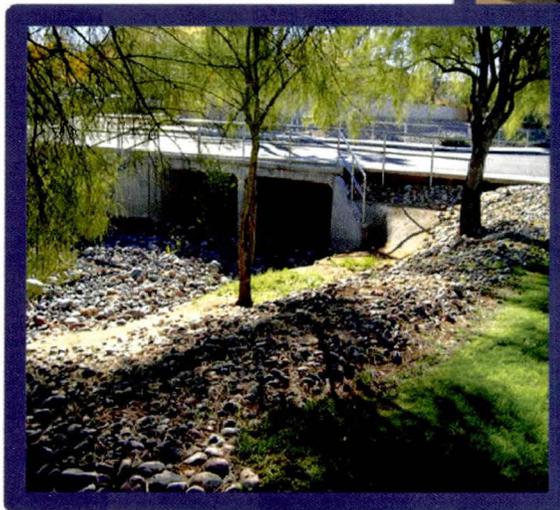
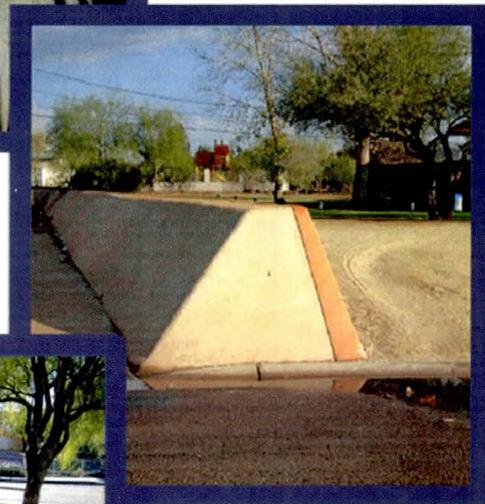


71ST STREET STORM DRAIN



60% DESIGN REPORT

JUNE 2004



CIVIL BRANCH

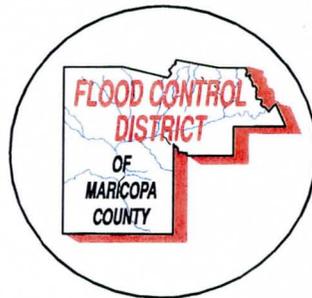
71st STREET STORM DRAIN

Mescal Road to Sunnyside Drive



June, 2004

Prepared For:
Chief Engineer & General Manager



Prepared by:
Engineering Division

FCD Project No. 120-03-31

71st STREET STORM DRAIN
Mescal Road to Sunnyside Drive

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1.0 PROJECT DESCRIPTION	1
1.1 PURPOSE	1
1.2 LOCATION	1
1.3 FIELD CONDITIONS	3
1.4 RIGHTS-OF-WAY	4
1.5 UTILITIES	4
2.0 HYDROLOGIC ANALYSIS	5
3.0 HYDRAULIC ANALYSIS	8
3.1 EXISTING CHANNEL HYDRAULICS	8
3.2 PROPOSED STORM DRAIN HYDRAULICS	8
4.0 CONSTRUCTION COST ESTIMATE	9



LIST OF FIGURES

<u>FIGURE NO.</u>	<u>DESCRIPTION</u>	<u>PAGE</u>
FIGURE 1	PROJECT LOCATION MAP	2
FIGURE 2	TEMPORARY CONSTRUCTION EASEMENTS.....	4

LIST OF TABLES

<u>TABLE NO.</u>	<u>DESCRIPTION</u>	<u>PAGE</u>
TABLE 1	PROJECT DESIGN FLOWS.....	8
TABLE 2	PROJECT DESIGN FLOWS.....	10

LIST OF PHOTOS

<u>PHOTO NO.</u>	<u>DESCRIPTION</u>	<u>PAGE</u>
PHOTO 1	71 st Street Channel between Paradise Drive & Cactus Road	C-1
PHOTO 2	Paradise Drive at 71 st Channel Alignment	C-1
PHOTO 3	Existing Culvert Outlet @ Paradise Drive	C-1
PHOTO 4	End of Existing Concrete Channel at Sunnyside Drive	C-1
PHOTO 5	Drainageway South of Sunnyside Drive	C-1
PHOTO 6	Asphalt Swale between Sunnyside & Jenan Dr	C-1
PHOTO 7	71 st Street North of Cholla Rd.....	C-2
PHOTO 8	Drainage Easement South of Cholla Road.....	C-2
PHOTO 9	End of Drainage Easement South of Cholla Road	C-2
PHOTO 10	Downstream of Storm of Existing Storm Drain Outlet.....	C-2
PHOTO 11	Drainage Easement South of Cholla Road.....	C-2

LIST OF APPENDICES

APPENDIX A	EXISTING CHANNEL HYDRUALICS
APPENDIX B	PROPOSED STORM DRAIN HYDRAULICS
APPENDIX C	PROJECT PHOTOS
APPENDIX D	BID SCHEDULE
APPENDIX E	TCE EXHIBIT
APPENDIX F	SPECIAL PROVISIONS



1.0 PROJECT DESCRIPTION

1.1 Purpose

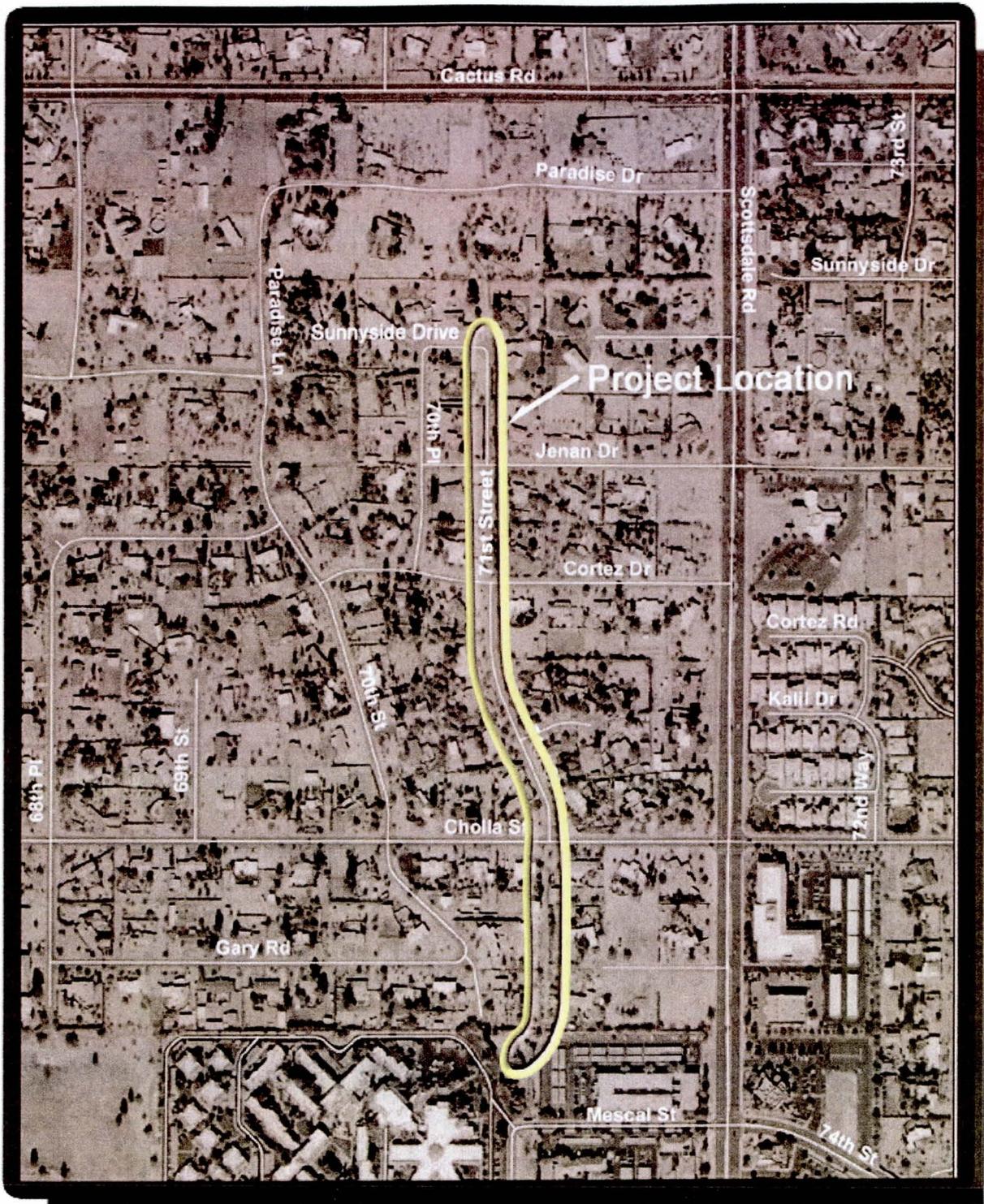
The purpose of this project is to design a conveyance system to capture and convey local 10-yr runoff and flows discharged from the 71st Street Channel through existing residential neighborhoods as identified in the Scottsdale Road Corridor Drainage Master Plan (Stanley, 11/02). The solution consists of a large diameter storm drain from Sunnyside Drive to an existing channel that begins north of Mescal Road. The 71st Street Storm Drain will eliminate or significantly reduce flood damage that would be caused by rainfall events less than or equal to the 10-year event.

Presently, the existing 71st Street Channel ends at Sunnyside Drive where the flows are discharged into a local cul-de-sac and left to flow overland until they reach the southern portion of the 71st Channel at approximately 700' south of Cholla Road.

The District entered into an Intergovernmental Agreement (IGA 2002A016) with the City of Scottsdale, and agreed to cost-share in the design and construction of improvements.

1.2 Location

This project is located in Section 22, Township 3 North, Range 4 East of the Gila and Salt River Base and Meridian in the City of Scottsdale (See Figure 1). Section 22 is bounded on the north by Cactus Road, on the east by Scottsdale Road, on the south by Shea Blvd, and on the west by 64th Street. The Project's alignment is from north to south along and extending north and south of 71st Street. The beginning of the Project is south of Cactus Road at the Sunnyside Drive cul-de-sac, and the end of the Project is approximately 650 feet south of Cholla Road.



Project Location Map

FIGURE 1

1.3 Field Conditions

The area surrounding the 71st Street Storm Drain between Sunnyside Dr and Mescal Road (See Figure 1) is developed residential properties. Portions of the storm drain alignment are within existing drainage easements, and other portions are within existing road rights-of-way.

71st Street Channel begins at Cactus Road. It is an outfall for the Cactus Road Storm Drain that was constructed by the City of Scottsdale. At Cactus Road, the storm drain collects runoff from the east and west in a concrete box culvert and discharges it into a concrete lined trapezoidal channel (Photo 1). This lined channel conveys the flows south underneath Paradise Drive via a concrete box culvert (Photo 2). Once past Paradise Drive, the channel is again a concrete lined trapezoidal section (Photo 3). This section of lined channel ends at the Sunnyside Drive cul-de-sac (Photo 4) where the flows are discharged into the roadway. After flows leave the end of the lined trapezoidal section they continue across the cul-de-sac (Photo 5) where retaining walls direct the flows south through a very shallow asphalt swale (Photo 6). The drainage swale continues south from Sunnyside Drive to Jenan Street and then continues on south to Cortez Road.

The asphalt drainage swale ends on the north side of Cortez Road. From Cortez Road south to and across Cholla Road, flows are conveyed in the road rights-of-way of 71st Street. 71st Street is a residential collector street that has an inverted crown section (Photo 7). The final segment of the 71st Street Channel is between Cholla Road and an existing channel (Photo 10) that begins approximately 650 feet south of Cholla Road. This segment is also a trapezoidal section comprised of a flat 12' wide asphalt bottom with steep concrete side slopes (Photo 8) averaging 3' in depth. In conjunction with the above ground swale, a 60-inch concrete pipe that drains the Cactus Road Detention basin is below the swale.

The entire reach of the 71st Street Channel between Sunnyside Drive and the existing channel south of Cholla Road has very little capacity. Far less than the Project's 10-year event.

1.4 Rights-of-Way

The existing right-of-way along the 71st Street Storm Drain Project from Sunnyside Drive to Mescal Road consists of road rights-of-way and drainage easements. The existing right-of-way throughout this reach is enough to operate and maintain the storm drain, but temporary construct easements will be required to construct the Project (See Figure 2).



Temporary Construction Easements

Figure 2

1.5 Utilities

The existing utilities in the Project Corridor include water, gas, telephone, cable communication, and overhead electric. For the most part, no major utility relocations will be necessary to construct the project. Although it is anticipated that there will be some minor vertical realignments of some water and gas lines.

Pothole investigation has revealed that the waterlines that cross the storm drain alignment are shallow and are in conflict with the proposed storm drain. The vertical relocation of these waterlines will be part of the construction drawings. Other relocations that will be required are several reaches of overhead powerlines throughout the project (Photos 4, 5, 6, 8 & 11). APS is planning to relocate and underground these facilities.

2.0 HYDROLOGIC ANALYSIS

The hydrology from Scottsdale Road Corridor Drainage Master Plan (Stanley, Nov 2002) was used as a basis for this Project with only minor adjustments made. The design flows are shown below in Table 1.

TABLE 1 **Project Design Flows**

Physical Location	10-yr
Cactus Rd to Cholla Road	485
Cholla Road to North of Mescal Road	533

No additional hydrology is necessary for the design of this project.

The hydrologic models developed for the Scottsdale Corridor Drainage Study (Stanley, 2002) are utilized to evaluate the design of improvements proposed as part of that study. A figure from the Stanley report of the study area, sub-basin boundaries, detention basins and diversion is provided as Figure __. The models consist of 10-year and 100-year existing and future condition scenarios. The 71 Street drainage improvements are consistent with those proposed in the Stanley report and was modeled using the U.S. Army Corps of Engineers HEC-1 computer program Version 4.1, June 1998. The model computes hydrographs for watershed sub-basins, kinematic and level pool routing reaches, combination and diversion locations within the project area.

Almost the entire contributing watershed is fully developed with various land uses such as residential and

the watershed. However large portion of the project area consist of older developments that did not provide storm water facilities and consequently this project will improve runoff conditions both locally and downstream.

The final HEC-1 models utilize the 10- and 100-year, 6-hour precipitation patterns. The Green-Ampt rainfall loss method in HEC-1 was used to calculate runoff rates for sub-basins. Unit hydrographs were calculated using the Clark unit hydrograph option. Hydrograph routing reaches were modeled using either the kinematic wave or normal depth storage routing options. Detention basins were modeled using the Modified Puls level pool storage routing options. Existing drainage facilities in the project area have evolved over many years and the design of these systems has not been consistent with current standards.

The sub-basin unit discharge for the 6-hour storm is representative of unit discharge rates typically found for regional sub-basins having similar hydrologic characteristics. The multiple storm option in HEC-1 was used for both the 10- and 100-year events. The amount of contributing area within the model had to be adjusted at various locations to properly account for the flow splits and diversions in the study area. The soil characteristics utilized within the model are based upon soil surveys prepared by the National Resource Conservation Service (NRCS). The majority of the study area (80 percent) is underlain loams having a hydraulic conductivity (XKSAT) of 0.27 inches per hour. This value was used for the entire project. The watershed has a relatively large percent of impervious area that decreases the significance of the soil related influence on rainfall losses.

The modifications made to the Stanley models reflects the following changes. First, the volume to be available as a result of this project is reflected in the reservoir routing at Mescal Basin. Second, the channel routing in Berniel Ditch reflects existing condition. Lastly, kinematic routings were modified to eliminate numerical instabilities by changing the default reach segments. The results of these changes at key locations are provided in Table __. The modified model output is provided in Appendix __, and electronic files are also provided.

Table 2 - Flow Comparison Before and After Recommended Projects

Recommended Projects:

1. Cactus Road Basin Flood Wall Modification
2. Mescal Basin Emergency Spillway
3. 71st Street Storm Drain & Channel

HEC-1 Concentration Points	Location Description	Existing Condition Flow (cfs)		With Project Design Flow (cfs)		Increase/Decrease in Flow (cfs)	
		10-yr	100-yr	10-yr	100-yr	10-yr	100-yr
AD037B	Mescal Street 71st St Channel	615	1362	615	1362	0	0
ROUNDED		600	1400	600	1400	0	0
AD051	South of Shea Blvd, 71st St Channel	823	1706	815	1700	-8	-6
ROUNDED		800	1700	800	1700	0	0
AD055D	Mountain View Road & Bernill Ditch	942	1862	935	1856	-7	-6
ROUNDED		900	1900	900	1900	0	0
AD057C	Mountain View Road & 68th St, Bernill Ditch	1295	3008	1286	2975	-9	-33
ROUNDED		1300	3000	1300	3000	0	0
AD068	Bernill Ditch @ Double Tree Rd	1287	3012	1277	2982	-10	-30
ROUNDED		1300	3000	1300	3000	0	0
RR070A	Bernill Ditch @ Indian Bend Wash	1282	3008	1273	2973	-9	-35
ROUNDED		1300	3000	1300	3000	0	0

* The flows are based on the HEC-1 model prepared by Stanley Consultant and revised by FCD. Flow schematic remains the same.

3.0 HYDRAULIC ANALYSIS

3.1 Existing Channel Hydraulics

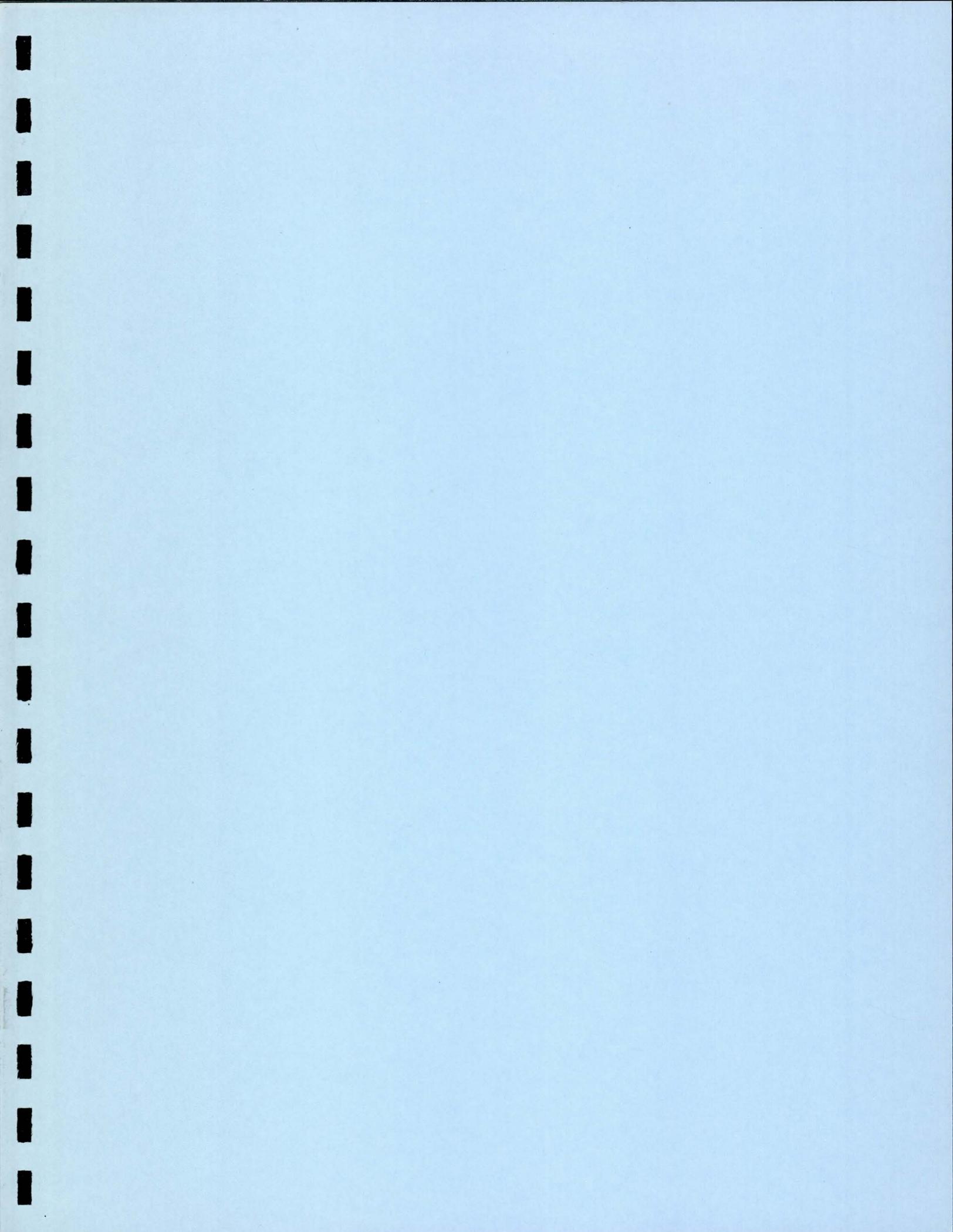
The existing channel from Saguario Drive north to the upstream end located a few hundred feet north of Mescal Road was modeled using HECRAS. The purpose of this model was to determine if the existing channel has the capability of conveying the 10-year event within its channel banks. The analysis determined that it does have the 10-year capacity. Therefore, no modifications to the channel banks south of Mescal Road are proposed for this project. All of the results are presented in Appendix A.

3.2 Proposed Storm Drain Hydraulics

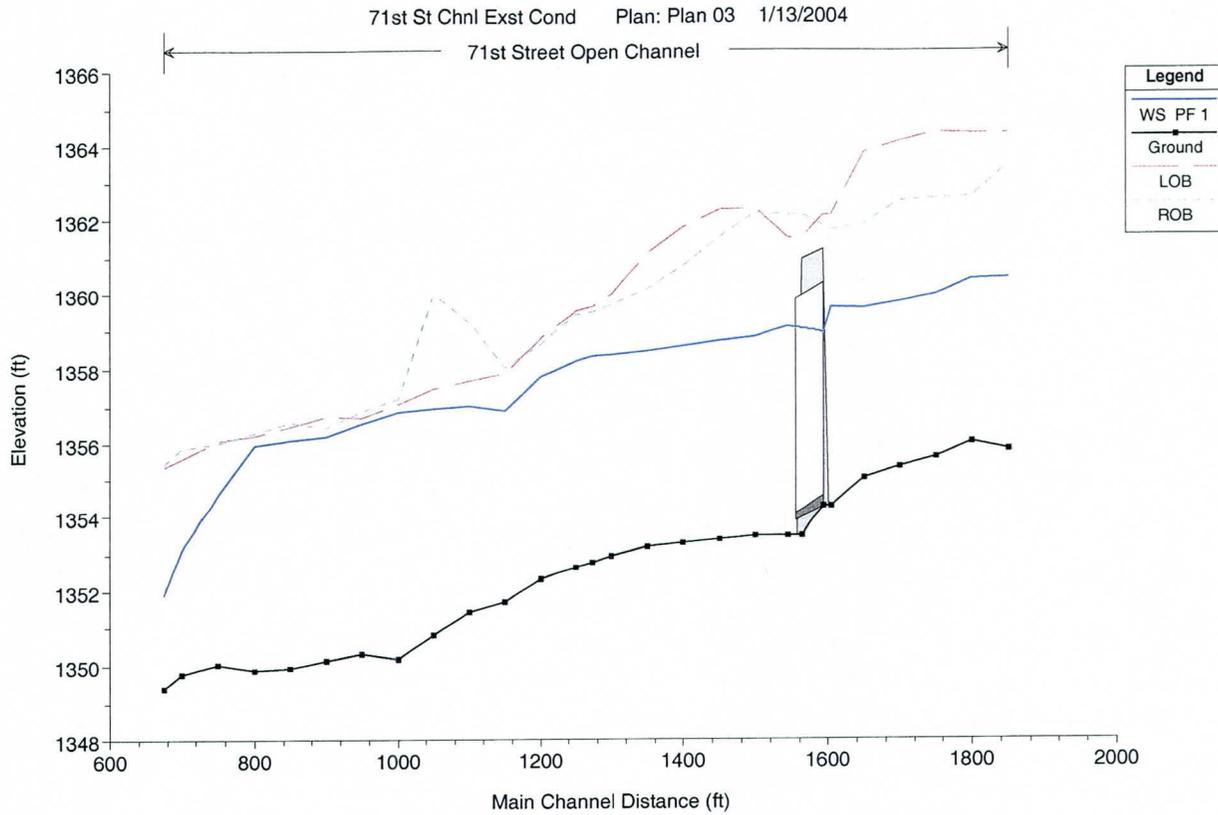
A storm drain model was developed to size a system that would have the capacity to capture and convey the 10-year runoff from the end of the improved channel at Sunnyside Drive to the existing channel south of Cholla Road. The proposed section modeled from Sunnyside Drive to Cholla road is an 84" concrete pipe. At Cholla Road, the new storm drain would need to have the capacity to receive the flows from the Cactus Detention Basin Outfall pipe and the 10-year runoff for the final segment. Originally planned for this final reach was to utilize the existing storm drain and construct a parallel pipe to convey the flows. During design, it was determined that the drainage corridor did not have sufficient room to construct an additional precast pipe. The design then modeled two different options: 1) Eliminate the existing 60" pipe and replace it with a single barrel 10' x 5' concrete box culvert and 2) cast-in-place a 78" pipe immediately adjacent to the existing 60" pipe and use both pipes for conveyance. Each of the above alternates has the hydraulic capacity to convey the 10-year event, but the second option using the cast-in-place pipe is more economical will be simpler to construct. The results of this model are shown in Appendix B.

4.0 CONSTRUCTION COST ESTIMATE

The estimated cost for the 71st Street Storm Drain is that includes a 20% contingency. A breakdown of the estimate is presented in Appendix D.



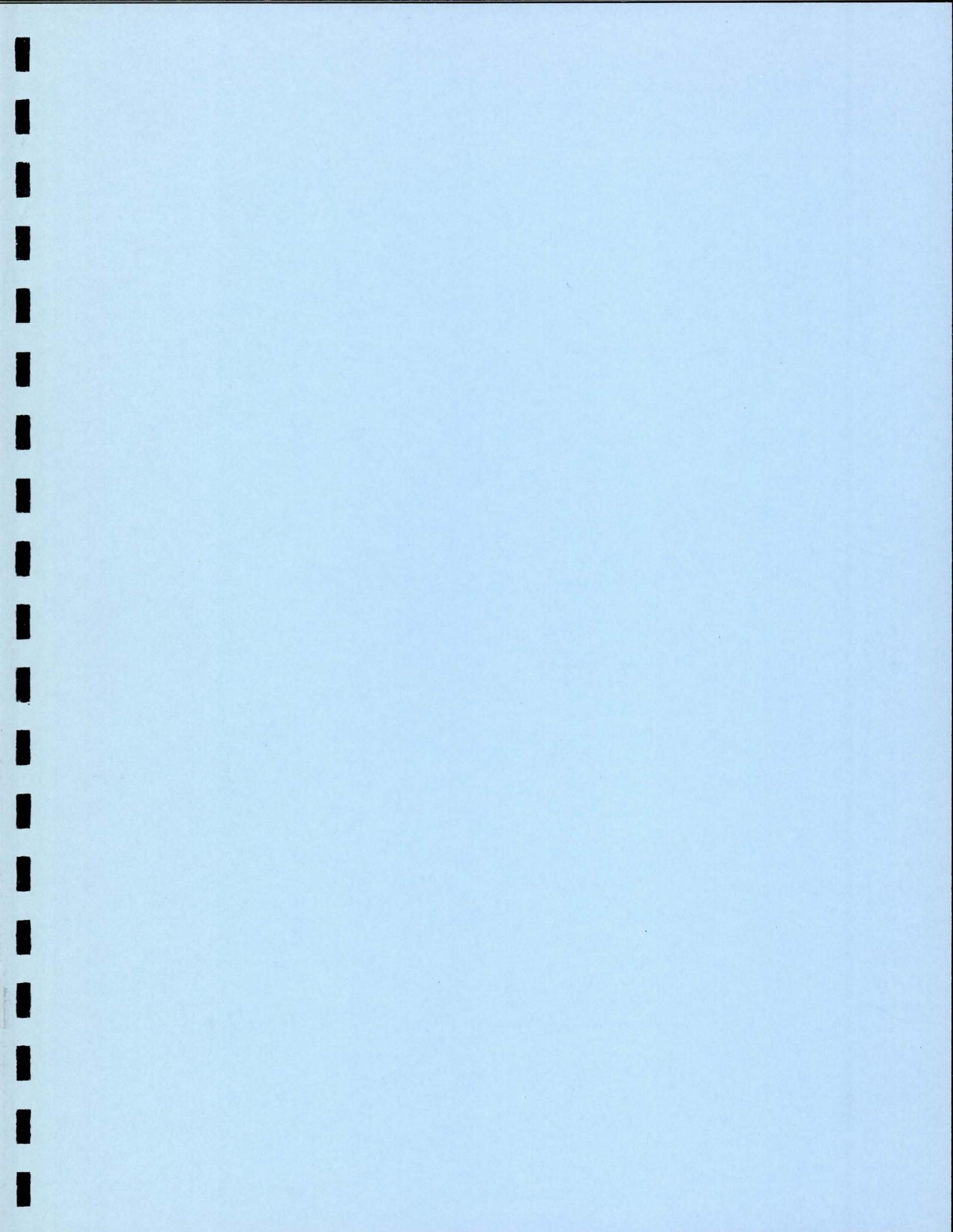
APPENDIX A – EXISTING CHANNEL HYDRAULICS



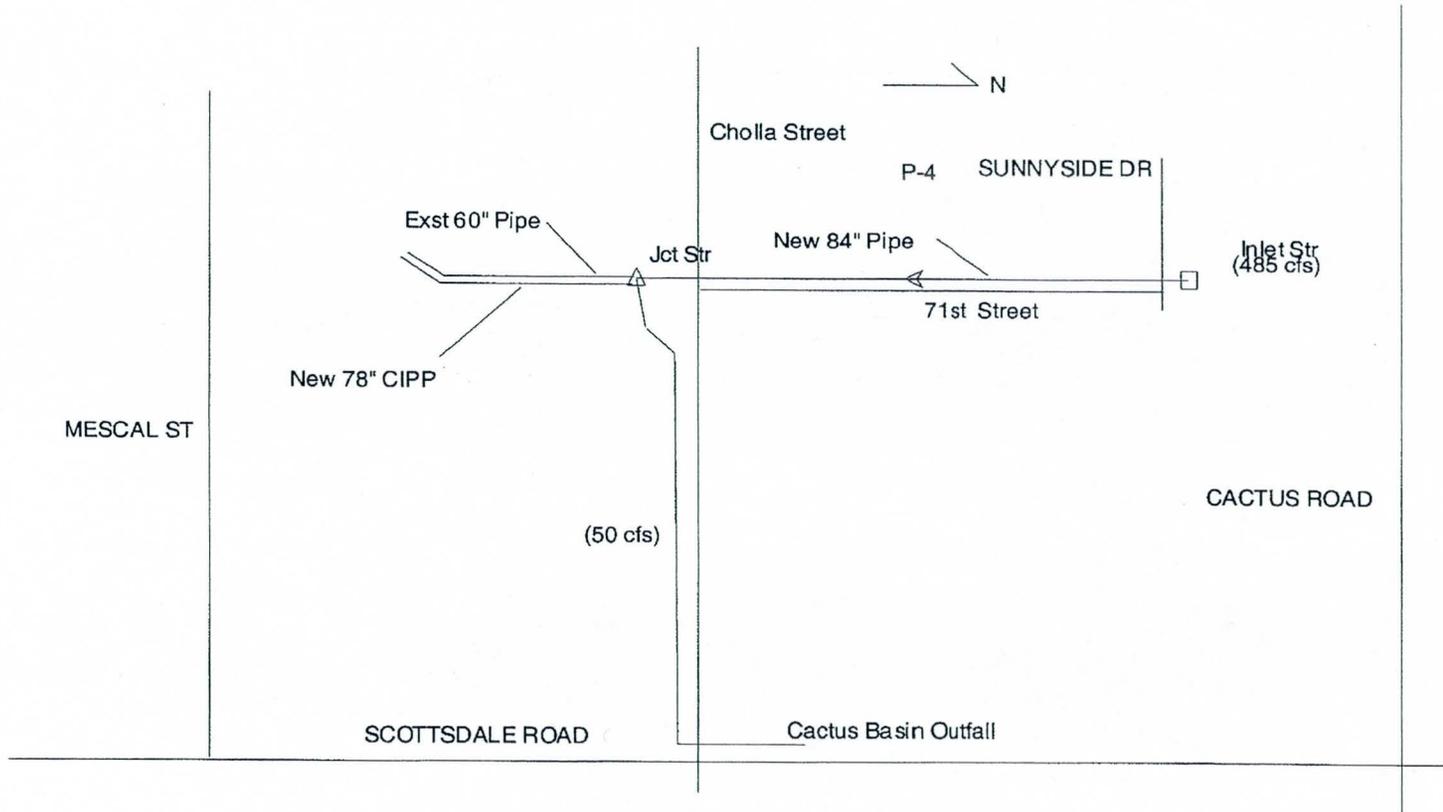
River Sta	Profile	Q Total (cfs)	Min Ch EI (ft)	W.S. Elev (ft)	E.G. Elev (ft)	Vel Chnl (ft/s)	Top Width (ft)	Froude #
1850	PF 1	616	1355.81	1360.38	1360.58	3.57	55.4	0.36
1850	PF 2	1350	1355.81	1363.89	1364.05	3.26	85.69	0.25
1800	PF 1	616	1356	1360.34	1360.5	3.22	64.52	0.33
1800	PF 2	1350	1356	1363.89	1364.02	2.9	87.17	0.22
1750	PF 1	616	1355.6	1359.94	1360.38	5.31	42.18	0.56
1750	PF 2	1350	1355.6	1363.7	1363.97	4.18	76.26	0.33
1700	PF 1	616	1355.33	1359.74	1360.19	5.33	43.05	0.57
1700	PF 2	1350	1355.33	1363.67	1363.91	3.93	84.59	0.31
1650	PF 1	616	1355	1359.57	1359.99	5.2	42.85	0.55
1650	PF 2	1350	1355	1363.66	1363.85	3.54	88.12	0.28
1604	PF 1	616	1354.28	1359.61	1359.84	3.82	46.58	0.36
1604	PF 2	1350	1354.28	1363.66	1363.81	3.2	95.23	0.23
1575		Culvert						
1545	PF 1	616	1353.47	1359.09	1359.27	3.41	38.14	0.28
1545	PF 2	1350	1353.47	1361.26	1361.66	5.03	48.64	0.35
1500	PF 1	713	1353.45	1358.83	1359.19	4.79	48.9	0.48
1500	PF 2	1557	1353.45	1361.08	1361.56	5.59	66.52	0.48

APPENDIX A – EXISTING CHANNEL HYDRAULICS

River Sta	Profile	Q Total (cfs)	Min Ch EI (ft)	W.S. Elev (ft)	E.G. Elev (ft)	Vel Chnl (ft/s)	Top Width (ft)	Froude #
1450	PF 1	713	1353.34	1358.71	1359.05	4.69	49.78	0.47
1450	PF 2	1557	1353.34	1360.98	1361.44	5.46	68.17	0.47
1400	PF 1	713	1353.24	1358.58	1358.92	4.71	49.32	0.47
1400	PF 2	1557	1353.24	1360.86	1361.33	5.47	74.5	0.47
1350	PF 1	713	1353.14	1358.44	1358.8	4.78	48.57	0.48
1350	PF 2	1557	1353.14	1360.75	1361.22	5.51	73.58	0.46
1300	PF 1	713	1352.92	1358.34	1358.66	4.59	48.81	0.45
1300	PF 2	1557	1352.92	1360.67	1361.11	5.36	75.3	0.43
1274	PF 1	713	1352.76	1358.29	1358.6	4.49	48.45	0.44
1274	PF 2	1557	1352.76	1360.64	1361.06	5.26	79.5	0.42
1250	PF 1	713	1352.62	1358.17	1358.54	4.91	40.94	0.46
1250	PF 2	1557	1352.62	1360.49	1361.01	5.9	79.9	0.46
1200	PF 1	713	1352.32	1357.77	1358.36	6.2	35.33	0.61
1200	PF 2	1557	1352.32	1360.08	1360.85	7.21	59.82	0.56
1150	PF 1	713	1351.71	1356.84	1358	8.64	26.43	0.86
1150	PF 2	1557	1351.71	1358.77	1360.51	10.67	46.94	0.91
1100	PF 1	713	1351.44	1356.97	1357.55	6.11	32.41	0.57
1100	PF 2	1557	1351.44	1358.98	1359.95	8.02	61.33	0.63
1050	PF 1	713	1350.81	1356.93	1357.34	5.17	37.6	0.48
1050	PF 2	1557	1350.81	1358.96	1359.71	6.98	55.58	0.55
1000	PF 1	713	1350.18	1356.8	1357.22	5.17	37.83	0.48
1000	PF 2	1557	1350.18	1358.81	1359.56	7.01	49.09	0.53
950	PF 1	713	1350.31	1356.52	1357.05	5.85	37.86	0.57
950	PF 2	1557	1350.31	1358.53	1359.4	7.56	48.84	0.59
900	PF 1	713	1350.14	1356.18	1356.82	6.44	35.53	0.64
900	PF 2	1557	1350.14	1358.2	1359.19	8.09	48.11	0.64
850	PF 1	713	1349.94	1356.07	1356.58	5.7	38.37	0.56
850	PF 2	1557	1349.94	1358.13	1358.96	7.36	46.58	0.57
800	PF 1	713	1349.85	1355.92	1356.4	5.53	38.33	0.53
800	PF 2	1557	1349.85	1358	1358.8	7.24	45.85	0.55
750	PF 1	793	1350.02	1354.58	1356.01	9.6	29.34	1.01
750	PF 2	1644	1350.02	1356.5	1358.43	11.16	42.1	0.97
700	PF 1	793	1349.77	1353.07	1354.47	9.5	30.14	1.01
700	PF 2	1644	1349.77	1354.91	1356.94	11.43	35.5	1
676	PF 1	793	1349.4	1351.91	1353.15	8.94	36.26	1.01
676	PF 2	1644	1349.4	1353.45	1355.46	11.38	36.26	1



Scenario: Base



APPENDIX B - STORM DRAIN HYDRAULICS

Calculation Results Summary

=====
 Scenario: Base

>>>> Info: Subsurface Network Rooted by: Outlet
 >>>> Info: Subsurface Analysis iterations: 1
 >>>> Info: Convergence was achieved.

CALCULATION SUMMARY FOR SURFACE NETWORKS

Label	Inlet Type	Inlet	Total Intercepted Flow (cfs)	Total Bypassed Flow (cfs)	Capture Efficiency (%)	Gutter Spread (ft)	Gutter Depth (ft)
MH 1	Generic Inlet	Generic Default 100%	0.00	0.00	100.0	0.00	0.00

CALCULATION SUMMARY FOR SUBSURFACE NETWORK WITH ROOT: Outlet

Label	Number of Sections	Section Size	Section Shape	Length (ft)	Total System Flow (cfs)	Average Velocity (ft/s)	Hydraulic Grade Upstream (ft)	Hydraulic Grade Downstream (ft)
P-1	1	60 inch	Circular	43.00	212.00	10.80	1,360.77	1,360.15
P-2	1	60 inch	Circular	628.00	212.00	10.80	1,365.56	1,361.39
P-3	1	60 inch	Circular	13.00	212.00	10.80	1,366.01	1,365.92

Label	Total System Flow (cfs)	Ground Elevation (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
Outlet	212.00	1,362.00	1,356.01	1,356.01
Bend 1	212.00	1,362.00	1,361.39	1,360.77
Junction Str	212.00	1,368.50	1,365.92	1,365.56
MH 1	212.00	1,365.37	1,365.37	1,365.37

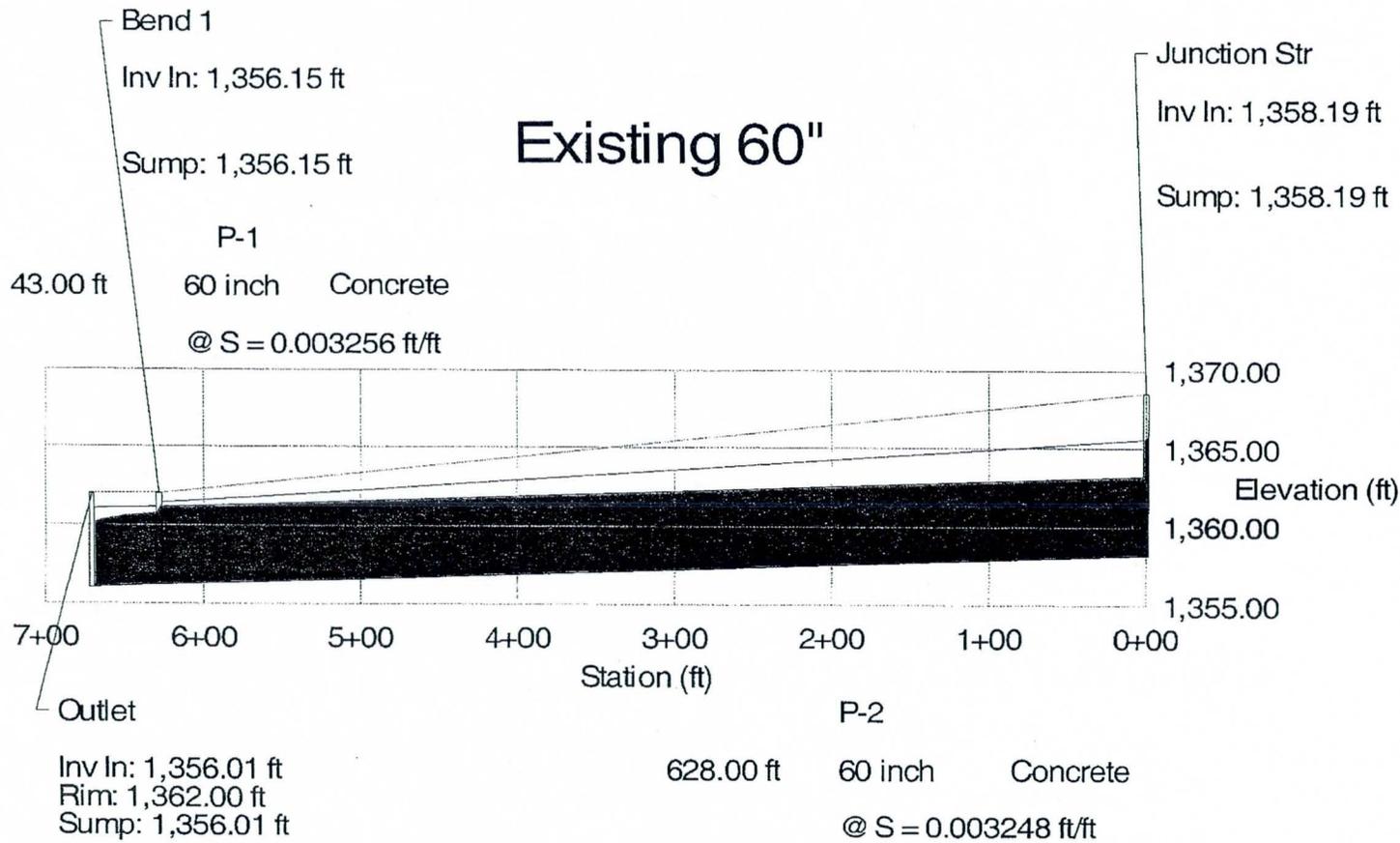
=====
 Completed: 05/27/2004 10:12:29 AM

Title: 71st Street Storm Drain
 s:\...hydraulics\storm drain\71st-sd-3a.stm
 05/27/04 10:12:53 AM

Flood Control District of Maricopa County
 37 Brookside Road Waterbury, CT 06708 USA

Project Engineer: Information Technology
 StormCAD v5.6 [5.5003]
 +1-203-755-1666 Page 1 of 1

Profile
Scenario: Base



APPENDIX B – STORM DRAIN HYDRAULICS

Calculation Results Summary

=====
 Scenario: Base

>>>> Info: Subsurface Network Rooted by: Outlet
 >>>> Info: Subsurface Analysis iterations: 1
 >>>> Info: Convergence was achieved.

CALCULATION SUMMARY FOR SURFACE NETWORKS

Label	Inlet Type	Inlet	Total Intercepted Flow (cfs)	Total Bypassed Flow (cfs)	Capture Efficiency (%)	Gutter Spread (ft)	Gut Dep (f)
Junction Str	Generic Inlet	Generic Default 100%	0.00	0.00	100.0	0.00	0

CALCULATION SUMMARY FOR SUBSURFACE NETWORK WITH ROOT: Outlet

Label	Number of Sections	Section Size	Section Shape	Length (ft)	Total System Flow (cfs)	Average Velocity (ft/s)	Hydraulic Grade Upstream (ft)	Hydraulic Grade Downstream (ft)
P-1	1	72 inch	Circular	46.00	323.00	11.42	1,361.65	1,360.91
P-2	1	72 inch	Circular	611.00	323.00	11.42	1,365.56	1,362.00

Label	Total System Flow (cfs)	Ground Elevation (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
Outlet	323.00	1,362.00	1,356.01	1,356.01
Bend 1	323.00	1,362.00	1,362.34	1,361.65
Junction Str	323.00	1,368.50	1,365.96	1,365.56

=====
 Completed: 05/27/2004 10:13:13 AM

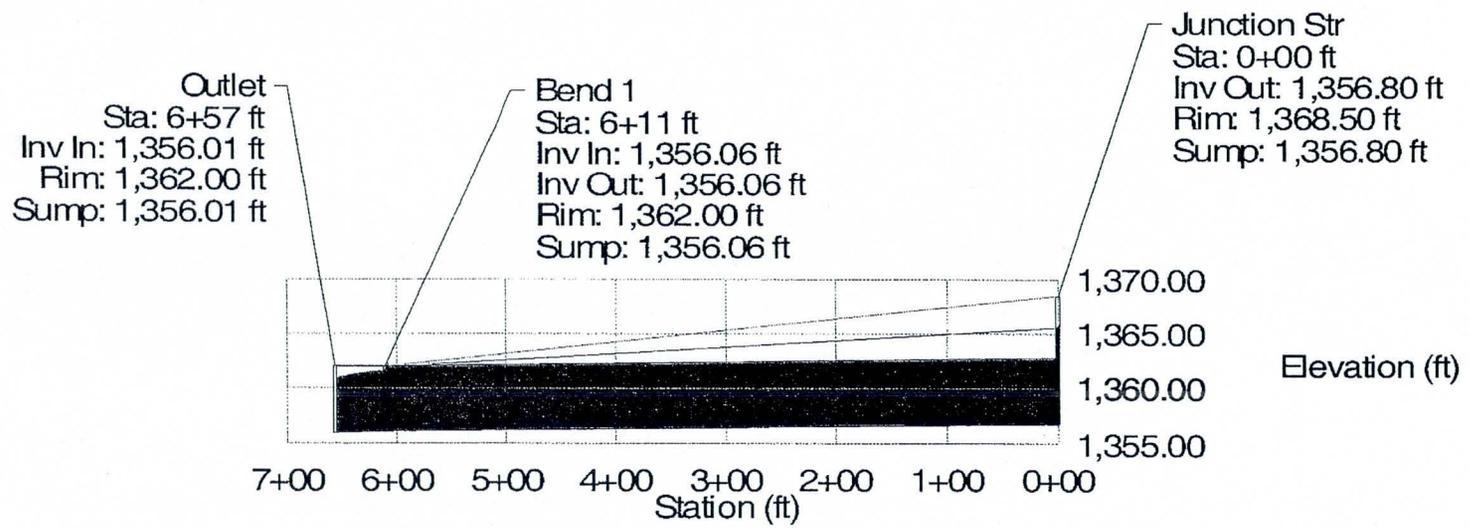
Title: 71st Street Storm Drain
 s:\...hydraulics\storm drain\71st-sd-3b.stm
 05/27/04 10:13:28 AM © Haestad Methods, Inc.

Flood Control District of Maricopa County
 37 Brookside Road Waterbury, CT 06708 USA

Project Engineer: Information Technology
 StormCAD v5.5 [5.5003]
 +1-203-755-1666 Page 1 of 1

Profile
Scenario: Base

New Cast-in-Place Pipe



	P-1			P-2	
46.00 ft	72 inch	Concrete	611.00 ft	72 inch	Concrete
	@ S = 0.001087 ft/ft			@ S = 0.001211 ft/ft	

APPENDIX B – STORM DRAIN HYDRAULICS

Calculation Results Summary

=====
 Scenario: Base

>>> Info: Subsurface Network Rooted by: Jct Str
 >>> Info: Subsurface Analysis iterations: 1
 >>> Info: Convergence was achieved.

=====
 CALCULATION SUMMARY FOR SURFACE NETWORKS

Label	Inlet Type	Inlet	Total Intercepted Flow (cfs)	Total Bypassed Flow (cfs)	Capture Efficiency (%)	Gutter Spread (ft)	Gutter Depth (ft)
I-3	Generic Inlet	Generic Default 100%	0.00	0.00	100.0	0.00	0.00

=====
 CALCULATION SUMMARY FOR SUBSURFACE NETWORK WITH ROOT: Jct Str

Label	Number of Sections	Section Size	Section Shape	Length (ft)	Total System Flow (cfs)	Average Velocity (ft/s)	Hydraulic Grade Upstream (ft)	Hydraulic Grade Downstream (ft)
P-4	1	84 inch	Circular	1,877.00	485.00	12.60	1,376.78	1,365.96

Label	Total System Flow (cfs)	Ground Elevation (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
Jct Str	485.00	1,367.50	1,365.96	1,365.96
I-3	485.00	1,377.80	1,376.78	1,376.78

=====
 Completed: 05/27/2004 10:17:06 AM

Title: 71st Street Storm Drain

s:\...hydraulics\storm drain\71st-sd-3c.stm

05/27/04 10:17:40 AM

© Haestad Methods, Inc.

Flood Control District of Maricopa County

37 Brookside Road Waterbury, CT 06708 USA

Project Engineer: Information Technology

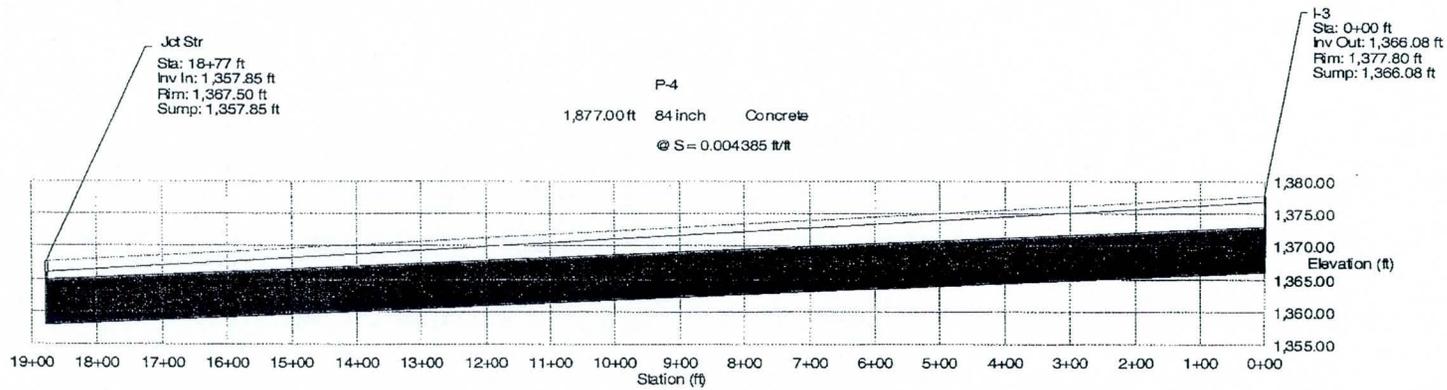
StormCAD v5.5 [5.5003]

+1-203-755-1666

Page 1 of 1

Profile
Scenario: Base

84" - Cholla - Sunnyside Drive



APPENDIX B – STORM DRAIN HYDRAULICS

INLET DESIGN CALCULATIONS

$$Q = 1.49/n \times A \times R_h^{0.67} \times S_L^{0.5}$$

Eq 4-37

HEC No. 22, URBAN DRAINAGE DESIGN MANUAL

Q = 485 Discharge (cfs)
 n = 0.013 Coefficient
 B = 16 Bottom Width (ft)
 Z = 1 Side slope to 1
 S_L = 0.0016 Bed slope (ft/ft)
 d = 3.1 depth of flow (ft)

$$A = zd^2 + bd$$

$$P = b + 2d(z^2 + 1)^{0.5}$$

$$R_h^{2/3} = (A/P)^{2/3}$$

$$S_L^{0.5} = 0.040$$

$$1.49/n = 114.615$$

Solve for d try

d	A	P	R _h ^{2/3}	Q
3	57	24.5	1.8	459.0
3.1	59.21	24.8	1.8	485.3
3.2	61.44	25.1	1.8	512.3
3.3	63.69	25.3	1.8	539.9
3.4	65.96	25.6	1.9	568.1

Weir Flow

$$Q_w = C_w P d^{1.5}$$

W (ft) = 16 Width of grate
 L (ft) = 7 Length of Grate
 P (ft) = 30 2L + W
 C_w = 3 Coefficient

Clogging Factor, C_F = 50%

$$P_e (ft) = (1 - C_F) * W + 2L = 22$$

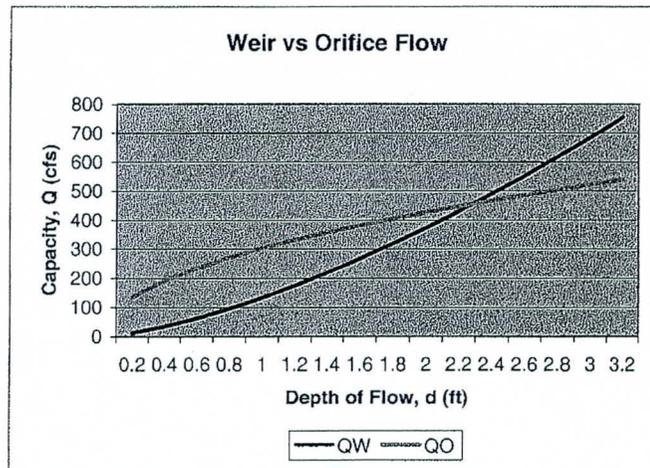
Orifice Flow

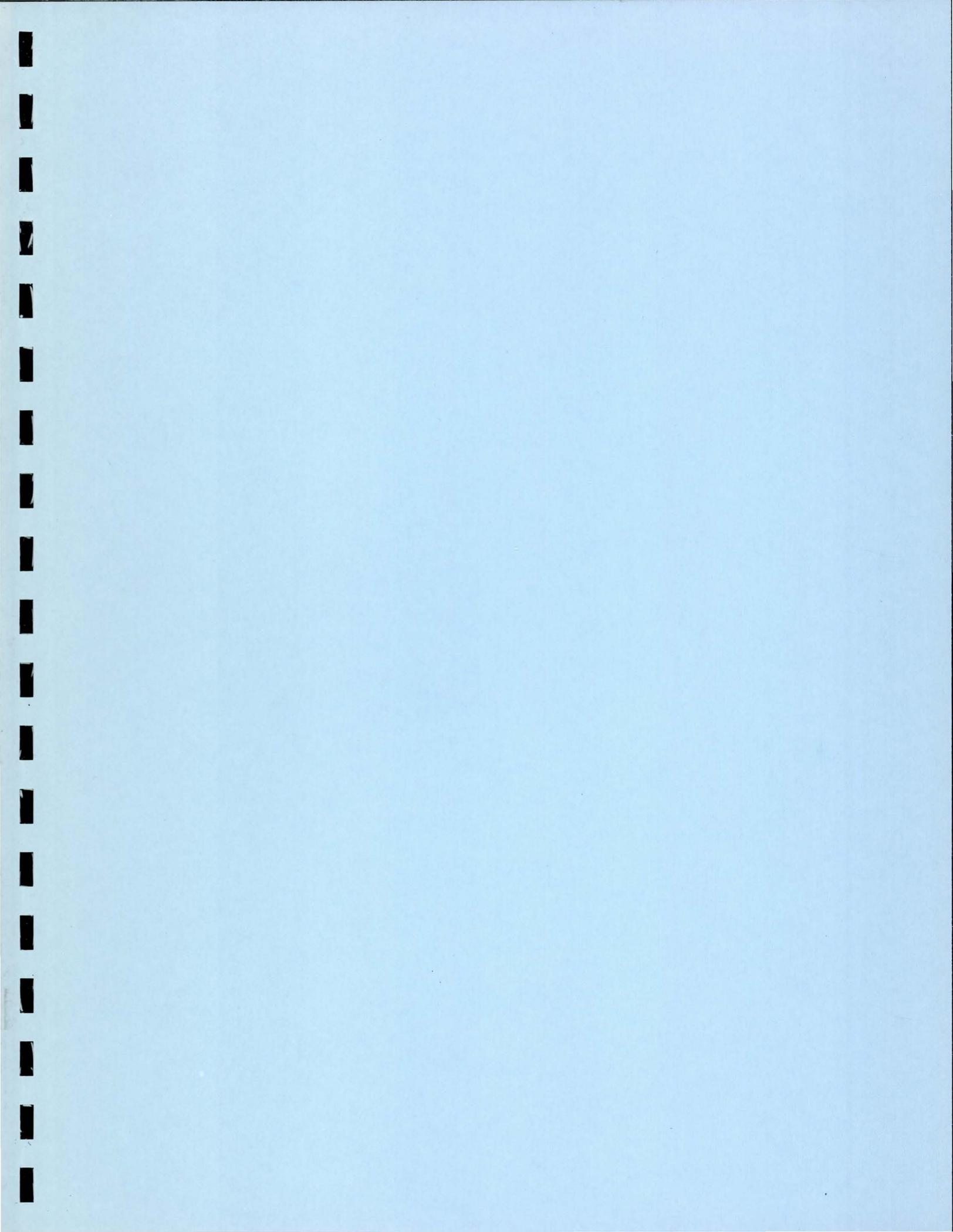
$$Q_o = C_o A_G (2gd)^{0.5}$$

C_o = 0.67 Coefficient
 A (sf) = 112 Gross grate area
 Clogging Factor, C_F = 50%

A_G (sf) = 56 Net area of Grate

d	Q _w	Q _o
0.2	12	135
0.4	33	190
0.6	61	233
0.8	94	269
1	132	301
1.2	174	330
1.4	219	356
1.6	267	381
1.8	319	404
2	373	426
2.2	431	447
2.4	491	466
2.6	553	486
2.8	618	504
3	686	522
3.2	756	539





APPENDIX C - PHOTOS

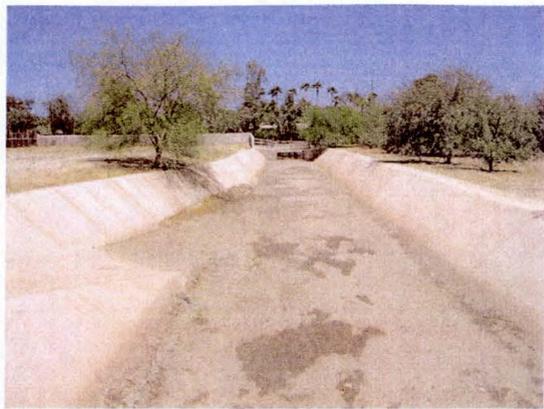


PHOTO 1 71st Street Channel between Paradise Dr & Cactus Road (facing north)



PHOTO 2 Paradise Drive at 71st Channel alignment (facing south)

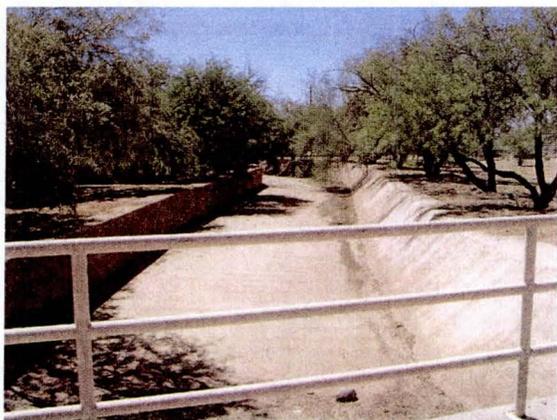


PHOTO 3 Existing culvert outlet @ Paradise Drive (facing south)



PHOTO 4 End of concrete channel at Sunnyside Drive & beginning of storm drain project (facing north)

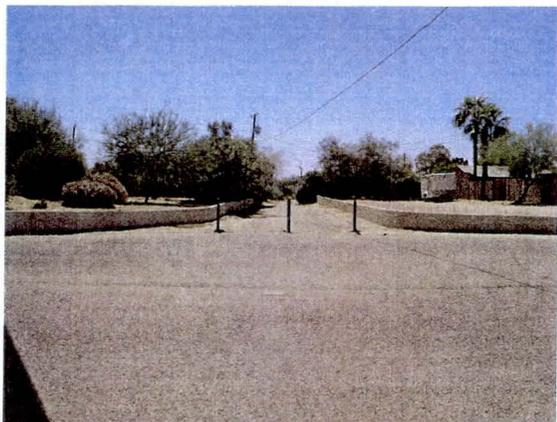


PHOTO 5 Drainageway south of Sunnyside Drive (Facing South)

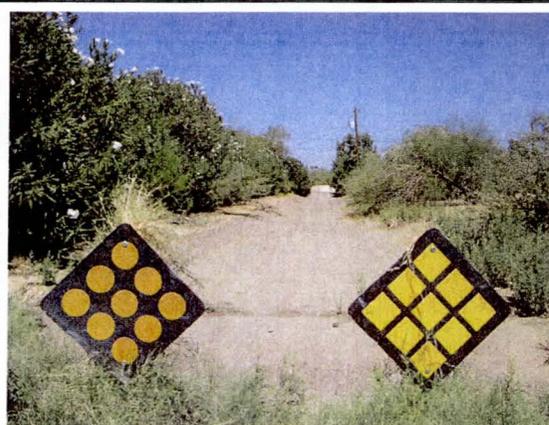


PHOTO 6 Asphalt swale between Sunnyside & Jenan Dr (Facing north)

APPENDIX C - PHOTOS

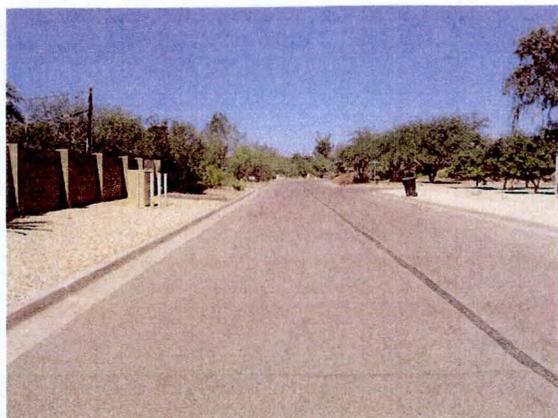


PHOTO 7 71st Street Road north of Cholla Rd (Facing North)



PHOTO 8 Drainage easement south of Cholla (Facing North)



PHOTO 9 End of drainage easement south of Cholla Road (Facing South)



PHOTO 10 Downstream of storm drain outlet upstream of Mescal (Facing South)

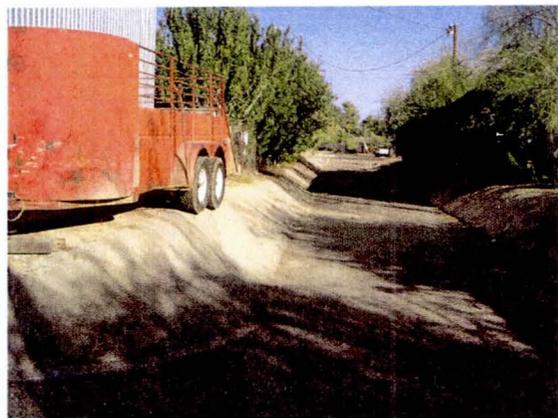
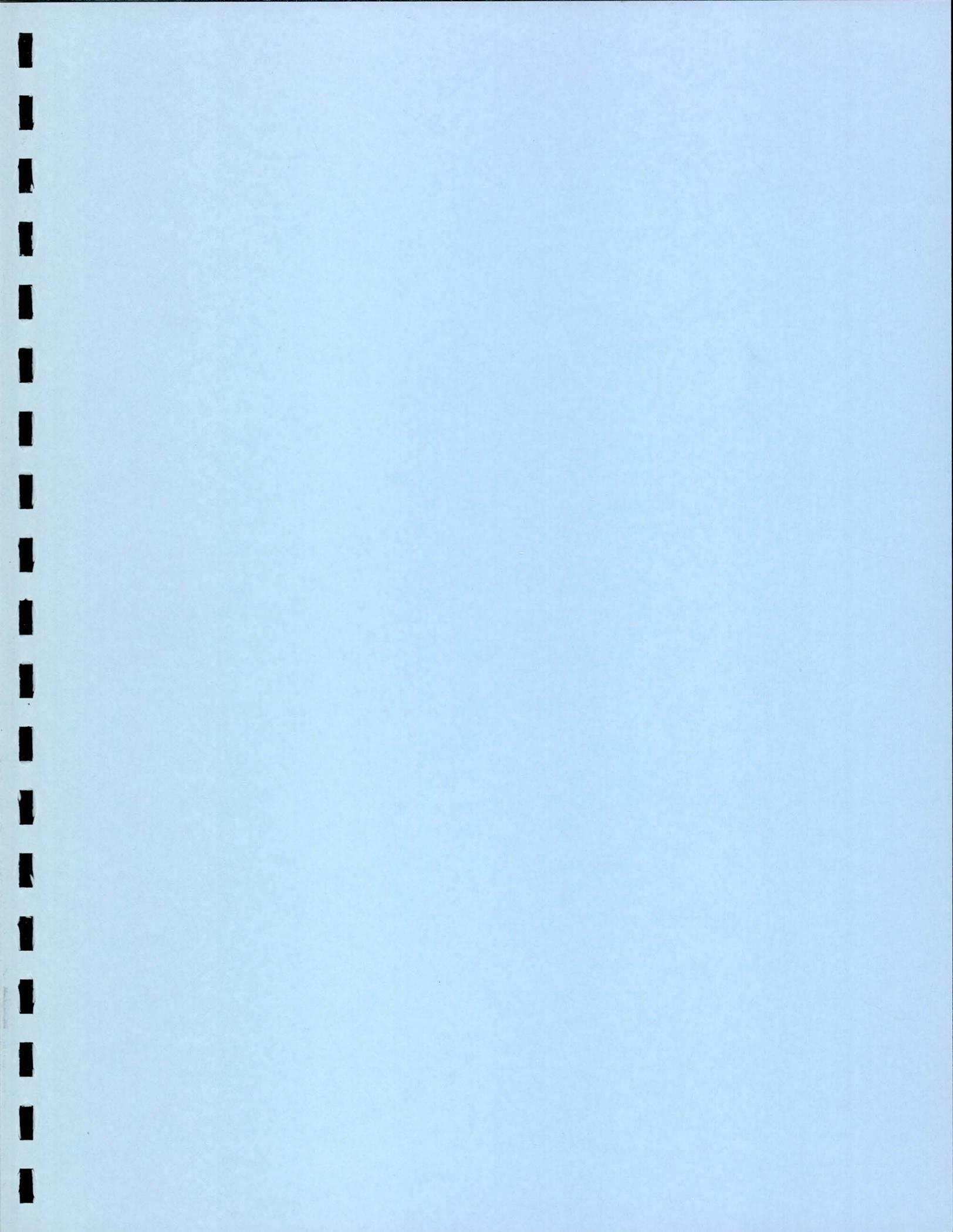


PHOTO 11 Drainage Easement south of Cholla Road (Facing North)

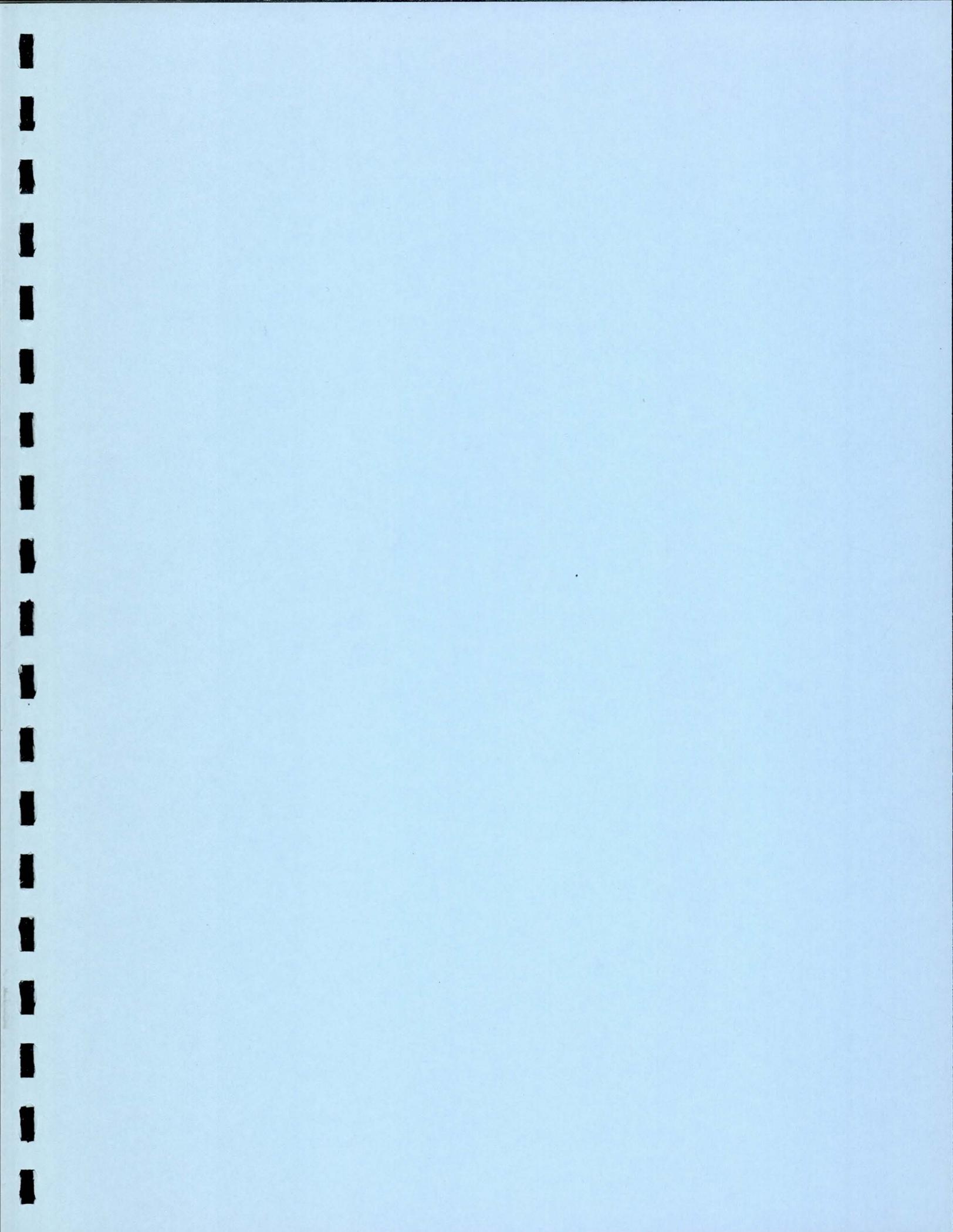


APPENDIX D – BIDDING SCHEDULE

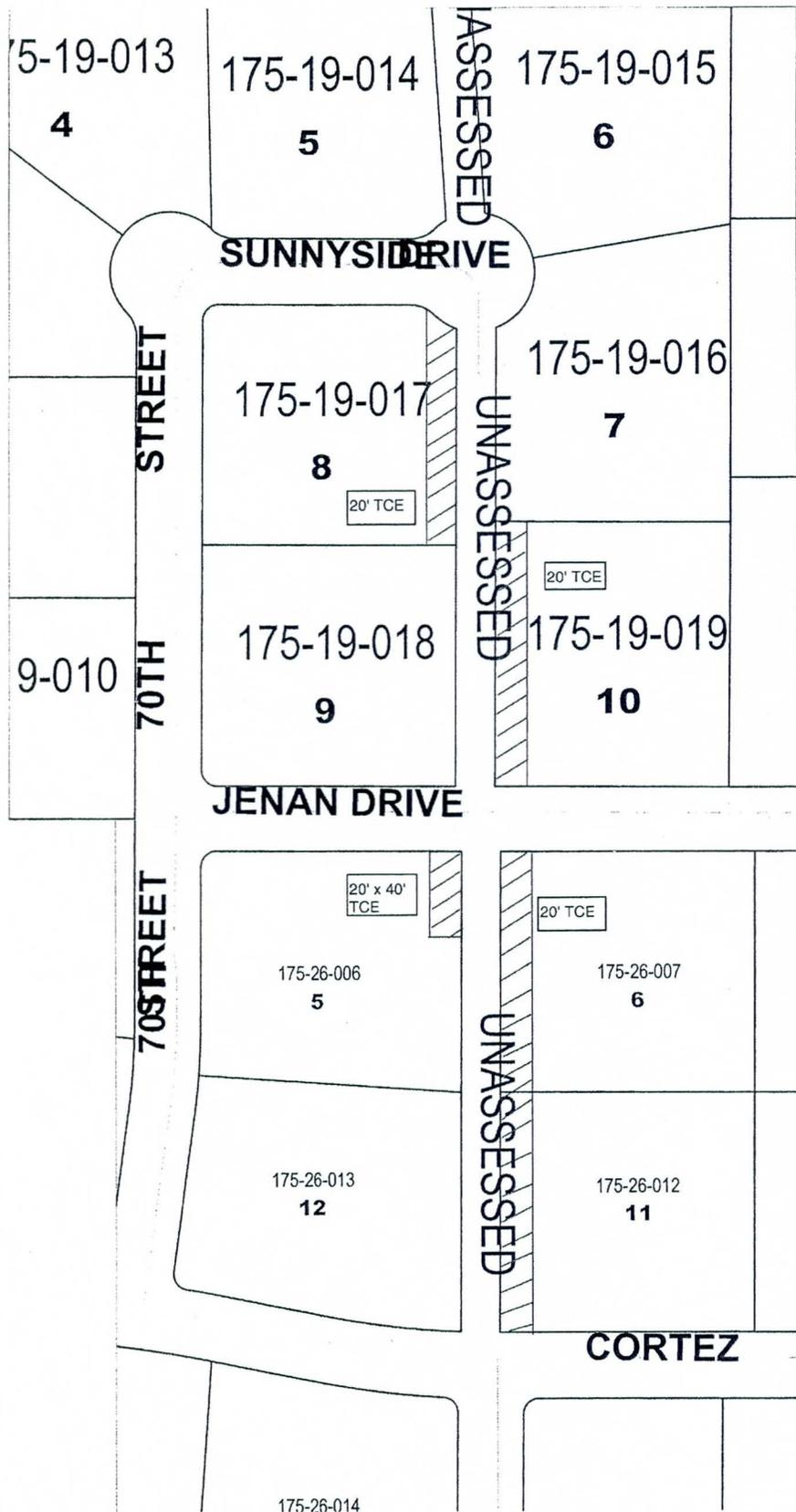
PROJECT: 71st Storm Drain
Mescal To Sunnyside Drive

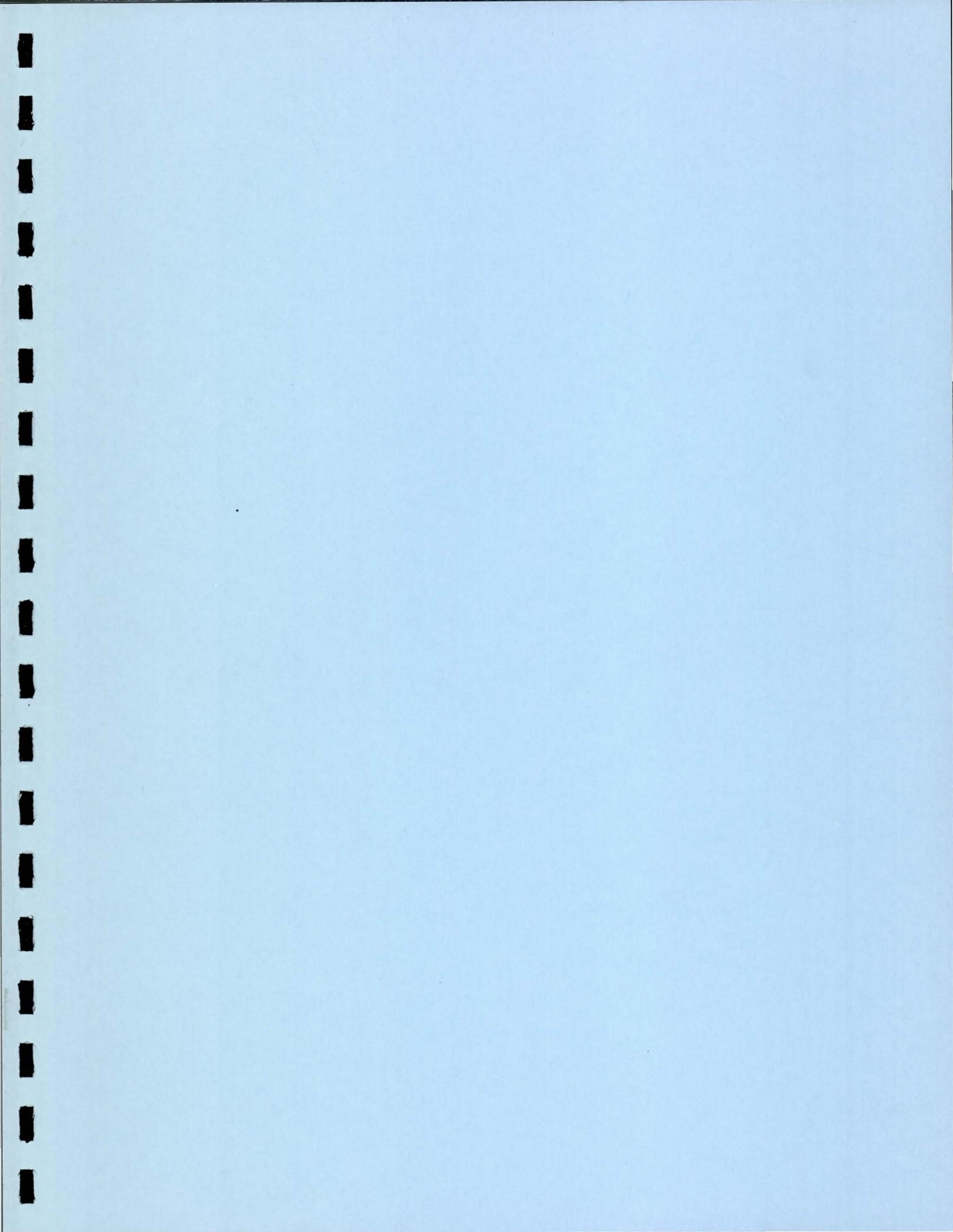
PROJECT CONTROL NO. 120.03.31
CONTRACT NO. 2004C0xx

ITEM NO.	DESCRIPTION	Unit	Qty	UNIT COST NUMBERS	EXTENDED AMOUNT
105 - 1	Partnering Allowance	LS	1		
107 - 1	AZPDES / SWPPP Permits	LS	1		
107 - 2	Public Information and Notification Allowance	LS	1		
107 - 3	Project Signs Allowance	LS	1		
202 - 1	Mobilization	LS	1		
211 - 1	Fill	CY	0		
220 - 1	Grouted Rip Rap (Dmax=12")	SY	150		
336 - 1	Asphalt Pavement (2" A.C.)	SY	849		
336 - 2	Permanent Pavement Replacement (5" A.C.)	SY	2,017		
340 - 1	Concrete Curb & Gutter, MAG Std Detail 220 Type A	LF	1,162		
340 - 2	Concrete Curb & Gutter, MAG Std Detail 220 Type B	LF	72		
340 - 3	Concrete Valley Gutter, MAG Std Detail 240	LF	885		
343 - 1	Decorative Concrete Pavement, Type I	SF	2,348		
343 - 2	Decorative Concrete Pavement, Type II	SF	7,429		
350 - 1	Removal of Existing Improvements	LS	1		
350 - 2	Remove Pavement	SY	4,225		
350 - 3	Remove Concrete Curb	LF	1,248		
350 - 4	Remove Existing Concrete Lining	SY	761		
350 - 5	Remove Concrete Headwall & Apron	EA	1		
350 - 6	Remove Slotted Drain	EA	1		
350 - 7	Remove 60 Inch Concrete Pipe	LF	22		
350 - 8	Remove 24 Inch and/or Smaller Concrete Pipe	LF	6		
350 - 9	Remove Grouted RipRap	SY	150		
401 - 1	Traffic Control	LS	0		
405 - 1	Survey Monument MAG Std DET 120-1, Type B	EA	1		
505 - 1	Conc Junction Structure, Detail D1	EA	1		
505 - 2	Conc Catch Basin & Apron, MAG Std Detail 535-F & Dtl 1	EA	0		
505 - 3	Conc Drop Inlet Str, Detail 2	EA	1		
505 - 4	Conc Outlet Headwall, ADOT DET B-04.1(4:1), B06.10	EA	1		
525 - 1	Concrete Channel Lining (3" thick)	SY	820		
610 - 1	4" Waterline Vertical Realignment, COS Std Detail 2370	EA	2		
610 - 2	6" Waterline Vertical Realignment, COS Std Detail 2370	EA	4		
610 - 3	4" Water Valve Box & Cover (Allowance Item)	EA	0		
610 - 4	6" Water Valve Box & Cover (Allowance Item)	EA	0		
618 - 1	84 Inch Pipe	LF	1,874		
618 - 2	24 Inch Pipe	LF	8		
620 - 1	78 Inch Cast-In-Place Pipe	LF	666		
625 - 1	Storm Drain Manhole MAG Std Detail 521 & 522	EA	3		
Contingency			%		

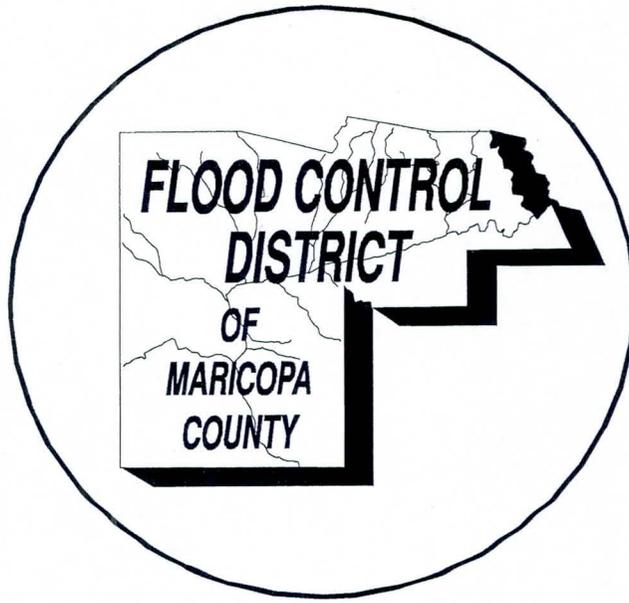


APPENDIX E - TCE EXHIBIT





APPENDIX F – SPECIAL PROVISIONS



**SPECIAL PROVISIONS
DRAFT 60%**

CONTRACT FCD 2004Cxxx

71st STREET STORM DRAIN

PCN 120.03.31

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

**71ST STREET STORM DRAIN
CONTRACT NO. FCD 2004Cxxx
PROJECT NO. 120.03.31**

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 201.5-Payment

Replace this subsection with the following:

No payment will be made for this task. The cost thereof shall be included in the bid price for the construction of the items to which such clearing and grubbing is incidental or appurtenant.

Subsection 201.6 – Measurement, Removal and Disposal of Trees

Replace this subsection with the following:

No measurement will be made for the removal or disposal of trees regardless of size.

Subsection 201.7 – Payment, Removal and Disposal of Trees

Replace this subsection with the following:

No payment will be made for the removal or disposal of trees regardless of size. The cost thereof shall be included in the price bid for clearing and grubbing.

SECTION 202 – MOBILIZATION

Add this section in its entirety.

Subsection 202.1 - Description

Add the following subsection:

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 and operations that must be performed and costs incurred prior to beginning work on various items on the project site. The work under this section also includes maintenance and utilities costs for all offices, buildings, and facilities during construction, and removal of all offices, buildings, and facilities upon completion of construction.

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 office shall not be in the same building or mobile trailer as office space of the contractor.

The Contractor shall obtain written approval from the property owner upon site selection of the field office.

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 luminaries to provide a minimum illumination level at desk 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, FAX machine – Two (2) separate outside telephone lines for 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 this line.
- d. Toilet - A commode and wash sink in a separately enclosed room with the building or mobile trailer, properly ventilated and complying with applicable sanitary codes. Contractor shall provide water service.
- e. Maintenance – The Contractor shall maintain all facilities and furnished equipment in good working order.
- f. Fire Extinguisher – Two (2) 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: 2B: 10C.
- g. Electricity – Contractor shall provide electric power and pay for all electric service.
- h. Furnishings – Three (3) office desks with drawers, six office chairs (padded, swivel type), two (2) drafting tables (adjustable height three feet (3') by six feet (6'), three (3) eight (8) foot conference tables, twelve (12) folding chairs, one (1) draftsman's stool, and three (3) four (4) drawer legal file cabinets. All furnishings shall be in good working order.
- i. Copier - Copier for eight and one-half inch by eleven inch (8½" X 11") and eleven inch by eleven inch by seventeen inch (11" X 17") paper with minimum of ten (10) copy capacity.
- j. First Aid Kit – Contractor shall provide a first aid kit.
- k. Potable Water Supply – Contractor shall provide a potable water supply and pay for all water 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 ten (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.

The Contractor shall maintain all 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 202.2 – Payment

Replace this subsection with the following:

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 Five (5) percent of the total project bid amount exclusive of mobilization. No additional payment will be made for occupancy and services during periods of contract extension of time due to engineering changes.

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 to this subsection:

The work includes structure excavation and backfill for construction of the junction structure, special inlet structure, catch basins, and headwalls as shown in the plans.

Subsection 206.2 - Foundation Material Treatment

Add the following to this subsection:

Foundation bearing surfaces shall be free of debris and water softened materials prior to placing concrete and reinforcing steel. Any loose or disturbed zones should be removed and replaced with compacted fill or lean concrete.

Subsection 206.4 - Structure Backfill

Add the following to this subsection:

Compaction of structure backfill soils against embedded footings, walls, and headwall structures shall be accomplished to a minimum ninety-five percent (95%) of the maximum ASTM D698 density.

Compaction against wing walls, or channel lining within three feet (3') of the walls shall be accomplished using non-wheeled, hand operated compaction equipment only.

Backfill shall consist of free draining granular soils that exhibit low expansive potentials. The material shall be free of vegetation, debris, organic contaminants, and fragments no larger than four inches (4") in size.

Compaction operations shall be accomplished by mechanical methods. Water settling or jetting shall not be permitted.

On-site soils may be used in structural fills or backfill except for high plasticity on-site soils (P.I. > 12) that may not be used in structure fills or backfill. Imported soil used for fills under pavements, or channels, backfill around structures should be granular soils conforming to the following requirements:

Sieve Size	Percent Passing
3"	100
3/4"	60-80
#8	35-80
#200	0-12

(Arizona Test Method 201)

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

Subsection 206.5 - Payment

Replace this subsection with the following:

No payment will be made for structure excavation and backfill as such. The cost thereof shall be included in the bid price for the construction or installation of the items to which such excavation and backfill is incidental or appurtenant.

SECTION 220 – RIPRAP CONSTRUCTION

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

Subsection 220.1 Description

Add the Following:

The work under this section shall consist of furnishing and grouting riprap in place to a depth as shown on the plans.

Subsection 220.7 – Measurement

Replace this subsection with the following:

The quantities of riprap construction shall be those of the completed bid item, in place, within the limits of the dimensions shown on the plans. The quantity shall be measured by the square yard at the exposed surface.

Subsection 220.8 – Payment

Replace this subsection with the following:

Payment for grouted riprap construction shall be made for number of exposed square yards of grouted riprap in place and shall include preparation of ground surfaces, and any other work necessary to which is incidental or appurtenant to the construction of the grouted riprap.

ITEM 220-1 – GROUTED RIPRAP ($D_{min} = 8''$, $D_{max} = 12''$)

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:

The work under this section shall consist of furnishing and applying all water required for control of dust, for the safety and convenience of the traveling public, and for the reduction of the dust nuisance to adjacent properties.

The Contractor shall obtain the necessary permits under the County Air Pollution Statutes. It shall be the responsibility of the Contractor to keep the construction site moistened to prevent dust pollution to the air and adjacent properties.

Subsection 225.5 – Payment

Replace this subsection with the following:

No payment shall be made for the cost of watering. The cost of watering shall be included in the price bid for the construction operation to which such 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.

Subsection 301.1 – Description –

Add the following:

This work consists of the preparation of the subgrade for pavement replacement along 71st Street and the alleyway south of Cholla Road.

Subsection 301.7 – Measurement

Replace this subsection with the following:

No separate measurement will be made for this item.

Subsection 301.8 – Payment

Replace this subsection with the following:

No separate payment shall be made for this item. The cost thereof shall be included in the cost of pavement replacement as described in Section 336.

SECTION 310 – UNTREATED BASE

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

Subsection 301.1 – Description –

Add the following:

This work consists of the placement of ABC for pavement replacement along 71st Street as described in Section 336.

Subsection 310.4 – Payment

Replace this subsection with the following:

No separate measurement or payment will be made for this item. The cost thereof shall be included in the cost of pavement replacement as described in Section 336.

SECTION 329 – TACK COAT

Construction shall conform to Section 329 of the MAG Uniform Standard Specifications except as modified herein.

Subsection 329.6 – Measurement

Replace this subsection with the following:

No separate measurement shall be made for this item.

Subsection 329.7 – Payment

Replace this subsection with the following:

No separate payment will be made for tack coat. The cost thereof shall be included in the cost of pavement replacement as described in Section 336.

SECTION 334 – PRESERVATIVE SEAL FOR ALPHALT CONCRETE

Construction shall conform to Section 334 of the MAG Uniform Standard Specifications except as modified herein.

Subsection 334.4 – Measurement

Replace this subsection with the following:

No separate measurement will be made for this item.

Subsection 334.5 – Payment

Replace this subsection with the following:

No separate payment will be made for Fog seal coats or preservative seal coats. The cost thereof shall be included in the cost of pavement replacement as described in Section 336.

SECTION 336 – PAVEMENT PATCHING AND SURFACING REPLACEMENT

Construction shall conform to Section 336 of the MAG Uniform Standard Specifications except as modified herein.

Subsection 336.1 – Description

Add the following to this subsection.

This item is for the re-construction of the pavement cuts in 71st Street for the construction of the storm drain and waterline pipes, and any other project improvements in the roadway.

Subsection 336.2.2 -Pavement to be Removed

Add the following to this subsection.

All pavement to be removed shall first be sawcut.

The street shall be seal coated after installation of permanent pavement replacement in accordance with Section 336.2.2. The seal shall be a slurry seal coat with a type II aggregate mix (MAG Section 715). The cost of the slurry seal coat shall be included in the cost of the permanent pavement replacement.

Subsection 336.2.4 –Permanent Pavement Replacement:

Add the following:

The acceptable surface profile from the existing surface across a pavement replacement shall not vary more than ¼-inch from the lower edge of a 12-foot straightedge when the straightedge is placed parallel or perpendicular to the centerline of the roadway. When the width of the pavement replacement is greater than six (6) feet, compliance with the specification shall be measured by placing the straightedge a minimum of 4-feet overlapping the existing pavement.

Subsection 336.3 - Types and Locations of Pavement and Surfacing Replacement

Replace this subsection with the following:

The Contractor will be responsible to replace, at his own cost any and all damaged pavement due to his construction activities on the project. This includes, but is not limited to, the replacement of newly cracked pavement, the replacement of existing cracked pavement where the cracks have been widened, the replacement of any chipped or missing pieces of pavement, and the replacement of any deformed pavement. The pavement will be sawcut at right angles to the roadway, to encompass the replacement areas.

Subsection 336.4 - Measurement

Replace this subsection with the following:

Measurement for payment and surfacing replacement will be by the square yard, based upon actual field measurements of the area covered. Pavement outside the normal construction limits damaged by the Contractors operation will not be measured.

Subsection 336.5 - Payment

Replace this subsection with the following:

Payment for asphalt concrete pavement replacement shall be made on the basis of price bid per square yard. No payment will be made for the slurry seal coat, as such, the cost thereof shall be included in the bid price for Pavement Replacement.

ITEM 336-1 – ASPHALT PAVEMENT (2" A.C.)

ITEM 336-2 – PERMANENT PAVEMENT REPLACEMENT (5" A.C.)

SECTION 340 - CONCRETE CURB

Concrete single curb shall conform to Section 340 of the MAG Uniform Standard Specifications and COS Supplement except as modified herein.

Subsection 340.1 - Description

Add the following to this subsection:

The work shall include the construction of a concrete single, vertical, and roll curb as shown on the plans.

Subsection 340.6 - Payment

Replace this subsection with the following:

Payment for concrete curb and valley gutter shall be made on the basis of the price bid per linear foot. This price shall be considered full compensation for the item complete including all construction equipment, labor, materials, pavement removal and replacement if necessary, and all incidentals items necessary to accomplish the work in conformance to the plans including construction of the curb transitions.

ITEM 340-1 - CONCRETE CURB & GUTTER, MAG STD DET 220, TYPE 'A'

ITEM 340-2 - CONCRETE CURB & GUTTER, MAG STD DET 220, TYPE 'B'

ITEM 340-3 - CONCRETE VALLEY GUTTER, MAG STD DET 240

SECTION 343 - INTEGRAL COLOR EXPOSED AGGREGATE PAVING

Integral Color Exposed Aggregate Concrete Type I and Type II shall conform to the provisions of Sections 305, 343, 702, 725, 727 and 729 of the MAG Uniform Standard Specifications For Public Works Construction are hereby amended to include the following:

Subsection 343.1 Description

Add the following to this subsection:

The work under this item shall consist of furnishing all materials, personnel and equipment to construct a pavement base and integral color exposed aggregate finish concrete pavement in accordance with the details shown on the project plans and the requirements of these specifications.

TYPE I - INTEGRAL COLOR EXPOSED AGGREGATE PAVING, 1" RIVER RUN TYPE ROCK (NOT CRUSHED)

TYPE II - INTEGRAL COLOR EXPOSED AGGREGATE PAVING, 2" RIVER RUN TYPE ROCK (NOT CRUSHED)

Subsection 343.2 Materials

Add the following to this subsection:

Subsection 343.2.1 Concrete

Replace with the following to this subsection:

Concrete shall be Class B per Section 725.

Subsection 343.2.3 Decorative Pavement Texture

Add the following subsection:

Concrete mix shall be placed and screeded to the proper grade and floated to a uniform surface while concrete is still plastic, texturing shall be performed to make the desired pattern and texture.

The exposed aggregate surface shall have a uniform surface free of irregularities. The Type I - Integral Color, 1" river run type rock, exposed aggregate concrete shall have integral color San Diego Buff, as manufactured by Davis Color or approved equal.

The Type II - Integral color, 2" river run type rock, exposed aggregate concrete shall have integral color Kahlua, as manufactured by Davis Color or approved equal.

The finish surface shall be exposed aggregate be uniform in finish and per approved sample.

Prior to construction of decorative pavement, the contractor shall provide the Resident Landscape Architect with a sample of the decorative pavement to be constructed and a list of previous local projects where the proposed pavement has been constructed. Additionally, the contractor shall provide the Resident Landscape Architect with color sample specimens, which are within the color range specified on the project plans. The Resident Landscape Architect will select the color specimen, which will be used as the criteria for pavement color and uniformity acceptance. Construction of the decorative pavement shall not begin until the submitted sample have been approved by the Resident Landscape Architect. The contractor shall stake the horizontal placement and vertical locations for the Resident Landscape Architect's approval prior to construction.

The contractor shall provide supervisors and workmen who are capable of construction decorative pavement of the quality represented by the samples submitted and as demonstrated on previous projects.

The pavement base shall be constructed as shown on the project plans and in accordance with the requirements of Section 303 of the Specifications. The surface on which the decorative pavement is constructed shall be smooth and free of debris, loose rock exceeding one inch in diameter and other foreign material.

Concrete mix shall be placed and screeded to the proper grade and floated to a uniform surface while concrete is still plastic, texturing shall be performed to make the desired pattern and texture. The exposed aggregate surface shall have a uniform surface free of irregularities.

Subsection 343.2.4 Joint Materials

Add the following subsection:

Joints shall be constructed with ½ inch wide preformed bituminous joint filler conforming to the requirements of AASHTO M213.

Subsection 343.4.1 Measurement and Pavement

Replace this subsection with the following:

Decorative pavement will be measured by the square foot of each type of pavement constructed. Payment will be made at the unit bid price per square foot. This price shall be full compensation for all labor, material, tools, and equipment required to complete the work.

ITEM 343-1 – DECORATIVE CONCRETE PAVEMENT, TYPE I

ITEM 343-2 - DECORATIVE CONCRETE PAVEMENT, TYPE II

SECTION 350 - REMOVAL OF EXISTING IMPROVEMENTS

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

Subsection 350.1 - Description

Add the following:

The work includes the removal and disposal of pavement, pipes, headwalls, trees, shrubs, sidewalk, curbs, gutters, and other items within the project corridor.

Subsection 350.4 - Payment

Add the following:

Payment for removal of trees, shrubs, and other items not specifically called out or noted as NPI (non pay items) that are necessary for the construction of the storm drain, channel, and appurtenances shall be made on the basis of the lump sum price bid. Payment shall be full compensation for furnishing all labor, materials, tools and equipment, sawcutting, removal, salvaging traffic signs &/or reinstalling traffic signs, hauling, disposal and all other items necessary to accomplish the work.

ITEM 350-1 – REMOVAL OF EXISTING IMPROVEMENTS

Payment for removal and disposal of the existing AC pavement shall be made on the basis of the price bid per square yard. Payment shall be full compensation for furnishing all labor, materials, tools and equipment, sawcutting, removal, hauling, disposal and all other items necessary to accomplish the work.

ITEM 350-2 – REMOVE PAVEMENT

Payment for removal and disposal of the concrete curb shall be made on the basis of the price bid per linear foot. Payment shall be full compensation for furnishing all labor, materials, tools and equipment, sawcutting, removal, hauling, disposal and all other items necessary to accomplish the work.

ITEM 350-3 – REMOVE CONCRETE CURB

Payment for removal and disposal of existing concrete lining shall be made on the basis of the price bid per square yard. Payment shall be full compensation for furnishing all labor, materials, tools and equipment, sawcutting, removal, hauling, disposal and all other items necessary to accomplish the work.

ITEM 350-4 – REMOVE CONCRETE LINING

Payment for removal and disposal of concrete headwall and apron shall be made on the basis of the price bid per each. Payment shall be full compensation for furnishing all labor, materials, tools and equipment, removal, hauling, disposal and all other items necessary to accomplish the work.

ITEM 350-5 – REMOVE CONCRETE HEADWALL AND APRON

Payment for removal and disposal of the slotted drain pipe shall be made on the basis of the price bid per each. Payment shall be full compensation for furnishing all labor, materials, tools and equipment, removal, hauling, disposal of the basin, slotted drain pipe and coincidental valley gutter and all other items necessary to accomplish the work.

ITEM 350-6 – REMOVE SLOTTED DRAIN

Payment for removal and disposal of the concrete pipe shall be made on the basis of the price bid per linear foot. Payment shall be full compensation for furnishing all labor, materials, tools and equipment, removal, hauling, disposal and all other items necessary to accomplish the work.

ITEM 350-7 – REMOVE 60 INCH CONCRETE PIPE

ITEM 350-8 – REMOVE 24 INCH AND/OR SMALLER CONCRETE PIPE

Payment for removal and disposal of the existing grouted riprap shall be made on the basis of the price bid per square yard. Payment shall be full compensation for furnishing all labor, materials, tools and equipment, removal, hauling, disposal and all other items necessary to accomplish the work.

ITEM 350-9 – REMOVE GROUTED RIPRAP

SECTION 401 – TRAFFIC CONTROL

The work described by this section shall conform to MAG Section 401, City of Scottsdale Section 401, City of Scottsdale's Traffic Barricade Manual and the Manual of Uniform Traffic Control Devices, except as modified herein.

Subsection 401.1 – Description

The Contractor shall be responsible to provide all barricades, signs, lights, off-duty police officers, fences, security instruments, flagmen, and all other traffic control devices and personnel necessary to properly mark and control the construction area for the safe and efficient movement of traffic around, and through, the work site. The Contractor will be responsible to maintain all traffic control devices during construction and will be responsible for the removal of all traffic control devices upon completion of the work as accepted by the Engineer. The application of traffic control measures and traffic regulation in these specifications are intended to supplement and are not intended to delete any provisions of the City of Scottsdale's Traffic Barricade Manuals, the Uniform Manual on Traffic Control Devices or any agency's Supplements to these Standard Specifications. All traffic control shall conform to these specifications and any requests from the Engineer.

The Contractor shall submit to the Engineer at the Pre-Construction meeting, for the Engineer's approval, a temporary traffic control plan and the use of temporary traffic control devices as described in subsection 401.5 of these specifications. Subsequent to approval, the traffic plan and all traffic control devices shall be installed prior to the start of any work. The Engineer's approval of the Contractor's traffic control method shall not relieve the Contractor of his responsibility to protect the work, the Contractor's personnel, nor the general public.

The Contractor shall provide and maintain all necessary signs and barricades to protect the work area for five (5) days beyond the concrete cure time or acceptance of the work by the Engineer, whichever period is greater.

Subsection 401.2 – Traffic Control Devices

Add the following:

All existing signs in conflict with the construction signs shall be temporarily covered

Temporary traffic control devices shall meet the following requirements:

- (A) All regulatory and warning signs shall have flags and lights displayed.
- (B) All Type II Barricades, Type III Barricades and vertical panels shall be equipped with steady burning lights.
- (C) All orange construction signs shall use high reflectivity sheeting and all other signs shall use standard reflective sheeting.
- (D) All signs to be used on the job during periods of darkness shall be reflectorized.

Subsection 401.3 – Flagmen

Flagmen shall consist of providing sufficient flagmen, uniformed off-duty law enforcement officers to expedite the safe passage of traffic.

Subsection 401.4 – Traffic Control Measures

Add the following:

Whenever construction operations create a condition hazardous to the public in the opinion of the Contractor or the Engineer, the Contractor shall furnish such flagmen and guards as necessary to provide adequate warning to the public of any dangerous conditions. Safety devices, flagmen and guards, while on duty, shall conform to the applicable City, County and State requirements. The Contractor will be responsible to immediately inform the Engineer of hazardous conditions.

Should the Contractor appear to be neglectful or negligent in furnishing adequate warning and protection measures, the Engineer may direct attention to the existence of a hazard and the necessary warning and protective measures shall be furnished and installed by the Contractor without additional cost to the District. Should the Engineer determine inadequacy of warning and protective measures, such action of the Engineer shall not relieve the Contractor from any responsibility for public safety or abrogate his obligation to furnish any pay for those devices. The installation of any general illumination shall not relieve the Contractor of his responsibility for furnishing and maintaining any protective facility.

Subsection 401.5 – General Traffic Regulations

Add the following:

Contractor shall comply with MAG Section 401.5 as supplemented by COS Section 401 and appended as follows:

Delete COS reference to lane closures between the hours of 7 to 9 A.M. and 4 to 6 P.M. One lane of traffic in each direction must be provided at all times in the City of Scottsdale unless advance approval in writing is obtained from the City of Scottsdale Traffic Engineering Director.

The Contractor will develop routes for haul trucks on public streets, which will be submitted in writing through the City of Scottsdale Development Services for review and approval. The submittal shall include, but not be limited to, the proposed travel direction, turn movements, hours of use, street sweeping, watering and clean up. Presently established truck routes must be used.

The City of Scottsdale Traffic Engineering Department shall determine approach speed limits and speed limits within the construction area.

In addition to the traffic control required for the Contractor's daily operations, the following is also included as part of this item:

A) Traffic Control General Requirements

- Construction shall be staged and scheduled to minimize disruption to the neighborhoods, schools and businesses.
- The Contractor shall provide and maintain two variable message signs for project traffic control purposes for the duration of the project.

(B) Other Project Coordination - The Contractor shall be responsible to coordinate and schedule work to minimize disruption or conflicts with other projects in the project area.

- (C) **Sanitation Pick-up** - The Contractor shall provide sanitation pick-up for affected residents by relocating trash containers, or by providing alternative measures acceptable to the Sanitation Division of the City of Scottsdale Municipal Services Department.
- (D) **Special Events** - The Contractor shall coordinate special events scheduled to take place during construction into the construction schedule.
- (E) **Special Sign Requirements** - The Contractor shall provide, erect and maintain advance notification, information, and directional access signs (for businesses, churches, hospitals, etc.) that may be required by the Engineer. The cost shall be included in the bid item for Traffic Control.
- (F) **Bus Stops** - The Contractor shall maintain all existing bus stop locations on this project in a safe manner, or provide alternate bus stop locations as required by the Engineer.
- (G) **Flagging of Traffic** - No flagging of traffic will be permitted during the peak traffic hours of 6:00 a.m. to 8:30 a.m. and 4:00 p.m. to 7:00 p.m. weekdays. If construction requires, intermittent flagging will be allowed from 8:30 a.m. to 4:00 p.m. to facilitate access for heavy construction equipment.
- (H) **Traffic Control Plan** - The Contractor shall submit a traffic control plan for approval by the City of Scottsdale Traffic Engineering Department and the Engineer. The traffic control plan shall include the placement of all traffic control devices, including all conflicting signs to be covered/removed or relocated, or other features that may conflict with the placement of temporary signage. This plan shall be professionally drawn on a 24" x 36" reproducible medium, and shall be submitted to the Engineer at the Pre-Construction meeting.
- (I) **Safety Fencing Requirements for Trenches and Excavations** -
- The Contractor shall provide safety construction fencing around all open trenches and excavations during all non-working hours.
 - The Contractor shall provide for the safety and welfare of the general public by adequately fencing all excavations and trenches that are permitted by the Engineer to remain open when construction is not in progress.
 - Fencing shall be securely anchored to approved steel posts located six (6) feet on center, having a minimum height of six (6) feet, and shall consist of wire mesh fabric of sufficient weight and rigidity to adequately span a maximum supporting post separation of six (6) feet.
 - The fencing, when installed about the periphery of excavations and trenches, shall form an effective barrier against intrusion by the general public into areas of construction. The Contractor, at all times when construction is not in progress, shall be responsible for maintaining the fencing in good repair, and upon notification by the Engineer, shall take immediate action to rectify any deficiency. Prior to the start of any excavating or trenching required for the execution of the proposed work, the Contractor shall submit to the Engineer for approval detailed plans showing types of materials and methods of fabrication for the protective fencing.
- (J) **Sequence of Construction**
- The sequence of construction shall conform to the requirements of the Special Traffic Control Requirements.

- The project shall follow a phasing plan approved by the Engineer. All lanes shall be maintained on a paved surface at all times during construction. This may be accomplished by using existing, new or temporary asphalt pavement. Trenches shall be completely backfilled and either paved with temporary asphalt pavement, or covered with metal plating as necessary to comply with this requirement and the "Special Traffic Regulations."
- Night work will **not** be allowed.
- The right to direct the sequence of construction is a function vested solely with the Engineer. Prior to commencement of the work, the Contractor shall prepare and submit to the Engineer a written phasing plan and work schedule for the project. This plan and work schedule shall be submitted to the Engineer at the Pre-Construction Conference for review.
- When approved, the phasing plan and work schedule shall not be changed without the written consent of the Engineer. Orderly procedure of all work to be performed under this contract shall be the full responsibility of the Contractor. The work schedule shall include the hours per day and the days per week that the Contractor plans to work on the project site.

(K) **Local Access Requirements** - The Contractor shall maintain local access to all side streets, access roads, driveways, alleys and parking lots at all times and shall notify residents, as described in section (P) below, 72 hours in advance of any restrictions which will affect their access as described in. The Contractor shall restore the access as soon as possible. If the primary access cannot be restored in a timely manner, the Contractor shall provide an alternative that shall be predetermined with the residents prior to imposing any restrictions. Any local street restrictions imposed shall be such that local area traffic circulation is maintained.

(L) **Residential and Business Area Requirements**

- The Contractor shall communicate in writing by use of door hangers, and in person as necessary, with all residences, businesses, schools and other entities impacted by the proposed construction. Written communication shall be completed prior to construction, and during construction as refinements are made. The Contractor shall provide information on the planned traffic restrictions including timing, start dates and finish dates by the areas restricted. This information shall be refined and made more specific, such as maps identifying temporary parking areas by date, excavation limits by date, truck routes, and other impacts to the neighborhood.
- 71st Street, Cholla Road to Cortez Street may be allowed to be closed to "Local Traffic Only" where reasonable and necessary as mutually agreed upon by the Contractor and the Engineer. Written approval from the City of Scottsdale Traffic Engineering Director is required prior to each road closure.
- Driveways to individual residences shall not be blocked for more than three days.
- Parking areas for residences whose driveways are blocked shall be identified by the Contractor and communicated to the neighborhood by use of door hangers.
- The Contractor shall provide assistance to residents whose driveways are blocked by construction. This assistance will include carrying groceries, moving heavy objects from vehicle to home and home to vehicle, clearing paths, and other worked deemed necessary by the Engineer to compensate for the temporary inconvenience of construction within the neighborhood.

(M) **Work Site Requirements**

- The Contractor's work area shall be completely fenced and secured at the end of each work shift and it shall not extend more than 200 feet at the end of any work shift.
- The Contractor's work area shall be secured such that neighborhood residents and others are not exposed to construction hazards.

(N) **Cholla Road Requirements**

- Cholla Road may be closed for a weekend if approved in writing two weeks in advance by the Engineer.
- A minimum of one lane with a flagmen shall be provided for traffic on Cholla Road other than the one allowed weekend closure.
- Weekends are defined as FRIDAY 10 P.M. to MONDAY 4 A.M.

Subsection 401.6 – Measurement

Measurement of all traffic control devices as described herein, as required by Subsection 104.1 and as required for the project will be measured on a lump sum basis, except as modified by the following:

- There will be no direct measurement or payment for furnishing, installing, maintaining, or removing temporary asphalt pavement, subgrade preparation including earthwork, and installing temporary drainage facilities, the cost being considered incidental to the cost of the project.
- Uniformed off-duty law enforcement officers will be measured by the hour for each individual, including vehicle and equipment, required to perform traffic control. When an officer is used less than 3 hours, a minimum of 3 hours will be charged. Anything over 3 hours will be measured by the hour.

Subsection 401.7 – Payment

Payment for all traffic control devices and work, excluding the use of uniformed off-duty law enforcement officers as described above, will be paid for at the lump sum contract bid price. Payment shall include full compensation for furnishing labor, materials, tools, equipment and incidentals, and for doing all the work involved to provide traffic control for the project.

ITEM 401-1 – TRAFFIC CONTROL

SECTION 405 – SURVEY MONUMENTS

Construction of survey monuments shall conform to Section 405 of the MAG Uniform Standard Specifications except as modified herein.

Subsection 405.3 – Construction

Add the following:

Prior to removal of any existing survey monument, the Contractor shall ensure that appropriate survey ties have been made and recorded by a Registered Land Surveyor for re-establishing the survey monuments after construction has been completed.

Subsection 405.5 – Payment

Replace this subsection with the following:

Payment for survey monuments including removal, furnishing and installing the monuments, complete in place, including the cost of labor, Registered Land Surveyor, and all other work not specifically covered that is incidental shall be made on the basis of the unit price bid per each item.

ITEM 405-1 – SURVEY MONUMENT, MAG STD DET 120-1, TYPE “B”

SECTION 505 – CONCRETE STRUCTURES

Construction of all concrete structures shall be in accordance with MAG Standard Specification 505, except as noted herein.

Subsection 505.1 - Description

Add the following to this subsection:

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 as located and indicated on the plans.

All steel access barriers, grates and handrails are considered incidental to the concrete features to which they are appurtenant and no separate payment shall be made for these items.

Subsection 505.6 – Joints

Add the following:

A construction joint is defined as a planned joint where two placements of concrete meet across which development and maintenance of bond are required, and through which any reinforcement that may be present is not interrupted. 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 construction joints for a minimum of 2'-0" beyond the end of pour unless noted otherwise on the plans.

After initial cleanup and at the last opportunity prior to placing concrete, concrete surface shall be thoroughly washed with water or air-water jets, and shall be uniformly surface dried. Elastomeric (mastic) sealant used on the construction joints shall be Sikaflex 1-a or an approved equivalent.

When concrete channel lining and placing operations are stopped for the day, interrupted because of breakdown, or delayed by other causes, the edge of the fresh concrete lining shall be bulkheaded to a surface normal to the placement along a transverse or longitudinal lines. Before placing operations are resumed, the surface of the hardened concrete shall be cleaned as specified for a construction joint.

Longitudinal construction joints for the concrete channel lining shall be located at least 1 foot up the side slope and not in the channel bottom.

Subsection 505.8 – Curing

Add the following:

Use one of the following methods as approved by the Engineer:

1. Continuously sprinkle with water 100 percent of the exposed surface for 10 days starting immediately after concrete placement;
2. Cover with burlap or cotton mats and keep continuously wet for 10 days;

3. Cover with 1" layer of wet sand, earth, or sawdust, and keep continuously wet for 10 days;
4. Apply a liquid forming compound method (requires pre-approval of compound by the Engineer).

Subsection 505.9 – Finishing Concrete

Add the following to this subsection:

The finish of the concrete channel lining shall be a Class II Finish as outlined in Subsection 505.9.3.

Subsection 505.10 – Payment

Replace this subsection with the following:

Payment for concrete junction(s), concrete catch basin(s), drop inlet structure, headwall(s) shall be made on the basis of the price bid per each. This price shall be full compensation for all labor, materials, reinforcing steel, handrails, equipment, excavation and backfill, color stain, protective coating, and all other items necessary and incidental to construct the structures complete in place according to the plans and these Special Provisions.

ITEM 505-1 - CONCRETE JUNCTION STRUCTURE, DETAIL D1

ITEM 505-2 - CONCRETE CATCH BASIN & APRON, MAG STD DETAIL 535-F & D-1

ITEM 505-3 - CONCRETE DROP INLET STRUCTURE, DETAIL D-2

ITEM 505-4 - CONCRETE OUTLET HEADWALL & APRON, ADOT DET B4.1, B6.10

SECTION 515 - STEEL STRUCTURES

Steel Structures shall conform to Section 515 of the MAG Uniform Standard Specifications except as modified herein.

Subsection 515.1 - Description

Add the following to this subsection:

The work under this section shall consist of supplying and installing access barriers and catch basin grates according to the plans and these Special Provisions.

All material for the access barriers and grates shall be A36 steel. The access barriers and grates and associated embedments shall be galvanized in accordance with MAG Section 771.

Subsection 515.7 - Payment

Add the following to this subsection:

No payment shall be made for access barriers, or grates, the cost thereof shall be considered incidental to the item that the handrail is attached.

SECTION 520 - STEEL HANDRAILS

Steel handrails shall conform to Section 520 of the MAG Uniform Standard Specifications except as modified herein.

Subsection 520.1 - Description

Add the following to this subsection:

The work under this section shall include providing and erecting steel handrails as shown in the plans.

All steel handrails shall be galvanized in accordance with MAG Section 771 and constructed per City of Scottsdale Standard Detail 2508 unless noted otherwise on the plans.

Subsection 520.5 - Payment

No payment shall be made for handrails, the cost thereof shall be considered incidental to the item that the handrail is attached.

SECTION 601 – TRENCH EXCAVATION, BACKFILLING AND COMPACTION

The work under this section shall conform to Section 601 of the MAG Uniform Standard Specifications except as modified herein.

Subsection 601.1 – Description

Add the following:

This work shall include the placement of cement-treated slurry bedding as specified on the plans and in these Special Provisions.

Subsection 601.4.2 – Bedding

Replace this subsection with the following:

Bedding material from the trench bottom to the bottom of the pipe or concrete box shall consist of granular material containing no pieces larger than 1½ inches and free of broken concrete, broken pavement, wood or other deleterious material. Bedding material from the bottom of the pipe to the pipes springline and from the bottom of the box to the top of the box shall be cement-treated slurry and shall conform to the gradation specified for bedding material and to the requirements set forth in MAG Section 728. Cement-treated bedding material shall have a slump of 7 inches ± 1 inch and have a minimum of 50-psi compressive strength and a maximum of 150 psi based on a 28-day test. Bedding material as described above is not subject to a VECF proposal.

Cement treated slurry bedding material shall be placed in a uniform manner that will prevent voids in, or segregation of, the bedding material, and will not float or shift the pipe. Cement-treated slurry bedding material shall be placed from bottom of pipe to pipe springline.

Bedding material above the springline of the pipe for RGRCP shall be granular material containing no pieces larger than 1-½ inches and free of broken concrete, broken pavement, wood or other deleterious material. No backfilling above the cement-treated slurry shall be commenced until 24 hours after the cement-treated slurry has been placed.

No water consolidation will be permitted.

Where mechanical compaction is used, the moisture content shall be such that the specified compaction can be obtained. Bedding lifts shall not exceed 12 inches loose and extreme care will be taken to prevent damage to or movement of the conduit by the compaction equipment.

The Contractor may opt to use cement-treated slurry from the bottom of the pipe to one foot above the top of the pipe for RGRCP.

Subsection 601.4.3 – Backfill

Add the following:

Water consolidation is not permitted.

The Contractor may opt to use cement-treated slurry aggregate base course in place of native backfill. If used, this backfill will begin from one (1) foot above the top of the pipe to one (1) foot below the top of the trench.

Cement-treated slurry backfill material if used shall conform to Section 728 of MAG. Cement-treated slurry shall have a slump of 7 inches \pm 1 inch and have a minimum of 50-psi compressive strength and a maximum of 150 psi based on a 28-day test.

Cement-treated slurry pipe backfill shall be placed in a uniform manner that will prevent voids in, or segregation of the backfill. No backfilling above the cement-treated slurry pipe backfill shall be commenced until 24 hours after the cement-treated slurry has been placed.

Connector pipes shall be backfilled full depth with aggregate base course.

Subsection 601.6 – Payment

Replace this subsection with the following:

No separate measurement or payment shall be made for excavation, falsework, backfilling, shoring, compacting of the storm drain and connector pipes, and protecting utilities in place. The cost thereof shall be included in the price bid for construction or installation of the storm drain and connector pipes to which such work is incidental or appurtenant.

Section 610 - Waterline Construction and relocation

Except as modified herein, waterline construction shall conform to Section 610 of the MAG Uniform Standard Specifications and the City of Scottsdale (whichever applies) supplements to the MAG Specifications.

Subsection 610.2 - General

Add the following:

The City of Scottsdale require a minimum of 72 hours written notice prior to shut downs on waterlines. City fire departments must be notified at least 24 hours in advance of any shut downs for waterlines serving as hydrants.

The Contractor is responsible for maintaining access to water valves within the construction area. Failure to do so may result in delays to a scheduled water shut down. Only personnel from the City of Phoenix or City of Scottsdale are permitted to operate water valves.

The Contractor shall provide all materials and labor necessary to complete all waterline work. The City of Scottsdale will not provide materials, labor, or equipment for work related to this project.

The Contractor shall be responsible for all waterline testing, disinfection and flushing including the cost of the water needed for flushing.

Water System Shut Down

Except where noted otherwise, the Contractor is responsible for protecting all waterlines in place and for maintaining all waterlines in service for the duration of the project. The waterline may be shut down and the pressure relieved in segments for short periods during construction. The waterline may not be shut down before 7:30 a.m. and must be back in service by 3:00 p.m. If a fire emergency develops that will require the waterline to be placed back in service, the Contractor shall be responsible for backfilling or shoring the trench as necessary to allow re-pressurizing the waterline.

If the Contractor elects to temporarily shut down a water main for a period of time which exceeds eight hours, the Contractor shall provide a temporary bypass waterline at no additional cost which is approved by the City of Scottsdale, depending upon the location.

When a shut down is necessary that will take a water user out of service, those residents and businesses must be notified by door hanger a minimum of 48 hours prior to the shut down. The hanger should state the hours that the water will be turned off.

Waterline Replacement

In the event of ACP or plastic waterlines crossing over the mainline storm drain construction or laterals which are greater than 24" diameter, the Contractor shall replace the waterline with DIP in accordance with Section 610 of the MAG Standard Specifications; as modified herein.

The Contractor shall arrange to have the line shut down in order to perform this work. The Contractor shall notify the Cities at least 72 hours prior to the need to shut down any waterlines. The Contractor shall bear the cost of flushing the lines.

Except for 2 inch and smaller waterlines, materials for waterline replacement shall be ductile iron, in accordance with Subsection 610.3 of the MAG Standard Specifications. The replaced waterlines shall be visually inspected for leaks under line pressure prior to back filling.

Waterline Realignment

In the event of an unforeseen conflict between storm drain construction and an existing waterline not detailed on the plans or as directed by the Engineer, the Contractor shall vertically and/or horizontally realign the waterline in accordance with C.O.S. Standard Detail 2370.

The waterline realignment shall include, but not be limited to, excavation, backfill, compaction, pipe, fittings, offsets, couplings, sleeves, blocking, joint restraints and hardware. The realigned waterline shall be tested per Subsection 610.14 of the MAG Standard Specifications and Subsection 610.14 of the COS Supplemental Standard Specification prior to backfilling.

The Contractor shall coordinate with the City of Scottsdale to obtain permission to have the line shut down in order to perform this work. The Contractor shall notify the City at least 72 hours in advance of the need for a shutdown.

Materials for waterline realignment shall be ductile iron, in accordance with Section 750 of the MAG Standard Specifications.

Subsection 610.18 - Measurement and Payment

Replace this subsection with the following:

Payment for waterline realignment, replacements and supports shall be made at the contract unit price bid per each location and size of pipe. Such payment shall be full compensation for furnishing and installing the item complete and in place including the cost of all materials, labor, and equipment. Payment will include all trenching, bedding backfill, and other items incidental to the relocation, realignment or support of the waterlines.

ITEM 610-1 - VERTICAL REALIGNMENT WATERLINE - 4-INCH - COS DET. 2370

ITEM 610-2 - VERTICAL REALIGNMENT WATERLINE - 6-INCH - COS DET. 2370

Payment for water valves shall be made at the contract unit price bid per each. Such payment shall be full compensation for furnishing and installing the valve, box, and cover complete in place, as specified, including labor, excavation, backfilling, compaction, removal of obstructions, shoring, bracing, testing, and all other work not specifically covered that is incidental.

ITEM 610-3 - 4" VALVE, VALVE BOX, & COVER (ALLOWANCE ITEM)

ITEM 610-4 - 6" VALVE, VALVE BOX, & COVER (ALLOWANCE ITEM)

SECTION 618 - STORM DRAIN CONSTRUCTION

The work under this section shall conform to Section 618 of the MAG Uniform Standard Specifications except as modified herein.

Subsection 618.1 - Description

Add the following:

The work under this section shall consist of furnishing and installing Rubber Gasketed Reinforced Concrete Pipe (RGRCP) or approved Alternate Pipe at the locations and to the grades and slopes indicated on the plans.

Subsection 618.2 - Materials

Add the following:

Concrete pipe, joints, gaskets, and testing shall be according to MAG Section 735 and as specified below. No pipe materials other than what is listed in the Alternate Pipe Table will be considered for this project.

Subsection 618.6 - Payment

Replace this subsection with the following:

Payment for storm drain construction shall be made at the unit price bid per linear foot. This shall be full compensation for furnishing and installing the pipe, complete in place, as specified, including excavation, backfilling, compaction, shoring, sheeting and bracing, pavement replacement, testing and all incidental work not specifically covered in other pay items.

ITEM 618-1 - 84 INCH PIPE

ITEM 618-2 - 24 INCH PIPE

SECTION 620 - CAST-IN-PLACE CONCRETE PIPE

The work under this section shall conform to Section 620 of the MAG Uniform Standard Specifications except as modified herein.

Subsection 620.5 – Measurement

Replace with the following:

Measurement for cast-in-place concrete pipe will be the number of linear feet of pipe measured horizontally along the pipe axis from the outside of outlet headwalls to the interior side of the wall on transition structures. At manholes, the pipe shall be measured through the manhole or to the center of a manhole when pipe sizes change.

Subsection 620.6 – Payment

Add the following:

ITEM 620-1 - 78 CAST-IN-PLACE PIPE

SECTION 625 – MANHOLE CONSTRUCTION

The work under this section shall conform to Section 625 of the MAG Uniform Standard Specifications except as modified herein.

Subsection 625.4 – Measurement

Add the following:

Measurement for manholes shall be for each bid item completed in place within the limits shown on the plans.

Subsection 625.5 – Payment

Payment for manholes shall be made at the contract unit price bid per each. Such payment shall be for furnishing and installing the item complete in place including the cost of all prefabricated tees, covers, labor, excavation, removal of obstructions, shoring, bracing, bedding, backfilling, compaction, pavement replacement, testing, and all other work not specifically covered that is incidental.

ITEM 625-1 – STORM DRAIN MANHOLE, MAG DET 521, & 522