Hawes Road Channel Improvement Project
Candidate Assessment Report

FCD 98-23

PCN # 442-05-01

Prepared for:

Flood Control District of Maricopa County

2801 West Durango Street

Phoenix, Arizona 85009

Prepared by:

Primatech, LLC

2929 North 44th Street, Suite 228

Phoenix, Arizona 85018

Registered Professional Engineer (Civil)
CERTIFICATE NO. 21630
DAVID W. DUST
Date Signed 4-30-99
ARIZONA, U.S.A.

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Hawes Road Channel Improvement Project
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- City of Mesa Project No. 97-56.1: Southern Avenue Drainage Improvements: Sossaman Channel to Hawes Road

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Executive Summary

Project Requested By:

City of Mesa
55 North Center Street
P.O. Box 1466
Mesa, Arizona 85211-4466
Business Phone: (602) 948-7411

Recommended Project:

Low Cost Alternative: Alternative 1/Preferred Alternative – The basic premise of the preferred alternative is to supplement the existing drainage facilities and future facilities being developed by the City of Mesa to provide a regional drainage system that conveys the 100-year flow event. In summary this alternative involves:

- Reaches 0, 1, and 2: Parallel Storm Drain System
- Reaches 0 and 1: Improvements by the City of Mesa (Existing Street Section)
- Reach 2: Extension of Existing Concrete Channel and Replacement of Broadway Road Culverts (Modified Major Collector Street Section)
- Reach 3: New Concrete Channel System and Box Culvert Under the Eastbound Lane of Apache Trail (Residential Street Section)

Problem Identification and Background:

The *East Mesa Area Drainage Master Plan (East Mesa ADMP),* prepared by Dibble & Associates in 1998, identified that existing and future drainage facilities along the Hawes Road alignment are an important part of the regional drainage plan. The concept presented in the East Mesa ADMP indicates that the future drainage improvements along the Hawes Road alignment will collect and convey storm water to existing regional drainage facilities, including the ADOT channel system along the north side of the Superstition Freeway, the Sossaman Channel, and the Southern Avenue Channel. The City of Mesa requested that the District continue to evaluate future drainage improvements along the Hawes Road alignment, beyond the master planning level, as part of the District's *Candidate Assessment Report* or CAR program.

Currently, the drainage system along Hawes Road is comprised of a system of earthen channels, lined channels, box culverts at Southern Avenue and Broadway Road, and the flow bifurcation structure at Southern Avenue (See Photographs in Appendix A: Photograph Log of Project Site. The Hawes Road channel system has insufficient capacity to collect and convey major events, including the 100-year flood event as defined in the East Mesa ADMP.

Conceptual Cost Estimate:

The conceptual cost estimate for Alternative 1 is $6,960,000.

Listing of Probable Partners:

City of Mesa
55 North Center Street
P.O. Box 1466
Mesa, Arizona 85211-4466
Business Phone: (602) 948-7411

Maricopa County Highway Department

1. INTRODUCTION / PROJECT BACKGROUND

1.1. Project Name / Title

Primatech LLC was contracted by the Flood Control District of Maricopa County (District) to prepare the Candidate Assessment Report for the Hawes Road Channel Improvement Project. The District's official project name and number is as follows: ***Hawes Road Channel Improvement Project*: FCD 98-23: PCN# 442-05-01**.

1.2. General Description / Problem Identification

The District has defined that the purpose of the Candidate Assessment Report (CAR) process is "to review and analyze existing information and develop project data to serve as a planning tool for evaluation of projects submitted by outside agencies as well as projects submitted within the District for inclusion into the CIP program." The general goal of the CAR process is to identify several alternatives and evaluate the funding requirements for the potential projects.

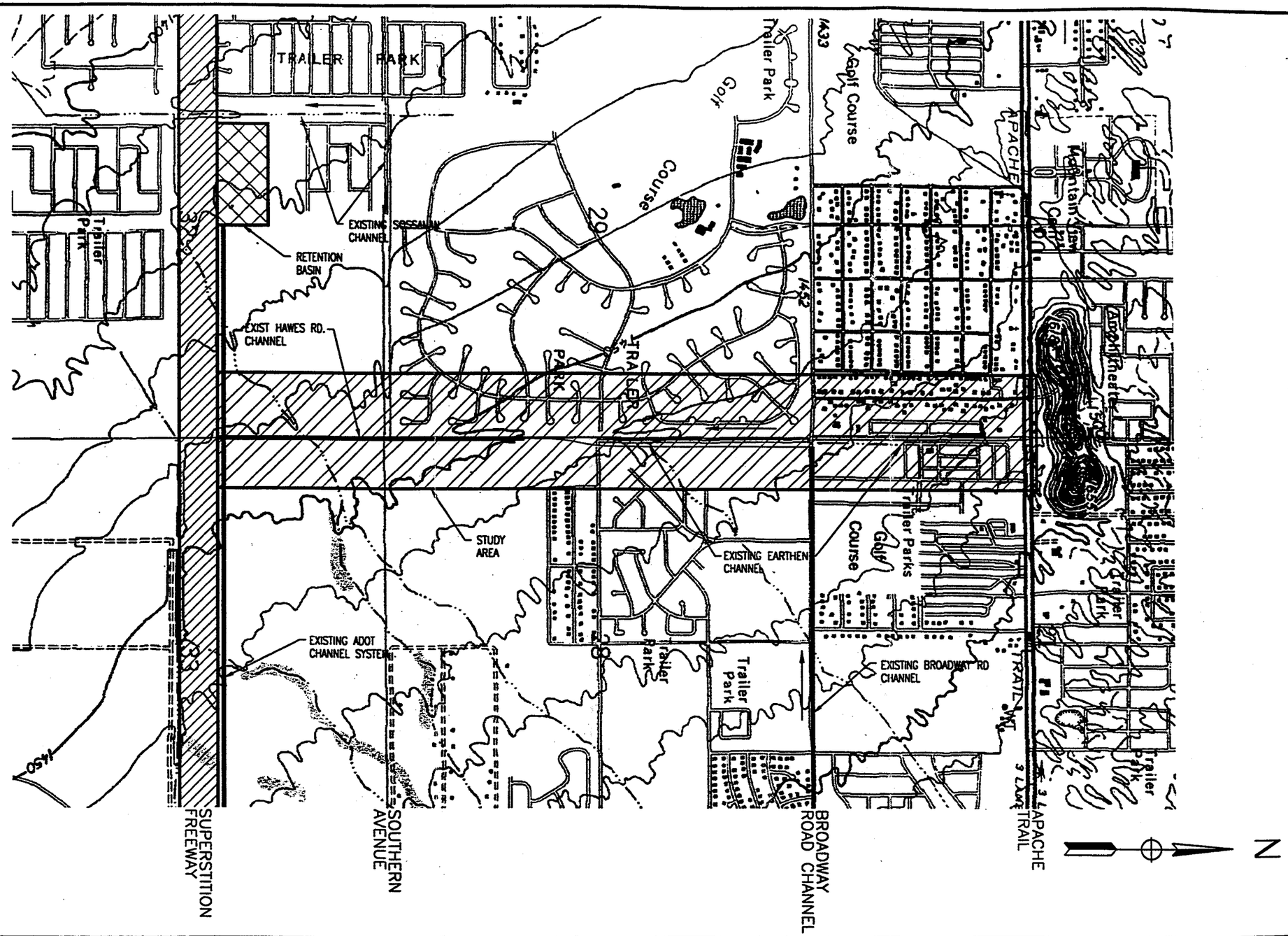
The *East Mesa Area Drainage Master Plan (East Mesa ADMP),* prepared by Dibble & Associates in 1998, identified that existing and future drainage facilities along the Hawes Road alignment are an important part of the regional drainage plan. The concept presented in the East Mesa ADMP indicates that the future drainage improvements along the Hawes Road alignment will collect and convey storm water to existing regional drainage facilities, including the ADOT channel system along the north side of the Superstition Freeway, the Sossaman Channel, and the Southern Avenue Channel. The City of Mesa requested that the District continue to evaluate future drainage improvements along the Hawes Road alignment, beyond the master planning level, as part of the District's *Candidate Assessment Report* or CAR program.

Currently, the drainage system along Hawes Road is comprised of a system of earthen channels, lined channels, box culverts at Southern Avenue and Broadway Road, and the flow bifurcation structure at Southern Avenue (See Photographs in Appendix A: Photograph Log of Project Site. The Hawes Road channel system has insufficient capacity to collect and convey major events, including the 100-year flood event as defined in the East Mesa ADMP.

1.3. Location of the Project Area

As shown in Figure 1-1, the project area extends along the Hawes Road alignment from the Superstition Freeway north to Apache Trail (i.e., Main Street). (It is important to note that the roadway known as Apache Trail in Unincorporated Maricopa County is known as Main Street within the City of Mesa.) Figure 1-1 also shows the location of other regional drainage facilities in the vicinity of the project area.

The Hawes Road project area is located within Township 1 North, Range 7 East, Maricopa County, Arizona. More specifically, the Hawes Road alignment between the Superstition Freeway (US 60) and Apache Trail is located within Sections 20, 21, 22, 29, 28, 32, and 33.



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HAWES ROAD
IMPROVEMENT PROJECT

PROJECT LOCATION MAP

Figure 1-1

2. ALTERNATIVE INVESTIGATION

2.1. Project Information / Project Constraints

The initial step in the alternative investigation process involved identifying the parameters that influence the types and/or configurations of feasible flood control alternatives. In the context of this study, these parameters are referred to as project constraints. The goal of this section of this report is to describe the project constraints for the Hawes Road Channel Improvement Project.

2.1.1. Jurisdictional Limits: Maricopa County Versus City of Mesa

The jurisdictional limits for the City of Mesa were identified from the City of Mesa "Land" Maps, which are published in quarter sections at a scale of 1"=200'. This information was verified with additional information provided by the District. Historical jurisdictional limits were identified using Phoenix Area Road Atlases published by Wide World of Maps, Inc. As indicated in Figure 2-1, approximately 1.5 miles (i.e., 75%) of the 2-mile-long study area is located within the City of Mesa. More specifically, the Hawes Road alignment from Broadway Road to the Superstition Freeway is within the City of Mesa; whereas, the Hawes Road alignment from Apache Trail (i.e., Main Street) to the north side of Broadway Avenue is located within unincorporated Maricopa County. The jurisdictional limits for the City of Mesa and Maricopa County are shown in Figure 2-1.

2.1.2. Preferred Street Cross Section

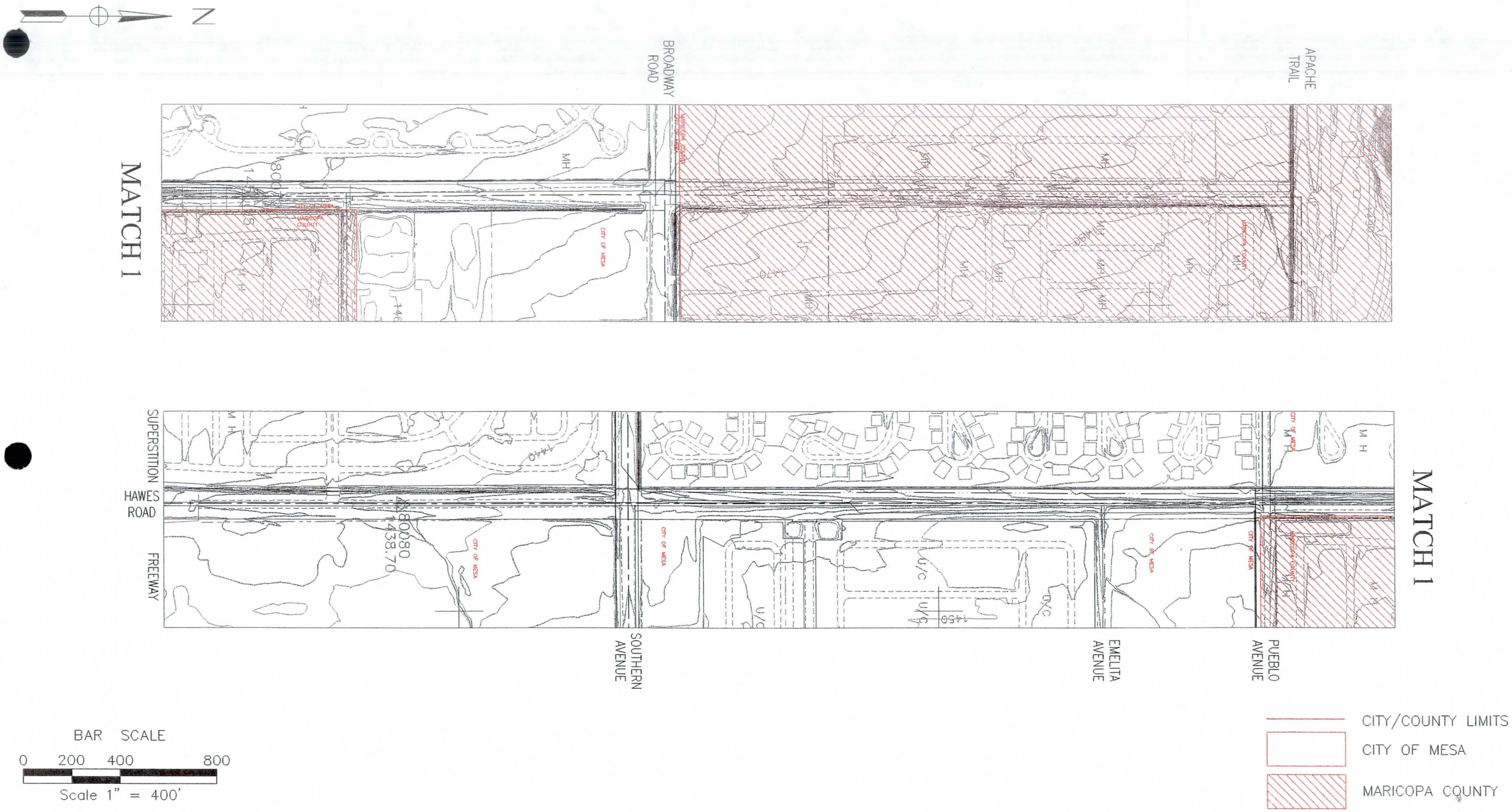
The City of Mesa has indicated that the preferred street section for Hawes Road be a "modified" Major Collector Street, per City of Mesa Standard Details M-19.1. The "modified" Major Collector Street includes a 68-foot roadway width, curbs, and a 5-foot sidewalk on one side of the street.

2.1.3. Existing Drainage and Roadway Facilities

The existing drainage facilities within the study area include a system of trapezoidal concrete channels, earthen channels, concrete box culverts, and a flow bifurcation structure. The existing drainage and roadway facilities are shown schematically in Figure 2-2. The following are brief descriptions of the existing drainage facilities starting at the southern limit of the study area:

Superstition Freeway Channel to Southern Avenue: A trapezoidal concrete channel extends northward, along the west side of Hawes Road, from the confluence with ADOT's Superstition Freeway channel to the 2(8'x4') box culvert at Southern Avenue. Within this reach a concrete bridge structure spans the channel at an entrance into the adjacent development. Due to restrictions associated with the bridge slab, the channel has a capacity of approximately 365 cfs at the bridge; whereas, the channel has a capacity of approximately 600 cfs downstream of the bridge. Existing drainage improvements in this reach of the study area are shown in Photographs 1 to 4 in Appendix A: Photograph Log of Project Site.

South of Southern Avenue, the existing street improvements include half-street improvements on the west side, as shown in Photograph 4 (Appendix A). The half-street improvements include



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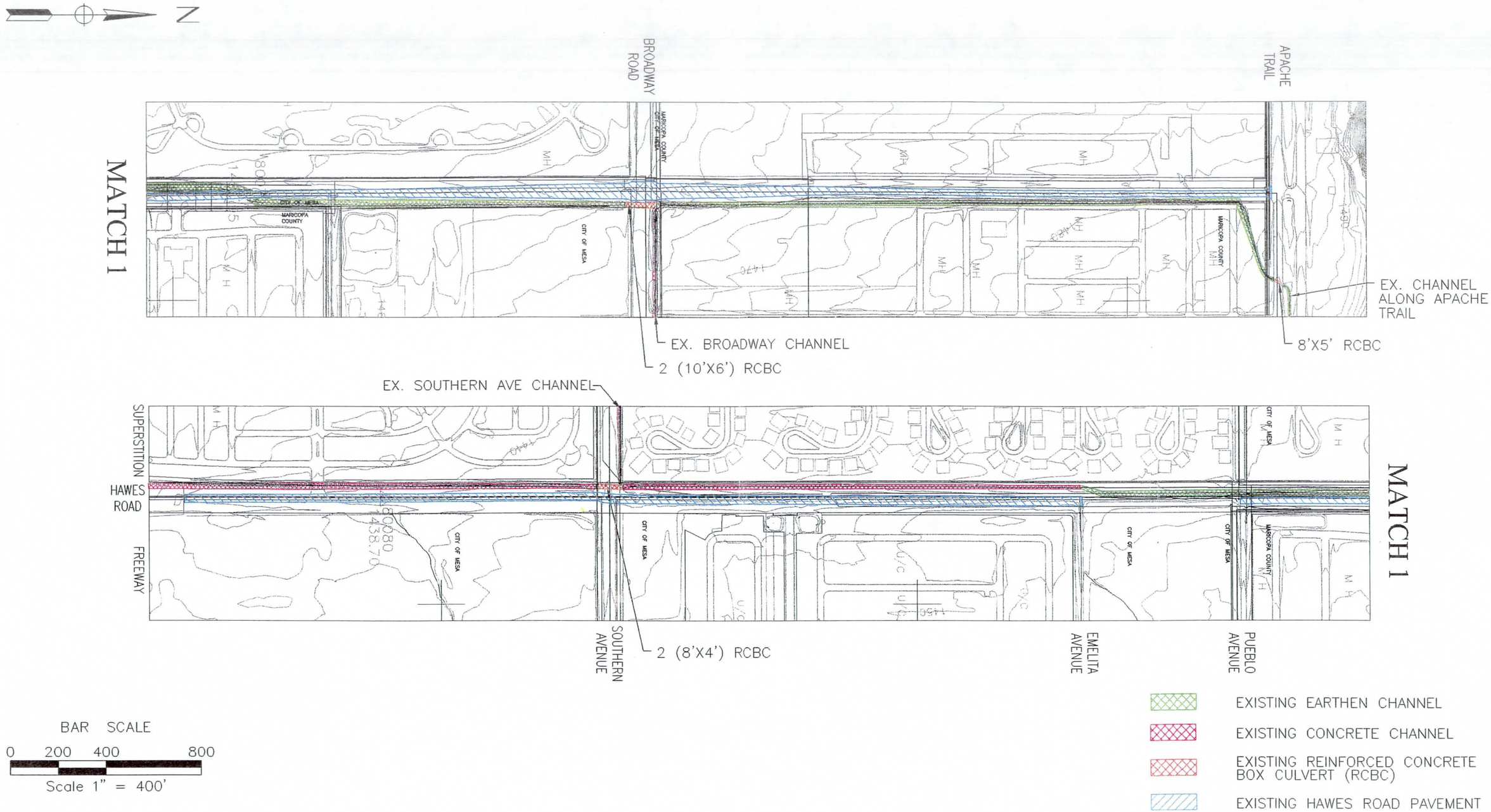
HAWES ROAD
IMPROVEMENT PROJECT

JURISDICTIONAL LIMITS:
MARICOPA COUNTY
VERSUS CITY OF MESA

Figure 2-1



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HAWES ROAD
IMPROVEMENT PROJECT

EXISTING DRAINAGE STRUCTURES & ROADWAY FACILITIES

Figure 2-2

an approximately 30-foot-wide pavement section, which appears to be consistent with a Collector or Major Collector Street Section per City of Mesa Standard Detail M-19.1.

Southern Avenue to Emelita Avenue: The existing flow bifurcation structure is located at the northwest corner of Hawes Road and Southern Avenue. This structure consists of the 2(8'x4') box culvert that conveys storm water to the south and a trapezoidal concrete channel that conveys storm water to west along the north side of Southern Avenue. The channel along Southern Avenue conveys flows to the Sossaman Channel. Existing drainage improvements in this reach of the study area are shown in Photographs 4 to 6 in Appendix A: Photograph Log of Project Site.

The Crescent Run Mobile Home Park development included street and drainage improvements for Hawes Road from Southern Avenue to Emelita Avenue, as indicated in the construction documents provided in Appendix F. The drainage improvements include a concrete channel (COM Project No. 97-69) that extends northward from the bifurcation structure to the Emelita Avenue alignment, along the west side of the Hawes Road right-of-way. This channel has a design capacity of 1800 cfs (with 0.2 feet of freeboard) and is designed to flow supercritical. This channel is shown in Photograph 5 in Appendix A: Photograph Log of Project Site.

0.20 ft Freeboard?
not enough
to FCD standards

Adjacent to the Crescent Ru ments taper from a full modified Major Collector Str et improvements. The half-street improvements inc ent section and appear to be consistent with a Major andard Detail M-19.1.

Emelita Avenue to Broadw ends from the Emelita Avenue alignment to the 2(1(ox culvert at Broadway Road was constructed by M(ondition. As shown in Figure 2-2, the earthen chanr Hawes Road at the dip section located approximate The irregular earthen channel has a capacity that v e 2(10'x6') box culvert at Broadway Road has a c headwater depth of approximately 7 feet. Existing study area are shown in Photographs 6 to 14 in App

From Emelita to Pueblo Ave ments, as shown in Photographs 6 and 7 (Appenc m Pueblo to Coralbell Avenue include approximately 25 feet of pavement (i.e. two lanes), without curbing. Between Coralbell Avenue and Broadway Road, the pavement section transitions from 25 feet of pavement to a 68-foot pavement section at the Broadway and Hawes Road intersection, as shown in Photograph 14 (Appendix A).

Broadway Road to Apache Trail (i.e., Main Street): An irregular earthen channel extends from Broadway Road to the 8'x5' box culvert at Apache Trail. As shown in Figure 2-2, the earthen channel is on the west side of Hawes Road. The irregular earthen channel has a capacity that varies from approximately 15 to 150 cfs. Existing drainage improvements in this reach of the study area are shown in Photographs 14 to 21 in Appendix A: Photograph Log of Project Site.

North of Broadway Road and in a distance of approximately 550 feet, the existing street section transitions from a 68-foot pavement section at the Broadway and Hawes Road intersection, to an approximately 25-foot pavement section without curbing, as shown in Photograph 18 (Appendix A). The 25-foot pavement section extends northward to Apache Trail, as shown in Photograph 19 (Appendix A).

an approximately 30-foot-wide pavement section, which appears to be consistent with a Collector or Major Collector Street Section per City of Mesa Standard Detail M-19.1.

Southern Avenue to Emelita Avenue: The existing flow bifurcation structure is located at the northwest corner of Hawes Road and Southern Avenue. This structure consists of the 2(8'x4') box culvert that conveys storm water to the south and a trapezoidal concrete channel that conveys storm water to west along the north side of Southern Avenue. The channel along Southern Avenue conveys flows to the Sossaman Channel. Existing drainage improvements in this reach of the study area are shown in Photographs 4 to 6 in Appendix A: Photograph Log of Project Site.

The Crescent Run Mobile Home Park development included street and drainage improvements for Hawes Road from Southern Avenue to Emelita Avenue, as indicated in the construction documents provided in Appendix F. The drainage improvements include a concrete channel (COM Project No. 97-69) that extends northward from the bifurcation structure to the Emelita Avenue alignment, along the west side of the Hawes Road right-of-way. This channel has a design capacity of 1800 cfs (with 0.2 feet of freeboard) and is designed to flow supercritical. This channel is shown in Photograph 5 in Appendix A: Photograph Log of Project Site.

Adjacent to the Crescent Run development, the existing street improvements taper from a full modified Major Collector Street Section, at Southern Avenue, to half-street improvements. The half-street improvements include an approximately 34-foot-wide pavement section and appear to be consistent with a Major Collector Street Section per City of Mesa Standard Detail M-19.1.

Emelita Avenue to Broadway Road: An irregular earthen channel extends from the Emelita Avenue alignment to the 2(10'x6') box culvert at Broadway Road. The box culvert at Broadway Road was constructed by MCDOT in 1987 and appears to be in good condition. As shown in Figure 2-2, the earthen channel crosses from the west to the east side of Hawes Road at the dip section located approximately 1650 feet south of Broadway Road. The irregular earthen channel has a capacity that varies from approximately 100 to 300 cfs. The 2(10'x6') box culvert at Broadway Road has a capacity of approximately 1000 cfs with a headwater depth of approximately 7 feet. Existing drainage improvements in this reach of the study area are shown in Photographs 6 to 14 in Appendix A: Photograph Log of Project Site.

From Emelita to Pueblo Avenue, there are no existing street improvements, as shown in Photographs 6 and 7 (Appendix A). The existing street improvements from Pueblo to Coralbell Avenue include approximately 25 feet of pavement (i.e. two lanes), without curbing. Between Coralbell Avenue and Broadway Road, the pavement section transitions from 25 feet of pavement to a 68-foot pavement section at the Broadway and Hawes Road intersection, as shown in Photograph 14 (Appendix A).

Broadway Road to Apache Trail (i.e., Main Street): An irregular earthen channel extends from Broadway Road to the 8'x5' box culvert at Apache Trail. As shown in Figure 2-2, the earthen channel is on the west side of Hawes Road. The irregular earthen channel has a capacity that varies from approximately 15 to 150 cfs. Existing drainage improvements in this reach of the study area are shown in Photographs 14 to 21 in Appendix A: Photograph Log of Project Site.

North of Broadway Road and in a distance of approximately 550 feet, the existing street section transitions from a 68-foot pavement section at the Broadway and Hawes Road intersection, to an approximately 25-foot pavement section without curbing, as shown in Photograph 18 (Appendix A). The 25-foot pavement section extends northward to Apache Trail, as shown in Photograph 19 (Appendix A).

2.1.4. Future City of Mesa Projects

The City of Mesa has two major projects associated with the Hawes Road Channel currently under design. The general locations of these projects are highlighted in Figure 2-3.

Broadway Road Flow Bifurcation: Culvert and storm drain improvements are planned at the intersection of Hawes Road and Broadway Road as part of City of Mesa Project No. 95-16. The design includes the removal of an existing 15-inch drain pipe and the installation of a new 72-inch storm drain pipe line. The storm drain line will extend west under Broadway Road, collecting runoff from the Hawes/Broadway Channel and various catch basins along Broadway Road. City of Mesa staff indicated that the 72-inch storm drain is designed to collect 360 cfs from the Hawes/Broadway Road channel system located at the northeast corner of the Hawes and Broadway Road intersection. City of Mesa staff has indicated that the storm drain system is currently under design and that the project has a construction start date of approximately the spring of 2000.

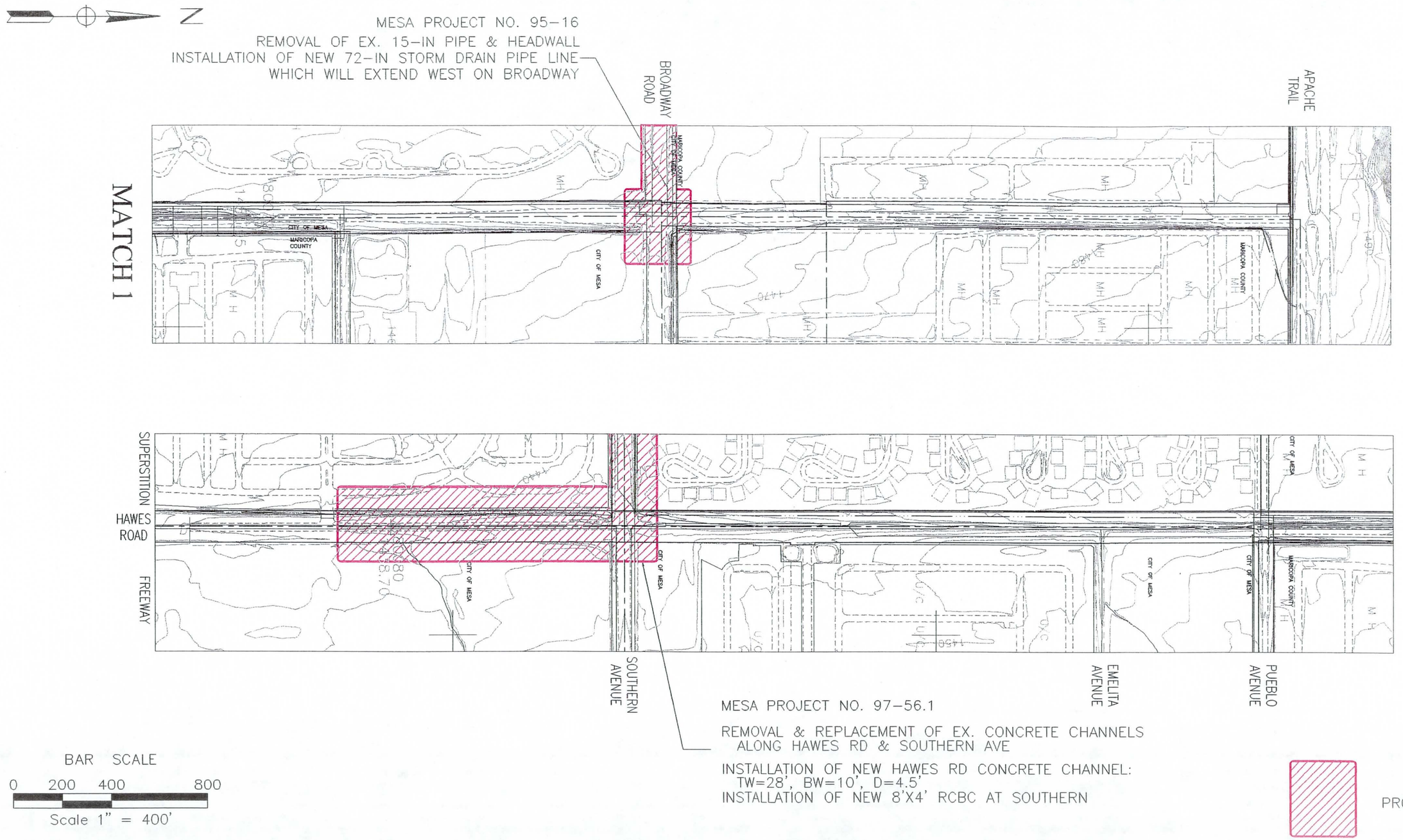
Southern Avenue Flow Bifurcation: City of Mesa Project No. 97-56.1 includes culvert and channel improvements at Southern Avenue and Hawes Road. City of Mesa staff has indicated that this project has an anticipated construction start date of September 1999. More specifically, the planned improvements include:

- A flow bifurcation structure at Southern and Hawes. This structure includes one 8'x4' reinforced concrete box culvert to be installed adjacent to the existing 2(8'x4') box culvert to convey flows to the south; while 2(10'x6') box culverts will convey flow westerly to the Sossaman Channel. Based on a letter report provided by the City of Mesa, it is believed that the design capacity for the flow bifurcation structure is 1800 cfs (Entellus, 1997).
- The planned improvements also include the removal and replacement of approximately 1100 feet of the existing concrete channel south (i.e., downstream) of Southern Avenue. This channel has a design capacity of approximately 600 cfs (Entellus, 1997).

2.1.5. Rights-of-Way

Rights-of-way limits along the study area are shown in Figure 2-4. The current rights-of-way limits were obtained from the City of Mesa Land Maps, the Maricopa County Department of Transportation Rights-of-Way Department, and Maricopa County Assessors data. In addition, rights-of-way (R/W) limits were shown on the various utility quarter section maps. As indicated in Figure 2-4, the total right-of-way width is a uniform 130 feet within the City of Mesa; however, the total right-of-way width varies from 95 to 105 feet north of Broadway Road.

Comparison of the aforementioned maps and information disclosed an inconsistency with respect to the current right-of-way width from Apache Trail to Broadway Road. That is, some of the maps indicate a right-of-way width 65 feet to the east of the monument line, while other maps indicate a width of 40 feet. Maricopa County Assessors data indicated a right-of-way width of 40 feet to the east of the monument line. Maricopa County Assessors data was assumed to be the most accurate.



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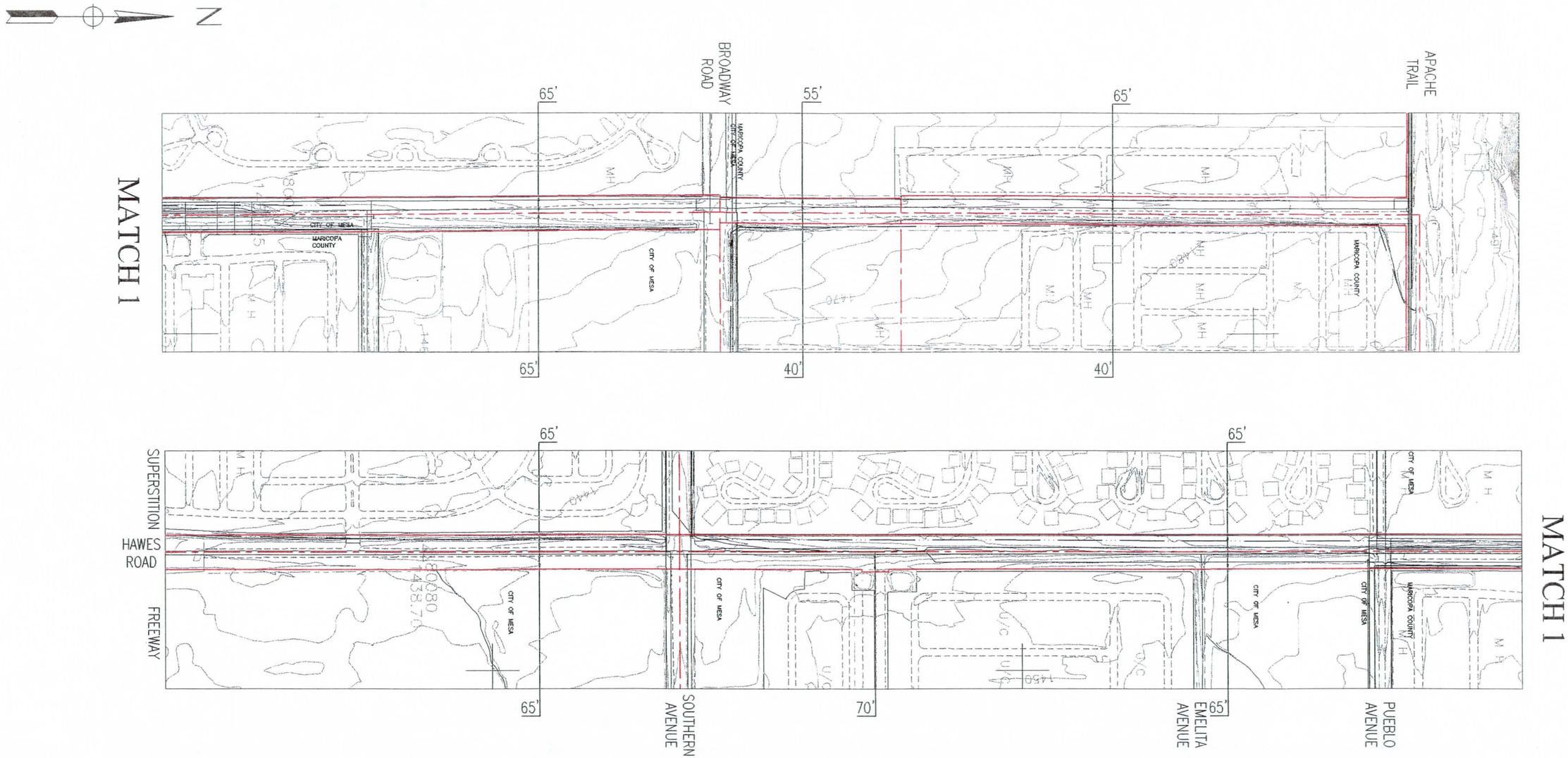
FUTURE CITY OF MESA
PROJECTS

Figure 2-3



BAR SCALE

0 200 400 800

Scale 1" = 400'

EXISTING RIGHT-OF-WAY

CENTERLINE OF RIGHT-OF-WAY

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HAWES ROAD
IMPROVEMENT PROJECT

CURRENT
RIGHTS-OF-WAY LIMITS

Figure 2-4

2.1.9. Design Discharges/Previous Hydrology Studies

The East Mesa ADMP (Dibble et. al., 1998) documents the last comprehensive hydrologic study that includes the Hawes Road Study Area. It is important to note that the design discharge information provided in the East Mesa ADMP (Dibble et. al., 1998) reflects future (or build-out) land use conditions and the implementation of all the other regional drainage facilities proposed in the East Mesa ADMP.

The East Mesa ADMP identified that existing and future drainage facilities along the Hawes Road alignment are an important link in the future regional drainage system. The concept presented in the East Mesa ADMP indicates that the future drainage improvements along the Hawes Road alignment will interconnect a system of both future and existing regional drainage facilities, as shown in Figure 6: Preliminary Plan of the East Mesa ADMP (Appendix D).

The computed discharges from previous hydrology studies are summarized in Figure 2-6. As indicated in Figure 2-6, the results of the previous studies are relatively consistent, even though the hydrologic analyses were prepared for different conditions. For example, the analysis for the Superstition Freeway corresponds to "existing conditions" circa 1988 (URS, 1988); whereas, the analysis documented in the East Mesa ADMP represents future "build-out" conditions with future upstream regional drainage facilities in place (FCDMC, 1999).

Based on the results of the previous hydrologic studies, the preliminary design discharges identified for the study area are summarized in Figure 2-7. These design discharges are consistent with the hydrologic analysis documented in the East Mesa ADMP (Dibble et. al., 1998). However, the computed peak flow rates shown south of Broadway Road have been reduced by approximately 360 cfs to reflect the capacity of the 72-inch storm drain proposed by the City of Mesa, as shown in Figure 2-3. The 72-inch storm drain system down Broadway Road proposed by the City of Mesa was not reflected in the hydrologic analysis documented in the East Mesa ADMP (Dibble et. al., 1998). City of Mesa staff indicated that the designed inlet capacity of the 72-inch storm drain, at Broadway Road, is 360 cfs; however, detailed capacity calculations were not available from the City of Mesa at the time that this report was prepared.

The design discharges shown in Figure 2-7 exceed the design capacity of both the existing and the future Southern Avenue flow bifurcation structure, as proposed by the City of Mesa. The City of Mesa has specified a design discharge of 1800 cfs for the flow bifurcation structure and upstream channel; whereas, a design discharge of approximately 1930 cfs would be more consistent with the East Mesa ADMP (Dibble et. al., 1998).

2.1.10. Site Conditions/Environmental Observations

The site conditions were noted and documented over the course of two site visits. The undeveloped portion of the Hawes Road alignment, from Pueblo Avenue to Emelita Avenue, has been subject to unregulated dumping. It appears that various construction materials, landscaping debris, tires, and furniture have been disposed of in this area, as shown in Photographs 6 through 10 (Appendix A). Some of the material disposed of in this area may require special disposal procedures.

2.1.6. Existing Utilities

Existing major utilities within the study are shown in Figure 2-5 (pocket). The public and private utility locations were obtained from quarter section maps provided as follows:

- City of Mesa – Water, Sewer, and Gas

  Although the City of Mesa provides natural gas service to various areas, there were no public services located within the study area.

- Southwest Gas Corporation - Natural Gas Lines

- Salt River Project - Electric Power

  Overhead electric information is not shown on the quarter section maps provided by SRP. The approximate locations of overhead electric lines were identified during field observations and are shown in Figure 2-5 (pocket).

- U.S. West Communications – Telephone

  As shown in Figure 2-5, a sanitary sewer line extends from Coralbell Avenue south to Southern Avenue. This sanitary sewer line was constructed as part of the Wynstone development. As-built plans for this sanitary sewer line are provided in Appendix F.

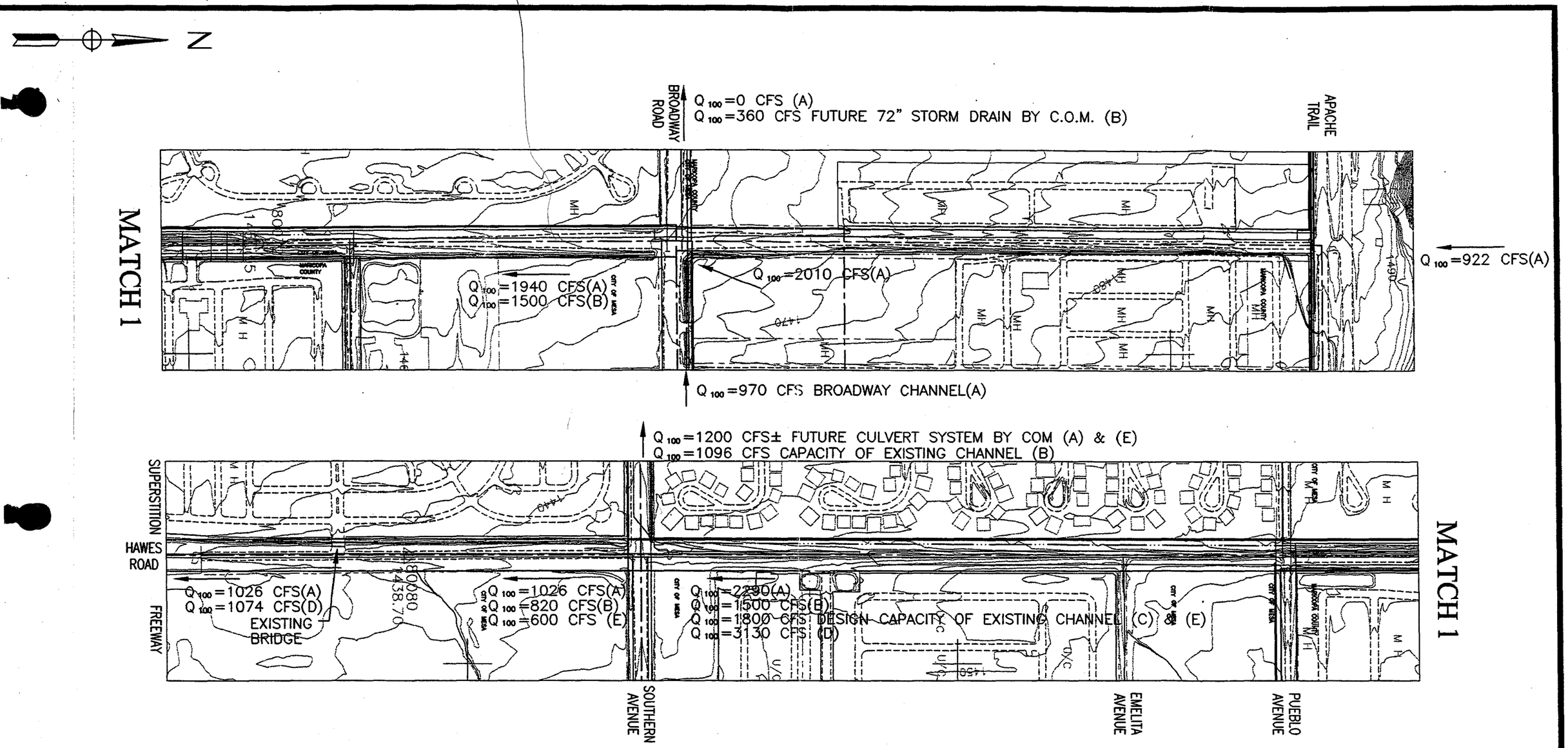
2.1.7. Future Red Mountain Freeway

The preliminary *Red Mountain Freeway from Lindsay Road to Baseline Road Design Concept Report* was prepared for the ADOT Highway Division by Parsons Brinckerhoff in 1988. The drainage concept documented in the report indicates that an interceptor channel (that parallels the freeway) will collect and convey a 100-year discharge of approximately 2300 cfs to the Hawes Road Channel at Southern Avenue (Parsons Brinckerhoff, 1988). This concept is not consistent with the East Mesa ADMP-FCD #95-32 (Dibble et. al., 1998) and does not appear to take into account the Broadway Road Channel System. Hence, it appears that the concept presented in the Red Mountain Freeway DCR may now be outdated and not directly pertinent to this project.

2.1.8. Superstition Freeway Channel Capacity at Confluence with Hawes Road Channel

South of Southern Avenue, the existing Hawes Road Channel outfalls into the Superstition Freeway Channel or ADOT Channel. This channel is maintained and operated by the Arizona Department of Transportation (ADOT). Based on the *Final Drainage Report for the Superstition Freeway: Power Road to Ellsworth Road* (URS, 1988), the ADOT Channel is designed to accept a 100-year flow of 1074 cfs at Hawes Road, with a corresponding peak flow in the ADOT Channel of 1260 cfs. Excerpts from the *Final Drainage Report for the Superstition Freeway: Power Road to Ellsworth Road* are provided in Appendix D.

It is appropriate to inform ADOT of any construction activities that impact the storm water being collected by the ADOT Channel. It is anticipated that any construction activities that directly impact the ADOT Channel will require a permit from ADOT.



BAR SCALE

0 200 400 800

Scale 1" = 400'

(A) 100 YEAR FLOW RATE AS DOCUMENTED IN THE EAST MESA ADMP (DIBBLE ET. AL., 1998)
(B) CAPACITY INFORMATION PROVIDED BY THE CITY OF MESA (1999)
(C) DESIGN CAPACITY FOR EXISTING CHANNEL PER CONSTRUCTION DOCUMENTS (COM PROJECT NO. 97-69)
(D) 100 YEAR DISCHARGE PER THE FINAL DRAINAGE REPORT FOR THE SUPERSTITION FREEWAY (URS, 1988)
(E) 100 YEAR FLOW RATE DOCUMENTED IN LETTER REPORT TO COM FROM ENTELLUS (1997)

← FLOW DIRECTION

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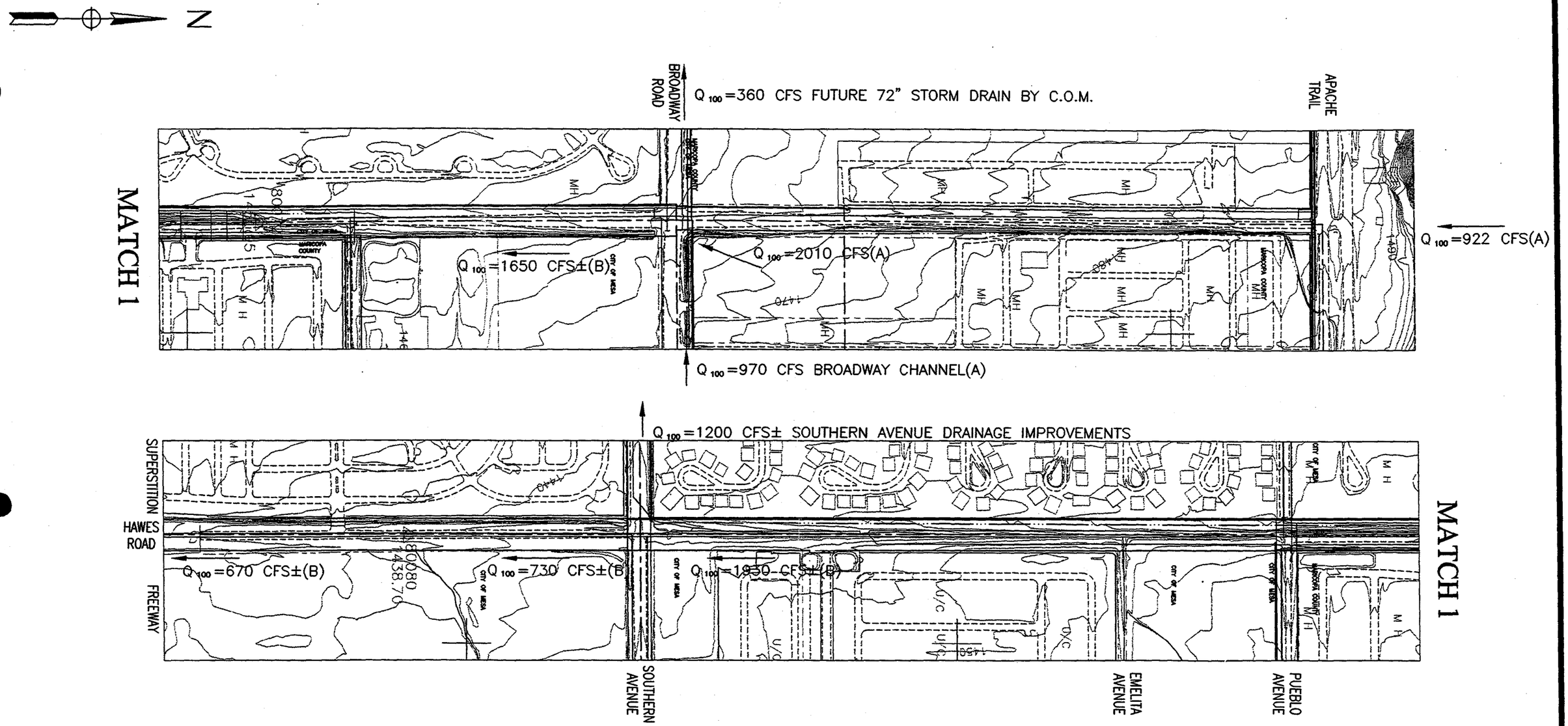
SUMMARY OF COMPUTED FLOW RATES

Figure 2-6



BAR SCALE

0 200 400 800

Scale 1" = 400'

(A) 100 YEAR FLOW RATE AS DOCUMENTED IN THE EAST MESA ADMP (DIBBLE ET. AL., 1998)
(B) ESTIMATED 100 YEAR FLOW RATE BASED ON EAST MESA ADMP AND FUTURE FLOW BIFURCATION AT BROADWAY

FLOW DIRECTION

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RECOMMENDED DESIGN DISCHARGES

Figure 2-7

2.1.11. Section 404 Permitting

Construction activities that impact waters of the United States, as defined in Section 404 of the Clean Water Act, will typically require a Section 404 Permit and a Section 401 Water Quality Certification. The U.S. Army Corps of Engineers (Corps) administers the Section 404 program in Arizona and the Arizona Department of Environmental Quality (ADEQ) administers the Section 401 program. Within the project area, approximately 1 mile of the existing Hawes Road channel system is comprised of earthen channels, as shown in Figure 2-2. District staff has identified that these earthen channels qualify as jurisdictional areas of the Section 404 program. There are approximately 4 acres of Section 404 jurisdictional area within the project area.

District staff are involved in discussions with the Corps regarding permitting requirements for proposed regional drainage facilities in the East Mesa Area, including future Hawes Road Channel improvements. District staff have indicated that future Hawes Road Channel improvements will require an "individual" Section 404 Permit independent of permits for other projects within the East Mesa Planning Area. However, it is possible that the Corps may require that "individual" Section 404 Permits be processed for all or some grouping of the proposed regional drainage facilities with the East Mesa Planning Area.

District staff are involved in preparing habitat/vegetation and archaeological evaluations for the study area. An excerpt from the vegetation survey is provided in Appendix D. This information is typically used to develop mitigation plans. Therefore, project constraints associated with Section 404 permitting typically involve minimizing the impact on jurisdictional areas and including opportunities for impact mitigation in the improvement alternatives.

2.1.12. Accident Reports

To evaluate the potential hazards to public safety posed by the existing drainage facilities adjacent to the roadways, traffic accident report data was obtained from ADOT. The accident report data maintained by ADOT had only a couple of entries that corresponded to the study area. In addition, the accidents did not appear to be clustered or in any way related to the existing drainage facilities. Therefore, the ADOT accident report data was deemed inconclusive.

2.1.13. Evaluation Criteria / Primary Project Constraints

The goal of the project information data collection was to identify the parameters that influence the types and/or configurations of feasible flood control alternatives. In the context of this study, these parameters are referred to as project constraints.

The primary project constraints that influence the development and evaluation of flood control alternatives for the Hawes Road project area were identified as follows:

1. The City of Mesa has indicated that the preferred street section for Hawes Road be a "modified" Major Collector Street (i.e., 68-foot roadway width, curbs, and a 5-foot sidewalk on one side of the street). The "modified" Major Collector Street section requires approximately 80 feet of right-of-way. As indicated in Figure 2-1, approximately 1.5 miles (i.e., 75%) of the 2-mile-long study area is located within the City of Mesa.
2. Provide drainage facilities that do not negatively impact future City of Mesa projects, including the Southern Avenue bifurcation structure and the Broadway Road storm drain system.

3. Minimize the impact on residents within the community by locating proposed improvements within the existing right-of-way limits (Figure 2-4) as much as possible. South of Broadway Road, the right-of-way is 130 feet in width (i.e., an Arterial Street). However, the right-of-way is as narrow as 95 feet in width north of Broadway Road.

4. Do not negatively impact the existing sanitary sewer line within the Hawes Road alignment.

5. Do not negatively impact the existing drainage facilities downstream of the Hawes Road Study Area, including the Sossaman Channel, the currently improved sections of the Hawes Road Channel, and the ADOT Superstition Freeway Channel. That is, do not convey flow to the existing facilities such that the design capacities of the facilities are exceeded.

    - The future City of Mesa Southern Avenue bifurcation structure has a design capacity of 1800 cfs. The estimated 100-year discharge at this location is 1930 cfs; hence, this structure is undersized by approximately 130 cfs.
    - The future City of Mesa Broadway Road bifurcation structure/storm drain has a design capacity of 360 cfs.
    - The existing channel adjacent to Crescent Run has a design capacity of 1800 cfs, with a freeboard of 0.2 feet. (The provided freeboard does not meet the District's requirements.)
    - The ADOT Superstition Freeway Channel was designed to collect approximately 1080 cfs at Hawes Road.

6. Since the East Mesa ADMP identifies that the Hawes Road channel system will be a link in a regional drainage system, it is recommended that the design event be the 100-year flow event, with the appropriate freeboard per the Drainage Design Manual: Volume II Hydraulics (FCDMC, 1996).

7. Collect the computed 100-year discharge of 922 cfs at Apache Trail (Dibble et. al., 1998), with the understanding that existing drainage facilities along Apache Trail cannot currently convey the flow to Hawes Road.

8. Minimize the impact on Section 404 jurisdictional areas and include opportunities for impact mitigation.

9. Provide drainage facilities that minimize the risk to public safety. Limiting both vehicular and pedestrian access can reduce the risk to public safety.

2.2. *Alternative Development*

Given the project constraints summarized in Section 2.1.13, various flood control options for the Hawes Road channel were developed and evaluated on a conceptual level. The following are brief descriptions of the various parameters and/or configurations that were evaluated and the results of the evaluation process.

- Grass/Earthen versus Concrete Channel Linings: Grass/earthen channel configurations required acquisition of additional right-of-way, relocation of residents, and significant utility relocations. The evaluation of channel lining options is described in detail in Section 2.2.1.
- Channel Alignment on the West Versus East Side of the Roadway **North** of Broadway Road (Reach 3): The **East Side** was identified as the preferred option, due to access requirements on the west side of the roadway by residents.
- Channel Alignment on the West Versus East Side of the Roadway **South** of Broadway Road (Reach 2): The **West Side** was identified as the preferred option, due to access requirements on the east side of roadway by residents.
- Location for Channel Crossover from the East to West Side of the Roadway: Currently, the channel crossover point is located just south of Coralbell Avenue (Figure 2-2). Two crossover points were identified as feasible – (1) at the Broadway Road and Hawes Road intersection, and (2) just south of the Broadway Road and Hawes Road intersection.
- Detention Basin at the Northeast Corner of the Broadway and Hawes Road Intersection: Currently there is a "desert" golf course at this location; hence, replacement of the existing golf course with a multi-use detention basin was initially considered feasible. However, hydrologic analysis indicated that there is insufficient storage space available to effectively reduce the peak discharge; therefore, further evaluation of the detention basin option was not considered.
- Channel Alignment Location Along Apache Trail: The East Mesa ADMS identified a channel alignment south of the roadway, which requires additional right-of-way. However, a channel alignment between the eastbound and westbound lanes was identified as the preferred option.

2.2.1. Channel Lining Options

Various channel lining options were evaluated for the two primary reaches within the study area. Table 2-1 summarizes the results of the channel lining evaluation. As indicated in Table 2-1, there is insufficient right-of-way for a grass/earthen lined channel and a minimal roadway section (i.e., residential street section with 34 feet of pavement). If the existing channel and roadway between Emelita Avenue and Southern Avenue are to remain in place, a grass/earthen-lined channel configuration will require acquisition of additional right-of-way, relocation of residents, and significant utility relocations. As indicated by the parcel ownership data provided in Appendix E, most of the land adjacent to the Hawes Road alignment is currently developed.

It may be possible for a grass/earthen-lined channel section and a residential roadway to be located within the existing right-of-way. However, it is anticipated that this option will require replacement of the existing channel and roadway from Emelita Avenue to the Superstition

Table 2-1: Channel Lining Options Evaluation

Reach Description	Lining Type	Q100 (cfs)	V100 (fps)	Required Channel Topwidth (ft)	R/W Required for Preferred Roadway (ft)	R/W Required for Overhead Utilities (ft)	Total Existing R/W Width	Comments
Emelita Ave to Broadway Rd (Reach 2) (1)	Grass/Earthen	1800 cfs	6	90	80 min	6 min	130	Insufficient R/W for Earthen/Grassed Channel and Preferred Roadway. Options include acquiring 50' additional R/W or reduce roadway to Residential and acquire 20' additional R/W
Emelita Ave to Broadway Rd (Reach 2) (1)	Concrete	1800 cfs	14	39	80 min	6 min	130	Sufficient R/W for concrete channel flowing super-critical
Broadway Rd. to Apache Trail (Reach 3)	Grass/Earthen	922 cfs	5	85 (w/ 5 - 2' drop struct.)	39 +/-	6 min	95 min	Insufficient R/W for Earthen/Grassed Channel and Preferred Roadway. Options include acquiring 40' additional R/W or increase roadway to Major Collector and acquire 80' additional R/W
Broadway Rd. to Apache Trail (Reach 3)	Concrete	922 cfs	9 +	36	39 +/-	6 min	95 min	Sufficient R/W for concrete channel w/ drop structures flowing sub-critical

Notes:
(1) The channel configurations evaluated assume that the existing channel between Emelita Avenue and Southern Avenue will remain in place and that a parallel storm drain system will convey the 130 cfs not conveyed in the channel.

Freeway Channel and complete replacement of the Southern Avenue bifurcation structure. In addition, detailed hydraulic analyses are required to further evaluate the feasibility of this option.

In conclusion, conceptual level evaluation indicates that a grass/earthen-lined channel system will require:

- acquisition of additional right-of-way, relocation of residents, and significant utility relocations, **or**
- replacement of the existing channel and roadway from Emelita Avenue to the Superstition Freeway Channel, complete replacement of the Southern Avenue bifurcation structure, and significant utility relocations.

Due to right-of-way limitations, an alternative involving a grass/earthen-lined channel system is potentially very expensive (due to land acquisition and relocation costs), disruptive to the local community, and may only allow for a minimal roadway section; therefore, a grass/earthen-lined channel system appears infeasible.

2.2.2. Summary of Alternatives

Three basic alternatives have been developed. These alternatives fall within the following general categories:

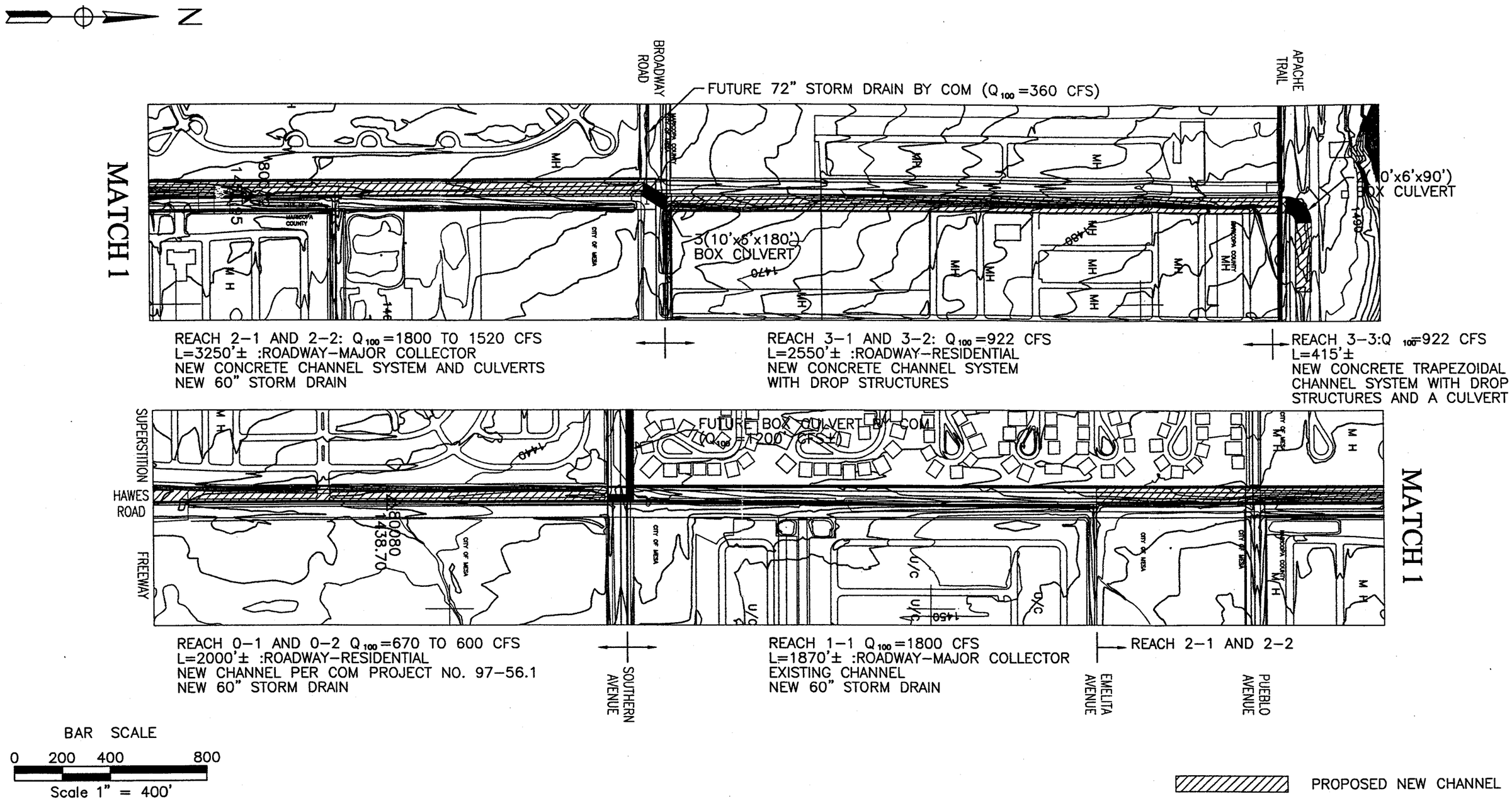
Low Cost Alternative: Alternative 1 – The basic premise of this alternative is to supplement the existing drainage facilities and future facilities being developed by the City of Mesa to provide a regional drainage system that conveys the 100-year flow event. The proposed drainage facilities associated with Alternative 1 are shown schematically in Figure 2-8. In summary this alternative involves:

- Reaches 0, 1, and 2: Parallel Storm Drain System
- Reaches 0 and 1: Improvements by the City of Mesa (Existing Street Section)
- Reach 2: Extension of Existing Concrete Channel and Replacement of Broadway Road Culverts (Modified Major Collector Street Section)
- Reach 3: New Concrete Channel System and Box Culvert Under the Eastbound Lane of Apache Trail (Residential Street Section)

The conceptual construction cost estimate for Alternative 1 is $6,960,000. The itemized conceptual cost estimate for Alternative 1 is provided in Appendix C.

Full Cost Alternative: Alternative 2 – The basic premise of this alternative is to identify the regional drainage facilities required to convey the 100-year flow event as established in the East Mesa ADMP, that meets all design criteria established by the District (Dibble et. al, 1998). The proposed drainage facilities associated with Alternative 2 are shown schematically in Figure 2-9. In summary this alternative involves:

- Reach 0: Replace Existing Channel System and Southern Avenue Bifurcation Structure
- Reach 1: Replace Existing Channel System (Existing Street Section)
- Reach 2: New Concrete Channel System and Replacement of Broadway Road Culverts (Modified Major Collector Street Section)
- Reach 3: New Concrete Channel System and Box Culvert Under the Eastbound Lane of Apache Trail (Modified Major Collector Street Section)



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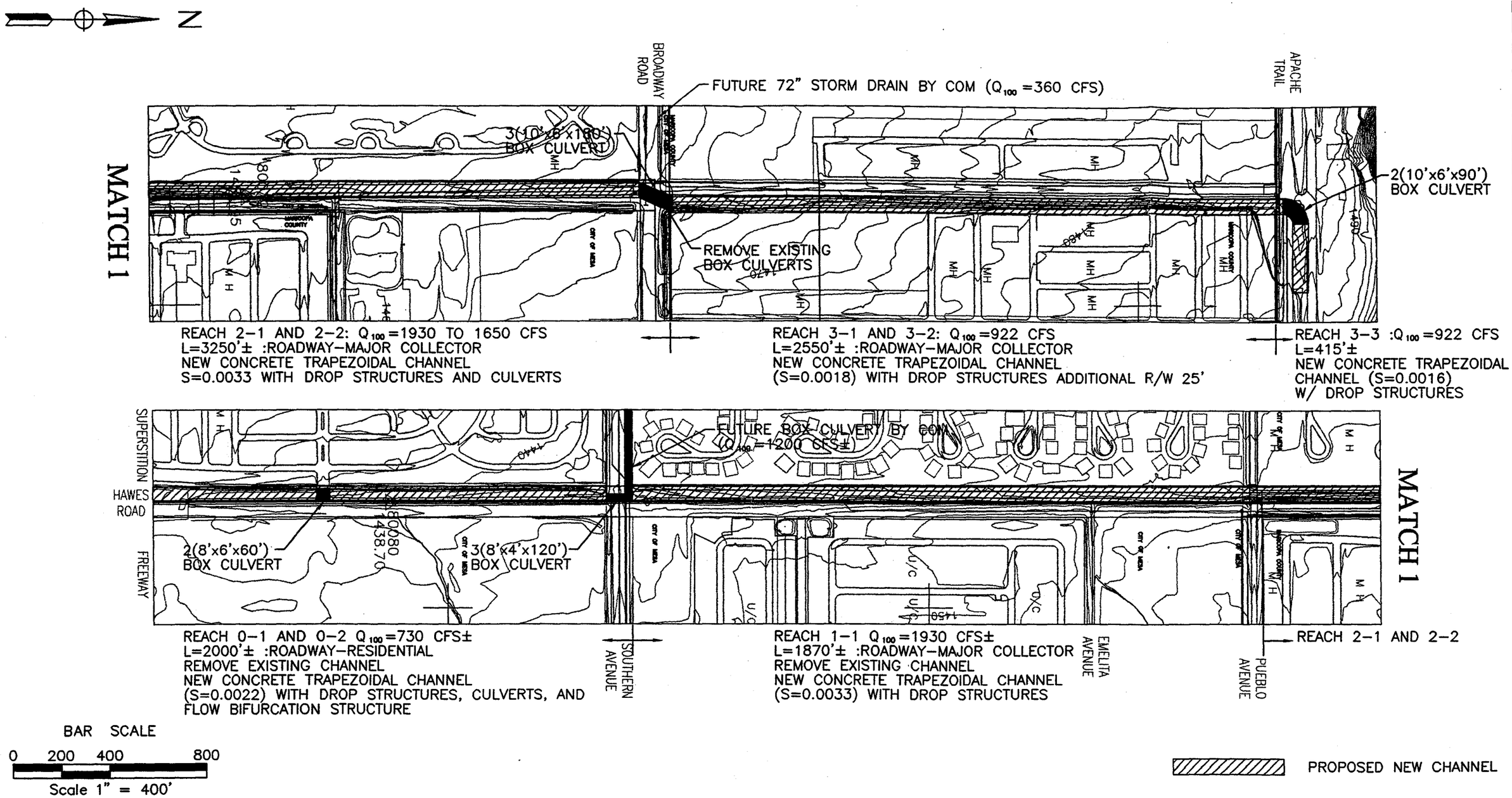
ALTERNATIVE NO. 1:
SCHEMATIC

Figure 2-8



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ALTERNATIVE NO. 2:
SCHEMATIC

Figure 2-9

The conceptual construction cost estimate for Alternative 2 is $7,370,000. The itemized conceptual cost estimate for Alternative 2 is provided in Appendix C.

No Action Alternative or Phased Alternative – Existing drainage facilities in the vicinity of the Hawes Road project area have been constructed as part of private development, District projects, and road improvement projects. However, improvements to the regional drainage system upstream of the Hawes Road Channel, as proposed in the East Mesa ADMP, will change the role of some of the Hawes Road Channel system from a "local" to a "regional" drainage facility. Therefore, the "no action alternative" is inconsistent with the overall master plan, as presented in the East Mesa ADMP. However, complete implementation of all of the facilities identified in either Alternatives 1 or 2 may be immediately necessary. That is the improvements may be phased as follows:

Highest Priority/Phase I – Improvements South of Broadway Road (i.e., Reaches 0, 1, and 2): The flood control improvements at and south of Broadway Road warrant the highest priority, since other future improvements associated with the East Mesa ADMP will direct more flood water to the future/existing Broadway Road Channel. The Broadway Road Channel, in turn, directs more storm water to the Hawes Road Channel.

Temporary improvements to the existing channel, immediately downstream of the existing Apache Trail culvert, may be implemented to reduce the flood hazard. Under existing conditions, relatively minor channel improvements to approximately 350 feet of channel could significantly improve the effectiveness of the existing Hawes Road Channel system north of Broadway Road.

Second Priority/Phase II – Improvements North of Broadway Road (i.e., Reach 3): The flood control improvements north of Broadway Road warrant a lower priority, since currently unplanned improvements along Apache Trail are required to direct the design discharge of 922 cfs to the Hawes Road channel system.

3. PREFERRED ALTERNATIVE

3.1. Components of Preferred Alternative

The preferred alternative is Alternative 1, which is shown schematically in Figure 2-8 and in detail in Figure 3-1 (pocket). Figure 3-1 includes cross-sections that illustrate the proposed channel system. Alternative 1 includes drainage facilities that supplement the existing system of channels and culverts. The preferred alternative includes the following components:

Parallel Storm Drain System (Reaches 0, 1, and 2): As indicated in Figure 3-1, the Preferred Alternative includes a storm drain system along Hawes Road that parallels the channel system south of Broadway Road. This storm drain system is intended to intercept flow from the channel system to maintain the design discharge of 1800 cfs for the existing concrete Hawes Road channel system (adjacent to the Crescent Run development) and the Southern Avenue flow bifurcation structure proposed in City of Mesa Project No. 97-56.1.

Extension of Existing Concrete Channel from Emelita Avenue to Broadway Road (Reach 2): As indicated in Figure 3-1, the Preferred Alternative includes extending the existing channel northward to Broadway Road with a similar channel section (Figure 3-1: Section D-D).

Broadway Culverts (Reach 2): As indicated in Figure 3-1, the Preferred Alternative includes replacing the existing culvert with a 3(10'x6') box culvert that is set at a lower elevation than the existing culverts. Replacement of the existing culverts will also require complete replacement of the existing headwall structure.

Concrete Channel System North of Broadway Road (Reach 3): As indicated in Figure 3-1, the Preferred Alternative includes construction of a new concrete channel system that extends from Broadway Road to Apache Trail, a 2(10'x6') box culvert under the eastbound lane of Apache Trail, and a concrete channel in the median between the eastbound and westbound lanes of Apache Trail. It is proposed that additional right-of-way only be acquired near the Broadway Road and Hawes Road intersection and that the proposed roadway section be similar to the existing roadway section (i.e., approximately 34 feet of pavement).

Pedestrian and Vehicular Access: Due to high velocities and potentially life threatening conditions in the channel system during flow events, it is recommended that public access to the channel system be limited. Hence, the conceptual cost estimate for the Preferred Alternative includes safety rail/fencing for the entire channel system (both existing and proposed) and curbing/guard rail along roadways adjacent to the channel system.

Opportunities for Section 404 Mitigation Measures: As indicated in Figure 3-1, the Preferred Alternative includes open space, within Reach 2 (i.e., Sections D-D & E-E) that may be planted with appropriate vegetation. There is very limited open space areas within Reach 3, due to existing right-of–way limitations.

3.2. Participating Agencies

It is anticipated that, in addition to the Flood Control District of Maricopa County, the following agencies would participate in the Hawes Road Channel Improvement Project. The roles of each the agencies will be defined in an Inter-Agency Agreement developed by the participating agencies.

- City of Mesa
  55 North Center Street
  P.O. Box 1466
  Mesa, Arizona 85211-4466
  Business Phone: (602) 948-7411

- Maricopa County Department of Transportation
  2901 West Durango
  Phoenix, Arizona 85009
  Business Phone: (602) 506-4622

4. REFERENCES

City of Mesa, Design and Existing Capacity Data provided in a Facsimile Transmittal, March 17, 1999. (Provided in Appendix D)

Dibble & Associates and Hoskin Engineering Consultants, *East Mesa Area Drainage Master Plan: FCD #95-32: Recommended Design Report*, Prepared for the Flood Control District of Maricopa County, July 1998.

Entellus, *Southern Avenue Drainage Improvements: Hydrology Review and Design Flows: City of Mesa Project No. 97-56.1*, Letter report sent to Mr. Les Broughton at the City of Mesa, May 8, 1997. (Provided in Appendix D)

Flood Control District of Maricopa County, *Internal Memo – Subject: Flows at Hawes Road and Broadway Road Within the East Mesa Area Drainage Master Plan*, March 30, 1999. (Provided in Appendix D)

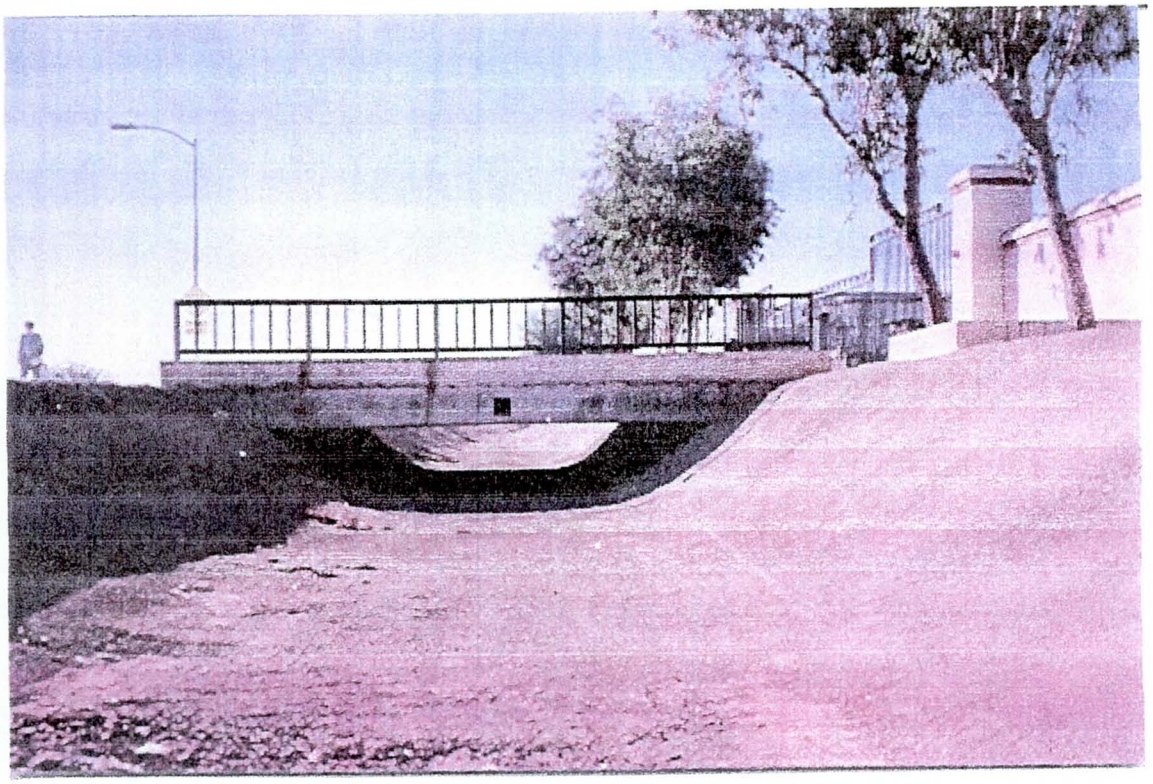
Flood Control District of Maricopa County, *Drainage Design Manual for Maricopa County: Volume II Hydraulics*, January 1996.

Parsons Brinckerhoff, *Red Mountain Freeway from Lindsay Road to Baseline Road: Design Concept Report*, Prepared for the ADOT Highway Division, 1988.

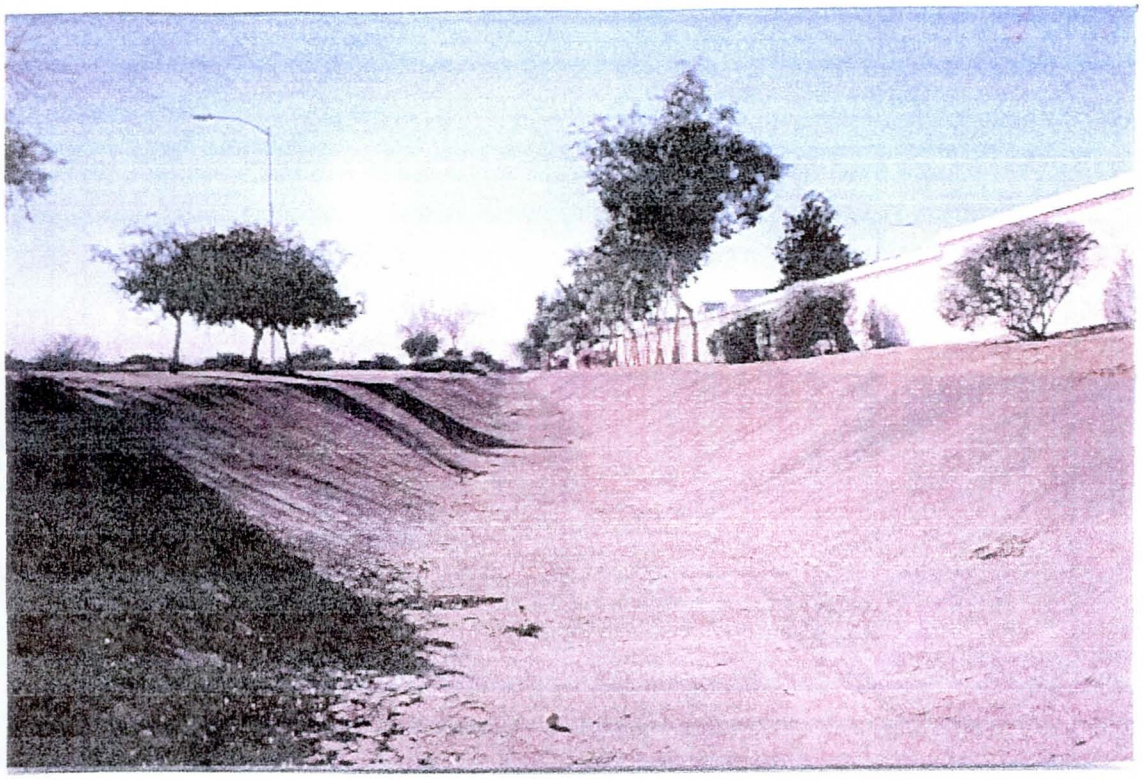
URS Greiner Corporation, *Final Drainage Report for the Superstition Freeway: State Route 360: Power Road To Ellsworth Road*, Prepared for the Arizona Department of Transportation, September 1988. (Excerpts provided in Appendix D)

Appendix A: Photograph Log of Project Site

Photograph 1: Existing Hawes Road Channel at confluence with the ADOT-Superstition Freeway Channel (looking south).

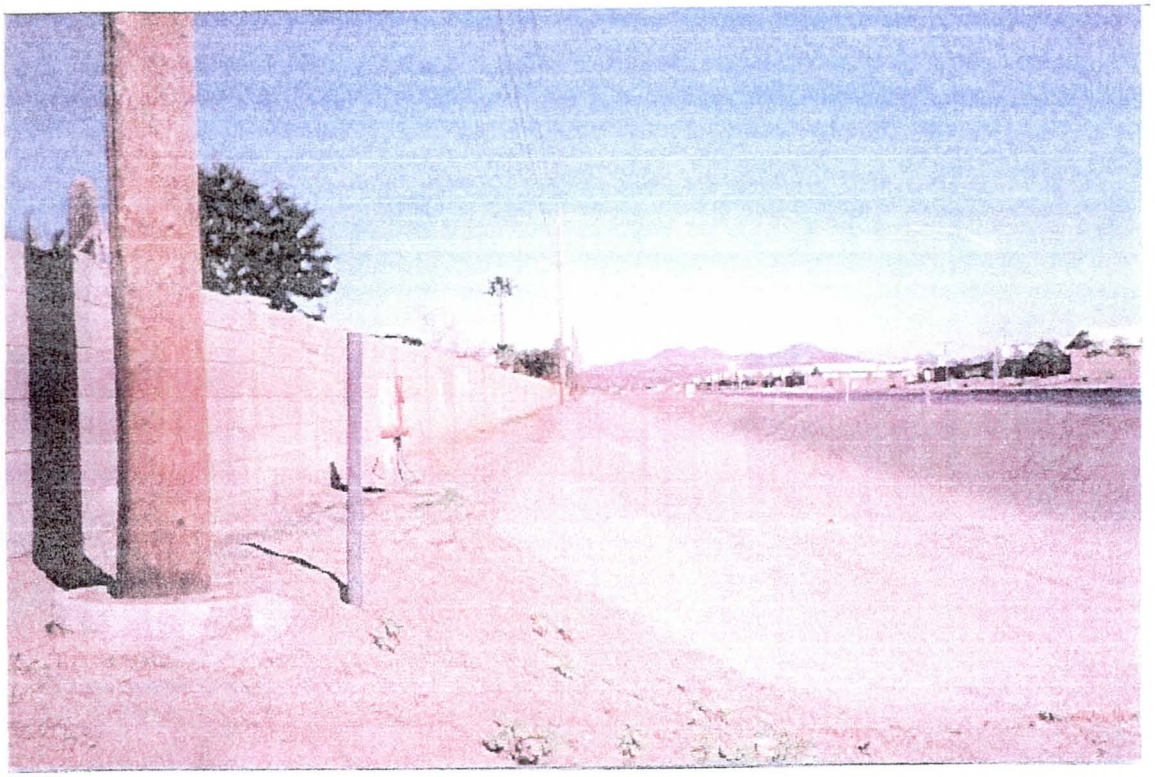


Photograph 2: Existing Hawes Road Channel, south of Southern Avenue, at the existing bridge structure (looking south).

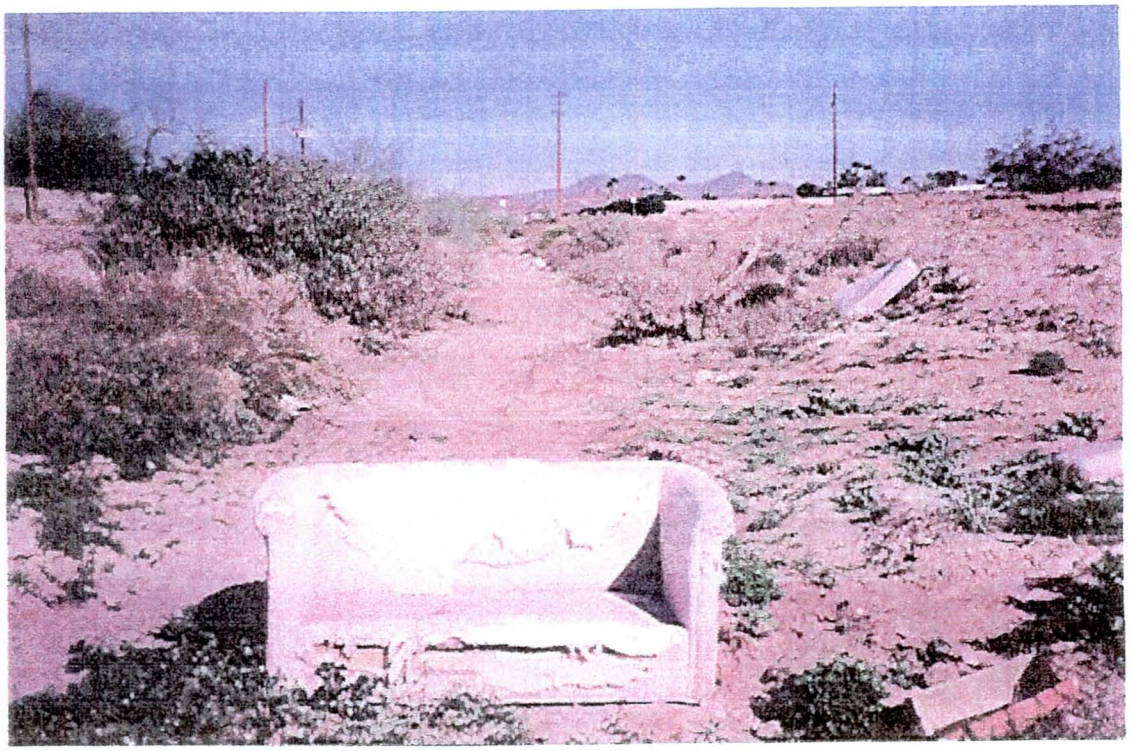


Photograph 3: Existing Hawes Road Channel, south of Southern Avenue.

Photograph 4: Existing Hawes Road Channel at the existing Southern Avenue bifurcation structure (looking south).



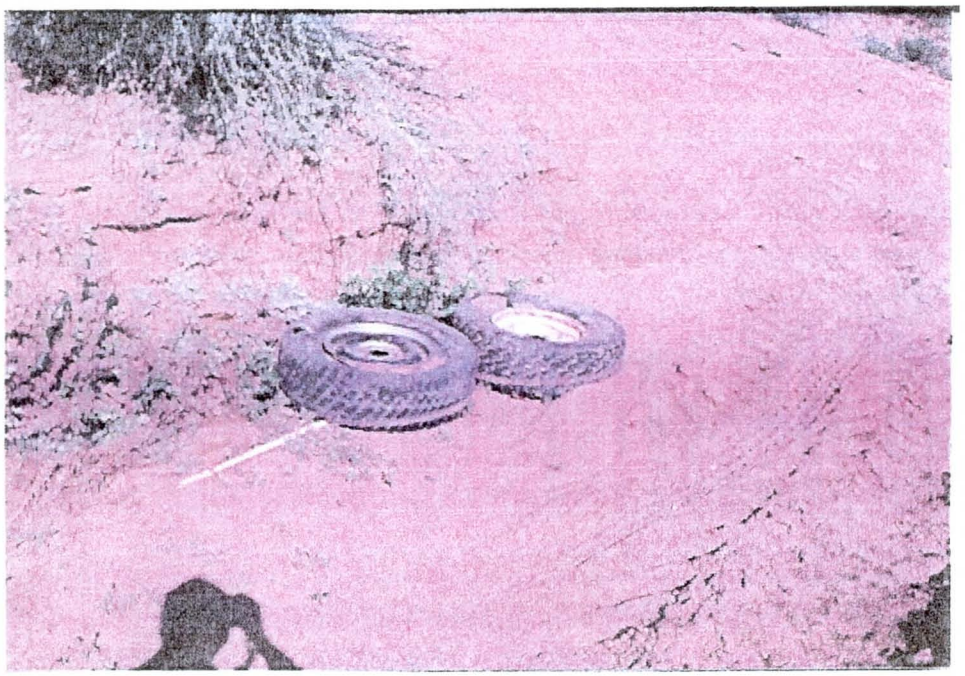
Photograph 5: Existing Hawes Road Channel north of the existing Southern Avenue bifurcation structure (looking north).



Photograph 6: Existing Hawes Road Channel looking north from Emelita Avenue (looking north).

Photograph 7: Existing Hawes Road Channel south of Pueblo Avenue (looking south).

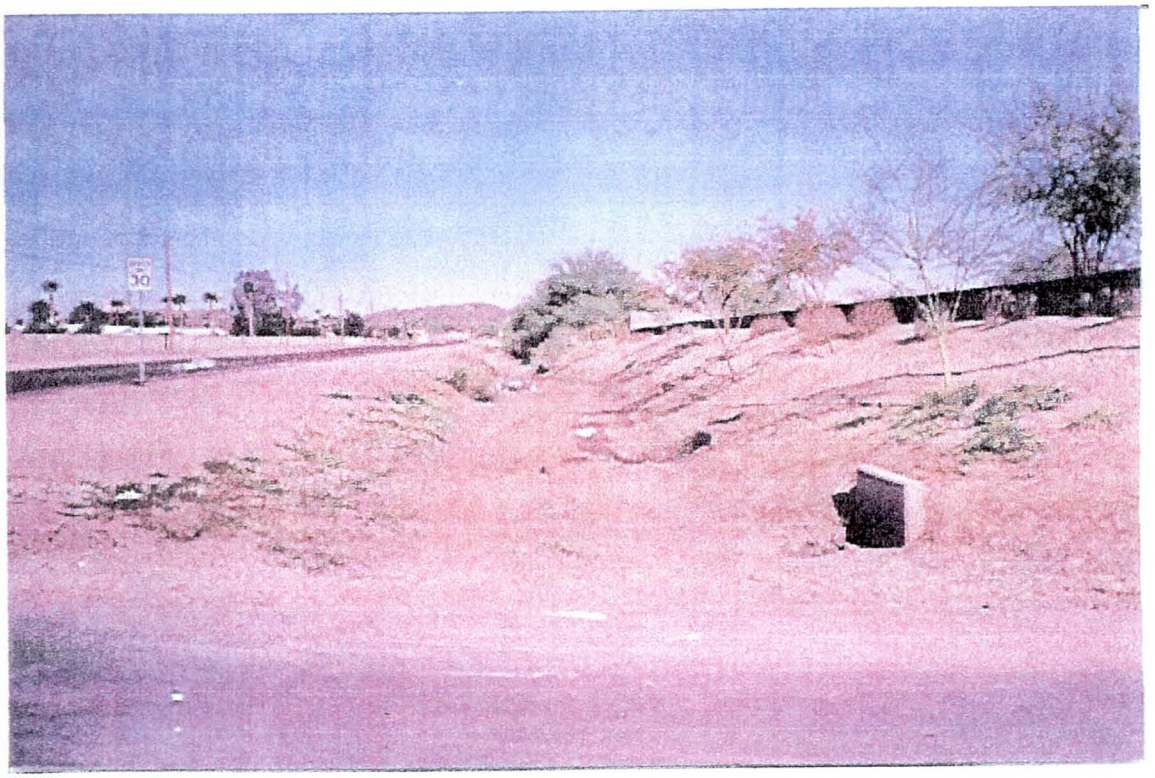
Photograph 8: Existing Hawes Road Channel at Pueblo Avenue (looking west).



Photograph 9: Existing Hawes Road Channel at Pueblo Avenue (looking north).

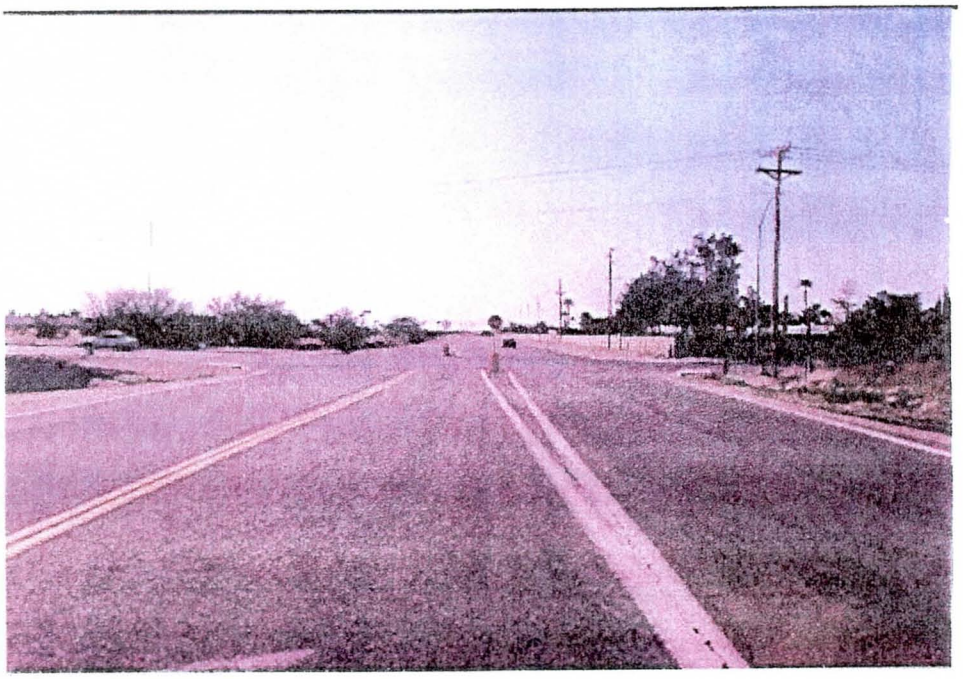
Photograph 10: Existing Hawes Road Channel at Pueblo Avenue (looking north).

Photograph 11: Existing Hawes Road Channel at the dip section south of Corabell Avenue (looking south).

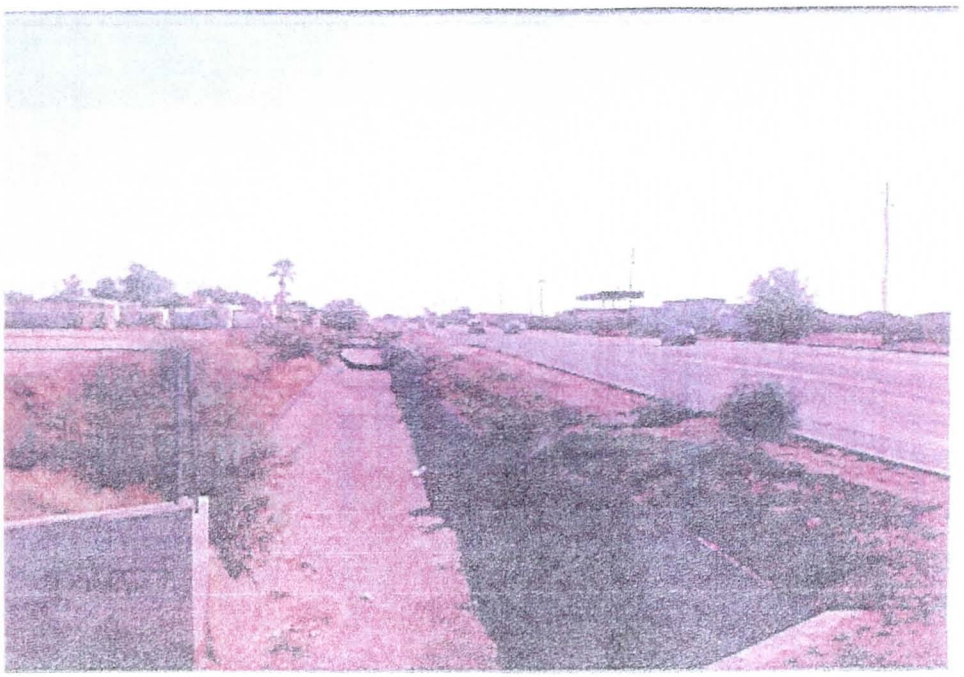


Photograph 12: Existing Hawes Road Channel looking north at Corabell Avenue (looking north).

Photograph 13: Existing Hawes Road Channel south of Broadway Road (looking south).



Photograph 14: Hawes Road at Broadway Road (looking south).

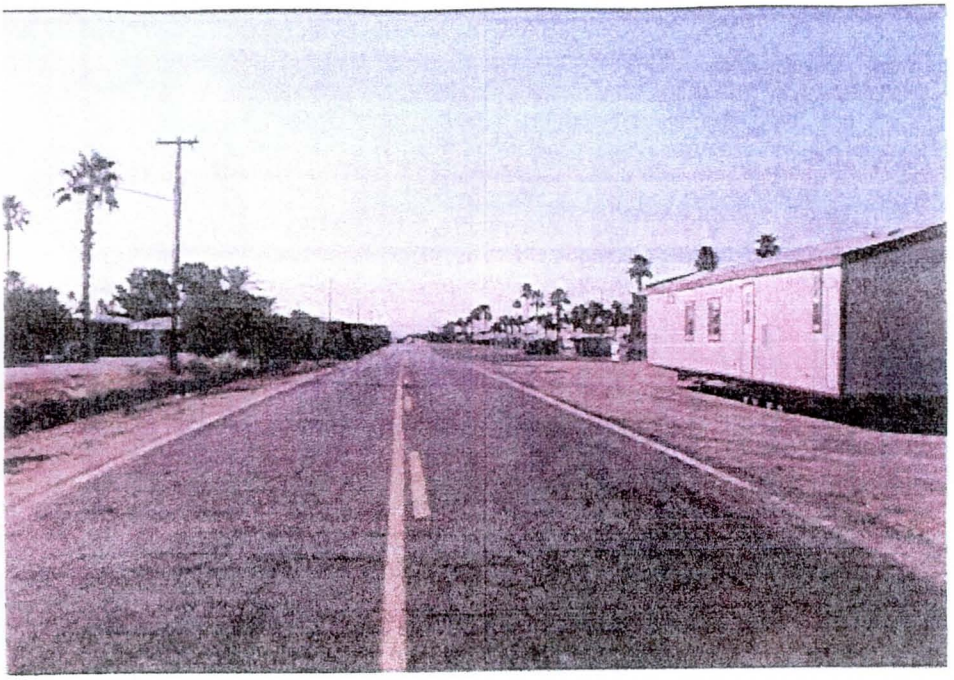


Photograph 15: Existing Broadway Road Channel at Hawes Road (looking east).

Photograph 16: Existing Hawes Road Channel and culverts at Broadway Road (looking south).

Photograph 17: Hawes Road looking north from Broadway Road (looking north).

Photograph 18: Existing Hawes Road north of Broadway Road (looking south).



Photograph 19: Existing Hawes Road Channel south of Apache Trail (looking south).

Photograph 20: Existing Hawes Road Channel at Apache Trail (looking south).

Appendix B: Hydraulic Computations

Appendix B: Hydraulic Computations

Alternative 1

Reach 0-1: Q=600 cfs
Worksheet for Trapezoidal Channel

Existing Channel

Project Description	
Project File	e:\1prj\mfc018~1\hawesr~1.fm2
Worksheet	Reach 0-1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.015	
Channel Slope	0.002400	ft/ft
Left Side Slope	2.000000	H : V
Right Side Slope	2.000000	H : V
Bottom Width	6.00	ft
Discharge	600.00	cfs

Results		
Depth	4.44	ft
Flow Area	66.13	ft²
Wetted Perimeter	25.87	ft
Top Width	23.77	ft
Critical Depth	4.35	ft
Critical Slope	0.002623	ft/ft
Velocity	9.07	ft/s
Velocity Head	1.28	ft
Specific Energy	5.72	ft
Froude Number	0.96	
Flow is subcritical.		

Reach 0-1: @ MHP Entrance
Worksheet for Trapezoidal Channel

Existing Channel at Entrance to Mobile Home Park

Project Description	
Project File	e:\1prj\mfc018~1\hawesr~1.fm2
Worksheet	Reach 0-1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Discharge

Input Data		
Mannings Coefficient	0.015	
Channel Slope	0.002400	ft/ft
Depth	3.50	ft
Left Side Slope	2.000000	H : V
Right Side Slope	2.000000	H : V
Bottom Width	6.00	ft

Results		
Discharge	362.26	cfs
Flow Area	45.50	ft²
Wetted Perimeter	21.65	ft
Top Width	20.00	ft
Critical Depth	3.37	ft
Critical Slope	0.002797	ft/ft
Velocity	7.96	ft/s
Velocity Head	0.99	ft
Specific Energy	4.49	ft
Froude Number	0.93	
Flow is subcritical.		

Reach 0-2: COM Channel
Worksheet for Trapezoidal Channel

Existing/Proposed Q=600cfs

Project Description	
Project File	e:\1prj\mfc018~1\hawesr~1.fm2
Worksheet	Reach 0-2
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.015	
Channel Slope	0.002215	ft/ft
Left Side Slope	2.000000	H : V
Right Side Slope	2.000000	H : V
Bottom Width	10.00	ft
Discharge	600.00	cfs

Results		
Depth	3.90	ft
Flow Area	69.35	ft²
Wetted Perimeter	27.43	ft
Top Width	25.59	ft
Critical Depth	3.74	ft
Critical Slope	0.002606	ft/ft
Velocity	8.65	ft/s
Velocity Head	1.16	ft
Specific Energy	5.06	ft
Froude Number	0.93	
Flow is subcritical.		

Reach1-1: Q=1800CFS
Worksheet for Trapezoidal Channel

Existing Channel

Project Description	
Project File	e:\1prj\mfc018 - hawes road car- pcn# 442-05-01\flowmaster\hralt1.fm2
Worksheet	Reach 1- Supercritical Option
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.015	
Channel Slope	0.003317	ft/ft
Left Side Slope	1.500000	H : V
Right Side Slope	1.500000	H : V
Bottom Width	16.70	ft
Discharge	1,800.00	cfs

Results		
Depth	5.35	ft
Flow Area	132.42	ft²
Wetted Perimeter	36.00	ft
Top Width	32.76	ft
Critical Depth	5.92	ft
Critical Slope	0.002284	ft/ft
Velocity	13.59	ft/s
Velocity Head	2.87	ft
Specific Energy	8.23	ft
Froude Number	1.19	
Flow is supercritical.		

Reach 2-1: Q=1800cfs
Worksheet for Trapezoidal Channel

Project Description	
Project File	e:\1prj\mfc018 - hawes road car- pcn# 442-05-01\flowmaster\hralt1.fm2
Worksheet	Reach 2 - Supercritical Flow
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.015	
Channel Slope	0.003300	ft/ft
Left Side Slope	1.500000	H : V
Right Side Slope	1.500000	H : V
Bottom Width	17.00	ft
Discharge	1,800.00	cfs

Results		
Depth	5.32	ft
Flow Area	132.88	ft^2
Wetted Perimeter	36.18	ft
Top Width	32.96	ft
Critical Depth	5.87	ft
Critical Slope	0.002283	ft/ft
Velocity	13.55	ft/s
Velocity Head	2.85	ft
Specific Energy	8.17	ft
Froude Number	1.19	
Flow is supercritical.		

$$FB = 0.25\left(Y + \frac{V^2}{2g}\right) = 2.0$$

Reach 2-2(a): Q=1520 cfs
Worksheet for Rectangular Channel

Project Description	
Project File	e:\1prj\mfc018\flowmaster\hralt1.fm2
Worksheet	Reach 2-2a: Alt. 1
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Slope

Input Data		
Mannings Coefficient	0.015	
Depth	4.70	ft
Bottom Width	30.00	ft
Discharge	1,520.00	cfs

Results		
Channel Slope	0.002163	ft/ft
Flow Area	141.00	ft^2
Wetted Perimeter	39.40	ft
Top Width	30.00	ft
Critical Depth	4.31	ft
Critical Slope	0.002821	ft/ft
Velocity	10.78	ft/s
Velocity Head	1.81	ft
Specific Energy	6.51	ft
Froude Number	0.88	
Flow is subcritical.		

BOX CULVERT ANALYSIS

COMPUTATION OF CULVERT PERFORMANCE CURVE

April 30, 1999

PROGRAM INPUT DATA

DESCRIPTION	VALUE
Culvert Span (ft)	10.0
Culvert Rise (ft)	6.0
FHWA Chart Number	8
FHWA Scale Number (Type of Culvert Entrance)	1
Manning's Roughness Coefficient (n-value)	0.012
Entrance Loss Coefficient of Culvert Opening	0.5
Culvert Length (ft)	180.0
Invert Elevation at Downstream end of Culvert (ft)	0.0
Invert Elevation at Upstream end of Culvert (ft)	10.0
Culvert Slope (ft/ft)	0.0556
Starting Flow Rate (cfs)	506.0
Incremental Flow Rate (cfs)	1.0
Ending Flow Rate (cfs)	508.0
Starting Tailwater Depth (ft)	4.7
Incremental Tailwater Depth (ft)	0.01
Ending Tailwater Depth (ft)	4.72

COMPUTATION RESULTS

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater (ft) Inlet Control	Headwater (ft) Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
506.0	4.7	6.82	0.0	1.55	4.3	1.55	32.66
507.0	4.71	6.83	0.0	1.55	4.31	1.55	32.68
508.0	4.72	6.84	0.0	1.55	4.31	1.55	32.7

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Reach 3-1 : Q = 922 cfs
Worksheet for Rectangular Channel

Project Description	
Project File	e:\1prj\mfc018~1\hawesr~1.fm2
Worksheet	Reach 3-1: Transition Channel
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.015	
Channel Slope	0.001800	ft/ft
Bottom Width	20.00	ft
Discharge	922.00	cfs

Results		
Depth	4.94	ft
Flow Area	98.83	ft²
Wetted Perimeter	29.88	ft
Top Width	20.00	ft
Critical Depth	4.04	ft
Critical Slope	0.003236	ft/ft
Velocity	9.33	ft/s
Velocity Head	1.35	ft
Specific Energy	6.29	ft
Froude Number	0.74	
Flow is subcritical.		

$$FB = 0.25\left(Y + \frac{V^2}{2g}\right) = 1.6'$$

$\therefore$ Total channel Depth = 6.5'

Reach 3-2: Q=922cfs
Worksheet for Trapezoidal Channel

Project Description	
Project File	e:\1prj\mfc018~1\hawesr~1.fm2
Worksheet	Reach 3: Subcritical
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.015	
Channel Slope	0.001800	ft/ft
Left Side Slope	1.500000	H : V
Right Side Slope	1.500000	H : V
Bottom Width	20.00	ft
Discharge	922.00	cfs

Results		
Depth	4.02	ft
Flow Area	104.67	ft²
Wetted Perimeter	34.50	ft
Top Width	32.06	ft
Critical Depth	3.67	ft
Critical Slope	0.002488	ft/ft
Velocity	8.81	ft/s
Velocity Head	1.21	ft
Specific Energy	5.23	ft
Froude Number	0.86	
Flow is subcritical.		

$$FB = 0.25\left(y + \frac{v^2}{2g}\right) = 1.3'$$

$$TW_{max\ w/2'\ drops} = 20 + 2\left(1.5(4'+2'+1.3')\right) = 41.9'$$

Say 42'

Reach 3-3: Q=922 cfs
Worksheet for Trapezoidal Channel

2 x(10' x 6' x 90') RCBC @ Main Street

Project Description	
Project File	e:\1prj\mfc018 - hawes road car- pcn# 442-05-01\hr alts.fm2
Worksheet	Reach 3-3: Main Str. Culvert
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.012	
Channel Slope	0.001800	ft/ft
Left Side Slope	0.000000	H : V
Right Side Slope	0.000000	H : V
Bottom Width	10.00	ft
Discharge	461.00	cfs

Results		
Depth	4.82	ft
Flow Area	48.22	ft²
Wetted Perimeter	19.64	ft
Top Width	10.00	ft
Critical Depth	4.04	ft
Critical Slope	0.002902	ft/ft
Velocity	9.56	ft/s
Velocity Head	1.42	ft
Specific Energy	6.24	ft
Froude Number	0.77	
Flow is subcritical.		

Reach 3-3: Q= 922 cfs
Worksheet for Trapezoidal Channel

Project Description	
Project File	e:\1prj\mfc018 - hawes road car- pcn# 442-05-01\hr alts.fm2
Worksheet	Reach 3-3: Main Street Channel
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.015	
Channel Slope	0.001600	ft/ft
Left Side Slope	1.500000	H : V
Right Side Slope	1.500000	H : V
Bottom Width	15.00	ft
Discharge	922.00	cfs

Results		
Depth	4.76	ft
Flow Area	105.45	ft²
Wetted Perimeter	32.17	ft
Top Width	29.29	ft
Critical Depth	4.22	ft
Critical Slope	0.002489	ft/ft
Velocity	8.74	ft/s
Velocity Head	1.19	ft
Specific Energy	5.95	ft
Froude Number	0.81	
Flow is subcritical.		

$$FB = 0.25\left(Y + \frac{V^2}{2g}\right) = 1.5$$

$$T_{W\,max} = 15 + 2\left(1.5\left(4.8 + 2 + 1.5\right)\right) = 39.9$$

Say 40

Appendix B: Hydraulic Computations

Alternative 2

Reach 0-1 and 0-2: Q=730 cfs Alt 2
Worksheet for Trapezoidal Channel

Project Description	
Project File	e:\1prj\mfc018\flowmaster\hralt1.fm2
Worksheet	Reach 0-1 - Alt. 2
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.015	
Channel Slope	0.002400	ft/ft
Left Side Slope	1.500000	H : V
Right Side Slope	1.500000	H : V
Bottom Width	12.00	ft
Discharge	730.00	cfs

Results		
Depth	4.15	ft
Flow Area	75.63	ft^2
Wetted Perimeter	26.96	ft
Top Width	24.45	ft
Critical Depth	4.07	ft
Critical Slope	0.002574	ft/ft
Velocity	9.65	ft/s
Velocity Head	1.45	ft
Specific Energy	5.60	ft
Froude Number	0.97	
Flow is subcritical.		

Reach 1-1 & 2-1: Q=1800cfs
Worksheet for Trapezoidal Channel

Project Description	
Project File	e:\1prj\mfc018\flowmaster\hralt1.fm2
Worksheet	Reach 1-1 and 2-1: Alt.2
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.015	
Channel Slope	0.003300	ft/ft
Left Side Slope	1.500000	H : V
Right Side Slope	1.500000	H : V
Bottom Width	17.00	ft
Discharge	1,800.00	cfs

Results		
Depth	5.32	ft
Flow Area	132.88	ft²
Wetted Perimeter	36.18	ft
Top Width	32.96	ft
Critical Depth	5.87	ft
Critical Slope	0.002283	ft/ft
Velocity	13.55	ft/s
Velocity Head	2.85	ft
Specific Energy	8.17	ft
Froude Number	1.19	
Flow is supercritical.		

BOX CULVERT ANALYSIS

COMPUTATION OF CULVERT PERFORMANCE CURVE

April 30, 1999

PROGRAM INPUT DATA

DESCRIPTION	VALUE
Culvert Span (ft)	10.0
Culvert Rise (ft)	6.0
FHWA Chart Number	8
FHWA Scale Number (Type of Culvert Entrance)	1
Manning's Roughness Coefficient (n-value)	0.012
Entrance Loss Coefficient of Culvert Opening	0.5
Culvert Length (ft)	180.0
Invert Elevation at Downstream end of Culvert (ft)	0.0
Invert Elevation at Upstream end of Culvert (ft)	10.0
Culvert Slope (ft/ft)	0.0556
Starting Flow Rate (cfs)	506.0
Incremental Flow Rate (cfs)	1.0
Ending Flow Rate (cfs)	508.0
Starting Tailwater Depth (ft)	4.7
Incremental Tailwater Depth (ft)	0.01
Ending Tailwater Depth (ft)	4.72

COMPUTATION RESULTS

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater (ft) Inlet Control	Headwater (ft) Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
506.0	4.7	6.82	0.0	1.55	4.3	1.55	32.66
507.0	4.71	6.83	0.0	1.55	4.31	1.55	32.68
508.0	4.72	6.84	0.0	1.55	4.31	1.55	32.7

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Reach 3-1 : Q = 922 cfs
Worksheet for Rectangular Channel

Project Description	
Project File	e:\1prj\mfc018\flowmaster\hralt1.fm2
Worksheet	Reach 3-1: Transition Channel
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.015	
Channel Slope	0.001800	ft/ft
Bottom Width	20.00	ft
Discharge	922.00	cfs

Results		
Depth	4.94	ft
Flow Area	98.83	ft^2
Wetted Perimeter	29.88	ft
Top Width	20.00	ft
Critical Depth	4.04	ft
Critical Slope	0.003236	ft/ft
Velocity	9.33	ft/s
Velocity Head	1.35	ft
Specific Energy	6.29	ft
Froude Number	0.74	
Flow is subcritical.		

Reach 3-2: Q=922cfs
Worksheet for Trapezoidal Channel

Project Description	
Project File	e:\1prj\mfc018~1\hawesr~1.fm2
Worksheet	Reach 3: Subcritical
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.015	
Channel Slope	0.001800	ft/ft
Left Side Slope	1.500000	H : V
Right Side Slope	1.500000	H : V
Bottom Width	20.00	ft
Discharge	922.00	cfs

Results		
Depth	4.02	ft
Flow Area	104.67	ft²
Wetted Perimeter	34.50	ft
Top Width	32.06	ft
Critical Depth	3.67	ft
Critical Slope	0.002488	ft/ft
Velocity	8.81	ft/s
Velocity Head	1.21	ft
Specific Energy	5.23	ft
Froude Number	0.86	
Flow is subcritical.		

$$FB = 0.25\left(y + \frac{v^2}{2g}\right) = 1.3'$$

$$TW_{\substack{max \\ w/2' drops}} = 20 + 2\left(1.5(4' + 2' + 1.3')\right) = 41.9'$$

Say 42'

Reach 3-3: Q=922 cfs
Worksheet for Trapezoidal Channel

2 x(10' x 6' x 90') RCBC @ Main Street

Project Description	
Project File	e:\1prj\mfc018 - hawes road car- pcn# 442-05-01\hr alts.fm2
Worksheet	Reach 3-3: Main Str. Culvert
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.012	
Channel Slope	0.001800	ft/ft
Left Side Slope	0.000000	H : V
Right Side Slope	0.000000	H : V
Bottom Width	10.00	ft
Discharge	461.00	cfs

Results		
Depth	4.82	ft
Flow Area	48.22	ft²
Wetted Perimeter	19.64	ft
Top Width	10.00	ft
Critical Depth	4.04	ft
Critical Slope	0.002902	ft/ft
Velocity	9.56	ft/s
Velocity Head	1.42	ft
Specific Energy	6.24	ft
Froude Number	0.77	
Flow is subcritical.		

Reach 3-3: Q= 922 cfs
Worksheet for Trapezoidal Channel

Project Description	
Project File	e:\1prj\mfc018 - hawes road car- pcn# 442-05-01\hr alts.fm2
Worksheet	Reach 3-3: Main Street Channel
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.015	
Channel Slope	0.001600	ft/ft
Left Side Slope	1.500000	H : V
Right Side Slope	1.500000	H : V
Bottom Width	15.00	ft
Discharge	922.00	cfs

Results		
Depth	4.76	ft
Flow Area	105.45	ft²
Wetted Perimeter	32.17	ft
Top Width	29.29	ft
Critical Depth	4.22	ft
Critical Slope	0.002489	ft/ft
Velocity	8.74	ft/s
Velocity Head	1.19	ft
Specific Energy	5.95	ft
Froude Number	0.81	
Flow is subcritical.		

$$FB = 0.25\left(Y + \frac{V^2}{2g}\right) = 1.5$$

$$Tw_{max} = 15 + 2\left(1.5\left(4.8 + 2 + 1.5\right)\right) = 39.9$$

Say 40

Appendix B: Hydraulic Computations

Grass/Earthen Channel Options

Table 2-1: Channel Lining Options Evaluation

Reach Description	Lining Type	Q100 (cfs)	V100 (fps)	Required Channel Topwidth (ft)	R/W Required for Preferred Roadway (ft)	R/W Required for Overhead Utilities (ft)	Total Existing R/W Width	Comments
Emelita Ave to Broadway Rd (Reach 2) (1)	Grass/Earthen	1800 cfs	6	90	80 min	6 min	130	Insufficient R/W for Earthen/Grassed Channel and Preferred Roadway. Options include acquiring 50' additional R/W or reduce roadway to Residential and acquire 20' additional R/W
Emelita Ave to Broadway Rd (Reach 2) (1)	Concrete	1800 cfs	14	39	80 min	6 min	130	Sufficient R/W for concrete channel flowing super-critical
Broadway Rd. to Apache Trail (Reach 3)	Grass/Earthen	922 cfs	5	85 (w/ 5 - 2' drop struct.)	39 +/-	6 min	95 min	Insufficient R/W for Earthen/Grassed Channel and Preferred Roadway. Options include acquiring 40' additional R/W or increase roadway to Major Collector and acquire 80' additional R/W
Broadway Rd. to Apache Trail (Reach 3)	Concrete	922 cfs	9 +	36	39 +/-	6 min	95 min	Sufficient R/W for concrete channel w/ drop structures flowing sub-critical

Notes:
(1) The channel configurations evaluated assume that the existing channel between Emelita Avenue and Southern Avenue will remain in place and that a parallel storm drain system will convey the 130 cfs not conveyed in the channel.

Grass/Earthen Lined Channel Reach 2
Worksheet for Trapezoidal Channel

Project Description	
Project File	e:\1prj\mfc018\flowmaster\hralt1.fm2
Worksheet	Grass/Earthen Lined channel
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Bottom Width

Input Data		
Mannings Coefficient	0.033	
Channel Slope	0.003300	ft/ft
Depth	5.30	ft
Left Side Slope	4.000000	H : V
Right Side Slope	4.000000	H : V
Discharge	1,800.00	cfs

Results		
Bottom Width	33.20	ft
Flow Area	288.35	ft^2
Wetted Perimeter	76.91	ft
Top Width	75.60	ft
Critical Depth	3.83	ft
Critical Slope	0.011332	ft/ft
Velocity	6.24	ft/s
Velocity Head	0.61	ft
Specific Energy	5.91	ft
Froude Number	0.56	
Flow is subcritical.		

Grass/Earthen Lined Channel Reach 3
Worksheet for Trapezoidal Channel

Project Description	
Project File	e:\1prj\mfc018\flowmaster\hralt1.fm2
Worksheet	Grass/Earthen Lined channel - N of BR
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.033	
Channel Slope	0.003300	ft/ft
Left Side Slope	4.000000	H : V
Right Side Slope	4.000000	H : V
Bottom Width	30.00	ft
Discharge	922.00	cfs

Results		
Depth	3.89	ft
Flow Area	177.15	ft²
Wetted Perimeter	62.07	ft
Top Width	61.11	ft
Critical Depth	2.72	ft
Critical Slope	0.012516	ft/ft
Velocity	5.20	ft/s
Velocity Head	0.42	ft
Specific Energy	4.31	ft
Froude Number	0.54	
Flow is subcritical.		

TW = 61' + 16' for Drop Structures
+ 8.4' for Freeboard
= 85.4' say 85

FB = 0.25(3.9 + .42) = 1.1'

Appendix C: Conceptual Cost Estimates

Appendix C: Conceptual Cost Estimates

Alternative 1

PRIMATECH
ENGINEERS & CONSULTANTS

Project: **Hawes Road Channel Improvements CAR**
Alternative 1: Conceptual Cost Estimate Project No. FCD 98-23

ID #	Item/Description	Quantity	Units	Unit Cost	Amount
REACH 0-1: SUPERSTITION FREEWAY TO MOBILE HOME PARK ENTRANCE Q100 =130 cfs in SD		**900**	**LF**		
	60" RGRCP	900	LF	$255.00	$229,500
	Storm Drain Outlet Structure	40	CY	$630.00	$25,200
	Hand Rail/Fencing - 1 side of channel	850	LF	$35.00	$29,750
	Water Line Relocation (12")	450	LF	$100.00	$45,000
	Asphalt Concrete Replacement	1,083	SY	$15.00	$16,245
	Sub-Total				$345,695
REACH 0-2: MOBILE HOME PARK ENTRANCE TO SOUTHERN AVE. Q100 = 130 cfs in SD		**1,080**	**LF**		
	60" RGRCP	1,080	LF	$255.00	$275,400
	Hand Rail/Fencing - 1 side of channel	1,080	LF	$35.00	$37,800
	Water Line Relocation (12")	1,080	LF	$100.00	$108,000
	Asphalt Concrete Replacement	1,800	SY	$15.00	$27,000
	Sub-Total				$448,200
REACH 1-1: SOUTHERN AVENUE TO EMILITA AVE Q100 = 1800 cfs and 130 cfs SD		**1,810**	**LF**		
	60" RGRCP	1,810	LF	$255.00	$461,550
	Hand Rail/Fencing - 1 side of channel	1,810	LF	$35.00	$63,350
	Asphalt Concrete Replacement	3,017	SY	$15.00	$45,255
	Sub-Total				$570,155

PRIMATECH
ENGINEERS & CONSULTANTS

Project: **Hawes Road Channel Improvements CAR**
Alternative 1: Conceptual Cost Estimate Project No. FCD 98-23

ID #	Item/Description	Quantity	Units	Unit Cost	Amount
REACH 2-1: EMILITA AVE to Transition Channel Q100 = 1800 cfs and 130 cfs in SD		**3,030**	**LF**		
	60" RGRCP	3,030	LF	$255.00	$772,650
	Concrete Channel Lining (6") - Trap Channel BW=17, z=1.5, D=7.3'	2,317	CY	$290.00	$672,043
	Earthwork/Channel Excavation	26,170	CY	$11.00	$287,872
	Hand Rail/Fencing - 1 side of channel	3,030	LF	$35.00	$106,050
	Concrete Curb & Gutter (West side adjacent to channel only)_	3,030	LF	$9.00	$27,270
	Asphalt Concrete Pavement/ Base Course (2 Lanes -34' wide)	22,893	SY	$15.00	$343,400
	Remove Existing Channel - remove portion of existing channel that extends north of Emilita Ave	80	LF	$110.00	$8,800
	Remove Existing Asphalt Concrete (28' X 1750')	5,444	SY	$2.50	$13,611
	Gas Line Relocation	1,750	LF	$35.00	$61,250
	Sub-Total				$2,292,946
REACH 2-2: Transition Channel to Broadway Road Q100 = 1650 cfs		**200**	**LF**		
	Concrete Box Culvert: 3-10'x6'x180	594	CY	$370.00	$219,780
	Concrete Channel Lining (8"-10") - Rectangular Channel BW=30, D=7'	271	CY	$370.00	$100,207
	Headwall/Inlet Structure	300	CY	$180.00	$54,000
	Earthwork/Channel Excavation	1,727	CY	$11.00	$19,001
	Hand Rail/Fencing - 1 side of channel	200	LF	$35.00	$7,000
	Concrete Curb & Gutter	594	LF	$9.00	$5,346
	Asphalt Concrete Pavement/ Base Course (2 Lanes - 34' wide)	1,511	SY	$15.00	$22,667
	Remove Existing Asphalt Concrete	889	SY	$2.50	$2,222
	Gas Line Relocation	200	LF	$35.00	$7,000
	60" RGRCP	210	LF	$255.00	$53,550
	Sub-Total				$490,773
	Sub-Total: Hawes Road Channel - South of Broadway Road				**$4,147,769**
	Engineering and Contingencies	25%			$1,036,942
	Total: Hawes Road Channel - South of Broadway Road				**$5,184,711**

PRIMATECH
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Project: **Hawes Road Channel Improvements CAR**
Alternative 1: Conceptual Cost Estimate Project No. FCD 98-23

ID #	Item/Description	Quantity	Units	Unit Cost	Amount
REACH 3-1: Transition Channel North of Broadway Road Q100 = 922 cfs		**300**	**LF**		
	Concrete Channel Lining (8"-10") - Rectangular Channel BW=20, D=6.5'	305	CY	$370.00	$112,764
	Earthwork/Channel Excavation	1,444	CY	$11.00	$15,889
	Hand Rail/Fencing - 2 sides of channel	600	LF	$35.00	$21,000
	Concrete Curb & Gutter (side adjacent to channel only)	300	LF	$9.00	$2,700
	Asphalt Concrete Pavement/ Base Course w/ 28' to 68' tapers (2 Lanes - 28' wide)	1,600	SY	$15.00	$24,000
	Remove Existing Asphalt Concrete (28' x 110')	342	SY	$2.50	$856
	Land Acquisition Cost - Assuming Commercial Zoning	5,250	SF	$2.97	$15,593
	Sub-Total				$192,802
REACH 3-2: Transition Channel to Main Street Q100 =1030 cfs		**2,250**	**LF**		
	Concrete Channel Lining (6") - Trap Channel BW=20, z=1.5, D=5.3'	1,633	CY	$290.00	$473,667
	Drop Structure(s): Seven - 2.0'	227	SY	$180.00	$40,925
	Earthwork/Channel Excavation	16,275	CY	$11.00	$179,025
	Hand Rail/Fencing - 2 sides of channel	4,500	LF	$35.00	$157,500
	Concrete Curb & Gutter (side adjacent to channel only)	2,250	LF	$9.00	$20,250
	Asphalt Concrete Pavement/ Base Course (2 Lanes - 28' wide)	7,000	SY	$15.00	$105,000
	Remove Existing Asphalt Concrete (28' Wide')	7,000	SY	$2.50	$17,500
	Sub-Total				$993,867

PRIMATECH
ENGINEERS & CONSULTANTS

Project: **Hawes Road Channel Improvements CAR**
Alternative 1: Conceptual Cost Estimate Project No. FCD 98-23

ID #	Item/Description	Quantity	Units	Unit Cost	Amount
REACH 3-3:	**Main Street/Apache Blvd. Channel: Q100 = 922 cfs**	**365**	**LF**		
	Concrete Channel Lining (6") - Trap Channel BW=15', z=1.5, D=6.3'	255	CY	$290.00	$73,899
	Drop Structure(s): Three - 2.0'	97	SY	$180.00	$17,539
	Concrete Box Culvert: 2-10'x6'x90'	207	CY	$370.00	$76,590
	Earthwork/Channel Excavation	2,640	CY	$11.00	$29,042
	Hand Rail/Fencing - 2 sides of channel	730	LF	$35.00	$25,550
	Concrete Curb & Gutter (sides adjacent to channel only)	730	LF	$9.00	$6,570
	Asphalt Concrete Pavement/ Base Course (2 Lanes - 28' wide)	280	SY	$15.00	$4,200
	Remove Existing Asphalt Concrete (28' Wide')	280	SY	$2.50	$700
	Sub-Total				$234,090
	Sub-Total: Hawes Road Channel - North of Broadway Road				**$1,420,759**
	Engineering and Contingencies	25%			$355,190
	Total: Hawes Road Channel - North of Broadway Road				**$1,775,949**
	Grand Total: Hawes Road Channel from the Superstition Freeway to Main Street				**$6,960,660**

Appendix C: Conceptual Cost Estimates

Alternative 2

PRIMATECH
ENGINEERS & CONSULTANTS

Project: **Hawes Road Channel Improvements CAR**
Alternative 2: Conceptual Cost Estimate

Project No. FCD 98-23

ID #	Item/Description	Quantity	Units	Unit Cost	Amount
REACH 0-1: SUPERSTITION FREEWAY TO MOBILE HOME PARK ENTRANCE Q100 =730 cfs		**900**	**LF**		
	Concrete Channel Lining (6") - Trap Channel BW=12, z=1.5, D=6'	567	CY	$290.00	$164,333
	Drop Structure(s) one - 1.5'	16	SY	$180.00	$2,943
	Concrete Box Culvert: 3-8'x5'x50'	120	CY	$370.00	$44,400
	Earthwork/Channel Excavation	141	CY	$11.00	$1,553
	Hand Rail/Fencing - 1 side of channel	850	LF	$35.00	$29,750
	Remove Existing Channel	850	LF	$60.00	$51,000
	Sub-Total				$293,979
REACH 0-2: MOBILE HOME PARK ENTRANCE TO SOUTHERN AVE. Q100 = 730 cfs		**1,080**	**LF**		
	Concrete Channel Lining (6") - Trap Channel BW=12, z=1.5, D=6'	680	CY	$290.00	$197,200
	Earthwork/Channel Excavation	9,328	CY	$11.00	$102,608
	Hand Rail/Fencing - 1 side of channel	1,080	LF	$35.00	$37,800
	Remove Existing Channel	1,080	LF	$60.00	$64,800
	Concrete Box Culvert: 3-8'x5'x120' part of bifurcation structure	288	CY	$370.00	$106,560
	Sub-Total				$508,968
REACH 1-1: SOUTHERN AVENUE TO EMILITA AVE Q100 = 1930 cfs		**1,810**	**LF**		
	Concrete Channel Lining (6") - Trap Channel BW=19, z=1.5, D=7.3'	1,475	CY	$290.00	$427,696
	Earthwork/Channel Excavation	15,633	CY	$11.00	$171,963
	Hand Rail/Fencing - 1 side of channel	1,810	LF	$35.00	$63,350
	Concrete Curb & Gutter	1,810	LF	$9.00	$16,290
	Remove Existing Channel - remove portion of existing channel that extends north of Emilita Ave	1,810	LF	$110.00	$199,100
	Sub-Total				$878,399

PRIMATECH
ENGINEERS & CONSULTANTS

Project: **Hawes Road Channel Improvements CAR**
Alternative 2: Conceptual Cost Estimate Project No. FCD 98-23

ID #	Item/Description	Quantity	Units	Unit Cost	Amount
REACH 2-1:	**EMILITA AVE to Transition Channel Q100 = 1800 cfs and 130 cfs in SD**	**3,030**	**LF**		
	Concrete Channel Lining (6") - Trap Channel BW=19, z=1.5, D=7.3'	2,469	CY	$290.00	$715,978
	Earthwork/Channel Excavation	26,170	CY	$11.00	$287,872
	Hand Rail/Fencing - 1 side of channel	3,030	LF	$35.00	$106,050
	Concrete Curb & Gutter	3,030	LF	$9.00	$27,270
	Asphalt Concrete Pavement/ Base Course (2 Lanes - 28' wide)	9,427	SY	$15.00	$141,400
	Remove Existing Channel - remove portion of existing channel that extends north of Emilita Ave	80	LF	$110.00	$8,800
	Remove Existing Asphalt Concrete (28' X 2440')	7,591	SY	$2.50	$18,978
	Gas Line Relocation	3,030	LF	$35.00	$106,050
	Sub-Total				$1,412,398
REACH 2-2:	**Transition Channel to Broadway Road Q100 = 1930 cfs**	**200**	**LF**		
	Concrete Box Culvert: 3-10'x6'x180	594	CY	$370.00	$219,780
	Concrete Channel Lining (8"-10") - Rectangular Channel BW=30, D=7'	271	CY	$370.00	$100,207
	Headwall/Inlet Structure	300	CY	$630.00	$189,000
	Earthwork/Channel Excavation	1,727	CY	$11.00	$19,001
	Hand Rail/Fencing - 1 side of channel	200	LF	$35.00	$7,000
	Concrete Curb & Gutter	594	LF	$9.00	$5,346
	Asphalt Concrete Pavement/ Base Course (2 Lanes - 28' wide)	622	SY	$15.00	$9,333
	Remove Existing Asphalt Concrete (28' X 810')	2,520	SY	$2.50	$6,300
	Gas Line Relocation	200	LF	$35.00	$7,000
	Sub-Total				$562,967
	Sub-Total: Hawes Road Channel - South of Broadway Road				**$3,656,711**
	Engineering and Contingencies	25%			$914,178
	Total: Hawes Road Channel - South of Broadway Road				**$4,570,889**

PRIMATECH
ENGINEERS & CONSULTANTS

Project: **Hawes Road Channel Improvements CAR**
Alternative 2: Conceptual Cost Estimate Project No. FCD 98-23

ID #	Item/Description	Quantity	Units	Unit Cost	Amount
REACH 3-1: Transition Channel North of Broadway Road Q100 = 922 cfs		**300**	**LF**		
	Concrete Channel Lining (8"-10") - Rectangular Channel BW=20, D=6.5'	305	CY	$370.00	$112,764
	Earthwork/Channel Excavation	1,444	CY	$11.00	$15,889
	Hand Rail/Fencing - 2 sides of channel	600	LF	$35.00	$21,000
	Concrete Curb & Gutter (side adjacent to channel only)	300	LF	$9.00	$2,700
	Asphalt Concrete Pavement/ Base Course w/ 28' to 68' tapers (2 Lanes - 28' wide)	1,600	SY	$15.00	$24,000
	Remove Existing Asphalt Concrete (28' x 110')	342	SY	$2.50	$856
	Land Acquisition Cost - Assuming Commercial Zoning	5,250	SF	$2.97	$15,593
	Sub-Total				$192,802
REACH 3-2: Transition Channel to Main Street Q100 = 922 cfs		**2,250**	**LF**		
	Concrete Channel Lining (6") - Trap Channel BW=20, z=1.5, D=5.3'	1,633	CY	$290.00	$473,667
	Drop Structure(s): Seven - 2.0'	227	SY	$180.00	$40,925
	Earthwork/Channel Excavation	16,275	CY	$11.00	$179,025
	Hand Rail/Fencing - 2 sides of channel	4,500	LF	$35.00	$157,500
	Concrete Curb & Gutter (side adjacent to channel only)	2,250	LF	$9.00	$20,250
	Asphalt Concrete Pavement/ Base Course (2 Lanes - 28' wide)	7,000	SY	$15.00	$105,000
	Remove Existing Asphalt Concrete (28' Wide')	7,000	SY	$2.50	$17,500
	Land Acquisition Cost 35' additional Rights-of-Way	7,350	SF	$0.99	$7,277
	Residential Relocation Costs	40	EA	$15,000	$600,000
	Relocation of Overhead Power Lines	7	EA	$30,000	$210,000
	Sub-Total				$1,811,144

PRIMATECH
ENGINEERS & CONSULTANTS

Project: **Hawes Road Channel Improvements CAR**
Alternative 2: Conceptual Cost Estimate

Project No. FCD 98-23

ID #	Item/Description	Quantity	Units	Unit Cost	Amount
REACH 3-3:	**Main Street/Apache Blvd. Channel: Q100 = 922 cfs**	**365**	**LF**		
	Concrete Channel Lining (6") - Trap Channel BW=15', z=1.5, D=6.3'	255	CY	$290.00	$73,899
	Drop Structure(s): Three - 2.0'	97	SY	$180.00	$17,539
	Concrete Box Culvert: 2-10'x6'x90'	207	CY	$370.00	$76,590
	Earthwork/Channel Excavation	2,640	CY	$11.00	$29,042
	Hand Rail/Fencing - 2 sides of channel	730	LF	$35.00	$25,550
	Concrete Curb & Gutter (sides adjacent to channel only)	730	LF	$9.00	$6,570
	Asphalt Concrete Pavement/ Base Course (2 Lanes - 28' wide)	280	SY	$15.00	$4,200
	Remove Existing Asphalt Concrete (28' Wide')	280	SY	$2.50	$700
	Sub-Total				$234,090
	Sub-Total: Hawes Road Channel - North of Broadway Road				**$2,238,036**
	Engineering and Contingencies	25%			$559,509
	Total: Hawes Road Channel - North of Broadway Road				**$2,797,544**
	Grand Total: Hawes Road Channel from the Superstition Freeway to Main Street				**$7,368,433**

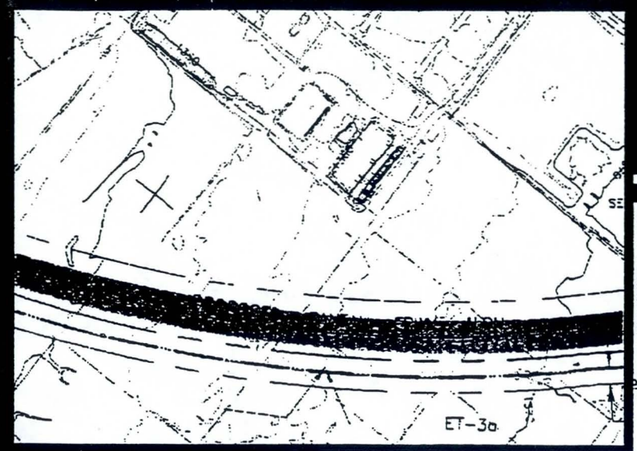
Appendix D: Excerpts from Selected Reports

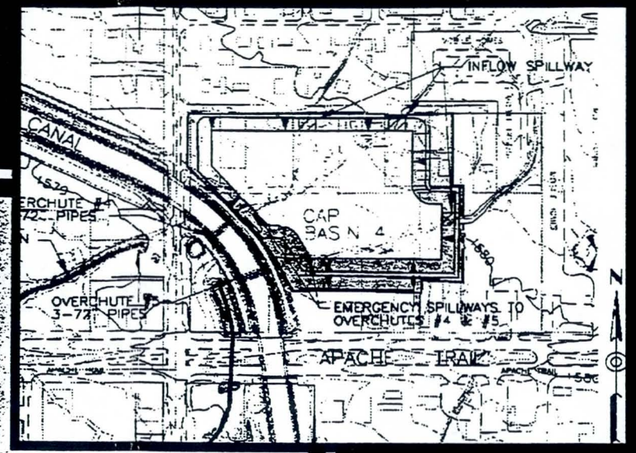
East Mesa ADMP

East Mesa Area Drainage Master Plan
FCD #95-32

July, 1998

Recommended Design Report

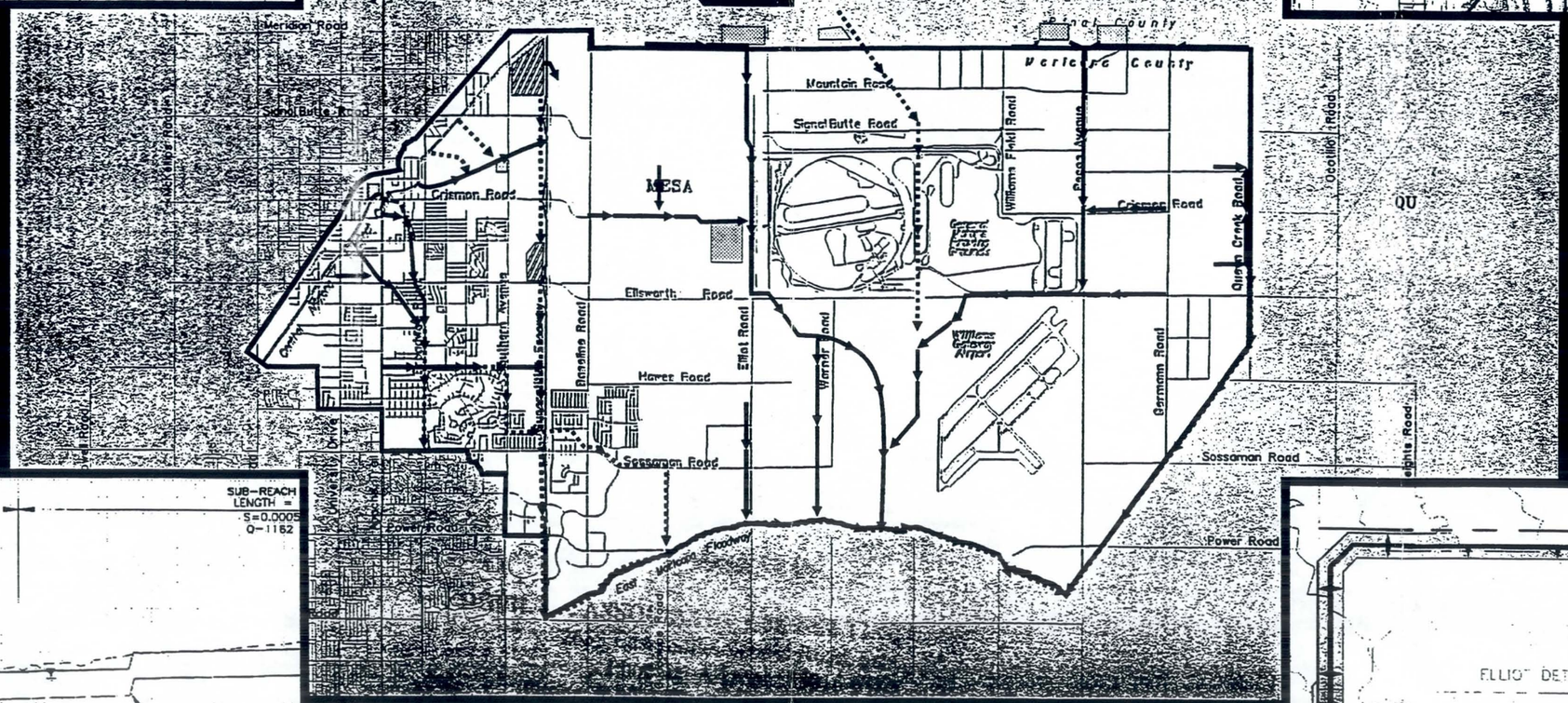


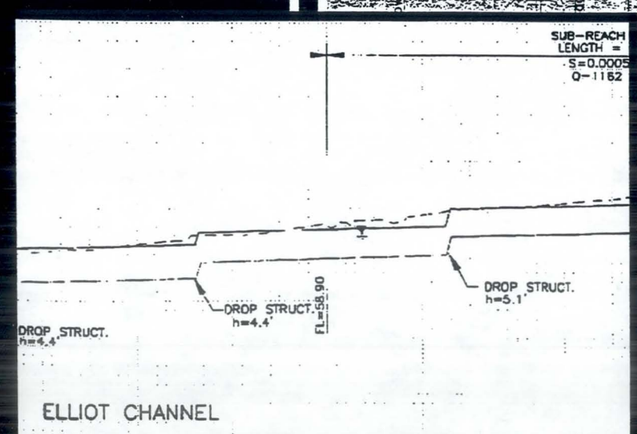


Prepared for:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD CONTROL DISTRICT of MARICOPA COUNTY 1959





Prepared by:

DIBBLE & ASSOCIATES
CONSULTING ENGINEERS
Since 1962
2633 East Indian School Road, Suite 401
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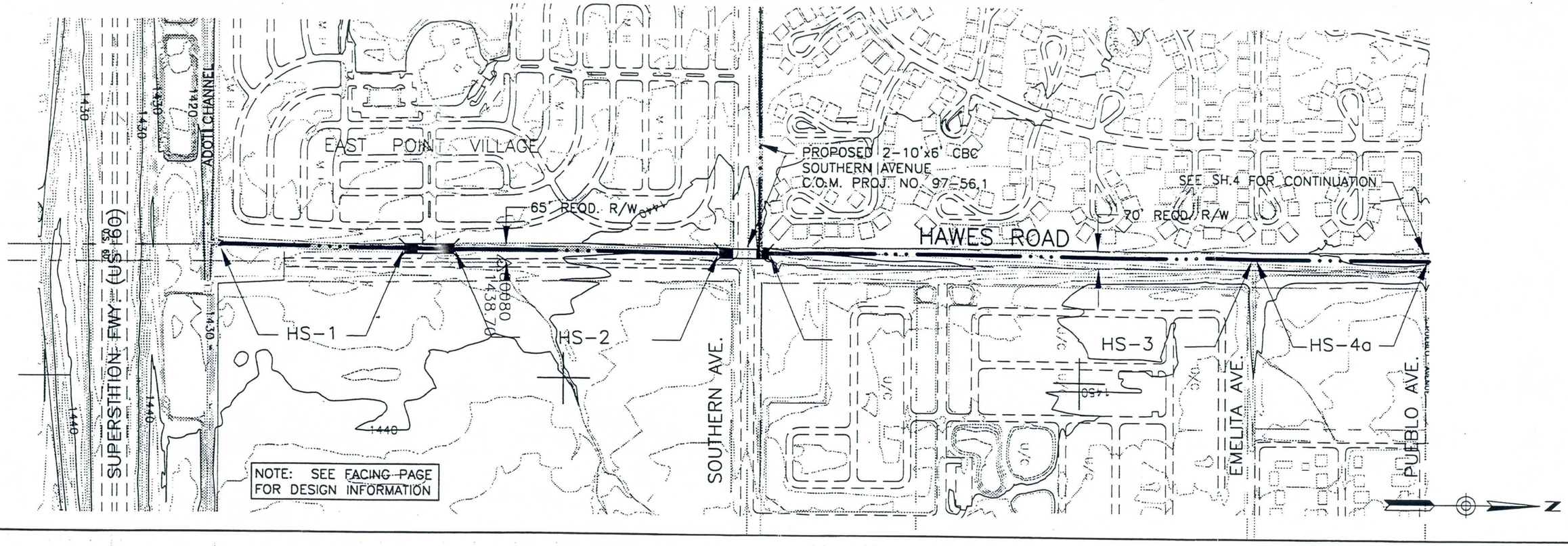
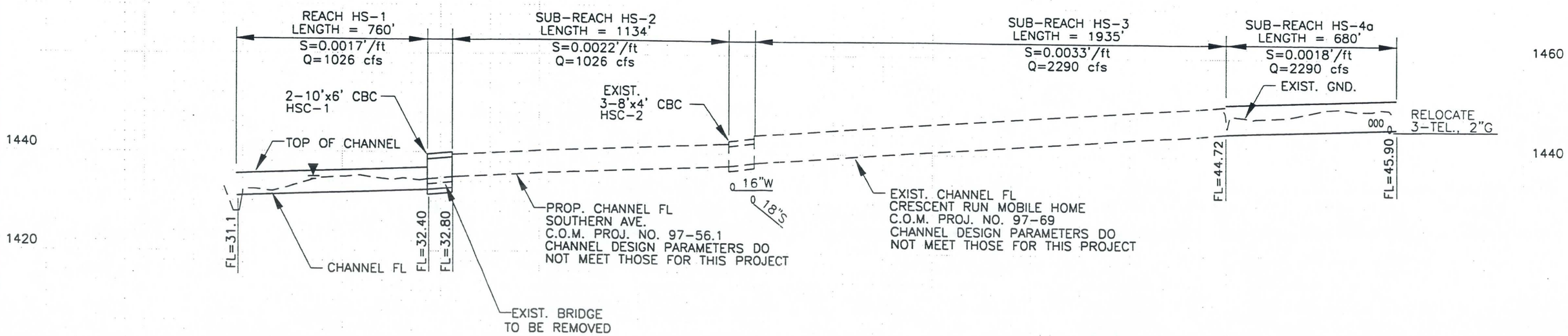
Phone: (602) 957-1155 FAX: (602) 957-2838

In Association with:

Hoskin Engineering Consultants
520 East Portland Street
Phoenix, Arizona 85004
Phone: (602) 462-5775 FAX: (602) 462-5770





HAWES CHANNEL

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY	COUNTY PROJECT NO. FCD #95-32	EAST MESA AREA DRAINAGE MASTER PLAN	
	PRIME CONSULTANT DIBBLE & ASSOCIATES CONSULTING ENGINEERS	PROJECT DESCRIPTION AREA 3 HAWES CHANNEL	
	SUB CONSULTANT Hoskin Engineering Consultants	DRN. JEV DATE: 6-16-98	SCALE 1" = 400' HORIZONTAL
		DES. PWH DATE: 6-11-98	1" = 20' VERTICAL
		CKD. FEB DATE: 6-17-98	SHEETS NO. 3 OF 43

East Mesa Area Drainage Master Plan
AREA 3 - HAWES CHANNEL

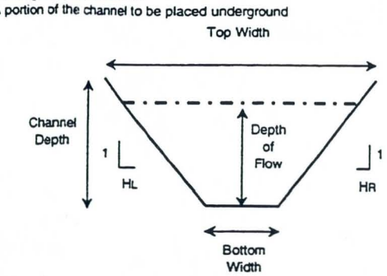
Channel Properties

I.D.	HEC-1 I.D.	Design Q100 (cfs)	Comp. Capacity (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Computed Invert. Slope (ft./ft.)	Design Invert Slope (ft./ft.)	Total Vertical Drop (ft.)	No. of Drops	Vertical Drop (ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (HL)	Sideslope (H:1) Right (HR)	Area (sf.)	Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	
HS-1	31T38	1026	1026	1431.1	1432.4	760	0.0017	0.0017	0.0	0	0.0	C	0.0150	25.0	3.8	2	2	122.7	41.9	0.84	Sub	8.4	1.2	5.0	44.9	
HS-2	31T38	1026	1026	1435.0	1437.5	1134	0.0022	0.0022	0.0	0	0.0	C	0.0150	10.0	5.1	2	2	103.0	32.8	0.95	Trans	10.0	1.7	6.8	37.0	Existing channel to remain
HS-3	C31	2290	2290	1438.3	1444.7	1935	0.0033	0.0033	0.0	0	0.0	C	0.0150	16.7	6.1	1.5	1.5	157.7	38.7	1.21	Trans	14.5	2.3	8.4	42.0	Existing channel to remain
HS-4a	C31	2290	2290	1444.7	1445.9	680	0.0018	0.0018	0.0	0	0.0	C	0.0150	50.0	4.5	0	0	225.5	59.02	0.84	Sub	10.2	1.5	6.0	50.0	A portion of the channel to be placed underground

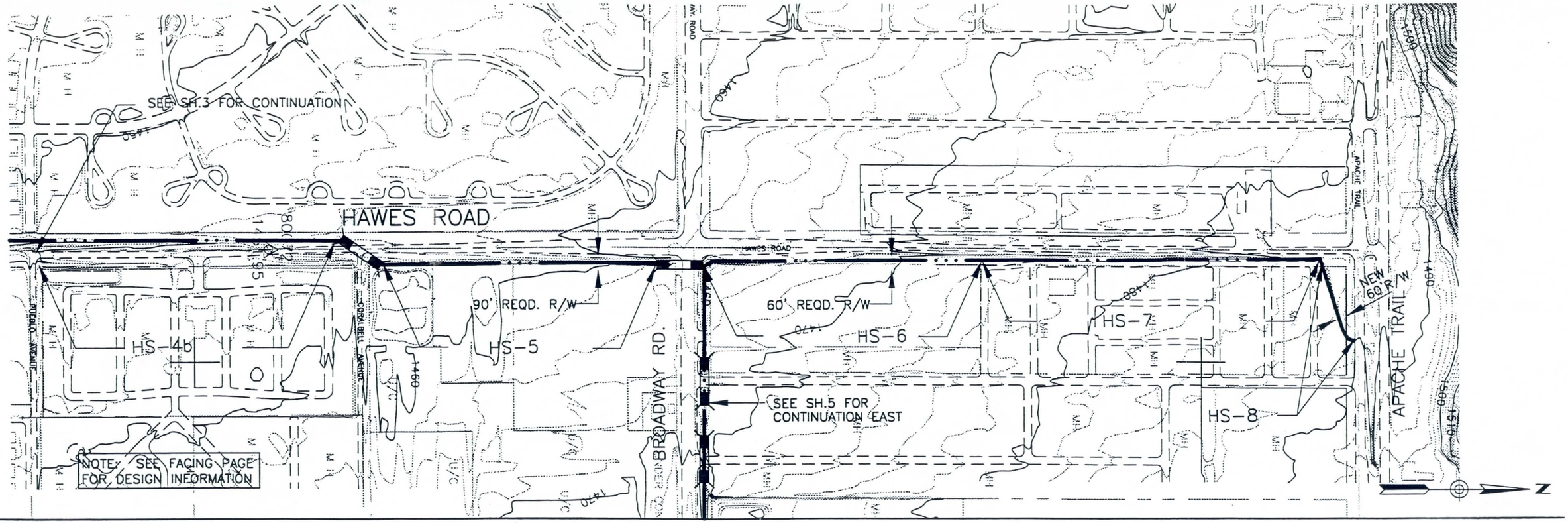
Channel Material Type: C = Concrete, R = Riprap, G = Grass, E = Natural or Earth

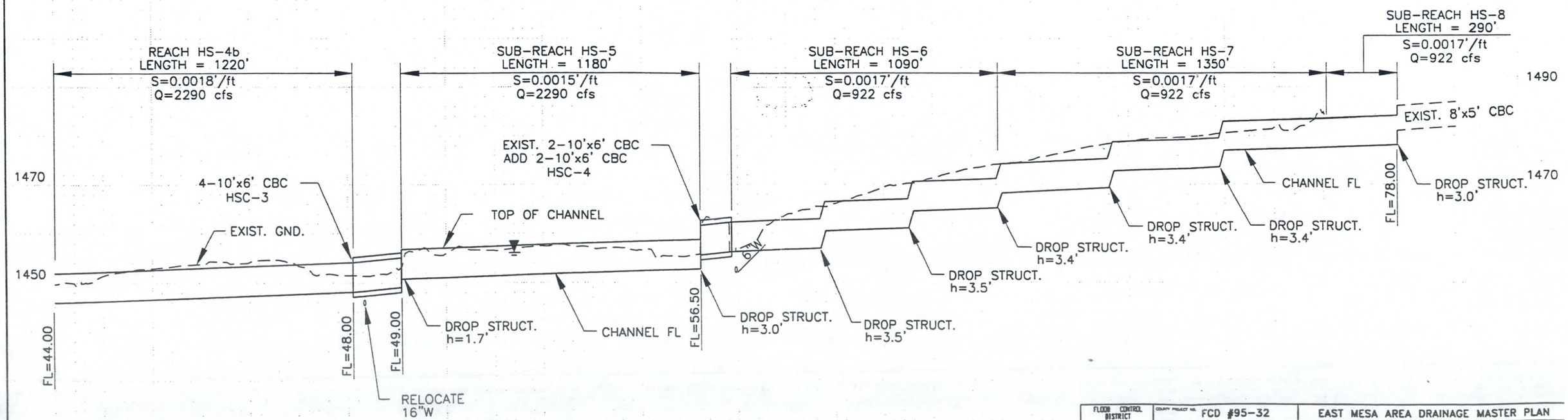
Culvert Properties

I.D.	HEC-1 I.D.	Design Q100 (cfs)	Comp. Capacity (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Material/ Barrel Type	Manning's "n" Value	Number of Barrels	Culvert Dia./ Height	Unit	Width (ft)	Barrel/ Material	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D	Control	
HSC-1	31T38	1026	1026	50	1432.8	1432.4	0.0080	C	0.0120	2	6	ft.	10	RCBC	Wingwall	3.77	7.03	1.17	IC	
HSC-2	31T38	1026	1026	114	1438.1	1437.5	0.0053	C	0.0120	3	4	ft.	8	RCBC	Wingwall	5.1	7.62	1.90	IC	Existing to remain



Typical Channel Section





HAWES CHANNEL

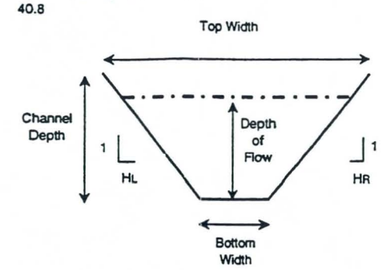
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY	COUNTY PROJECT NO. FCD #95-32	EAST MESA AREA DRAINAGE MASTER PLAN	
	PRIME CONSULTANT: DIBBLE & ASSOCIATES CONSULTING ENGINEERS	PROJECT DESCRIPTION: AREA 3 HAWES CHANNEL	
	SUB CONSULTANT: Haslin Engineering Consultants	DRN. JEV DATE: 6-16-98	SCALE -
		DES. PWH DATE: 6-11-98	1"=400' HORIZONTAL
		CKD. FEB DATE: 6-17-98	1"=20' VERTICAL
		SHEETS NO. 4 OF 43	

East Mesa Area Drainage Master Plan
AREA 3 - HAWES CHANNEL

Channel Properties

I.D.	HEC-1 I.D.	Design Q100 (cfs)	Comp. Capacity (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Computed Invert. Slope (ft./ft.)	Design Invert Slope (ft./ft.)	Total Vertical Drop (ft.)	No. of Drops	Vertical Drop (ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (HL)	Sideslope (H:1) Right (HR)	Area (sf.)	Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	
HS-4b	C31	2290	2290	1445.9	1448.0	1220	0.0018	0.0018	0.0	0	0.0	C	0.0150	50.0	4.5	0	0	225.5	59	0.84	Sub	10.2	1.5	6.0	50.0	
HS-5	C31	2290	2290	1449.0	1455.5	1180	0.0055	0.0015	4.7	2	2.4	C	0.0150	40.0	4.8	2	2	240.7	61.7	0.83	Sub	9.5	1.6	6.4	65.6	
HS-6	C18A	922	922	1456.2	1465.0	1090	0.0081	0.0017	6.9	2	3.5	C	0.0150	20.0	4.0	2	2	110.3	37.7	0.84	Sub	8.4	1.3	5.2	40.8	
HS-7	C18A	922	922	1465.0	1477.5	1350	0.0093	0.0017	10.2	3	3.4	C	0.0150	20.0	4.0	2	2	110.3	37.7	0.84	Sub	8.4	1.3	5.2	40.9	Max. topwidth = 30 feet
HS-8	C18A	922	922	1477.5	1478.0	290	0.0017	0.0017	0.0	0	0.0	C	0.0150	20.0	4.0	2	2	110.3	37.7	0.84	Sub	8.4	1.3	5.2	40.8	

Channel Material Type: C = Concrete, R = Riprap, G = Grass, E = Natural or Earth



Typical Channel Section

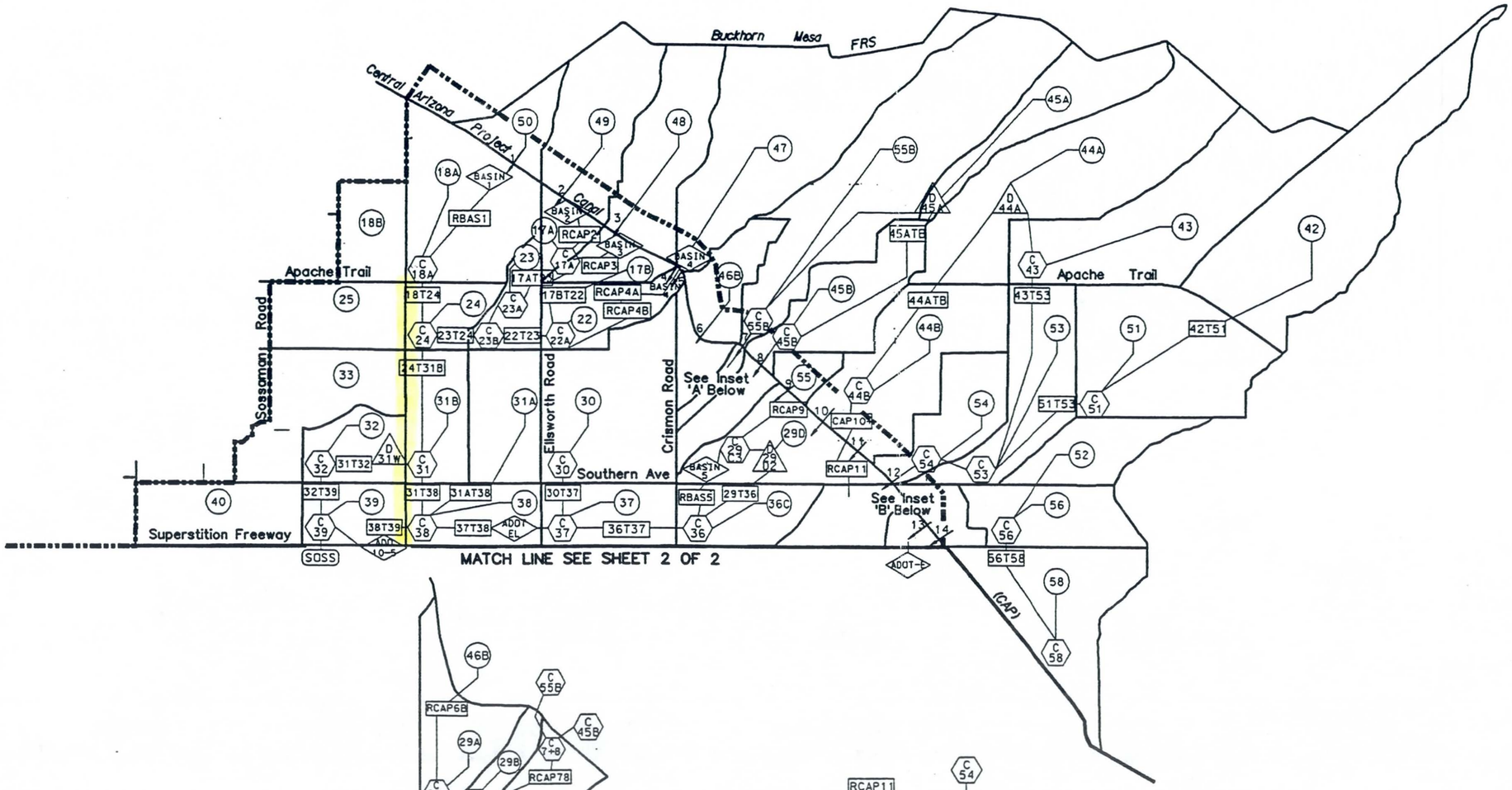
Culvert Properties

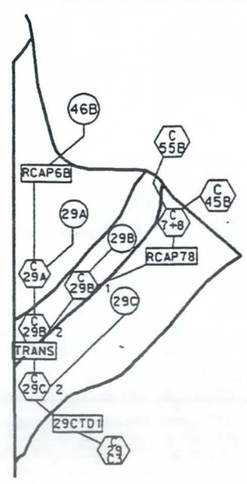
I.D.	HEC-1 I.D.	Design Q100 (cfs)	Comp. Capacity (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Material/ Barrel Type	Manning's "n" Value	Number of Barrels	Culvert Dia./ Height	Unit	Width (ft)	Barrel/ Material	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D	Control	
HSC-3	C31	2290	2290	180	1449.0	1448.0	0.0056	C	0.0120	4	6	ft.	10	RCBC	Wingwall	4.5	8.33	1.39	IC	
HSC-4	C31	2290	2290	132	1456.2	1455.8	0.0030	C	0.0120	4	6	ft.	10	RCBC	Wingwall	4.8	8.35	1.39	IC	Existing to remain, add 2-10'x6' CBC

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

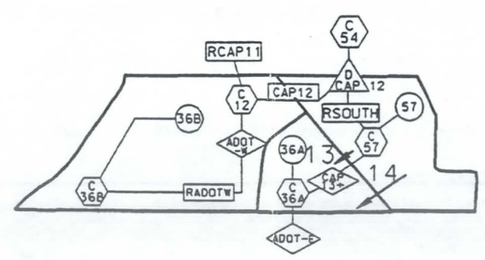
East Mesa Area
Drainage Master Plan

F.C.D. CONTRACT NO. 95-32





INSET 'A'



INSET 'B'

LEGEND

STUDY BOUNDARY	
SUB-BASIN BOUNDARY	
DIVERT HYDROGRAPH	DT TRW
SUB-BASIN RUNOFF	90A
ROUTE HYDROGRAPH	6AT7B
COMBINE HYDROGRAPH	CP 90A
OUTFLOW FROM STUDY AREA	CAP5
DETENTION BASIN	ADOT -W
CAP OVERCHUTE	5

N

2500 0' 2500 5000
SCALE: 1" = 5000'

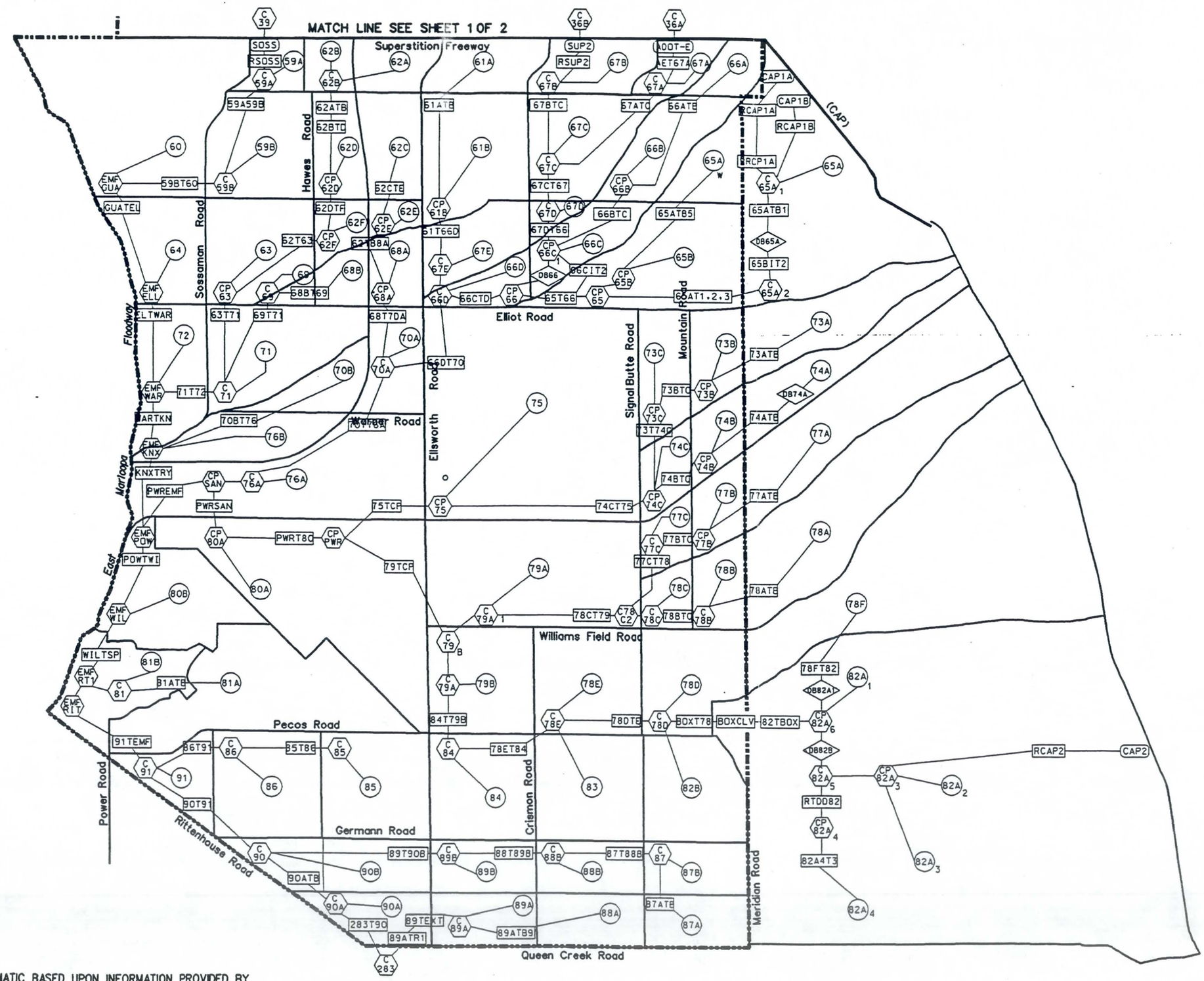
DIBBLE & ASSOCIATES
CONSULTING ENGINEERS

Hoskin Engineering Consultants

HEC-1 SCHEMATIC
NORTH OF
SUPERSTITION FREEWAY

SHEET 1 OF 2

NOTE:
SCHEMATIC BASED UPON INFORMATION PROVIDED BY
THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY



NOTE:
SCHEMATIC BASED UPON INFORMATION PROVIDED BY THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

East Mesa Area Drainage Master Plan

F.C.D. CONTRACT NO. 95-32

LEGEND

STUDY BOUNDARY	
SUB-BASIN BOUNDARY	
DIVERT HYDROGRAPH	DT TRW
SUB-BASIN RUNOFF	90A
ROUTE HYDROGRAPH	6AT7E
COMBINE HYDROGRAPH	CP 90A
OUTFLOW FROM STUDY AREA	CAP5
DETENTION BASIN	ADOT -W
CAP OVERCHUTE	5

N

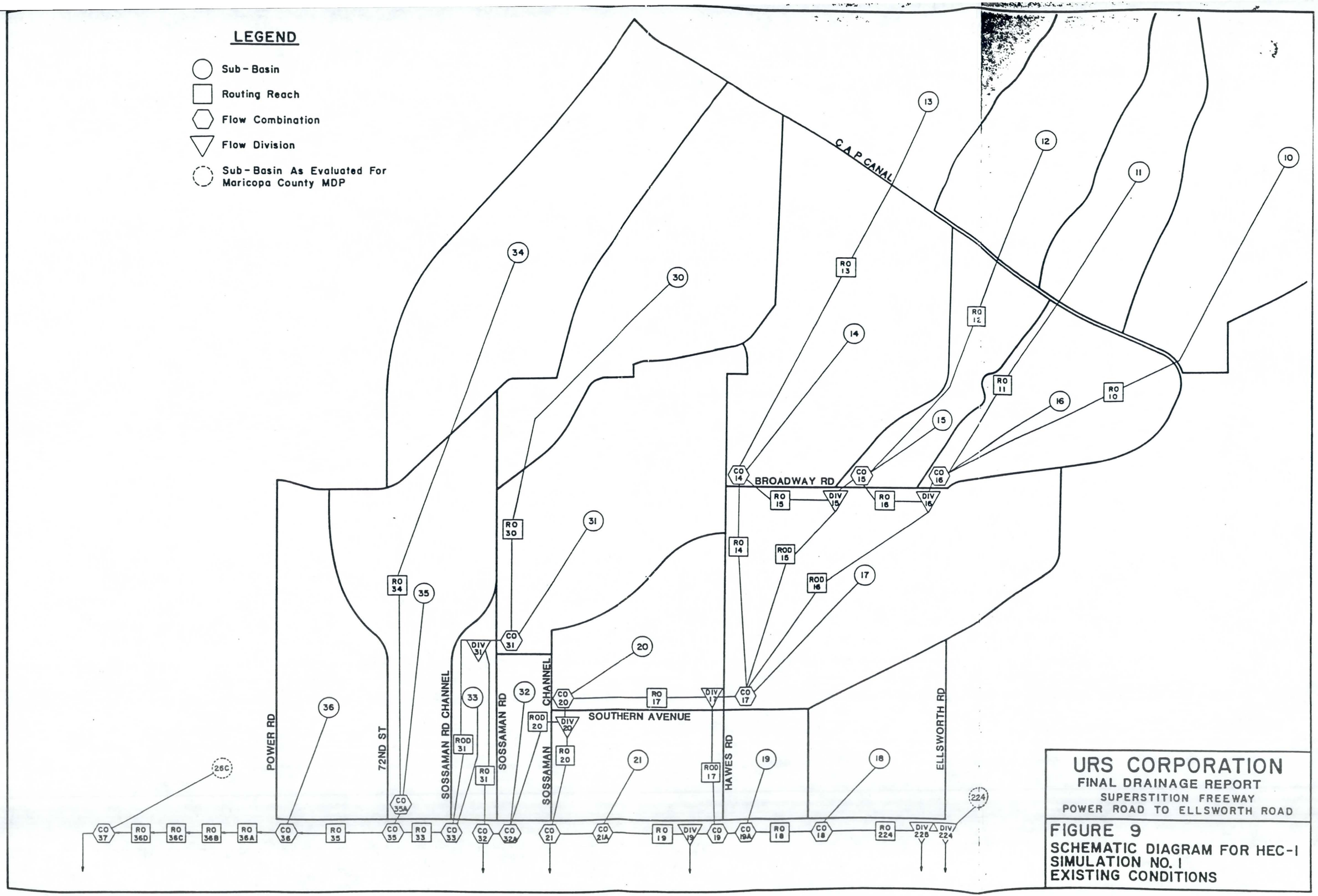
2500 0' 2500 5000
SCALE: 1" = 5000'

DIBBLE & ASSOCIATES
CONSULTING ENGINEERS

Hoskin Engineering Consultants

HEC-1 SCHEMATIC SOUTH OF SUPERSTITION FREEWAY

SHEET 2 OF 2



URS CORPORATION
FINAL DRAINAGE REPORT
SUPERSTITION FREEWAY
POWER ROAD TO ELLSWORTH ROAD

FIGURE 9
SCHEMATIC DIAGRAM FOR HEC-1
SIMULATION NO. 1
EXISTING CONDITIONS

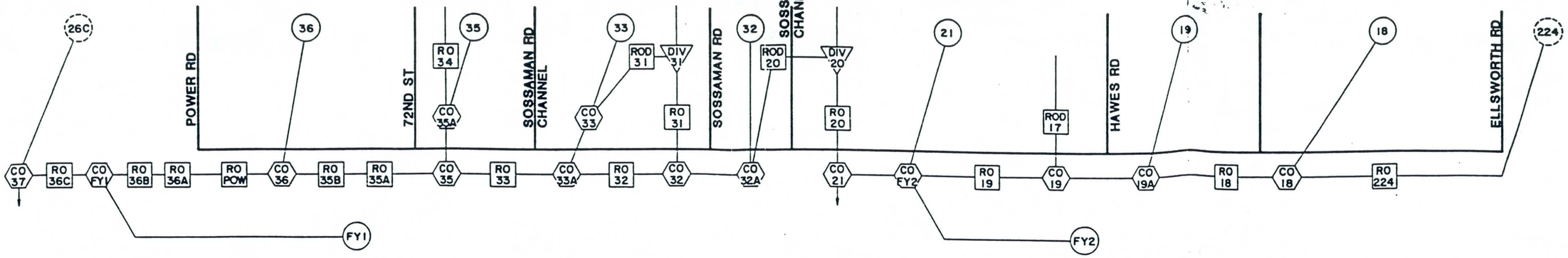


FIGURE 10 - SIMULATION NO. 2
PROPOSED CONDITIONS WITHOUT DETENTION

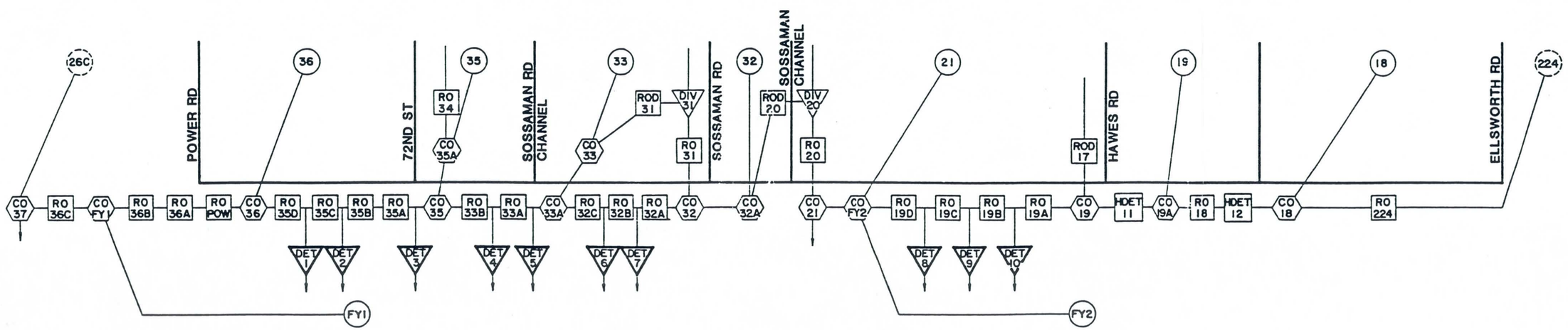


FIGURE 13 - SIMULATION NO. 3
PROPOSED CONDITIONS WITH DETENTION

LEGEND

- Sub-Basin
- Routing Reach
- Flow Combination
- Flow Division
- Detention Pond Division
- Sub-Basin As Evaluated For Maricopa County MDP

URS CORPORATION
FINAL DRAINAGE REPORT
SUPERSTITION FREEWAY
POWER ROAD TO ELLSWORTH ROAD

SCHEMATIC DIAGRAMS FOR HEC-1
PROPOSED CONDITIONS

SUPERSTITION FREEWAY
POWER RD. TO U.S. 60-PHASE II
MARICOPA/PINAL CO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	F-028-1-913			

Construction ℄ Station	Offset To ℄ Channel	Offset To North Top Bank	Elevation At North Top Bank	Offset To South Top Bank	Elevation At South Top Bank	Comments
868+63	398.1	24.9	1368.4	26.1	1369.0	P.T. Horizontal Curve
869+00	398.9	24.9	1368.4	26.1	1369.0	
870+00	401.0	24.9	1369.0	25.9	1369.5	
871+00	402.7	26.0	1370.1	25.8	1370.0	
872+00	404.0	25.2	1370.4	25.4	1370.5	
872+02	404.0	25.2	1370.4	25.4	1370.5	
872+27	404.3	25.1	1370.4	25.6	1370.7	See Pond No.1, Sht. 2C-50
873+00	405.0	25.7	1370.5	26.9	1371.1	

LEGEND

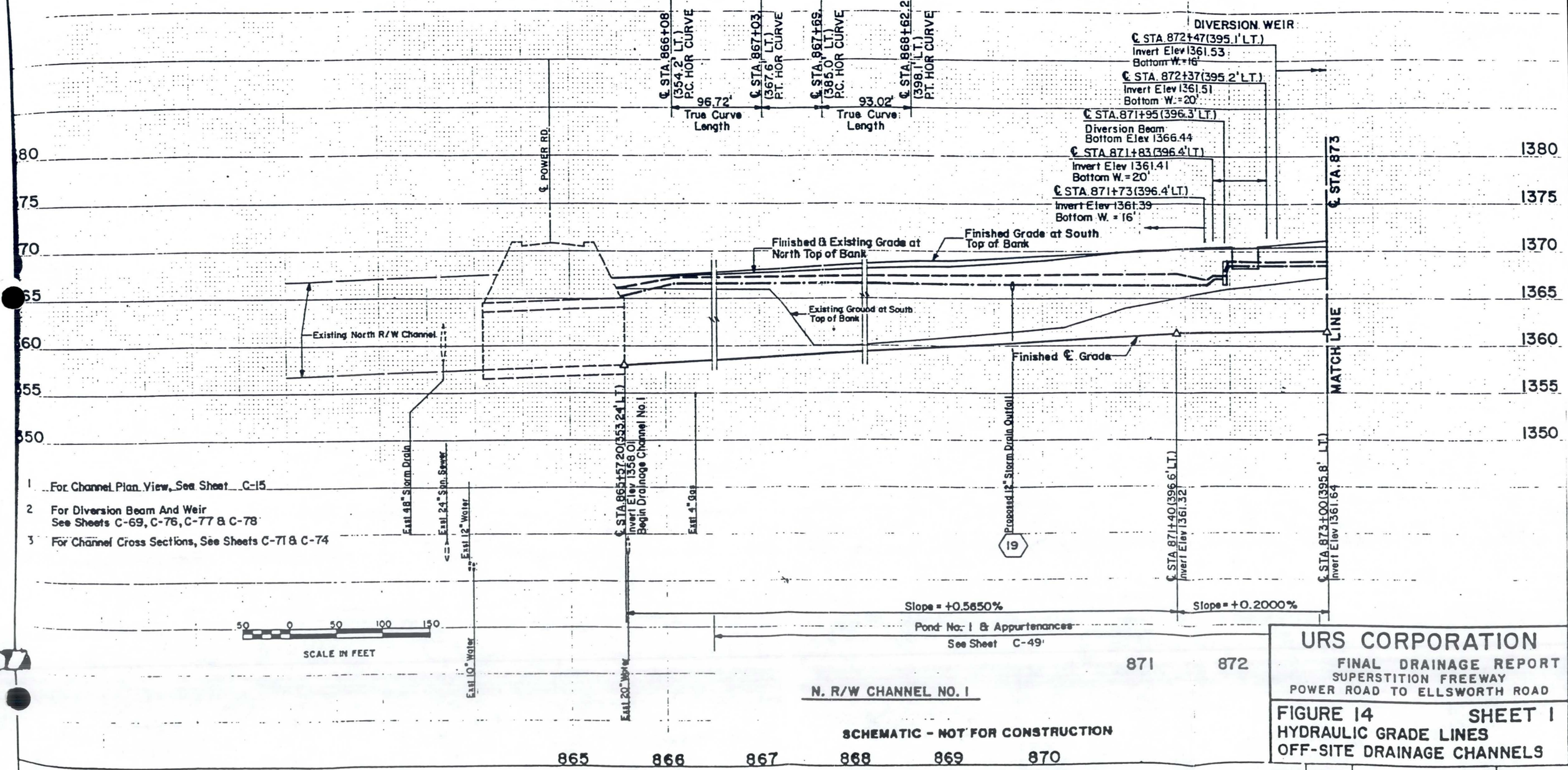
—·— 50 Yr. Hydraulic Grade Line

— — — 100 Yr. Hydraulic Grade Line

P & M BM # P-9 Aluminum Cap Set In Sidewalk Of Southeast Corner Power Rd. Overpass At SR 360 Stamped. -Elev. 1371.52

NOTE: Slopes Shown Are Based On True Lengths Between Grade Breaks.

Station & Offsets Reflect Radial Stake-Out Due To Superstition Freeway ℄ Being In A Curve Segment.



1 For Channel Plan View, See Sheet C-15

2 For Diversion Beam And Weir See Sheets C-69, C-76, C-77 & C-78

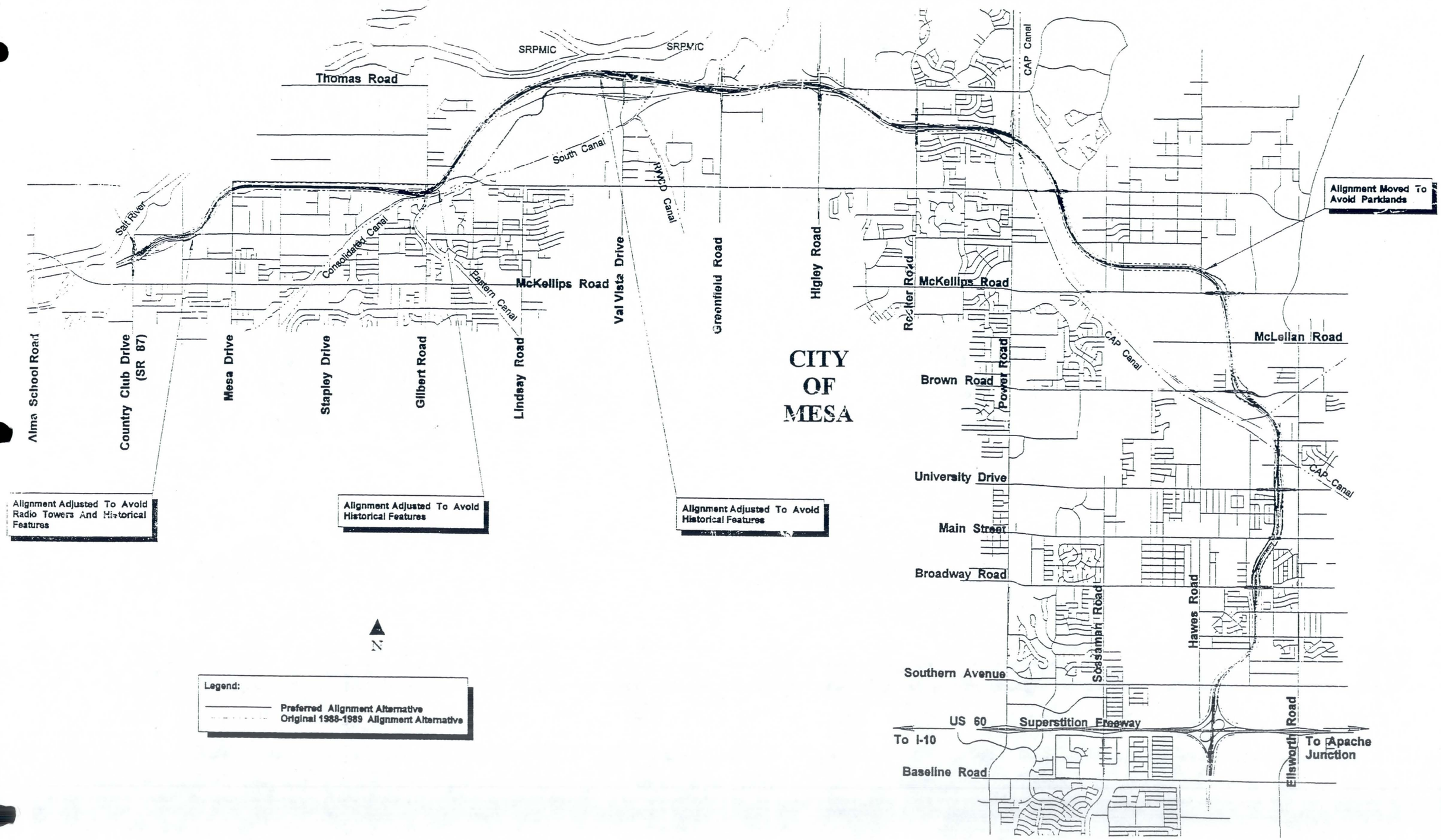
3 For Channel Cross Sections, See Sheets C-71 & C-74

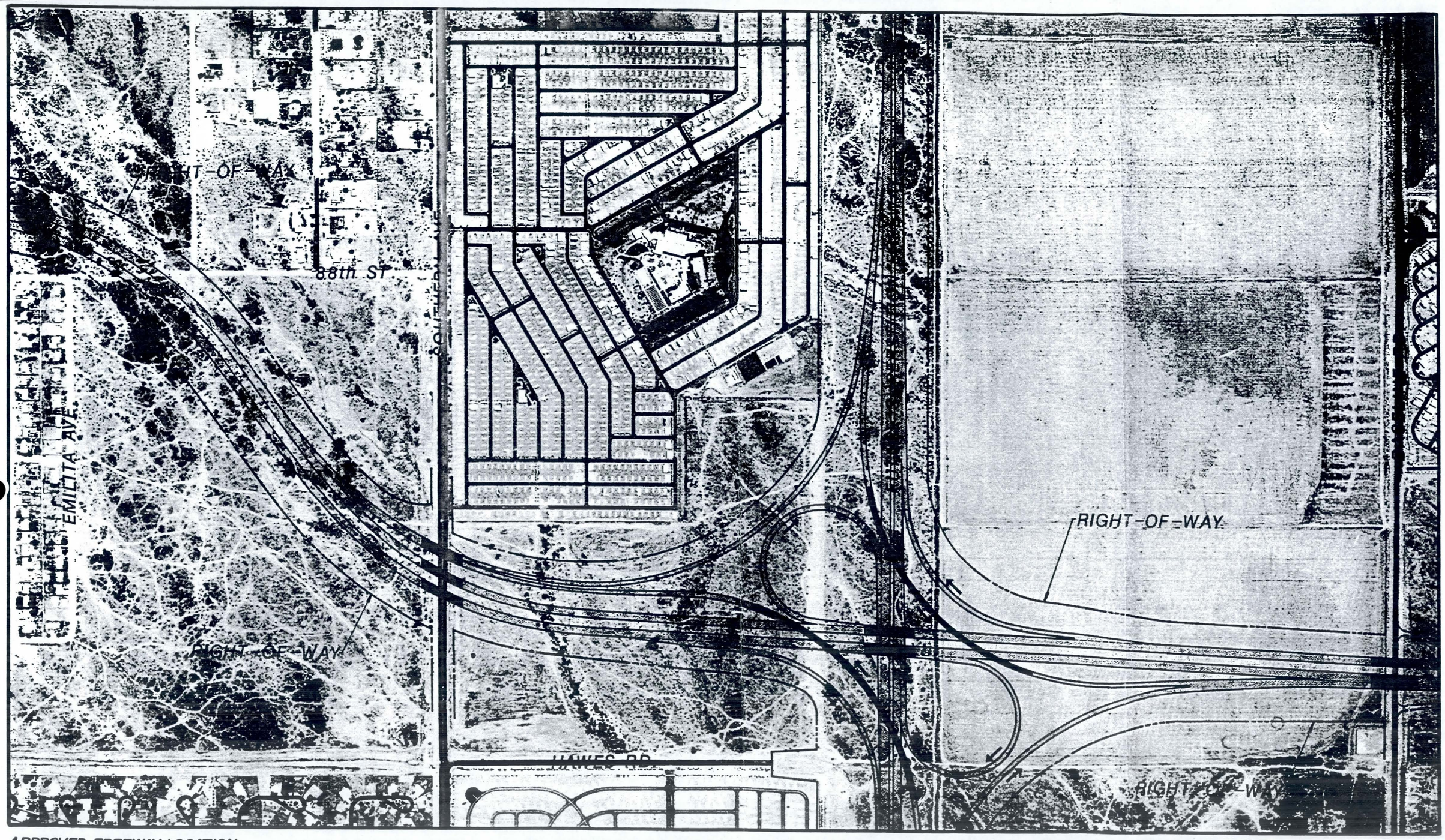
SCHEMATIC - NOT FOR CONSTRUCTION

URS CORPORATION

FINAL DRAINAGE REPORT
SUPERSTITION FREEWAY
POWER ROAD TO ELLSWORTH ROAD

FIGURE 14 SHEET 1
HYDRAULIC GRADE LINES
OFF-SITE DRAINAGE CHANNELS


SRPMIC
SRPMIC
Thomas Road
South Canal
RWCD Canal
Salt River
Consolidated Canal
Eastern Canal
McKellips Road
Val Vista Drive
Greenfield Road
Higley Road
Recker Road
McKellips Road
CAP Canal
Alignment Moved To Avoid Parklands
Alma School Road
Country Club Drive (SR 87)
Mesa Drive
Stapley Drive
Gilbert Road
Lindsay Road
CITY OF MESA
Power Road
Brown Road
CAP Canal
McLellan Road
University Drive
CAP Canal
Main Street
Broadway Road
Sossaman Road
Hawes Road
Southern Avenue
US 60
Superstition Freeway
To I-10
Baseline Road
Ellsworth Road
To Apache Junction
Alignment Adjusted To Avoid Radio Towers And Historical Features
Alignment Adjusted To Avoid Historical Features
Alignment Adjusted To Avoid Historical Features
N
Legend:
Preferred Alignment Alternative
Original 1988-1989 Alignment Alternative



APPROVED FREEWAY LOCATION
ARIZONA DEPARTMENT OF
TRANSPORTATION

Engineering Consultant:
PARSONS BRINCKERHOFF
Tempe, Arizona

NOTE:
THE CENTERLINE AND RIGHT-OF-WAY
SHOWN ON THIS PLAN ARE APPROXIMATE.
AERIAL PHOTOGRAPHY DATE JUNE 5, 1986.

500 0 500 1000 1500 2000
SCALE IN FEET

NOTE:
THE DESIGN CONCEPTS AND RIGHT OF WAY SHOWN ON THIS PLAN ARE APPROXIMATE ONLY AND ARE SUBJECT TO REFINEMENT DURING FINAL DESIGN.

RED MOUNTAIN FREEWAY

EXHIBIT 15

Appendix D: Excerpts from Selected Reports

Letter Report from Entellus to City of Mesa

Intelligent Engineering
Environmental Solutions

May 8, 1997

Mr. Les Broughton
CITY OF MESA
Engineering Department
20 East Main # 400
Mesa, AZ 85211-1466

RE: **CITY OF MESA** Southern Avenue Drainage Improvements
Hydrology Review and Design Flows
City of Mesa Project No. 97-56.1
Entellus Project No. 130.46

Dear Mr. Broughton:

On October 23, 1996, the City of Mesa retained the services of Entellus, Inc. to evaluate alternatives for the improvement of a drainage system along the north side of Southern Avenue between Hawes Road and Sossaman Channel. The scope of work included reviewing several hydrology reports and obtaining design flows. This letter summarizes the results of the hydrology review, presents the selected design flows, and explains the reasoning for the selection.

Entellus

1255 N. 44th Street
Suite 330
Phoenix, Arizona
85008.3279

Tel 602.244.2566
Fax 602.244.8947

HYDROLOGY REVIEW

As part of the design concept phase of this project, Entellus received several hydrology reports from the City of Mesa, the Flood Control District of Maricopa County (FCDMC), and the Arizona Department of Transportation (ADOT). A list of the drainage reports reviewed are included as **References 1-9** under REFERENCES at the end of this letter. Concentration points varied from model to model, making it difficult to compare their results at all concentration points. **Figure 1** shows existing flow capacities of drainage facilities in the project area and concentration points of interest. Note that concentration point locations shown are approximate, since all the models' concentration points did not coincide exactly. **Table 1** accompanies **Figure 1,** summarizing the flows obtained from the different models. The table shows that flows vary significantly between the models.

It is evident from our review, that many major assumptions used in estimating runoff have changed since the original ADMS prepared in 1987 (Reference 1). Some of the assumptions were revised by the District in 1990 (Reference 2). The District is currently working on an

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update of the ADMS (Reference 3). Entellus met with the District and reviewed their current model, however; since it is not complete and some of the assumptions are yet to be revised, the usefulness of this model is limited. The reports prepared for ADOT (References 4-5) were not used because the large scale nature of the study ignores some of the physical conditions of the watershed. Additionally, improvements for the Red Mountain Expressway were not addressed in this study. The Red Mountain Expressway will cut across the watershed and likely reduce peak flows for this project. Reports for the Sossaman Channel and Basin (References 6-7) were found to be the most useful because they concentrate on the same area and also represent the physical constraints downstream from this project. Other reports reviewed include the Final Hydrology Report, Crescent Run Mobile Home Park (Reference 8), and the Final Drainage Report, Superstition Point Mesa (Reference 9). The Hawes Channel, upstream from Southern Avenue, was designed and will soon be constructed based on the flows shown in the Crescent Run Report.

DESIGN FLOWS

Table 2 summarizes the design flows used for this project. In most cases, the design flows used in this project were based primarily on the Kirkham-Michael report (Reference 7) or capacity of downstream facilities. However, the specific reasons for use of each particular design flow are outlined below.

The flow at Sossaman Channel (C2) was obtained from the Kirkham-Michael report. This flow was used for the design of the Sossaman Channel because conveying flow in excess of this amount would cause the channel to overtop and flood the adjacent area. This is one of the few locations where projected peak flows from the various reports closely matched.

Flows at C3, C4 and C5 were also obtained from Kirkham-Michael report. This model is fairly recent and is sufficiently detailed at these locations. As mentioned for C2, flows in excess of those used for the design of the Sossaman Channel (Kirkham-Michael) would overtop the channel and cause flooding.

Upstream of the project, the existing Hawes Channel (C6) is an unimproved earthen Channel. Havill Engineering recently designed a lined channel to convey the flood water along the west side of new Hawes Road. The maximum design capacity of the channel is approximately 1800-cfs, based on a 100- year storm. Flows in excess of this amount would spill out of the channel onto Hawes Road, bypassing the inlet into the Sossaman Channel. Therefore, this flow was used as the design flow at this location.

The existing flow capacity of Hawes Channel downstream from Southern Avenue varies widely between reports (from 300-cfs to 2700-cfs). A design flow of 600-cfs was derived using the continuity principle (Upstream flow (1800 cfs) - Southern Avenue flow (1200 cfs) = Hawes Channel flow (600 cfs)). This also closely matches the available existing capacity of the channel along Hawes Road, which is not planned to be replaced. Further, it falls within the range of flows from previous hydrology reports.

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This summary is purposely brief to provide the reader with a general understanding of the rationale used in deriving the design flows for this project. The reader may contact Entellus directly at 244-2566, if further detailed information is required about the drainage report review or design flow selection. Additional information about the facility design, including hydraulics, was prepared by Entellus. A copy of the report entitled *Southern Avenue Improvements, Drainage Calculations,* City of Mesa Project No. 97-561 is available at the City of Mesa.

Sincerely,

ENTELLUS, INC.

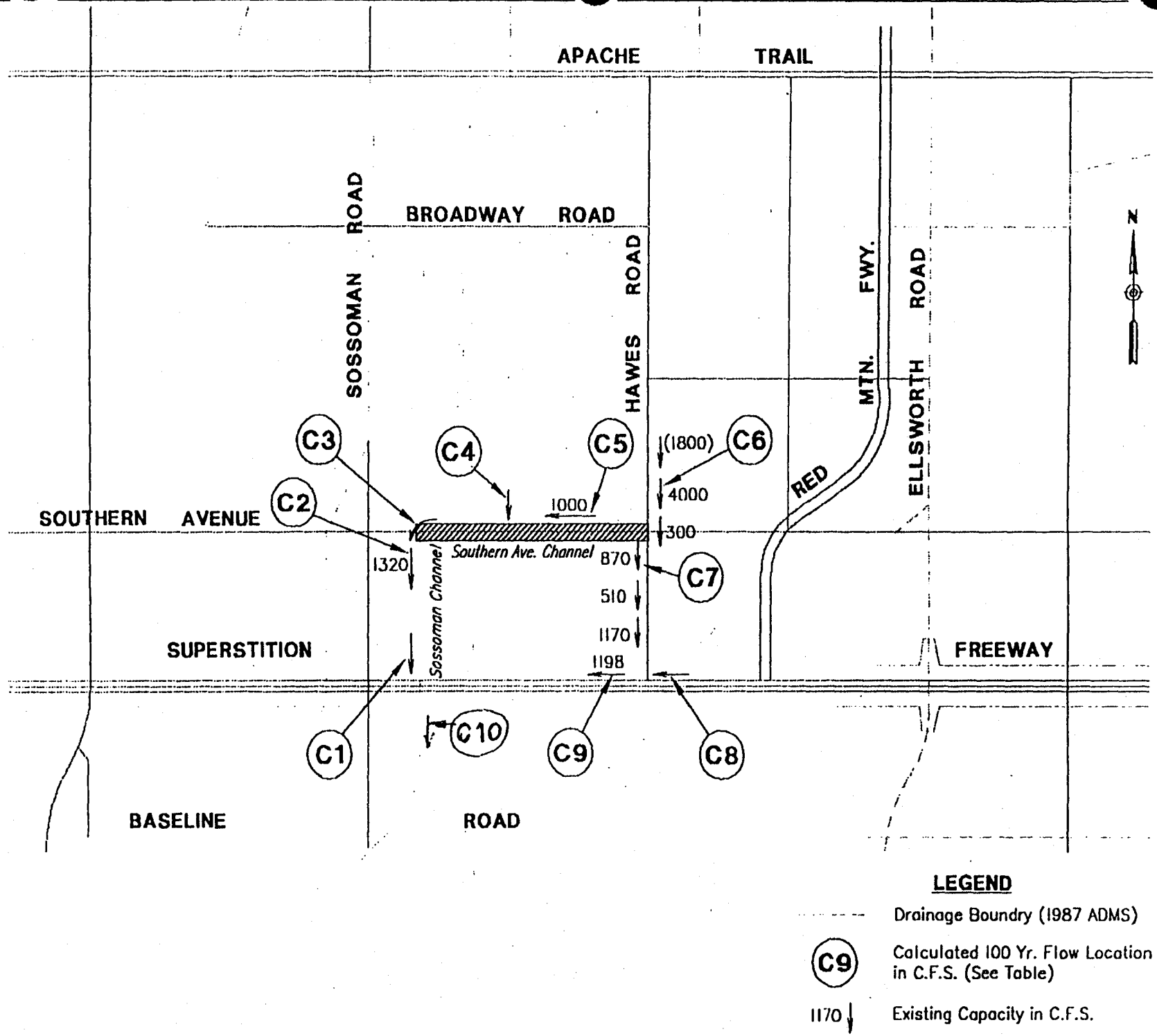
Michael J. Bonar, P.E.

Registered Professional Engineer (Civil) CERTIFICATE NO. 20321 MICHAEL J BONAR Date Signed 5-8-97 ARIZONA, U.S.A.

Hernan A. Aristizabal, P.E.

Registered Professional Engineer (Civil) CERTIFICATE NO. 29737 HERNAN A. ARISTIZABAL Date Signed 5-8-97 ARIZONA, U.S.A.

MJB/HAA/pp



EXISTING FLOW CAPACITIES AND CALCULATED 100 YEAR FLOWS

FIGURE 1

Entellus

Quantity of Flows @ Various Locations based on Previous Drainage Studies

TABLE 1

Location	$Flow_{100}$	$Flow_{50}$	Reference No.
C1	230		4. A-N West ADOT
C1	800		7. Kirkham-Michael
C1	1670 (before basin)		6. APA-Geotrack
C2	1325		7. Kirkham-Michael
C2	1320		6. APA-Geotrack
C2	1208		5. URS - ADOT
C3	1325		7. Kirkham-Michael
C3	1325		6. APA-Geotrack
C3	2141		5. URS - ADOT
C4	344		7. Kirkham-Michael
C4	50		4. A-N West ADOT
C4	405		5. URS - ADOT
C5	854		6. APA-Geotrack
C5	1123		7. Kirkham-Michael
C5	1972		5. URS - ADOT
C6	2704		1. A-N West - 1987 ADMS
C6	2134		2. FCDMC - 1993 ADMS
C6	3900		3. FCDMC - 1996 ADMS (underway)
C6	3074		5. URS - ADOT
C7	2704		1. A-N West - 1987 ADMS
C7	2704		2. A-N West ADOT
C7	1068		5. URS - ADOT
C7	300		3 . FCDMC - 1996 ADMS (underway)
C8	1500±		6. APA-Geotrack
C8	3200±		4. A-N West ADOT
C8	211		5. URS ADOT
C9	1198		5. URS - ADOT
C9	1500		2. FCDMC - 1993
C9	1800		3. FCDMC - 1996 ADMS (underway)
C10	3200		4. A-N West ADOT
C10	2011		5. URS - ADOT
C10	1800		3. FCDMC - 1996 ADMS (underway)

Entellus

Table 2

Design Flows for Southern Avenue Drainage Design

Location	Reach or Concentration Point	Flow Q100 (cfs)	Report obtained from
C2	Sossaman Channel	1300	7. Kirkham-Michael 6. APA-Geotrack
C3	Southern Avenue Drain between Sossaman Channel and 80th street	1300	7. Kirkham-Michael 6. APA-Geotrack
C4	80th Street	340	7. Kirkham-Michael
C5	Southern Avenue Drain between 80th Street and Hawes Road	1200	7. Kirkham-Michael
C6	Hawes Channel North of Southern Avenue	1800	8. Havill Engineering
C7	Hawes Channel South of Southern Avenue	600	* Entellus

* Upstream flow minus Southern Avenue flow (1800-1200=600)

Entellus

REFERENCES

1. Eastern Maricopa County ADMS, A-N West, Inc., Jan. 30, 1987.

2. Schematic Routing for East Maricopa County ADMS (EADMS 14), prepared by FCDMC, revised Oct. 1990.

3. Hydrology update for east Maricopa County ADMS to be prepared by Dibble & Associates, prepared by FCDMC, underway December 1996.

4. Superstition Freeway Offsite Drainage Plan, A-N West, Inc. For Tudor Engineering, March 7, 1987.

5. Final Drainage Report for Superstition Freeway, SR 360, Power Road to Ellsworth Road, URS Corporation, September 1988.

6. Comparative Drainage Design Report for Sossaman Channel and Basin, Baseline to Southern Avenue, apa Geotech, January 1993.

7. Miscellaneous Hydraulic and Hydrologic Calculations for Construction Plans for the Sossaman Channel, Southern to Superstition Freeway, Kirkham-Michael, 1994.

8. Final Hydrology Report for Crescent Run Mobile Home Park, Havill Engineering, Revised Sept. 1995.

9. Final Drainage Report, Superstition Point Mesa, American Engineering, June 12, 1996.

Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009-6399
(602) 506-1501
FAX: (602) 506-4601
TT: (602) 506-5897

March 30, 1999

MEMO TO: Nick Sciarro
Cc: Amir Motamedi
David Dust, Primatech

FROM: Valerie A. Swick

SUBJECT: FLOWS AT HAWES ROAD AND BROADWAY ROAD WITHIN THE EAST MESA AREA DRAINAGE MASTER PLAN.

There were a number of different hydrologic models conducted for this area. The first was the Eastern Maricopa County Area Drainage Master Study (ADMS). This model was conducted by the Flood Control District of Maricopa County in the late 1980's. The East Mesa Area Drainage Master Plan (ADMP) hydrologic model replaced the Eastern Maricopa County ADMS in 1998. The East Mesa ADMP revised the hydrology to current acceptable methodologies and revised the subbasin boundaries by increasing the minimum size of the subbasin.

The East Mesa ADMP has two parts. The first report includes the hydrology for existing and future land uses. This study was conducted by the Flood Control District of Maricopa County. The second part of the ADMP was conducted by Dibble and Associates to include proposed capital improvement plans (CIP). Below is a summary table of the flows at specific locations.

	ADMS	ADMP – EXISTING LAND USES	ADMP – FUTURE LAND USES	ADMP – FUTURE LAND USES WITH CIP
Hawes Rd. @ Broadway Rd.	1150 cfs	2356 cfs	2194 cfs	2010 cfs
Hawes Rd @ Southern Ave.	2134 cfs	2455 cfs	2421 cfs	2290 cfs
Split Flows West on Southern Ave.	1067 cfs	2155 cfs	2121 cfs	1261 cfs
Split Flows South on Hawes Rd.	1067 cfs	300 cfs	300 cfs	1029 cfs

The ADMS flows are slightly lower than the ADMP flows because the model uses a lumped parameter to generate the excess rainfall, whereas the ADMP uses physical parameters from the soil and imperviousness from the land uses.

The flows at Hawes Rd. @ Broadway Rd. are less for the ADMS than the ADMP. The ADMS assumes some flows spilling out of the Broadway Channel to the south from Ellsworth Rd. to Hawes Rd. and then being picked up again at Hawes Rd. and Southern Ave. The flows at Hawes Rd. and Southern Ave. for the ADMS then become closer to the ADMP values.

The CIP model does not indicate a significant drop in the flows even though the overchute detention basins are modeled. The concentration point is far enough downstream that the subbasins downstream of the CAP control the peak flows rather than the flows over the overchute.

Appendix D: Excerpts from Selected Reports

FCDMC Memo Regarding Hydrologic Analyses

Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009-6399
(602) 506-1501
FAX: (602) 506-4601
TT: (602) 506-5897

March 30, 1999

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Cc: Amir Motamedi
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Appendix D: Excerpts from Selected Reports

Vegetation Study

Excerpt from Vegitation Survey Prepared for the FCDMC
Provided by the FCDMC on 4-29-99

Hawes Road Channel

Hawes Road channel is a roadside constructed channel with both concrete and earthen lined portions. The concrete lined portion did not support vegetation, therefore, only the earthen lined portion of the channel was surveyed. The earthen lined portion of the channel is located between Apache Trail Road to the north and Emilita Avenue alignment to the south. The vegetation within the channel consisted of ornamentals, native plant species, and vegetation characteristic of disturbed areas. Only the native tree and shrub species that would be removed during construction were counted. The results of the vegetation survey are presented below (Table Six).

Table Six. Hawes Road Channel Vegetation Survey

Common Name	Scientific Name	Trees	Shrubs/Seedlings
Blue Paloverde	*Cercidium floridum*	39	103
Creosote	*Larrea tridentata*	N/A	8
Desert Broom	*Baccharis sarothroides*	N/A	56
Foothills Paloverde	*Cercidium microphyllum*	--	1
Graythorn	*Ziziphus obtusifolia*	N/A	1
Ironwood	*Olneya tesota*	2	--
Mexican Paloverde	*Parkinsonia aculeata*	25	46
Velvet Mesquite	*Prosopis velutina*	3	12

PROPOSED MITIGATION

The objective of this re-vegetation plan is to replace the native vegetation within or adjacent to the Waters of the U.S. that will be removed during the basin construction and the channel improvements. Ultimately, the goal is for the post-construction vegetation to be similar in composition, density, and structure to the pre-construction vegetation at the end of five years. Most of the native vegetation species will be replaced with the same species. However, nuisance and exotic species will be replaced with a native species that is similar to the exotic with respect to growth characteristics.

Appendix E: Parcel ownership Data Prepared by FCDMC

HAWES ROAD CHANNEL CAR Parcel Ownership

TAG	F	LAST	FIRST	MAIL	MAIL2	SITE1	SITE2	T ACRES
2	218 44 001B		DOLLBEER MESA MOBILE HOME PARK	58 N La Senda Dr	Laguna Beach Ca 92651	*No Site Address*	Az	2.61
3	218 44 001E		DOLLBEER MESA MOBILE HOME PARK	58 N La Senda Dr	Laguna Beach Ca 92651	*No Site Address*	Az	15.13
4	218 44 001D		BONITA VISTA MOBILE HOME PARK	58 N La Senda Dr	Laguna Beach Ca 92651	*No Site Address*	Az	8.69
5	218 51 037C		CITY OF MESA	10592 E Mission Ln	Scottsdale Az 85258	*No Site Address*	Az	8.09
6	218 52 001G		CRESCENT RUN LIMITED PARTNERSH	4114 E Wood St #2	Phoenix Az 85040	*No Site Address*	Mesa Az	56.66
7	218 52 001E							54.52
8	218 58 001B		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	35.41
9	218 29 114B	Kempton	A Bryce & Leta R	3335 E Main St	Mesa Az 85213	8355 E Apache Trl	Az	1.22
10	218 29 114D	Kempton	A Bryce & Leta R	3335 E Main St	Mesa Az 85213	*No Site Address*	Az	0.61
11	218 29 114E	Hayes	Barney A & Margaret R	PO Box 2121	Fallbrook Ca 92088	*No Site Address*	Az	9.63
12	218 30 098A	Mitchell	Raymond E & Debra K	308 S Hawes Rd	Mesa Az 85208	*No Site Address*	Az	0.77
13	218 30 098B	Wright	Margaret J	120 N Miller St	Mesa Az 85203	120 N Miller St	Mesa Az 85203	0.77
14	218 30 097	McCue	Michael John & Judy Fae	340 S 84Th St	Mesa Az 85208	340 S 84Th St	Mesa Az 85208	1.36
15	218 30 096A	Hart	Robert W	9275 N 3Rd St	Garden City Ks 67846	*No Site Address*	Az	1.02
16	218 54 353	Fitzsimmons	Walter A Jr & Joanne Stevens	8344 E Desert Trl	Mesa Az 85208	8344 E Desert Trl	Mesa Az 85208	0.28
17	218 54 354	Nygaard	Philip M & Geraldine W	8349 E Desert Trl	Mesa Az 85208	8349 E Desert Trl	Mesa Az 85208	0.30
18	218 53 001K		MOUNT BALDY LIMITED PARTNERSHI	3303 S 40Th St	Phoenix Az 85040	*No Site Address*	Mesa Az	9.00
19	218 54 355	Vandergrift	C Robert	8347 E Desert Trl	Mesa Az 85208	8347 E Desert Trl	Mesa Az 85208	0.18
20	218 54 356	Boss	Lydia B	8345 E Desert Trl	Mesa Az 85208	8345 E Desert Trl	Mesa Az 85208	0.18
22	218 54 358	Gabert	Arthur Allen & Ruth Elaine	445 S 83Rd Way	Mesa Az 85208	445 S 83Rd Way	Mesa Az 85208	0.32
23	218 54 359	Rendant Jr.	Erick J & Dorothy L	449 S 83Rd Way	Mesa Az 85208	8001 E Broadway Rd #298	Mesa Az 85208	0.26
24	218 54 360	Trochelman	Raymond W & Arlene B	455 S 83Rd Way	Mesa Az 85208	455 S 83Rd Way	Mesa Az 85208	0.21
25	218 54 361	Lowe	Alfred D & Bernice L	461 S 83Rd Way	Mesa Az 85208	461 S 83Rd Way	Mesa Az 85208	0.18
26	218 54 362	Vanzanen	Elizabeth	PO Box 155	Raymond Mn 56282	1501 S 83Rd St	Mesa Az 85208	0.17
27	218 54 363	Pahlke	Newton W & Ruth A	507 S 83Rd Way	Mesa Az 85208	507 S 83Rd Way	Mesa Az 85208	0.15
28	218 53 001W		CORP PRES BISH CHURCH JESUS CH	50 E North Temple #12Th	Salt Lake City Ut 84150	*No Site Address*	Mesa Az	3.36
29	218 54 364	Robert	H Nytes	513 S 83Rd Way	Mesa Az 85208	513 S 83Rd Way	Mesa Az 85208	0.15
30	218 54 365	Nielsen	V Marie	519 S 83Rd Way	Mesa Az 85208	519 S 83Rd Way	Mesa Az 85208	0.15
31	218 54 366	Brinkman	Donna J	525 S 83Rd Way	Mesa Az 85208	8001 E Broadway Rd	Mesa Az 85208	0.15
32	218 54 367	Borucki	Sally V	531 S 83Rd Way	Mesa Az 85208	8001 E Broadway Rd	Mesa Az 85208	0.16
33	218 54 368	Donewald	Florence Eileen	66 Dearborn Ct	Lawrenceburg In 47025	537 S 83Rd Way	Mesa Az 85208	0.15
34	218 54 369	Drake	Norman	543 S 83Rd Way	Mesa Az 85208	543 S 83Rd Way	Mesa Az 85208	0.15
35	218 53 571		SUPERSTITION POINT MESA HOMEOW	2140 E 5Th St #8	Tempe Az 85281	*No Site Address*	Mesa Az	1.76
36	218 54 370		MIDTOWN INVESTMENT CO	549 S 83Rd Way	Mesa Az 85208	549 S 83Rd Way	Mesa Az 85208	0.14
37	218 54 371	Hummel	Lloyd E & Alma G	Hc 2 Box 168B	Bovey Mn 55709	555 S 83Rd Way #83	Mesa Az 85208	0.15
38	218 54 372	Doyle	John F & Barbara E	6729 W 82Nd St	Bloomington Mn 55438	561 S 83Rd Way	Mesa Az 85208	0.16
39	218 54 373	Poitz	Elinore	601 S 83Rd Way	Mesa Az 85208	601 S 83Rd Way	Mesa Az 85208	0.15
40	218 54 374	Wylie	Norma J	607 S 83Rd Way	Mesa Az 85208	607 S 83Rd Way	Mesa Az 85208	0.15
41	218 53 288		PATTERSON FARMS INC	PO Box 16657	Phoenix Az 85011	661 S 86Th St	Mesa Az 85208	16.23
42	218 54 375	Stahlecker	Myrtle A	613 S 83Rd Way	Mesa Az 85208	613 S 83Rd Way	Mesa Az 85208	0.14
43	218 54 376	Sessions	James M & Roberta A	619 S 83Rd Way	Mesa Az 85208	619 S 83Rd Way	Mesa Az 85208	0.14
44	218 54 377	Langbeen	Patricia A	625 S 83Rd Way	Mesa Az 85208	625 S 83Rd Way	Mesa Az 85208	0.15
45	218 54 378	Mueller	Evert H & Olivia A	631 S 83Rd Way	Mesa Az 85208	631 S 83Rd Way	Mesa Az 85208	0.15

HAWES ROAD CHANNE[illegible]:AR Parcel Ownership

93	218 [illegible]		ELL CAP 87 SILVERIDGE	33 N Garden Av[illegible]	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
94	218 65 283		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
95	218 65 282		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
96	218 65 281		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
97	218 65 280		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.06
98	218 65 279		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.07
99	218 65 278		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.08
100	218 65 277		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.10
101	218 65 275		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.09
102	218 65 274		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.07
103	218 65 273		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.06
104	218 65 272		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.06
105	218 65 271		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
106	218 65 270		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
107	218 65 269		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
108	218 65 268		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
109	218 65 267		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
110	218 65 266		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
111	218 65 265		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
112	218 65 264		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
113	218 65 263		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
115	218 65 262		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
116	218 58 005A		DIAMOND INTERCHANGE LTD PARTSH	4600 S Mill Ave #200	Tempe Az 85282	*No Site Address*	Mesa Az	21.47
117	218 65 261		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
118	218 65 260		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
119	218 65 259		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
120	218 65 258		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
121	218 65 257		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
122	218 65 256		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
123	218 65 255		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
124	218 65 254		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
125	218 65 253		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
126	218 65 252		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
127	218 65 251		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
128	218 65 250		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
129	218 57 006A		ARIZONA STATE OF	206 S 17Th Ave	Phoenix Az 85007	*No Site Address*	Mesa Az	21.06
130	218 58 005B		ARIZONA STATE OF	206 S 17Th Ave	Phoenix Az 85007	*No Site Address*	Mesa Az	18.53
131	218 65 249		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
132	218 65 248		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05
133	218 65 247		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.06
134	218 65 246		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.10
135	218 65 245		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.10

HAWES ROAD CHANN[illegible]'AR Parcel Ownership

46	218 [illegible]	Albinger	Gail H & Darlene J	637 S 83Rd Wa[illegible]	Mesa Az 85208	637 S 83Rd Way	Mesa Az 85208	0.15
47	218 54 380	Lapetino	Anthony & Joann	643 S 83Rd Way	Mesa Az 85208	643 S 83Rd Way	Mesa Az 85208	0.17
48	218 54 381	Howis	Robert E & Gail E	649 S 83Rd Way	Mesa Az 85208	649 S 83Rd Way	Mesa Az 85208	0.19
50	218 54 382	Kozan	Stephen M & Margaret R	14484 N Forest Beach Shore	Northport Mi 49670	655 S 83Rd Way	Mesa Az 85208	0.25
51	218 54 384	Granfor	Julian V & Beverly M	Rr 1 Box 24	Perly Mn 56574	705 S 83rd Way #83	Mesa Az 85208	0.20
52	218 54 385	Swanson	Marlys J	709 S 83Rd Way	Mesa Az 85208	709 S 83Rd Way	Mesa Az 85208	0.22
53	218 54 386	Frank	L Bradford	711 S 83Rd Way	Mesa Az 85208	711 S 83Rd Way	Mesa Az 85208	0.29
55	218 54 399	Bingaman	G William & Helen H	8346 E Deer Cir	Mesa Az 85208	8346 E Deer Cir	Mesa Az 85208	0.31
56	218 54 400	Hall	Luther C & Connie B	8349 E Deer Cir	Mesa Az 85208	8349 E Deer Cir	Mesa Az 85208	0.23
57	218 54 401	McGowan	Loren F & Ruth L	8347 E Deer Cir	Mesa Az 85208	8347 E Deer Cir	Mesa Az 85208	0.32
59	218 54 411	Albright	Myrl M\eileen E	1314 17Th St S	Fargo Nd 58103	8354 E Pueblo Ave	Mesa Az 85208	0.17
60	218 54 489		FOUNTAIN OF THE SUN COUNTRY CL	500 S 80Th St	Mesa Az 85208	*No Site Address*	Mesa Az	0.19
61	218 62 527	Allen	Jerome & Myra J	8352 E Edgewood Ave	Mesa Az 85208	8352 E Edgewood Ave	Mesa Az 85208	0.33
62	218 62 526	Read	James F & Frances A	8355 E Edgewood Ave	Mesa Az 85208	8355 E Edgewood Ave	Mesa Az 85208	0.24
63	218 62 525	Wendt	Marie E	17505 Old Rockford Rd	Plymouth Mn 55446	8349 E Edgewood Ave	Mesa Az 85208	0.31
64	218 62 514	Schooth	Donna M	8350 E Emelita Ave	Mesa Az 85208	8350 E Emelita Ave	Mesa Az 85208	0.33
65	218 62 513	Barnes	Claude L & Billie M	PO Box 781	Raymore Mo 64083	8354 E Emelita Ave	Mesa Az 85208	0.22
66	218 62 512	Garner	Robert G & Sandra K	61 NW 68Th Pl	Ankeny Ia 50021	8351 E Emelita Ave	Mesa Az 85208	0.32
67	218 62 503	Pinkham	Cleon E & Doris M	8348 E Ebola Ave	Mesa Az 85208	8348 E Ebola Ave	Mesa Az 85208	0.33
68	218 62 502	Sala	William L & Roma J	8355 E Ebola Ave	Mesa Az 85208	8355 E Ebola Ave	Mesa Az 85208	0.22
69	218 62 501	Mack	Flute Jay & Ruth M	8351 E Ebola Ave	Mesa Az 85208	8351 E Ebola Ave	Mesa Az 85208	0.29
70	218 62 490	Friedl	John C & Evelyn	8348 E Euclid Ave	Mesa Az 85208	8348 E Euclid Ave	Mesa Az 85208	0.32
71	218 62 489	Walters	Ted E & Leona M	8352 E Euclid Ave	Mesa Az 85208	8352 E Euclid Ave	Mesa Az 85208	0.26
72	218 62 488	Bolin	John O & Jeanne F	8349 E Euclid Ave	Mesa Az 85208	8349 E Euclid Ave	Mesa Az 85208	0.30
73	218 62 477	Iverson	Frances	8344 E Fay Ave	Mesa Az 85208	8344 E Fay Ave	Mesa Az 85208	0.34
74	218 62 476	Taylor	Doris D	8348 E Fay Ave	Mesa Az 85208	8348 E Fay Ave	Mesa Az 85208	0.20
75	218 62 475	Polzin	Herbert E & Ruth	2414 W Avalon Rd	Janesville Wi 53546	8352 E Fay Ave	Mesa Az 85208	0.16
76	218 62 474	Seymour	Roylene A	301 S Signal Butte Rd #E32	Apache Junction Az 8522	8356 E Fay Ave	Mesa Az 85208	0.15
77	218 62 473	Green	Louise M	8360 E Fay Ave	Mesa Az 85208	8360 E Fay Ave	Mesa Az 85208	0.15
78	218 62 472	Simon	Paul C & Lorraine D	N5556 Bachelors Ave	Gleason Wi 54435	8364 E Fay Ave	Mesa Az 85208	0.20
79	218 62 471	Hamre	Jerome B & Shirley	PO Box 107C	Fertile Mn 56540	8366 E Fay Ave	Mesa Az 85208	0.35
80	218 62 443	Anderson	Alvin L & Stella M	507 S 83Rd Way	Mesa Az 85208	8340 E Fable Cir	Mesa Az 85208	0.32
81	218 62 442	Bach	Estate	8344 E Fable Cir	Mesa Az 85208	8344 E Fable Cir	Mesa Az 85208	0.26
82	218 62 441		WESTERN NORMAN M	1200 Milner Ln	Longmont Co 80503	8348 E Fable Cir	Mesa Az 85208	0.15
83	218 62 440	Arthur	Roy Parsons	8352 E Fable Cir	Mesa Az 85208	8352 E Fable Cir	Mesa Az 85208	0.15
84	218 62 439	Turner	Alyce B & Datema Gary	8356 E Fable Cir	Mesa Az 85208	8354 E Fable Cir	Mesa Az 85208	0.15
85	218 62 438	Mack	Richard J & Patricia	2945 Farner Ct	Deerfield Il 60015	8360 E Fable Cir	Mesa Az 85208	0.18
86	218 62 437	Besenhofer	John & Carole	8364 E Fable Cir	Mesa Az 85208	8364 E Fable Cir	Mesa Az 85208	0.32
87	218 65 854		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	1.62
88	218 65 289		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.12
89	218 65 288		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.08
90	218 65 287		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.11
91	218 65 286		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.06
92	218 65 285		ELL CAP 87 SILVERIDGE	33 N Garden Ave #950	Clearwater Fl 33755	*No Site Address*	Mesa Az	0.05

CITY OF MESA

IMPROVEMENT PLANS
FOR

WYNSTONE

A PROPOSED SUBDIVISION WITHIN A PORTION OF THE NORTH HALF OF SECTION 28
TOWNSHIP 1 NORTH, RANGE 7 EAST OF THE GILA
AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA

ADDRESS: UNAVAILABLE

HAWES ROAD OFFSITE SANITARY SEWER

GENERAL NOTES:

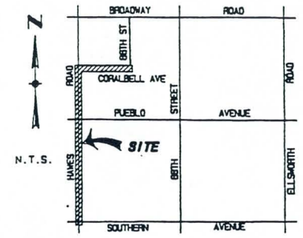
1. ALL WORK AND MATERIALS SHALL CONFORM TO THE MOST CURRENT UNIFORM STANDARD SPECIFICATIONS AND DETAILS FOR PUBLIC WORKS CONSTRUCTION AS FURNISHED BY THE MARICOPA ASSOCIATION OF GOVERNMENTS AND AMENDED BY THE CITY OF MESA. ALL WORK AND MATERIALS NOT IN CONFORMANCE WITH THESE AMENDED SPECIFICATIONS AND DETAILS ARE SUBJECT TO REMOVAL AND REPLACEMENT AT THE CONTRACTOR'S EXPENSE.
2. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING AN EXCAVATION AND DIRT MOVING PERMIT FROM THE MARICOPA COUNTY ENVIRONMENTAL SERVICE DEPARTMENT AND COMPLYING WITH ITS REQUIREMENTS.
3. THE CONTRACTOR SHALL NOTIFY THE CITY ENGINEERING DIVISION AT LEAST 24-HOURS IN ADVANCE OF ANY CONSTRUCTION FOR INSPECTION AT 844-2253.
4. CALL THE BLUE STAKE CENTER (263-1100) TWO (2) WORKING DAYS BEFORE YOU DIG FOR LOCATION OF ALL UNDERGROUND UTILITIES.
5. CITY OF MESA PARKS DEPARTMENT IS NOT A PART OF BLUE STAKE. WHEN THE CONTRACTOR EXCAVATES NEAR OR ADJACENT TO A CITY PARK, THE CONTRACTOR WILL BE REQUIRED TO CONTACT PARKS DEPARTMENT ADMINISTRATION OFFICE AT 844-2354 FOR MARKING OF ALL THEIR FACILITIES.
6. ALL FRAMES, COVERS, VALVE BOXES, MANHOLES, ETC.... SHALL BE INSTALLED TO FINISH GRADE OR SHALL BE ADJUSTED TO FINISH GRADE PRIOR TO PLACING OF ASPHALTIC CONCRETE SURFACE COURSE BY THE CONTRACTOR AS PER M.A.G. STANDARD DETAIL 270 AND 422.
7. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES PRIOR TO EXCAVATION.
8. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL INVERT ELEVATIONS BEFORE PROCEEDING WITH BALANCE OF TRENCHING.
9. THE CONTRACTOR SHALL BE REQUIRED TO INSTALL A DAYTIME TIE-IN FOR ANY NEW WATER LINE THAT WILL AFFECT EXISTING SERVICE SUFFICIENTLY TO WARRANT SAME IN THE OPINION OF THE CITY INSPECTOR (9:00 a.m. TO 2:00 p.m.). CONTRACTOR SHALL COMPLETE ALL WORK NECESSARY TO RESTORE UTILITY SERVICE AND FULLY OPEN THE TIE-IN AREA TO TRAFFIC WITHIN THE TIME ALLOWED.
10. WATER LINE TESTS WILL BE CONDUCTED SO THAT NO OLD LINES WILL BE INCLUDED IN THE TESTS.
11. THE CONTRACTOR IS TO INSTALL A TEMPORARY PLUG OR VALVE ON A SECTION OF NEW LINE TO TEST LINES BEFORE CONNECTING TO THE EXISTING WATER SYSTEM WHERE THERE IS NO VALVE ON THE EXISTING LINE.
12. BEDDING OR SHADING MATERIAL ADJACENT TO THE CITY OF MESA GAS PIPE SHALL BE SELECT SANDY TYPE SOIL FREE OF ROCK OR DEBRIS, THAT WILL PASS THROUGH A NO. 4 SIEVE (AS DEFINED BY A.S.T.M. D-2487, 1983 EDITION) AS INSPECTED AND APPROVED BY THE CITY OF MESA GAS INSPECTION PERSONNEL. CONTRACTOR SHALL FURNISH AND INSTALL A MINIMUM OF SIX (6) INCHES OF SHADING MATERIAL AROUND THE GAS PIPE.
13. WHEN THE CITY OF MESA GAS MAINS AND SERVICES ARE EXPOSED, CONTACT THE CITY OF MESA AT 844-2574 FOR INSPECTION OF THE EXPOSED PIPE AND COATING PRIOR TO BACKFILLING OF THE TRENCH.
14. ALL CONSTRUCTION NOTES ENCLOSED IN DASHED BOXES SHALL BE COMPLETED BY CITY OF MESA UTILITY CONSTRUCTION CREWS.
15. THE CONTRACTOR SHALL COMPLY WITH ALL THE REQUIREMENTS AS INDICATED ON THE CITY OF MESA DETAIL M-58 FOR TRENCHING FOR THE WATER LINE WHERE A GAS MAIN IS TO BE INSTALLED IN THE SAME TRENCH.
16. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REMOVE ALL ABANDONED (RETIRED) UTILITIES THAT INTERFERE WITH HIS CONSTRUCTION PROJECT. THE CITY OF MESA UTILITY CONSTRUCTION DIVISION WILL ASSIST THE CONTRACTOR TO DETERMINE IF THE UTILITY (WATER, GAS, SEWER ONLY) IS ABANDONED. CALL 844-2754 FOR THIS ASSISTANCE.
17. ENGINEER CERTIFIES THAT HE HAS CONTACTED ALL INTERESTED UTILITY COMPANIES AND HAS TRANSFERRED ALL EXISTING AND/OR PROPOSED UTILITY LINES AND RELATED INFORMATION ONTO THESE PLANS. THE ENGINEER ALSO CERTIFIES THAT THE EXISTING AND PROPOSED RIGHTS-OF-WAY OR EASEMENTS HAVE BEEN CORRECTLY PLOTTED.
18. THE CONTRACTOR SHALL COMPLY WITH THE PROVISIONS FOR TRAFFIC CONTROL AND BARRICADING AS PER THE CITY OF MESA TRAFFIC BARRICADE MANUAL.
19. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE RELOCATION OFF ALL UTILITIES. POWER POLES, IRRIGATION DRY-UPS, REMOVALS BY OTHERS, ETC..
20. THE DEVELOPER AND THE CONTRACTOR ARE REQUIRED TO COORDINATE TO AVOID PLACEMENT OF DRIVEWAYS IN CONFLICT WITH UTILITY SERVICES.
21. THE CONTRACTOR SHALL OBTAIN ANY AND ALL PERMITS REQUIRED UNLESS OTHERWISE NOTED. NOTE: PERMITS BECOME INVALID AND MUST BE UPDATED IF WORK HAS NOT BEGUN WITHIN SIXTY (60) DAYS. PERMITS ALSO BECOME INVALID IF THE CONTRACTOR'S INSURANCE LAPSES OR IS VOIDED.
22. CONTRACTOR TO ARRANGE FOR IRRIGATION DRY-UPS, RESETS AND REMOVALS BY OTHERS.
23. ALL IMPROVEMENTS WITHIN THE RETENTION BASIN AND/OR ROADWAY PARKWAYS SHALL BE IN ACCORDANCE WITH THE LANDSCAPE AND IRRIGATION STANDARDS BOOKLET.
24. ALL SPRINKLER AND LANDSCAPING WORK MUST BE INSTALLED IN ACCORDANCE WITH THE LANDSCAPE AND IRRIGATION STANDARDS BOOKLET.
25. THE STREET PAVING PERMITEE/CONTRACTOR IS HEREBY NOTIFIED THAT STREET PAVING WILL NOT BE ACCEPTED BY THE CITY OF MESA UNTIL ALL STREET LIGHTS, RETENTION BASINS, AND LANDSCAPING IMPROVEMENTS ARE INSTALLED AND ACCEPTED AND UNTIL POST-CONSTRUCTION CERTIFICATION IS RECEIVED BY THE CITY ENGINEER FOR ALL LOTS WITHIN A SPECIFIED FLOOD PLAIN.
26. THE STREET PAVING PERMITEE/CONTRACTOR IS HEREBY NOTIFIED THAT IN THE EVENT THAT ACCEPTANCE OF THE STREET PAVING IS DELAYED BY SIX (6) MONTHS OR MORE AFTER THE PAVING IS INSTALLED, THE PERMITEE/CONTRACTOR SHALL APPLY A SEAL COAT TO THE PAVING. TYPE OF MATERIAL AND RATE OF APPLICATION WILL BE AS DIRECTED BY THE CITY ENGINEER.
27. THE DEVELOPER SHALL PROVIDE ALL CONSTRUCTION STAKING REQUIRED FOR THE PROJECT
28. THE ENGINEER SHALL CERTIFY THAT ALL IMPROVEMENTS (CONCRETE, PAVING, WATER, AND SEWER UTILITIES, STORM SEWERS, ETC...) HAVE BEEN INSTALLED AT THE LOCATIONS AND ELEVATIONS SHOWN ON APPROVED PLANS. ANY CHANGES SHALL BE REFLECTED ON "AS-BUILT" DRAWINGS PROVIDED BY THE ENGINEER.
29. THE ENGINEER SHALL CERTIFY THAT THE STORM WATER RETENTION HAS BEEN PROVIDED. THE CERTIFICATION SHALL ALSO INDICATE THE ACTUAL VOLUME PROVIDED. SUCH CERTIFICATION SHALL BE PROVIDED TO BUILDING INSPECTIONS WHEN THE RETENTION AREA IS TO REMAIN PRIVATE PROPERTY AND TO ENGINEERING CONSTRUCTION WHEN THE RETENTION AREA IS TO BECOME CITY PROPERTY.
30. THE ENGINEER SHALL CERTIFY THAT THE MINIMUM HORIZONTAL AND VERTICAL SEPERATION, AS REQUIRED BY LAW OR POLICY, BETWEEN UTILITIES HAS BEEN MAINTAINED.
31. THE FOLLOWING REQUIREMENTS ARE NECESSARY TO TRANSFER OWNERSHIP OF RETENTION BASINS TO THE CITY OF MESA:
    A) PRELIMINARY TITLE REPORT
    B) TITLE INSURANCE POLICY VALUED AT 50 PERCENT OF MARKET VALUE.
    C) THESE REQUIREMENTS MUST BE FULFILLED PRIOR TO ACCEPTANCE OF THE RETENTION BASIN AND PRIOR TO PAVING ACCEPTANCE BY THE CITY OF MESA.
32. ALL MANHOLES PER M.A.G. DETAILS MUST NECK DOWN TO USE THE STANDARD 30-INCH FRAME AND COVER.
33. FLAT-TOP STYLE MANHOLE CONSTRUCTION IS NOT ACCEPTABLE UNLESS OTHERWISE APPROVED BY THE ENGINEERING DIVISION.
34. ALL LOTS SHALL RECEIVE 3/4" WATER SERVICES.
35. ALL LOTS SHALL RECEIVE 4" SEWER SERVICES.
36. BACKFILL AND COMPACTION WITHIN COUNTY RIGHT-OF-WAY SHALL BE IN ACCORDANCE WITH LATEST MARICOPA COUNTY SPECIAL PROVISIONS FOR INSTALLATION OF UNDERGROUND UTILITIES.
37. THE CONTRACTOR SHALL COMPLY WITH THE PROVISIONS FOR TRAFFIC CONTROL AND BARRICADING AS PER THE MARICOPA COUNTY TRAFFIC BARRICADE MANUAL.
38. THE CONTRACTOR SHALL NOTIFY EL PASO NATURAL GAS (987-1688) 48 HOURS PRIOR TO COMMENCING CONSTRUCTION IN THE VICINITY OF EL PASO NATURAL GAS RIGHT-OF-WAY.

SPECIAL NOTES:

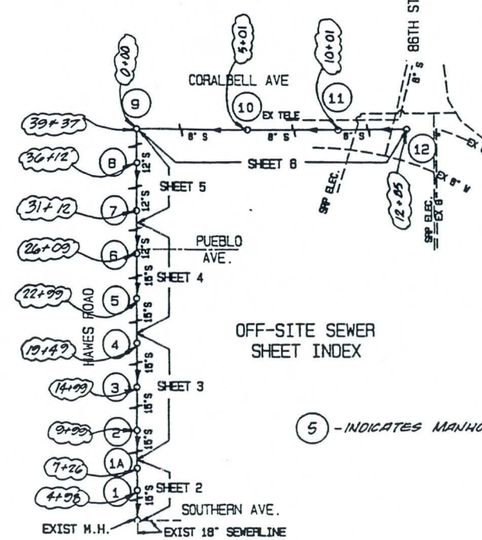
1. THE CONTRACTOR SHALL NOTIFY THE DEVELOPER AT LEAST 48 HOURS IN ADVANCE FOR ANY STAKING OR RESTAKING REQUIRED.
2. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN ANY PERMITS REQUIRED AT HIS OWN EXPENSE.
3. THE CONTRACTOR WILL MAKE EXPLORATORY EXCAVATIONS AND LOCATE EXISTING UNDERGROUND FACILITIES SUFFICIENTLY AHEAD OF CONSTRUCTION TO PERMIT THE REVISION OF THESE PLANS, IF NECESSARY DUE TO A CONFLICT BETWEEN A FACILITY PROPOSED HEREIN AND AN EXISTING FACILITY.
4. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO VERIFY THE PRESENCE AND LOCATION OF ANY AND ALL EXISTING OVERHEAD AND/OR UNDERGROUND UTILITIES THAT MAY INTERFERE WITH THIS CONSTRUCTION, WHETHER OR NOT SAID UTILITIES ARE SHOWN ON THE CONSTRUCTION PLANS FOR THIS PROJECT, AND TO ADEQUATELY PROTECT AND MAINTAIN ANY SUCH UTILITIES.
5. THE ENGINEER DOES NOT ASSUME ANY LIABILITY FOR ERRORS OF LINE AND/OR OF GRADE ON ANY STAKING WHICH HAS BEEN DISTURBED IN ANY WAY, NOR DOES THE ENGINEER ASSUME ANY LIABILITY FOR ERRORS OF LINE AND/OR GRADE ON ANY STAKING THAT HAS BEEN IN PLACE FOR A PERIOD OF TWENTY-FOUR (24) HOURS OR MORE WITHOUT THE COMMENCEMENT OF THE CONSTRUCTION FOR WHICH IT WAS SET.
6. CONSTRUCTION LOADS: DURING CONSTRUCTION OPERATIONS, HEAVY EQUIPMENT MAY CROSS EXISTING OR PROPOSED PIPE. IF THIS IS THE CASE, AN EARTH FILL SHOULD BE CONSTRUCTED TO AT LEAST 3' ABOVE PIPE. THE FILL SHOULD BE SUFFICIENT TO PREVENT THE LATERAL DISPLACEMENT OF THE PIPE.
7. CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER AND THE ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR THE ENGINEER.
8. ANY QUESTIONS RELATIVE TO THE ACCURACY OF IMPROVEMENT INSTALLATION SHALL NOT BE RAISED SUBSEQUENT TO COMPLETION OF THE WORK UNLESS ALL SURVEY STAKES ARE MAINTAINED INTACT. SHOULD SUCH STAKES NOT BE PRESENT AND VERIFIED AS TO THEIR ORIGIN, NO CLAIM FOR ADDITIONAL COMPENSATION FOR CORRECTION SHALL BE PRESENTED TO ANY PARTY AND SUCH WORK SHALL BE CORRECTED BY THE CONTRACTOR AT HIS EXPENSE.
9. THESE PLANS ARE NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS THE APPROVAL BLOCK HAS BEEN SIGNED BY THE APPROPRIATE AGENCIES. ALL WORK SHALL CONFORM TO THE CURRENT M.A.G. SPECIFICATIONS AND STANDARD DETAILS TOGETHER WITH THE SUPPLEMENT OF THE APPROPRIATE AGENCY.
10. NOTHING CONTAINED IN THE CONTRACT DOCUMENTS SHALL CREATE, NOR SHALL BE CONSTRUED TO CREATE, ANY CONTRACTUAL RELATIONSHIP BETWEEN THE ENGINEER AND THE CONTRACTOR OR ANY SUBCONTRACTOR.
11. THE CONTRACTOR SHALL, IN ALL CASES, BEGIN SEWERLINE CONSTRUCTION FROM THE DOWNSTREAM MANHOLE OR SEWER STUB WHETHER EXISTING OR PROPOSED. PRIOR TO INSTALLATION OF AN SEWERLINE, CONTRACTOR SHALL EXCAVATE AND EXPOSE THE POINT OF CONNECTION OF NEW SEWERLINE TO THE EXISTING STUB OR MANHOLE AND VERIFY THE ELEVATION AND LOCATION. SHOULD THE EXISTING CONDITION VARY FROM THE DESIGN ON THE PLANS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO CONTINUING WORK.
12. THE CONTRACTOR SHALL NOTIFY THE ENGINEER BEFORE THE FITTINGS ARE COVERED SO RECORD DRAWING MEASUREMENTS MAY BE TAKEN. FITTINGS SHALL NOT BE COVERED UNTIL SURVEYS HAVE BEEN COMPLETED.
13. THE ENGINEER MAKES NO REPRESENTATION OR GUARANTEE REGARDING EARTHWORK QUANTITIES OR THAT THE EARTHWORK FOR THIS PROJECT WILL BALANCE DUE TO THE VARYING FIELD CONDITIONS, CHANGING SOIL TYPES, ALLOWABLE CONSTRUCTION TOLERANCES AND CONSTRUCTION METHODS THAT ARE BEYOND THE CONTROL OF THE ENGINEER.
14. PRIOR TO BIDDING THE WORK, THE CONTRACTOR SHALL THOROUGHLY SATISFY HIMSELF AS TO THE ACTUAL CONDITIONS, EARTHWORK QUANTITIES, IF ANY. NO CLAIM SHALL BE MADE AGAINST THE OWNER/DEVELOPER OR ENGINEER FOR ANY EXCESS OR DEFECIENCY THEREIN, ACTUAL OR RELATIVE.

SHEET INDEX:

COVER SHEET 1
OFF-SITE IMPROVEMENTS 2-6



VICINITY MAP



OFF-SITE SEWER
SHEET INDEX

(5) - INDICATES MANHOLE NUMBER

SEWER

ITEM	CITY R/W	COUNTY R/W	TOTAL	UNIT
15" SEWERLINE	2614	—	2614	LF
12" SEWERLINE	1325	—	1325	LF
8" SEWERLINE	45	1240	1285	LF
5' DIA. MANHOLE	10	3	13	EA.
8" STUB AND CAP	115	—	80	LF
12" STUB AND CAP	15	—	15	LF
CONCRETE ENCASEMENT	4	—	4	CY
PAVEMENT REMOVAL & REPLACEMENT	1225	—	1225	SY
MH FRAME AND COVER ADJUSTMENT	10	3	15	EA.

ESTIMATED QUANTITIES

THE QUANTITIES LISTED ABOVE ARE APPROXIMATE. THE CONTRACTOR SHALL MAKE HIS OWN DETERMINATION OF THE QUANTITIES AND BASE HIS BID ON HIS OWN ESTIMATE. PAYMENT WILL BE MADE IN ACCORDANCE WITH THE CONTRACT FOR WORK ACTUALLY COMPLETED.

PVC S/L
ALL STUB ARE
PER PLAN

SEWER CONSTRUCTION NOTES

1. INSTALL 8" SEWERLINE (LENGTH PER PROFILE)
2. CONSTRUCT 5' DIAMETER MANHOLE PER M.A.G. STD. DET. 420 & 424
3. INSTALL CLEANOUT PER M.A.G. STD. DET. 441
4. INSTALL 4" SERVICE CONNECTION PER M.A.G. STD. DET. 440-A
5. INSTALL 8" PLUG PER M.A.G. STD. DET. 427
6. INSTALL 12" SEWERLINE (LENGTH PER PROFILE)
7. INSTALL 15" SEWERLINE (LENGTH PER PROFILE) STDP 35
8. INSTALL 12" PLUG PER M.A.G. STD. DET. 427

GENERAL NOTES:

SEPARATE RIGHT-OF-WAY PERMITS ARE REQUIRED FOR ALL PUBLIC UTILITIES, STREET IMPROVEMENTS, AND RIGHT-OF-WAY LANDSCAPING. CONTACT PUBLIC WORKS SERVICES AT 844-2231 AND MCDOT AT 506-8792 FOR UNINCORPORATED AREAS

AT THE TIME OF COMPLETION OF DEVELOPMENT, THE DEVELOPER'S ENGINEER SHALL PROVIDE AS-BUILT CERTIFICATION TO THE DEPUTY CITY ENGINEER--CONSTRUCTION THAT DRAINAGE AND RETENTION FACILITIES WERE CONSTRUCTED ACCORDING TO APPROVED PLANS AND CONFORMS TO CITY STANDARDS. SAID CERTIFICATION SHALL BE SIGNED BY THE ENGINEER AND STAMPED WITH HIS PROFESSIONAL SEAL.

ALL PUBLIC WATER MAIN MATERIALS SHALL BE PER SECTION 810.3 OF THE M.A.G. UNIFORM STANDARD SPECIFICATIONS. ALL DUCTILE IRON PIPE (D.I.P.) WATER MAINS SHALL HAVE POLYETHYLENE CORROSION PROTECTION PER SEC. 810.5 OF THE M.A.G. UNIFORM STD. SPECS.

THE REQUIRED BACKFLOW PREVENTION ASSEMBLY SHALL BE A MANUFACTURED AND MODEL NUMBER DESIGNATED IN THE CURRENT CITY OF MESA LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES.

THE BACKFLOW PREVENTION ASSEMBLY SHALL BE TESTED AND APPROVED BY A CERTIFIED TECHNICIAN DESIGNATED IN THE CURRENT CITY OF MESA LIST OF APPROVED INSPECTORS PRIOR TO THE REQUEST FOR FINAL INSPECTION.

ALL CONSTRUCTION IN MARICOPA COUNTY RIGHT-OF-WAY SHALL CONFORM TO MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION STANDARD PROVISIONS FOR CONSTRUCTION OF STREET IMPROVEMENTS DATED NOVEMBER 3, 1993.

PUBLIC SEWER MAIN MATERIAL TO BE USED: V.C.P. (ALL SIZES), A.B.S. TRUSS (8"-12"), P.V.C. (8"-12"), AND P.V.C. LINED C.P. (20"+) ARE APPROVED MATERIALS FOR CONSTRUCTING PUBLIC SEWER MAINS.

DEVELOPER:
DEL MAR DEVELOPMENT INC.
2 WEST ALAMEDA #5
TEMPE, ARIZONA 85282
(602) 967-4486

BENCHMARK:
TOP OF CURB LOCATED AT THE SOUTHWEST CORNER OF HAWKES ROAD AND SOUTHERN AVENUE
ELEVATION = 1443.45 (CITY OF MESA DATUM)

AS-BUILT
By D. MARTINEZ Date 10-23-96

Two working days before you dig CALL FOR THE BLUE STAKES 263-1100 Blue Stake Center CALL COLLECT

NO.	REVISION	BY	APPROVED	DATE

sign-engineering corporation
3414 S. 48TH STREET— SUITE B
PHOENIX, ARIZONA 85040
(602)859-0671

DESIGNED BY: JBB
DRAWN BY: JLB
CHECKED BY: GHN

WYNSTONE
OFF-SITE SEWER PLAN

JOB NO. 1020094 DATE JUNE 1995
SCALE: HORIZ. N/A VERT. N/A

SHEET 1 OF 6

A-58876

Hawes Road Channel - CAR

North Half Parcels

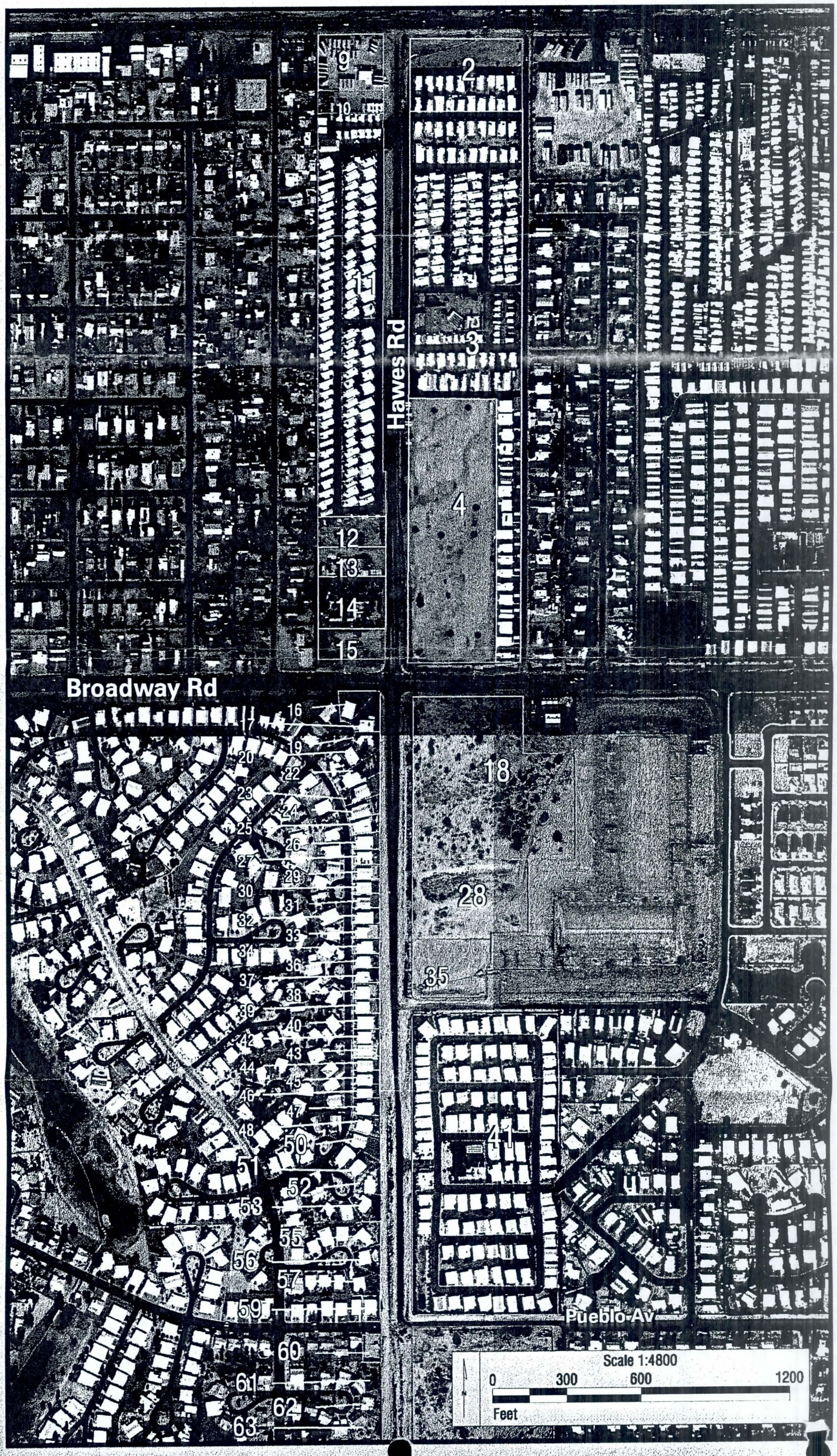


Photo Date: 2 Dec 1996

Hawes Road Channel - CAR

South Half Parcels

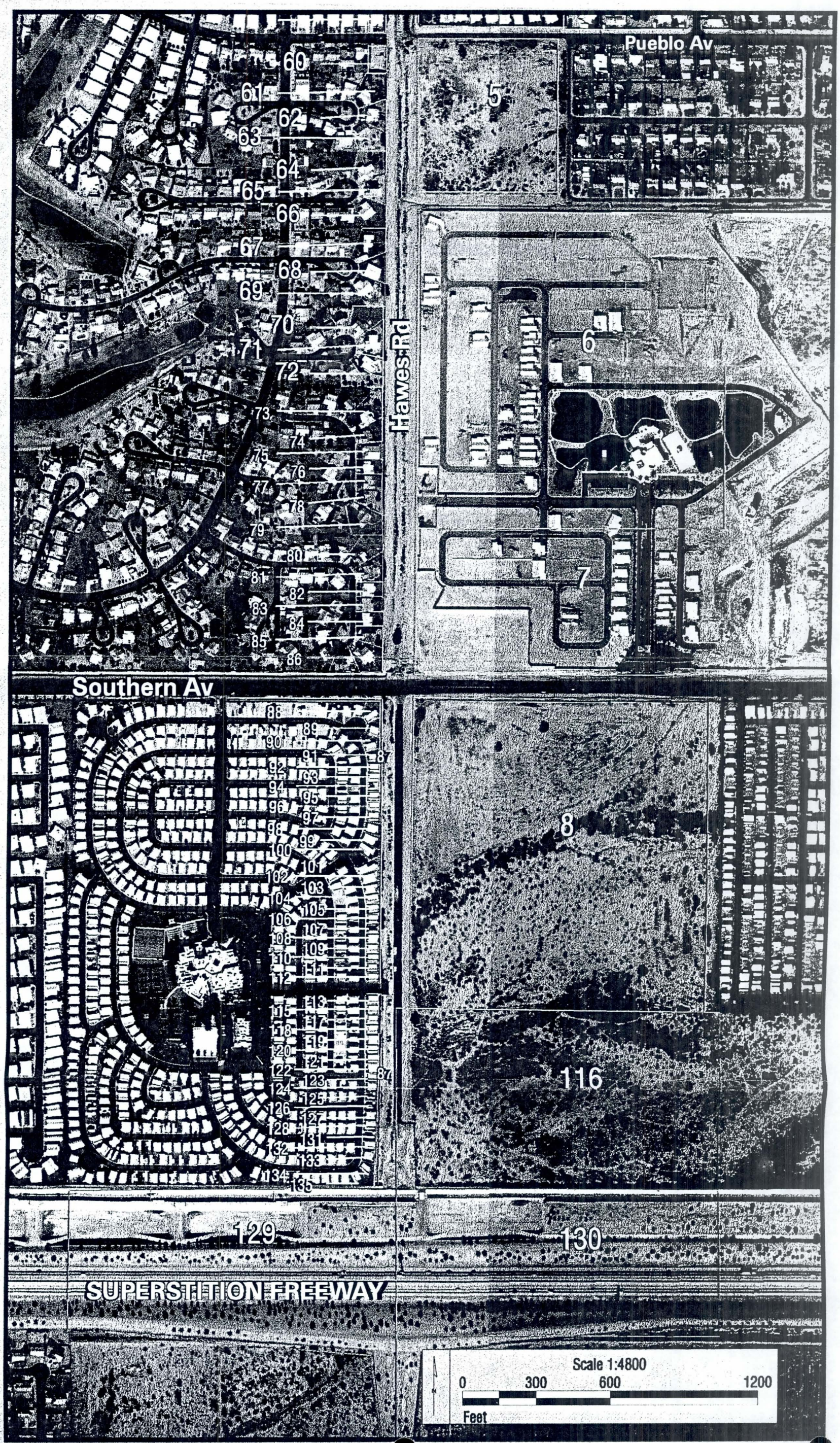


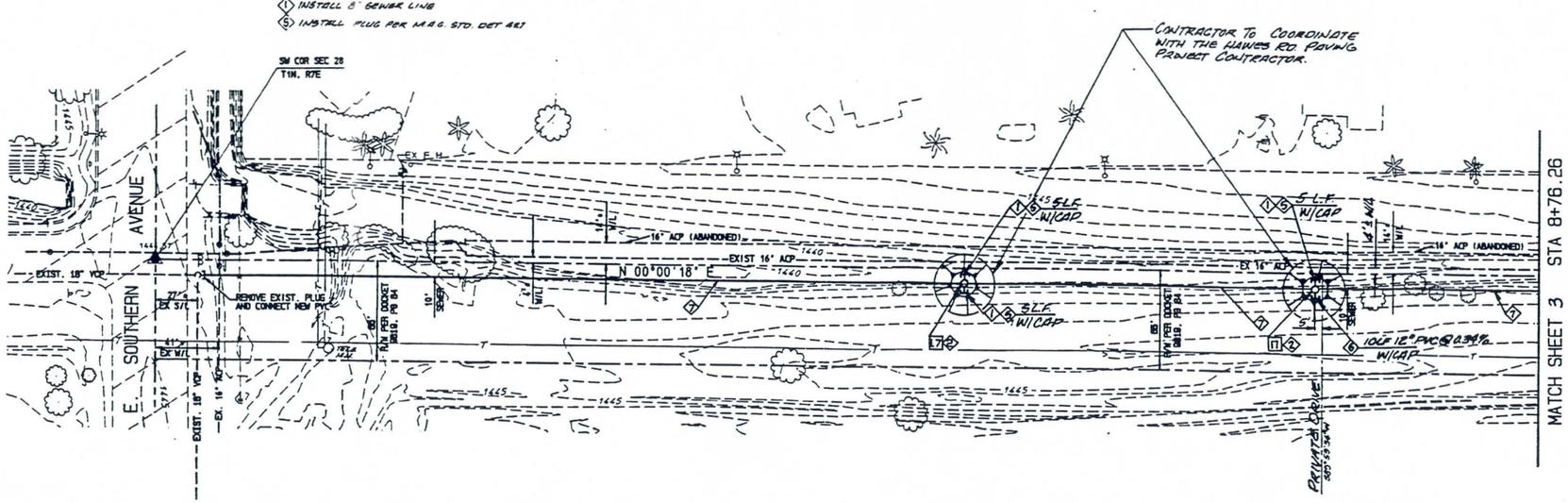
Photo Date: 2 Dec 1996

SEWER CONSTRUCTION NOTES

1. INSTALL 15" SEWERLINE (LENGTH PER PROFILE) SDR 35
2. CONSTRUCT 5' DIAMETER MANHOLE PER M.A.G. STD. DET. 420 & 424
3. INSTALL 8" SEWER LINE
5. INSTALL PLUG PER M.A.G. STD. DET 483

PAVING CONSTRUCTION NOTES

7. ADJUST RIM AND COVER TO GRADE PER M.A.G. STD. DET. 422



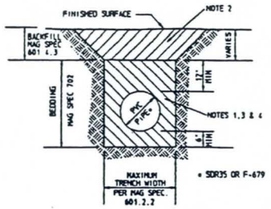
UNSUBDIVIDED

S. HAWES ROAD

PHASE 1

DETAIL NOTES:

1. BEDDING MATERIAL TO BE ABC PER MAG SPEC 702
2. NATIVE MATERIAL AS DESCRIBED IN MAG SPEC 601 4 3
3. ALL COMPACTION DENSITIES, TYPE 1 AS DESCRIBED IN MAG 601 4 4
4. COMPACTION METHODS AS DESCRIBED IN MAG 601.4.5



SEWER PIPE BEDDING DETAIL

N.T.S.

DETAIL NOTES & SPECIFICATIONS

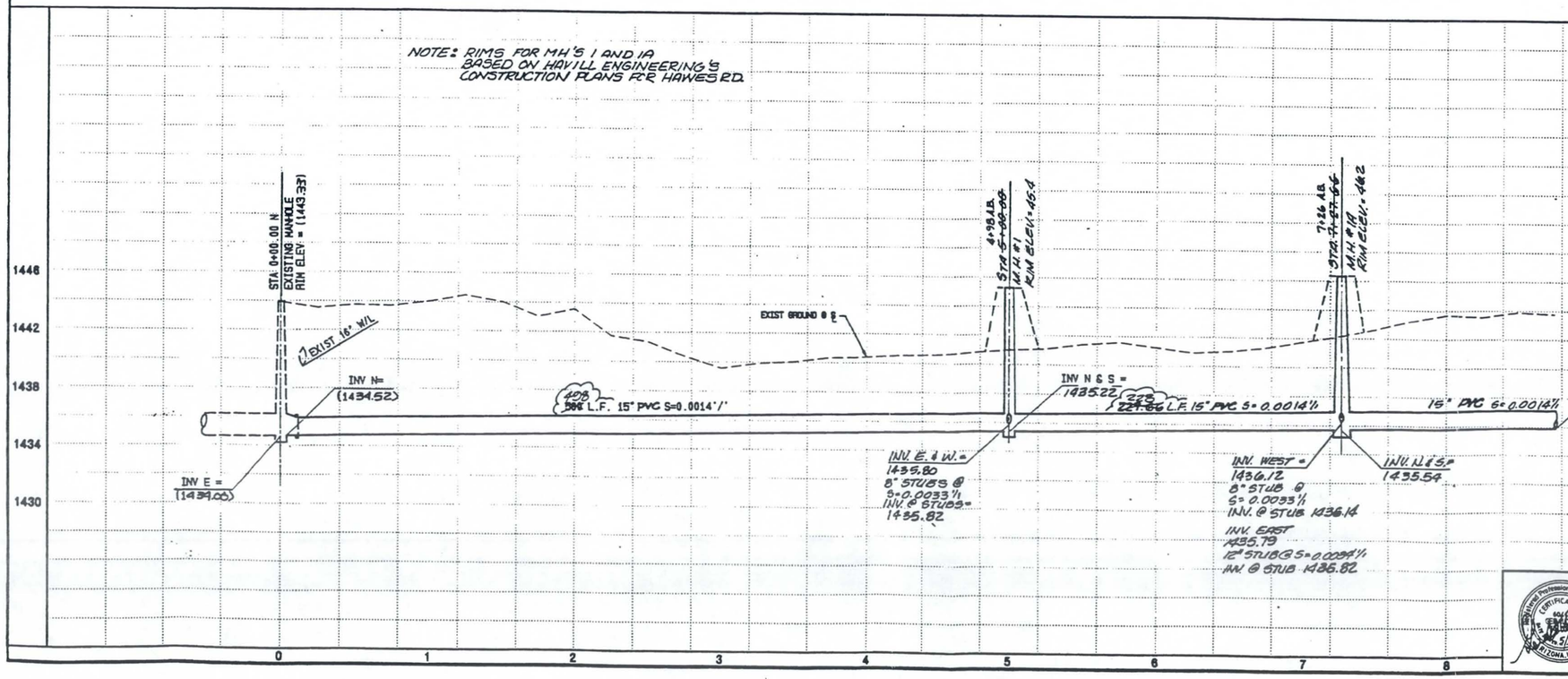
1. ASTM D448, #67 CRUSHED STONE

100%	PASSING	1"	(25.0 MM) SIEVE
90-100%	PASSING	3/4"	(19.0 MM) SIEVE
20- 55%	PASSING	3/8"	(9.5 MM) SIEVE
0- 10%	PASSING	#4	(4.8 MM) SIEVE
0- 5%	PASSING	#8	(2.4 MM) SIEVE

2. CONCRETE STRENGH SHALL BE 3,000 PSI OR GREATER (CURED A MINIMUM OF 24 HOURS)
3. MECHANICAL COMPACTION ONLY PER M.A.G. SPEC. 601.4.5
4. A) NATIVE MATERIAL AS DESCRIBED IN M.A.G. 601.4.3
   B) ALL COMPACTION DENSITIES TYPE 1 AS DESCRIBED IN M.A.G. 601.4.4
   C) COMPACTION METHODS AS DESCRIBED IN M.A.G. 601.4.5
5. SHOULD THE CONTRACTOR EXCEED THE MAXIMUM TRENCH WIDTHS SPECIFIED, WITHOUT WRITTEN APPROVAL OF THE ENGINEER AND CONCURRENCE BY THE CITY OF MESA ENGINEERING DEPARTMENT, HE MAY BE REQUIRED TO PROVIDE, AT HIS OWN EXPENSE, BEDDING ONE CLASS HIGHER THAN SHOWN (WITH CONCRETE ENCASEMENT AS THE HIGHEST BEDDING) FOR THE PIPE AS DIRECTED BY THE ENGINEER OR CITY OF MESA INSPECTOR AND NO SEPARATE PAYMENT WILL BE MADE
6. ALL GROUTED RIP-RAP SHALL CONFORM TO M.A.G. SPECS. 220.5

N

0 20 40 80 120
SCALE: 1"=40'



AS-BUILT

By D. MARTINEZ Date 10-18-96

DESIGNED BY: JBB	age engineering corporation, 3616 S. 48th ST. -- SUITE 9, PHOENIX, ARIZONA 85040, (602)966-7971		SHEET 2 of 6
DRAWN BY: JLB	WYNSTONE OFF-SITE SEWER PLAN		
CHECKED BY: GHN	JOB NO. 1020094	DATE APRIL 1995	
	SCALE: HORIZ. 1"=40'	VERT.: 1"= 4'	

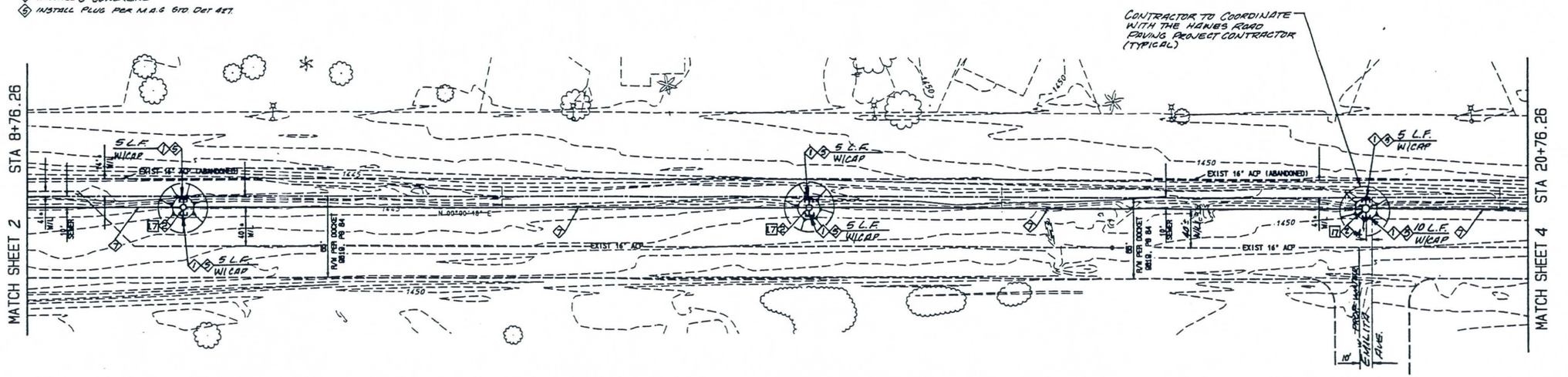
A-58877

SEWER CONSTRUCTION NOTES

1. INSTALL 15" SEWERLINE (LENGTH PER PROFILE) SDR 35
2. CONSTRUCT 5' DIAMETER MANHOLE PER M.A.G. STD. DET. 420 & 424
3. INSTALL 8" SEWERLINE
4. INSTALL PLUG PER M.A.G. STD. DET. 427.

PAVING CONSTRUCTION NOTES

7. ADJUST RIM AND COVER TO GRADE PER M.A.G. STD. DET. 422



CAUTION:
EXIST. WATERLINE IN THIS AREA.
CONTRACTOR TO VERIFY EXACT LOCATION
& ELEVATION PRIOR TO CONSTRUCTION.

UNSUBDIVIDED

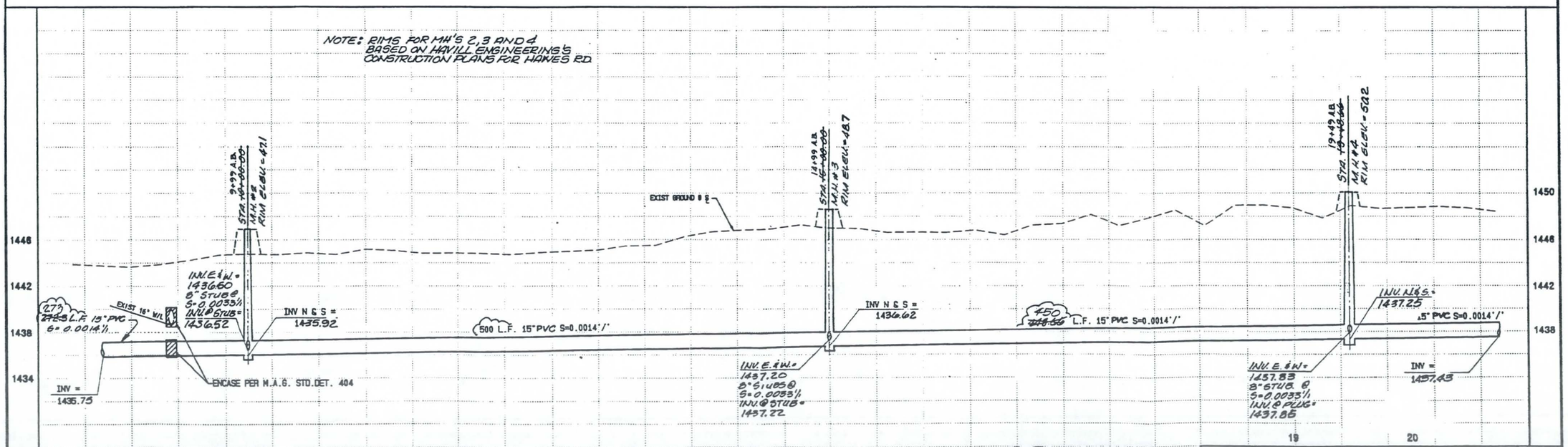
N

0 20 40 80 120
SCALE: 1"=40'

S. HAWES ROAD

PHASE 1

NOTE: RIMS FOR MH'S 2,3 AND 4 BASED ON HAVILL ENGINEERING'S CONSTRUCTION PLANS FOR HAWES RD.



AS-BUILT

By C. MARTINEZ Date 10-28-96

DESIGNED BY: JBB	sage engineering corporation 3414 S. 48th ST. -- SUITE 9 PHOENIX, ARIZONA 85040 (602)966-9971	SHEET 3 OF 6
DRAWN BY: JLB	WYNSTONE OFF-SITE SEWER PLAN	
CHECKED BY: GWN	JOB NO. 1020094 DATE APRIL 1995	
	SCALE: HORIZ. 1"=40' VERT.: 1"= 4'	

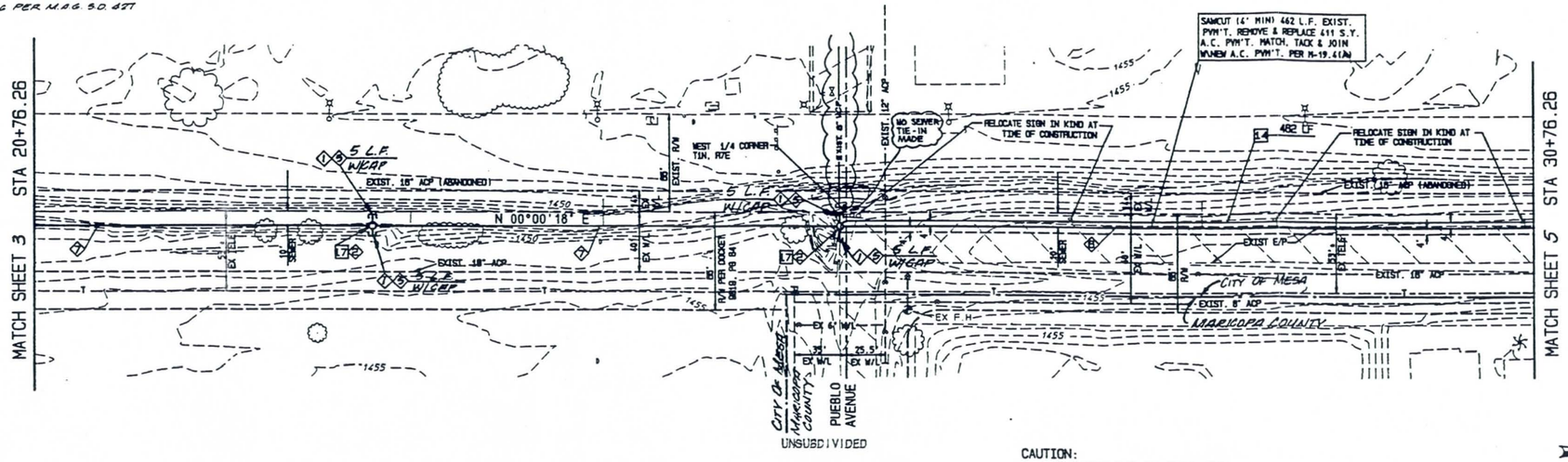
A-58878

SEWER CONSTRUCTION NOTES

- (6) INSTALL 12" SEWERLINE (LENGTH PER PROFILE)
- (2) CONSTRUCT 5' DIAMETER MANHOLE PER M.A.G. STD. DET. 420 & 424
- (7) INSTALL 15" SEWERLINE (LENGTH PER PROFILE) SDR 35
- (1) INSTALL 8" SEWERLINE
- (5) INSTALL 8" PLUG PER M.A.G. S.D. 427

PAVING CONSTRUCTION NOTES

- (2.d) CONSTRUCT PAVEMENT SECTION AT TERMINATION TYPE "B" PER M.A.G. STD. DET. 201
- (1.7) ADJUST RIM AND COVER TO GRADE PER M.A.G. STD. DET. 422

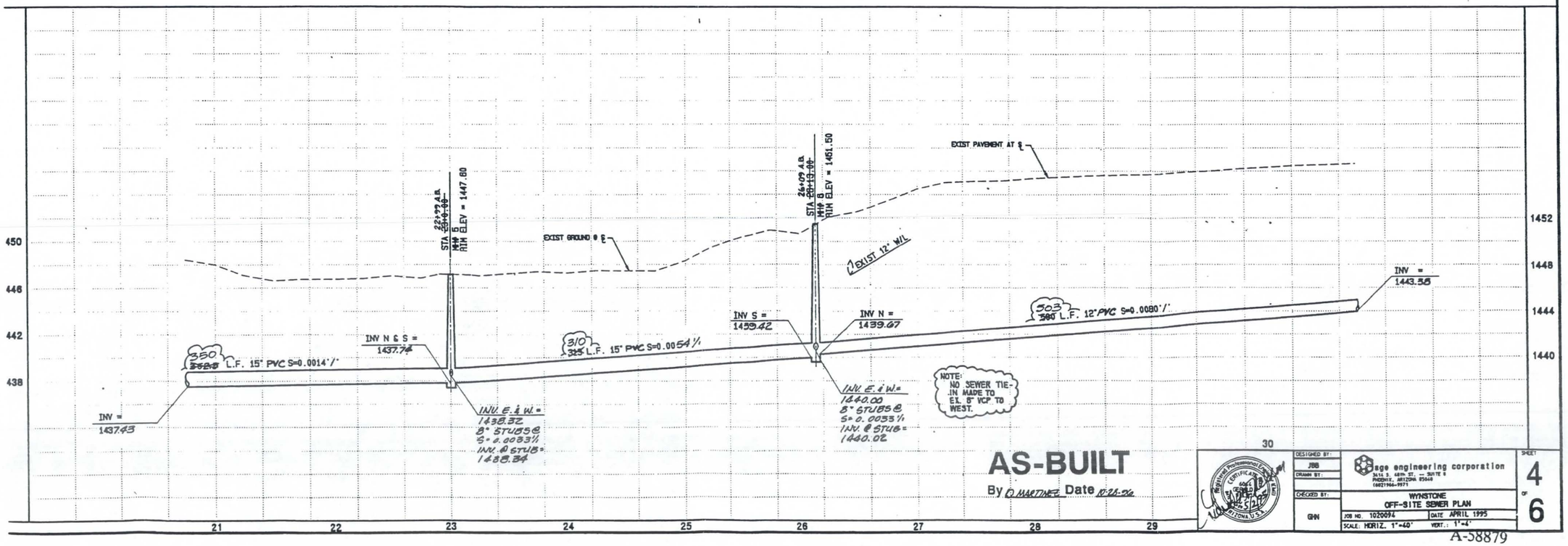


CAUTION:
EXIST. WATERLINE IN THIS AREA.
CONTRACTOR TO VERIFY EXACT LOCATION
& ELEVATION PRIOR TO CONSTRUCTION.

S. HAWES ROAD

PHASE 1

0 20 40 80 120
SCALE: 1"=40'



AS-BUILT

By D. MARTINEZ Date 10-26-96

DESIGNED BY: JBB	sage engineering corporation, 3414 S. 48th ST. — SUITE 6, PHOENIX, ARIZONA 85040, (602)966-9971
DRAWN BY:	WYNSTONE OFF-SITE SEWER PLAN
CHECKED BY: GHN	JOB NO. 1020094 DATE APRIL 1995
	SCALE: HORIZ. 1"=40' VERT.: 1"=4'

SHEET 4 OF 6

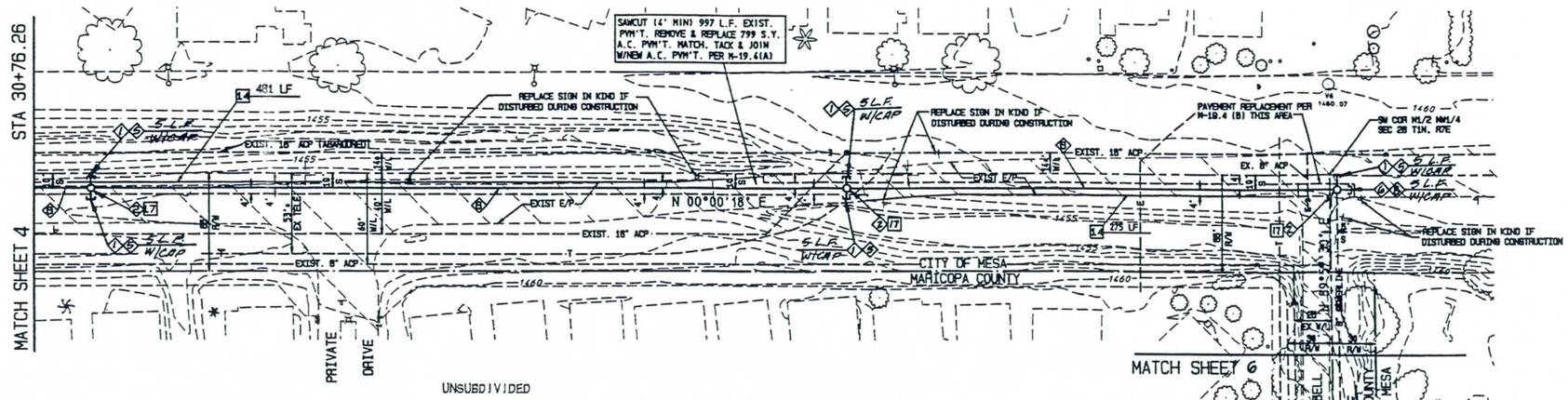
A-58879

SEWER CONSTRUCTION NOTES

- 6 INSTALL 12" SEWERLINE (LENGTH PER PROFILE)
- 2 CONSTRUCT 5' DIAMETER MANHOLE PER M.A.G. STD. DET. 420 & 424
- 1 INSTALL 8" SEWERLINE
- 5 INSTALL 8" PLUG PER M.A.G. S.D. 427
- 6 INSTALL 12" PLUG PER M.A.G. S.D. 427

PAVING CONSTRUCTION NOTES

- 1.4 CONSTRUCT PAVEMENT SECTION AT TERMINATION TYPE "B" PER M.A.G. STD. DET. 201
- 1.7 ADJUST RIM AND COVER TO GRADE PER M.A.G. STD. DET. 422

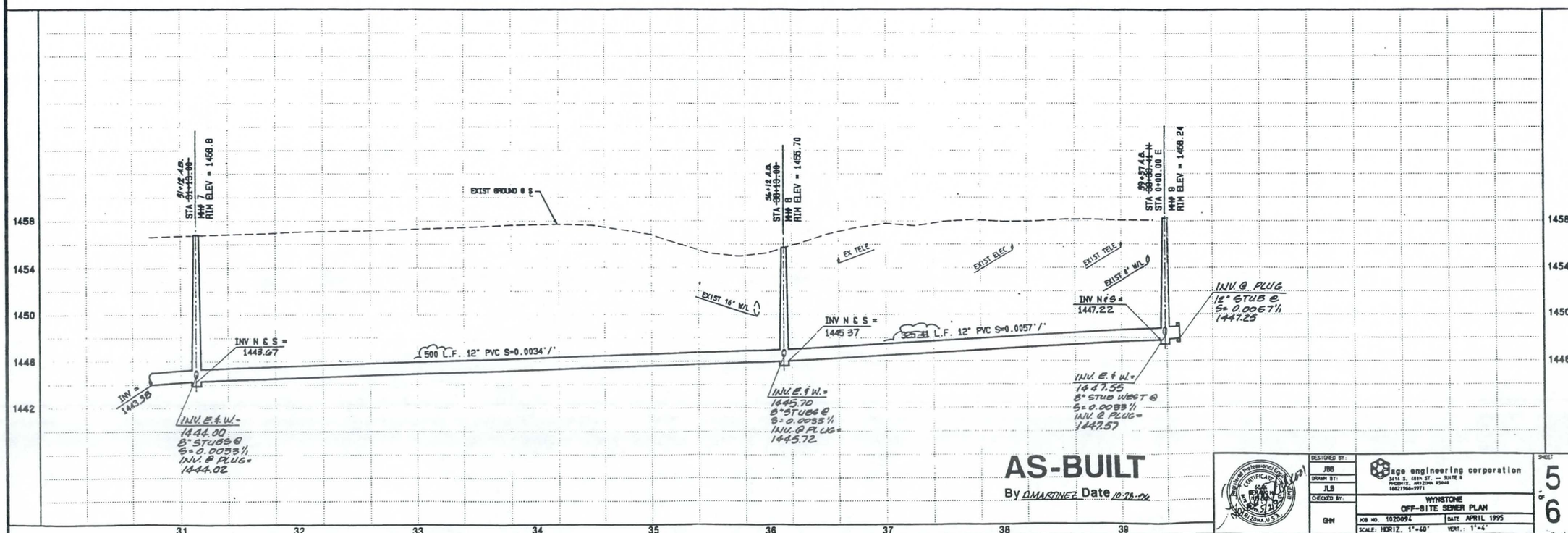


CAUTION:
EXIST. WATER & TELE LINE IN THIS AREA.
CONTRACTOR TO VERIFY EXACT LOCATION
& ELEVATION PRIOR TO CONSTRUCTION.

S. HAWES ROAD
PHASE 1

N

0 20 40 80 120
SCALE: 1"=40'



AS-BUILT

By D.MARTINEZ Date 10-26-94

DESIGNED BY: JBB	sage engineering corporation, 3414 S. 48TH ST. — SUITE 8, PHOENIX, ARIZONA 85040, (602)966-9971	SHEET 5 OF 6
DRAWN BY: JLS	WYNSTONE OFF-SITE SEWER PLAN	
CHECKED BY: GHM	JOB NO. 1020094 DATE APRIL 1995	
	SCALE: HORIZ. 1"=40' VERT.: 1"=4'	

A-58880

CITY OF MESA - PROJECT NO. 97-69
OFF-SITE IMPROVEMENT PLANS
FOR
SOUTHERN AVENUE AND HAWES ROAD
CRESCENT RUN
MOBILE HOME PARK

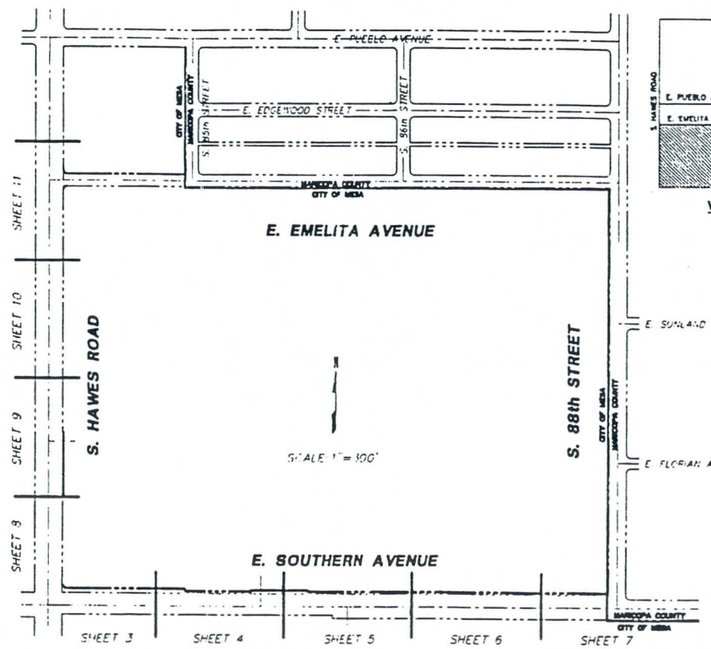
8500 E. SOUTHERN AVENUE

LOCATED IN A PORTION OF THE SW 1/4 OF SECTION 28, T1N-R7E, G. & S.R.B. & M., MARICOPA COUNTY, ARIZONA

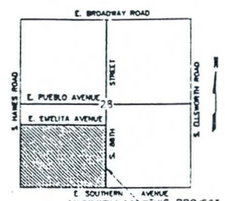
GENERAL NOTES

(CITY OF MESA)

1. ALL WORK AND MATERIALS SHALL CONFORM TO THE MOST CURRENT UNIFORM STANDARD SPECIFICATIONS AND DETAILS FOR PUBLIC WORKS CONSTRUCTION AS FURNISHED BY THE MARICOPA ASSOCIATION OF GOVERNMENTS AND AS AMENDED BY THE CITY OF MESA. ALL WORK AND MATERIALS NOT IN CONFORMANCE WITH THESE AMENDED SPECIFICATIONS AND DETAILS ARE SUBJECT TO REMOVAL AND REPLACEMENT AT THE CONTRACTOR'S EXPENSE.
2. SEPARATE R/W PERMIT REQUIRED FOR ALL PUBLIC UTILITIES, STREET IMPROVEMENTS AND RIGHT-OF-WAY LANDSCAPING. CONTACT PUBLIC WORK SERVICES AT 644-2231.
3. THE CONTRACTOR SHALL NOTIFY THE CITY ENGINEERING DIVISION AT LEAST 24 HOURS IN ADVANCE OF ANY CONSTRUCTION FOR INSPECTION AT 644-2253.
4. CALL THE BLUE STAKE CENTER (263-1100) TWO (2) WORKING DAYS BEFORE YOU DIG FOR LOCATION OF ALL UNDERGROUND UTILITES.
5. CITY OF MESA PARKS DEPARTMENT IS NOT A PART OF BLUE STAKE. WHEN THE CONTRACTOR EXCAVATES NEAR OR ADJACENT TO A CITY PARK, THE CONTRACTOR WILL BE REQUIRED TO CONTACT PARKS DEPARTMENT ADMINISTRATION OFFICE AT 644-2354 FOR MARKING OF ALL THEIR FACILITIES.
6. THE CONTRACTOR SHALL OBTAIN ANY AND ALL PERMITS REQUIRED UNLESS OTHERWISE NOTED.
   NOTE: PERMITS BECOME INVALID AND MUST BE UPDATED IF WORK HAS NOT BEGUN WITHIN SIXTY (60) DAYS. PERMITS ALSO BECOME INVALID IF THE CONTRACTOR'S INSURANCE LAPSES OR IS VOIDED.
7. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING AN EXCAVATION AND DIRT MOVING PERMIT FROM THE COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT, AND COMPLYING WITH ITS REQUIREMENTS.
8. ENGINEER CERTIFIES THAT HE HAS CONTACTED ALL INTERESTED UTILITY COMPANIES AND HAS TRANSFERRED ALL EXISTING AND/OR PROPOSED UTILITY LINES AND RELATED INFORMATION ONTO THESE PLANS. THE ENGINEER ALSO CERTIFIES THAT THE EXISTING AND PROPOSED RIGHTS-OF-WAY OR EASEMENTS HAVE BEEN CORRECTLY PLOTTED.
9. THE ENGINEER SHALL CERTIFY THAT ALL IMPROVEMENTS (CONCRETE, PAVING, WATER AND SEWER UTILITIES, STORM SEWER, ETC...) HAVE BEEN INSTALLED AT THE LOCATIONS AND ELEVATIONS SHOWN ON THE APPROVED PLANS. ANY CHANGES SHALL BE REFLECTED ON AS-BUILT DRAWINGS PROVIDED BY THE ENGINEER.
10. THE ENGINEER SHALL CERTIFY THAT THE REQUIRED STORM WATER RETENTION HAS BEEN PROVIDED. THE CERTIFICATION SHALL ALSO INDICATE THE ACTUAL VOLUME PROVIDED. SUCH CERTIFICATION SHALL BE PROVIDED TO BUILDING INSPECTIONS WHEN THE RETENTION AREA IS TO REMAIN PRIVATE PROPERTY AND TO ENGINEERING CONSTRUCTION WHEN THE RETENTION AREA IS TO BECOME CITY PROPERTY.
11. AT THE TIME OF COMPLETION OF DEVELOPMENT, THE DEVELOPER'S ENGINEER SHALL PROVIDE AS-BUILT CERTIFICATION TO THE DEPUTY CITY ENGINEER-CONSTRUCTION THAT DRAINAGE AND RETENTION FACILITIES WERE CONSTRUCTED ACCORDING TO APPROVED PLANS AND CONFORMS TO CITY STANDARDS. SAID CERTIFICATION SHALL BE SIGNED BY THE ENGINEER AND STAMPED WITH HIS PROFESSIONAL SEAL.
12. THE ENGINEER SHALL CERTIFY THAT THE MINIMUM HORIZONTAL AND VERTICAL SEPARATION, AS REQUIRED BY LAW OR POLICY, BETWEEN UTILITIES HAS BEEN MAINTAINED.
13. THE DEVELOPER SHALL PROVIDE ALL CONSTRUCTION STAKING REQUIRED FOR THE PROJECT.
14. THE CONTRACTOR SHALL COMPLY WITH THE PROVISIONS FOR TRAFFIC CONTROL AND BARRICADING AS PER THE CITY OF MESA TRAFFIC BARRICADE MANUAL.
15. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE RELOCATION OF ALL UTILITIES, POWER POLES, ETC.
16. THE DEVELOPER AND THE CONTRACTOR ARE REQUIRED TO COORDINATE TO AVOID PLACEMENT OF DRIVEWAYS IN CONFLICT WITH UTILITY SERVICES.
17. ALL FRAMES, COVERS, VALVE BOXES, MANHOLES, ETC ... SHALL BE INSTALLED TO FINISH GRADE OR SHALL BE ADJUSTED TO FINISH GRADE PRIOR TO PLACING OF ASPHALTIC CONCRETE SURFACE COURSE BY THE CONTRACTOR AS PER M.A.G. STANDARD DETAIL 270 AND 422.
18. ALL IMPROVEMENTS WITHIN THE RETENTION BASIN AND/OR ROADWAY PARKWAYS SHALL BE IN ACCORDANCE WITH THE LANDSCAPE AND IRRIGATION STANDARDS BOOKLET.
19. ALL SPRINKLER AND LANDSCAPING WORK MUST BE INSTALLED IN ACCORDANCE WITH THE LANDSCAPE AND IRRIGATION STANDARDS BOOKLET.
20. THE STREET PAVING PERMITTEE/CONTRACTOR IS HEREBY NOTIFIED THAT STREET PAVING WILL NOT BE ACCEPTED BY THE CITY OF MESA UNTIL ALL STREET LIGHTS, RETENTION BASIN, AND LANDSCAPING IMPROVEMENTS ARE INSTALLED AND ACCEPTED AND UNTIL POST-CONSTRUCTION CERTIFICATION IS RECEIVED BY THE DEPUTY CITY ENGINEER-CONSTRUCTION FOR ALL LOTS WITHIN A SPECIFIED FLOODPLAIN.
21. THE STREET PAVING PERMITTEE/CONTRACTOR IS HEREBY NOTIFIED THAT IN THE EVENT THAT ACCEPTANCE OF A STREET PAVING IS DELAYED BY SIX (6) MONTHS OR MORE AFTER THE PAVING IS INSTALLED, THE PERMITTEE/CONTRACTOR SHALL APPLY A SEAL COAT TO THE PAVING. TYPE OF MATERIAL AND RATE OF APPLICATION WILL BE AS DIRECTED BY THE DEPUTY CITY ENGINEER - CONSTRUCTION.
22. ~~THE FOLLOWING REQUIREMENTS ARE NECESSARY TO TRANSFER OWNERSHIP OF RETENTION BASINS TO THE CITY OF MESA.~~
    1. ~~PRELIMINARY TITLE REPORT.~~
    2. ~~TITLE INSURANCE POLICY VALUED AT 50 PERCENT OF MARKET VALUE.~~
    3. ~~THESE REQUIREMENTS MUST BE FULFILLED PRIOR TO ACCEPTANCE OF THE RETENTION BASIN AND PRIOR TO PAVING ACCEPTANCE BY THE CITY OF MESA.~~
23. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES PRIOR TO EXCAVATION.
24. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL INVERT ELEVATIONS BEFORE PROCEEDING WITH THE BALANCE OF TRENCHING.
25. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REMOVE ALL ABANDONED (RETIRED) UTILITIES THAT INTERFERE WITH HIS CONSTRUCTION PROJECT. THE CITY OF MESA UTILITY CONSTRUCTION DIVISION WILL ASSIST THE CONTRACTOR TO DETERMINE IF THE UTILITY (WATER, GAS, SEWER ONLY) IS ABANDONED. CALL 644-2754 FOR THIS ASSISTANCE.
26. ALL PUBLIC WATER MAIN MATERIAL SHALL BE PER SECTION 610.1 OF THE M.A.G. UNIFORM STANDARD SPECIFICATIONS. ALL DUCTILE IRON PIPE (D.I.P.) WATER MAINS SHALL HAVE POLYETHYLENE CORROSION PROTECTION PER SECTION 610.05 OF THE M.A.G. UNIFORM STANDARD SPECIFICATIONS.
27. THE CONTRACTOR SHALL BE REQUIRED TO INSTALL A DAYTIME TIE-IN FOR ANY NEW WATER LINE THAT WILL AFFECT EXISTING SERVICE SUFFICIENTLY TO WARRANT SAME IN THE OPINION OF THE CITY INSPECTOR (9:00 A.M. TO 2:00 P.M.). CONTRACTOR SHALL COMPLETE ALL WORK NECESSARY TO RESTORE UTILITY SERVICE AND FULLY OPEN THE TIE-IN AREA TO TRAFFIC WITHIN THE TIME ALLOWED.
28. THE CONTRACTOR IS TO INSTALL A TEMPORARY PLUG OR VALVE ON A SECTION OF NEW LINE TO TEST LINES BEFORE CONNECTING TO THE EXISTING WATER SYSTEM WHERE THERE IS NO VALVE ON THE EXISTING LINE.
29. WATER LINE TESTS WILL BE CONDUCTED SO THAT NO OLD LINES WILL BE INCLUDED IN THE TESTS.
30. THE REQUIRED BACK FLOW PREVENTION ASSEMBLY SHALL BE A MANUFACTURER AND MODEL # DESIGNATED IN THE CURRENT CITY OF MESA LIST OF APPROVED BACK FLOW PREVENTION ASSEMBLIES.
31. BACK FLOW PREVENTION ASSEMBLY SHALL BE TESTED AND APPROVED BY A CERTIFIED TECHNICIAN DESIGNATED IN THE CURRENT CITY OF MESA LIST OF APPROVED INSPECTORS PRIOR TO THE REQUEST FOR FINAL INSPECTION.
32. BEDDING OR SHADING MATERIAL ADJACENT TO THE CITY OF MESA GAS PIPE SHALL BE SELECT SANDY TYPE SOIL FREE OF ROCK OR DEBRIS, THAT WILL PASS THROUGH A NO. 4 SIEVE (AS DEFINED BY A.S.T.M. D-2487, 1993 EDITION) AS INSPECTED AND APPROVED BY CITY OF MESA GAS INSPECTION PERSONNEL.
33. WHEN THE CITY OF MESA GAS MAINS AND SERVICES ARE EXPOSED, CONTACT THE CITY OF MESA AT 644-2754 FOR INSPECTION OF THE EXPOSED PIPE AND COATING PRIOR TO BACK FILLING OF THE TRENCH.
34. ALL CONSTRUCTION NOTES ENCLOSED IN DASHED BOXES SHALL BE COMPLETED BY CITY OF MESA UTILITY CONSTRUCTION CREWS.
35. THE CONTRACTOR SHALL COMPLY WITH ALL THE REQUIREMENTS AS INDICATED ON THE CITY OF MESA DETAIL M-58 FOR TRENCHING FOR THE WATER LINE WHERE A GAS MAIN IS TO BE INSTALLED IN THE SAME TRENCH.
36. ALL MANHOLES PER M.A.G. DETAILS MUST NECK DOWN TO USE THE STANDARD 30 INCH FRAME AND COVER.
37. FLAT-TOP STYLE MANHOLE CONSTRUCTION IS NOT ACCEPTABLE UNLESS OTHERWISE APPROVED BY THE ENGINEERING DIVISION.
38. ~~LOTS _____ SHALL RECEIVE _____ WATER SERVICES.~~
39. ~~LOTS 138-157 & 363-378 SHALL RECEIVE 4" SEWER SERVICES.~~
40. CONTRACTOR TO ARRANGE FOR IRRIGATION DRY-UPS, RESETS AND REMOVALS BY OTHERS.
41. ALL CONSTRUCTION IN MARICOPA COUNTY RIGHT-OF-WAY SHALL CONFORM TO MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION STANDARD PROVISIONS FOR CONSTRUCTION OF STREET IMPROVEMENTS DATED 11/03/93.
42. BACKFILL AND COMPACTION WITHIN COUNTY RIGHT-OF-WAY SHALL BE IN ACCORDANCE WITH THE LATEST MARICOPA COUNTY SPECIAL PROVISIONS FOR INSTALLATION OF UNDERGROUND UTILITIES.
43. THE CONTRACTOR SHALL COMPLY WITH THE PROVISION FOR TRAFFIC CONTROL AND BARRICADING AS PER THE MARICOPA COUNTY TRAFFIC BARRICADE MANUAL.
44. THE CONTRACTOR SHALL NOTIFY EL PASO NATURAL GAS (967-1886) 48 HOURS PRIOR TO COMMENCING CONSTRUCTION IN THE VICINITY OF EL PASO NATURAL GAS RIGHT-OF-WAY.
45. PRIOR TO START OF CONSTRUCTION ON PRIVATE PROPERTY (EASEMENTS), THE CONTRACTOR WILL GIVE THE OWNER (IF IN RESIDENCE) SUFFICIENT TIME (MINIMUM 24-HOURS) TO REMOVE ITEMS HE WISHES TO. THE CONTRACTOR WILL ARRANGE TO REMOVE AND REPLACE ALL OTHER CONFLICTS AS REQUIRED.
46. NO JOB WILL BE CONSIDERED COMPLETE UNTIL ALL CURBS, PAVEMENT AND SIDEWALKS HAVE BEEN SWEPT CLEAN OF DIRT AND DEBRIS AND ALL SURVEY MONUMENTS ARE INSTALLED ACCORDING TO THE PLANS.
47. THE CONTRACTOR IS ADVISED TO CONTACT TRAFFIC SIGNALS' SUPERVISOR AT 644-3122, 48-HOURS PRIOR TO ANY WORK WITHIN THE VICINITY OF, OR THROUGH A SIGNALIZED INTERSECTION WHICH WILL CHANGE TRAFFIC LANE PATTERNS FOR AREAS WITHIN THE CITY OF MESA.
48. THE CONTRACTOR AND CITY OF MESA UTILITY AND TRAFFIC CREWS SHALL COORDINATE WORK SCHEDULES SO AS TO PREVENT ANY CONFLICTING WORK CONDITIONS.
49. CONTRACTOR TO NOTIFY TRAFFIC OPERATIONS AT 644-3126 PRIOR TO SIGN REMOVAL AND WHEN READY TO PERMANENTLY RELOCATE SIGN.
50. GUTTERS WILL BE WATER TESTED IN THE PRESENCE OF THE CITY INSPECTOR OR HIS AUTHORIZED REPRESENTATIVE TO ENSURE PROPER DRAINAGE, PRIOR TO FINAL APPROVAL BY THE ENGINEER.
51. EXACT POINTS OF MATCHING TERMINATION AND OVERLAY, IF NECESSARY, MAY BE DETERMINED IN THE FIELD BY THE ENGINEER.
52. ALL 5" THICK DRIVEWAYS (DETAIL 250) AND SIDEWALK RAMPS (DETAIL 231) SHALL BE PAID AS SIDEWALK (DETAIL 230).
53. IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE ALL NECESSARY FITTINGS AND ADAPTERS REQUIRED TO CONNECT DIFFERENT TYPES OF PIPE LINE MATERIAL. THE COST IS TO BE INCLUDED IN HIS PER FOOT BID.
54. ALTERNATE SEWER PIPE MAY BE P.V.C. FOR LINES 8"-12" ~~OR VITRIFIED CLAY PIPE~~ OR A.R.S. TRUSS FOR LINES 8"-12" SMALLER. SEE SECTION 745 OF THE U.S.S. AND MANUFACTURER'S RECOMMENDATION FOR THIS MATERIAL.
55. CONTRACTOR TO INSTALL 4" AND/OR 6" SEWER SERVICES AS PER DETAIL 440 AT THE LOCATIONS SHOWN AND MARKED ON THE PLANS.
56. CONTACT CITY OF MESA UTILITY CONSTRUCTION COORDINATOR AT 644-2784, FOR SCHEDULING AND COORDINATION FOR THE INSTALLATION OF THE NATURAL GAS SERVICES AND/OR MAINS.
57. ALL STORM DRAIN WITHIN RIGHT-OF-WAY SHALL BE RCRCP CLASS III. IRRIGATION LINES MAY BE CAST-IN-PLACE CONCRETE OR RCRCP CLASS III, EXCEPT WHERE NOTED OTHERWISE. ON-SITE STORM DRAIN MAY BE PVC SDR 35.
58. ALL WATER METERS TO BE PURCHASED FROM THE CITY OF MESA. METERS 2" OR LESS WILL BE DELIVERED AND INSTALLED BY CITY FORCES. METERS 3" OR LARGER WILL BE DELIVERED BY THE CITY AND INSTALLED BY THE CONTRACTOR.
59. AS THE RESULT OF USING 3" OR LARGER WATER METERS ON THIS PROJECT, THE CONTRACTOR WILL BE REQUIRED TO COORDINATE SPECIAL SCHEDULING AND INSPECTIONS WITH CITY FORCES. CONTACT THE PUBLIC WORKS SERVICES DEPARTMENT (644-2231) FOR THE SPECIFIC PROCEDURE. FAILURE TO DO SO COULD RESULT IN THE DELAY OF THIS PROJECT.
60. THE DEVELOPER IS RESPONSIBLE TO VERIFY IF UTILITY MAIN LINE BUY-INS APPLY TO THIS PROJECT. CONTACT PUBLIC WORKS SERVICES AT 644-2548.



KEY MAP



VICINITY MAP
N.T.S.

LEGEND

EX P	INDICATES EXISTING PAVEMENT
EX G	INDICATES EXISTING GUTTER
TC	INDICATES TOP OF CURB
	INDICATES STREET SIGN BASE
G	INDICATES GUTTER
	INDICATES EXISTING PAVEMENT
	INDICATES NEW PAVEMENT
	INDICATES NEW CONCRETE CHANNEL LINING
1495	INDICATES EXISTING CONTOUR
	INDICATES NEW SEWER MANHOLE
	INDICATES NEW SEWER CLEANOUT
	INDICATES EXISTING FIRE HYDRANT
	INDICATES NEW FIRE HYDRANT (COMPLETE WITH TEE, 6" V.B. & C, AND ALL FITTINGS TO MAIN.)
	INDICATES WATER VALVE
1	INDICATES CONSTRUCTION NOTE
	INDICATES SURVEY MONUMENT
STA 0+90	INDICATES NEW 150 WATT STREET LIGHT LOCATION
STA 0+90	INDICATES NEW 310 WATT STREET LIGHT LOCATION

SHEET INDEX

DESCRIPTION	SHEET NO
COVER SHEET	1
TYPICAL SECTIONS	2
OFF-SITE IMPROVEMENT PLAN & PROFILE	3-11
MASTER UTILITY PLAN	12
HAWES ROAD CROSS-SECTIONS	13
UTILITY CROSSING PROFILES	14
HEADWALL DETAILS	15
STREET LIGHT PLANS	16-18
BOX CULVERT DETAIL	19

BENCH MARK

CHISELED SQUARE IN TOP OF CURB AT THE SW CORNER OF 84th ST. (HAWES RD) AND SOUTHERN AVE.

ELEVATION= 1443.45 (CITY OF MESA DATUM)

FLOOD PLAIN INFORMATION

THIS SITE LIES WITHIN FLOOD ZONE "B" AS DEFINED BY FEMA ON THE FLOOD INSURANCE RATE MAP # 04013C2220 D, DATED APRIL 15th, 1986.

DEVELOPER

CRESCENT RUN L.P.
8500 E. SOUTHERN AVENUE
MESA, ARIZONA 85200
(602) 373-8500

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE LOCATION OF UNDERGROUND UTILITIES 263-1100

ESTIMATED QUANTITIES

QUANTITIES ARE FOR PERMIT ESTIMATING PURPOSES ONLY. CONTRACTOR SHALL VERIFY ALL QUANTITIES PRIOR TO PLACING ANY BIDS.

NO	DESCRIPTION	QUANTITY	UNITS
1	Removal & Disposal of Asbestos Cement Pipe	1,885	LF
2	Reinforced Concrete Drainage Channel	1,975	LF
3	Earthwork for Open Channel	1	LS
4	Grading & Earthwork	1	LS
5	16" Water Line Vertical Relocation	100	LF
6	16"x6" TS&V, Valve Box and Cover	3	EA
7	8"x6" TS&V, Valve Box and Cover	1	EA
8	8" Valve, Valve Box and Cover, Type C	1	EA
9	6" Fire Hydrant Complete	8	EA
10	Remove or Relocate Existing Fire Hydrant	2	EA
11	1" Water Service Complete	3	EA
12	Catch Basin MAG 533-1	1	EA
13	Valley Gutter Including Apron	2,985	SF
14	Concrete Sidewalk	21,892	SF
15	Sidewalk Ramp, Mesa M-44 Type A	847	SF
16	Pavement Matching & Replacement, Type B	135	SF
17	Single Commercial Driveway, Mesa M-42	800	SF
18	Double Commercial Driveway, Mesa M-42	1,110	SF
19	Curb & Gutter, MAG 220 , Type A	4,362	LF
20	Paving: 10" Base/2 1/2" AC(A-25)/1 1/2" AC(A=12.5)	25,899	SY
21	Paving: 4" Base/2" AC(R-25)/1" AC(R-12.5)	147	SY
22	Double 138"x10'x3' CBC, Transitions and Flares	1	LS
23	Pavement Delineators Mesa M-81	43	EA
24	Street Sign Base, Mesa M-39, Type G	2	EA
25	Traffic Signal Pull Box, Mesa M-93.1	2	EA
26	3" Schedule 40 PVC Conduit	564	LF
27	Street Light Pole Foundation, M-76.1, #P-101	23	EA
28	40' Street Light Pole Complete, M-73.2 #P-207	10	EA
29	45' Street Light Pole Complete, M-73.3, #P-311	13	EA
30	310 Watt HPS Fixture, Type III, M-70.1	23	EA
31	Luminary Mounted Photo Control (M-72, PC-101)	4	EA
32	Lighting Control Cabinet with Pad, M-75.1 & .2	2	EA
33	Feeders for Lighting Control Cabinet Complete	2	EA
34	No. 5 Pull Box, Mesa Detail M-74.1 & .2, PB-104	26	EA
35	2" Schedule 40 PVC Conduit	4,385	LF
36	1" Schedule 40 PVC Conduit	230	LF
37	No. 2 AWG, XHHW Copper Conductor	4,464	LF
38	No. 4 AWG, XHHW Copper Conductor	1,172	LF
39	No. 6 AWG, XHHW Copper Conductor	1,900	LF
40	No. 8 AWG, XHHW Copper Conductor	3,440	LF
41	No. 10 AWG, XHHW Copper Conductor	1,010	LF
42	No. 8 Bare Copper Wire	2,675	LF
43	No. 12 AWG, THHN/THWN Copper Stranded Conductor	2300	LF
44	Traffic Control, Off-Duty Police Officers	50	HR
45	Construction Staking	1	LS

GENERAL NOTES

(MARICOPA COUNTY)

1. CONTRACTOR TO OBTAIN NECESSARY MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION PERMITS PRIOR TO CONSTRUCTION WITHIN COUNTY RIGHT-OF-WAY.
2. CONTRACTOR SHALL NOTIFY THE MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION AT LEAST 24 HOURS IN ADVANCE OF ANY CONSTRUCTION.
3. CONTRACTOR PERFORMING EXCAVATING OPERATIONS IS RESPONSIBLE FOR LOCATING AND PROTECTING ALL UNDERGROUND UTILITIES.
4. IF EXISTING SIGNAL EQUIPMENT NEEDS TO BE RELOCATED OR REPAIRED BECAUSE OF CONTRACTORS WORK, IT WILL BE DONE BY THE CONTRACTOR AT HIS EXPENSE.
5. SIGNAL WORK WILL BE INSPECTED AND WILL HAVE TO MEET COUNTY STANDARDS BEFORE RELEASE OF BOND.
6. ASPHALT MIX DESIGN SHALL BE SUBMITTED TO MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION PRIOR TO PLACING ANY ASPHALT COURSES. ("APPLIES TO SUBDIVISION DEVELOPMENTS ONLY")

UTILITY COORDINATION LIST

UTILITY	REPRESENTATIVE	PHONE
SRP - ELECTRIC	SCOTT HENSLEY	236-6280
US WEST - TELEPHONE	STEVE CHITWOOD	630-0502
SOUTHWEST GAS - GAS	JOE VARELA	484-5337
CITY OF MESA - W & S	BETH ORMELAS	644-3254
COX CABLE - TV	DON WEIMER	866-0072 X298

APPROVALS

APPROVAL CONFIRMED BY LETTER, TOM CHISHOLM, P.E. (COPY ON FILE) 10/7/97
MARICOPA COUNTY DEPT. OF ENVIRONMENTAL SERVICES — DATE

APPROVED BY LETTER, RICHARD WALLACE, ENGR. MGR. (COPY ON FILE) 4/21/97
MARICOPA COUNTY DEPT. OF TRANSPORTATION, ENGINEERING — DATE

SUBMITTED BY:

A-67226

JAMES R. BARR — 11/10/97
REGISTERED PROFESSIONAL ENGINEER (CIVIL) — DATE

SUBMITTING ENGINEER
Z & H Engineering, Inc.
717 WEST DUNLAP AVENUE
PHOENIX, ARIZONA 85021
PHONE (602) 997-7536

REVISIONS TO ORIGINAL SHOWN WITHIN & NOTED IN REV. BLOCK ARE CERTIFIED TO BY SUBMITTING ENGINEER.

NO.	DATE	DESCRIPTION	BY
1	10/31/97	PER UPDATED CITY COMMENTS	JMR
2	9/15/97	MINOR CHANGES	JMR
3	7/22/97	QUANTITIES UPDATED	JMR
4	8/28/96	QUANTITIES UPDATED	JPG
5	4/22/96	ADDED WALL, SHEETS 3 & 3A	MD

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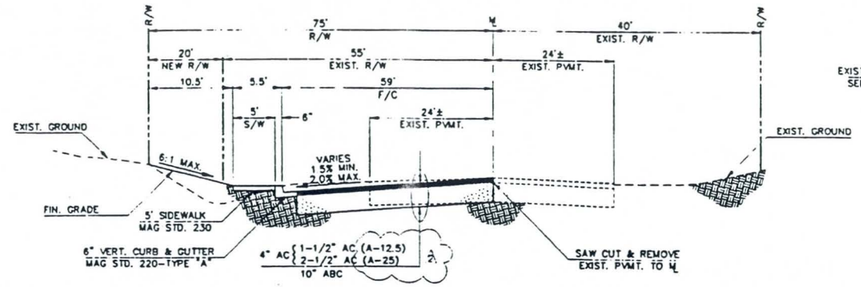
• surveying • environmental engineering
4131 N. 24th Street Suite A-200 Phoenix, Arizona 85016 (602) 956-1710

CRESCENT RUN
MOBILE HOME PARK

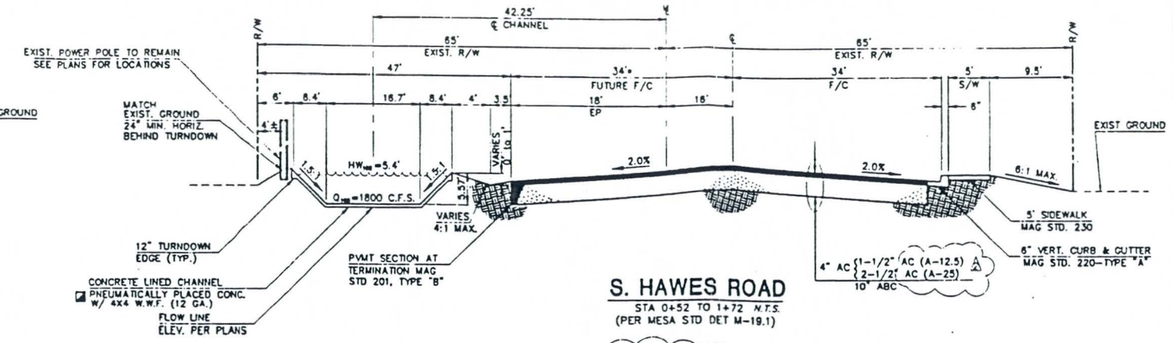
SOUTHERN AVE & HAWES RD
OFF-SITE IMPROVEMENT PLANS

DATE 9/06/95 | JOB NO. 3186 | MAP NO. —
DRAWN BY RHR | CHECKED BY RPG | FILE NO. CLDWG
SHEET 1 OF 19



E. SOUTHERN AVENUE

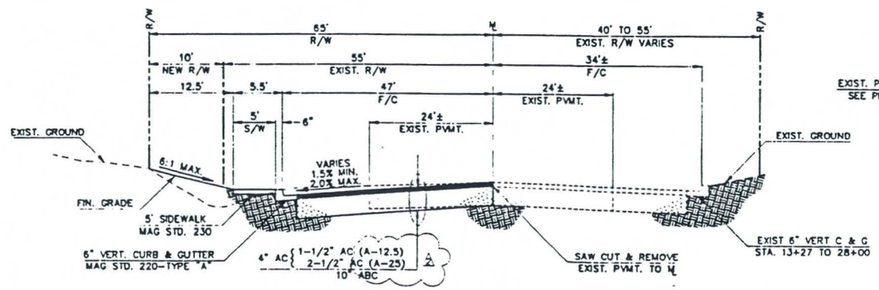
STA. 0+80 TO 3+30 N.T.S.
(PER MESA STD DET M-19.1)



S. HAWES ROAD

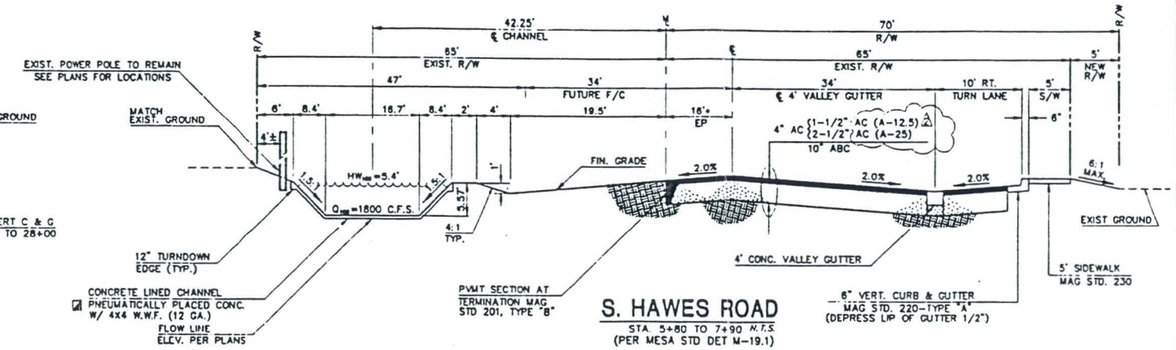
STA 0+52 TO 1+72 N.T.S.
(PER MESA STD DET M-19.1)

*NOTE: PAVEMENT WIDTH LEFT VARIES 34' TO 18' IN 500' PAVEMENT TAPER STA 1+72.30 to 8+72.30



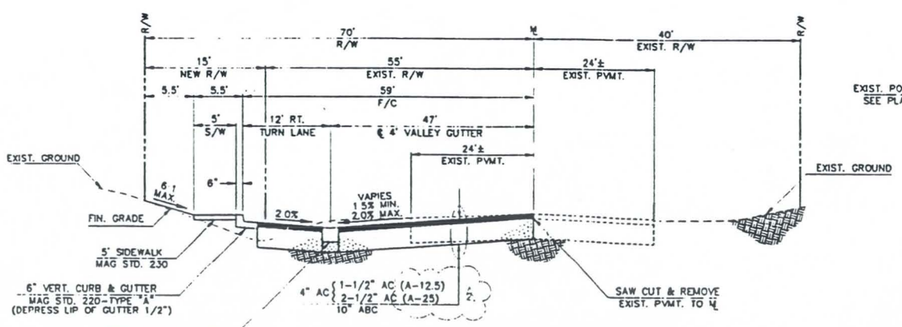
E. SOUTHERN AVENUE

STA. 6+30 TO 9+38 N.T.S.
STA. 12+85 TO 25+98
(PER MESA STD DET M-19.1)



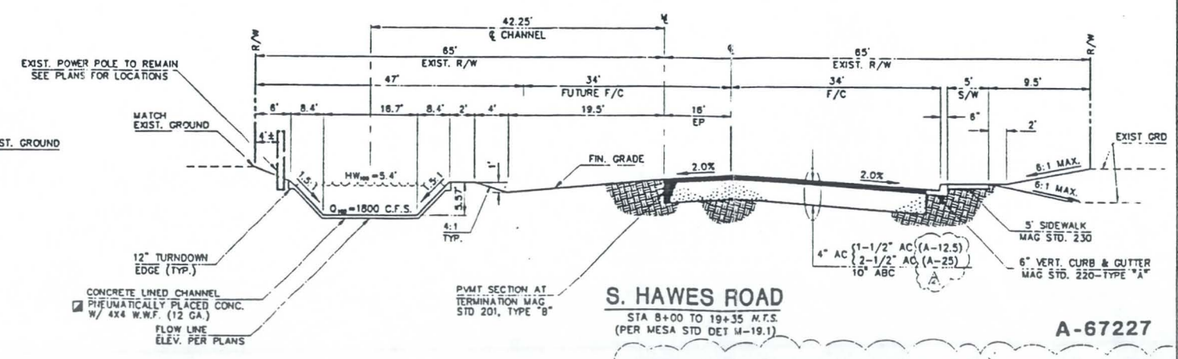
S. HAWES ROAD

STA. 5+80 TO 7+90 N.T.S.
(PER MESA STD DET M-19.1)



E. SOUTHERN AVENUE

STA. 9+56 TO 11+84 N.T.S.
(PER MESA STD DET M-19.1)



S. HAWES ROAD

STA 8+00 TO 19+35 N.T.S.
(PER MESA STD DET M-19.1)

A-67227

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUESTAKES 263-1100 CALL COLLECT

SUBMITTING ENGINEER
Z & H Engineering, Inc.
717 WEST DUNLAP AVENUE
PHOENIX, ARIZONA 85021
PHONE (602) 997-7536

REVISIONS TO ORIGINAL AS SIGNED BY GERALD R. COPELAND, 9/8/95 ARE SHOWN WITHIN & NOTED IN REV. BLOCK ARE CERTIFIED TO BY SUBMITTING ENGINEER.

NO.	DATE	DESCRIPTION	BY
3	10/31/97	1ST WORKS FINAL	JKN
2	9/15/97	ASPHALT SPEC REVISION	JCM
1	6 11/95	ALIGNMENT	JHH

HAYNIE ENGINEERING
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4121 N. 24th Street Suite A-200 Phoenix, Arizona 85016 (602) 956-1210

CRESCENT RUN MOBILE HOME PARK
TYPICAL SECTIONS
OFF-SITE IMPROVEMENT PLANS

DRAWN BY RHR | DATE 8/02/95
CHECKED BY RPG | JOB NO. 3188
FILE NO.
SHEET 2 OF 19

FOUNTAIN OF THE SUN
PARCEL NO. 4 BK 155, PG 20, MCR

NOTE:
SEE SHEET 13 FOR HAWES ROAD CHANNEL CROSS SECTIONS.

SEE HAWES RD SEC. SHT 2

MATCH LINE STA 5+00 SEE SHEET 9

MATCH LINE STA 0+80.55 E SEE SHEET 3

MATCH LINE STA 5+00 SEE SHEET 9

SAWCUT & REMOVE EXIST PVMT; TACK WITH EMULSIFIED ASPHALT & REPAVE TO MATCH EXISTING. FEATHER SURFACE COURSE TO SOUTH 1' MIN.

SAWCUT & MATCH EXIST CONC

EXIST CONCRETE CHANNEL LINING TO BE REMOVED FROM STA. 0+54.75

STA 0+94.55~42.67' LT (℄ HOWL) INSTALL CONCRETE HOWL PER MAG STD 501-1 & 501-2~TYPE "U", WITH TRASH RACK PER MAG STD 502-2. (SEE DETAIL SHEET 15)

STA 0+94.55~LT INSTALL 6 LF~24" x 38" REINFORCED CONC ELLIPTICAL PIPE~S=0.005 FT/FT; CONNECT TO EXST. 24" x 38" SD WITH CONC. PIPE COLLAR MAG STD 505 (SEE PROFILE SHT 14)

STA 1+60±~LT: REMOVE & SALVAGE EXIST WATER LINE & F.H.; PLUG OR FLANGE EXIST. 6" VALVE & PROVIDE THRUST BLOCK OR APPROVED RESTRAINT

EXISTING 15" SEWER, SEE "WYNSTONE SUBD." DESIGNED BY: SAGE ENGINEERING

MATCH EXIST GRADE AT R/W

EXISTING FIRE HYDRANT

EXIST CONC BOX CULVERT 2-10' x 4' x 110' CBC

INSTALL STREET SURVEY MONUMENT, M.A.G. 120-1 TYPE A

ADJUST M.H. FRAME & COVER TO GRADE

REMOVE VALVE, BOX & COVER

INSTALL WEIR SEE DETAIL & BELOW LEFT

CONCRETE ENCASEMENT M.A.G. STD. 404

INSTALL PAVEMENT SECTION AT TERMINATION TYPE B

CONST. ℄ & CROWN LINE (SPACING = 45')

FUTURE CURB, GUTTER & 5' S/W

EXIST. 24" x 38" SD

STA 3+12~41.5' RT

STA 1+38: INSTALL 3-3" SCHEDULE 40 PVC CONDUITS FOR PROPOSED ELEC. CAP EACH END (LENGTH=135')

NEW 10 DRAINAGE ESMT TO BE DEDICATED

NEW CB SEE SHT. 3 INV. 1440.21

EXIST. 12" SD

EXIST. 18" SD

TRACT J

ADJUST M.H. FRAME & COVER TO GRADE

SEE STREET LIGHT PLANS FOR INSTALLATION (TYP) SHEETS 16-18.

PARKWAY GRADING AT 6:1 MAX. PER TYPICAL SECTION, SHEET 2.

REMOVE EXIST. GUARD RAIL

EXIST 2-10' x 4' x 110' CBC

CONSTRUCT WEIR OPENING IN CHANNEL BANK FOR DRAINAGE (TB 44.07; FL WEIR 43.07) SEE DETAIL LEFT

EXISTING GROUND @ ℄ CHANNEL ~42.25' LT

FLOW LINE @ ℄ CHANNEL ~2.25' LT

FINISHED GRADE @ CONSTR. ℄

MATCH EXIST FLOW LINE CBC EX FL 438.30±

EXISTING GRADE @ CONSTR. ℄

EXISTING GROUND 10' RT

TOP CURB RT

GUTTER RT

TOP OF BANK~LT & RT

UNDEVELOPED

STA 0+00.00 ℄ SOUTHERN AVE= SW COR SEC 28 FD BC IN HH

STA 0+16.00 ℄ SOUTHERN AVE= STA 0+00.00 CONSTR ℄ HAWES ROAD

E. SOUTHERN AVE

S. HAWES ROAD

INDICATES CONSTRUCTION NOTE

KEY NO.	ABBREVIATED DESCRIPTION (SEE SPECIAL PROVISIONS)
1	Removal & Disposal of Asbestos Cement Pipe
2	Reinforced Concrete Drainage Channel
3	Earthwork for Open Channel
6	16" X 6" TSAV, Valve Box & Cover
8	6" Valve, Valve Box, and Cover, Type C
9	6" Fire Hydrant complete
10	Remove or Relocate Existing Fire Hydrant
14	Concrete Sidewalk
15	Sidewalk Ramp, Mesa M-44 Type A
19	Curb & Gutter, MAG 220 , Type A
20	Paving: 10" Base, 2-1/2" AC(A-25)& 1-1/2" AC(A-12.5)
23	Pavement Delineators Mesa M-61
25	Traffic Signal Pull Box, Mesa M-93.1
26	3" Schedule 40 PVC Conduit

GRAPHIC SCALE (IN FEET) 1 INCH = 20 FT

SCALE: HORIZ 1"=20' VERT 1"=2'

WEIR OPENING DETAIL

SECTION A-A CONCRETE LINED CHANNEL

WEIR DETAILS

NO.	DATE	DESCRIPTION	BY
5	9-14-95	MINOR REVISIONS	
4	7-27-95	CHANGE IN MEASURES	
3	11-7-94	EXTEND CHANNEL	
2	8-25-94	MISC.	
1	6-11-94	INITIAL SUBM.	

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4131 N. 24th Street, Suite A-200 Phoenix, Arizona 85016 (602) 956-1210

CRESCENT RUN
MOBILE HOME PARK

OFF-SITE IMPROVEMENT PLANS

DATE 8/02/95 | JOB NO. 3186 | MAP NO. 19 A

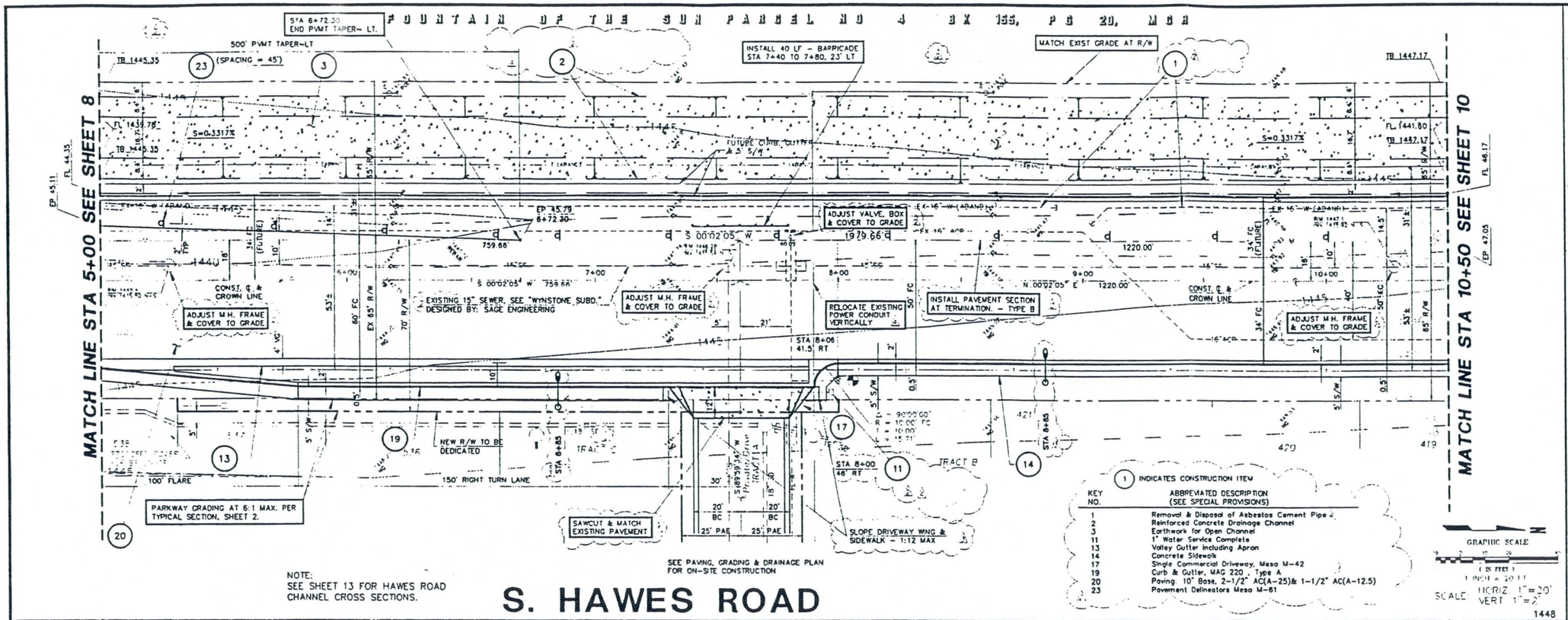
DRAWN BY RHR | CHK'D BY RPG | FILE C8.DWG

SHEET 8 OF

SUBMITTING ENGINEER
Z & H Engineering, Inc.
717 WEST DUNLAP AVENUE
PHOENIX, ARIZONA 85021
PHONE (602) 997-7536

A-67233
REVISIONS TO ORIGINAL AS SIGNED BY GERALD R. COPELAND 9/8/95 ARE SHOWN WITHIN & NOTED IN REV. BLOCK ARE CERTIFIED TO BY SUBMITTING ENGINEER.

Registered Professional Engineer (Civil) CERTIFICATE NO. 27261 JAMES R. BARR Date Signed ARIZONA U.S.A.



NO.	DATE	DESCRIPTION	BY
6	10-11-95	REVISIONS PER COMMENTS	JCM
5	9-18-95	REVISIONS PER COMMENTS	JCM
4	7-27-95	REVISIONS PER COMMENTS	JCM
3	7-27-95	REVISIONS PER COMMENTS	JCM
2	6-12-95	REVISIONS PER COMMENTS	JCM
1	6-12-95	ISSUED FOR REVIEW	JCM

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engineering • surveying • environmental
1111 N. 24th Street, Suite A-100, Phoenix, Arizona 85008 (602) 354-1210

CRESCENT RUN MOBILE HOME PARK

OFF-SITE IMPROVEMENT PLANS

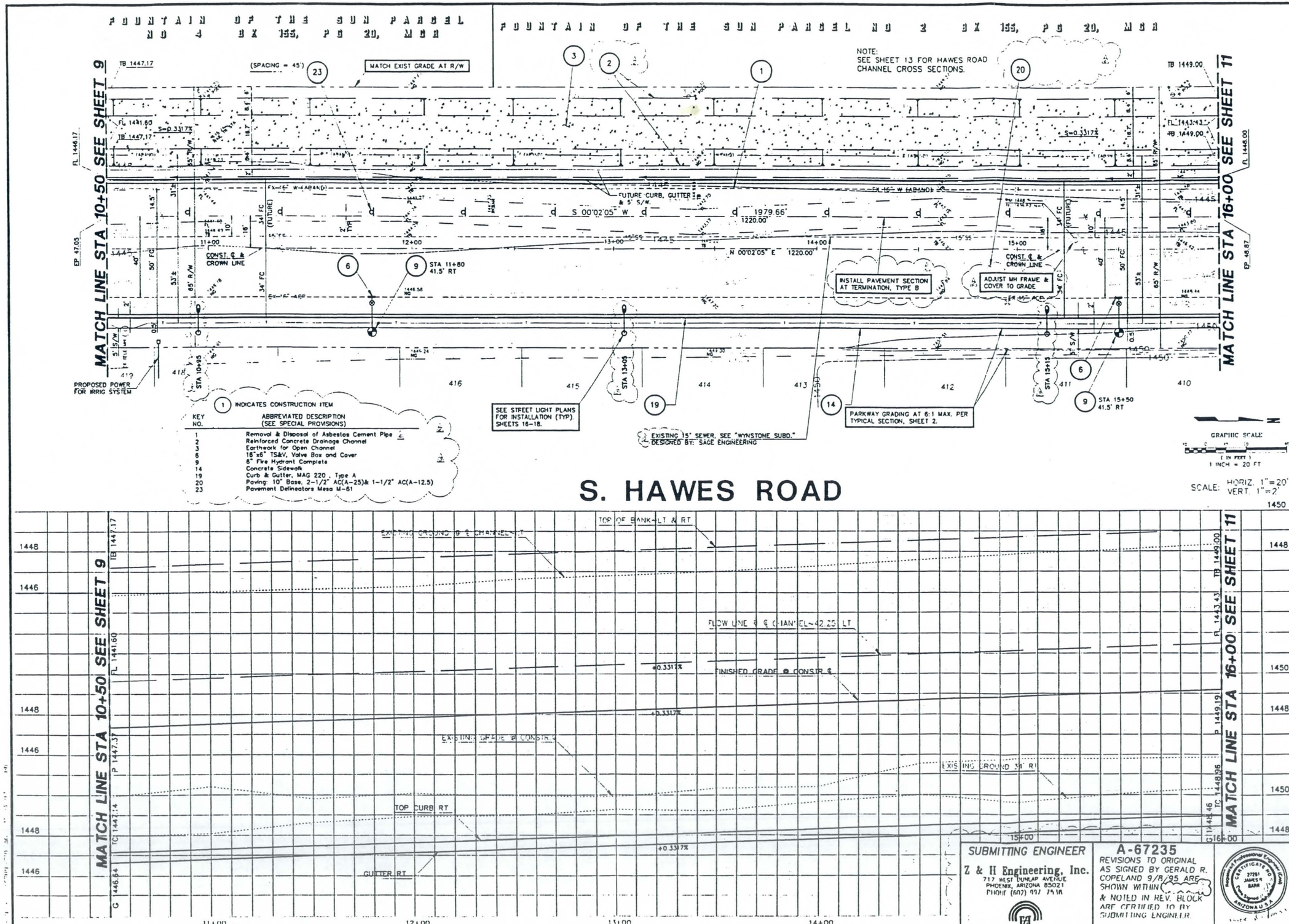
A-67234

DATE 8/02/95 | JOB NO. 3186 | DRAWN BY RHR | CHECKED BY RPG | SHEET 9 OF 19

SUBMITTING ENGINEER
Z & H Engineering, Inc.
717 WEST DUNLAP AVENUE
PHOENIX, ARIZONA 85021
PHONE (602) 997-7536

REVISIONS TO ORIGINAL AS SIGNED BY GERALD R. COPELAND 9/8/95 ARE SHOWN WITHIN & NOTED IN REV. BLOCK ARE CERTIFIED TO BY SUBMITTING ENGINEER.

Registered Professional Engineer (Civil) CERTIFICATE NO. 21261 JAMES R. BARR Date Signed 10/11/95 ARIZONA U.S.A.



KEY NO.	ABBREVIATED DESCRIPTION (SEE SPECIAL PROVISIONS)
1	Removal & Disposal of Asbestos Cement Pipe
2	Reinforced Concrete Drainage Channel
3	Earthwork for Open Channel
6	16"x6" TS&V, Valve Box and Cover
9	6" Fire Hydrant Complete
14	Concrete Sidewalk
19	Curb & Gutter, MAG 220, Type A
20	Paving: 10" Base, 2-1/2" AC(A-25)& 1-1/2" AC(A-12.5)
23	Pavement Delineators Mesa M-61

(1) INDICATES CONSTRUCTION ITEM

SUBMITTING ENGINEER
Z & H Engineering, Inc.
717 WEST DUNLAP AVENUE
PHOENIX, ARIZONA 85021
PHONE (602) 997-7518

A-67235
REVISIONS TO ORIGINAL AS SIGNED BY GERALD R. COPELAND 9/8/95 ARE SHOWN WITHIN & NOTED IN REV. BLOCK ARE CERTIFIED TO BY SUBMITTING ENGINEER

NO	DATE	DESCRIPTION	BY
6	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]
1	[illegible]	[illegible]	[illegible]

HAYLL ENGINEERING
a division of Tait & Associates, Inc.
engineering • surveying • environmental
[illegible] 44th Street, Suite A-200 Phoenix, AZ 85018 (602) [illegible]

CRESCENT RUN MOBILE HOME PARK

OFF-SITE IMPROVEMENT PLANS

DATE 8/02/95 | JOB NO. 3186 | MAP NO. 19 A

DRAWN BY RHR | CHECKED BY RPG | FILE NO. C10.DWG | SHEET 10 OF 19

FOUNTAIN OF THE SUN PARCEL NO 2 BK 155, PG 20, MCR

NOTE:
SEE SHEET 13 FOR HAWES ROAD CHANNEL CROSS SECTIONS.

MATCH LINE STA 16+00 SEE SHEET 10

MATCH EXIST GRADE AT R/W

70' CHANNEL TRANSITION TO MATCH EXISTING

STA 19+79.66 M HAWES ROAD = STA 0+00.00 EMELITA AVE

INSTALL STREET SURVEY MONUMENT, M.A.G. 120-1 TYPE A

INSTALL 12" x 24" CONCRETE CUT-OFF WALL STA. 20+59.67 SEE DETAIL BELOW

FUTURE CURB, GUTTER & 5' S/W

CAP 16" ACP WATER LINE @ STA. 20+60.00

EXISTING 15" SEWER, SEE "WYNSTONE SUBD." DESIGNED BY: SAGE ENGINEERING

INSTALL 8'x10'x1.5' PLAIN RIPRAP TO MATCH CHANNEL LINING

ADJUST VALVE BOX & COVER TO GRADE

MATCH EXIST GRADE

FILL PER SECT 211

S 00°02'05" W 1979.66'

1220.00'

N 00°02'05" E 1220.00'

CONST. ℄ & CROWN LINE

INSTALL PAVEMENT SECTION AT TERMINATION - TYPE B

ADJUST FRAME & COVER TO GRADE

STA 19+58 60' RT

MATCH PVMT STA 0+80.47 E

INSTALL 85 LF-BARRICADE PER MAG STD 130, TYPE "A" STA. 19+92

ADJUST FRAME & COVER TO GRADE

RELOCATE EXISTING POWER CONDUIT VERTICALLY

PARKWAY GRADING AT 6:1 MAX. PER TYPICAL SECTION, SHEET 2.

SEE STREET LIGHT PLANS FOR INSTALLATION (TYP) SHEETS 16-18.

NEW R/W TO BE DEDICATED (R=20')

REMOVE 36 LF-BARRICADE AFTER EMELITA IS COMPLETED

ADJUST TO GRADE

COORDINATION REQUIRED
CONCURRENT CONTRACT
PROPOSED IMPROVEMENTS.
SEE OFF-SITE IMPROVEMENT PLANS FOR
EMELITA AVENUE & 88th STREET

NEW R/W TO BE DEDICATED

EMELITA AVE

S. HAWES ROAD

GRAPHIC SCALE
1 IN FEET
1 INCH = 20 FT

SCALE: HORIZ. 1"=20' VERT. 1"=2'

KEY NO.	ABBREVIATED DESCRIPTION (SEE SPECIAL PROVISIONS)
1	Removal & Disposal of Asbestos Cement Pipe
2	Reinforced Concrete Drainage Channel
3	Earthwork for Open Channel
13	Valley Gutter Including Apron
14	Concrete Sidewalk
15	Sidewalk Ramp, Mesa M-44 Type A
19	Curb & Gutter, MAG 220 , Type A
20	Paving: 10" Base, 2-1/2" AC(A-25)& 1-1/2" AC(A-12.5)
21	Paving: 4" Base, 2" AC(R-25)& 1" AC(R-12.5)
23	Pavement Delineators Mesa M-61
24	Street Sign Base, Mesa M-39, Type G

MATCH LINE STA 16+00 SEE SHEET 10

EXISTING GROUND @ ℄ CHANNEL ~11' RT

FLOW LINE @ ℄ CHANNEL ~42.25' RT

FINISHED GRADE @ CONSTR. ℄

EXISTING GRADE @ CONSTR. ℄

EXISTING GROUND 34' RT

TOP CURB RT

GUTTER RT

RIP-RAP 6" MIN

GRADE TO DRAIN

END CONCRETE LINED CHANNEL

MATCH EXIST CHANNEL

EXISTING TOP OF BANK

EXISTING FL CHANNEL

INSTALL 12" x 24" x 20' CONCRETE CUT-OFF WALL SEE DETAIL

CLASS A CONC. PER SECT. 725
CUT OFF WALL DETAIL

SUBMITTING ENGINEER
Z & H Engineering, Inc.
717 WEST DUNLAP AVENUE
PHOENIX, ARIZONA 85021
PHONE (602) 997-7536

A-67236
REVISIONS TO ORIGINAL AS SIGNED BY GERALD R. COPELAND 9/8/95 ARE SHOWN WITHIN & NOTED IN REV. BLOCK ARE CERTIFIED TO BY SUBMITTING ENGINEER.

Registered Professional Engineer (Civil) CERTIFICATE NO. 27261 JAMES R. BARR Date Signed 8-2-95 ARIZONA U.S.A.

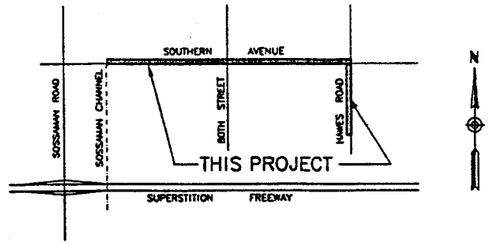
NO.	DATE	DESCRIPTION	BY
1A	10-31-94	REVISIONS FOR CONSTRUCT.	JWM
1B	7-25-95	UNDER SEPARATE COVER	JWM
1C	7-27-95	SUBMITTED SEPARATE COVER	RB
1D	8-11-95	INCORPORATION	JWM

HAVILL ENGINEERING
a division of Tait & Associates, Inc.
engineering • surveying • environmental
4141 N. 44th Street, Suite A-200 Phoenix, Arizona 85018 (602) 955-3215

CRESCENT RUN
MOBILE HOME PARK

OFF-SITE IMPROVEMENT PLANS

DRAWN BY RHR | DATE 8/02/95
DESIGNED BY RPG | JOB NO. 3186
REVIEWED BY | MAP
SHEET 11 OF 19



VICINITY MAP
Not to Scale

APPROVED COPY
CITY OF MESA ENGINEERING DEPARTMENT
PLAN APPROVAL DOES NOT CONSTITUTE AN APPROVAL OR PERMIT FOR VIOLATION OF ANY PROVISIONS OF THE MAG UNIFORM STANDARD SPECIFICATIONS & DETAILS AS AMENDED BY THE CITY OF MESA.
BY [illegible] DATE 10/21/98

CITY OF MESA

SOUTHERN AVENUE DRAINAGE IMPROVEMENTS

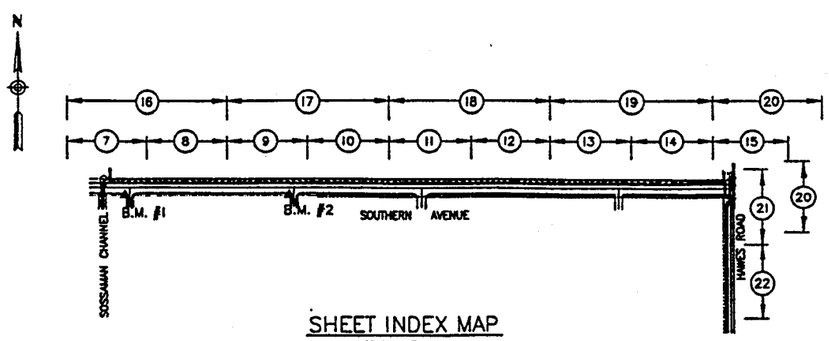
SOSSAMAN CHANNEL TO HAWES ROAD

PROJECT NO. 97-56.1

BENCHMARKS

▲ B.M #1
78TH STREET
T.C. SOUTHWEST CORNER
ELEVATION: 1416.63 (City of Mesa Datum)

▲ B.M #2
84TH STREET
T.C. SOUTHWEST CORNER
ELEVATION: 1443.45 (City of Mesa Datum)



SHEET INDEX MAP
Not to Scale

SHEET INDEX

DESCRIPTION	SHEET NUMBER
COVER SHEET	1
GENERAL NOTES & LEGEND	2
TYPICAL SECTIONS	3–5
STORM DRAIN LATERAL SECTIONS	6
SOUTHERN AVENUE PAVING PLAN & CULVERT PROFILE	7–15
SOUTHERN AVENUE PAVING PROFILE	16–20
HAWES CHANNEL PLAN & PROFILE	21–22
SOUTHERN AVENUE GRADER DITCH & DRAINAGE DETAILS	23
CMU WALL DETAILS	24
SCUPPER & DRAINAGE DETAILS	25
INLET STRUCTURE DETAILS (80TH STREET)	26–27
HAWES CHANNEL TYPICAL SECTIONS & DETAILS	28
MISCELLANEOUS DETAILS	29–30
STRUCTURAL DETAILS:	
INLET AT HAWES ROAD	S-1 TO S-6 (31–36)
BOX CULVERT	S-7 TO S-8 (37–38)
MISCELLANEOUS	S-9 (39)
⚠BRIDGE REPAIR LOCATION MAP	40
⚠BRIDGE REPAIR PLAN AND DETAILS SHEET	41-43

* Sheets Revised on 12/19/97: 3, 6, 7, 15, 16, 20, 23, 24, 25, 26, 28, 29, 32, 34, 35, 37, 38, and 39.

APPROVAL
[signature] 9/9/97
MARICOPA COUNTY ENVIRONMENTAL SERVICES DEPT. DATE
970890

Entellus
2355 N. 44th Street Suite 230
Phoenix, AZ 85008-2279
Tel 602.241.2566
Fax 602.241.0947

⚠ADDED BY CITY OF MESA 12/31/97

CALL TWO WORKING DAYS BEFORE YOU DIG
263-1100
ALL OTHER SERVICES

FIELD BK:		SOUTHERN AVENUE DRAINAGE IMPROVEMENTS
WORK ORDERS: 2572		COVER SHEET
PROJ. NO: 97-56.1		REVISED 6 Revised 12/19/97
RELEASE DATE:	DRAWN BY: GLT ENGINEER: HMA APPROVED BY: MJB	SHEET 1 OF 43 / 38 — CATALOG NUMBER: A-68176

GENERAL NOTES

1. ALL WORK AND MATERIALS SHALL CONFORM TO THE MOST CURRENT UNIFORM STANDARD SPECIFICATIONS AND DETAILS FOR PUBLIC WORKS CONSTRUCTION AS FURNISHED BY THE MARICOPA ASSOCIATION OF GOVERNMENTS AND AS AMENDED BY THE CITY OF MESA. ALL WORK AND MATERIALS NOT IN CONFORMANCE WITH THESE AMENDED SPECIFICATIONS AND DETAILS ARE SUBJECT TO REMOVAL AND REPLACEMENT AT THE CONTRACTOR'S EXPENSE.

2. CONTRACTOR IS RESPONSIBLE FOR VERIFYING LOCATIONS OF ALL EXISTING UTILITIES AND AVOIDING DAMAGE TO SAME. CALL 263-1100 FOR BLUE STAKES. FOR SALT RIVER POWER DISTRICT POLE BRACING, ELECTRIC SERVICE OR CONSTRUCTION SCHEDULING, CALL 273-8888.

3. CONTRACTOR SHALL COMPLY WITH THE PROVISIONS FOR TRAFFIC CONTROL AND BARRICADING AS PER CURRENT CITY OF MESA "TRAFFIC BARRICADE MANUAL".

4. CONTRACTOR TO OBTAIN ANY PERMITS REQUIRED UNLESS OTHERWISE INDICATED, AND COORDINATE ALL IRRIGATION DRY-UPS, RELOCATIONS, AND REMOVAL BY OTHERS.

5. CONTRACTOR TO POTHOLE EXISTING UTILITIES AHEAD OF HIS CONSTRUCTION, TO ALLOW FOR ANY NECESSARY ADJUSTMENT IN GRADELINE, AND TO VERIFY PIPE TYPES FOR ORDERING PROPER TRANSITION, AND/OR TIE-IN FITTINGS WHICH MAY BE REQUIRED.

6. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REMOVE ALL ABANDONED (RETIRED) UTILITIES THAT INTERFERE WITH THE CONSTRUCTION PROJECT. THE CITY OF MESA UTILITY CONSTRUCTION DIVISION WILL ASSIST THE CONTRACTOR IN DETERMINING IF THE UTILITY (GAS, WATER, AND SEWER ONLY) IS ABANDONED. CALL 644-2754 FOR THIS ASSISTANCE.

7. PRIOR TO START OF CONSTRUCTION ON PRIVATE PROPERTY THE CONTRACTOR WILL GIVE THE OWNER (IF IN RESIDENCE) SUFFICIENT TIME (MINIMUM 24-HOURS) TO REMOVE ITEMS HE WISHES. THE CONTRACTOR WILL ARRANGE TO REMOVE AND REPLACE ALL OTHER CONFLICTS AS REQUIRED. ALL WORK ON PRIVATE PROPERTY SHALL BE PER THE SPECIAL PROVISIONS.

8. THE CONTRACTOR AND CITY OF MESA UTILITY AND TRAFFIC CREWS SHALL COORDINATE WORK SCHEDULES SO AS TO PREVENT ANY CONFLICTING WORK CONDITIONS.

9. THE CONTRACTOR IS ADVISED THAT AN EXCAVATION AND DIRT MOVING PERMIT MAY BE REQUIRED BY THE MARICOPA COUNTY HEALTH DEPARTMENT. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN THIS PERMIT, IF NECESSARY, AND COMPLY WITH ITS REQUIREMENTS.

10. INSPECTIONS AND STAKING SHALL BE BY THE CITY OF MESA. THE CONTRACTOR SHALL NOTIFY THE CITY OF MESA INSPECTION DEPARTMENT AT LEAST 48 HOURS IN ADVANCE OF ANY CONSTRUCTION. STAKING REQUESTS SHALL COMPLY WITH SECTION 105 OF THE UNIFORM STANDARD SPECIFICATIONS (TWO (2) WORKING DAYS NOTICE).

11. THE JOBSITE, AT THE COMPLETION OF THE CONSTRUCTION, SHALL BE CLEANED OF ANY DEBRIS OR SPOIL RESULTING FROM THE CONSTRUCTION.

12. ALL EQUIPMENT AND MATERIALS NOT SHOWN OR SPECIFIED ON THESE PLANS OR IN THE SPECIFICATIONS AND ARE REQUIRED TO COMPLETE THIS INSTALLATION, SHALL BE SUPPLIED BY THE CONTRACTOR AS PART OF THIS CONTRACT WORK.

13. IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE ALL NECESSARY FITTINGS AND ADAPTORS REQUIRED TO CONNECT DIFFERENT TYPES OF WATER LINE MATERIAL. THE COST IS TO BE INCLUDED IN HIS LINEAL FOOT BID.

14. ALL VERTICAL OR HORIZONTAL BENDS SHALL BE PIPE JOINT DEFLECTION UNLESS OTHERWISE NOTED. PIPE JOINT DEFLECTION SHALL NOT EXCEED MANUFACTURE'S RECOMMENDATIONS.

15. WATER LINE TEST WILL BE COMPLETED SO THAT NO OLD LINES WILL BE INCLUDED IN THAT TEST. A DAYTIME TIE-IN (BETWEEN 9:00 A.M.AND 2:00 P.M.) MAY BE NECESSARY IF REQUIRED BY CITY INSPECTOR. FOR ANY DAYTIME TIE-IN REQUIRED BETWEEN 9:00 A.M. AND 2:00 P.M., CONTRACTOR SHALL COMPLETE ALL WORK NECESSARY TO RESTORE UTILITY SERVICE AND FULLY OPEN THE TIE-IN AREA TO TRAFFIC WITHIN THE TIME ALLOWED. SEE THE SPECIAL PROVISIONS FOR REQUIREMENTS ON OTHER TRAFFIC CONTROL REQUIREMENTS.

16. WHERE SIDEWALKS ARE TO BE REMOVED AND REPLACED, REMOVAL AND REPLACEMENT SHALL BE TO THE NEAREST EXISTING CONTROL JOINT ON EITHER SIDE OF THE REMOVAL LOCATION.

17. ALL VALVES TO BE INSTALLED WITH VALVE BOX AND COVER DETAIL 391-1 (TYPE "C"), AND 391-2 IF 2" OPERATING NUT IS OVER 5' BELOW EXISTING CENTERLINE GRADE.

18. WHEN A SEWER CROSSES BELOW A WATER LINE WITH LESS THAN TWO (2) FEET OF SEPARATION OR WHEN A SEWER CROSSES OVER A WATER LINE, ENCASEMENT IS REQUIRED PER DETAIL 404. BOTH WATER LINE AND SEWER LINE SHALL BE ENCASED.

19. WHEREVER PAVEMENT REPLACEMENT PER C.O.M. DETAIL M-19.4 OR M.A.G. DETAIL 200, IS REFERRED TO WITHIN THESE PLANS, BACKFILLING SHALL BE PER THE SPECIAL PROVISIONS.

20. CONTRACTOR TO COORDINATE ALL REMOVAL OR RESETS OF PRIVATE PROPERTY ON ALL STREETS WITH OWNERS AND CITY INSPECTOR.

21. ALL FRAMES, COVERS, VALVE BOXES, ETC., SHALL BE ADJUSTED TO FINISHED GRADE AFTER PLACING OF ASPHALT CONCRETE SURFACE COURSE BY THE CONTRACTOR PER DETAIL 270 AND 422.

22. SAWCUT AND REMOVE ALL EXISTING ASPHALT CONCRETE PAVEMENT WHERE NOTED ON PLANS AND FIGURE COST IN AMOUNT BID FOR PAVEMENT REPLACEMENT, (UNLESS OTHERWISE NOTED).

23. WHEN GAS MAIN AND/OR SERVICES ARE EXPOSED, CONTACT SOUTHWEST GAS AT 1-800-873-2440 FOR INSPECTION OF THE EXPOSED PIPE AND COATING PRIOR TO THE BACKFILLING OF THE TRENCH.

24. IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSPECT THE JOB SITE TO FAMILIARIZE HIM/HERSELF WITH ALL EXISTING CONDITIONS THAT COULD EFFECT THE INSTALLATION OF ANY WORK SET FORTH IN THESE PLANS PRIOR TO SUBMITTING A BID.

25. ALL MATERIALS REQUIRED SHALL BE OF A GRADE AND QUALITY CONSISTENT WITH THE INTENDED USE AS APPROVED BY THE ENGINEER.

26. INSTALLATION OF ALL JOINTS CALLED OUT IN THESE PLANS SHALL INCLUDE THRUST BLOCKING PER MAG STD. DET. 303 OR JOINT RESTRAINT PER THE SPECIAL PROVISIONS.

27. FOR PURPOSES OF PAVEMENT REPLACEMENT PER MAG STD. DET. 200 OR C.O.M. STD. DET. M-19.4 INTERSECTIONS ARE DEFINED BY THE CURB RETURNS IN ALL DIRECTIONS.

28. WHERE THE NEW WATER LINE CROSSES EXISTING GAS OR WATER LINES, CONTRACTOR SHALL MAINTAIN A MINIMUM OF 12 INCHES CLEARANCE, UNLESS OTHERWISE APPROVED BY THE CITY INSPECTOR.

29. THE CONTRACTOR SHALL COMPLY WITH CITY OF MESA POLICY FOR REMOVAL AND DISPOSAL OF ACP PIPE, AS STATED IN THE SPECIAL PROVISIONS.

30. WHERE THE PLANS CALL FOR CONNECTIONS TO EXISTING WATER LINES, THE CONTRACTOR SHALL REMOVE A SUFFICIENT AMOUNT OF EXISTING PIPE TO ALLOW FOR INSTALLATION OF ALL FITTINGS, COUPLINGS AND PLUGS CALLED FOR IN THE PLANS.

31. ALL EXISTING (GAS, ELECTRIC, WATER, ETC.) COVERS AND BOXES SHALL REMAIN UNCOVERED. CONTRACTOR SHALL ADJUST COVERS AND BOXES TO FINISHED GRADE.

32. THE CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL AND DISPOSAL OF ANY DEBRIS RESULTING FROM THE DEMOLITION AND CONSTRUCTION.

33. THE CONTRACTOR IS ADVISED TO CONTACT TRAFFIC SIGNALS SUPERVISOR AT 644-3122, 48-HOURS PRIOR TO ANY WORK WITHIN THE VICINITY OF OR THROUGH A SIGNALIZED INTERSECTION WHICH WILL CHANGE TRAFFIC LANE PATTERNS.

34. CONTRACTOR TO NOTIFY TRAFFIC OPERATIONS AT 644-3126 PRIOR TO SIGNAL REMOVAL, AND WHEN READY TO PERMANENTLY RELOCATE SIGN.

35. WATER LINES TO BE RELOCATED BY CONTRACTOR PER M.A.G. STD DET 370, EXCEPT AS NOTED OTHERWISE.

36. CONTRACTOR TO PROVIDE TEMPORARY SUPPORT FOR EXISTING PIPELINES DURING CONSTRUCTION. REPLACE THRUST BLOCKING PER M.A.G. STD. DET 380 IF DISTURBED (N.P.I.)

37. ALL RELOCATIONS OR DISTURBANCES SUCH AS SMALL TREES, SPRINKLER HEADS, MAIL BOXES, LANDSCAPE BUSHES, ETC. SHALL BE HANDLED AS ITEMS WHICH ARE INCIDENTAL TO THE UNIT PRICE OF ALL OTHER ITEMS IN THE BID SCHEDULE.

38. BIDDERS ARE ADVISED THAT THE LOCATION, NUMBER, AND TYPE OF UTILITIES SHOWN ON THESE PLANS AND SPECIFICATIONS ARE ONLY AS ACCURATE AS THE BEST INFORMATION AVAILABLE FROM PUBLIC UTILITIES, OWNERS, AND USERS AT THE TIME THESE PLANS AND SPECIFICATIONS WERE PREPARED. UNDERGROUND UTILITIES MAY BE PRESENT ON THIS PROJECT WHICH WERE NOT DISCLOSED TO THE ENGINEER. NO REPRESENTATION IS MADE THAT THE UTILITY LOCATIONS INDICATED ON THESE PLANS ARE ACCURATE, COMPLETE, OR EXCLUSIVE. BIDDERS ARE ADVISED TO UNDERTAKE THEIR OWN INVESTIGATION OF EXISTING CONDITIONS BEFORE SUBMITTING A PROPOSAL ON THIS PROJECT. THE CONTRACTOR IS RESPONSIBLE FOR THE COST OF ALL TEST PITS OR OTHER PRE-CONSTRUCTION INVESTIGATION OF UNDERGROUND UTILITIES OR STRUCTURE. PURSUANT TO ARIZ. REV. STAT. 40-360.21, THE CONTRACTOR SHALL CONTACT "BLUE STAKE" AT 263-1100 OR THE APPROPRIATE PUBLIC UTILITY FOR ASSISTANCE IN LOCATING UNDERGROUND FACILITIES, LINES, AND APPURTENANCES PRIOR TO CONSTRUCTION.

39. BY SUBMITTING A PROPOSAL ON THIS PROJECT, BIDDERS ARE REPRESENTING THAT THEY HAVE CONSIDERED THE POTENTIAL IMPACT OF TEMPORARY OR PERMANENT RELOCATION OF EXISTING UNDERGROUND UTILITIES LOCATED WITHIN THE PROJECT ON THEIR COSTS, AND THAT THEY HAVE INCLUDED IN THEIR PROPOSALS THE COST OF FINDING, PROTECTING, AND RELOCATING ALL EXISTING UTILITIES WITHIN THE PROJECT. NO ADDITIONAL COMPENSATION OR DAMAGES WILL BE PAID FOR ANY COST, LOSS, DAMAGED, HINDRANCE, OR DELAY INCURRED BY A CONTRACTOR OR SUBCONTRACTOR DUE TO CONFLICTS WITH EXISTING UTILITIES; REGARDLESS OF WHETHER OR NOT THOSE UTILITIES ARE INDICATED ON THE PLANS AND SPECIFICATIONS FOR THIS PROJECT.

40. THE SOLE AND EXCLUSIVE REMEDY FOR ANY COST, HINDRANCE, OR DELAY CAUSED BY ANY UTILITIES LOCATED WITHIN THE PROJECT (WHETHER OR NOT INDICATED ON THE PLANS AND SPECIFICATIONS) SHALL BE AN EXTENSION OF THE CONTRACT TIME; THE NEED FOR OR DURATION OF WHICH SHALL BE DETERMINED BY THE ENGINEER IN ITS SOLE DISCRETION.

LEGEND

DESCRIPTION	NEW	EXIST.
VERT. CURB, GUTTER, AND SIDEWALK		
ROLL CURB, GUTTER, AND SIDEWALK		
EXTRUDED CURB		
CATCH BASIN		
MANHOLE, SANITARY SEWER		
MANHOLE, TELEPHONE		
MANHOLE, STORM DRAIN		
FIRE HYDRANT		
WATER VALVE		
REDUCER		
STREET LIGHT W/MAST ARM		
TELEPHONE RISER		
CABLE T.V. RISER		
TRANSFORMER		
UTILITY POLE		
WATER METER		
GAS METER		
MAILBOX		
SURVEY MONUMENT		
TREE (DECIDUOUS)		
TREE (PALM)		
FENCE, BLOCK		
FENCE, WIRE		
RIGHT OF WAY LINE		
PROPERTY LINE (SEE NOTE BELOW)		
CONSTRUCTION CENTERLINE – ℄		
MONUMENT LINE – M		
SANITARY SEWER LINE		
WATER LINE (QUANTITIES ON SHEET)	16" V	
GAS LINE		
ELECTRICAL LINE		
TELEPHONE LINE		
CABLE TELEVISION LINE		
STORM DRAIN LINE		
GUY WIRE		
PAVEMENT		
REMOVE & REPLACE CONC. SIDEWALK		
INDICATES PROPERTY ELEVATION		
INDICATES ELEVATION	P= 1444.16	
PAVEMENT (BY OTHERS)		

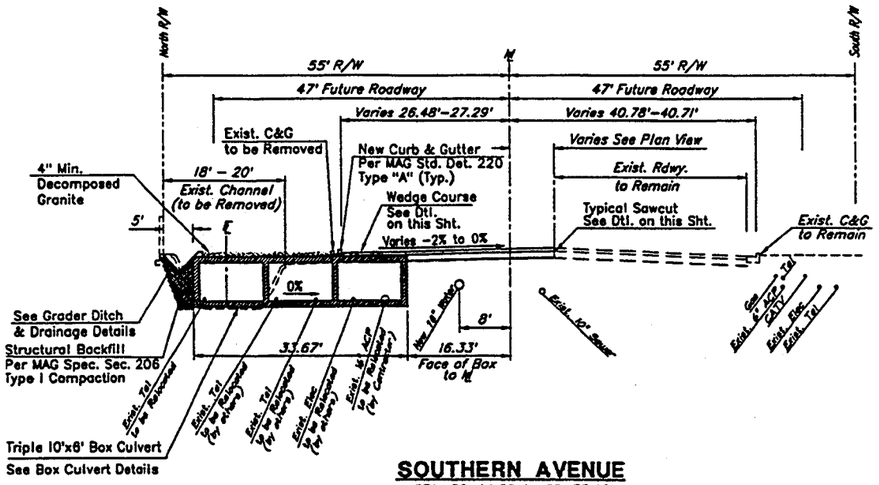
DEFINITIONS: N.P.I. = NO PAY ITEM

NOTE: RIGHT-OF-WAY/PROPERTY LINES SHOWN ARE APPROXIMATE LOCATIONS.

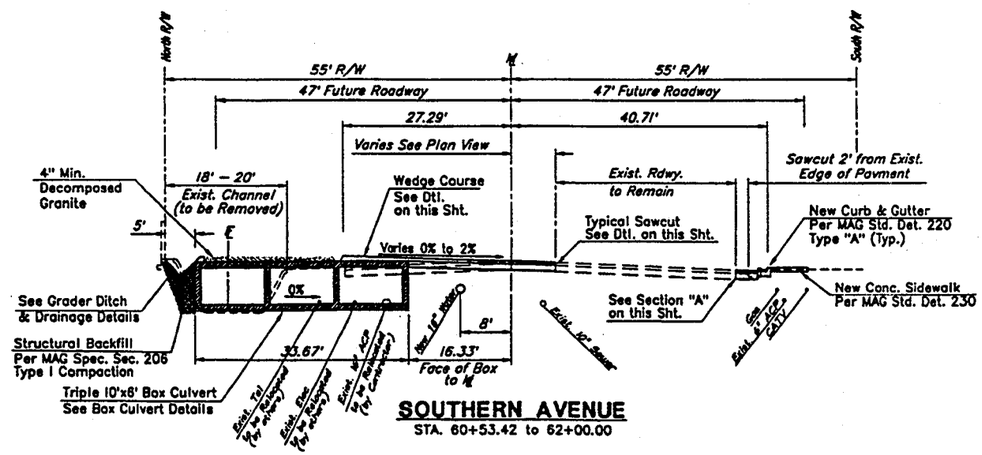
NOTE:
PLEASE SEE SPECIAL PROVISIONS FOR APPROVED ALTERNATE FOR BOX CULVERT.

Entellus
2255 N. 44th Street Suite 300
Phoenix, AZ 85008.3279
Tel 602.244.2566
Fax 602.244.8947

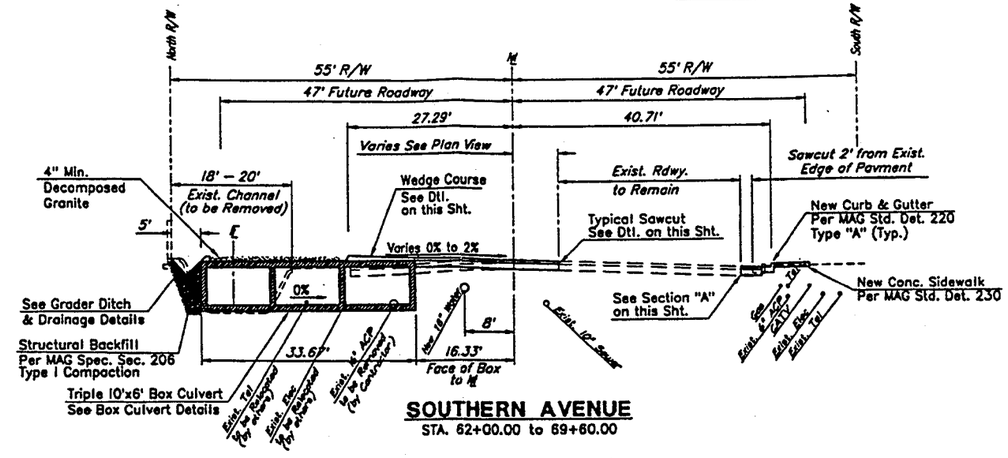
FIELD BK:		SOUTHERN AVENUE DRAINAGE IMPROVEMENTS
WORK ORDERS: 2572		GENERAL NOTES & LEGEND
PROJ. NO:97-56.1		REVISED
RELEASE DATE: Dec 97	DRAWN BY: GLT ENGINEER: HAA APPROVED BY: MJB	SHEET 2 OF 36 43 — CATALOG NUMBER A-68177



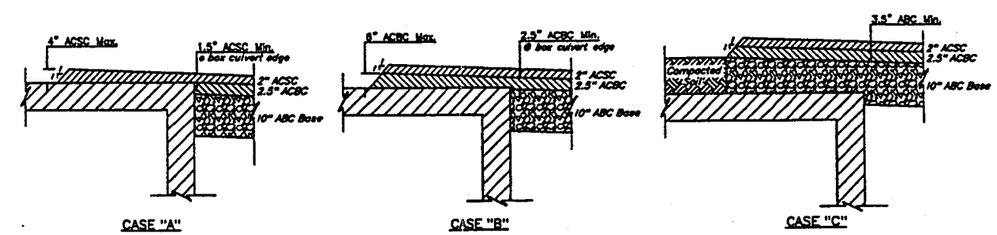
SOUTHERN AVENUE
STA. 59+14.00 to 60+53.42



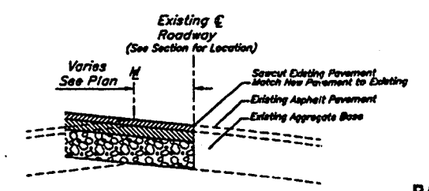
SOUTHERN AVENUE
STA. 60+53.42 to 62+00.00



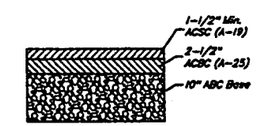
SOUTHERN AVENUE
STA. 62+00.00 to 69+60.00



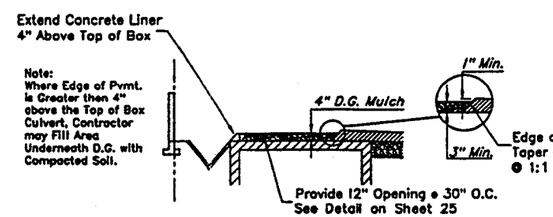
WEDGE COURSE TYPICAL SECTION @ BOX CULVERT
(All Materials and Construction Shall Conform to M.A.G. Specs.)



TYPICAL SAWCUT DETAIL



PAVEMENT SECTION "A"
(Arterial Street)



DECOMPOSED GRANITE DETAIL

NOTE:

1. These sections are taken at specific locations chosen to be representative of the typical roadway sections needed for this project. They are not intended to provide the limits of work for all situations to be encountered. These sections along with the paving plan and profile sheets provide the required limits of construction of paving removal, installation, milling, overlay and etc.

2. All utilities to be Relocated, are to be Relocated by Others. (Unless Noted Otherwise)

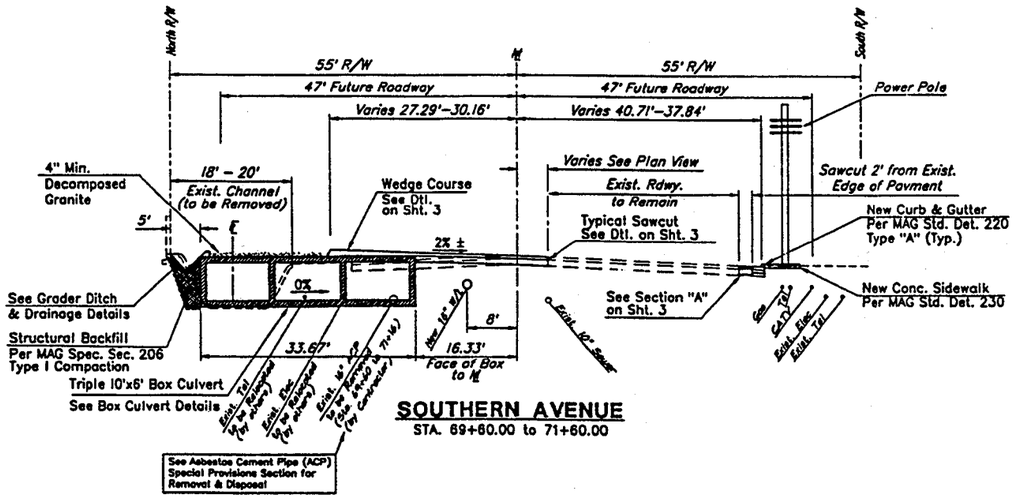
263-1100

10 0 10 20

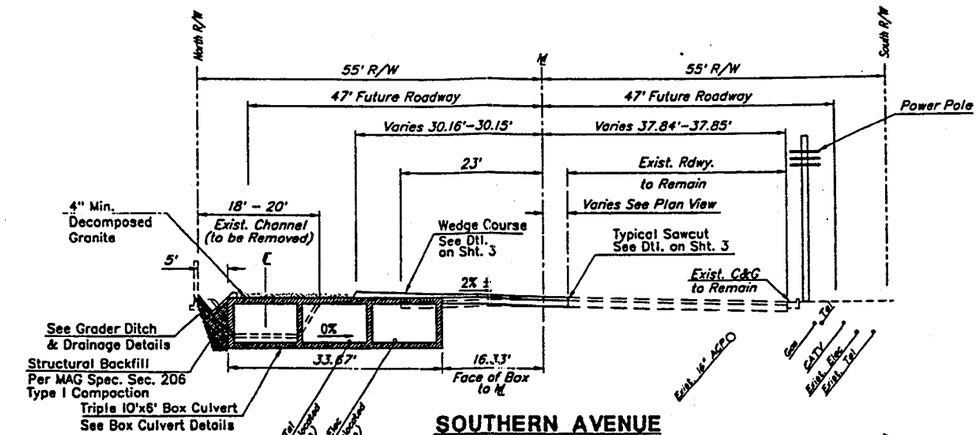
Entellus
3200 N. 44th Street Suite 200
Phoenix, AZ 85018-2279
Tel 602.344.3686
Fax 602.344.0947

FIELD BK:		SOUTHERN AVENUE DRAINAGE IMPROVEMENTS
WK. ORDER: 2572		TYPICAL SECTIONS
PROJ. NO: 97-56.1		REVISED
RELEASE DATE: Dec 97	DRAWN BY: GLT ENGINEER: HAA APPROVED BY: MJB	SHEET 43 3 of 34 — CATALOG NUMBER A-68178

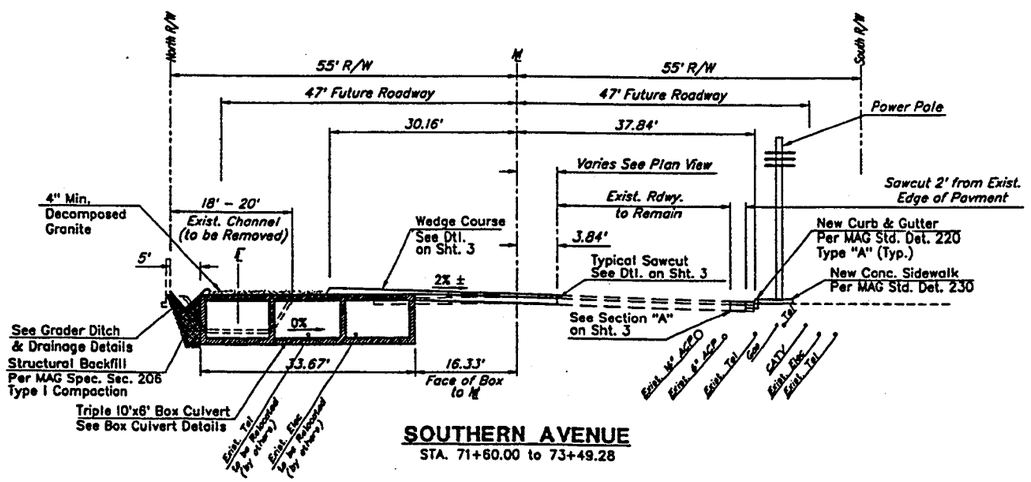
CITY OF MESA ENGINEERING DEPARTMENT



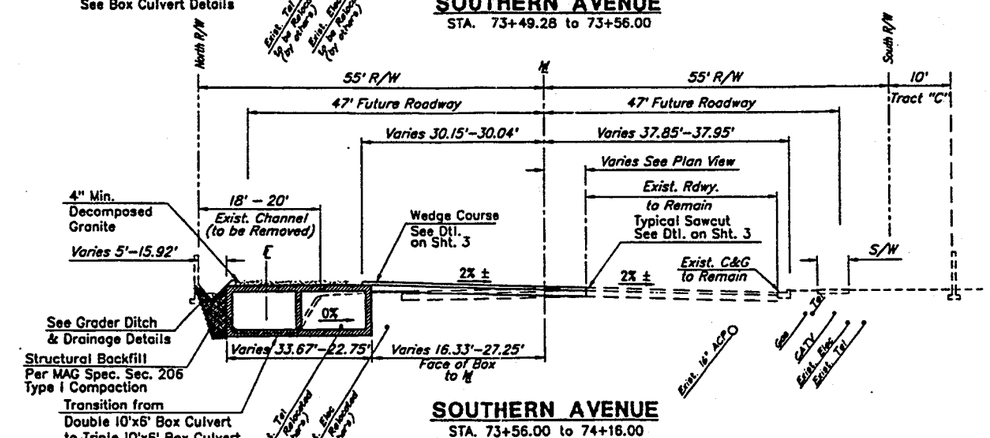
SOUTHERN AVENUE
STA. 69+60.00 to 71+60.00



SOUTHERN AVENUE
STA. 73+49.28 to 73+56.00



SOUTHERN AVENUE
STA. 71+60.00 to 73+49.28



SOUTHERN AVENUE
STA. 73+56.00 to 74+16.00

NOTE:

1. These sections are taken at specific locations chosen to be representative of the typical roadway sections needed for this project. They are not intended to provide the limits of work for all situations to be encountered. These sections along with the paving plan and profile sheets provide the required limits of construction of paving removal, installation, milling, overlay and etc.

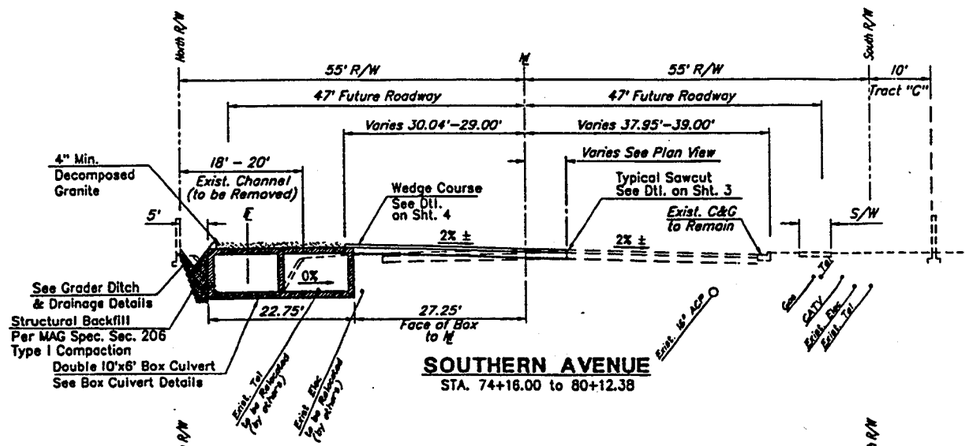
2. All utilities to be Relocated, are to be Relocated by Others. (Unless Noted Otherwise)

263-1100

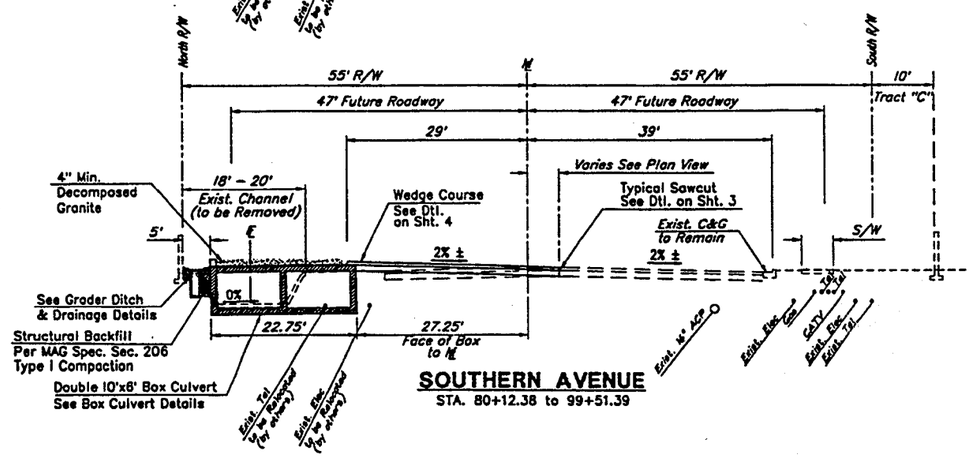
10 0 10 20

Entellus
2355 W. 44th Street Suite 200
Phoenix, AZ 85009-5279
Tel. 602.344.2965
Fax. 602.344.0947

FIELD BK:		SOUTHERN AVENUE DRAINAGE IMPROVEMENTS
WK. ORDER: 2572		TYPICAL SECTIONS
PROJ. NO: 97–56.1		REVISED
RELEASE DATE: Dec 97	DRAWN BY: GLT DESIGNED: MAA APPROVED BY: MJB	SHEET 43 of 54 — CATALOG NUMBER: A-68179



SOUTHERN AVENUE
STA. 74+16.00 to 80+12.38



SOUTHERN AVENUE
STA. 80+12.38 to 99+51.39

NOTE:

1. These sections are taken at specific locations chosen to be representative of the typical roadway sections needed for this project. They are not intended to provide the limits of work for all situations to be encountered. These sections along with the paving plan and profile sheets provide the required limits of construction of paving removal, installation, milling, overlay and etc.

2. All utilities to be Relocated, are to be Relocated by Others. (Unless Noted Otherwise)

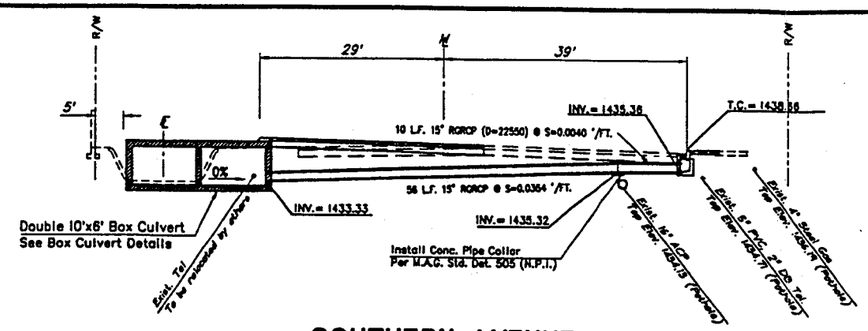
CALL TWO WORKING DAYS BEFORE YOU DIG
263-1100
BLUE STAKE CENTER

10 0 10 20

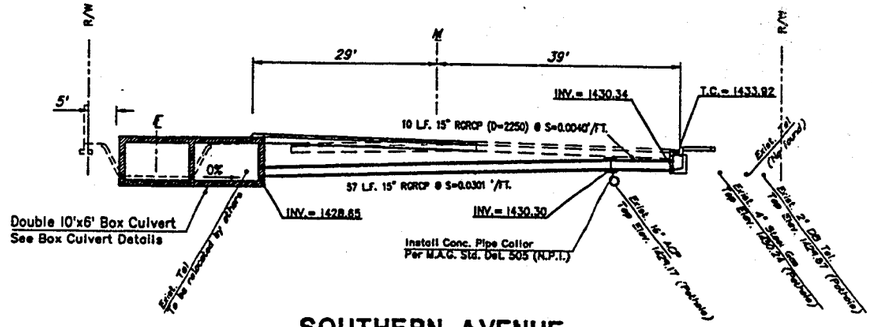
Entellus
2350 N. 44th Street Suite 300
Phoenix, AZ 85008-2270
Tel 602.244.0065
Fax 602.244.0047

FIELD BK:		SOUTHERN AVENUE DRAINAGE IMPROVEMENTS
WK. ORDER: 2572		TYPICAL SECTIONS
PROJ. NO: 97-56.1		REVISED
RELEASE DATE: Dec 97	DRAWN BY: GLT ENGINEER: NA APPROVED BY: MJS	SHEET 43 5 OF 36 — CATALOG NUMBER: A-68180

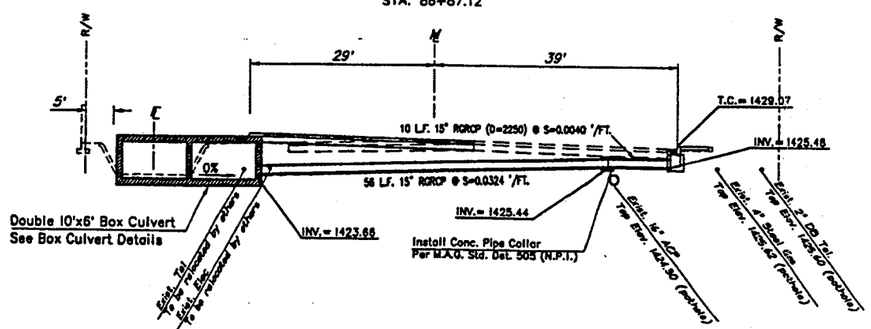
CITY OF MESA ENGINEERING DEPARTMENT



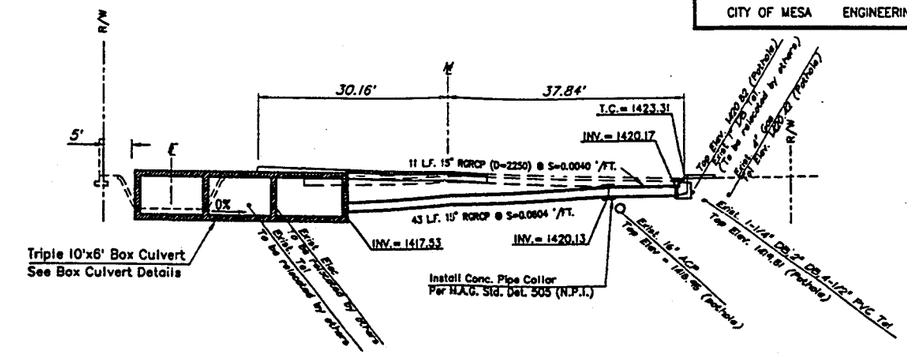
SOUTHERN AVENUE
STA. 93+25.90



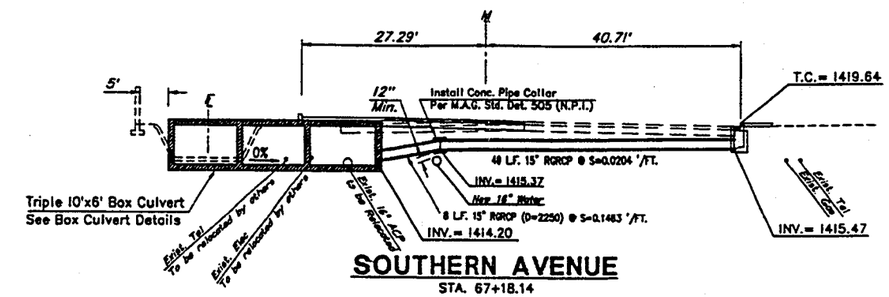
SOUTHERN AVENUE
STA. 86+87.12



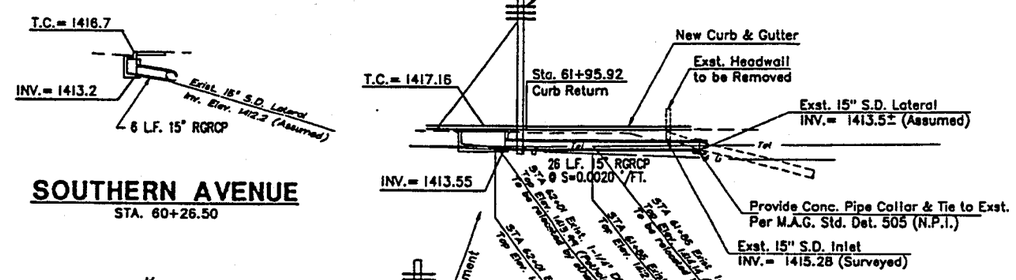
SOUTHERN AVENUE
STA. 80+71.69



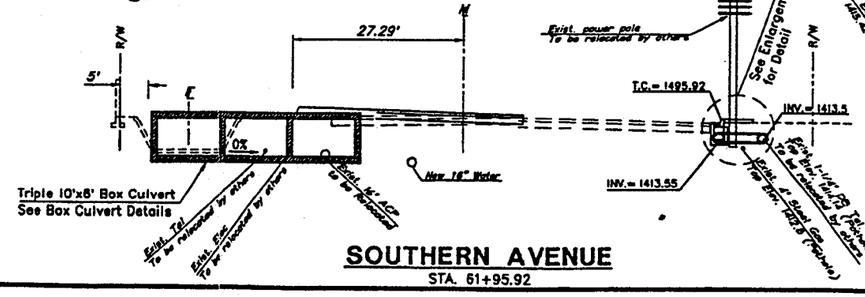
SOUTHERN AVENUE
STA. 72+59.85



SOUTHERN AVENUE
STA. 67+18.14



SOUTHERN AVENUE
STA. 60+26.50



SOUTHERN AVENUE
STA. 61+95.92

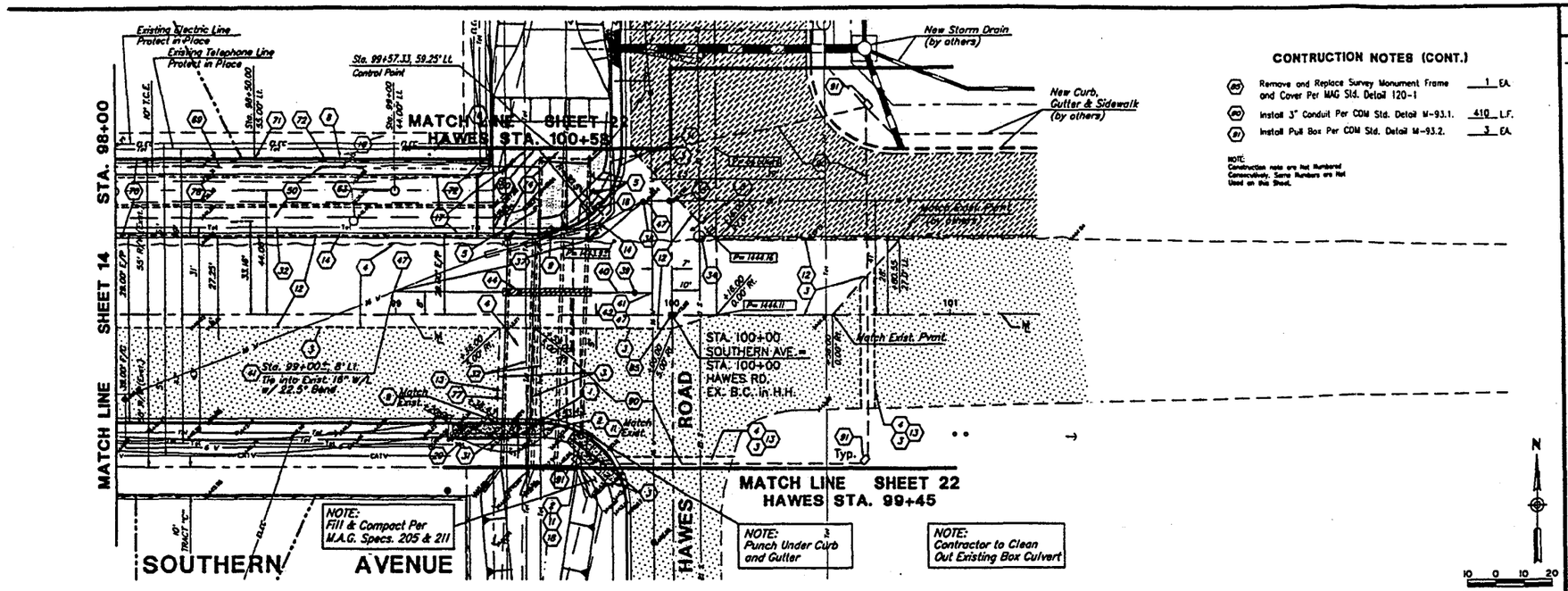
NOTE:
All 15" RGRCP Pipes shall be D=1750.
(Unless Noted Otherwise)

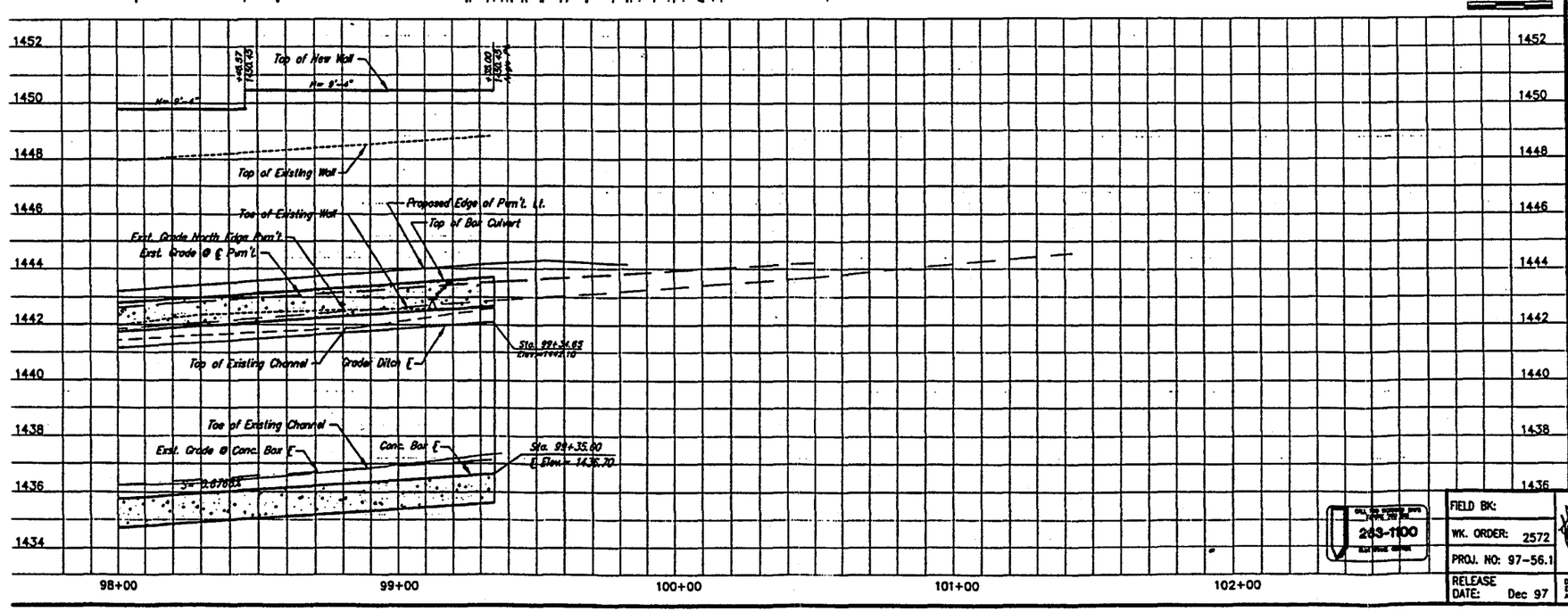
CALL TWO WORKING DAYS BEFORE YOU DIG
263-1100
ALL CITY OF MESA UTILITIES

10 0 10 20

Entellus
2366 N. 44th Street, Suite 200
Phoenix, AZ 85008-2870
Tel 602.344.5905
Fax 602.344.5947

FIELD BK:		SOUTHERN AVENUE DRAINAGE IMPROVEMENTS
WK. ORDER: 2572		STORM DRAIN LATERAL SECTIONS
PROJ. NO: 97-56.1		REVISED
RELEASE DATE: Dec 97	DRAWN BY: GLT ENGINEER: HAA APPROVED BY: MJB	SHEET 43 6 OF 30 — CATALOG NUMBER: A-68181





CONTRUCTION NOTES (CONT.)

(80)	Remove and Replace Survey Monument Frame and Cover Per MAG Std. Detail 120-1	1 EA.
(90)	Install 3" Conduit Per COM Std. Detail M-93.1.	410 L.F.
(91)	Install Pull Box Per COM Std. Detail M-93.2.	3 EA.

NOTE: Construction note are not Numbered Consecutively. Some Numbers are Not Used on this Sheet.

CITY OF MESA ENGINEERING DEPARTMENT

CONSTRUCTION NOTES - PAVING

NO.	DESCRIPTION	QTY. THIS SHEET
(1)	Remove concrete curb and gutter, Sta. 99+36 to Sta. 99+54.	18 L.F.
(2)	Remove concrete sidewalk, valley gutter, or driveway Sta. 99+20 to Sta. 99+53.43.	278 S.F.
(3)	Sawcut existing asphalt or concrete. Match new pavement to existing.	NPI
(4)	Remove asphalt pavement.	NPI
(5)	Remove traffic control sign and turn over to C.O.M. inspector.	NPI
(8)	Remove existing block wall, Sta. 98+00 to Sta. 99+35	140 L.F.
(9)	Construct 6" vertical curb and gutter per M.A.G. Std. Det. 220, Type A. See paving profiles (shts. 16-20).	85 L.F.
(11)	Construct concrete sidewalk per M.A.G. Std. Det. 230.	517 S.F.
(12)	Install 1-1/2" A.C. surface course on 2-1/2" A.C. base course on 10" A.B.C. See Pavement Section "A" on Sheet 3.	1002 S.Y.
(13)	Backfill trench & replace pavement per C.O.M. Std. Detail M-19.4.	63 S.Y.
(14)	Install wedge surface course, 1-1/2" min. thickness, on top of concrete box culvert. See Pavement Section "A" on Sheet 3.	38 S.Y.
(16)	Restore landscape and improvements to original conditions.	NPI
(17)	Install 4" decomposed granite mulch per Special Provisions.	428 S.Y.
(18)	Construct handicap ramp per C.O.M. Std. Det. M-44.	2 EA.
(29)	Restore Decomposed Granite after Construction.	NPI
(31)	Relocate item (by SRP Power Co.).	N/A
(32)	Relocate item (by U.S. West).	N/A
(34)	Adjust manhole frame and cover per M.A.G. Std. Det. 427.	1 EA.
(35)	Adjust valve frame and cover per M.A.G. Std. Det. 270. (typ.)	1 EA.
(37)	Remove 8" or 16" ACP water line, Sta. 98+78 to Sta. 99+90. See Special Provisions for handling asbestos pipe.	119 L.F.
(38)	Remove existing valve assembly.	1 EA.
(39)	Install 16" gate valve, box, and cover per M.A.G. Std. Det. 391-1, Type C.	1 EA.
(40)	Install 16" D.I.P. water line.	115 L.F.
(41)	Tie-in existing water line to new water line.	2 EA.
(42)	Install 16x16x16 tee.	1 EA.
(43)	Bore and jack casing pipe for new 16" waterline per Detail on Sheet 30.	L.S.
(46)	Install thrust restraint per M.A.G. Std. Det. 303.1 & 303.2.	NPI
(47)	Install thrust blocking per M.A.G. Std. Det. 380.	NPI
(50)	Remove concrete ditch lining Sta. 98+00 to Sta. 99+52.	392 S.Y.
(67)	Install Storm Drain Manhole set per Detail on Sheet 39.	2 EA.
(69)	Construct lined grader ditch per Detail on Sheet 23.	NPI
(70)	Excavate existing ground and provide structural backfill for culverts and subgrade of channels per Std. Specifications Sections 205 & 211.	L.S.
(71)	Construct drainage opening per Detail on Sheet 24.	NPI
(72)	Construct CMU wall per Details on Sheet 24. See profile for height of wall. Reconnect wall to existing walls to north.	140 L.F.
(74)	Construct junction structure @ Hawes and Southern per Details on Sheets 31 thru 36.	L.S.
(77)	Construct single barrel box culvert and new headwall wing per Details on Sheet 28.	L.S.
(78)	Construct new double barrel box culvert per Details on Sheet 37.	135 L.F.

Entellus
2355 N. 44th Street, Suite 200
Phoenix, AZ 85008-3279
Tel 602.344.3900
Fax 602.344.3947

CALL FOR BLUESTAKE INFO TYPE AREA CODE 263-1100 ELECTRONIC SERVICE

FIELD BK:
WK. ORDER: 2572
PROJ. NO: 97-56.1
RELEASE DATE: Dec 97

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 22140 STATE OF ARIZONA

SOUTHERN AVENUE DRAINAGE IMPROVEMENTS

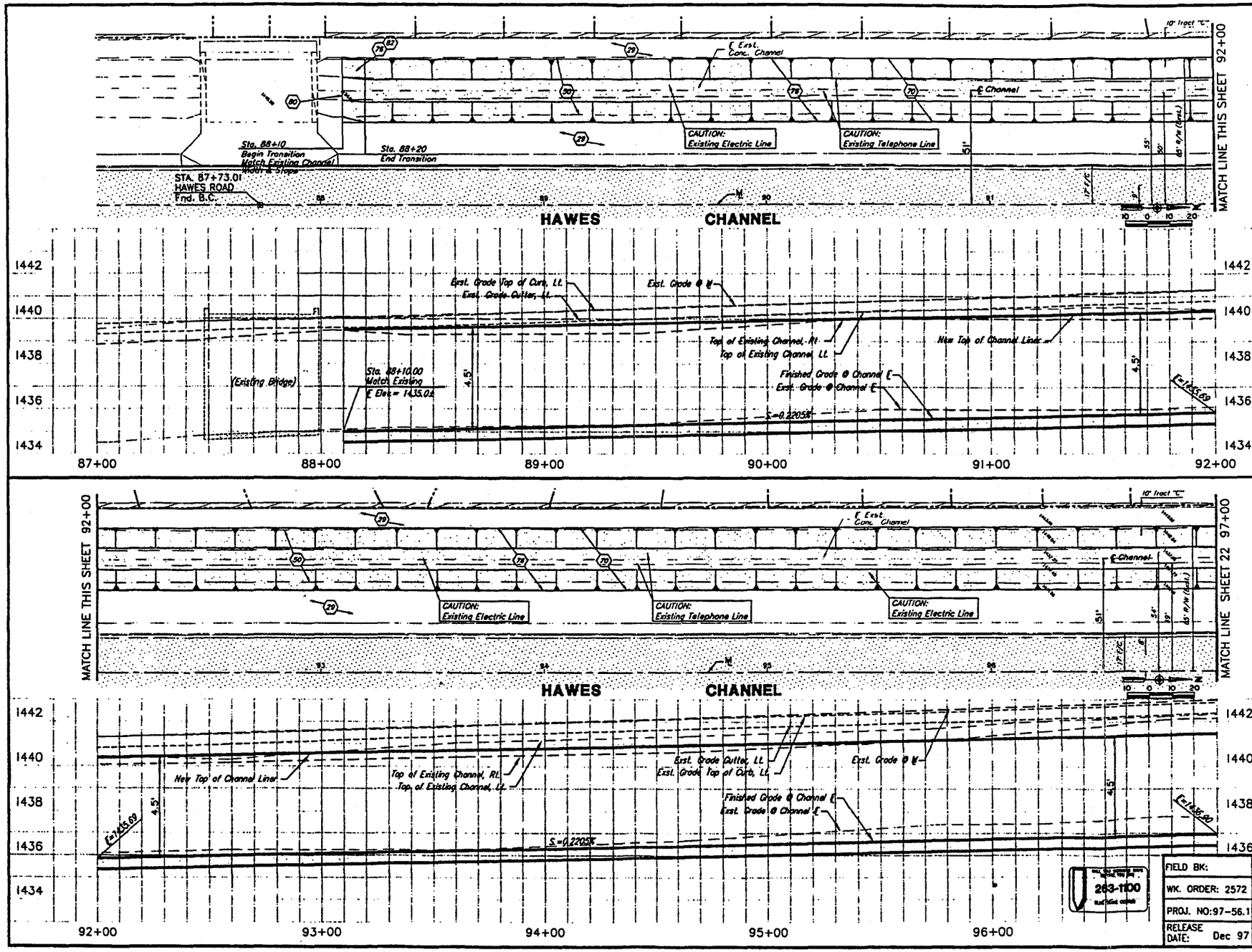
SOUTHERN AVENUE PLAN & CULVERT PROFILE STA. 98+00 TO 103+00

REVISED

DRAWN BY: GLF
ENGINEER: MAA
APPROVED BY: MJB

SHEET 43
15 of 36

CATALOG NUMBER A-68190



CITY OF MESA ENGINEERING DEPARTMENT

CONSTRUCTION NOTES - PAVING

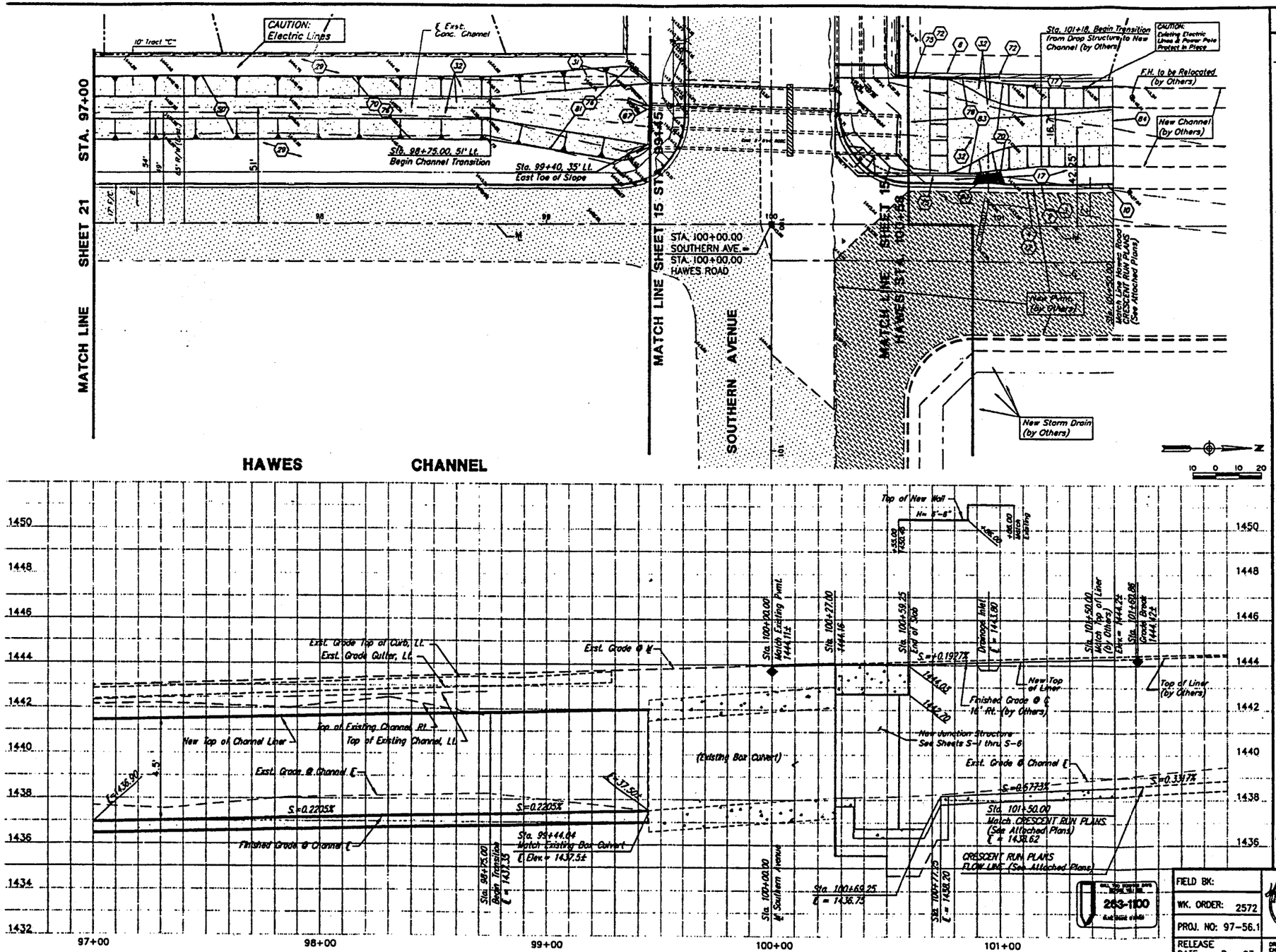
NO.	DESCRIPTION	QTY THIS SHEET	
79	Restore Decomposed Granite after Construction.		NP
80	Remove concrete ditch lining.	24,137	S.Y
70	Excavate existing ground and provide structural backfill for culverts and subgrade of channels per Std. Specifications Sections 205 & 211.		L.S.
78	Construct concrete lined channel per Details on Sheet 28.	26,807	S.F
80	Sawcut existing channel liner. Match new channel to existing.		NP
82	Install channel transition per Details on Sheet 28.		NP

NOTE:
Construction Notes are not numbered consecutively. Some numbers are not used on this sheet.

Entellus
2555 N. 44th Street Suite 200
Phoenix, AZ 85008-3279
Tel 602.344.5666
Fax 602.344.5947

CALL ARIZONA BLUE STAKE, INC. 263-1100

FIELD BK:		SOUTHERN AVENUE DRAINAGE IMPROVEMENTS
WK. ORDER: 2572		HAWES CHANNEL PLAN AND PROFILE STA. 87+00 TO 97+00
PROJ. NO: 97-56.1		REVISED
RELEASE DATE: Dec 97	DRAWN BY: GLT/HMA ENGINEER: MJB APPROVED BY: HMA	SHEET 21 OF 43 / CATALOG NUMBER: A-68196



CITY OF MESA ENGINEERING DEPARTMENT

CONSTRUCTION NOTES - PAVING

NO.	DESCRIPTION	QTY. THIS SHEET
3	Sawcut existing asphalt or concrete. Match new pavement to existing.	NPI
4	Remove asphalt pavement.	NPI
6	Remove existing block wall, Sta. 100+58 to Sta. 100+99.	50 L.F.
9	Construct 6" vertical curb and gutter per M.A.G. Std. Det. 220, Type A. See paving profiles (shts. 16-20).	87 L.F.
10	Install 5' curb termination per M.A.G. Std. Det. 220, Type "A", except taper curb height from 6" to 0" in 5 ft.	5 L.F.
12	Install 1-1/2" A.C. surface course on 2-1/2" A.C. base course on 10" A.B.C. See Pavement Section "A" on Sheet 3.	21 S.Y.
17	Install 4" decomposed granite mulch per Special Provisions.	73 S.Y
29	Restore Decomposed Granite after Construction.	NPI
31	Relocate item (by SRP Power Co.).	N/A
32	Relocate item (by U.S. West).	N/A
50	Remove concrete ditch lining. From Sta. 97+00 to Sta. 99+45	794 S.Y.
67	Sawcut existing box culverts, and remove as shown on Detail Sheets. Match new box culverts to existing.	NPI
70	Excavate existing ground and provide structural backfill for culverts and subgrade of channels per Std. Specifications Sections 205 & 211.	L.S.
72	Construct CMU wall per Details on Sheet 24. See profile for height of wall. Reconnect wall to existing walls to north.	50 L.F.
73	Construct retaining wall per Details on Sheet 35.	66 L.F.
78	Construct concrete lined channel per Details on Sheet 29 or Sheet 30.	11490 S.F.
81	Install channel transition per Detail on Sheet 29.	NPI
83	Install concrete drop structure and transition per Detail on Sheet 30.	NPI
84	Sawcut Existing Liner.	NPI

NOTE: Construction Notes are not numbered consecutively. Some numbers are not used on this sheet.

Entellus
2386 E. 6th Street Suite 330
Phoenix, AZ 85008-2279
Tel 602.344.3865
Fax 602.344.3847

FIELD BK:

WK. ORDER: 2572

PROJ. NO: 97-56.1

RELEASE DATE: Dec 97

SOUTHERN AVENUE DRAINAGE IMPROVEMENTS

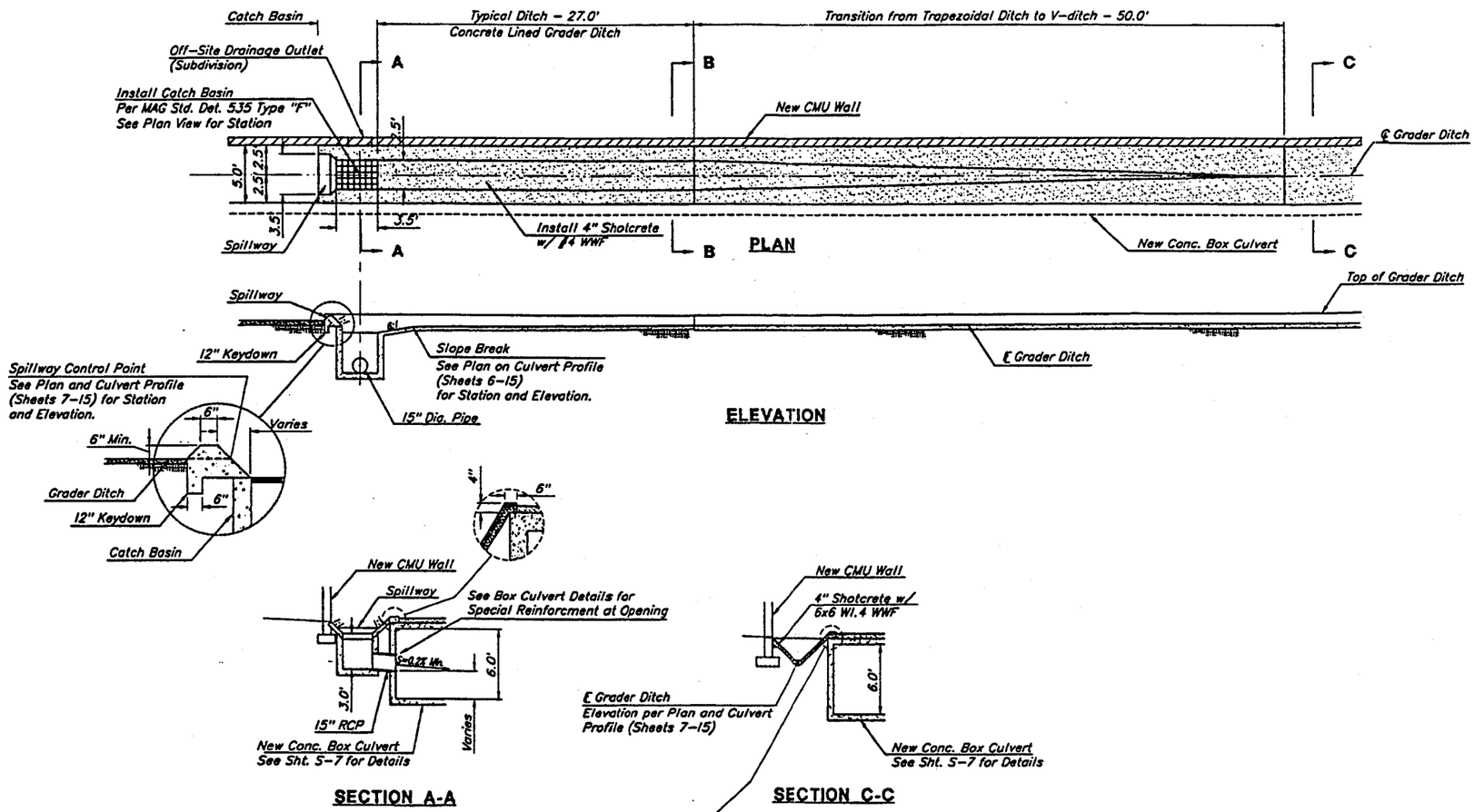
HAWES CHANNEL PLAN AND PROFILE STA. 97+00 TO 102+00

REVISED

DRAWN BY: GLT
CHECKED: MAS
APPROVED BY: MJB

SHEET 43 22 OF 34

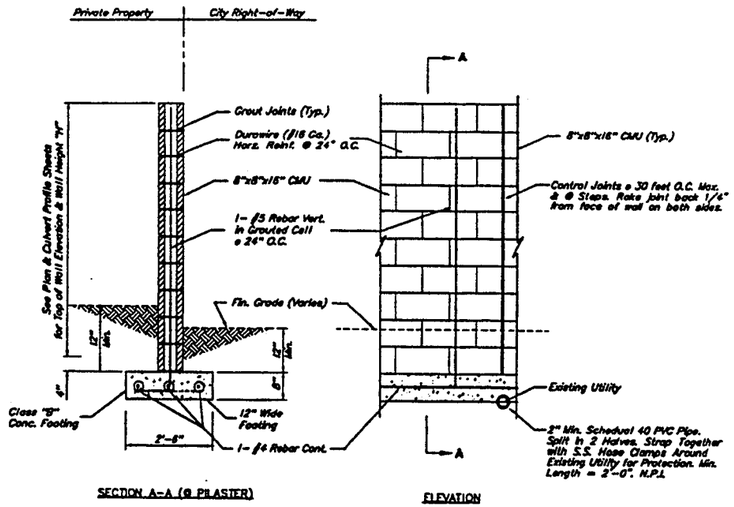
CATALOG NUMBER: A-68197



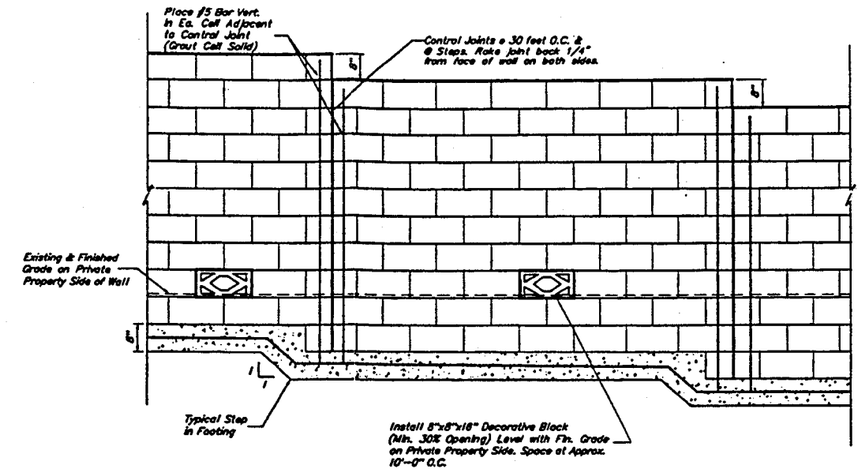
Entellus

CALL TWO WORKING DAYS BEFORE YOU DIG
263-1100
ELECTRONIC SERVICE

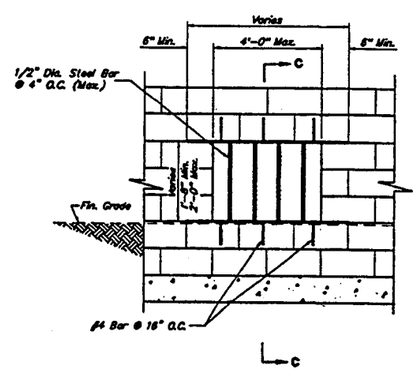
FIELD BK:		SOUTHERN AVENUE DRAINAGE IMPROVEMENTS
WK. ORDER: 2572		SOUTHERN AVENUE GRADER DITCH AND DRAINAGE DETAILS
PROJ. NO: 97-56.1		REVISED
RELEASE DATE:	DRAWN BY: GLT/HAA ENGINEER: MJB APPROVED BY: HAA	SHEET 43 23 OF 38 — CATALOG NUMBER: A-68198



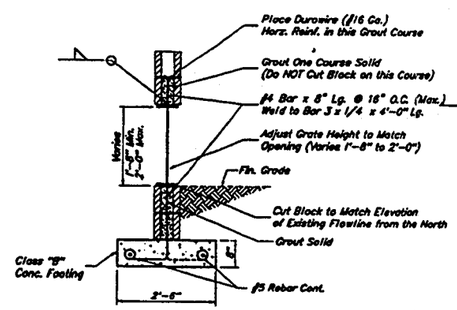
CONCRETE MASONRY WALL



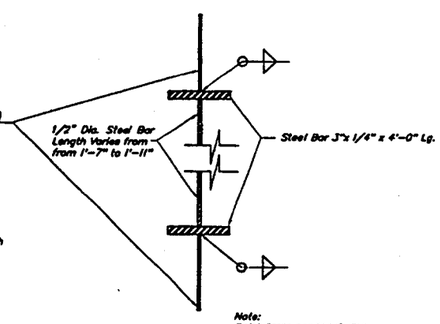
TYPICAL MASONRY WALL ELEVATION



ELEVATION

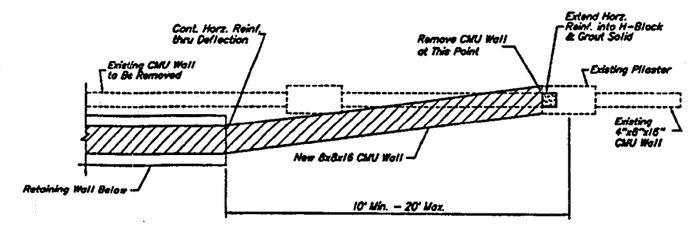


SECTION C-C
(@ Drainage Openings)



Note:
Point Grate per M.A.G. Std. Specifications _____
Finish Color = Light Grey (Match Block)

DRAINAGE OPENING



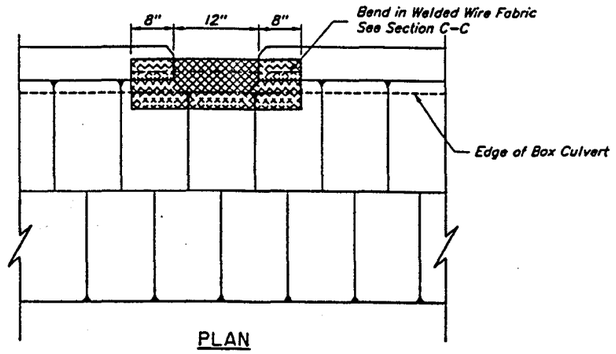
CMU WALL TRANSITION DETAIL

(@ HAWES CHANNEL)

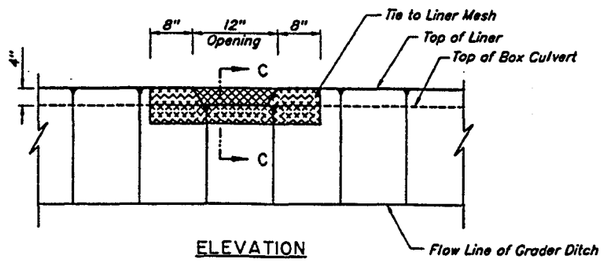
CALL TWO WORKING DAYS BEFORE YOU DIG
263-1100
ELAS SERVE CENTER

Entellus
2386 E. 44th Street, Suite 200
Phoenix, AZ 85008-2279
Tel 602.344.2660
Fax 602.344.5847

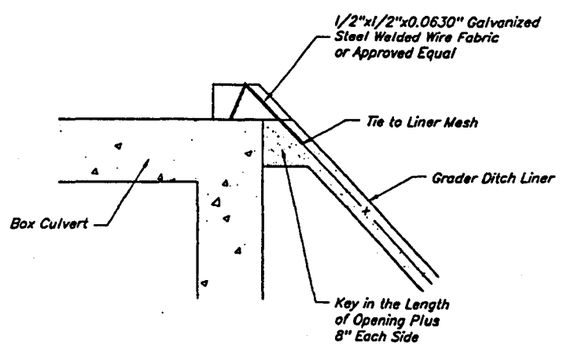
FIELD BK:		SOUTHERN AVENUE DRAINAGE IMPROVEMENTS
WK. ORDER: 2572		CMU WALL DETAILS — REVISED
PROJ. NO: 97-56.1		
RELEASE DATE: Dec 97	DRAWN BY: GLT ENGINEER: HAA APPROVED BY: MJB	SHEET 24 OF 43 — CATALOG NUMBER: A-68199



PLAN



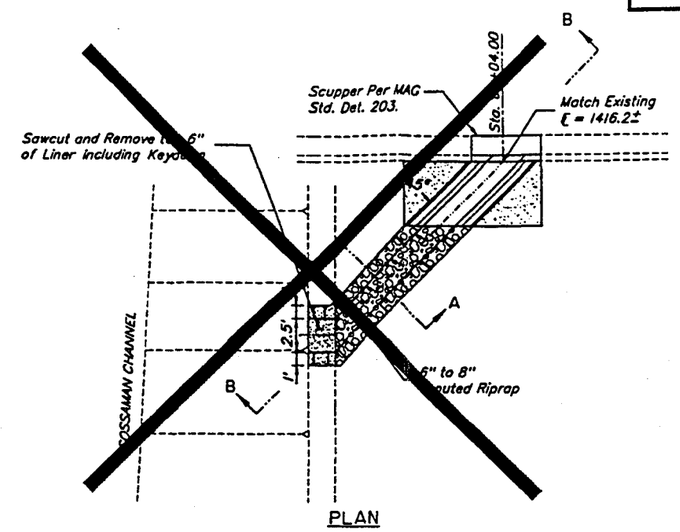
ELEVATION



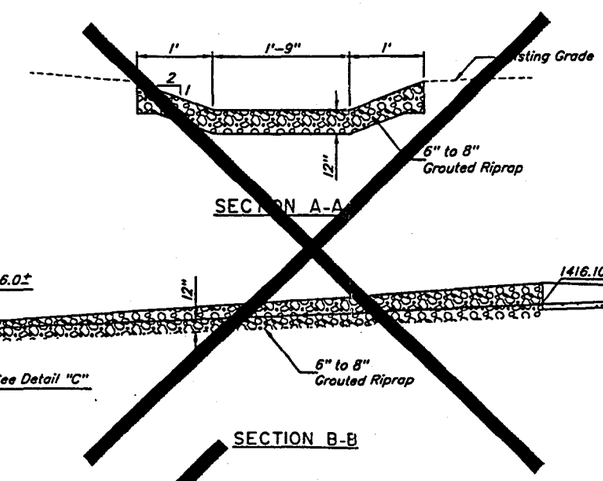
SECTION C-C

DRAINAGE OPENING

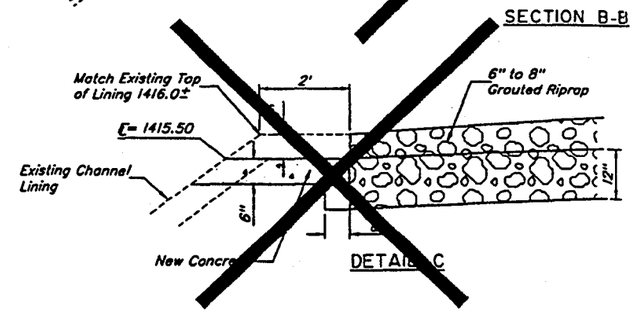
NOT TO SCALE



PLAN



SECTION B-B

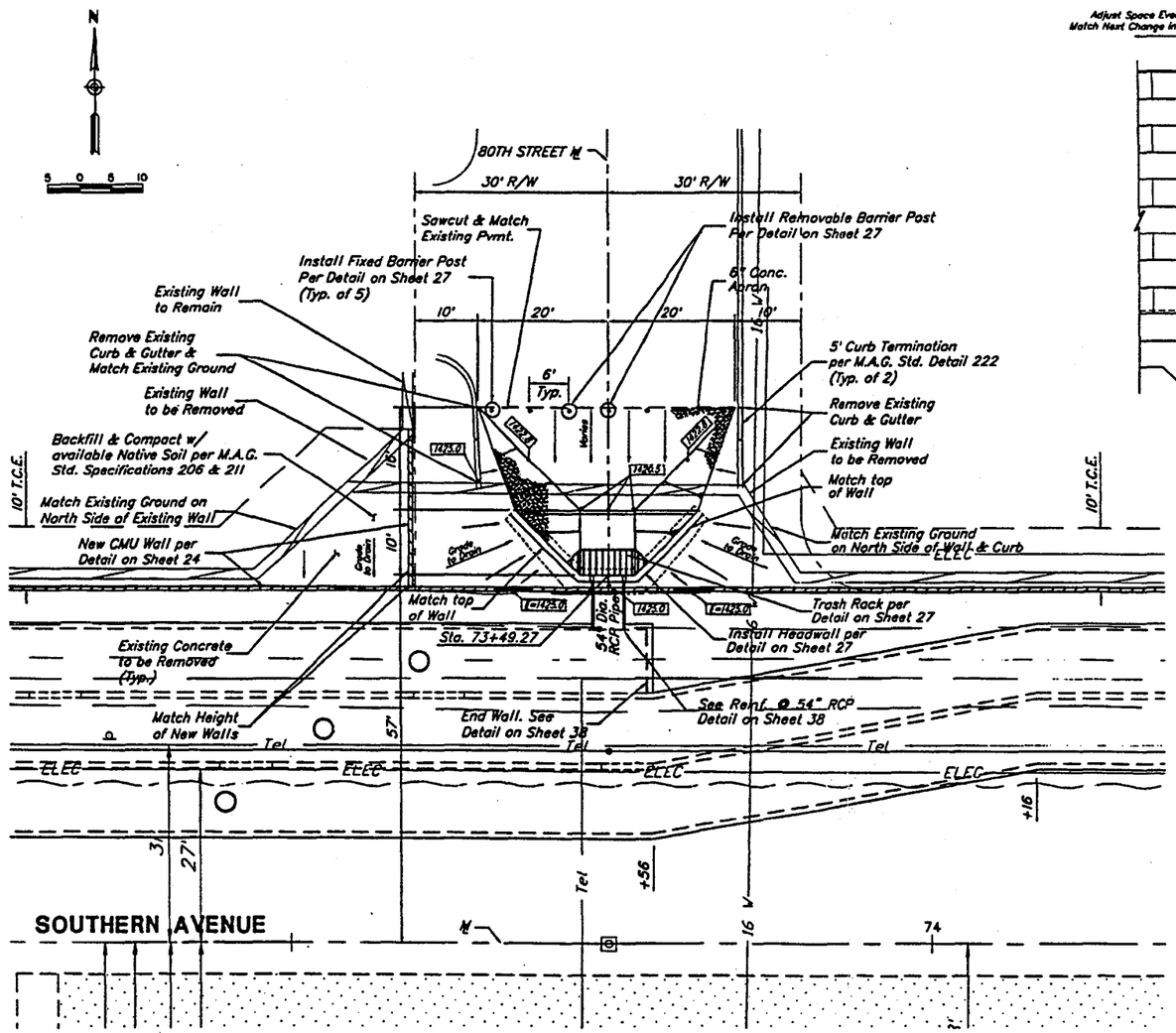


DETAIL C

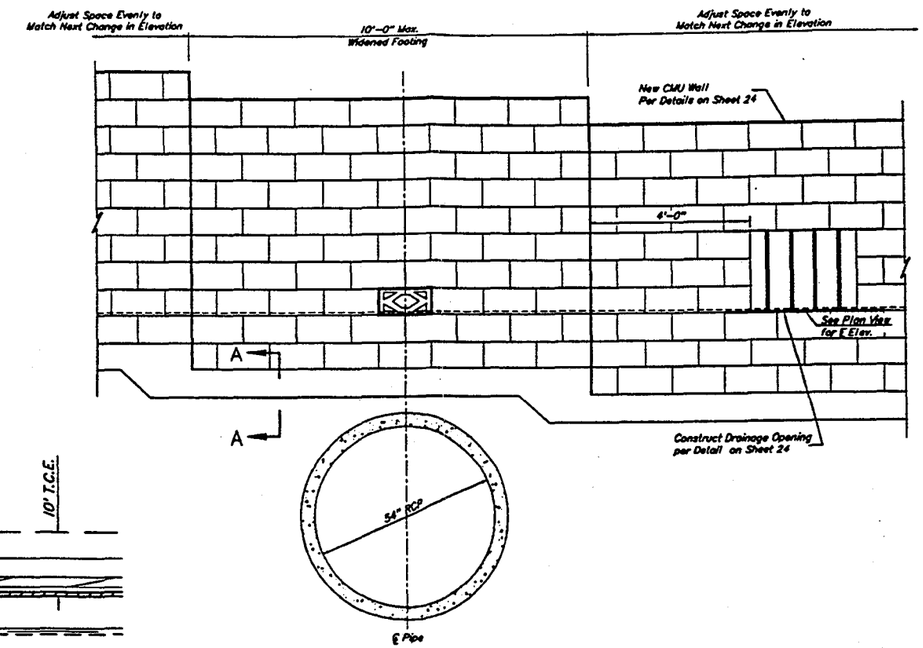
263-1100

Entellus

FIELD BK:		SOUTHERN AVENUE DRAINAGE IMPROVEMENTS
WK. ORDER: 2572		SCUPPER DETAIL
PROJ. NO: 97-56.1		REVISED
RELEASE DATE: Dec 97	DRAWN BY: GLT ENGINEER: HAA APPROVED BY: MJB	SHEET 43 25 OF 38 — CATALOG NUMBER: A-68200

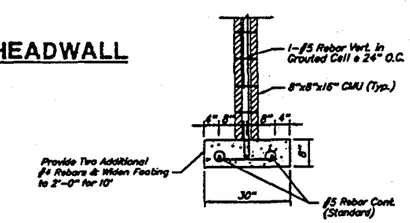


PLAN VIEW



ELEVATION @ INLET HEADWALL

(LOOKING SOUTH)



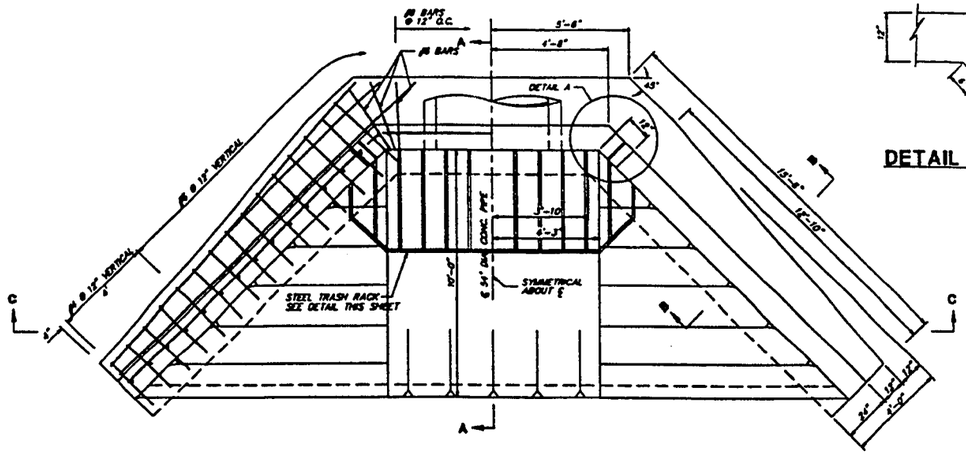
SECTION A-A

263-1100

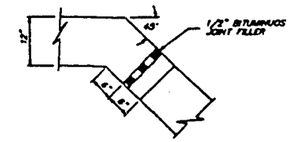
Entellus

FIELD BK:		SOUTHERN AVENUE DRAINAGE IMPROVEMENTS
WK. ORDER: 2572		INLET STRUCTURE DETAILS @ 80TH STREET
PROJ. NO: 97-56.1		REVISED
RELEASE DATE: Dec 97	DRAWN BY: GLT ENGINEER: NHA APPROVED BY: MJB	SHEET 26 OF 43 / CATALOG NUMBER: A-68201

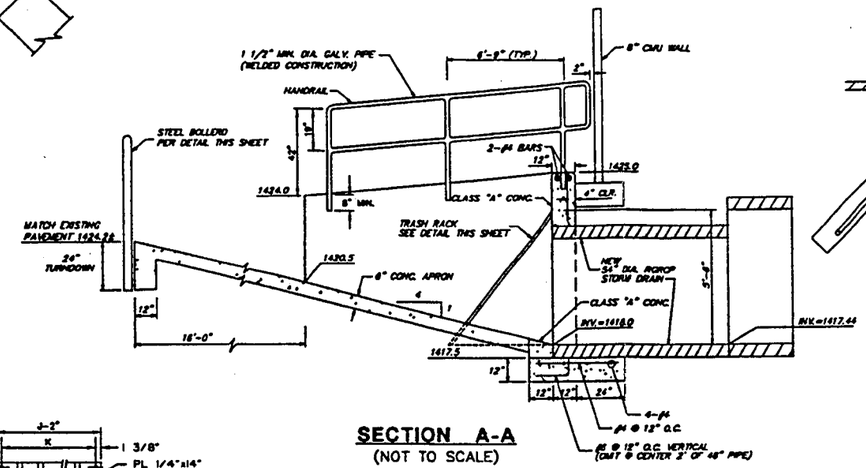
CITY OF MESA ENGINEERING DEPARTMENT



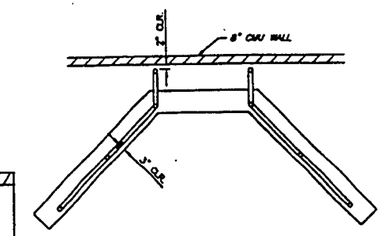
INLET HEADWALL PLAN
(NOT TO SCALE)



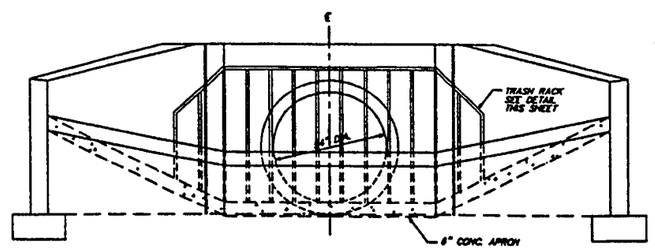
DETAIL A



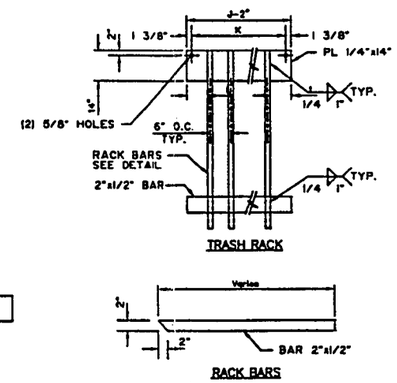
SECTION A-A
(NOT TO SCALE)



HANDRAIL PLAN
(NOT TO SCALE)

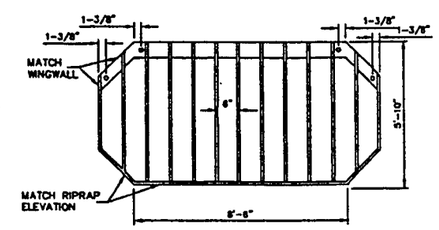


SECTION C-C
(NOT TO SCALE)



TRASH RACK

RACK BARS



TRASH RACK DETAIL
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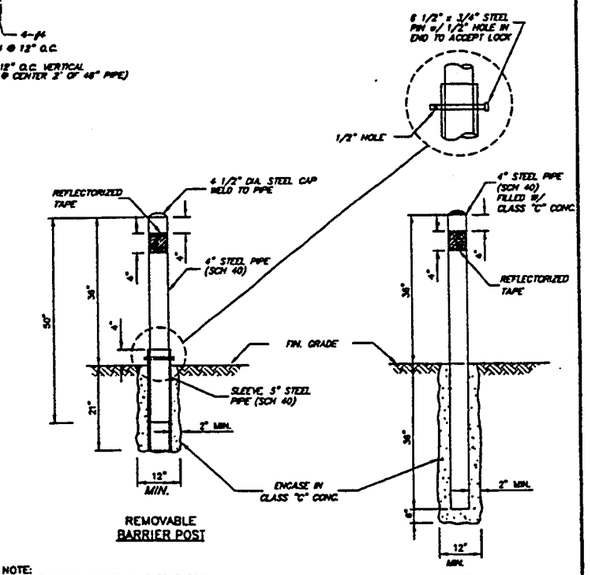
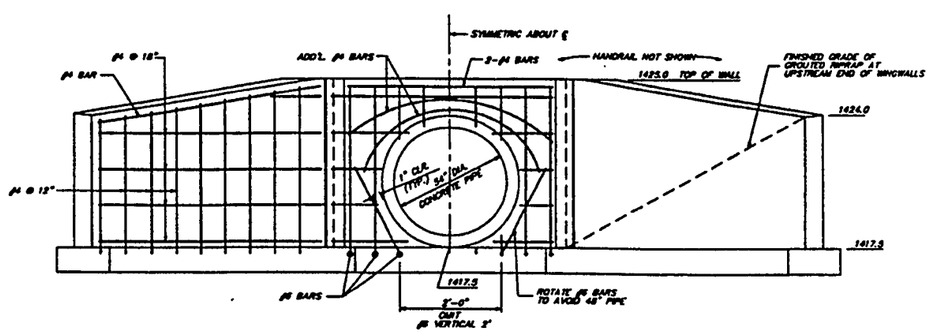
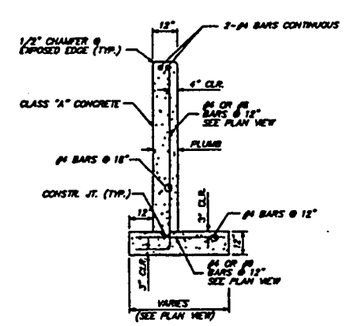


NOTE:
PAINT BARRIER POSTS & SLEEVE PER M.A.G. STD. SPECIFICATIONS SECTION 530.
FINISH COLOR= YELLOW

BARRIER POST DETAIL
(NOT TO SCALE)



INLET HEADWALL ELEVATION
(NOT TO SCALE)

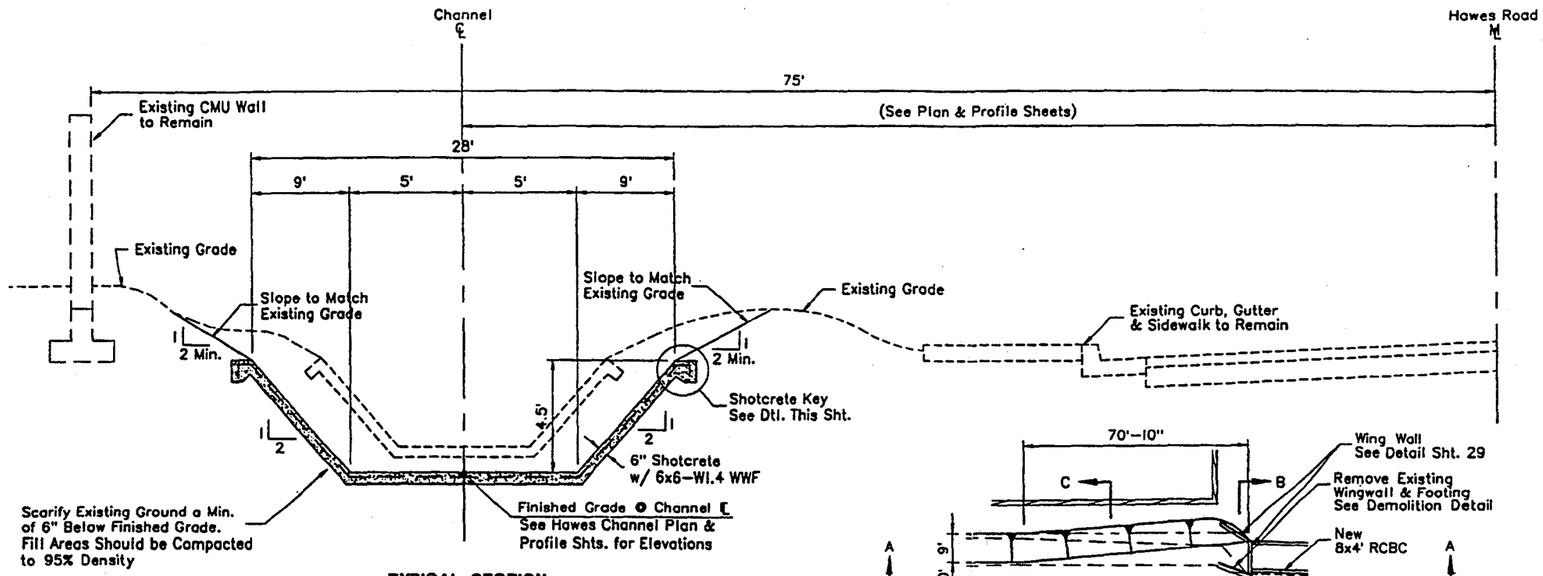


SECTION B-B
(NOT TO SCALE)

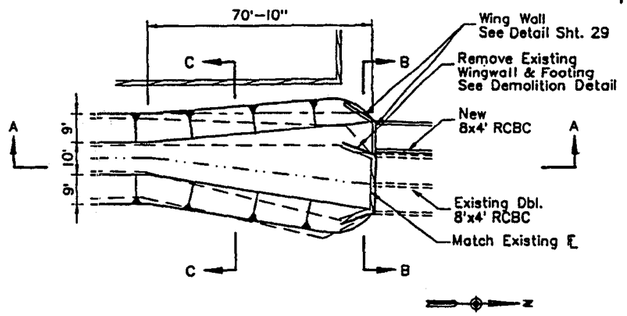
263-1100

Entellus

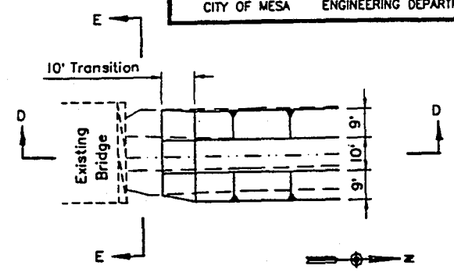
FIELD BK:		SOUTHERN AVENUE DRAINAGE IMPROVEMENTS
WK. ORDER: 2572		DETAIL SHEET INLET @ 80TH STREET
PROJ. NO: 97-56.1		REVISED
RELEASE DATE: Dec 97	DRAWN BY: GLT ENGINEER: HAA APPROVED BY: MJB	SHEET 27 OF 34 — CATALOG NUMBER A-68202



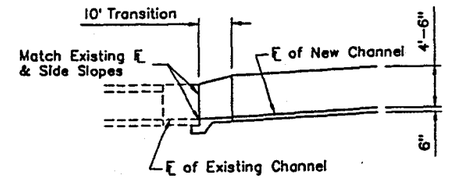
TYPICAL SECTION HAWES CHANNEL
NOT TO SCALE



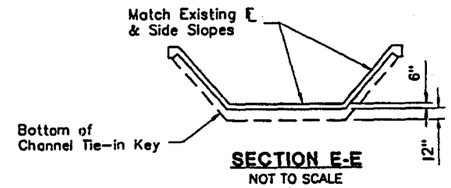
HAWES CHANNEL PLAN (UPSTREAM)
NOT TO SCALE



HAWES CHANNEL PLAN (DOWNSTREAM)
NOT TO SCALE



SECTION D-D
NOT TO SCALE



SECTION E-E
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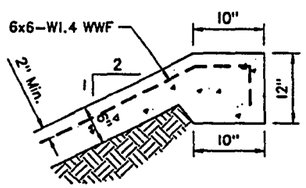

SHOTCRETE KEY DETAIL
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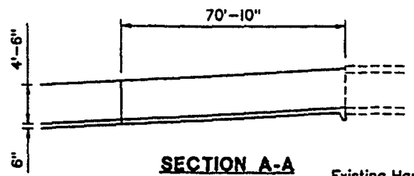

SECTION A-A
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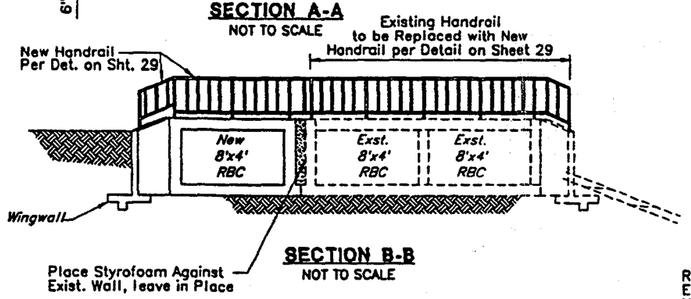

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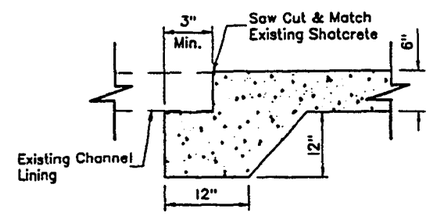
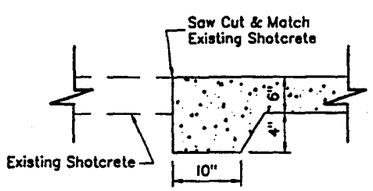


EXISTING CHANNEL TIE-IN
NOT TO SCALE



TIE-IN KEY SECTION
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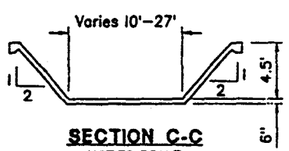
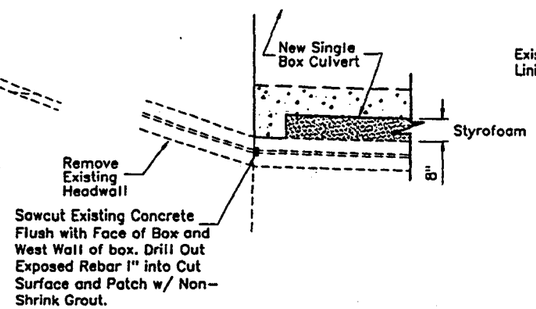


SECTION C-C
NOT TO SCALE

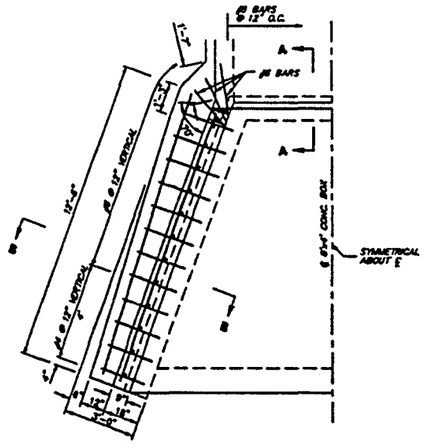


PLAN VIEW DEMOLITION DETAIL
NOT TO SCALE

263-1100

Entellus

FIELD BK:		SOUTHERN AVENUE DRAINAGE IMPROVEMENTS
WK. ORDER: 2572		HAWES CHANNEL TYPICAL SECTION AND DETAILS
PROJ. NO: 97-56.1		REVISED
RELEASE DATE: Dec 97	DRAWN BY: GLT DESIGNED: HHA APPROVED BY: MJB	SHEET 43 28 OF 39 — CATALOG NUMBER: A-68203



OUTLET HEADWALL PLAN
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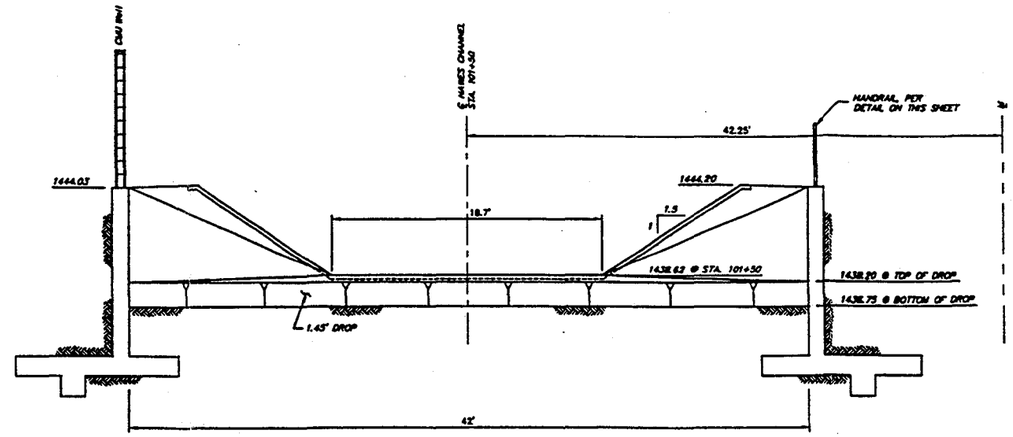
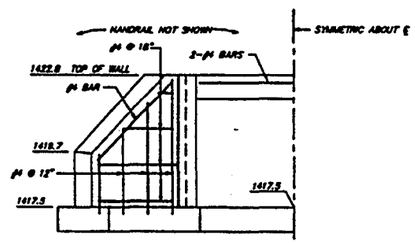
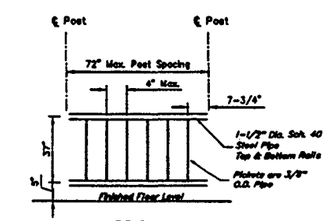


HAWES CHANNEL DROP STRUCTURE / TRANSITION SECTION
(LOOKING NORTH FROM JUNCTION STRUCTURE)
(NOT TO SCALE)



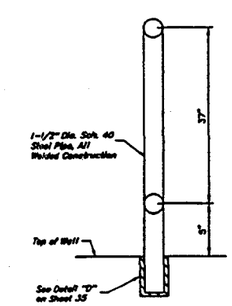
OUTLET HEADWALL ELEVATION
(NOT TO SCALE)



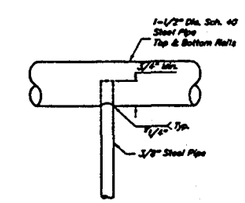
ELEVATION

PICKET RAIL SECTION @ 9"

POST SPACING	NUMBER OF PICKETS
40"	9
56"	13
64"	15
72"	17



SECTION

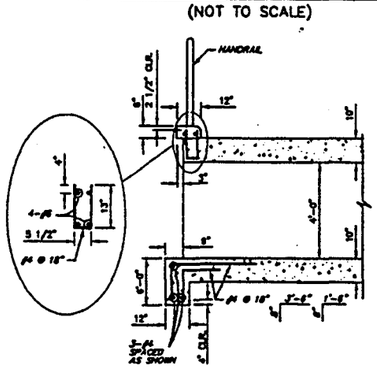


NOTES:

Apply Protective Coating Consisting of:

1) 1 Coat of Tnemec Series 4 Versare Primer or Equal & 2 Coats of Black Series 66 Hi-Build Epoxolene Topcoat 3.0 to 5.0 mil Per Coat.

2) Protective Coating Shall be Applied to Portion Imbedded in Concrete & Non-Accessible Areas Prior to Installation.



SECTION A-A
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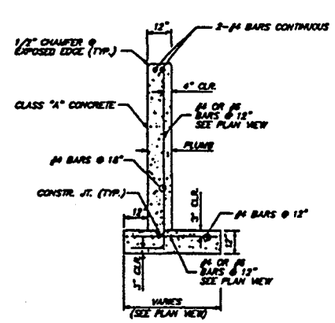

SECTION B-B
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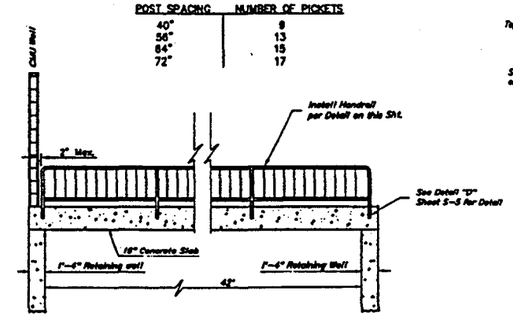
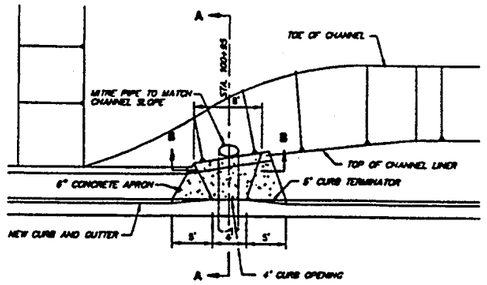


HANDRAIL DETAIL @ HAWES INLET
(NOT TO SCALE)

CALL TWO WORKING DAYS BEFORE YOU DIG
263-1100
ELAINE STONE CENTER

Entellus
2905 N. 44th Street Suite 220
Phoenix, AZ 85008-3279
Tel 602.344.3500
Fax 602.344.3647

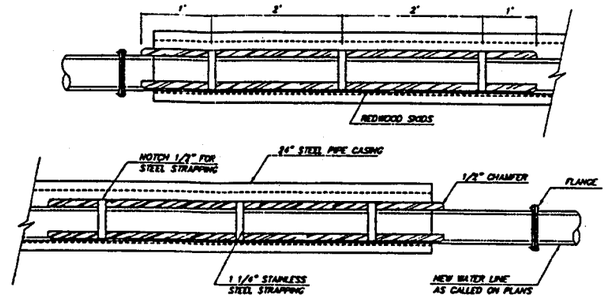
FIELD BK:		SOUTHERN AVENUE DRAINAGE IMPROVEMENTS
WK. ORDER: 2572		DETAIL SHEET MISCELLANEOUS
PROJ. NO: 97-56.1		REVISED
RELEASE DATE: Dec 97	DRAWN BY: GLT ENGINEER: HAA APPROVED BY: MJB	SHEET 29 OF 43 — CATALOG NUMBER: A-68204

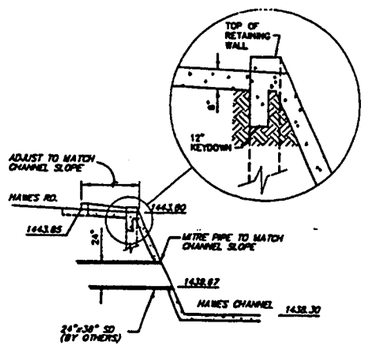


PLAN

DRAINAGE OPENING AT HAWES RD.

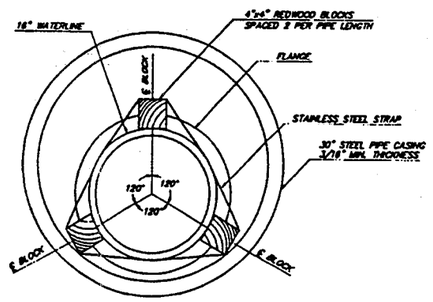
(NOT TO SCALE)





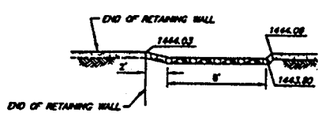
SECTION A-A

(NOT TO SCALE)



CASING PIPE DETAIL

(NOT TO SCALE)



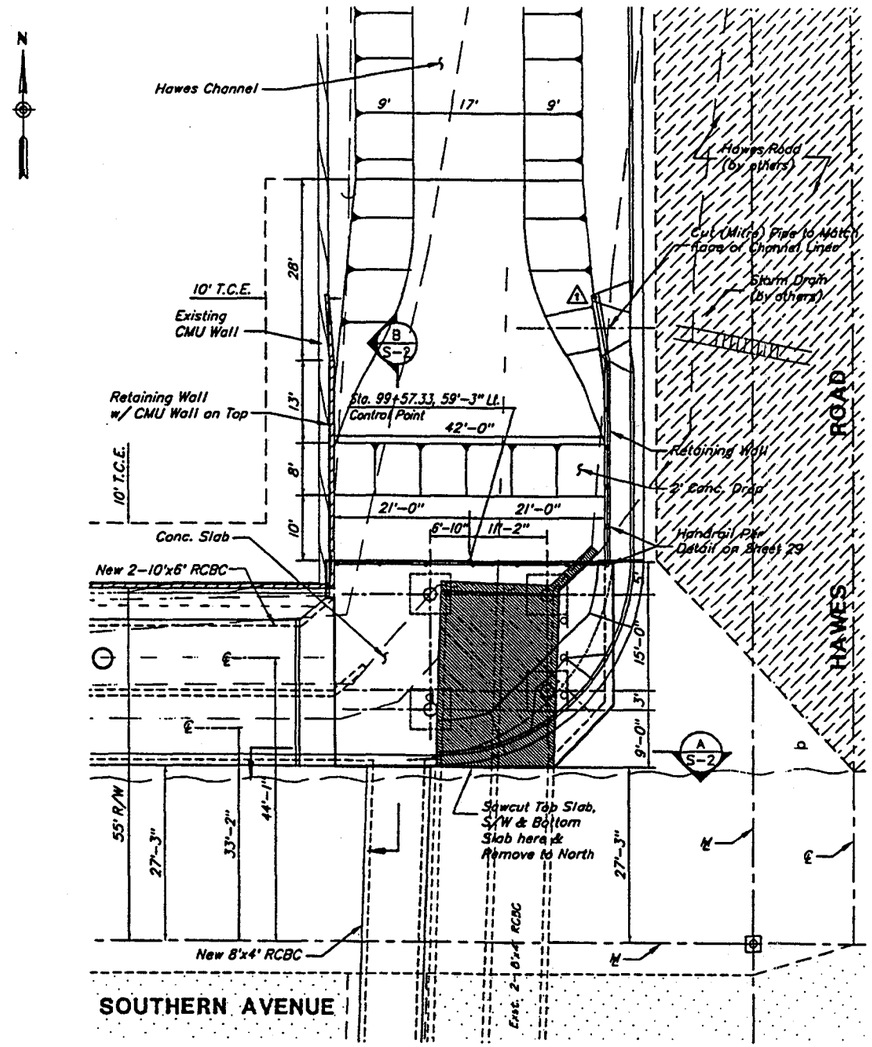
SECTION B-B

(NOT TO SCALE)

CALL TWO WORKING DAYS BEFORE YOU DIG
263-1100
ELIC STAKE CENTER

Entellus
2555 N. 44th Street Suite 220
Phoenix, AZ 85008-2279
Tel 602.344.2646
Fax 602.344.2647

FIELD BK:		SOUTHERN AVENUE DRAINAGE IMPROVEMENTS
WK. ORDER: 2572		DETAIL SHEET MISCELLANEOUS — REVISED
PROJ. NO: 97-56.1		
RELEASE DATE: Dec 97	DRAWN BY: GLT ENGINEER: HRA APPROVED BY: MJB	SHEET 43 30 OF 35 — CATALOG NUMBER: A-68205



LIMITS OF EXISTING STRUCTURE REMOVAL

PLAN VIEW
SCALE: 1"=10'

GENERAL STRUCTURAL NOTES

1. Construction Specification – Maricopa Association of Governments (MAG) Uniform Standard Specifications and Details for Public Works Construction dated 1992 and revised to date as amended by the City of Mesa, Arizona.
2. Design Specifications – American Association of State Highway and Transportation Officials (AASHTO) Standard Specifications for Highway Bridges, 16th Edition 1996 with the current interim specifications.
3. Dead Loads:
   Box Culvert – 250 psf (fill weight)
   Hawes Road Inlet Structure – 200 psf.
4. Loading Class – AASHTO HS20-44 Loading.
5. All concrete shall be Class "A" unless noted otherwise.
6. Reinforcing steel shall conform to ASTM Specification A615. All reinforcing shall be furnished as Grade 60.
7. All bend dimensions for reinforcing steel shall be out-to-out of bars. All placement dimensions for reinforcing steel shall be center of bars unless noted otherwise.
8. All reinforcing steel shall have 2 inch clear cover unless noted otherwise.
9. All reinforcing steel shall be continuous unless noted otherwise.
10. Lap all reinforcing steel 40 bar diameters unless noted otherwise.
11. Stagger all laps unless noted otherwise.
12. Reinforcing steel shall be detailed in accordance with the American Concrete Institute (ACI) Manual for Detailing Reinforced Concrete Structures unless noted otherwise.
13. Stresses:

Hawes Road Structure Slab & Drop Panel (Class AA)	f'c =	4500 psi
Hawes Road Structure Columns & Footings (Class AA)	f'c =	3500 psi
All Other concrete (Class A)	f'c =	3000 psi
Grade 60 reinforcing steel	fs =	24000 psi

14. Chamfer all exposed corners 3/4" or as shown in the project plans.
15. Dimensions shall not be scaled from drawings.
16. Sandblast all construction joints in concrete prior to placement of concrete.
17. The use of construction joints at locations not shown on the drawings shall require approval by the Engineer.
18. Foundation recommendations were provided by Ricker, Atkinson and McBee & Associates , Inc.
19. All the geometric information necessary to layout the structures was provided by Entellus, Inc.

DEMOLITION NOTES

1. The limits of concrete removal at the existing Hawes Road and Sossoman Channel structures are shown in the project plans.
2. The contractor shall exercise due care in removal of concrete to prevent damage to the remaining structure. All damage shall be repaired at no cost to the City.

THIS SEAL COVERS ONLY REVISIONS TO THE APPROVED PLANS AND/OR SPECIFICATIONS AS MADE BY THE CITY OF MESA.

1 ADDED BY CITY OF MESA 12/31/97

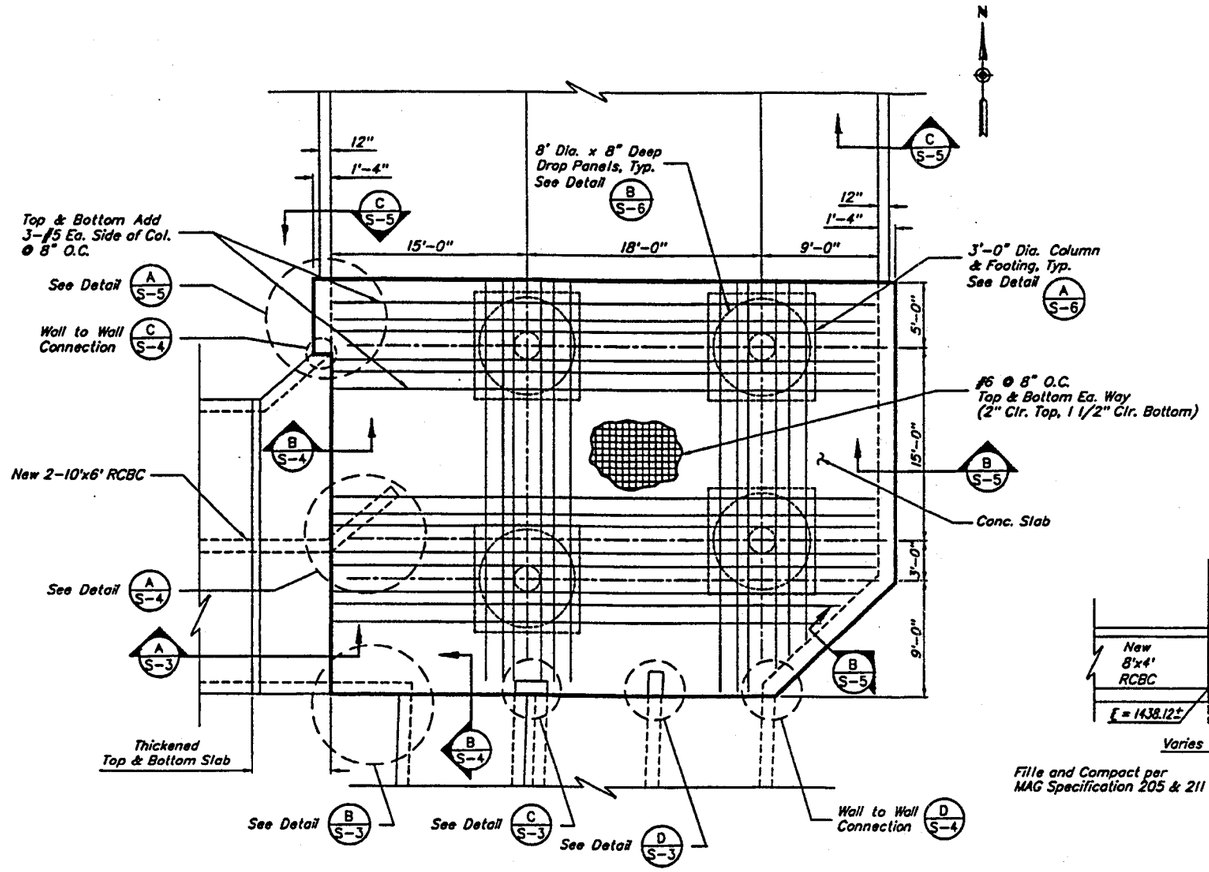
263-1100

S-1

PREMIER ENGINEERING CORPORATION

Entellus
2565 N. 44th Street Suite 200
Phoenix, AZ 85008-2279
Tel 602.344.3500
Fax 602.344.0947

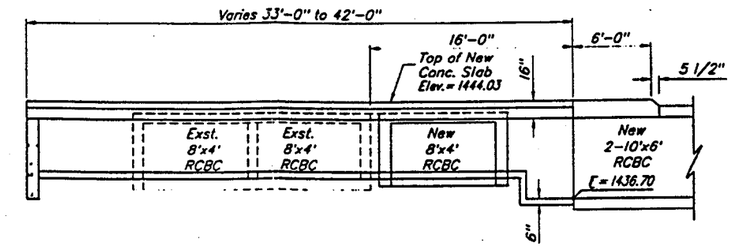
FIELD BK:	SOUTHERN AVENUE DRAINAGE IMPROVEMENTS
WK. ORDER: 2572	STRUCTURAL DETAILS INLET @ HAWES ROAD
PROJ. NO: 97-56.1	REVISED
RELEASE DATE: Dec 97	DRAWN BY: GLT ENGINEER: DEP APPROVED BY: CO
SHEET 43 31 OF 34	CATALOG NUMBER: A-68206



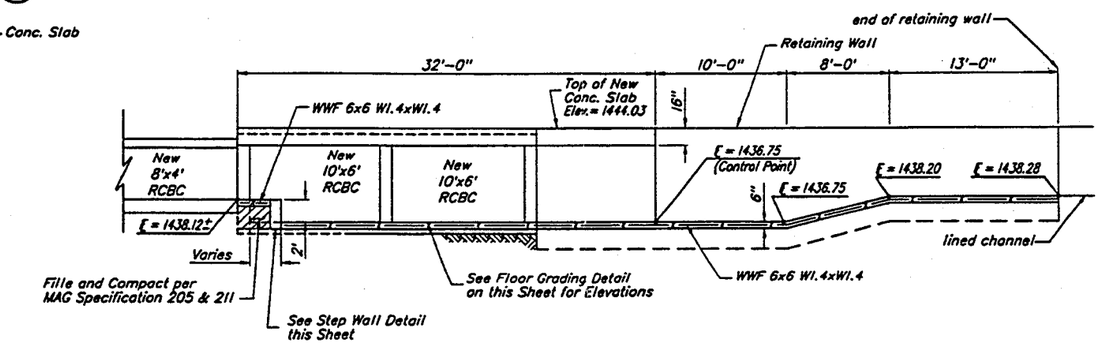
Note:
For Conduit Locations
See Sheet S-4

SLAB REINFORCING PLAN

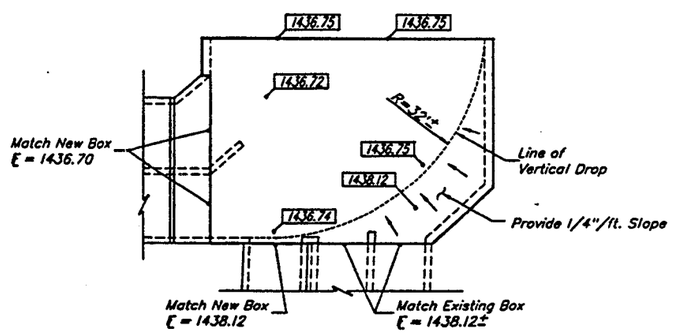
HAWES ROAD 16" SLAB



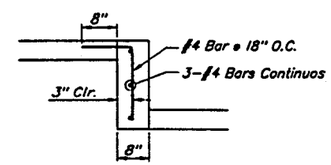
(A) SECTION



(B) SECTION



FLOOR GRADING DETAIL



STEP WALL DETAIL

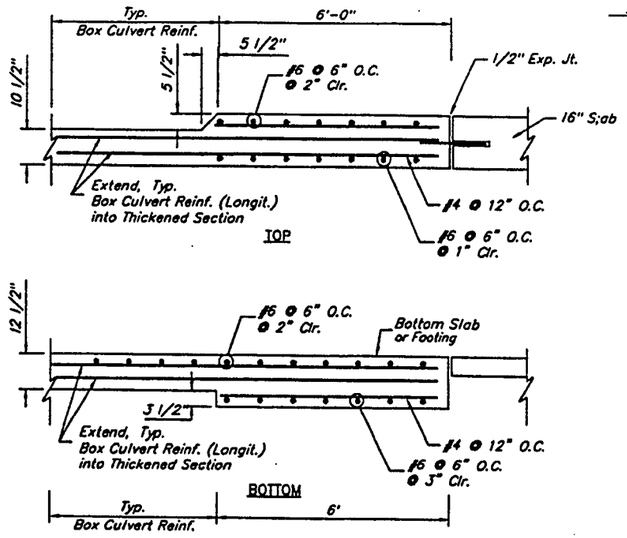
Entellus
2206 N. 44th Street Suite 200
Phoenix, AZ 85008-2279
Tel 602.344.2800
Fax 602.344.2847

PREMIER ENGINEERING CORPORATION

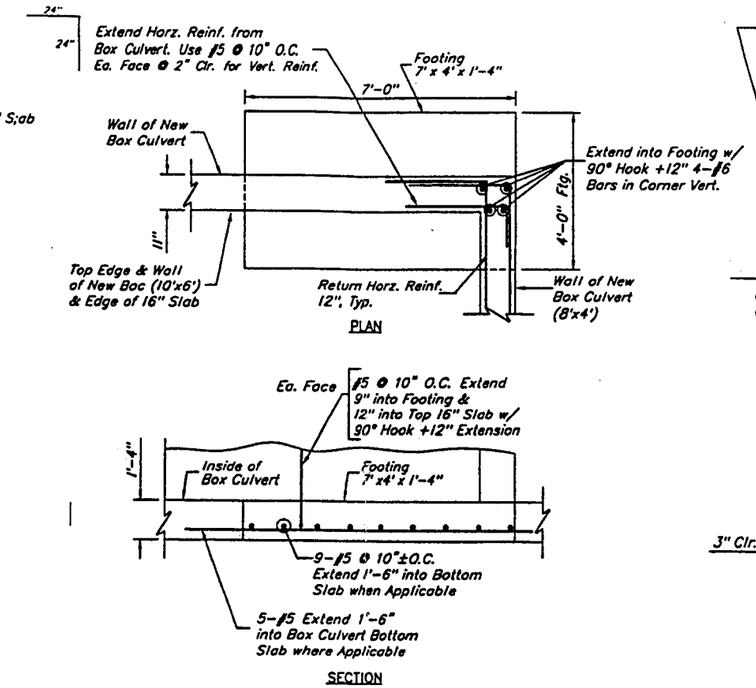
S-2

FIELD BK:		SOUTHERN AVENUE DRAINAGE IMPROVEMENTS
WK. ORDER: 2572		STRUCTURAL DETAILS INLET @ HAWES ROAD
PROJ. NO: 97-56.1		REVISED
RELEASE DATE: Dec 97	DRAWN BY: GLT ENGINEER: DCP APPROVED BY: CG	SHEET 43 32 OF 34 — CATALOG NUMBER: A-68207

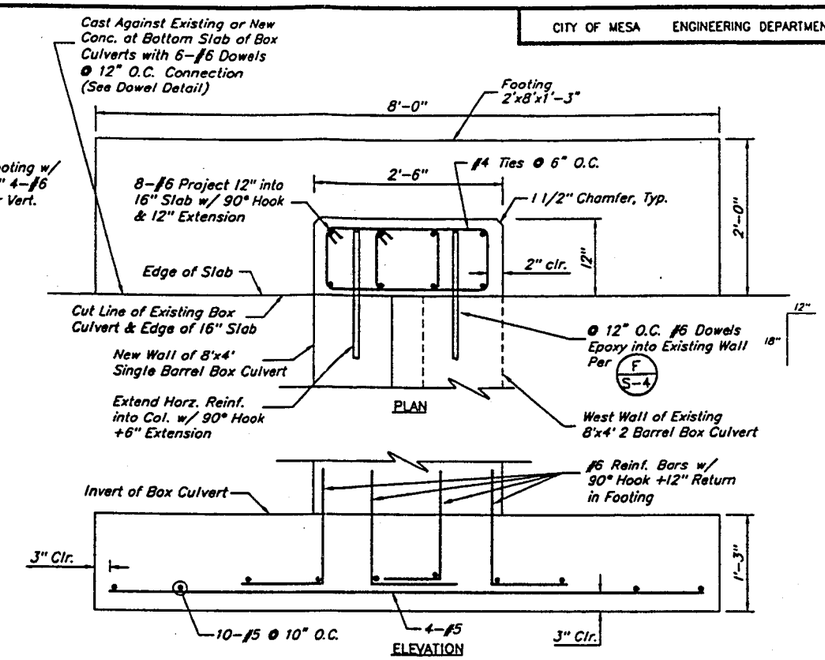
CALL TWO WORKING DAYS BEFORE YOU DIG!
263-1100
ELAINE DRIVE SERVICE



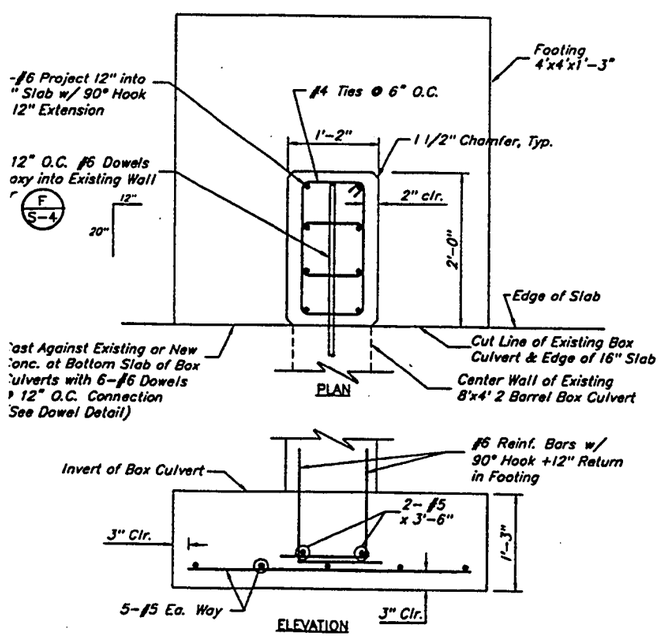
(A) SLAB SECTION



(B) DETAIL



(C) WEST WALL TIE-IN DETAIL



(D) CENTER WALL TIE-IN DETAIL

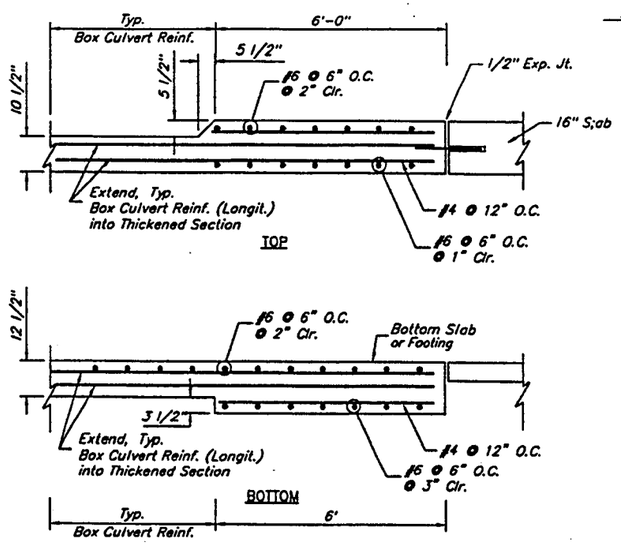
CALL TWO WORKING DAYS BEFORE YOU DIG
263-1100
ALL ONE CALL MEMBERS

Entellus
2366 N. 44th Street Suite 200
Phoenix, AZ. 85008-2279
Tel 602.344.2646
Fax 602.344.0947

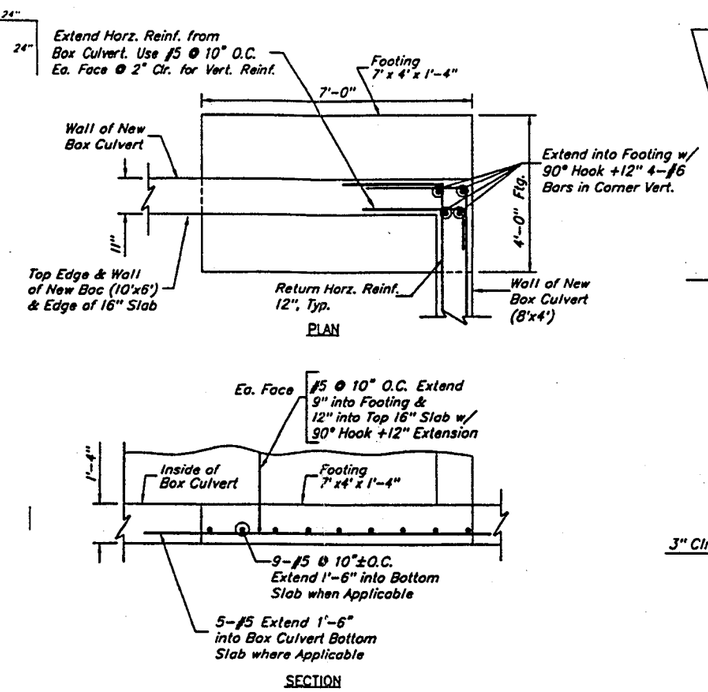
PREMIER ENGINEERING CORPORATION

S-3

FIELD BK:		SOUTHERN AVENUE DRAINAGE IMPROVEMENTS
WK. ORDER: 2572		STRUCTURAL DETAILS INLET @ HAWES ROAD
PROJ. NO: 97-56.1		REVISED
RELEASE DATE: Dec 97	DRAWN BY: GLT ENGINEER: DCP APPROVED BY: CG	SHEET 33 OF 43 / 34 — CATALOG NUMBER: A-68208



(A) SLAB SECTION



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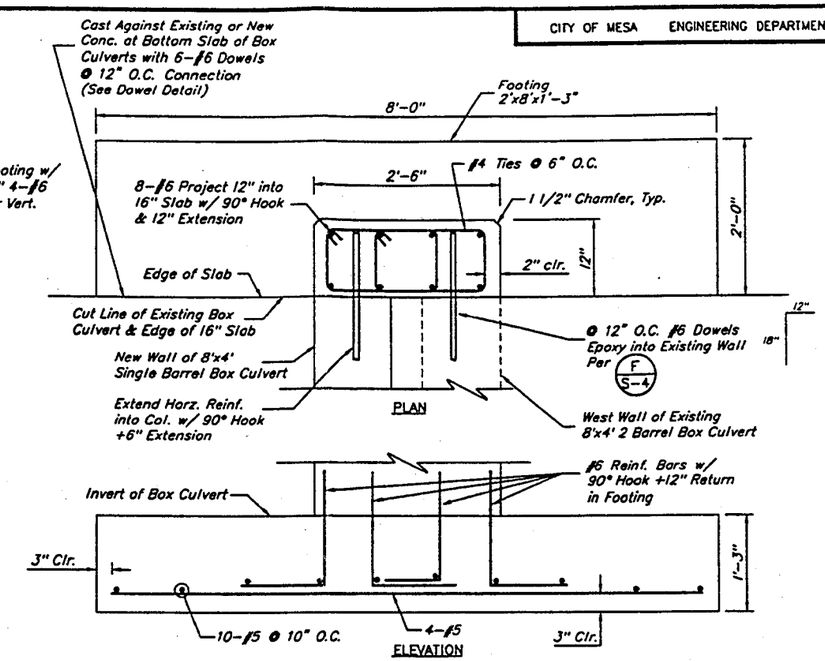
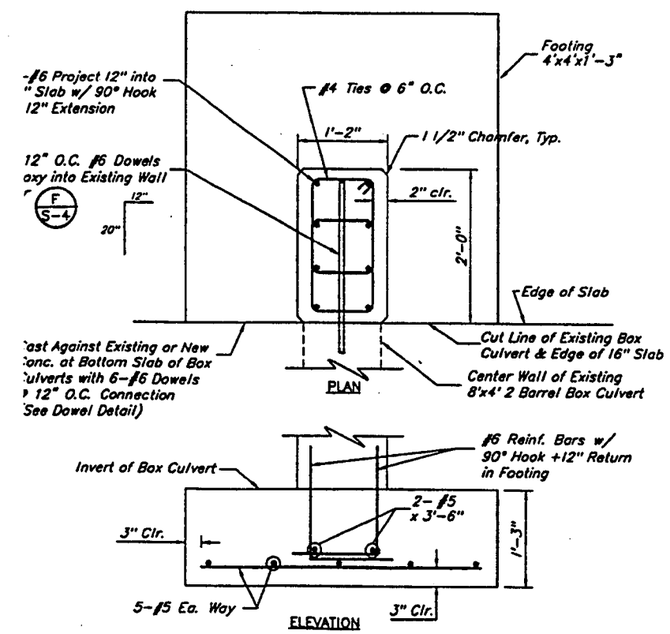


(C) WEST WALL TIE-IN DETAIL



(D) CENTER WALL TIE-IN DETAIL

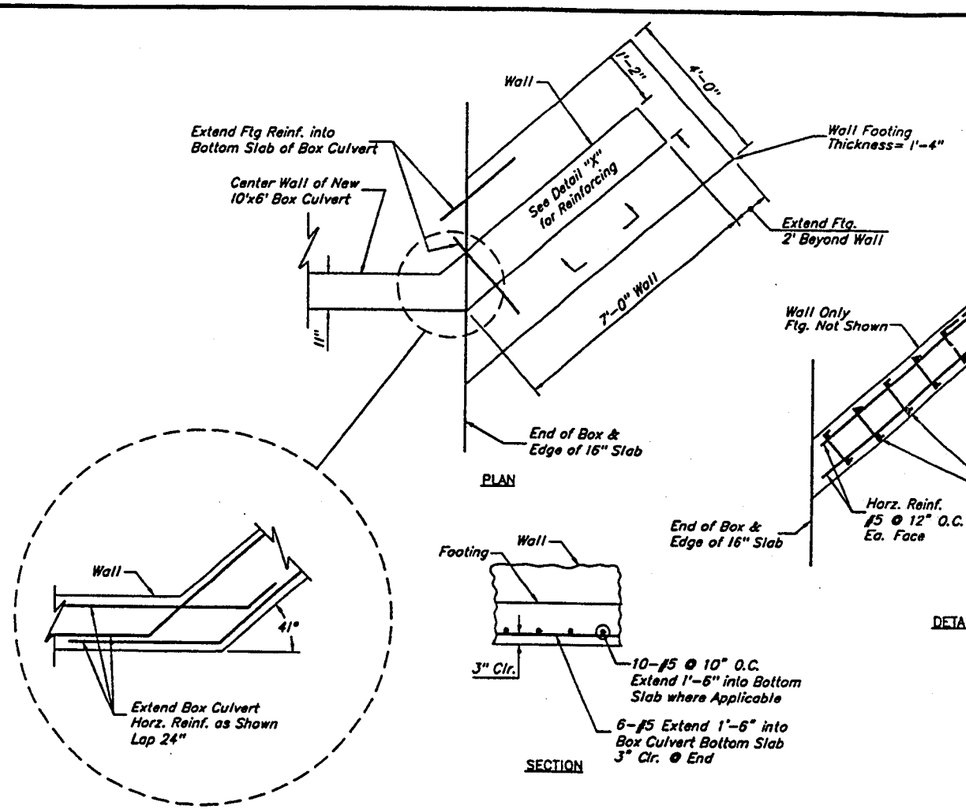
Entellus
2366 N. 44th Street Suite 220
Phoenix, AZ 85008-2279
Tel 602.344.2800
Fax 602.344.2847

PREMIER ENGINEERING CORPORATION

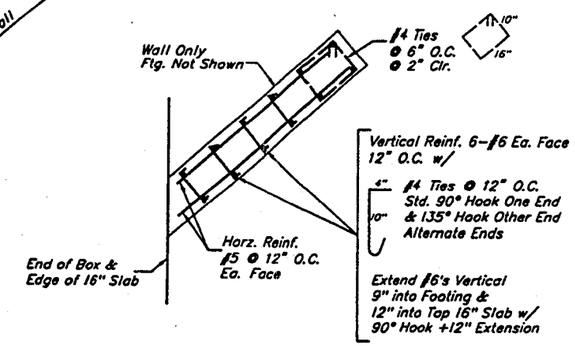
S-3

FIELD BK:		SOUTHERN AVENUE DRAINAGE IMPROVEMENTS
WK. ORDER: 2572		STRUCTURAL DETAILS INLET @ HAWES ROAD
PROJ. NO: 97-56.1		REVISED
RELEASE DATE: Dec 97	DRAWN BY: GLT ENGINEER: DEP APPROVED BY: CG	SHEET 43 33 OF 58 — CATALOG NUMBER: A-68208

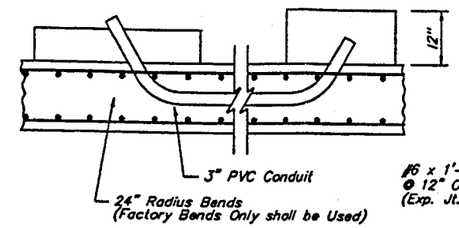
CALL TWO WORKING DAYS BEFORE YOU DIG 263-1100 ELAN SPANG GROUP

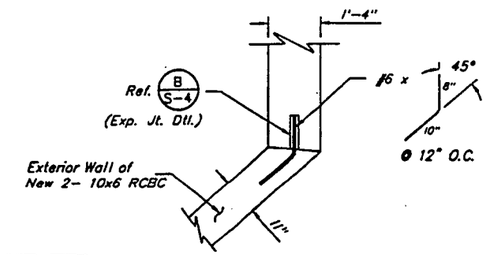


A DETAIL

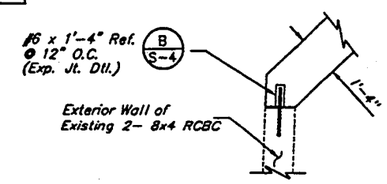


DETAIL X

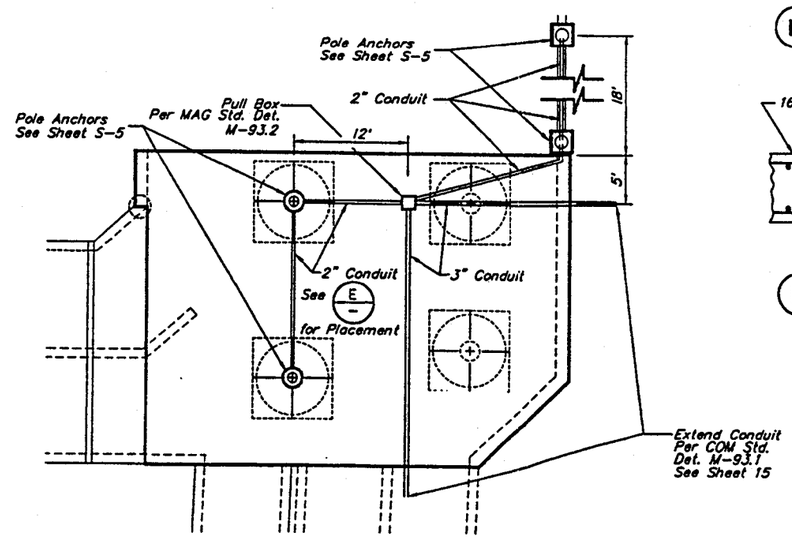




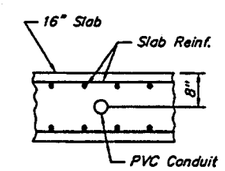
C DETAIL



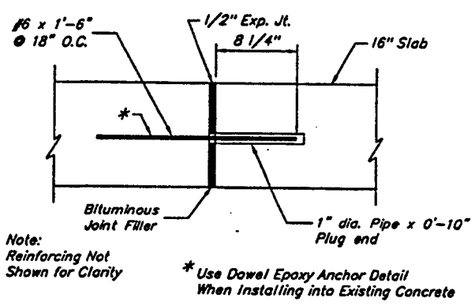
D DETAIL

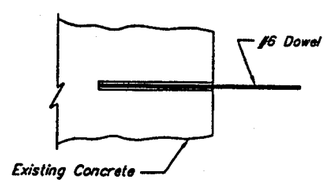


CONDUIT & LIGHT POLE SCHEMATIC



E DETAIL





Drill 26 mm dia. Hole x 8 1/4" Deep. Epoxy Dowel in Hole with an Approved Epoxy Adhesive. Epoxy Anchorage Shall Develop a Min. Tensile Pullout Strength of 15,000 Lbs.. Details of the Anchorage System Shall be Submitted to the Engineer for Approval Prior to Installation.

B TYPICAL EXPANSION JOINT SECTION

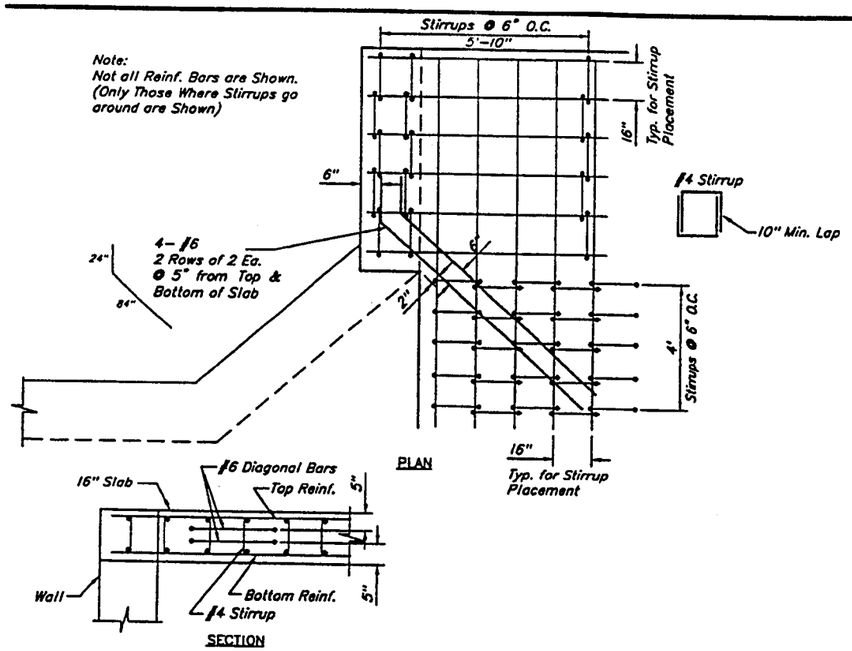
S-4

PREMIER ENGINEERING CORPORATION

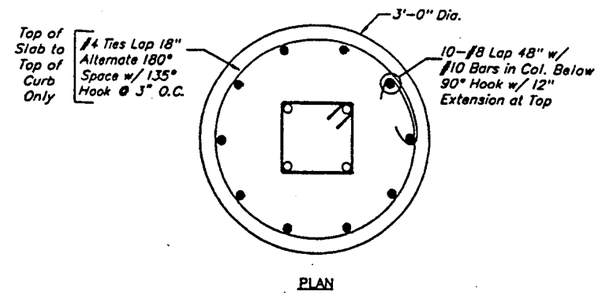
Entellus

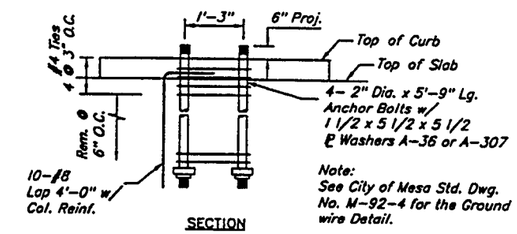
263-1100

FIELD BK:		SOUTHERN AVENUE DRAINAGE IMPROVEMENTS
WK. ORDER: 2572		STRUCTURAL DETAILS INLET @ HAWES ROAD
PROJ. NO: 97-56.1		REVISED
RELEASE DATE: Dec 97	DRAWN BY: GLT ENGINEER: DDP APPROVED BY: DQ	SHEET 43 OF 34 — CATALOG NUMBER A-68209

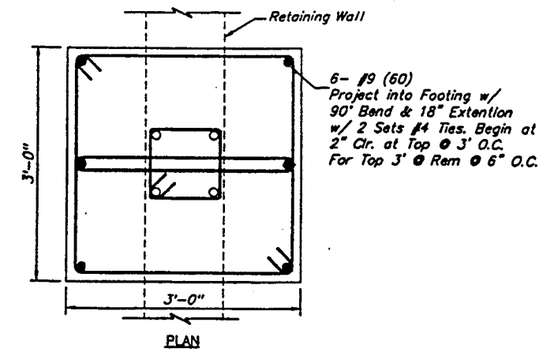


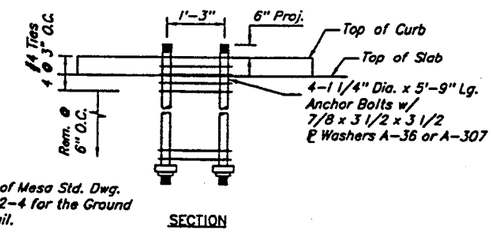
(A) DETAIL



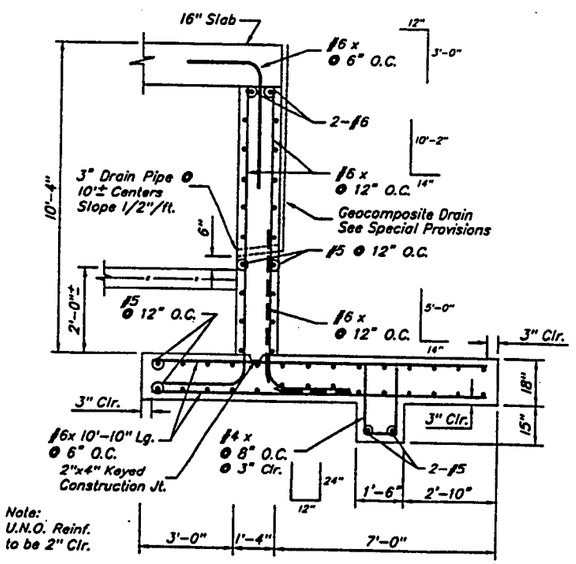


POLE ANCHOR BOLTS @ COLUMN





POLE ANCHOR BOLTS @ RETAINING WALL



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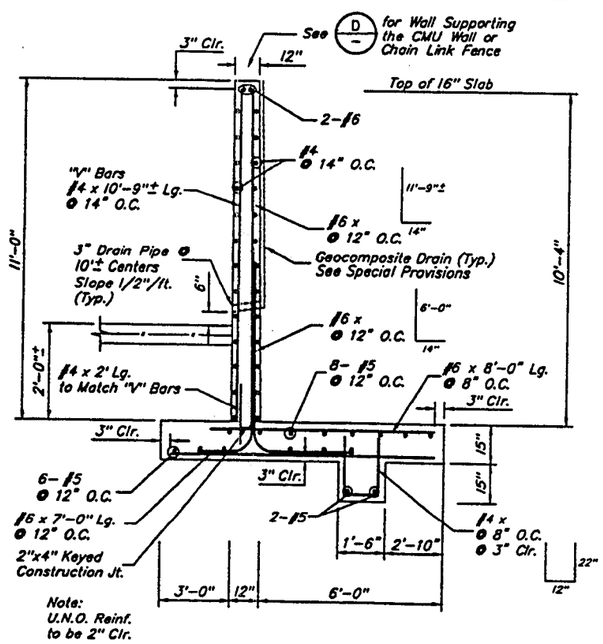
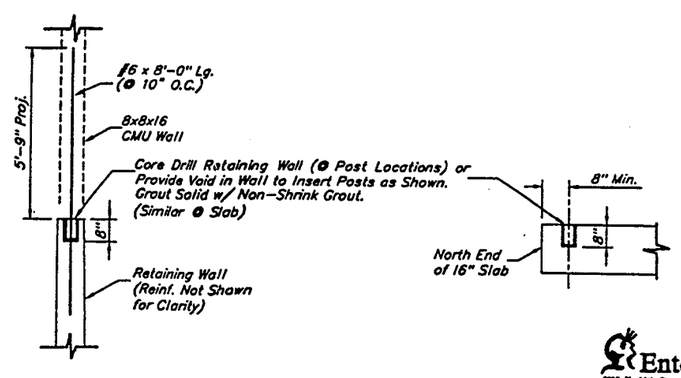


(C) SECTION



(D) DETAIL

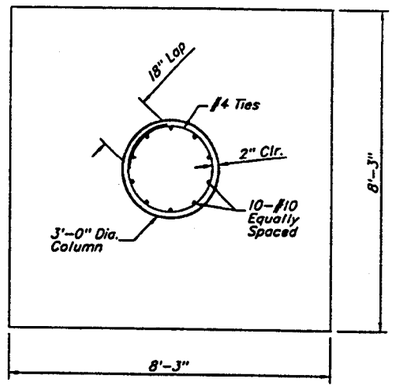
CALL TWO WORKING DAYS BEFORE YOU DIG
263-1100
ELSE DOING DAMAGE

S-5

PREMIER ENGINEERING CORPORATION

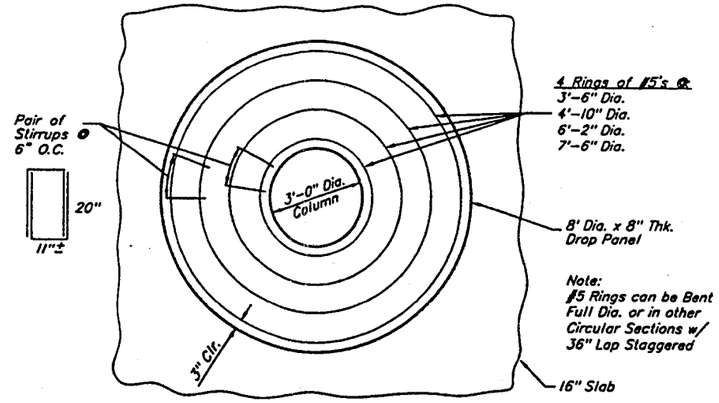
Entellus
2365 N. 44th Street Suite 200
Phoenix, AZ 85008-3279
Tel 602.344.3500
Fax 602.344.3047

FIELD BK:		SOUTHERN AVENUE DRAINAGE IMPROVEMENTS
WK. ORDER: 2572		STRUCTURAL DETAILS INLET @ HAWES ROAD
PROJ. NO: 97-56.1		REVISED
RELEASE DATE: Dec 97	DRAWN BY: GLT ENGINEER: DEP APPROVED BY: CG	SHEET 43 35 OF 34 — CATALOG NUMBER: A-68210



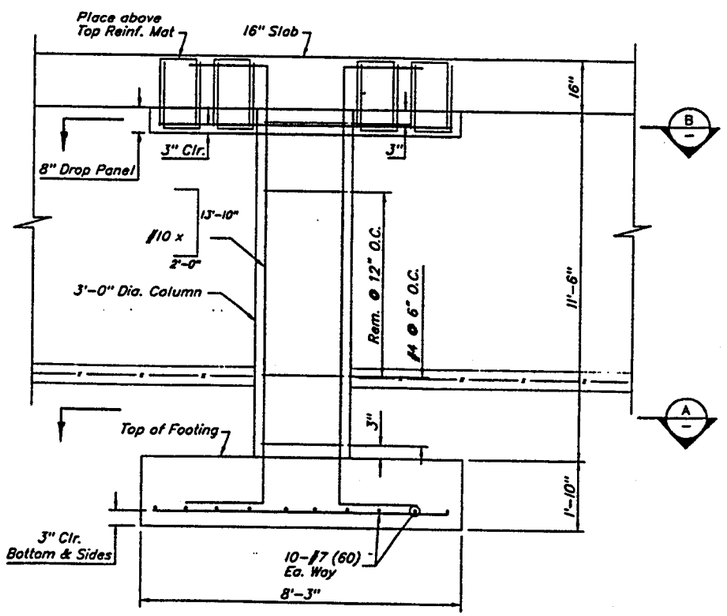
COLUMN & FOOTING PLAN

A SECTION



DROP PANEL PLAN

B SECTION



COLUMN & FOOTING ELEVATION

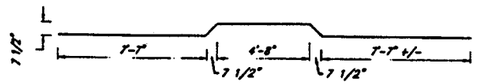
S-6

PREMIER ENGINEERING CORPORATION

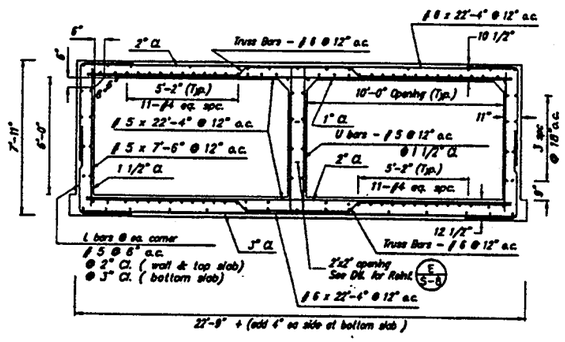
Entellus
2366 N. 44th Street, Suite 300
Phoenix, AZ 85008-2273
Tel 602.244.8946
Fax 602.244.8947

CALL TWO WORKING DAYS BEFORE YOU DIG
263-1100
MAKE SURE HERE

FIELD BK:		SOUTHERN AVENUE DRAINAGE IMPROVEMENTS
WK. ORDER: 2572		STRUCTURAL DETAILS INLET @ HAWES ROAD
PROJ. NO: 97-56.1		REVISED
RELEASE DATE: Dec 97	DRAWN BY: GLT ENGINEER: DCP APPROVED BY: CG	SHEET 43 36 OF 36 — CATALOG NUMBER A-68211

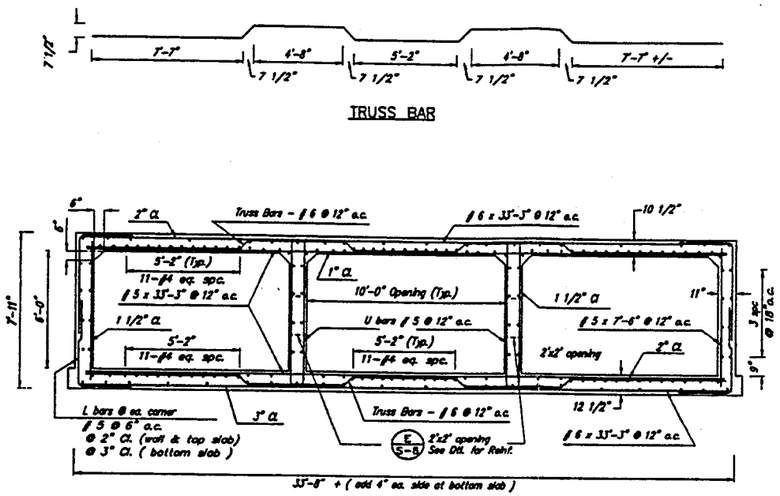


TRUSS BAR



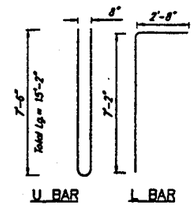
Total No. of longit. bars = 108, all are # 4's Place as shown.

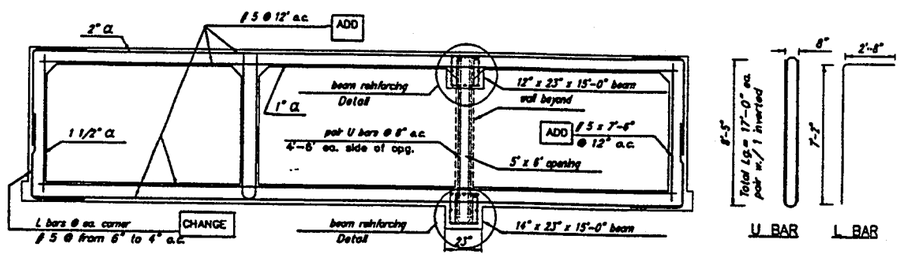
DOUBLE BARREL BOX CULVERT



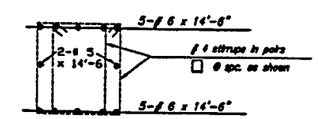
Total No. of longit. bars = 174, all are # 4's Place as shown.

TRIPLE BARREL BOX CULVERT

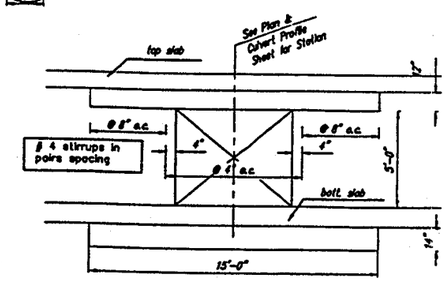




SECTION



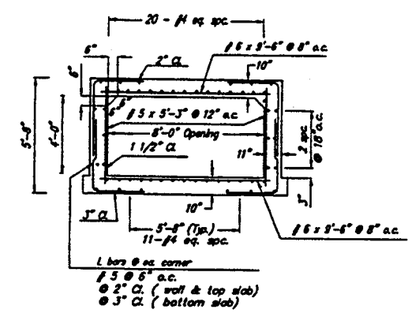
BEAM REINFORCING DETAIL



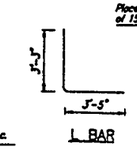
INTERIOR WALL ELEVATION @ OPENING

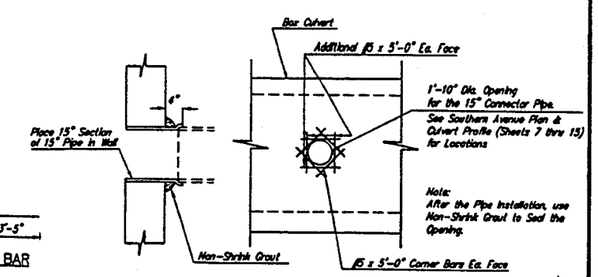
ADDED OR CHANGED REINFORCING REQ'D. AT OPENING AS SHOWN

DETAILS AT INTERIOR WALL 5' x 6' OPENING



SINGLE BARREL BOX CULVERT





15" CONNECTOR PIPE OPENING

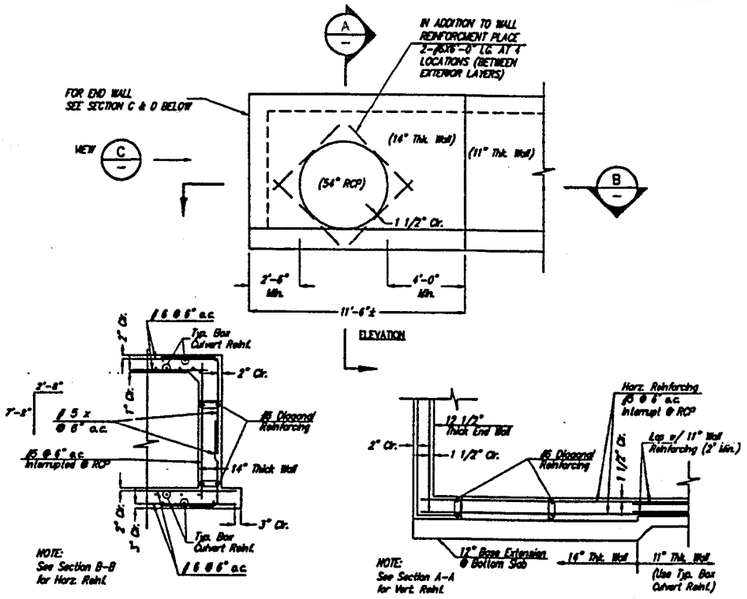
Entellus
2355 W. 4th Street Suite 230
Phoenix, AZ 85009-2979
Tel 602.344.3946
Fax 602.344.3947

PREMIER ENGINEERING CORPORATION

S-7

FIELD BK:	14788 DONALD E. PRIBOTT, Arizona	SOUTHERN AVENUE DRAINAGE IMPROVEMENTS
WK. ORDER: 2572		STRUCTURAL DETAILS BOX CULVERTS
PROJ. NO: 97-56.1		REVISED
RELEASE DATE: Dec 97	DRAWN BY: CLT ENGINEER: DEP APPROVED BY: CG	SHEET 43 37 OF 39 — CATALOG NUMBER: A-68212

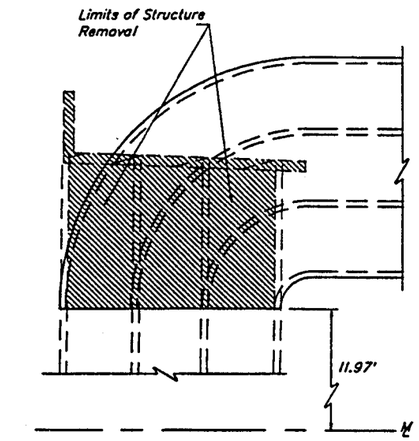
CALL THE FOLLOWING DAYS BEFORE YOU DIG 263-1100 ELVE STATE CLAIMS



A SECTION

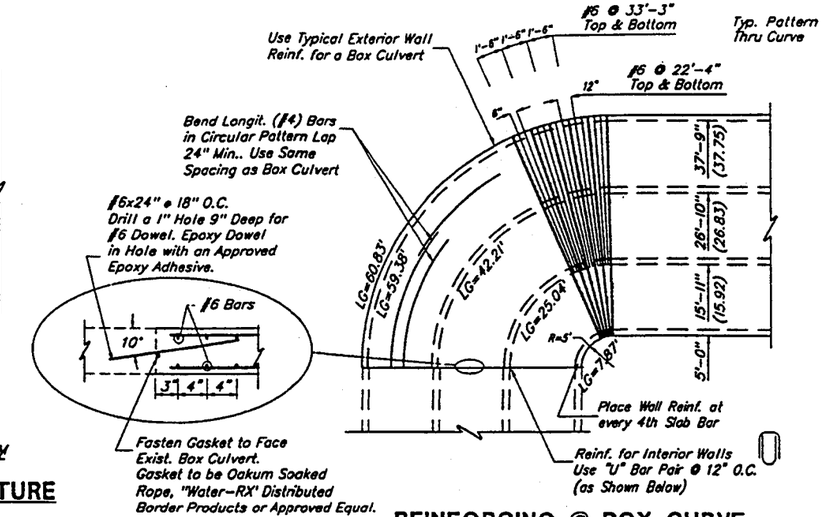
B SECTION

REINFORCMENT @ 54" RCP



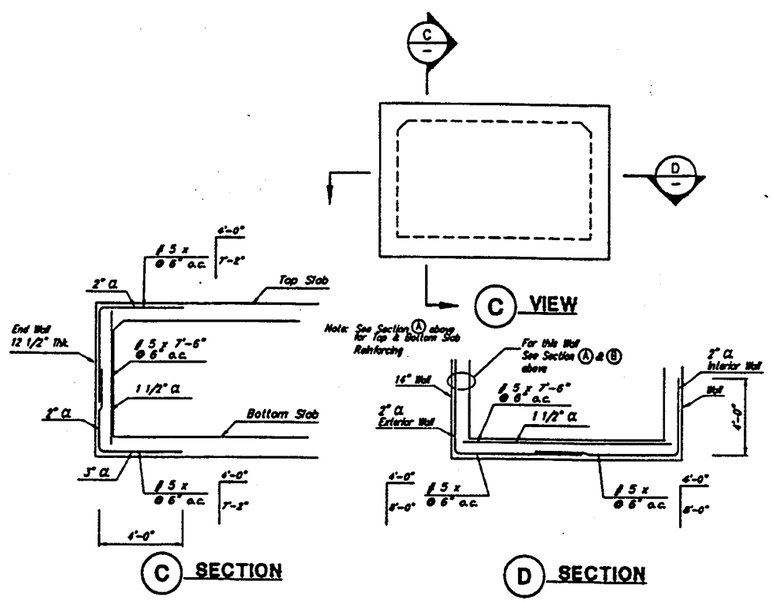
DEMOLITION OF EXISTING STRUCTURE

(@ SOSSOMAN CHANNEL)



REINFORCING @ BOX CURVE

(@ SOSSOMAN CHANNEL)

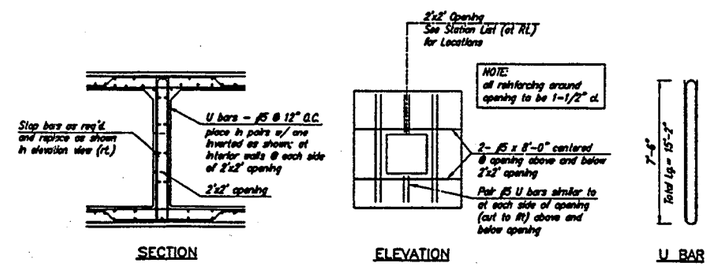


C VIEW

C SECTION

D SECTION

END WALL DETAIL



SECTION

ELEVATION

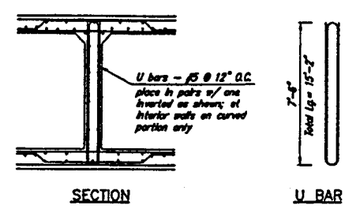
U BAR

2'x2' OPENING @ INTERIOR WALLS OF BOX CULVERT

E

STATION FOR 2'X2' OPENINGS

STATION	OFFSET
60+00	27.25
61+00	38.16
62+00	27.25
63+00	38.16
64+00	27.25
65+00	38.16
66+00	27.25
67+00	38.16
68+00	27.25
69+00	38.16
70+00	27.25
71+00	38.16
72+00	27.25
75+00	38.16
77+00	38.16
79+00	38.16
81+00	38.16
83+00	38.16
85+00	38.16
87+00	38.16
89+00	38.16
91+00	38.16
93+00	38.16
95+00	38.16
97+00	38.16



SECTION

U BAR

TRIPLE BARREL BOX CULVERT

@ Sossoman Channel Curve

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263-1100
BLUE STAKE INC.

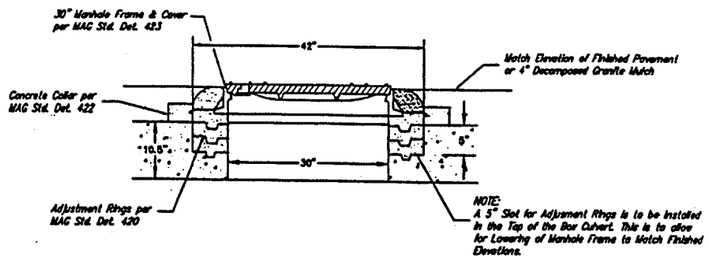
S-8

PREMIER ENGINEERING CORPORATION

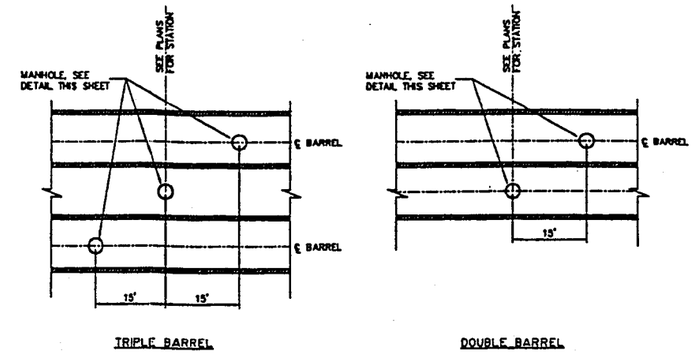
Entellus
2366 N. 44th Street Suite 200
Phoenix, AZ 85008-5279
Tel 602.341.2600
Fax 602.341.5847

FIELD BK:	SOUTHERN AVENUE DRAINAGE IMPROVEMENTS
WK. ORDER: 2572	STRUCTURAL DETAILS BOX CULVERTS
PROJ. NO: 97-56.1	REVISED
RELEASE DATE: Dec 97	DRAWN BY: GLT ENGINEER: DEP APPROVED BY: CG
SHEET 43 38 OF 38	CATALOG NUMBER: A-68213

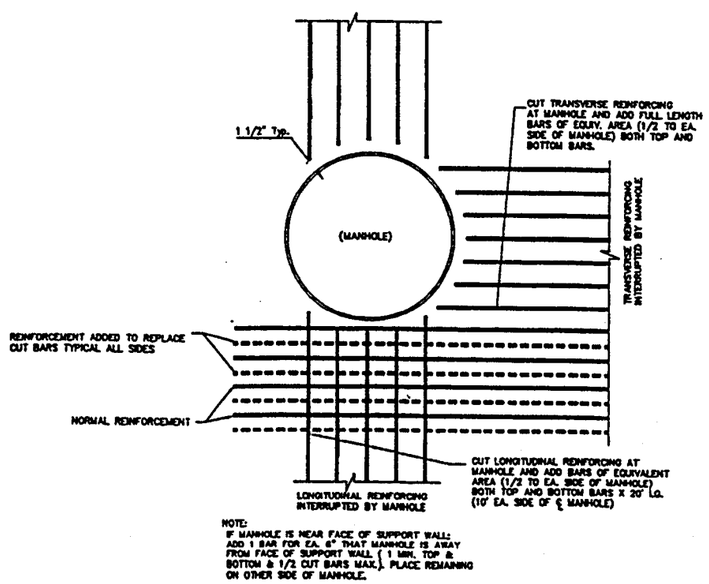
CITY OF MESA ENGINEERING DEPARTMENT



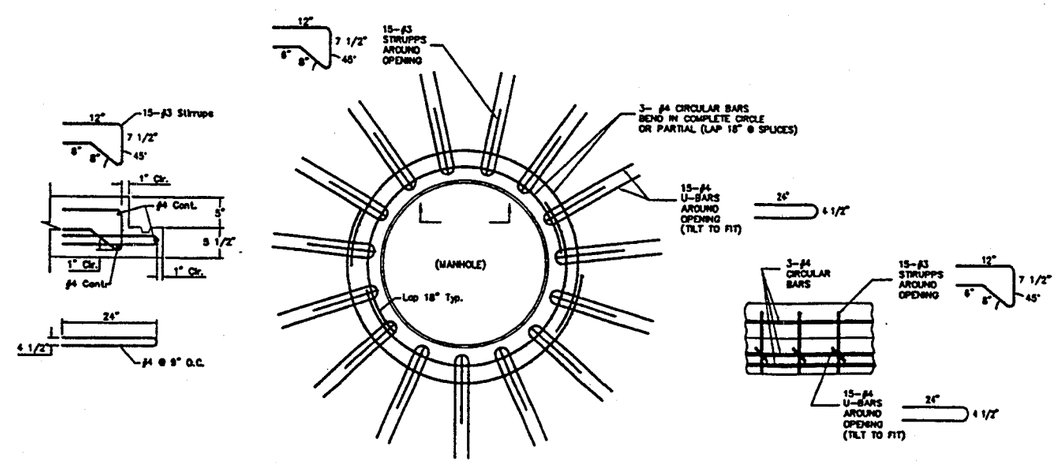
MANHOLE FRAME AND COVER



MANHOLE SET DETAIL



BOX CULVERT MANHOLE COVERS



REINFORCING @ MANHOLE COVERS

S-9

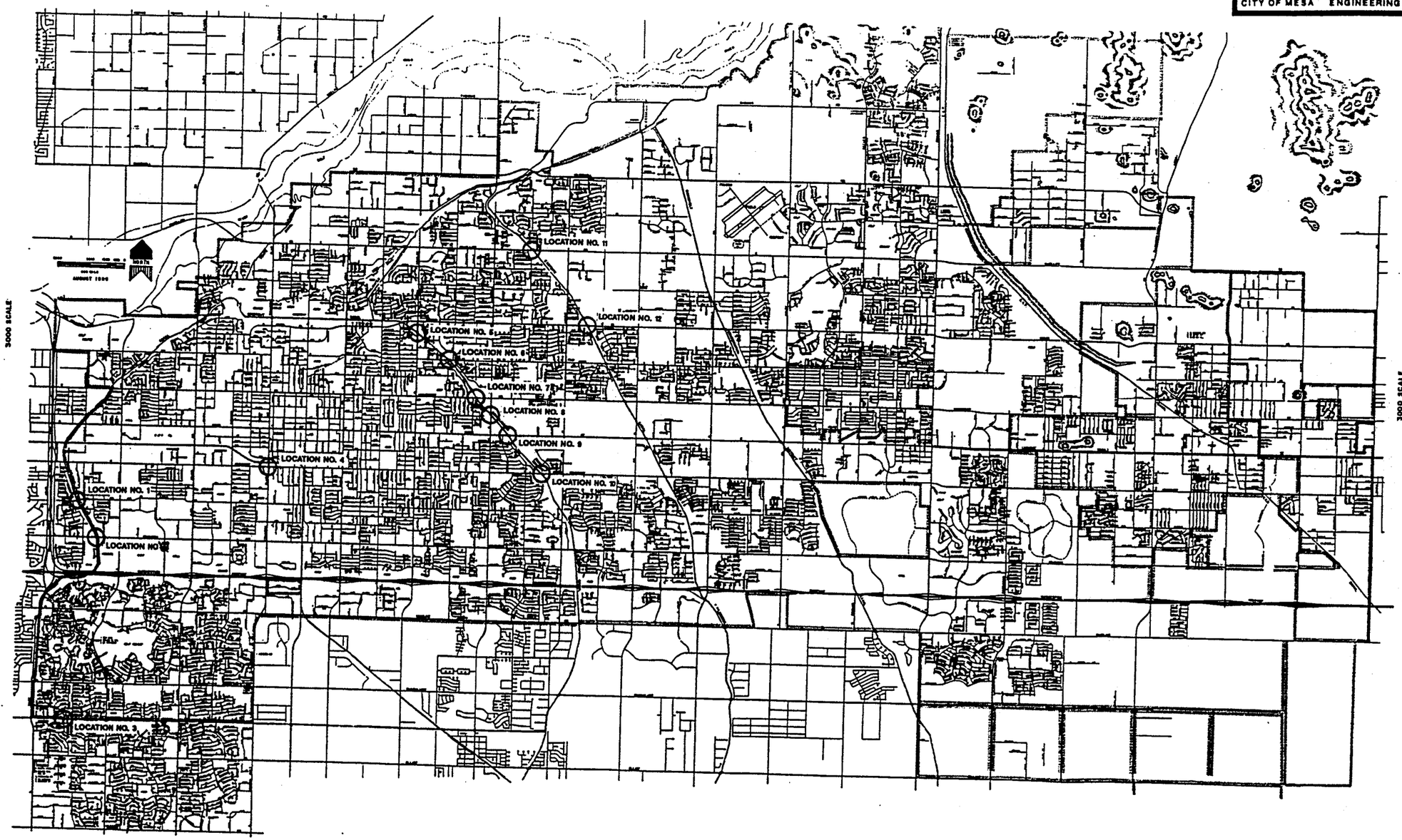
PREMIER

Entellus

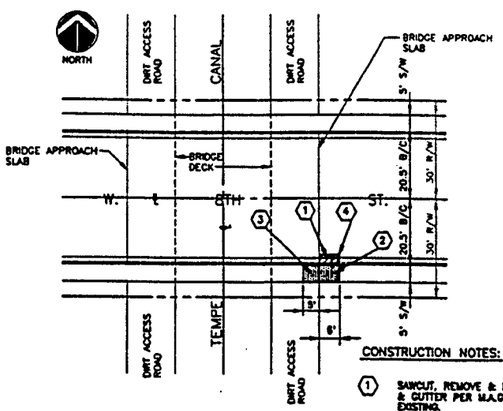
FIELD BK:		SOUTHERN AVENUE DRAINAGE IMPROVEMENTS
WK. ORDER: 2572		MISCELLANEOUS STRUCTURAL DETAILS
PROJ. NO: 97-56.1		REVISED
RELEASE DATE: Dec 97	DRAWN BY: GLT ENGINEER: DEF APPROVED BY: CG	SHEET 39 OF 43 — CATALOG NUMBER A-68214

263-1100

CITY OF MESA ENGINEERING DEPARTMENT



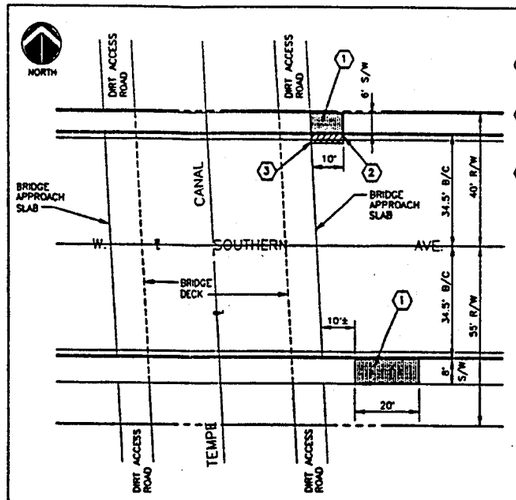
FIELD BK:		BRIDGE MODIFICATIONS
WK. ORDER:		BRIDGE LOCATION MAP
PROJ. NO:		REVISED
RELEASE DATE:	DRAWN BY: ENGINEER: APPROVED BY:	SHEET 40 OF 43 — CATALOG NUMBER A-68215



CONSTRUCTION NOTES:

1. SAWCUT, REMOVE & REPLACE 8 L.F. OF EXISTING CURB & GUTTER PER M.A.G. DETAIL 220, TYPE "A". MATCH EXISTING.
2. SAWCUT, REMOVE & REPLACE 30 S. F. OF CONCRETE SIDEWALK PER M.A.G. DETAIL 230. MATCH EXISTING.
3. SAWCUT, REMOVE & REPLACE 25 S.F. OF EXISTING CONCRETE SIDEWALK RAMP PER M.A.G. DETAIL 230. MATCH EXISTING DRIVEWAY & NEW SIDEWALK.
4. SAWCUT, REMOVE & REPLACE 1 S.Y. OF EXISTING ASPHALT PAVEMENT (1-1/2" A-19 OVER 2-1/2" A-25 OVER 10" A.B.C.).

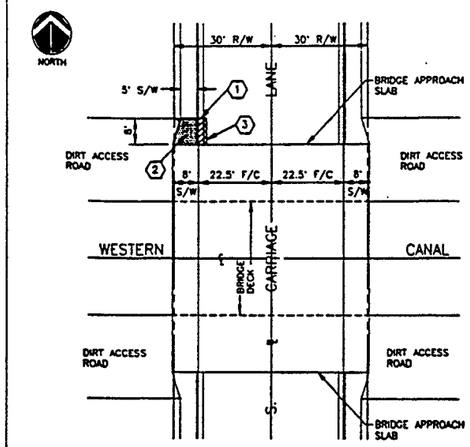
LOCATION NO. 1



CONSTRUCTION NOTES:

1. SAWCUT, REMOVE & REPLACE 220 S.F. OF CONCRETE SIDEWALK PER M.A.G. DETAIL 230. MATCH EXISTING.
2. SAWCUT, REMOVE & REPLACE 10 L.F. OF EXISTING CURB & GUTTER PER M.A.G. DETAIL 220, TYPE "A". MATCH EXISTING.
3. SAWCUT, REMOVE & REPLACE 1 S.Y. OF EXISTING ASPHALT PAVEMENT (1-1/2" A-19 OVER 2-1/2" A-25 OVER 10" A.B.C.).

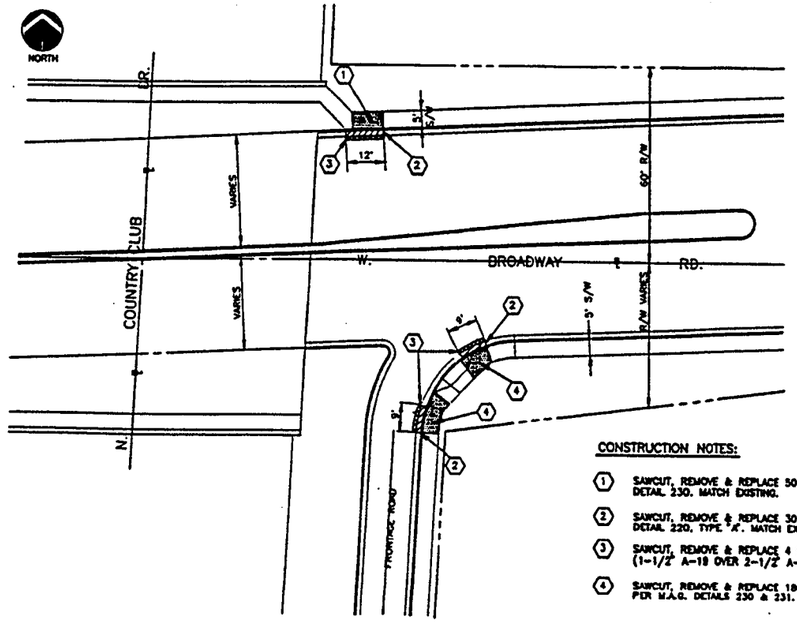
LOCATION NO. 2



CONSTRUCTION NOTES:

1. SAWCUT, REMOVE & REPLACE 8 L.F. OF EXISTING CURB & GUTTER PER M.A.G. DETAIL 220, TYPE "A". MATCH EXISTING.
2. SAWCUT, REMOVE & REPLACE 48 S. F. OF CONCRETE SIDEWALK PER M.A.G. DETAIL 230. MATCH EXISTING.
4. SAWCUT, REMOVE & REPLACE 1 S.Y. OF EXISTING ASPHALT PAVEMENT (1-1/2" A-19 OVER 2-1/2" A-25 OVER 10" A.B.C.).

LOCATION NO. 3



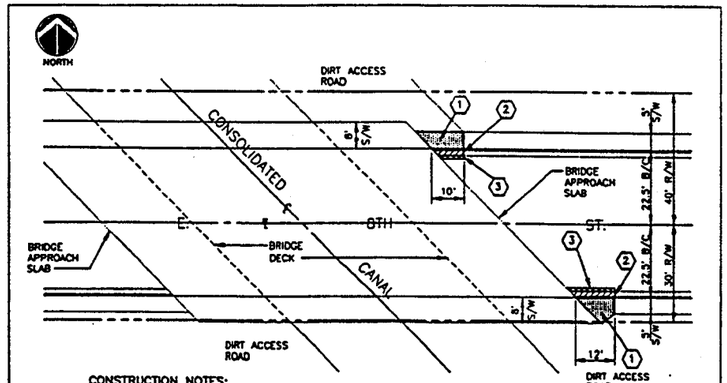
CONSTRUCTION NOTES:

1. SAWCUT, REMOVE & REPLACE 50 S. F. OF CONCRETE SIDEWALK PER M.A.G. DETAIL 230. MATCH EXISTING.
2. SAWCUT, REMOVE & REPLACE 30 L.F. OF EXISTING CURB & GUTTER PER M.A.G. DETAIL 220, TYPE "A". MATCH EXISTING.
3. SAWCUT, REMOVE & REPLACE 4 S.Y. OF EXISTING ASPHALT PAVEMENT (1-1/2" A-19 OVER 2-1/2" A-25 OVER 10" A.B.C.).
4. SAWCUT, REMOVE & REPLACE 180 S.F. OF EXISTING CONCRETE SIDEWALK RAMP PER M.A.G. DETAILS 230 & 231. MATCH EXISTING.

LOCATION NO. 4

FIELD BK:		BRIDGE MODIFICATIONS	
340 W.O. 342 W.O.		PLAN VIEW	REVISED
PROJ. NO:	DRAWN BY: H.M. ENGINEER: T.S. APPROVED BY: P. HUDSON	SHEET 41 OF 43	CATALOG NUMBER: A-68216

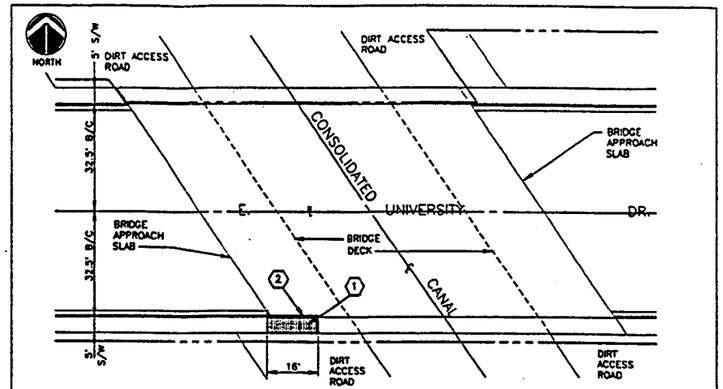
CITY OF MESA ENGINEERING DEPARTMENT



CONSTRUCTION NOTES:

1. SAWCUT, REMOVE & REPLACE 115 S.F. OF EXISTING CONC. DRIVEWAY PER M.A.G. DETAILS 230 & 250. MATCH EXISTING.
2. SAWCUT, REMOVE & REPLACE 22 L.F. OF EXISTING CURB & GUTTER PER M.A.G. DETAIL 220, TYPE "A". MATCH EXISTING.
3. SAWCUT, REMOVE & REPLACE 3 S.Y. OF EXISTING ASPHALT PVMT. (1-1/2" A-19 OVER 2" A-25 OVER 10" A.B.C.).

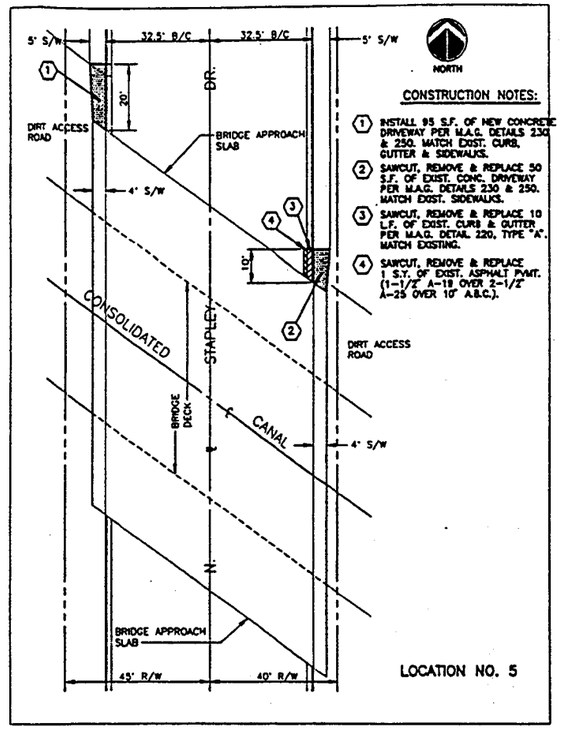
LOCATION NO. 6



CONSTRUCTION NOTES:

1. SAWCUT, REMOVE & REPLACE 80 S.F. OF EXIST. CONC. DRIVEWAY PER M.A.G. DETAILS 230 & 250. MATCH EXISTING.
2. SAWCUT, REMOVE & REPLACE 16 L.F. OF EXIST. CURB & GUTTER PER M.A.G. DETAIL 220, TYPE "A". MATCH EXISTING.

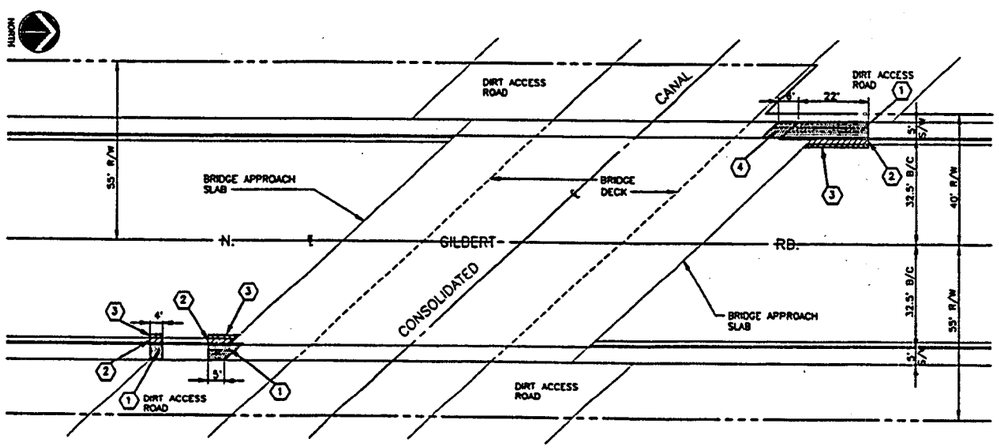
LOCATION NO. 7



CONSTRUCTION NOTES:

1. INSTALL 95 S.F. OF NEW CONCRETE DRIVEWAY PER M.A.G. DETAILS 230 & 250. MATCH EXIST. CURB, GUTTER & SIDEWALKS.
2. SAWCUT, REMOVE & REPLACE 50 S.F. OF EXIST. CONC. DRIVEWAY PER M.A.G. DETAILS 230 & 250. MATCH EXIST. SIDEWALKS.
3. SAWCUT, REMOVE & REPLACE 10 L.F. OF EXIST. CURB & GUTTER PER M.A.G. DETAIL 220, TYPE "A". MATCH EXISTING.
4. SAWCUT, REMOVE & REPLACE 1 S.Y. OF EXIST. ASPHALT PVMT. (1-1/2" A-19 OVER 2-1/2" A-25 OVER 10" A.B.C.).

LOCATION NO. 5



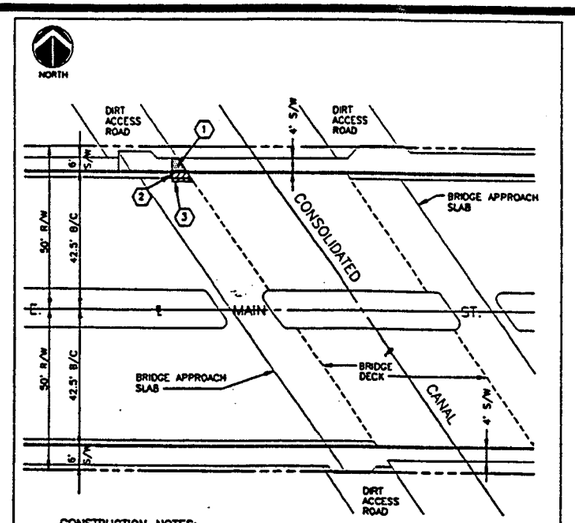
CONSTRUCTION NOTES:

1. SAWCUT, REMOVE & REPLACE 175 S. F. OF EXISTING CONCRETE DRIVEWAY PER M.A.G. DETAIL 230 & 250. MATCH EXISTING.
2. SAWCUT, REMOVE & REPLACE 35 L.F. OF EXISTING CURB & GUTTER PER M.A.G. DETAIL 220, TYPE "A". MATCH EXISTING.
3. SAWCUT, REMOVE & REPLACE 4 S.Y. OF EXISTING ASPHALT PAVEMENT (1-1/2" A-19 OVER 2-1/2" A-25 OVER 10" A.B.C.).
4. SAWCUT, REMOVE & REPLACE 30 S. F. OF CONCRETE SIDEWALK RAMP PER M.A.G. DETAIL 230. MATCH EXISTING.

LOCATION NO. 8

FIELD BK:		BRIDGE MODIFICATIONS	
340 W.O.		PLAN VIEW	REVISED
342 W.O.			
PROJ. NO:	DRAWN BY: H.M. ENGINEER: F.A. APPROVED BY: P. HUDSON	SHEET 42 OF 43	CATALOG NUMBER: A-68217

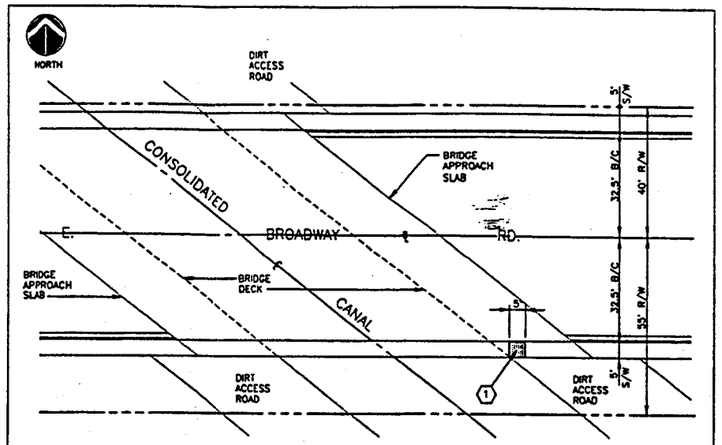
D:\BOCT2



CONSTRUCTION NOTES:

1. SAWCUT, REMOVE & REPLACE 6 S.F. OF EXISTING CONCRETE SIDEWALK PER DETAIL "A" THIS SHEET.
2. SAWCUT, REMOVE & REPLACE 5 L.F. OF EXISTING CURB & GUTTER PER M.A.G. DETAIL 220, TYPE "A". MATCH EXISTING.
3. SAWCUT, REMOVE & REPLACE 1 S.Y. OF EXISTING ASPHALT PAVEMENT (1-1/2" A-19 OVER 2-1/2" A-25 OVER 10" A.B.C.).

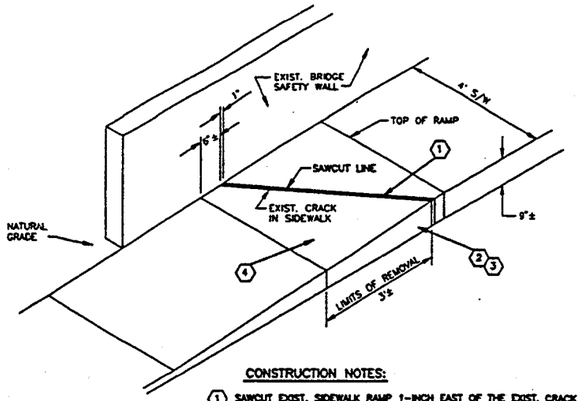
LOCATION NO. 9



CONSTRUCTION NOTES:

1. SAWCUT, REMOVE & REPLACE 25 S.F. OF EXIST. CONCRETE SIDEWALK PER M.A.G. DETAIL 230. MATCH EXISTING.

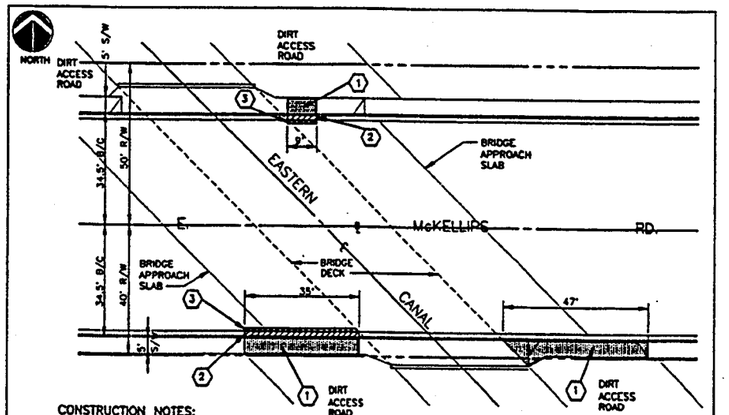
LOCATION NO. 10



CONSTRUCTION NOTES:

1. SAWCUT EXIST. SIDEWALK RAMP 1-INCH EAST OF THE EXIST. CRACK IN SIDEWALK. SAWCUT TO A DEPTH OF 3-INCH MIN.
2. REMOVE 6 S.F. OF EXIST. CONC. SIDEWALK DOWN TO EXIST. RAMP FULL DEPTH (9"±).
3. INSTALL 6 S.F. OF CLASS AA CONCRETE PER M.A.G. SECTION 725. MATCH EXISTING RAMP.
4. REMOVE EXIST. STEEL REINFORCING AS NECESSARY FOR REMOVAL OF THE EXIST. CONC. RAMP. REPLACE IN-KIND PER DIRECTION OF THE CITY INSPECTOR.

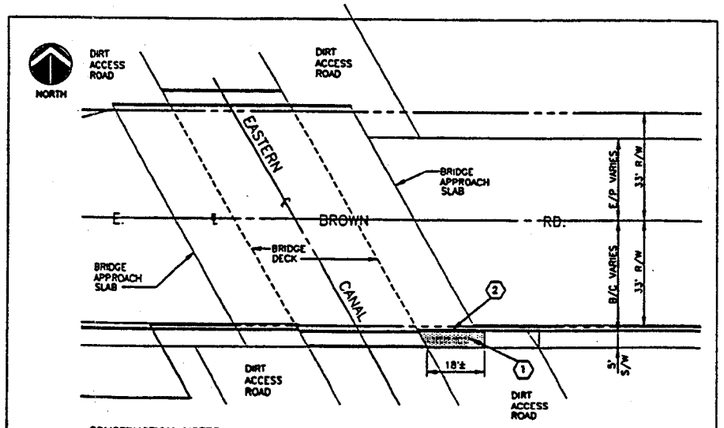
DETAIL "A"



CONSTRUCTION NOTES:

1. SAWCUT, REMOVE & REPLACE 480 S.F. OF EXISTING CONCRETE DRIVEWAY PER M.A.G. DETAIL 230 & 250. MATCH EXISTING.
2. SAWCUT, REMOVE & REPLACE 44 L.F. OF EXISTING CURB & GUTTER PER M.A.G. DETAIL 220, TYPE "A". MATCH EXISTING.
3. SAWCUT, REMOVE & REPLACE 5 S.Y. OF EXISTING ASPHALT PAVEMENT (1-1/2" A-18 OVER 2-1/2" A-25 OVER 10" A.B.C. MATCH EXISTING.

LOCATION NO. 11



CONSTRUCTION NOTES:

1. SAWCUT, REMOVE & REPLACE 90 S.F. OF EXIST. CONCRETE DRIVEWAY PER M.A.G. DETAIL 230 & 250. MATCH EXISTING.
2. SAWCUT, REMOVE & REPLACE 12 L.F. OF EXISTING CURB & GUTTER PER M.A.G. DETAIL 222, TYPE "A". MATCH EXISTING.

LOCATION NO. 12

FIELD BK:		BRIDGE MODIFICATIONS	
340 W.O.		PLAN VIEW	REVISED
342 W.O.			
PROJ. NO:	DRAWN BY: M.M. ENGINEER: P.R. APPROVED BY: P. KNUDSON	SHEET 43 OF 43	CATALOG NUMBER A-68218

D:\BDCT3