation.

F) ***Cost Sharing***.

(1) **Rates**. The Owner's share of savings is determined by subtracting the Owner's costs from instant contract savings and multiplying the result by 50 percent. The Contractor's share shall be the remaining 50 percent.

(2) **Payment**. Payment of any share due the Contractor for use of a VECP on this contract shall be authorized by a change order to this contract to accept the VECP, reduce the contract price or estimated cost by the amount of instant contract savings, and provide the Contractor's share of savings by adding the amount calculated to the contract price.

G) ***Subcontracts***. The Contractor may include an appropriate value engineering clause in any subcontract. In computing any adjustment in this contract's price under paragraph F above, the Contractor's allowable development and implementation costs shall include any subcontractor's allowable development and implementation costs clearly resulting from a VECP accepted by the Owner under this contract, but shall exclude any value engineering incentive payments; provided that these payments shall not reduce the Owner's share of the savings resulting from the VECP.

Subsection 105.1 - Authority of Engineer: Add the following:

105.1.1 - Engineer's Evaluation: Engineer will be allowed ten (10) working days within which to evaluate each proposal or submittal made pursuant to subsections 105.3.1 and 106.4. Engineer will be the sole judge of acceptability. No "or-equal" or substitute will be ordered, installed or utilized without Engineer's prior written acceptance which will be evidenced by either a Change Order or an approved Shop Drawing. Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any "or-equal" or substitute. Engineer will record time required by Engineer and Engineer's Consultants in evaluating substitutes proposed or submitted by Contractor pursuant to subparagraphs 105.3.1 and 106.4(B) and in making changes in the Contract Documents (or in the provisions of any other direct contract with Owner for work on the project) occasioned thereby. Whether or not Engineer accepts a substitute item so proposed or submitted by Contractor, Contractor shall reimburse Owner for the charges of Engineer and Engineer's Consultants for evaluating each such proposed substitute item.

Subsection 105.3 - Conformity with Plans and Specifications: Add the following:
105.3.1 - Substitute Construction Methods or Procedures: If a specific means, method, technique, sequence or procedure of construction is shown or indicated and expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence or procedure of construction acceptable to Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The procedure for review by Engineer will be similar to that provided in subparagraph 106.4(B).

Subsection 105.5 - Cooperation of Contractor: Add the following:
105.5.1 - Partnering
The Owner intends to encourage the foundation of a partnering relationship with the Contractor and its subcontractors. This partnering relationship will be structured to draw on the strength of each organization to identify and achieve reciprocal goals. The objectives are effective and efficient contract performance, intended to achieve completion within budget, on schedule, and in accordance with plans and specifications.

This partnering relationship will be bilateral in makeup. Any cost associated with effectuating partnering will be covered by the Bid Item. The initial partnering workshop shall be scheduled after award of the contract, and prior to the Notice to Proceed, and shall be facilitated by a third party competent in the fundamentals of partnering, and mutually acceptable to Contractor and Owner. The Contractor shall be responsible for scheduling, coordinating, and hiring the third party facilitator, and planning all of the partnering meetings in consultation with the Engineer. The Owner will be responsible to notify and coordinate attendance at the partnering meetings by other agencies. To achieve the desired partnering relationships, the Contractor will need to encourage attendance by its major subcontractors on the project. Follow-up workshops will be held periodically throughout the duration of the contract as agreed to by the Contractor and Owner.

An integral aspect of partnering is the resolution of disputes in a timely, professional, and non-adversarial manner. Alternative dispute resolution (ADR) methodologies will be encouraged in place of the more formal dispute resolution procedures. ADR will assist in promoting and maintaining an amicable working relationship to preserve the partnering relationship. ADR in this context is intended to be a voluntary, non-binding procedure available for use by the parties to this contract to resolve any dispute that may arise during performance.

Payment for Partnering will be made on the basis of invoices of actual costs, and will be for a total amount not to exceed the amount shown in the bid schedule for the item.
ITEM 105-1 - PARTNERING

105.5.2 – Pre-Construction Meeting
After award of the contract, a pre-construction meeting shall be scheduled at a location and time (prior to mobilization and start of construction) to be agreed upon between the Owner and the Contractor. The Contractor shall make all necessary arrangements to have key personnel of his company and of his principal subcontractors present at the meeting. Each representative shall have authority to make commitments and act for his firm. The purpose of the pre-construction meeting is to discuss any specific concerns or potential problems that the Contractor is aware of, to provide general information appropriate to the contract, to identify responsible individuals for various functions within each organization, and to develop tentative dates for the start of construction. There are submittals identified within the contract documents which are required to be prepared for the pre-construction meeting.

The Contractor shall be responsible to take minutes of the pre-construction meeting and distribute copies to all meeting participants. The meeting minutes shall be distributed within 48 hours of the meeting. At the subsequent construction progress meeting, the minutes will be attested or revised, as appropriate. The cost for attendance at the pre-construction meeting, and preparation and distribution of meeting minutes shall be incidental to the project and no extra payment will be made.

105.5.3 –Construction Progress Meetings
Construction progress meetings shall be scheduled weekly, or as considered necessary by the Owner. The Contractor shall make all arrangements to have key personnel of his company and of his principal subcontractors present at all progress meetings; representatives shall have authority to make commitments and act for their firms. The Contractor shall assume full responsibility to act for and commit any subcontractor employed by the Contractor, whether or not such subcontractor is represented at the meeting.

During the construction progress meeting the Owner's representative will act as chairman and will advise the Contractor of any administrative matters connected with the contract. The Contractor shall submit for review his two-week rolling schedule. The Contractor's representative at these meetings shall be prepared to discuss and resolve construction problems and concerns, material delivery and vendor data submittals status, construction progress as measured against the Contractor's approved construction schedule and the Contractor's short range construction activities as provided on his two-week rolling schedule. The Contractor shall not be relieved of his responsibility to fulfill all of the terms of the contract as a result of any inferences drawn or suggestions made available at these meetings.

The Contractor shall be responsible to take minutes of the construction progress meetings and distribute copies to all meeting participants. The meeting minutes shall be distributed within 48 hours of the meeting. At the subsequent construction progress meeting, the minutes will be attested or revised, as appropriate. The cost for attendance at meetings, and preparation and distribution of meeting minutes shall be incidental to the project and no extra payment will be made.

Subsection 105.6 - Cooperation with Utilities: Add the following**:**
An attempt has been made to determine the location of all underground utilities, drainage pipes, and structures; however, it shall be the Contractor's responsibility to cooperate with the pertinent utility companies so that any obstructing utility installation(s) may be adjusted. The location of the underground and overhead utilities as shown on the plans is based on the best available information. The Contractor shall not assume that this represents an exact location of the line. No guarantee is made to the accuracy of the location shown on the plans. The Contractor shall determine for himself the exact location of all utilities. Should Contractor's operations result in damage to any utility the location of which has been brought to its attention, he shall assume full responsibility for such damage. There also exists the strong likelihood that other abandoned older and undocumented underground utility and irrigation lines exist within the project area. Contractor shall contact Arizona Blue Stake (telephone number 263-1100) a minimum of two (2) working days before beginning any underground work. In addition, Blue Stake notification(s) shall be maintained on a current basis.

The following phone numbers should put the Contractor in contact with the proper personnel:

Arizona Public Service Company (APS) 230kV OHE
Mr. Steve Goodman, Project Design Leader (602) 371-6965

AT&T Fiber Optic Telephone
Mr. Franco Jauregui (909) 898-4776

City of Chandler (COC) Water and Sewer
Mr. Pete Rodriguez, Water (480) 782-2388
Mr. Alvin Robertson, Sewer (480) 782-2389

Cox Communications (COX) Cable TV
Mr. Carl McKay, Utility Liaison (602) 659-7214

El Paso Natural Gas (EPNG) High pressure gas mains
Mr. Bill Ward, Phoenix District Superintendent (602) 438-4224
Mr. John McNeely, Principal Engineer (915) 496-5562

Salt River Project Irrigation (SRP) Pecos Drain, Gila Drain, etc.
Mr. Gerry Bastian, Project Leader (602) 236-4609

Salt River Project Power Distribution (SRPPD) 12kV lines, etc.
Mr. Greg Wilson, Project Leader (602) 236-8643

Salt River Project Power Transmission (SRPPT) 69kV Trans.
Mr. Dan Hawkins, Senior Engineer (602) 236-8603

Southwest Gas Corporation (SWG) Natural gas lines
Mr. Gene Florez (602) 484-5302

Union Pacific Railroad Company (UPRR)
Mr. Gary Houk, Manager of Track Maintenance (602) 257-2505
Mr. Sam Kephart, Manager of Train Operations (602) 257-2531

U.S. West Communications (USW) Telephone Lines
Mr. John Aker, Public Works Project Manager (602) 630-0496

Stellar Airpark (Airport)
Mr. John Morris, Airport Manager (480) 961-9050

Many overhead and underground facilities have been relocated in advance of construction to avoid conflicts. However, it shall be the responsibility of the Contractor to verify the location of all utilities prior to commencing any construction activities in a particular area. All existing overhead and underground utilities shall be Protected-in-Place (P.I.P.) unless noted otherwise on the plans, in these Supplementary General Conditions, and in the Special Provisions.

APS and SRPPT:
Both APS and SRP maintain high voltage (69 kV, 230kV and 500kV) overhead electric transmission lines in the vicinity of the project. The project does not directly impact the APS and SRP overhead lines.

At all times during construction, the Contractor shall comply with all laws, ordinances, rules, regulations, and safety requirements, including but not limited to the National Electric Safety Code, and the Occupational Safety and Health Standards for General Industry when working in the vicinity of these high voltage lines.

AT&T:

AT&T has an underground fiber optic cable across the East Collector Channel alignment at Kyrene Road. This line has been retired. The Contractor shall verify the location of this cable and remove and discard it off-site.

City of Chandler (COC) Water Line and Sanitary Sewer:

Water Lines - From Kyrene Road to McClintock Drive, the Contractor shall install a new 24" ductile iron pipe (DIP) water line within ADOT right-of-way. From Country Club Way to Price Road, the Contractor will install a new 36" concrete cylinder pipe (CCP) water line within ADOT right-of-way. These two water lines will parallel the East Collector Channel alignment, and shall be protected in place throughout construction of the channel. Connections of these new water lines to the existing City water system will require temporary shut down of water services. The Contractor shall coordinate these service disruptions with the City Public Works Department and must keep these disruptions to a minimum. All service shutdowns shall be performed by City personnel.

From the west side of Los Feliz Drive to Country Club Way in the Hearthstone subdivision, the Contractor shall relocate two existing 12" ACP and 36" CCP water lines to ADOT right-of-way. These two water lines will parallel the East Collector Channel alignment and shall be protected in place during construction. Connection of these two water lines to the existing City water system shall require coordination with City Public Works personnel. The connections will require temporary water system shut down during construction, requiring coordination with the City of Chandler, and will also require schedule coordination for the relocation of the water lines and the construction of the box culvert.

Sanitary Sewers and Lift Station - From East Collector Channel Station 96+85 east to Country Club Way, the Contractor shall relocate a 24" sanitary sewer. This sewer will roughly parallel the East Collector Channel alignment.

In and to the east of Kyrene Road, the Contractor shall relocate two existing 27" and 36" sanitary sewers to a new sewage lift station, and a sewer force main across the Channel corridor.

On the west side and parallel to the Gila Drain is located an existing 24" VCP sanitary sewer. The Contractor shall exercise extreme caution to protect the sanitary sewer when constructing the West Collector Channel, the Forebay Channel, and the Gila Drain Bypass Channel. The Contractor shall perform necessary sewage flow bypass, and shall replace segments of the existing sanitary sewer with DIP pipe during construction of the West Channel and Forebay Channel siphon culverts. There shall be no disruption of sewer service allowed during construction of this project at any time.

Throughout the project limits, there are multiple water and sewer lines along and across the channel corridor. Unless indicated to be removed or to be abandoned, these lines remain active and shall be protected in place at all times. Underground lines crossing to the south of the channel corridor that require removal will be removed to a point at least 60 feet south of the channel profile grade line, unless noted otherwise on the plans.

NOTE: These sanitary sewers generally flow under pressure in a surcharged condition. The Contractor shall exercise extreme caution when working on or near any of the existing sanitary sewer lines to avoid spills or off-site discharges. The contractor shall comply with conditions of the Sewage Discharge Prevention Program, as follows:

SEWAGE DISCHARGE PREVENTION PROGRAM:

The objective of this program is to prevent any accidental sewage discharges as result of construction activities on this project.

The program includes the following components:

- Sewage Control Plans,
- Location and Protection of New and Existing Lines, and
- Handling Private Lateral Service Connections

These components are described in more detail below.

Sewage Control Plans:

Purpose:

A sewage control plan (SCP) will be submitted at least one week in advance to the Engineer whenever the Contractor intends to:

- excavate near, brace, or tie into a sewer line or service connection, or
- interrupt, divert, relocate, plug, or abandon a sewer line or service connection.

The intent of the plan is to ensure that any work done in or near any sewer line containing raw sewage is performed in a safe and controlled manner resulting in no accidental discharges.

Required Elements of the SCP:

The following elements shall be contained/addressed in every SCP.

1. Describe the proposed work in general including the purpose, scope, objectives, reasons for the work, locations, dates and estimated times the work will be conducted. Include project plan sheets detailing the proposed work.

2. List the proposed foreman or forewoman, superintendent, manager and field office performing the work (include phone numbers). Described proposed crew, size, and classification of each crew member.

3. Describe the work in step-by-step detail including excavation plans and how both the new and existing structures and utilities will be identified and protected.

4. Provide a detailed description of any hardware, fittings, tools and materials needed to accomplish the work, and note the status of these items (on-hand, to be fabricated, on order with expected delivery date, etc.). Include any manufacturer's specifications or recommendations, especially for any pipe plugs, sewer line fittings and patching materials.

5. List major equipment to be used to perform the work. Include in this item any pumps that will be used to perform the work and the rated capacity of the pumps at the anticipated suction head. Also include standby pumps in this item.

6. List the safety equipment to be used and describe any unique safety procedures. Cite the applicable OSHA standards covering the work.

7. Describe any contingency plans the contractor will implement in the event of accidental releases and/or damage to existing facilities.

8. Describe how the public will be protected during the work and include or cite any applicable traffic control plans.

9. Describe the quality control procedures that will be used in the field.

10. Discuss how temporary plugs or flow control devices will be secured and monitored.

The plan shall be in written form and include any diagrams or sketches necessary for clarity. When possible, diagrams and sketches should be shown using the applicable project plan sheets.

Plan Approval:

The plan including all hardware, materials, and plugs to be used shall be approved by the owner-operator of the sanitary sewer system. Plan approval is required before beginning any work in or near any sewer line containing raw sewage. The Engineer will review the plan and oversee the work to ensure it complies with the approved plan.

Location and Protection of New and Existing Sewer Lines:

Normal blue staking procedures shall be followed first for any work on the project. The City of Chandler will "blue stake" all sewer mains within the project limits that were in existence before award of the project. Sewage control plans shall be required when the work is near or involves any sewer line containing raw sewage.

The Contractor will brief and coordinate with others working near new or existing sewer lines or other utilities on the procedures to be followed to prevent damaging of these utilities.

The Engineer will coordinate the locating of existing and newly constructed sewer lines and laterals with the City of Chandler and the Contractor prior to any on-site work by utility companies or other agencies.

The Contractor will immediately report in writing to the Engineer any work performed by itself or subcontractors that damages an existing or newly installed sewer line or manhole.

Handling Private Lateral Service Connections:

The Contractor to the satisfaction of the City of Chandler and the Engineer will protect unidentified service connections encountered during excavation that are not damaged. The Contractor will immediately notify the Engineer when an unidentified service connection is encountered.

The Contractor will immediately repair, to the satisfaction of the Engineer and the City of Chandler, unidentified service connections that are damaged during excavation. Any damaged service connections shall be reported to the Engineer, including all remedial actions taken.

Sewage Discharge Penalties:

Any and all civil or criminal penalties, fines, damages, or other charges ("penalties") imposed by any regulatory agency or court for sewage discharges that are in violation of applicable statutes and laws and that are a result, direct or indirect, of work performed under this Contract, whether imposed on Contractor

or the Owner, or either of their subcontractors, or the City of Chandler, shall be paid for by the Contractor, and the Contractor shall defend and indemnify the City against such penalties. These regulatory agencies may include, but are not limited to, the Arizona Department of Environmental Quality (ADEQ) and the United States Environmental Protection Agency (USEPA). As an example, ADEQ may assess civil penalties up to $25,000 per day per violation for sewer discharges.

Contractor's Qualifications:

The Contractor, or the water and sewer utility Subcontractor, shall have at least five years of experience in the construction of underground large diameter (18-inch or above) water and sewer improvements. This experience shall include working with and around water and sewer utility lines that are in service. The water and sewer utility Contractor/Subcontractor shall submit the following documentation to the Engineer for review and approval of their qualifications.

1. A list of water and sewer work completed over the past 3 years. List the dates of work, type of work, description of the project, amount of work performed by the Contractor/Subcontractor, and the name and phone number of a contact with the owning company or agency for which the work was completed.

2. List of equipment that will be used for this project. The list shall include, as a minimum, equipment type, date of manufacture, and if contractor-owned or rented.

3. List of key personnel, minimum three, who will perform the actual water and sewer utility work and have at least 5 years of experience in the installation and construction of underground large diameter water and sewer lines. The list shall be accompanied with resumes for each of the key personnel. The resumes shall include the following information and demonstrate compliance with any requirements requested:

    a) Education.
    b) Level of applicable formal training.
    c) Number of years of relevant experience in performing like construction.
    d) Detailed relevant experience, minimum two projects, and containing project description, date of work, actual work performed by the individual, and references (one for each project, minimum).

4. A list of all violations in the past five years of applicable water and wastewater laws and statutes. State all fines, penalties, lawsuits, and judgements rendered against water and sewer utility Contractor/Subcontractor as a result of violations of applicable water and wastewater laws and statutes.

This documentation shall be submitted to the Engineer at the Pre-Construction Conference.

El Paso Natural Gas (EPNG):

EPNG has a 24" and two 10" high pressure gas mains located west of West Channel Station 45+00. The two 10" gas lines also cross the alignment of the Forebay Channel at about Station 9+00. The Contractor shall verify the location of these lines and shall protect in place all gas lines. Specifically:

1. Maintain a minimum of five (5) feet of cover over the gas pipelines at any location the line is crossed.
2. The top of slope of West Channel may not be closer than twenty (20) feet to the gas pipelines.
3. The Contractor will contact EPNG a minimum of 14 calendar days in advance of any construction activities near these lines. EPNG will have a representative on site as they deem necessary.

Salt River Project (SRP) Irrigation:

Salt River Valley Water Users Association has several facilities that are impacted by the project. The Gila Drain is a major regional drain and flows must remain uninterrupted throughout the construction period. A capacity of at least 100 cfs must be maintained at all times to convey irrigation and storm water to the outlet. The Gila Drain must be diverted during construction and will be reconstructed as a box culvert and concrete-lined channel in its present location after the Forebay and West Collector Channel box culvert siphons are installed. The reconstruction of the Gila Drain is included in this project as shown on the plans. Existing irrigation laterals that presently discharge into the drain must be maintained during construction. SRP construction forces will construct the diversion structure to be located at the upstream end of the new Gila Drain box culvert and channel. Until this work is completed, the temporary bypass of the Gila Drain (see Detail D13) cannot be removed. As part of the removal of the temporary bypass, the Contractor will install concrete lining in the Gila Drain at the location of the bypass turnouts. This lining work will be accomplished in accordance with SRP details provided in Appendix "A" and as shown in Detail D13. The limit of the concrete lining is related to the extent that the Contractor disturbs the existing channel bottom and banks. Approval of the limits of this concrete lining will be required from SRP.

Irrigation laterals along Kyrene Road and McClintock Drive must be temporarily diverted during adjacent box culvert construction. After the box culverts are installed, the two irrigation laterals will be replaced as slip form ditches, in accordance with the SRP plans attached to and made a part of the plans.

Prior to any construction activities relating to the removal and to the reconstruction of the Gila Drain or irrigation laterals, the Contractor shall contact SRP to schedule a pre-construction meeting. The meeting will be used to identify what role SRP will have during construction. The Contractor shall be prepared to discuss proposed construction, survey and potential impacts to irrigation delivery, along with executing a TEMPORARY OUTAGE AGREEMENT and obtaining the necessary construction clearance using the instruction sheet included in Appendix "A". Construction of the SRP facilities shall not commence until the Contractor attends the SRP Pre-Construction Conference.

The Contractor shall restore the area of all temporary drain, lateral and ditch locations to as good as or better than pre-existing conditions, including backfilling to 95% any temporary ditches and removing any temporary berms and pipes. The cost of the temporary relocations and the restoration work shall be considered incidental to the construction of the permanent facilities in accordance with the plans.

There are a number of irrigation ditches, both SRP and private, which cross the channel and box culvert alignment. Where noted on the plans to be abandoned or removed, the limits of removal of these abandoned ditches will be sufficient enough to accommodate construction activities.

NOTE: The Contractor shall exercise caution and care when working around these facilities, in particular, when diverting flows. The costs for the repair of any damage to neighboring property, and any loss of water conveyance or revenue by the SRP that is in any way caused by the Contractor's actions shall be the sole responsibility of the Contractor, and shall be corrected to the satisfaction of the SRP solely at the Contractor's expense and at no cost to the project. The Contractor is cautioned that the Gila Drain currently intercepts a significant amount of off-site storm water. The Contractor must make provisions to maintain at least the 100 cfs capacity at all times during construction.

Salt River Project Power Distribution (SRPPD):

Salt River Project has overhead and underground electric distribution facilities throughout the project area that cross the construction site or are in very close proximity. These are along Pecos Road for the entire

channel alignment and crossings of the East and West Collector Channels. There are also temporary overhead 12kV shoofly alignments which cross the East Collector Channel alignment.

SRP has also recently installed underground ductbanks at eight locations crossing under the East and West Collector Channels, and these shall be Protected-in-Place. The Contractor shall horizontally and vertically locate these ductbanks prior to any construction activities relating to the installation of the sanitary sewers, water lines and channels.

General Requirements

1. Any damage to existing, new or partially completed SRP facilities, including survey markers and staking, by the contractor's forces or equipment will be the responsibility of the contractor. No excavation shall take place without Blue Stake.
2. Any modifications to temporary shooflies installed by SRP due to project design changes beyond the control of SRP, or specifically requested by the Contractor to facilitate his work, shall be coordinated with SRP and paid for by the Contractor.
3. All shooflies, disconnects, and reconnects associated with temporary power requirements will be at the expense of the Contractor and paid in advance.
4. Sub-grade and final grade stakes must be installed and maintained at or near SRP crossings and surface mounted equipment. Horizontal and vertical controls must be established and maintained in the immediate vicinity of the work for all grade and survey ties.
5. Any required 69 kV line outages must be requested at least 20 working days in advance of planned construction activities. Outages for 12kV should be requested at least 5 working days before planned construction activity. All outages are subject to loading conditions, weather and critical customer load. 69 kV OUTAGES BETWEEN MAY 1st AND OCTOBER 1st ARE EXTREMELY DIFFICULT TO OBTAIN. All outages are subject to availability.
6. In order to operate and maintain its 12 kV equipment, SRP requires an eight to ten foot wide linear corridor for its relocated facilities. Where ground level equipment is located a total of 12 feet of clearance is required in the front of equipment.
7. Any streetlights that are to be disconnected for removal and/or construction purposes will require a disconnect letter from the owner of the streetlights, and a minimum of 5 working days notice for a disconnect and/or reconnect. If the streetlights are to be removed, SRP will only remove its cable from any conduit to the point of delivery and abandon the conduit and any direct buried cable. The contractor should confirm ownership of lights before any removal and disposal. The party requesting the disconnect or reconnect will be responsible for the cost. Streetlights and the interconnections are not the property of SRP.
8. A DISCONNECT IS ONLY THE REMOVAL OF THE METER. If total removal of electrical equipment is required, a written request to remove or abandon equipment is required from the owner of the facilities. All removals are at the expense of the owner and/or requestor.
9. Any conduit installation or other work that is performed by the Contractor for and on behalf of SRP, including street lights, that is covered or closed before being inspected by SRP will be exposed for inspection at the contractor's expense. A pre-construction meeting shall take place prior to construction. Pre-scheduling of inspection may be available after construction starts. The present phone number for scheduling inspection is(602) 236-6300. This number may change and will be appropriately updated.
10. Contractors must submit plans to SRP for approval at least 7 working days prior to start of work if construction requires any excavation within a 25-foot radius of a power pole. Review by SRP does not relieve the Contractor of his responsibilities for protecting structures from impacts of adjacent excavations. Any bracing, guying or other special provision required to allow contractors to excavate next to SRP structures will be prepaid by the contractor.

11. After existing SRP facilities are relocated and energized SRP will: 1) remove overhead lines that are in conflict and 2) for underground (UG) lines, SRP will remove the above ground equipment and cable from existing conduits. The Contractor will be responsible for the removal of abandoned direct buried cable, pads and conduit that may be in conflict.

The contractor should contact SRP safety department at (602) 236-8120 prior to the start of construction to discuss safety issues related to working near energized overhead lines. One group meeting will be conducted prior to construction. The contractor will pay for individual contractor or subcontractor meetings.

Please address any questions regarding the above conditions to Mr. Dan Hawkins at P. O. Box 52025, Phoenix, AZ 85072-2025, Mail Station XCT 315.

At all times during construction, the Contractor shall comply with all laws, ordinances, rules, regulations, and safety requirements, including but not limited to the National Electric Safety Code, and the Occupational Safety and Health Standards for General Industry when working in the vicinity of electrical lines.

NOTE: The cost for the repair of any damage to these facilities, and any loss of revenue by SRP due to the loss of service of the overhead or underground electric cables that is in any way caused by the Contractor's actions shall be the sole responsibility of the Contractor at no cost to the project.

US West (USW) and Southwest Gas Company (SWG):
Both US West and Southwest Gas maintain underground facilities in the project area. The Contractor shall exercise extreme caution when working near these facilities. The Contractor shall contact US West and Southwest Gas a minimum of 14 calendar days in advance of any work to be done in the vicinity of these facilities. An inspector will be provided by the utilities on site as required during these construction activities to monitor the work.

US West facilities are in close proximity to the Santan Collector Channels and must be protected-in-place. A SWG 2" gas line at the Twelve Oaks Blvd. alignment crosses the channel alignment and must be protected-in-place. A SGW 4" gas line at the Kyrene Road alignment crosses the channel alignment and must be protected in place.

NOTE: The Contractor shall exercise extreme caution and care when working around or near these facilities. The costs for the repair of any damage to these facilities and any loss of revenue by US West or SWG due to the loss of service which is in any way caused by the Contractor's actions shall be the sole responsibility of the Contractor at no cost to the Owner.

Union Pacific Railroad Company (UPRR):
Should the Contractor elect to use 56th Street as a construction access point, the Contractor shall coordinate with the UPRR for the installation of a temporary at grade crossing of the UPRR track at the east side of 56th Street. The Contractor is required to obtain a permit from the UPRR for this purpose, as discussed in Subsection 107.2.

The Contractor may be required by the UPRR to provide flagging services. The UPRR will supply the flagging services, as required, at a rate of approximately $500 per day. Flagging is generally required whenever the Contractor is working within 25 feet of the track centerline. The Contractor shall notify the Engineer and the UPRR at least 24 hours in advance of any time the Contractor will have equipment or personnel working within 25 feet of the track.

If the Contractor obtains a temporary crossing permit, flagging will normally be required when the Contractor's vehicles and equipment are crossing the track. However, the trains for this spur line only operate from 5:00 pm to 5:00 am at the time of preparation of this document. The UPRR has indicated that it may close the track during the day when the trains are not operating, and therefore flagging would not be required from 5:00 am to 5:00 pm.

NOTE: Any loss of service or revenue to the UPRR beyond that covered by these Specifications that is in any way caused by the Contractor's actions shall be the sole responsibility of the Contractor at no cost to the Owner.

All Contractor's costs for coordination with the UPRR and work within the UPRR right-of-way, including provision of labor, equipment, materials, flagging services, and others, shall be included in the price bid for construction activities for which such access and flagging is incidental or appurtenant.

Stellar Airpark:
The Contractor shall notify in writing the Engineer and Airport Manager, Mr. John Morris at least 60 days prior to start of construction of the East Channel between Stations 118+00 and 123+00. On receipt of said notice, the Airport Manager will file a Notice to Airmen (NOTAM) with the FAA, Prescott Flight Service Station (FSS) at 6490 Wilkinson Drive, Prescott, AZ 86301 (Tel # 520-778-7801). FSS will issue the NOTAM at least 24 hours prior to start of construction. The Contractor will comply with requirements of Federal Aviation Administration (FAA) Advisory Circular AC 150/5370-2C (latest revision), "Operational Safety on Airports During Construction."

Subsection 105.7 - Cooperation Between Contractors: Add the following:
A Contractor(s) for the development of the property between 56th Street and the Gila Drain and north of the Pecos Road alignment may be working in or near the project along the west side of the forebay channel that parallels the west side of Gila Drain. The project Contractor shall cooperate as necessary with this Contractor(s) and coordinate his work accordingly, to the extent that such cooperation and coordination does not adversely affect project schedule and cost. Contact Robert Long, V.P., Phoenix Investment Office, Conning Asset Management Company at 483-8817.

The Kyrene South Storm Water Pump Station construction will be underway at the time of construction of this project. This construction will include installation of the pump station discharge line to a point where it will be connected to by this project. The Pump Station is located near the northwest corner of Pecos Road and Kyrene Road adjacent to the Basin complex. This Contractor will be working in the Basin complex and will require access from Kyrene Road. Coordination will be required between contractors at Kyrene Road and for the construction of the pump station discharge line connection. This Contractor may also have under construction during this project the installation of an 8" water line in Kyrene Road that will cross the East Collector Channel alignment. The Contractor will coordinate and cooperate with the Kyrene Pump Station Contractor as required to minimize impacts to either project. The ADOT Project Engineer for the Kyrene South Storm Water Pump Station is Ebbie Attar who can be reached at (480) 968-7412.

The Contractor shall first coordinate with the Kyrene Pump Station Contractor (ADOT Project No. RAM 600-7-508, Tracs No. H516801C) before proceeding with construction that intentionally directs storm water runoff into the existing Equalization Basin at the east end of the Forebay Channel. The Contractor shall contact Mike McKinney (PCL Civil Project Manager) at (480) 558-8364 and the ADOT Project Engineer, Ebbie Attar at (480) 968-74112. This includes construction of the Forebay Channel Outlet to the Equalization Basin in accordance with Detail D16. Storm water flows must not be directed to the Equalization Basin until such time as the Kyrene Pump Station Contractor can accept those flows. The Contractor can dewater the Forebay Channel construction site into Basin B, the large basin immediately

south of the Forebay Channel following a storm event. The Kyrene Pump Station Contractor will close all gates to prevent flooding during construction.

Construction of Phase 2 of the project may be near completion at the time of construction of this project. The eastern limit of Phase 2 of the project is the western limit of the construction being undertaken by this project. The Contractor will coordinate and cooperate with the Phase 2 Contractor as required to minimize impacts to either project.

The Contractor will coordinate the connection of the new 24" sanitary sewer to the existing manhole (Manhole 101A as shown on Sheet U-1.07) and sewer stubouts at the west end of Stellar Airpark. This connection will require reconstruction of the manhole floor (Manhole 101 as shown on U-1.07) upstream to this connection. The Contractor will notify the developer. Contact Robert Kvamme at Mark-Taylor, Inc. at (480) 991-9111 fourteen days prior to construction.

A City of Chandler street reconstruction project in the Hearthstone Subdivision should be complete at the start of this contract between McClintock Drive and Country Club Way. This street reconstruction project will cul-de-sac Los Feliz Drive, Geronimo Street and Pecos Road. The new cul-de-sacs and other associated reconstruction work have been shown on the plans as existing features. In the event the Hearthstone reconstruction project is not complete, the Contractor will coordinate and cooperate with the City of Chandler Contractor as required to minimize impacts to either project.

A City of Chandler street construction project may be underway in the vicinity of the Stellar Airpark during construction of this project. The Contractor will coordinate and cooperate with the City of Chandler Contractor as required to minimize impacts to either project.

The Contractor will coordinate construction of the Gila Drain box culvert and channel lining with SRP as described in Subsection 105.6.

Subsection 105.8 - Construction Stakes, Lines, and Grades: Add the following:

A) The Engineer will furnish a Benchmark which the Contractor will use to set line and grade for all construction. All other surveying required for the project shall be the Contractor's responsibility. The Engineer will not set any construction stakes.

B) Before any construction work is started, the Contractor shall perform all base surveys and cross sections of existing conditions that may be required as a basis for quantity determination.

C) The Contractor shall submit original construction surveyor's notes duly signed by a Registered Land Surveyor to the Engineer at the end of the project. Copies of the survey notes shall be submitted to the Engineer during construction as and when requested.

D) As-built plans sealed by an Engineer registered in the State of Arizona shall be provided by the Contractor to the Engineer prior to project close out.

Subsection 106.1 - Source of Materials and Quality: Add the following:

Select Material, Aggregate Base, Mineral Aggregate, concrete, steel products and pipe shall be obtained from commercial sources. Contractor shall pay all royalties, or any other charges or expenses, incurred in connection with the securing and hauling of the material. Contractor will be required to furnish Engineer with a list of its proposed commercial sources prior to use, and shall present certificates stating that the material produced from any commercial sources is in accordance with the Uniform Standard Specifications and these Supplementary General Conditions.

Subsection 106.4 - Trade Names and Substitutions: Replace with the following:
Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function and quantity required. Unless the specification or description contains or is followed by words reading that no like, equivalent or "or-equal" item or no substitution is permitted, other items of material or equipment of other Suppliers may be accepted by Engineer under the following circumstances:

A) "Or-Equal": If in the Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for acceptance of proposed substitute items.

B) Substitute Items: If in Engineer's sole discretion an item does not qualify as an "or-equal" item under subparagraph 106.4 (A), it will be considered a proposed substitute item. Contractor shall submit sufficient information as provided below to allow Engineer to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. The procedure for review by Engineer will include the following and may be supplemented in the Special Provisions and as Engineer may decide is appropriate under the circumstances. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor. If Contractor wishes to furnish or use a substitute item of material or equipment, Contractor shall first make written application to Engineer for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified and be suited to the same use as that specified. The application will state the extent, if any, to which the evaluation and acceptance of the proposed substitute will prejudice Contractor's achievement of completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for work on the project) to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also contain an itemized estimate of all costs or credits that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other Contractors affected by the resulting change, all of which will be considered by Engineer in evaluating the proposed substitute. Engineer may require Contractor to furnish additional data about the proposed substitute.

C) Contractor's Expense: All data to be provided by Contractor in support of any proposed "or-equal" or substitute item will be at Contractor's expense.

Subsection 107.2 - Permits: Replace with the following:
Contractor shall obtain all permits and licenses, including those required by ADOT, the City of Chandler, Maricopa County and the Union Pacific Railroad Company, and shall pay all charges, fees, taxes, and provide all notices necessary and incidental to the due and lawful prosecution of the work.

If the Contractor desires to cross the UPRR track at other than existing public crossings, such as for hauling equipment and material across the tracks, the plan must be approved by the Engineer and a separate agreement must be made with the UPRR prior to performing the activity. A sample Contractor's Application for Private Road Crossing is included in Appendix "C" for reference. The UPRR contact for these arrangements is Mr. Bob Prince (909) 879-6611. UPRR requirements may include improvements

to the track to allow equipment to cross, temporary security fencing and others. The cost associated with these activities, including the $500 application fee and any cost for the UPRR to install and remove the temporary crossing, is considered incidental to the construction and included in ITEM 202-1 MOBILIZATION. The Contractor may be required to have UPRR provide flagging services when equipment is crossing the track, as discussed in Subsection 105.6.

Subsection 107.2.1 - NPDES Permit Requirements: Add the following:

A. This project is subject to the National Pollutant Discharge Elimination System (NPDES) storm water requirements for construction sites under the Environmental Protection Agency (EPA) General Permit for Arizona. Under provisions of that permit, the Contractor shall be designated as permittee, and shall take all necessary measures to assure compliance with the NPDES General Permit for Arizona as well as all other applicable Federal, State and local laws, ordinances, statutes, rules and regulations pertaining to storm water discharge. As the permittee, the Contractor is responsible for preparing, in a manner acceptable to the EPA, all documents required by this regulation, including but not necessarily limited to:

1. Storm Water Pollution Prevention Plan (SWPPP) for the project, including certification of compliance form. Contractor shall be required to develop, implement, update and revise the SWPPP, as necessary, in order to assure compliance with the EPA permit requirements. The SWPPP shall be retained on the project site at all times during construction.

2. Notice of Intent (NOI) to assure compliance with the NPDES General Permit for Arizona, including certification of signatures.

3. Notice of Termination (NOT) of coverage under NPDES General Permit for Arizona.

B. Preliminary copies of the NOI and the SWPPP shall be submitted to Owner during the pre-construction meeting and shall be subject to review by Owner prior to implementation.

C. Contractor shall submit the completed and duly signed NOI forms no later than forty-eight (48) hours prior to the initial start of construction on the project to the following agencies:

EPA Storm Water Notice of Intent
P.O. Box 1215
Newington, VA 22122

A copy of the completed NOI form shall be submitted to the following:

Storm Water Coordinator
Arizona Department of Environmental Quality
P.O. Box 600
Phoenix, AZ 85001-0600

James Weiss, Current Planning
Environmental Coordinator
City of Chandler
25 South Arizona Place, Suite 305
Chandler, Arizona 85225

Failure by the Contractor (or Subcontractors of any tier) to submit NOI=s within the mandated time frame, shall result in delay of the construction start date, and no claim for extension of time will be granted for such delay. A copy of the completed NOI shall be posted at the construction site.

D. Inspections of all storm water pollution control devices on the project shall be performed by Contractor on a monthly basis and following each rainfall of 0.50 inches or more in a 24-hour period at the project site as required under provisions of the NPDES General Permit for Arizona. Contractor shall prepare reports on such inspections and retain the reports for a period of three years following the completion of the project. Inspection reports shall be submitted monthly to Owner along with progress payment requests. Additionally, Contractor shall maintain all storm water pollution control devices on the project in proper working order, which shall include cleaning and/or repair during the duration of the project.

E. Contractor warrants that its employees and Subcontractors of any tier and their employees shall at all times comply with all applicable laws, ordinances, statutes, rules and regulations set forth by all federal, state and local governments and the Environmental Protection Agency in connection with NPDES Permitting requirements and laws and regulations pertaining to air, groundwater and surface water quality.

Fines and penalties imposed by the EPA against Owner or the Contractor for Contractor's failure to comply with any of the requirements of NPDES General Permit of Arizona shall be borne by the Contractor.

F. Upon project completion, acceptance and demobilization, Contractor shall submit its completed, duly executed NOT form to the EPA, with a copy to the Arizona Department of Environmental Quality and the Gila River Indian Community Department of Environmental Quality, at the address listed in Section C above, thereby terminating all NPDES permit coverage for the project. Contractor shall then surrender to Owner copies of the SWPPP, inspection information and all other documents prepared and maintained by the Contractor in compliance of the NPDES General Permit. Contractor shall retain the originals of such documents for a period of three (3) years following the completion of the project.

G. The Lump Sum price for the SWPPP shall include all material, labor, and all other costs relating to the preparation, installation and maintenance of the SWPPP during project construction, including assuring proper operation of the pollution control devices installed, and all maintenance, cleaning, and disposal costs associated with clean-up and repair following storm events, runoff or releases on the project. The Lump Sum price for the SWPPP shall be inclusive of all costs, and no additional claims shall be made by Contractor under any other specification provision of these documents, including Changed Conditions. Payment for this bid item shall be upon final completion and acceptance of the project, as per Section 109.1.

H. Copies of all required forms and guidance for preparing the SWPPP are available in the "Drainage Design Manual for Maricopa County, Volume III Erosion Control." The manual is available at the Flood Control District, 2801 West Durango Street, Phoenix, Arizona 85009.

Payment for NPDES/SWPPP permit requirements shall be made on the basis of lump sum for all work described in Subsection 107.2.1.

ITEM 107-1 - NPDES/SWPPP PERMITS

Subsection 107.4 - Archeological Reports: Add the following:

Any cultural and/or paleontological resource (historic or prehistoric site or object) discovered by the Contractor, or any person working on his behalf, shall be immediately reported to the Engineer. The Contractor shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Engineer. An evaluation of the discovery will be made by authorized personnel and the Engineer to determine appropriate actions to prevent the loss of significant cultural or scientific resources.

Subsection 107.5 - Safety, Health and Sanitation Provisions: Add the following:
The entire construction site shall be considered a "Hard Hat Area" and all personnel in the area will be required to wear a hard hat.

Subsection 107.5.3 - Compliance with the Arizona Communication Standard: Add the following:
Owner will provide Contractor with Material Safety Data Sheets (MSDS) for any products known to exist on the site that are deemed health hazards. Contractor will provide a copy of Owner-provided MSDS to all Subcontractors.

Contractor will provide Owner and all Subcontractors with MSDS for any products that have or are deemed health hazards that will be brought onto the site or created on the site either by Contractor or by any Subcontractors.

Contractor will provide Owner with a statement certifying that all personnel (Contractor and Subcontractor) employed by Contractor or by a Subcontractor on the job site have received the required Hazard Communication Standard training.

Subsection 107.6.1 - Contractors Marshaling Yards: Add the following:
The Contractor shall obtain approval of the Engineer when using ADOT or other vacant property to park and service equipment and store materials for use. The Contractor will obtain prior written approval of the property owner for such use and submit a copy of the approval to the Engineer prior to use of the property.

The Contractor shall grade all construction yards, easements and limits of construction which are disturbed by construction or construction related activities to the lines and grades shown on the plans; or as a minimum, where no line or grade is shown, to a condition similar to or better than the pre-existing condition.

Subsection 107.6.3 B Public Information and Notification: Add the following:
The Contractor shall employ a specialty public information service as a subcontractor to provide the community relations program for the project as described herein. The name and address of the public information subcontractor shall be submitted with the bid as specified in subsection 102.6 of the Supplementary General Conditions. Contractor shall work closely with his subcontractor in developing and carrying out the community relations program, but shall not expect to actually perform the work of providing the public information services. Contractor shall submit a history of the subcontractor's qualifications and experience in public information services at the pre-construction conference for acceptance by the Engineer. The community relations program shall be designed to run the full length of calendar days in the contract for this project. The program will include but not be limited to:

1. Distributing a preconstruction information letter to all residents, business, schools, etc. for the area within one-quarter mile of the project limits from 56th Street to Price Road.
2. Printing and distribution of public notices and/or newsletters.

The Contractor will use these or other means to inform the local citizens of necessary operations which create high noise levels, street closures, limited access, detour locations, haul route and material delivery routes, hours of construction and disruption of bus, trash, school bus and other delivery/pick-up routes.

The Contractor will be required to furnish a private line telephone to be used solely for receiving incoming calls from local citizens with questions or complaints concerning construction operations or procedures. The Contractor shall publish this phone number and maintain a 24-hour answering service. The answering service shall be operated by Contractor personnel during all hours that work is being performed on the job site. The Contractor shall maintain a log of incoming calls, responses, and action taken which shall be submitted to the Engineer weekly and/or upon request.

Prior to the start of work, the Contractor shall notify, by letter, all affected businesses and residents of construction plans and schedules within the geographic area identified above. In addition, all schools and emergency services which serve the geographic area will also be notified even though they may be located outside the geographic area described above. The letter shall contain, as a minimum, the following information:

1. Name of Contractor
2. 24-hour telephone complaint number
3. Brief description of the project
4. Name of Contractor project Superintendent
5. Name of Engineer
6. Name of area supervisor
7. Construction schedule including anticipated work hours
8. Traffic regulations including lane restrictions
9. City of Chandler Street Transportation 24-hour phone number

The Contractor shall submit a Public Information and Notification Plan to the Engineer at the pre-construction meeting. No payments shall be made for this item until the Engineer approves the plan.

The plan and work which is eligible for reimbursement shall include: meetings with impacted businesses, schools, emergency services, residents, etc.; scheduling; preparation and distribution of newsletter at least monthly; and maintaining a 24-hour telephone hot line for complaints.

The Contractor shall submit a final report/evaluation of the Public Information and Notification process performed for this project. This report shall be submitted before the Contractor receives final payment.

Payment will be based on invoices, and will be for a total amount not to exceed the amount shown in the bid schedule for the item, "PUBLIC INFORMATION AND NOTIFICATION ALLOWANCE", for work performed in notifying and coordinating with the local population impacted by this project. To cover the cost for administration and supervision, the General Contractor may add an amount equal to not more than 5 percent of the accumulated total invoiced billing for actual public information services provided by a Subcontractor. This cost for administration and supervision will be considered included in the "PUBLIC INFORMATION AND NOTIFICATION ALLOWANCE".

ITEM 107-2 - PUBLIC INFORMATION AND NOTIFICATION ALLOWANCE

Subsection 107.6.4 - Project Signs: Add the following:

Contractor shall provide and install five project information signs, at locations to be determined by the Engineer, before beginning construction to inform the public of the forthcoming project, construction dates, and suggested alternate travel routes. Project signs shall include the names of all agencies

participating in the project. The signs shall also include the 24-hour hot line complaint telephone number. Signs shall be constructed in accordance with the "Project Sign Information" drawing to be provided to the Contractor at the pre-construction meeting. The signs shall be installed at the location(s) approved by the Engineer. The Contractor shall maintain the signs as necessary, and update the information as requested by the Engineer. Payment shall be made according to the allowance in the Bidding Schedule in installments of 50% upon installation, and the remaining 50% upon final payment for the work.
ITEM 107-3 - PROJECT SIGNS ALLOWANCE

Subsection 107.9 - Protection and Restoration of Property: Add the following:
The Contractor shall protect-in-place all existing structures and other features along the project corridor and as may be identified on the plans, including but not limited to irrigation facilities, roadways, fencing, block walls, signs, railroad, and other structures and features near construction activities.

The Contractor shall limit all construction activities to the right-of-way limits shown on the plans including dedicated street rights-of-way such as 56th Street, Kyrene Road, McClintock Drive, and Pecos Road, and shall not disturb any areas other than as required for construction as shown on the plans.

The Contractor will grade all Temporary Construction and Permanent Easement areas, and project areas which are disturbed during construction to the lines and grades shown on the plans, or as a minimum, where no lines and grades are shown, to a condition similar to or better than the pre-existing condition.

The Contractor shall restore the area of all temporary drain locations to as good as or better than pre-existing conditions, including backfilling any temporary ditches and removing any temporary berms and pipes.

Subsection 107.10 - Contractor's Responsibility for Work: Add the following:

A) Contractor is advised that the work will be subject to flows of water of varying amounts. Owner assumes no responsibility for notifying Contractor of any anticipated flows, nor for any damages incurred by Contractor to its equipment or to any of the Contractor's work as a result of any flows of water.

B) No payment will be made for providing excavation protective works for such things as dewatering. The cost thereof shall be included in the bid price for the construction or installation of the items to which said excavation protective works are incidental or appurtenant.

C) Storm water runoff generally flows to the south through the project area, including potential ponding along and discharging into the Gila Drain. The Contractor shall take all necessary precautions to protect his work and the irrigation drains from damage that may be caused by such runoff and ponding.

D) The Contractor shall take all necessary action to protect the public from the construction work area.

E) New rights-of-way being acquired along the east side of the Gila Drain and north of the West Collector Channel will not be available for construction activities until after March 1, 2000.

F) The Contractor shall horizontally and vertically locate the eight new ductbanks prior to any construction activities relating to the installation of the sanitary sewers, water lines and channels.

G) The Contractor shall maintain dust control measures at all times during the project. This is especially important along the project in the vicinity of residential areas.

H) The Contractor shall limit construction site access routes to 56th Street, Kyrene Road and McClintock Drive. Approval of the local jurisdiction will be required for the use of these access points, as well as any other access route the Contractor may wish to use.

Subsection 108.1 - Notice to Proceed: Delete Paragraph A and replace with the following:

(A) Contractor shall commence work within seven (7) calendar days after the date of the Notice to Proceed and complete all work within **three hundred and sixty five** (365) calendar days beginning the day following the effective date specified in the Notice to Proceed.

Subsection 108.2 - Subletting of Contract: Add the following:

For this project, Contractor shall perform, with its own organization, work amounting to 50 percent or more of the total contract cost.

Subsection 108.4 - Contractor's Construction Schedule: Delete in its entirety and replace with the following:

Contractor shall submit a proposed work schedule to Engineer for review before starting work using the Primavera or other similar software program that is acceptable to the Engineer. Weekly updates shall be submitted to Owner's Inspector at the weekly coordination meeting.

Subsection 108.4.1 - Contractor's Billing Schedule: Add the following:

The Contractor shall furnish the Engineer an Estimated Billing Schedule which shall include the estimated amount of each billing for the total project at the pre-construction conference, and thereafter at monthly intervals as agreed to between the Contractor and Engineer.

Subsection 108.5 - Limitation of Operations: Add the following:

The normal work week shall be 40 hours, Monday through Friday, and the work hours will be determined at the pre-construction meeting. This does not imply that this contract can be completed on time utilizing normal working hours. The Contractor shall furnish sufficient forces and shall work such hours including night shifts and overtime operations as necessary to ensure the completion of the work within the time required. To work other than normal working hours, for other than emergency situations, the Contractor shall give the Engineer at least 24 hours advance notification and receive written approval before working. Should the Contractor elect to perform any work after regular working hours, on weekends, or legal holidays, any charges incurred by the Owner for inspection of the work, surveys or tests of materials will be deducted from monies due or to become due to the Contractor.

Subsection 108.9 - Failure to Complete on Time: Add the following:

The actual cost per calendar day incurred by the District for Administrative and Inspection Services on this project will be added to the daily charges as indicated by TABLE 108, LIQUIDATED DAMAGES, and will be deducted from money due or to become due to the Contractor for each and every calendar day that work shall remain incomplete after the time specified for the completion of the work in the proposal, or as adjusted by the Engineer. Nothing contained in this provision shall prohibit the Owner from deducting from money due or to become due to the Contractor for any other costs incurred by the Owner directly attributable to the delay in completing this contract.

Subsection 109.2 - Scope of Payment: Add the following:

In addition to the contained provisions, the work under this section shall consist of preparatory work and operations, including but not limited to, the movement of personnel, equipment, supplies and incidentals to the project site; the establishment of all offices, buildings and other facilities necessary for work on the project, and for all other work operations that must be performed and costs incurred prior to beginning work on the various items on the project site.

Subsection 109.7 - Payment for Bond Issue and Budget Projects:

(A) To third paragraph, add:
Payment or release of retained funds will be made to the Contractor within thirty (30) days following final payment to the Contractor [reference (B) following], and Contractor furnishing to Engineer satisfactory receipts for all labor and material billed and waivers of liens from any and all persons and Subcontractors holding claims against the work. Additionally, Contractor shall furnish a completed Certificate of Performance to Engineer evidencing it has satisfactorily discharged all its duties in connection with the work to be performed under this Contract. The form of Certificate of Performance shall be provided to Contractor by the Engineer.

(B) Delete second and third paragraphs and replace with the following:
The final payment will be made to Contractor by Owner within thirty (30) days following receipt of Engineer's final estimate and receipt by Owner of Consent of Contractor's Surety to said final payment. If payment will be longer than thirty (30) days as aforesaid, Owner will provide Contractor specific written findings for reasons justifying the delay in payment.

(C) Contractor's pay estimates will be initially processed by Owner's Construction Branch on the week prior to the last day of the month.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PHASE 3 - SANTAN COLLECTOR CHANNEL PROJECT
SOUTHEAST VALLEY REGIONAL DRAINAGE SYSTEM

CONTRACT NO. FCD 99-05
PCN 4900133

SPECIAL PROVISIONS

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SPECIAL PROVISIONS

SECTION 201 - CLEARING AND GRUBBING

Clearing and grubbing shall conform to Section 201 of the MAG Uniform Standard Specifications except as modified herein.

Subsection 201.1 – Description

Remnant and stubble from such crops as hay and corn may exist within the project corridor along the West Collector Channel construction centerline between Stations 40+00 and 55+00 and the East Collector Channel construction centerline between Stations 162+00 to 185+00. Lease agreements with ADOT require all farming activities on ADOT right-of-way to be completed and crops harvested by December 1999.

All houses and other structures have been demolished and removed by others prior to construction, including slabs.

Subsection 201.5 - Payment

No payment will be made for clearing and grubbing as such; the cost thereof shall be included in the bid price for the construction or installation of the items to which said clearing and grubbing are incidental or appurtenant.

SECTION 202 - MOBILIZATION

Subsection 202.1 - Description

The work under this section shall consist of preparatory work and operations, including but not limited to, the movement of personnel, equipment, supplies and incidentals to the project site; the establishment of all offices, buildings and other facilities necessary for work on the project, permits and licenses, and for all other work and operations that must be performed, and costs incurred prior to beginning work on various items on the project site.

Field Office:

This work shall consist of providing and maintaining a furnished Field Office for the exclusive use of and occupancy by the Engineer and the Engineer's staff.

The office shall be a building or mobile trailer erected at a location convenient to the project. The Contractor's and the Engineer's offices shall not be in the same building or mobile trailer although the offices shall be located next to each other or within reasonable walking distance.

The Contractor may furnish equivalent facilities in an existing building provided such facilities and building are located to provide convenient service.

The field office shall be an approved and weatherproof building or mobile trailer providing a minimum of 500 square feet of clear floor space, not including the toilet area. The structure shall have a minimum ceiling height of seven (7) feet and shall be provided with weatherproof doors equipped with adequate locking devices. Windows shall also be provided with adequate locking devices. The Contractor shall also provide the following:

a. Lighting - Electric light, non-glare type luminaires to provide a minimum illumination level at desk height level.

b. Heating & Cooling - Adequate electrically powered equipment to maintain an ambient air temperature of 72 degrees F plus or minus 8 degrees.

c. Telephone, answering, plain paper FAX machine, and copying machine - Two (2) telephones with two (2) outside lines for the exclusive use of the Engineer. The Contractor will pay for the cost of the line and local calling charges. The District will pay for long distance charges made on these lines.

d. Toilet - A commode and wash sink in a separately enclosed room within the building or mobile trailer, properly ventilated and complying with applicable sanitary codes. Contractor shall provide water and sewer service.

e. Maintenance - The Contractor shall maintain all facilities and furnished equipment in good working condition, and the office shall be cleaned weekly.

f. Fire Extinguisher - Two non-toxic, dry chemical, fire extinguishers meeting Underwriters Laboratories, Inc. approval for Class A, Class B, and Class C fires with a minimum rating of 2A: 20B: 10C.

g. Electricity - Contractor shall provide electric power and pay for all electric services.

h. Furnishings - Three office desks with drawers, five office chairs (padded, swivel type), one drafting table (adjustable height) 1 meter by 2 meter, one eight foot (8') conference table, twelve folding chairs, one four drawer legal size file cabinet, and one draftsman's stool. All furnishings shall be in good working order.

i. First Aid Kit

j. Potable water supply or service

The office shall be fully equipped and made available for the Engineer's use and occupancy prior to the start of any Contract work and not later than 10 days after the date of Notice to Proceed. The Engineer will notify the Contractor, in writing, of the acceptability of the Field Office provided. The Contractor shall maintain the field office in operating condition until seven (7) days after acceptance of the Contract work.

All facilities shall be maintained in good operating condition and appearance by the Contractor for the designated period, after which all portable buildings or trailers, fencing, surfacing, and utilities shall be removed from the site, the areas cleaned and seeded if required and left in a neat and acceptable condition.

Subsection 202.1 - Payment

Payment shall be made on the basis of the lump sum price bid and shall be full compensation for supplying and furnishing all materials, facilities, and services and performing all work involved as specified herein. The lump sum price bid shall not exceed three (3%) percent of the total project bid amount exclusive of mobilization and permits and licenses. No additional payment will be made for occupancy and services during periods of contract extension of time due to engineering changes or shutdowns.

ITEM 202-1 - MOBILIZATION

SECTION 206 - STRUCTURE EXCAVATION AND BACKFILL

Structure excavation and backfill shall conform to Section 206 of the MAG Uniform Standard Specifications except as modified herein.

Subsection 206.1 - Description

Add the following:

Work specified in this item includes excavation and backfill required to construct structures such as headwalls, wingwalls, channel, retaining walls and culverts as shown on the plans. Structure excavation and backfill for the sanitary sewer lift station shall also be accomplished in accordance with subsection 650.11.1.

Subsection 206.2 - Foundation Material Treatment

Add the following:

Foundation bearing surfaces shall be free of debris and water softened materials prior to placing concrete and reinforcing steel. All foundation excavations shall be inspected and approved by the Engineer prior to placing the reinforcing steel and all trench excavations shall be inspected prior to placing bedding material. Any loose or disturbed zones should be removed and replaced with compacted fill or lean concrete as directed by the Engineer.

Below box culverts, the moisture content of existing site soils should be maintained between optimum and optimum plus 3 percent (ASTM D698) during and subsequent to site grading to reduce expansive potentials. At these conditions, some pumping may be experienced under dynamic loading if the compaction is done by very heavy equipment (i.e., loaded scrapers, water-pulls, etc.) Some pumping is not considered detrimental in areas below the culvert/pipeline bottom (i.e., static loading conditions) provided specified densities are obtained. Lighter compaction equipment and/or drying of wet soils may be used to reduce pumping if this condition becomes severe.

Geotechnical Reports are available from the Owner and may be used by the Contractor in developing plans for temporary construction slopes.

Subsection 206.4 - Structure Backfill

Add the following:

Compaction of structure backfill soils against embedded footings or walls shall be accomplished to a minimum 95 percent of the maximum ASTM D698 density.

Compaction operations shall be accomplished by mechanical methods. Water settling or jetting shall not be permitted. Compaction against culverts, wing walls, or channel lining within 3 feet of the walls or lining shall be accomplished using manual or remote control compaction equipment only.

Backfill behind subsurface walls designed to support utilities, pavement, channels, or other facilities should be compacted to density criteria from Section 211 of these Special Provisions. Backfills shall consist of granular soils, free of vegetation, debris, organic contaminants, and fragments larger than 75 mm in size, which exhibit low expansive potentials and a PI less than 5. On-site soils may be used in structure fills or backfills more than 3 feet below the final grade. High plasticity soils with PI > 25 may not be used in structure fills or backfills.

Imported soil used for fills below box culverts or backfills around box culverts or under pavements, or channels should be granular soils conforming to the following requirements:

Maximum Particle size:	3 inch*

Maximum percent expansion: 1.5**

* Maximum size may be reduced at the Engineer's direction to satisfy trenching and landscape requirements, etc.

**Performed on sample remolded to 95 percent of the maximum ASTM D698 density and 2 percent below optimum moisture under a 100 pounds per square foot surcharge pressure.

Kyrene Road will be detoured to allow open-cut installation of the Santan Collector Channel box culvert. The trenches may be up to 15 feet deep and installation of the box culvert will require construction within close proximity to the detour. Trench excavations, however, shall not be closer than 6 feet from detour traveled lanes. The Contractor may determine that a distance of greater than 6 feet is required due to construction and soil conditions. Since vertical, or near vertical trench walls will be required to install the culvert and pipelines in the vicinity of the detour lanes, shoring may be required to provide for trench and adjacent detour road stability. The design of such temporary structures for the trench is the responsibility of the Contractor, and plans for such structures shall be sealed by an Arizona Registered Engineer and submitted to the Engineer.

Subsection 206.5 - Payment
No payment will be made for structure excavation or backfill as such; the cost thereof shall be included in the bid price for the construction or installation of the items for which said excavation is incidental or appurtenant.

SECTION 211 - FILL CONSTRUCTION

Fill construction shall conform to Section 211 of the MAG Uniform Standard Specifications except as modified herein.

Subsection 211.1 - Description
Add the following:
The work under this section shall consist of fill necessary adjacent to the top of the channel lining to match natural ground. The limits of fill are delineated on the plans by a fill line.

The work also includes the backfilling, compacting and reshaping of an existing bench along the east side of the forebay channel between approximate Stations 10+00 to 17+00. This work shall be considered incidental to the placement of the forebay channel lining.

The work also includes the backfilling, compacting and reshaping of the existing spillway and basin slopes along the south side of the forebay channel between approximate Stations 22+00 to 33+50. This work shall be considered incidental to the placement of the forebay channel lining.

Subsection 211.2 - Placing
Add the following:
Highly plastic soils, PI >25, removed from the excavation shall not be used in any required fills or structural backfills.

Subsection 211.3 - Compacting
Add the following:
Compaction of exposed site soil, backfill, fill, and base course materials shall be accomplished to the following density criteria:

Material	Minimum Percent Compaction (ASTM D698)
Subgrade Soil:	
Below structural elements	95
Below Pavement	95
Backfill:	
Below channel lining	95
Channel berms	95
Temporary irrigation ditches	95
Aggregate base course:	
Below channel lining	95
Below pavement	100
O&M Road	95

Compaction of on-site soils in scarified zones or in new fills more than 3 feet below final grade should be accomplished at a moisture content between optimum and optimum plus 3 percent. Compaction of granular imported soil below the channel lining, box culverts, or footings should be accomplished at a moisture content between optimum minus 3 percent and optimum plus 3 percent. Compaction of exposed soil and fill material within 1 meter of asphalt pavement should be accomplished at a moisture content 2 percent below optimum or lower.

On site undisturbed soils or compacted soils subsequently disturbed or removed by construction operations should be replaced by materials compacted as specified above.

Subsection 211.6 - Payment
No payment will be made for fill construction as such; the cost thereof shall be included in the bid price for construction or installation of items for which said fill construction is incidental or appurtenant.

SECTION 215 - EARTHWORK FOR OPEN CHANNELS

Earthwork for open channels shall conform to Section 215 of the MAG Uniform Standard Specifications except as modified herein.

Subsection 215.1 - Description
Add the following:
The work in this section consists of excavation, over-excavation, fill, grading, and disposal of excavated and removed material for the construction of the open channels, including the transitions to the box culverts, and spillways, and O&M roads.

Subsection 215.7 - Measurement
Add the following:
Measurement for excavation will be made according to the quantity of material excavated from natural ground to the finished sub-grades shown on the plans. The Engineer will verify the quantities of excavation by a method which in his opinion is best suited to obtain an accurate determination.

Subsection 215.8 - Payment
Payment for excavation for the open channels, spillways, and O&M roads, shall be made on the basis of the price bid per cubic yard, and shall include disposal of excess material.

ITEM 215-1 - DRAINAGE EXCAVATION

SECTION 220 - RIPRAP CONSTRUCTION

Riprap construction shall conform to Section 220 of the MAG Uniform Standard Specifications except as modified herein.

Subsection 220.1 - Description

Add the following:

The construction of plain riprap (no grout) at the forebay channel weir into Basin B, and at the outlet of the forebay channel into the equalization basin shall consist of furnishing and placing stone as shown on the plans and in these specifications. Sacked concrete riprap shall not be allowed.

4-inches of granular material and geotextile fabirc will be placed beneath the forebay channel weir riprap per Detail D20 and D21. The material and construction will considered incidental to the riprap.

Subsection 220.2 - Materials:

Add the following:

In order to maintain slope stability where plain rip rap is constructed, stones shall be angular in shape and conform to the requirements set forth in Table below. A geotextile fabric underlay shall be provided per ADOT Standard Specifications 913-2.05.

Riprap shall conform to Section 913 of the ADOT Standard Specifications. Gradation requirements for the two riprap classifications are provided below:

Gradation	Riprap Classification (D50)	
% Passing	12-inch	18-inch
100-90	24	36
85-70	18	27
50-30	12	18
15-5	8	12
5-0	4	6

Subsection 220.8 - Payment

Payment for riprap construction shall be made at the price bid per cubic yard to the neat lines shown on the plans, and shall include full compensation for furnishing all labor, materials, tools, and equipment, and doing all the work involved in constructing the riprap structures complete in place as specified on the plans, and in the special provisions. This includes, but is not limited to, preparation of ground surfaces, excavation and backfill, furnishing and placing granular filter, geotextile fabric, riprap, and cleanup.

ITEM 220-1 - PLAIN RIPRAP (12-INCH D50)

ITEM 220-2 - PLAIN RIPRAP (18-INCH D50)

SECTION 225 - WATERING

Watering shall conform to Section 225 of the MAG Uniform Standard Specifications except as modified herein.

Subsection 225.1 - Description

Add the following:

Material to be excavated between the existing ground surface and the finished grade shall be pre-wet immediately prior to its removal. The Contractor shall rip or scarify the upper 1.5 feet of soil in the excavation area concurrently with the application of water. Dust shall be kept to a minimum. The moisture shall be kept at a content sufficient to insure that dust will be kept at a minimum for the excavation, hauling, and disposal or placement of soil.

Subsection 225.2 - Water Supply
Add the following:
Water used for construction purposes such as pre-wetting, excavation, dust control, etc. may be obtained from the Salt River Project (SRP). Permits must be obtained from SRP for the use of this water. The Contractor should contact the Shareholder Service Department, Anita Jasper at 602-236-3368 or Linda Montanez at 602-236-3391. The Contractor may also contact Lisle Tollefson at 602-236-5011. The permit paperwork can be obtained at the SRP offices located at 1521 Project Drive, Tempe, Arizona, or at 3160 South Alma School Road, Mesa, Arizona.

Subsection 225.5 - Payment
No payment will be made for watering as such; the cost thereof shall be included in the bid price for the construction or installation of the items to which watering is incidental or appurtenant.

SECTION 301 - SUBGRADE PREPARATION

Subgrade preparation shall conform to Section 301 of the MAG Uniform Standard Specifications except as modified herein.

301.1 - Description
Add the following:
This work includes the preparation of natural, or excavated areas prior to the placement of aggregate base course (ABC) for the operation and maintenance road and placement of sub-base material and pavement for the 79th Street cul-de-sac.

301.7 – Measurement
Add the following:
No measurement for subgrade preparation under the operation and maintenance road or pavement will be made.

301.8 – Payment
No payment will be made for subgrade preparation as such; the cost thereof shall be included in the bid price for the construction or installation of the items for which said work is incidental or appurtenant.

SECTION 310 - UNTREATED BASE

Untreated base shall conform to Section 310 of the MAG Uniform Standard Specifications except as modified herein.

Subsection 310.1 - Description
Add the following:
This work includes the placement of aggregate base course (ABC) for the Santan Channel operations and maintenance (O&M) road.

310.2 - Materials:
Add the following:
Materials for use as ABC shall be in accordance with Section 702 - Base Materials of the MAG Standard Specifications.

310.4 – Payment:
Add the following:
Quantities of ABC shown on the plans are measured by the square yard, based upon the dimensions shown. No allowance is made for waste beyond those limits.

Payment for aggregate base course shall be made on the basis of the price bid per square yard complete in place, to the dimensions shown on the plans. Such payment shall be compensation in full for all materials, transportation, miscellaneous earthwork, labor, equipment, and placement.
ITEM 310-1 - AGGREGATE BASE COURSE

SECTION 336 - PAVEMENT MATCHING AND SURFACING REPLACEMENT
Pavement matching and surfacing replacement shall conform to Section 336 of the MAG Uniform Standard Specifications except as modified herein.

Subsection 336.1 - Description
Add the following:
Kyrene Road pavement, near the East Channel Station 28+88, removed during construction of the Kyrene Road box culvert installation shall be replaced in a manner so as to match the existing pavement. Prior to removal of the existing Kyrene Road pavement, the Contractor shall survey the existing pavement centerline and edge of pavement elevations at 25-foot intervals along the existing Kyrene Road and within the limits of the pavement removal. Contractor shall replace in-kind the raised median removed during construction. Concrete curb and gutter for the replacement of raised median shall match the existing configurations meeting the material and construction specifications of Section 340 of the MAG Standard Specifications. The Contractor shall also survey the top of curb elevations of the existing raised median on Kyrene Road at 10-foot intervals within the limits of removal. Upon completion of the box culvert construction, the Contractor shall replace Kyrene Road in accordance with the as-built survey data. This includes replacement of the curb and gutter for the raised median, landscape brick, replacing the existing sign in the median, and replacement of any pavement markings removed due to the box culvert construction.

This work shall include the construction of an AC temporary detour pavement per the details shown on the plans to facilitate the box culvert construction.

Temporary pavement reconstruction shall be in accordance with pavement section shown on the plans and meeting the material and construction specifications of Section 336.2.3. All permanent pavement replacement shall be in accordance with Section 336.2.4 of the MAG Standard Specifications.

Subsection 336.2.3 – Temporary Pavement Replacement
Add the following:
The asphaltic concrete shall be as specified in Section 409 of the ADOT Standard Specifications for Road and Bridge Construction.

BITUMINOUS MATERIAL
Asphalt cement shall be an asphalt binder performance grade (PG) 70-10. The asphalt cement shall conform to the requirements of Section 1005 of the ADOT Standard Specifications. The pressure aging temperature shall be 110 degrees Celsius (C).

The binder supplier shall provide the laboratory mixing and compaction temperature ranges for each PG asphalt binder used for mix design purposes. The mixing temperature range is defined as the temperature range within which the unaged asphalt binder has a rotational viscosity of 0.17 $\pm$ 0.02 Pascal-seconds (Pa-s) measured in accordance with ASTM D4402. The compaction temperature range is defined as the temperature range within which the unaged asphalt binder has a rotational viscosity of 0.28$\pm$ 0.03 Pa-s, measured in accordance with ASTM D4402. ASTM D4402 shall be performed at 135 degrees C, and the results plotted on a semi-log graph with viscosity (logarithmic scale) versus temperature (arithmetic scale). PG asphalt binders that are polymer-modified shall have mixing and compaction temperature

ranges in accordance with the manufacturer's recommendations, if the mixing temperature range exceeds 163 degrees C and/or the compaction temperature range exceeds 149 degrees C as determined by the ASTM D4402 procedure. The laboratory mixing and compaction temperature ranges shall be reported for the mix design.

ASPHALT CEMENT
Asphalt cement shall be a PG asphalt binder conforming to the requirements of AASHTO Provisional Standard MP1.

A minimum of five working days prior to the start of asphaltic concrete production, the Contractor shall provide to the Engineer a one gallon preconstruction sample of the proposed asphalt binder and a Certificate of Analysis showing complete AASHTO Provisional Standard MP1 asphalt binder testing. Asphaltic concrete production shall not begin until the Engineer determines the acceptability of the proposed asphalt binder.

If it is determined by testing that asphalt cement fails to meet the requirements of AASHTO Provisional Standard MP1 for the specified grade, the asphaltic concrete represented by the corresponding test results shall be evaluated for acceptance. When test results for the asphalt cement are not in compliance with specification requirements, the contract unit price shall be adjusted by the percentage shown in the following table, when the asphaltic concrete is allowed to remain in place. Should the asphalt cement be in reject status, the Contractor shall, upon request by the Engineer, supply an engineering analysis of the expected performance of the asphaltic concrete in which the asphalt cement is incorporated. The engineering analysis shall detail any proposed corrective action and anticipated effect of such corrective action on the performance. Asphaltic concrete not allowed to remain in-place will be removed at the Contractor's expense and replaced with asphaltic concrete meeting the requirements of the applicable specifications.

Asphalt Binder Pay Adjustment Table

Test Property	Test Value	Percent of Contract Unit Price Allowed
Dynamic Shear of Original Binder G*/sin (delta), kPa	0.90 - 1.00 0.70 - 0.89 less than 0.70	100 85 70**
Dynamic Shear of TRFO Binder G*/sin (delta), kPa	2.00 - 2.20 1.60 - 1.99 less than 1.60	100 85 70**
Dynamic Shear of PAV Binder G*/sin (delta), kPa	5,000 - 5,500 5,501 - 7,000 7,001 - 8,000 more than 8,000	100 85 75 65**
Creep Stiffness of PAV Binder S, Maximum, Mpa	300 - 330 331 - 450 451 - 600 more than 600	100 85 75 65**
m-value at 60 sec.	0.28 - 0.30	100

Asphalt Binder Pay Adjustment Table		
Test Property	**Test Value**	**Percent of Contract Unit Price Allowed**
	0.23 - 0.27 less than 0.23	80 65**

**Reject Status: The price adjustment applies if the asphaltic concrete is allowed to remain in-place.

Notes:

(1) Specified properties for flash point, viscosity at 135 degrees C and mass loss are not considered performance-related. Specification deficiencies for these properties shall be cause for a work stoppage until the specified properties are met, but shall not be cause for a pay adjustment.

(2) Should the bituminous material be deficient in more than one property, the price adjustment will be the greatest adjustment possible considering individual test results.

Concrete curb and gutter shall be replaced in kind, conforming to the requirements given in Section 340 of the MAG Standard Specifications.

Subsection 336.4 - Measurement

Add the following:

Measurement for pavement, curb, gutter and median replacement shall be done on a lump sum basis.

Subsection 336.5 – Payment

Add the following:

Payment for the pavement replacement and detour construction at Kyrene Road shall be made on the basis of the lump sum price bid. Payment shall be full compensation for all work required for the construction including, but not limited to, subgrade preparation, asphalt concrete, earthwork, drainage, concrete curb, gutter and median restoration and the complete removal of all temporary construction and the restoration of all pavement, median, median signing and shoulders to pre-project conditions.

ITEM 336-1 – PAVEMENT REPLACEMENT AT KYRENE ROAD

ITEM 336-2 – KYRENE ROAD TEMPORARY DETOUR

SECTION 350 - REMOVAL OF EXISTING IMPROVEMENTS

Removal of existing improvements shall conform to Section 350 of the MAG Uniform Standard Specifications except as modified herein.

Subsection 350.1 - Description

Add the following:

The work includes the removal and disposal of existing structures, pavement, curb and gutter, irrigation facilities, abandoned utilities and any other obstacles to construction. Holes, cavities and trenches resulting from the removal of structures shall be backfilled in accordance with Sections 206 and 211.

The work also includes the removal and reconstruction of the existing fence along the ADOT right-of-way at the Basin complex as shown on the plans. The fence will be removed for construction of the cross culvert, forebay channel and forebay box culvert siphon structure. The fencing will be reinstalled at the same location after construction of these features.

The work also includes the removal of existing fire hydrants, streetlights and street signs as indicated for removal on the plans and transport to City of Chandler storage yards (See Sheet C-1.01).

The work also includes the removal of existing manholes, frames, covers, and cones, and backfilling with native material.

The disposal of all waste material removed under this item shall be the responsibility of the Contractor. The disposal site shall be approved by the Engineer.

If a Maricopa County landfill is selected for disposition of waste materials and/or debris, a Maricopa County Landfill Use Permit will be required. Application for permit can be made at the Maricopa County Landfill Office, located at 2801 West Durango Street, Phoenix, Arizona 85009 (telephone (602) 269-2661). Charges will be levied on a volume basis for each load delivered to the landfill in accordance with the current fee schedule.

The project construction limits shall be cleared of all trash and construction debris. Such material as collected shall be disposed of at an approved landfill site and shall be subject to landfill fees so assessed, which will be included in the unit price bid for this item.

Weigh tickets from all landfill disposal must be furnished to the Engineer.

Subsection 350.4 - Payment
Payment for the removal and reinstallation of the existing fencing along the ADOT right-of-way at the Basin complex shall be made on the basis of the lump sum price bid.
ITEM 350-1 – REMOVE AND REPLACE FENCING

Payment for the removal of the existing pavement, median, curb and gutter, shall be made on the basis of the lump sum price bid.
ITEM 350-2 - REMOVE PAVEMENT, CURB AND GUTTER, MEDIAN

Payment for the removal and transport of these items shall be made on the basis of the price bid per each. Removal and transport of fire hydrants, street lights, and street signs shall be coordinated with the appropriate City of Chandler agency as indicted on Sheet C-1.01.
ITEM 350-3 – REMOVE AND TRANSPORT FIRE HYDRANTS
ITEM 350-4 – REMOVE AND TRANSPORT STREET LIGHTS
ITEM 350-5 – REMOVE AND TRANSPORT STREET SIGNS

Payment for the removal of the existing manholes, frames, covers and cones, and backfilling with native material shall be made on the basis of the price bid per each.
ITEM 350-6 - REMOVE AND BACKFILL MANHOLES

Payment for all miscellaneous removals required for construction of the project shall be made on the basis of the lump sum price bid, and including but not limited to, removal and disposal of headwalls, irrigation ditches and boxes, riprap, above ground and underground utilities and remnants abandoned within the area of construction, and other items as required.
ITEM 350-7 - MISCELLANEOUS REMOVALS

SECTION 401 - TRAFFIC CONTROL

Modify MAG Section 401 as follows:
Traffic control for the Kyrene Road Detour shall conform to Section 701 of the Arizona Department of Transportation (ADOT) Stored Specifications included in Appendix "B" and the City of Chandler Traffic

Control Manual. For the purposes of this Contract, reference to the "Department" in Appendix "B" shall be understood to be Flood Control District of Maricopa County acting on behalf of ADOT.

Subsection 401.1 - Description
Add the following:
All traffic control shall conform to the Construction Specifications for this project, including Part VI of the "Manual On Uniform Traffic Control Devices For Streets And Highways" (U.S. Department of Transportation, Federal Highway Division) and the associated ADOT supplement.

It shall be Contractor's responsibility to provide, erect and maintain and remove after completion of the work all necessary signs, barricades, barriers, berms, lights, high level warning devices, delineators, and any other required devices, uniformed officers, and flagman, necessary to properly mark and control the construction area for the safe and efficient movement of traffic. Temporary traffic control devices shall be installed prior to the start of any work. It shall be Contractor's responsibility to construct the required detour lanes in order to make the road available to traffic.

When there is no curb, Contractor shall mark all structures such as manholes and valve boxes outside of the traveled way and within the right-of-way with at least two reflectorized yellow posts.

Approval of the Contractor's traffic control method by ADOT, or the City of Chandler (COC) shall not relieve Contractor of its responsibility to protect the work, the Contractor's personnel, or the general public.

Contractor shall provide and maintain all necessary signs, barricades and centerline vertical panels for five (5) working days beyond the concrete cure time or acceptance of the project by the Engineer, whichever period is greater.

Subsection 401.5 General Traffic regulations
Add the following:
Road closures for the convenience of the Contractor will not be authorized, except as specified in these Special Provisions, without the prior approval of the controlling jurisdiction (ADOT or COC). Traffic restrictions are not permitted on Kyrene Road during peak traffic hours of 6:00 a.m. to 8:30 a.m. and 4:00 to 7:00 p.m. weekdays. Access to the Gila River Indian Community from Kyrene Road shall be maintained throughout the construction. Kyrene Road is used for access to a trash and refuse transfer station located on the west side of Kyrene Road just south of the Pecos Road alignment.

Channelization, including "KEEP RIGHT" signs, shall be provided whenever traffic is moved across the street center line, the existing center line is removed or opposing traffic is maintained in other than the normal traffic lanes.

All temporary traffic control devices shall be ballasted with sandbags or other approved ballast.

The "SPEED LIMIT 25" sign shall be used where traffic is maintained on unpaved shoulders, on temporary detour roads, on road sections where the existing pavement has been removed, or on traffic lanes that are severely restricted.

Access to all adjacent properties shall be maintained at all times. When access cannot be maintained, Contractor shall notify the adjacent residents at least 48 hours in advance of the access closure.

Contractor shall maintain or relocate all existing signal indications, warning signs, STOP, YIELD, and street name signs erect, clean and in full view of the intended traffic at all times. Portable signs should be

used to supplement blocked or removed signs. Contractor shall reset all disturbed signs to permanent locations when construction is completed. The Contractor shall cover all existing signs that are in conflict with the traffic control signing. Contractor is responsible for the cost of replacing lost or damaged traffic signs.

Contractor shall erect portable concrete barriers as shown on plans or when deemed necessary by the Engineer. The approach ends of all portable barriers shall be flared a minimum of ten feet away from the travel lane, or as otherwise shown on the plans in order to lessen the severity of an accidental impact.

Subsection 401.5.1 - Special Traffic Regulations
Add the following:
Road closures will be permitted only at McClintock Drive, 79th Street, Los Feliz Drive and Geronimo Street. Access to Pecos Road alignment from Kyrene Road must be maintained at all times.

The public will be adequately notified of construction operations using methods including distribution of construction alert publications.

Access to Pecos Road at Kyrene Road will be maintained throughout roadway construction so that there will be no substantial impacts on bus service to nearby schools. Prior to construction activities, the Engineer will coordinate with the Kyrene School District regarding any road closures that may have temporary impacts on bus services.

The temporary detour construction for Kyrene Road shall be in accordance with this Section 401 and Section 336 of these Special Provisions.

The Contractor will provide and install the "Dead End" sign for 79th Street, as well as install a permanent barricade at the end of 79th Street.

Construction shall not commence or proceed without an approved Traffic Control Plan. At the pre-construction conference, the Contractor shall submit for review his plan for the sequence of construction and the planned road closure for 79th Street south of Lindbergh Way. A Traffic Control Plan (TCP) covering the signing and staging shall be submitted and approved prior to the start of each stage of construction. The Traffic Control Plans shall address all construction staging and special provisions requirements.

At the time of the Pre-Construction conference, the Contractor shall designate an employee, other than the Project Superintendent, who is well qualified and experienced in construction traffic control and safety, to be available on the project site during all periods of construction to set up, maintain and coordinate safe barricading whenever construction restricts traffic. This individual shall be authorized to receive and fulfill instructions from the Engineer and shall supervise and direct the work. Instructions and information given by the Engineer to this individual shall be considered as having been given to the Contractor.

Subsection 401.7 - Payment
Payment for traffic control shall be made on the basis of the lump sum price bid and shall be full compensation for all work, including mobilization, placing, storing, removal and maintenance of all traffic control devices, signing and striping, flag persons, and other activities incidental to the implementation of the approved traffic control plan. The Contractor shall provide a detailed cost breakdown to document the basis for the lump sum bid price in accordance with the bid items shown on the plans. Section 701 shall be used as a basis to generate the detailed cost breakdown and the unit prices therein will be used as a basis for determining percentage of completion.

The Contractor is solely responsible for estimating the duration of the "EA-DAY" items included as part of the bid. The Contractor shall provide to the Engineer at the pre-construction conference the assumed durations for each "EA-DAY" item considered in the bid. Plan Sheet T-1.01 includes an estimate of the quantity of "EA-DAY" items required per day.

The Contractor shall be solely responsible for the identification of all work items and durations for temporary traffic control used to place the traffic control plan shown on the plans. The plan concept, the identification of work items and durations shall be included as part of the details provided as back up in the Contractor's lump sum bid for Traffic Control.

Payment for the traffic control devices required for the detour at Kyrene Road and 79th Street cul-de-sac shall be made on the basis of the lump sum price bid and shall be full compensation for all work required for placing, storing, removing and maintaining traffic control devices, signing, pavement markings, and barricades. The Contractor shall provide to the Engineer at the pre-construction conference a detailed cost breakdown to document the basis of the lump sum price bid according to the bid items shown on the prepared plans.

ITEM 401-1 – TRAFFIC CONTROL

Payment for the 79th Street Dead End sign and permanent barricade shall be made on the basis of the lump sum price bid, complete in place.

ITEM 401-2 – SIGN AND BARRICADE

Payment for miscellaneous traffic control including at Pecos Road, McClintock Drive and 56th Street shall be made on the basis of the lump sum price bid.

ITEM 401-3 – MISCELLANEOUS TRAFFIC CONTROL

SECTION 405 - MONUMENTS

Modify MAG Section 405 as follows:

Contractor shall provide and install ADOT right-of-way markers including reference markers in accordance with ADOT Standard Specifications Section 901 and Standard Drawing C-21.10, at locations shown on the plans. A description of the ADOT right-of-way including a comprehensive list of all right-of-way coordinates will be provided to the Contractor at the pre-construction conference. The Contractor will utilize this right-of-way and coordinate information to determine the coordinates for each of the right-of-way markers to be installed.

Payment shall be made on the basis of the price bid per each monument installed including reference markers, complete in place.

ITEM 405-1 - MONUMENTS

SECTION 420 - CHAIN LINK FENCES

Modify MAG Section 420 as follows:

Subsection 420.1 - Description

Add the following:

Fencing shall be placed along the ADOT right-of-way as shown on the plans in accordance with ADOT Standard Chain Link Fence Detail C-12-20, 72-inch, Type 1 and Standard Specification for Chain Link Fences. Gates shall be installed as shown on the plans and in accordance with ADOT Standard Gate Detail C-12.20, Type 1.

This work shall also include the installation of chain link fence at the open rectangular channel section as shown in the plans in Detail S1 and Detail D3.

Subsection 420.5 - Payment
Payment for the chain link fence shall be made on the basis of the price bid per linear foot, complete in place.
ITEM 420-1 - CHAIN LINK FENCE
ITEM 420-2 - CHAIN LINK FENCE DETAIL D3

Payment for the chain link fence gates shall be made on the basis of the price bid per each complete in place.
ITEM 420-3 - CHAIN LINK FENCE GATES

SECTION 505 - CONCRETE STRUCTURES

Concrete structures shall conform to Section 505 of the MAG Uniform Standard Specifications except as modified herein.

Subsection 505.1 - Description
Add the following:
The work under this section shall consist of furnishing all labor, materials and equipment for the construction of all cast-in-place and other concrete, including:

Box culvert to concrete channel transition walls and headwall extensions at channel transitions; reinforced concrete box culverts (RCBC or CBC) constructed to ADOT Standard Details; headwalls and wing walls; concrete channel lining; rectangular concrete channel section, forebay channel spillway, bulkheads and gate structures.

The Hearthstone box culvert cannot be fully constructed until existing water and sewer lines have been relocated. Refer to the plans and Section 610 and 615.

All wall drain systems will be constructed per ADOT Std. B-19.10 and will be considered incidental to the installation of said walls.

PVC weepholes are to be constructed in the channel lining between vertical joints spaced at 20 feet (max). The weepholes will be constructed of 4-inch PVC pipe extending through the channel lining. The area behind the weepholes will be backed by a burlap bag filled with No. 57 clean aggregate with untreated kraft paper between the bag and the back of the channel per the project plans. All material and construction of the weepholes will be considered incidental to the installation of channel lining.

Concrete shall conform to the requirements of Section 1006 of the ADOT Standard Specifications. The Contractor shall submit mix designs and certifications of conformance with the above requirements for written approval by the Engineer.

ADOT Class "S" Concrete, f'c = 4000 psi, shall be used for all Reinforced Concrete Box Culvert construction.

ADOT Class "S" Concrete, f'c = 3000 psi, shall be used for all other concrete structures, including the channel transition walls, wing walls, channel lining, irrigation structures, spillways, and head walls, weir retaining walls, and gate structures.

The use of Class F fly ash will be permitted in all concrete mixes, subject to approval of mix design by Engineer.

Transit concrete mixers used on the project must carry current certification from ADOT or Arizona Rock Products Association.

The reinforcing steel shall conform to Section 1003 of the ADOT Standard Specifications.

Reinforcing steel for the forebay channel and west channel box culvert siphons shall be epoxy coated in accordance with ADOT Specification 605-3.03.

Wire mesh reinforcement shall be furnished in flat sheets (not rolled).

Waterstops indicated on the project plans shall be ADEKA Ultra Seal MC-2010M or approved equal. Payment for waterstop is incidental to the cost of the structures in which it is being installed.

All sluice gates shall be the product of one of the following or approved equal:

- Rodney Hunt
- Waterman
- Hydro Gate

Sluice gate, stem lifts, and other appurtenances of site, type, material and construction shall be supplied as shown on the plans and specified. Gates shall meet requirements of AWWA specification C-501. Maximum clearance between seating surfaces with slide gate closed is 0.004 IN.

Sluice gate shall have manual handwheel operator with centerline of handwheel approximately 36 IN above operating floor unless otherwise shown. Lift shall be provided in accordance with AWWA C-501. All lifts shall be provided with clear butyrate plastic stem cover with Mylar open-close indicator.

Sluice gate frame, glides, slide, pedestal, gear housing, thimble, and yoke shall be constructed of cast iron, ASTM A126 Class B. Resilient seals for flush bottom gates shall be of neoprene. Wedges shall be of bronze, ASTM B584, CA872. Stems, stem couplings, anchor bolts, assembly bolts and nuts shall be bronze ASTM B98.

Operators with counter clockwise opening as viewed from the top shall be provided as shown on Drawings or specified. A handwheel shall be provided with the direction of opening and the word OPEN shall be cast into the handwheel. Size handwheel for valves in accordance with AWWA C500.

Size actuator to produce required torque with a maximum pull of 80 LB and to withstand without damage a pull of 200 LB. Gear actuators to be totally enclosed, permanently lubricated and with sealed bearings.

The project includes the temporary relocation and reconstruction of the Salt River Project (SRP) Gila Drain and the Kyrene Road and McClintock Drive laterals noted in the plans. The Gila Drain and the two laterals will be temporarily diverted from their present locations to allow for the construction of box culverts on the forebay, west and east channels. After the box culverts are installed, the Gila Drain will be reconstructed as a box culvert, and the two laterals will be reconstructed as concrete lined ditches, all in accordance with the SRP plans made a part of these project plans and the SRP Standard Specifications included in Appendix "A". Partial concrete lining of the Gila Drain will also be required in the location of the turnouts for the temporary bypass. See Detail D13 and Appendix "A" for the SRP concrete lining details.

For the diversion of the Gila Drain during construction a capacity of at least 100 cfs must be maintained at all times while the Gila Drain is being diverted.

505.6.1 - Joints
Add the following:
Construction joints shall be located at the end of a day's pour or when concrete placement stops for more than 45 minutes. Reinforcing steel shall be continuous through channel lining construction joints for a minimum of two feet beyond the end of pour unless noted otherwise on the plans. The end of the pour shall be a roughened surface.

Subsection 505.8 - Curing
Add the following:
All concrete in top and bottom slabs of box culverts shall be water cured, utilizing the wet burlap method, unless otherwise permitted by the Engineer, and shall be kept continuously wet for 10 days.

No vehicular loads will be permitted on the box culvert structures before the period of twenty-one (21) days from the date of the last pour of concrete unless approval is obtained in writing from the Engineer. In no case shall traffic be allowed on the structure until the specified concrete strength has been attained. The Contractor shall take special precautions to keep the area properly barricaded, lighted, and marked to prevent automotive traffic from crossing the new box culvert structures prior to the Engineer's approval.

Subsection 505.9 - Finishing Concrete
Add the following:
The use of wood trowels will not be permitted in any finishing operations for concrete slabs.

Concrete Channel Lining shall be finished to light broomed texture.

Pneumatically placed mortar shall have a shot finish.

The channel lining finish shall not deviate more than 1/8 inch in 10 feet in any direction. The Contractor will supply a 10 foot straightedge for surface testing.

Subsection 505.10 – Payment
Payment for box culvert to channel transition walls (Detail D1 and D7), Santan Freeway Cross Culvert wingwalls and weir walls shall be made on the basis of the price bid per cubic yard including all concrete, reinforcing steel, weepholes, waterstop, structure excavation and backfill, and labor and equipment and other materials as required complete in place.
ITEM 505-1 – TRANSITION WALLS
ITEM 505-2 – CROSS CULVERT WINGWALLS
ITEM 505-3 – WEIR WALLS

Payment for reinforced concrete box culverts, including headwalls, shall be made on the basis of the price bid per linear foot including all concrete, reinforcing steel, epoxy coated reinforcing steel, venting manholes (Detail S4), and other materials, all structure excavation and backfill, and all labor, equipment and appurtenances necessary for construction complete in place.
ITEM 505-4 - RCBC 1, WEST CHANNEL SIPHON CULVERT
ITEM 505-5 - RCBC 2, KYRENE ROAD CULVERT
ITEM 505-6 - RCBC 3, McCLINTOCK DRIVE CULVERT
ITEM 505-7 - RCBC 4, HEARTHSTONE/COUNTRY CLUB WAY CULVERT
ITEM 505-8 - RCBC 5, SANTAN FREEWAY CROSS CULVERT

ITEM 505-9 - RCBC 6, FOREBAY CHANNEL SIPHON CULVERT

Payment for the reinforced concrete rectangular channel section shall be made on the basis of the price bid per linear foot including all concrete, reinforcing steel, waterstop, and other materials, all structure excavation and backfill, and all labor, equipment and appurtenances necessary for construction complete in place.

ITEM 505-10 – RECTANGULAR CHANNEL SECTION

Payment for Gate Structure No. 1 shall be made on the basis of the price bid per each complete in place and including all materials, concrete, reinforcing steel, aluminum grates, sluice gate and crank stand assembly, structure excavation and backfill, labor, equipment, and other materials and appurtenances complete in place.

ITEM 505-11 - GATE STRUCTURE (DETAIL D22)

Payment for concrete channel lining shall be measured to neat lines and made at the unit price bid per square yard, and shall include full compensation for all labor, material, equipment, and appurtenances necessary for the construction of the channel lining in place including all concrete and reinforcing steel, PVC weep holes, the forebay channel spillway, and turndowns complete and in place. The channel lining shall be constructed using one of the channel lining reinforcing details D5 or D10 in the plans. Channel lining may be constructed using cast-in-place concrete per MAG Section 505 or pneumatically placed concrete per MAG Section 525 as modified herein. At the Pre-Construction Conference the Contractor shall present to the Engineer the type of concrete, MAG 505 or MAG 525, and the channel lining detail D5 or D10 from the plans, that forms the basis of the bid price. Only one type of concrete and one reinforcement detail can be bid for this item. **[This item will not be eligible for Value Engineering.]**

ITEM 505-12 – CONCRETE CHANNEL LINING

ITEM 505-13 – GILA DRAIN CONCRETE CHANNEL LINING

Payment for the SRP Gila Drain box culvert construction as shown in the plans, and including the headwalls and wingwalls, and the temporary diversion of the existing Gila Drain and all connections thereto for the construction of the Forebay Channel and West Channel box culvert siphons, shall be made on the basis of the lump sum price bid, and shall include all concrete, reinforcing steel, structure excavation and backfill; and the cost for temporarily diverting and maintaining the 100 cfs capacity of the existing Gila Drain during construction; and the cost of backfilling the diversion after construction of the box culvert and the Gila Drain diversion structure to be constructed by SRP forces, and installing concrete lining of the Gila Drain at the locations of the temporary bypass turnouts.

ITEM 505-14 - RCBC 7, GILA DRAIN CROSS CULVERT

Payment for the reconstruction of the two existing SRP laterals along Kyrene Road and McClintock Drive as concrete lined ditches as shown in the SRP prepared plans, and including the diversion of the existing laterals and all connections thereto for the construction of the East Channel box culverts, shall be made on the basis of the lump sum price bid, and shall include all concrete reinforcing, excavation and backfill, and shall include the cost for temporarily diverting and maintaining the capacity of the existing laterals during construction, and the cost of backfilling the diversion after construction of the box culverts.

ITEM 505-15 - SRP LATERALS RECONSTRUCTION

SECTION 516 - STORM WATER MONITORING STATION

Fabrication, furnishing and installation of the Storm Water Monitoring Station, as shown on the plans in Detail D12, shall conform to Section 515.2 of the MAG Uniform Standard Specifications, with the following additions.

Subsection 516.1 – Specification for Sampler Enclosure
The provisions of this subsection shall apply to the Monitoring Station Sampler Enclosure and its appurtenant piping and connecting piping.

The following are minimum specifications:

- Equipment shall measure 55 by 44 by 26 inches (Height by Width by Depth).
- Enclosure will meet or exceed NEMA 3R rating and shall be UL listed.
- Cabinet and door shall be constructed from 5052-H32 sheet aluminum alloy with a thickness of 0.125 inches.
- Cabinet shall be sloped on top to allow water to runoff.
- A door restraint shall be provided to prevent door movement in windy conditions.
- Door shall be at least 80 percent of the front surface area for easy access to sampling equipment inside.
- Door shall be furnished with a water tight gasket seal.
- Door hinges shall be continuous and bolted to the cabinet door.
- Latching mechanism shall be a 3-point draw roller type. Center catch and pushrods shall be cadmium plated, Type II Class 1 or equivalent.
- Door shall have a stainless steel operating handle with 3/4-inch diameter shank. The latch/handle shall have a keyed entry and shall accommodate a padlock.
- Cabinet shall be ventilated with louvers that satisfy NEMA rod entry test for 3R enclosures.
- A filter shall cover the vent louvers.
- Cabinet finish shall be natural aluminum.
- Cabinet will be finished for pad mounting.
- An aluminum shelf shall be provided within the cabinet. Shelf shall be constructed of 5052-H32 aluminum with thickness of 0.125 inches. Shelf shall be 12 inches deep and 12 inches below top.

Subsection 516.2 - Specification for Monitoring Equipment
The furnishing and installation of Automatic Stormwater Monitoring Equipment shall conform to the following. Equipment shall be furnished as an entire unit and as individual parts. It is anticipated that component parts will be supplied on an as-needed basis to maintain existing equipment.

The Contractor shall furnish and install one automatic liquid sampler meeting the following specifications that are the specific requirements of a single sampler unit and its appurtenances for operation as a stand-alone unit. Many individual components are required for operation. All items including sampler and components are itemized in the parts list following the technical specifications. Sampler shall be refrigerated.

The equipment will be used in NPDES storm water monitoring. Therefore, rainfall, runoff, and storm programming capability shall be provided.

ADOT will secure and pay for all necessary telephone (US West) and electric (SRP) services and permits for the monitoring equipment. The Contractor shall be responsible for compliance with all conditions of these permits. The Contractor shall furnish and install electric service conduits and meter pedestal as shown on the plans and shall coordinate with the service utilities SRP and US West, as required. Electric meter will be furnished and installed by SRP. Power requirement shall be 120 VAC, 20A, #12 AWG.

For electrical pad and service meter pedestal details see Appendix "A", SRP specifications and details.

The sampler shall be designed for indoor or outdoor use. The sampler shall be capable of representative collection of liquid samples for conventional and toxic pollutants. The sampler shall incorporate a high-

speed peristaltic pump for collection of the sample liquid. The liquid shall be under continuous pumped flow from the stream inlet to the collection container, and shall not pass through any metering chamber, valves, or distribution plate. The pump shall purge the intake line before and after taking each sample. The duration of the purge shall be able to be adjusted automatically for differing intake line lengths. The pump tubing shall have a minimum inside diameter of 3/8 inch.

The sampler unit shall be equipped with a refrigeration unit such that the samples inside the base shall be cooled electro-mechanically and maintained at a pre-set temperature.

All electro-mechanical components shall be protected from humidity and corrosive gases within a sealed injection molded ARS plastic housing meeting NEMA 4X, 6 standards for submersible, watertight, dust tight, corrosion and ice resistant operation. All receptacles shall be sealed and shall not require capping to be watertight. The electronics housing shall contain silica gel desiccant and shall incorporate an indicator for relative humidity within the controller housing.

The controller shall have a hermetically sealed multiple key function keypad allowing decimal entries, and self-prompting multi-line, multi-character LCD graphic display. The multi-line, multi-character display shall be capable of displaying real time data. The display shall also be capable of displaying historical data either graphically or tabularly. The controller shall be capable of storing up to five complete sampling programs in memory. A software program lock shall be provided to prevent tampering. The sampler shall incorporate a solid state, real time clock that indicates time and date. The program shall include a delay function. The delay format shall be selectable as real time and date or time/day of week. The display shall provide the program status including the time/date of whom the program started, minutes or flow pulses remaining until the next sample, bottle number, number of samples collected and missed, volume collected and volume remaining. The display shall also provide a review of all program settings.

The controller shall have an RS232 serial interface for transfer of logged data to an IBM, or compatible, PC. The controller shall have an RS232 serial interface for transfer of logged data to a hand held unit with the specific purpose of collecting logged data The serial port data transfer rate shall be at least 19,200 baud. Base memory shall hold up to 17,000 data values.

The sampler shall be capable of operating in a time or flow-proportional mode. For the time mode of operation, the interval between samples shall be 1 to 9,999, in one-minute increments. For the flow mode, the pulse interval shall be 1 to 9,999 pulses in one pulse increments.

Sample volume shall be able to be set in milliliters. The controller shall have two non-contact liquid sensors whereby pump flow rate is determined with each collection cycle. The pumping time shall be automatically adjusted for repeatable sample volume with changing suction lifts. To prevent overflow, the controller shall automatically reject program entries for sample volume and the number of samples per bottle, the combination of which would exceed the container volume. With any rejected entry, the controller shall compute and display the closest acceptable entry.

The program shall be capable of assigning any number of multiple bottles as error bottles. In the event that a measured parameter such as flow rate or level, falls outside of user selected limits, the distributor arm shall move to an error bottle(s) and place a sample in the bottle. The error bottle sample volume shall be settable independent of the regular program volume. Both normal and error samples shall be logged in the controller memory.

The sampler shall be capable of rinsing the intake line with the source liquid immediately before sample collection. If enabled, the program shall accommodate up to three rinses. In addition, if enabled, the

sampler shall be capable of initiating up to three sample collections on the initial cycle. The time/day of any missed samples shall be logged in memory and indicated during the program review. The sampler shall be capable of collecting a manually initiated sample, independent of the program in progress.

The sampler shall be capable of sampling during user specified intervals. Sampler shall allow up to 99 independent intervals between samples.

The sampler shall be equipped with an integral open channel flow meter. Sampler shall be capable of collecting samples at time intervals independent of flow measurements/logging, and shall be capable of collecting flow proportional samples when paced by the integral flow meter. The flow interval between samples shall be user selectable and the flow units shall include gallons, liters, cubic meters, acre-feet, and cubic feet. Sampler/flowmeter shall be equipped with proper receptacles for each of the following devices: general-purpose depth sensor, area-velocity meter, or ultrasonic depth sensor. Lengths of cable for each sensor are site specific, and will range from 25 to 100 feet.

All programming entries shall be accomplished via the sampler keypad and self-prompting alphanumeric graphics display. Only one microprocessor shall be necessary to perform the flow measurements, data logging, and sampler control functions. The sampler/flow meter dimensions shall not exceed the standard sampler dimensions.

The integral flowmeter shall have field selectable primary devices, with at least the following:

V notch weirs with angles of from 22.5 to 120 degrees.
Compound v-notch / rectangular weirs.
Contracted and non-contracted rectangular weirs, trapezoidal weirs and thelmar weirs.
Manning equation for round, trapezoidal, U-channel, and rectangular cross sections.
Power curve equations.
Head versus flow tables for up to 99 head / flow points per table.
Area Velocity.

The field selectable units of measurement shall include at least:
Level: inches, feet, centimeters, and meters
Flow rate: gallons per second, gallons per minute, gallons per hour, million gallons per day, acre-feet per day, liters per second, liters per minute, liters per hour, cubic feet per second, cubic feet per hour, cubic feet per day, cubic meters per second, cubic meters per minute, cubic meters per hour cubic meters per day.

The integral flowmeter shall be capable of storing at least 17,000 data points, and up to 32 daily summaries for minimum, maximum, average, cumulative average, total daily, and cumulative total flow. Slate and wrap around data storage shall be available.

The integral flowmeter shall have two software totalizers, one resetable and one not resetable. Totalizers shall be scaleable.

The sampler shall be equipped with two optically isolated 4-20 mA outputs. Each output shall be field assignable to level, flow rate, or other measured values.

The sampler shall be equipped with an FCC approved internal modem. The sampler shall be programmable for assigning alarm conditions to the modem. The modem shall be capable of reporting alarm conditions to a computer, pager service, or both. Upon an alarm condition, the sampler shall report the condition, along with the time and date of the alarm incident to the selected recipient. Alarm

conditions shall include high/low settings for logged values, rainfall, missed samples, low memory batteries, low and full slate memories, and program completion.

Base memory of the data logging capacity shall be expandable to record at least 96,000 additional readings beyond the standard capacity. Additional memory shall be included with each unit.

The sampler shall have a receptacle for receiving pulses from a tipping bucket rain gauge. Rainfall data shall be recorded in the sampler memory for retrieval and analysis. The sampler shall be programmable to log rainfall data and initiate sampling on a field selectable rate of rainfall.

The sampler shall have the capability to log data on up to three channels from an external source. Logged data shall be stored in sampler memory and shall be displayed on the sampler display in both tabular and graphical x-y plots. Data shall be transferable to an IBM PC or compatible for additional analysis with the manufacturer supplied software or another commercially available spreadsheet program.

Subsection 516.3 – Measurement:
Add the following:
The Storm Water Monitoring Station will be lump sum complete and in place.

Subsection 516.4 – Payment:
Add the following:
Payment for the Storm Water Monitoring Station shall be made on the basis of the lump sum price bid and shall include full compensation for all labor, materials, equipment, permits, telephone and electrical service connections, and appurtenances necessary complete and in place.
ITEM 516-1 – STORM WATER MONITORING STATION

SECTION 520 - STEEL AND ALUMINUM HANDRAILS
Steel handrail construction shall conform to Section 520 of the Uniform Standard Specifications except as modified herein.

Subsection 520.1 - Description
Add the following:
The work shall consist of furnishing and installing steel handrails per Detail D4, on box culvert headwalls and transition walls at locations shown on the plans. All handrail shall be galvanized in accordance with MAG Section 771.

Subsection 520.4 - Measurement
Add the following:
Measurement shall be made on a per linear foot basis.

Subsection 520.5 - Payment
Payment for handrails, including galvanizing shall be made on the basis of the price bid per linear foot and shall be full compensation for furnishing and installing steel handrail, complete in place.
ITEM 520-1 - STEEL HANDRAIL

SECTION 525 - PNEUMATICALLY PLACED MORTAR
Pneumatically placed mortar shall conform to Section 525 of the MAG Uniform Standard Specifications except as modified herein.

Subsection 525.1 - Description
Add the following:

Pneumatically placed mortar may be used for concrete channel lining. Pneumatically placed mortar shall be constructed with reinforcement per the channel lining Detail D10 in the plans. Cement concrete used for the channel lining shall be Class "A" concrete and conform to MAG Standard Specifications Section 725.

Subsection 525.9 - Finishing
Add the following:
Pneumatically placed mortar used for Concrete Channel Lining shall be finished to a light broomed texture.

Subsection 525.12 - Payment
Payment for pneumatically placed Concrete Channel Lining shall be made per the applicable bid item in Section 505 (ITEM 505-12 and 505-13).

SECTION 601 - TRENCH EXCAVATION, BACKFILLING AND COMPACTION

Trench excavation, backfilling and compaction for the pipelines shall conform to Section 601 of the MAG Uniform Standard Specifications except as modified herein.

Subsection 601.1 - Description
Add the following:
The work covered by this specification covers the base pipe alternate of AWWA C302 reinforced concrete pipe (rigid pipe) design. Trenching, backfilling and compaction specifications for allowable alternative pipe materials shall be submitted by the Contractor for any allowable alternative pipe material other than the base pipe material and shall be reviewed and approved by the Engineer prior to acceptance of the alternative pipe material.

Subsection 601.4 - Foundation, Bedding, Backfilling and Compaction
Add the following:
Water consolidation for compaction shall not be allowed.

Type I trench backfill compaction of 90% is predicated on the base design condition of a rigid pipe design. Should the Contractor choose an alternate pipe for construction, the Contractor shall provide pipe manufacturers recommendation for trench backfill compaction to the owner=s engineer for review prior to beginning construction.

Granular material for bedding shall be a fine aggregate (sand) with a sand grading as shown in ASTM C33 or cover aggregate (chips or pea gravel) where 100% passes the 3/8-inch sieve with 10% to 40% passing the No. 4 sieve.

Subsection 601.6 - Payment
No payment will be made for trench excavation, granular bedding, backfilling, and compaction. The cost of this work shall be included in the unit price bid per linear foot for furnishing and laying pipe.

SECTION 610 - WATER LINE CONSTRUCTION

Temporary and new water line construction shall conform to Section 610 of the MAG Uniform Standard Specifications, including testing and disinfecting, except as modified herein.

Subsection 610.1 - Description
Add the following:
The work includes the installation of 12", 24" and 36" ductile iron pipe (DIP) water lines and 36" concrete cylinder pressure pipe (CCP), including fittings, bends, gate valves and butterfly valves as

shown on the plans. Steel casing pipe for water lines shall be as specified in Subsection 615.1 of these Special Provisions. Placement of thrust blocks and the removal of existing water lines shall be considered incidental to the water line installation. All work associated with connections of new water lines to the existing water system, including system shutdown, removal and replacement of several joints of the existing water lines, shall be considered incidental to the water line installation. Resilient wedge type gate valves, manufactured by Clow or Waterous or approved equal, may be installed to isolate the water lines during construction, and these shall be considered incidental to the water line installations. This will allow for shutoff of the water line as necessary. Any portion of the water line not affected by construction shall remain and be protected-in-place. Should any portion of water line require temporary shutdown or relocation to allow for construction activities resulting from the project, such work shall be accomplished, including testing and disinfecting, in accordance with Section 610 of the MAG Uniform Standard Specifications and the requirements of these specifications.

The City of Chandler has requested the installation of the entire 24" water line, and the installation of the 36" water line with sleeve between approximate East Channel stations 160 and 184. These water line installations, including all associated valves, sleeves, and connections to the existing water system, shall be included as "Alternate" bid items, which may or may not be awarded. See Supplementary General Conditions, Subsection 103.3. Refer to Detail U11 for valve vaults to be installed for the 36" butterfly valves. These vaults are considered incidental to the installation of the valves.

The Contractor will coordinate with the City of Chandler for the shutdown of any water line. Refer to plan sheet C-1.01 for contact names and numbers.

Unless indicated otherwise on the plans, ductile iron pipes and fittings shall have mechanical or push-on joints, Class 150 in accordance with Section 750 of the MAG Uniform Standard Specifications. Restrained joints, when specified on the plans, shall be push-on type or mechanical type with a minimum working pressure of 350 psi, EBAA/Iron Mega-lug, or approved equal.

36" CCP and fittings shall be rated for 150 psi working pressure and shall conform to MAG Uniform Standard Specifications Section 758. Unless indicated otherwise on the plans, CCP shall have bell and spigot joints. Beveled joints, when specified on the plans, shall conform to the manufacturer's design guidelines. At no time shall beveled angles exceed 5 degrees.

The Hearthstone box culvert cannot be fully constructed until the existing water lines have been relocated in accordance with the plans.

Pavement replacement for the installation of water lines will be considered incidental to the installation of the water lines.

Prior to any excavation for the water lines, the Contractor shall locate the existing SRP underground ductbanks which extend north to the ADOT right-of-way line.

Subsection 610.13 - Blocking
Add the following:
Any required temporary water line piping shall be restrained using approved methods of restraint in appropriate locations as directed by the Engineer.

Subsection 610.18 - Measurement and Payment
Payment for the installation of the 12", 24" and 36" water lines, associated 48" steel casing, and including all fittings, tees and bends, connections to existing water systems, excavation and backfill, concrete thrust

blocks, testing, the removal of existing water lines, and if required the temporary relocation and reinstallation of water lines shall be made on the basis of the price bid per linear foot, complete in place.
ITEM 610-1 - DUCTILE IRON PIPE (12"), CLASS 150
ITEM 610-2 - DUCTILE IRON PIPE (24"), CLASS 150 (ALTERNATE)
ITEM 610-3 - CONCRETE CYLINDER PIPE (36")
ITEM 610-4 - CONCRETE CYLINDER PIPE (36"), STA. 160 TO 184 (ALTERNATE)
ITEM 610-5 - DUCTILE IRON PIPE (36"), CLASS 150, STA. 160 TO 184 (ALTERNATE)
ITEM 610-6 - STEEL CASING PIPE (48") (ALTERNATE)

Payment for the installation of air relief valves, gate valves, butterfly valves and vaults shall be made on the basis of the price bid per each.
ITEM 610-7 - 4" GATE VALVE
ITEM 610-8 - 6" GATE VALVE
ITEM 610-9 - 8" GATE VALVE (ALTERNATE)
ITEM 610-10 - 12" GATE VALVE
ITEM 610-11 - 12" GATE VALVE (ALTERNATE)
ITEM 610-12 - 16" GATE VALVE (ALTERNATE)
ITEM 610-13 - 24" GATE VALVE (ALTERNATE)
ITEM 610-14 - 36" BUTTERFLY VALVE
ITEM 610-15 - 36" BUTTERFLY VALVE (ALTERNATE)
ITEM 610-16 – AIR RELIEF VALVE
ITEM 610-17 – AIR RELIEF VALVE (ALTERNATE)

Payment for the 1" water line service to the lift station including all fittings, bends, valves, pavement replacement water line taps and all other work incidental and required shall be made on the basis of the price bid per linear foot complete in place.
ITEM 610-18 - 1" WATER SERVICE LINE FOR LIFT STATION

SECTION 615 - SEWER LINE CONSTRUCTION

Sewer line construction shall conform to Section 615 of the MAG Uniform Standard Specifications except as modified herein.

Subsection 615.1 - Description

Add the following:
This work includes the installation of 8", 24", 30" and 36" lined ductile iron pipe (DIP) Class 150 sewer pipe and 24" DIP Class 150 sewer force main.

This work also includes the installation of a 24" and 48" steel casing near West Channel Station 51+45 for future use by the City of Chandler.

This work also includes the replacement of existing 24" VCP sanitary sewer line with 24" MJDIP at the crossing of the sewer line and the West Channel and Forebay Channel siphon structures. Refer to plan sheet C-1.02.

Unless indicated otherwise on the plans, DIP sewer pipes and fittings shall have mechanical or push-on joints in accordance with MAG Uniform Standard Specifications Section 750. Restrained joints shall be push-on type or mechanical type, EBAA/Iron Mega-lug or approved equal.

Restrained joint ductile iron pipe (DIP), Class 150, in accordance with AWWA C-150 shall be used through the casing under the East Channel as shown on the plans. Steel casing pipe shall conform to ASTM 53, Schedule 80. Steel casing pipe shall be a minimum 0.375" thick for sizes up to 36" nominal

diameter, and shall be 0.428" thick for 48" diameter. Joints shall be single-welded butt joints per AWWA C206. Casing shall be sealed with filter fabric at both ends. All ductile iron pipe shall have a coal tar epoxy or polyethylene protective lining in accordance with City of Chandler Standard Specification No. 2. The pipe manufacturer shall be solely responsible for the quality of the lining and shall supply a certification as to compliance with the specification. The certification of the lining shall be submitted to the Engineer for approval prior to installation of the DIP pipe.

All buried ductile iron pipe and fittings shall be coated on the exterior with 30 mils of coal tar epoxy in accordance with ANSI/AWWA C151/A21.51 standards and encased in a polyethylene sleeve for protection against corrosive soils. The total thickness must be attainable in no more than two coats. Coating shall be Kop-Coat 300M, TNEMEC 46H-413 or approved equal. The polyethylene sleeve for protective wrap shall conform to the requirements of ANSI/ASM D1248 and be as manufactured by American Cast Iron Pipe Company or approved equal. Prior to installation, damaged exterior coatings of ductile iron pipe and fittings shall be repaired with a coat of Rockote Black Mastic No. 612 Medium, or approved equal.

Existing sanitary sewer pipe to be removed according to the plans will be considered incidental to the cost of the new sewer line installation.

Other incidental work includes placement of concrete thrust blocks and anchors for the sewer force main, the plugging of existing sewer pipes to existing manholes and other modifications and adjustments to existing manholes that will remain in place, as shown on the plans. Plugs shall be per MAG Std. Det. 427. The Contractor will coordinate with the City of Chandler for the shutdown and/or bypassing of any sewer line. Refer to plan sheet C-1.01 for contact names and numbers.

The cost for reshaping the existing manhole floors will be considered incidental to the cost for the sewer pipe for which the manhole floor reshaping is required.

Prior to any excavation for the sewer lines, the Contractor shall locate the existing SRP underground ductbanks which extend north to the ADOT right-of-way line.

Subsection 615.3 - Laying Pipe
Add the following:
Connection of new sanitary sewer pipes to existing manholes shall be completed according to the alignment and grade shown on the plans. The Contractor shall exercise caution when making the connection so as not to damage the existing manhole structure or connected sewer lines. Any damage to these facilities resulting from the Contractors construction activities shall be repaired to the satisfaction of the Engineer at the Contractors expense.

Pipe and fittings used in the forcemain, except for those in the wetwell and the discharge manifold, shall be mechanical joint ductile iron pipe, pressure class 150, meeting AWWA C-111, C-150 and C-151, interior lined. Interior lining shall be 40 mil thickness bonded polyethylene in accordance with ASTM D-1248 or 10 mil dry film thickness fusion bonded epoxy per AWWA C213. Refer to Section 650 for other installation information for the force main piping inside the wetwell and manifold.

Subsection 615.4 - Measurement and Payment
Measurement for connection of new sanitary sewer line to existing manhole will be incidental to the installation to the sewer line.

Payment for the installation of DIP and steel casing pipe will be made on the basis of the price bid per linear foot and shall be compensation in full for such work including all required equipment, labor and

materials, excavation and backfill, coatings and linings, bends, plugs, and modifications to existing manholes complete in place.

ITEM 615-1 - LINED DUCTILE IRON PIPE (8"), CLASS 150
ITEM 615-2 - LINED DUCTILE IRON PIPE (24"), CLASS 150
ITEM 615-3 - LINED DUCTILE IRON PIPE (30"), CLASS 150
ITEM 615-4 - LINED DUCTILE IRON PIPE (36"), CLASS 150
ITEM 615-5 - LINED DUCTILE IRON PIPE (24") FORCE MAIN, CLASS 150
ITEM 615-6 - STEEL CASING PIPE (24")
ITEM 615-7 - STEEL CASING PIPE (36")
ITEM 615-8 - STEEL CASING PIPE (48")

Payment for the replacement of existing 24" VCP sewer line with 24" DIP sewer line will be made on the basis of the price bid per linear foot and shall be compensation in full for such work including all required equipment, labor and materials, excavation and backfill, coatings and linings complete in place.

ITEM 615-9 - 24" DIP REPLACEMENT SEWER

SECTION 618 - STORM DRAIN CONSTRUCTION

Storm drain construction shall conform to Section 618 of the MAG Uniform Standard Specifications except as modified herein.

Subsection 618.1 - Description

Add the following:

The work includes the installation of the 90" reinforced concrete pipe (RCP) Basin G Outfall pipe, the 60" RCP Kyrene Pump Station Discharge pipe with access barrier, the 24" RCP drain pipe for the Kyrene Pump Station Discharge pipe, a 96" RCP storm drain pipe and two plugs, and a 54" RCP storm drain pipe stubout and plug all as shown on the plans.

The work also includes the installation of four RCP storm drain pipe stubouts and plugs along the Hearthstone/Country Club Way RCBC.

Installation of the storm drain plugs shall be incidental to the installation of the storm drain pipe. Installation of the access barrier (ADOT Standard C-13.75) shall be considered incidental to the installation of the 60" RCP.

Subsection 618.2 - Materials

Add the following:

Concrete pipe, joints, gaskets, installation and testing for piping shall be according to ADOT Standard Specifications 501 and 1010.

Subsection 618.5 - Measurement

Add the following:

All pipe and sleeve installation shall be measured on a per linear foot basis.

Subsection 618.6 - Payment

Payment for the installation of discharge and drain pipe, outfall pipe, and storm drains shall be made on the basis of the price bid per linear foot, and shall be full compensation for furnishing and installing the pipe, including excavation, backfilling, plugs, access barrier, and headwall, compaction, sheeting and bracing, testing, and all incidental work not specifically covered in other pay items.

ITEM 618-1 - REINFORCED CONCRETE PIPE (18", Class III)
ITEM 618-2 - REINFORCED CONCRETE PIPE (24", Class II)
ITEM 618-3 - REINFORCED CONCRETE PIPE (24", Class III)

ITEM 618-4 - REINFORCED CONCRETE PIPE (24", Class V)
ITEM 618-5 - REINFORCED CONCRETE PIPE (36", Class III)
ITEM 618-6 - REINFORCED CONCRETE PIPE (36", Class V)
ITEM 618-7 - REINFORCED CONCRETE PIPE (48", Class II)
ITEM 618-8 - REINFORCED CONCRETE PIPE (54", Class III)
ITEM 618-9 - REINFORCED CONCRETE PIPE (60", Class III)
ITEM 618-10 - REINFORCED CONCRETE PIPE (60", Class IV)
ITEM 618-11 - REINFORCED CONCRETE PIPE (60", Class V)
ITEM 618-12 - REINFORCED CONCRETE PIPE (90", Class III)
ITEM 618-13 - REINFORCED CONCRETE PIPE (96", Class V)

SECTION 625 - MANHOLE CONSTRUCTION AND DROP SEWER CONNECTIONS

Manhole construction shall conform to Section 625 of the MAG Uniform Standard Specifications except as modified in the City of Chandler Standard Specification No. 3 and as specified herein:

Subsection 625.1 - Description

Add the following:
The work includes the installation of manhole structures for the sanitary sewer lines, for the Kyrene Pump Station discharge line, and all irrigation diversion pipelines and storm drains. The work also includes an 8-inch drop sewer connection.

Sanitary sewer manholes shall conform to MAG Detail 420 and City of Chandler Standard Specification No. 3. Irrigation diversion, stormdrain, and discharge line manholes shall conform to ADOT Standard Detail C-18.10.

All plugs required for the abandonment of existing sewer lines at new manhole locations shall be considered incidental to the installation of the manholes. Plugs shall be per MAG Std. Det. 427.

Subsection 625.2 - Materials

Add the following:
All sanitary sewer manhole covers shall be water tight covers per MAG Std. Det. 423. All manhole frames and the underside of the accompanying covers shall be coated with 2 B 16 mil coats of coal tar epoxy. All costs for such shall be considered incidental to the price of the manhole.

All sanitary sewer manholes shall be PVC lined and coated as per the City of Chandler Standard Specification No. 3. The cost of such coating materials and labor shall be considered incidental to the price of the manhole.

Subsection 625.3 - Construction Methods

Add the following:
Existing sanitary sewer manhole floors shall be reshaped in order to accommodate the connection of the new sewer pipe. The invert channels shall be smooth and semicircular in shape, conforming to the inside of the adjacent sewer pipe connections. The cost for the reshaping of existing manhole floors will be considered incidental to the cost for the sewer pipe in Section 615 for which the manhole floor reshaping is required. The Contractor shall exercise caution when reshaping the manhole floor so as not to damage the existing manhole structure or connected sewer lines. Any damage to these facilities resulting from the Contractors construction activities shall be repaired to the satisfaction of the Engineer at the Contractors expense.

Subsection 625.4 - Measurement

Add the following:

Manhole measurement will be per each complete in place.

Subsection 625.5 - Payment
Payment for the drop sewer connection and all manholes shall be made on the basis of the price bid per each, and shall include full compensation for all labor, materials, equipment, and appurtenances necessary for construction including all concrete and reinforcing steel, precast manhole sections, all coatings and PVC linings, and all other steel and other embedments, ladders, and manhole covers and frames, sewer plugs, and excavation and backfilling.
ITEM 625-1 - DROP SEWER CONNECTION 8" (MAG 426)
ITEM 625-2 - SANITARY SEWER MANHOLE (5' DIAMETER, MAG 420)
ITEM 625-3 - IRRIGATION, STORM DRAIN AND DISCHARGE LINE MANHOLES

SECTION 650 - SANITARY SEWER LIFT STATION

Add this entire section:

650.1 Description:
The work under this section shall consist of furnishing, installing and constructing a complete and functioning sanitary sewer lift station, including all subsurface and surface components, appurtenances, site grading, excavation and backfill (including structure excavation and backfill), setting of all parts and components, and testing of the system in accordance with the project plans, drawings and specifications.

The lift station shall include all elements necessary to comprise a fully functioning system, including the wetwell structure, valve vault structure, wetwell interior piping and fittings, pumps, pump motors, pump guide bars, hardware and fittings, anchorages, below ground and above ground or exposed piping and fittings, check valves, shutoff valves, backflow valves, air and vacuum release valves, odor control systems, potable water service, electrical service and distribution system, emergency power generator systems and fuel tanks, control cabinets and electronics, site lighting, remote monitoring systems, site surfacing, screen walls, access gates, site grading, equipment pads and slabs, conduits, switches, wiring, panels, fixtures, temporary services and all incidentals thereto.

ADOT will apply for the necessary permits and pay associated fees for the electrical and water services for the sewage lift station. The Salt River Project, the electric utility company, will furnish and install the transformer, and the primary and service wiring to the load center. The City of Chandler Public Works Department will furnish and install the water meter. The Contractor shall coordinate with the respective agencies for these services.

For electrical pad details see Appendix "A", SRP specifications and details.

Subsection 650.2 - Grading and Surfacing:
Aggregate base for use as surfacing within the lift station site shall meet Section 701.2 of the Standard Specifications and shall be Class 2.

Concrete and Masonry Components:

Concrete components shall be cast-in-place in accordance with applicable sections in Part 700 of the Standard Specifications, Special Provisions and notes on the plans. Unless otherwise specified or noted, concrete shall be ADOT Class "S" f'c = 3,000 psi.

Grout used shall be a non-shrink type in accordance with Section 776 of the Standard Specifications and as noted on the plans.

Mortar used shall be in accordance with Section 776 of the Standard Specifications and as noted on the plans.

Concrete masonry units used for the compound screen wall shall be in accordance with Sections 775 and 776 of the Standard Specifications and as noted on the plans and herein. Masonry units shall be normal weight, integrally colored, "Architectural" type concrete masonry units, vertically ribbed with a rough or split face type finish on the exposed ribs and smooth rectangular shaped channels or flutes in-between. Block shall be Superlite Block, Inc. "Sonora" block or equivalent, with Superlite "umber brown" integral color or equivalent. Contractor shall submit an actual integrally colored block sample for approval by the Engineer and City of Chandler prior to material ordering and construction for color confirmation. Color change from that stated above shall not be cause for additional compensation. Block used for construction shall be ordered all at once to assure most effective color consistency among individual units. Mortar shall be colored to match masonry units. Secure pigments at time of block order to obtain best color match.

Subsection 650.3 - Metal Components:
Steel reinforcement shall be in accordance with Section 727 of the Standard Specifications and notes on the plans.

Bolts, anchors, nuts, hardware, pump lifting chains and other appurtenances in the wetwell shall be Type 316 stainless steel meeting the requirements of ASTM A-240/A-240M and A-193/A-193M. Bolts, nuts and hardware on the sewer piping system outside of the wetwell shall also be Type 316 stainless steel meeting the requirements of ASTM A-240/A-240M and A-193/A-193M.

Pipe bracing and supports, pump guide bars, guide bar supports, braces, straps and any other miscellaneous metals placed inside the wetwell shall be Type 316 stainless steel meeting ASTM A-240/A-240M. Such materials for use outside the wetwell may be carbon steel meeting ASTM A-570/A-570M, A-563/A-563M, A500, A-325/A-325M, A-307, A-109/A-109M or A-36 as appropriate for the component unless otherwise noted.

Pump access hatches or covers in the wetwell shall be fabricated from anodized aluminum diamond plate meeting ASTM B-209 and rolled or fabricated aluminum shapes meeting ASTM B-221 with Type 316L stainless steel hardware, hinges, latches and locking hasps. The access hatch shall have a recessed or flush type lifting handle with a spring latch provision to securely close the hatch. The hatch shall have provision for locking with a padlock. The hatch hinge shall have a lift assisting torsion spring to reduce the force required to open the hatch. The hatch shall have a brace bar or latch provision to secure the hatch in the open position. This feature shall require a positive and deliberate action to disengage it to allow hatch closure. The hatch shall have a range of movement of 0 to +95 degrees minimum, 0 to +100 degrees maximum from horizontal and shall open to at least +90 degrees before the secure open latching mechanism engages.

Site access gate frame shall be carbon steel meeting ASTM A-36/A-36M, A-500, or A-570/A-570M, Grade 36 for the appropriate component. The gate bolts and hardware shall be cadmium plated steel meeting A-307. The various metal frame components shall be joined by welding as noted in the plans.

Subsection 650.4 - Pipe, Fitting and Valve Components:
Pipe and fittings used in the wetwell and discharge manifold shall be flanged ductile iron pipe, pressure class 350, meeting AWWA C-115, C-150 and C-151. Flanges shall meet AWWA C115 and ANSI B16.1, Class 125.

Bolts and nuts for pipe flanges shall be Type 316 stainless steel meeting ASTM A-240/A-240M and A-320/A-320M. Bolt threads within the wetwell shall be coated with an anti-seize compound prior to assembly.

Sewage air and vacuum valves shall allow unrestricted venting or re-entry of air during filling or draining of the discharge manifold and force main to prevent water column separation or pipeline collapse due to vacuum. The sewage air and vacuum valve shall incorporate one upper and one lower stainless steel float, connected by a common stainless steel float guide, thereby maintaining an air gap between the bottom float and the top shut-off float. The air gap shall retard waste solids from fouling or clogging the top shut-off float. The internal baffle shall be fitted with a guide bushing and act to protect the shut-off float from direct airflow. The baffle shall retain the valve float seat in place, without distortion, for tight shut-off. All internals shall be easily removed through the top cover without removing the main valve from the lines. Both floats shall withstand 1000 psi or more. Body, cover and baffle shall be cast iron, ASTM A-48 Class 30. Internal parts shall be stainless steel, ASTM A-240. The seat shall be Viton rubber. The valve shall have a 1 inch U.S. NPT inlet and a 1 inch U.S. NPT outlet. The valve shall be supplied with isolation and blowoff valves, quick disconnect couplings and a minimum 6 feet of hose to permit backflushing after installation without dismantling the valve. Air and vacuum valve shall be GA Industries Model 1SAV or approved equal.

Plug valves shall be non-lubricated eccentric type with flanged joints drilled to ANSI B 16.1, 125 lbs. Valve bodies shall be semi-steel with raised seats. Seats shall have welded-in overlay of high nickel content on all surfaces contacting the plug face. Plugs shall be resilient faced plugs with neoprene facings suitable for use with sewage. Port areas shall be at least 80 percent of full pipe area.

Check valves shall be flanged, horizontal, swing check type meeting AWWA C508. They shall have outside lever and weight mechanisms with rubber faced iron gates. The valve body shall be cast iron meeting ASTM A-48, Class 30. The valve interior shall be epoxy coated per AWWA C210 for corrosion protection. Valves shall be rated for 175 psi water working pressure and 350 psi hydrostatic shell pressure.

Valves and fittings shall be flanged meeting ANSI B16.1, Class 125 and shall be of the type noted. Fittings shall be interior lined as is the pipe. Valves shall be liquid epoxy lined per AWWA C210.

Ball valves for use in potable water systems shall be brass or stainless steel (ASTM A-316) and as noted on the plans. They shall operate smoothly and provide drop tight closure. They shall be furnished with operating levers. Ball valves for use in sewage handling systems shall be stainless steel.

Potable water service piping, fittings and appurtenances shall be in conformance with MAG Specification 631 except that copper pipe shall be used exclusively. No HDPE, other plastic or iron pipe shall be used. Copper pipe and tubing shall be Type K in accordance with the UPC and notes on the plans. Fittings shall be copper or bronze as noted in the details on the plans or as referred to in the specifications. Size shall be as noted on the plans. Backflow prevention units shall be reduced pressure principle type with test cocks.

Sluice gates shall be heavy duty, have resilient seats, and be installed complete with a wall thimble, anchor bolts, operating stem, gate lift operator and other appurtenances needed to make a complete and operating installation. The gates shall be resilient seated and shall meet the performance requirements of AWWA C-501 (latest revision) except the gate must allow leakage of no more than 0.008 gallons per minute per perimeter foot. The sluice gate must perform to this standard while withstanding 25 feet seating and 39 feet unseating head. Gates shall be the size indicated on the plans and meet the requirements of AWWA C-501 with the exception of the seats which shall be as noted herein. All sliding

and mating metal parts shall be fully machined. All parts shall be designed with a minimum safety factor of five. The frame and guide rails shall be cast one-piece construction or may have guides doweled and bolted to the frame. Frames shall be of flush bottom design with a resilient seat attached to the frame so that it is flush with the invert. The frame shall be provided with cast on pads which shall be machined, drilled and tapped for the mounting of the wedge devices. The back of the frame shall be machined to a plane and drilled to match the wall thimble. Guide rails shall be of such length to retain at least one half of the vertical height of the slide when the gate is fully open. The cover shall be of one piece construction with vertical and horizontal ribs, a thrust nut pocket and wedge pads. The cover shall properly engage the guide rails. The gate shall have a lubricated rising stem in a weather proof enclosure with a geared, manual operator. The gate shall be furnished for operator mounting on the cover slab of the wetwell and be furnished with stem guides to reach the cover slab. The gate shall be square with a circular to square opening wall thimble. The wall thimble shall be epoxy coated as for interior pipe linings above. The thimble shall be cast iron with Type 316 stainless steel fasteners. The gate, sill plate and yoke shall be cast iron meeting ASTM A-126, Class B. The wedges and stem block shall be manganese bronze meeting ASTM B-584. The fasteners, retainers and stem shall be 316 stainless steel. The seal and seating faces shall be Neoprene rubber and PVC. The sluice gate shall be Waterman Industries Model 5900 or approved equal.

Subsection 650.5 - Paint, Lining and Coating Components:
Wetwell interior coating shall be a trowel applied, 100% solids, aggregate filled, epoxy polyamine coating intended for use in municipal wastewater areas. Coating shall be Plasite 5371, Sauereisen 210 or Joseph's Sewer Shield 100.

Paint for use exterior of the wetwell for pipe, pipe supports, gate frames and other metal surfaces shall be two coats of an exterior service paint such as Tnemec Endurashield Series, High-Build Epoxy intermediate coat, with an inorganic zinc prime coat and a pigmented polyurethane finish coat alkyd paint system 82-5 or equivalent in accordance with MAG Specification 530. The finished color shall be camel tan or desert tan.

Pipe interior lining shall be 40 mil bonded polyethylene in accordance with ASTM D-1248, or 10 mil fusion bonded, amine cured epoxy or high build coal tar epoxy such as Kop-Coat High-Build 300M, Tnemec 46H-413 or approved equal.

Pipe exterior coating for use in the wetwell shall be a coal tar epoxy capable of providing a 14 to 20 mil dry film thickness per coat with total thickness required available in two coats such as Kop-Coat 300M, Tnemec 46H-413 or approved equal.

Anti-seize compound for use on bolt threads within the wetwell shall be Fel-Pro C5-A, Permatex 133K or approved equal.

Subsection 650.6 - Pumps:
Pumps shall be submersible, non-clog sewage pumps for raw wastewater pumping. Number of pumps to be provided shall be as indicated on the drawings and as described herein. Pumps and ancillary equipment shall be as indicated on the drawings and as provided herein.

All pumps shall be submersible, non-clog wastewater pumps capable of handling up to 3 inch diameter solids without clogging. Each pump shall be complete with an impeller providing the performance requirements noted herein, a mating cast iron discharge connection elbow, stainless steel anchor bolts, stainless steel guide bar system, stainless steel upper and intermediate guide bar brackets, stainless steel lifting chain, submersible electric motor, submersible motor control cable and any other items noted herein or on the drawings or not noted but required to install and operate the pumps.

The pump shall be designed for automatic connection to the discharge connection elbow, guided by no less than two guide bars extending from the top of the station to the discharge elbow. Sealing of the pump to discharge connection elbow interface shall be strictly by a machined metal to metal contact of the pump volute flange on the discharge connection elbow. Gaskets, O-rings or diaphragm shall not be used. The pump shall not bear directly on the wet well or sump floor.

Pump volute shall be single piece gray cast iron, Class 35B, with smooth passages and surfaces devoid of irregularities and large enough to pass solids that enter the impeller. Discharge size shall be as specified. Other major pump components shall be gray cast iron, ASTM A-48, Class 35B devoid of irregularities. All exposed bolts or nuts shall be AISI Type 316 stainless steel. The pump shall be exterior coated with a factory applied acrylic zinc phosphate primer and polyester resin paint finish system. Sealing of the pump components shall be by machined surface metal to metal contact. Critical mating surfaces shall also be fitted with Nitrile or Viton rubber O-rings for watertight sealing with controlled compression without specific torque requirements. Rectangular section gaskets and secondary sealing compounds shall not be used.

The pump shall have a water jacket encircling the stator housing to provide heat dissipation. Circulation shall be provided by impeller back vanes through non-clogging channels and ports. The system shall permit continuous pump operation in liquid media of 104 degrees F temperature.

The pump and motor shafts shall be one and the same. The shaft shall rotate on two permanently grease lubricated bearings. The upper bearing shall be a single roller bearing. The lower bearing shall be a two row angular contact bearing that compensates for radial and axial forces. The stainless steel or carbon steel (ASTM C-1035) shaft shall have no stress concentrating steps or grooves. The shaft shall be completely isolated from the pumped liquid.

The pump shall be equipped with a tandem mechanical seal shaft seal system to prevent flow between the motor housing and the pump volute. The independent mechanical seals shall operate in a lubricant bath seal lubrication system that permits rapid servicing of the hydraulic end. The seal system shall not use the pumped media for lubrication. The lower seal shall have a stationary tungsten-carbide ring and a positively driven rotating tungsten carbide ring. The upper seal shall have a stationary tungsten-carbide ring and a positively driven rotating tungsten carbide ring. Each seal shall have its own spring system to maintain contact and shall not require maintenance, adjustment or depend on a specific direction of rotation to seal.

Each pump shall be provided with a lubricant chamber for the shaft sealing system. The chamber shall be designed to prevent overfilling and allow for lubricant expansion. The drain and inspection plug, with positive anti-leak seal, shall be easily accessible from the outside.

The pump shall be equipped with a double shrouded, non-clogging impeller in a volute with a replaceable wear ring. Impellers shall be capable of handling solids, fibrous materials, heavy sludge and other matter found in wastewater. Impellers shall be dynamically balanced and secured to a straight fit on the motor shaft by means of a tapered collet and bolt or key and bolt fastener arrangement. The impeller shall be stainless steel or gray cast iron, ASTM A48, Class 35B having a long throughlet without acute turns. The impeller shall be coated with a factory applied acrylic zinc phosphate primer.

A wear ring system shall be used to provide efficient sealing between the volute and suction inlet of the impeller. Each pump shall be equipped with a stainless steel (meeting ASTM A-743-CA40, 300-350 BHN), brass or nitrile rubber coated steel ring insert that is drive fitted to the volute inlet. The pump shall also have a stainless steel impeller wear ring heat shrink fitted onto the suction inlet of the impeller.

The submersible motor control and power cable shall be an oil resistant chloroprene rubber jacketed type capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet. The power cable shall be sized according to NEC and ICEA standards, plus meet P-MSHA approval. The power cable for each pump shall have sufficient length to reach the junction box outside the wet well without any splices. All pumps and motors shall be approved for use in areas classified as hazardous locations in accordance with NEC Class 1, Division 1, Group C and D service.

The submersible electric motor shall be an induction type with squirrel-cage rotor and shell type design. It shall be housed in an air-filled, watertight, NEMA B type chamber. The stator winding and stator leads shall be insulated with moisture resistant Class F insulation which will resist a temperature of 311 deg. F. The stator shall have been dipped and baked in Class F varnish with at least three layers applied. The stator shall be heat-shrink fitted into the stator housing. No bolts, pins or other fastening devices shall penetrate the stator housing to hold the stator. The motor shall be designed for continuous duty handling pumped media of 104 deg. F and shall be capable of sustaining fifteen (15) starts per hour. The motor shall be rated at the specified shaft output, have a combined service factor of at least 1.15, and be connected for a 208 volt, 60 Hz, 3 Phase, 4 wire commercial quality service meeting NEMA standards for electric motors. The motor shall be designed to operate with a voltage tolerance of 10 percent, plus or minus and operate in an ambient temperature environment of 104 deg. F with a temperature rise of not more than 176 deg. F.

Thermal switches shall be embedded in the stator lead coils to monitor the temperature of each phase winding. The switches shall be set to open at 260 deg. F and connected to the control panel to be used in conjunction with an external motor overload protection system. Opening of the switches at the stated temperature shall stop the motor and activate an alarm signal.

The power cable entry seal design shall preclude specific torque requirements to insure a watertight and submersible seal. The cable entry system shall be field replaceable and shall not require any special tools. The cable entry shall consist of a single cylindrical elastomer grommet flanked by washers having a close tolerance fit against the cable exterior and entry interior. The entry shall compress the washers and grommet providing a strain relief function separate from the cable sealing function. The cable entry junction chamber and motor shall be separated by a terminal board, which shall isolate the motor interior from water or other foreign material entering through the pump top, cable or cable entry. Epoxies, silicones or other secondary sealing systems shall not be acceptable. An elastomer O-ring seal shall hermetically seal the junction chamber containing the terminal board from the motor. Connection between the cable conductors and stator leads shall be with threaded compression type binding posts permanently affixed to the terminal board. Wire nuts or crimping type connections are not acceptable. The motor and pump shall be designed and assembled by the same manufacturer. The motor power output shall be adequately sized such that the pump is non-overloading throughout the entire pump performance curve from shutoff through run out.

Each pump shall be fitted with stainless steel lifting chains.

The pump manufacturer shall warrant the units being supplied to be free of defects in workmanship, materials and poor performance for a period of five (5) years or 10,000 hours under their Municipal Wastewater-Permanent Installation Warranty Policy, under normal use, operation and service. The warranty shall cover parts and labor for the pump and motor and shall be in printed form and apply to all similar units.

The Contractor shall supply the following original equipment manufacturer spare parts with each pump unit:

One (1) set of bearings for each model of pump supplied.
One (1) set of mechanical seals for each model of pump supplied.
One (1) set of O-rings and grommets, watertight sealing compounds and cable entries for each model of pump supplied.

The pumps shall meet the operating conditions for a single pump, two pumps in parallel and three pumps in parallel as shown on the plans.

The pumps shall be ITT Flygt brand, Model CP-3201 with 639 impellers or approved equal.

Subsection 650.7 - Electrical Systems Components:
The Contractor shall furnish and install all electrical equipment, components, wire, conduits, boxes, and fittings required for the electrical power, control, instrumentation, communication, grounding and lighting systems as shown on the plans and required in these specifications. All electrical materials and equipment shall be new and of the type and quality specified, listed by UL and bear their label where standards have been established, in compliance with the applicable standards of NEC (NFPA 70), NFPA, ANSI, IEEE, IPCEA and NEMA. The Contractor shall replace or repair any nonconforming, damaged or defective items at no extra cost to the Owner.

Subsection 650.7.1 – Conduit:
Conduit sizes for various numbers and sizes of wire shall be as required by the NEC, but not smaller than 3/4 inch size except as otherwise noted. Conduit size shall be such that the required number and sizes of wires can be easily pulled in. The Contractor shall be responsible for the final selection of the conduit sizes, depending on field conditions. Conduit sizes shown on the drawings are minimum sizes in accordance with appropriate tables in the NEC. If, because of bends or elbows, a larger conduit size is required, the Contractor shall so furnish without further cost to the Owner. Conduit shall be as manufactured by Allied, Triangle, Jones-McLaughlin, Republic, National Electric, or as approved. All flexible conduit shall be steel. Non-metallic conduit shall be as manufactured by Carlon, Ipex Inc., PW pipe, or as approved. Liquidtight flexible metal conduit shall be steel as manufactured by Anaconda Sealtite Type UA or approved equal. Rigid metal or IMC conduit shall be used exclusively for this project except where PVC is noted on the plans. All metal underground or In-slab conduits shall be wrapped with a minimum of one (1) one-half-lapped layer of 10 mil corrosion protection tape (3M Temflex 1100). The corrosion protection tape shall be applied to underground conduits to a point at least 12 inches above grade. Rigid Schedule 40 PVC conduit shall be permitted only as noted on drawings. Provide rigid steel elbows and risers.

Couplings and connectors for galvanized rigid steel or IMC conduit shall be steel or malleable iron, threaded, rain and concrete tight. Transition from plastic to steel conduits shall be with PVC female threaded adaptors. Conduit outlet bodies shall be cast malleable iron. Types LB, C, LR, & LL as manufactured by Killark, Appleton or as approved by the Engineer. Bushings and locknuts shall be steel or malleable iron with sharp, clean cut threads. Fittings shall be Appleton, Crouse-Hinds, Steel City, T&B, or equivalent. Crouse-Hinds type XJ, or as approved, shall be used for expansion joint fittings on rigid steel or IMC. Carlon type E945 or equal shall be used for PVC conduit. Entrance seals shall be O-Z/Gedney type FSK, or as approved. Conduit seals shall be designed to accommodate the 40% conduit fill. Sealing compound shall be provided for the appropriate condition, temperature or hazardous location. Seal and compound shall be listed for the intended use. Acceptable manufacturers are Killark, Appleton, or approved equal.

Subsection 650.7.2 - Wire, Cable, Connectors and Conductors:

The Contractor shall furnish, install, connect and test all insulated wire and cable required to complete the installation of all electrical systems and components. The Contractor shall furnish all lugs and terminals, terminal blocks, cable joints, splicing connectors and insulation materials, etc., as required for a complete, operable lift station.

All low voltage wire and cable shall be new, 600 volt insulated copper, of types specified below for different applications. All wire and cable shall bear the UL label and shall be brought to the job in unbroken packages. Wire and cable shall be type THHN/THWN or XHHW, 90 C unless noted otherwise. All wire and cable shall be stranded with the exception of wire used for the concrete encased electrode which shall be solid. Wire used for instrument and control systems may be stranded and shall be in accordance with the system manufacturer's requirements. Conductors for branch circuit lighting, receptacle, power and miscellaneous systems must be a minimum of #12 AWG. Wire indicated to be larger than #12 must be increased the entire length of the circuit. Wire and cable shall be pulled into conduits without strain using an approved lubricant such as Richards "Gel Lube 7/5"; American Polywater A, C, G & J; Quelcor "Quelube"; American Colloid "Slip X-300"; Thomas/Jet Line "Slipry Loob"; Ideal "Wire Lube"; Mac "Wirepull"; Minerallac "Wire-Wax"; or Electro "Y-er Eas". In no case shall wire be repulled if same has been pulled out of a conduit run for any purpose. No conductors shall be pulled into conduit until conduit system is complete, including junction boxes, pull boxes, etc.

All connections to circuit breakers and switches and all joints in wires shall be made as follows: Connections to circuit breakers and switches: #12, #10 and #8 wire, Buchanan "Termend," or as approved, locking tongue lug; #6 wire and larger, Burndy "Quick-Lug" type QDA, or as approved, round flange, solderless lug. Fixture connections: Circuit wiring connections to fixture wire shall be made with pressure-type solderless connectors, Buchanan, Scotchlok, Wing Nut or approved equal. Stranded wire connections to receptacles, switches and other branch circuit wire devices shall be made using nylon insulated locking fork terminals (T&B Stakon) or as approved. Joints in wire: #6 wire and larger, Burndy or approved equal; #8 wire and smaller, Buchanan, Scotchlock, Wing Nut, or equal pressure type solderless connectors. Uninsulated solderless connectors shall be insulated as follows: Three layers of varnish cambric tape (Scotch #2520) followed by three layers of plastic electrical tape (Scotch #33+). In damp locations the varnish cambric tape shall be replaced by rubber tape. All conductor lugs shall have No Lox or Coppershield installed on the threads and conductor.

All wiring throughout shall be color coded as follows:

	480 Volt System	208 Volt System
A Phase	Brown	Black
B Phase	Orange	Red
C Phase	Violet	Blue
Neutral	White	White
Ground	Green	Green
Isolated GroundN/A		Green with Orange Tape

All 600V, #8 AWG and smaller conductor shall have colored insulation. Conductors #6 AWG and larger shall have colored tape applied at all termination points, junction boxes or pull boxes. Colored tape shall be a minimum of 3/4 inch wide with three complete wraps.

All control wiring in a circuit shall be color coded, each conductor having a separate color, and with all segments of the control circuit, whether in apparatus or conduit, utilizing the same color coding. All low voltage (less than 50V) control/system wiring shall be shielded.

Splices in conductors size #2 AWG and larger shall be accomplished with butt joint compression fittings or compression type bolted splices as manufactured by Burndy or Illsco. All current carrying conductors shall be insulated at splice points. Re-insulate material shall be rated for 600Vac application and have temperature rating equal to the spliced conductor insulation, 75 degrees C minimum. Insulation shall consist of heavy-wall shrink tubing for butt joints and molded cap shrink tubing for "motor connection" style bolted compression splice. Exterior splices shall be waterproof. Equal to Raychem.

The Contractor shall furnish and install all grounding materials, installation, etc. for system bonding as indicated on the drawings. The "Electrode" ground shall be solid bare copper conductor, sizes as shown on the drawings, encased by at least 2 inches of concrete, located within or near the bottom of the wetwell concrete foundation or footing which is in direct contact with earth. Provide at least 40 feet long copper conductor within the footings. The cold water pipe ground shall be stranded, bare or insulated, copper conductor, sized as shown on the drawings; effectively connected to the metallic cold water pipe system that is electrically continuous and in direct contact with earth for 10 feet or more at or near the entry into the facility and to the service entrance ground conductor. Ground all other metal pipe systems similarly. The water pipe shall be supplemented by an additional electrode. If used, the molded fusion weld process shall be as supplied by "Cadweld", "Metalweld", or "Thermoweld" in accordance with the applicable installation instructions. Ground fittings shall be silicon bronze alloy. Solderless compression lugs shall be copper, long barrel, two bolt. Ground rods shall be "copper clad" with stiff steel core to facilitate driving and copper bonded to steel to provide increased conductivity and to prevent corrosion. Ground rods shall be 3/4 inch diameter, 10 feet long or as shown on the drawings. Mechanical connectors and clamps shall be silicon bronze. Exposed grounding conductors (bars, straps, cables, flexible jumpers, braids, shunts, etc.) shall be bare copper unless specifically noted or approved otherwise. Cable sizes shall be as required by NEC 250, stranded, soft drawn or soft annealed, unless otherwise shown on drawings. Cable insulation type and color shall be in accordance with code.

Subsection 650.7.3 - Junction, Fixture and Panel Boxes:
The Contractor shall furnish and install electrical wiring boxes as specified herein and as shown on the drawings. All boxes must conform to the provisions of Article 370 of the NEC. All boxes shall be of the proper size to accommodate the quantity of conductors enclosed in the box. Boxes on exterior surfaces or in damp locations shall be corrosion resistant, cast malleable iron. Boxes shall have threaded hubs for rigid conduit and neoprene gaskets for their covers. Boxes shall be Appleton type FS or FD, Crouse-Hinds, or as approved. Boxes in concrete shall be of a type to allow the placing of conduit without displacing the reinforcing bars. All lighting fixture outlet boxes shall be equipped with the proper fittings to support and attach a light fixture. All light, switch, receptacle, and similar outlets shall be provided with approved boxes, suitable for their function. Back boxes shall be furnished and installed as required for the equipment and/or systems under this contract.

Pull and junction boxes shall be substantially made code gauge boxes with screw covers. Boxes shall be rigid under torsional and deflecting forces and shall be provided with angle-iron framing where required. Boxes shall be rigidly attached to the structure, independent of any conduit support. Boxes shall have their covers accessible. Covers shall be fastened to boxes with machine screws to ensure continuous contact all around. Covers for surface mounted boxes shall line up evenly with the edges of boxes. Covers for flush mounted oversize boxes shall extend 3/4 inch past boxes all around. Covers for 4 inch square and 4 inch ganged boxes shall extend 1/4 inch past box all around.

Subsection 650.7.4 - Devices and Fixtures:
The Contractor shall furnish and install all wiring devices as shown on drawings and as specified herein. All receptacles and switches shall be commercial grade, 20A rated, as manufactured by Hubbell, Bryant, Lavation and P&S. Weatherproof plates shall UL listed for weatherproof when in-use, Tay-mac polycarbonate series, or approved equal.

The Contractor shall furnish and install all lighting fixtures with lamps as specified and as shown on the drawings. Fixtures shall be complete including canopies, hangers, diffusers, ballasts, etc. All fixtures of the same type shall be of one manufacturer and of identical finish and appearance. All fixtures and component parts shall bear the UL label. Ballasts shall be CBM certified and bear the UL label. HID Ballast for high pressure sodium lamps shall be equal to Lagreactor (for 70, 100 and 150 watts) or the auto-regulator with high power factor (90% min.) and starting current equal to or less than normal operating current; capable of maintaining ANSI lamp operation standards for a change in line voltage of 5% for 70 through 150 watt and 10% for 200 through 1000 watt. Insulation shall be 356 degrees F, Class H. Minimum starting temperature shall be -20 degrees F. Contractor shall be responsible for the replacement of all ballasts due to excessive noise or failure for five years after final acceptance.

The Contractor shall furnish and install panelboards as specified herein and as indicated on the drawings. Panelboards shall include all necessary components and accessories for a complete installation. Acceptable manufacturers are Square D, General Electric, Cutler-Hammer/Westinghouse or Siemens/ITE. Approved 120/208 Vac panelboard types for each of the above manufacturers shall be Square D Type NQOD using bolt-on branch circuit breakers, General Electric Type AQ using bolt-on branch circuit breakers, Siemens/ITE Type S1 using bolt-on branch circuit breakers or Cutler-Hammer/Westinghouse Type PRL1 using bolt-on branch circuit breakers. All bus bars shall be copper, located in the rear of the panelboard cabinet. Circuit breakers shall be bolted into suitable supporting members at the front of the cabinet which are connected with suitable lugs to the bus bars in the rear of the cabinet. Individual circuit breakers shall be removable from the cabinet without disturbing adjacent units or supporting members. Panelboards shall be equipped with full neutral and ground busses.

The Contractor shall furnish and install all disconnect switches as shown on the drawings and as required by the NEC. Disconnect switches shall be heavy-duty type, quick-make, quick-break, externally operated with interlocking cover, to break all ungrounded conductors. Provide with solid neutrals where required, number of poles, ampacity, and voltage as required by application. Provide fusible type switches except where noted to be non-fused (NF) on the drawings. All switches for motors shall be horsepower rated. Fusible switches shall be complete with rejecting type fuse clips. Acceptable manufacturers are Square D, General Electric, Siemens/ITE, or Cutler-Hammer/Westinghouse.

Disconnect switches for fractional horsepower, 120 volt, single-phase motors furnished without built-in thermal overload protection shall be furnished as single-pole, manual motor starter with thermal overload protection and pilot light unless noted otherwise. Starter ampere rating shall match branch circuit breaker. Overload elements shall be sized per motor manufacturer's recommendations and NEC Article #430-32(c). Maximum ambient temperatures shall be considered when sizing overload elements. Enclosures shall be NEMA 3R.

The Contractor shall furnish and install fuses and circuit breakers as specified herein and as indicated on the drawings. Fuse catalog numbers indicated on the plans are that of Bussmann Manufacturing Co. Equivalent products from Little-Fuse, or Gould/Shawmut are acceptable. The specified product shall set the standard relative to quality and performance. Alternate fuses shall be submitted for approval during the "pre-approval" process. Fuses 600 amps and smaller shall be UL Class "RK5," current limiting, time-delay, 600 or 250 volt, with interrupting rating of 200,000 amperes RMS symmetrical. Where no indication is given, fuses shall be Bussmann LPN-R for 250V or less applications and LPS-R for greater than 250V but less than 600V applications. Fuses shall be coordinated with each other, with circuit breakers which they are protecting and with motor overload relays. All applications of fuses shall be on a single fuse per phase leg basis.

The Contractor shall furnish and deliver to Owner spare fuse cabinet, with spare fuses at the job site as follows:

a. Three spares for each type and size, in excess of 60 amperes, used for initial fusing.
b. Ten percent (10%) or minimum of three (3) spares for each type and size, up to and including 60 amperes, used for initial fusing.
c. Cabinet shall be NEMA 3R for exterior applications. Size for quantity of fuses provided.

Circuit breaker protective devices shall be molded case circuit breakers with inverse time and instantaneous tripping characteristics. Circuit breakers shall be operated by a toggle-type handle and shall have a quick-make, quick-break over-center switching mechanism that is mechanically trip-free. Automatic tripping of the breaker shall be clearly indicated by the handle position. Contacts shall be non-welding silver alloy, and arc extinction shall be accomplished by means of DE-ION arc chutes. Trip ratings shall be as shown on the drawings or noted herein. Circuit breakers shall have an interrupting rating no less than the available duty at the breaker.

Subsection 650.7.5 - Service Entrance:
The Contractor shall furnish and install electric service entrance (ESE) and distribution equipment as specified herein and as shown on the drawings and shall coordinate with the serving utility, Salt River Project, as required. All equipment and installations shall conform to applicable standards of National Fire Protection Association (NFPA), National Electric Code (NEC), National Electric Manufacturers Association (NEMA), Underwriters' Laboratories, Inc. (UL), American National Standards Institute (ANSI), local or state codes, and the serving power company standards. The Contractor shall submit shop drawings for pads, service entrance switchboard, metering provisions, main and distribution switches to the serving utility for approval. Payment of SRP electric service charges shall be the responsibility of ADOT.

The Contractor shall furnish a combination, free-standing, front access only cabinet enclosing the service entrance section, automatic transfer switch, motor control section and control and telemetry sections as shown on the drawings. The switchboard shall be NEMA enclosure type 3R, factory preassembled metal-clad units, shipped in sections to facilitate handling and field assembly, consisting of incoming services entrance pull section, main disconnect, metering section, and distribution sections. All major components of the switchboard shall be manufactured by the same manufacturer except as shown on the drawings and as specified herein. The Contractor shall provide engraved identification nameplates for each circuit, or piece of equipment properly marked to indicate equipment served and circuit number.

All equipment shall be rated to comply with NEMA for construction and ampacity. All equipment compartments shall be furnished with hinged access doors provided with friction catches to facilitate inspection and adjustment. Live compartments shall be secured with captive bolts. The main bus shall be copper with full capacity neutral. The bus bar structure shall be braced for short circuit faults as indicated on the drawings. A ground bus shall be furnished and secured to vertical structure. The switchboard shall be assembled of a welded frame work with sheet steel enclosure and support for bus work, switches, cables, etc. The switchboard shall be completely enclosed on front, sides, top and rear with removable sheet steel plates not less than No. 12 gauge. All fastenings between structural members shall be bolted, not welded, in order to provide flexibility during installation. The main service disconnect shall be labeled approved for service disconnect applications with minimum rating as indicated on the drawings. Each switchboard section shall have steel fire barrier side plates, open bottom and individual removable top plates for installation and termination of conduits. All closure plates shall be screw removable and small enough for easy handling by one person. Switchboard sections shall be designed for front access only.

Fusible switch units shall be quick-make, quick-break where and as scheduled on the drawings. The units shall be listed and approved by UL for general service entrance use and where applicable, shall be dual Hp rated for both standard one-time or dual-element fuses. Switch units 600 amperes and less shall be Class R with rejection feature. Switch units over 600 ampere shall be quick-make and break pressure type bolts. Each switch is to be enclosed in a separate steel enclosure. The enclosure will employ a hinged cover for access to the fuses which will be interlocked with the operating handle to prevent opening the cover when the switch is in the "ON" position. The units shall have padlocking provisions in the "OFF" position and the operating handle position shall give positive switch position indication. Switches shall pass industry standard I2T withstand ability tests and fuse race tests.

The distribution assembly shall be given Hi-Pot tests in accordance with all NEMA and UL standards before shipment. All bus bars shall be solid electrolytic copper, 98% minimum conductivity, sized at not more than 155 amperes per square centimeter (1000 amperes per square inch) of cross sectional area, plated for its entire length. The horizontal main bus bars shall be fully rated the entire length of the switchboard. Provide full capacity neutral buses. Bus arrangement shall be A-B-C left to right, top to bottom, front to rear. Vertical sections shall be fully bussed to facilitate addition of future switch-fuse-units. Thoroughly clean and corrosion treat sections, prime with rust-inhibiting primer and finish with two coats of manufacturer's standard grey enamel.

The switchboard as a complete unit shall be given a single withstand short circuit current rating by the manufacturer. The withstand short circuit rating shall certify that all equipment is capable of withstanding the stresses of a fault equal to the interrupting rating of the least overcurrent protective device contained therein. Such rating shall be established by actual tests by the manufacturer on equipment constructed similarly to the subject switchboard.

Subsection 650.7.6 - Motor Control Center:

The Contractor shall furnish and install a motor control center as specified herein and as shown on the electrical drawings. Motor control center design shall be in accordance with the latest applicable standards of NEMA and UL. The design shall have been tested in a recognized high power laboratory to prove adequate mechanical and electrical capabilities. All major components shall have been individually design tested and guaranteed by the motor control center manufacturer. Each control center shall consist of one or more vertical sections bolted together to form a rigid, free standing assembly and shall be designed to permit future additions, changes or regrouping of units by the purchaser. Vertical sections shall be formed to sheet steel and bolted together side by side on structural steel channel sills. Vertical sections shall be approximately 90 inches high by 20 inches deep by 20 inches wide, and shall be uniform in appearance. End sections shall have removable cover plates for connecting future sections. Removable front plates shall cover all unused unit space. The one-piece top plate shall be removable. Top and bottom horizontal wiring troughs shall extend the entire length of the control center and intersect with a vertical wiring trough on one side of the control units in each section. Wiring channels shall be provided on back-to-back arrangements to connect front and rear top horizontal wiring troughs. The bottom horizontal wiring area shall extend the full depth and the enclosure shall be open at the bottom for stubbing in conduit. Horizontal bus bars shall be provided near the top or bottom of each control center running its entire length. These may be cut at intervals and provided with splice bars to facilitate handling. Horizontal bus bars shall be mounted edge to edge to provide greater mechanical strength and to provide accessibility for attaching incoming feeders. Vertical bus bars shall be rated not less than 300 amperes. All bus bars shall be plated copper. Provide a 1/4 inch x 2 inch ground bus running the full length of the motor control center assembly. Bus bracing and unit interrupting capacities shall be suitable for operation at fault currents as indicated on the drawings.

Each control unit shall be completely enclosed and isolated from all other units and bus bars. Unit side plates shall be permanently attached so they cannot be accidentally discarded. Each unit shall have a door

mounted, piano type hinge fastened to the stationary structure so it can be closed to cover the bus bars when the unit is removed. Each control unit shall contain a 150VA, single phase, 120V control transformer. Plug-in fingers shall be plated and backed by steel springs to ensure adequate contact pressure. Guide rail brackets shall be provided on vertical sections to support and guide all four corners of each unit to ensure proper engagement with vertical buses so that the unit may be installed or replaced while busses are energized. Control centers shall be Class I for type B wiring.

Non-reversing starter units shall be of the combination type consisting of a full voltage magnetic starter providing external manual reset, thermal overload and low voltage protection. Each starter unit shall include a disconnecting means with dead front operation and provision for locking switch handle with a minimum of three padlocks in the open position. Locking switch handle in the open position shall prevent opening of cover. Each starter shall be equipped with a red pilot light to indicate motor is in the RUN position. Furnish hand-off-automatic switches, start-stop push buttons and other devices as indicated on the drawings. All starters shall be furnished with three thermal overloads to be selected after final installed name plate full load amperes of motors is determined and four NO/NC auxiliary contacts. Starter disconnects shall be circuit breaker type or fusible switch type as shown on the drawings. Circuit breakers shall be magnetic trip only with current limiters where shown. Interrupting capacities shall be adequate for the available fault current. Fusible switches shall be horsepower rated, quick-make, quick-break, with a minimum contact interrupting rating of 14 times its continuous current rating and shall be equipped with Class R rejection fuse clips where shown on the drawings. All devices shall have cover interlocked to prevent opening door when disconnect is energized. The door interlock shall be defeatable by qualified personnel. It shall be possible to padlock each device in the OFF position. With the door open, an interlock shall be provided to prevent inadvertent closing of the disconnect. A second interlock to prevent removal of the unit while in the ON position shall be provided by this same interlock. A defeater shall be provided to bypass this interlock.

Subsection 650.7.7 - Transfer Switch:
The Contractor shall furnish and install an automatic transfer switch as shown on the plans and specified herein with full load current, rating and number of poles as shown on the plans and shall be listed under UL 1008. The transfer switch shall be provided with battery charger rated for the existing generator battery. The transfer switch shall be capable of switching all classes of load and shall be rated for continuous duty when installed outdoors in a non-ventilated enclosure constructed in accordance with Underwriters' Laboratories, Inc., Standard UL 508. Approved manufacturers are ASCO, Onan, Russelectric, and Zenith. The transfer switch shall have withstand, closing and interrupting rating sufficient for voltage employed and the available short circuit current at the point of application. Solid state voltage sensing modules shall be provided to monitor each phase of the normal supply. A drop in voltage in any phase below the pre-determined dropout value of the module shall initiate load transfer. The solid state modules shall initiate re-transfer of the load to the normal supply, as soon as the voltage is restored in all phases beyond the pre-determined pickup value of the module. The transfer switch shall obtain its operating current from the source to which the load is being transferred. It shall be capable of being operated manually and shall have suitable provisions for readily disengaging the operator when necessary. Contacts shall operate at the same speed manually as electrically. The transfer switch shall be mechanically and electrically interlocked. It shall not be possible for load circuits to be connected to normal and emergency sources simultaneously, regardless of whether switch is electrically or manually operated. The intelligence circuit shall utilize solid state components mounted on printed circuit boards to accomplish proper operation, wherever practical, to accomplish functions such as timing, voltage and frequency monitoring. The transfer switch shall be mounted in a NEMA 1 enclosure inside the NEMA 3R SES enclosure and shall have hinged front access doors.

The transfer switch accessories shall include:

1. Exerciser Clock: set the day, time and duration of plant exercise period with load/no load selector switch.
2. A time delay to override momentary normal source outages to delay all transfer switch and engine starting signals. The time delay shall be field adjustable from 0.5 to 6 seconds, set at 1 second.
3. A time delay on transfer to emergency, adjustable to 1 minute for controlled timing of load transfer to emergency, set at zero.
4. A time delay on re-transfer to normal source. The time delay shall be automatically bypassed if the emergency source fails and normal source is available. The time delay shall be field adjustable from 0 to 30 minutes and factor set at 30 minutes.
5. An unloaded running time delay for emergency generator cool-down, adjustable from 0 to 30 minutes, set at 5 minutes.
6. Indicating lights for transfer switch position.
7. A test switch to momentarily simulate normal source failure and transfer load to generator.
8. Alarm and status outputs for control remote monitoring functions as described on the drawings.

Subsection 650.7.8 - Pump Control System:
The Contractor shall furnish and install a pump control system as shown on the plans and specified herein. The control system shall be as supplied by ITT Flygt with a Milltronics HydroRanger ultrasonic level sensing system. The control system shall be designed to operate four (4) 40 HP submerisble pumps at power characteristics as shown on the plans. The control function shall provide for the operation of the pumps under normal conditions and shall alternate the pumps on each pump down cycle to equalize the run time. In the event the incoming flow exceeds the pumping capacity of the lead pump, subsequent pumps shall automatically start to handle the increased flow. As the flow decreases, the pumps shall cut off at the elevations as shown on the plans. The control shall function as described below. The equipment listed below is a guide and does not relieve the supplier from supplying a system that will function as required. The control system shall interface with the MCC and telemetry system as described herein and as shown on the drawings.

The ITT Flygt control system shall be designed to interface with the Milltronics HydroRanger level sensing system with both primary and backup ultrasonic level sensing. Alarm and status outputs shall be provided as described on the drawings. The Contractor shall provide wiring schematics and panel layout drawings showing all control, status and alarm functions and wiring interfaces, as well panel layouts and device locations, for review by the Engineer prior to the release for construction. The Contractor shall provide all control and instrument raceway and wiring into the wetwell for control and monitoring, and shall test the system to verify all control, alarm and status functions operate properly.

The control system enclosure shall be a NEMA 12 rated enclosure installed within the NEMA 3R SES enclosure. The enclosure shall be a wall mount type with a minimum depth of 8 inches sized to adequately house all the components. The door gasket shall be rubber composition and shall assure a positive weatherproof seal. A polished aluminum dead front shall be mounted on a continuous aircraft type hinge, shall contain cutouts for mounted equipment, and shall provide protection of personnel from live internal wiring. Cutouts for breaker handles shall be provided to allow operation of breakers without entering the compartment. All control switches, indicator pilot lights, elapsed time meters, duplex receptacle and other operational devices shall be mounted on the external surface of the dead front. A 3/4 inch break shall be formed around the perimeter of the dead front to provide rigidity. The back plate shall be manufactured of 12 gauge sheet steel and be finished with a primer coat and two (2) coats of baked on white enamel. All hardware mounted to the subpanel shall be accomplished with machine thread tapped holes. Sheet metal screws are not acceptable. All devices shall be permanently identified.

Provide a lightning-transient protector with tell-tale warning lights on each phase to indicate loss of protection on the individual phases. The devices shall be solid state with a response time of less than 5 nanoseconds withstanding surge capacity of 6500 amperes. The unit shall be instant recovery, long life, and have no holdover currents. A line voltage rated, adjustable phase monitor shall be installed to sense low voltage, loss of power, reversed phasing and loss of a phase. Control circuit shall de-energize upon sensing any of the faults and shall automatically restore service upon return to normal power.

The Contractor shall furnish and install an ITT Flygt MiniCAS (Mini Control and Status) module to monitor the temperature and leakage detectors installed in each pump. The MiniCAS shall be capable of monitoring the thermal switches embedded in the stator end coils, the FLS (float switch type) water in the stator housing sensor, and the CLS (capacitive type) water in oil sensor. The MiniCAS shall monitor both the series connected thermal switches and leakage sensor(s) by outputting 12 VDC on a single two wire circuit. When both CLS and FLS leakage sensors are specified they shall be connected in parallel with each other and then in series with the thermal switches. The MiniCAS circuitry shall operate on the current sensing principle whereby a change in temperature or leakage condition shall change the resistance of the associated sensor and thus alter the current in the sensing circuit. The MiniCAS shall contain two sets of form C dry contacts, one for over temperature and one for leakage. The dry contacts shall change state upon occurrence of an over temperature or leakage condition so as to indicate the condition to other control components in the pump control panel. In the case of an over temperature, the over temperature dry contacts shall be used to trip the pump off line. The MiniCAS shall be designed to be plugged into a standard 11 pin circular socket and shall be powered by a 24 VAC supply.

The pump's ground conductor(s) and associated ground terminals shall be continuously monitored for open circuits, corrosion and loose connections. This monitoring shall take place in the pump control panel and shall not require the addition of any electrical/electronic circuitry within the pump. The standard pump cable shall be provided with a yellow ground check conductor in addition to the green ground conductor(s), to provide a continuous ground loop for monitoring. A solid state plug-in relay shall be provided to monitor the continuity of the ground loop and to measure the ground connections for a resistance of less than 500 ohms.

LED pilot lights shall provide an indication of a faulty ground condition and in the event of an alarm, the relay shall shut down the motor. A manual reset shall be provided to reset the alarm condition. A test push-button shall simulate an open ground wire and shall check the relay for proper operation.

An alarm system shall be provided. The alarm light shall be a weatherproof-shatterproof red light fixture with a 40 watt bulb to indicate alarm conditions. The alarm light shall be turned on by the alarm level. It shall be mounted on the top of the NEMA 3R cabinet. The alarm system shall also send a signal to the telemetry system.

The control system shall provide for the automatic and manual control of the pumps to maintain a pumped down condition in the wet well. Liquid levels shall be sensed by a Milltronics HydroRanger ultrasonic level sensing system initially set to the "Initial Control Level Elevations" shown on the plans.

Each pump shall have a permanent and specific duty as follows with pump names referenced on the plans:

Pump	Duty
P1	Lead pump
P2	First lag pump
P3	Second lag pump
P4	Standby pump

When the liquid level in the wet well rises above the "Pump 1 On / Pump 2 Off" control elevation, the lead pump shall start and pump the station to the "Pumps Off" control elevation.

When the incoming flow exceeds the capacity of the lead pump such that the liquid level rises above the "Pump 2 On / Pump 3 Off" control elevation, the first lag pump shall start and both pumps shall run to lower the level to the "Pump 1 On / Pump 2 Off" control elevation, at which point the first lag pump shall shut off.

In the event the "Pumps Off" level control fails, system shall pump between the "Pump 1 On / Pump 2 Off" and the "Pump 3 On" control elevation with the "Pump 1 On / Pump 2 Off" becoming the effective "Pumps Off" elevation. The system shall provide an indication of the failed liquid level sensing system.

The control system shall include, but not be limited to, the equipment listed below.

1. A three position Hand/Off/Auto switch shall be provided for each pump. The switch shall be NEMA 4X rated with 10 amp contacts. A position indicating legend plates shall be provided. The Hand/Off/Auto switches shall be mounted on the inner dead front door.

2. A green "Run" pilot indicator shall be mounted on the dead front.

3. An elapsed time meter shall be mounted on the dead front door. The meter shall operate on 120 VAC, shall indicate in hours (6 digits) and tenths, and shall be non-resetable.

4. The alternator shall be a plug-in solid state unit with Lead/Lag/Auto selector and test switches. The unit shall operate on 120 VAC and provide dpdt ten amp rated contacts. Two LEDs shall indicate the next position to run as lead pump.

A final record (as-built) drawing, laminated in mylar, shall be attached to the inside of the front door. A list of all legends shall be included. All component parts in the control panel shall be permanently marked and identified as they are indicated on the drawing. Marking shall be on the back plate adjacent to the component. All control conductors shall be identified with wire markers at each end as close as practical to the end of conductor.

All panels shall be tested to the power requirements as shown on the plans to assure proper operation of all the components. Each control function shall be activated to check for proper indication. All equipment shall be guaranteed for a period of three (3) years from date of shipment. The guarantee is effective against all defects in workmanship and/or defective component. The warranty is limited to replacement or repair of the defective equipment.

The control system manufacturer shall be a UL listed shop for industrial control systems and shall provide evidence of such on request from the engineer or using authority.

Subsection 650.8 - Telemetry System:
The telemetry system shall be furnished and installed by the Contractor and shall be compatible with the existing City of Chandler system. The remote terminal unit (RTU) shall be a Modicom Micro 612 Model PLC. Terminal strips shall be provided for the interface between the control system wiring and the RTU. Phoenix brand terminal strips shall be provided and installed in the control enclosure as required. The system shall include a 9600 baud modem for interface between the RTU and radio. The radio shall be a Microwave Data Systems Model 2335, self-contained in a NEMA enclosure. The frequencies shall be in the 900 MHZ range as determined by the City of Chandler. The City may change frequencies and the

Contractor should verify frequencies before ordering of materials. The local supplier is Abelard Controls in Tucson, (520)795-8885.

The antenna is a Yagi type directional antenna. The antenna shall be pole mounted at a height required to obtain a clear line of sight to the repeater located at Chandler Fire Station No. 1 near the southwest corner of Pecos and McQueen Roads. The antenna shall be grounded for lightning protection and a lightning protection surge protector shall be installed on the communications line to the antenna. The antenna shall mounted on a steel pole or truss type antenna structure. Foundation design shall be adequate to support the structure and meet a 100 mph wind load. Other systems integrators may be contracted, but the equipment shall be as specified herein and shown on the drawings. Drawings for the complete system shall be provided for the Engineer and City of Chandler review and approval prior to release for construction.

Subsection 650.9 - Odor Control System:

The Contractor shall furnish and install the self contained, skid-mounted modular odor control systems described herein. The purpose of these systems shall be to remove H_2S and methyl mercaptan odors emanating from ambient sewage emissions. Each system includes the following:

1. Skid -Mounted Modular Adsorber Unit, with fan and accessories
2. Activated Carbon

The skid-mounted modular adsorber unit and activated carbon function as a system and shall be the end product of Calgon Carbon Corporation or approved equal.

Shop drawing submittals shall include, but not be limited to the following:

1. Documentation to demonstrate that the adsorber system is the standard product of the supplier.

2. Documentation to demonstrate that the manufacturer has been regularly engaged in fabricating modular odor control carbon systems for at least 5 years.

3. Reference list of at least 10 separate installations of similar function and construction material to that of this section. The list shall include the following information:

    a. location
    b. application
    c. size and number of units
    d. installation date
    e. airflow
    f. type and amount of carbon
    g. contact name and phone number

Failure to supply this list with the submittal shall be considered a non-responsive submittal by the Contractor.

Skid-mounted modular adsorber:

a. The self contained, skid-mounted modular adsorber unit shall be a High FlowVentSorb Model HF-400, as supplied by Calgon Carbon Corporation, or approved equal, which meets these specifications.

b. The canister shall be manufactured of prefabricated polypropylene (PPL), or equal. The canister shall have no moving parts and shall be reusable.

c. The adsorber unit shall provide continuous treatment when fan is in service.

d. The canister shall have the following features:

1.	Inlet:	ANSI 150 flanged nozzle, 6 inches O.D.
2.	Outlet:	Plain end nozzle, 6 inches O.D.
3.	Carbon Capacity:	225 pounds.
4.	Air Flow Capacity:	200 - 400 CFM.
5.	Carbon Bed Support System:	FRP grating with PPL carbon retaining screen.
6.	Drain:	2 inch FNPT with plug.

e. The canister shall be rated at 15 inches W.C. positive pressure and 10 inches W.C. vacuum.

f. The following canister features shall be provided:

1. Air sample port with PPL ball valve, 1-1/2"
2. Carbon sample port with PPL ball valve, 1-1/2"
3. Pressure Gauge: (1) differential pressure gauge. Factory installed.
4. Grounding Rod: (1) 316 stainless steel ground rod. Factory installed.

g. The following optional canister features can be provided:

1. Flanged outlet: Sized and drilled per PS 15-69.
2. Rain Cap: "Tee" shaped raincap, PPL construction mounted at outlet. Factory installed.

h. TYPE: Product shall be Calgon Carbon Corporation CENTAUR HSV type carbon, or approved equal.

i. Sufficient activated carbon shall be provided to fill each adsorber unit with up to 225 pounds. The activated carbon shall be virgin granular activated carbon, derived from bituminous coal. The activated carbon shall be suitable for the vapor phase adsorption of sewage treatment odors. No chemical impregnation of the activated carbon is permitted. The activated carbon shall have the following specifications:

1.	Iodine No., mg/g	800 min
2.	Butane Activity, weight %	15.6 min
3.	Ash, weight %	8 max
4.	Moisture, weight % as packed	4 max
5.	Hardness No.	95 min
6.	Apparent Density, g/ml	0.56 min
7.	Mean Particle Diameter, mm	3.7 min
8.	H_2S Breakthrough Capacity, g H_2S removed/cc Carbon*	0.09 min

* The determination of H_2S breakthrough capacity will be made by passing a moist (85% R.H.) air stream containing 1% H_2S at a rate of 1,450 cc/min. through a 1 inch diameter by 9 inch deep bed of uniformly packed activated carbon and monitored to 50 ppm breakthrough. Results are expressed in grams H_2S removed per cc of carbon.

The carbon supplied shall be of a type that does not require chemicals to be regenerated in-place. Carbons which require hydroxide, permanganate, chlorine, organic, or other solutions, except clean water, to regenerate the material, will not be accepted.

Fan and skid assembly:

a. Each Skid-Mounted High Flow Ventsorb system shall be supplied with an air motive fan assembly factory mounted with accessories on a structural steel skid. Each fan shall be AMCA Certified with a 3 phase, 60 Hertz, 460 Volt, TEFC, 2 HP, 3500 rpm, V-belt driven motor, with suitable base, coupling and OSHA approved guard. The fan shall be constructed of FRP. The fan shall be a New York Blower Model RFE-200 or approved equal.

b. The structural steel skid shall be of one piece construction capable of supporting the full weight of the fan assembly and adsorber unit, when fully loaded when lifted at identified pickup points, without noticeable deflection. The entire skid shall be coated with an epoxy mastic paint system. Skid shall be complete with grounding lug to ground the adsorber unit and fan. The skid shall be provided with clips to hold the canister in position.

c. The system shall be supplied with the following:

1. (1) Silicone flexible boot, minimum 1/8 inch wall thickness.
2. (1) PVC tight shut-off flow control valve, with PVC body and disk, stainless steel shaft, EPDM seat, and hand quadrant lever.
3. Fastener and clamp hardware of type 316 stainless steel.

d. The system shall be provided with one (1) Combination Motor Starter, NEMA 4X FRP enclosure, with NEMA full size starter, fusible disconnect switch with 20A time delay fuse, heater elements, and "start" and "stop" buttons with red pilot "run" light.

Manufacturer's service and quality assurance:

a. No on-site assistance shall be required. The modular adsorber unit shall come with installation instructions which allow the operator to install the unit without Manufacturer's supervision.

b. The engineer may provide and direct inspectors to inspect the equipment at the place of manufacture or upon arrival at the job site. The inspector shall have the authority to reject work which does not conform to the requirements of pertinent sections of this specification. Inspection shall not relieve the manufacturer from any obligation to perform the work strictly in accordance with this specification. Work not so performed shall be replaced by the manufacturer at his own expense.

Subsection 650.10 - Submittals:

Shop drawings and manufacturers data and cut sheets shall be submitted to the Engineer for review and approval prior to construction for all components of the pump station in accordance with Section 105.03 of the Standard Specifications. Along with the pump, pipe, structure, and electrical components; this includes, but is not limited to, all fabricated items such as gates, pipe supports, access frames, hatches, tread plates, gratings, hold downs, electrical systems, and hardware whether such components will be furnished as indicated on the drawings or not. Grating submittal shall include manufacturer's rated grating load or span capacity and weight. Information furnished shall include material, dimensional, weight and performance data as well as specification references to ASTM or other common specification systems.

Subsection 650.11- Construction:

Subsection 650.11.1 - Earthwork:
Clearing and grubbing of the site shall be in accordance with Section 201 of the Standard Specifications.

Grading, parking, and driveway access for the site shall be in accordance with the grades, slopes and elevations shown on the plans.

Excavation shall be in accordance with the drawings and Section 206 of the Standard Specifications. Correction for any vertical over-excavation shall be made by increasing the thickness of the base structure. Contractor shall coordinate placement of the wetwell with the inflow sewer installation. Compact the soil under the wetwell base to 95% density prior to placement of materials. Backfill shall be compacted in accordance with Section 206 of the Standard Specifications and these Special Provisions. Structure backfill of the type specified herein shall be placed to the limits shown on the plans.

Structure backfill around the structure walls (wetwell and valve vault) shall be a free draining granular backfill. The free draining backfill shall be placed against the structure walls up to an elevation 2.0 ft. below finished grade. The gradation requirements, as determined by ASTM C-136, for the free draining backfill shall be as follows:

Sieve Size (square openings)	**Percent Passing by Weight**
3 inch	100
1-1/2 inch	80-100
¼ inch	10-60
No. 200	0-5

The plasticity index of the fraction of material passing the No. 40 sieve should be non-plastic when tested in accordance with ASTM D-4318.

Aggregate base surfacing shall not be placed within the walled compound until after all subsurface work in completed. Compact such material to 90% density, minimum, to prevent rutting and movement of material.

Subsection 650.11.2 - Wetwell and Valve Vault:
Due to manufacturing variances in pump dimensions, shape and size, Contractor shall be responsible for confirmation of pump fit and compatibility with wetwell and piping. This shall be accomplished prior to shop drawing submittal and any necessary adjustments to layout, piping, and other components reflected in said shop drawings.

Cast-in-place base slab, side walls, partition walls, and cover shall be constructed in accordance with the drawings and applicable sections of part 700 of the Standard Specifications. Concrete and reinforcing steel class shall be as noted herein or on the drawings.

All waterstops, piping, hardware and miscellaneous metal components to be embedded in the walls, base or cover shall be located and installed as indicated in the drawings.

Wetwell interior coating shall be installed per manufacturer's recommendations. All wetwell interior surfaces that are to be coated shall be cleaned and prepared in accordance with manufacturer's printed

surface preparation instructions. Adequate ventilation shall be provided in the wetwell during installation. Coating materials shall be mixed, thinned and applied in accordance with manufacturer's printed instructions. Allow each coat to dry thoroughly before applying the next coat. The wetwell interior coating minimum total thickness shall be 1/8 inch. The material is temperature sensitive for application and the Contractor shall strictly follow the manufacturer's printed instructions concerning application.

Access hatches and frames shall be installed in accordance with the drawings and manufacturer's specifications. Contractor shall verify pump unit dimensions, clearance and alignment with pumps for proper installation.

Piping penetrating the wetwell cover or walls shall be wall pipe or wall thimbles cast into the wall. Pipe openings penetrating the valve vault walls but not the wetwell walls shall be sleeved openings as noted on the plans. Adequate thrust restraint for piping must be provided with restraining rods, clamps or other acceptable means. Link seals, if used, shall have stainless steel metal components and shall be compression type. All non-stainless steel pipe within the wetwell shall be exterior coated as noted herein.

Each pumping unit shall be aligned, connected, installed and tested as shown on the drawings and in strict accordance with the manufacturer's recommendations. Nothing herein shall be construed as relieving the Contractor of his responsibility for this portion of the work.

Subsection 650.11.3 - Piping, Fittings and Appurtenances:
Pipe alignment, horizontal layout and location shall be checked by the Contractor prior to materials ordering and field fabrication. Pipe shall be supported to resist uplift and lateral forces as well as gravity. Assembled piping shall be leak free.

The sewage air and vacuum valve shall vent back to the wetwell by means of threaded, interior epoxy lined, galvanized iron pipe or stainless steel pipe that connects to the vent outlet and is routed back into the wetwell. Size shall be that of the vent outlet.

The sluice gate shall not be mounted in its frame until all supporting walls and anchorages have developed sufficient strength to support the gate.

Construction of the wetwell shall be coordinated with the incoming sewer and outgoing forcemain.

Subsection 650.11.4 - Painting:
All exposed piping, valves, valve operators, pipe supports, and fittings, except copper potable water piping or stainless steel materials, shall be painted with a two coat exterior service paint system as specified herein. All surfaces shall be prepared to accept the primer and surface coats in accordance with the paint manufacturer's instructions. All manufacturer's nameplates, viewing ports, lubrication fittings, and moving parts shall be masked for protection from painting contamination and cleaned after paint application.

Subsection 650.11.5 - Gates:
Gates shall be set to allow easy operation after installation. Gates shall be set on wheels, rollers, rails, tracks or other conveyance devices to permit easy operation. The gate shall remain open when left unattended in the open position. The gates shall provide the clear open width indicated on the plans when in the open position.

Gate frames shall be painted with a two coat exterior paint system as noted herein. Paint color shall match the color of the masonry wall.

The gate shall have a locking hasp or other mechanism that shall allow locking of the gate with a common, exterior use, keyed padlock. The locking mechanism shall be useable and accessible from both inside and outside the compound. The locking hasp and related hardware shall be cadmium plated, hardened steel. Such hardware shall be secured to the gate and/or jamb plate in such a manner as to prevent removal or access to the securing fasteners from the exterior of the compound while the gate is closed. The gate shall have a pull handle design for movement of the gate useable from both inside and outside the compound for opening and closing. Such a handle design shall be accessible for grasping when the gate is in the open and closed position. The handle shall be set no less than 38 in. and no more than 48 in. above adjacent ground level.

Wood slats (pickets) shall be sawn, dimensioned California Redwood Grade 1 lumber of the size indicated. The lumber shall be free of splits, large knots, disease or other flaws or damage that would weaken the lumber. The lumber shall be treated to resist weathering with a clear sealant or waterproofing agent such as Behr, Thompson's, Olympic or approved equal. The pickets shall be attached such that the fasteners heads are on the exterior side and are smooth surfaced or of vandal resistant style. Fasteners shall be cadmium plated.

Subsection 650.11.6 - Site Work:
Masonry walls shall be braced as necessary during construction to prevent collapse until the material strengths are developed. Gates shall not be hung until 28 day strengths have been attained in the masonry construction. During construction, block shall be used from at least three pallets at a time to effectively distribute color differences throughout the construction. Mortar shall be same color as block. Contractor shall prepare test batches of mortar and note pigment ratio needed to obtain best color match. Engineer shall field approve the color of selected test mortar mix before construction of the wall proceeds.

Subsection 650.11.7 - Potable Water Service and Piping:
The service contract for potable water service shall be secured by ADOT from Chandler by payment of prevailing fees for the service size noted. Work under this lift station pay item shall include the installation of all water service appurtenances within the lift station site and extending the service piping from within the compound to a point exterior of the wall where the proposed meter box will be located. The extended service piping shall be capped and its terminating location clearly marked outside the wall by use of above and underground markers and protected from damage during later stages of construction. The line shall be constructed from the proposed meter box location into the compound as noted. Potable water piping within the compound may be buried or secured to the screen wall by means of supports and anchors such as Unistrut or approved equal. Adequate clearance shall be provided around the installed piping to operate all valves and to provide maintenance, repair and replacement of fittings and supports.

Subsection 650.11.8 - Electrical Systems:
The Contractor shall perform all labor in a thorough and workmanlike manner. Contractor must staff the project with sufficient skilled workmen, including a fully qualified superintendent, to complete the work in the time allotted. Superintendent must be qualified to supervise all of the work. Scaled and figured dimensions are approximate only. Before proceeding with work, carefully check and verify dimensions, etc., and be responsible for properly fitting equipment and materials together and to the structure in spaces provided. Drawings are essentially diagrammatic, and many offsets, bends, pull boxes, special fittings, and exact locations are not indicated. Carefully study drawings and premises in order to determine best methods, exact locations, routes, building obstructions, etc., and install apparatus and equipment in available locations. Verify location and mounting height of all receptacles, wall mounted fixtures, switches, and other equipment before roughing in. See drawings for pertinent information. The Contractor shall maintain at site a set of record drawings, which clearly indicate (by shading, coloring, or some other acceptable method) the day-by-day extent of work installed.

The Contractor shall perform all necessary excavation, shoring and backfilling required for the proper laying of all conduits as may be necessary. Remove all excess excavated materials from the site, or as otherwise directed. Excavate all trenches open cut, keep trench banks as nearly vertical as practicable, and sheet and brace trenches where required for stability and safety. Excavate trenches true to line and make bottoms no wider than necessary to provide ample work room. Grade trench bottoms accurately. Machine grade only to the top line of the pipes, doing the remainder by hand. Do not cut any trench near or under footings without first consulting Engineer. All trenching shall comply with OSHA standards and regulations.

Backfilling of trenches shall be done in one foot lifts, with each lift tamped and compacted before another lift is added. No stones or coarse lumps shall be laid directly on conduits. Provide 6" wide red metallic warning tape in all electrical trenches at 12" below finished grade unless noted specifically otherwise. Cover no work until inspected, tested and approved. Where work is covered before inspection and test, uncover it, and when inspected, tested and approved, restore all work to original proper condition.

The Contractor shall support equipment and other electrical items on curbs, legs, or steel framework. Provide all metal bases and supports. Furnish required foundation sizes, bolts, washers, sleeves, plates, templates, etc., for mechanical equipment provided. Review concrete, masonry, metal, or wood bases provided under other divisions for adequacy and suitability and provide for necessary modifications such review may establish. Supports for lighting fixtures, panelboards, exposed feeders and similar items shall be UL approved. Mounting of equipment that is of such size as to be freestanding and that equipment which cannot conveniently be located on walls, such as motor starters, etc., shall be rigidly supported on a framework of galvanized steel angle, B-line, Unistrut or as approved.

After installation, clean equipment and accessories with factory primed or finished painted surfaces, and touch up bare or marred spots with same paint as supplied at factory in accordance with painting section. When this is not available, obtain complete description of the paint so that an exact duplicate maybe procured locally. Repair and refinish finished surfaces scuffed or damaged by installation of work under this Division. Paint all unfinished metal with one coat of rust-inhibiting primer. (Galvanized and factory painted equipment shall be considered as having a sub-base finish.) Nameplates on equipment shall be clean and left free of paint.

Distribution panels, panelboards, transformers, transfer switches, and other electrical equipment shall have laminated plastic plates, white letters on black background mounted to the equipment. Letters shall be vertical 1/4 inch high. Nameplates shall have equipment identification. If required, use three lines each containing as many as 30 letters and/or spaces. The text of name plates shall be taken from the plans and shown on shop drawings.

All panelboards shall be provided with a two-column, typewritten directory card under a plastic cover inside the door. Name plates shall be attached to equipment with pop rivets or self tapping screws. Use caution to avoid filings and other metal from falling into the electrical enclosure.

Thoroughly clean all parts of the equipment. Where exposed parts are to be painted, thoroughly clean off any spattered construction materials and remove all oil and grease spots. Wipe the surface carefully and scrape out all cracks and corners. Use steel brushes on exposed metal work to carefully remove rust, scale, etc., and leave smooth and clean.

Conduits/raceways shall be continuous from outlet to outlet, cabinet or junction box, and shall be so arranged that wire may be pulled in with the minimum practical number of junction boxes. All empty conduits shall be provided with a nylon pull cord. The ends of all conduits shall be securely plugged, and

all boxes temporarily covered to prevent foreign material from entering the conduits. All conduit shall be thoroughly swabbed out with a dry swab to remove moisture and debris before conductors are drawn into place. Where rigid or IMC conduits enter boxes, panels, cabinets, etc. they shall be rigidly clamped to the box using integral threaded box or cabinet hubs, threadless connectors with insulated throats or double locknuts and insulated bushings. All conduits shall enter the box squarely. Where PVC conduits enter boxes, panels, cabinets, etc. they shall be rigidly clamped to the box threaded connectors. All conduits shall enter the box squarely. All fittings/connectors shall be installed with PVC primers and glues per the conduit manufacturers' instructions.

Conduits shall be supported at intervals no greater than 96 inches, within 36 inches of any bend, and within 36 inches of every outlet or junction box, panel, etc. This shall apply to vertical runs as well as horizontal runs. Where conduits are run individually, they shall be supported by approved conduit straps or beam clamps. Straps shall be secured by means of toggle bolts on hollow masonry; expansion shields and machine screws or standard preset inserts on concrete or solid masonry, machine screws or bolts on metal surfaces, and wood screws on wood construction. No perforated straps or wire hangers of any kind will be permitted. Where individual conduits are suspended from the ceiling, or above ceiling, they shall be supported by hanger rods and hangers. Conduits installed exposed in damp locations shall be provided with clamp backs under each conduit clamp, to prevent accumulation of moisture around the conduits. Not more than four 90 degree bends will be allowed in one raceway run. Where more bends are necessary, a pull box shall be installed. All bends in 1 inch and smaller shall be made with a conduit bender and all larger sizes shall have machine bends. Conduit stubbed up/down or through slabs shall be galvanized rigid steel or IMC conduit with a minimum of 6 inches of conduit exposed out of slab for connection of threaded or compression fitting. Where conduit bends extend out of slab, the conduit shall be placed at the maximum allowable distance from the exit surface and shall have a bend radius as allowed by code to provide as true and square a conduit exit as possible. Conduit deck flanges will be used where conditions allow and where the flange can be tightly secured flush to the face of a concrete form. All raceways which are not buried or embedded in concrete shall be supported by straps, clamps, or hangers to provide a rigid installation. Exposed conduit shall be run in straight lines at right angles to or parallel with walls, beams, or columns. In no case shall conduit be supported or fastened to other pipes or installed to prevent the ready removal of other pipe. All raceways installed underground shall be placed at the minimum depth indicated in NEC Table #300-5 for each specific condition. Where raceways stacked or banked within the same trench, provide non-metallic spacers placed at maximum of 10 feet O.C.

The Contractor shall furnish and install grounding and grounding conductors as specified herein and as shown on the drawings. All switchboard enclosures, panelboard cabinets, equipment, enclosures, and conduit systems shall be grounded securely in accordance with pertinent sections of Article 250 of NEC, as amended by any local codes. Conductors shall be copper. All electrically operated equipment shall be bonded to the bonded conduit system. All non-current carrying conductive surfaces that are likely to become energized and subject to personal contact shall be grounded as indicated on the drawings or by one or more of the methods detailed in Article 250 NEC. All ground connections shall have clean contact surfaces. Install all grounding conductors in conduit and make connections readily accessible for inspection. Grounding bushings shall be provided at both ends of all conduits used to protect grounding or grounding electrode conductors. The conduit run and bushing shall be bonded to the grounding conductor. Furnish and install grounding electrodes as described on the drawings.

Grounding of metal raceways shall be assured by means of grounding bushings on feeder conduit terminations at the service entrance, distribution switchboards and panelboards, and by means of a continuous, stranded, copper grounding wire extended from the ground bus in the enclosure to the conduit grounding bushings. In addition, conduit grounding bushings shall be provided at the load side termination and at all junction, splice or pull boxes for all such feeder conduits. A separate insulated

grounding conductor, sized per NEC 250-95, shall be installed in all conduit runs unless noted otherwise. Provide separate, insulated, isolated grounding conductors for all isolated ground branch circuits or feeders as indicated on the drawings. The neutral conductor of each and every low voltage, single and/or polyphase, system or distribution system, except special isolated systems, shall be solidly connected at one point only; preferable at the transformer neutral bushing, or at the main secondary switchboard; to system ground and shall be sized for current carrying capacity, not to be less than as required by NEC.

Do not install bare copper bars, cables and fittings in cinder fill or cover with soil containing cinders or other corrosive material. Install cables with enough slack to prevent breaking stresses. Protect all grounding conductors subject to mechanical damage by rigid steel conduit or other suitable steel guards and permanently and effectively ground to the enclosure at each end of its length. Make connection to water pipes, including water meter or other similar device bypass connections, only after the surface of the pipe at the point of connection has been thoroughly cleaned and brightened. Immediately prior to actually making the connection coat the contact surfaces with non-oxidizing agent. All equipment ground bus, ground pads, frames, enclosures, etc. shall have surfaces at point of connection thoroughly cleaned and brightened just prior to actually making the connection. Touch up damage to painted surfaces. Do not splice wire or cable grounding conductors. Bond all metal supports, messenger cables, frames, brackets, braces, etc. for any part of the raceway system, panels, switches, boxes, starters, controls, etc. which are not rigidly secured to and in contact with the raceway system, or which are subject to vibration and loosening, to the raceway system; size of the bonding conductor shall be in accordance with NEC.

Tightly make-up terminations of rigid conduit at boxes, cabinets, and enclosures with a double locknut arrangement and a bushing. Use insulated type bushings where required by NEC. Provide conduit which runs to or from all boxes, cabinets, or enclosures having concentric or eccentric knockouts which partially perforate the metal around the conduit (and hence impair the continuity of system ground circuits) with bonding jumpers sized in accordance with NEC connected between a grounding type bushing/locknut on the conduit and a ground bus or stud inside the box, cabinet, or enclosure and attached thereto. Where flexible metallic conduit and/or liquid tight conduit is used, provide a bonding jumper, sized in accordance with NEC. Provide a ground conductor in all conduits, etc. unless otherwise noted. Where conduit enters or leaves any electrical enclosure with removable cover plates, provide conduit grounding bushings and bonding jumpers sized in accordance with NEC between the grounding bushings and the enclosure rigid frame or ground bus. Locate attachment bonds of ground conductors to structural steel members at points not subject to mechanical damage, but if possible where accessible for inspection. Attach preferably by molded fusion welding process. Where welding is prohibited, attach by bolting 7/16 inch hole in steel, 3/8 inch silicon bronze bolt, bolt end peened, steel surface bright and flat prior to bolting. Just prior to bolting contact surfaces lightly coated with non-oxidizing agent. Bond equipment ground to J-box and provide a "pigtail" to grounding lug on the device (where applicable).

The Contractor shall be thoroughly clean all luminaries, lamps and lenses prior to final acceptance and field adjust aiming angles as required. Surface mounted fixtures shall be supported from its outlet box by means of a hickey or other threaded connection where its weight is from 5 to 50 pounds. Every outlet box or other support for lighting fixtures shall be of sufficient strength to support at least four times the weight of the fixture. Support all fixtures weighing more then 50 pounds independently of outlet box. Replace any lamps burning for construction purposes with new lamps at time of and just prior to project close-out. Lamps shall be in new operating condition for a period of 90 days after project close-out.

Subsection 650.11.9 - Generator Set:
The Contractor shall furnish and install a diesel engine driven electric generator system, complete, including engine, generator, air-cooled radiator, starting system, exhaust system, engine controls, relays, piping, wiring, bases, and appurtenances ready for use as specified herein and as shown on the electrical drawings. Generator design shall be in accordance with the latest applicable standards of NEMA and UL.

The design shall have been tested in a recognized high power laboratory to prove adequate mechanical and electrical capabilities. All major components shall have been individually design tested and guaranteed by the generator manufacturer. Provide unit of latest commercial type, with continuous and standby rating indicated and with accessories sized for standby capacity. In-operation standby rating is defined as operation with all power consuming accessories in operation without reduction in load for duration of emergency, at following conditions - 1,000 feet altitude, 120 degrees F maximum ambient temperature. Certify standby rating at stated conditions. Engine generator shall start and assume electrical load within period of 10 seconds.

Prior to fabrication and installation, submit product data, shop drawings, and shop test results of manufacturer's standard test on completely assembled unit in manufacturer's plant. Submit results of field tests, manufacturer's written certifications that system hardware and software are Year-2000 compliant and operation and maintenance data for each equipment Caterpillar Tractor Company equipment is specified to establish quality and general requirements.

Number of Units Required: 1
Standby Rating: 150 KW
Power Factor: 0.80
Model Number: D150P2
Generator Voltage: 277/480V, 3 phase, 4 wire
Frequency: 60 Hz
Rotative Speed: Not to exceed 1,800 RPM

Provide flexible vibration isolators for piping and conduit connections. Engine governor shall be Woodward EG3P/2301, and maintained frequency regulation not to exceed 3 percent (1.8 Hz) from no load to full rated loads. Engine shall be water cooled in line type, 4 stroke cycle compression ignition diesel, meeting specifications when operating on No. 2 domestic burner oil. Diesel engines requiring premium fuels are unacceptable. Equip engines with fuel, lubricating oil, and intake air filters, lubricating oil coolers, fuel transfer pump against 12 foot pressure head, fuel priming pump, gear driven water pump, and engine mounted instrument panel including fuel pressure gauge and lubricating oil pressure gauge. Equip engine with electric speed sensing governor capable of isochronous frequency regulation from no load to full rated load. Mount unit on structural steel sub-base with suitable vibration isolators. Provide safety shut offs for high water temperature, low oil pressure, overspeed and engine overcrank

Generator shall be three phase, 60 Hz, single bearing, synchronous type with brushless exciter, built to NEMA standards. Provide Class F insulation on starter, rotor, and exciter windings; protect insulation with 100 percent epoxy impregnation and overcoat of resilient insulating material to reduce possible fungus and abrasion deterioration. Incorporate reactive droop compensation. Provide 3 pole UL listed molded case circuit breaker mounted on the generated set in a vibration isolated NEMA 3R sheet steel box.

Provide generator mounted volts per hertz type regulator to match characteristics of generator and engine. Voltage regulation shall maintain voltage within plus or minus 1.0 percent from no load to full rated load.

Provide readily accessible voltage drop, voltage level, and voltage gain controls. Voltage level adjustment and solid state - minimum of plus or minus 10 percent. Solid state regulator module shall have shock mounted and epoxy encapsulated for protection against vibration and atmospheric deterioration.

Provide engine mounted radiator with blower type fan sized to maintain safe operation at 122 degrees F maximum ambient temperature. Equip with duct adapter flange Provide water temperature regulator and

solenoid shut-off valve. Mount solenoid valve on cooling water inlet side; open on engine start and close on engine stop. Fill engine cooling system with solution of 505 ethylene glycol.

Provide a dual wall sub-base fuel storage tank with 300 gallons capacity. The tank shall be constructed of corrosion resistant steel and shall be UL listed. The equipment, as installed, shall meet all local and regional requirements for fuel tank.

Provide critical type silencer including flexible exhaust fitting for remote mounting, properly sized and installed according to manufacturer's recommendations. Mount silencer independent of engine. Size exhaust pipe sufficiently large to ensure measured exhaust back pressure does not exceed maximum limitations specified by generator set manufacturer. Insulate muffler and indoor exhaust piping to maintain surface temperature less than 150 degrees F. Install insulation in manner to prevent interference with functioning of flexible exhaust fitting. Provide exhaust system combination industrial silencer and catalytic converter, Houston DE-Nox type Model 500-Mount silencer so weight is not supported from engine. Insulate muffler and indoor exhaust piping to maintain surface temperature not to exceed 150 degrees F. Install insulation to not interfere with functioning of flexible exhaust fitting.

Provide DC electrical starting system with positive engagement drive starting motor, voltage as recommended by engine manufacturer. Provide fully automatic generator set start/stop controls in generator control panel. Provide shutdown for low oil pressure, high water temperature, overspeed, overcrank, and 1 auxiliary contact for activating accessory items. Include 30 seconds single cranking cycle limit with lockout and means for reset and overriding for manual starting (momentary contact type) at control panel.

Provide unit mounted thermal circulation type jacket water heater single phase, 60Hz, 208V to maintain engine jacket water at 90 degrees F in ambient temperature of 30 degrees F.

Provide set of 24V lead-acid storage batteries of heavy duty diesel starting type of sufficient capacity to provide 90 seconds total cranking time without recharging and rated not less than 227 amp-hours. Provide battery rack and necessary cables and clamps. Provide current limiting battery charger to automatically recharge batteries, float at 2.17V per cell and equalize at 2.33V per cell including overload protection, silicon diode full wave rectifiers, voltage surge suppressor, DC ammeter, and fused AC input. AC input voltages shall be as same as generator output voltage with the amperage output not less than 5A.

Provide control panel in generator mounted, vibration isolated, NEMA 3R type dead front, 14 gage steel enclosures containing with following equipment - Voltmeter, 3-1/2 inch, 2 percent accuracy; Ammeter, 3-1/2 inch, 2 percent accuracy; Ammeter phase selector switch; Voltmeter phase and phase to neutral selector switch; Frequency meter, 3-1/2 inches, dial type; Automatic starting controls; Panel illumination lights and switch; Voltage level adjustment rheostat; Engine oil pressure gage; Engine water temperature gage; Dry contacts for remote alarms wired to terminal strips including separate remote alarms for pre-shutdown and for shutdown conditions; Fault indicators for low oil pressure, high water temperature, overspeed, and overcrank; Four position function switch marked AUTO, MANUAL, OFF/RESET and STOP; Access door in housing at control panel locations with window for visibility when door is closed.

Install equipment as indicated in accordance with manufacturer's recommendations and accepted shop drawings. Test emergency engine driven generator system. Check engine and driven unit mounting bolts. Check alignment of engine and generator by dial indication. Check generator rotor air gap. Test generator and exciter insulation resistance with megger. Take generator readings at circuit breaker, to include generator leads to switchboard. Perform engine manufacturer's recommended pre-starting checks. Start engine and make engine manufacturer's after-starting checks during reasonable run-in warmup period. Operate generator set 3 hours at 75 percent rated load. Follow above run immediately with 3 hours at 100

percent rated load. Provide load bank for utilization during testing phase. During tests, perform operations of which controls are capable to assure controls are functioning in satisfactory manner. At several points during tests, observe each instrument to assure instruments and gages are functioning properly. During tests, check auxiliary and accessory equipment, values, including pilot valves, and injection pumps, to assure proper operation.

Provide exhaust emission monitoring instruments and take readings as required by EPA.

At completion of Project, demonstrate equipment and systems. Include minimum 4 hours instruction.

Subsection 650.11.10 - Antenna:
Due to variables concerning signal strength and path, the Contractor shall provide a design for the telemetry antenna support structure for review and approval. The area shown on the plans for the antenna foundation has been reserved for such use. The Contractor shall test the radio signal path to establish the height of antenna required. The test results shall be furnished to the Engineer for review. Height requirements for the zoning district in which the station is located restrict building and structure heights to 30 feet. If testing of the signal path indicates an antenna height taller than this is needed, the Engineer shall be explicitly notified. The signal path testing work shall be performed during the early stages of the project so that any zoning variances or alternative solutions needed for an excessively tall antenna structure can be developed without delaying the work. Time extension requests resulting from untimely testing of the signal path shall not be entertained or compensated.

Subsection 650.11.11 - Testing:
After completion of installation and prior to agency acceptance, each pumping unit shall be completely field demonstrated over the range of operating conditions to demonstrate compliance with the specified performance requirements. Demonstrations shall be coordinated with the owner of the sewerage system to prevent overload of downstream facilities. The Contractor shall be responsible for providing a sufficient quantity of clean water to demonstrate the operation of the station. All pumps shall be run and impeller rotational direction verified.

All pump controls shall be demonstrated to be operating as intended. Diversion of flows into the new pump station shall not occur until the station has been tested, any deficiencies fixed and the pump station re-demonstrated to be operable. Telemetry or SCADA systems shall be demonstrated to be reliably operating and communicating over the assigned radio frequencies. Tuning of radio signals, signal strength, antenna height and signal direction shall be part of the work herein.

Upon completion of the electrical work, the entire electrical installation shall be tested and demonstrated to be operating satisfactorily. Wiring shall be tested for continuity, short circuits and/or accidental grounds. All systems shall be entirely free from grounds, short circuits, and any or all defects. Motors shall be operating in proper rotation and control devices functioning properly. Check all motor controllers to determine that properly sized overload devices are installed. Check all electrical equipment for proper operation. Tests and adjustments shall be made prior to acceptance of the electrical installation by the Engineer, and a certificate of inspection and acceptance of the electrical installation by local inspection authorities shall be provided. All equipment or wiring provided, which tests prove to be defective or operating improperly, shall be corrected or replaced promptly, at no additional cost to the Owner. The insulation system of all feeders (60 amps or larger), switchboards, panelboards, bus ducts and motors shall be checked and verified by performing a megger test. The megger test voltages and resulting ohm values shall be as specified by National Electrical Testing Association standards. The Contractor shall keep a record of all megger testing to indicate the date, the equipment tested, the testing values and test results. These records shall be made available as requested and shall be included with the project record documents.

Subsection 650.11.12 - Operations and Maintenance Manual:
The Contractor shall prepare an operation and maintenance manual for delivery to the City of Chandler upon completion of the pump station work and acceptance by the agency. The manual shall include manufacturer's data on all components of the lift station including manufacturer's recommended maintenance and service procedures, local service representatives and locations including addresses and telephone numbers, and parts lists. All information furnished shall be clearly marked as to the model to which the data pertains. The data shall be furnished in a three ring binder format with hard cover binders. The binder(s) shall have a clear vinyl cover that will accept a printed sheet clearly stating the contents of each notebook. The manual(s) shall have tabbed index dividers to separate each section of the manual. The dividers shall be labeled for the appropriate subject. One copy of the manual shall be prepared. The Contractor shall submit the compiled manual to the City of Chandler, with notification to the Engineer, for review of completeness prior to acceptance of the manual. The cost of compiling the manual shall be considered incidental to the work to be performed.

Subsection 650.12 - Method of Measurement:
The sanitary sewer lift station will be measured as a lump sum item, complete in place with all components, labor, materials, equipment and incidentals.

Subsection 650.13 - Basis of Payment:
Payment will made on the basis of the lump sum price bid for the sanitary sewer lift station which shall be full compensation for the construction of the complete lift station including all excavation, backfilling, grading, 6-inch AB surfacing of driveway and parking area, compaction, structures, pumps, piping, supports, appurtenances, potable water service, valves, fittings, electrical work, telemetry systems, temporary systems, materials, labor, testing, training and all other incidental materials, equipment and work for the lift station complete in place.
ITEM 650-1 – SANITARY SEWER LIFT STATION

APPENDIX "A"

SALT RIVER PROJECT (SRP)
STANDARD SPECIFICATIONS

for

PHASE 3 - SANTAN COLLECTOR CHANNEL PROJECT
SOUTHEAST VALLEY REGIONAL DRAINAGE SYSTEM

CONTRACT NO. FCD 99-05
PCN 4900133

SRP
CONSTRUCTION INFORMATION AND SPECIFICATIONS

PROVIDE THIS ENTIRE PACKAGE TO YOUR CONTRACTOR

GENERAL

Temporary Irrigation Outage Agreement Instructions

Temporary Irrigation Outage Agreement Form

Permit-Required Confined Space Policy

Confined Space Checklist - Pipe Crawl

Confined Space Entry Permit Form

STANDARD SPECIFICATIONS

SRP 02227	Salt River Project Standard Specification for Slurry Backfill Materials
WTR 02614	Salt River Project Water Group Standard Specification for Precast Concrete Pipe
SRP 03210	Salt River Project Standard Specification for Reinforcing Steel
SRP 03300	Salt River Project Standard Specification for Concrete
GE 03305	Salt River Project Generation Engineering Standard Specification for Concrete Formwork and Placement

REFERENCE DRAWINGS

WES-30300-001	Pipeline Bedding/Backfill Requirements
WES-30300-003	Standard Concrete Pipe Collar
WES-30300-004	Rubber Gasket Joints
WES-30350-200	45 Degree Trashrack for Pipeline Headwall

SRP APPROVED LANDFILLS MAP

TEMPORARY IRRIGATION OUTAGE AGREEMENT INSTRUCTIONS

Whenever an SRP irrigation outage is needed for construction, an Outage Agreement must be completed by SRP and signed by the Contractor before SRP will allow construction to begin.

To initiate the process, the Contractor shall contact the SRP Inspector and request a pre-construction meeting.

At the pre-construction meeting, or subsequent meetings, if all conditions have been met to the satisfaction of SRP, the Outage Agreement form will be filled out by SRP. The Outage Agreement form must be signed by the SRP Watermaster and by the Contractor. A copy of the signed Outage Agreement will be provided to the Contractor.

After the Outage Agreement form has been completed and signed, the Contractor may proceed with the agreed upon work during the time period specified.

Delivering More Than Power.™

SRP File or License # _____

TEMPORARY IRRIGATION OUTAGE AGREEMENT

This TEMPORARY IRRIGATION OUTAGE AGREEMENT ("OUTAGE AGREEMENT") is made by and between _____ ("CONTRACTOR") and the SALT RIVER PROJECT AGRICULTURAL IMPROVEMENT AND POWER DISTRICT ("SRP"), an agricultural improvement and power district organized and existing under the laws of the State of Arizona.

During the period from _____ 19___ at ____:00 ____.M. through _____ 19___ at ____:00 ____.M. ("OUTAGE PERIOD"), SRP agrees to cease irrigation deliveries through the SRP irrigation facilities at the following location(s):

_____

_____

_____

_____

_____

The CONTRACTOR, having read both sides of this OUTAGE AGREEMENT, understands and agrees to all the terms and conditions contained herein. CONTRACTOR further acknowledges that CONTRACTOR (1) has been informed that the workplace may contain OSHA Permit-Required Confined Spaces, (2) agrees that CONTRACTOR will conduct any Permit-Required Confined Space entry under a permit space program that complies with applicable OSHA requirements, and (3) has received and reviewed SRP's Association Permit-Required Confined Space Program.

_____

Authorized CONTRACTOR Representative Date

Office Phone No.: _____ Emergency Phone No.: _____

_____

SRP Date

SRP emergency phone number: 236-5296

COPIES: WHITE - INSPECTOR CANARY - WATERMASTER PINK - CONTRACTOR

TERMS AND CONDITIONS

In consideration of the permission granted by SRP to the CONTRACTOR to perform certain work (the "Work") on or near SRP's irrigation facilities as identified herein, the CONTRACTOR agrees as follows:

1. CONTRACTOR shall complete the Work and shall restore the affected SRP irrigation system to full operational condition during the OUTAGE PERIOD.

2. If CONTRACTOR does not complete the Work during the OUTAGE PERIOD, CONTRACTOR, upon demand, shall pay SRP for all costs and expenses incurred in completing the Work and/or restoring the irrigation facilities to full operational condition and for all direct and indirect damages incurred by SRP.

3. CONTRACTOR shall comply with all applicable federal, state, and local laws, rules, regulations and ordinances.

4. If CONTRACTOR or CONTRACTOR's employees enter a Permit-Required Confined Space as defined in OSHA 29 C.F.R. 1910.146, CONTRACTOR shall notify SRP of the Permit-Required Confined Space program that the CONTRACTOR followed and shall notify SRP during OSHA required debriefing about any hazards encountered or created. SRP has informed CONTRACTOR of potential known hazards of Permit-Required Confined Spaces, including but not limited to: engulfment from water; atmospheric hazards such as oxygen deficiency, carbon monoxide or flammable atmosphere from methane gas; and/or entrapment hazard from roots or other debris in the pipeline.

NOTE: THIS OUTAGE AGREEMENT DOES NOT GUARANTEE DRY CONDITIONS.

5. CONTRACTOR is responsible for "The Control of Hazardous Energy (Lockout/Tagout)" as defined in OSHA 29 C.R.F. 1910.147. CONTRACTOR shall protect the job site from water that may leak through SRP gates or from storm water and nuisance water that may enter the system uncontrolled, and CONTRACTOR shall relieve SRP from any such responsibility.

6. CONTRACTOR shall indemnify, defend and hold harmless the United States, Salt River Valley Water Users' Association, and SRP, for, from and against all damages, costs, liabilities, and expenses, including attorneys' fees, arising out of any act, omission, or negligence of CONTRACTOR or of any of its contractors or subcontractors.

7. CONTRACTOR shall dispose of all waste materials removed from the site that are associated with the construction or modification of SRP's irrigation facilities in an SRP APPROVED LANDFILL.

8. If CONTRACTOR enters into any contract or subcontract for performance of any Work, CONTRACTOR shall require each such contractor or subcontractor to agree to the terms and conditions of this OUTAGE AGREEMENT. If contract or subcontract Work is performed in Permit-Required Confined Space as defined by OSHA 29 C.F.R. 1910.146, CONTRACTOR shall provide each such contractor or subcontractor with a copy of SRP's Association Permit-Required Confined Space Program, inform each such contractor or subcontractor that the workplace may contain OSHA Permit-Required Confined Spaces, and ensure all permit-required confined space entries are made under a Permit-Required Confined Space program that complies with applicable OSHA requirements. CONTRACTOR shall be responsible for compliance by such contractors or subcontractors with the terms and conditions of this OUTAGE AGREEMENT.

9. This OUTAGE AGREEMENT shall be governed by and construed under the laws of the State of Arizona. No change, addition, or modification shall be binding upon SRP unless in writing and signed by SRP.

ASSOCIATION PERMIT-REQUIRED CONFINED SPACE POLICY
April 15, 1993

PURPOSE:

To provide a procedure assuring that Salt River Project personnel can safely enter new, existing or other permit-required confined spaces to accomplish inspection, repairs or construction of water transmission and distribution facilities.

COMPLIANCE WITH OSHA STANDARD CFR 1910.146, CFR 1910.147

I. DEFINITIONS, TERMINOLOGY, DUTIES OF PARTICIPANTS

A. PERMIT-REQUIRED CONFINED SPACE DEFINITION

1. Any space which is large enough to enter and work in;

2. Has limited means for entry or exit;

3. Is not designed for continuous occupancy; AND,

4. Has one or more of the following characteristics:

   a. Contains, or has the potential to contain, a hazardous atmosphere;
   b. Is an engulfment hazard; or,
   c. Any other recognized serious safety or health hazard.

5. Examples of permit-required confined space: structures, manholes, vaults, pipelines, well casings, stand pipes, sumps, and culverts.

   Examples of non-confined space: canals, open lateral structures, removing check boards from a structure, assembling pre-cast structures.

6. **No pipe crawl will be made in pipe less than 24" nominal diameter.**

B. CONFINED SPACE ENTRY PERMIT

A document that defines the conditions under which permitted confined space may be entered; states the reason(s) for entering a space, the anticipated hazards of the entry, lists the attendants, entrants and the individuals who may be in charge of the entry and establishes the length of time for which the permit may remain valid. Entry permit must be maintained in departmental file for one year after the permit is cancelled.

If gas monitor goes off while entrants are in the confined space, send the original copy of permit to Employee Safety Services.

Confined Space Checklist and Confined Space Entry Permit shall be completed prior to entry into a confined space.

C. DUTIES OF PARTICIPANTS

No person(s) will participate in an entry into a permitted confined space unless they have had prior Association confined space training.

All participants will be trained as the "attendant", "entrant", and or "crew leader". These roles may be rotated as directed by crew leader.

No pipe crawl shall take place unless the crew is in complete agreement as to the safety of the confined space entry.

Rescue will be conducted by local fire department personnel.

1. ATTENDANT
   An employee stationed outside the permitted confined space who is trained in accordance with OSHA Standard 29 CFR 1910.146 and who monitors the authorized entrants inside the confined space and does not attempt rescue of entrant.

2. ENTRANT
   An employee who is trained in accordance with the OSHA Standard 29 CFR 1910.146 and who is authorized by the employer to enter a confined space. Entrant must have minimum SRP Category B respirator certification. The employee is considered an "entrant" as soon as any part of the employee's body breaks the opening of a confined space.

3. CREW
   Refers to entrant(s), attendant, crew leader (foreman, inspector), zanjero, watermaster.

4. CREW LEADER
   This job function title may also refer to foreman or inspectors regarding confined space policies, permits, checklist. Crew Leader authorizes entry and ensures that permit contains all information and that all procedures,

practices and equipment for safe entry are in effect before notifying ADC of entry. Crew leader continues to monitor at appropriate intervals and ensures that only entrants are permitted in the confined space. Crew leader terminates entry whenever conditions are unacceptable and upon completion of work, cancels permit. If there are air quality problems requiring assistance, the crew leader will call the foreman.

5. FOREMAN
Existing Pipe: foreman or crew leader meets with watermaster and reviews microfilm drawings, print, and Zanjero Hazards Identification Map when problem arises. Passes all of above information on to the crew leader.

6. ZANJERO
A person with SRP water distribution systems who will arrange the system for dry-up and act as standby at a specific location for control of potential water hazards. Identifies points of Lock Out/Tag Out.

7. WATERMASTER
Existing Pipe: Meets with foreman and reviews microfilm drawings, print, and Zanjero Hazards Identification Map to identify potential water hazards when problem arises. Arranges for dry-up with zanjeros.

D. TERMINOLOGY

1. CULVERTS
Pipelines or other confined spaces, 100 feet or less in length such as road crossings, ties to open ditch where both ends are open.

2. ENTRY
The employee is considered to have entered as soon as any part of the employee's body breaks the plane of an opening into the confined space.

3. EXISTING PIPELINE
Any irrigation pipeline that has had water in it or any new irrigation pipeline that is tied into existing facilities as determined by the foreman and/or watermaster.

4. HOT WORK PERMIT
Employer's written authorization to perform operations which could provide a source of ignition.

5. NEW PIPELINE
A pipeline which has not yet been tied into the existing facilities as determined by the foreman and/or watermaster.

6. PIPE CRAWL
When one or more employees enter a pipeline.

II. REQUIRED SPECIAL EQUIPMENT FOR PERMITTED CONFINED SPACES

Each department involved in permitted confined space work will provide and maintain the following equipment for use when entering confined spaces. Most of the equipment listed below is stored in a Confined Space Box along with other equipment, such as: knee pads, batteries, etc. Prior to going to work site, monitors may be obtained from tool room and upon completion of work, returned to tool room for battery charging.

A. Flammable gas, oxygen and carbon monoxide gas monitors with sampling pumps in appropriate carrying cases. Each entrant is required to carry a monitor.

B. One emergency air/oxygen escape pack for each entrant and one spare in crew truck.

C. NOTIFICATION SIGNS FOR ENTERING EXISTING PIPE:

1. Magnetic Sign for wellsite starter cabinet:

   "DANGER DO NOT START, PERSON IN PIPELINE"

2. Clearance Tag with Special Lock:
   SRP Warehouse Stock Code # 73-2293

   "DO NOT OPERATE"

D. Air Blowers for ventilation

E. Radios for Existing Pipe - a minimum of two are required when working in existing pipeline. One unit with the attendant at the entry point and one unit with the zanjero, both using the same channel.

Radios for New Pipe and "other" confined spaces - a minimum of one is required.

F. Air horns in Existing & New Pipe - a minimum of four are required. Two for inside the pipeline and two outside at the entry point.

G. Safe-Alert Measuring Probe used by Zanjero is an additional safety precaution which is placed at water surface at the nearest upstream structure. Any influx of water will trigger the probe and alert the zanjero who is also visually monitoring the water level.

III. CHECKING FOR HAZARDOUS GASES AND ADEQUATE AIR FLOW IN ALL CONFINED SPACES

PERFORM TESTS NO LONGER THAN 30 MINUTES PRIOR TO ENTERING ANY CONFINED SPACE

A. Crew will check entrance opening to all confined spaces for oxygen, flammable gases and carbon monoxide content.

B. In New and Existing Pipe, crew will check downstream opening to determine that an adequate flow of air is coming out of the pipeline to ensure that the line is clear.

C. Crew leader will determine if a suitable air supply does exist. If air is not suitable, a portable air blower will be used. Blower runs a minimum of 10 minutes before entry. Care should be taken to place the gasoline/powered blowers so that the exhaust fumes will not be sucked into the air stream going into the confined space.

AFTER VENTILATION, THE AIR SUPPLY MUST BE RETESTED

D. If there are any questions, the crew leader will call the foreman. The foreman will call Employee Safety Services if additional assistance is required.

IV. PROCEDURES FOR ENTERING EXISTING PIPELINE

A. Crew will consist of two or more employees depending on the job.

1. A minimum of two people will enter existing pipe together to **repair or construct.**

   One person may enter existing pipe for **inspection or observation.**

2. One attendant is required.

B. Prior to entrant(s) entering existing pipeline:

1. Watermaster meets with foreman, crew leader or inspector when problem arises.

   - Review microfilm drawings and copy
   - Review zanjero identification map

2. Crew leader, entrant(s), watermaster and zanjero will meet at the job site to inspect the area for anything that might impact the pipeline; i.e. street drains.

3. Crew leader will pass on all information to crew gathered from the microfilm and the meeting held with the foreman/watermaster.

IN CASE OF EMERGENCY,
CONTACT ADC VIA RADIO OR PHONE 236-5296

C. Procedure to **PLACE** Lock Out/Tag Out Equipment

1. Zanjero will identify all lockout/tag out sources.

   Crew Leader will issue equipment: Safe Alert Probe, special locks and clearance tags, and if needed, signs for pump starter boxes.

   Crew Leader & Zanjero will place locks/tags on all sources using special locks and clearance tags, and if needed, signs for pump starter boxes.

2. Zanjero will recheck the pipeline upstream and downstream for any possible source of water including waste water, street drainage and well sites.

   The dry up will be such that both the upstream and downstream ends of the pipe will be open to allow a free flow of air through the pipeline.

   If there is a well site that could discharge water into the pipeline, the Crew Leader will place magnetic sign on the outside of the starter box that states: **DANGER DO NOT START, PERSON IN PIPELINE**

   Crew Leader, at direction of Zanjero, will place special lock & tag on control box and switch deep-well to "MANUAL" if pump is on supervisory control and notify ADC (circuit breaker switch must be on outside of control box). If circuit breaker is on inside of motor control box, call Groundwater).

   Crew Leader, at direction of Zanjero, will place special lock and clearance tag on the first upstream control gate to prevent it from being operated when someone is in the pipe.

   CREW LEADER HOLDS KEYS TO SPECIAL LOCKS

   Zanjero stations himself/herself at the nearest upstream structure where water could possibly enter and installs the Safe-Alert probe in the nearest upstream structure.

3. Crew leader will review checklist, complete Confined Space Entry Permit and then notify ADC that they are about to enter pipeline, giving all required permit information.

   ADC will broadcast entry on both channels D and E and notify appropriate municipalities and agencies.

D. Procedure to REMOVE Lock Out/Tag Out Equipment

1. Crew leader will inform zanjero, foreman, and ADC when the work is completed and all entrant(s) are out of the pipeline.

   ADC will broadcast completion on channel D and E. This cancels the permit.

   Zanjero will remain on the job and monitor the pipeline until the crew leader has informed the zanjero that all employees are out of the pipeline and the job is completed.

2. Crew Leader who placed all of the special locks and clearance tags upstream and on control box must remove them. If used, Crew Leader who placed magnetic sign on pump starter will remove it and return pump to "Supervisory" control at direction of Transmission.

   OSHA regulations require that the same "authorized" person who places a specific lock and tag, removes them.

   If the Crew Leader who placed the locks/tags is unable to remove them, the Crew Leader will notify the Foreman who will name a replacement Crew Leader. An "Authorized Exception" Form shall be completed which names another Crew Leader as the authorized replacement.

3. Crew Leader checks that all numbered locks and tags are returned to the confined space box upon completion of every confined space entry.

IN CASE OF EMERGENCY,
CONTACT ADC VIA RADIO OR PHONE 236-5296

V. PROCEDURES FOR ENTERING NEW PIPELINE

A. Crew will consist of two or more employees depending on the job.

One person may enter new pipe, the second person will act as attendant.

B. Crew leader will review checklist, complete Confined Space Entry Permit and then notify ADC that they are about to enter new pipe, giving all required permit information.

ADC will broadcast entry on both channels D and E and notify appropriate municipalities and agencies.

IN CASE OF EMERGENCY,
CONTACT ADC VIA RADIO OR PHONE 236-5296

VI. PROCEDURES FOR ENTERING NEW OR EXISTING IRRIGATION STRUCTURES, MANHOLES, VAULTS OR CULVERTS

A. Crew will consist of two or more employees depending on the job.

One person may enter the confined space provided the attendant has verbal or visual contact with the entrant.

B. Crew leader will review checklist, complete Confined Space Entry Permit and then notify ADC that they are about to enter confined space, giving all required permit information.

ADC will broadcast entry on both channels D and E and notify appropriate municipalities and agencies.

IN CASE OF EMERGENCY,
CONTACT ADC VIA RADIO OR PHONE 236-5296

CONFINED SPACE CHECKLIST

Pipe Crawl

Foreman, Crew Leader and Inspector are synonymous		Check Here
1. WATERMASTER	Meet with Foreman, Crew Leader or Inspector when problem arises.	
	Review microfilm drawings and copy.	
	Review area zanjero Hazards Identification Map.	
2. WATERMASTER/ZANJERO	Arrange for dry-up with zanjeros/Transmission.	
3. CREW LEADER	Obtain necessary ventilation equipment.	
	Obtain gas monitors from charge base.	
	Obtain confined space storage box.	
4. WATERMASTER	Arrange for zanjeros as needed.	
5. AREA ZANJERO (OR Most Experienced)	Check all upstream and downstream facilities. **Crew Leader & Zanjero place all locks/tags.**	
6. AREA ZANJERO CREW LEADER	Meet to review & discuss Lock Out/Tag Out Procedures. In case of problems, instructs zanjeros which channel to use.	
7. ON-SITE MEETING: Crew Leader, Crew, Foreman, Watermaster & Area Zanjero		
8. CREW LEADER	Crew has checked structure for gas, oxygen content and carbon monoxide no longer than 30 minutes before entry.	
	Complete Confined Space Entry Permit.	
	Notify ADC with Confined Space Entry Permit information.	
	ADC announces on Channel "D" and "E" that a confined space entry is about to begin at _____ location. Terminates entry when necessary.	
	Notify ADC when confined space entry has been completed. **Crew Leader & Zanjero remove all locks/tags.**	
	ADC announces on Channel "D" and "E" that a confined space entry has been completed. Release zanjero from site.	

Crew Leader will turn in Confined Space Entry Permit to Foreman which will be kept on file for one year

If Gas Monitor sounds, during confined space entry, send a copy of permit to Employee Safety Services

AUTHORIZED EXCEPTION

CONFINED SPACE LOCK OUT/TAG OUT
OSHA CFR 1910.147

Directions: In the event that the same authorized person (crew leader) who placed the special locks and tags, cannot remove them, the following documentation is required by OSHA and SRP Employee Safety Services. Complete spaces with correct information.

PERMIT # _____ Date _____ Time _____

1. Name of authorized person who PLACED Lock Out/Tag Out equipment:

   _____

2. Reason for an Authorized Exception:

   _____

   _____

3. Name of authorized replacement who will REMOVE Lock Out/Tag Out equipment:

   _____ _____

4. Signature of Supervisor/Crew Leader reviewing & acknowledging transfer:

   _____

Authorized Exception Form is to be turned in with the Permit
Blank Forms are to be kept in the Confined Space Box

PERMIT # _____ SALT RIVER PROJECT DATE _____

ASSOCIATION CONFINED SPACE ENTRY PERMIT

SPECIAL EQUIPMENT: Confined Space Box ___ Ventilation ___ Hyd. Probe ___ Signs ___ Radios ___
PERSONAL PROTECTION EQUIPMENT: Emergency Escape Pack ___ Air Horn ___ Gas Monitor ___

INFORMATION BELOW MUST BE COMPLETED AND CALLED TO ADC PRIOR TO ENTRY
IN CASE OF EMERGENCY NOTIFY ADC

ADC Phone Number 236-5296

1. ADC NOTIFIED BY CREW LEADER: _____ TIME: _____

2. PURPOSE: INSPECT ___ CONSTRUCT ___ REPAIR ___ 3. NEW PIPE ___ EXISTING PIPE ___ HOT WORK ___ OTHER___

4. COORDINATES: _____ - _____ 5. Emergency Notification:
City/Agency _____

6. STREET ADDRESS: _____

POINT OF ENTRY: MANHOLE ____ STRUCTURE ____ CANAL ____ LATERAL ____ GATE ____ OTHER ___

8. Trained Participants	Name(s):	Radio #	Channel
Crew Leader			D / E
Attendant			
Entrant(s)	(1) (2) (3)		
Foreman			D / E
Watermaster			D / E
Area Zanjero	Truck #		D / E
Standby Zanjero	Truck #		D / E

9. Standby Location: COORDINATES _____ - _____ CANAL ____ LATERAL ____ GATE____

STREET ADDRESS _____

10. LOCK OUT/TAG OUT PROTECTION

PUMP #	Coordinates	Canal #	Lateral #	GATE #	Coordinates	DRAIN
	-				-	
	-				-	
	-				-	
	-				-	

11. WORK COMPLETED/ADC NOTIFIED TIME: _____ Date _____ SIGNED _____

Maintain Permit in Departmental Files One Year

If Gas Monitor sounds during pipe crawl, send a copy of permit to Employee Safety Services

Use this space to list additional Stand-By Zanje s

ATMOSPHERIC TESTING

Test For:		Acceptable Levels:
(OX)	Oxygen	Between 19.5% - 23.5%
(LEL)	Flammable Gas	Less than 10%
(CO)	Carbon Monoxide	Below 35 ppm

Tests must be performed no longer than 30 minutes before entry

#1 Entry Tested by: _____ Time In _____ Time Out _____		#2 Entry Tested by: _____ Time In: _____ Time Out: _____		#3 Entry Tested by: _____ Time In: _____ Time Out: _____		#4 Entry Tested by: _____ Time In: _____ Time Out: _____	
GAS TEST	LEVEL	GAS TEST	LEVEL	GAS TEST	LEVEL	GAS TEST	LEVEL
OX		OX		OX		OX	
LEL		LEL		LEL		LEL	
CO		CO		CO		CO	

#5 Entry Tested by: _____ Time In _____ Time Out _____		#6 Entry Tested by: _____ Time In: _____ Time Out: _____		#7 Entry Tested by: _____ Time In: _____ Time Out: _____		#8 Entry Tested by: _____ Time In: _____ Time Out: _____	
GAS TEST	LEVEL	GAS TEST	LEVEL	GAS TEST	LEVEL	GAS TEST	LEVEL
OX		OX		OX		OX	
LEL		LEL		LEL		LEL	
CO		CO		CO		CO	

#9 Entry Tested by: _____ Time In _____ Time Out _____		#10 Entry Tested by: _____ Time In: _____ Time Out: _____		#11 Entry Tested by: _____ Time In: _____ Time Out: _____		#12 Entry Tested by: _____ Time In: _____ Time Out: _____	
GAS TEST	LEVEL	GAS TEST	LEVEL	GAS TEST	LEVEL	GAS TEST	LEVEL
OX		OX		OX		OX	
LEL		LEL		LEL		LEL	
CO		CO		CO		CO	

06/07/96

SALT RIVER PROJECT

STANDARD SPECIFICATION FOR SLURRY BACKFILL MATERIALS

(SRP 02227)

TABLE OF CONTENTS

Prepared By: M. D. Voda

Reviewed By: P. M. Kandaris
(Revised for Metric 6/7/96)

STANDARD SPECIFICATION
FOR
SLURRY BACKFILL MATERIALS
(SRP 02227)

1.0 GENERAL

1.1 Work Included

This specification shall cover the furnishing of all labor, equipment and materials for supplying and placing slurry-type backfills.

The following is a brief description of the types of slurry backfills and their intended uses:

ASB - Aggregate Slurry Backfill - washed gravel and sand, no cementitious materials, for use as a backfill around wood and concrete transmission line poles and trench backfill where no structural loads will be anticipated.

LMB 1/2 SACK - Lean Mix Backfill with 1/2 Sack (21.3-kg) portland cement per cubic yard (0.84-m^3) - washed gravel and sand with cement, for use as a general trench backfill in low load areas (streets and parking areas).

LMB 1 SACK - Lean Mix Backfill with 1 Sack (42.5-kg) portland cement per cubic yard (0.84-m^3) - washed gravel and sand with cement, for use as a general trench backfill in low load areas (streets and parking areas). Use in lieu of LMB 1/2 Sack (21.3-kg) when required by municipality.

LMB 1-1/2 SACK - Lean Mix Backfill with 1-1/2 Sacks (63.8-kg) portland cement per cubic yard (0.84-m^3) - washed gravel and sand with cement, for use as a structural backfill under foundations and as thermal fill and/or mechanical protection of duct banks.

DBA - Duct Bank Backfill w/ Aggregate - washed gravel and sand with four sacks (170-kg) portland cement per cubic yard (0.84-m^3), used as a thermal backfill/encasement for electrical ductbank with conduits spaced greater than 2 inches (51-mm) apart.

DBS - Duct Bank Backfill w/ Sand - washed sand with four sacks (170-kg) portland cement per cubic yard (0.84-m^3), used as a thermal backfill/encasement for electrical ductbank with conduits spaced less than 2 inches (51m-mm) apart and for pumping grout around conduits run through a pipe sleeve.

DEPB - Direct Embed Pole Backfill - a lean concrete with a minimum strength of 1000 psi (6.9-MPa) at 28 days, for use as backfill around direct embed steel poles.

RFG - Rock with Fly Ash Grout - a two component backfill for direct embed steel and concrete poles; the initial component, RFG-Gravel, is a uniform size, coarse gravel. The gravel is placed by ready-mix truck in the annulus space of direct embedment poles. The second component, RFG-Grout is a flowable fly ash/cement/lime grout. The grout is batched separately and placed afterward, filling voids in the aggregate backfill by gravity flow (no pumping).

Each of these backfill materials has an SRP Material Stock Code Number (See Table 1). All references to these materials in purchase order documents, submittals and invoices shall use the SRP material stock code. Vendor may assign its own product codes in addition to those required by the Purchaser.

1.2 Reference Standards

1.2.1 Reference to standards and/or specifications herein shall be interpreted to mean the latest revision unless noted otherwise.

1.2.2 The following abbreviations appear in this Specification:

ACI	American Concrete Institute
ARPA	Arizona Rock Products Association
ASTM	American Society for Testing and Materials
NRCMA	National Ready-Mixed Concrete Association
SRP	Salt River Project

1.2.3 The following standards shall be made a part of this Specification:

ASTM C25	Standard Test Method for Chemical Analysis of Limestone, Quicklime and Hydrated Lime
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C117	Standard Test Method for Materials Finer Than 75-Micrometer (No. 200) Sieve in Mineral Aggregates by Washing

ASTM C136	Standard Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C143	Standard Test Method for Slump of Hydraulic Cement Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260	Standard Specification for Air-Entraining Admixtures
ASTM C311	Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland Cement Concrete
ASTM C403	Standard Test Method for Time of Setting of Concrete Mixtures by Penetration Resistance
ASTM C494	Standard Specifications for Chemical Admixtures for Concrete
ASTM C618	Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolan for use as a Mineral Admixture in Portland Cement Concrete
ASTM C685	Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing
ASTM C937	Standard Specification for Grout Fluidifer for Preplaced-Aggregate Concrete
ASTM C939	Standard Test Method for Flow of Grout for Preplaced Concrete Aggregate (Flow Cone Method)
ASTM C1064	Standard Test Method for Temperature of Freshly Mixed Portland Cement Concrete
ASTM D512	Standard Test Methods for Chloride Ion in Water
ASTM D516	Standard Test Method for Sulphate Ion in Water

1.2.4 Exceptions to this specification must be approved in writing by the Engineer prior to commencement of the affected work.

1.3 Definitions

One Sack of cement: same as one 94 pound (42.5-kg) bag of cement.

1.4 Submittals

1.4.1 Vendor shall submit the following items for each material to be supplied:

a. Plant Certification
b. Mix designs
c. Source and gradation of coarse and fine aggregate
d. Cement certification and mill test report
e. Certification of testing of the water
f. Fly ash certification
g. Admixture brand and source
h. Lime certification and chemical analysis

1.4.2 If the mix design and batch plant have been pre-approved by the Engineer, submittals under Section 1.4.1 will be waived.

1.4.3 Vendor shall refer to the mix designs by the SRP Material Stock Code Number.

1.4.4 In addition to the specified materials, Vendors may submit alternate mix designs or deviations to the specifications for review and approval. The Engineer may request additional test and certification documentation for alternate mixes submitted.

1.5 Quality Assurance

1.5.1 Each plant from which the Vendor intends to provide materials governed by this specification must have current NRMCA, ARPA or equivalent laboratory certification.

1.5.2 Vendor shall provide access to the plant for inspection of materials and/or batch plant equiprnent.

1.6 Storage and Handling

1.6.1 All materials shall be stored and handled in such a manner as to prevent deterioration or intrusion of foreign matter and to produce a minimum amount of segregation.

1.6.2 Storage of aggregate on a natural ground surface will be permitted if bottom 6 inches (152-mm) of pile is not used in batching.

2.0 PRODUCT

2.1 Cement

Cement shall conform to ASTM C150, Type II with alkali content not to exceed 0.6 percent.

2.2 Fly Ash

not deleteriously reactive with alkali in cement. Fly ash shall be sampled and tested in accordance with ASTM C311.

2.3 Lime

Lime shall be commercial dry hydrated lime containing a minimum 85 percent calcium hydroxide, $Ca(OH)_2$, as determined by ASTM C25. Lime shall be protected from exposure to moisture until used and shall be sufficiently dry and flow freely when handled.

2.4 Aggregate

Aggregate shall conform to ASTM C33; coarse aggregate shall be sized as noted in Table 1 of this specification.

2.5 Water

Water for washing aggregates and for mixing slurry shall be potable or shall meet requirements of ASTM C94. If water does not meet said requirements, a chemical analysis of water shall be performed in accordance with ASTM D512 and ASTM D516 by an independent testing laboratory at Vendor's expense and submitted to the Engineer for approval.

2.6 Admixtures

2.6.1 Admixtures shall be approved in writing by the Engineer prior to use. Admixtures shall be added at the plant at the time of batching unless noted otherwise.

2.6.2 Air-entraining admixtures shall conform to ASTM C260 and shall be used only in DEPB.

2.6.3 Water-reducing, retarding, and accelerating admixtures shall conform to ASTM C494. Chloride admixtures shall not be used.

2.6.4 Superplasticizers shall conform to ASTM C494, Type F or G. Superplasticizer may be added at batch plant or at jobsite.

2.6.5 Grout Fluidifers shall conform to ASTM C937.

2.7 Measurement and Mixing of Materials

2.7.1 Measurement and mixing of materials shall be in accordance with ASTM C94 and C685.

2.7.2 Mixes shall be homogenous, readily placeable and uniformly workable. Proportioning of ingredients shall produce consistency, durability, workability and other required properties appropriate for the intended usage.

2.8 Mix Design for RFG Grout

2.8.1 Proportioning of ingredients shall produce grout with efflux (flow consistency), set, strength and shrinkage characteristics as specified herein and appropriate for intended usage. Grout upon delivery shall be homogeneous, readily placeable and uniformly flowable.

2.8.2 Grout shall have an efflux time of less than 18 seconds for minimum 30 minutes after arrival at jobsite (tested in accordance with ASTM C939), shall be firm to the touch within 72 hours after placement, shall have no more than three percent volume loss (including fluid separation) seven days after batching and have a compressive strength when combined with aggregate of minimum 1000 psi (6.9-MPa) in 56 days. Mix shall maximize use of fly ash. General proportions for mix design are as follows:

a. Solids: 5 parts fly ash to 1 part cement to 3/4 part lime

b. 2 1/4 parts solids to 1 part water

c. 20 ounces (0.6-L) of high-range water-reducing admixture per 100 pounds (45.2-kg) of solids

Vendor is responsible for final mix design that meets performance requirements of this specification.

2.8.3 Retarding admixtures may be added to mix to meet efflux requirements and compensate for travel time to specific jobsites. Volume of retarding agent added is responsibility of Vendor, but specific type must be preapproved by the Engineer prior to batching of grout.

2.8.4 No change in source, character or mix proportions of grout shall be made without prior written approval of the Engineer. For changes to be approved, affected items listed under Paragraph 1.4.1 shall be resubmitted.

2.9 Batching RFG Grout

2.9.1 Mixing shall follow the procedures in ASTM C94, with all grout constituents added at the batch plant.

2.9.2 Fly ash shall be added in a manner and at a rate as to minimize incompletely mixed fly ash nodules within the grout. Dry fly ash nodules over one inch

diameter shall not be allowed. Grout containing non-uniform material exceeding one percent of total grout volume, as determined by the Engineer, will be rejected at full cost to the Vendor.

2.10 Washed Gravel for RFG

2.10.1 Gravel shall be washed to remove dust and dirt prior to placement in mixer.

2.10.2 Washed gravel shall be sent to jobsite by ready-mix truck. Maximum of two gallons (7.6-L) of water per cubic yard (0.84-m^3) of gravel may be added.

3.0 EXECUTION

3.1 Delivery

3.1.1 Deliver materials in conformance with ASTM C94.

3.1.2 When materials contain cement, machine-stamp batch out time of truck on delivery ticket at Vendor's plant. A copy of delivery ticket having machine-stamped batch out time shall be given to the Engineer at the time of delivery. Deliveries of materials containing cement without machine-stamped batch out time on delivery ticket will be rejected.

3.1.3 Deliver materials within 30 minutes of requested delivery time. Time lapse between successive deliveries shall not vary by more than 20 minutes from that requested. The Engineer may reject any batch not meeting these requirements. Vendor shall allow 30 minutes for material discharge. Standby time may be charged after 30 minutes.

3.1.4 Backfill containing cement will be rejected if the Engineer determines that, on arrival at the jobsite, backfill temperature is outside the range of 50°F (10°C) to 90°F (32°C), or that backfill has attained its initial set. Rejected backfill shall be at the Vendor's cost.

3.1.5 Vendor may add water only once to bring a mix to the desired slump. Water shall not be added to RFG-Grout. Mix not meeting slump requirements will be rejected.

3.2 Placement

3.2.1 Slurry and Lean Mix Backfills

Discharge backfill containing cement within 1-1/2 hours after initial mixing water is added. The Engineer may waive this limitation if slump is such that the material can be placed without addition of water.

Place backfill so that it flows easily around and beneath conduit, pipe or other obstructions in trenches and excavations. Slurry shall have consistency, workability, flow characteristics and pumpability (where required) such that the

material when placed is self-compacting and has sufficient plasticity that mechanical compaction or vibration is typically not required. Mechanical compaction or vibration may be used to consolidate around obstructions.

Place slurry backfill equally on both sides of conduit or pipe to prevent displacement of conduit or pipe.

Place slurry backfill in lift depths that will not float the conduit or pipe; to place backfill in greater lift depths, provide sufficient approved anchorage so the conduit or pipe cannot float.

3.2.2 Washed Gravel for RFG

Remove all excess water prior to placement of gravel by rotating mixer and directing water away from backfill area. Time for removal of excess water shall be at Vendor's cost. Wet gravel must flow uniformly and readily out of truck.

Gravel that has not been washed of dust and dirt will be rejected. Gravel that is not surface saturated shall not be placed.

3.2.3 RFG Grout

Discharge grout within 30 minutes after arrival at jobsite. This requirement may be waived by the Engineer if retarding admixtures are used.

Grout that exceeds efflux time requirements upon arrival at jobsite (as determined by flow testing), shall be rejected at full cost to Vendor. No water shall be added at jobsite or after batching to decrease efflux time.

3.3 Protection

3.3.1 Slurry backfill for trenches shall be protected from vehicular loading and shall not be covered with pavement prior to having reached initial set per ASTM C403, or for 12 hours, whichever occurs first. Set time tests shall be performed during initial placement while backfill is fluid.

3.3.2 Slurry backfill for foundation excavations shall be protected from foundation loading and placement of foundation concrete prior to having reached initial set per ASTM C403, or for six hours, whichever occurs first.

3.3.3 Where the Engineer has identified soils as being moisture sensitive, a drainage notch or drain wick shall be placed longitudinally along centerline of slurry backfill within first hour following placement. Drainage water shall be collected at end of trench or excavation and removed.

3.4 Testing

3.4.1 Samples will be taken directly from transit mix truck. Sampling and testing will be in accordance with the following standards:

Sampling	ASTM C172
Temperature	ASTM C1064
Slump	ASTM C143
Air	ASTM C231
Gradation	ASTM C117/ ASTM C136

3.4.2 Testing of gradation shall be done for all projects in public rights-of-way and other locations as determined by the Engineer; sampling shall be done at material source prior to the start of mix production.

3.4.3 Testing will be performed by the Engineer at no cost to Vendor.

3.5 Acceptance of Backfill Materials

3.5.1 Backfill materials shall be considered deficient and will be rejected if:

a. slump is less than specified in table.
b. aggregate gradation is outside specified limits.

3.5.2 Rejected material shall not be used and shall be replaced with new material. Cost of disposing of rejected material and replacing with new material, including Purchaser's direct and indirect costs, shall be paid by Vendor.

TABLE 1 - BACKFILL MIXES

Stock Code Number	Backfill Designation	Description	Coarse Aggregate ASTM C33	Fine Aggregate	Slump Range	Minimum Cement Content (lbs/cu. yd.)	Required Admixtures
00-0100	ASB	Aggregate Slurry Backfill	No. 67 [3/4" (19mm) nom. max]	A, H	6"-9" (152-229mm)	None	
00-0101	DEPB	Direct Embed Pole Backfill	No. 8 [3/8" (9.5mm) nom. max]	A	6"-9" (152-229mm)	376 B (223 kg/m^3)	C
00-0104	LMB 1/2 SACK	Lean Mix Backfill w/ 1/2 Sack Cement pcy	No. 57 [1" (25mm) nom max]	A	6"-9" G (152-229mm)	47 (28 kg/m^3)	
00-0105	LMB 1 SACK	Lean Mix Backfill w/ 1 Sack Cement pcy	No. 57 [1" (25mm) nom. max]	A	6"-9" G (152-229mm)	94 (56 kg/m^3)	
00-0106	LMB 1-1/2 SACK	Lean Mix Backfill w/ 1-1/2 Sack Cement pcy	No. 57 [1" (25mm) nom. max]	A	6"-9" G (152-229mm)	141 (84 kg/m^3)	
00-0108	DBA	Duct Bank Backfill w/ Large Aggregate	No. 8 [3/8" (9.5mm) nom. max]	A	6"-9" (152-229mm)	376 (223 kg/m^3)	
00-0109	DBS	Duct Bank Backfill w/ Sand	None	A	6"-9" (152-229mm)	376 (223 kg/m^3)	
00-0160	RFG GRAVEL	Washed Gravel for RFG	No. 4 [1-½" (38.1mm) to 3/4" (19mm)]	None			
00-0161	RFG GROUT	Lime and Fly Ash Grout for RFG	None	None		D, E	F

NOTES

A. Fine aggregates (sand) shall be in accordance with ASTM C33
B. Maximum water/cement ratio .60
C. Air entrainment 4% +/- 1%, Superplasticizers as required to obtain slump
D. Cementitious solids: 5 parts fly ash to 1 part cement to 3/4 part lime, by weight. See paragraph 2.8.2
E. Limit water content to 1 part water to 2.25 parts cementitious solids by weight. See paragraph 2.8.8
F. High range water reducing admixture
G. Purchaser may request material at lower slumps
H. Fine aggregates 45-50% of the total aggregate weight

5/08/97

SALT RIVER PROJECT
WATER GROUP

STANDARD SPECIFICATION FOR PRECAST CONCRETE PIPE

(WTR 02614)

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PREPARED: CHARLES W. THUMS APPROVED:

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STANDARD SPECIFICATION
FOR
PRECAST CONCRETE PIPE
(WTR 02614)

1.0 GENERAL

1.1 Work Specified

This specification covers the fabrication, furnishing and installation of precast concrete pipe.

1.2 Measurements

Both English and metric measurements are shown in this specification. The English and metric measurements shown may not be exactly equal, however, the difference between them will generally be between +/- 1.5%. The system of measurement to be used relative to this specification for a particular project will be that used in the project-specific documents and drawings.

1.3 Reference Standards

1.3.1 Reference to standards or specifications shall be interpreted to mean the latest revision unless noted otherwise.

1.3.2 The following abbreviations appear in this specification.

ASTM	American Society for Testing and Materials
CE	Civil Engineering
OSHA	Occupational Safety and Health Administration
SRP	Salt River Project
29 CFR	Code of Federal Regulations, Title 29

1.3.3 The following standards shall be made a part of this specification:

ASTM C14	Standard Specification for Concrete Sewer, Storm Drain, and Culvert Pipe (reference only - for hydrostatic testing of ASTM C76 pipe)

ASTM C76	Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C207	Standard Specification for Hydrated Lime for Masonry Purposes
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C361	Standard Specification for Reinforced Concrete Low-Head Pressure Pipe
ASTM C443	Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
ASTM C507	Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe
ASTM C822	Standard Terminology Relating to Concrete Pipe and Related Products
ASTM D698	Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (Standard Proctor)
ASTM C924	Standard Practice for Testing Concrete Pipe Sewer Lines by Low-Pressure Air Test Method
ASTM C969	Standard Practice for Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines
ASTM C1103	Standard Practice for Joint Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines

SRP 02227	Salt River Project Standard Specification for Slurry Backfill Materials
SRP 02230	Salt River Project Standard Specification for Aggregate Base, Select Material and Surface Material
CE 02.272	Salt River Project Standard Specification for Geotextiles
OSHA	General Industry Occupational Safety and Health Standards (29 CFR Part 1910)
OSHA	Safety and Health Standards for Construction (29 CFR Part 1926)
SRP ESRM	Salt River Project Excavation Safety Resource Manual

1.3.4 Exceptions to this specification require approval in writing by the Engineer prior to beginning the affected work.

1.4 Quality Assurance

As part of purchase agreement for pipe, Contractor shall stipulate that the Engineer shall have access to the following:

a. Pipe manufacturing specifications.

b. Certification of pipe by others.

c. Pipe manufacturing quality control test results.

d. Manufacturing facilities to observe manufacture of pipe.

e. Testing facilities to observe testing of materials and pipe.

1.5 Delivery, Storage and Handling

1.5.1 Notify the Engineer of name and address of pipe seller a minimum of two working days before delivery of pipe.

1.5.2 Deliver only requested quantity of pipe to jobsite. Delivery of greater or lesser quantity of pipe requires advance approval of the Engineer.

1.5.3 Provide copy of D-load test documentation along with delivery for each production lot of pipe included in that delivery. Pipe shall not be installed if copy of D-load test information for that particular production lot/date is not available on site.

1.5.4 Integrity of pipe is responsibility of seller until pipe has been delivered and unloaded at jobsite. Contractor is responsible for protecting pipe from physical damage or loss after delivery at jobsite until acceptance of the Work by the Engineer.

1.6 Warranty

Contractor shall warranty material and workmanship for a period of one year from date of written final acceptance of pipeline by the Engineer; leaks, defects and deterioration shall be repaired/replaced at no cost to SRP. Contractor shall make repairs/replacements within 14 days, or if dry-up is required, during first available dry-up following notification of leak or deficiency.

2.0 PRODUCT

2.1 Type and Class of Pipe

Type and class of pipe required for project will be stated in project-specific specifications or shown on drawings.

2.2 Pipe Markings

Pipe shall be marked as required by the applicable ASTM specification.

2.3 Irrigation and Low Head Pressure Drain Pipe

2.3.1 Rubber gasketed reinforced concrete pipe (RGRCP) shall meet one of the following requirements:

a. ASTM C361 and withstand minimum 10 PSI (70 kPa) hydrostatic test pressure.

b. ASTM C76, class III, wall B and meet hydrostatic test requirements as specified in ASTM C14.

2.3.2 Reinforced concrete elliptical pipe (RCEP) shall meet requirements of ASTM C507 and withstand minimum 10 PSI (70 kPa) hydrostatic test pressure as specified in hydrostatic testing requirements of ASTM C361.

2.3.3 Premanufactured bend shall meet requirements of specification for type of pipe with which it is to be

used. Maximum angle of bend shall not exceed that shown on drawings. Premanufactured bends shall be manufactured in accordance with approved shop drawings; submit shop drawings to the Engineer for approval minimum two weeks prior to manufacture of bend.

2.4 Rubber Gasket Joints

2.4.1 Rubber gasket joints shall meet requirements of ASTM C443.

2.4.2 When pipe is supplied with gasket installed, gasket end of pipe shall be enclosed in weathertight protective covering.

2.5 Source Quality Control

2.5.1 External load crushing strength tests shall be in accordance with ASTM standard under which pipe was manufactured.

2.5.2 Pipe tests shall be performed at no cost to SRP at either pipe manufacturer's plant or at an independent testing facility acceptable to the Engineer.

2.6 Mortar/Grout

Mortar for repair of precast concrete pipe shall be composed of two parts sand to one part portland cement (by volume) and sufficient water to provide a plastic mixture. Up to one-fifth part hydrated lime may be added to adjust consistency of mix. Lime shall be in addition to and not a replacement for cement. Equal or similar mortar may be substituted with prior approval of the Engineer.

a. Sand (aggregate) shall conform to requirements of ASTM C144.

b. Portland cement shall conform to requirements of ASTM C150, Type II.

c. Hydrated lime shall conform to requirements of ASTM C207, type N.

2.7 Pipe Diaper

Pipe diaper shall be made of Typar or other suitable fabric having porosity low enough to prevent loss of cement from grout. Edges of fabric shall be hemmed; steel strapping bands for securing diaper around pipe shall be sewn into outside edges of diaper.

2.8 Geotextiles

Geotextiles used to stabilize subgrade shall conform to requirements of CE 02.272.

2.9 Bedding

Granular fill used for Class C or better bedding shall be processed aggregate base material (ABC) meeting requirements of SRP 02230.

2.10 Backfill

2.10.1 Native material used for backfill shall meet following particle size requirements:

a. Maximum 50 percent (by weight) retained on 3/4" (19 mm) sieve.

b. From bedding to finish grade, native backfill shall not contain solid material exceeding three inches (75 mm) in greatest dimension or exceeding 1/3 distance between side of pipe and trench wall.

Suitability of native material for use as backfill for specific project will be determined by the Engineer.

2.10.2 Granular backfill material shall be processed aggregate base material (ABC) meeting requirements of SRP 02230.

2.10.3 Aggregate slurry backfill shall be processed (washed) aggregate base material (ABC) in slurry form meeting requirements of SRP 02227.

2.10.4 Lean mix backfill shall meet requirements of SRP 02227.

2.10.5 Unsuitable backfill materials include, but are not limited to, the following:

a. Silt and clay soils which have moisture content significantly over optimum or which cannot be compacted to required density.

b. Expansive soils.

c. Sod, matted or decayed vegetation.

d. Deleterious materials.

3.0 EXECUTION

3.1 Protection

3.1.1 Cost of excavation protection shall be included in excavation bid price.

3.1.2 Protect excavation and safeguard personnel as required for safety and conformance to governing law, including OSHA standards and SRP ESRM. The Engineer reserves the right to stop work deemed unsafe until unsafe condition is corrected by Contractor.

3.1.3 Maintain underground and overhead utilities in continuous service unless prior approval to interrupt service has been obtained from the Engineer. Locate conflicting utilities shown on drawings and identified in field. Comply with Blue Stake requirements for locating all utilities. Contractor shall be responsible for locating, protecting and repairing private lines. Pothole for true depths. Relocate conflicting utilities to resolve conflicts. Utilities identified before excavation and subsequently damaged by Contractor shall be repaired at Contractor's expense.

3.1.4 Contractor shall protect against and shall be liable for damage to buildings, foundations and structures.

3.1.5 Keep pipe trench free of water. Berm or otherwise protect trench from surface drainage and runoff. Failure to protect trench is not grounds for extension of irrigation outage.

3.1.6 Provide safe and convenient passage for pedestrians and vehicles. Maintain access to hospitals, fire stations, and fire hydrants at all times. Barricade or bridge trenches at end of day's work as specified by governing municipality/agency. The Engineer may designate additional points at which passage shall be provided.

3.1.7 Remove excess material from jobsite within 48 hours after backfilling trench. See paragraph 3.8.1 for disposal requirements. Treat loose material to control dust and to prevent pollution of runoff water as specified by governing municipality/agency.

3.2 Excavation

3.2.1 Comply with open trench length requirements of governing municipality/agency.

3.2.2 Alignments and elevations will be surveyed and staked by SRP, unless noted otherwise. Contractor shall

be responsible for protecting stakes. Restaking shall be at Contractor's expense.

3.2.3 Excavations shall conform to alignments, elevations, dimensions and tolerances indicated on drawings or in specifications. Do not begin excavation before establishment of alignments and elevations.

3.2.4 Trench width shall be as specified in Table 1 unless otherwise indicated on drawings or in project-specific specifications. Written approval of the Engineer is required prior to substitution of other pipe or bedding for that specified. From one foot (300 mm) above top of pipe, trench may be widened as necessary to accommodate sheeting, bracing and proper installation of pipe.

Table 1

Size of Pipe (ID)	Maximum Width at Top of Pipe (Add to Barrel OD)	Minimum Width at Springline (Each Side of Pipe)
Less than 18 in. (450 mm)	16 in. (400 mm)	6 in. (150 mm)
18 in. to 24 in. (450-600 mm) inclusive	19 in. (475 mm)	8 in. (200 mm)
27 in. to 39 in. (675-975 mm) inclusive	22 in. (550 mm)	9 in. (225 mm)
42 in. to 60 in. (1050-1500 mm)	1/2 OD	12 in. (300 mm)
Over 60 in. (1500 mm)	36 in. (900 mm)	12 in. (300 mm)

3.2.5 When backfill below springline of pipe is to be mechanically compacted, minimum distance from all points on pipe at springline to edge of trench shall be width of compaction shoe plus two inches (50 mm).

3.2.6 When backfill from bottom of trench to springline or above is to be aggregate slurry, minimum distance from pipe at springline to edge of trench shall be three inches (75 mm).

3.2.7 Trench bottom shall be level for full width; remove, or fill and compact tooth marks greater than two inches (50 mm) deep. In rock, bottom of trench shall be overexcavated minimum six inches (150 mm) and filled with granular bedding material to provide smooth surface; compact granular bedding material for full width of trench to requirements shown on drawings.

3.2.8 Excavation carried beyond dimensions or elevations indicated on drawings without the Engineer's approval, shall be backfilled and compacted as directed by the Engineer at Contractor's expense.

3.3 Subgrade

3.3.1 Existing subgrade material and subgrade fill material shall be compacted to a minimum of 85 percent of maximum density and moisture content shall be between four percent below and two percent above optimum moisture content as determined per ASTM D698, unless noted otherwise in specifications or drawings.

3.3.2 Suitability of subgrade will be determined by the Engineer prior to placement of bedding.

3.3.3 Unsuitable subgrade materials include, but are not limited to, the following:

a. Silt and clay soils which have moisture content significantly over optimum or which cannot be compacted to required density.

b. Expansive soils.

c. Sod, matted or decayed vegetation.

d. Deleterious materials.

3.3.4 Treatment of existing subgrade material which exceeds optimum moisture content by more than two percent must be approved by the Engineer. Method of treatment shall be submitted in writing to the Engineer for approval.

3.3.5 Remove unsuitable materials, soil that cannot be dried to meet moisture content specified in paragraph 3.3.1 and soil that cannot attain a maximum dry density of 85 percent. Overexcavate trench minimum two feet (600 mm) each side of pipe bell at springline and maximum four feet (1200 mm) below elevation indicated on drawings, or to suitable subgrade, whichever occurs first. Dispose of removed material in accordance with paragraph 3.8.1. Fill overexcavation with granular material (ABC) to grade indicated on drawings and compact to 95 percent of optimum density per ASTM D698.

3.3.6 Subgrade soils which are unsuitable only because of high moisture content may be left in place and stabilized using geotextiles, if approved by the Engineer. Geotextile shall comply with requirements of CE 02.272. Subgrade preparation, placement of geotextiles, and

placement and compaction of fill material shall be in accordance with geotextile manufacturer's recommendations.

3.4 Bedding

3.4.1 Bedding requirements shall be as called for on drawings. Class C bedding or better is required unless otherwise specified on drawings, on license or in project-specific specifications.

3.4.2 Remove loose material, rocks, deleterious material, and debris from trench bottom prior to placing bedding material.

3.4.3 Bedding material shall be at a uniform moisture content of between optimum and five percent above optimum; compact to density required in 3.6.3 Compaction in one foot (300 mm) or smaller uncompacted lifts.

3.4.4 Finish and compact bedding to elevation indicated on drawings; assure that bedding will provide continuous support for pipe.

3.4.5 Excavate bell holes with minimum two inch (50 mm) clearance to prevent point loading of laid pipe and to maintain continuous support of pipe barrel. Excavate cable holes to prevent movement of pipe when removing sling.

3.4.6 Added or disturbed bedding material shall be compacted to densities required in 3.6.3. Compaction.

3.5 Pipe Installation

3.5.1 General

a. Install pipe to alignment and elevation shown on drawings. Variation from indicated alignment and elevation shall not exceed 0.1 foot (30 mm), and the rate of departure from or return to indicated alignment and elevation shall be no more than 0.1 foot (30 mm) in ten feet (3000 mm), unless otherwise approved by the Engineer. Bends shall be within one-half pipe section of station shown on drawings. All changes in station require prior approval of the Engineer. Contractor shall mark approved changes in stationing, based on measurement of installed pipe, on drawings and shall supply marked drawings to the Engineer.

b. Lay pipeline with minimum horizontal separation of two feet (600 mm) from parallel utilities and with minimum one foot (300 mm)

vertical separation from utilities which cross below pipeline. No overcrossings of SRP irrigation pipe will be allowed without approval of the Engineer. Notify the Engineer immediately if it is found that a utility will be closer to pipeline than specified minimum separation.

c. Install elliptical pipe and elliptically reinforced pipe with vertical axis within ten degrees of true vertical.

d. Gaps in pipeline during installation due to utility conflicts will not be allowed unless otherwise approved by the Engineer.

3.5.2 Joint Assembly

a. Rubber gasketed joints (C76 and C361 pipe): Lay pipe with bell ends facing in direction of laying unless otherwise approved by the Engineer. Begin laying pipe at lower end of slope and proceed upward on grades which exceed ten percent. Only use gaskets and lubricant supplied by pipe seller. Clean joint mating surfaces and gasket before joining pipes. Apply generous, uniform coating of gasket lubricant to inside surface of bell end of pipe, in groove portion of spigot, and on gasket. Install gasket in accordance with pipe seller's instructions. Keep joint from contacting ground when inserting pipe spigot into bell. Use industry approved methods to push or pull pipe to complete joint closure.

b. Tongue and groove mortar joints (C507 pipe): Clean joint mating surfaces prior to joining pipes. Thoroughly wet tongue and groove with water and keep moist until mortar is placed; use brush to apply water. Apply mortar to upper half of tongue and to bottom half of groove in a manner which will fill entire joint. Use industry approved methods to push or pull pipe into position until mortar is squeezed from both inside and outside of joint. Adjust pipe to design alignment and grade; secure pipe section firmly in position using a small amount of bedding material placed and tamped thoroughly against lower portion of pipe at midpoint of length. Remove excess mortar from interior joint and finish interior joint recess smooth and flush with inside of pipe; remove all debris.

If adjustment of position of pipe is required after it has been laid, remove pipe, clean and rejoint it.

Keep the finishing of exterior joints between five and two sections of pipe behind pipe laying operations. Complete outside of joint by covering with hand-placed mortar band extending completely around outside of pipe. As soon as mortar band has set sufficiently, coat it with white-pigmented curing compound conforming to ASTM C309, Type 2, Class A, or provide a suitable moist cure acceptable to the Engineer.

c. Pipe diaper joints: Grout bands may be placed by diapering when specifically authorized by the Engineer.

After joining pipe, center and secure diaper over the exterior joint recess. Diaper shall completely and snugly encase the exterior joint except for an opening at the top; width of diaper is governed by size of pipe. Moisten joint recess with water prior to grout placement. Form grout band around pipe by pumping grout into opening of diaper; pump grout to one side of pipe until it flows completely under bottom of pipe and partially up other side, then pump to opposite side to fill diaper and complete grout band. Close opening in diaper. Keep grout band moist until trench is backfilled and band is covered.

3.5.3 Radius Curves

a. Gasketed joints: Long radius curves shall be made by using pipe manufactured with beveled ends or by pulling pipe joints of straight sections of pipe (deflecting pipe unit from straight alignment by opening one side of the outside perimeter of the joint wider than the other side) as it is laid. Maximum opening of pulled joint is ½" (13 mm) wider than width of joint when pipe is assembled in straight alignment. Deflections requiring outside joint to be pulled more than ½" (13 mm) shall be considered to be field bends.

b. Field bends and grade changes: Use reinforced pipe collar to make joints at field bends up to and including 45° (degrees) and grade changes.

Collar for reinforced concrete pipe shall be of mechanically compacted, reinforced, minimum 3000 psi (20 MPa) concrete. Outside of collar shall be made by forming; inside of collar shall conform to inside diameter of pipe. Maintain full pipe cross-section and smoothness through length of bend or grade change. Ensure that forming material is completely removed from inside pipe.

c. Precast Bends: Shall be as shown on drawings. Submit shop drawings of precast bends to the Engineer for approval; approval of the Engineer is required before beginning fabrication of precast bends.

3.5.4 Branch Connections

Type, size, location and angle of branch connections for irrigation pipe will be shown on drawings. Shop drawings are required for all prefabricated connections; submit shop drawings for approval of the Engineer.

3.5.5 Repairs

a. Repair tie holes, minor cracks and depressions in pipe surface with cement based, rapid setting mortar such as Speed Crete 2028 (Tammis Industries Co.) or approved equal. Clean and moisten surface before applying mortar.

b. If new or existing pipe has 0.01 inch (0.3 mm) or wider crack(s) notify the Engineer and request inspection of the pipe.

Repair 0.01 inch (0.3 mm) or wider cracks in an otherwise acceptable section of pipe with epoxy grout approved by the Engineer. V-groove inside cracks minimum 1/4 inch (6 mm) deep. Clean area prior to repair.

If crack goes through pipe wall or if structural integrity of pipe is in question, the Engineer may, at his option, require removal of damaged pipe and replacement with new.

c. Finished surface of inside repairs shall be smooth and flush with inside pipe surface.

d. Repairs shall not reduce inside pipe diameter.

3.5.6 Plugs

a. Temporarily cover or plug installed piping systems each day at end of work. Covers or plugs shall prevent entry of persons, small animals or deleterious material into pipe.

b. Completely remove all temporary covers, plugs, caps or dikes installed during construction before completion of construction.

3.6 Backfilling

3.6.1 General

a. Unless otherwise noted on drawings or in project-specific specifications, backfill shall be as noted in 2.10 Backfill.

b. Moisture content of backfill shall be as noted in paragraph 3.6.2.

c. Do not disturb or damage pipe when backfilling trenches. Place backfill evenly on opposite sides of pipe to prevent movement of pipe.

d. Lift thickness shall not exceed that which can be effectively compacted by type of equipment and method used. Maximum uncompacted lift thickness for processed or native granular material shall be limited to one foot (300 mm); maximum uncompacted lift thickness for non-granular native material shall be limited to eight inches (200 mm). Do not allow mechanical compaction equipment to come into direct contact with pipe.

e. Place and consolidate lean mix backfill and aggregate slurry backfill in lift depths that will not cause pipe to move or float. Discharge backfill directly from mixer into trench with even distribution on opposite sides of pipe. Backfill shall flow freely and uniformly around and under pipe without leaving voids; vibrate backfill to consolidate when slump is less than six inches (150 mm) or whenever required to fill voids.

3.6.2 Moisture Content

a. Contractor shall have sole responsibility to control moisture content of backfill. Optimum moisture content of backfill shall be determined in accordance with ASTM D698. Moisture

content which is outside of range specified shall be sufficient cause to require removal of placed backfill.

b. Moisture condition backfill material before placement, unless otherwise approved by the Engineer.

c. Place granular material, except for aggregate slurry, at a uniform moisture content of between optimum and three percent above optimum.

d. Place aggregate slurry with water content as specified in SRP 02227. The Engineer may require increase or decrease in water content to obtain desired slump.

e. Place native material, which does not meet requirements for classification as granular material, at a uniform moisture content of between three percent below to two percent above optimum.

3.6.3 Compaction

Compact or consolidate bedding and backfill to, at minimum, density specified in Table 2. Where conflicting density requirements exist, use highest density. Test density in accordance with ASTM D698. Bedding or backfill not meeting density requirements shall be removed/reworked at Contractor's expense.

3.6.4 Field Quality Control

a. Inspection and compaction tests are required on trench backfill. Compaction tests are not required on lean mix backfill meeting requirements of SRP 02227.

b. The Engineer will verify density and moisture content of bedding and backfill material during construction. Tests will be made at discretion of the Engineer.

c. Backfill lifts shall not be covered before compaction tests are performed. If lift is covered prior to testing, Contractor is at own risk and shall excavate test holes for making density tests on lower portions of backfill at instruction of the Engineer. Refill and compact test holes in accordance with specifications. Excavating, refilling and compacting test holes shall be at Contractor's expense.

TABLE 2				
Compaction Type	Location	From Surface to 2' (600 mm) Below Surface	From 2' (600 mm) Below Surface to 1' (300 mm) Above Top of Pipe	From 1' (300 mm) Above Top of Pipe to Bottom of Trench
I	Under any existing or proposed pavement, curb, gutter, sidewalk, or such construction included in the contract, or when any part of the trench excavation is within 2' (600 mm) of the above.	100% for granular, 95% for non-granular	90%	90%
II	On any utility easement, street, road or alley right-of-way outside limits of (I).	85%	85%	90%
III	Around any structures or exposed utilities.	95%	95%	95%

3.7 Field Test

3.7.1 The Engineer may, at his option, require Contractor to test integrity of installed pipeline or joints. Pipeline and joint tests shall be made at Contractor's expense. The Engineer will monitor field testing.

3.7.2 Pipeline tests shall be in accordance with ASTM C969. Test pressure shall correspond to maximum operating head condition stipulated by SRP Watermaster responsible for that area. Test period shall be 24 hours. The availability of water for pipeline field tests is entirely at the option and convenience of SRP.

3.7.3 Joint tests shall be in accordance with ASTM C924 for 24" (600 mm) pipe or smaller and ASTM C1103 for 27" 675 mm) pipe or larger.

3.7.4 Contractor shall repair all deficiencies revealed by field testing. Tests shall be successfully completed prior to final acceptance of the pipeline.

3.8 Cleanup

3.8.1 Remove unsuitable material and excess spoil material from jobsite and dispose of at SRP approved disposal site, unless otherwise directed by the Engineer. Removal and disposal of material shall be at Contractor's expense.

3.8.2 Dress grades adjacent to the work as needed to return site to like original condition, unless otherwise directed by the Engineer.

3.8.3 All work and property of SRP and/or others damaged or destroyed by Contractor, its employees or Subcontractors shall be repaired or replaced at Contractor's expense to the satisfaction of the Engineer.

SALT RIVER PROJECT
STANDARD SPECIFICATION
FOR
REINFORCING STEEL
(SRP 03210)

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PREPARED BY: K. L. CHHIBBER APPROVED BY: L. A. BOTTOLFSON

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STANDARD SPECIFICATION FOR REINFORCING STEEL (SRP 03210)

1.0 GENERAL

1.1 Work Specified

This Specification covers the furnishing of all shop drawings, plant, labor, materials, tools, equipment and performing all operations and incidentals necessary for supplying reinforcing steel, plain steel dowels and bar supports.

1.2 Work Performed by Purchaser

When construction work is performed by Purchaser, the term Contractor shall mean the reinforcing steel supplier.

1.3 Standard Units

Either English or SI (metric) units may be used. Whichever units are specified on the drawings shall be considered standard for that project. Substitution between English and SI products will be allowed, provided that at least equivalent cross-sectional area is furnished.

1.4 Reference Standards

1.4.1 Reference to standards or specifications shall be interpreted to mean the latest revision unless otherwise noted.

1.4.2 The following abbreviations appear in this Specification:

ACI	American Concrete Institute
ASTM	American Society for Testing and Material
CRSI	Concrete Reinforcing Steel Institute

1.4.3 The following standards shall be made a part of this Specification:

ACI 315	Details and Detailing of Concrete Reinforcement

ACI 318/318M	Building Code Requirements for Reinforced Concrete
ACI SP-66	ACI Detailing Manual
ASTM A36/A36M	Standard Specification for Carbon Structural Steel
ASTM A82	Standard Specification for Steel Wire, Plain, for Concrete Reinforcement
ASTM A185	Standard Specification for Steel Welded Wire Fabric, Plain for Concrete Reinforcement
ASTM A615/ A615M	Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM A775/ A775M	Standard Specification for Epoxy-Coated Reinforcing Steel Bars
CRSI Handbook	Concrete Reinforcing Steel Institute Handbook

1.4.4 Exceptions to this Specification must be approved in writing by the Engineer prior to beginning the affected work.

1.5 Submittals

1.5.1 Shop Drawings

a. Two prints of each shop drawing shall be submitted to the Engineer for review and approval. The Engineer will require at least three working days for review of shop drawings.

b. Shop drawings shall include placement drawings, bar list, bending details, standees and spreader bars, and schedules for fabrication and delivery of reinforcing steel.

c. Shop drawings shall be checked and signed prior to submittal.

d. The Engineer will return one print of each shop drawing marked "Approved", "Approved as Noted", or "Not Approved". Submittals that are marked "Approved as Noted" or "Not Approved" shall be corrected and resubmitted. Each revision shall be dated.

e. The Engineer's approval of submittals shall not relieve Contractor from responsibility for compliance with Drawings, Specifications and other Contract Documents nor from responsibility for errors in submittals.

f. Fabrication shall not begin until all shop drawings are approved by the Engineer.

g. Four sets of prints and one vellum of each final approved shop drawing shall be provided to the Engineer. The Engineer will distribute shop drawings to jobsite Foreman and Inspector when construction work is performed by Purchaser.

1.5.2 Two copies of original material manufacturer's Material Test Reports (MTR) for reinforcing steel shall be submitted to the Engineer prior to shipment.

1.5.3 Two copies of manufacturer's catalog data for each splicing device or other specialty item shall be submitted to the Engineer prior to shipment.

1.6 Storage and Handling

1.6.1 Reinforcing steel shall be protected during shipping and unloading to prevent damage to material or loss of identification tags.

1.6.2 Reinforcing steel shall be stored above grade and in such a manner as to prevent contamination with dirt, rust, oil or other bond-breaking coatings.

1.6.3 Damaged, misfabricated or deteriorated materials, not caused by Purchaser's actions, shall be replaced by Contractor at no additional cost to Purchaser.

2.0 PRODUCT

2.1 Reinforcing Steel

2.1.1 All reinforcing steel shall comply with the following standards:

a. Bars shall conform to ASTM A615, Grade 60 (ASTM A615M, Grade 400) unless noted otherwise.

b. Epoxy-coated bars shall conform to ASTM A775/A775M.

c. Plain steel wire reinforcement shall conform to ASTM A82.

d. Plain steel welded wire fabric shall conform to ASTM A185.

e. Plain steel dowels shall conform to ASTM A36/A36M.

2.1.2 All material shall be new and free from loose rust, loose mill scale, dirt, oil and paint.

2.1.3 Reinforcing steel with tightly adhered mill scale or rust or a combination of both will be acceptable provided the minimum dimensions (including deformations) and weight of a hand wire-brushed test specimen are not less than acceptable ASTM requirements.

2.2 Bar Supports

2.2.1 Chairs and bolsters shall be steel, plastic or concrete, and shall be of size and dimensions necessary to perform required function.

2.2.2 Standees shall be furnished with the reinforcing steel when top and bottom mats in slabs are shown on the drawings. Maximum standee spacing shall be 4 feet (1200 mm) each way.

2.2.3 Spreader bars shall be furnished with the reinforcing steel when reinforcing in both faces of walls is shown on the drawings and the concrete pour height in such walls exceeds 8 feet (2400 mm). Maximum spreader bar spacing shall be 4 feet (1200 mm) each way.

2.3 Specialty Items

Materials not specifically described, but required for complete and proper installation of reinforcing steel, shall be approved by the Engineer prior to use.

2.4 Drawing Requirements

2.4.1 All placement drawings shall have a clear area within the border in lower right corner for Purchaser's drawing number to be affixed by the Engineer.

2.4.2 Letters, figures and line work on reproducibles shall be clear and dense enough to reproduce legibly on prints. Background shall be free of blemishes which would show on reproduction.

2.4.3 Drawings and data shall be in sufficient detail to indicate the type, size, arrangement and weight of each component.

2.5 Fabrication

2.5.1 All reinforcing steel shall be shop fabricated in accordance with approved shop drawings.

2.5.2 All bars shall be bent cold.

2.5.3 Welding reinforcing steel will not be allowed.

2.5.4 Fabrication details and tolerances shall comply with requirements of ACI 315.

2.6 Quality Assurance

2.6.1 All material shall be subject to inspection by the Engineer. Materials not meeting the requirements of this Specification will be rejected. Reinforcing steel may be rejected at fabrication plant or at jobsite. The Contractor shall be responsible for all Purchaser's direct and indirect costs for removal and replacement of rejected reinforcing steel. Inspection may be waived by the Engineer but such waiver shall not be interpreted as releasing Contractor from responsibility for delivery of materials conforming to this Specification.

2.6.2 Each bundle shall be tagged with quantity, bar size, and piece mark in accordance with approved shop drawings. A complete shipping list shall be provided for each shipment. Failure of Contractor to comply with these requirements will result in rejection of the shipment.

3.0 EXECUTION

None

SALT RIVER PROJECT
STANDARD SPECIFICATION
FOR
CONCRETE
(SRP 03300)

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STANDARD SPECIFICATION FOR CONCRETE (SRP 03300)

1.0 GENERAL

1.1 Work Specified

This specification covers the furnishing of all plant, labor, materials and equipment necessary for mixing and delivering normal weight portland cement concrete ready for placement.

1.2 Work Performed by Purchaser

When construction work is performed by Purchaser, the term Contractor shall mean the concrete supplier.

1.3 Standard Units

When both English and SI (metric) units are stated, the English units are the standard. The SI units are approximations listed for information only.

1.4 Reference Standards

1.4.1 Reference to standards or specifications shall be interpreted to mean the latest revision unless noted otherwise.

1.4.2 The following abbreviations appear in this Specification:

ACI	American Concrete Institute
ARPA	Arizona Rock Products Association
ASTM	American Society for Testing and Materials
MAG	Maricopa Association of Governments
NRMCA	National Ready-Mixed Concrete Association
SRP	Salt River Project

1.4.3 The following standards shall be made a part of this Specification:

ACI 301	Specifications for Structural Concrete for Buildings
ACI 305R	Hot Weather Concreting
ACI 306.1	Standard Specification for Cold Weather Concreting
ACI 318/318M	Building Code Requirements for Reinforced Concrete
ASTM C31	Standard Practice for Making and Curing Test Specimens in the Field
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C42	Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C138	Standard Test Method for Unit Weight, Yield, and Air Contents (Gravimetric) of Concrete
ASTM C143	Standard Test Method for Slump of Hydraulic Cement Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C233	Standard Test Method for Air-Entraining Admixtures for Concrete
ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete

ASTM C311	Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland Cement Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C618	Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolan for use as a Mineral Admixture in Portland Cement Concrete
ASTM C1064	Standard Test Method for Temperature of Freshly Mixed Portland Cement Concrete
ASTM D512	Standard Test Methods for Chloride Ion in Water
ASTM D516	Standard Test Method for Sulfate Ion in Water

1.4.4 Exceptions to this specification must be approved in writing by the Engineer prior to beginning the affected work.

1.5 Submittals

1.5.1 Contractor shall submit the following items for each mix to be supplied:

a. Plant certification

b. Cement certification and mill test report

c. Fly ash certification

d. Fly ash replacement ratio

e. Source and gradation of fine and coarse aggregate

f. Admixture brand and certification

g. Source of water and certification

h. Mix design

i. Mix design performance/trial batch data

1.5.2 Concrete supplier shall use SRP Stock Code Numbers, but may assign mix design product codes in addition to SRP Stock Code Numbers specified in Table 1 (Page 10).

1.6 Quality Assurance

1.6.1 Each batch plant from which concrete supplier intends to provide concrete must have current NRMCA, ARPA or equivalent laboratory certification.

1.6.2 Concrete supplier shall provide documentation that an Arizona-registered professional engineer has reviewed mix design and other submittals prior to submitting to Purchaser for review and approval.

1.6.3 Concrete supplier shall provide access to batch plant for sampling/inspection of materials and equipment.

1.7 Storage and Handling

1.7.1 Materials shall be stored and handled in a manner that prevents deterioration, segregation, or intrusion of foreign matter.

1.7.2 Storage of aggregate on natural ground surface will be permitted if bottom six inches of pile is not used in batching.

2.0 PRODUCT

2.1 Cement

Cement shall be portland cement, Type II, low alkali, moderate heat of hydration, conforming to ASTM C150. Equivalent alkali content shall not exceed 0.6 percent, per Table 2, ASTM C150.

2.2 Aggregate

Coarse and fine aggregate shall conform to ASTM C33.

2.3 Water

Water for washing aggregate and for mixing concrete shall be potable or shall meet requirements of ASTM C94. If potable water is not used, concrete supplier shall have independent testing laboratory perform chemical analysis of water certifying suitability in accordance with ASTM D512 and ASTM D516.

2.4 Admixtures

2.4.1 Admixtures shall not be used or substituted without prior written approval of the Engineer.

2.4.2 Air-Entraining Admixtures

a. Air-entraining admixtures shall conform to ASTM C260.

b. Air-entraining admixtures shall be tested in accordance with ASTM C233.

c. Air content, unless specified otherwise, shall conform to ACI 318, Table 4.2.1, moderate exposure. Tolerance for air content as delivered shall be ± 1.5 percent.

2.4.3 Water-Reducing, Retarding, and Accelerating Admixtures

a. Water-reducing, retarding, and accelerating admixtures shall conform to ASTM C494.

b. Chloride admixtures shall not be used.

2.4.4 Superplasticizers

a. Superplasticizers shall conform to ASTM C494, Type F or G.

b. Superplasticizer may be added at batch plant or at jobsite.

2.5 Fly Ash

2.5.1 Fly ash shall be used in all mix designs, unless noted otherwise in Table 1.

2.5.2 Fly ash shall conform to ASTM C618, Class F.

2.5.3 Fly ash shall be compatible with cement and shall not react deleteriously with alkalis in cement. Concrete supplier shall have fly ash sampled and tested in accordance with ASTM C311.

2.5.4 Maximum 20 percent of weight of cement required for mix design may be replaced when using fly ash. Concrete supplier shall be responsible to determine replacement ratio for each pound of replaced cement to maintain specified compressive strength f'c.

2.6 Proportioning of Mix

2.6.1 Source, character or gradation of materials shall not be changed without prior written approval of the Engineer.

2.6.2 Mix shall be homogeneous, readily placeable and uniformly workable. Proportioning of ingredients shall produce consistency, durability, workability, specified compressive strength f'c, and other properties as required per reference standards in Section 1.4.

2.7 Measurement of Materials

Material shall be measured in accordance with ASTM C94.

2.8 Mixing

2.8.1 Mixing shall follow the procedures in accordance with ASTM C94.

2.8.2 Water, or cement and water, shall not be added at the jobsite unless concrete supplier has received prior written approval from the Engineer.

2.9 Delivery

2.9.1 Ready-mix concrete shall be produced and delivered in accordance with ASTM C94. Concrete that is outside the temperature range of 55°F (13 °C) to 90 °F (32 °C), or has attained its initial set upon arrival at jobsite, as determined by the Engineer, will be rejected at Contractor's cost. Engineer may waive these limitations if slump is such that concrete can be placed without addition of water. Concrete shall be discharged within 1-1/2 hours after initial mixing water has been added to cement and aggregate.

2.9.2 Concrete supplier shall be responsible to make corrections to bring mix to specified slump. Only one addition of water to bring mix to specified slump shall be allowed. Mix not meeting slump requirements will be rejected.

2.9.3 Batch out time of truck shall be machine-stamped on delivery ticket at concrete supplier's plant. A copy of delivery ticket having machine-stamped batch out time shall be given to the Engineer at time of delivery. Concrete deliveries without machine-stamped batch out time on delivery ticket shall be rejected.

2.9.4 Concrete shall be delivered within 30 minutes of requested delivery time. Time-lapse between successive deliveries shall not vary by more than 20 minutes from that requested. The Engineer may reject any batch not meeting these requirements.

2.10 Hot Weather Concreting

2.10.1 During conditions of high temperature, low relative humidity, or wind which might impair quality of concrete, setting time shall be delayed by using proper admixtures.

2.10.2 Hot weather concreting shall be in accordance with ACI 305R. The concrete temperature during discharge shall not exceed 90° F (32° C).

2.11 Cold Weather Concreting

Cold weather concreting shall be in accordance with ACI 306.1. Concrete temperature during discharge shall not be less than 55° F (13° C).

2.12 Direct and Indirect Costs

Direct and indirect costs incurred by Purchaser due to failure to meet requirements of this specification shall be paid by Contractor.

3.0 EXECUTION

3.1 Testing, Strength Compliance, and Acceptance of Concrete

3.1.1 Testing

a. Frequency for sampling concrete for strength compliance will be in accordance with ACI 318 or as specified by the Engineer.

b. Concrete samples will be taken directly from transit mix truck. Sampling and testing will be in accordance with the following standards:

ASTM C138	Unit Weight & Yield
ASTM C143	Slump
ASTM C172	Sampling
ASTM C231	Air
ASTM C1064	Temperature

c. Concrete strength specimens will be made in accordance with ASTM C31. Test specimens will be 4" (100 mm) diameter by 8" (200 mm) long cylinders.

d. Test cylinders will be tested in accordance with ASTM C39.

3.1.2 Testing specified in Section 3.1.1 will be performed by the Engineer at no cost to Contractor.

3.1.3 Compliance With Compressive Strength Provisions

Compressive strength will be considered satisfactory if test results meet following requirements:

a. 7-day average compressive strength, per strength test (average of two cylinders) equals or exceeds 70 percent specified compressive strength f'c.

b. 28-day average compressive strength of all sets of three consecutive strength tests equals or exceeds specified compressive strength f'c.

c. No individual strength test (average of two cylinders) falls more than 500 psi (3 Mpa) below specified compressive strength f'c when at least three strength tests are made.

d. When less than three strength tests are made, no individual cylinder strength falls below specified compressive strength f'c.

3.1.4 Failure to Meet Compliance Requirements

a. Failure to meet requirements of Section 3.1.3a indicates that potentially low-strength concrete has been delivered. Contractor will be notified of potential problem for remedial action.

b. Failure to meet requirements of Section 3.1.3b or Section 3.1.3c shall be basis for investigation of low-strength concrete per Section 3.1.5.

c. Failure to meet requirements of Section 3.1.3d will be basis for investigation of low-strength concrete per Section 3.1.5.

3.1.5 Investigation of Low-Strength Concrete

a. A set of three cores representing each strength test shall be taken.

b. Cores shall be taken within 72 hours of testing for 28-day compressive strength or as specified by the Engineer, in accordance with ASTM C42 and tested in accordance with ASTM C39.

c. Contractor shall be responsible for costs associated with investigation of low-strength concrete. However, Contractor's cost will be reimbursed if requirements of Section 3.1.6 have been satisfied.

3.1.6 Acceptance of Low-Strength Concrete

Concrete in an area represented by core tests will be considered acceptable if the average of three cores is minimum 85 percent specified compressive strength f'c and no single core is less than 75 percent specified compressive strength f'c.

3.1.7 Rejection of Low-Strength Concrete

Concrete failing to meet acceptance requirements of Section 3.1.6 will be rejected. Contractor shall be responsible for direct and indirect costs of removal and replacement of rejected concrete.

TABLE 1
CONCRETE MIXES

SRP Stock Code Number	Description	Specified Compressive Strength @ 28 Days f'c Psi (Mpa)	Coarse Aggregate Max. Size in. (mm) ASTM C33 Table 2	Slump Range in. (mm)	Maximum Water/ Cementitious Material Ratio (By Wt.)	Remarks
0000220	MAG C or Canal Bottom	2,000 (15)	1 (25) #57	3-5 (75-125)	N/A	
0000221	Slipform		1/2 (12.5) #7	3-4 (75-100)	N/A	Min. cement 423 lbs/yd^3 (250 Kg/m^3)
0000222	Masonry Grout		3/8 (9.5) #8	4-6 (100-150)	0.60	
0000230	MAG A or Normal	3,000 (20)	1 (25) #57	3-5 (75-125)	N/A	
0000231	Flowable			6-8 (150-200)	0.55	Use superplasticizer
0000232	C.I.P. Pipe 42 in. (1050 mm) & larger		3/4 (19) #67	2-3 (50-75)		
0000233	C.I.P. Pipe 36 in. (900 mm) & smaller		1/2 (12.5) #7	3-4 (75-100)		
	Cable Trench					
0000234	Shotcrete		3/8 (9.5) #8		0.47	75-85% Coarse aggregate passing 3/8 in. (9.5mm) sieve
0000235	Ditchmix			3-5 (75-125)	0.60	
0000240	MAG AA or Normal	4,000 (30)	1 (25) #57	3-5 (75-125)	N/A	
0000241	Normal with air				0.50	
0000242	Flowable			6-8 (150-200)		Use superplasticizer
0000243	Flowable with air					
0000244	Precast without flyash		1/2 (12.5) #7	3-5 (75-125)		
0000250	Normal	5,000 (35)	1 (25) #57	3-5 (75-125)	0.45	
0000251	Normal with air					
0000252	Flowable			6-8 (150-200)		Use superplasticizer
0000253	Flowable with air					
0000254	Normal without flyash			3-5 (75-125)		
0000255	Normal with small aggregate		1/2 (12.5) #7			
0000256	Normal with small aggregate & without flyash					

SALT RIVER PROJECT

GENERATION ENGINEERING

STANDARD SPECIFICATION FOR CONCRETE FORMWORK AND PLACEMENT (GE 03305)

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STANDARD SPECIFICATION
FOR
CONCRETE FORMWORK AND PLACEMENT
(GE 03305)

1.0 GENERAL

1.1 Work Specified

This Specification covers the furnishing of labor, equipment and materials needed to form, place, consolidate, finish and cure cast-in-place concrete.

1.2 Reference Standards

1.2.1 Reference to standards or specifications shall be interpreted to mean the latest revision unless noted otherwise.

1.2.2 The following abbreviations appear in this Specification:

ACI	American Concrete Institute
ASTM	American Society for Testing and Materials
CRSI	Concrete Reinforcing Steel Institute
SRP	Salt River Project

1.2.3 The following Standards shall be made a part of this Specification:

ACI 117	Standard Specification for Tolerances for Concrete Construction and Materials
ACI 302	Guide for Concrete Floor and Slab Construction
ACI 304R	Guide for Measuring, Mixing, Transporting, and Placing Concrete
ACI 304	Placing Concrete by Pumping Methods
ACI 305R	Hot Weather Concreting
ACI 306.1	Standard Specification for Cold Weather Concreting

ACI 308	Standard Practice for Curing Concrete
ACI 309R	Guide for Consolidation of Concrete
ACI 318/318M	Building Code Requirements for Reinforced Concrete
ACI 347R	Guide to Formwork for Concrete
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C920	Standard Specification for Elastomeric Joint Sealants
ASTM D1752	Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
CRSI	CRSI Recommended Practice for Placing Reinforcing Bars
SRP 03210	Salt River Project Standard Specification for Reinforcing Steel
SRP 03300	Salt River Project Standard Specification for Concrete
GE 07920	Generation Engineering Standard Specification for Caulking and Sealants

1.2.4 Exceptions to this specification must be approved in writing by the Engineer prior to beginning the affected work.

1.3 Submittals

Fabrication and placement drawings for reinforcing steel and embedded items, mix designs, and Manufacturer's Material Safety Data Sheets (MSDS) for chemicals shall be submitted to the Engineer for approval at least five working days prior to placement of concrete. Work shall not proceed until submittals have been approved by the Engineer.

2.0 PRODUCT

2.1 Materials

2.1.1 Concrete shall conform to SRP 03300.

2.1.2 Reinforcing steel shall conform to SRP 03210.

2.1.3 Waterstop shall be dumbbell shape extruded elastomeric polyvinyl chloride of type, width and thickness specified on Drawings.

2.1.4 Expansion joint filler material shall be preformed neoprene sponge rubber conforming to ASTM D1752, Type I.

2.1.5 Elastomeric sealants for expansion and control joints shall conform to GE 07920. Polyethylene foam backer rod shall be used for back-up of cold-applied elastomeric sealants.

2.1.6 Sealants in fuel or chemically active water containments shall be compatible with properties of stored material.

2.2 Curing Compound

Curing compound shall conform to ASTM C309. Type 1-D, Class A clear resin compound shall be used for interior applications. Type 1-D, Class A clear resin compound with fugitive dye or Type 2, Class A white-pigmented wax emulsion compound shall be used for exterior applications.

2.3 Form Lumber

Form lumber in contact with exposed concrete surfaces shall be new and shall conform to the following:

a. Structural Plywood, Class I or II. High-density overlay shall be used when highly smooth, grain-free concrete surface is required.

b. Dimension lumber, Douglas Fir or Larch, Number 2 grade, seasoned and surfaced all sides.

2.4 Metal Forms

A commercial metal forming system or combination metal and plywood forming system may be used provided it is straight, clean and assembled to manufacturer's instructions.

2.5 Other Accessories

2.5.1 Form accessories such as, but not limited to, styrofoam form liners or fiberglass may be used.

2.5.2 Form accessories or other embedded items which are to be partially or entirely embedded in concrete shall be of a commercially manufactured type.

2.5.3 Aluminum pipe which is to be embedded in concrete shall be completely taped with Polyken two-inch wide pipe wrap, spiral wrapped with 50% overlap.

2.5.4 Reinforcing bar supports shall conform to CRSI Class 3 (bright wire) for use in contact with formed surfaces that will not be exposed, and CRSI Class 1 (plastic tipped or coated) for use in contact with formed surfaces that will be exposed.

2.5.5 Concrete block or plastic reinforcing bar supports may also be used.

3.0 EXECUTION

3.1 Forming

3.1.1 Contractor shall be responsible for design and construction of forms, in accordance with ACI 347R. Forms shall have adequate strength to support weight of fresh concrete and added loads imposed by workers, wind and construction equipment.

3.1.2 Forms shall be designed, constructed, braced, and maintained so that finished concrete will be true to line and elevation, and will conform to dimensions and contours specified in Contract Documents. Forms shall be sufficiently tight to prevent leakage of mortar paste.

3.1.3 Reusable forms shall be maintained and kept in good condition as to accuracy of shape, strength, rigidity, watertightness, and smoothness of surface. Forms unsatisfactory to the Engineer shall not be used.

3.1.4 Three-quarter inch chamfer shall be provided in forms at exposed corners and edges of concrete. Horizontal edges of curved forms may be radiused with an edging tool.

3.1.5 Forms shall be treated with form-release agent which will not adhere to or discolor concrete. Form-release agent shall be cleaned from rebar and other embedded items prior to concrete placement.

3.1.6 Shear keys in construction joints shall be formed prior to concrete placement.

3.2 Reinforcing Steel Placement

3.2.1 Reinforcing steel shall be positioned on supports, spacers or hangers and secured in place with wire ties or clips. Welding of reinforcing steel and embedded items will not be permitted.

3.2.2 Reinforcing steel shown on Drawings is the minimum required. Additional bars may be added for working supports, at Contractor's expense, provided these do not interfere with concrete placement or violate concrete cover requirements.

3.2.3 Solid grout or concrete blocks or non-eroding chairs or bolsters shall be used to position bottom mat of slab reinforcing steel.

3.2.4 The following minimum concrete cover shall be provided for reinforcing steel, unless noted otherwise in Contract Documents:

a. Concrete cast against and permanently exposed to earth: 3 inches

b. Concrete exposed to earth or weather:

#6 through #18 bars	2 inches
#5 bar, W31 or D31 wire, and smaller	1-1/2 inches

c. Concrete not exposed to weather nor in contact with earth:

Slabs, Walls, Joists:	
#11 bar and smaller	3/4 inch
#14 and #18 bars	1-1/2 inches
Beams, Columns:	
Primary Reinforcement, Ties, Stirrups, Spirals 1-1/2 inches	1-1/2 inches

3.2.5 Contact splices of reinforcing steel are preferred. Noncontact splices shall be spaced no farther apart transversely than 1/5 required lap splice length nor six inches clear distance.

3.3 Waterstop Installation

Waterstop shall be accurately located and properly braced to prevent movement during placement of concrete. Waterstop shall be clean and free of dirt, grease or concrete splatter. Splices shall be kept minimum, but when unavoidable, splices shall be made using teflon coated splicing iron to assure watertight joints. Prefabricated intersections shall be used where possible.

3.4 Concrete Placement

3.4.1 Contractor shall notify the Engineer at least 24 hours in advance of each proposed concrete placement. Installation of anchor bolts, reinforcing steel, embedded items, and forms shall be approved by the Engineer prior to concrete placement.

3.4.2 Unless specifically waived by the Engineer, concrete placement shall be done in the presence of the Engineer and shall not commence until the work has been authorized to proceed.

3.4.3 Concrete slabs on grade shall be placed on undisturbed soil or compacted subgrade. Frozen subgrade or subgrade that contains frozen materials will not be acceptable.

3.4.4 Forms and construction joint surfaces shall be clean and free of foreign materials. Sandblasting, water-blasting, or other methods specified in ACI 304R shall be used to achieve a clean interface at construction joints.

3.4.5 Subgrade shall be dampened and excess water removed prior to placement of concrete on grade. Wooden forms that will be in contact with concrete shall be thoroughly moistened unless wood has been properly treated with form release agent. When ambient temperature exceeds 90°F, fog nozzles shall be used to cool reinforcing steel and forms prior to concrete placement. When temperature of reinforcing steel is greater than 120°F, steel forms and reinforcing steel shall be sprayed with water just prior to placing concrete. During cold weather (mean daily temperature below 40°F), ice, snow and frost shall be removed from reinforcing steel and placement areas and temperature of all surfaces which will be in contact with fresh concrete shall be raised to minimum 40°F. Minimum concrete temperature of 50°F shall be maintained during and after placement.

3.4.6 Concrete from mixer shall be conveyed and deposited in place by methods which will prevent segregation or loss of materials. Where concrete trucks cannot access jobsite, concrete shall be pumped or conveyed, or energy dissipating chutes (elephant trunks) shall be used.

3.4.7 Equipment for chuting and pumping concrete shall be of a size and design that can provide a continuous flow of concrete at the delivery end. Aluminum conveying equipment shall not be used.

3.4.8 Mud, soil or foreign matter shall be prevented from entering concrete or forms during placement operations.

3.4.9 Concrete in walls shall be placed continuously in level layers not exceeding two feet thick, so that no cold joints form. Prior to concrete placement, Contractor shall make arrangements to assure uninterrupted delivery of concrete.

3.4.10 Beams and floor slabs shall be placed in one continuous operation unless noted otherwise.

3.4.11 Grade beams, pedestals, columns, and walls shall be placed monolithic, without joints, unless noted otherwise.

3.4.12 Construction joints for walls shall be placed at maximum ten feet height unless noted otherwise.

3.5 Consolidation

3.5.1 Concrete shall be compacted thoroughly into a dense homogeneous mass throughout entire depth of layer being consolidated.

3.5.2 Concrete for slabs, drilled piers, footings, and walls shall be consolidated by vibration, spading or rodding so that concrete is thoroughly worked around reinforcing steel, conduit, embedded items and into corners of forms. Manual consolidation methods for structural concrete placement shall not be used. Structural concrete slab surface shall not be hand tamped when concrete has four inch or greater slump.

3.5.3 Adequate number of vibrators of sufficient capacity shall be provided to keep up with maximum rate of concrete placement. An adequate supply of standby equipment, including a minimum of one vibrator, shall be kept at jobsite.

3.5.4 Internal vibrators shall be inserted vertically through the full depth of layer being placed, penetrating into the previous layer. Vibrator shall not be dragged, but inserted and withdrawn slowly with vibrator running continuously so that no void is left in concrete. Vibrator shall not be used to flow concrete from one location to another.

3.5.5 Concrete shall be vibrated until it is thoroughly consolidated and voids are filled as evidenced by level appearance of concrete at exposed surface and embedment of surface aggregate.

3.5.6 Form vibrators may be used only where sections are too thin or inaccessible for internal vibrators.

3.6 Finishing

3.6.1 Concrete for foundations shall be finished so that free water will not collect on surface.

3.6.2 Threads on anchor bolts and reinforcing steel dowels shall be protected from concrete buildup and/or splatter. Threads on anchor bolts shall be cleaned so that nuts turn freely without interference.

3.6.3 Exposed concrete surfaces for floor slabs shall have final finish conforming to ACI 302.1R unless noted otherwise.

3.6.4 Floor slabs which are to be covered with resilient flooring or coatings shall have smooth, steel trowel finish.

3.6.5 Slabs on which concrete pedestals are to be placed shall have rough, scored finish.

3.6.6 All other exposed concrete surfaces shall have formed or smooth, steel trowel finish, unless noted otherwise.

3.6.7 Control joints may be formed or sawcut. Sawcutting shall be done during initial setting of concrete, but in no case later than 12 hours after completion of concrete placement. Sawcut shall extend full design length. Wall and edge conflicts will preclude use of sawcutting.

3.6.8 Exposed concrete shall be free from irregularities, fins, rock pockets, or other imperfections. Defective concrete surfaces including misalignment and holes from form ties, shall be repaired. Defective surfaces shall be repaired prior to placement of backfill. Repairs to defective surfaces shall be made in following manner:

a. Surface shall be chipped back to minimum depth of one-half inch beyond imperfection. Edges shall be chipped perpendicular to surface, and the depression shall be pre-wetted and brushed with neat cement immediately before patching.

b. Mortar used for patching shall have same sand-cement ratio as original concrete with minimum water for placing. Color of existing concrete shall be matched at exposed surfaces.

c. Mortar to patch form-tie holes shall be applied with hammer and ramming rod within 24 hours of removal of wall forms and shall be struck flush.

d. Repairs shall be cured by moistening for three days or by using curing compound.

3.7 Curing

3.7.1 Concrete surfaces shall be cured by methods recommended in ACI 308, ACI 305R or ACI 306.1. The following are acceptable methods:

a. Using saturated burlap, soaker hoses, or sprinklers to keep concrete continuously wet for minimum seven days.

b. Covering concrete with polyethylene sheets, other than black film, applied in full contact with surfaces and sealed around edges.

c. Applying curing compound to unformed concrete surfaces within one hour after applying finish. Curing compound shall be applied to formed concrete within one hour after stripping forms. Where epoxy coating or staining of concrete is required, curing compound shall contain no waxes, paraffins or oils. Curing compound shall be applied by spraying with uniform coverage, at rate recommended by manufacturer.

3.7.2 Curing compound shall not be used on concrete surfaces which are to be in contact with grout; if curing compound is used, concrete surfaces shall be sandblasted prior to placing grout. Other means of surface cleaning, such as high pressure water blasting/water jetting, will also be acceptable.

3.7.3 If concrete shows tendency to set and dry too rapidly, form shrinkage cracks or form cold joints, concrete shall be kept moist using fog spray, wet burlap, cotton mats, or other method(s) acceptable to the Engineer.

3.7.4 Concrete placed during cold weather shall be protected with insulating blankets or heated enclosures. Fresh concrete shall not be exposed to carbon monoxide or carbon dioxide fumes from heaters or engines.

3.8 Form Removal

3.8.1 Forms shall not be relieved of load or removed without approval of the Engineer. Formwork for structural slabs shall not be removed until concrete has attained 70 percent specified minimum compressive design strength (f'c) or until

seven days, whichever occurs first. Formwork for structural walls shall remain in place for minimum 24 hours after concrete placement. Side forms for nonstructural members may be removed, at Contractor's risk, after concrete has set.

3.8.2 70 percent specified minimum compressive design strength (f'c) shall be required before backfilling against walls or application of loads.

3.9 Tolerances

Tolerances for concrete construction shall conform to ACI 117. Following tolerances are maximum, noncumulative, variations from dimensions shown on Contract Documents.

a. Plumbness in lines and surfaces of concrete walls, columns and piers:

In any 10 feet	1/4 inch
Maximum for total structure height	1/2 inch

b. Cross-sectional dimensions of columns, beams, walls and slab thickness:

Up to 12 inches	+ 3/8 inch/- 1/4 inch
More than 12 inches	+ 1/2 inch/- 3/8 inch

c. Footings, Horizontal Dimensions:

Formed Excavation	+ 2 inches/- 1/2 inch
Unformed Excavation	+ 3 inches

d. Minimum Concrete Cover:

Beams, Walls & Columns	- 0 inch

e. Finished Slab Surfaces:

Maximum depression in floors shall not exceed 3/16 inch below a 10 foot straightedge.

f. Anchor bolts shall be plumb and to the following tolerances:

Bolt projection	+1/4 inch/- 0 inch
Bolt location (without sleeves)	± 1/8 inch
Bolt location (with sleeves)	± 3/16 inch

Top of plastic anchor bolt sleeves shall be cut off flush with rough concrete just prior to grouting or setting equipment and base plates.

3.10 Quality Control

3.10.1 Reinforcing steel setting, embedded items, electrical grounding wires and form accessories will be inspected by the Engineer prior to concrete placement. Concrete shall not be placed until all items have been approved by

the Engineer. Contractor shall bear cost of delays in concrete placement caused by not providing sufficient inspection time or for making corrections to comply with requirements.

3.10.2 Concrete Testing

a. The Engineer will furnish test equipment and trained personnel to perform required field tests and to make required test cylinders.

b. The Engineer shall be provided access and adequate time for securing samples to determine whether materials are in accordance with Contract Documents.

c. The Engineer may select and pay an independent testing laboratory to perform required laboratory tests.

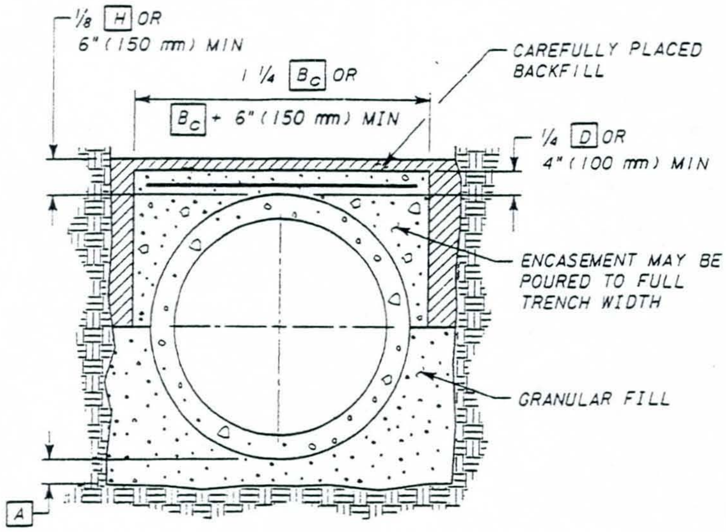
d. Testing, strength compliance, and acceptance of concrete will be in accordance with SRP 03300.

e. Contractor has right to observe all phases of concrete cylinder fabrication, curing and testing. Should Contractor observe deviations from the prescribed testing procedure that may be detrimental to concrete strength test results, Contractor shall immediately notify the Engineer.

f. The Engineer may require modifications of materials on the basis of field or laboratory tests. Contractor shall make such modifications at his own expense.

3.10.3 Contractor shall have sole responsibility for meeting concrete placement requirements. Inspection by the Engineer shall not relieve Contractor of responsibility for errors or deviations from specifications.

3.10.4 Concrete rejected by the Engineer for nonconformance shall be corrected to conform to specifications or removed and replaced. Contractor shall be responsible for direct and indirect costs of correction, removal and replacement of rejected concrete, including costs incurred by the Engineer.

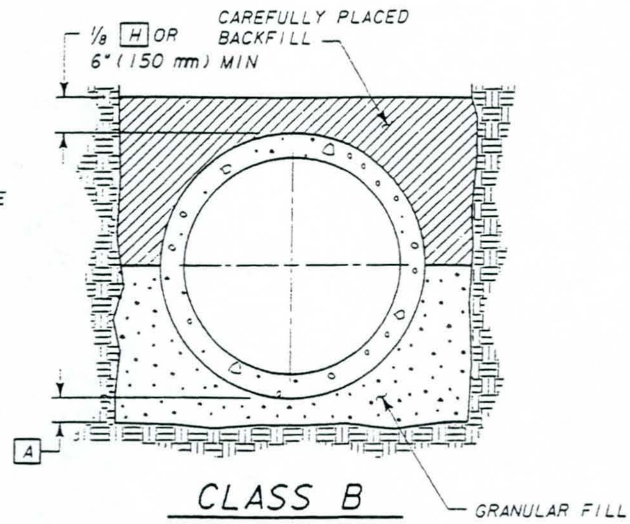


CLASS A

ARCH ENCASEMENT

LOAD FACTOR
- REINFORCED, A_s = 0.40% = 3.5
- REINFORCED, A_s = 1.00% = 4.8
- PLAIN=2.8

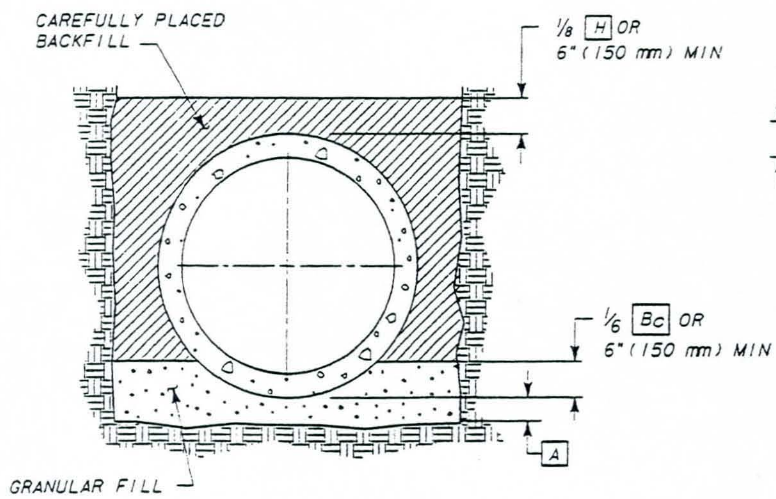
A_s = PERCENTAGE OF AREA OF TRANSVERSE STEEL IN THE CONCRETE ABOVE CROWN OF PIPE



CLASS B

FIRST- CLASS BEDDING

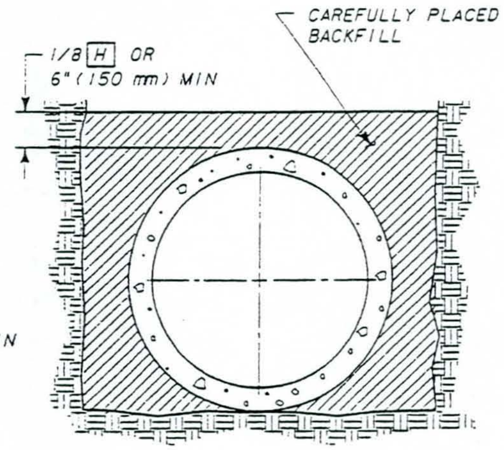
LOAD FACTOR 1.9



CLASS C

ORDINARY BEDDING

LOAD FACTOR 1.5



CLASS D

FLAT BOTTOM BEDDING

LOAD FACTOR 1.15

TABLE OF FILL DEPTHS BELOW PIPE

D DIAMETER	A MINIMUM
36" (900 mm) & SMALLER	4" (100 mm)
OVER 36" (900 mm)	1/12 OF Bc

H - DEPTH OF FILL ABOVE TOP OF PIPE

Bc - OUTSIDE DIMENSION OF PIPE

REFERENCES

PRECAST CONCRETE PIPE SPECIFICATION ______ WTR 02614

REVISIONS

REV NO	DATE	DFTR	CHKR	ENGR CHK	SUPV APPD	ISSUE AUTH
INITIAL ISSUE.						
0	2/89	AK	WJC	REL	AAR	TNS
ADDED METRIC DIMENSIONS						
1	4/97	MD	—	CWT	—	[illegible]

SALT RIVER PROJECT
WATER ENGINEERING STANDARDS

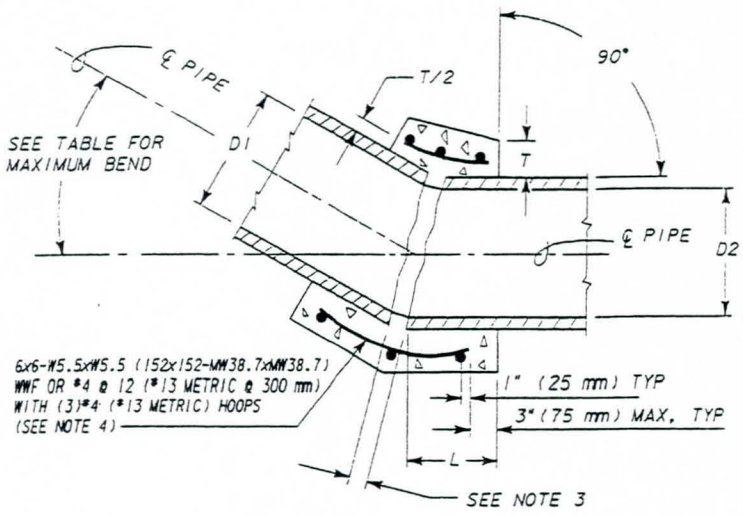
PIPELINE BEDDING/BACKFILL REQUIREMENTS

SCALE: NONE

P02:[130.236]30300001.WES

DWG SIZE 17 X 22

WES-30300-001



SECTION @ PIPE JOINT

TABLE			
D	L	T	MAXIMUM BEND
12" (300 mm)	12" (300 mm)	6" (150 mm)	22 ½°
24" (600 mm)	12" (300 mm)	6" (150 mm)	30°
36" (900 mm)	18" (450 mm)	8" (200 mm)	
48" (1200 mm)	18" (450 mm)	10" (250 mm)	
54" (1350 mm)	18" (450 mm)	10" (250 mm)	
60" (1500 mm)	21" (525 mm)	11" (275 mm)	
66" (1650 mm)	24" (600 mm)	11" (275 mm)	45° *
72" (1800 mm)	24" (600 mm)	11" (275 mm)	
78" (1950 mm)	24" (600 mm)	12" (300 mm)	
84" (2100 mm)	30" (750 mm)	12" (300 mm)	
90" (2250 mm)	30" (750 mm)	12" (300 mm)	
96" (2400 mm)	30" (750 mm)	12" (300 mm)	

* 30" (750 mm) PIPE OR LARGER

NOTES:

1. A CONCRETE COLLAR IS REQUIRED WHERE PIPES OF DIFFERENT DIAMETERS OR MATERIALS ARE JOINED, OR WHERE A CHANGE IN ALIGNMENT OR GRADE EXCEEDS THAT ALLOWED FOR AN ORDINARY JOINT.
2. D=D1 OR D2, WHICHEVER IS GREATER. FOR PIPE SIZES NOT LISTED USE NEXT LARGER SIZE.
3. PIPE ENDS SHALL BE TRIMMED SUCH THAT THE MAXIMUM DISTANCE BETWEEN PIPES AT ANY POINT IS 2" (50 mm).
4. THE DIAMETER OF THE WWF OR REBAR HOOPS SHALL BE THE OUTSIDE DIAMETER OF THE PIPE PLUS "T". LAP SHALL BE 12" (300 mm).
5. CONCRETE COLLARS SHALL BE FINISHED SMOOTH AND FLUSH WITH THE INSIDE SURFACE OF THE PIPE.
6. ALL CONCRETE SHALL BE A MINIMUM OF 3000 PSI (20 mPa) AT 28 DAYS AND SHALL BE CONSOLIDATED BY MECHANICAL VIBRATOR OR EQUIVALENT METHOD.
7. ALL WELDED WIRE FABRIC (WWF) SHALL BE ASTM A185 AND ALL REINFORCING STEEL BARS SHALL BE ASTM A615 GR 40 (ASTM A615M GR 400) MINIMUM.
8. ALL FORMS SHALL BE REMOVED PRIOR TO BACKFILLING.

REFERENCES

REVISIONS

REV NO	DATE	DFTR	CHKR	ENGR CHK	SUPV APPD	ISSUE AUTH
1	09/88	AK	WJC	TCTN		TNS
2	1/90	AK	WJC	LAB	REL	TNS
REVISED TABLE (ADDED ANGLES) & ADDED METRIC DIMENSIONS						
3	5/97	MAD	—	CWT	—	

SALT RIVER PROJECT
WATER ENGINEERING STANDARDS

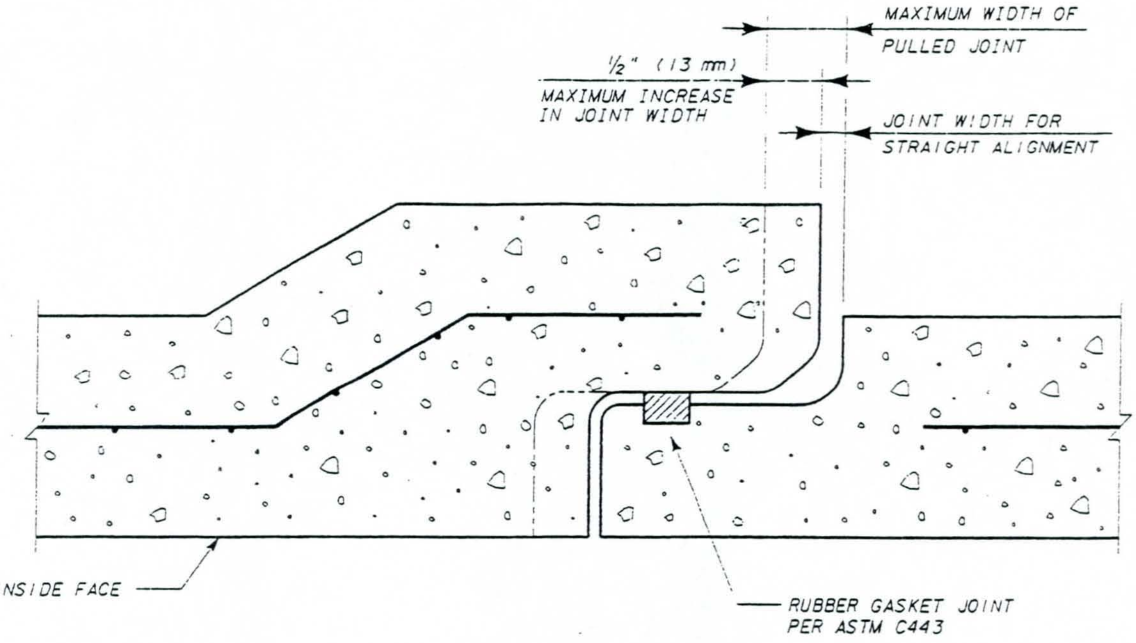
STANDARD CONCRETE PIPE COLLAR

SCALE: NONE

P02: [120.236]30300003.WES

DWG SIZE: 17 X 22

WES-30300-003



SECTION THRU PIPE JOINT

NOTES:

1. THIS DETAIL IS FOR A TYPICAL RUBBER GASKET BELL & SPIGOT ASSEMBLY. FLUSH BELL RUBBER GASKET JOINTS MUST MEET THE SAME SPECIFICATIONS.

REFERENCES

PRECAST CONCRETE PIPE SPECIFICATION ______ WTR 02614

REVISIONS

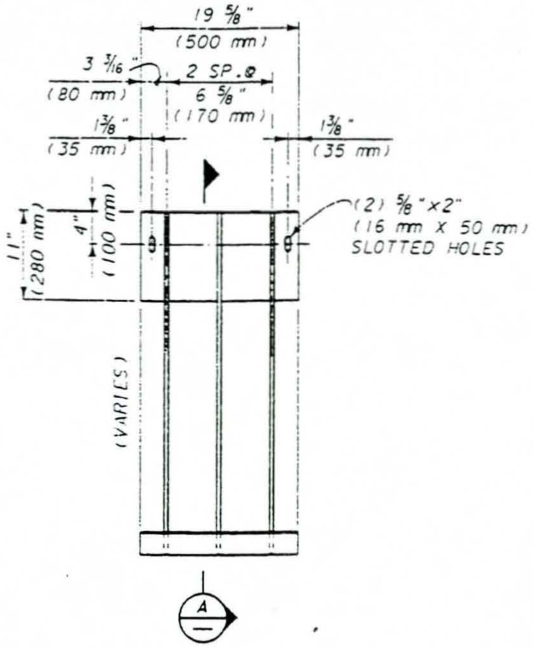
REV NO	DATE	DFTR	CHKR	ENGR CHK	SUPV APPD	ISSUE AUTH
INITIAL ISSUE						
0	2/89	AK	WJC	REL	AAR	TNS
REVISED TO ASTM C433 STANDARD						
1	5/97	NW	—	CWT	—	[illegible]

SALT RIVER PROJECT
WATER ENGINEERING STANDARDS

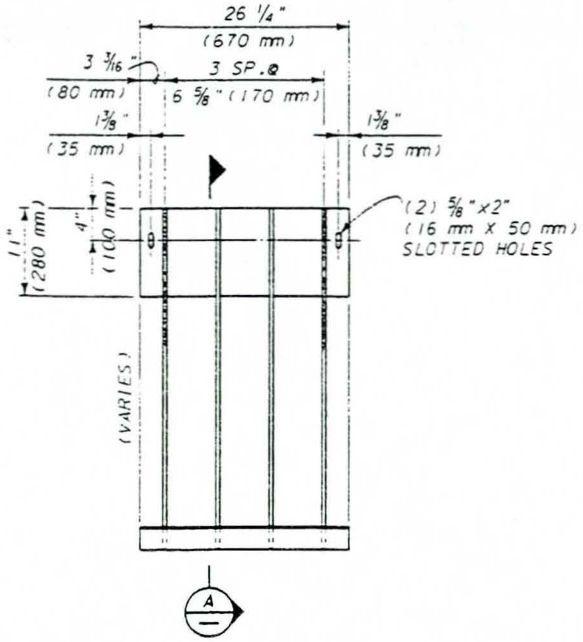
RUBBER GASKET JOINTS

SCALE: NONE | P02:[120.236]30300004.WFS

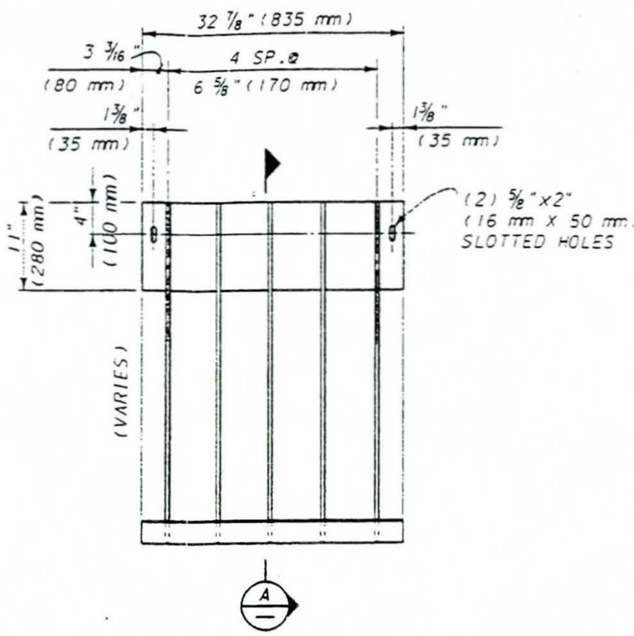
DWG SIZE 17 X 22 | WES-30300-004



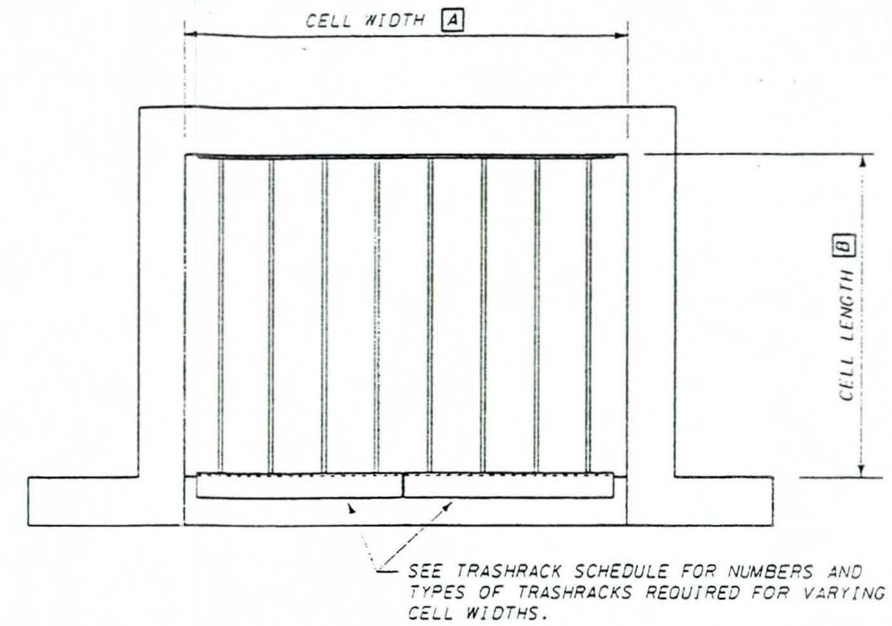
TRASHRACK-TYPE I



TRASHRACK-TYPE II



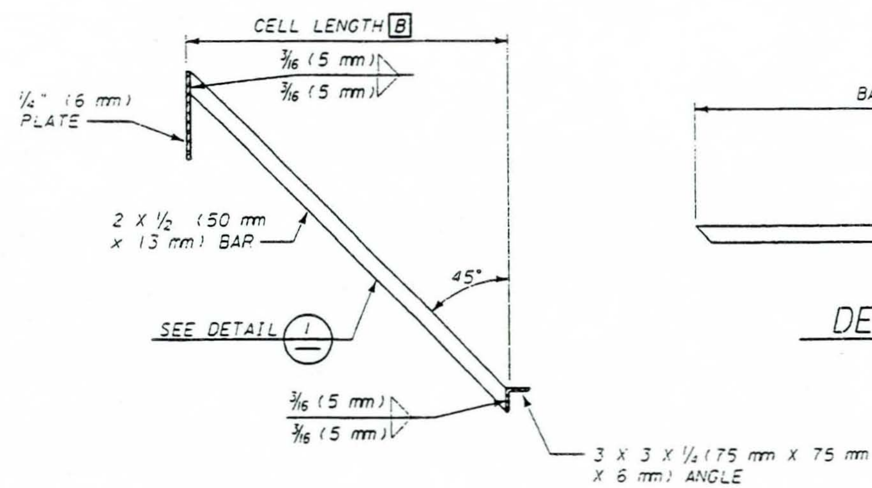
TRASHRACK-TYPE III



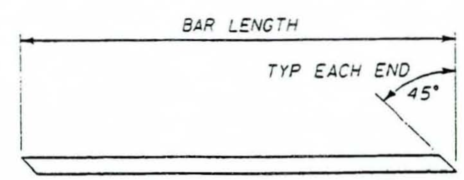
HEADWALL KEY PLAN

TRASHRACK SCHEDULE

HEADWALL CELL WIDTH A	NUMBER OF PANELS REQUIRED		
	TYPE I	TYPE II	TYPE III
32" (813 mm)	╳	1	╳
40" (1016 mm)	╳	╳	1
48" (1219 mm)	1	1	╳
56" (1422 mm)	╳	2	╳
64" (1626 mm)	╳	1	1
72" (1829 mm)	╳	╳	2
80" (2032 mm)	1	2	╳
88" (2235 mm)	╳	2	1
96" (2438 mm)	╳	1	2
108" (2743 mm)	2	╳	2
120" (3048 mm)	╳	2	2
132" (3353 mm)	╳	1	3
144" (3658 mm)	2	╳	3
156" (3962 mm)	1	╳	4
168" (4267 mm)	╳	╳	5
180" (4572 mm)	1	1	4
192" (4877 mm)	1	╳	5



SECTION A



DETAIL 1

TRASHRACK BAR LENGTH SCHEDULE

HEADWALL CELL LENGTH B	BAR LENGTH
16" (406 mm)	23 15/16" (608 mm)
24" (610 mm)	35 ¼" (895 mm)
32" (813 mm)	46 9/16" (1183 mm)
40" (1016 mm)	57 ⅞" (1470 mm)
48" (1219 mm)	69 3/16" (1757 mm)
56" (1422 mm)	80 ½" (2045 mm)

CONTRACTOR NOTE:

TRASHRACK(S) MUST BE MANUFACTURED PRIOR TO REQUESTING A IRRIGATION OUTAGE FOR THIS JOB.

TRASHRACKS AND ASSOCIATED HARDWARE CAN BE SUPPLIED BY SALT RIVER PROJECT UPON REQUEST. PLEASE CALL THE MECHANICAL CONSTRUCTION & MAINTENANCE DIVISION OF SRP FOR PRICE QUOTES: (602)236-4154.

NOTES:

1. UNLESS OTHERWISE SPECIFIED, TOLERANCE DIMENSIONS SHALL BE ± 1/32" (1 mm).
2. ALL STEEL SHALL BE ASTM A36 UNLESS OTHERWISE NOTED.
3. SANDBLAST TO NEAR WHITE AND ZINC METAL SPRAY OR HOT DIP GALVANIZE 5-7 MILS (0.127-0.178 mm) AFTER FABRICATION.

REFERENCES

REVISIONS

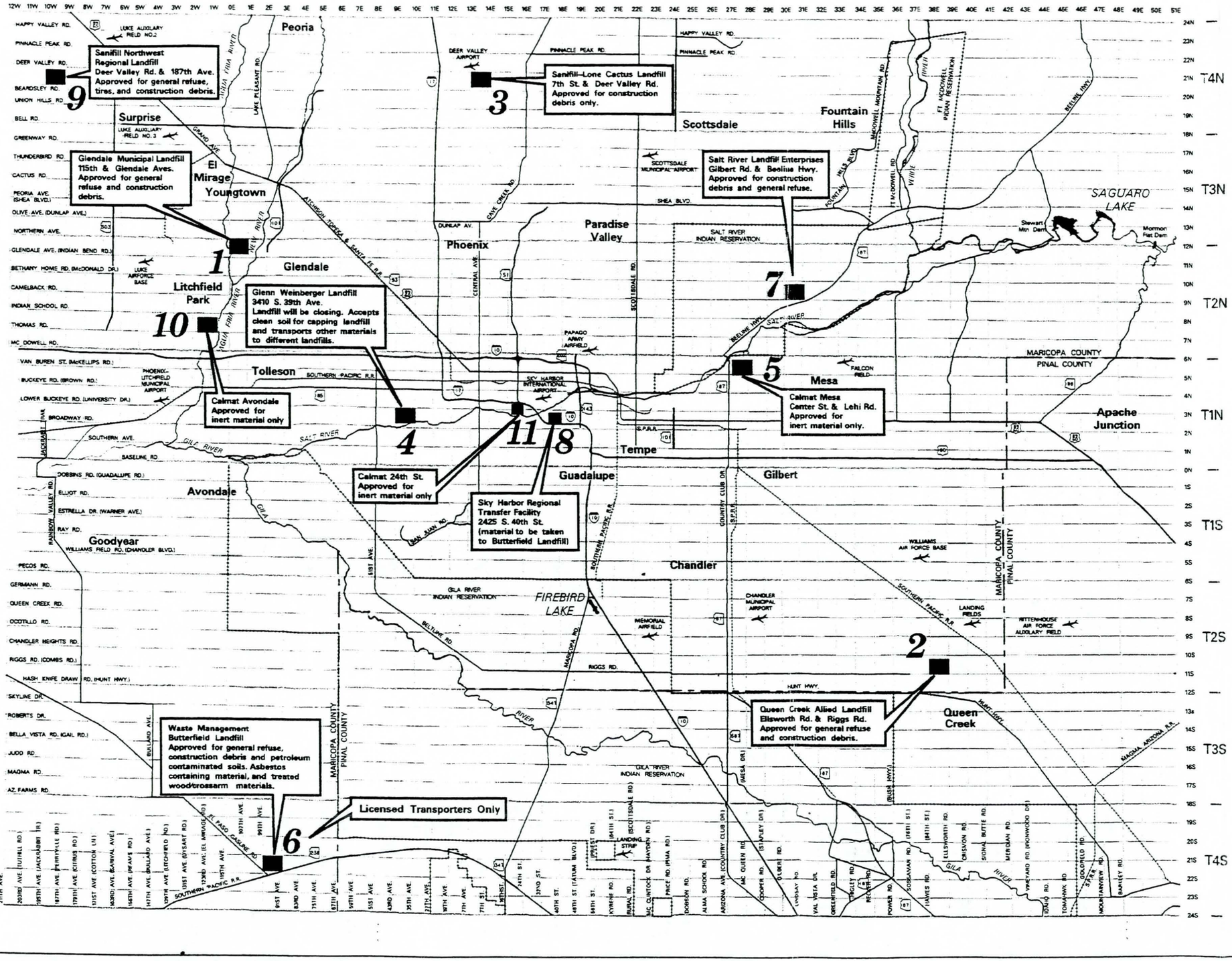
REV NO.	DFTR	DSGN	ENGR CHK	ISSUE AUTH	DATE
ADDED METRIC DIMENSIONS					
2	MOD	—	CWT	REL	5/23/97
REVISED CONTRACTOR NOTE					
1	MOD	CWT	MLK	REL	06/20/96

SALT RIVER PROJECT
WATER ENGINEERING STANDARD

45° TRASHRACK FOR PIPELINE HEADWALL

SCALE: NONE | P02:[120,236]30350200.WES
DWG SIZE: 22X34
WES-30350-200

SRP APPROVED LANDFILLS



LEGEND

County Boundary

Indian Reservation Boundary

Approved Landfill Sites

CONSTRUCTION DEBRIS includes solid waste from construction, repair, or remodeling of buildings or other structures (does not include asbestos-containing material or treated wood poles or crossarm material)

GENERAL REFUSE includes solid waste such as garbage, trash, rubbish, refuse, and household waste.

INERT MATERIAL includes uncontaminated concrete, asphalt pavement, brick, rock, gravel, sand and soil. (can include metal but only if used as reinforcement in concrete.)

No Liquids or Lighting Wastes to any Landfill.

Contact Environmental Compliance Division, x6330, x3457, x2811, or x8077, for disposal of any petroleum contaminated soil or asbestos containing material.

Contact Environmental, Health & Safety Audits at x-8118 for approval of any landfills not shown on map.

NORTH

SCALE IN MILES

0 3 6 12

REVISED: 5/15/97 CAR:[140,200]SRPALF.DGN

W C P M

8.03 BY-PASS FACILITIES

EXHIBIT 1

DESIGN AND CONSTRUCTION REQUIREMENTS

1. Requests for by-pass facilities shall be submitted to the SRP Project Leader for processing and must include: (1) a sketch showing the location, cross-section and profile of the proposed facility, and (2) all hydraulic calculations conforming to the following criteria. All documents must be stamped by an Arizona Registered Civil Engineer.

    a. Mannings "n" for graded dirt by-pass ditches shall be 0.030 and 0.022 for corrugated metal pipe.

    b. Maximum velocity shall be 3.0 FPS for open ditches.

    c. Side slopes shall be no steeper than 0.75:1 or flatter than 1.5:1.

    d. Minimum bottom width shall be 2.0 feet.

    e. Minimum berm height shall be 1.0 foot above calculated water surface. Top width of berm shall be 1.0 foot minimum with minimum slope of 1.25:1.

    f. Where the bypass ditch may be subjected to vehicular traffic, the minimum berm height on the traffic side shall be 1.0 foot above the adjacent ground or as specified in "e", whichever is higher.

    g. The capacity shall be as shown of SRP plans unless the customer obtains authorization from the Area Watermaster for an alternate design capacity (Exhibit 2).

2. Acquisition of all right-of-way required is the responsibility of the customer.

3. The following construction specifications are to be made part of the construction plans

    a. Construct ditch to the cross-section and grade or corrugated metal pipe to alignment and grade established and staked by the licensee's engineer.

Prepared By: Andy Overby

Reviewed By: _____

Approved By: _____

b. Ditch sides and bottom shall be smoothly cut and all loose material cleaned out.

c. Dirt berms shall be built as necessary to provide a minimum freeboard of one foot above the designed water surface elevation.

d. If the designed water surface elevations for a by-pass ditch are above the existing ground elevations along the proposed ditch alignment, then the existing surface must be cleaned of all vegetation and foreign matter, and scarified a minimum of six inches deep prior to the installation of the dirt berms (c).

e. Safety berms, a minimum 1.0 foot above adjacent ground shall be constructed where bypass ditch may be subjected to vehicular traffic.

f. Soil for berms shall be sufficiently wetted to bring it to within 2% of optimum moisture content.

g. All fill material, except that placed for constructing safety berms only shall be placed at plus or minus 2% of optimum moisture content in maximum 8 inch lifts and compacted to a minimum of 95% of maximum Proctor density in accordance with ASTM D698.

Prepared By: Andy Overby

Reviewed By: _____

Approved By: _____

4. Additional Requirements

a. The Licensee agrees to maintain the by-pass ditch in a safe and operable condition as determined by SRP. SRP reserves the right to perform any emergency maintenance needed at full cost to the Licensee.

b. Any cuts in existing permanent open ditch banks will be filled, compacted and concrete lined to SRP specifications at the conclusion of the by-pass ditch use, unless otherwise approved by SRP.

Prepared By: Andy Overby

Reviewed By:

Approved By:

W C P M

8.03 BY-PASS FACILITIES

EXHIBIT 2

ALTERNATE CAPACITY AUTHORIZATION FILE NO:_____

Project Name _____

Coordinate Location _____

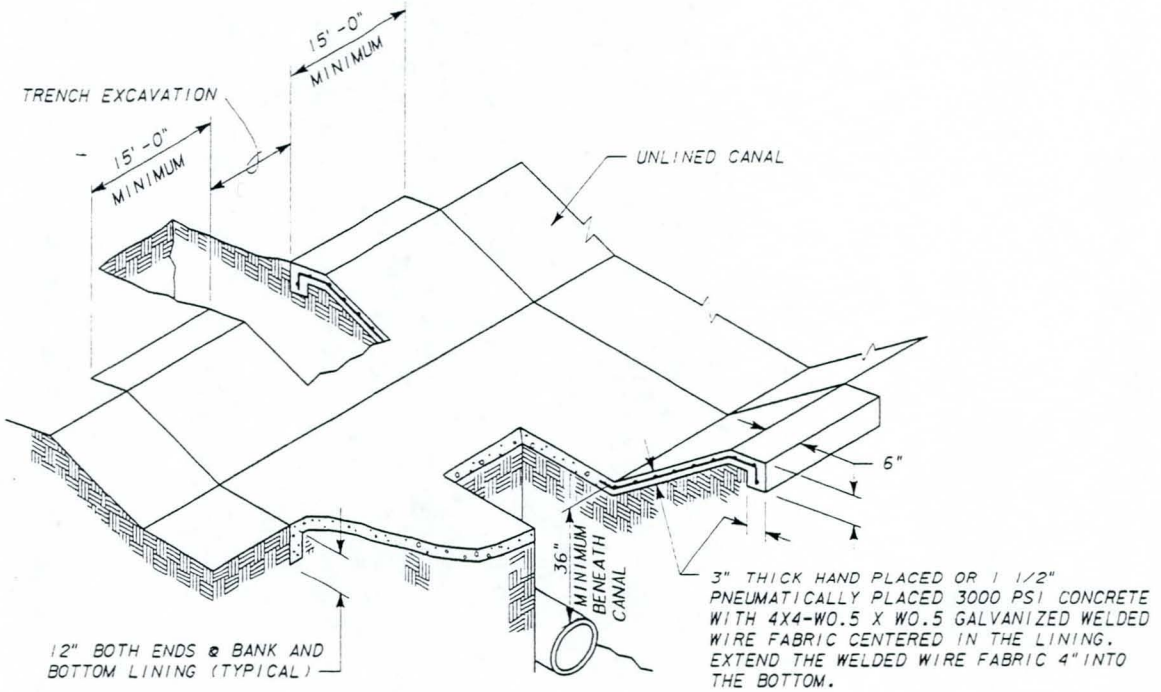
The alternate capacity of _____ is approved for the by-pass facility located from _____ to _____ for the period from _____ to _____.

_____ _____
Approved by SRP Area Watermaster (date)

Prepared By: Andy Overby

Reviewed By: _____

Approved By: _____



UNDER CROSSING UNLINED CANAL

NOTES

1. NO MANHOLES, RISERS, VALVES OR OTHER SIMILAR FACILITIES ARE TO BE PLACED IN ANY PORTION OF SRP RIGHT-OF-WAY WITHOUT SPECIFIC AUTHORIZATION IN AN SRP LICENSE.
2. TOP OF PIPE, CONDUIT, CABLE OR ENCASEMENT IN SRP RIGHT-OF-WAY IS TO BE A MINIMUM OF 36 INCHES BELOW GRADE OR ROAD SURFACE.
3. ALL AFFECTED PORTIONS OF SRP RIGHT-OF-WAY, INCLUDING ROAD SURFACES, SHALL BE RESTORED TO THEIR ORIGINAL CONDITION OR BETTER.
4. SRP FACILITIES DAMAGED OR DESTROYED SHALL BE REPAIRED OR REPLACED TO THE SATISFACTION OF THE SRP ENGINEER.
5. COMPLETELY REMOVE ALL DIRT AND DEBRIS AFTER COMPLETION OF CROSSING CONSTRUCTION.
6. REMOVE UNSUITABLE/DELETERIOUS MATERIAL TO A MINIMUM TWO FOOT DEPTH AND REPLACE WITH APPROVED BACKFILL.
7. BACKFILL SHALL BE CLEAN, COHESIVE NATIVE MATERIAL AS APPROVED BY THE SRP ENGINEER.
8. PLACE BACKFILL AT OPTIMUM MOISTURE CONTENT IN 6 INCH LIFTS AND COMPACT TO 90 PERCENT OF MAXIMUM PROCTOR DENSITY (ASTM D698 STANDARD PROCTOR).
9. ELEVATIONS AND SLOPES SHALL BE AS DETERMINED BY THE SRP ENGINEER.
10. APPLY WHITE PIGMENTED CURING COMPOUND WITHIN ONE HOUR AFTER PLACING/FINISHING CONCRETE.
11. THE UNLINED CANAL BANK SURFACES SHALL BE SHAPED TO A SLOPE DETERMINED BY THE SRP ENGINEER. THE SLOPE SPECIFIED WILL NOT BE STEEPER THAN 3/4 TO 1 AND WILL NOT NECESSARILY MATCH THE EXISTING BANK SLOPES. TRANSITION FROM THE EXISTING UNLINED BOTTOM AND BANKS TO THE NEW LINING AT A MAXIMUM 4 TO 1 SLOPE.

REFERENCES

PREPARATION OF SUBGRADE FOR CANAL LINING SPECIFICATION ___ CE 02.490
CANAL BANK REINFORCEMENT SPECIFICATION ___ CE 03.212
CONCRETE MATERIALS & CONCRETE SPECIFICATION ___ SRP 03300
PLACEMENT OF CANAL BOTTOM CONCRETE SPECIFICATION ___ CE 03.361
PLACEMENT OF CANAL BANK SHOTCRETE SPECIFICATION ___ CE 03.362

REVISIONS

REV NO.	DFTR	DSGN	ENGR CHK	ISSUE AUTH	DATE
INITIAL ISSUE					
0	MOD	CWT	CWT	REL	1/20/98
					/ /

SALT RIVER PROJECT
WATER ENGINEERING STANDARD

UNLINED CANAL UNDERCROSSING

SCALE: NOT TO SCALE | P02:[120.235]30100010.WES
DWG SIZE: 22X17

WES-30100-010

SSSSSSYTIMESSSSSS

STANDARD SPECIFICATION

CONCRETE
FOR
SLIPFORM CONCRETE LINING
(CE 03.110)

TABLE OF CONTENTS

PREPARED: R. Larchick REVIEWED: H. Mattingly APPROVED: A. Richards

PAGE # ~~All~~ REVISED: W. Kelly REVIEWED: APPROVED:

STANDARD SPECIFICATION

CONCRETE
FOR
SLIPFORM CONCRETE LINING
(CE 03.110)

1.0 GENERAL

1.1 Work Specified Herein

This specification covers the requirements for concrete materials to be used in slipform concrete lining. Salt River Project's Standard Specification for Concrete Materials and Concrete (CE 03.300) shall be considered a part of this specification, except where modified in this specification.

1.2 Reference Standards

Reference to standard specifications herein shall be interpreted to mean the latest revisions. The following abbreviations may appear in the specifications:

ASTM American Society for Testing and Materials
ACI American Concrete Institute

Permission for deviation from any requirements mentioned herein or from the aforesaid standards shall be obtained from Salt River Project in writing.

1.3 Tests

1.3.1 The Vendor shall provide such materials and testing equipment, or provide facilities for such, as may be necessary for procuring and testing representative samples, and shall provide access to the plant for inspection of materials and equipment used in the concrete. Tests are to be conducted when and as requested by the Engineer in charge.

1.3.2 Concrete cylinder tests will be taken by the Purchaser at the rate of one set for each day's pour up to 1/2 mile, and one additional set of cylinders for each additional 1/2 mile or portion thereof.

1.4 Inspection

1.4.1 All material shall be subject to inspection by the Purchaser or its authorized agent. When material furnished

by the Vendor fails to fulfill specification requirement, the Purchaser shall reject it and inform the Vendor. Concrete may be rejected at the Vendor's plant and/or at the Purchaser's premises. Inspection may be waived by the Purchaser, but shall not be interpreted as releasing the Vendor from his responsibilities for delivery of concrete as stated on the Purchase Order, which meets the requirements of this specification.

1.4.2 Rejected concrete shall be replaced by the Vendor at no extra cost to the Purchaser.

2.0 PRODUCT

2.1 Materials

2.1.1 Fine aggregate and coarse aggregate shall conform to ASTM C-33, except where modified herein, and be from a source approved by the Engineer.

2.1.2 Fine aggregate shall be hard, dense, durable, uncoated rock fragments that will pass a screen having 3/8 inch square openings. The fine aggregate shall be graded in accordance with ASTM C-33, Section 5, and shall be free from injurious amounts of silt, clay, organic matter, and other deleterious substances.

2.1.3 The coarse aggregate shall consist of hard, dense, durable, uncoated rock fragments; shall be free from injurious amounts of thin pieces, organic matter, or other deleterious substances. The aggregate shall be graded in accordance with ASTM C-33, Section 9, from 3/8 of an inch to a maximum size that will pass through a screen having 3/4 inch square openings.

2.1.4 Upon prior notification, the Vendor shall furnish the Salt River Project with a representative gradation of the sand and coarse aggregate to be used.

2.1.5 An air-entraining admixture shall be used, in accordance with the manufacturer's directions, to produce an air content of 5%, plus or minus 1 1/2%.

2.1.6 Fly ash, if used, shall conform to the requirements of ASTM C-618, Class F. Fly ash shall not exceed 15%, by weight, total cement plus fly ash content.

2.2 Composition

2.2.1 Concrete shall be composed of cement, sand, coarse aggregate, water, and admixtures as specified in these

specifications, all thoroughly mixed and brought to the proper consistency.

2.2.2 Concrete shall be proportioned in accordance with ASTM C-94, Section 5.4, Alternative No. 3. The concrete shall have a cement content of not less than 4 1/2 sacks (423 lbs) per cubic yard. Tests of the concrete will be made and the mix proportions shall be adjusted whenever deemed necessary by the Purchaser.

2.2.3 The amount of water used in the concrete shall be regulated as required to secure concrete of the proper consistency and to adjust for any variation in the moisture content of the aggregates to maintain a constant water-cement ratio. Additional water to compensate for stiffening of the concrete before placing will not be permitted.

2.2.4 The slump of the concrete shall not exceed four (4) inches, and shall not be less than one and one-half (1 1/2) inches.

2.2.5 The compressive strength of the concrete shall not be less than 2,000 pounds per square inch at 28 days.

3.0 EXECUTION

3.1 Batching and Mixing

3.1.1 A proposed mix design with certified test results shall be submitted with the Vendor's bid documents for review and acceptance by the Purchaser.

3.1.2 Vendor delivery tickets (receipts) must be stamped by a time clock, and include the number of yards delivered, design strength, ref. mix design, job location, and Purchaser P.O. number.

SPECIFICATIONS

FOR

EXCAVATION AND INSTALLATION OF CONCRETE LINING

A - GENERAL CONDITIONS

A - 1. Definition of Terms

The term "Association" as used in these specifications means the Salt River Valley Water Users' Association, or its duly authorized representative. The term "Licensee" as used in these specifications is the person, firm, or corporation, or his duly authorized representative to which an Association license was issued permitting certain work to be performed within Association facilities. The term "Engineer" as used in these specifications shall mean the Chief Engineer of the Association or his duly authorized representative.

A - 2. The Engineer

The Engineer shall have general supervision of the work as the agent of the Association.

A - 3. Plans & Specifications and Their Interpretation

The Engineer will provide the Licensee with plans and/or specifications with issuance of license. If additional plans and/or specifications are required, they shall be provided by the Engineer on request by the Licensee. The Engineer will provide the Licensee with such revised plans and/or specifications as may be required to show any authorized changes or extra work.

Any difference between plans and specifications and questions as to meaning of plans and specifications, shall be interpreted by the Engineer. The Licensee will not be allowed to take advantage of any errors or omissions in the plans and specifications. The Engineer will provide full instructions when errors or omissions are discovered.

A - 4. Decisions by Engineer

All work done under this contract shall be done to the satisfaction of the Engineer, who shall in all cases determine the amount, quality, acceptability and fitness of the work and materials. The Engineer shall decide all questions which may arise and shall determine all questions respecting the true construction or meaning of the plans and specifications. The Engineer's determination and decision thereon shall be final and conclusive.

A - 5. Climatic Conditions

The Engineer may order the Licensee to suspend any work that may be subject to damage by climatic conditions.

A - 6. Line and Grade

All lines and grades required shall be laid out by the Engineer. The Licensee shall notify the Engineer of this intention to start any portion of the work. The Licensee shall carefully preserve all stakes, reference points, etc. against destruction, and shall promptly notify the Engineer of any stakes which have been disturbed. In case of willful or careless destruction, the Licensee may be charged with the resulting expense and damage from such destruction.

A - 7. Inspection

All materials used and all work done by the Licensee shall be subject at all times to the inspection, test, and approval of the Engineer. The Licensee shall furnish such samples of materials for inspection and tests as may be requested by the Engineer, and shall furnish any information required concerning the nature or source of any materials or equipment which he proposes to use. The construction, fabrication, and manufacture of any equipment or materials specified herein may be inspected by the Engineer at the plant or factory and the Engineer shall have free access to make such inspection. Any materials, equipment or work which do not satisfactorily meet the specifications may be condemned by the Engineer by giving a written notice to the Licensee. All condemned materials, equipment, or work shall be promptly taken out and replaced at the Licensee's expense. Any defective material, equipment, or work may be rejected by the Engineer at any time prior to final acceptance by the Association.

A - 8. Tests

Tests shall be performed by the Engineer upon the materials and equipment as are specified, to determine if such equipment and materials meet the requirements of the specifications, the conditions of operation, and the guarantees of the Licensee. All equipment shall be subject to such factory tests as are specified herein. Certified evidence of such tests shall be furnished if requested by the Engineer. All tests shall be in accordance with the standards of the A.S.M.E., A.S.T.M., A.I.E.E., and other recognized standards.

A - 9. Changes

The Engineer shall have the right to make such changes in the location and quantities of work as may be deemed advisable. These changes may include modifications of the planned construction to suit conditions disclosed as work progresses, or changes in the relocations of equipment. No changes shall be authorized unless they are shown on revised plans or by written instructions of the Engineer.

B - EXCAVATION FOR CONCRETE LINING

B - 1. The Requirement

It is required that excavation be completed in accordance with these specifications, prior to installation of concrete lining, for various reaches of laterals and drainage ditches on the Salt River Project in Maricopa County, Arizona.

B - 2. Description of Work

The principal work to be performed under these specifications is excavation for placing concrete lining.

B - 3. Artificial Lighting

The Licensee shall provide adequate artificial lighting when work is in progress after daylight hours.

B - 4. Excavation for Lining

Sections for the lateral or drainage ditch shall be excavated to a sub-grade indicated by the grade stakes, and with the proper section for installation of a 2-inch concrete lining with 1, 2, or 3-foot bottom and 1-1/4:1 side slopes, or 1-1/2-inch concrete lining when using a 1:1 side slope. The surfaces against which lining is to be placed shall be finished accurately to the dimensions shown on drawings or approved by the Engineer and shall be compacted to a minimum density of 85%.

B - 5. Stakes

Association survey crews will provide one row of stakes set at 50-foot intervals, providing both elevation and alignment, and set on any practical offset requested by the Licensee.

The Licensee shall pay all costs for additional stakes requested for his convenience, or for replacement of stakes moved or destroyed as the result of his negligence or carelessness.

B - 6. Disposal of Materials

Except as otherwise specified, all suitable material removed in excavation or as much thereof as may be needed, shall be used in the construction of lateral embankments, roadway embankments, or for backfills. If there is an excess of material in the excavation, it shall be used to strengthen the embankment on either side of the lateral as directed.

C - CONCRETE LINING

C - 1. Description of Work

The principal work to be performed under these specifications is installing concrete lining in laterals or drainage facilities having a bottom width of 1, 2 or 3 feet.

C - 2. Composition

The Licensee shall furnish all materials for use in concrete, including cement, water, sand and coarse aggregate, and air-entraining agent. Concrete shall be mixed in proportions such that the 28-day strength is a minimum of 2000 p.s.i. and such that the cement content is not less than 4.5 sacks of cement per cubic yard of concrete. Cement for concrete shall be Type II, low alkali, in accordance with Federal Specification SS-C-192. The slump of the concrete shall not exceed 4 inches. The cement shall be free from lumps and damaged cement when used in concrete. The Licensee shall use an air-entraining agent in the concrete, which shall be one of those permitted under A.S.T.M. Designation C-175 and approved by USBR for use in air-entraining cement. The amount of air-entraining agent used shall be such as will effect the entrainment of from 4 to 6 percent of air, by volume, of the concrete at the job site. The water used in concrete, shall be free from objectionable quantities of silt, organic matter, alkali, salts and other impurities. The sand particles shall be hard, dense, durable uncoated rock fragments that will pass a screen having 1/4 inch square openings. The sand shall be well graded from fine to coarse, and shall be free from injurious amounts of dirt, organic matter and other deleterious substances. The course aggregate shall consist of hard, dense, durable uncoated rock fragments, and shall be free from injurious amounts of thin pieces, organic matter, or other deleterious substances. The course aggregate shall pass through a screen having 3/4 inch square openings, and shall

be reasonably well-graded from 3/16 inch to 3/4 inch. Screens having openings of other sizes and shapes may be used, if equivalent results, as determined by the Engineer are obtained. The Engineer reserves the right to test the sand and course aggregate and, if required, the Licensee shall submit, for preliminary tests and approval, representative samples of the sand and course aggregate proposed for use in the concrete work.

C - 3. Batching and Mixing

The sand and course aggregate shall be proportioned on the basis of integral sacks of cement, unless the cement is weighed, and the Licensee shall either provide, maintain, and operate the equipment as required to accurately determine and control the amount of each separate ingredient entering the concrete or purchase ready-mix or transit-mix concrete from a firm approved by the Engineer. Batching shall be such that combined inaccuracies in feeding and measuring the materials will not exceed 1-1/2% of water and weighed cement, and 2% for sand and each size of coarse aggregate.

The concrete shall be uniform in composition and consistency from batch to batch, except where changes in composition or consistency are required. The mixing time shall be at least 1-1/2 minutes. The Engineer reserves the right to increase the mixing time when the charging and mixing operations fail to produce a concrete batch throughout which the ingredients are uniformly distributed. Excessive overmixing, requiring the addition of water to preserve the required consistency, will not be permitted. Truck mixers and their operation shall be such that the concrete throughout the mixed batch and from batch to batch is uniform with respect to consistency and grading. Any concrete retained in truck

mixers so long as to require additional water to permit satisfactory placing shall be wasted. Standard 6 inch by 12 inch cylinders will be taken by the Association at the rate of two for each one-half mile or a portion thereof per day's pour. The cost of testing cylinders will be borne by the Licensee.

C - 4. Forms, Preparations for Placing, and Placing

Continuously moving forms shall be used to shape the concrete to the required lines. All surfaces of foundations upon or against which concrete is to be placed, shall be free from standing water, mud, debris, and organic material. The surfaces of absorptive foundations against which concrete is to be placed shall be moistened thoroughly so that moisture will not be drawn from the freshly placed concrete. The surfaces of construction joints shall be clean and damp when covered with fresh concrete or mortar. Cleaning shall consist of the removal of all laitance, loose or defective concrete, coatings and foreign material. The methods and equipment used for transporting concrete shall be such that concrete having the required composition and consistency will be placed without objectionable segregation or loss of slump. Exposed surfaces of concrete shall be free from rock pockets and brought to uniform surfaces with a reasonably smooth finish as directed.

The temperature of concrete when it is being placed shall not be more than 90°F, and not less than 40°F in moderate weather, or 50°F in weather during which the wet-bulb temperature drops to 32°F. Methods of heating or cooling concrete ingredients shall be subject to approval.

C - 5. Finishing

Allowable deviations from alignment, profile grades and dimensions shown on the drawings and specified in paragraph C-7, are defined as "Tolerances" and

are to be distinguished from finishes as described herein. Concrete surfaces will be tested by the Engineer, where necessary, to determine whether surface irregularities are within the limits hereinafter specified.

The finished surface shall be equivalent in evenness, smoothness, and freedom from rock pockets and surface voids to that obtainable on concrete by effective use of a long-handled steel trowel. Light surface pitting and light trowel marks will not be considered objectionable. Surface irregularities as described in this paragraph shall not exceed one-half of an inch.

C - 6. Grooves

Transverse grooves, as shown on Drawing C-8-9, shall be made along straight lines in the concrete lining at intervals of ten (10) feet. The grooves shall be made to the detail dimensions shown and shall be maintained to the required shape and dimensions until the concrete has hardened. The grooves are to be made while the concrete or mortar is still plastic.

C - 7. Tolerances

The intent of this paragraph is to establish tolerances that are consistent with modern construction practice, yet governed by the effect that permissable deviations will have on the operational and maintenance functions of the laterals and drainage ditches. The Licensee shall be responsible for maintaining the line, grade and dimensions within the tolerance limits so as to insure completed work within the tolerances specified herein. Work that exceeds the tolerance limits shall be remedied, or removed and replaced at the expense of and by the Licensee.

Tolerances for Slipform Lining

a.	Departure from established alignment	2 inches on tangents 4 inches on curves
b.	Departure from established profile	0.1 foot in 10 feet
c.	Reduction in thickness of lining	10% of specified thickness in no more than 15% of the area covered in any days work.
d.	Variation from specified width of section at any height	0.1 foot
e.	Variation from established height of lining	0.12 foot

C - 8. Curing

As soon as the lining has hardened sufficiently, it shall be cured by membrane curing. Membrane curing shall be by application of a white pigmented, sealing compound which shall be furnished by the Licensee, and shall conform to Bureau of Reclamation "Specifications for Sealing Compound for Curing Concrete, effective June 1, 1961." Sealing compound shall be applied to the concrete surfaces by spraying a single coat to provide a continuous, uniform, white membrane over the entire surface. Coverage shall not exceed 150 square feet per gallon and shall be decreased as necessary to obtain the required continuous membrane.

C - 9. Berms

Berm protection on new slipform lining to be placed as shown on Drawing C-8-9, attached.

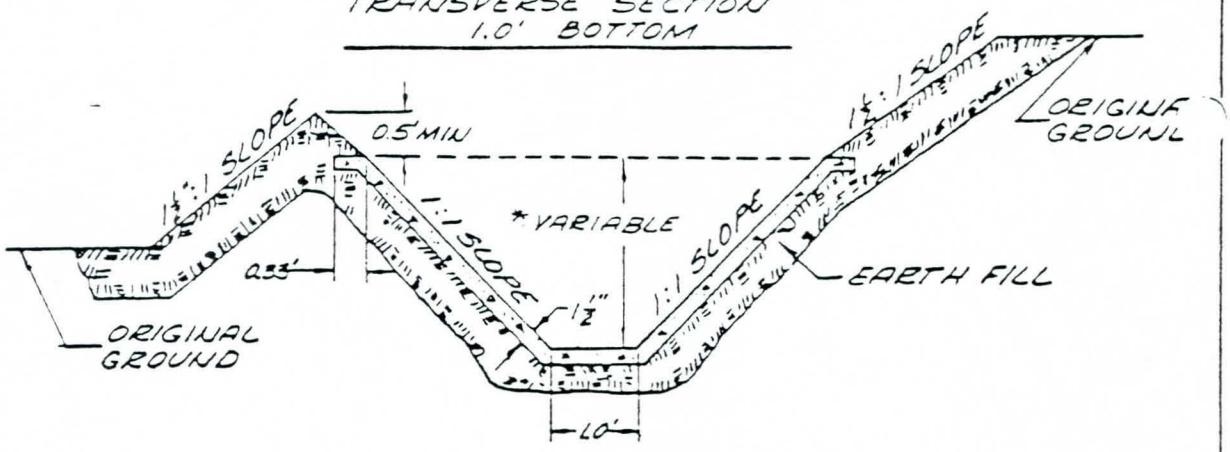
C - 10. Protection

The Licensee shall protect all lining against any damage until final acceptance by the Association.

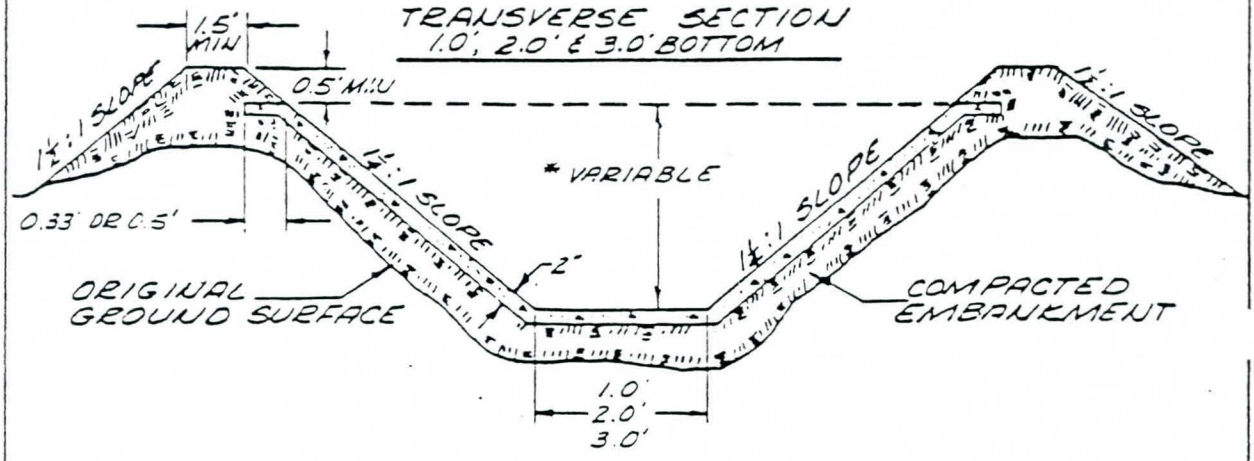
C - 11. Clean Up

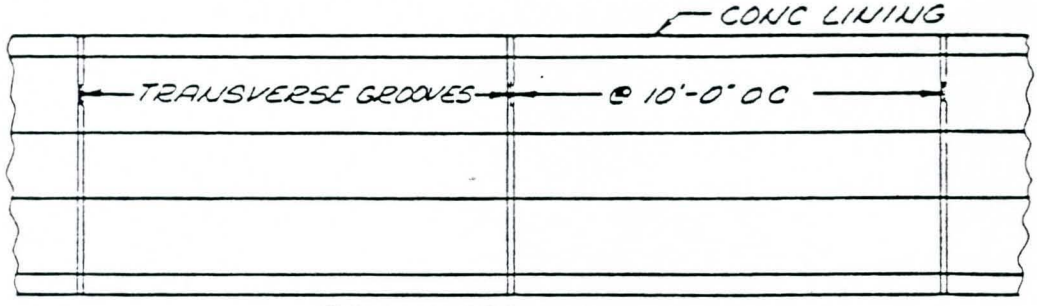
Upon completion of the work the Licensee shall remove from the vicinity of the work all plant, buildings, rubbish, unused materials, concrete forms, and other like materials, belonging to him or used under his direction during construction, and in the event of his failure to do so the same may be removed by the Association at the expense of the Licensee, and his surety or sureties shall be liable therefore.

TRANSVERSE SECTION 1.0' BOTTOM



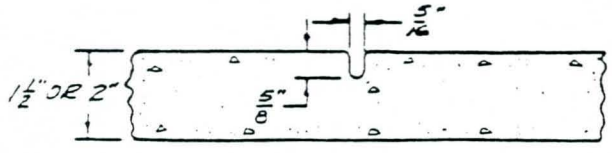
TRANSVERSE SECTION 1.0', 2.0' & 3.0' BOTTOM





TRANSVERSE GROOVES

* SEE SPECIFIC PLAN PROFILE FOR DIMENSIONS



TYPICAL LONGITUDINAL SECTION SHOWING TRANSVERSE GROOVES IN BOTTOM & SIDES

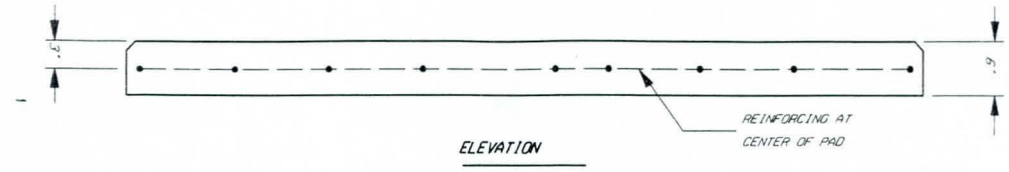
REV	DATE	DESCRIPTION OF CHANGE	DRAWN BY	CHK'D.
D	11-7-67	VARIABLE NOTE	DVR	
C	8-3-65	REDRAWN - 3'-BOT.	DVR	
B	4-27-62			

SALT RIVER VALLEY WATER USERS' ASS'N
PHOENIX, ARIZONA

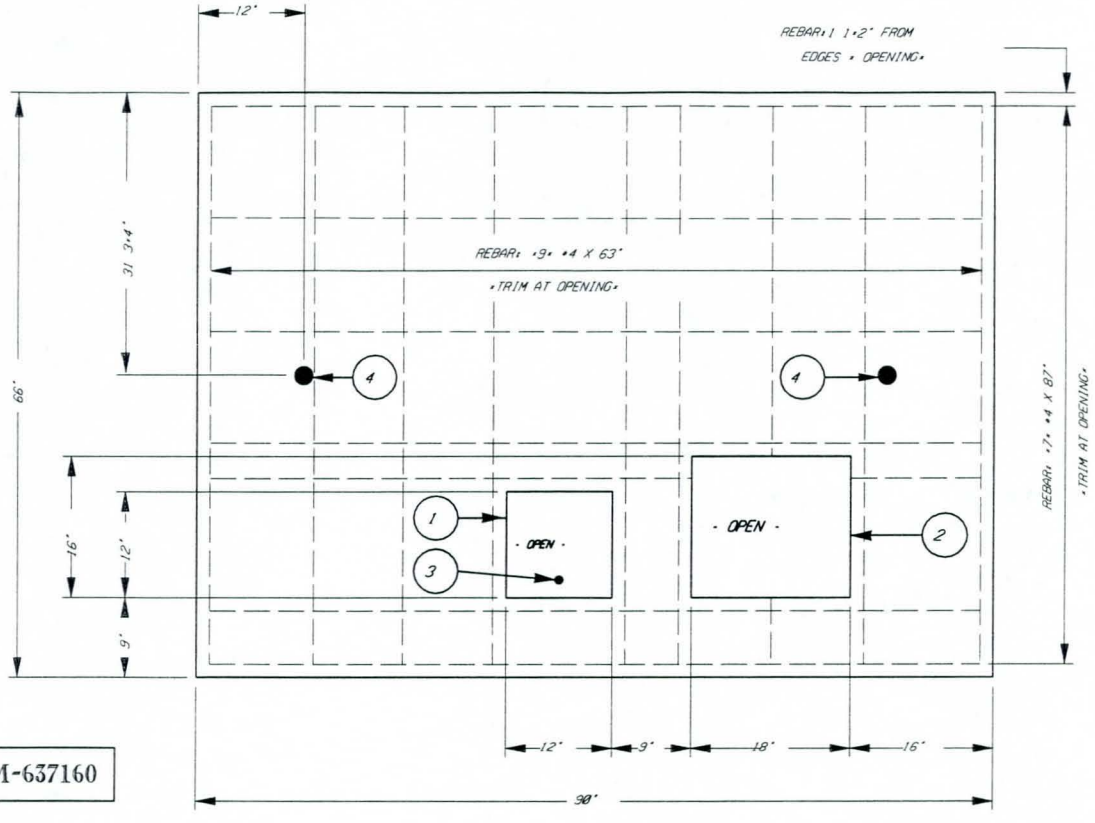
TYPICAL LATERAL SECTIONS NON-REINFORCED CONCRETE LINING

DESIGN	CHK'D. L. COONS
DRAWN R.A.S.	RECOM. D.E. LYCMASK
SCALE NONE	APPR. E.H. TEEPLES

OCT. 17, 1955 C-8-9



ELEVATION



SM-637160

PLAN VIEW

NOTE: WEIGHT - 2,870 LBS.

LEGEND

(1) HIGH VOLTAGE OPENING

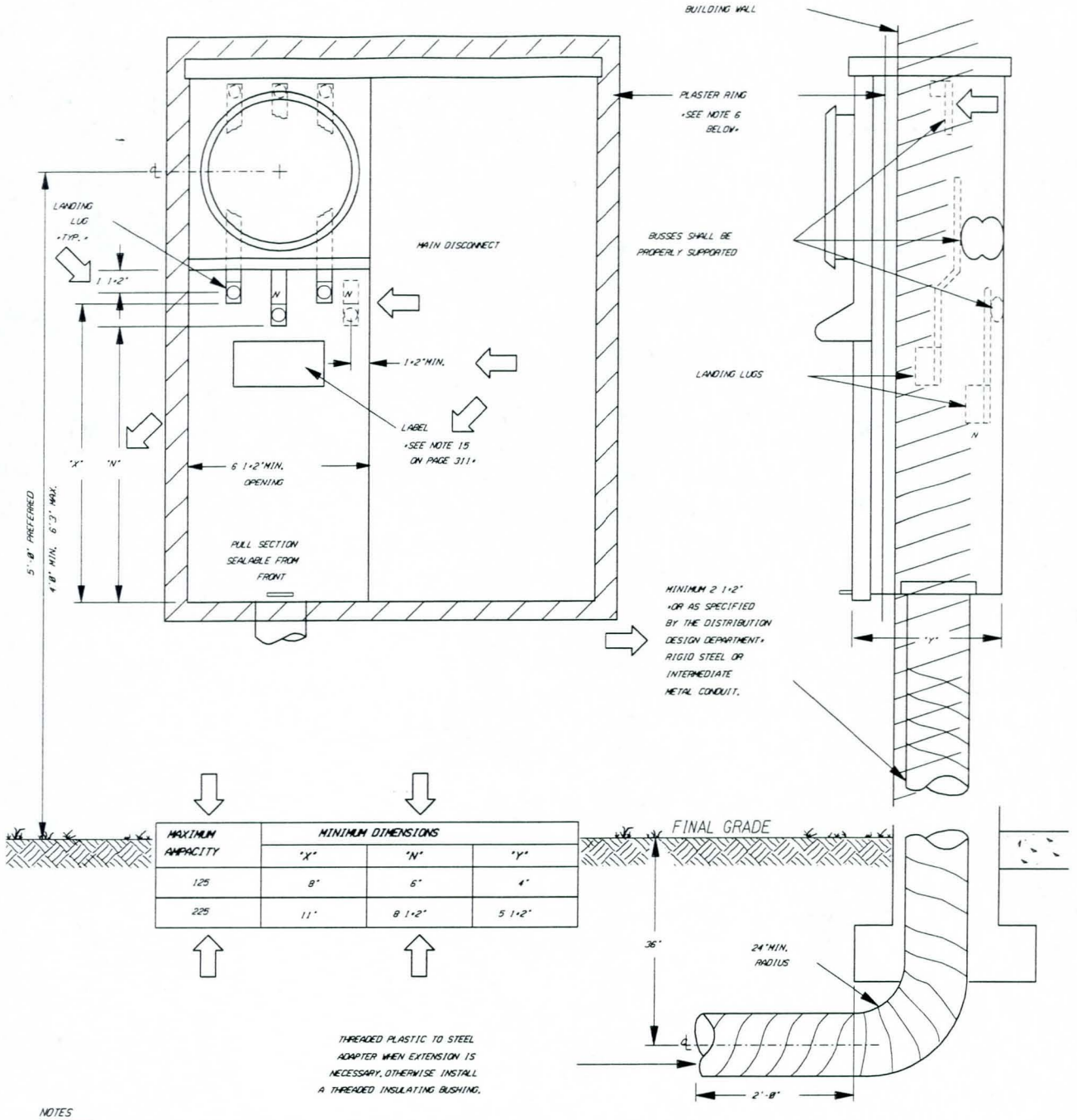
(2) LOW VOLTAGE OPENING

(3) 5/8" X 8' - 0" COPPER CLAD GROUND ROD

(4) PAD ANCHOR -2 PLACES FOR PRECAST PAD

DES.
DR.
APP.
DATE

SALT RIVER PROJECT



MAXIMUM AMPACITY	MINIMUM DIMENSIONS		
	"X"	"N"	"Y"
125	8"	6"	4"
225	11"	8 1•2"	5 1•2"

NOTES

1. METER LOCATION TO BE DETERMINED BY AUTHORIZED DISTRICT PERSONNEL OF THE DISTRIBUTION DESIGN DEPARTMENT. THERE MUST BE 18" HORIZONTAL CLEARANCE FROM SIDE OF ELECTRICAL EQUIPMENT TO NEAREST GAS FACILITY.
2. SEE PAGE 211 FOR METER SOCKET CLIP ARRANGEMENT.
3. SERVICE ENTRANCE TO BE INSTALLED IN ACCORDANCE WITH PAGE 310, 311, 404 OR 411.
4. RISER CONDUIT SHALL BE RIGID STEEL OR INTERMEDIATE METAL, INSTALLED PER NEC 230-44. METAL CONDUIT INSTALLED UNDERGROUND OR IN CONCRETE SHALL BE WRAPPED WITH AN APPROVED PVC TAPE AND MUST OVERLAP A MINIMUM OF 1•2 THE TAPE WIDTH TO MINIMUM OF 6" ABOVE GROUND LEVEL.
5. THE CUSTOMER SHALL PROVIDE DISTRICT APPROVED PLASTIC CONDUIT FROM THE END OF THE RISER CONDUIT TO THE LOCATION SPECIFIED BY THE DISTRICT.
6. ONLY FACTORY MANUFACTURED SERVICE ENTRANCE EQUIPMENT WITH PLASTER RING WILL BE APPROVED. NO FIELD ALTERATIONS OF SERVICE ENTRANCE EQUIPMENT WILL BE ACCEPTED.
7. SERVICE EQUIPMENT SHALL BE INSTALLED SO THAT THE FRONT PANEL •S• MAY BE REMOVED WITHOUT DAMAGING THE SERVICE EQUIPMENT OR THE BUILDING.

05MDE9 | REV. 3 | CHANGED MAXIMUM AMPS FROM 200 TO 225; REVISED DETAILS • CHART 12-30-93.

DES. ACF•RAL•MLD
DR. PCD•AF•BEB
APP.
DATE 4-15-86

SALT RIVER PROJECT ELECTRIC SERVICE SPECIFICATION

SERVICE ENTRANCE SECTION ALL-IN-ONE, SEMI-FLUSH UNDERGROUND ⇨ 225 AMPS MAXIMUM

SALT RIVER PROJECT

APPENDIX "B"

SALT RIVER PROJECT (SRP)
STANDARD SPECIFICATIONS

for

PHASE 3 - SANTAN COLLECTOR CHANNEL PROJECT
SOUTHEAST VALLEY REGIONAL DRAINAGE SYSTEM

CONTRACT NO. FCD 99-05
PCN 4900133

SECTION 701 - MAINTENANCE AND PROTECTION OF TRAFFIC: of the Standard Specifications is revised to read:

701-1 Description:

The work under this section shall consist of providing flagging services and pilot trucks, and furnishing, installing, maintaining, moving and removing barricades, warning signs, lights, signals, cones, and other traffic control devices to provide safe and efficient passage through and/or around the work and to protect workers in or adjacent to the work zone. The work shall be done in accordance with the requirements of Part VI of the Manual on Uniform Traffic Control Devices (MUTCD) and the associated Arizona Department of Transportation supplement. When referred to herein, these documents will be referred to as MUTCD and associated ADOT Supplement.

The requirements of the MUTCD and associated ADOT Supplement shall be considered as the minimum standards for the protection of workers and the traveling public.

When a traffic control plan is included in the project plans, this plan shall govern unless an alternate plan, acceptable to the Engineer, is submitted by the contractor. If no traffic control plan is provided or if the contractor desires to deviate from the provisions for maintaining traffic as described in this section, it shall submit to the Engineer for approval a proposed sequence of operations and a compatible method of maintaining traffic. The proposal shall be submitted early enough to allow at least two weeks for review and approval before use of the proposed traffic control plan.

The traffic control and safety plan of the contractor, along with the contractor's work schedule and actual operations, shall be such that no condition that is considered to be unsafe, in the opinion of the Engineer, shall exist. The traffic control plan shall assure that miscellaneous operations occurring throughout the work, as well as during the final stages, are adequately protected. As a result of effective planning and efficient scheduling of the type and quantity of work, the duration, degree, length, amount, size, etc., of any traffic restriction or lane closures shall be limited to that absolutely necessary to provide a safe condition for both traffic and construction personnel.

701-2 Materials (Equipment, Workers, Devices and Facilities):

701-2.01 General:

Except as specified herein, all equipment, procedures used by workmen, devices and facilities shall conform to the requirements of the MUTCD and associated ADOT Supplement.

701-2.02 Flashing Arrow Panels:

Flashing arrow panels shall conform to the requirements of Section 6F-3 of the MUTCD and associated ADOT Supplement with the following additions:

> Each arrow panel shall have its own independent power source. The power source shall be capable of supplying adequate continuous power for the sign operation over extended periods of time. Fuel capacity shall be such as to provide for at least 12 hours of continuous operation without refueling. Panels may be solar powered with adequate energy source to provide for at least 12 hours of continuous operation without refueling or recharging.

701-2.03 Temporary Concrete Barrier:

Temporary concrete barrier shall conform to the requirements of Subsections 910-2 and 910-3 of these specifications for precast sections.

701-2.04 Temporary Impact Attenuation Devices:

Temporary impact attenuation devices shall conform to the requirements of Subsections 702-2 and 702-3 of these specifications for the type of device shown on the project plans or as approved by the Engineer.

701-2.05 Temporary Pavement Markings:

(A) Temporary Pavement Markers and Chip Seal Pavement Markers:

Temporary Pavement Markers may be Temporary Reflective Markers, Permanent Reflective Markers (used as Temporary) or Non-reflective Markers, as required on the Project Plans or as approved by the Engineer.

Temporary Pavement Markers shall be in conformance with Standard Drawings 4-M-2.02, 4-M-2.05, and Subsections 706-2 and 706-3 of these specifications and shall be included on a list of pre-approved products maintained by the Department.

Chip Seal Pavement Markers shall conform to Standard Drawing 4-M-2.05. The Chip Seal marker body and cover shall be manufactured from a polyurethane material conforming to the following requirements:

	Requirement	ASTM Test Method
Specific Gravity, min.	1.19	D 792
Hardness, min.	80A	D 2240
Tensile Strength, min. psi.	4600	D 412
Ultimate Elongation, min. %	330	
Modulus @ 300 %, psi	1000	
Stiffness @ - 20 degrees F, min. psi 70 degrees F, min. psi	 17000 900	D 1053
Compression Set, 22 hrs. @ 70 °C	65	D 395
Taber Abrasion, CS17 wheel, Wt. loss, mg/1000 cycles	3	---

(B) Pavement Marking Paint:

Paint for temporary striping, arrows, symbols and legends shall be white or yellow and shall conform to the requirements for permanent striping paint as set forth in Section 708 of these specifications and as indicated on the project plans or as approved by the Engineer. Paint for temporary symbols and legends shall be white and shall meet the same requirements as temporary striping.

(C) Preformed Pavement Markings:

Preformed Pavement Markings shall be either Type II, Temporary-Removable, or Type III, Temporary-Nonremovable, as indicated on the project plans or as approved by the Engineer. Preformed Pavement Markings shall be in conformance with the requirements of Section 705 of these specifications and shall be included on a list of pre-approved products maintained by the Department.

Reflective tape shall be metalized polycarbonate microprism retroreflective material with acrylic backing or equal. The tape shall have a minimum reflectance equal to or greater than 1800 candle power per foot-candle per square foot at 1/10-degree observation and zero-degree entrance angles.

701-2.06 Temporary Sign Supports:

Temporary Sign Supports may be wood, steel or aluminum, at the option of the contractor and shall be approved by the Engineer prior to installation. Wood posts shall be Southern Pine, Douglas Fir or other soft wood. Wood posts need not be treated. Embedded posts shall meet the criteria established under NCHRP Report 350 for breakaway sign supports.

Angle braces will not be allowed.

701-2.07 Delineators:

Delineators shall be as shown on the plans and shall be in conformance with Standard Drawing 4-M-4.01 and Subsection 703-2 of these specifications.

701-2.08 Barricades:

Type I barricades having a minimum of 270 square inches of retroreflective area facing traffic, and otherwise conforming to Section 6F-5(f) of the MUTCD, may be used in lieu of Type II barricades in freeway or other high speed applications, unless specifically excepted in the project plans.

All sheeting for barricades shall be a minimum of Type II sheeting, conforming to AASHTO M 268.

701-3 Construction Requirements:

701-3.01 General:

The contractor shall provide for the adequate protection of all vehicular and pedestrian traffic and workers through any portion of the work where construction operations interfere with, obstruct, or create a hazard to the movement of traffic.

At the Pre-construction Conference, the contractor shall provide the Engineer with the name of the contractor's employee who is responsible for implementing, monitoring, and altering, as necessary, the traffic control plan. The Engineer will then advise the local law enforcement agency having jurisdiction, of the names of the contractor's representative and a representative of the Department who will act in a similar capacity. The contractor's designee shall be available at any time to respond to calls involving damage or displacement to barricades, lights, signs and other devices resulting from vandalism, traffic accident or other causes.

If, at any time, the Engineer determines that sufficient traffic control is not being provided or maintained, the Engineer may order suspension of the work until the proper level of traffic control is achieved. In cases of serious or willful disregard for safety of the public or workers by the contractor, the Engineer may proceed to place the traffic control measures in proper condition and deduct the cost thereof from monies due or becoming due the contractor.

All contractor's personnel, equipment, machinery, tools and supplies shall be kept clear of active traffic lanes, except as necessary for the prosecution of the work. The contractor shall promptly remove any material or debris that is spilled or tracked onto the traveled roadway as a result of the prosecution of the work at no additional cost to the Department. Materials, vehicles and parked equipment shall be kept as far from the traveled way as practical. The contractor shall not park equipment or store materials within 30 feet of the edge of a traveled way unless an adequate barrier is present. Equipment may be parked and materials may be stored in the right-of-way only at locations approved by the Engineer.

Any devices provided under this section which are lost, stolen, destroyed or are deemed unacceptable by the Engineer, while their use is required on the project, shall be replaced by the contractor and, except as hereinafter specified for temporary impact attenuators, at no additional cost to the Department. All such devices shall be replaced by the end of the work shift unless otherwise specified.

The Engineer shall be sole judge as to which signs may require embedded posts, portable stands or another type of support.

701-3.02 Maintenance and Protection of Traffic:

All traffic control devices necessary for the first stage of construction shall be properly placed and in operation before any construction is allowed to start. When work of a progressive nature is involved, such as resurfacing a roadway under traffic, the necessary devices shall be moved concurrently with the advancing operation. The use of temporary devices shall not be extended beyond the anticipated length of work of one shift production.

All traffic control devices shall be kept clean and free from dirt, mud, and roadway grime. Scratches, rips and tears in reflective sheeting shall be promptly corrected by the contractor, as approved by the Engineer.

Temporary pavement markings shall be applied in conjunction with changes in the traffic pattern. Placement of new pavement markings and removal of old markings shall be done immediately when the need for each arises. Temporary markings and devices shall be removed and new roadway marking shall be completed within 24 hours after any changes in traffic pattern unless otherwise directed by the Engineer. Obliteration of the temporary pavement markings shall be in conformance with Subsection 701-3.06 of these specifications.

Types of barricades, supports or devices not specifically described in the MUTCD and associated ADOT Supplement, but which would cause a hazard to traffic if used by the contractor, will not be permitted in the work area. The methods used by a contractor to control traffic when there are no details included in the contract, shall produce a safe condition for travel to the maximum extent possible at all times.

701-3.03 Temporary Concrete Barriers:

Barriers shall be installed in accordance with the details and at the locations shown on the project plans or where directed by the Engineer. Sections of temporary barrier shall be fastened together as shown on Standard Drawing 4-C-2.01 to form a continuous chain. After placement, each unit shall be moved

longitudinally to remove slack in the joints between the units. Where shown on the project plans or directed by the Engineer, the ends of the barrier run shall be flared back or fitted with an impact attenuation device. Attenuation devices shall be installed in accordance with the requirements of Subsection 701-3.04 of these specifications.

Barrier Markers shall be installed as shown on the project plans, or standard drawings.

Any unit which has been excessively damaged, as determined by the Engineer, shall not be used. Any unit damaged during or after installation shall be replaced with an undamaged unit by the close of that work shift, at no additional cost to the Department.

Temporary Glare Screen shall be installed on barriers at locations shown on plans, and on barriers used to separate opposing traffic on freeway construction contracts in urban areas. When barrier is used on freeway construction to separate traffic from construction operations, glare screen may be required when construction activity is continuous for at least 1,500 feet adjacent to the active traffic lanes.

Temporary Glare Screen shall be expanded metal or plastic attached to the barrier by a method satisfactory to the Engineer. Temporary Glare Screen shall have the following characteristics:

(1) When hit, the device shall not penetrate the passenger compartment of the errant vehicle or present a hazard to workers and other traffic.

(2) The device shall perform in a predictable manner when hit.

(3) The device shall effectively reduce glare from oncoming vehicle head lights.

(4) The device shall be resistant to vandalism and vehicle damage, and shall be easy to repair.

701-3.04 Temporary Impact Attenuation Devices:

Energy absorbing terminals conforming to the requirements of Subsection 702-2.02 of these specifications shall be installed at the locations and in accordance with the details shown on the project plans and the manufacturer's instructions.

Devices that are damaged by the traveling public shall be repaired within 36 hours by the contractor utilizing a replacement parts package, which shall be on the job site whenever this system is in use. The replacement parts package supplied by the contractor shall be the one recommended by the manufacturer of the attenuation device in use. Upon completion of the work for which energy absorbing terminals are required, all terminals and replacement parts packages shall be carefully removed and stockpiled by the contractor within the limits of the project at a location specified by the Engineer and shall become the property of the Department.

Sand barrel crash cushions conforming to the requirements of Subsection 702-2.03 of these specifications shall be placed in accordance with the details shown on the project plans.

Crash cushions damaged by the traveling public shall be removed and disposed of by the contractor. New devices shall be furnished and installed by the contractor. The contractor shall repair any damaged installations within 36 hours. Sand barrel crash cushions will remain the property of the contractor upon completion of temporary use unless permanently incorporated into the project.

Upon approval of the Engineer, undamaged attenuation devices, sand barrels or metal type, may be used for permanent installation in accordance with the requirements of Subsections 702-2 and 702-3 of these specifications.

701-3.05 Temporary Pavement Markings (Application and Removal):

(A) General:

Application of temporary pavement markings shall conform to the requirements of Subsection 708-3, of these specifications, the MUTCD and associated ADOT Supplement, and other provisions of these specifications as applicable. Placement of new markings shall be done immediately when the need for each arises, in conjunction with changes in the traffic pattern.

On intermediate lifts of overlay projects, pavement marking for temporary striping shall consist of four-inch wide by four-foot long strips of reflective material, either pavement marking tape or traffic paint, placed at 40-foot intervals. In situations involving severe degree of curvature, the Engineer may direct that the length and spacing be adjusted to two feet and 20 feet, respectively. These requirements apply to white lane lines separating traffic moving in the same direction and to yellow centerlines for two-lane, two-way roadways in areas where passing is permitted. Temporary pavement marking shall be placed on each subsequent pavement course.

Pavement Markings may be required by the Engineer in lieu of barricades for temporary delineation when the duration of the traffic control plan may exceed five days or when lane widths are less than 12 feet.

(B) Raised Pavement Markers:

The adhesive shall be applied uniformly to the cleaned pavement surface and the raised pavement marker shall be placed in the correct position on the adhesive area with the application of pressure as specified by the manufacturer.

(C) Preformed Pavement Markings:

Preformed pavement markings for temporary applications shall be Types II, Temporary-Removable, and Type III, Temporary-Nonremovable, and shall conform to the requirements of Subsection 705-3 of these specifications.

Only Type II, Preformed Pavement Markings, shall be used on surfaces or finish pavement courses where eventual removal will be required.

Type III, Preformed Pavement Markings, shall only be used where removal of markings is not required due to obliteration, abandonment or overlaying the pavement surface. Temporary pavement marking paint may also be used where removal of markings is not required unless otherwise shown on the project plans or in the special provisions.

701-3.06 Obliteration of Existing Pavement Markings:

Pavement marking obliteration shall be accomplished by the contractor as indicated on the plans or as directed by the Engineer.

Pavement markings shall be removed to the fullest extent possible from the pavement by any method that does not materially damage the surface color, or texture of the usable pavement. Abrasive blasting, using

air or water, is an acceptable method for removing pavement markings, however, other methods may be approved by the Engineer. Overpainting of markings with paint or asphalt will not be permitted.

Sand or other material deposited on the pavement as a result of removing pavement markings shall be removed as the work progresses. Accumulations of sand or other material, which might interfere with drainage or might constitute adverse safety conditions to traffic, shall be removed by the contractor.

Where blast cleaning is used for the removal of pavement markings or for removal of objectionable material, the residue, including dust, shall be removed immediately after contact between the sand and the surface being treated. Such removal shall be by a vacuum attachment operating concurrently with the blast cleaning operation, or by other methods approved by the Engineer. Blast cleaning shall not be used within 12 feet of a lane occupied by public traffic unless a suitable barrier separates traffic from the area being cleaned.

Obliteration or removal of raised pavement markers shall include removal of the marker and adhesive pad, or adhesive pad alone if the marker is missing.

Any damage to the pavement caused by pavement marking removal shall be repaired by methods acceptable to the Engineer. When asphalt slurry is used to repair damage to the pavement caused by pavement marking removal or the obliteration of the marks remaining after the markings have been removed, the asphalt slurry shall be placed parallel to the new direction of travel and shall be at least two feet in width.

If obliteration of lead-based striping is necessary, it shall be accomplished by a method that is in compliance with 29 CFR, Lead Exposure in Construction, Interim Final Rule. If lead exposure prevention measures are required, the contractor shall ensure that all contractor personnel, subcontractors, and ADOT personnel present on the job site are notified of the activity and advised of precautions necessary to avoid contamination by lead compounds. The contractor shall submit a lead exposure plan to the Engineer for review at least 48 hours prior to the start of any striping obliteration activities. Payment for additional work to remove lead-based striping shall be in accordance with Subsections 104.02 or 109.04.

701-3.07 Truck-Mounted Attenuator:

Trucks and truck-mounted attenuators shall be furnished by the contractor at the locations shown on the project plans and/or as directed by the Engineer.

Trucks shall weigh between 10,000 and 24,000 pounds. Trucks shall be furnished with shoulder and lap restraint safety belts for both driver and passenger seats. These trucks shall be equipped with truck-mounted impact attenuators. All truck-mounted attenuators shall meet NCHRP 230 requirements. The attenuators shall consist of three basic components:

(1) A back-up support structure for attaching the back-up to the truck;

(2) A back-up; and

(3) A crushable cartridge containing an energy absorbing material.

The dimensions of the attenuator shall be approximately seven feet long, two feet high and eight feet wide, and the total weight of the attenuator shall be approximately 1,000 pounds.

Attenuators shall have rear-mounted black and high-intensity yellow chevron stripes and a standard trailer lighting system, including brake lights, turn signals, ICC-bar lights, and two yellow rotating beacons mounted on opposite rear corners of the truck approximately 4-1/2 feet from ground level. When the attenuator is in position, roadway clearance shall be between 10 and 12 inches. The attenuator shall be designed to provide for quick and simple connection to the truck.

When impacted head-on at 45 miles per hour, the truck-mounted attenuator shall perform as follows:

(1) For impacting vehicles weighing from 1,800 to 4,500 pounds, the average over-all longitudinal deceleration shall be less than 12 g's; the two-foot flail space velocity shall be less than 40 feet per second; and the roll-ahead distance of the truck, with wheels locked and parking brake set, on clean, dry pavement, shall be less than 15 feet.

(2) For impacting vehicles weighing up to 1,800 pounds, the average over-all longitudinal deceleration shall be less than 15 g's; the two-foot flail space velocity shall be less than 40 feet per second; and the roll-ahead distance of the truck, with wheels locked and parking brake set, on clean, dry pavement, shall be less than 10 feet.

It shall be the contractor's responsibility to keep the attenuator bright and clean for maximum visibility.

The contractor shall cease operations when a truck-mounted attenuator is damaged. The contractor shall not resume operations until the attenuator has been repaired or replaced, unless authorized by the Engineer.

701-3.08 Changeable Message Board:

Changeable message boards shall be furnished and maintained by the contractor at the locations shown on the plans and as specified by the Engineer. The operations and messages programmed into the board controller shall be as directed by the Engineer. The changeable message board shall be a complete and operational portable unit which shall consist of a wheeled trailer with an adjustable, changeable message board, board message controller and self-contained power supply.

The power supply for the changeable message board shall be a fully independent self-contained trailer-mounted system. The power supply shall be either an internal combustion engine generator or batteries which are recharged from a solar panel mounted above the changeable message board.

The message characters shall be delineated by either electromagnetically actuated reflective dots or optically enhanced light emitting diode pixels (LED) operating under the control of a digital computer.

For changeable message boards using electromagnetically actuated reflective dots or for non solar-powered LED changeable message boards, the contractor shall submit, at the pre-construction conference, a Certificate of Compliance that the message board to be used on this project shall be as described herein.

The Department's Approved Products List (APL) provides a list of approved solar-powered LED changeable message boards which may be used in the performance of this work. For other solar-powered LED changeable message boards, the contractor shall submit, at the pre-construction conference, a Certificate of Compliance that the message board to be used shall be as described herein. The current APL is available from the Engineering Records Office, 1655 West Jackson, Phoenix, AZ 85007, Phone (602) 255-8216.

The character formation system and components shall conform to the following requirements:

(1) The changeable message board shall have a minimum of three separate lines with eight characters per line.

(2) The changeable message board matrix configuration shall be 35 dots or pixels per character in a five horizontal by seven vertical arrangement of the dots or pixels.

(3) The dot or pixel size shall be a 2.5-inch high by 1.625-inch wide rectangle (minimum), or equivalent area.

(4) Each character shall be 18 inches in height and 12 inches in width (minimum).

(5) The horizontal character separation shall be three inches or more.

(6) Dot color shall be fluorescent yellow upon activation and flat black when not activated. The LED pixels shall emit amber light upon activation and be dark when not activated.

(7) The line separation shall be five to 12 inches.

(8) Changeable message boards shall be protected with a clear lexan-type or equivalent shield that shall not interfere with or diminish the visibility of the sign message.

(9) The programmable message board shall be capable of displaying moving arrow patterns as one of the operator -selected programs.

(10) The programmable message board shall be capable of displaying a minimum of three lines of message copy, with a minimum of eight characters per line, in various alphanumeric combinations.

(11) The message board shall also be capable of displaying a minimum of four messages in sequence, with variable timing in a minimum of quarter-second increments.

(12) The message board shall be clearly visible and legible from a distance of 800 feet under both day and night conditions. The dot-matrix board shall have an internal illumination system that shall automatically activate under low light conditions to achieve the visibility requirements. The LED-pixel matrix board shall adjust light output (pulse width modulation) to achieve the visibility requirements.

(13) The power supply achieved from an internal combustion engine generator shall be capable of operating the changeable message board for 72 continuous hours without refueling.

(14) The power supply achieved from the battery and solar panel recharging system shall have sufficient capacity to operate the changeable message board for a minimum of 20 days without direct sunshine. The solar panel array shall be capable of recharging the batteries such that 2.5 to 3.5 hours of direct sunshine shall provide for a minimum of one 24-hour period of usage. Additionally, the battery recharging controller shall have an ambient temperature sensing device which will

automatically adjust the voltage supplied from the solar panels to the batteries. The sensing device shall ensure that the batteries are properly charged in hot or cold weather and shall provide the sign with sufficient power to operate the sign as specified.

When in operation, the changeable message board trailer shall be offset a minimum of eight feet from the nearest traffic lane. Where possible, a twenty-foot or more offset shall be used. When positioned on the highway, a minimum of ten 28-inch reflectorized traffic cones shall be set around the sign unit at a spacing of up to 10 feet.

When not in operation, the changeable message board shall be turned away from oncoming traffic.

The changeable message board trailer shall be placed on a level surface and be secured as recommended by the manufacturer and as directed by the Engineer. The contractor shall provide any necessary incidental grading and clearing work required to provide a level surface and clear area for the sign.

701-3.09 Chip Seal Pavement Marker:

Chip Seal Pavement Markers and covers shall be located and placed on the asphaltic concrete prior to any work being started on the chip seal coat, all in a manner as approved by the Engineer.

Immediately after application of the chip seal coat to the roadway pavement, the plastic covers shall be removed, exposing the reflective tape surfaces.

Chip Seal Pavement Markers that are damaged by the contractor shall be replaced by the contractor at its own expense.

701-3.10 Sign Sheetings:

All sign sheeting shall be Type II sign sheeting, conforming to AASHTO M 268, unless otherwise shown on the project plans.

701-3.11 Temporary Removal or Covering of Signs:

Where existing signs are not applicable during construction, they shall be removed or have the affected legends covered in place. Unless otherwise stated in the plans, or if a discrepancy exists, the Engineer will approve the method or methods to be used.

Removed signs shall be properly shipped, stored, and handled in accordance with the manufacturer's recommendations and in a manner approved by the Engineer to assure that such signs will continue to be suitable upon reinstallation.

Where removal of a sign or legend is not practical, the sign face may be covered with an opaque porous cloth or fiber material, folded over the sign edges and secured at the rear of the sign in such a manner that the sign shall not be damaged.

Tape, hardware, ropes, cables, etc., used to secure the covering material shall not touch, place any pressure on, or damage the sign face.

The covering shall be maintained by the contractor until the Engineer directs removal or the contract ends.

The contractor shall restore the signs and legends to their previous conditions, as directed by the Engineer. The contractor shall repair any damage to the signs or shall replace the damaged signs, as directed by the Engineer when damage is the result of the contractor's operations.

701-3.12 Temporary Sign Supports:

Temporary Sign Supports installed in the ground shall be removed at the completion of the project, the post holes filled and compacted, and the immediate area restored to match the surrounding area.

701-3.13 Flagging Services:

Flagging services shall consist of either civilian, local enforcement officers and their vehicles, or DPS (Department of Public Safety) officers and their vehicles. The Engineer will determine the type of flagger needed, and may adjust the relative number of hours of each type of flagger specified in the traffic control plan.

If available, only DPS officers shall be used on Interstate Highways and Urban Freeways. DPS officers shall also be used on other construction projects except when a local agency has jurisdiction, in which case a local law enforcement officer and vehicle shall be used.

The Engineer will make all the necessary arrangements to procure DPS flagging services. The contractor shall notify the Engineer a minimum of three working days prior to the start of any operation involving DPS officers for flagging.

Procurement of civilian flaggers, or local enforcement officers used for flaggers, will be the responsibility of the contractor.

For operations in which DPS officers are to be used for flagging, the contractor shall be responsible to notify the Engineer a minimum of six hours in advance of any operation which is to be canceled. Should such notification not be received as specified, and DPS officers are dispatched to provide flagging services for the canceled operation, a charge of $70.00 per DPS officer will be deducted from the monies due the contractor.

In the event that local enforcement officers or DPS officers are temporarily unable to provide flagging services, the contractor shall ensure that traffic control is maintained and all personnel are protected, either by providing civilian flaggers or through other means as approved by the Engineer. No adjustments to the contract will be allowed for any delays resulting from the unavailability of local enforcement officers or DPS officers.

A local enforcement officer shall not work more than 12 consecutive hours unless an emergency situation exists which, in the opinion of the Engineer, requires that the officer remain in the capacity of a flagger.

The contractor shall furnish verification to the Engineer that civilian flaggers have had training in safe flagging procedures.

701-4 Method of Measurement:

701-4.01 General:

The Department will reimburse the contractor for the work of maintaining and protecting traffic on the basis of unit bid prices for the various Elements of Work. No additional measurement for payment to the contractor will be made for any Elements of Work other than those listed in the bidding schedule.

Elements of Work specified under this subsection which are lost, stolen, destroyed, or are deemed unacceptable by the Engineer, while in use on a project shall be replaced by the contractor and, except as hereinafter specified for temporary impact attenuators, at no additional cost to the Department.

Elements of Work will be measured for payment as follows:

(A) Elements of Work (Complete-in-Place):

The Elements of Work listed herein under Subsection 701-5 will be measured for payment upon the satisfactory completion of the initial installation or obliteration. Except as hereinafter specified under Basis of Payment, no subsequent measurements will be made.

(B) Elements of Work (In-Use):

The elements of work listed herein under Subsection 701-6 will be measured for payment from the time at which the element is put into active use on the project and accepted by the Engineer until such time that the Engineer determines that the element is no longer required.

701-4.02 Relocation of Work Elements:

Following the initial installation of an Element of Work described above, the Engineer may direct the contractor to move the Element of Work from one location and reinstall it at another location. Except as specified elsewhere herein in Subsection 701-5.01 for Temporary Concrete Barrier (Installation and Removal) and Subsection 701-5.02 for Temporary Impact Attenuators (Installation and Removal), no measurement for payment will be made for relocation of Work Elements.

When work of a progressive nature is involved, such as resurfacing a road under traffic, or closing a lane or lanes for work to be accomplished during a shift, no measurement for payment will be made for setting up or relocating the necessary traffic control equipment, workers, devices, facilities, signs etc., that are moved concurrently with the advancing operation, or removal at the end of a shift.

701-4.03 Payment Exceptions:

(A) Deficient Elements of Work:

Any deficiencies in the traffic control plan, devices, equipment, services, or other elements of work listed herein under Subsection 701-4.01(B) will be brought to the attention of the contractor by the Engineer and all deficiencies shall be corrected before the close of that work shift, unless otherwise specified.

The contractor shall not be paid for those deficient Elements of Work listed herein under Subsection 701-4.01(B) unless restored to full usefulness prior to the close of the work shift in which notice of the defect is given, or within the time limits specified in Subsection 701-3. Measurement for payment will not resume until the beginning of the work shift following that work shift in which those elements are restored to usefulness.

(B) Substantial Deficiencies:

For each work day or work shift during which there are, as determined by the Engineer, substantial deficiencies in the contractor's traffic control plan, devices, and/or services, no payment will be made to the contractor for any Element of Work listed herein under Subsection 701-4.01(B).

Measurement for payment will not resume for any Element of Work until the beginning of the work day or work shift following that work day or work shift in which all corrective measures have been performed by the contractor and approved by the Engineer.

In cases of serious or willful disregard for the safety of the public or the contractor's employees by the contractor, the Engineer may place the traffic control elements in proper condition and deduct the cost thereof from monies due or becoming due the contractor.

(C) Nondiligent Prosecution of Work:

In the event that the Engineer determines that the contractor's construction operations are not resulting in the diligent prosecution of the work under contract, no payment will be made to the contractor for the Elements of Work listed herein under Subsection 701-4.01(B) until such time as the Engineer determines that the contractor is devoting appropriate efforts toward completion of the work. Payment will be suspended effective with the end of the work day or work shift in which written notice is issued to the contractor by the Engineer notifying the contractor of its failure to prosecute the work. Payment will resume with the beginning of the work day or work shift following that work day or work shift in which the Engineer determines that satisfactory efforts are being made by the contractor toward completion of the work. In any case, the contractor shall continue to be responsible for maintaining all barriers, attenuators, signs, lights and other traffic control devices in proper functioning condition at all times.

(D) Non-Working Periods:

Measurement for payment of the Elements of Work listed herein under Subsection 701-4.01(B) will begin on the day they are installed in place for traffic control and direction. When the elements are not needed for traffic control, they shall be removed or covered and will not be measured unless they are required to stay on site in anticipation of future use or emergency use as determined by the Engineer. Should devices be required on site for these purposes they will be measured and paid for by the unit prices. During non-working periods such as holidays and Sundays, the elements in place and in satisfactory condition will be measured for payment on the day following such downtime. During these non-working periods the contractor shall conduct a minimum of one check per day to verify that the elements are in place and in satisfactory condition.

No payment will be made to the contractor for the Elements of Work listed herein under Subsection 701-4.01(B) for non-working periods resulting from a suspension of work that, in the opinion of the Engineer, is due to the fault of the contractor. In any case, the contractor shall continue to be responsible for maintaining all barriers, attenuators, signs, lights and other traffic control devices in proper functioning condition at all times.

(E) Limitation of Measurement:

Elements of Work listed herein under Subsection 701-4.01(B) that are measured on a unit per day basis will be measured for payment for each 24-hour day. Measurement will be based on the maximum number of units of the specific element of work that are in simultaneous use during any given period regardless of the length of time that the elements are in use and regardless of the number of times the elements are relocated.

Measurement will be made after the initial installation and once weekly thereafter for items in continuous use and at any other times changes are made in the use of traffic control elements listed under Subsection 702-4.01(B). The contractor shall notify the Engineer when any changes are made in the use or location of traffic control elements.

(F) Expiration of Contract Time:

No reimbursement will be made to the contractor for the Elements of Work listed herein under Subsection 701-4.01(B) when they are required in association with construction work being performed after the expiration of the contract time and all approved extensions.

In any case, the contractor shall continue to be responsible for maintaining all barriers, attenuators, signs, lights and other traffic control devices in proper functioning condition at all times.

701-4.04 Measurement of Work Elements:

Measurement will be made as follows:

(A) Temporary Concrete Barrier will be measured by the linear foot along the center line of the uppermost surface upon its initial installation (Complete-in-Place). Barrier will be measured by linear feet for each 24-hour day for the "In-Use" condition.

(B) Temporary Impact Attenuators, such as Sand Barrels and Energy Absorbing Terminals, will be measured by the unit for each complete device upon its initial installation (Complete-in-Place). Temporary Impact Attenuaters will be measured by the day for each 24-hour day that a temporary impact attenuator is in place and functional for the "In-Use" condition.

(C) Truck-mounted attenuators including driver will be measured by the day for each 24-hour day that a truck-mounted attenuator and operator are used to protect the work site.

(D) Flashing Arrow Panels will be measured by the day for each 24-hour day that each panel is in place and operating.

(E) Pilot Vehicles, including Driver, will be measured by the hour for each approved hour of operation.

(F) Civilian flagging services will be measured by the hour for each hour that a civilian flagger is provided. Flagging services by local enforcement officers will be measured for each hour that a uniformed, off-duty law enforcement officer with police vehicle is employed directly by the contractor as a flagger, when authorized in advance by the Engineer. No measurement will be made when DPS officers and their vehicles are used to provide flagging services.

Civilian or local enforcement flagging services, and traffic control required to permit contractors' traffic to enter safely into normal traffic within the project limits will be paid under this item. Flaggers required by a written local permit agreement will be measured for payment under this item. Additional civilian or local enforcement flagging services used within the project limits shall be measured for payment under this item, subject to the approval of the Engineer.

Civilian or local enforcement flagging services, and traffic control devices used outside the project limits will be measured under this item. The Department will pay 50 percent of the unit bid price for such flaggers and traffic control devices used as described in this paragraph, subject to the approval of the Engineer. The project limits are defined as the construction work zone as shown on the approved traffic control plan for the specific section of highway under construction.

The contractor shall be responsible for obtaining and paying all costs for local enforcement officers and vehicles.

(G) Temporary Preformed Markings for Pavement, Types II and III, will be measured in accordance with the requirements of Subsection 705-4 of these specifications.

(H) Temporary Painted Markings for Pavement, will be measured in accordance with the requirements of Subsection 708-4 of these specifications.

(I) Obliterate Pavement Marking will be measured in accordance with the requirements of Subsection 708-4 of these specifications.

(J) Changeable Message Boards will be measured by the day for each 24-hour day that the sign is utilized to maintain and control traffic.

(K) Obliterate Pavement Markers will be measured for each unit, Markers and Adhesive pad, or Adhesive pad alone, where Markers are missing.

(L) Temporary Delineators (Standard Drawing 4-M-4.01) and Temporary Pavement Markers will be measured as a unit for each delineator and marker furnished, utilized, and subsequently removed from the project site. No measurement for payment will be made for delineators and markers that are furnished to replace damaged units as specified under Subsection 701-4.01.

(M) Vertical Panels, Barricades (Types II and III), Tubular Markers, Warning Lights (Types A, B, and C), Traffic Cones (28-inch), High-Level Flag Trees, Drums, Embedded Sign Posts, and Portable Sign Stands (Spring-Type and Rigid), will be measured as a unit for each device furnished and subsequently utilized at the project site for each 24-hour day.

Temporary Signs will be measured as Small (less than 10 square feet) with either Type II or III/IV sheeting, and Large (10 square feet or more) with either Type II or III/IV sheeting. Temporary Signs will be measured as a unit for each sign furnished and subsequently utilized at the project site for each 24-hour day. Quantities may be determined on a weekly basis for signs in continuous use.

Utilization shall be defined as including those devices ordered to remain on site or covered in accordance with Subsection 701-4.03(D) and approved by the Engineer.

(N) Specialty Signs are signs which are required on the job, as determined by the Engineer or shown on project plans, and are not reusable as traffic control signs. Specialty Signs shall contain information which is project and location specific. The sign sheeting shall be Type II; and the size, type and legend of the Specialty Signs will be determined by the Engineer, unless specified on the project plans. Specialty Signs will be measured for payment by the

square foot, inclusive of borders. Any sign over twenty square feet in area shall be considered a Specialty Sign.

(O) Obliterate Pavement Legends or Arrows will be measured by each separate symbol, arrow or legend.

701-5 Basis of Payment for Elements of Work (Complete-in-Place):

701-5.01 Temporary Concrete Barrier (Installation and Removal):

Temporary concrete barrier, measured as provided above, will be paid for at the contract unit price, which price shall be full compensation for the work, complete, as specified herein and as shown on the plans, including furnishing, placing, dismantling, and removal. The price bid shall also include any required connection devices, barrier markers, and glare screen.

Should it be necessary to dismantle, pick up and relocate a portion of the barrier installation a lateral distance of more than 12 feet during construction, that portion of the removed and relocated barrier will be considered a new installation and measured for payment at the contract unit price.

For a lateral movement of 12 feet or less, or any vertical movement, the contractor will be paid for 50 percent of the length of the relocated Temporary Concrete Barrier (Installation and Removal), provided the contractor can demonstrate, to the Engineer's satisfaction, that it is not possible to move the barrier without dismantling and lifting. No payment will be made for portions of the barrier which the contractor can relocate without dismantling and picking up.

701-5.02 Temporary Impact Attenuators (Installation and Removal):

Temporary Impact Attenuation Devices shall include Sand Barrels and Energy Absorbing Terminals, measured as provided above, and paid for at the contract unit price, which price shall be full compensation for the work complete in place, as specified herein and as shown on the plans, including furnishing the devices with replacement parts, installing, removing and stockpiling the devices.

Should it be necessary to dismantle, pick up and reinstall attenuation devices during construction, for use on the project site, the work of removing and reinstalling the devices will be measured for payment as a new installation.

The Engineer will be the sole judge as to whether devices are to be dismantled, picked up and reinstalled or are to be adjusted or realigned.

Measurement and payment for furnishing materials, equipment and labor and repairing attenuation devices that are damaged by the traveling public will be made in accordance with the requirements of Subsection 109.04 of these specifications.

No measurement or direct payment will be made for furnishing replacement parts and repairing devices damaged by other than the traveling public.

701-5.03 Temporary Preformed Markings for Pavement:

The accepted quantities of Temporary Preformed Markings, measured as provided above, will be paid for at the unit bid price for the type specified, which price shall be full compensation for the work, complete in place, including necessary pavement cleaning, and maintaining Types II and III temporary markings in

construction work zones. Installation for accepted quantities shall be considered satisfactory when the markings are installed in conformance with the requirements of the plans.

When the type of temporary preformed marking is not specified, the contractor shall furnish Type II.

Additional reimbursement will be made for replacement of Temporary Markings when the contractor is required by the Engineer to install marking materials on distressed pavements or during adverse weather conditions and subsequent failure occurs. Distressed pavement conditions are defined as alligator cracking, bleeding, or spalling of bituminous pavements and spalling of PCC pavements. Adverse weather conditions are defined as any occurrence where application is required at pavement temperatures less than 50 degrees F or when precipitation occurs within 24 hours before application. The Department will pay for the replacement, where failures occur, at the unit bid price for the items. In the event a second failure occurs when markings have been reapplied on distressed pavements or under weather conditions described above, the Engineer shall determine if conditions require primer, alternate methods of marking, or reapplication of Preformed Markings. Preformed markers and markings will be paid for at the unit bid price. Primers or other methods of markings deemed necessary by the Engineer will be paid for in accordance with the provisions of Subsection 109.04 of these specifications.

701-5.04 Temporary Painted Pavement Markings:

The accepted quantities of Temporary Painted Markings, Symbols, Arrows, and Legends, measured as provided above, will be paid for at the unit bid price for the type specified, which price shall be full compensation for the work, complete in place, including glass beads.

701-5.05 Obliterate Pavement Marking:

Obliterate Striping, measured as provided above, will be paid for at the unit bid price per linear foot which price shall be full compensation for the work, complete, including furnishing all labor and equipment required and restoring the pavement surface to a condition acceptable to the Engineer.

The accepted quantities of Arrows, Symbols or Legends obliterated shall be paid for at the unit bid price for each item.

701-5.06 Temporary Pavement Markers and Chip Seal Pavement Markers:

The accepted quantities of Temporary Pavement Markers and Chip Seal Pavement Markers measured as provided above will be paid for at the unit bid price each, which price shall be full compensation for the work, complete in place, as specified herein and as shown on the plans.

701-5.07 Obliterate Pavement Markers:

Obliterate Pavement Markers will be paid for at the unit bid price each, which price shall be full compensation for the work, complete, including adhesive pad.

701-5.08 Temporary Delineators (Standard Drawing 4-M-4.01):

The accepted quantities of Temporary Delineators, measured as provided above, will be paid for at the unit bid price each, which price shall be full compensation for the work, complete, including subsequent removal as specified herein and as shown on the plans.

701-5.09 Specialty Signs:

The accepted quantities of Specialty Signs, measured as provided above, will be paid for at the unit bid price per square foot which price shall be full compensation for the work, complete in place, including manufacturing, delivery to the job site, erection and eventual removal. The price paid shall also include the cost of flags, ballasting, mountings, sign stands, and embedded posts as required.

701-5.10 Temporary Removal or Covering of Signs:

No payment will be made for Temporary Removal or Covering of Signs, including maintenance of storage facilities for the signs or sign legends and the maintenance of sign coverings. The cost being considered as included in the price of contract items.

701-6 Basis of Payment for Elements of Work (In-Use):

701-6.01 Quantity Variances:

Payment for variances in quantities shall be in accordance with Subsection 104.02, except that, for decreases in quantities, the following items will be considered as major items:

(1) Temporary Concrete Barrier (In-Use);

(2) Barricades; and

(3) Temporary Signs.

701-6.02 Temporary Concrete Barrier (In-Use):

The accepted quantities of temporary concrete barrier, measured as provided above, will be paid for at the unit bid price, which price shall be full compensation for the use of the barrier installation(s), including glare screen, and for furnishing all material, equipment and labor and maintaining, realigning and adjusting the barrier installation(s), as specified herein and as shown on the plans. No payment will be made for barrier not in service, such as, barrier in stockpiled configuration awaiting phase construction change.

There will be no payment for each day that the Engineer determines the barrier traffic reflectors are not in good reflective condition, or for each day that the Engineer determines the barrier is out of alignment.

701-6.03 Channelization Devices:

(A) Vertical Panels, Barricades (Type II), Traffic Cones (28-inch), and Tubular Markers:

The accepted quantities of Vertical Panels, Barricades (Type II), Traffic Cones (28-inch), and Tubular Markers, measured as provided above, will be paid for at the unit bid price, which price shall be full compensation for the use and maintenance of each device (in-use), including labor and equipment.

Type I barricades which are substituted for Type II barricades in accordance with Subsection 701-2.08 shall be paid for at the unit bid price for Type II barricades.

The unit bid price for barricades includes the cost of ballasting as required.

(B) Barricades (Type III) and High-Level Flag Trees:

The accepted quantities of Barricades (Type III) and High-Level Flag Trees, measured as provided above will be paid for at the unit bid price, which price shall be full compensation for the use and maintenance of each device (in-use), including labor and equipment.

The unit bid price for barricades includes the cost of ballasting and flags, as required.

When signs are to be mounted on Barricades (Type III) or High-Level Flag Trees, the sign will be paid for as Temporary Signs, Subsection 701-6.04.

(C) Drums:

The accepted quantities of Drums, measured as provided above, will be paid for at the unit bid price, which price shall be full compensation for the use and maintenance of each device (in-use), including labor and equipment.

Drums shall conform to Standard Drawing 4-M-2.07, and shall be included on the list of pre-approved products maintained by the Department or be an alternate plastic drum approved by the Engineer.

(D) Warning Lights (Types A, B, and C):

The accepted quantities of Warning Lights (Types A, B, and C), measured as provided above, will be paid for at the unit bid price, which price shall be full compensation for the use and maintenance of each device (in-use), including labor and equipment.

(E) Embedded Sign Posts, Portable Sign Stands (Spring-Type or Rigid) and Portable Sign Posts-Barrier Mounted:

The accepted quantities of Embedded Sign Post, Portable Sign Stands (Spring-Type and Rigid) and Portable Sign Posts-Barrier Mounted, measured as provided above will be paid for at the unit bid price, which price shall be full compensation for the use and maintenance of each device (in-use), including labor and equipment.

The unit bid price for signs includes the cost of ballasting as required.

701-6.04 Temporary Signs:

The accepted quantities of Temporary Signs, measured as provided above, will be paid for at the unit bid price, which price shall be full compensation for the use and maintenance of each device (in-use), including labor and equipment.

The unit bid price for signs includes the cost of flags and ballasting as required.

No separate payment shall be made for speed plates, distance plates, or other minor sign message boards that are attached to a temporary sign, or temporary sign post, as shown on the plans. If additional signs are attached to those shown on the plans or to existing temporary sign installations, payments will be made as additional temporary signs.

701-6.05 Truck-Mounted Attenuators:

The accepted quantities of truck-mounted attenuators, measured as provided above, will be paid for at the unit bid price per day of work site protection, which rate shall be full compensation for the work, complete, including, but not limited to, furnishing all materials, equipment and labor (including the operator) and maintaining and repairing the truck and truck-mounted attenuator as specified herein and on the project plans. It shall be the contractor's responsibility to replace any damaged or destroyed parts of the attenuator at no additional cost to the Department.

701-6.06 Flashing Arrow Panels and Changeable Message Boards:

The accepted quantity of flashing arrow panels, measured as provided above, will be paid for at the unit bid price, which price shall be full compensation for the work, complete, including furnishing, operating, maintaining, and relocating the panels on the work site, and providing all necessary labor and equipment.

The accepted quantities of Changeable Message Boards, measured as provided above, will be paid for at the unit bid price per day, which price shall be full compensation for the work, complete, including incidental grading; traffic cones; and furnishing, operating, maintaining and relocating the boards on the work site, and providing all necessary labor and equipment. No payment will be made for incidental grading or traffic cones, the cost being considered a part of contract items.

701-6.07 Pilot Services and Flagging Services:

The accepted quantities of pilot and relocation service trucks, measured as provided above, will be paid for at the unit bid price, which price shall be full compensation for the work, complete, including, but not limited to, furnishing and maintaining the vehicle and furnishing the pilot truck driver. Overtime hours for pilot services worked will be paid at a rate determined by multiplying the straight-time hours times a factor of 1.35.

Basis of payment for a local enforcement officer, including vehicle, used as a flagger will be in accordance with the following:

Hours / Day	Pay Rate
First eight hours	straight time
Hours nine through twelve	time and one half
Over 12 hours	double time

Overtime hours will be converted into straight-time hours for measurement.

The accepted quantities for flagging services provided by civilian flaggers, measured as provided in Subsection 701-4.04(F), will be paid for at the unit bid price, which price shall be full compensation for the work, complete, including all overhead costs and fringe benefits.

No payment will be made when DPS officers and their vehicles are used to provide flagging services.

701-6.08 Temporary Impact Attenuators (In-Use):

The accepted quantities of temporary impact attenuators, measured as provided above, will be paid for at the unit bid price, which price shall be full compensation for the use of the complete attenuating device

and for furnishing all material, equipment and labor for maintaining, realigning and adjusting the attenuator installation, as specified herein and as shown on the plans. No payment will be made for attenuators not in service, such as attenuator stockpiled for replacement parts or awaiting phase construction change.

APPENDIX "C"

SALT RIVER PROJECT (SRP)
STANDARD SPECIFICATIONS

for

PHASE 3 - SANTAN COLLECTOR CHANNEL PROJECT
SOUTHEAST VALLEY REGIONAL DRAINAGE SYSTEM

CONTRACT NO. FCD 99-05
PCN 4900133

APPLICATION FOR RIGHT OF ENTRY

1). Name of Licensee _____

(Name to be shown on Document)

a). If a corporation _____

(Exact Name of Corporation)

a corporation of the state of _____

(State of Incorporation)

NOTE: The corporate name of a company should be exactly as stated in its Articles of Incorporation. Type of Corporation, if other than a normal business corporation (this MUST be shown):

_____

(Municipal, quasi-municipal, body politic, etc.)

b). If an Individual _____

(Name of Individual)

of _____

(City & State)

c). If an individual or corporation doing business under a trade name:

_____

(Doing Business As or Trade Name)

d). If a partnership _____

(Name of Partnership)

a partnership consisting of:

_____

and _____

all of _____

(City & State)

2). Name and mailing address of individual to whom instrument is to be sent for execution:

_____

(Name & Address)

3). Address (billing address) to be shown on document if different than that shown in Item 2.

_____

(Address)

4). Name and phone number of individual to contact in event of questions:

_____

_____FAX #_____

5). Time period of your project and use of the Railroad Company's property? (*Proposed start/stop dates:*)

Start: _____ Stop: _____

6). When do you need to receive this agreement from the Railroad Company? _____
(*Please allow 30-45 days for processing of this request*)

7). Will there by any activity, material, vehicles or equipment within 50 feet of a railroad track in connection with your project? **Yes / No** (*If 'Yes,' Railroad Protective Liability Insurance will be required*)

Within 25 feet? **Yes / No** (*If 'Yes', a Railroad Flagman will be required at your sole cost.*)

8). Will there by any excavation involved? **Yes / No** (*If 'Yes', include shoring plans in compliance with attached Railroad Company standards.*)

9). Site Location (*City, County & State*):

_____

10). Railroad Site Location Information:
(*Railroad Mile Post, Subdivision, or any other pertinent location information. Attach map/site plan.*)

_____

11). Purpose of your request:
(*This must be detailed & complete; attach engineering plans, shoring plans, if applicable, and details to support*)

_____

_____

Additional fees and charges may be applicable to your request. These charges cannot be determined until your project is approved.

Road Crossing Application Form

SECTION 1: TO BE COMPLETED FOR ALL CROSSINGS

Name _____

Address _____

City _____ State_____ Zip Code_____

Contact Person _____

Phone _____ Fax _____

( ) Individual ( ) Partnership ( ) Proprietorship ( ) Corporation: _____ State Incorporated

Names Of Officers, Partners Or Proprietor _____

Billing Address if different than above _____

Type Of Road Crossing:

____Private Farm Crossing ____Private Commercial Crossing ____Contractor's Crossing

____Pedestrian Overpass ____Pedestrian Underpass ____Other _____

____Existing Crossing ____New Installation _____Relocation

____Permanent Use ____Temporary Use for _____ Mos.

Crossing will be used to access _____

Name of Owner Of Property to be served by crossing _____

Address if different than above _____

Attach a Legal Description of Your Property to be served by the crossing.

SECTION 2: TO BE COMPLETED FOR EXISTING CROSSINGS ONLY

Name(s) of previous users of crossing _____

Crossing is currently covered by license agreement number _____

Dated _____ with _____

SECTION 3: TO BE COMPLETED FOR INSTALLATION OF NEW CROSSINGS ONLY

How is property currently accessed?_____

Why was access to property not obtained from previous owner_____

_____

Desired crossing will be _____ feet ( ) north ( ) south ( ) east ( ) west

of nearest _____ ( ) public ( ) private road crossing.

Track is in _____-ft cut/fill Number tracks crossed_____ Track is on: ( ) curve ( ) straight

Signed _____ Date _____

FOR RAILROAD USE ONLY

RAILROAD MILEPOST_____ RAILROAD SUBDIVISION_____ AAR/DOT NUMBER _____

MGR IND & PUBLIC PROJECTS _____ MGR TRACK MAINTENANCE _____ MGR SIGNAL MAINTENANCE _____

TELEPHONE:_____ TELEPHONE:_____ TELEPHONE:_____

SUPERINTENDENT TRANSP SVCS APPROVAL RECEIVED:

WIDTH OF CROSSING_____ WIDTH OF RR RIGHT-OF-WAY____ CROSSING SURFACE _____

FLAGGING PROTECTION REQUIRED? _____

LOCKED GATES REQUIRED AT RIGHT-OF-WAY LINES?_____

SPECIAL PROVISIONS:

ESTIMATED COST (ATTACH MATERIAL AND FORCE ACCOUNT ESTIMATE)

WORK TO BE PERFORMED BY RAILROAD:

ANNUAL LICENSE FEE

_____

ANNUAL SIGNAL MAINTENANCE FEE

_____

SUBMITTED BY _____ DATE _____

TITLE: _____