SCOTTSDALE ROAD CORRIDOR
DRAINAGE MASTER PLAN

FCD 2000C030

TECHNICAL SECTION – VOLUME 1

HYDROLOGY ANALYSIS
FINAL REPORT

Prepared for:
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009

Flood Control District of Maricopa County

Prepared by:
Stanley Consultants, Inc.
2929 East Camelback Road, Suite 130
Phoenix, Arizona 85016

Stanley Consultants INC.
A Stanley Group Company
Engineering, Environmental and Construction Services - Worldwide

SCI Project #15586

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Registered Professional Engineer (Civil)
CERTIFICATE NO.
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G. SCOTT
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Date Signed 12-11-02
ARIZONA, U.S.A.

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Scottsdale Road Corridor
Drainage Master Plan
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Technical Section – Volume 1
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File #15586C10.txt:	Scottsdale Road Corridor DMP HEC-1 Model 10-Year, 6-Hour Existing Conditions
File #Alt100.txt:	Scottsdale Road Corridor DMP HEC-1 Model 100-Year, 6-Hour Recommended Alternative Conditions
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File #15586A24.dat:	Scottsdale Road Corridor DMP HEC-1 Model 100-Year, 24-Hour Existing Conditions
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1.0 INTRODUCTION

The Scottsdale Road Corridor Drainage Master Plan study area boundary was established on the basis of contributing drainage area. The boundary comprises all of the area that contributes runoff to the Scottsdale Road corridor above Mountain View Road, and all of the contributing drainage area to the Berneil Ditch and the 64th Street Channel (Invergordon Road Channel) at their respective outfalls to the Indian Bend Wash. The total contributing drainage area corresponding to the study boundary is 9.81 square miles.

The upper boundary of the Scottsdale Road Corridor Drainage Master Plan study area corresponds to the stormwater detention facilities that protect the Central Arizona Project (CAP) canal from runoff originating in the McDowell Mountains to the northeast. Because of the high level of design used in the construction of these features, the CAP is generally considered an effective barrier to storm runoff from the north.

The lower limit of the study is the Indian Bend Wash, a major regional watercourse that originates in the City of Phoenix west of the study area. The Indian Bend Wash has been improved in many phases over the past 25 or 30 years as a multi-purpose flood control, public parks and open space and private golf course corridor. It passes through the Town of Paradise Valley and the City of Scottsdale and outfalls to the Salt River several miles south of the study.

The east and west limits of the study area were established on the basis of extensive field reconnaissance and the review of topography and as-built plans. There are a total of seven locations along the east and west boundaries of the study area where storm runoff leaves the Scottsdale Road Corridor Drainage Master Plan study and drains to the adjoining watersheds. The runoff that leaves the study at these locations flows to the Indian Bend Wash and does not return to the study area. There is no runoff that enters the study area from outside of the study boundary.

Development in the Scottsdale Road Corridor Drainage Master Plan area dates back to the 1950's and 1960's consisting primarily of single-family residential homes on large parcels in the southern part of the study area. Early residential improvements were exposed to repeated flooding from the (then unimproved) Indian Bend Wash and its major tributaries that had large uncontrolled drainage areas extending far north into the McDowell Mountains. Over the years, development in the study area, along with the associated municipal, transportation and utility improvements, steadily progressed, generally from the south to the north.

Today, the study area is almost completely developed. Land use ranges from single and multi-family residential to parks and open space to commercial and light industrial parcels. The study area comprises portions of the City of Scottsdale, the Town of Paradise Valley and the City of Phoenix. Overall, the study area is characterized primarily as urban residential but there are significant blocks of commercial and light industrial land use that is present. The Scottsdale Airport, with origins that date back prior to World War II, occupies a sizeable portion of the northeast quadrant of the study area.

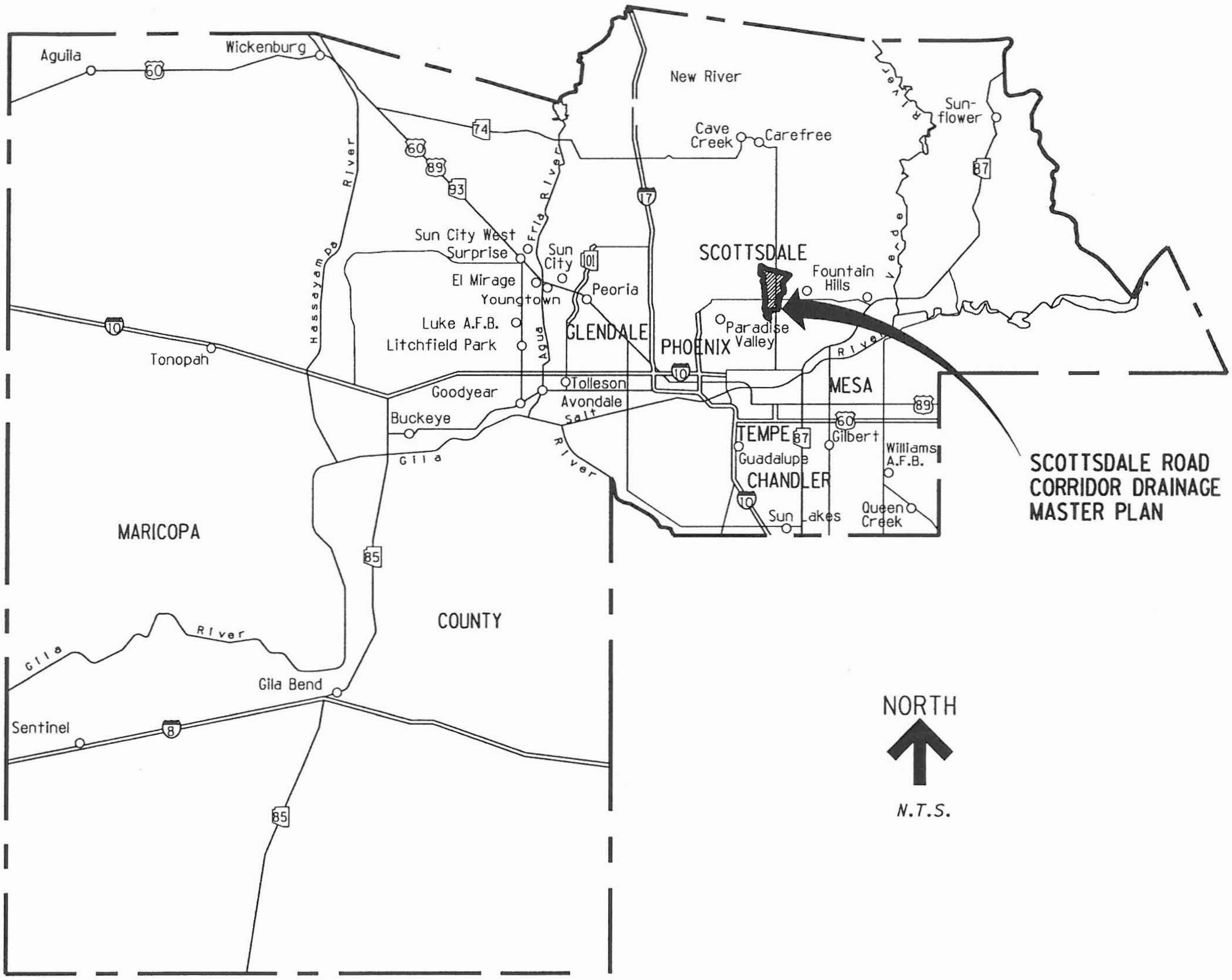
The predominant slope and direction of flow is from north to south. Elevation ranges from a high of approximately 1,520 feet to a low of about 1320 feet. Slopes range from about 1 ½ percent in the north end of the study area to about ½ percent in the south end. Location and study boundary/vicinity maps and an aerial photograph (Figures 1, 2 and 3) depicting the Scottsdale Road Corridor Drainage Master Plan study are included on Pages 3, 4 and 5 of this report. Exhibit 1 in Appendix D depicts the USGS topography for the study area. The aerial photo (Figure 3) on Page 5 is also found at a full size scale of 1" = 1000' in Appendix D.

A number of significant regional public drainage improvements have been constructed within the study area over the years. In addition to the public drainage improvements, there are many private improvements that have been constructed consisting primarily of stormwater detention basins required by local drainage ordinance. However, there are still many specific locations in the study area that have experienced drainage and flooding problems. These specific locations typically have either no drainage infrastructure to protect them or the drainage infrastructure that does exist was not designed to current standards.

The overall objectives of the Scottsdale Road Corridor Drainage Master Plan are to evaluate and alleviate regional flooding conditions in the study's focus area. Originally, the focus area of the study was along the Scottsdale Road corridor from Mountain View Road on the south to Thunderbird Road on the north, including the 71st Street Channel. The focus has since expanded to cover a major stormwater corridor in the Town of Paradise Valley, the Berneil Ditch.

A complete description of the study background and objectives is contained in the Existing Conditions Analysis prepared by Stanley Consultants under separate cover. The Existing Conditions Analysis contains extensive descriptions of the study area's physical character. It is recommended that the Existing Conditions Analysis be read for a complete understanding of the Volume 1 Hydrology Analysis report.

The objective of this report is to establish baseline hydrology for existing conditions within the study area for both the 10- and 100-year return frequency storms. This hydrology will be used in the hydraulic evaluation of existing major drainage facilities. Please refer to the Volume 2 Hydraulic Analysis, September 2002, prepared by Stanley Consultants for the Flood Control District of Maricopa County (under separate cover) for hydraulic analyses related to this study. The hydrology documented herein will also be used as the basis for formulation and evaluation of proposed study alternatives intended to address existing drainage and flooding problems in the study area.



STUDY LOCATION MAP

FIGURE 1

Stanley Consultants INC.

SCOTTSDALE ROAD CORRIDOR DRAINAGE MASTER PLAN (FCD2000C030)

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PROJECT: 15586 | DATE: NOV, 2002

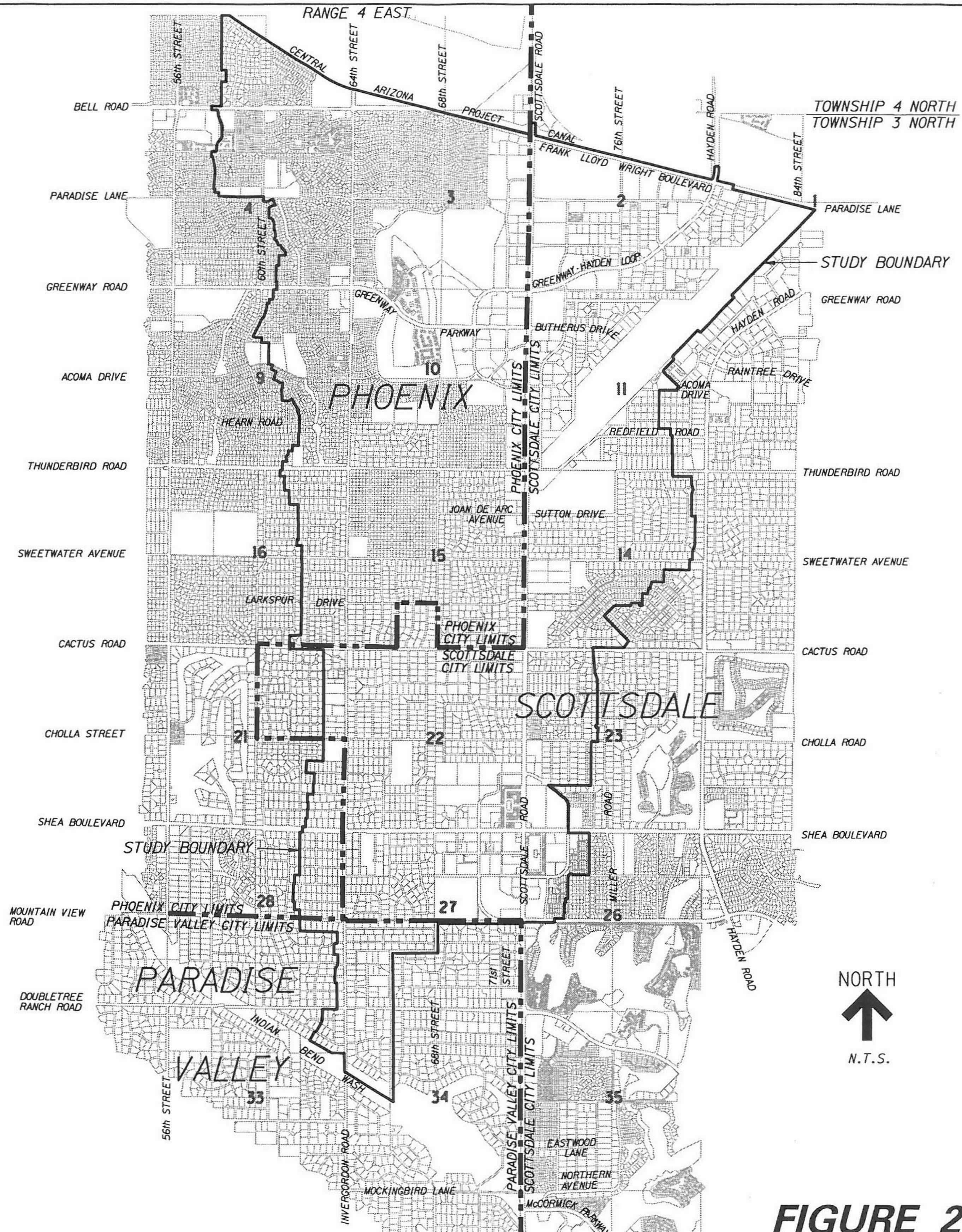

FIGURE 2

STUDY LIMITS
AND VICINITY MAP

SCOTTSDALE ROAD CORRIDOR DRAINAGE MASTER PLAN (FCD2000C030)

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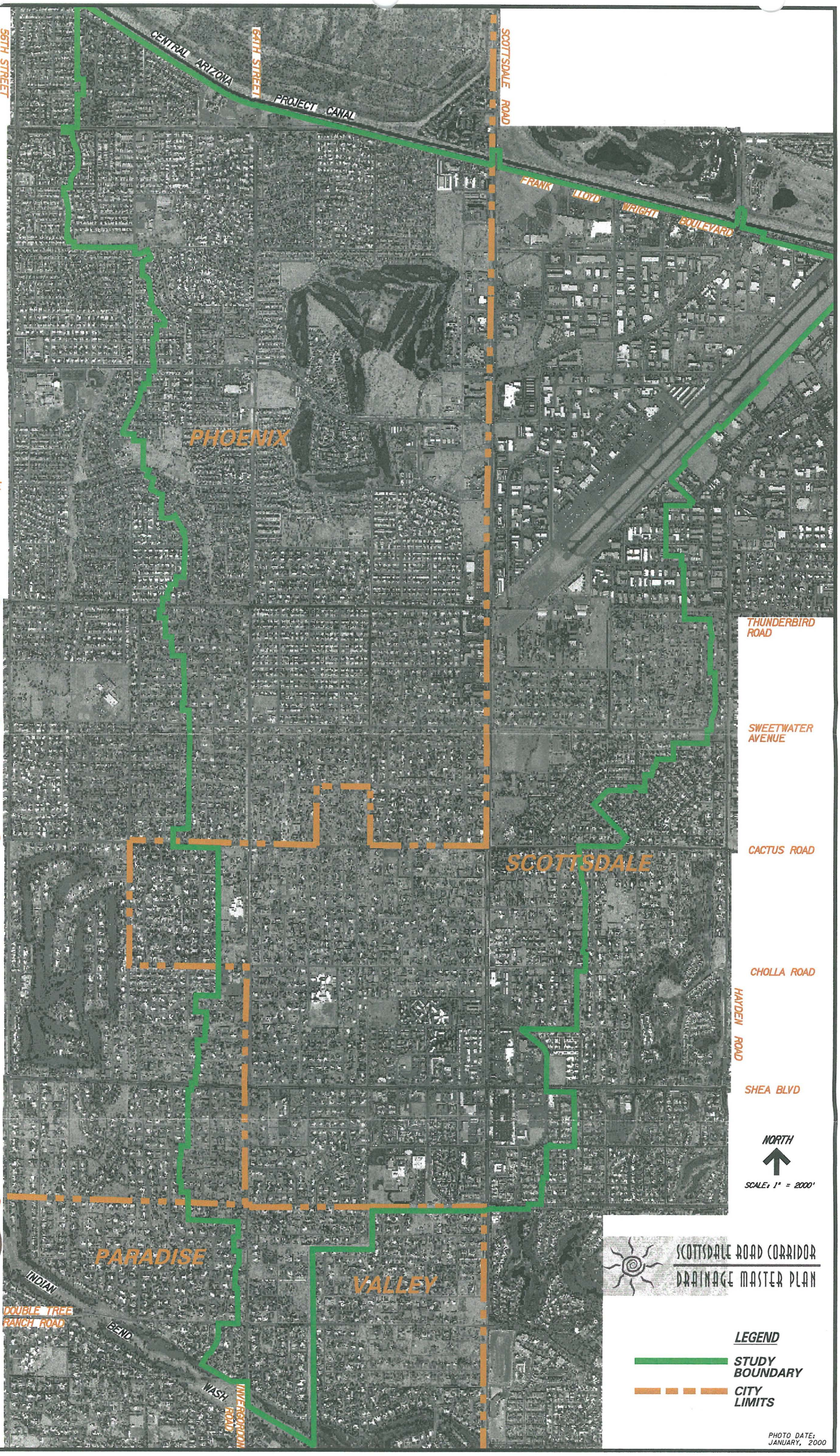
PROJECT: 15586

DATE: NOV, 2002



Stanley Consultants INC.

FIGURE 3
AERIAL PHOTOGRAPH

NOV 2002
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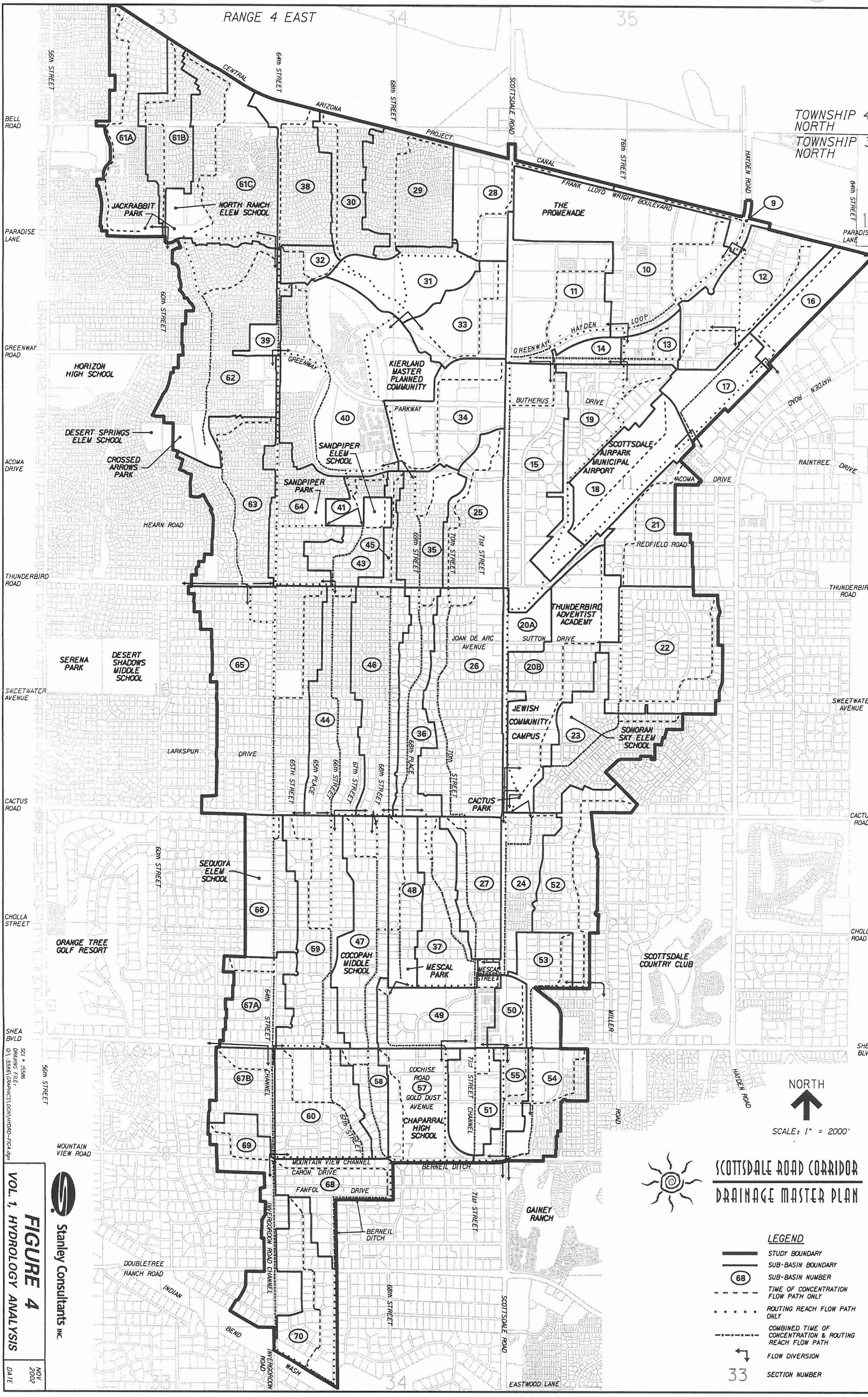


SCOTTSDALE ROAD CORRIDOR
DRAINAGE MASTER PLAN

FIGURE 4
VOL. 1, HYDROLOGY ANALYSIS

Stanley Consultants INC.

NOV 2002
DATE

2.0 PREVIOUS HYDROLOGIC STUDIES

There have been numerous drainage studies performed over the years within the Scottsdale Road Corridor Drainage Master Plan study area. Virtually every residential subdivision or commercial development in the study area will likely have some level of documentation supporting the associated drainage design. A number of drainage studies for the smaller individual developments in the study area were collected and reviewed in cases considered important and relevant to the study objectives. Typically, however, historical drainage design was not investigated on a small scale for this study. While of general interest, the drainage studies for individual developments are typically difficult to acquire and the quality, extent and consistency of data that they would provide was generally considered not worth the required time and effort in light of the overall study objectives.

The Flood Insurance Study for Maricopa County was researched but no FEMA hydrology that corresponds to the study area was found. However, there are a number of drainage studies that were significant enough to be collected and reviewed because they provide insight into the evolution and function of the larger more regional drainage facilities. Some of these reports were prepared for master planned developments and some were prepared for regional or specific drainage improvements such as storm drains and detention basins. The following subsections summarize the more significant reports, their objectives, their basic approach and methods and some of their hydrologic conclusions. Please refer to the bibliography of references in Appendix C of the final report (under separate cover) for a complete listing of all the drainage documents that were collected for this study.

The following drainage studies were performed at different times and for different purposes. They are not always consistent with each other in terms of their assumptions, objectives, methodologies, approach and criteria. They represent the basis for design of many but not all of the major drainage facilities found in the Scottsdale Road Corridor Drainage Master Plan study area. For example, no specific hydrologic documentation was found for the Berneil Ditch or the Mountain View Channel or for the Jackrabbit or Crossed Arrows Park detention basins.

Please refer to the drainage sub-basin map (Figure 4) and Exhibit 2 in Appendix D that depict the existing major drainage facilities, for the locations and physical relationships of the drainage discussed in the following subsections. The existing major drainage facilities shown on Exhibit 2 were based on an extensive field reconnaissance and review of quarter section maps, as-built plans and drainage reports within the study area. Figure 4 is also found at a full size scale of 1" = 1000' in Appendix D.

2.1 PVSP Drainage Study (Paradise Valley, Scottsdale, Phoenix Drainage Study)

The PVSP Study was sponsored jointly by the Flood Control District of Maricopa County, the Town of Paradise Valley, the City of Scottsdale and the City of Phoenix. It was completed in 1978 by the combined team of Collar, Williams and White Engineering and Water Resources Associates. It is the comprehensive but somewhat outdated predecessor of all subsequent major drainage studies applicable to the Scottsdale Road Corridor Drainage Master Plan study area. It encompassed the area from the Central Arizona Project to the Indian Bend Wash and from roughly Pima Road to 56th Street. At the time of the study, there were still large tracts of undeveloped desert in the study area, especially in the northern regions.

The objective of the PVSP Study was to serve as a comprehensive conceptual planning study, including hydrology and hydraulics, for all of the (then) future proposed regional drainage facilities within its boundary. The study was to provide a framework for future flood control and drainage projects in an area that was developing steadily with residential, commercial and light industrial land uses. It was also intended to help reduce flooding along the Berneil Ditch system, which, according to the PVSP Study, had overflowed its banks in the past and was generally considered to be inadequate.

The PVSP Study focused on three major drainage corridors: 56th Street, 64th Street and Scottsdale Road. The PVSP Study was the original basis for design of the Airport, Sandpiper, Cactus and Mescal Park detention basins, all of which have since been constructed. It acknowledged the future construction of detention basins west of 64th Street and north of Thunderbird Road but apparently did not include them in any planning, hydrology or hydraulics. A number of the specific features, conclusions and recommendations from the PVSP Study have been superseded by subsequent hydrology and design. One of the recommended features, a proposed detention basin at Chaparral High School, was never constructed.

Hydrology for the PVSP Study considered both a short duration, high intensity "summer" storm with a duration of one hour or less and a 6-hour Corps of Engineers "winter" storm. Summer storms were generally considered as the basis of design for channels and culverts while winter storms were considered applicable to the design of detention basins. The return frequency was 100-year for both the summer and winter storms but there was also a 2-year frequency analysis performed for the summer storm only.

Hydrology was developed for both a "with" and a "without" project condition. The contributing area was considered to be in a fully developed future land use condition with an estimated impervious area of 50%. SCS curve numbers (typically in the high 90's) were used to model the rainfall-runoff relationship for the pervious area. This approach appears to have been applied to both the summer and winter storms. It appears that there was no assumption that any onsite stormwater retention or detention would be incorporated with future development.

The summer storm hydrology utilized the SCS dimensionless unit hydrograph approach and the winter storm hydrographs were based on a Corps of Engineers' S-curve considered applicable to the Phoenix area. The report text indicates that hydrographs were "determined by computer" but it is unclear what computer program was used.

The total PVSP "with project" summer storm peak inflow to the proposed Cactus Park detention basin was approximately 2400 cfs. The "with project" 100-year discharge used in the PVSP study for the 71st Street Channel downstream from Cholla Street was between 1,200 and 1,300 cfs.

2.2 Shea Scottsdale Master Plan

The Shea Scottsdale Master Plan was completed in 1985 and amended in 1987 by Collar, Williams and White Engineers. It was the basis of drainage design for 18 contiguous parcels of land known as the "Herberger Properties" totaling 165 acres both east and west of Scottsdale Road near Shea Boulevard. These parcels have since been developed as commercial, office, hotel, single family and multi-family land use.

At the time of the original study, some of the regional drainage features and flow diversions proposed in the PVSP Study had not yet been constructed. The Shea Scottsdale Master plan makes specific reference to the PVSP Study and evaluates the hydrologic impact to the Herberger Properties considering that not all of the upstream regional drainage features were in place.

Much of the upper area contributing to the 71st Street Channel was undeveloped desert at the time of the study. The Cactus Park detention basin had been constructed at the time of the original Shea Scottsdale Master Plan. The Mescal Park detention basin was under construction at the time of the Shea Scottsdale Master Plan Addendum but the Cactus Road street and storm drain improvements west of Scottsdale Road including the outfall pipe(s) from Cactus Road to the Mescal Park detention basin had not yet been constructed.

The hydrologic analysis in the Shea Scottsdale Master Plan generally uses either the Arizona Department of Transportation (ADOT) Rational method or the (ADOT) SCS Part 1 method for the smaller local offsite and onsite drainage areas. Both of these methods have been replaced by revised ADOT methodology. Hydrology for the 71st Street Channel was revised in the 1987 addendum based on HEC-1 modeling. The HEC-1 model used SCS curve numbers and SCS unit hydrograph options similar to the PVSP study. However, the HEC-1 model used a 1-hour PH hypothetical storm which differed from the PVSP Study and also assumed watershed conditions that existed at the time of the study (1987) instead of the future "with project" conditions from the PVSP Study.

Rational method discharges in the Shea Scottsdale Master Plan were estimated for the 2- 10- and 100-year storms while (ADOT) SCS Part 1 and HEC-1 discharges were estimated for the 100-year return frequency only. The 100-year HEC-1 discharges estimated for the 71st Street Channel from Mescal Street to the Berneil Ditch were on the order of 1,500 to 1,800 cfs.

2.3 Cactus Road Outfall Drainage Study

The Cactus Road Outfall Drainage Study was prepared for the City of Scottsdale by BRW, Inc. in 1991. This report was the basis for the evaluation of (then) existing condition hydrology and the alternatives for dealing with storm runoff related to the proposed roadway and associated drainage improvements in Cactus Road west of Scottsdale Road. Cactus Road was being improved from a two-lane section with no curb and gutter to a five-lane section with curb and gutter.

The old two-lane road had a number of shallow dips in its profile to accommodate the crossing of offsite drainage from the north. The new five-lane configuration required a storm drain system to meet current design criteria. However, the shallow nature of the cross drainage coupled with the lack of cohesive, comprehensive downstream drainage characteristics did not provide adequate outfall opportunities for a storm drain system. The Cactus Road Outfall Drainage Study explored various alternatives to deal with this situation and establish a plan to outfall both the onsite roadway drainage and the offsite drainage from the north that would be intercepted by the proposed storm drain system.

The plan that was selected involved three outfalls for the proposed storm drain system. The 64th Street drainage corridor provided an outfall for the drainage originating from the west end of the project. Drainage was collected by a storm drain system that extended both east and west in Cactus Road from 64th Street. This drainage was conveyed to the 64th Street storm drain. The contributing area included about 1600 feet of Cactus Road improvements west of 64th Street, including the associated offsite drainage. It also included the drainage from Cactus Road starting about 800 feet east of 64th Street including the adjacent offsite drainage and a portion of the flow approaching Cactus Road from the north at 65th Place.

At the east end of the project near Scottsdale Road, the chosen storm drain outfall was near the 71st Street alignment where there had been a shallow dip located in the old Cactus Road profile. This location marks the upstream limit of the 71st Street Channel for the purposes of the Scottsdale Road Corridor Drainage Master Plan study. Drainage from approximately 1400 feet of Cactus Road just west of Scottsdale Road, including offsite drainage from the north, is collected by storm drain system and directed to a concrete lined outfall channel that was constructed with the project from Cactus Road to Sunnyside Drive, a distance of approximately 900 feet.

The third storm drain outfall involved the Mescal Park detention basin, which had been constructed a few years earlier. Based on the existing condition hydrology prepared by BRW, it was concluded that the Mescal Park detention basin could accommodate more runoff than what naturally surface drained into it at the time. A total of three trunk line outfall alignments from Cactus Road to Mescal Park had been considered. Alternatives involving increasing the detention volume capacity of Mescal Park were also considered.

The study concluded that the Mescal Park basin could remain in its constructed configuration. The selected storm drain and outfall plan involved collecting the drainage from the segment of Cactus Road from just west of 70th Street to just west of 65th Place (approximately 3100 feet), including the offsite area to the north, in two storm drain systems that would converge from the east and west at 68th Street. These storm drains feed a 96-inch diameter trunk line that goes south from Cactus Road along 68th Street. This trunk line transitions to a pair of 78-inch diameter trunk lines that continue south, then turn east at Cholla Road then south again at 68th Place where they discharge into Mescal Park.

The three storm drain outfalls described above correspond in location to historical drainage paths. In addition to these three locations, there were three other drainage paths identified by BRW making a total of six locations where offsite drainage from the north historically crossed Cactus Road. The proposed profile of Cactus Road was designed to create low points corresponding to these six historical flow path locations. The new storm drain in Cactus Road and each respective storm drain outfall was designed to convey a 10-year runoff event from the reconstructed roadway and the adjacent offsite drainage area to the north. Runoff in excess of the new storm drain capacity was intended to surface overflow to the south at each of the six locations, thus maintaining the historic flow pattern.

The offsite drainage area above Cactus Road extended north to Sandpiper Park west of 68th Street and north to Acoma Drive east of 68th Street and was bounded by Scottsdale Road on the east. The report apparently did not consider any offsite drainage from north of Sandpiper Park or Acoma Drive in what is now the Kierland Master Planned Development, perhaps because it was anticipated that the future development would be required to contain or control all of its onsite and offsite runoff. It was unclear in the report if or how the drainage in 64th Street from north of Cactus Road, including drainage contributing through the Jackrabbit Park, Crossed Arrows Park, Sandpiper Park and Thunderbird Road detention basins was considered.

Discharges were estimated in the Cactus Road Outfall Study using HEC-1. Hydrograph routing through the Mescal Park detention basin was based on elevation-storage data derived by BRW from a field survey that they performed for the study. A 24-hour SCS Type II storm distribution was used along with SCS dimensionless unit hydrograph and SCS curve number HEC-1 options. A curve number of 75 was used for all sub-basins and an estimate of the impervious area was made for each sub-basin.

Discharges entering the 71st Street Channel at Cactus Road were estimated at 200 cfs and 475 cfs for the 10- and 100-year storms respectively. The total combined storm drain trunk line pipe and surface inflow at the Mescal Park detention basin was estimated to be 799 cfs for the 100-year event with an outflow of 107 cfs. The hydrograph that was routed through the Mescal Park detention basin was a composite of the 10-year hydrograph from the storm drain trunk line and the 100-year surface inflow from 68th Place.

It was concluded that all of the outflow from the Mescal basin would pass through the outfall pipe that drains east to the 71st Street Channel. No surface overflow was anticipated from the Mescal Park detention basin according to the analysis.

2.4 <u>Kierland Master Planned Development</u>

The Kierland Master Planned Development consists of approximately 700 acres of land in the City of Phoenix mostly north of Acoma Drive and west of Scottsdale Road. The Kierland development includes single and multi-family residential as well as commercial and office land uses, a golf course, a small park and other open space. A significant drainage infrastructure system was constructed in phases with the development. This system included a series of stormwater detention basins, primarily within the golf course and open space areas; a number of open channels and several major storm drain systems. Although a few of the parcels within the Kierland master plan have not yet been developed, the drainage system is essentially all constructed and was designed to accommodate the future completely developed condition.

A master drainage report for the Kierland Development was prepared by Coe and Van Loo Consultants in 1994, and later amended in 1995. The objective of the report was to document the proposed drainage infrastructure system in compliance with the City of Phoenix drainage criteria. Both (then) existing and proposed drainage conditions were analyzed. The proposed drainage system accommodates both onsite and offsite drainage with detention occurring in four major regional-sized detention basins. Drainage outfall from Kierland occurs at five historic drainage path locations: 64th Street, Sandpiper Park, 69th Street, 71st Street and Scottsdale Road.

Overall hydrology in the Addendum to Master Drainage Report for Kierland was analyzed using HEC-1. All models employed SCS curve number loss rate and SCS dimensionless unit hydrograph options. Several different return frequencies were considered. Of primary interest are the 100-year discharges for the 2- and 24-hour storms. The 24-hour distribution that was used was the NOAA distribution (which differs from the SCS Type II distribution) with a point precipitation total of 4.04 inches and no aerial reduction. There was no 6-hour storm run.

The Addendum to Master Drainage Report for Kierland concluded that the post developed condition discharge leaving the Kierland development at all of the historical outfalls would be less than the pre-project condition discharge. At Sandpiper Park, this conclusion comparing pre- and post-development discharge is taken at the park's detention basin outfall. A surface overflow of 10 cfs from the Sandpiper Park detention basin and 80 cfs to 69th Street below Acoma Drive would occur for the 100-year, 24-hour storm. These discharges are based on Plate 1, shown in Appendix D, of the Addendum to Master Drainage Report for Kierland.

2.5 Scottsdale Stormwater Master Plan and Management Program

The City of Scottsdale Stormwater Master Plan and Management Program was submitted to the City of Scottsdale on March 18, 1996. The Plan and Program were completed by KVL Consultants, Inc. The Plan and Program were aimed at several key issues:

- Facilitate management of the City's Stormwater System,
- Facilitate updating the master plan as conditions change,
- Generate Capital Improvement Programs,
- Program should stand alone on a Personal Computer,
- Integrate into the City's Geographical Information System, and
- Establish the foundation for a future Stormwater Utility.

The study area encompassed the City of Scottsdale south of the Central Arizona Project (CAP) dike. This area of Scottsdale includes various land use types, including: low density residential, medium density residential, high density residential, commercial and office, and open space. This area also includes several stormwater detention basins, numerous open channels and several major storm drain systems.

The hydrology for the project was analyzed using HEC-1. A 10-year, 24-hour PH record, hypothetical storm, was used as precipitation input data. Rainfall losses were modeled using the SCS Curve Number (CN) approach. Runoff was computed using the kinematic wave overland flow plane computation option. Hydraulic conveyance capacity calculations were completed using the Manning's equation.

The study area was broken down into 31 major basins, each basin having numerous sub-basins. The majority of the Scottsdale Road Corridor Drainage Master Plan study area lies within major basin number 25. The Berneil Ditch and Mountain View Channel are located within the Town of Paradise Valley and outside the City of Scottsdale Stormwater Master Plan and Management Program study area. Stormwater storage located within the Kierland Development and the Promenade Atuoplex are not reflected in the KVL hydrologic model. Based on the KVL Conveyance Facilities data, no recommendations were made to increase the conveyance capacity for the 71st Street Channel. It was, however, recommended to increase the size of the Cactus Park outfall pipe.

3.0 APPROACH AND METHODOLOGY

The Scottsdale Road Corridor Drainage Master Plan study area watershed was modeled using the U.S. Army Corps of Engineers HEC-1 computer program Version 4.1, June 1998. The model was used to compute hydrographs for watershed sub-basins, routing reaches, level pool storage routing steps, combination points and diversions within the project area.

Almost the entire watershed encompassed by the study consists of a fully developed land use condition except for a small percentage of parcels, primarily in the north-central part of the study area. As the remaining parcels develop, onsite stormwater detention or retention will be incorporated as required by the City of Scottsdale. Remaining undeveloped parcels in the City of Phoenix are primarily in the Kierland master plan where regional stormwater detention is already in place. It is not envisioned that there will be a significant increase or decrease in either peak discharge or runoff volume between the present condition and the future completely developed condition. The HEC-1 models in this study assume a fully developed future land use condition. At the present rate of development, it is anticipated that only a short time remains before the entire study area is completely developed.

The Flood Control District of Maricopa County (FCDMC) Drainage Design Management System for Windows (DDMSW) computer program, Version 1.8 dated May 2001 was used to calculate certain HEC-1 data. DDMSW is used to compile rainfall, soil, land use, sub-basin and routing reach parameters. DDMSW calculates times of concentration and storage coefficients for each of the sub-basins using the compiled data in accordance with FCDMC methodology. DDMSW also facilitates the assembly and modification of the basic HEC-1 model.

The final HEC-1 models utilize the 10- and 100-year, 6-hour precipitation pattern(s). The Green and Ampt rainfall loss option in HEC-1 was used to calculate runoff rates for sub-basins. Unit hydrographs were calculated using the Clark unit hydrograph method. Hydrograph routing reaches were modeled using either kinematic wave or normal depth storage routing options in HEC-1. Stormwater detention basins were modeled using the Modified Puls level pool storage routing option. A computation time interval of 5 minutes for 300 hydrograph ordinates was specified resulting in a time duration that totaled 25 hours. The computation time interval was determined by using the old SCS rule of thumb 13% of the average time of concentration, which approximated five minutes. Time intervals of less than and greater than five minutes were also tested with little change in the resulting peak discharges.

A total of 33 hydrograph diversion steps were necessary to account for surface flow splits, overflows, storm drain systems, cross drainage and detention basin inflow and outflow at certain locations. Drainage systems in the study area have evolved over many years. The criteria used to design these systems have not always been consistent in this evolution and certain key documents that support past designs have not been found.

This study was significantly challenged by the size and complexity of the area, the history of its development and by certain limitations of basic HEC-1 capabilities. The HEC-1 models in this study are extensively annotated at key hydrograph steps with data and notes of explanation and assumption. Other than the rainfall input the times of concentration, storage coefficients and cumulative drainage areas, there is essentially no difference between the 10-year and 100-year models.

Figure 4 on the following page shows the overall study area and sub-basin boundaries, flow paths, routing reaches, detention basins and diversions. Figure 4 is also included at a full size scale of 1" = 1000' in Appendix D. HEC-1 printouts for existing conditions are found in Appendix B. HEC-1 electronic input files and DDMSW electronic data files are found on diskette in Appendix D.

3.1 Rainfall Patterns

The 2- and 100-year, 6- and 24-hour point rainfall depths for the project area were estimated from Maricopa County, Arizona isopluvial precipitation maps in the FCDMC Hydrology Manual. Using these point rainfall depths as input data, the Bureau of Reclamation's Prefre software that is nested within DDMSW was used to generate a depth-duration-frequency table for the study area. Point precipitation values were estimated corresponding to the center of mass of the study area. Point precipitation depth values for various durations and frequencies are shown in Table 1.0. Isopluvial precipitation maps and the Prefre depth-duration-frequency table are provided in Appendix A.

The multiple storm option in HEC-1 was used for both the 10- and 100-year storms. The FCDMC 6-hour rainfall distribution patterns number 1 through 5 were used to represent the percent rainfall depths over time. This approach was used in combination with precipitation aerial reduction coefficients for each of the five rainfall patterns based on the FCDMC Hydrology Manual, Table 2.2. Aerial reduction coefficients are shown in Table 2.0. The amount of contributing area in the HEC-1 model had to be adjusted manually at numerous hydrograph combination points to properly account for the flow split diversions found throughout the study area. The 6-hour multiple storm procedure produces high, short duration rainfall intensities that occur over a relatively small area. The FCDMC 6-hour rainfall distribution patterns are provided in Appendix A.

A 100-year, 24-hour model was prepared in order to compare discharges with the 100-year, 6-hour storm at representative locations. The 24-hour model used a single SCS Type II rainfall distribution instead of the 6-hour patterns. The times of concentration and storage coefficients were re-calculated by DDMSW for the 24-hour storm. All other aspects of the 24-hour model were identical to the 6-hour model. Hydrographs were compared at the Cactus Park detention basin (AD20B1 and LP020B), Mescal Park detention basin (AD048 and LP048), a typical representative sub-basin (sub-basin SB044), the flow in the Berneil Ditch immediately downstream of the 71st Street Channel confluence (AD055C) and the total combined flow located at the Berneil Ditch outfall into the Indian Bend Wash (AD070). In addition, the sub-basin unit discharges were compared for each storm. Hydrograph plots for the key locations described above are provided in Appendix A. Sub-basin unit discharge comparisons are shown in Table 3.0.

The 6-hour hydrographs were more compressed, having shorter times of concentration and in general, larger peak discharges than the 24-hour hydrographs. However, a few of the 24-hour model HEC-1 steps with relatively large contributing areas exhibited not only a larger volume of runoff and longer time of concentration (as expected) but also a slightly higher peak discharge. Surface overflow occurs at the Cactus Park detention basin for both the 6-hour and 24-hour storms. Surface overflow of the Mescal Park detention basin occurs for the 6-hour storm, but not the 24-hour storm.

The sub-basin unit discharges were found to be higher for the 6-hour storm than they were for the 24-hour storm. These higher unit discharges were more representative of unit discharges typically found for regional sub-basins having similar hydrologic characteristics. The 6-hour multiple storm approach was chosen over the 24-hour single storm approach because it is a more conservative reflection of the kind of storm that will most likely result in flooding problems within the project area. This approach generally produced larger, more conservative peak discharges and more appropriate sub-basin unit discharges.

Table 1.0, Point Precipitation Depth Values.

	Point Values (in)		
Duration	**2-Yr**	**10-Yr**	**100-Yr**
1 Hour	0.89	1.52	2.40
6 Hour	1.20	2.03	3.20
24 Hour	1.50	2.56	4.05

Table 2.0, Aerial Reduction Coefficients

Coefficient	Basin Area
1	0.01
0.994	0.5
0.975	2.8
0.922	16
0.812	90
0.57	500

Table 3. Sub-basin Unit Discharge Comparisons

Sub-basin	Area (sq mi)	100YR - 6HR 15586C		100YR - 24HR 15586A24		ADOT Indirect Metod #2 - USGS Data for Arizona		10YR - 6HR 15586C10	
		Q (cfs)	Q/Area (cfs/sq mi)	Q (cfs)	Q/Area (cfs/sq mi)	Q_{100} (cfs)	Q/Area (cfs/sq mi)	Q (cfs)	Q/Area (cfs/sq mi)
SB009	0.060	94	1567	64	1067	186	3101	47	783
SB010	0.160	418	2613	286	1788	316	1975	214	1338
SB011	0.220	557	2532	380	1727	375	1706	286	1300
SB012	0.200	498	2490	339	1695	356	1782	250	1250
SB013	0.040	122	3050	83	2075	149	3737	65	1625
SB014	0.030	71	2367	48	1600	128	4265	35	1167
SB015	0.250	513	2052	353	1412	402	1608	255	1020
SB016	0.090	214	2378	144	1600	232	2573	108	1200
SB017	0.090	244	2711	168	1867	232	2573	137	1522
SB018	0.150	355	2367	244	1627	305	2034	179	1193
SB019	0.190	353	1858	242	1274	347	1825	167	879
SB020A	0.060	85	1417	58	967	186	3101	39	650
SB021	0.140	355	2536	243	1736	294	2100	181	1293
SB022	0.240	508	2117	344	1433	393	1639	208	867
SB023	0.170	383	2253	264	1553	326	1920	176	1035
SB020B	0.270	439	1626	299	1107	419	1552	179	663
SB025	0.140	326	2329	220	1571	294	2100	164	1171
SB026	0.440	917	2084	621	1411	546	1240	381	866
SB027	0.120	282	2350	195	1625	271	2254	130	1083
SB028	0.134	330	2463	224	1672	287	2143	174	1299
SB029	0.180	444	2467	302	1678	337	1871	208	1156
SB030	0.100	228	2280	154	1540	245	2451	107	1070
SB031	0.120	271	2258	182	1517	271	2254	110	917
SB032	0.030	39	1300	25	833	128	4265	13	433
SB033	0.140	300	2143	201	1436	294	2100	128	914
SB034	0.180	446	2478	303	1683	337	1871	228	1267
SB035	0.110	246	2236	167	1518	258	2346	113	1027
SB036	0.130	177	1362	119	915	282	2173	66	508
SB037	0.210	436	2076	294	1400	366	1743	180	857
SB024	0.110	179	1627	122	1109	258	2346	78	709
SB038	0.120	289	2408	198	1650	271	2254	141	1175
SB039	0.030	75	2500	52	1733	128	4265	41	1367
SB040	0.410	845	2061	564	1376	525	1281	342	834
SB041	0.040	88	2200	58	1450	149	3737	38	950
SB043	0.080	172	2150	116	1450	217	2716	75	938
SB044	0.180	293	1628	201	1117	337	1871	120	667
SB045	0.030	49	1633	33	1100	128	4265	21	700
SB046	0.190	337	1774	232	1221	347	1825	140	737
SB048	0.090	189	2100	127	1411	232	2573	80	889
SB049	0.140	378	2700	261	1864	294	2100	201	1436
SB050	0.040	105	2625	74	1850	149	3737	61	1525
SB051	0.090	228	2533	158	1756	232	2573	121	1344
SB052	0.170	263	1547	177	1041	326	1920	101	594
SB053	0.100	227	2270	154	1540	245	2451	109	1090
SB054	0.110	214	1945	148	1345	258	2346	105	955
SB055	0.053	123	2321	83	1566	174	3283	65	1226
SB057	0.150	413	2753	289	1927	305	2034	231	1540
SB047	0.190	314	1653	214	1126	347	1825	126	663
SB058	0.060	120	2000	80	1333	186	3101	51	850
SB059	0.240	371	1546	254	1058	393	1639	144	600
SB060	0.180	487	2706	338	1878	337	1871	265	1472
SB061A	0.190	258	1358	176	926	347	1825	101	532
SB061B	0.110	171	1555	115	1045	258	2346	66	600
SB061C	0.270	589	2181	405	1500	419	1552	272	1007
SB062	0.340	753	2215	516	1518	475	1396	343	1009
SB063	0.220	454	2064	311	1414	375	1706	210	955
SB064	0.140	233	1664	159	1136	294	2100	97	693
SB065	0.440	888	2018	602	1368	546	1240	366	832
SB066	0.120	280	2333	190	1583	271	2254	129	1075
SB067A	0.100	215	2150	-	-	245	2451	89	890
SB067B	0.090	172	1911	-	-	232	2573	70	778
SB068	0.110	89	809	60	545	258	2346	31	282
SB069	0.140	161	1150	110	786	294	2100	58	414
SB070	0.140	219	1564	149	1064	294	2100	84	600

3.2 Soil Characteristics and Associated Rainfall Loss Rates

Sub-basin rainfall loss rates estimated for the HEC-1 model utilized the Green and Ampt procedure and were calculated by the Maricopa County Unit Hydrograph Procedure1 (MCUHP1) nested within DDMSW. This procedure requires the following input data: surface retention loss (IA), volumetric moisture deficit (DTHETA), wetted front suction (PSIF), hydraulic conductivity (XKSAT) and percent impervious (RTIMP). This data is associated with sub-basin soil characteristics and land use and is either entered into or calculated by DDMSW.

Soil characteristics were obtained from the Soil Survey of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties, Arizona; Soil Conservation Service; April 1986 and the Soil Survey, Eastern Maricopa and Northern Pinal Counties Area, Arizona; Soil Conservation Service; November 1974. Approximately 80 percent of the study area is underlain by Gilman loam, which has a bare ground hydraulic conductivity (XKSAT) of 0.27 in/hr. Glenbar and Estrella loams make up approximately 17 percent of the study area and have an XKSAT of 0.26 in/hr. The remaining project area is underlain by Antho sandy loam, which has an XKSAT of 0.41 in/hr.

A bare ground XKSAT of 0.27 in/hr was used for the entire study area. The majority of soils found in the project area are classified as loam with the aerially weighted XKSAT being equal to 0.27 in/hr. The project area has a relatively large percent of impervious area, which decreases the significance of the soil-related aspect of rainfall losses. Table 4.0 provides a list of soils and their associated XKSAT found within the study area. Appendix A provides sub-basin soil characteristics entered into DDMSW. Exhibit 3 in Appendix D shows the soil group delineation for the study area.

Table 4.0. Soils and Associated XKSAT Found Within the Study Area

Map Unit #	Soil Name	USDA Soil Texture	Area (Sq. Mi.)	% of Total Area	XKSAT (in./hr.)
2	Antho	Sandy Loam	0.25	0.03	0.41
50	Estrella	Loam	1.30	0.13	0.26
55	Gilman	Loam	7.86	0.80	0.27
60	Glenbar	Loam	0.40	0.04	0.26

3.3 Land Use and Associated Rainfall Losses and Resistance Coefficients

Typical land use found in the project area ranges from parks and open space to light industrial and commercial sites. Land use delineation was estimated by project area reconnaissance and data obtained from the City of Phoenix, City of Scottsdale and the Town of Paradise Valley. The percent of land usage for each sub-basin was estimated by using a digital Planix 7 planimeter. The Green and Ampt rainfall loss parameters associated with land use defaults include DTHETA, percent of vegetative cover, RTIMP and IA.

Each land use default has an associated resistance coefficient, K_b type. DDMSW land use defaults and associated rainfall loss parameters and K_b types are shown in Table 5.0. Exhibit 4 in Appendix D shows the land use delineation in and around the study area. Sub-basin land use data is provided in Appendix A.

Table 5.0. Land Use Defaults and Associated Rainfall Loss Parameters and K_b Types

DDMSW Land Use Code	Description	DTHETA Condition	Vegetation Cover (%)	RTIMP (%)	IA (in)	K_b Type
DESERT	Desert	Dry	30	2	0.35	Low
AIRPORT	Airport	Normal	10	60	0.20	Minimal
V.L.D.R.	Very Low Density Residential	Normal	30	7	0.30	Minimal
L.D.R.	Low Density Residential	Normal	50	24	0.30	Minimal
M.D.R.	Medium Density Residential	Normal	50	45	0.25	Minimal
M.F.R.	Multiple Family Residential	Normal	50	45	0.25	Minimal
IND	Industrial	Normal	50	60	0.15	Minimal
COMM	Commercial	Normal	50	80	0.10	Minimal
PARK	Parks, Golf Course	Normal	90	2	0.20	Minimal
VACANT LOT	Vacant Lot	Dry	10	2	0.10	Low
SCHOOL	School	Normal	30	50	0.20	Minimal

3.4 Stormwater Detention and Retention in Non-municipal Basins

In general, stormwater detention or retention basins located within the project area on private property were considered but not reflected in the hydrologic model. There are a significant number of light industrial and commercial parcels in the Scottsdale Airport area that incorporate onsite stormwater retention or detention. This currently appears to be a viable means of managing storm runoff and its continued requirement by the City of Scottsdale is recommended. However, only about one third of the parcels in the City of Scottsdale that employ some form of on-site stormwater retention or detention have drainage easements recorded over them that would help ensure their perpetual function. But even the presence of a drainage easement does not ensure that the storage function will be maintained properly for the hundreds of small basins that exist.

Exceptions to not reflecting private retention basins include the Kierland Master Planned Development, the Thunderbird Industrial detention basin and the storage located in the commercial area north of Paradise Lane between Scottsdale and Hayden Roads, most notably in the Promenade commercial development. Kierland storage was accounted for by incorporating level pool routing step data taken directly from the Coe and Van Loo HEC-1 model. Retention storage for various locations north of Paradise Lane are shown in Appendix A.

Because of the size and location of the Thunderbird Industrial detention basin, its storage was accounted for in the HEC-1 model as a level pool routing step. Retention basins in the Promenade commercial development and in the auto dealership parcels north of Paradise Lane in the City of Scottsdale were concluded to be of sufficient size and design as well as being protected by a recorded drainage easement. Therefore, they were reflected in the HEC-1 model. This storage was accounted for in the HEC-1 model by subtracting the non-contributing area north of Paradise Lane from the total SB010 area. However, the unit hydrograph parameters for SB010 are based on the total area and total flow path length, including the area north of Paradise Lane.

3.5 Sub-basin Delineation and Associated DDMSW Data

The project area was delineated into 63 sub-basins based on extensive field reconnaissance, review of available topography and review of as-built drawings. Sub-basin areas were measured by using a digital Planix 7 planimeter and ranged in size from 0.03 square miles (19 acres) to 0.44 square miles (282 acres), with an average sub-basin size of 0.15 square miles, (96 acres).

Sub-basin parameters entered into DDMSW include area, flow path length and upstream and downstream flow path elevations. Sub-basin unit hydrograph numeric parameters calculated by DDMSW include the time of concentration (T_c) and storage coefficient (R) for the 2-, 5-, 10-, 25-, 50- and 100-year return periods. Sub-basin data is provided in Appendix A.

Boundaries for sub-basins were delineated by taking into consideration flow convergence locations, topographic relief, street flow, and major drainage facilities. Major drainage facilities include the Berneil Ditch, 64th Street (Invergordon Road) Channel, and storm drain systems. Flow path lines were typically established based on the longest representative surface flow length for each sub-basin. This path generally followed street flow routing.

Concentration points were established at locations where flows from sub-basins, diversions or routing steps converged. The upstream and downstream grade elevations (USGE and DSGE) for sub-basins were estimated from USGS topographic maps, City of Scottsdale 2-foot contour topography, as-built drawings and SCI survey data. Figure 4 in Section 3.0 (and in Appendix D) shows the sub-basin delineation, flow paths and routing reaches. Exhibit 2 in Appendix D shows major drainage facility locations.

3.6 Sub-basin Unit Hydrograph

The HEC-1 model utilized the Clark unit hydrograph procedure. Sub-basin unit hydrographs were calculated using MCUHP1 nested within DDMSW. The numeric parameters necessary for generating a Clark unit hydrograph are time of concentration, T_c and storage coefficient, R. The graphical parameter necessary for generating a Clark unit hydrograph is the time-area relation. The time-area relation specifies the accumulated area of the sub-basin that is contributing runoff to the outlet of the sub-basin at any point in time. The urban time-area relationship was entered as the unit hydrograph graphic parameter for all sub-basins. Both T_c and R were calculated by DDMSW after all necessary rainfall, soil, land use and sub-basin parameters were entered.

3.7 Hydrograph Reach Routing

Channel routing utilized in the hydrologic model includes normal depth routing for open channels and kinematic wave routing for storm drain pipes. The HEC-1 schematic, Exhibit 5 in Appendix D shows HEC-1 reach routing flow paths. Channel routing parameters reflect average representative conditions in the channel reaches. Crown street sections were modeled using rectangular 8-point hydraulic sections having similar channel and conveyance properties. Channel routing parameters were estimated based on field reconnaissance, as-built plans, topographic maps and SCI survey data.

Certain routing reaches contained both a surface flow component and a storm drain flow component. In these cases, the choice between the normal depth and kinematic wave routing options was generally based on the predominant of the two components, which, in most cases was surface flow. Routing reach assumptions are noted in the HEC-1 model at each of the steps. Typical Manning's roughness coefficients ranged from 0.013 for concrete storm drain pipes to 0.035 for open channels. Only normal depth routing parameters were entered into DDMSW. Kinematic wave parameters are entered directly into the HEC-1 model and not in DDMSW. No infiltration or percolation loss was assumed to occur for any reach routing steps.

Normal depth routing hydraulic and geometric parameters entered into DDMSW include reach length (RLNTH), slope (SEL), channel and overbank roughness coefficients (ANCH, ANL and ANR), channel cross-section and the number of steps to be used in the storage routing (NSTPS). The initial NSTP entry was checked against the resulting difference in peak times between the upstream and downstream hydrographs and adjusted where necessary as part of an iterative process. Kinematic wave routing parameters include reach length, slope, storm drain diameter and roughness. Normal depth and kinematic wave routing data is provided in Appendix A.

3.8 Level Pool Hydrograph Routing

Typical reservoir routing parameters include reservoir storage volume (SV), elevation (SE) and discharge (SQ). Storage basin contour elevations and volume estimations were generally derived from as-built and topographic drawings and SCI survey data. Typical storage basin discharge calculations were based on assumed inlet controlled outlet pipe hydraulics below the spillway elevation and overflow calculated above the spillway elevation using the standard weir equation.

In all cases, the reservoir was assumed to be empty at the beginning of the storm, no clogging was assumed to occur at the outlet and no infiltration or percolation loss was assumed to occur within the basin. For those detention basins like Crossed Arrows and Mescal Parks that derive a portion of their storage above natural grade by virtue of raised earth embankments, it was assumed that overtopping did not result in failure of the embankment.

The Cactus Park detention basin has an irregular shaped overflow spillway with a low decorative masonry screen wall that has a significant impact on the basin overflow. To correctly model this spillway in HEC-1, the top-of-dam (ST) and non-level top-of-dam (SW and SE) options were also utilized.

The Cactus Park detention basin also contains a low flow bypass feature that is unique to the detention basins found in the study area. The inflow hydrograph to the Cactus Park detention basin was split on the basis of the pipe flowing full capacity for the low flow bypass pipe. The portion of the flow associated with the low flow bypass was not routed through the basin. Full flow capacity was calculated utilizing Haestad Methods' Flow Master version 6.1.

The presence of the low flow bypass system at Cactus Park and the location where it ties into the basin outlet pipe indicate a potential dynamic relationship between stage, storage and discharge. However, HEC-1 cannot deal with this dynamic so it was disregarded.

Both the Cactus and Mescal Park detention basins have relatively long outlet pipes. According to simple friction slope analysis for these pipes, they are operating under outlet control for both the 10- and 100-year discharges. Therefore, their maximum capacity is based on the discharge and associated friction slope that results in a headwater equal to the surface overflow elevation at each basin. Reservoir routing data is provided in Appendix A.

3.9 Diversions

There are 33 diversions in the existing conditions HEC-1 model. Seven of the diversion locations take flow permanently out of the study area. The proportioning of flow for the majority of diversions involving storm drains was based on the full flow capacity of the storm drain pipe. Full flow capacity was calculated utilizing Haestad Methods' Flow Master version 6.1. Flow proportioning for the remaining diversions was based on various hydraulic approaches involving overflow spillway capacity, storm drain inlet capacity and street/open channel flow capacity. A few of the diversions were based simply on estimates from previous reports (if the proportioning appeared reasonable) or were purely based on field inspection using hydrologic/hydraulic judgment. For example, from field inspection, the bifurcation works located at the 64th Street Channel and Mountain View Channel confluence appears to be constructed in order to split the flow 50/50 – 50% of the flow continuing south and 50% of the flow diverted east. Notes found in the HEC-1 model at each diversion step explain the various flow split assumptions and approaches. Diversion calculations are provided in Appendix A.

At certain locations where diversion steps might be expected, no diversion was incorporated in the HEC-1 model. This applies to the Berneil Ditch and the Mountain View Channel. HEC-RAS hydraulic analysis indicates that these two channels will not contain their estimated discharges. However, it is assumed for hydrologic purposes that flow is contained. No diversion step that would reflect the breakout has been included in the HEC-1 model. If flow does overtop the south or east bank of the Berneil Ditch, it would leave the study area and flow to the Indian Bend Wash through the adjacent residential area. Flow that overtops the Mountain View Channel will flow through the residential area to the south. Some of this overflow would enter the Berneil Ditch and the remaining flow would travel south, eventually joining the Indian Bend Wash.

There are also locations along the 71st Street Channel and along Scottsdale Road north of Cholla Road where, according to hydraulic analysis, there is a strong potential for overtopping. If overtopping occurs, flow would potentially spread to adjacent sub-basins. This has not been reflected in the HEC-1 model as a diversion step. From a hydrologic standpoint, it is assumed that all the flow is contained along these corridors.

3.10 Kierland Master Drainage Report

An electronic copy of the original Coe and Van Loo 100-year, 24-hour HEC-1 model input file for the Addendum to Master Drainage Report for Kierland was acquired directly from Coe & Van Loo Consultants, Inc. for use in the Scottsdale Road Corridor Drainage Master Plan existing condition HEC-1 model. This original input file is named H1G100A.PS1 and an electronic copy of it is included on the diskette in Appendix D.

The H1G100A.PS1 HEC-1 file received from Coe and Van Loo was compared to the most recent version of the Addendum to Master Drainage Report for Kierland on file with the City of Phoenix. The H1G100A.PS1 model was verified to be the correct, most current model. However, when this model is run, it produces slightly different peak discharges than those noted on "Plate 1" from the Kierland report. A reduced copy of the "Conceptual Master Drainage Plan", Plate 1, from the Addendum to Master Drainage Report for Kierland is included in Appendix D.

The original Kierland HEC-1 model was not directly incorporated into the existing conditions HEC-1 model for various reasons. Sub-basins used in the Kierland HEC-1 model are significantly smaller in size than those used in the Scottsdale Road Corridor existing condition HEC-1 model. In addition, the Kierland HEC-1 model utilized the SCS curve number loss rate and SCS dimensionless unit graph options, whereas the existing condition HEC-1 model utilized Green and Ampt loss rate and Clark unit graph options.

In order to incorporate the Kierland HEC-1 model, sub-basin areas contributing to each detention basin were typically combined. In general, Kierland HEC-1 diversion, reach routing and level pool routing steps were not changed when incorporated into the existing conditions HEC-1 model although a few of the routing reach sequences were combined to for a single step. Notes found in the existing conditions HEC-1 model explain the Kierland HEC-1 model steps that were utilized and what modifications were made.

Within the Kierland development there are six storage basins. Of these six basins, four are significant enough to be modeled in the existing conditions hydrology model. In addition, the Sandpiper Park detention basin was part of the original Kierland HEC-1 model and was incorporated as-is in the Scottsdale Road Corridor Drainage Master Plan existing conditions hydrology model.

4.0 EXISTING CONDITION HYDROLOGY RESULTS

Figures 5 and 6, on the following pages, display existing condition peak discharges and peak times at various key locations throughout the study for the 10- and 100-year, 6-hour events, respectively. Figure 6 also displays the 100-year peak discharges estimated at various locations from the previous hydrologic studies reviewed earlier. Table 6.0 which follows Figure 6 summarizes key data related to the level pool detention basin routing steps for existing conditions.

Regional detention basins are modeled as level pool routing steps. Typically, private onsite detention/retention basins are not reflected in the HEC-1 models except for the larger basins just south of Frank Lloyd Wright Boulevard between Scottsdale Road and the Greenway-Hayden Loop. These are protected by recorded drainage easements. There are literally hundreds of small detention/retention basins on private property in the Scottsdale Airpark area. Based on preliminary HEC-1 models, it was found that discharges would be about 25% to 50% less in the area tributary to the Cactus Park detention basin if the smaller, private basins were reflected in the hydrology.

4.1 Unit Discharges

Unit discharges for the project area and for individual sub-basins were compared with unit discharges from regional studies. The unit discharge for the overall project area is approximately 350 cfs/sq mi. In comparison, the unit discharge for the Indian Bend Wash watershed upstream of Scottsdale Road is approximately 360 cfs/sq mi based on FEMA data. This indicates fairly good agreement on an overall scale.

The 100-year, 6-hour HEC-1 model sub-basin unit discharges were compared with sub-basin unit discharges calculated with the Arizona Department of Transportation (ADOT) Indirect Method No. 2 – USGS Data for Arizona. The average 100-year, 6-hour HEC-1 model individual sub-basin unit discharge is equal to 2,085 cfs/sq mi. (Refer to unit discharges presented in Table 3). In comparison, the average ADOT Indirect Method No. 2 individual sub-basin unit discharge is equal to 2,303 cfs/sq mi. The 100-year, 6-hour HEC-1 unit discharges were evaluated and approved by the City of Scottsdale and the Flood Control District of Maricopa County. It should be noted that the hydrology model does not reflect stormwater storage for the smaller private or commercial/industrial parcels located around the Scottsdale Airpark. Reflecting this storage would decrease the sub-basin peak and unit discharges.

4.2 Hydrology Calibration

There was a combination rain and stage gage recently installed by the Flood Control District of Maricopa County on the Berneil Ditch just downstream from Double Tree Ranch Road. The gage identification is Sensor ID #4688. The period of record for this gage is too short to provide any reliable correlation or calibration of the results from the HEC-1 model for the Scottsdale Road Corridor Drainage Master Plan study.

However, in addition to the Berneil Ditch gage, a combination rain and weather gage is located approximately ¼ mile southeast of the Scottsdale and Thunderbird Roads intersection. The gage identification is Sensor ID #4630 and was installed in January

1982. By utilizing precipitation data for a storm that occurred August 30th, 1997 and associated flood photographs of the upper 71st Street Channel, it was possible to approximate a flow rate and return frequency for this particular storm.

Based on the FCDMC Rainfall Intensity-Duration-Frequency (IDF) curves for the Phoenix Metro Area, the storm was estimated to have a return frequency between 1 and 2 years. From flood photographs it appears that the depth of flow in 71st Street, between Cortez Street and Cholla Street, was approximately at the top-of-curb. From normal depth calculations, this depth correlates to a flow rate of about 70 cfs. Therefore, it appears that a storm with a 1- to 2-year return frequency and 0.5-hour duration will produce approximately 70 cfs in the upper 71st Street Channel.

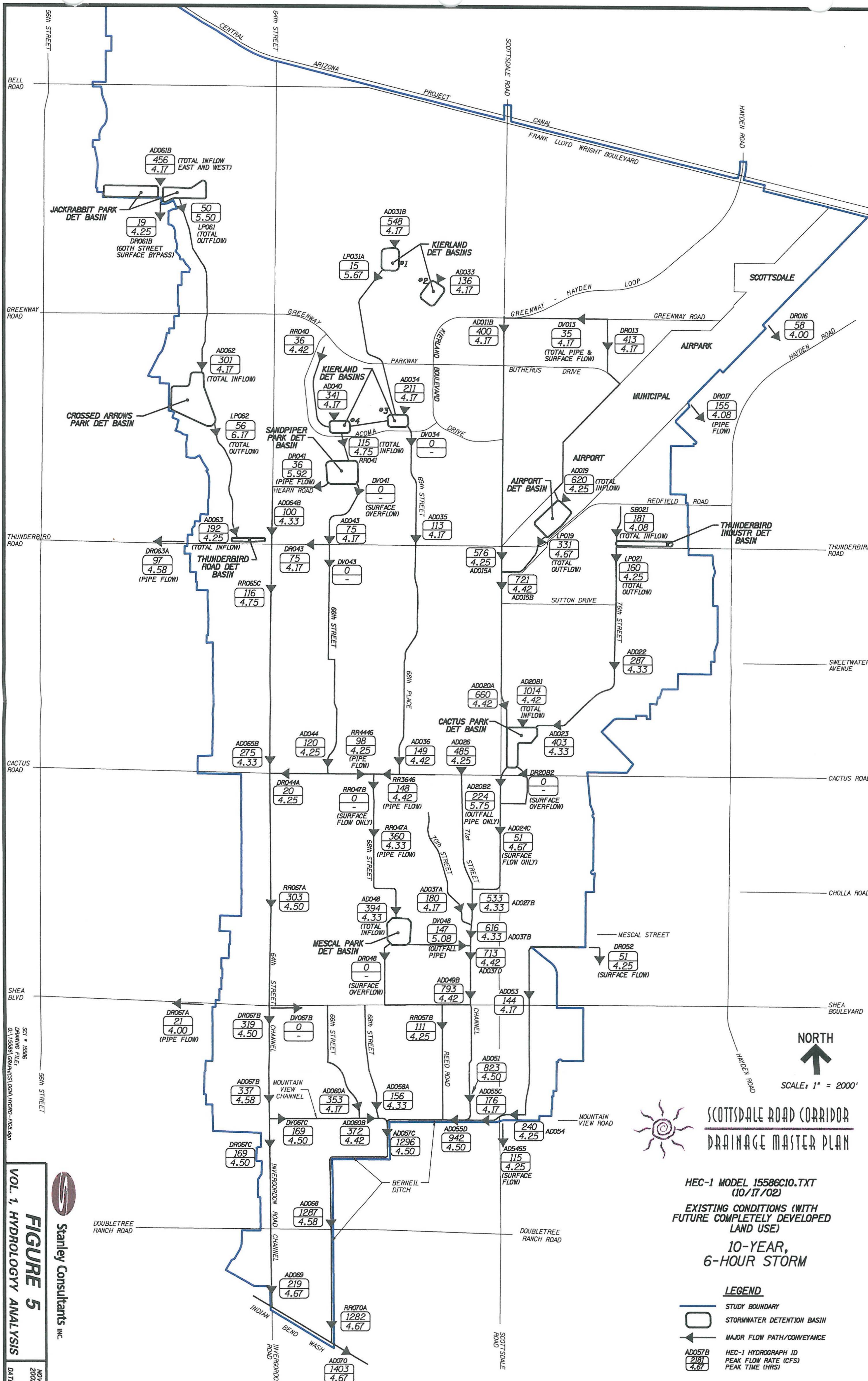
The HEC-1 estimated 10-year, 6-hour peak discharge for the upper 71st Street Channel is 485 cfs. Factors that may affect the accuracy of estimating the upper 71st Street Channel flow rate and storm return frequency include location of the storm relative to the rain gage, the distance between the rain gage and 71st Street between Cortez Street and Cholla Street, and the ability to determine the actual depth of water from the photographs. Gage data, IDF curves, photographs and normal depth calculations are provided in Appendix A. There are no other known data that would offer a reliable correlation to validate the hydrology from this study.

4.3 <u>Hydrologic Results and Historic Flooding</u>

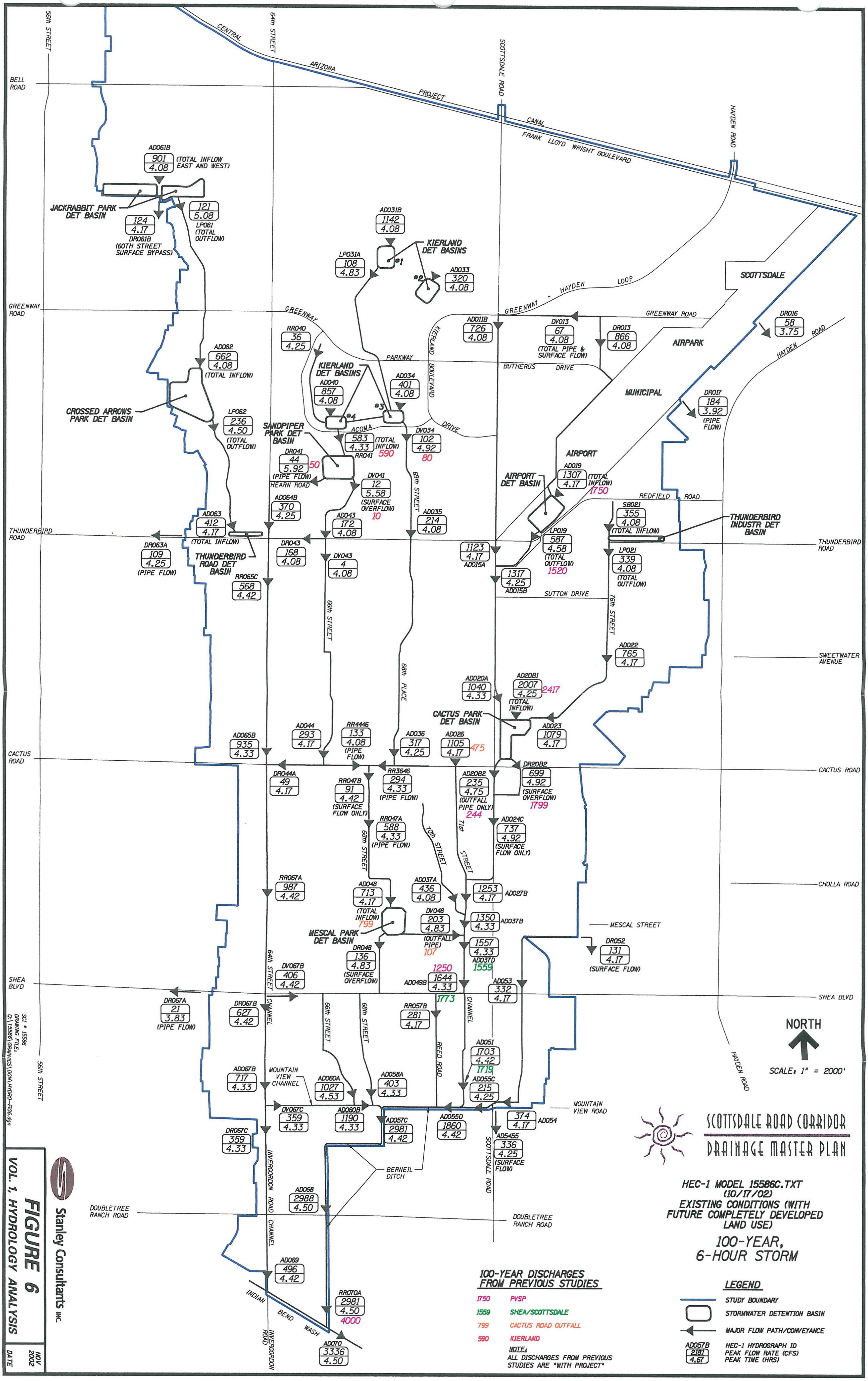
There does appear to be a general sense of correlation between the hydrologic results from this study and past flood events. For example, discharges estimated in this study for the Berneil Ditch, when coupled with the HEC-RAS backwater hydraulics for the Berneil Ditch, indicate the potential for overflow of its south bank at locations where overflow has occurred in recent history. In addition, discharges estimated for this study appear to have a fairly reasonable correlation with discharges from past studies, despite the differences in hydrologic approach and methods as summarized in the section on "previous hydrologic studies".

4.4 <u>PVSP Hydrology Comparison</u>

One observation worth noting relates to the PVSP discharges at the Cactus Park detention basin and downstream from the basin along the 71st Street Channel corridor. According to PVSP hydrology, the total 100-year inflow to the Cactus Park basin is roughly 2,400 cfs. This corresponds well with the Scottsdale Road Corridor Drainage Master Plan hydrology. The total peak outflow from the Cactus Park basin according to PVSP hydrology is roughly 2,000 cfs with the major portion of this peak being surface overflow. However, the PVSP 100-year discharges downstream along the 71st Street Channel corridor are estimated at between 1,200 and 1,300 cfs. This does not seem consistent with the outflow from the Cactus Park basin especially considering that the Scottsdale Road Corridor Drainage Master Plan hydrology estimates a 100-year discharge of about 1,600 to 1,800 cfs for the same reach of the 71st Street Channel corridor.



SCOTTSDALE ROAD CORRIDOR
DRAINAGE MASTER PLAN
HEC-1 MODEL 15586C10.TXT
(10/17/02)
EXISTING CONDITIONS (WITH FUTURE COMPLETELY DEVELOPED LAND USE)
10-YEAR, 6-HOUR STORM
LEGEND
STUDY BOUNDARY
STORMWATER DETENTION BASIN
MAJOR FLOW PATH/CONVEYANCE
AD057B 2181 4.67
HEC-1 HYDROGRAPH ID
PEAK FLOW RATE (CFS)
PEAK TIME (HRS)
NORTH
SCALE: 1" = 2000'
FIGURE 5
VOL. 1, HYDROLOGY ANALYSIS
Stanley Consultants INC.
NOV 2002
DATE
SCI # 15586
DRAWING FILE:
Q:\15586\GRAPHICS\DOH HYDRO-FIG5.dgn
CENTRAL ARIZONA PROJECT CANAL
FRANK LLOYD WRIGHT BOULEVARD
BELL ROAD
GREENWAY ROAD
GREENWAY - HAYDEN LOOP
GREENWAY PARKWAY
BUTHERUS DRIVE
ACOMA DRIVE
HEARN ROAD
REDFIELD ROAD
THUNDERBIRD ROAD
SUTTON DRIVE
SWEETWATER AVENUE
CACTUS ROAD
CHOLLA ROAD
MESCAL STREET
SHEA BLVD
SHEA BOULEVARD
MOUNTAIN VIEW ROAD
DOUBLETREE RANCH ROAD
INDIAN BEND WASH
56th STREET
64th STREET
66th STREET
68th STREET
68th PLACE
69th STREET
70th STREET
71st STREET
76th STREET
SCOTTSDALE ROAD
HAYDEN ROAD
KIERLAND BOULEVARD
REED ROAD
INVERGORDON ROAD CHANNEL
64th STREET CHANNEL
MOUNTAIN VIEW CHANNEL
BERNEIL DITCH
SCOTTSDALE AIRPARK
MUNICIPAL AIRPORT
JACKRABBIT PARK DET BASIN
KIERLAND DET BASINS
CROSSED ARROWS PARK DET BASIN
SANDPIPER PARK DET BASIN
AIRPORT DET BASIN
THUNDERBIRD ROAD DET BASIN
THUNDERBIRD INDUSTR DET BASIN
CACTUS PARK DET BASIN
MESCAL PARK DET BASIN
AD061B 456 4.17 (TOTAL INFLOW EAST AND WEST)
DR061B 19 4.25 (60TH STREET SURFACE BYPASS)
LP061 50 5.50 (TOTAL OUTFLOW)
AD031B 548 4.17
LP031A 15 5.67
AD033 136 4.17
AD062 301 4.17 (TOTAL INFLOW)
LP062 56 6.17 (TOTAL OUTFLOW)
RR040 36 4.42
AD040 341 4.17
AD034 211 4.17
RR041 115 4.75 (TOTAL INFLOW)
DV034 0 -
DR041 36 5.92 (PIPE FLOW)
DV041 0 - (SURFACE OVERFLOW)
AD011B 400 4.17
DV013 35 4.17 (TOTAL PIPE & SURFACE FLOW)
DR013 413 4.17
DR016 58 4.00
DR017 155 4.08 (PIPE FLOW)
AD019 620 4.25 (TOTAL INFLOW)
AD064B 100 4.33
AD043 75 4.17
AD035 113 4.17
AD063 192 4.25 (TOTAL INFLOW)
DR063A 97 4.58 (PIPE FLOW)
DR043 75 4.17
DV043 0 -
AD015A 576 4.25
LP019 331 4.67 (TOTAL OUTFLOW)
SB021 181 4.08 (TOTAL INFLOW)
LP021 160 4.25 (TOTAL OUTFLOW)
AD015B 721 4.42
RR065C 116 4.75
AD022 287 4.33
AD020A 660 4.42
AD20B1 1014 4.42 (TOTAL INFLOW)
AD023 403 4.33
AD065B 275 4.33
AD044 120 4.25
RR4446 98 4.25 (PIPE FLOW)
AD036 149 4.42
AD026 485 4.25
DR20B2 0 - (SURFACE OVERFLOW)
DR044A 20 4.25
RR047B 0 - (SURFACE FLOW ONLY)
RR3646 148 4.42 (PIPE FLOW)
AD20B2 224 5.75 (OUTFALL PIPE ONLY)
AD024C 51 4.67 (SURFACE FLOW ONLY)
RR047A 360 4.33 (PIPE FLOW)
RR067A 303 4.50
AD048 394 4.33 (TOTAL INFLOW)
AD037A 180 4.17
AD027B 533 4.33
DV048 147 5.08 (OUTFALL PIPE)
AD037B 616 4.33
AD037D 713 4.42
DR052 51 4.25 (SURFACE FLOW)
DR048 0 - (SURFACE OVERFLOW)
AD049B 793 4.42
AD053 144 4.17
DR067A 21 4.00 (PIPE FLOW)
DR067B 319 4.50
DV067B 0 -
RR057B 111 4.25
AD051 823 4.50
AD067B 337 4.58
AD060A 353 4.17
AD058A 156 4.33
AD055C 176 4.17
AD054 240 4.25
DV067C 169 4.50
AD060B 372 4.42
AD057C 1296 4.50
AD055D 942 4.50
AD5455 115 4.25 (SURFACE FLOW)
DR067C 169 4.50
AD068 1287 4.58
AD069 219 4.67
RR070A 1282 4.67
AD070 1403 4.67



SCOTTSDALE ROAD CORRIDOR
DRAINAGE MASTER PLAN
HEC-1 MODEL 15586C.TXT
(10/17/02)
EXISTING CONDITIONS (WITH FUTURE COMPLETELY DEVELOPED LAND USE)
100-YEAR, 6-HOUR STORM
100-YEAR DISCHARGES FROM PREVIOUS STUDIES
1750 PVSP
1559 SHEA/SCOTTSDALE
799 CACTUS ROAD OUTFALL
590 KIERLAND
NOTE: ALL DISCHARGES FROM PREVIOUS STUDIES ARE "WITH PROJECT"
LEGEND
STUDY BOUNDARY
STORMWATER DETENTION BASIN
MAJOR FLOW PATH/CONVEYANCE
AD057B 2181 4.67 HEC-1 HYDROGRAPH ID PEAK FLOW RATE (CFS) PEAK TIME (HRS)
NORTH
SCALE: 1" = 2000'
FIGURE 6
VOL. 1, HYDROLOGY ANALYSIS
Stanley Consultants INC.
NOV 2002
DATE
SCI # 15586
DRAWING FILE: Q:\15586\GRAPHICS\DOCS\HYDRO-FIG6.dgn
CENTRAL ARIZONA PROJECT CANAL
FRANK LLOYD WRIGHT BOULEVARD
56th STREET
64th STREET
SCOTTSDALE ROAD
HAYDEN ROAD
BELL ROAD
GREENWAY ROAD
GREENWAY - HAYDEN LOOP
GREENWAY PARKWAY
KIERLAND BOULEVARD
BUTHERUS DRIVE
ACOMA DRIVE
HEARN ROAD
REDFIELD ROAD
THUNDERBIRD ROAD
SUTTON DRIVE
SWEETWATER AVENUE
CACTUS ROAD
CHOLLA ROAD
MESCAL STREET
SHEA BLVD
MOUNTAIN VIEW ROAD
DOUBLETREE RANCH ROAD
INDIAN BEND WASH
INVERGORDON ROAD
INVERGORDON ROAD CHANNEL
64th STREET CHANNEL
MOUNTAIN VIEW CHANNEL
BERNEIL DITCH
REED ROAD
66th STREET
68th PLACE
68th STREET
69th STREET
70th STREET
71st STREET
76th STREET
SCOTTSDALE MUNICIPAL AIRPORT AIRPARK
JACKRABBIT PARK DET BASIN
CROSSED ARROWS PARK DET BASIN
KIERLAND DET BASINS
SANDPIPER PARK DET BASIN
AIRPORT DET BASIN
THUNDERBIRD ROAD DET BASIN
THUNDERBIRD INDUSTR DET BASIN
CACTUS PARK DET BASIN
MESCAL PARK DET BASIN
AD061B 901 4.08 (TOTAL INFLOW EAST AND WEST)
124 4.17 DR061B (60TH STREET SURFACE BYPASS)
121 5.08 LP061 (TOTAL OUTFLOW)
AD031B 1142 4.08
LP031A 108 4.83
AD033 320 4.08
AD062 662 4.08 (TOTAL INFLOW)
LP062 236 4.50 (TOTAL OUTFLOW)
RR040 36 4.25
AD040 857 4.08
AD034 401 4.08
AD011B 726 4.08
DV013 67 4.08 (TOTAL PIPE & SURFACE FLOW)
DR013 866 4.08
DR016 58 3.75
DR017 184 3.92 (PIPE FLOW)
583 4.33 RR041 (TOTAL INFLOW) 590
DV034 102 4.92 80
DR041 44 5.92 (PIPE FLOW) 50
DV041 12 5.58 (SURFACE OVERFLOW) 10
AD019 1307 4.17 (TOTAL INFLOW) 1750
AD064B 370 4.25
AD063 412 4.17 (TOTAL INFLOW)
AD043 172 4.08
AD035 214 4.08
SB021 355 4.08 (TOTAL INFLOW)
DR063A 109 4.25 (PIPE FLOW)
DR043 168 4.08
DV043 4 4.08
1123 4.17 AD015A
LP019 587 4.58 (TOTAL OUTFLOW) 1520
LP021 339 4.08 (TOTAL OUTFLOW)
RR065C 568 4.42
1317 4.25 AD015B
AD022 765 4.17
AD020A 1040 4.33
AD20B1 2007 4.25 (TOTAL INFLOW) 2417
AD065B 935 4.33
AD044 293 4.17
RR4446 133 4.08 (PIPE FLOW)
AD036 317 4.25
AD026 1105 4.17 475
AD023 1079 4.17
DR20B2 699 4.92 (SURFACE OVERFLOW) 1799
DR044A 49 4.17
RR047B 91 4.42 (SURFACE FLOW ONLY)
RR3646 294 4.33 (PIPE FLOW)
AD20B2 235 4.75 (OUTFALL PIPE ONLY) 244
RR047A 588 4.33 (PIPE FLOW)
AD024C 737 4.92 (SURFACE FLOW ONLY)
RR067A 987 4.42
AD048 713 4.17 (TOTAL INFLOW) 799
AD037A 436 4.08
1253 4.17 AD027B
DV048 203 4.83 (OUTFALL PIPE) 107
1350 4.33 AD037B
1557 4.33 AD037D 1559
DR048 136 4.83 (SURFACE OVERFLOW)
DR052 131 4.17 (SURFACE FLOW)
DV067B 406 4.42
AD049B 1644 4.33 1250 1773
AD053 332 4.17
DR067A 21 3.83 (PIPE FLOW)
DR067B 627 4.42
RR057B 281 4.17
AD051 1703 4.42 1719
AD067B 717 4.33
AD060A 1027 4.53
AD058A 403 4.33
AD055C 215 4.25
DV067C 359 4.33
AD060B 1190 4.33
AD057C 2981 4.42
AD055D 1860 4.42
374 4.17 AD054
AD5455 336 4.25 (SURFACE FLOW)
DR067C 359 4.33
AD068 2988 4.50
AD069 496 4.42
RR070A 2981 4.50 4000
AD070 3336 4.50

Table 6.0. Summary of 100- and 10-Year, 6-Hour Level Pool Data (HEC-1 15586C.TXT and 15586C10.TXT, Respectively)

					Total 6-Hr Peak Inflow (cfs)		Total 6-Hr Peak Outflow (cfs)		Peak Stage (ft)		Volume in Storage at 6-Hr Peak Stage (ac-ft)	
HEC-1 ID	Basin Name	Low Elevation (ft)	Overflow Elevation (ft)	Storage Volume at Overflow Elevation (ac-ft)	100-Yr	10-Yr	100-Yr	10-Yr	100-Yr	10-Yr	100-Yr	10-Yr
LP019*	Airport	1426.7	1432.0	33.6	1307	620	587	331	1432.1	1429.9	33.6	16.4
LP021*^	Thunderbird Industrial	1426.0	1430.0	4.4	355	181	339	160	1430.7	1430.3	5.6	4.9
LP020B*	Cactus	1370.0	1387.8	92.2	1823	830	749	40	1388.9	1385.9	92.2	69.7
LP031A	Kierland #1	54.5	76.0	57.9	1142	548	108	15	75.0	69.0	50.9	16.9
LP033	Kierland #2	35.0	65.0	230.0	320	136	**	**	42.5	40.5	25.6	17.3
LP034	Kierland #3	32.0	42.0	26.0	401	211	120	18	40.9	38.0	23.0	14.7
LP040	Kierland #4	31.0	40.0	20.6	857	341	578	116	39.7	38.1	19.1	12.1
LP041*	Sandpiper	25.0	33.5	29.4	583	119	56	36	33.6	29.6	29.4	6.2
LP048*	Mescal	1354.5	1363.5	38.1	713	394	338	147	1363.7	1360.6	38.1	21.3
LP061*	Jackrabbit	1463.0	1470.0	41.6	901	456	121	50	1470.7	1469.0	41.6	29.4
LP062*	Crossed Arrows	1432.0	1438.0	25.8	662	301	236	56	1438.3	1437.1	25.8	18.4
LP063*^	Thunderbird Road	1412.0	1417.0	5.1	412	192	386	137	1417.9	1417.1	5.1	5.4
				604.7							**390.0**	**232.7**

*Basins that overflow for the 100-year, 6-hour event

^Basins that overflow for the 10-year, 6-hour event

**No outflow except by small diameter bleedoff pipe

Note: Approximate Total Volume of 100-yr, 6-hr Hydrograph at AD070 = 660 ac-ft
Note: Approximate Total Volume of 10-yr, 6-hr Hydrograph at AD070 = 340 ac-ft

5.0 HYDROLOGY FOR THE RECOMMENDED ALTERNATIVE

Revisions were made to 10- and 100-year existing condition HEC-1 models, 15586C10.txt and 15586C.txt respectively, in order to reflect the recommended alternative hydrology. The "with recommended alternative" 10- and 100-year HEC-1 models are named ALT10.txt and ALT100.txt respectively. Changes to the existing conditions HEC-1 model included the following:

- Scottsdale Road channel routing reaches, from the Scottsdale Airport outfall channel confluence to Sweetwater Avenue (RR020A and RR020B), have been changed from channel sections to street sections. The recommended alternative consists of a storm drain trunk line with catch basins located in Scottsdale Road replacing the existing channel. The proposed trunk line starts at Thunderbird Road and connects to the existing 90-inch diameter stormdrain pipe at Sweetwater Avenue.

- The Cactus Park detention basin (LP020B) overflow spillway elevation was raised from 1387.8 feet to 1390.0 feet and the length of the spillway was changed in the model to reflect the concept design. The elevation-storage relationship was not modified nor was the elevation-discharge relationship for the primary outlet pipe.

- The Mescal Park detention basin (LP048) perimeter elevation was raised by one foot from 1363.5 feet to 1364.5 feet. Consequently the basin volume was increased proportionately by approximately 1 acre-foot starting at the bottom of the basin. The spillway from the concept design was reflected in the elevation-discharge relationship in the new HEC-1 model. The elevation-discharge relationship for the primary outlet pipe was not modified.

- The upper 71st Street channel routing RR049A was changed to reflect the recommended alternative channel section geometry and "n" value for the reach starting at Sahuaro Drive and extending north for approximately 570 feet. The proposed channel reach has an increased cross-section and hard lined surface.

- The upper 71st Street channel routing RR037B was changed to reflect the flatter slope north of Mescal Street for approximately 300 feet. The channel section geometry remained unchanged.

- Berneil Ditch channel routing reaches, from Scottsdale Road to the Mountain View Channel confluence (RR055D, RR057A and RR057C), have been changed to reflect the recommended alternative channel section and slope. The channel section was changed to a trapezoidal section with a hardened surface and a 40-foot bottom width. The channel slope was also reduced to a constant 0.00101 feet/feet.

Abbreviated HEC-1 printouts corresponding to the recommended alternative as well as supporting calculations are provided in Appendix C. Figures 7 and 8 on the following pages display recommended alternative condition peak discharges and peak times at various key locations throughout the study for the 10- and 100-year, 6-hour events, respectively.

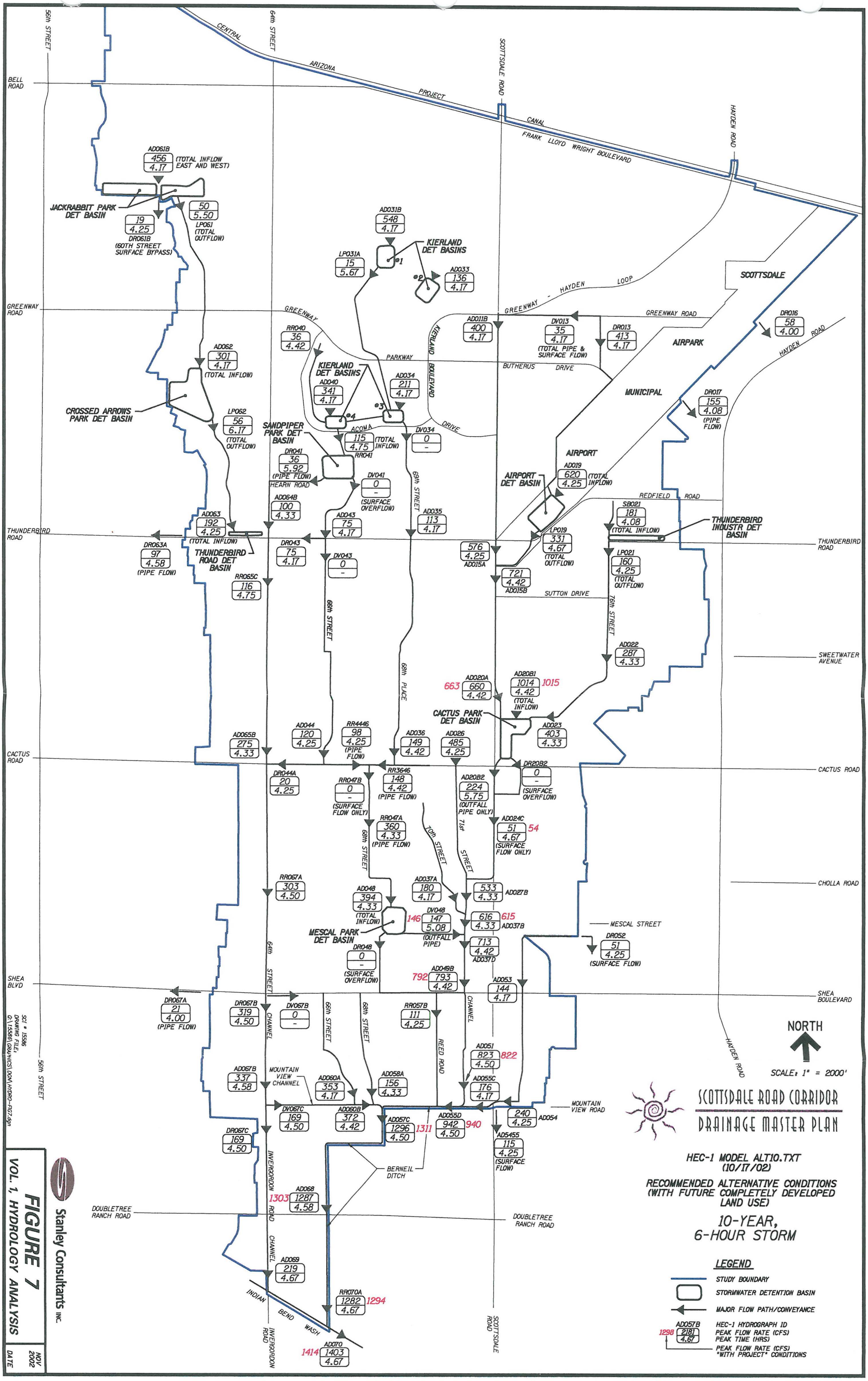


FIGURE 7
VOL. 1, HYDROLOGY ANALYSIS

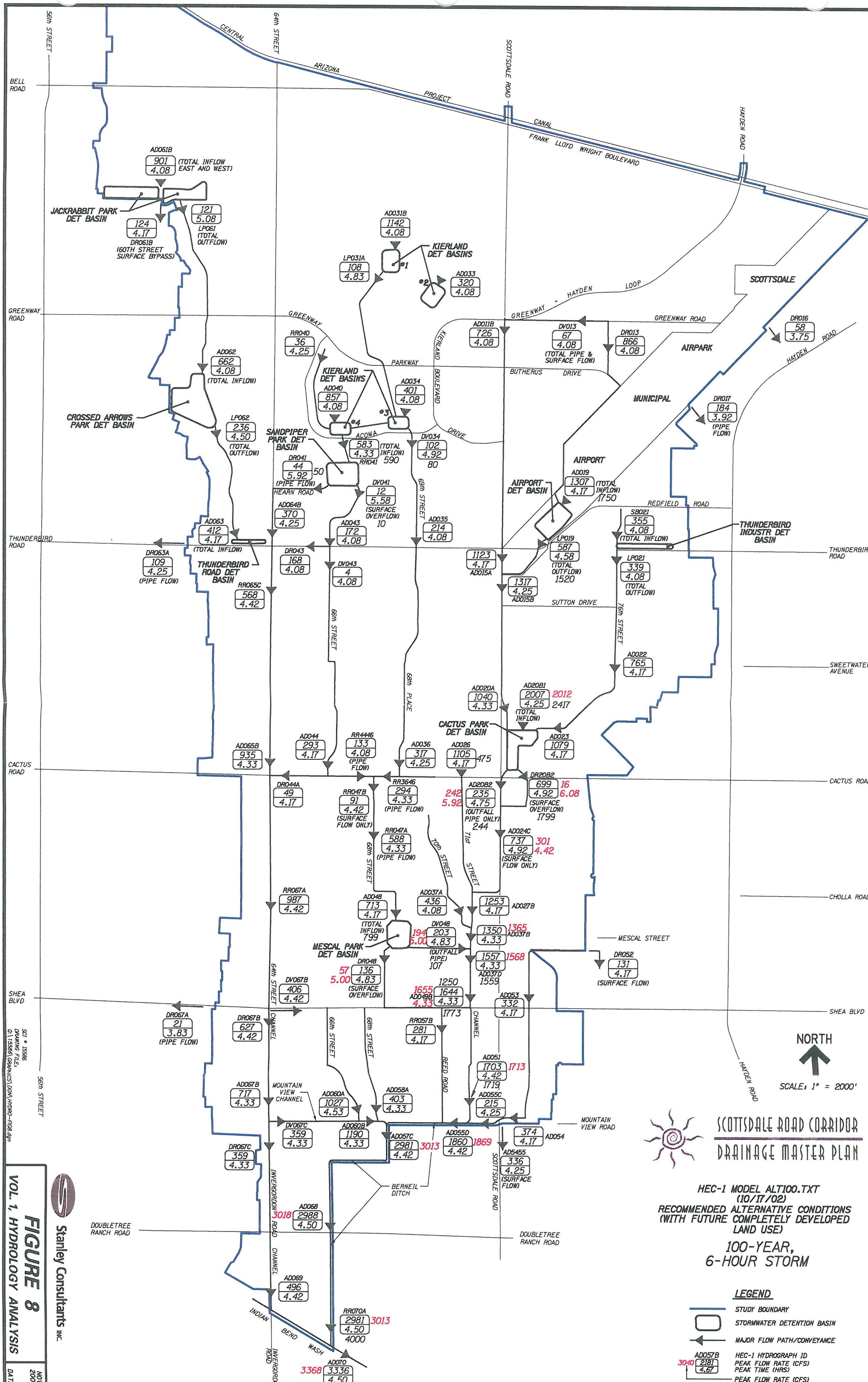


FIGURE 8
VOL. 1, HYDROLOGY ANALYSIS

6.0 HEC-1 WARNING MESSAGES

Warning messages generated by the existing conditions HEC-1 model include:

1. "FDKRUT – NEWTON RAPHSON FAILED FIXED POINT ITERATION USED – ITERATION = 1";
2. "WARNING - ROUTED OUTFLOW ( ) GREATER THAN MAXIMUM OUTFLOW ( ) IN STORAGE-OUTFLOW TABLE";
3. "FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT".

These warning messages are typically associated with level pool routing steps. The specific hydrograph steps that generated these warning messages were individually assessed and several attempts to eliminate the warning messages were conducted. Attempts included running HEC-1 Version 4.0, changing the computation time interval, increasing the number of hydrograph ordinates and eliminating HEC-1 JD records associated with the largest two basin areas.

Although it was possible to eliminate some warning messages, it was not possible to eliminate all warnings. The discharges, times of concentration and hydrographs associated with HEC-1 steps that generated the warning messages were assessed by the Flood Control District of Maricopa County hydrology staff and Stanley Consultants and determined to be reasonable.

APPENDIX A

SCOTTSDALE ROAD CORRIDOR DRAINAGE MASTER PLAN
SUPPORTING HYDROLOGIC DATA AND CALCULATIONS

Precipitation Data and Calculations

100-Year, 6- and 24-Hour Hydrographs

Soils Data and Calculations

Retention Storage for Various Places North of Paradise Lane

Sub-basin Related Data and Calculations

Routing Reach Data and Calculations

Diversion Data and Calculations

Gage Data, IDF Curves, Photographs and Normal Depth Calculations

Level Pool Data

Precipitation Data and Calculations

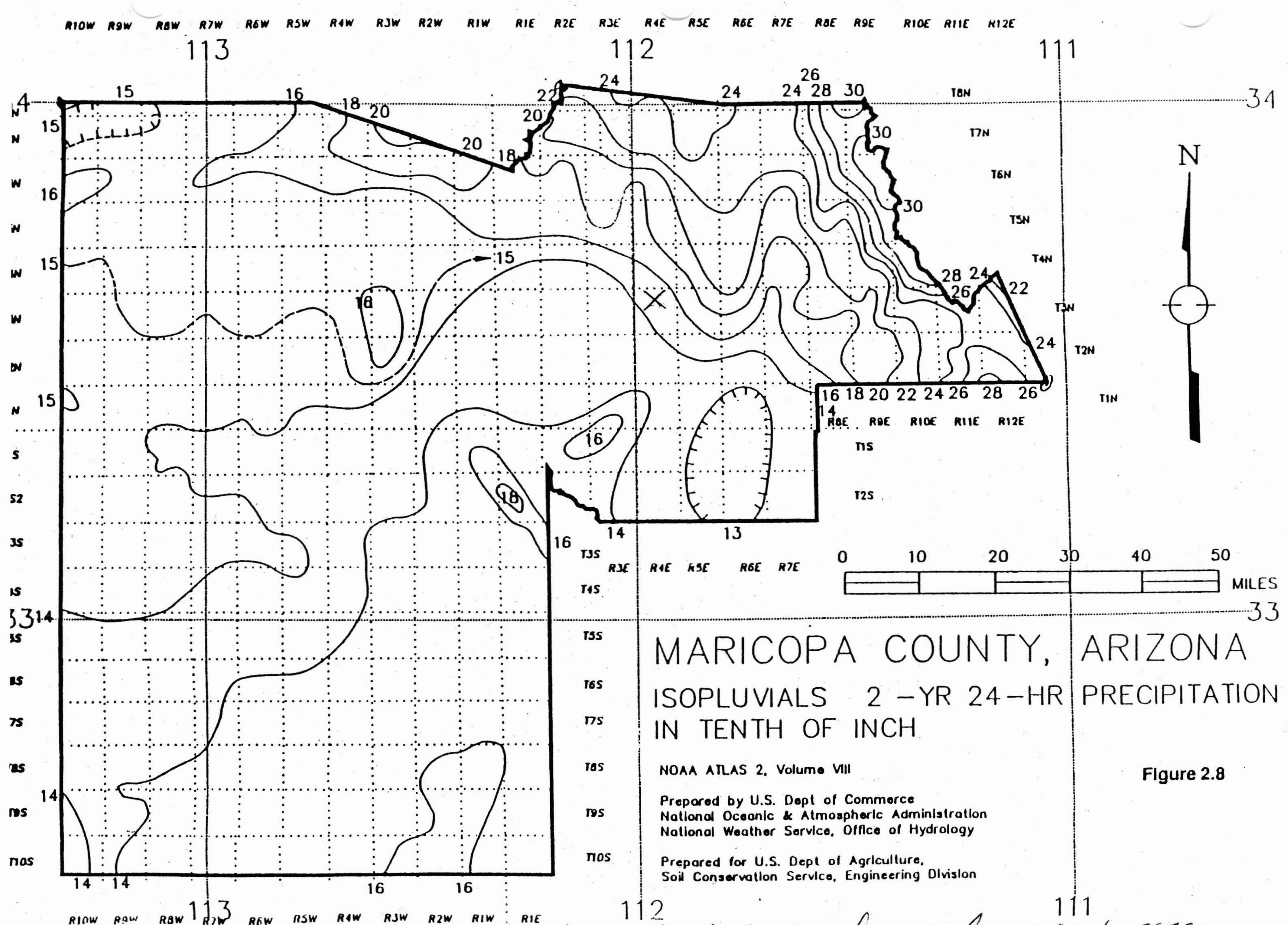
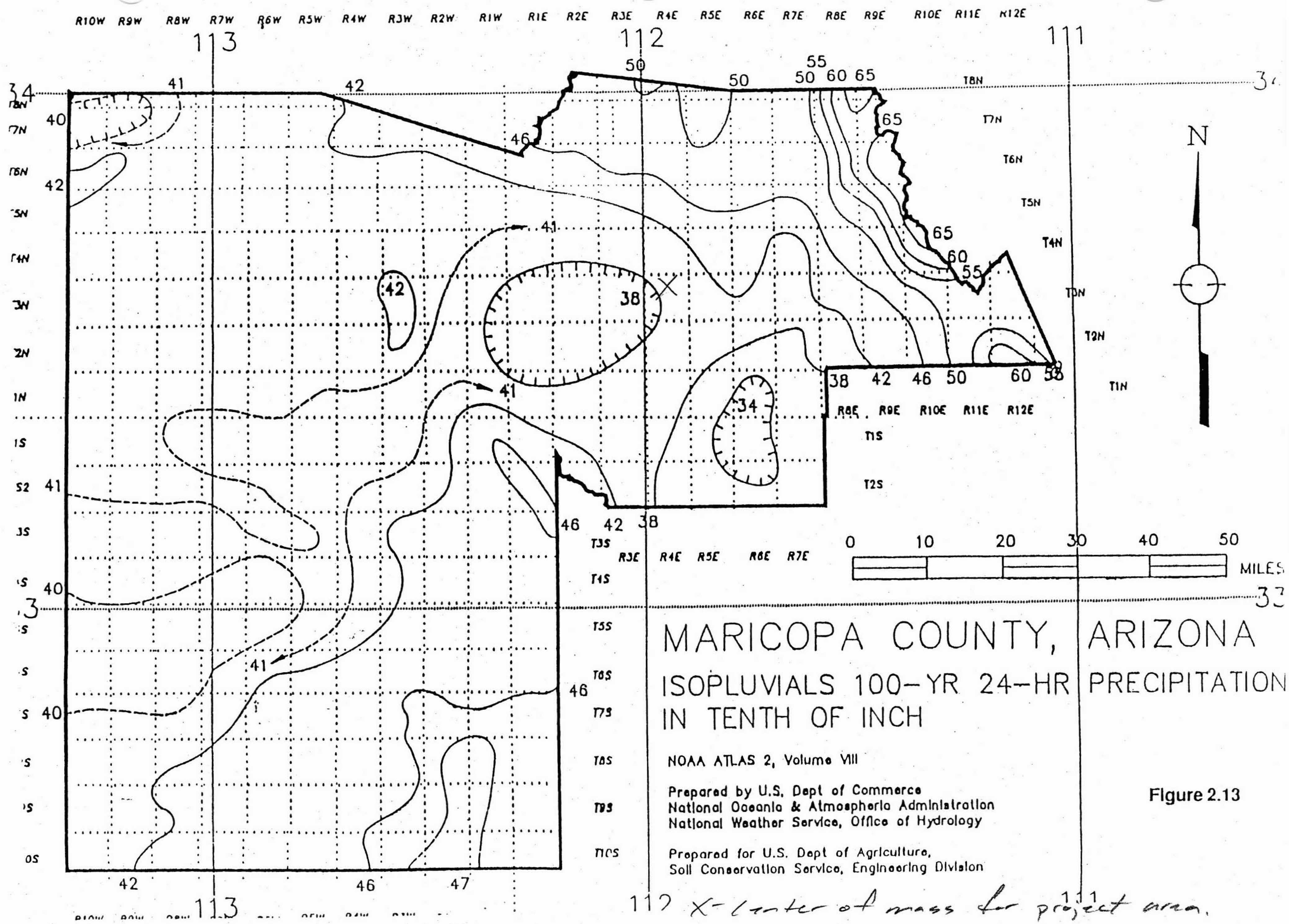


Figure 2.8

X- Center of mass for project area.



MARICOPA COUNTY, ARIZONA

ISOPLUVIALS 100-YR 24-HR PRECIPITATION IN TENTH OF INCH

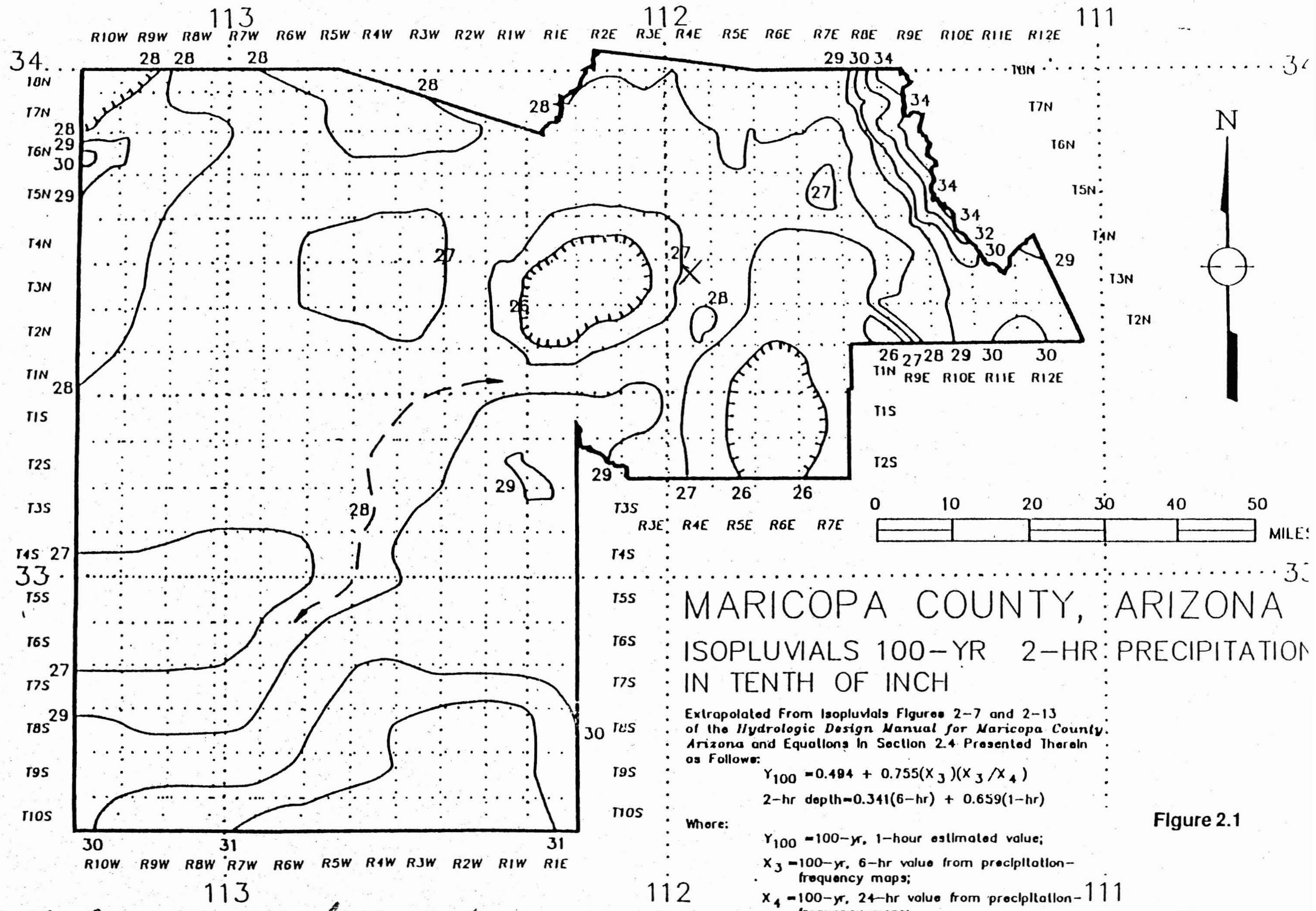
NOAA ATLAS 2, Volume VIII

Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology

Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division

Figure 2.13

X - Center of mass for project area.



MARICOPA COUNTY, ARIZONA

ISOPLUVIALS 100–YR 2–HR PRECIPITATION IN TENTH OF INCH

Extrapolated From Isopluvials Figures 2-7 and 2-13 of the *Hydrologic Design Manual for Maricopa County Arizona* and Equations In Section 2.4 Presented Thereln as Follows:

$$Y_{100} = 0.494 + 0.755(X_3)(X_3/X_4)$$

2-hr depth=0.341(6-hr) + 0.659(1-hr)

Where:

Y_{100} =100-yr, 1-hour estimated value;

X_3 =100-yr, 6-hr value from precipitation-frequency maps;

X_4 =100-yr, 24-hr value from precipitation-frequency maps;

6-hr=Isopluvial values from figure 2.7;

1-hr=X value as computed above

Figure 2.1

X- Approx center of mass for project area

X- Approx. center of mass for project area.

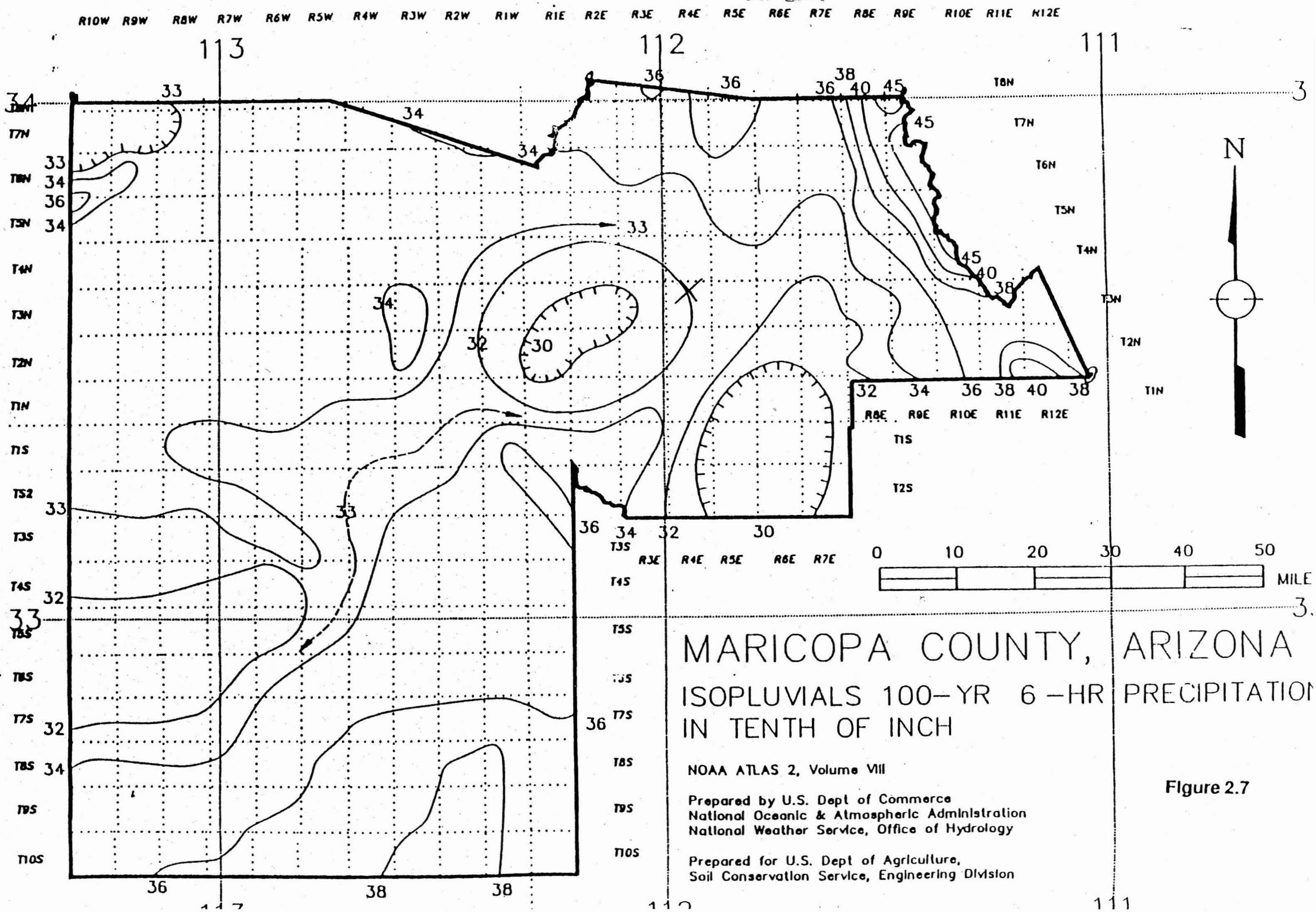
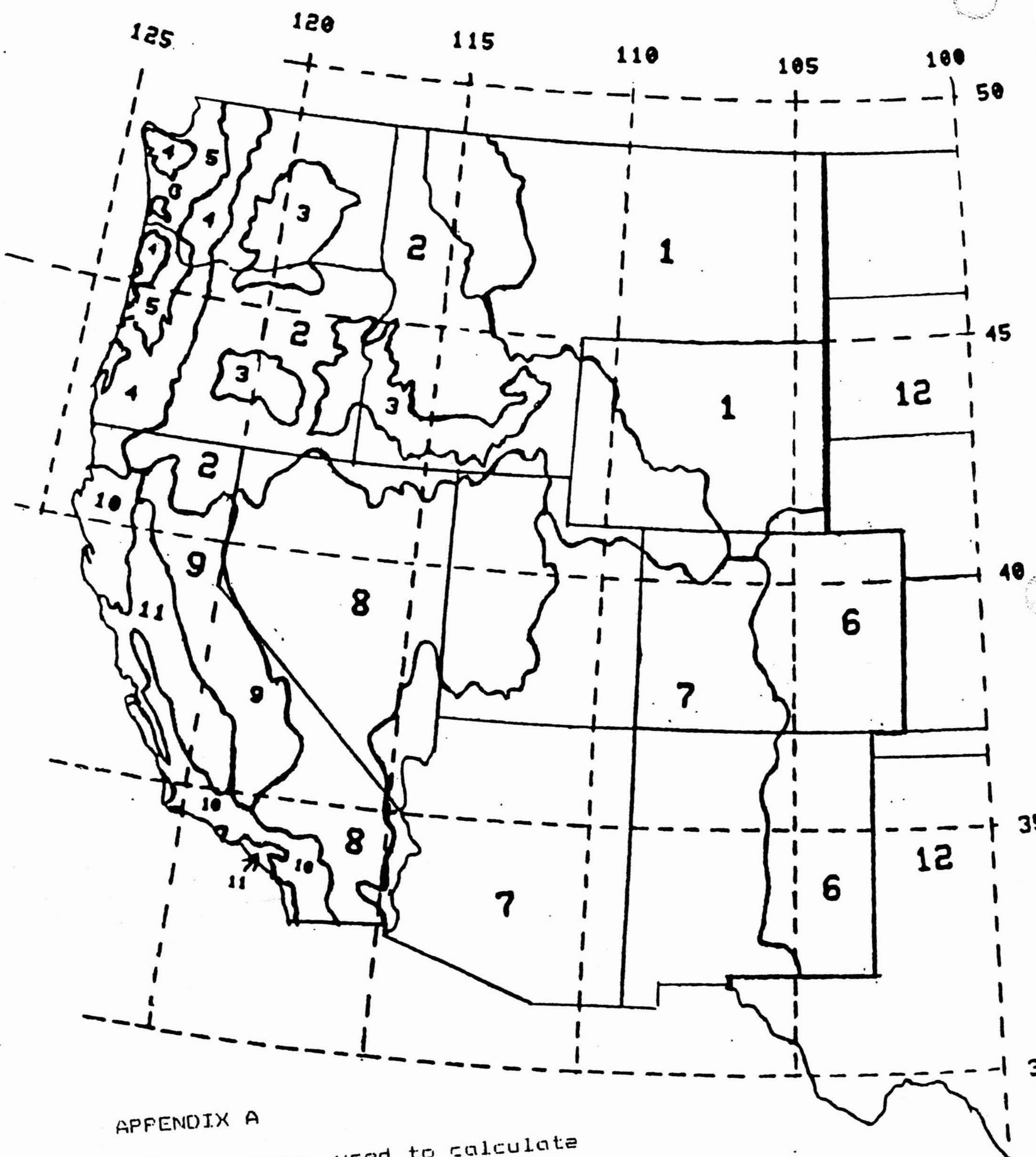


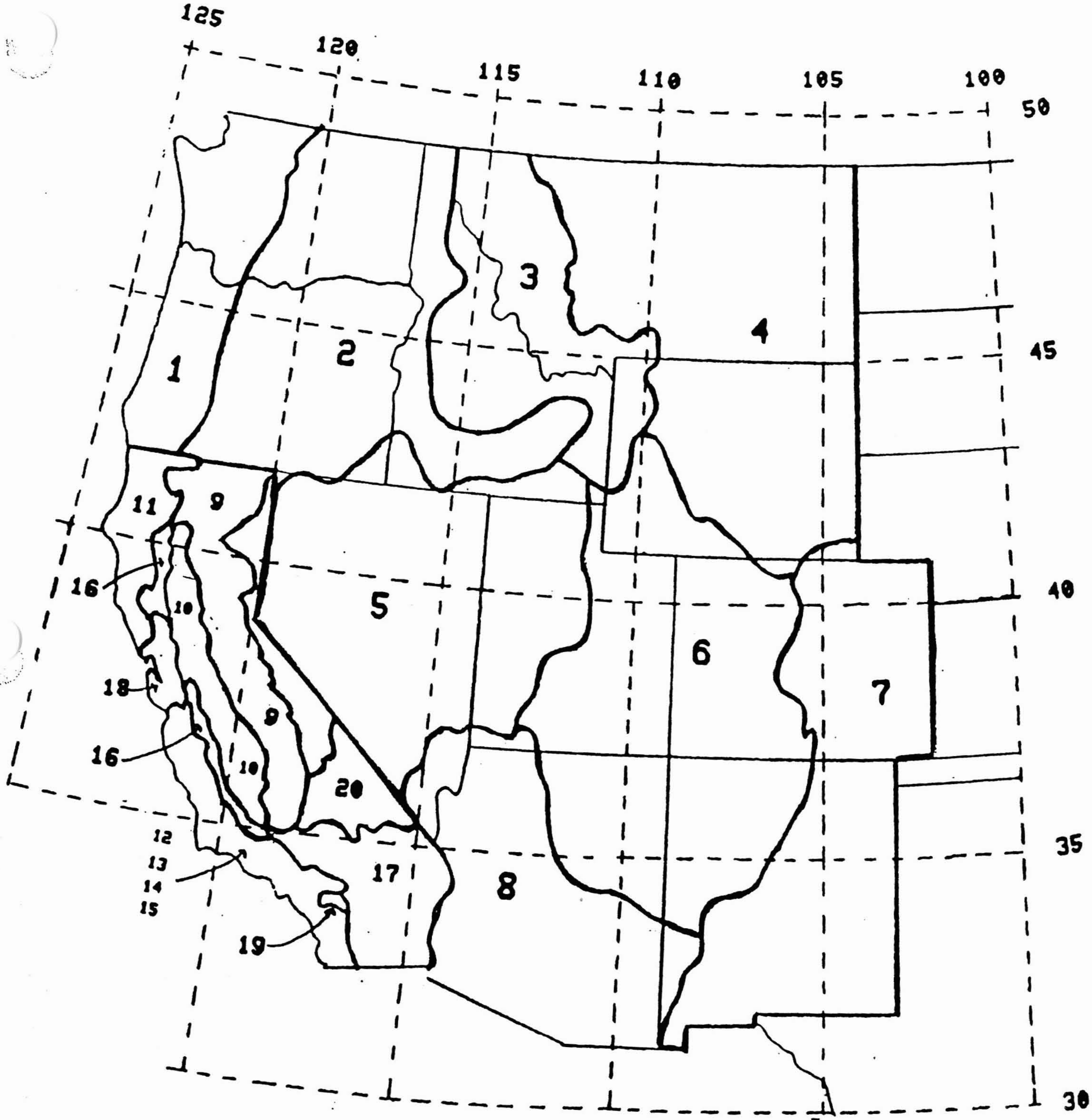
Figure 2.7



APPENDIX A

Primary zones, used to calculate precipitation for 1 to 24 hr durations. Zone boundaries are identical to those in NOAA Atlas 2, but zone numbers may differ.

PREFRE User's Manual
(FCDMC Hydrology Manual)



APPENDIX B

Short-duration zones, used to calculate 5 to 30 min durations.

PREFRE User's Manual
(FCDMC Hydrology Manual)

Table 2.2
Depth-Area Reduction Factors
for 6-Hour Duration Rainfall

Area, Square Miles	Ratio to Point of Rainfall
0	1.0
1	0.987
5	0.96
10	0.94
20	0.91
30	0.89
40	0.87
50	0.86
100	0.80
200	0.72
300	0.66
400	0.61
500	0.57

Use the depth-area reduction values from Figure 2.14 or Table 2.2 to correct the 6-hour point rainfall depth from the isopluvial maps (Figures 2.2 through 2.7) for all flood studies in which the 6-hour local storm is the design rainfall criteria (see Table 2.1).

If the flood study is for the design of a retention/detention facility for a small drainage area and the design rainfall criteria is the 100-year, 2-hour storm, then the point rainfall depths from Figure 2.1 are not to be reduced for area. This is because local retention/detention basins will be provided only for very small drainage areas and the point rainfall from Figure 2.1 is representative of the equivalent uniform depth of rainfall over the entire contributing area.

If a general storm is the accepted design rainfall criteria (as opposed to the 6-hour local storm as defined in this manual), then the appropriate depth-area reduction curve will need to be defined to correspond with the rainfall duration and the temporal distribution of the general storm. Usually the general storm for use in Maricopa County is the SCS Type II 24-hour design rainfall. Areal reductions for point rainfall for this 24-hour storm should be performed using Table 2.1a. The data for Table 2.1a have been taken from Figure 15 of the NWS HYDRO-40 (Zehr and Myers, 1984). For other general storms, the depth-area reduction and temporal distribution will need to be performed on a case-by-case basis depending on the purpose of the study, location of the watershed, and other meteorological and hydrological factors.

2.3.1 Procedure for Depth-Area Adjustment

The following procedure is to be used with the 6-hour local storm rainfall depths (Figures 2.2 through 2.7):

1. Determine the size of the drainage area.

Table 2.4
6-Hour Distributions*

Time (hrs)	Pattern 1	Pattern 2	Pattern 3	Pattern 4	Pattern 5
0:00	0.0	0.0	0.0	0.0	0.0
0:15	0.8	0.9	1.5	2.1	2.4
0:30	1.6	1.6	2.0	3.5	4.3
0:45	2.5	2.5	3.0	5.1	5.9
1:00	3.3	3.4	4.8	7.1	7.8
1:15	4.1	4.2	6.3	8.7	9.8
1:30	5.0	5.1	7.6	10.5	11.9
1:45	5.8	5.9	9.0	12.5	14.1
2:00	6.6	6.7	10.5	14.3	16.2
2:15	7.4	7.6	11.9	16.0	18.6
2:30	8.7	8.7	13.5	17.9	21.2
2:45	9.9	10.0	15.2	20.1	23.9
3:00	11.8	12.0	17.5	23.2	27.1
3:15	13.8	16.3	22.2	28.1	32.1
3:30	21.6	25.2	30.4	36.4	40.8
3:45	37.7	45.1	47.2	50.0	51.5
4:00	83.4	69.4	67.0	65.8	62.7
4:15	91.1	83.7	79.6	77.3	73.5
4:30	93.1	90.0	86.8	84.1	81.4
4:45	95.0	93.8	91.2	88.8	86.4
5:00	96.2	95.0	94.6	92.7	90.7
5:15	97.2	96.3	96.0	94.5	93.0
5:30	98.3	97.5	97.3	96.4	95.4
5:45	99.1	98.8	98.7	98.2	97.7
6:00	100.0	100.0	100.0	100.0	100.0

*Pattern represents percent Rainfall Depth.

FCDMC VOLUME 1, HYDROLOGY MANUAL

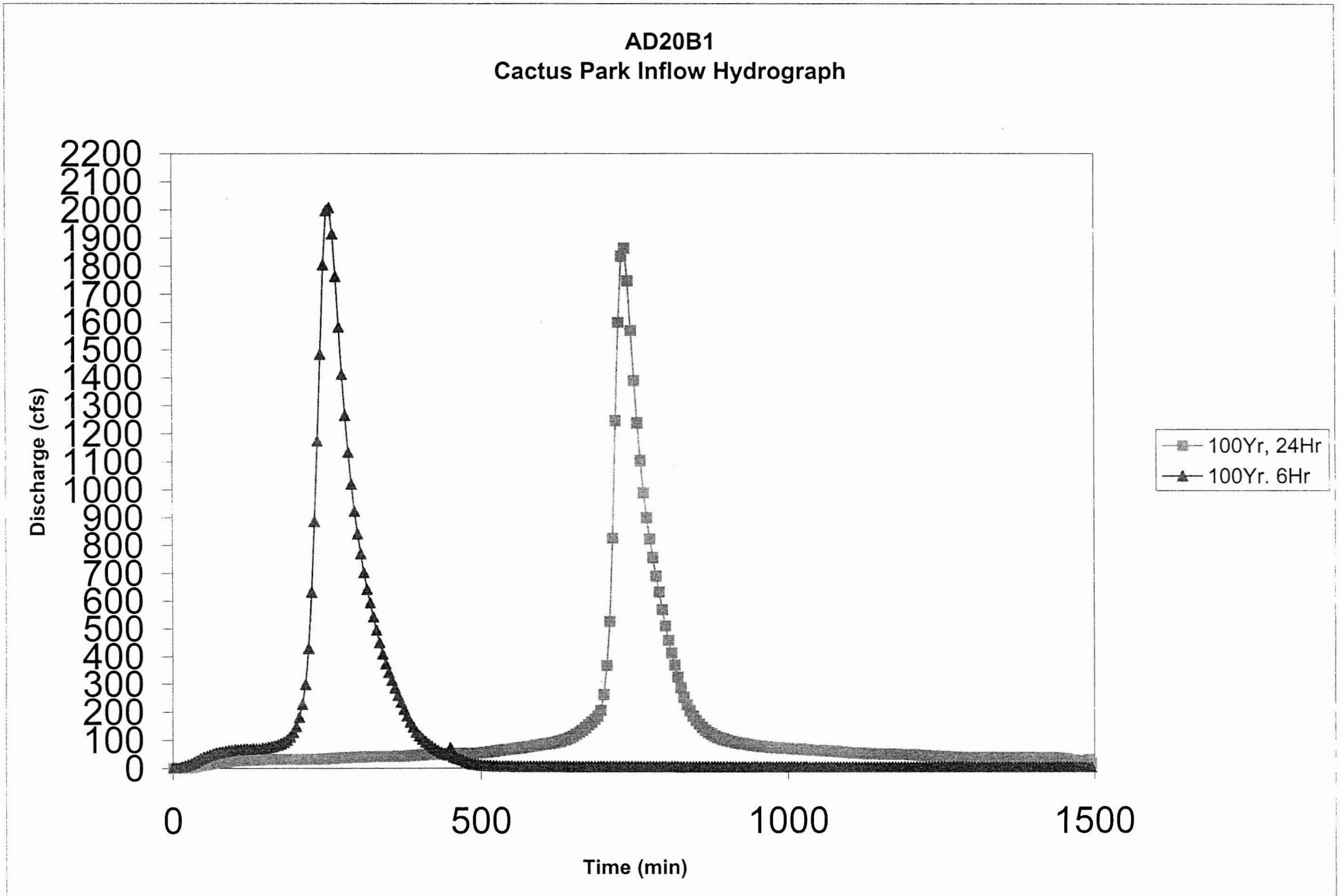
Prefire Table

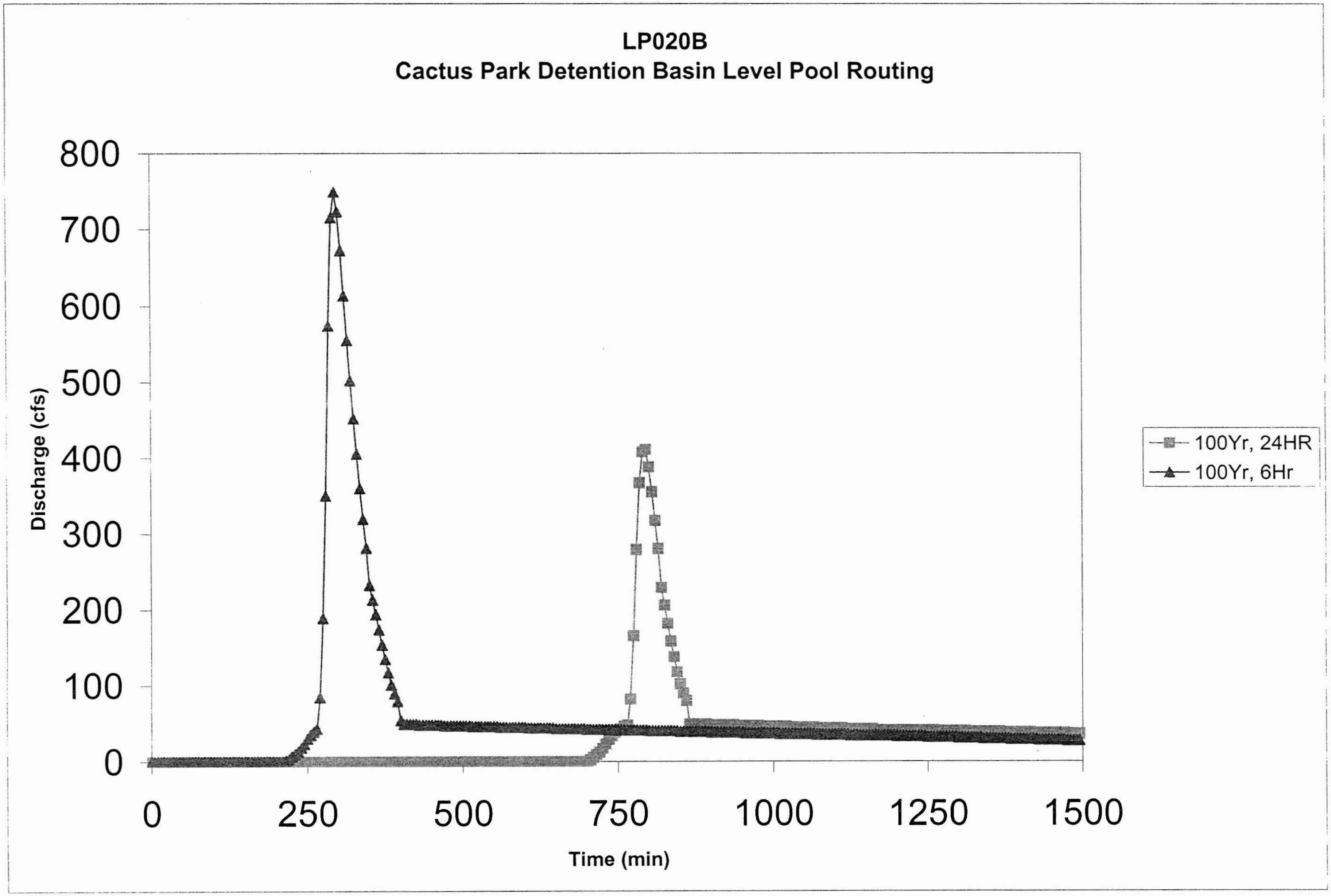
Flood Control District of Maricopa County
15586A - Scottsdale Road Corridor Drainage Master Plan
Rainfall Data

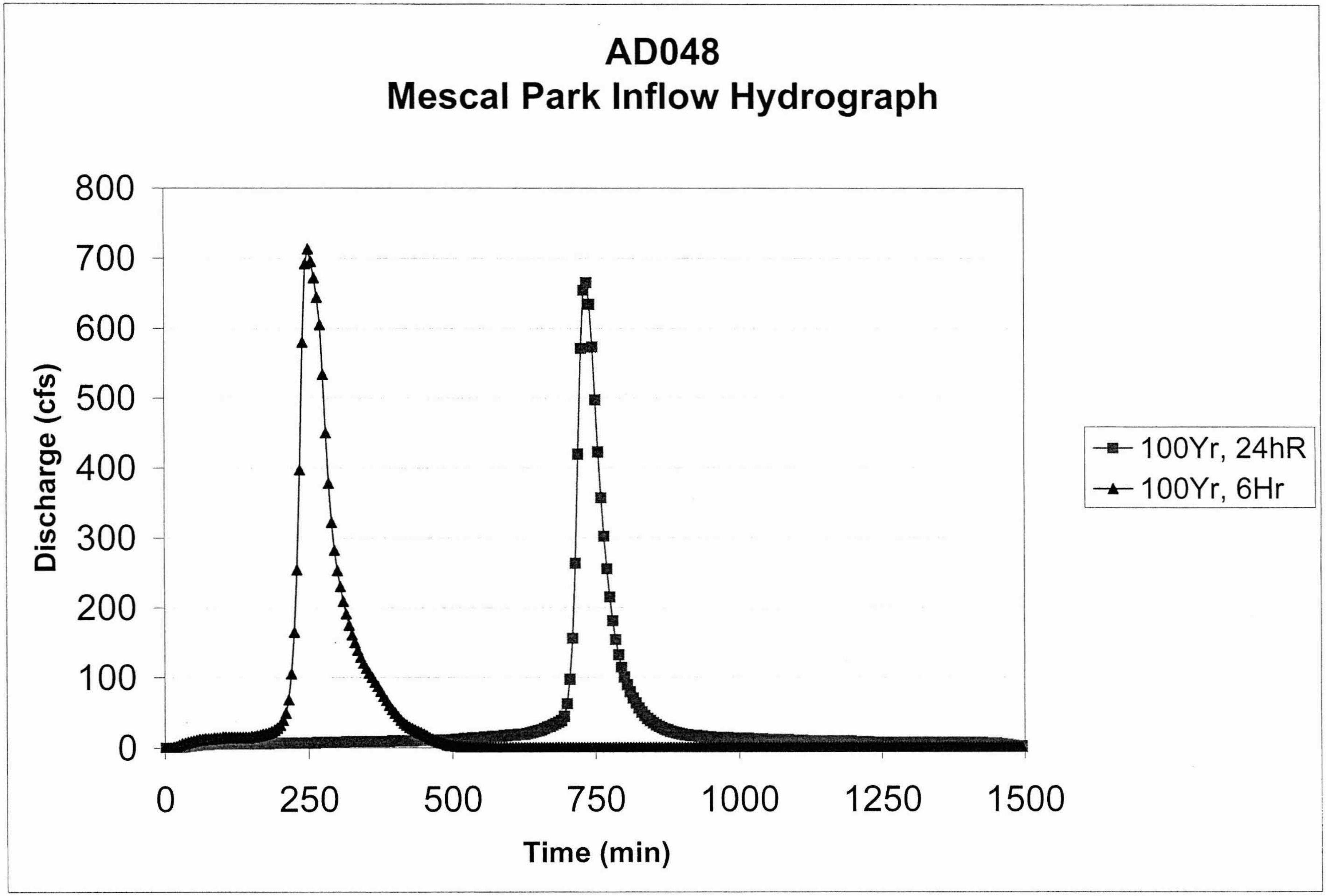
Primary Zone Number:	**7**	Latitude:	**0.0**	Elevation:	**0**
Short Duration Zone Number:	**8**	Longitude:	**0.0**		

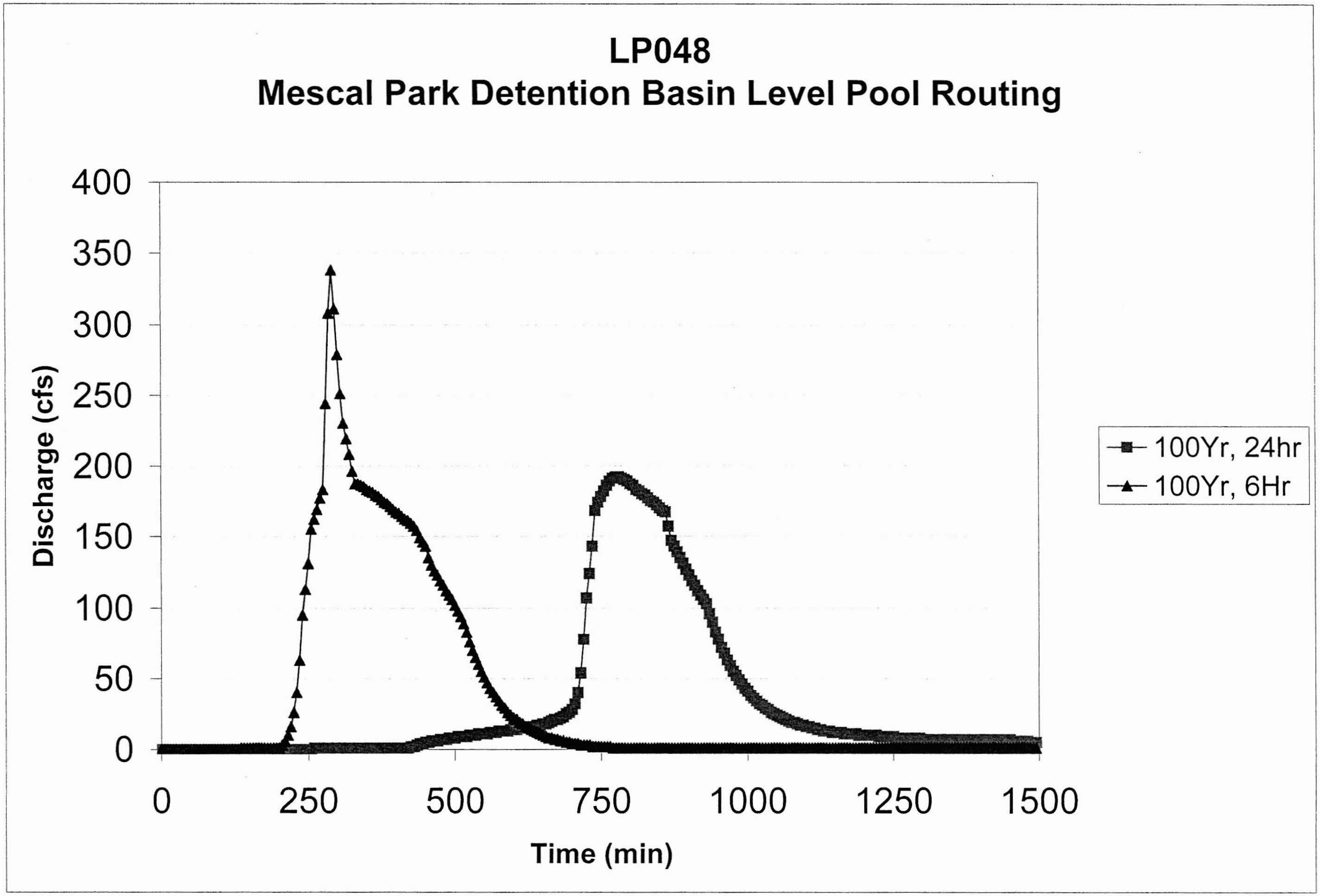
Duration	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
	Point Values (in)					
5 MIN	0.30	0.41	0.47	0.57	0.65	0.72
10 MIN	0.46	0.61	0.72	0.87	0.99	1.11
15 MIN	0.55	0.77	0.91	1.11	1.26	1.42
30 MIN	0.73	1.03	1.23	1.50	1.71	1.92
1 HOUR	0.89	1.27	1.52	1.87	2.14	2.40
2 HOUR	1.00	1.42	1.70	2.08	2.38	2.67
3 HOUR	1.07	1.51	1.81	2.22	2.54	2.86
6 HOUR	1.20	1.70	2.03	2.49	2.85	3.20
12 HOUR	1.35	1.92	2.30	2.82	3.22	3.63
24 HOUR	1.50	2.14	2.56	3.15	3.60	4.05

100-Year, 6- and 24-Hour Hydrographs

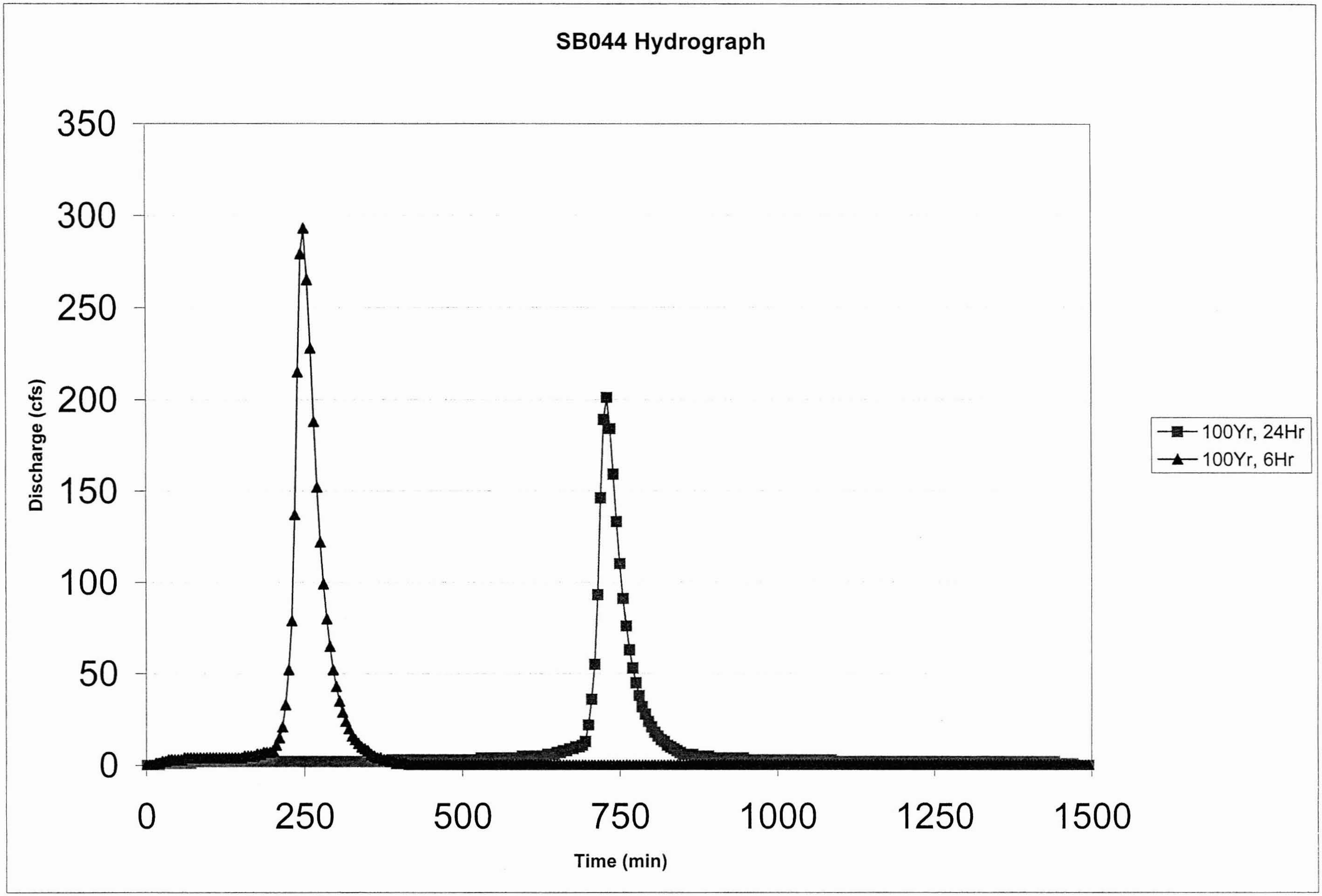

AD20B1
Cactus Park Inflow Hydrograph
Discharge (cfs)
2200
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
0
500
1000
1500
Time (min)
100Yr, 24Hr
100Yr. 6Hr

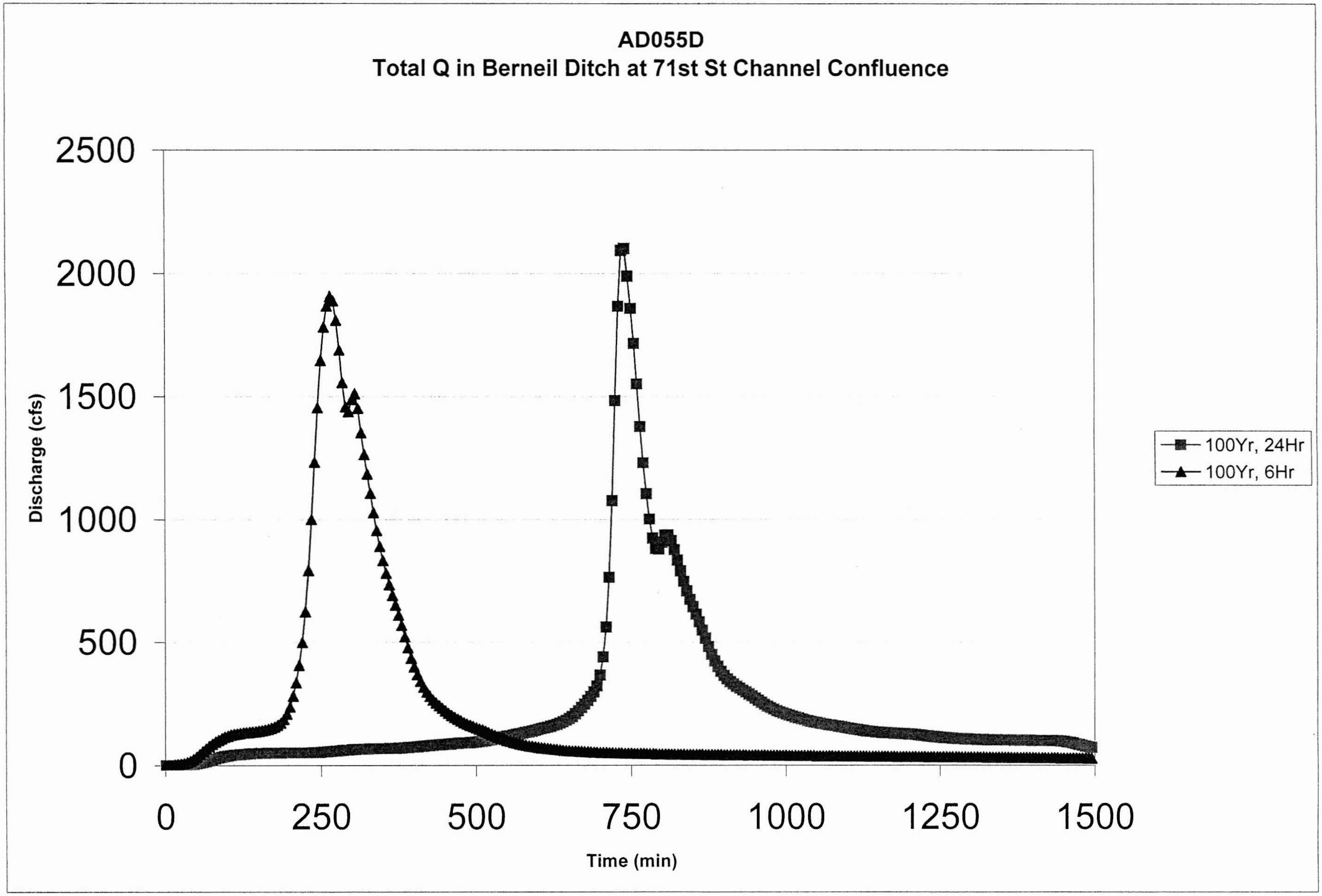

LP020B
Cactus Park Detention Basin Level Pool Routing
800
700
600
500
400
300
200
100
0
Discharge (cfs)
0
250
500
750
1000
1250
1500
Time (min)
100Yr, 24HR
100Yr, 6Hr

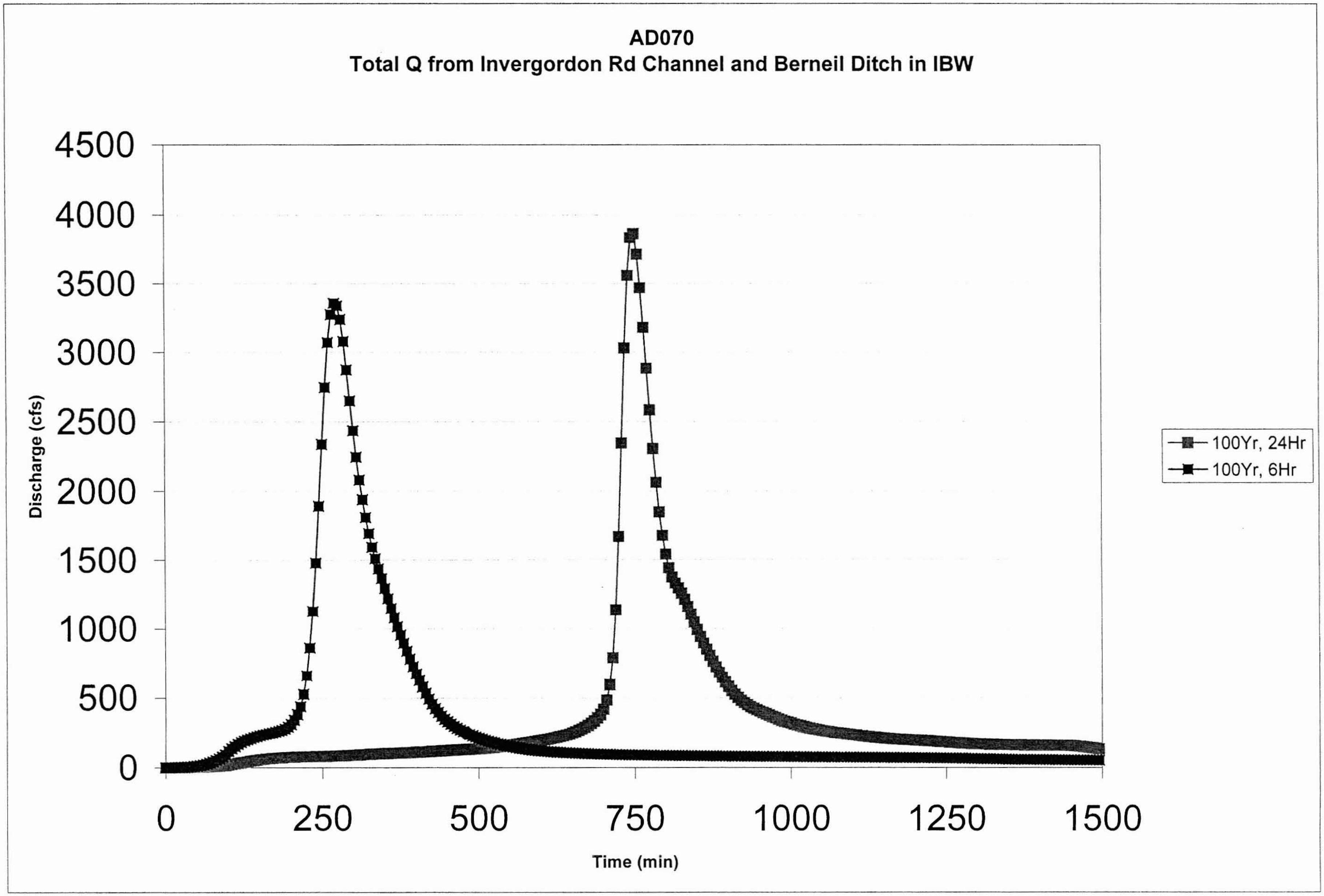

AD048
Mescal Park Inflow Hydrograph
Discharge (cfs)
800
700
600
500
400
300
200
100
0
0
250
500
750
1000
1250
1500
Time (min)
100Yr, 24hR
100Yr, 6Hr



LP048
Mescal Park Detention Basin Level Pool Routing
Discharge (cfs)
400
350
300
250
200
150
100
50
0
0
250
500
750
1000
1250
1500
Time (min)
100Yr, 24hr
100Yr, 6Hr


SB044 Hydrograph
Discharge (cfs)
Time (min)
0
50
100
150
200
250
300
350
0
250
500
750
1000
1250
1500
100Yr, 24Hr
100Yr, 6Hr


AD055D
Total Q in Berneil Ditch at 71st St Channel Confluence
2500
2000
1500
1000
500
0
Discharge (cfs)
0
250
500
750
1000
1250
1500
Time (min)
100Yr, 24Hr
100Yr, 6Hr



AD070
Total Q from Invergordon Rd Channel and Berneil Ditch in IBW
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Discharge (cfs)
0
250
500
750
1000
1250
1500
Time (min)
100Yr, 24Hr
100Yr, 6Hr

Soils Data and Calculations

Soil Data

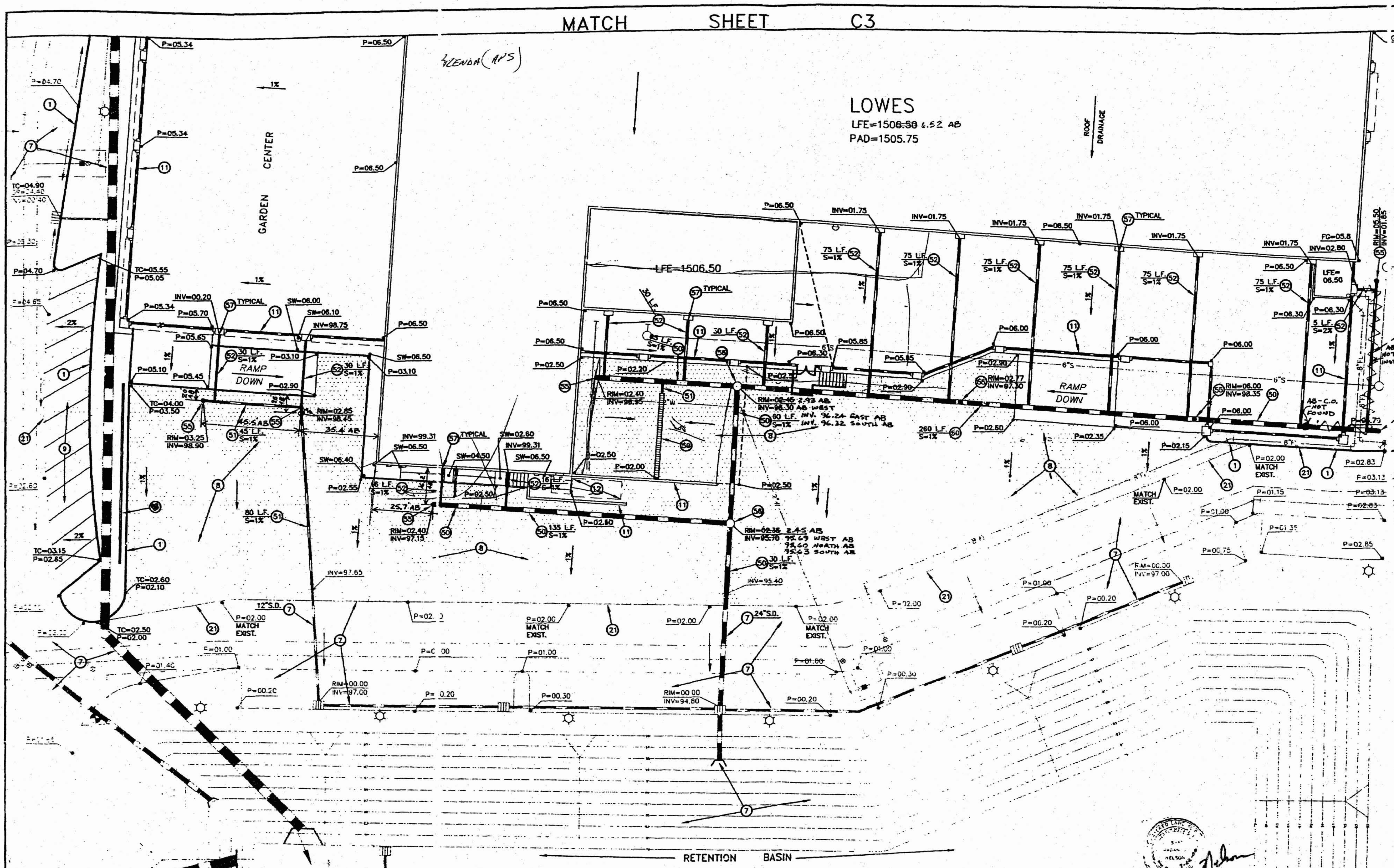
Sub Basin ID	Soil Survey	Map Unit	Area	Area Pct (%)	XKSAT	Rock Outcrop (%)	Effective (%)
SB009	Aguila/Carefree	55	0.060	100.0	0.27		
SB010	Aguila/Carefree	55	0.360	100.0	0.27		
SB011	Aguila/Carefree	55	0.220	100.0	0.27		
SB012	Aguila/Carefree	55	0.200	100.0	0.27		
SB013	Aguila/Carefree	55	0.040	100.0	0.27		
SB014	Aguila/Carefree	55	0.030	100.0	0.27		
SB015	Aguila/Carefree	55	0.250	100.0	0.27		
SB016	Aguila/Carefree	55	0.090	100.0	0.27		
SB017	Aguila/Carefree	55	0.090	100.0	0.27		
SB018	Aguila/Carefree	55	0.150	100.0	0.27		
SB019	Aguila/Carefree	55	0.190	100.0	0.27		
SB020A	Aguila/Carefree	55	0.060	100.0	0.27		
SB021	Aguila/Carefree	55	0.140	100.0	0.27		
SB022	Aguila/Carefree	55	0.240	100.0	0.27		
SB023	Aguila/Carefree	55	0.170	100.0	0.27		
SB020B	Aguila/Carefree	55	0.270	100.0	0.27		
SB025	Aguila/Carefree	55	0.140	100.0	0.27		
SB026	Aguila/Carefree	55	0.440	100.0	0.27		
SB027	Aguila/Carefree	55	0.120	100.0	0.27		
SB028	Aguila/Carefree	55	0.134	100.0	0.27		
SB029	Aguila/Carefree	55	0.180	100.0	0.27		
SB030	Aguila/Carefree	55	0.100	100.0	0.27		
SB031	Aguila/Carefree	55	0.120	100.0	0.27		
SB032	Aguila/Carefree	56	0.030	100.0	0.27		
SB033	Aguila/Carefree	55	0.140	100.0	0.27		
SB034	Aguila/Carefree	55	0.180	100.0	0.27		
SB035	Aguila/Carefree	55	0.110	100.0	0.27		
SB036	Aguila/Carefree	55	0.130	100.0	0.27		
SB037	Aguila/Carefree	55	0.210	100.0	0.27		
SB024	Aguila/Carefree	55	0.110	100.0	0.27		
SB038	Aguila/Carefree	55	0.120	100.0	0.27		
SB039	Aguila/Carefree	55	0.030	100.0	0.27		

* Custom Value (not default value)

Sub Basin ID	Soil Survey	Map Unit	Area	Area Pct (%)	XKSAT	Rock Outcrop (%)	Effective (%)
SB040	Aguila/Carefree	55	0.410	100.0	0.27		
SB041	Aguila/Carefree	55	0.040	100.0	0.27		
SB043	Aguila/Carefree	55	0.080	100.0	0.27		
SB044	Aguila/Carefree	55	0.180	100.0	0.27		
SB045	Aguila/Carefree	55	0.030	100.0	0.27		
SB046	Aguila/Carefree	55	0.190	100.0	0.27		
SB048	Aguila/Carefree	55	0.090	100.0	0.27		
SB049	Aguila/Carefree	55	0.140	100.0	0.27		
SB050	Aguila/Carefree	55	0.040	100.0	0.27		
SB051	Aguila/Carefree	55	0.090	100.0	0.27		
SB052	Aguila/Carefree	55	0.170	100.0	0.27		
SB053	Aguila/Carefree	55	0.100	100.0	0.27		
SB054	Aguila/Carefree	55	0.110	100.0	0.27		
SB055	Aguila/Carefree	55	0.053	100.0	0.27		
SB057	Aguila/Carefree	55	0.150	100.0	0.27		
SB047	Aguila/Carefree	55	0.190	100.0	0.27		
SB058	Aguila/Carefree	55	0.060	100.0	0.27		
SB059	Aguila/Carefree	55	0.240	100.0	0.27		
SB060	Aguila/Carefree	55	0.180	100.0	0.27		
SB061A	Aguila/Carefree	55	0.190	100.0	0.27		
SB061B	Aguila/Carefree	55	0.110	100.0	0.27		
SB061C	Aguila/Carefree	55	0.270	100.0	0.27		
SB062	Aguila/Carefree	55	0.340	100.0	0.27		
SB063	Aguila/Carefree	55	0.220	100.0	0.27		
SB064	Aguila/Carefree	55	0.140	100.0	0.27		
SB065	Aguila/Carefree	55	0.440	100.0	0.27		
SB066	Aguila/Carefree	55	0.120	100.0	0.27		
SB067A	Aguila/Carefree	55	0.100	100.0	0.27		
SB067B	Aguila/Carefree	55	0.090	100.0	0.27		
SB068	Aguila/Carefree	55	0.110	100.0	0.27		
SB069	Aguila/Carefree	55	0.140	100.0	0.27		
SB070	Aguila/Carefree	55	0.140	100.0	0.27		

* Custom Value (not default value)

Retention Storage for Various Places North of Paradise Lane



KEY:

1. CONSTRUCT CAST-IN-PLACE SINGLE CURB PER MAG STD. DET. 222 TYPE "B"
2. CONSTRUCT CURB TERMINATION PER MAG STD. DET. 222.
3. INSTALL 7" CONCRETE PAVEMENT ON 4" A.B.C. ON 8" COMPACTED SUBGRADE. SEE ARCHITECTURAL AND LANDSCAPE DRAWINGS FOR ADDITIONAL DETAILS.
4. INSTALL 4" THICK CONCRETE SIDEWALK WITH 6"x6" #10 MESH ON 8" COMPACTED SUBGRADE. SEE ARCHITECTURAL AND LANDSCAPE DRAWINGS FOR ADDITIONAL DETAILS.
5. INSTALL CONCRETE SIDEWALK PER MAG STD. DET. 230.
6. INSTALL SIDEWALK RAMP PER MAG STD. DET. 232.
7. IMPROVEMENTS BEING CONSTRUCTED PER PLANS FOR THE PROMENADE INFRASTRUCTURE (PLAN CHECK NO. 371-99).
8. INSTALL 7" CONCRETE PAVEMENT ON 4" A.B.C. ON 8" COMPACTED SUBGRADE. SEE ARCHITECTURAL AND LANDSCAPE DRAWINGS FOR ADDITIONAL DETAILS.
9. INSTALL ASPHALT PAVEMENT: 2" AC (C 3/4) ON 4" A.B.C. ON 8" COMPACTED SUBGRADE.
10. INSTALL M.U.T.C.D. "STOP" SIGN, R1-1 (36"x36") @ 2' BACK OF CURB.
11. INSTALL BLOCK WALL PER ARCHITECTURAL DRAWINGS.
12. TRASH COMPACTOR
13. CONSTRUCT SCREEN WALL - SEE LANDSCAPE DRAWING FOR DETAILS.
21. REMOVE EXISTING EXTRUDED CONCRETE CURB.
50. INSTALL 24 INCH STORM DRAIN PIPE (HDPE - ADS ULTRA).
51. INSTALL 12 INCH STORM DRAIN PIPE (HDPE - ADS ULTRA).
52. INSTALL 10 INCH STORM DRAIN PIPE (HDPE - ADS ULTRA) - ROOF DRAIN LEADER.
53. INSTALL 6 INCH STORM DRAIN PIPE (HDPE - ADS ULTRA) - ROOF DRAIN LEADER.
54. INSTALL 10 INCH STORM DRAIN PIPE (HDPE - ADS ULTRA) - GARDEN CENTER FLOOR DRAIN.
55. INSTALL CLEANOUT PER MAG STD. DET. 441.
56. INSTALL STORMDRAIN MANHOLE PER MAG STD. DET. 522.
57. SEE PLUMBING PLAN FOR CONTINUATION.
58. MATCH INVERT OF EXISTING STORM DRAIN PIPE.
59. INSTALL TRENCH DRAIN PER ARCHITECTURAL DRAWINGS.

36405

SCALE 20 10 0 20 40 FEET

CMX GROUP INC.
1515 E. MISSOURI
PHOENIX, AZ 85014
(602)279-8436
ENGINEERING
PROJECT ADMINISTRATION
CONSTRUCTION ANALYSIS
PROJECT NO. 6004
DATE: 10-04-99

REVISIONS
◇ PRE-BID SET ISSUE DATE
△ POST BID SET ISSUE DATE

DATE	DESCRIPTION

SCONZO HALLSTROM ARCHITECTS, P.S.C.

LOWE'S COMPANIES, INC. AUGUST 1999 COPYRIGHT ALL RIGHTS RESERVED

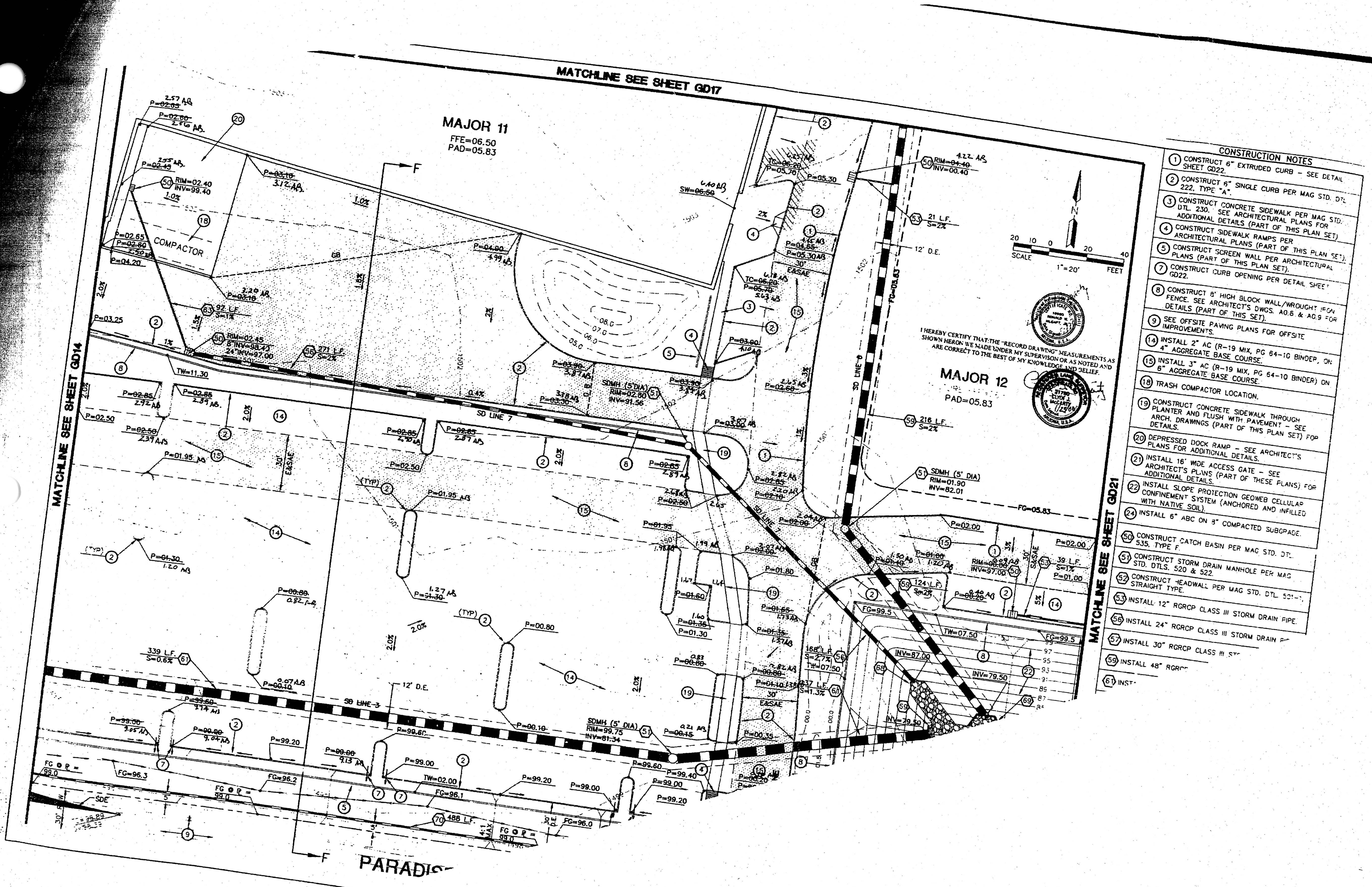
Lowe's Companies, Inc.
P. O. Box 1111 N. Wilkesboro, N. C. 28656

GRADING & DRAINAGE PLAN
LOWE'S
THE PROMENADE
SCOTTSDALE, ARIZONA

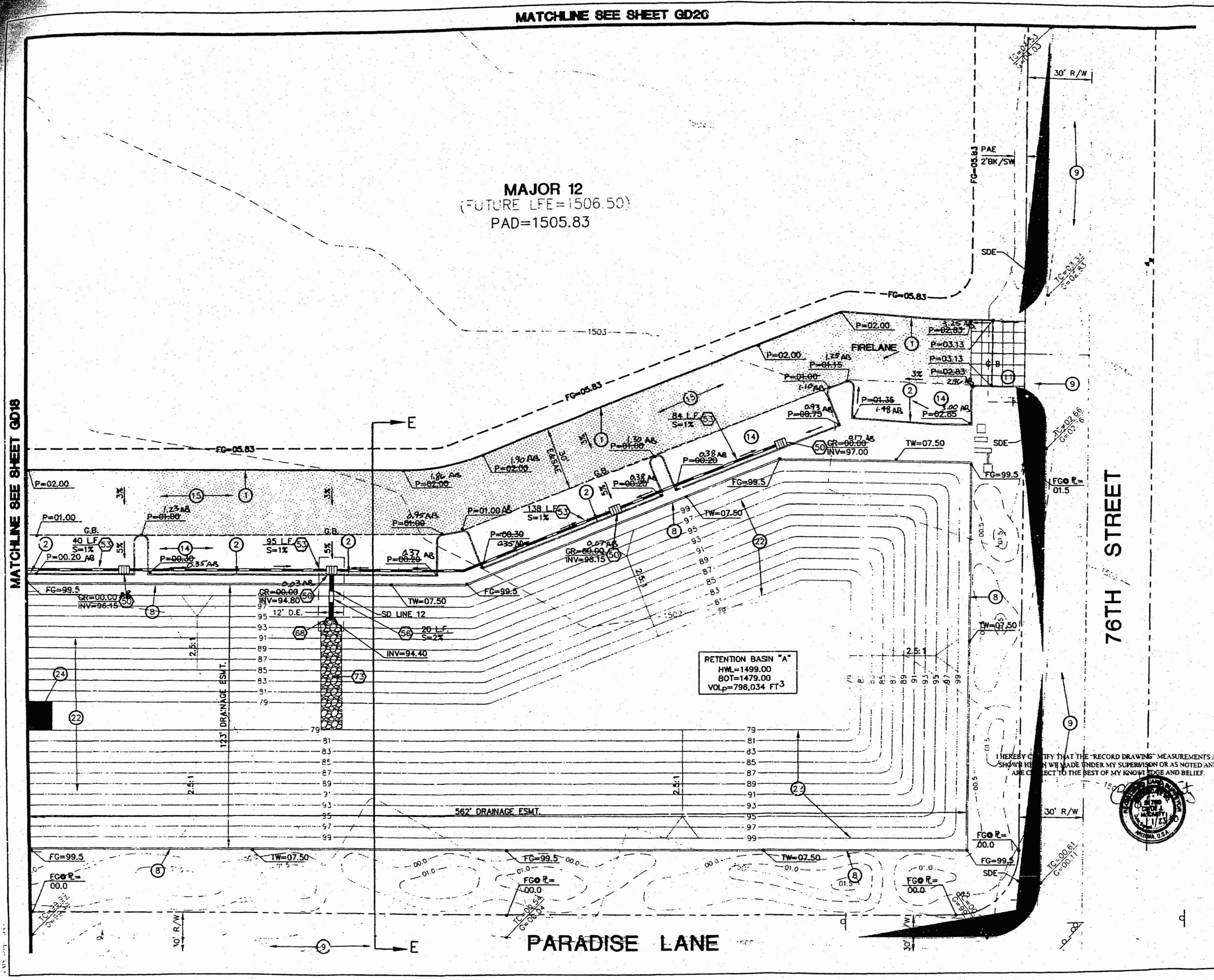
DRAWN BY D.L.
CHECKED G.S.
PERMIT SET ISSUE DATE 7-4-99
CONTRACT SET ISSUE DATE 8-9-99

SHEET C4
SHEET 4 OF 7

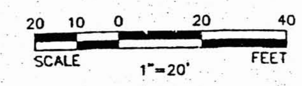
371-99T Q.S.# 36-45 144-DR-98

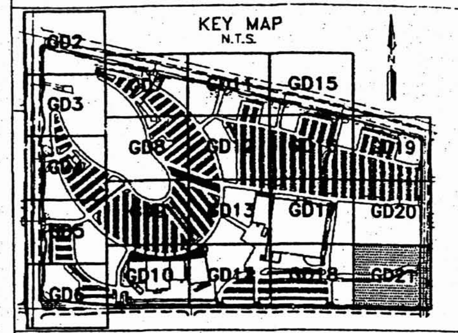


THE PROMENADE
SEET GD18
SDALE # 35929



I HEREBY CERTIFY THAT THE "RECORD DRAWING" MEASUREMENTS AS SHOWN HEREON WERE MADE UNDER MY SUPERVISION OR AS NOTED AND ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.





CONSTRUCTION NOTES

1. CONSTRUCT 6" EXTRUDED CURB – SEE DETAIL SHEET GD22.
2. CONSTRUCT 6" SINGLE CURB PER MAG STD. DTL. 222, TYPE "A".
8. CONSTRUCT 8' HIGH BLOCK WALL/WROUGHT IRON FENCE. SEE ARCHITECT'S DWGS. A0.8 & A0.9 FOR DETAILS (PART OF THIS SET).
9. SEE OFFSITE PAVING PLANS FOR OFFSITE IMPROVEMENTS.
11. CONSTRUCT DECORATIVE CONCRETE PAVEMENT. SEE ARCHITECT'S DWGS. FOR DETAILS (PART OF THIS SET).
14. INSTALL 2" AC (R–19 MIX, PG 64–10 BINDER) ON 4" AGGREGATE BASE COURSE.
15. INSTALL 3" AC (R–19 MIX, PG 64–10 BINDER) ON 6" AGGREGATE BASE COURSE.
22. INSTALL SLOPE PROTECTION GEOWEB CELLULAR CONFINEMENT SYSTEM (ANCHORED AND INFILLED WITH NATIVE SOIL).
24. INSTALL 6" ABC ON 8" COMPACTED SUBGRADE.

STORM DRAIN NOTES

50. CONSTRUCT CATCH BASIN PER MAG STD. DTL. 535, TYPE F.
53. INSTALL 12" RGRCP CLASS III STORM DRAIN PIPE.
56. INSTALL 24" RGRCP CLASS III STORM DRAIN PIPE.
58. INSTALL 36" RGRCP CLASS III STORM DRAIN PIPE.
68. CONSTRUCT HEADWALL PER MAG STD. DTL. 501-1 "U" TYPE.
73. CONSTRUCT EROSION PROTECTION/RIPRAP PER MAG STD. DTL. 555, TYPE 2. (18" THICK–12" MIN ROCK SIZE).

CERTIFICATE NO. 18980 RONALD W. HILGART, JR. ARIZONA, U.S.A.

GRADING, DRAINAGE & PAVING PLAN

THE PROMENADE

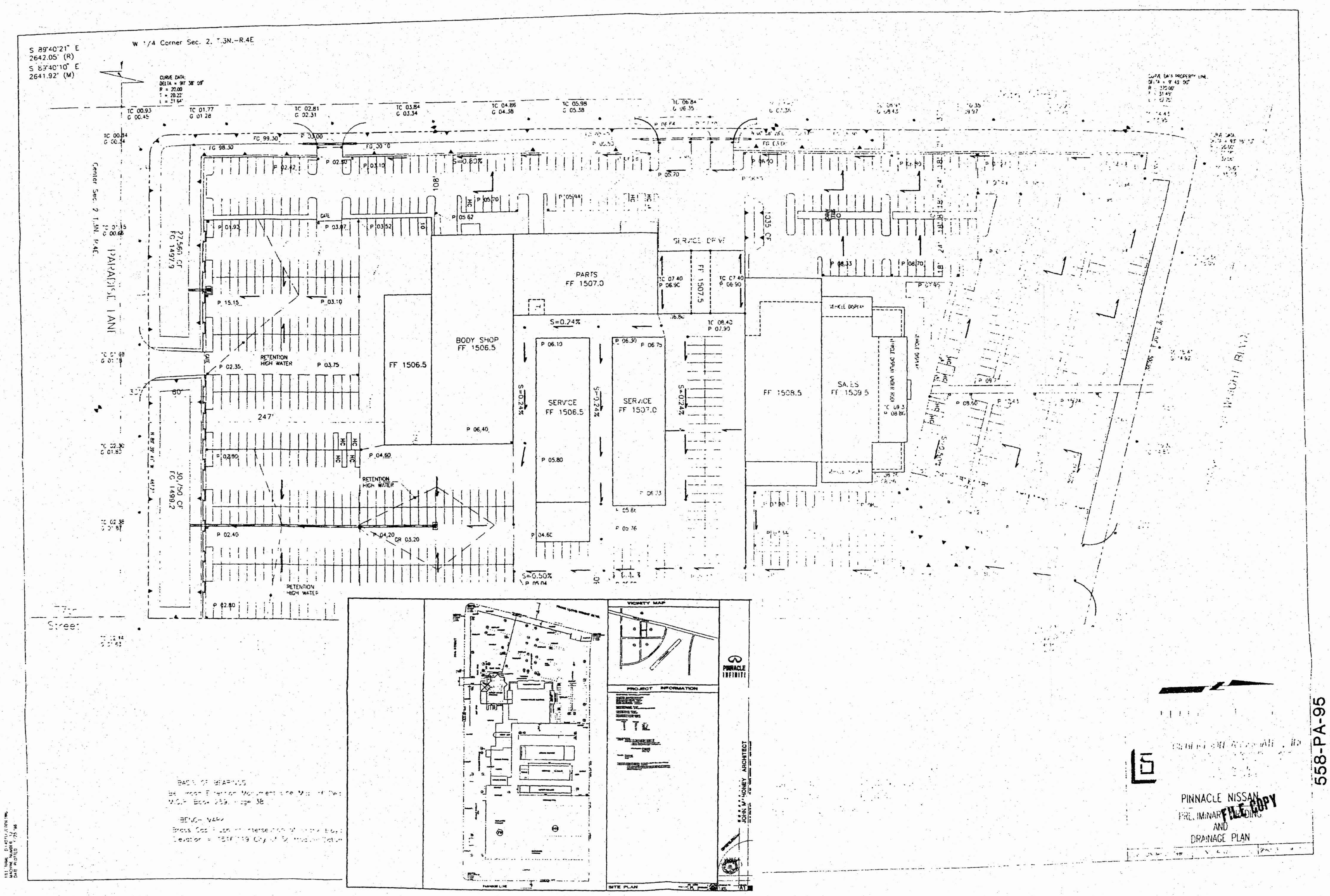
SEC FRANK L. WRIGHT BLVD. & SCOTTSDALE RD.
SCOTTSDALE, ARIZONA

CMX GROUP INC.
ENGINEERING
PROJECT ADMINISTRATION
CONSTRUCTION ANALYSIS

1515 E. MISSOURI
PHOENIX, AZ 85014
PH (602)279-8436
FAX (602)265-1191

CMX JOB NO. 5739	DATE: 04-28-99	SCALE: 1"=20'
DESIGNED: G.S.	DRAWN: B.I./M.G.	APPROVED: R.H.
REV.		DWG. NO. GD21 SHT. 21 OF 27

35932

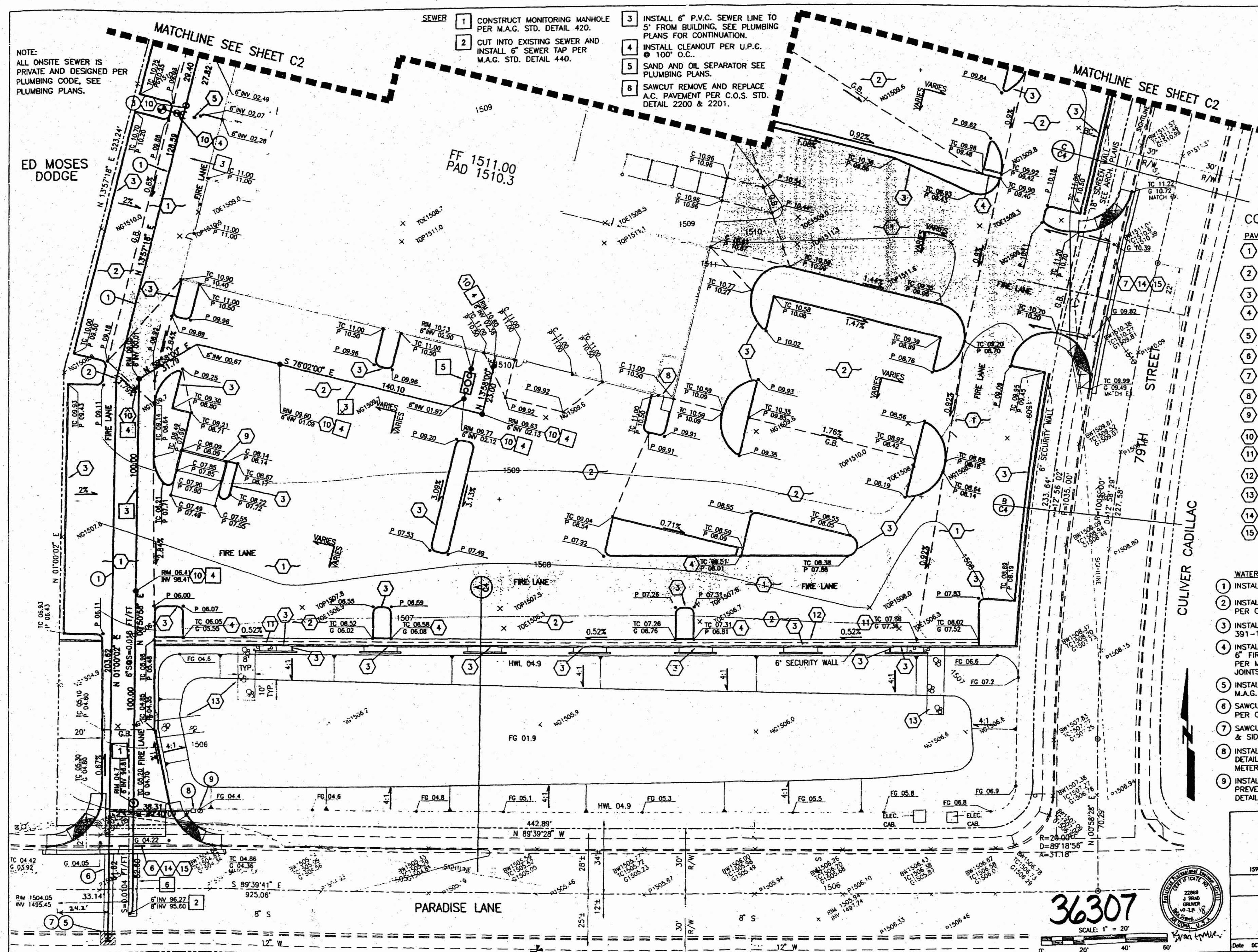

W 1/4 Corner Sec. 2, T.3N.-R.4E
S 89°40'21" E
2642.05' (R)
S 89°40'10" E
2641.92' (M)
Center Sec. 2 T.3N. R.4E.
PARADISE LANE
27,560 CF
FG 1497.9
30,750 CF
FG 1499.2
RETENTION
HIGH WATER
247'
80'
108'
GATE
BODY SHOP
FF 1506.5
FF 1506.5
PARTS
FF 1507.0
SERVICE DRIVE
FF 1507.5
SERVICE
FF 1506.5
SERVICE
FF 1507.0
FF 1508.5
SALES
FF 1509.5
S=0.24%
S=0.80%
S=0.50%
VEHICLE DISPLAY
7th
Street
BASIS OF BEARINGS
BENCH MARK
VICINITY MAP
PROJECT INFORMATION
SITE PLAN
PINNACLE INFINITI
JOHN MAHONEY ARCHITECT
PINNACLE NISSAN
PRELIMINARY GRADING
AND
DRAINAGE PLAN
FILE COPY

558-PA-95

SEWER

1. CONSTRUCT MONITORING MANHOLE PER M.A.G. STD. DETAIL 420.
2. CUT INTO EXISTING SEWER AND INSTALL 6" SEWER TAP PER M.A.G. STD. DETAIL 440.
3. INSTALL 6" P.V.C. SEWER LINE TO 5' FROM BUILDING. SEE PLUMBING PLANS FOR CONTINUATION.
4. INSTALL CLEANOUT PER U.P.C. @ 100' O.C..
5. SAND AND OIL SEPARATOR SEE PLUMBING PLANS.
6. SAWCUT REMOVE AND REPLACE A.C. PAVEMENT PER C.O.S. STD. DETAIL 2200 & 2201.

NOTE:
ALL ONSITE SEWER IS PRIVATE AND DESIGNED PER PLUMBING CODE. SEE PLUMBING PLANS.



RETENTION PROVIDED

BOTTOM AREA	16668 S.F.
TOP AREA	26939 S.F.
AVERAGE AREA	21804 S.F.
DEPTH	3'
VOLUME PROVIDED	65412 C.F.

RETENTION REQUIRED

VOLUME REQUIRED Q=CIA/12

C = 0.85
I = 2.82
A = 315906 S.F.

Q = (0.81 X 2.82 X 315906) / 12
Q = 60133 C.F.

CONSTRUCTION NOTES

PAVEMENT

1. CONSTRUCT A.C. PAVEMENT FOR TRUCK LANE PER DETAIL ON SHEET C4.
2. CONSTRUCT A.C. PAVEMENT FOR AUTO PARKING PER DETAIL ON SHEET C4.
3. CONSTRUCT SINGLE CURB PER M.A.G. STD. DETAIL 222 TYPE 'A'.
4. CONSTRUCT SCUPPER PER DETAIL ON SHEET C4.
5. INSTALL RAISED PAVEMENT MARKER PER C.O.S. STD. DETAIL 2363.
6. CONSTRUCT CH-1 DRIVEWAY ENTRANCE PER C.O.S. STD. DETAIL 2257.
7. CONSTRUCT CH-2 DRIVEWAY ENTRANCE PER C.O.S. STD. DETAIL 2257.
8. CONSTRUCT SIDEWALK. SEE ARCHITECTURAL PLANS.
9. CONSTRUCT DOUBLE TRASH ENCLOSURE PER C.O.S. STD. DETAIL 2147-1.
10. ADJUST VALVE BOX OR CLEANOUT TO GRADE PER C.O.S. STD. DETAIL 2270.
11. CONSTRUCT 3' CURB OPENING PER DETAIL ON SHEET C4.
12. CONSTRUCT CONCRETE VALLEY GUTTER PER M.A.G. STD. DETAIL 240.
13. CONSTRUCT RIP-RAP SLOPE PROTECTION PER DETAIL ON SHEET C4.
14. SAWCUT AND REMOVE EXISTING CURB.
15. SAWCUT AND REMOVE EXISTING SIDEWALK.

WATER

1. INSTALL 8" D.I.P. WATERLINE WITH POLYWRAP.
2. INSTALL 11¼° BEND WITH ELECTRONIC MARKER PER C.O.S. SPEC. 610.4 AND RESTRAINED JOINTS.
3. INSTALL 8" V.B.&C. PER M.A.G. STD. DETAIL 391-1, TYPE 'C' WITH RESTRAINED JOINTS.
4. INSTALL 8"X6" TEE, 6" V.B.&C., TYPE 'C', 6" FIRE HYDRANT WITH 6" D.I.P. WATER LINE PER M.A.G. STD. DETAIL 360 WITH RESTRAINED JOINTS PER C.O.S REQUIREMENTS.
5. INSTALL 12" X 8" T.S.V.B.&C., TYPE 'C', PER M.A.G. STD. DETAIL 340.
6. SAWCUT REMOVE AND REPLACE A.C. PAVEMENT PER C.O.S. STD. DETAIL 2200 & 2201.
7. SAWCUT REMOVE AND REPLACE CONCRETE CURB & SIDEWALK PER M.A.G. STD. DETAIL 220 & 230.
8. INSTALL 1½" WATER SERVICE PER C.O.S. STD. DETAIL 2330. SEE LANDSCAPE PLANS FOR METER SIZE.
9. INSTALL 1½" REDUCED PRESSURE BACKFLOW PREVENTION ASSEMBLY PER C.O.S. STD. DETAIL 2354. SEE LANDSCAPE PLANS.

36307

SCALE: 1" = 20'

0' 20' 40' 60'

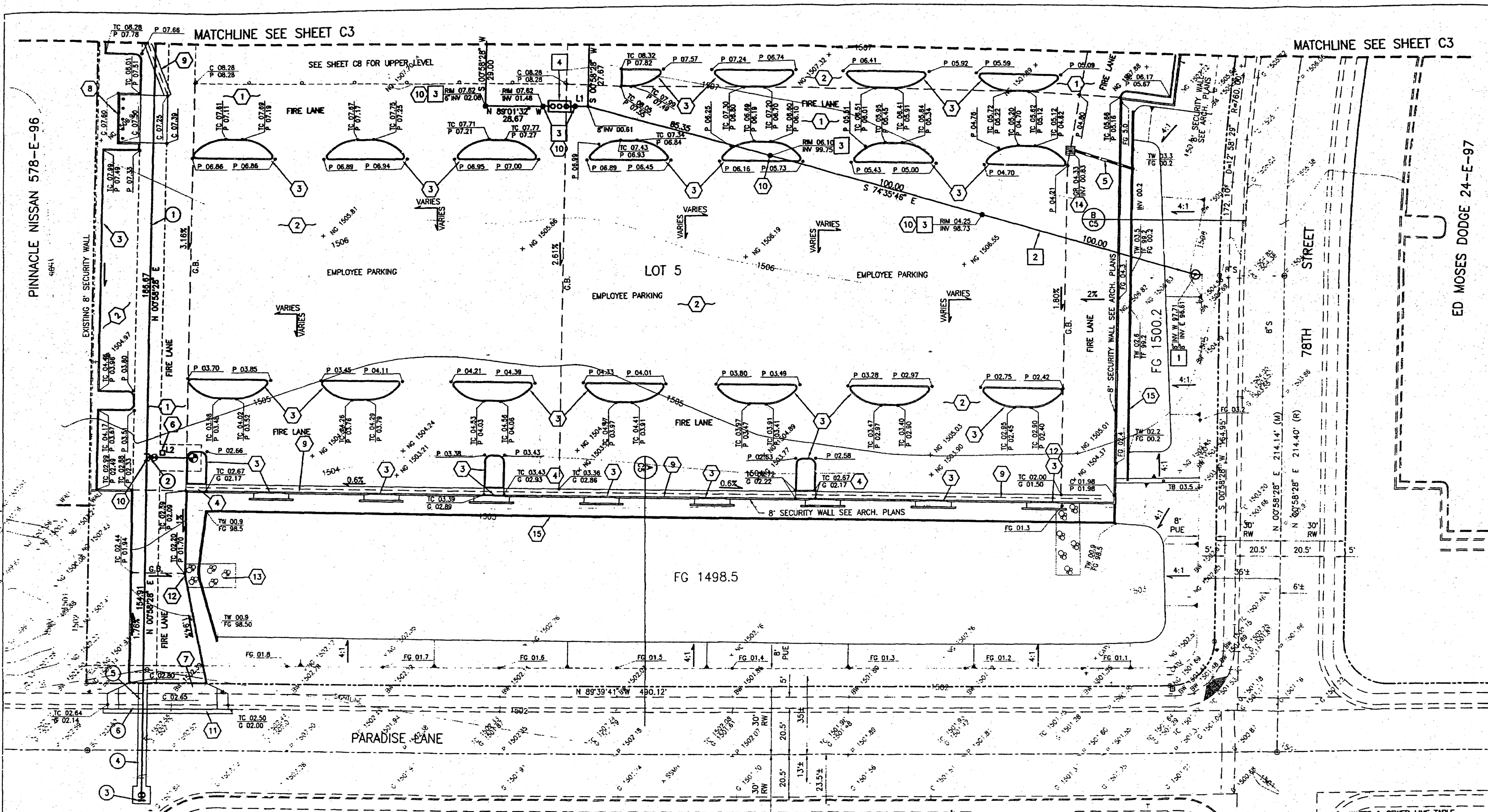
GILBERTSON ASSOCIATES inc.
consulting civil engineers & land surveyors
15974 North 77th Street, Scottsdale, Arizona 85260-1781 602-607-2244

SCOTTSDALE HONDA

GRADING, DRAINAGE, PAVING, AND SITE ULTILITY PLAN

Date OCTOBER 28, 1998 | Job No. 40108 | Sheet C3 of 7

176-DR-97 5370-98A



CONSTRUCTION NOTES

PAVEMENT

1. CONSTRUCT A.C. PAVEMENT FOR TRUCK LANE PER DETAIL ON SHEET C5.
2. CONSTRUCT A.C. PAVEMENT FOR AUTO PARKING PER DETAIL ON SHEET C5.
3. CONSTRUCT SINGLE CURB PER M.A.G. STD. DETAIL 222 TYPE 'A'.
4. CONSTRUCT SCUPPER PER DETAIL ON SHEET C5.
5. INSTALL 12" PVC DRAIN LINE.
6. INSTALL RAISED PAVEMENT MARKER PER C.O.S. STD. DETAIL 2363.
7. CONSTRUCT CL-1 DRIVEWAY ENTRANCE PER C.O.S. STD. DETAIL 2256.
8. CONSTRUCT DOUBLE TRASH ENCLOSURE PER C.O.S. STD. DETAIL 2147-1.
9. CONSTRUCT CONCRETE VALLEY GUTTER PER M.A.G. STD. DETAIL 240.
10. ADJUST VALVE BOX OR CLEANOUT TO GRADE. PER C.O.S. DETAIL 2270.
11. SAWCUT AND REMOVE EXISTING CURB.
12. CONSTRUCT 3' CURB OPENING PER DETAIL ON SHEET C5.
13. INSTALL RIP-RAP SLOPE PROTECTION PER DETAIL ON SHEET C5.
14. CONSTRUCT TYPE 'F' CATCH BASIN PER M.A.G. STD. DETAIL 535.
15. RETAINING WALL SEE DETAIL 28 ON SHEET A1.1.

WATER

1. INSTALL 8" D.I.P. WATERLINE WITH POLYWRAP.
2. INSTALL 8"X6" TEE, 6" V.B.&C., TYPE 'C', 6" FIRE HYDRANT WITH 6" D.I.P. WATER LINE PER M.A.G. STD. DETAIL 360 WITH RESTRAINED JOINTS PER C.O.S REQUIREMENTS.
3. INSTALL 12"X8" T.S.V.B.&C., TYPE 'C', PER M.A.G. STD. DETAIL 340.
4. SAWCUT REMOVE AND REPLACE A.C. PAVEMENT PER C.O.S. DETAIL 2200.
5. SAWCUT & REMOVE CONCRETE SIDEWALK.
6. SAWCUT & REMOVE VERTICAL CURB.

SEWER

1. CONSTRUCT MONITORING MANHOLE PER M.A.G. STD. DETAIL 420.
2. INSTALL 6" P.V.C. SEWER LINE TO 5' FROM BUILDING, SEE PLUMBING PLANS FOR CONTINUATION.
3. INSTALL CLEANOUT PER U.P.C. @ 100' O.C..
4. SAND AND OIL SEPARATOR SEE PLUMBING PLANS.

36386

SCALE: 1" = 20'

0 20' 40' 60'

WATER & SEWER LINE TABLE

LINE	BEARING	DISTANCE
L1	N 89°01'32" W	8.00
L2	N 89°01'32" W	21.00

GILBERTSON ASSOCIATES Inc.

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15974 North 77th Street, Scottsdale, Arizona 85260-1761 602\607\2244

TOYOTA OF SCOTTSDALE

GRADING, DRAINAGE, PAVING AND UTILITIES

Date NOVEMBER 9, 1998	Job No. 40112	Sheet C4 of 9

101-DR-98 5181-98A

Sub-basin Related Data and Calculations

Land Use Data

Sub Basin ID	Land Use Code	Area	Area Pct (%)	DTHETA Condition	Vegetation Cover (%)	RTIMP (%)	IA (in)	Kn	Kb Type	Kb
SB009	COMM	0.060	100.0	Normal	50.0	80	0.10	0.020	Min	0.030
SB010	IND	0.160	44.4	Normal	50.0	60	0.15	0.030	Min	0.027
	COMM	0.200	55.6	Normal	50.0	80	0.10	0.020	Min	0.027
SB011	IND	0.100	45.5	Normal	50.0	60	0.15	0.030	Min	0.029
	COMM	0.120	54.5	Normal	50.0	80	0.10	0.020	Min	0.028
SB012	IND	0.200	100.0	Normal	50.0	60	0.15	0.030	Min	0.027
SB013	IND	0.040	100.0	Normal	50.0	60	0.15	0.030	Min	0.031
SB014	IND	0.030	100.0	Normal	50.0	60	0.15	0.030	Min	0.032
SB015	IND	0.220	88.0	Normal	50.0	60	0.15	0.030	Min	0.027
	AIRPORT	0.030	12.0	Normal	10.0	60	0.20		Min	0.032
SB016	AIRPORT	0.090	100.0	Normal	10.0	60	0.20		Min	0.029
SB017	AIRPORT	0.090	100.0	Normal	10.0	60	0.20		Min	0.029
SB018	AIRPORT	0.150	100.0	Normal	10.0	60	0.20		Min	0.028
SB019	IND	0.150	78.9	Normal	50.0	60	0.15	0.030	Min	0.028
	AIRPORT	0.040	21.1	Normal	10.0	60	0.20		Min	0.031
SB020A	M.D.R.	0.020	33.3	Normal	50.0	45	0.25	0.050	Min	0.033
	IND	0.040	66.7	Normal	50.0	60	0.15	0.030	Min	0.031
SB020B	L.D.R.	0.130	48.1	Normal	50.0	24	0.30	0.050	Min	0.028
	PARK	0.030	11.1	Normal	90.0	2	0.20	0.100	Min	0.032
	SCHOOL	0.110	40.7	Normal	30.0	50	0.20		Min	0.028
SB021	IND	0.140	100.0	Normal	50.0	60	0.15	0.030	Min	0.028
SB022	L.D.R.	0.240	100.0	Normal	50.0	24	0.30	0.050	Min	0.026
SB023	L.D.R.	0.020	11.8	Normal	50.0	24	0.30	0.050	Min	0.033
	M.D.R.	0.150	88.2	Normal	50.0	45	0.25	0.050	Min	0.028
SB024	L.D.R.	0.060	54.5	Normal	50.0	24	0.30	0.050	Min	0.030
	M.D.R.	0.020	18.2	Normal	50.0	45	0.25	0.050	Min	0.033
	COMM	0.030	27.3	Normal	50.0	80	0.10	0.020	Min	0.032
SB025	M.D.R.	0.050	35.7	Normal	50.0	45	0.25	0.050	Min	0.031

* Custom Value (not default value)

Land Use Data

Sub Basin ID	Land Use Code	Area	Area Pct (%)	DTHETA Condition	Vegetation Cover (%)	RTIMP (%)	IA (in)	Kn	Kb Type	Kb
	M.F.R.	0.010	7.1	Normal	50.0	45	0.25	0.050	Min	0.035
	COMM	0.080	57.1	Normal	50.0	80	0.10	0.020	Min	0.029
SB026	L.D.R.	0.400	90.9	Normal	50.0	24	0.30	0.050	Min	0.025
	COMM	0.040	9.1	Normal	50.0	80	0.10	0.020	Min	0.031
SB027	V.L.D.R.	0.030	25.0	Normal	30.0	7	0.30	0.050	Min	0.032
	L.D.R.	0.090	75.0	Normal	50.0	24	0.30	0.050	Min	0.029
SB028	M.F.R.	0.004	3.0	Normal	50.0	45	0.25	*	Min	0.037
	COMM	0.130	97.0	Normal	50.0	80	0.10	*	Min	0.028
SB029	M.D.R.	0.180	100.0	Normal	50.0	45	0.25	0.050	Min	0.027
SB030	M.D.R.	0.100	100.0	Normal	50.0	45	0.25	0.050	Min	0.029
SB031	M.D.R.	0.010	8.3	Normal	50.0	45	0.25	0.050	Min	0.035
	PARK	0.110	91.7	Normal	90.0	2	0.20	0.100	Min	0.028
SB032	M.D.R.	0.010	33.3	Normal	50.0	45	0.25	0.050	Min	0.035
	PARK	0.020	66.7	Normal	90.0	2	0.20	0.100	Min	0.033
SB033	COMM	0.040	28.6	Normal	50.0	80	0.10	0.020	Min	0.031
	M.F.R.	0.020	14.3	Normal	50.0	45	0.25	0.050	Min	0.033
	PARK	0.080	57.1	Normal	90.0	2	0.20	0.100	Min	0.029
SB034	COMM	0.160	88.9	Normal	50.0	80	0.10	0.020	Min	0.027
	PARK	0.020	11.1	Normal	90.0	2	0.20	0.100	Min	0.033
SB035	M.D.R.	0.080	72.7	Normal	50.0	45	0.25	0.050	Min	0.029
	M.F.R.	0.030	27.3	Normal	50.0	45	0.25	0.050	Min	0.032
SB036	L.D.R.	0.130	100.0	Normal	50.0	24	0.30	0.050	Min	0.028
SB037	V.L.D.R.	0.030	14.3	Normal	30.0	7	0.30	0.050	Min	0.032
	L.D.R.	0.150	71.4	Normal	50.0	24	0.30	0.050	Min	0.028
	M.F.R.	0.030	14.3	Normal	50.0	45	0.25	0.050	Min	0.032
SB038	M.D.R.	0.120	100.0	Normal	50.0	45	0.25	0.050	Min	0.028
SB039	COMM	0.010	33.3	Normal	50.0	80	0.10	0.020	Min	0.035
	M.D.R.	0.020	66.7	Normal	50.0	45	0.25	0.050	Min	0.033
SB040	PARK	0.240	58.5	Normal	90.0	2	0.20	0.100	Min	0.026

* Custom Value (not default value)

Land Use Data

Sub Basin ID	Land Use Code	Area	Area Pct (%)	DTHETA Condition	Vegetation Cover (%)	RTIMP (%)	IA (in)	Kn	Kb Type	Kb
	COMM	0.050	12.2	Normal	50.0	80	0.10	0.020	Min	0.031
	M.F.R.	0.120	29.3	Normal	50.0	45	0.25	0.050	Min	0.028
SB041	M.D.R.	0.010	25.0	Normal	50.0	45	0.25	0.050	Min	0.035
	SCHOOL	0.010	25.0	Normal	30.0	50	0.20		Min	0.035
	PARK	0.020	50.0	Normal	90.0	2	0.20	0.100	Min	0.033
SB043	L.D.R.	0.060	75.0	Normal	50.0	24	0.30	0.050	Min	0.030
	SCHOOL	0.020	25.0	Normal	30.0	50	0.20		Min	0.033
SB044	L.D.R.	0.120	66.7	Normal	50.0	24	0.30	0.050	Min	0.028
	M.D.R.	0.060	33.3	Normal	50.0	45	0.25	0.050	Min	0.030
SB045	L.D.R.	0.010	33.3	Normal	50.0	24	0.30	0.050	Min	0.035
	M.D.R.	0.020	66.7	Normal	50.0	45	0.25	0.050	Min	0.033
SB046	L.D.R.	0.110	57.9	Normal	50.0	24	0.30	0.050	Min	0.028
	M.D.R.	0.080	42.1	Normal	50.0	45	0.25	0.050	Min	0.029
SB047	L.D.R.	0.160	84.2	Normal	50.0	24	0.30	0.050	Min	0.027
	SCHOOL	0.030	15.8	Normal	30.0	50	0.20		Min	0.032
SB048	L.D.R.	0.080	88.9	Normal	50.0	24	0.30	0.050	Min	0.029
	PARK	0.010	11.1	Normal	90.0	2	0.20	0.100	Min	0.035
SB049	COMM	0.100	71.4	Normal	50.0	80	0.10	0.020	Min	0.029
	M.F.R.	0.040	28.6	Normal	50.0	45	0.25	0.050	Min	0.031
SB050	COMM	0.040	100.0	Normal	50.0	80	0.10	0.020	Min	0.031
SB051	M.F.R.	0.040	44.4	Normal	50.0	45	0.25	0.050	Min	0.031
	COMM	0.050	55.6	Normal	50.0	80	0.10	0.020	Min	0.031
SB052	L.D.R.	0.150	88.2	Normal	50.0	24	0.30	0.050	Min	0.028
	M.D.R.	0.020	11.8	Normal	50.0	45	0.25	0.050	Min	0.033
SB053	L.D.R.	0.050	50.0	Normal	50.0	24	0.30	0.050	Min	0.031
	COMM	0.050	50.0	Normal	50.0	80	0.10	0.020	Min	0.031
SB054	M.D.R.	0.040	36.4	Normal	50.0	45	0.25	0.050	Min	0.031
	M.F.R.	0.020	18.2	Normal	50.0	45	0.25	0.050	Min	0.033
	COMM	0.050	45.5	Normal	50.0	80	0.10	0.020	Min	0.031

* Custom Value (not default value)

Land Use Data

Sub Basin ID	Land Use Code	Area	Area Pct (%)	DTHETA Condition	Vegetation Cover (%)	RTIMP (%)	IA (in)	Kn	Kb Type	Kb
SB055	M.F.R.	0.003	5.7	Normal	50.0	45	0.25	0.050	Min	0.038
	COMM	0.050	94.3	Normal	50.0	80	0.10	0.020	Min	0.031
SB057	M.F.R.	0.040	26.7	Normal	50.0	45	0.25	0.050	Min	0.031
	COMM	0.050	33.3	Normal	50.0	80	0.10	0.020	Min	0.031
	SCHOOL	0.060	40.0	Normal	30.0	50	0.20		Min	0.030
SB058	L.D.R.	0.060	100.0	Normal	50.0	24	0.30	0.050	Min	0.030
SB059	L.D.R.	0.230	95.8	Normal	50.0	24	0.30	0.050	Min	0.026
	SCHOOL	0.010	4.2	Normal	30.0	50	0.20		Min	0.035
SB060	L.D.R.	0.020	11.1	Normal	50.0	24	0.30	0.050	Min	0.033
	COMM	0.160	88.9	Normal	50.0	80	0.10	0.020	Min	0.027
SB061A	L.D.R.	0.100	52.6	Normal	50.0	24	0.30	0.050	Min	0.029
	M.D.R.	0.060	31.6	Normal	50.0	45	0.25	0.050	Min	0.030
	M.F.R.	0.020	10.5	Normal	50.0	45	0.25	0.050	Min	0.033
	PARK	0.010	5.3	Normal	90.0	2	0.20	0.100	Min	0.035
SB061B	V.L.D.R.	0.010	9.1	Normal	30.0	7	0.30	0.050	Min	0.035
	L.D.R.	0.100	90.9	Normal	50.0	24	0.30	0.050	Min	0.029
SB061C	M.D.R.	0.220	81.5	Normal	50.0	45	0.25	0.050	Min	0.027
	COMM	0.020	7.4	Normal	50.0	80	0.10	0.020	Min	0.033
	PARK	0.010	3.7	Normal	90.0	2	0.20	0.100	Min	0.035
	SCHOOL	0.020	7.4	Normal	30.0	50	0.20		Min	0.033
SB062	M.D.R.	0.290	85.3	Normal	50.0	45	0.25	0.050	Min	0.026
	COMM	0.020	5.9	Normal	50.0	80	0.10	0.020	Min	0.033
	PARK	0.030	8.8	Normal	90.0	2	0.20	0.100	Min	0.032
SB063	M.D.R.	0.210	95.5	Normal	50.0	45	0.25	0.050	Min	0.027
	COMM	0.010	4.5	Normal	50.0	80	0.10	0.020	Min	0.035
SB064	L.D.R.	0.050	35.7	Normal	50.0	24	0.30	0.050	Min	0.031
	M.D.R.	0.080	57.1	Normal	50.0	45	0.25	0.050	Min	0.029
	PARK	0.010	7.1	Normal	90.0	2	0.20	0.100	Min	0.035
SB065	L.D.R.	0.350	79.5	Normal	50.0	24	0.30	0.050	Min	0.025
	M.D.R.	0.080	18.2	Normal	50.0	45	0.25	0.050	Min	0.029
	SCHOOL	0.010	2.3	Normal	30.0	50	0.20		Min	0.035

* Custom Value (not default value)

Land Use Data

Sub Basin ID	Land Use Code	Area	Area Pct (%)	DTHETA Condition	Vegetation Cover (%)	RTIMP (%)	IA (in)	Kn	Kb Type	Kb
SB066	L.D.R.	0.080	66.7	Normal	50.0	24	0.30	0.050	Min	0.029
	COMM	0.020	16.7	Normal	50.0	80	0.10	0.020	Min	0.033
	SCHOOL	0.020	16.7	Normal	30.0	50	0.20		Min	0.033
SB067A	L.D.R.	0.100	100.0	Normal	50.0	24	0.30	0.050	Min	0.029
SB067B	L.D.R.	0.090	100.0	Normal	50.0	24	0.30	0.050	Min	0.029
SB068	L.D.R.	0.110	100.0	Normal	50.0	24	0.30	0.050	Min	0.028
SB069	L.D.R.	0.140	100.0	Normal	50.0	24	0.30	0.050	Min	0.028
SB070	L.D.R.	0.140	100.0	Normal	50.0	24	0.30	0.050	Min	0.028

* Custom Value (not default value)

Flood Control District of Maricopa County
15586B - Scottsdale Road Corridor Drainage Master Plan
Sub Basin Data

9/18/02

Basin: 01 | Storms: Multiple | Duration: 6 Hour | Loss Method: Green-Ampt | Unit Hydrograph: Clark

	Sub Basin Parameters						Rainfall Losses						Return Period (Years)					
Sub Basin ID	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2	5	10	25	50	100
SB009	0.06	0.49	4.1	4.1	Urban	0.030	0.10	0.25	4.65	0.38	80	Tc (hrs	0.88	0.73	0.65	0.58	0.54	0.50
												R (hrs)	0.91	0.73	0.65	0.57	0.52	0.49
SB010	0.36	0.91	31.9	31.9	Urban	0.027	0.12	0.25	4.65	0.38	71	Tc (hrs	0.55	0.44	0.40	0.35	0.33	0.31
												R (hrs)	0.31	0.25	0.22	0.19	0.18	0.17
SB011	0.22	0.81	33.3	33.3	Urban	0.028	0.12	0.25	4.65	0.38	71	Tc (hrs	0.51	0.41	0.37	0.33	0.31	0.29
												R (hrs)	0.35	0.28	0.25	0.22	0.20	0.19
SB012	0.20	0.85	43.5	43.5	Urban	0.027	0.15	0.25	4.65	0.38	60	Tc (hrs	0.48	0.38	0.34	0.30	0.28	0.26
												R (hrs)	0.36	0.28	0.25	0.22	0.20	0.19
SB013	0.04	0.30	50.0	50.0	Urban	0.031	0.15	0.25	4.65	0.38	60	Tc (hrs	0.25	0.21	0.19	0.18	0.17	0.16
												R (hrs)	0.19	0.16	0.14	0.13	0.12	0.11
SB014	0.03	0.28	10.7	10.7	Urban	0.032	0.15	0.25	4.65	0.38	60	Tc (hrs	0.46	0.37	0.33	0.29	0.27	0.25
												R (hrs)	0.42	0.32	0.29	0.25	0.23	0.22
SB015	0.25	1.17	44.4	44.4	Urban	0.028	0.16	0.25	4.65	0.37	60	Tc (hrs	0.62	0.48	0.43	0.38	0.35	0.33
												R (hrs)	0.54	0.41	0.37	0.32	0.29	0.27
SB016	0.09	0.66	36.4	36.4	Urban	0.029	0.20	0.25	4.65	0.27	60	Tc (hrs	0.45	0.36	0.32	0.29	0.27	0.25
												R (hrs)	0.43	0.34	0.30	0.26	0.24	0.23
SB017	0.09	0.55	56.4	56.4	Urban	0.029	0.20	0.25	4.65	0.27	60	Tc (hrs	0.33	0.26	0.24	0.22	0.21	0.20
												R (hrs)	0.27	0.21	0.19	0.17	0.16	0.15
SB018	0.15	0.68	22.1	22.1	Urban	0.028	0.20	0.25	4.65	0.27	60	Tc (hrs	0.56	0.44	0.40	0.35	0.33	0.30
												R (hrs)	0.42	0.32	0.29	0.25	0.23	0.21
SB019	0.19	1.17	39.3	39.3	Urban	0.029	0.16	0.25	4.65	0.36	60	Tc (hrs	1.57	0.52	0.47	0.41	0.38	0.35
												R (hrs)	1.78	0.52	0.46	0.41	0.37	0.34
SB020A	0.06	1.00	42.0	42.0	Urban	0.032	0.18	0.25	4.65	0.38	55	Tc (hrs	0.65	0.50	0.45	0.39	0.36	0.34
												R (hrs)	1.13	0.85	0.75	0.64	0.59	0.55
SB020B	0.27	1.31	35.9	35.9	Urban	0.028	0.25	0.25	4.65	0.37	32	Tc (hrs	0.92	0.66	0.57	0.48	1.58	0.40

* Non default value

Sub Basin Data

Basin: 01 | Storms: Multiple | Duration: 6 Hour | Loss Method: Green-Ampt | Unit Hydrograph: Clark

	Sub Basin Parameters						Rainfall Losses						Return Period (Years)					
Sub Basin ID	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2	5	10	25	50	100
												R (hrs)	0.88	0.61	0.52	0.43	1.60	0.35
SB021	0.14	0.68	38.2	38.2	Urban	0.028	0.15	0.25	4.65	0.38	60	Tc (hrs	0.45	0.36	0.32	0.28	0.26	0.25
												R (hrs)	0.34	0.27	0.24	0.21	0.19	0.18
SB022	0.24	0.81	25.9	25.9	Urban	0.026	0.30	0.25	4.65	0.38	24	Tc (hrs	0.80	0.54	0.46	0.38	0.35	0.32
												R (hrs)	0.55	0.35	0.30	0.24	0.22	0.20
SB023	0.17	0.66	22.7	22.7	Urban	0.029	0.26	0.25	4.65	0.38	43	Tc (hrs	0.65	0.48	0.43	0.36	0.33	0.31
												R (hrs)	0.45	0.32	0.28	0.24	0.22	0.20
SB024	0.11	0.95	33.7	33.7	Urban	0.031	0.24	0.25	4.65	0.38	43	Tc (hrs	0.74	0.55	0.48	0.42	0.38	0.35
												R (hrs)	0.89	0.64	0.55	0.47	0.43	0.40
SB025	0.14	0.80	41.3	41.3	Urban	0.030	0.16	0.25	4.65	0.38	65	Tc (hrs	0.50	0.40	0.36	0.32	0.30	0.28
												R (hrs)	0.44	0.34	0.30	0.27	0.25	0.23
SB026	0.44	1.12	33.9	33.9	Urban	0.026	0.28	0.25	4.65	0.38	29	Tc (hrs	0.84	0.59	0.50	0.43	0.38	0.35
												R (hrs)	0.53	0.36	0.30	0.25	0.22	0.20
SB027	0.12	0.61	54.1	54.1	Urban	0.030	0.30	0.25	4.65	0.36	20	Tc (hrs	0.54	0.35	0.30	0.25	0.24	0.23
												R (hrs)	0.42	0.26	0.22	0.18	0.17	0.16
SB028	0.13	0.74	33.8	33.8	Urban	0.028	0.10	0.25	4.65	0.38	79	Tc (hrs	0.46	0.38	0.34	0.31	0.28	0.27
												R (hrs)	0.38	0.31	0.28	0.25	0.23	0.22
SB029	0.18	0.70	32.9	32.9	Urban	0.027	0.25	0.25	4.65	0.38	45	Tc (hrs	0.54	0.40	0.35	0.30	0.28	0.26
												R (hrs)	0.37	0.27	0.23	0.20	0.18	0.17
SB030	0.10	0.68	44.1	44.1	Urban	0.029	0.25	0.25	4.65	0.38	45	Tc (hrs	0.49	0.37	0.32	0.28	0.26	0.25
												R (hrs)	0.46	0.33	0.29	0.25	0.22	0.21
SB031	0.12	0.47	31.9	31.9	Urban	0.029	0.20	0.25	4.65	0.50	6	Tc (hrs	0.78	0.41	0.33	0.27	0.25	0.23
												R (hrs)	0.51	0.25	0.20	0.16	0.14	0.13
SB032	0.03	0.38	7.9	7.9	Urban	0.034	0.22	0.25	4.65	0.47	16	Tc (hrs	1.13	0.70	0.59	0.49	0.43	0.39
												R (hrs)	1.44	0.85	0.70	0.57	0.49	0.45

* Non default value

Sub Basin Data

Basin: 01 | Storms: Multiple | Duration: 6 Hour | Loss Method: Green-Ampt | Unit Hydrograph: Clark

	Sub Basin Parameters						Rainfall Losses						Return Period (Years)					
Sub Basin ID	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2	5	10	25	50	100
SB033	0.14	0.61	24.6	24.6	Urban	0.030	0.18	0.25	4.65	0.46	30	Tc (hrs	0.70	0.48	0.42	0.35	0.32	0.30
												R (hrs)	0.51	0.34	0.29	0.24	0.22	0.20
SB034	0.18	0.80	35.0	35.0	Urban	0.028	0.11	0.25	4.65	0.39	71	Tc (hrs	0.50	0.40	0.36	0.32	0.30	0.28
												R (hrs)	0.38	0.30	0.27	0.23	0.22	0.20
SB035	0.11	0.59	23.7	23.7	Urban	0.030	0.25	0.25	4.65	0.38	45	Tc (hrs	0.59	0.44	0.39	0.34	0.31	0.29
												R (hrs)	0.48	0.35	0.30	0.26	0.23	0.21
SB036	0.13	1.14	32.5	32.5	Urban	0.028	0.30	0.25	4.65	0.38	24	Tc (hrs	0.98	0.66	0.56	0.47	0.42	0.39
												R (hrs)	1.28	0.83	0.70	0.57	0.50	0.46
SB037	0.21	0.80	30.0	30.0	Urban	0.029	0.29	0.25	4.65	0.37	25	Tc (hrs	0.79	0.53	0.45	0.38	0.35	0.32
												R (hrs)	0.58	0.38	0.31	0.26	0.23	0.21
SB038	0.12	0.68	47.1	47.1	Urban	0.028	0.25	0.25	4.65	0.38	45	Tc (hrs	0.46	0.35	0.30	0.27	0.25	0.23
												R (hrs)	0.39	0.28	0.24	0.21	0.19	0.18
SB039	0.03	0.34	44.1	44.1	Urban	0.034	0.20	0.25	4.65	0.38	57	Tc (hrs	0.31	0.25	0.23	0.21	0.20	0.19
												R (hrs)	0.32	0.24	0.22	0.20	0.19	0.18
SB040	0.41	1.04	35.6	35.6	Urban	0.027	0.20	0.25	4.65	0.46	24	Tc (hrs	0.87	0.58	0.50	0.42	0.38	0.35
												R (hrs)	0.54	0.35	0.29	0.24	0.21	0.20
SB041	0.04	0.31	16.1	16.1	Urban	0.034	0.21	0.25	4.65	0.43	25	Tc (hrs	0.59	0.40	0.35	0.29	0.27	0.25
												R (hrs)	0.51	0.33	0.28	0.23	0.21	0.20
SB043	0.08	0.49	20.4	20.4	Urban	0.031	0.28	0.25	4.65	0.36	31	Tc (hrs	0.64	0.45	0.39	0.33	0.30	0.28
												R (hrs)	0.54	0.36	0.31	0.26	0.24	0.22
SB044	0.18	1.10	35.5	35.5	Urban	0.029	0.28	0.25	4.65	0.38	31	Tc (hrs	0.86	0.61	0.52	0.44	0.40	0.37
												R (hrs)	0.90	0.61	0.52	0.43	0.38	0.35
SB045	0.03	0.50	24.0	24.0	Urban	0.034	0.27	0.25	4.65	0.38	38	Tc (hrs	0.61	0.44	0.39	0.33	0.30	0.28
												R (hrs)	0.91	0.63	0.55	0.46	0.42	0.39
SB046	0.19	1.06	37.7	37.7	Urban	0.028	0.28	0.25	4.65	0.38	33	Tc (hrs	0.78	0.55	0.48	0.41	0.37	0.34

* Non default value

Sub Basin Data

Basin: 01 | Storms: Multiple | Duration: 6 Hour | Loss Method: Green-Ampt | Unit Hydrograph: Clark

	Sub Basin Parameters						Rainfall Losses						Return Period (Years)					
Sub Basin ID	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2	5	10	25	50	100
												R (hrs)	0.76	0.52	0.44	0.37	0.33	0.30
SB047	0.19	1.08	32.4	32.4	Urban	0.028	0.28	0.25	4.65	0.37	28	Tc (hrs	0.88	0.62	0.53	0.45	0.40	0.37
												R (hrs)	0.88	0.59	0.50	0.41	0.37	0.34
SB048	0.09	0.68	54.4	54.4	Urban	0.030	0.29	0.25	4.65	0.39	22	Tc (hrs	0.58	0.38	0.32	0.27	0.25	0.24
												R (hrs)	0.59	0.37	0.30	0.25	0.23	0.22
SB049	0.14	0.52	23.1	23.1	Urban	0.030	0.14	0.25	4.65	0.38	70	Tc (hrs	0.47	0.38	0.34	0.30	0.28	0.26
												R (hrs)	0.29	0.23	0.20	0.18	0.16	0.15
SB050	0.04	0.34	23.5	23.5	Urban	0.031	0.10	0.25	4.65	0.38	80	Tc (hrs	0.34	0.28	0.25	0.23	0.22	0.21
												R (hrs)	0.30	0.24	0.21	0.19	0.18	0.18
SB051	0.09	0.55	38.2	38.2	Urban	0.031	0.17	0.25	4.65	0.38	64	Tc (hrs	0.42	0.33	0.30	0.26	0.25	0.23
												R (hrs)	0.34	0.26	0.23	0.21	0.19	0.18
SB052	0.17	1.04	28.8	28.8	Urban	0.029	0.29	0.25	4.65	0.38	26	Tc (hrs	0.96	0.66	0.57	0.48	0.43	0.39
												R (hrs)	1.00	0.66	0.56	0.46	0.41	0.37
SB053	0.10	0.61	29.5	29.5	Urban	0.031	0.20	0.25	4.65	0.38	52	Tc (hrs	0.53	0.41	0.36	0.32	0.29	0.28
												R (hrs)	0.46	0.35	0.30	0.26	0.24	0.22
SB054	0.11	0.74	24.3	24.3	Urban	0.031	0.18	0.25	4.65	0.38	61	Tc (hrs	0.63	0.49	0.44	0.39	0.36	0.34
												R (hrs)	0.61	0.47	0.41	0.36	0.33	0.31
SB055	0.05	0.55	34.5	34.5	Urban	0.031	0.11	0.25	4.65	0.38	78	Tc (hrs	0.40	0.33	0.30	0.27	0.25	0.24
												R (hrs)	0.45	0.36	0.32	0.29	0.26	0.25
SB057	0.15	0.55	45.5	45.5	Urban	0.031	0.18	0.25	4.65	0.36	59	Tc (hrs	0.40	0.31	0.28	0.25	0.23	0.22
												R (hrs)	0.24	0.18	0.16	0.14	0.13	0.13
SB058	0.06	0.57	36.8	36.8	Urban	0.030	0.30	0.25	4.65	0.38	24	Tc (hrs	0.59	0.39	0.34	0.28	0.26	0.25
												R (hrs)	0.66	0.42	0.35	0.29	0.26	0.25
SB059	0.23	1.12	26.8	26.8	Urban	0.026	0.30	0.25	4.65	0.38	25	Tc (hrs	0.98	0.67	0.57	0.48	1.58	0.40
												R (hrs)	0.91	0.60	0.50	0.41	1.55	0.34

* Non default value

Sub Basin Data

Basin: 01 | Storms: Multiple | Duration: 6 Hour | Loss Method: Green-Ampt | Unit Hydrograph: Clark

Sub Basin ID	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2	5	10	25	50	100
	Sub Basin Parameters						Rainfall Losses						Return Period (Years)					
SB060	0.18	0.68	35.3	35.3	Urban	0.028	0.12	0.25	4.65	0.38	74	Tc (hrs	0.44	0.35	0.32	0.29	0.27	0.25
												R (hrs)	0.29	0.23	0.21	0.18	0.17	0.16
SB061A	0.19	1.31	34.4	34.4	Urban	0.030	0.27	0.25	4.65	0.39	32	Tc (hrs	1.00	0.72	0.62	0.53	0.47	0.43
												R (hrs)	1.18	0.82	0.69	0.58	0.51	0.47
SB061B	0.11	1.00	45.0	45.0	Urban	0.030	0.30	0.25	4.65	0.37	22	Tc (hrs	0.83	0.55	0.46	0.39	0.35	0.33
												R (hrs)	1.05	0.67	0.55	0.46	0.41	0.37
SB061C	0.27	1.04	43.3	43.3	Urban	0.028	0.23	0.25	4.65	0.38	46	Tc (hrs	0.64	0.48	0.43	0.37	0.34	0.31
												R (hrs)	0.49	0.36	0.31	0.27	0.24	0.22
SB062	0.34	1.08	41.7	41.7	Urban	0.027	0.24	0.25	4.65	0.39	43	Tc (hrs	0.67	0.50	0.44	0.38	0.35	0.32
												R (hrs)	0.47	0.33	0.29	0.25	0.22	0.21
SB063	0.22	0.91	27.5	27.5	Urban	0.027	0.24	0.25	4.65	0.38	47	Tc (hrs	0.69	0.52	0.45	0.40	0.36	0.34
												R (hrs)	0.54	0.39	0.34	0.29	0.26	0.24
SB064	0.14	1.00	38.0	38.0	Urban	0.030	0.26	0.25	4.65	0.39	34	Tc (hrs	0.78	0.55	0.48	0.41	0.37	0.35
												R (hrs)	0.86	0.59	0.50	0.42	0.38	0.35
SB065	0.44	1.14	33.3	33.3	Urban	0.026	0.29	0.25	4.65	0.38	28	Tc (hrs	0.87	0.60	0.52	0.44	0.39	0.36
												R (hrs)	0.56	0.38	0.32	0.26	0.23	0.21
SB066	0.12	0.61	32.8	32.8	Urban	0.030	0.25	0.25	4.65	0.37	38	Tc (hrs	0.55	0.40	0.35	0.30	0.28	0.26
												R (hrs)	0.43	0.31	0.26	0.22	0.20	0.19
SB067A	0.10	0.53	20.8	20.8	Urban	0.029	0.30	0.25	4.65	0.38	24	Tc (hrs	0.71	0.47	0.40	0.34	0.30	0.28
												R (hrs)	0.56	0.36	0.30	0.25	0.22	0.20
SB067B	0.09	0.63	25.4	25.4	Urban	0.029	0.30	0.25	4.65	0.38	24	Tc (hrs	0.73	0.49	0.42	0.35	0.32	0.29
												R (hrs)	0.72	0.46	0.38	0.32	0.28	0.26
SB068	0.11	1.20	11.7	11.7	Urban	0.028	0.30	0.25	4.65	0.38	24	Tc (hrs	1.50	1.10	0.94	0.79	0.70	0.63
												R (hrs)	2.36	1.68	1.40	1.16	1.01	0.91
SB069	0.14	1.20	22.5	22.5	Urban	0.028	0.30	0.25	4.65	0.38	24	Tc (hrs	1.20	0.81	0.70	0.58	0.52	0.47

* Non default value

Sub Basin Data

Basin: 01 Storms: Multiple Duration: 6 Hour Loss Method: Green-Ampt Unit Hydrograph: Clark

	Sub Basin Parameters						Rainfall Losses						Return Period (Years)					
Sub Basin ID	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2	5	10	25	50	100
												R (hrs)	1.61	1.04	0.88	0.72	0.63	0.57
SB070	0.14	0.93	25.5	25.5	Urban	0.028	0.30	0.25	4.65	0.38	24	Tc (hrs	0.94	0.63	0.54	0.45	0.40	0.38
												R (hrs)	1.00	0.65	0.54	0.45	0.39	0.36

Routing Reach Data and Calculations

Kinematic Wave Routing Reaches					
Routing Reach	**Length (ft)**	**Slope (ft/ft)**	**Roughness**	**Diameter (ft)**	**Box Dim. (ft x ft)**
RR011A	2400	0.0016	0.013	4	-
RR012A	2000	0.0122	0.013	3	-
R1217	3200	0.006	0.013	3	-
RR020C	1480	0.006	0.013	7.5	-
RR2427	3500	0.007	0.013	5	-
RR034	1200	0.01	0.012	3.5	
RR024F	900	0.0015	0.013	-	1 - 6 x 5
RR4446	1110	0.0026	0.013	5	-
RR3646	580	0.0026	0.013	5.5	-
RR047A	1500	0.004	0.013	8	-
RR4748	2300	0.003	0.013	8.5	-
RR037D	1400	0.001	0.013	5	-
RR049C	580	0.005	0.013	4	-
RR053B	1300	0.004	0.013	-	1 - 8 x 3
RR054B	1600	0.0066	0.013	-	1 - 10 x 3
RR061C	1600	0.005	0.013	5	-

Routing Data - Normal Depth

		RS Card	RC Card							RX and RY Cards								
Basin	Reach ID	NSTPS	ANL	ANCH	ANR	RLNTH (ft)	SEL (ft/ft)	ELMAX		1	2	LB	4	5	RB	7	8
01	RR010	4	0.025	0.016	0.025	3300	0.0090		Sta	0.0	0.1	10.0	10.1	79.0	79.1	89.0	89.1
									Elev	103.0	100.5	100.5	100.3	100.3	100.5	100.5	103.0
01	RR013 A	1	0.025	0.016	0.025	1250	0.0020		Sta	0.0	5.0	5.1	26.0	46.9	47.0	52.0	52.1
									Elev	100.0	100.5	100.0	100.5	101.0	101.5	101.5	105.0
01	RR013 B	1	0.025	0.016	0.025	550	0.0090		Sta	0.0	0.1	5.0	5.1	44.9	45.0	50.0	50.1
									Elev	103.0	100.5	100.5	100.1	100.1	100.5	100.5	103.0
01	RR011 B	1	0.030	0.030	0.030	500	0.0050		Sta	0.0	0.1	10.0	22.0	52.0	64.0	74.0	74.1
									Elev	105.0	102.0	102.0	100.0	100.0	102.0	102.0	105.0
01	RR014	1	0.025	0.016	0.025	1500	0.0020		Sta	0.0	0.1	7.0	7.1	48.9	49.0	54.0	54.1
									Elev	105.0	102.0	100.5	100.0	101.0	101.5	101.5	105.0
01	RR017	3	0.025	0.025	0.025	2400	0.0120		Sta	0.0	0.1	25.0	50.0	100.0	150.0	299.9	300.0
									Elev	455.0	451.5	451.5	451.5	451.5	451.5	451.5	455.0
01	RR018	6	0.025	0.025	0.025	3400	0.0100		Sta	0.0	0.1	25.0	50.0	100.0	150.0	299.9	300.0
									Elev	455.0	451.5	451.5	451.5	451.5	451.5	451.5	455.0
01	RR015 B	1	0.025	0.016	0.025	4150	0.0110		Sta	0.0	0.1	10.5	10.6	98.5	98.6	103.5	103.6
									Elev	103.0	100.5	100.5	100.3	100.3	100.5	100.5	103.0
01	RR020 A	1	0.030	0.018	0.016	700	0.0100		Sta	0.0	0.1	21.8	46.7	77.2	95.9	204.9	205.0
									Elev	430.0	425.0	424.3	419.8	419.7	424.8	424.8	430.0
01	RR020 B	1	0.030	0.018	0.016	1400	0.0050		Sta	0.0	0.1	14.0	18.0	35.5	41.0	128.0	128.1
									Elev	105.0	103.5	103.0	100.5	100.5	103.3	103.3	105.0
01	RR022	2	0.030	0.030	0.016	2800	0.0090		Sta	0.0	0.1	5.0	8.5	12.0	19.0	66.0	66.1
									Elev	105.0	102.0	102.0	101.0	100.0	102.0	102.9	105.0
01	RR023	1	0.018	0.018	0.018	2250	0.0110		Sta	0.0	0.1	9.0	11.0	15.0	17.0	26.0	26.1
									Elev	109.5	104.5	100.0	100.0	100.0	100.0	104.5	109.5
01	RR026	2	0.030	0.016	0.030	5750	0.0070		Sta	0.0	0.1	6.0	7.6	37.5	39.0	42.0	42.1
									Elev	105.0	100.8	100.3	100.1	100.1	100.3	100.8	105.0
01	RR027	1	0.025	0.016	0.025	3250	0.0050		Sta	0.0	0.1	33.0	33.1	64.0	64.1	73.5	73.6
									Elev	105.0	102.9	100.9	100.2	100.2	100.9	101.9	105.0
01	RR031 A	1	0.035	0.035	0.035	1500	0.0065		Sta	55.0	60.0	73.0	97.0	103.0	127.0	140.0	145.0
									Elev	20.0	16.0	16.0	10.0	10.0	16.0	16.0	20.0

Routing Data - Normal Depth

		RS Card	RC Card							RX and RY Cards								
Basin	Reach ID	NSTPS	ANL	ANCH	ANR	RLNTH (ft)	SEL (ft/ft)	ELMAX		1	2	LB	4	5	RB	7	8
01	RR031	1	0.035	0.035	0.035	800	0.0100		Sta	55.0	60.0	70.0	90.0	110.0	130.0	140.0	145.0
	B								Elev	20.0	15.0	15.0	10.0	10.0	15.0	15.0	20.0
01	RR031	2	0.035	0.035	0.035	1950	0.0100		Sta	55.0	60.0	70.0	90.0	110.0	130.0	140.0	145.0
	C								Elev	20.0	15.0	15.0	15.0	15.0	15.0	15.0	20.0
01	RR031	2	0.035	0.035	0.035	1200	0.0016		Sta	55.0	60.0	70.0	90.0	110.0	130.0	140.0	145.0
	D								Elev	20.0	15.0	15.0	15.0	10.0	15.0	15.0	20.0
01	RR035	3	0.030	0.016	0.030	3000	0.0050		Sta	0.0	0.1	9.0	10.5	40.8	42.3	51.3	51.4
									Elev	106.0	101.0	100.6	100.1	100.1	100.6	101.3	106.0
01	RR036	3	0.030	0.016	0.030	5400	0.0070		Sta	0.0	0.1	12.5	14.0	44.0	45.5	56.0	56.1
									Elev	105.0	100.3	100.3	100.1	100.1	100.3	100.3	105.0
01	RR037	2	0.030	0.016	0.030	3500	0.0060		Sta	0.0	0.1	8.5	8.6	39.4	39.5	48.0	48.1
	A								Elev	105.0	101.9	100.9	100.2	100.2	100.9	101.9	105.0
01	RR037	1	0.035	0.018	0.035	300	0.0270		Sta	952.0	952.1	962.2	992.0	1007.8	1036.0	1046.0	1046.1
	B								Elev	367.0	363.6	363.6	355.0	355.1	362.0	362.0	367.0
01	RR039	1	0.015	0.015	0.015	2600	0.0092		Sta	50.0	60.0	60.1	99.0	101.0	140.0	140.1	150.0
									Elev	17.0	15.0	9.0	10.0	10.0	9.0	15.0	17.0
01	RR040	8	0.035	0.035	0.035	3660	0.0075		Sta	55.0	60.0	70.0	90.0	110.0	130.0	140.0	145.0
									Elev	20.0	15.0	15.0	10.0	10.0	15.0	15.0	20.0
01	RR041	1	0.035	0.035	0.035	600	0.0067		Sta	55.0	60.0	70.0	90.0	110.0	130.0	140.0	145.0
									Elev	20.0	15.0	15.0	10.0	10.0	15.0	15.0	20.0
01	RR043	2	0.025	0.016	0.025	1800	0.0070		Sta	0.0	0.1	24.3	24.4	56.2	56.3	96.5	96.6
									Elev	107.0	102.0	100.5	100.3	100.3	100.5	102.5	107.0
01	RR044	4	0.025	0.016	0.025	5250	0.0070		Sta	0.0	0.1	8.8	10.3	40.3	41.8	50.5	50.6
									Elev	105.5	100.3	100.3	100.1	100.1	100.3	100.3	105.5
01	RR046	2	0.025	0.016	0.025	3800	0.0080		Sta	0.0	0.1	5.0	5.0	45.0	45.1	52.0	52.1
	A								Elev	103.0	100.9	100.9	100.2	100.2	10.9	100.9	103.0
01	RR049	1	0.030	0.018	0.030	1450	0.0070		Sta	974.1	974.1	991.0	996.2	1000.0	1003.8	1027.0	1027.1
	A								Elev	365.0	360.5	355.7	353.5	353.5	353.5	360.0	365.0
01	RR051	1	0.018	0.018	0.018	1300	0.0040		Sta	989.2	989.3	989.4	993.8	1000.0	1006.2	1008.7	1009.0
	A								Elev	350.0	347.0	345.2	338.2	338.1	338.0	345.2	350.0

Routing Data - Normal Depth

		RS Card	RC Card							RX and RY Cards								
Basin	Reach ID	NSTPS	ANL	ANCH	ANR	RLNTH (ft)	SEL (ft/ft)	ELMAX		1	2	LB	4	5	RB	7	8
01	RR051 B	1	0.030	0.018	0.030	1300	0.0030		Sta	970.1	970.2	971.2	991.3	1000.0	1008.7	1039.1	1039.2
									Elev	340.0	339.0	338.0	332.5	332.5	332.4	339.3	340.0
01	RR055 A	1	0.025	0.025	0.025	600	0.0014		Sta	0.0	0.1	0.2	0.3	25.3	25.4	25.5	25.6
									Elev	103.0	103.0	103.0	100.0	100.0	103.0	103.0	103.0
01	RR055 B	1	0.025	0.016	0.025	1320	0.0060		Sta	0.0	0.1	8.5	8.6	96.4	96.5	104.9	105.0
									Elev	103.0	100.5	100.5	100.3	100.3	100.5	100.5	103.0
01	RR055 C	1	0.025	0.016	0.025	1320	0.0060		Sta	0.0	0.1	8.5	8.6	96.4	96.5	104.9	105.0
									Elev	103.0	100.5	100.5	100.3	100.3	100.5	100.5	103.0
01	RR055 D	1	0.030	0.030	0.030	600	0.0010		Sta	944.0	944.2	947.5	962.2	990.1	1000.0	1009.9	1035.8
									Elev	334.4	334.4	335.2	335.4	331.5	331.4	331.2	337.5
01	RR057 A	1	0.030	0.030	0.030	700	0.0010		Sta	944.8	944.9	957.0	992.3	1007.8	1033.0	1039.7	1039.8
									Elev	337.0	336.5	336.6	328.5	328.5	335.2	335.2	337.0
01	RR057 B	1	0.025	0.016	0.025	2640	0.0080		Sta	0.0	0.1	5.0	5.1	59.0	59.1	64.0	64.1
									Elev	103.0	100.6	100.6	100.3	100.3	100.6	100.6	103.0
01	RR057 C	1	0.030	0.030	0.030	1300	0.0010		Sta	944.8	944.9	957.0	992.3	1007.8	1033.0	1039.7	1039.8
									Elev	337.0	336.5	336.6	328.5	328.5	335.2	335.2	337.0
01	RR047 B	3	0.025	0.016	0.025	5500	0.0060		Sta	0.0	0.1	10.0	10.1	45.9	46.0	74.0	74.1
									Elev	105.0	100.9	100.9	100.2	100.2	100.9	102.4	105.0
01	RR058	1	0.025	0.016	0.025	2750	0.0090		Sta	0.0	0.1	5.0	5.1	43.9	44.0	49.0	49.1
									Elev	103.0	100.9	100.9	100.2	100.2	100.9	100.9	103.0
01	RR059 A	2	0.025	0.016	0.025	5400	0.0060		Sta	0.0	0.1	12.3	12.4	51.3	51.4	56.0	56.1
									Elev	105.9	100.9	100.9	100.2	100.2	100.9	100.9	105.9
01	RR060 A	1	0.025	0.016	0.025	2600	0.0100		Sta	0.0	0.1	17.0	17.1	47.9	48.0	58.5	58.6
									Elev	104.0	102.4	100.9	100.2	100.2	100.9	102.4	104.0
01	RR062 A	4	0.025	0.045	0.025	2750	0.0020		Sta	0.0	0.1	38.5	46.5	52.5	59.5	98.0	98.1
									Elev	108.8	103.8	102.3	100.9	100.9	102.3	104.8	108.8
01	RR062 B	1	0.035	0.030	0.035	1450	0.0090		Sta	0.0	0.1	15.0	36.5	41.5	46.0	52.0	52.1
									Elev	108.5	103.5	100.3	100.3	101.5	102.0	103.5	108.5
01	RR063	2	0.030	0.030	0.030	2800	0.0070		Sta	0.0	0.1	70.3	77.1	77.8	83.0	123.0	123.1
									Elev	109.0	104.0	102.7	100.0	100.1	102.6	104.0	109.0

Routing Data - Normal Depth

		RS Card	RC Card						RX and RY Cards								
Basin	Reach ID	NSTPS	ANL	ANCH	ANR	RLNTH (ft)	SEL (ft/ft)	ELMAX		1	2	LB	4	5	RB	7	8
01	RR064	2	0.015	0.015	0.015	1600	0.0019		Sta	50.0	60.0	60.1	98.0	102.0	140.0	140.1	150.0
	A								Elev	17.0	15.0	9.0	7.0	7.0	9.0	15.0	17.0
01	RR064	1	0.015	0.015	0.015	2550	0.0094		Sta	50.0	60.0	60.1	98.0	102.0	140.0	140.1	150.0
	B								Elev	17.0	15.0	9.0	10.0	10.0	9.0	15.0	17.0
01	RR064	1	0.025	0.016	0.025	1450	0.0030		Sta	0.0	0.1	5.5	5.6	71.5	71.6	76.5	76.6
	C								Elev	105.5	100.5	100.5	100.3	100.3	100.5	100.5	105.5
01	RR064	4	0.025	0.016	0.025	1250	0.0010		Sta	0.0	0.1	5.0	5.1	68.9	69.0	74.0	74.1
	D								Elev	103.0	100.5	100.5	100.3	100.3	100.5	101.2	103.0
01	RR065	1	0.025	0.016	0.025	800	0.0190		Sta	0.0	0.1	5.5	5.6	71.4	71.5	76.5	76.6
	A								Elev	105.5	100.5	100.5	100.3	100.3	100.5	100.5	105.5
01	RR065	1	0.025	0.016	0.025	1300	0.0040		Sta	0.0	0.1	9.0	9.1	40.9	41.0	49.0	49.1
	B								Elev	105.0	100.5	100.5	100.2	100.2	100.5	100.5	105.0
01	RR065	2	0.025	0.016	0.025	4500	0.0050		Sta	0.0	0.1	5.5	5.6	71.4	71.5	76.5	76.6
	C								Elev	105.0	100.5	100.5	100.3	100.3	100.5	100.5	105.0
01	RR066	1	0.025	0.025	0.016	3300	0.0050		Sta	0.0	0.1	15.0	18.0	21.0	32.0	72.0	72.1
									Elev	106.0	101.5	100.0	100.0	100.0	101.2	101.2	106.0
01	RR067	1	0.016	0.025	0.025	2100	0.0060		Sta	0.0	0.1	25.0	29.0	40.0	44.0	49.0	49.1
	A								Elev	108.0	104.0	104.0	100.0	100.0	105.0	105.0	108.0
01	RR067	1	0.025	0.025	0.025	2500	0.0060		Sta	0.0	0.1	5.0	20.0	31.0	46.0	62.0	62.1
	B								Elev	110.0	107.5	107.5	100.0	100.0	107.5	107.3	110.0
01	RR060	1	0.030	0.018	0.018	2000	0.0030		Sta	988.0	988.2	995.0	1000.0	1005.0	1014.7	1021.2	1021.5
	B								Elev	343.0	340.6	337.3	337.3	337.3	341.7	341.8	343.0
01	RR060	1	0.030	0.018	0.018	500	0.0030		Sta	961.9	962.0	987.0	997.0	1003.0	1013.0	1023.0	1023.1
	C								Elev	342.0	338.2	338.2	331.4	331.4	339.9	339.9	342.0
01	RR068	1	0.018	0.018	0.018	3800	0.0020		Sta	942.4	942.5	959.3	982.1	1017.9	1044.9	1055.0	1055.1
									Elev	335.0	332.9	332.9	324.2	325.0	333.1	333.1	335.0
01	RR070	1	0.018	0.018	0.018	2500	0.0030		Sta	947.8	947.9	954.6	978.1	1000.0	1022.0	1045.5	1045.6
	A								Elev	328.0	325.2	325.1	316.0	316.0	316.0	325.0	328.0
01	RR069	1	0.025	0.025	0.025	4100	0.0050		Sta	0.0	0.1	9.0	11.0	19.0	27.9	28.0	28.1
									Elev	107.0	105.5	100.0	100.0	100.0	105.5	105.8	107.0

Routing Data - Normal Depth

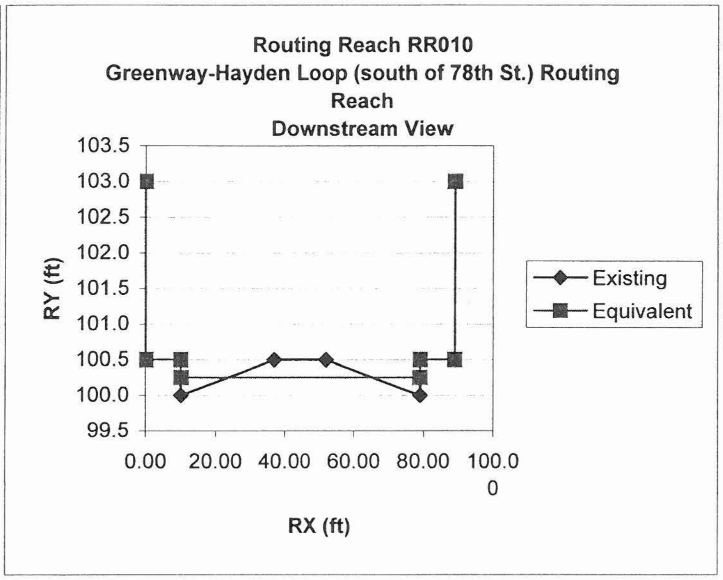
		RS Card	RC Card						RX and RY Cards								
Basin	Reach ID	NSTPS	ANL	ANCH	ANR	RLNTH (ft)	SEL (ft/ft)	ELMAX		1	2	LB	4	5	RB	7	8
01	RR046 B	1	0.030	0.030	0.030	1400	0.0070		Sta	0.0	0.1	4.0	6.5	6.6	9.0	13.0	13.1
									Elev	105.0	103.0	100.5	100.0	100.0	100.5	102.0	105.0
01	RR053 A	1	0.025	0.018	0.025	900	0.0020		Sta	0.0	0.1	2.0	10.0	13.0	21.0	23.0	23.1
									Elev	110.0	104.0	104.0	100.0	100.0	104.0	104.0	110.0
01	RR070 B	1	0.030	0.030	0.030	1800	0.0040		Sta	0.0	20.0	60.0	100.0	140.0	180.0	220.0	240.0
									Elev	102.0	100.0	100.0	100.0	100.0	100.0	100.0	102.0
01	RR051 C	1	0.035	0.035	0.035	1300	0.0030		Sta	969.9	983.6	994.4	1000.0	1002.3	1005.4	1016.9	1033.2
									Elev	340.9	336.6	335.1	335.1	335.0	336.4	336.7	341.9
01	RR015 A	1	0.025	0.016	0.025	1000	0.0068		Sta	0.0	0.1	10.5	10.6	98.5	98.6	103.5	103.6
									Elev	103.0	100.5	100.5	100.3	100.3	100.5	100.5	103.0
01	RR015 C	1	0.025	0.018	0.025	1200	0.0040		Sta	0.0	0.1	5.0	13.0	22.0	30.0	35.0	35.1
									Elev	106.0	104.0	104.0	100.0	100.0	104.0	104.0	106.0
01	RR011 B	1	0.030	0.030	0.030	500	0.0050		Sta	0.0	0.1	10.0	22.0	52.0	64.0	74.0	74.1
									Elev	105.0	102.0	102.0	100.0	100.0	102.0	102.0	105.0
01	RR024 A	2	0.025	0.016	0.025	700	0.0140		Sta	0.0	0.1	8.5	8.6	96.5	96.6	105.0	105.1
									Elev	102.0	100.5	100.5	100.3	100.3	100.5	100.5	102.0
01	RR024 D	2	0.025	0.016	0.025	2600	0.0040		Sta	0.0	0.1	8.5	8.6	96.5	96.6	105.0	105.1
									Elev	102.0	100.5	100.5	100.3	100.3	100.5	100.5	102.0
01	RR024 E	1	0.025	0.016	0.025	700	0.0070		Sta	0.0	0.1	10.0	10.1	40.9	41.0	51.0	51.1
									Elev	105.0	100.3	100.3	100.2	100.2	100.3	100.3	105.0
01	RR024 C	1	0.025	0.016	0.025	600	0.0030		Sta	0.0	0.1	5.0	5.1	35.9	36.0	41.0	41.1
									Elev	105.0	100.5	100.5	100.2	100.2	100.5	100.6	105.0
01	RR037 C	1	0.035	0.030	0.035	500	0.0080		Sta	964.1	964.2	974.1	996.2	1003.8	1027.0	1037.0	1037.1
									Elev	362.0	360.5	360.5	353.5	353.5	360.0	360.0	362.0
01	RR024 B	1	0.035	0.035	0.035	500	0.0040		Sta	0.0	0.1	4.0	6.5	9.0	13.0	13.1	13.2
									Elev	105.0	103.0	100.5	100.0	100.5	102.0	103.0	105.0
01	RR049 B	1	0.025	0.015	0.025	2500	0.0040		Sta	0.0	20.0	24.0	24.5	56.5	57.0	63.0	63.1
									Elev	102.3	100.3	100.3	100.2	100.2	100.3	100.3	102.3
01	RR019 A	1	0.020	0.016	0.020	1800	0.0080		Sta	0.0	0.1	5.0	5.1	44.9	45.0	50.0	50.1
									Elev	104.0	100.5	100.5	100.3	100.3	100.5	100.5	104.0

Routing Data - Normal Depth

		RS Card	RC Card						RX and RY Cards								
Basin	Reach ID	NSTPS	ANL	ANCH	ANR	RLNTH (ft)	SEL (ft/ft)	ELMAX		1	2	LB	4	5	RB	7	8
01	RR019 B	2	0.020	0.016	0.020	3700	0.0070		**Sta**	0.0	0.1	5.0	5.1	32.9	33.0	38.0	38.1
									Elev	103.0	100.8	100.8	100.3	100.3	100.8	100.8	103.0
01	RR054 A	1	0.018	0.018	0.016	1200	0.0025		**Sta**	0.0	0.1	6.0	10.0	12.0	33.0	59.0	59.1
									Elev	107.0	100.0	100.0	100.0	100.0	101.8	102.3	103.3
01	RR059 B	1	0.016	0.016	0.016	1250	0.0050		**Sta**	0.0	0.1	8.0	16.0	20.0	24.0	24.9	25.0
									Elev	103.0	100.0	100.0	100.0	100.0	100.0	100.0	103.0

Routing Reach RR010
Greenway-Hayden Loop (South of 78th St.)
Section taken from City of Scottsdale drawing, Project #8978, Sheet 31 of 225

Existing Hydraulic Section		
Desc.	**RX (ft)**	**RY (ft)**
NG	0.00	100.5
Curb	10.00	100.5
Gutter	10.05	100.0
Gutter	37.00	100.5
Gutter	52.00	100.5
Gutter	79.00	100.0
Curb	79.05	100.5
NG	89.00	100.5



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	10	10.1	79	79.1	89	89.1
RY	103	100.5	100.5	100.25	100.25	100.5	100.5	103

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.016	0.025

Upstream Elevation (ft)	1509
Downstream Elevation (ft)	1480
Reach Length (ft)	3300
Reach Slopte (ft/ft)	0.009

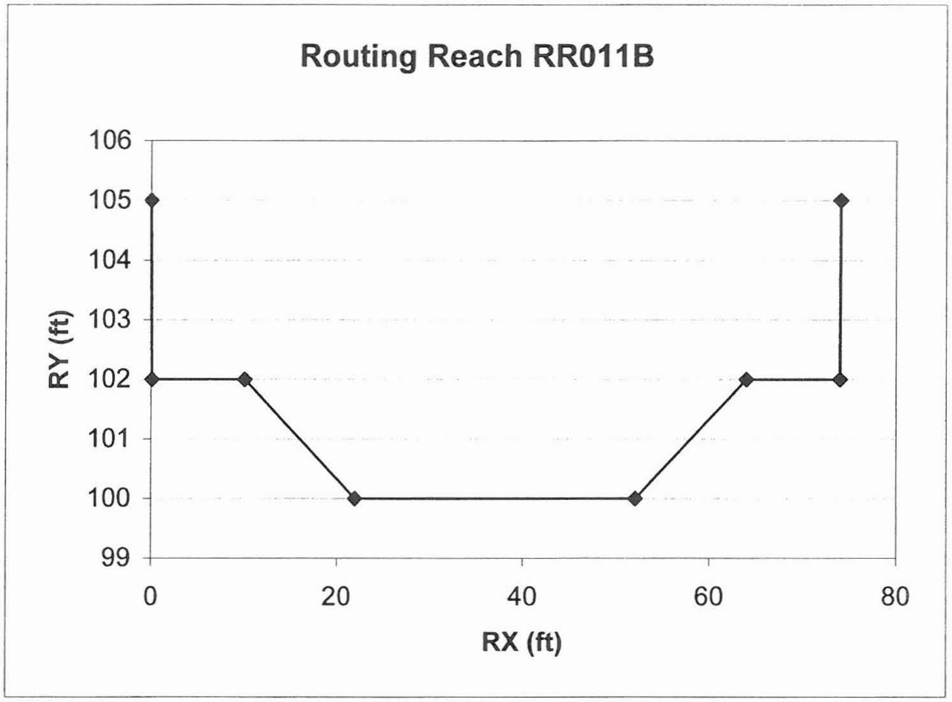
Routing Reach RR011A
48 Inch Diameter Storm Drain in Greenway-Hayden Loop

Length (ft.)	Slope (ft./ft.)	Diameter (ft.)	Roughness
2400	0.0016	4	0.013

City of Scottsdale Drawings No. 15079-15086
Storm Drain, Greenway-Hayden Loop
North Airport Industrial Improvement District, Project No. 8978

Routing Reach RR011B
Landscaped Swale Just South of Greenway-Hayden Loop

RX	RY
0	105
0.1	102
10	102
22	100
52	100
64	102
74	102
74.1	105



Manning's Roughness Coefficients		
Left Bank	Channel	Right Bank
0.03	0.03	0.03

Length (ft)	500
Slope (ft/ft)	0.005

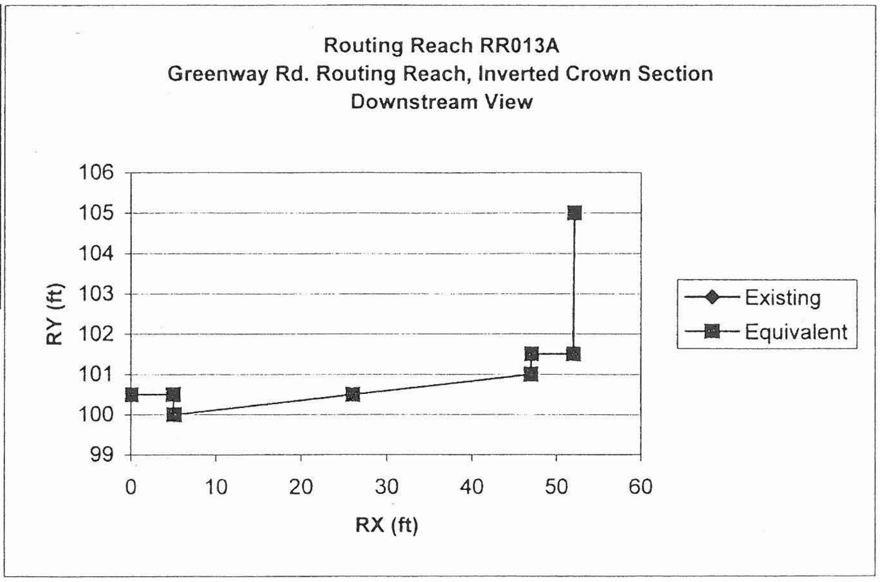
Routing Reach RR1217
36-Inch Diameter Storm Drain Pipe
Storm Drain Through Sdale Airport Property

Length	Slope	Diameter	
(ft)	(ft./ft.)	(ft)	Roughness
3200	0.006	3	0.013

See Existing Major Drainage Facilities Exhibit

Routing Reach RR013A
Greenway Rd. Routing Reach, Inverted Crown Section
Cross-Section Taken at 77th Street

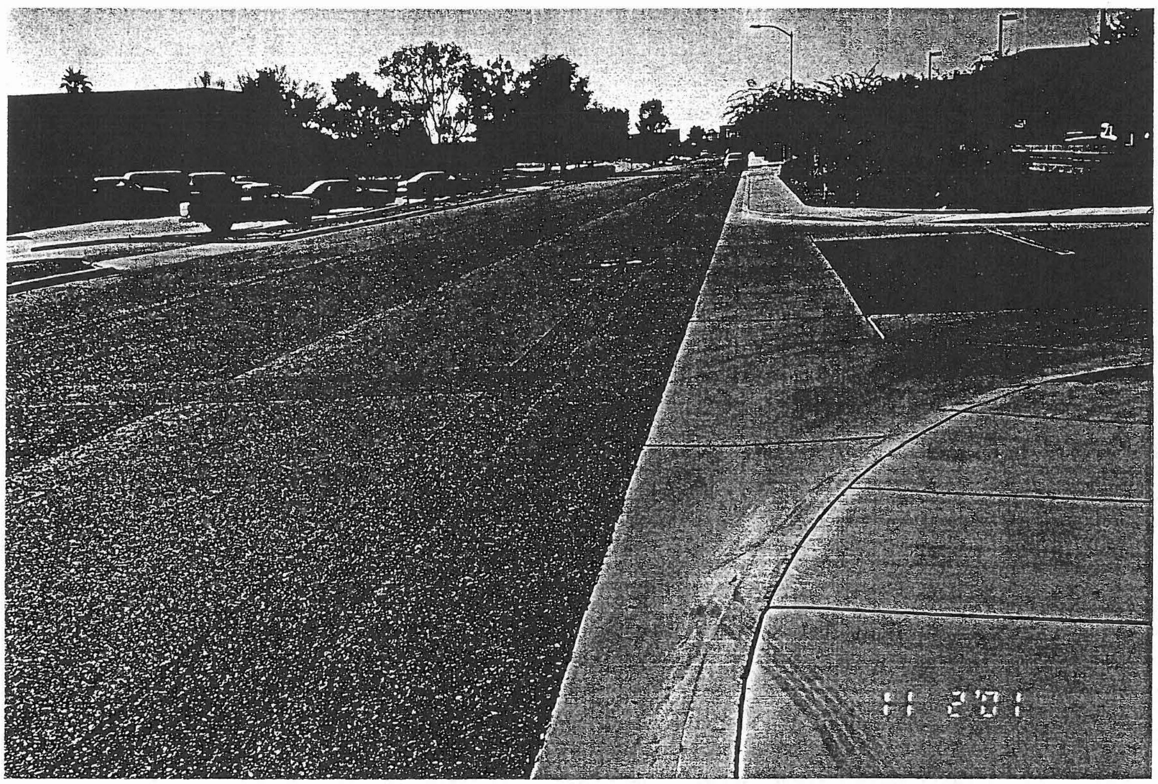
Existing Hydraulic Section		
Desc.	RX (ft)	RY (ft)
NG	0	100.5
Top	5	100.5
FLG	5.1	100
C/L	26	100.5
FLG	46.9	101
Top	47	101.5
ES	52	101.5



Equivalent 8-Point Hydraulic Section								
RX	0	5	5.1	26	46.9	47	52	52.1
RY	100.5	100.5	100	100.5	101	101.5	101.5	105

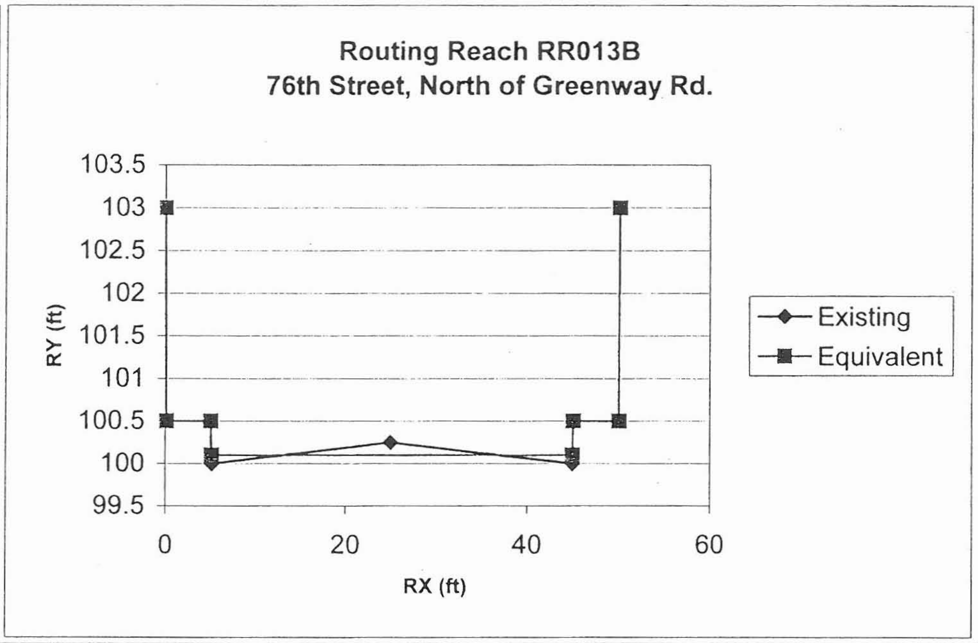
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.016	0.025

Upstream Elevation (ft)	1475
Downstream Elevation (ft)	1473
Reach Length (ft)	1250
Reach Slope (ft/ft)	0.002



Routing Reach RR013B
76th Street, North of Greenway Rd.

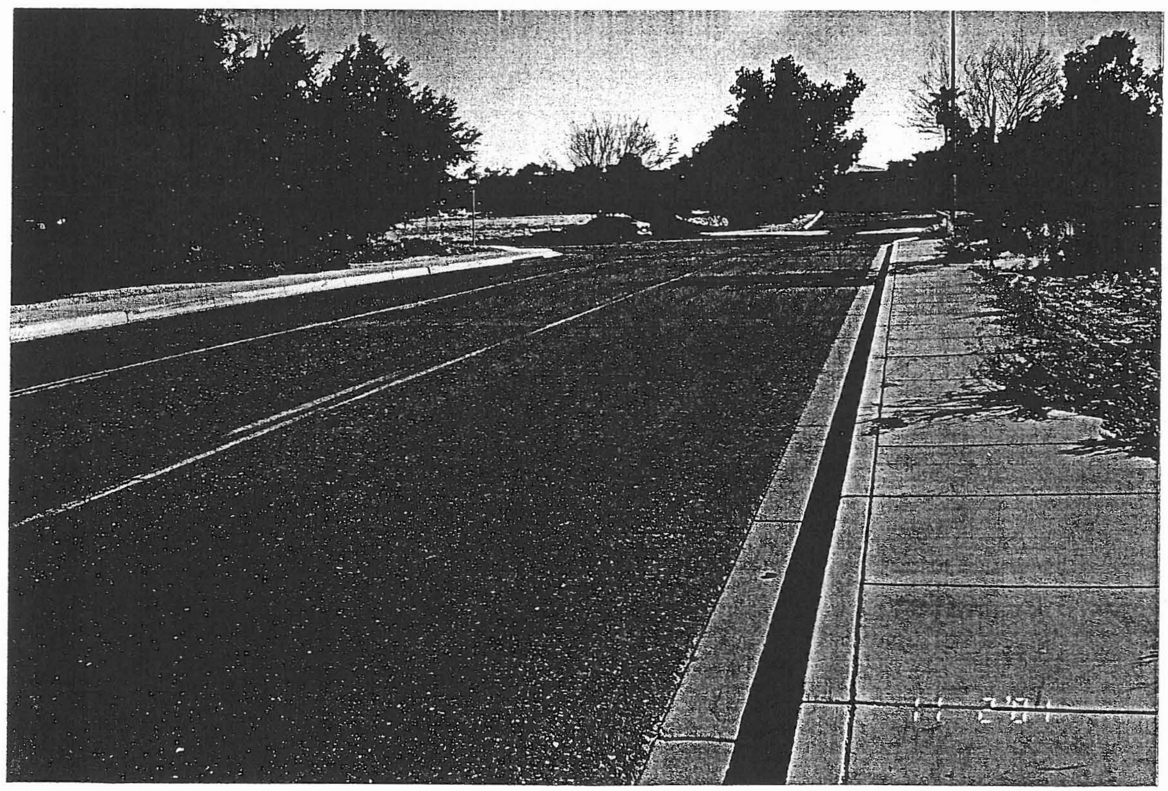
Hydraulic Section	
RX	RY
0	100.5
5	100.5
5.1	100
25	100.25
44.9	100
45	100.5
50	100.5



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	5	5.1	44.9	45	50	50.1
RY	103	100.5	100.5	100.1	100.1	100.5	100.5	103

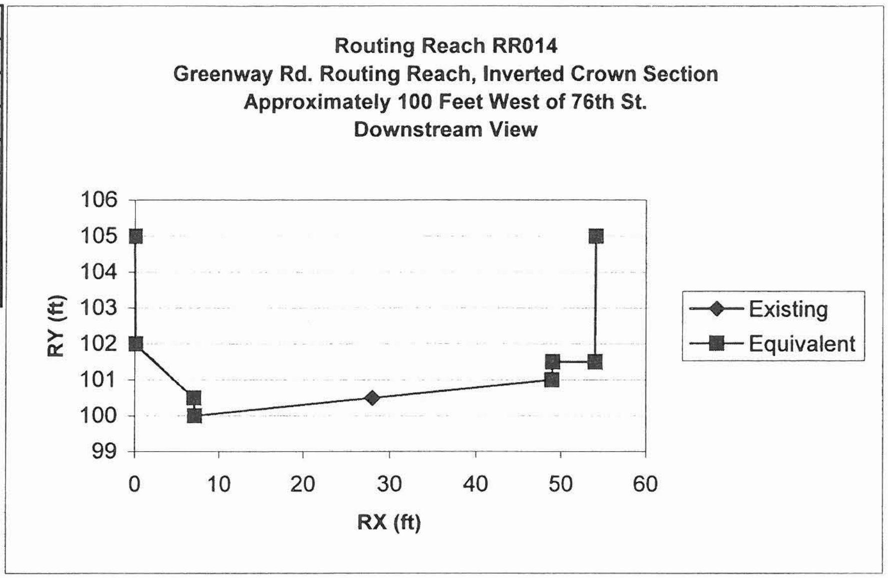
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.016	0.025

Upstream Elevation (ft)	1378
Downstream Elevation (ft)	1373
Reach Length (ft)	550
Reach Slope (ft/ft)	0.009



Routing Reach RR014
Greenway Rd. Routing Reach
Cross-Section Taken at 77th Street

Existing Hydraulic Section		
Desc.	**RX (ft)**	**RY (ft)**
NG	0	102
Top	7	100.5
FLG	7.1	100
C/L	28	100.5
FLG	48.9	101
Top	49	101.5
ES	54	101.5



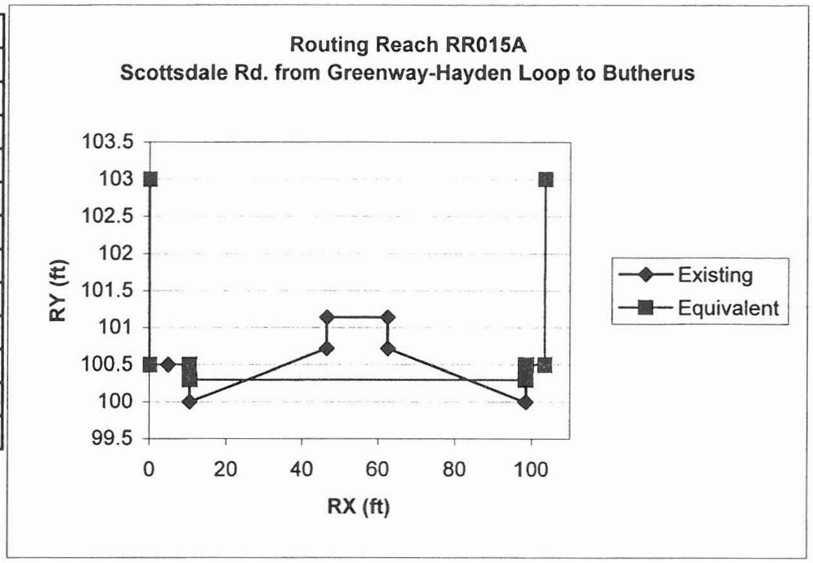
Equivalent 8-Point Hydraulic Section								
RX	0	0.1	7	7.1	48.9	49	54	54.1
RY	105	102	100.5	100	101	101.5	101.5	105

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.016	0.025

Upstream Elevation (ft)	1473
Downstream Elevation (ft)	1470
Reach Length (ft)	1500
Reach Slope (ft/ft)	0.002

Routing Reach RR015A
Scottsdale Rd. Routing Reach, Greenway-Hayden to Butherus, Crown Section
Section Taken Approximately 300 Feet North of Acoma Dr.

Existing Hydraulic Section		
Desc.	**RX (ft)**	**RY (ft)**
NG	0	100.5
ES	5	100.5
ES	10.5	100.5
FLG	10.55	100
Median	46.45	100.72
Median	46.5	101.14
Median	62.5	101.14
Median	62.55	100.72
FLG	98.45	100
NG	98.5	100.5
NG	103.5	100.5



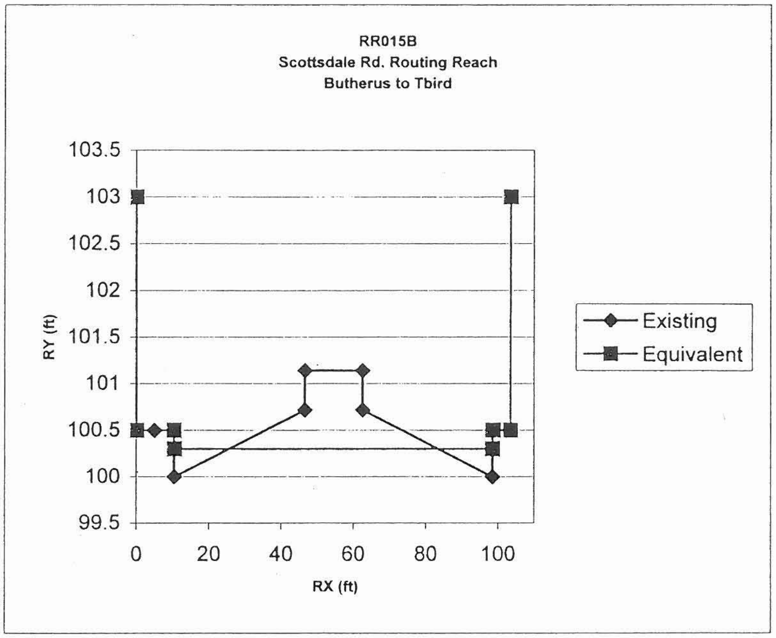
Equivalent Eight-Point Hydraulic Section								
RX	0	0.1	10.5	10.6	98.5	98.6	103.5	103.6
RY	103	100.5	100.5	100.3	100.3	100.5	100.5	103

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.016	0.025

Upstream Elevation	1471.5
Downstream Elevation (ft)	1464.7
Reach Length (ft)	1000
Reach Slope (ft/ft)	0.0068

Routing Reach RR015B
Scottsdale Rd. Routing Reach, Butherus to Tbird, Crown Section
Approximately 300 Feet North of Acoma Dr.

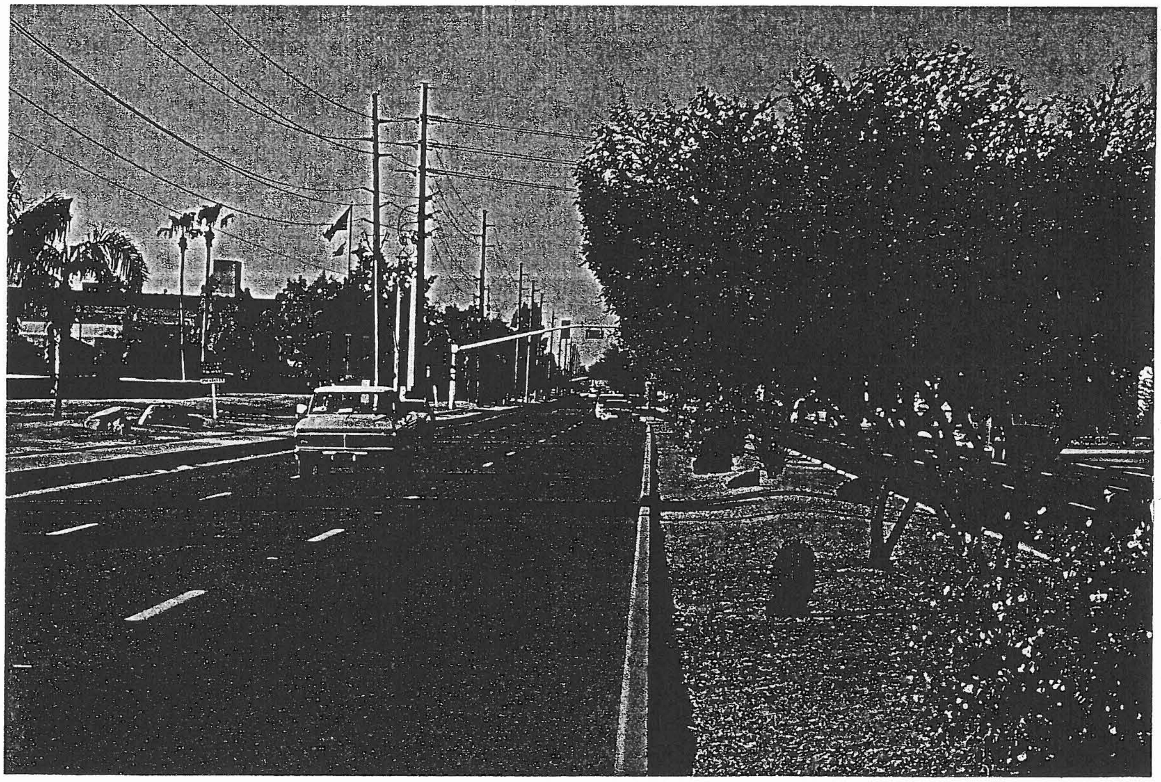
Existing Hydraulic Section		
Desc.	RX (ft)	RY (ft)
NG	0	100.5
ES	5	100.5
ES	10.5	100.5
FLG	10.55	100
Median	46.45	100.72
Median	46.5	101.14
Median	62.5	101.14
Median	62.55	100.72
FLG	98.45	100
NG	98.5	100.5
NG	103.5	100.5



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	10.5	10.6	98.5	98.6	103.5	103.6
RY	103	100.5	100.5	100.3	100.3	100.5	100.5	103

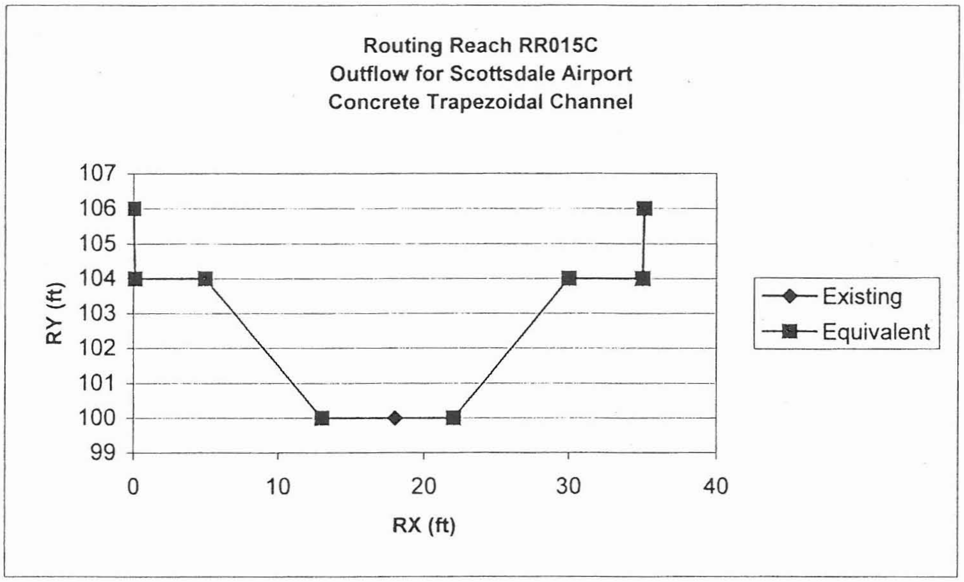
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.016	0.025

Upstream Elevation (ft)	1464.7
Downstream Elevation (ft)	1420
Length (ft)	4150
Slope (ft/ft)	0.011



Routing Reach RR015C
Outflow for Scottsdale Airport
Concrete Trapezoidal Channel

Existing Hydraulic Section	
RX (ft)	RY (ft)
0	104
5	104
13	100
18	100
22	100
30	104
35	104



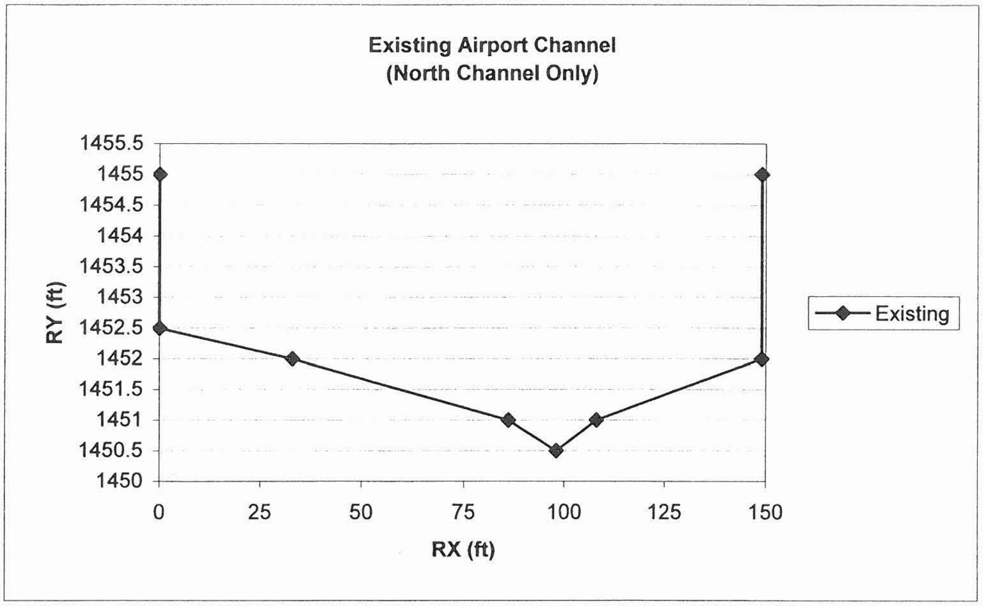
Equivalent 8-Point Hydraulic Section								
RX	0	0.1	5	13	22	30	35	35.1
RY	106	104	104	100	100	104	104	106

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.018	0.025

Upstream Elevation (ft)	1425
Downstream Elevation (ft)	1420
Reach Length (ft)	1200
Reach Slope (ft/ft)	0.004

Routing Reach RR017
Q:\15586\graphics\AutoCAD\AirportBase2001.dwg
Cross-Section of Channel on North Side of Runway

North Channel	
RX	RY
0	1455
0.02	1452.5
33	1452
86	1451
98	1450.5
108	1451
149	1452
149.02	1455



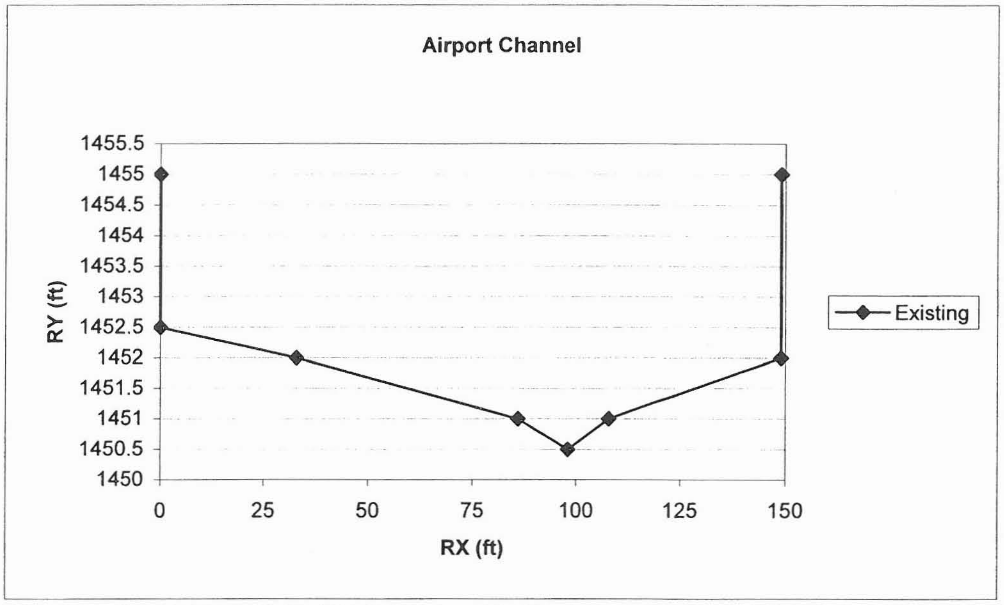
Equivalent Cross-Section for North and South Channels								
RX	0	0.1	25	50	100	150	299.9	300
RY	455	451.5	451.5	451.5	451.5	451.5	451.5	455

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.025	0.025

Upstream Elevation (ft)	1497
Downstream Elevation (ft)	1468
Reach Length (ft)	2400
Reach Slope (ft/ft)	0.012

Routing Reach RR018
Q:\15586\graphics\AutoCAD\AirportBase2001.dwg
Cross-Section of Channel on North Side of Runway

North Channel	
RX	RY
0	1455
0.02	1452.5
33	1452
86	1451
98	1450.5
108	1451
149	1452
149.02	1455



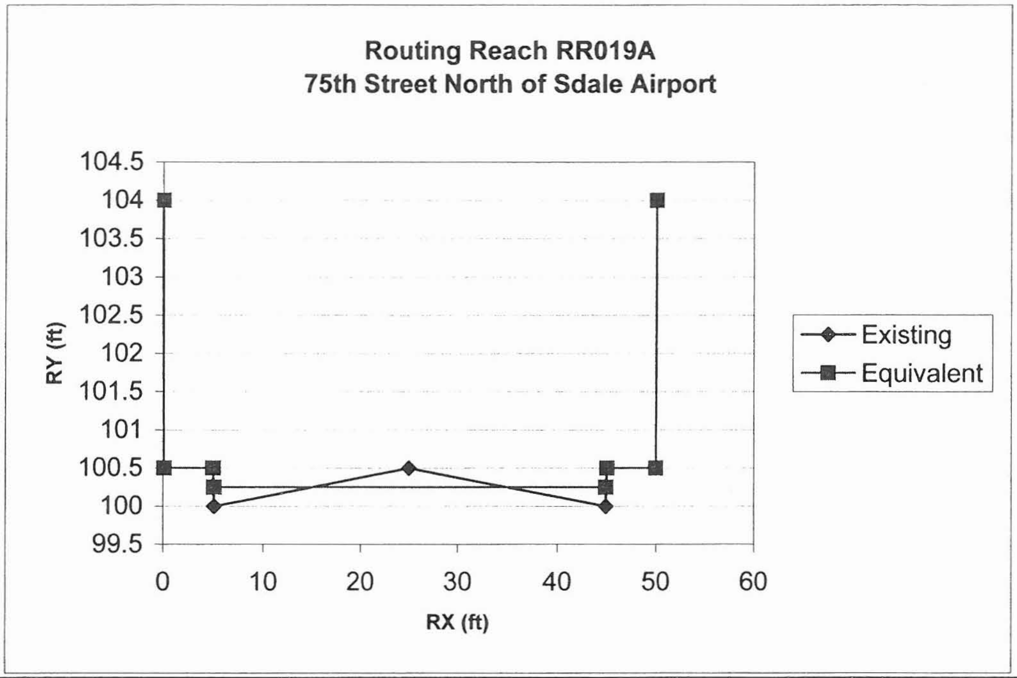
Equivalent Cross-Section for North and South Channels								
RX	0	0.1	25	50	100	150	299.9	300
RY	455	451.5	451.5	451.5	451.5	451.5	451.5	455

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.025	0.025

Upstream Elevation (ft)	1468
Downstream Elevation (ft)	1434
Reach Length (ft)	3400
Reach Slope (ft/ft)	0.010

Routing Reach RR019A
75th Street North of Sdale Airport

Hydraulic Section	
RX	RY
0	100.5
5	100.5
5.1	100
25	100.5
44.9	100
45	100.5
50	100.5



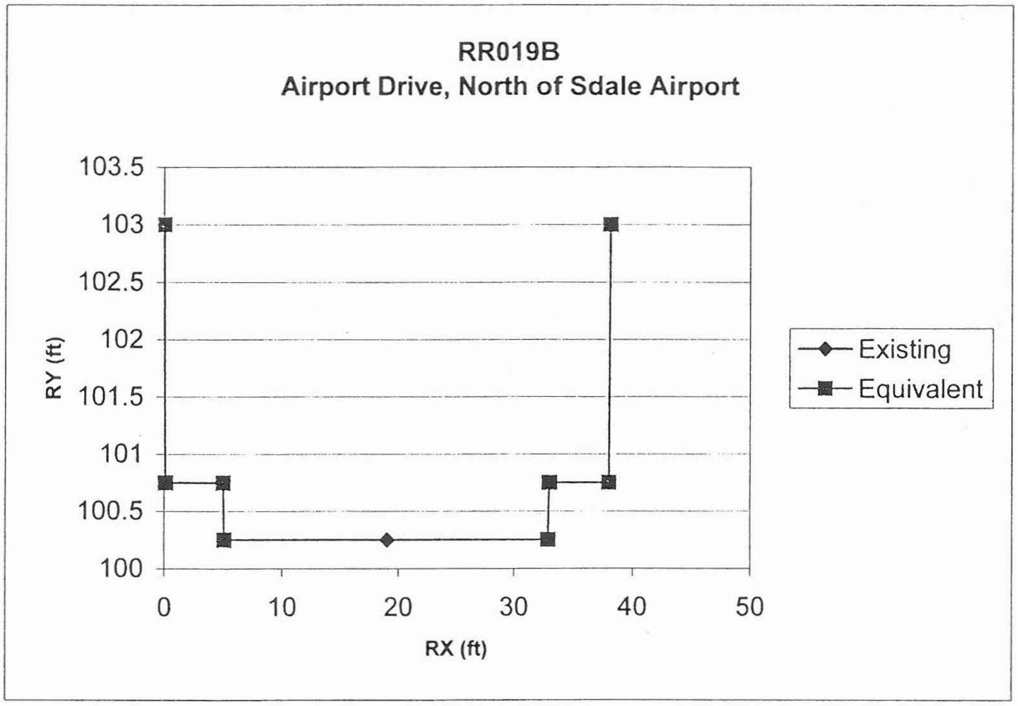
Equivalent 8-Point Hydraulic Section								
RX	0	0.1	5	5.1	44.9	45	50	50.1
RY	104	100.5	100.5	100.25	100.25	100.5	100.5	104

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.02	0.016	0.02

Upstream Elevation (ft)		1470
Downstream Elevation (ft)		1455
Reach Length (ft)		1800
Slope (ft/ft)		0.008

Routing Reach RR019B
Airport Drive, North of Sdale Airport

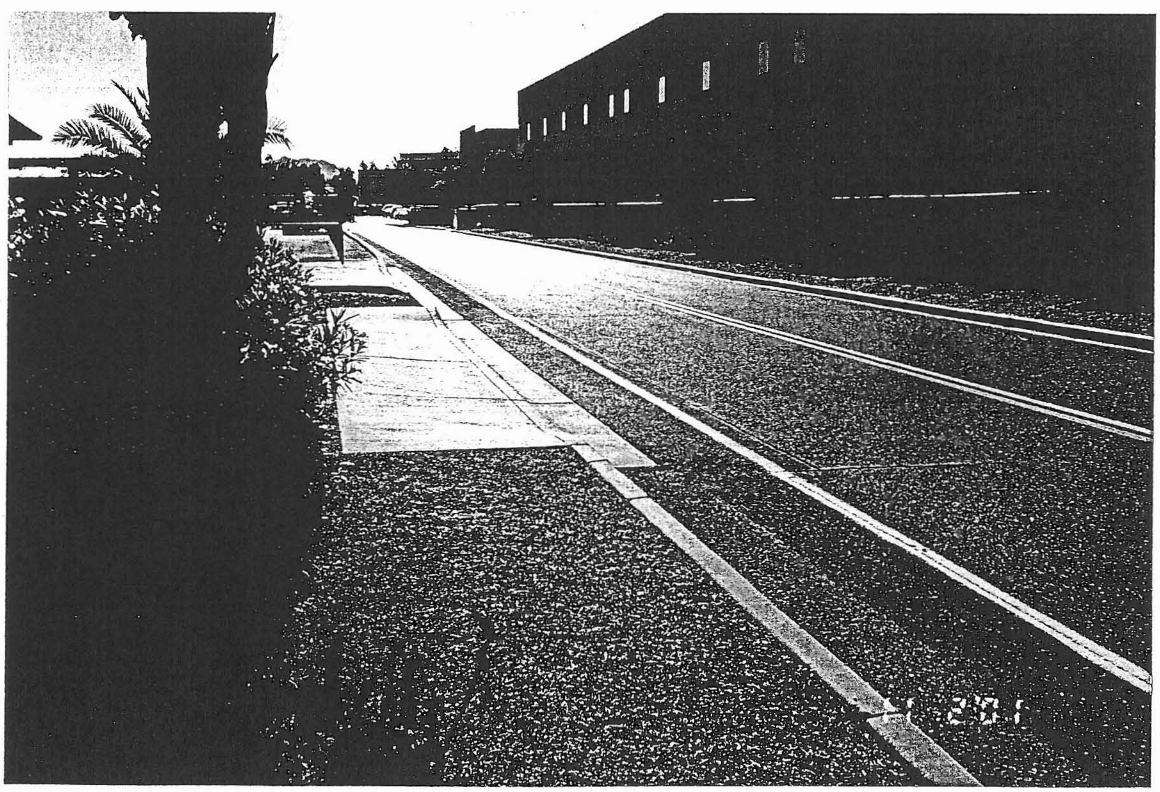
Hydraulic Section	
RX	RY
0	100.75
5	100.75
5.1	100.25
19	100.25
32.9	100.25
33	100.75
38	100.75



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	5	5.1	32.9	33	38	38.1
RY	103	100.8	100.8	100.3	100.3	100.8	100.8	103

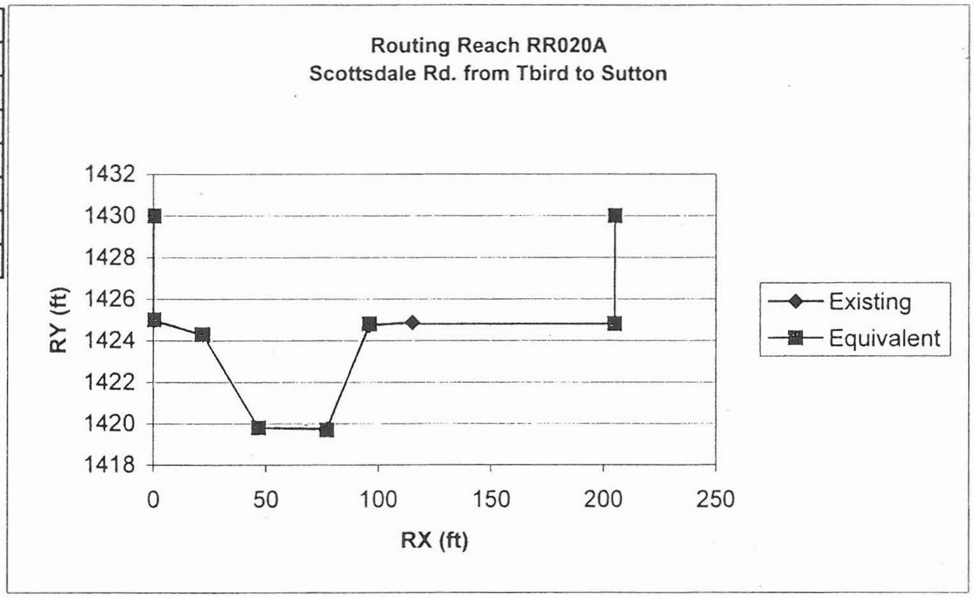
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.02	0.016	0.02

Upstream Elevation (ft)	1455
Downstream Elevation (ft)	1430
Reach Length (ft)	3700
Slope (ft/ft)	0.007



Routing Reach RR020A
Scottsdale Rd. Routing Reach, Crown Section, Scottsdale Rd. from Tbird to Sutton
SCI Survey Data

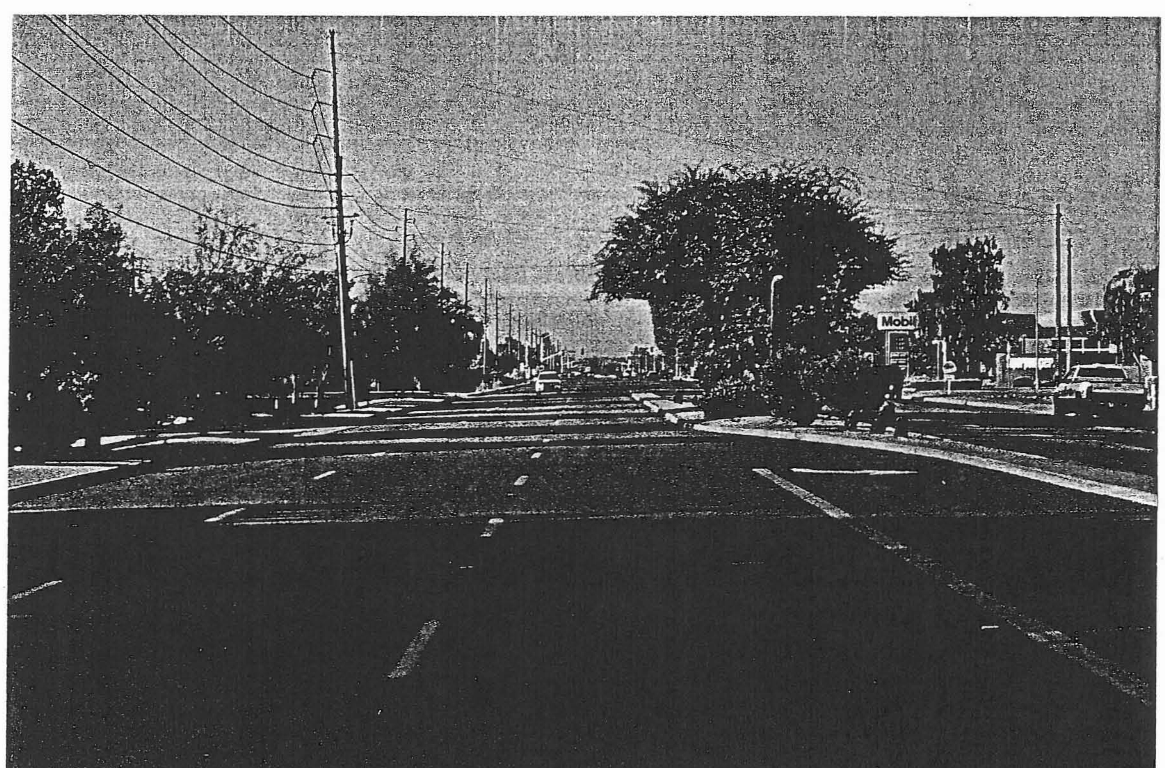
Existing Hydraulic Section	
RX (ft)	**RY (ft)**
0	1424.97
21.8	1424.29
46.67	1419.8
77.19	1419.75
95.92	1424.75
115	1424.87



Equivalent 8-Point Hydraulic Section								
RX	0.0	0.1	21.8	46.7	77.2	95.9	204.9	205.0
RY	1430	1425	1424.3	1419.8	1419.7	1424.8	1424.8	1430

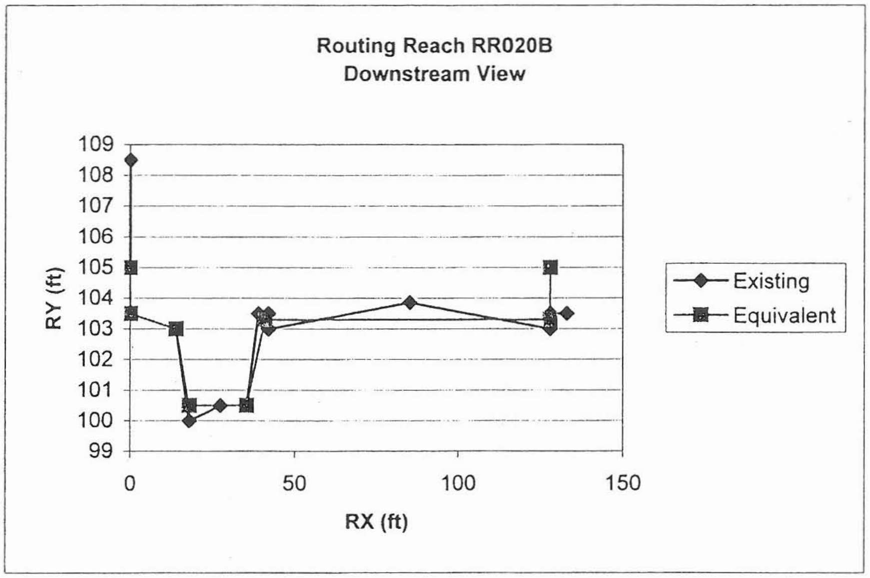
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.030	0.018	0.016

Upstream Elevation (ft)	1420
Downstream Elevation (ft)	1413
Reach Length (ft)	700
Reach Slope (ft/ft)	0.010



Routing Reach RR020B
Section taken Approximately 200 Feet South of Sutton Dr.
Scottsdale Rd. from Sutton to Sweetwater

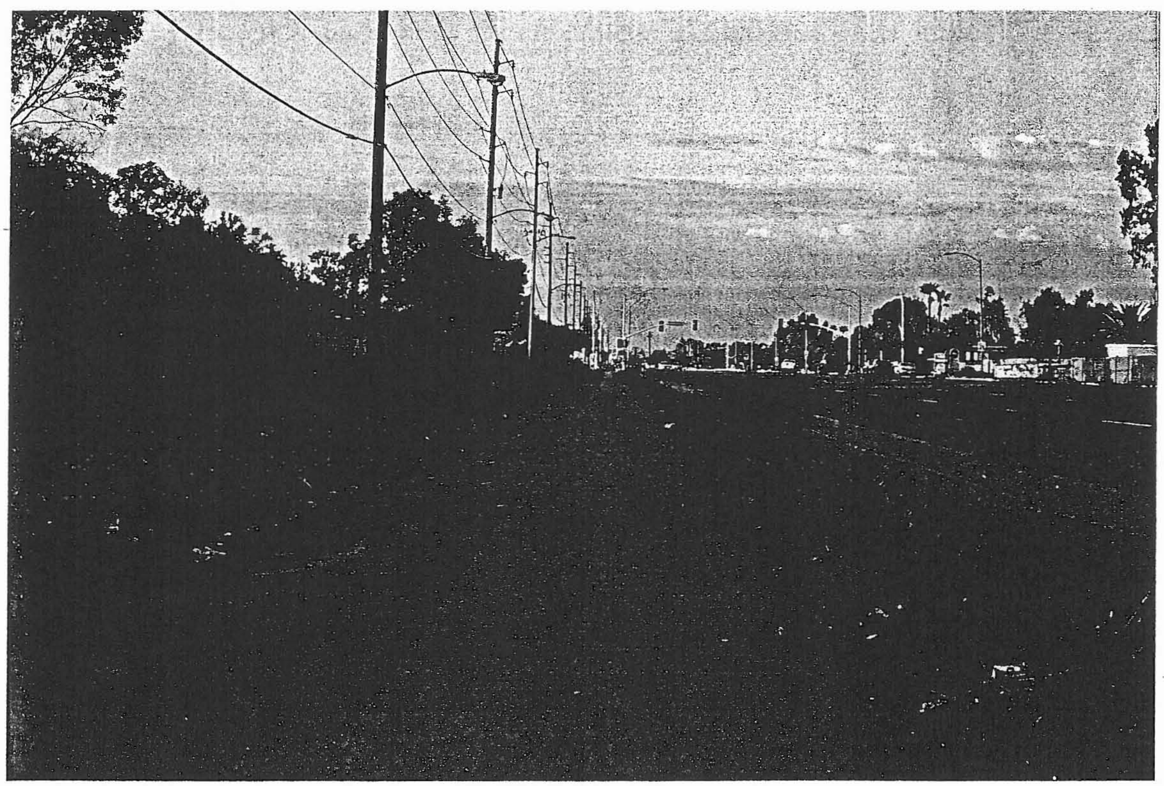
Existing Hydraulic Section		
Desc.	RX (ft)	RY (ft)
Wall	0	108.5
NG	0.05	103.5
Top	14	103
Toe	18	100
ES	27.5	100.5
ES	35.5	100.5
Top	39	103.5
Top	42	103.5
FLG	42.05	103
CL	85	103.86
FLG	128	103
ES	128.05	103.5
ES	133	103.5



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	14	18	35.5	41	128	128.1
RY	105	103.5	103	100.5	100.5	103.3	103.3	105

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.030	0.018	0.016

Upstream Elevation (ft)	1412
Downstream Elevation (ft)	1405
Reach Length (ft)	1400
Reach Slope (ft/ft)	0.005



Routing Reach RR020C
90-Inch Diameter Storm Drain in Sdale Rd. to Cactus Park

Length	Slope		Diameter
(FT)	(ft./ft.)	Roughness	(ft)
1480	0.006	0.013	7.5

City of Scottsdale Public Improvements
Scottsdale Road Improvements - Mercer Ln. to Sweetwater Ave.
Scottsdale Project No. S2704

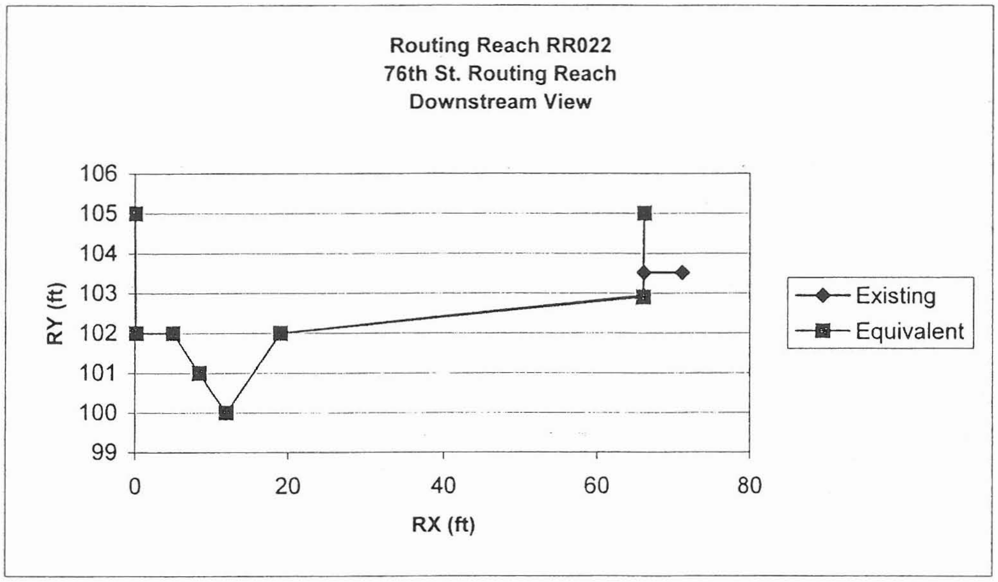
Slope and Diameter taken from
Scottsdale Road Improvements
Drawings Numbers 37956 and 37957

Sta 83+50.54 ft.
Elev 1388 ft.

Sta 73+12.43 ft.
Elev 1382 ft.

Routing Reach RR022
76th St. Routing Reach
Section taken Approximately 100 Feet South of Sutton Dr.

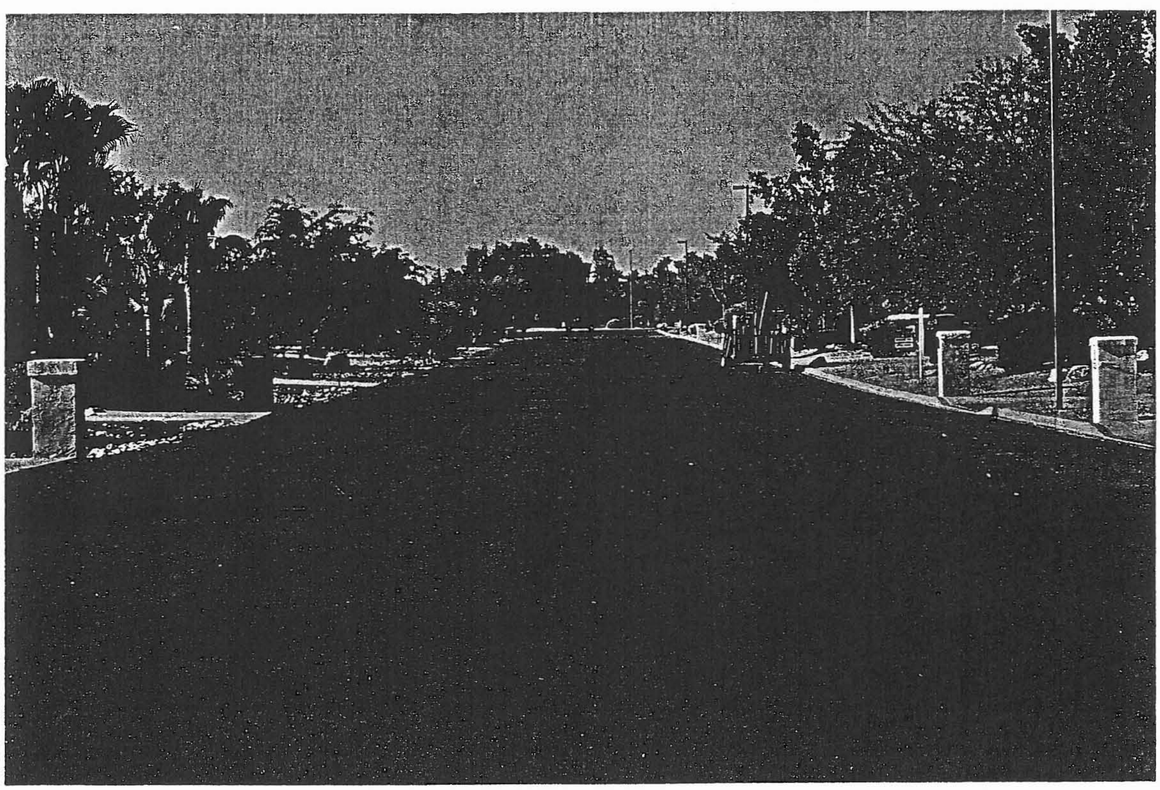
Existing Hydraulic Section	
RX (ft)	RY (ft)
0	102
5	102
12	100
19	102
66	102.94
66.05	103.52
71	103.52



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	5	8.5	12	19	66	66.1
RY	105	102	102	101	100	102	102.9	105

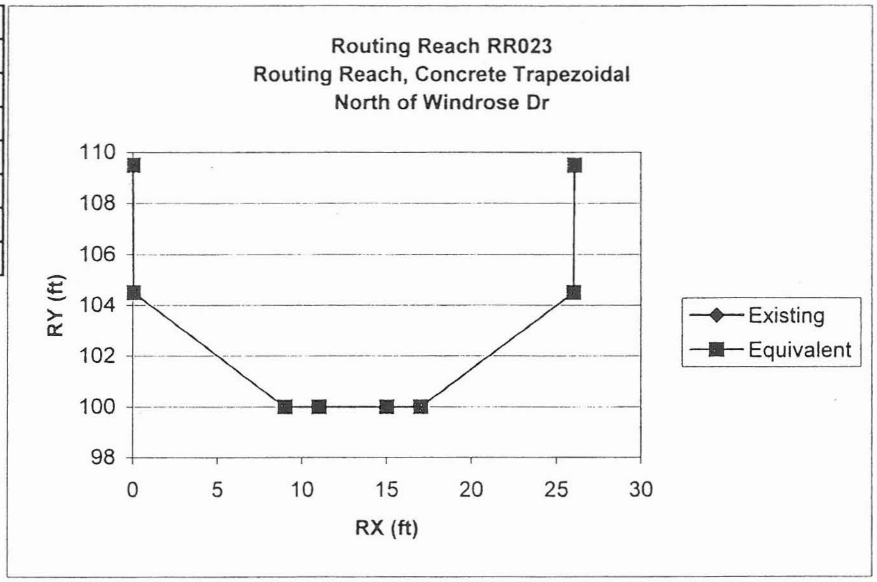
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.03	0.03	0.016

Upstream Elevation (ft)	1434
Downstream Elevation (ft)	1408
Reach Length (ft)	2800
Reach Slope (ft/ft)	0.009



Routing Reach RR023
Routing Reach, Concrete Trapezoidal
North of Windrose Dr.

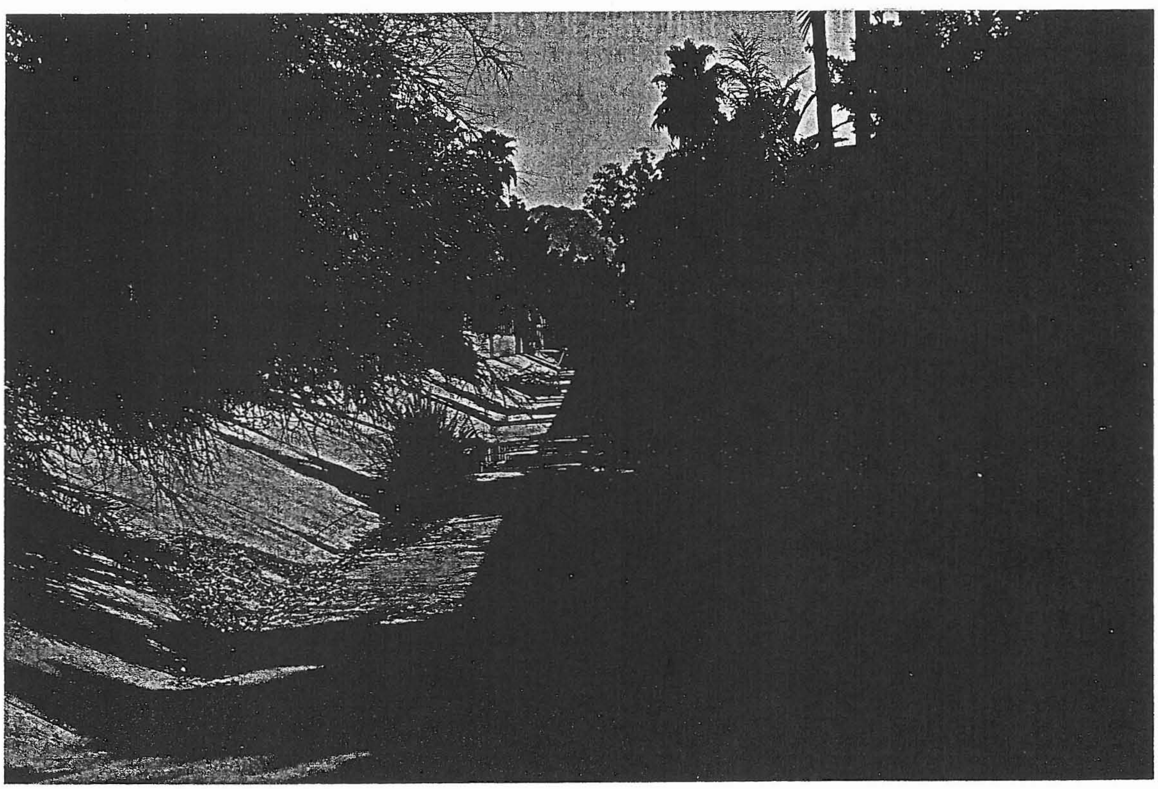
Existing Hydraulic Section		
Desc.	RX (ft)	RY (ft)
Wall	0	109.5
Wall	0.05	104.5
NG	9	100
Top	17	100
FLG	26	104.5
C/L	26.05	109.5



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	9	11	15	17	26	26.1
RY	109.5	104.5	100	100	100	100	104.5	109.5

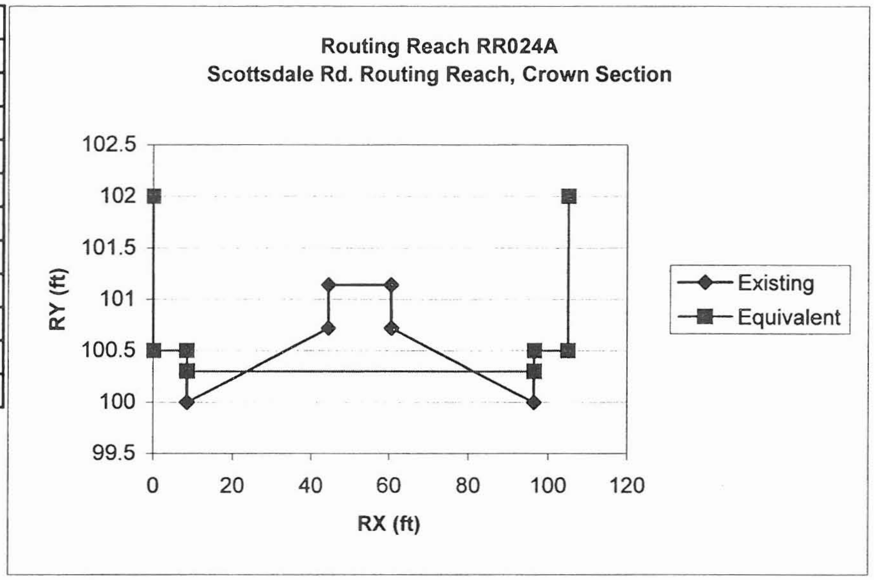
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.018	0.018	0.018

Upstream Elevation (ft)	1408
Downstream Elevation (ft)	1384
Reach Length (ft)	2250
Reach Slope (ft/ft)	0.011



Routing Reach RR024A
Scottsdale Rd. Routing Reach, from Cactus to Sunnyside Drive
X-Sect. Taken Approximately 200 Feet South of Jenan St.

Existing Hydraulic Section		
Desc.	**RX (ft)**	**RY (ft)**
NG	0	100.5
Top	8.5	100.5
FLG	8.55	100
Median	44.45	100.72
Median	44.5	101.14
Median	60.5	101.14
Median	60.55	100.72
FLG	96.45	100
Top	96.5	100.5
NG	105	100.5



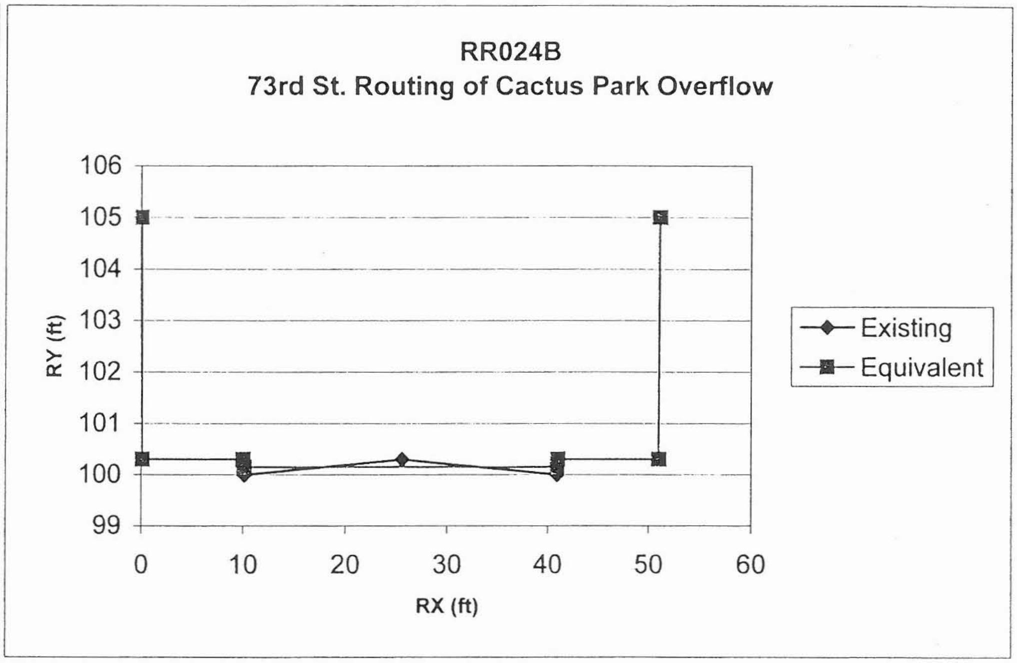
Equivalent 8-Point Hydraulic Section								
RX	0	0.1	8.5	8.6	96.5	96.6	105	105.1
RY	102	100.5	100.5	100.3	100.3	100.5	100.5	102

Manning's Roughness Coefficient		
Left Bank	**Channel**	**Right Bank**
0.025	0.016	0.025

Upstream Elevation (ft)	1389.6
Downstream Elevation (ft)	1380
Reach Length (ft)	700
Sloper (ft/ft)	0.014

Routing Reach RR024B
73rd Street Routing of Cactus Park Overflow to Sunnyside

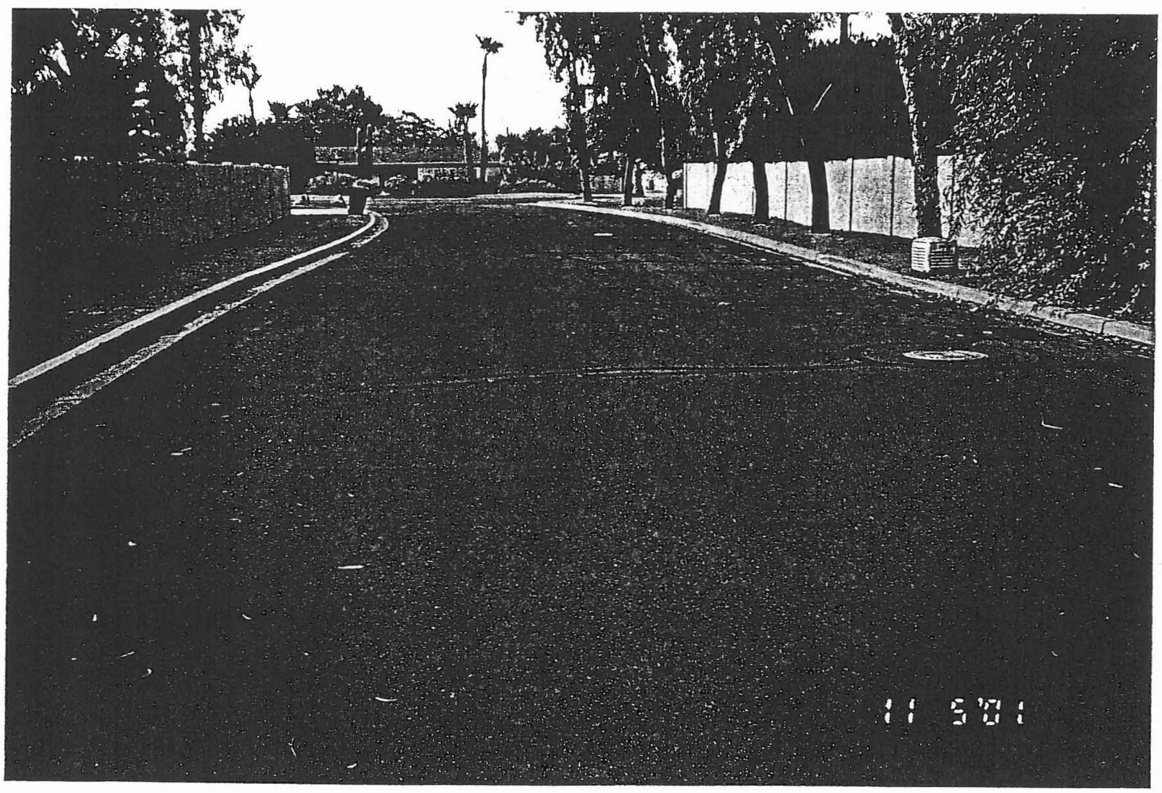
Hydraulic Section	
RX	RY
0	105
0.1	100.3
10	100.3
10.1	100
25.5	100.3
40.9	100
41	100.3
51	100.3
51.1	105



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	10	10.1	40.9	41	51	51.1
RY	105	100.3	100.3	100.2	100.2	100.3	100.3	105

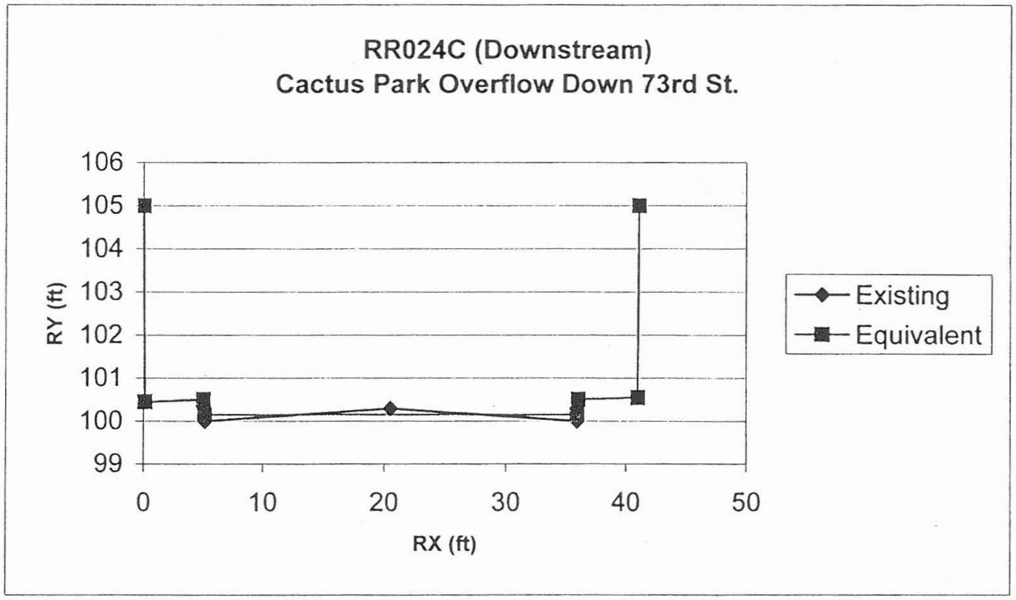
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.016	0.025

Upstream Elevation (ft)	1387
Downstream Elevation (ft)	1382
Reach Length (ft)	700
Slope (ft/ft)	0.007



Routing Reach RR024C
Sunnyside Drive Routing Reach Section
Cactus Park Overflow from 73rd St to Sdale Rd.

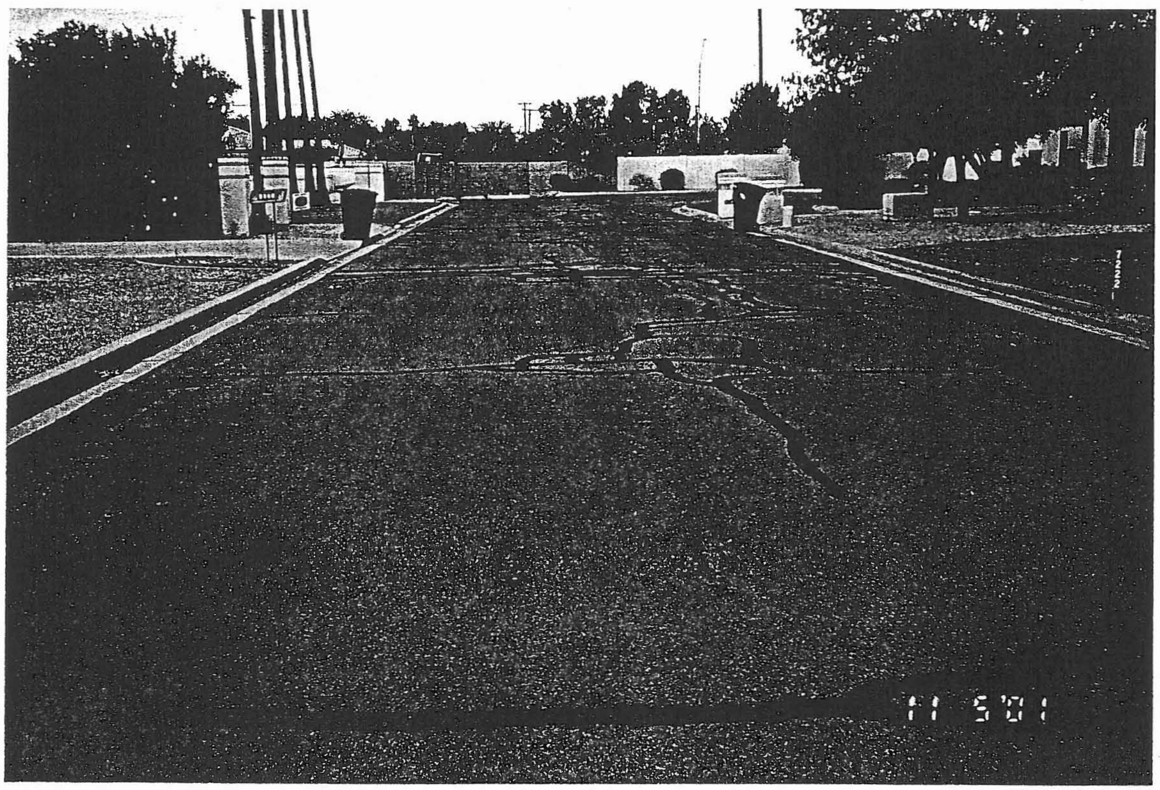
Hydraulic Section	
RX	RY
0	100.45
5	100.5
5.1	100
20.5	100.3
35.9	100
36	100.5
41	100.55



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	5	5.1	35.9	36	41	41.1
RY	105	100.45	100.5	100.2	100.2	100.5	100.55	105

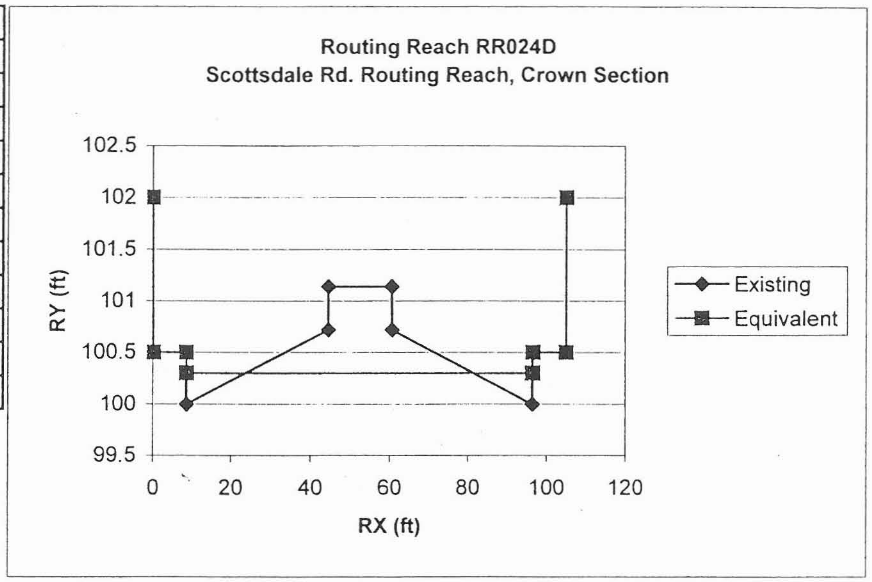
Manning's Roughness Coefficient		
Left Bank	**Channel**	**Right Bank**
0.025	0.016	0.025

Upstream Elevation (ft)	1382
Downstream Elevation (ft)	1380
Reach Length (ft)	600
Slope (ft/ft)	0.003



Routing Reach RR024D
Scottsdale Rd. Routing Reach, from Sunnyside Drive to Sump
X-Sect. Taken Approximately 200 Feet South of Jenan St.

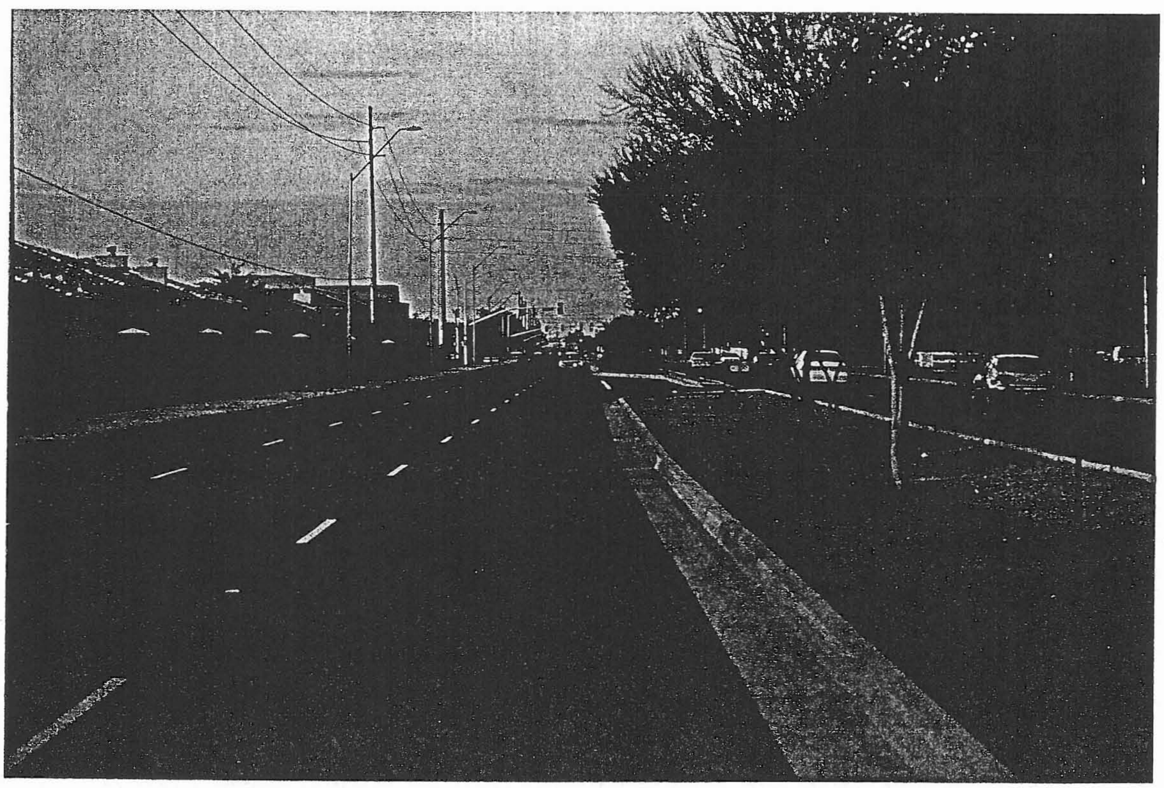
Existing Hydraulic Section		
Desc.	RX (ft)	RY (ft)
NG	0	100.5
Top	8.5	100.5
FLG	8.55	100
Median	44.45	100.72
Median	44.5	101.14
Median	60.5	101.14
Median	60.55	100.72
FLG	96.45	100
Top	96.5	100.5
NG	105	100.5



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	8.5	8.6	96.5	96.6	105	105.1
RY	102	100.5	100.5	100.3	100.3	100.5	100.5	102

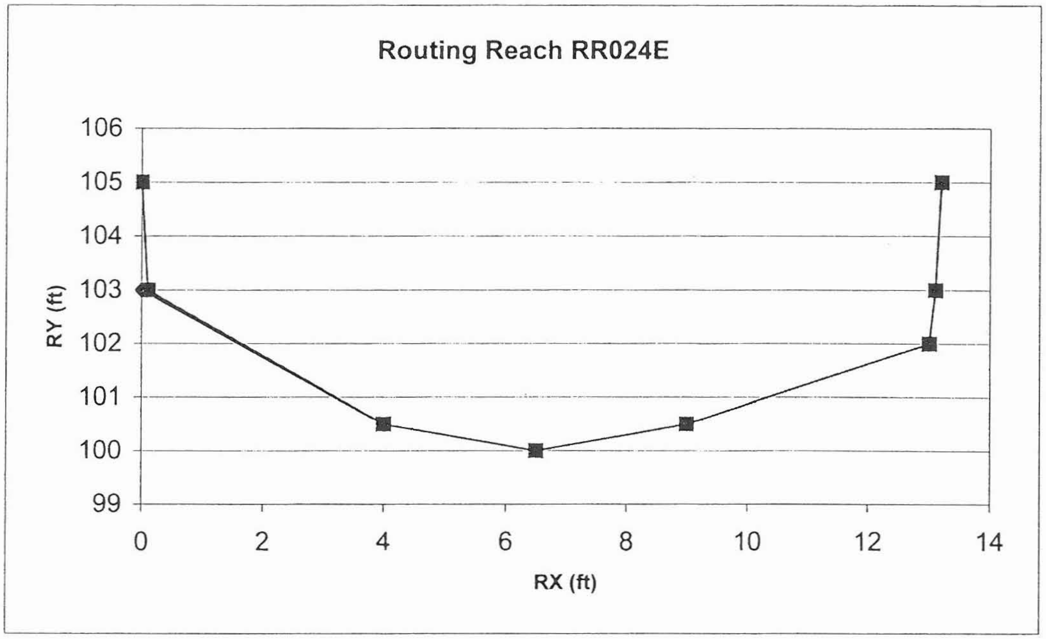
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.016	0.025

Upstream Elevation (ft)	1380
Downstream Elevation (ft)	1369
Reach Length (ft)	2600
Sloper (ft/ft)	0.004



Routing Reach RR024E
Open Channel Along North Side of Commercial Office Parcel

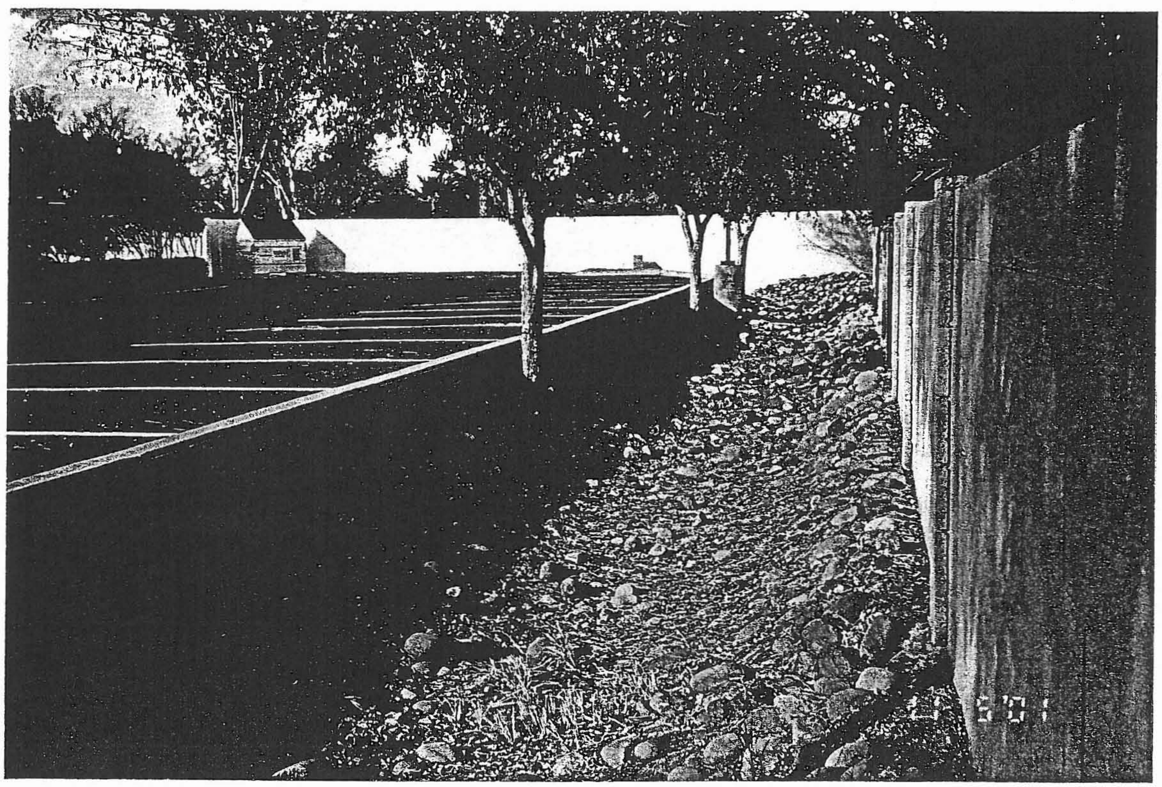
RX	RY
0	103
4	100.5
6.5	100
9	100.5
13	102



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	4	6.5	9	13	13.1	13.2
RY	105	103	100.5	100	100.5	102	103	105

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.035	0.035	0.035

Upstream Elevation (ft)	1369
Downstream Elevation (ft)	1367
Reach Length (ft)	500
Slope (ft/ft)	0.004



Routing Reach RR024F
1-5'x6' RCB @ S=0.0015 ft/ft
Storm Drain from Sdale Rd to Mescal to 71st Street Channel

Length	Slope	
(ft)	(ft./ft.)	Roughness
900	0.0015	0.013

City of Scottsdale Public Improvements
Scottsdale Road Improvements - Mercer Ln. to Sweetwater Ave.
Scottsdale Project No. S2704

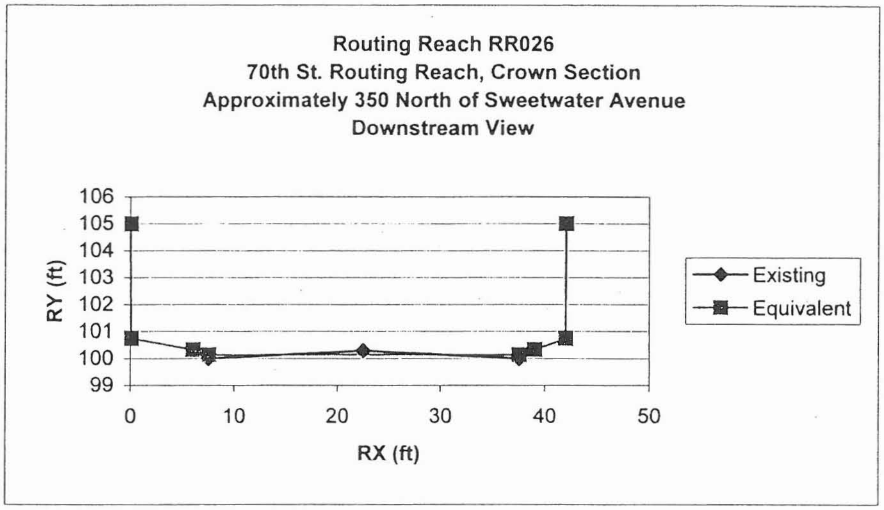
Routing Reach RR2427
60-Inch Diameter Storm Drain South in Sdale Rd, West in Cholla, South in 71st St Channel.

Length	Slope		Diameter
(FT)	(ft./ft.)	Roughness	(ft)
3500	0.007	0.013	5

City of Scottsdale Public Improvements
Scottsdale Road Improvements - Mercer Ln. to Sweetwater Ave.
Scottsdale Project No. S2704

Routing Reach RR026
70th St. Routing Reach, Crown Section
Section taken Approximately 350 North of Sweetwater Avenue
Corner of 70th Street and Dreyfus Avenue

Existing Hydraulic Section		
Desc.	**RX (ft)**	**RY (ft)**
Wall	0	105
NG	0.05	100.75
Top	6	100.33
FLG	7.5	100
C/L	22.5	100.3
FLG	37.5	100
Top	39	100.33
NG	42	100.75
Wall	42.05	105



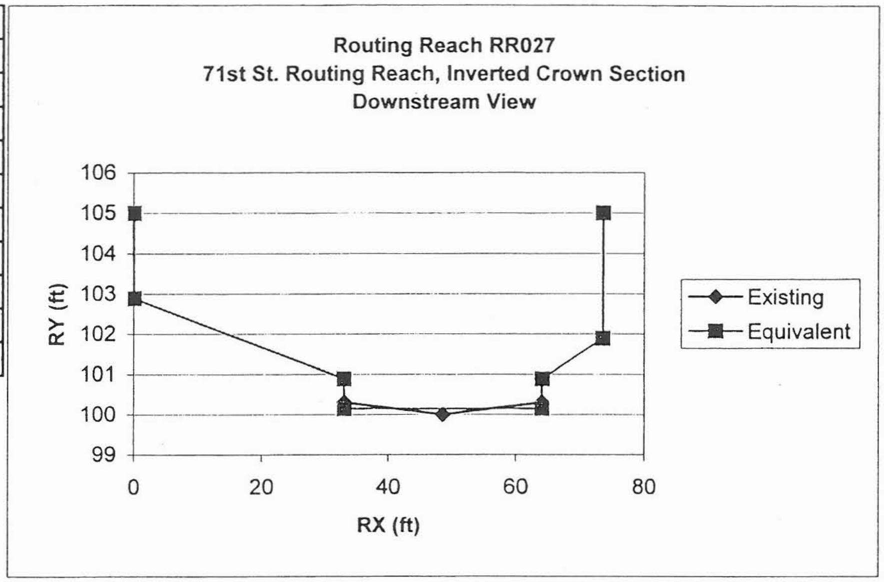
Equivalent 8-Point Hydraulic Section								
RX	0	0.1	6	7.6	37.5	39	42	42.1
RY	105	100.8	100.3	100.1	100.1	100.3	100.8	105

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.030	0.016	0.030

Upstream Elevation (ft)	1424
Downstream Elevation (ft)	1385
Reach Length (ft)	5750
Reach Slope (ft/ft)	0.007

Routing Reach RR027
71st St. Routing Reach, Inverted Crown Section
Section taken Approximately 500 Feet South of Cortez St.

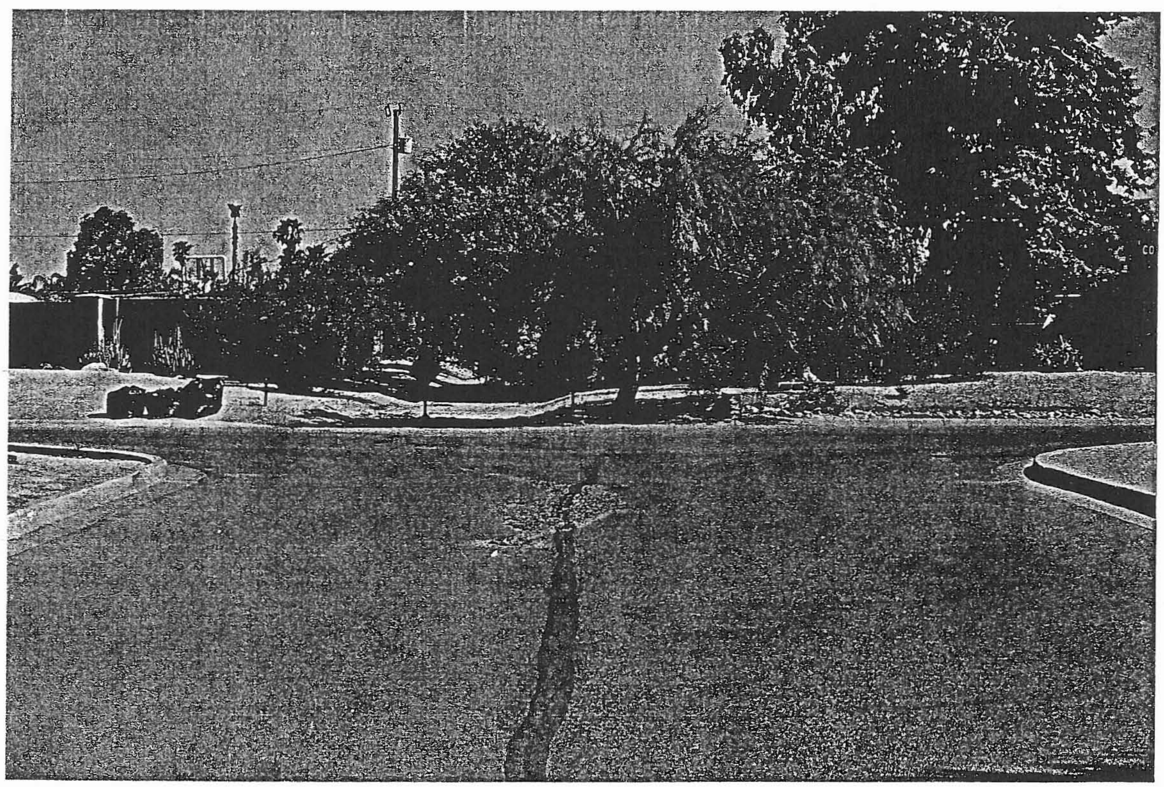
Existing Hydraulic Section		
Desc.	RX (ft)	RY (ft)
Wall	0	105
NG	0.05	102.89
Top	33	100.89
Curb	33.05	100.31
C/L	48.5	100
Curb	64	100.31
Top	64	100.89
NG	73.5	101.89
Fence	73.55	105



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	33	33.1	64	64.1	73.5	73.6
RY	105	102.9	100.9	100.2	100.2	100.9	101.9	105

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.016	0.025

Upstream Elevation (ft)	1379
Downstream Elevation (ft)	1363
Reach Length (ft)	3250
Reach Slope (ft/ft)	0.005

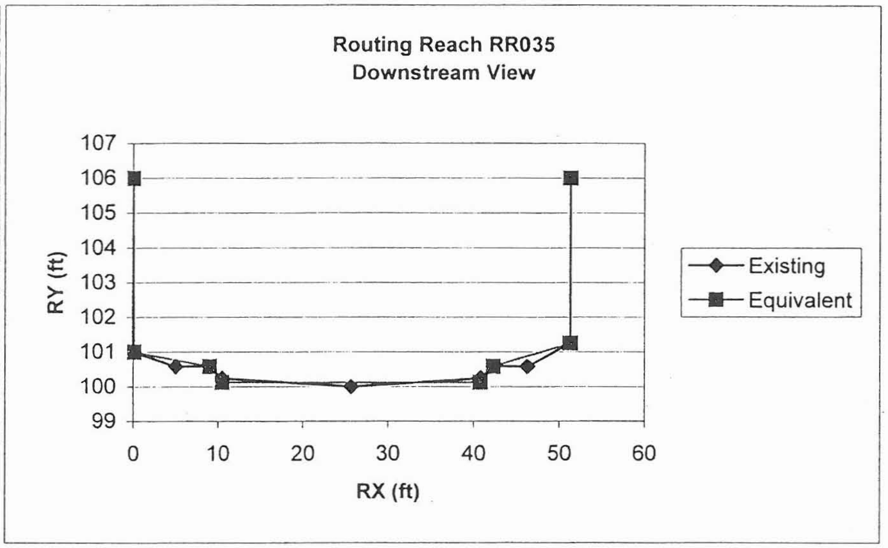


Routing Reach RR034

Length	Slope			Diameter
(ft)	(ft/ft)	n	Shape	(ft)
1200	0.01	0.012	circ.	3.5

Routing Reach RR035
69th St. Routing Reach, Inverted Crown Section
Section taken Approximately 600 Ft North of Thunderbird Road, Corner of 69th St and Friess Dr

Existing Hydraulic Section		
Desc.	RX (ft)	RY (ft)
Wall	0	106
Wall	0	101
ES	5	100.58
ES	9	100.58
FLG	10.5	100.25
C/L	25.625	100
FLG	40.75	100.25
ES	42.25	100.58
ES	46.25	100.58
Wall	51.25	101.25
Wall	51.3	106



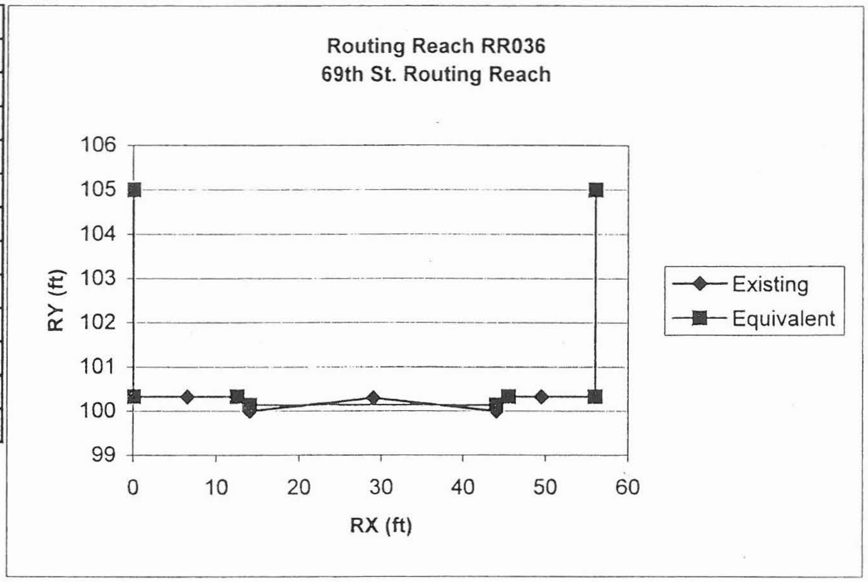
Equivalent 8-Point Hydraulic Section								
RX	0	0.1	9	10.5	40.8	42.3	51.3	51.3
RY	106	101	100.6	100.1	100.1	100.6	101.3	106

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.030	0.016	0.030

Upstream Elevation (ft)	1440
Downstream Elevation (ft)	1425
Reach Length (ft)	3000
Reach Slope (ft/ft)	0.005

Routing Reach RR036
69th St. Routing Reach, Crown Section
Section taken Approximately 100 Feet North of Sweetwater Ave.

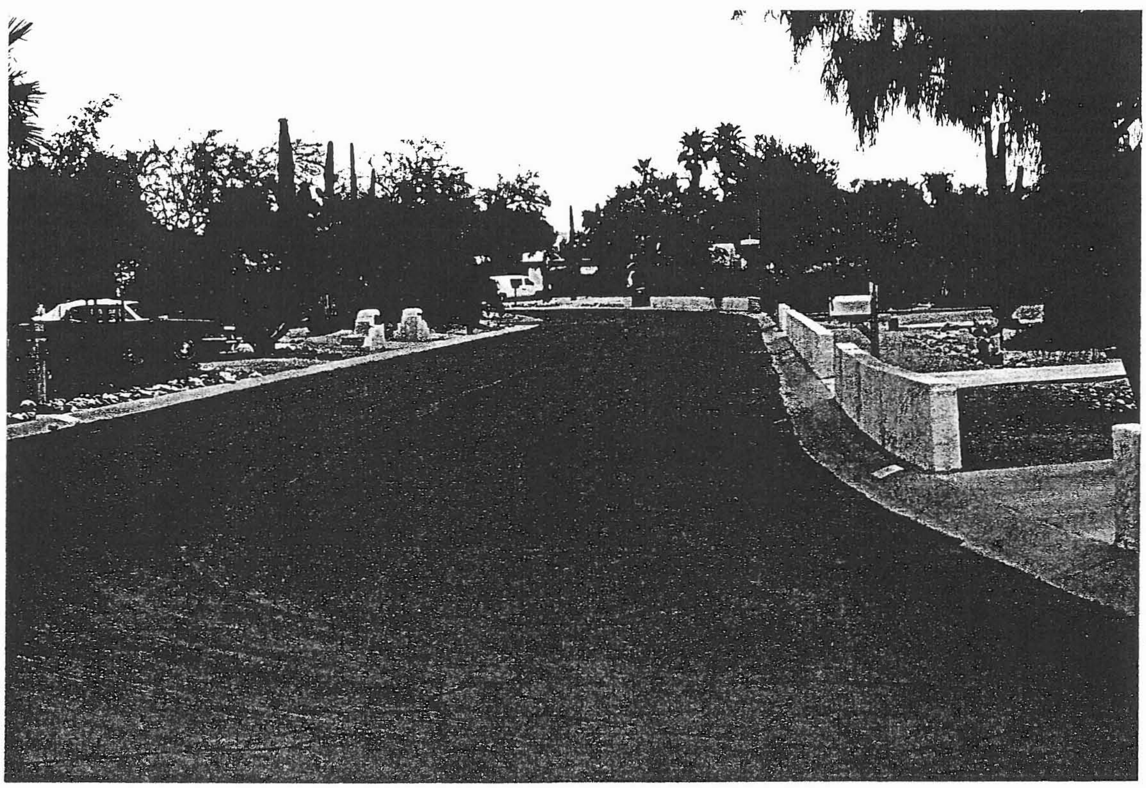
Existing Hydraulic Section		
Desc.	**RX (ft)**	**RY (ft)**
Wall	0	105
Wall	0.05	100.33
NG	6.5	100.33
Top	12.5	100.33
FLG	14	100
C/L	29	100.3
FLG	44	100
Top	45.5	100.33
NG	49.5	100.33
Wall	56	100.33
Wall	56.05	105



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	12.5	14	44	45.5	56	56.1
RY	105	100.3	100.3	100.1	100.1	100.3	100.3	105

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.03	0.016	0.03

Upstream Elevation (ft)	1425
Downstream Elevation (ft)	1385
Reach Length (ft)	5400
Slope (ft/ft)	0.007



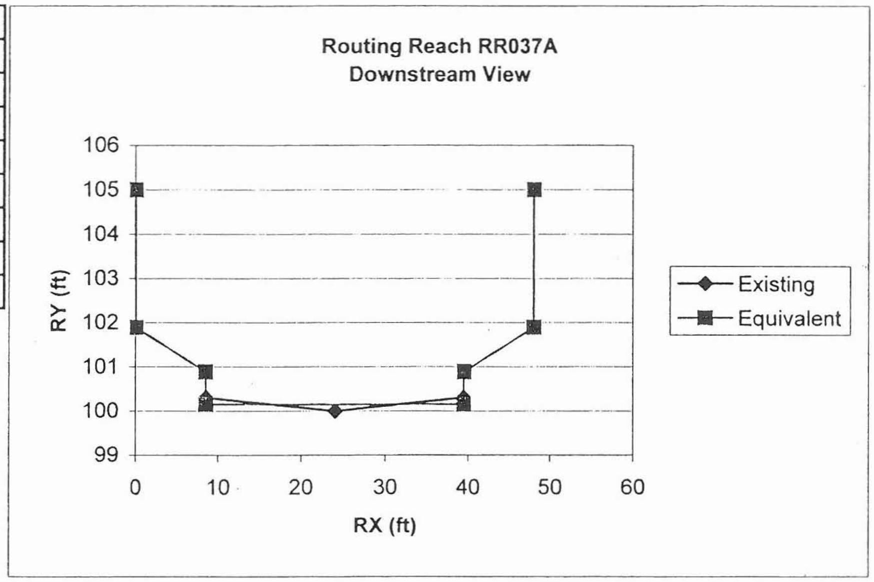
Routing Reach RR3646
Storm Drain Flow West in Cactus Rd to 68th Street

Length	Slope	Diameter	
(ft)	(ft./ft.)	(ft)	Roughness
580	0.0026	5.5	0.013

Cactus Road: 60th St. to Scottsdale Road
City of Scottsdale Project No. S 0706
Drawing #38493

Routing Reach RR037A
70th St. Routing Reach, Inverted Crown Section
Section taken Approximately 200 Feet South of Cortez St.

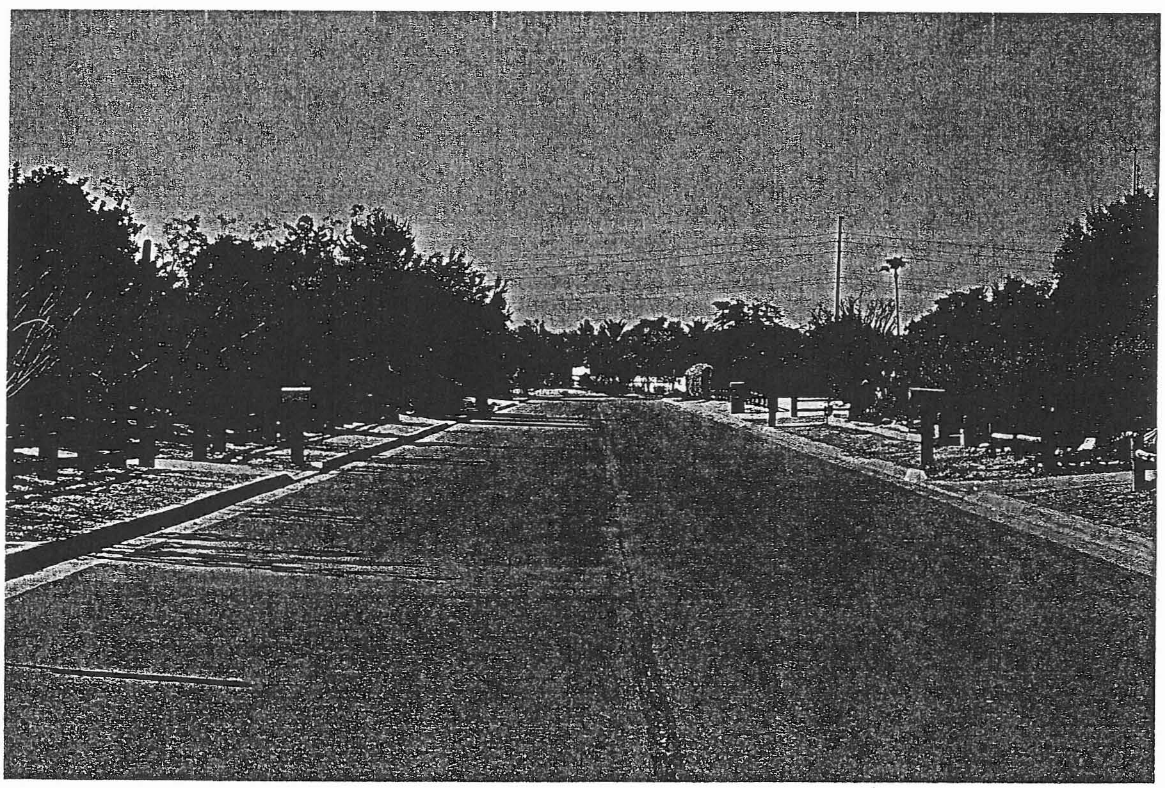
Existing Hydraulic Section		
Desc.	RX (ft)	RY (ft)
Wall	0	101.89
Wall	8.5	100.89
NG	8.55	100.31
Top	24	100
FLG	39.45	100.31
C/L	39.5	100.89
FLG	48	101.89



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	8.5	8.6	39.4	39.5	48	48.1
RY	105	101.9	100.9	100.2	100.2	100.9	101.9	105

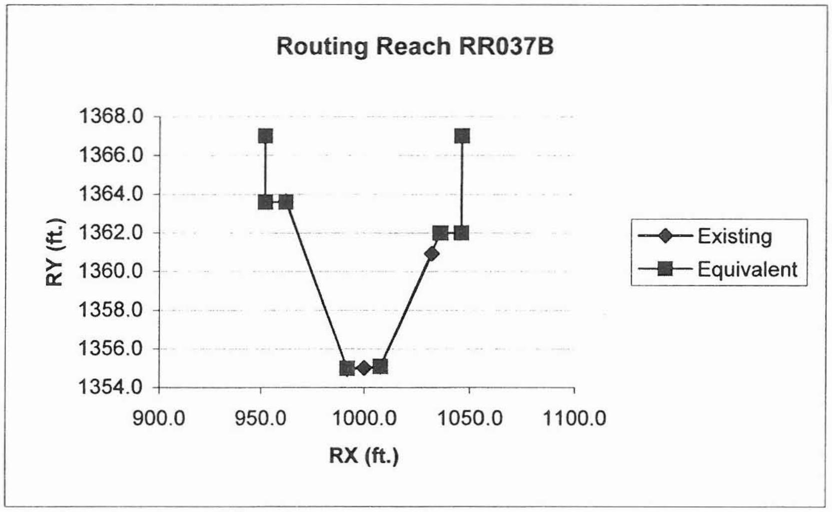
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.03	0.016	0.03

Upstream Elevation (ft)	1385
Downstream Elevation (ft)	1363
Reach Length (ft)	3500
Slope Length	0.006



Routing Reach RR037B
Cross-Section at River STA 343+78 obtained from
SCI survey data of 71st St. channel.
Cross-section is approximately 35 feet north of Mescal St.

River STA 343+78		
AutoCAD Pt.	**Station**	**Elevation**
542	962.2	1363.6
543	992.2	1355.0
Assumed Pt.	1000.0	1355.0
544	1007.8	1355.1
545	1032.0	1360.9



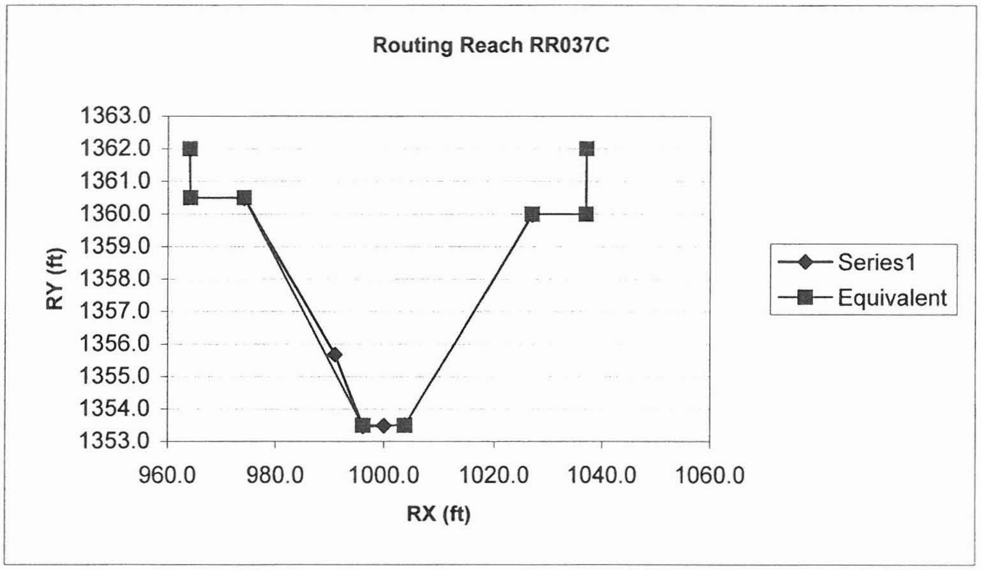
Equivalent 8-Point Hydraulic Section								
RX	952	952.1	962.2	992	1007.8	1036	1046	1046.1
RY	1367	1363.6	1363.6	1355	1355.1	1362	1362	1367

Manning's Roughness Coefficient		
Left Bank	**Channel**	**Right Bank**
0.035	0.018	0.035

Length (ft)	300
USGE (ft)	1363
DSGE (ft)	1355
Slope (ft/ft)	0.027

Routing Reach RR037C
Cross-Section at River STA 343+78 obtained from
SCI survey data of 71st St. channel.
Cross-section is approximately 62 feet south of Mescal St.

River STA 342+45	
Station	**Elevation**
974.1	1360.5
991.0	1355.7
996.2	1353.5
1000.0	1353.5
1003.8	1353.5
1027.0	1360.0



Equivalent 8-Point Hydraulic Section								
RX	964.1	964.2	974.1	996.2	1003.8	1027	1037	1037.1
RY	1362	1360.5	1360.5	1353.5	1353.5	1360	1360	1362

Manning's Roughness Coefficient		
Left Bank	**Channel**	**Right Bank**
0.035	0.03	0.035

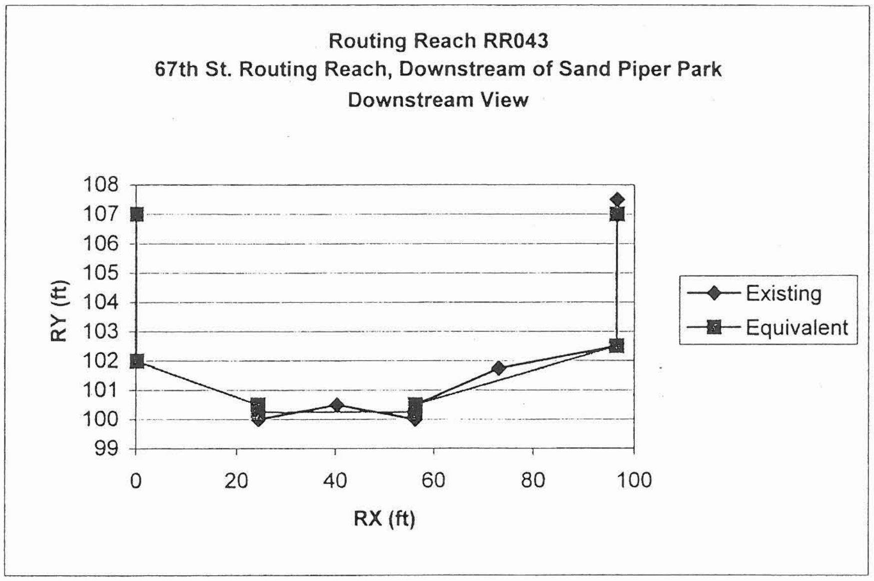
Length (ft)	500
USGE (ft)	1355
DSGE (ft)	1351
Slope (ft/ft)	0.008

Routing Reach RR037D
60-Inch Diameter Storm Drain Outfall to 71st Street Channel

Length (ft)	Slope (ft./ft.)	Roughness	Diameter (ft)
1400	0.005	0.013	5

Routing Reach RR043
67th St. Routing Reach, Downstream of Sand Piper Park
Section taken Approximately 150 Feet South of Hearn Road

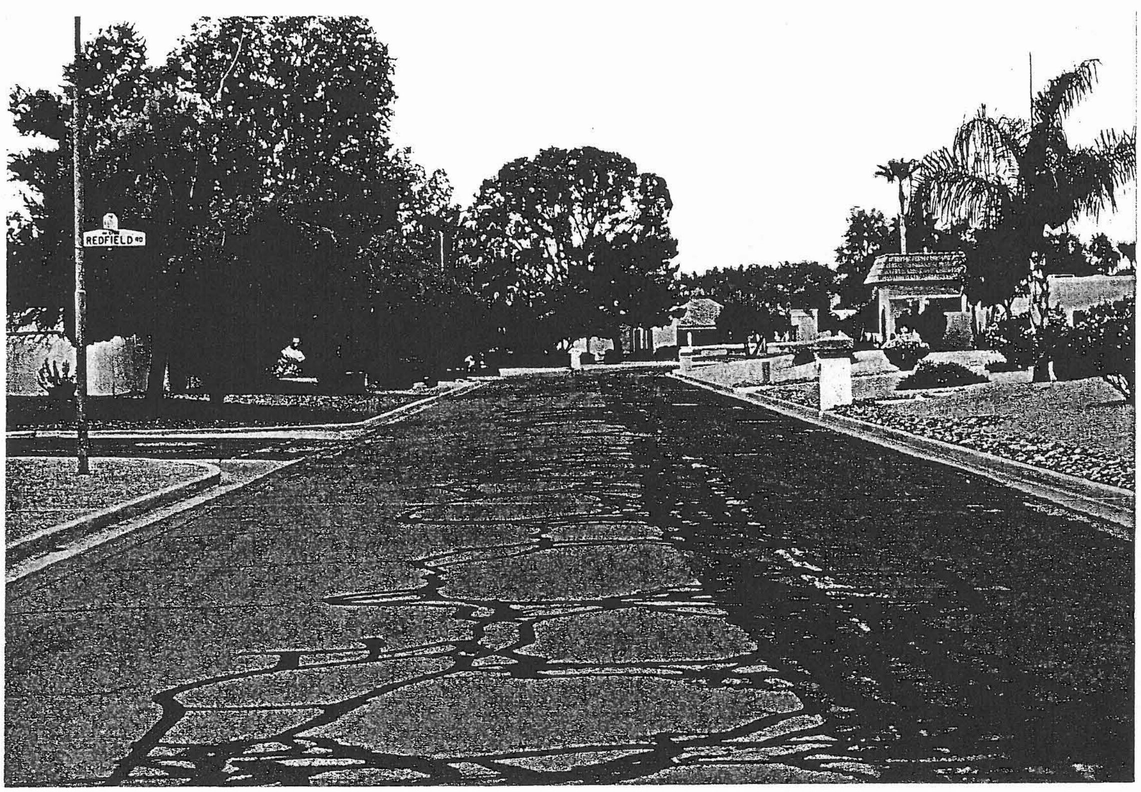
Existing Hydraulic Section		
Desc.	RX (ft)	RY (ft)
Wall	0	107
Wall	0	102
Curb	24.25	100.5
FLG	24.3	100
C/L	40.25	100.5
FLG	56.2	100
Curb	56.25	100.5
Ground	73	101.75
Wall	96.5	102.5
Wall	96.55	107.5



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	24.3	24.4	56.2	56.3	96.5	96.6
RY	107	102	100.5	100.3	100.3	100.5	102.5	107

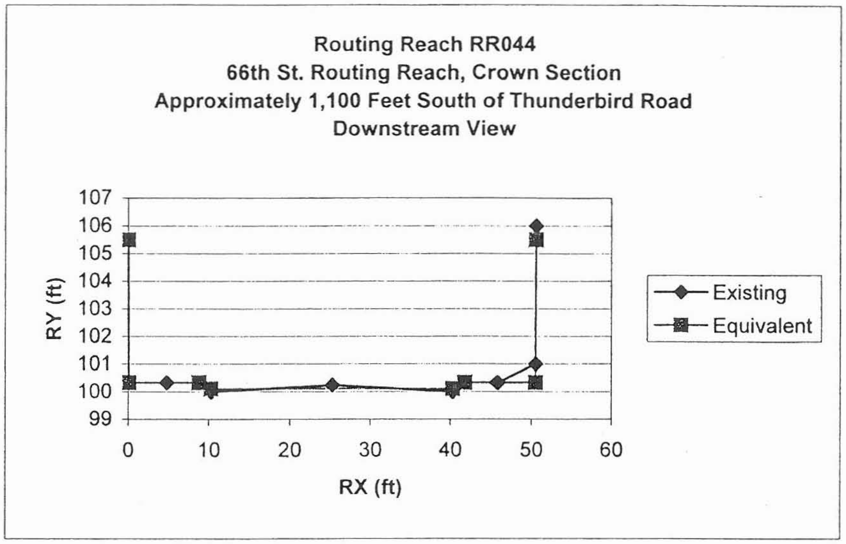
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.016	0.025

Upstream Elevation (ft)	1435
Downstream Elevation (ft)	1423
Reach Length (ft)	1800
Slope (ft/ft)	0.007



Routing Reach RR044
66th St. Routing Reach, Crown Section
Approximately 1,100 Feet South of Thunderbird Rd, Corner of 66th St and Presidio Rd

Existing Hydraulic Section		
Desc.	RX (ft)	RY (ft)
Wall	0	105.5
Wall	0.05	100.33
ES	4.75	100.33
ES	8.75	100.33
FLG	10.25	100
C/L	25.25	100.25
FLG	40.25	100
ES	41.75	100.33
ES	45.75	100.33
Wall	50.5	101
Wall	50.55	106



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	8.8	10.3	40.3	41.8	50.5	50.6
RY	105.5	100.33	100.33	100.11	100.11	100.33	100.33	105.5

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.016	0.025

Upstream Elevation (ft)	1423
Downstream Elevation (ft)	1385
Reach Length (ft)	5250
Slope (ft/ft)	0.007

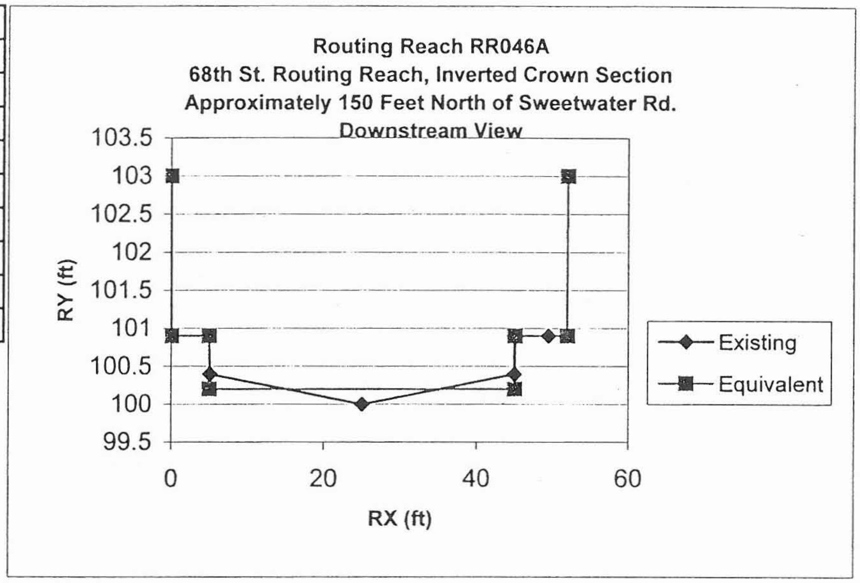
Routing Reach RR4446
Storm Drain Flow East in Cactus Rd to 68th Street

Length (ft)	Slope (ft./ft.)	Diameter (ft)	Roughness
1110	0.0026	5	0.013

Cactus Road: 60th St. to Scottsdale Road
City of Scottsdale Project No. S 0706
Drawing #38490

Routing Reach RR046A
68th St. Routing Reach to Larkspur, Inverted Crown Section
Section taken Approximately 150 Feet North of Sweetwater Rd.

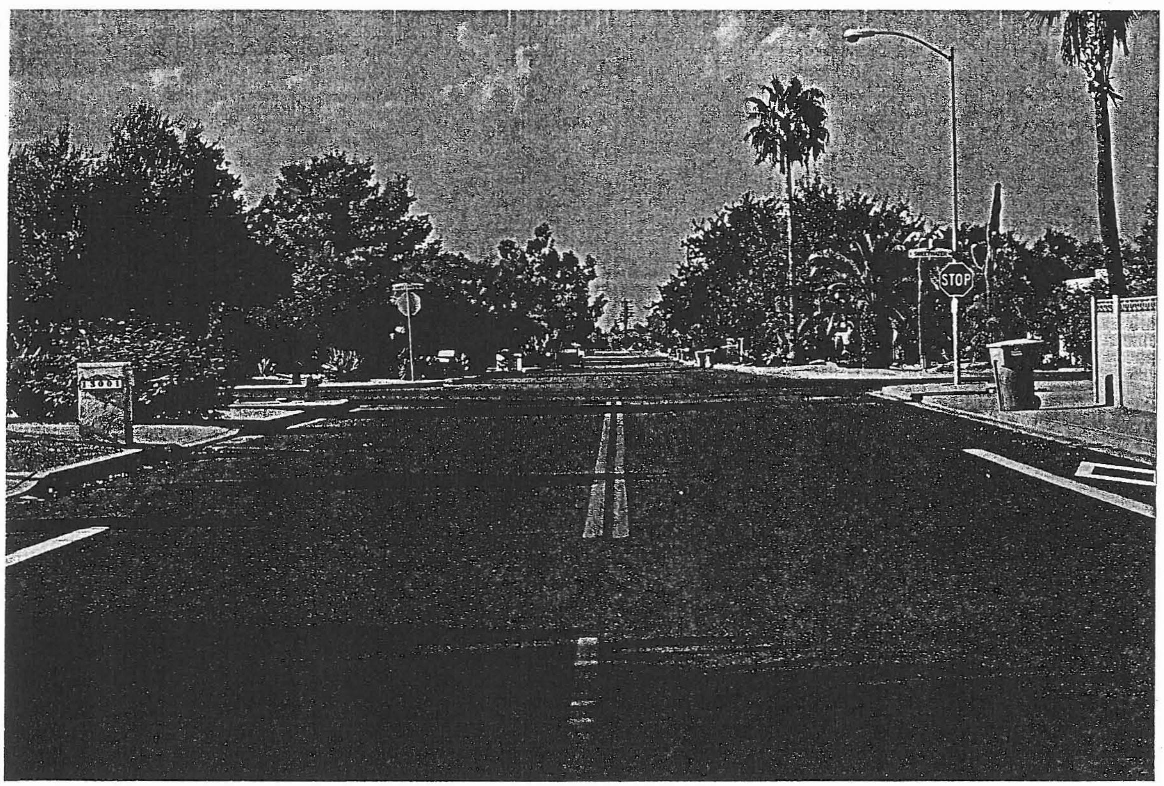
Existing Hydraulic Section		
Desc.	RX (ft)	RY (ft)
NG	0	100.9
Top	5	100.9
Toe	5.05	100.4
C/L	25	100
Toe	44.95	100.4
ES	45	100.9
ES	49.5	100.9
NG	52	100.9



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	5	5	45	45.1	52	52.1
RY	103	100.9	100.9	100.2	100.2	100.9	100.9	103

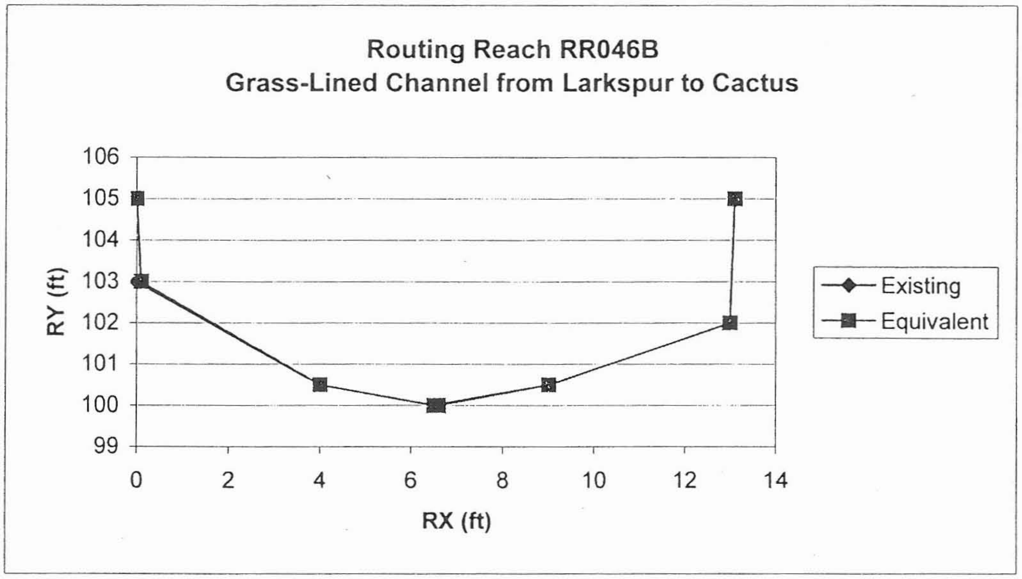
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.016	0.025

Upstream Elevation (ft)	1425
Downstream Elevation (ft)	1395
Reach Length (ft)	3800
Slope (ft/ft)	0.008



Routing Reach RR046B
Larkspur to Cactus

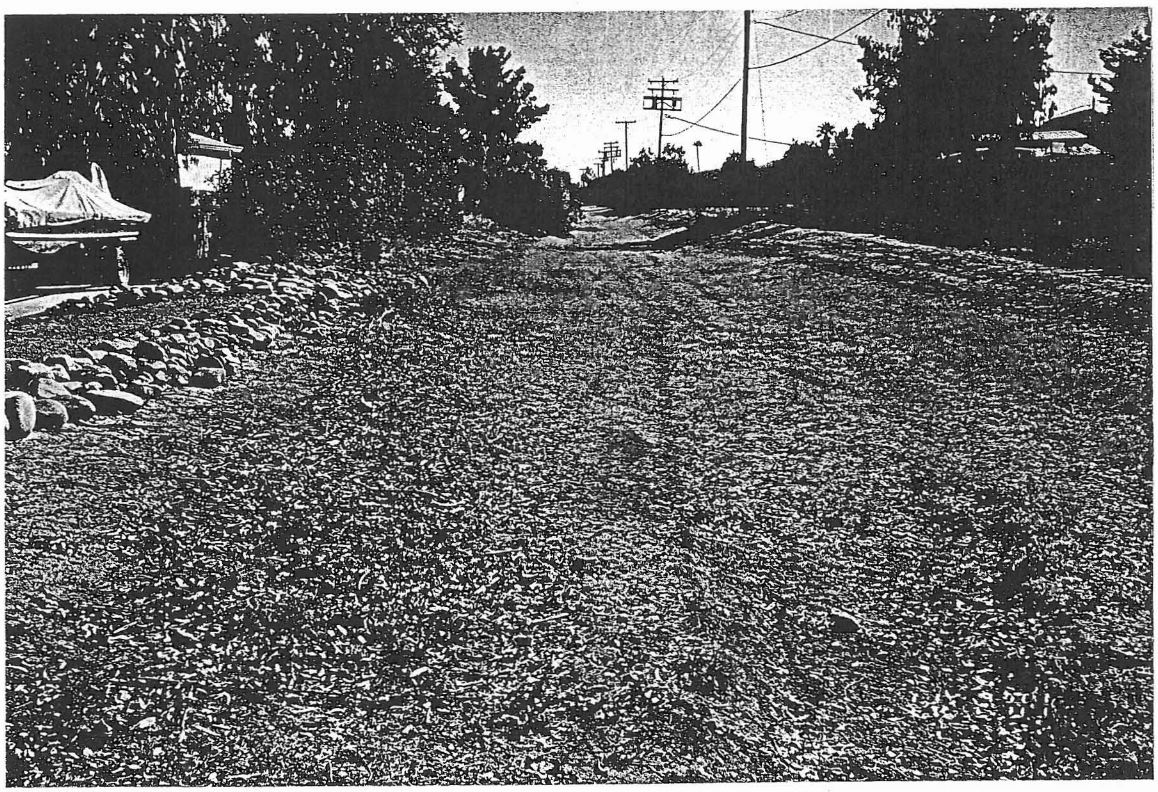
Existing Channel	
RX	RY
0	103
4	100.5
6.5	100
9	100.5
13	102



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	4	6.5	6.6	9	13	13.1
RY	105	103	100.5	100	100	100.5	102	105

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.03	0.03	0.03

Length (ft)	1400
USGE (ft)	1395
DSGE (ft)	1385
Slope (ft/ft)	0.007



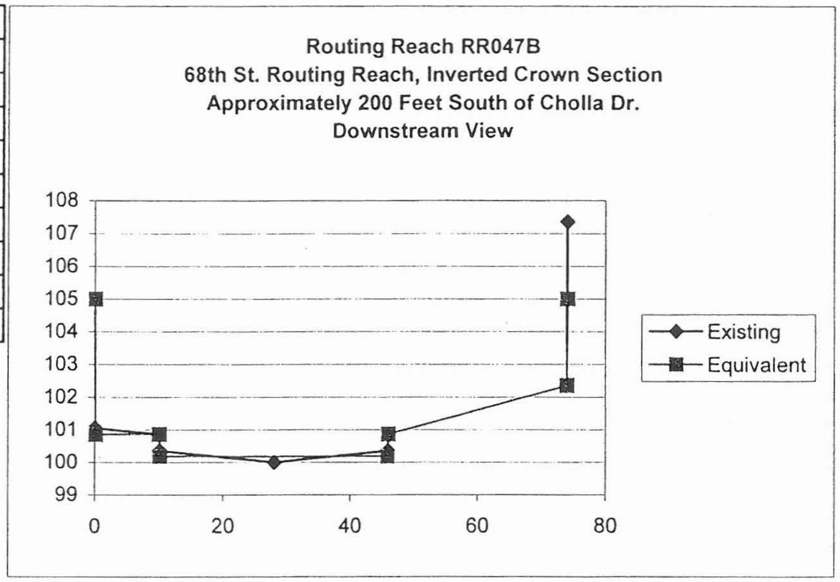
Routing Reach RR047A
1-96" Diam SD
Outfall south in 68th St. from Cactus Rd. to just south of Jenan Dr.

Length (ft)	Slope (ft./ft.)	Diameter (ft)	Roughness
1500	0.004	8	0.013

City of Scottsdale Drawings
Proj. # F0706
Drawing No. 23069 thru 23072

Routing Reach RR047B
68th St. Routing Reach, Inverted Crown Section from Cactus Rd to Shea Blvd.
Section taken Approximately 200 Feet South of Cholla Dr.

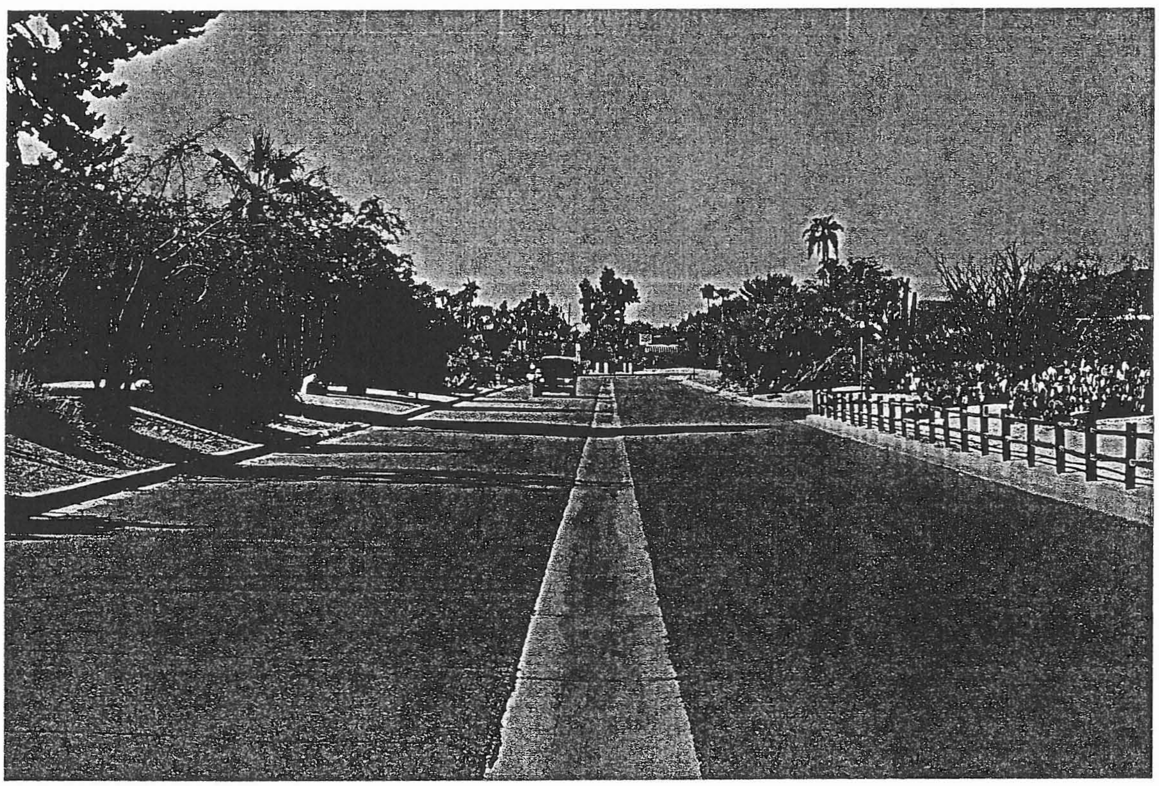
Existing Hydraulic Section		
Desc.	RX (ft)	RY (ft)
NG	0	101.06
NG	10	100.86
FLG	10.05	100.36
C/L	28	100
FLG	45.95	100.36
NG	46	100.86
NG	74	102.36
Wall	74.05	107.36



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	10	10.1	45.9	46	74	74.1
RY	105.0	100.9	100.9	100.2	100.2	100.9	102.4	105.0

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.016	0.025

Upstream Elevation (ft)	1385
Downstream Elevation (ft)	1353
Reach Length (ft)	5500
Slope (ft/ft)	0.006



Routing Reach RR4748
RR4748 Consists of 2-78" Diam SD.
Outfall South in 68th Street from Jenan Dr to Cholla, then East in Cholla to 68th Pl, then South to Mescal Park Detention Basin.

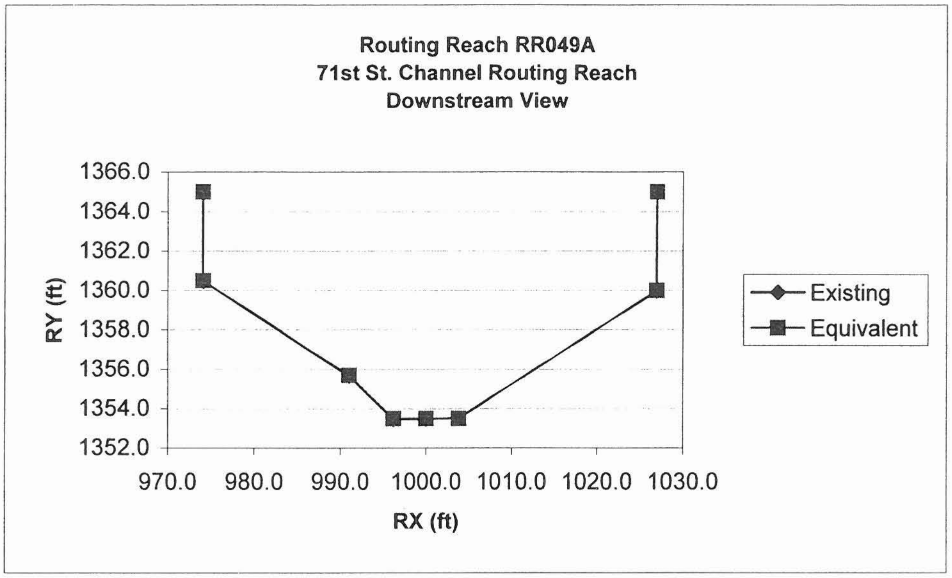
Length (ft)	Slope (ft./ft.)	Roughness	Diameter (ft)
2300	0.003	0.013	8.5

Pipe flowing full, 2-78" diam. sd = 575 cfs
Pipe flowing full, 1-102" diam sd = 590 cfs

City of Scottsdale - Cactus Rd. Storm Drain Outfall
City of Scottsdale Project No. F0706

Routing Reach RR049A
71st St. Channel Routing Reach
Section taken Approximately 75 Feet South of Mescal St.
SCI Survey, River STA 342+45

Existing Hydraulic Section	
RX (ft)	**RY (ft)**
974.1	1360.5
991.0	1355.7
996.2	1353.5
1000.0	1353.5
1003.8	1353.5
1027.0	1360.0



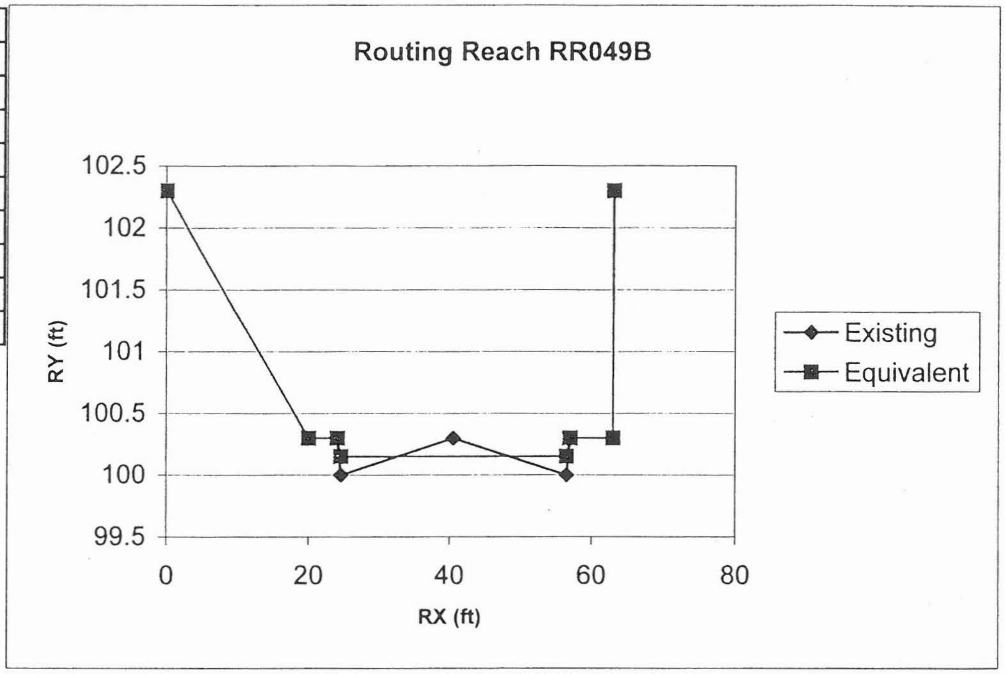
Equivalent 8-Point Hydraulic Section								
RX	974.09	974.1	991	996.2	1000	1003.8	1027	1027.05
RY	1365	1360.5	1355.7	1353.5	1353.5	1353.5	1360	1365

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.03	0.018	0.03

Upstream Elevation (ft)	1351
Downstream Elevation (ft)	1341
Reach Length (mi.)	1450
Slope (ft/ft)	0.007

Routing Reach RR049B
Routing for Mescal Park Overflow
South on 68th Pl. and East on Shea Blvd.

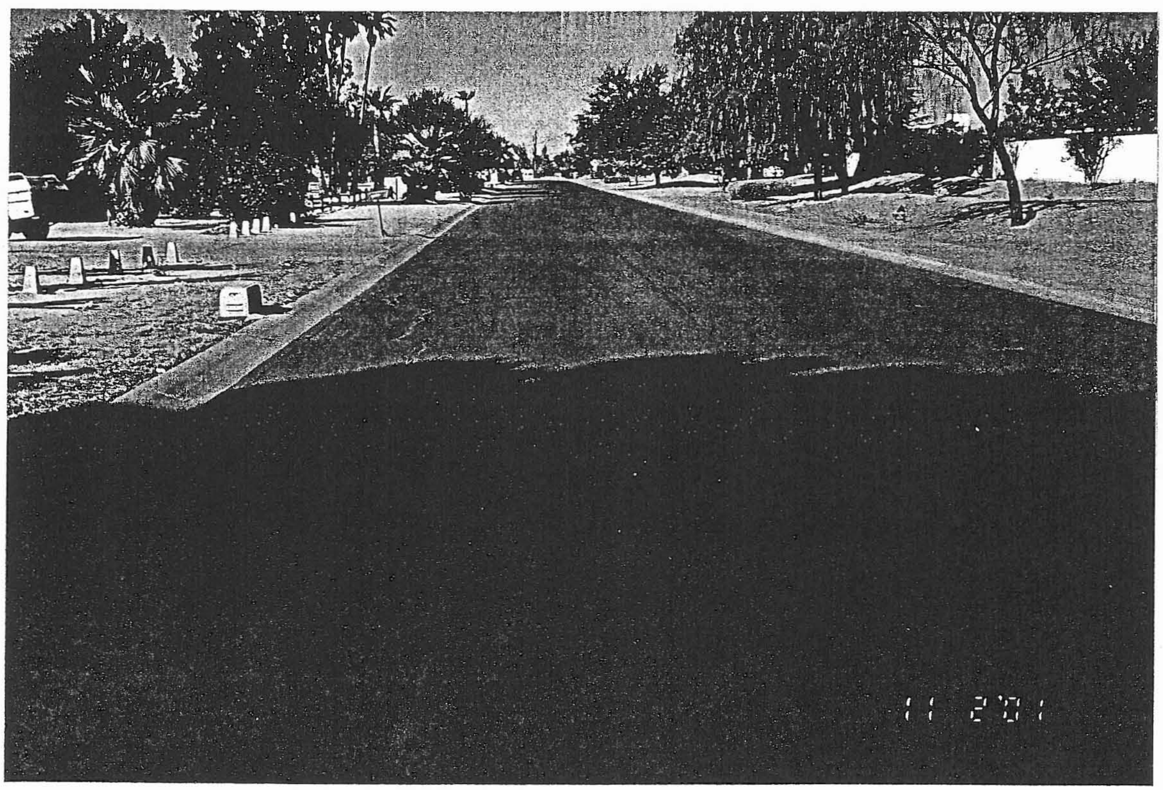
Hydraulic Section	
RX	RY
0	102.3
20	100.3
24	100.3
24.5	100
40.5	100.3
56.5	100
57	100.3
63	100.3



Equivalent 8-Point Hydraulic Section								
RX	0	20	24	24.5	56.5	57	63	63.1
RY	102.3	100.3	100.3	100.15	100.15	100.3	100.3	102.3

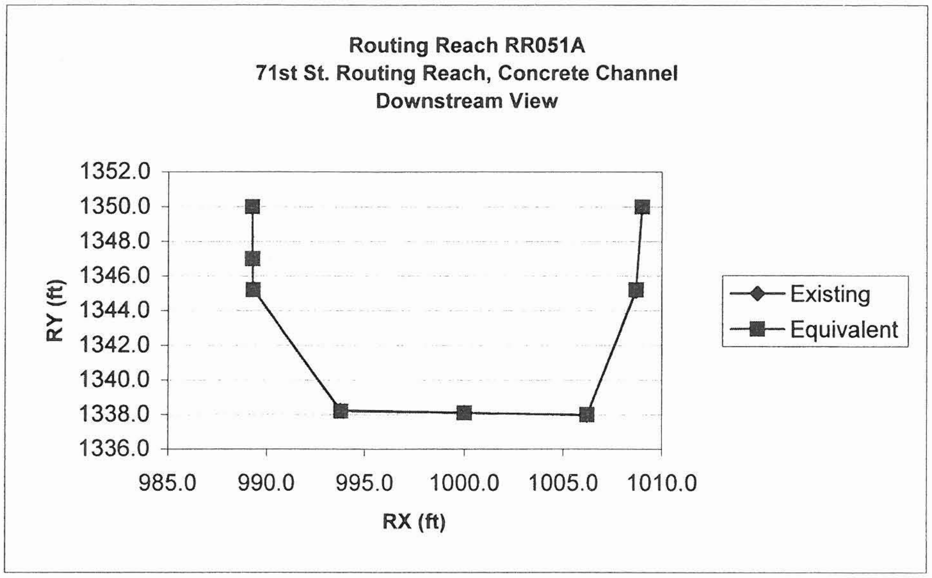
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.016	0.025

Upstream Elevation (ft)	1360
Downstream Elevation (ft)	1350
Reach Length (ft)	2500
Slope (ft/ft)	0.004



Routing Reach RR051A
71st St. Routing Reach, Shea to Cochise, Concrete Channel
Section taken North Side of Cochise Rd.
SCI Survey, River STA 320+24

Existing Hydraulic Section	
RX (ft)	**RY (ft)**
989.3	1345.2
993.8	1338.2
1000.0	1338.1
1006.2	1338.0
1008.7	1345.2



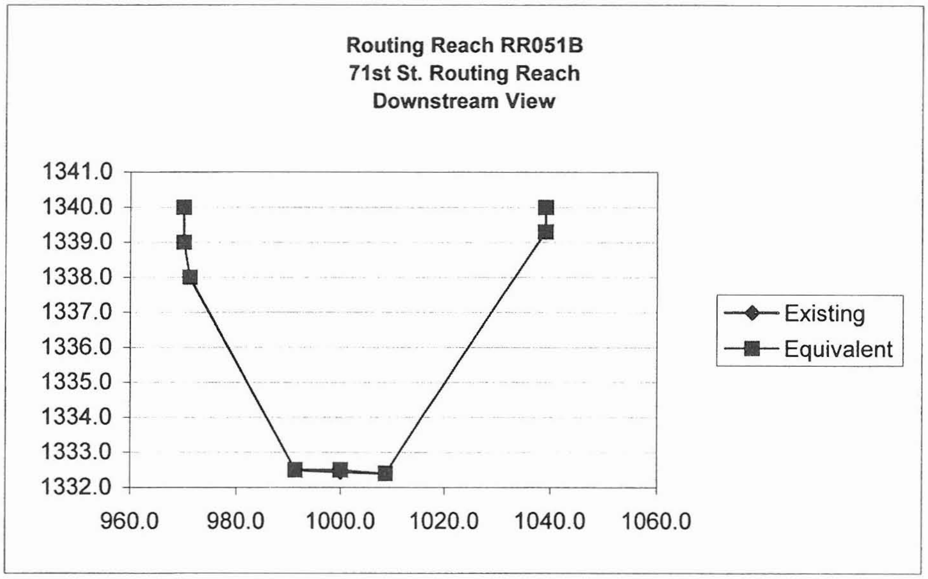
Equivalent 8-Point Hydraulic Section								
RX	989.2	989.3	989.3	993.8	1000	1006.2	1008.7	1009
RY	1350	1347	1345.2	1338.2	1338.1	1338	1345.2	1350

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.018	0.018	0.018

Upstream Elevation (ft)	1341
Downstream Elevation (ft)	1336
Reach Length (ft)	1300
Slope (ft/ft)	0.004

Routing Reach RR051B
71st St. Ditch Routing Reach
Section taken Approximately 130 Feet North of Berneil Ditch & 71st St Channel Confluence
SCI Survey, River STA 301+30

Existing Hydraulic Section	
RX (ft)	**RY (ft)**
971.2	1338.0
991.3	1332.5
1000.0	1332.5
1008.7	1332.4
1039.1	1339.3



Equivalent 8-Point Hydraulic Section								
RX	970.1	970.2	971.2	991.3	1000	1008.7	1039.1	1039.2
RY	1340	1339	1338	1332.5	1332.5	1332.4	1339.3	1340

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.03	0.018	0.03

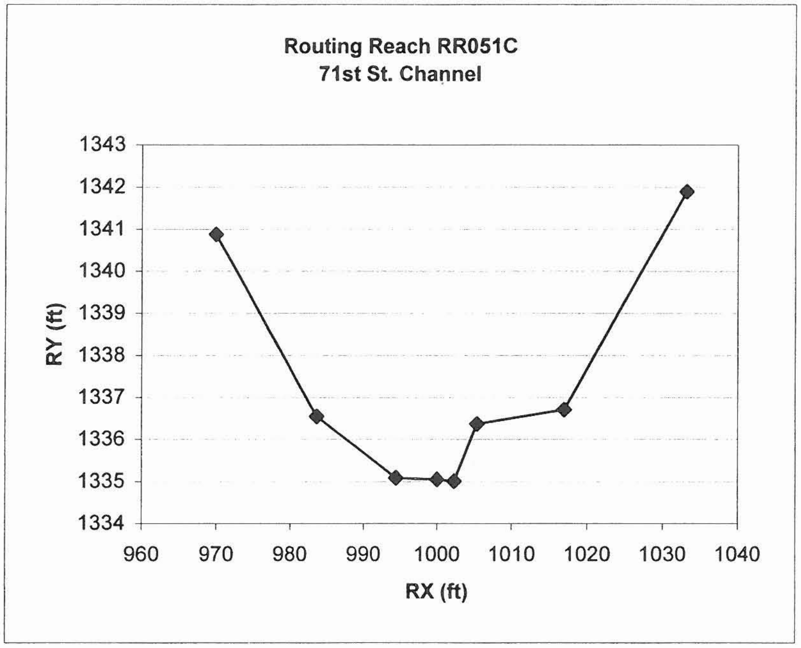
Upstream Elevation (ft)	1340.6
Downstream Elevation (ft)	1335.7
Reach Length (ft)	1300
Slope (ft/ft)	0.003

Routing Reach RR051C
71st St. Channel Routing from Gold Dust to Berneil
Section taken Approximately 200 feet South of Gold Dust
SCI Survey, River STA 310+66

AutoCAD Pt.	Station	Elevation
713	969.92	1340.88
714	983.6	1336.55
715	994.41	1335.09
Assumed Pt.	1000	1335.05
716	1002.34	1335.01
717	1005.4	1336.37
718	1016.93	1336.71
719	1033.15	1341.9

Upstream Elevation (ft)		1335.7
Downstream Elevation (ft)		1331.3
Reach Length (ft)		1300
Slope (ft/ft)		0.003

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.035	0.035	0.035

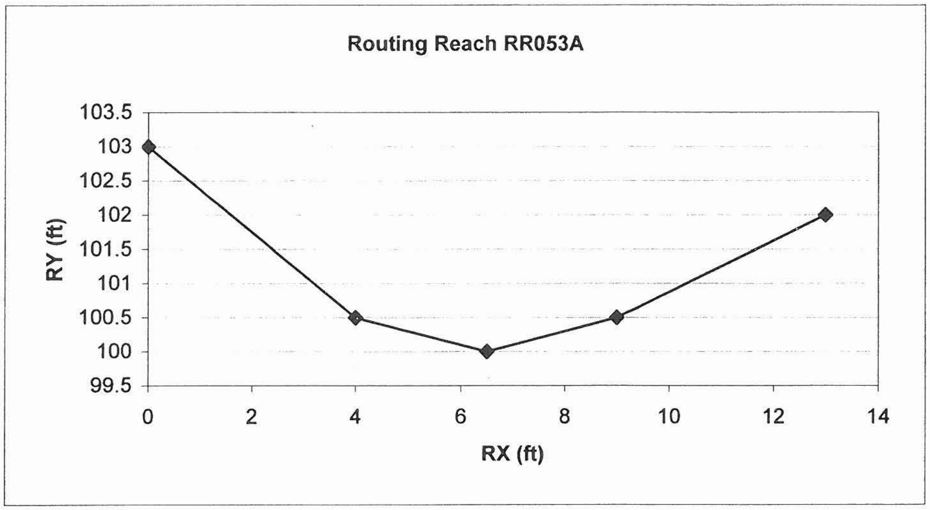


Routing Reach RR053A
Trapezoidal Channel to 74th St. Loop

RX	RY
0	110
0.01	104
2	104
10	100
13	100
21	104
23	104
23.1	110

Length (ft)	900
USGE (ft)	1360
DSGE (ft)	1358
Slope (ft/ft)	0.002

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.018	0.025

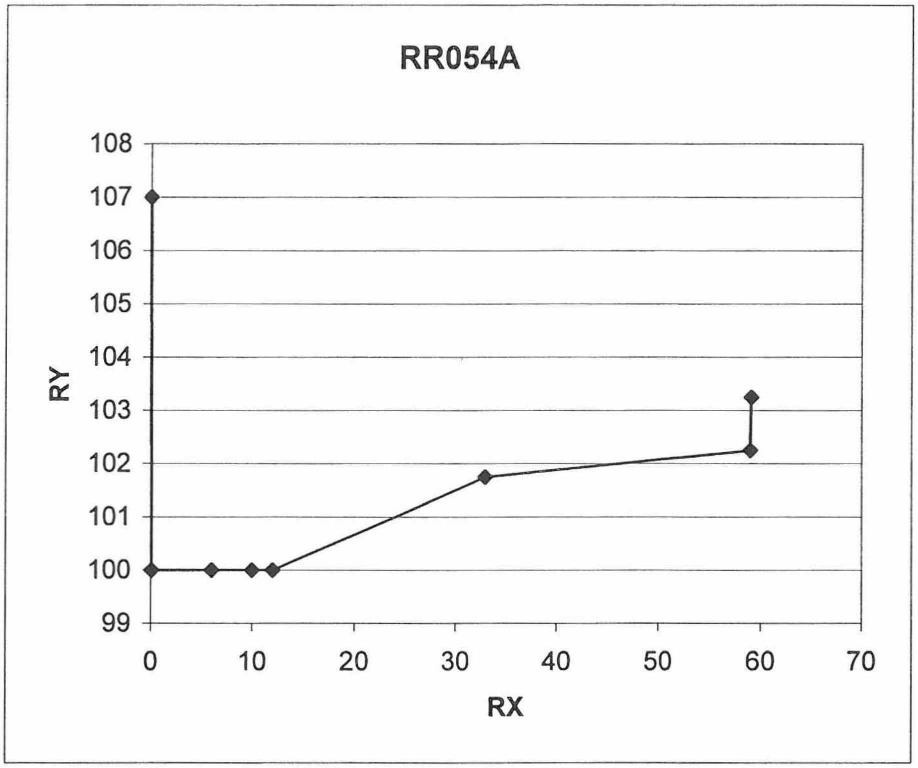


Routing Reach RR053B
8'x3' RCB Storm Drain Through Comm/Ret to Shea Blvd.

Length	Slope	
(ft)	(ft./ft.)	Roughness
1300	0.004	0.013

RR054A
CONCRETE TRAP CHANNEL BEHIND WINDMILL SHOPPING PLAZA,
FROM SHEA BLVD TO CULVERT AT GOLD DUST AVE.

RX	RY
0	107
0.1	100
6	100
10	100
12	100
33	101.75
59	102.25
59.1	103.25



LOB	CHNL	ROB
0.018	0.018	0.016

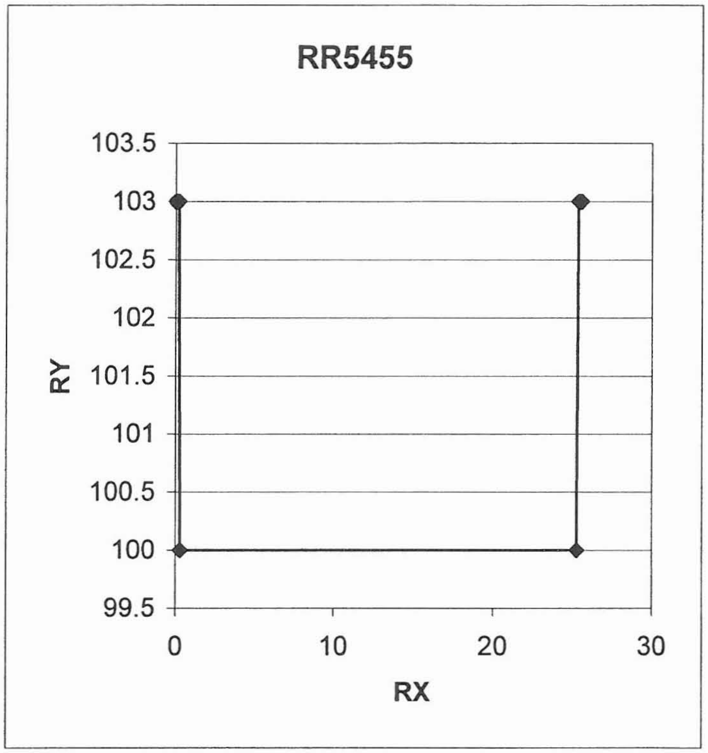
USGE	
DSGE	
LENGTH	1200
SLOPE	0.0025

Routing Reach RR054B
10'x3' RCB Storm Drain Through Comm/Ret to Sdale Rd

Length (mi.)	Slope (ft./ft.)	Roughness
1600	0.0066	0.013

ROUTING REACH RR055A
ROAD SECTION FROM CULVERT AT GOLD DUST FLOWING WEST TO SDALE RD
AND SOUTH TO MOUNTAIN VIEW RD.

RX	RY
0	103
0.1	103
0.2	103
0.3	100
25.3	100
25.4	103
25.5	103
25.6	103

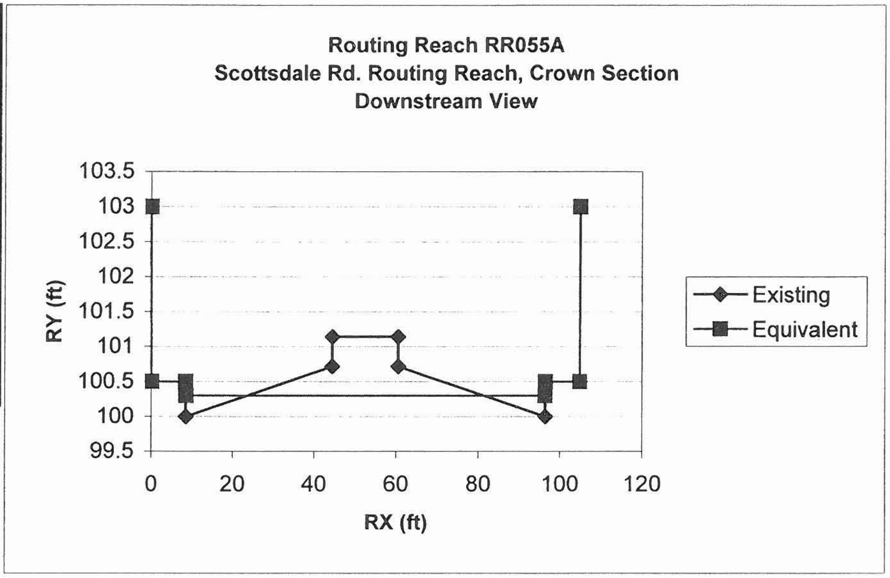


LOB	CHNL	ROB
0.025	0.025	0.025

USGE	1344
DSGE	1343.15
LENGTH	600
SLOPE	0.001417

Routing Reach RR055B
Scottsdale Rd. Routing Reach, Shea to Gold Dust, Crown Section
Section taken Approximately 200 Feet South of Jenan St.

Existing Hydraulic Section		
Desc.	RX (ft)	RY (ft)
NG	0	100.5
Top	8.5	100.5
FLG	8.55	100
Median	44.45	100.72
Median	44.5	101.14
Median	60.5	101.14
Median	60.55	100.72
FLG	96.45	100
Top	96.5	100.5
NG	105	100.5



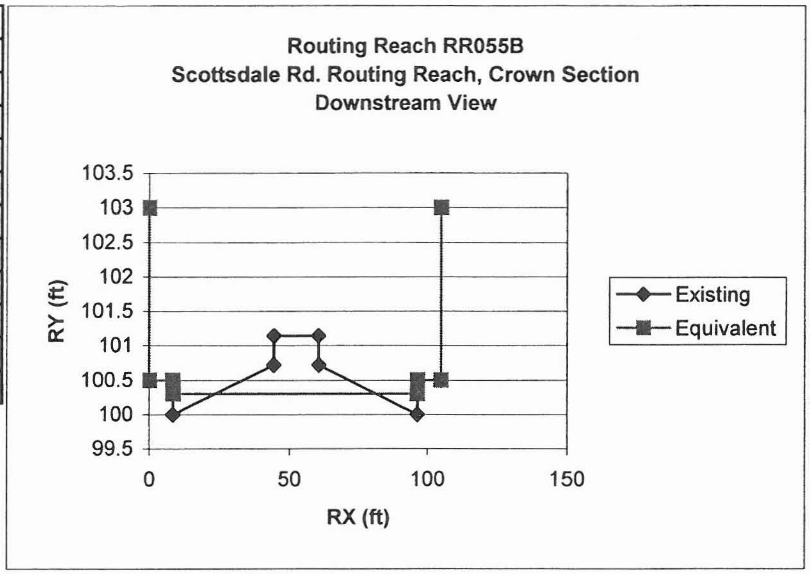
Equivalent 8-Point Hydraulic Section								
RX	0	0.1	8.5	8.6	96.4	96.5	104.9	105
RY	103	100.5	100.5	100.3	100.3	100.5	100.5	103

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.016	0.025

Upstream Elevation (ft)	1352
Downstream Elevation (ft)	1344
Reach Length (ft)	1320
Slope (ft/ft)	0.006

Routing Reach RR055C
Scottsdale Rd. Routing Reach, Gold Dust to Mtn View, Crown Section
Section taken Approximately 200 Feet South of Jenan St.

Existing Hydraulic Section		
Desc.	**RX (ft)**	**RY (ft)**
NG	0	100.5
Top	8.5	100.5
FLG	8.55	100
Median	44.45	100.72
Median	44.5	101.14
Median	60.5	101.14
Median	60.55	100.72
FLG	96.45	100
Top	96.5	100.5
NG	105	100.5



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	8.5	8.6	96.4	96.5	104.9	105
RY	103	100.5	100.5	100.3	100.3	100.5	100.5	103

lanning's Roughness Coefficier		
Left Bank	Channel	Right Bank
0.025	0.016	0.025

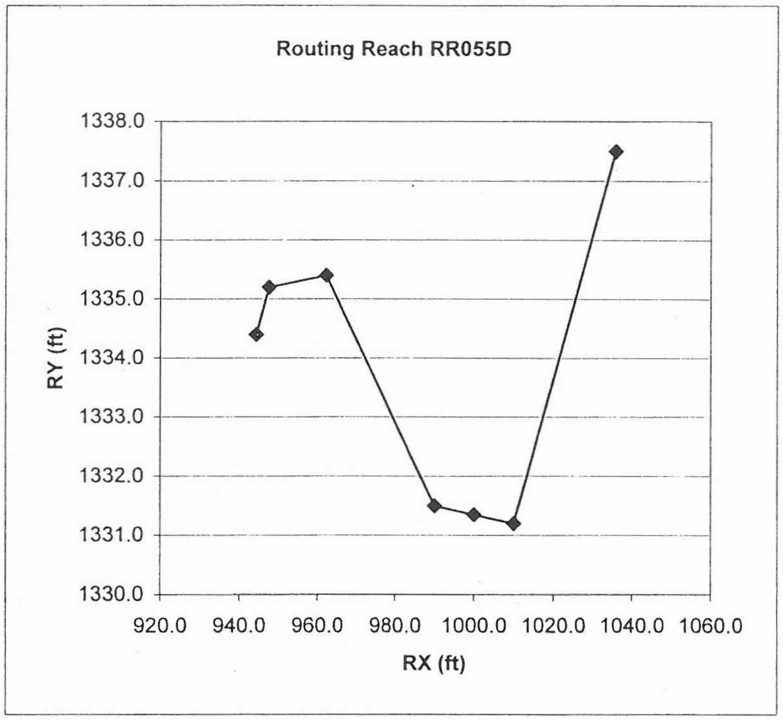
Upstream Elevation (	1344
Downstream Elevatic	1336
Reach Length (ft)	1320
Slope (ft/ft)	0.006

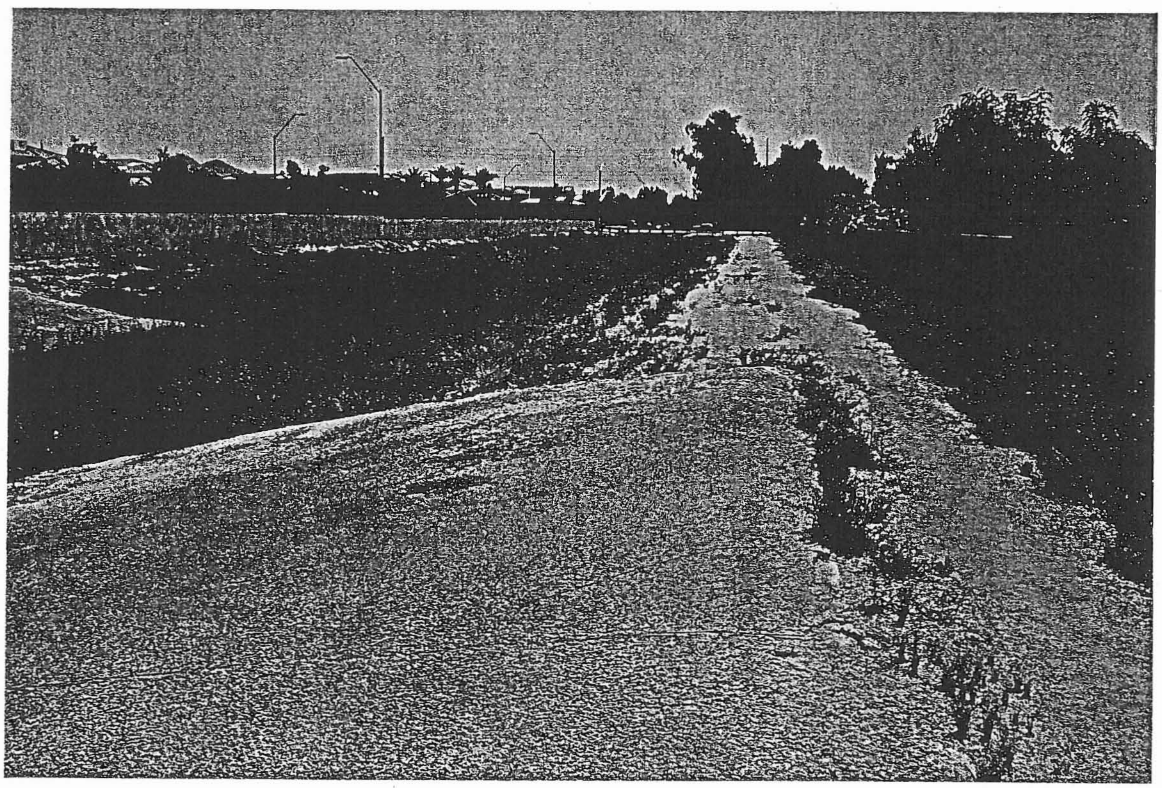
Routing Reach RR055D
Cross-Section at River STA 181+95 obtained from
SCI survey data of Berneil Channel.
Cross-section is approximately 100 feet upstream from 71st St. Channel outlet.
Sdale Rd to 71st Street Channel

River STA 181+95		
AutoCAD Pt.	Station	Elevation
2431.0	944.2	1334.4
2432.0	947.5	1335.2
2433.0	962.2	1335.4
2434.0	990.1	1331.5
Assumed Pt.	1000.0	1331.4
2435.0	1009.9	1331.2
2436.0	1035.8	1337.5

Length (ft)	600
USGE (ft)	1331.8
DSGE (ft)	1331.3
Slope (ft/ft)	0.001

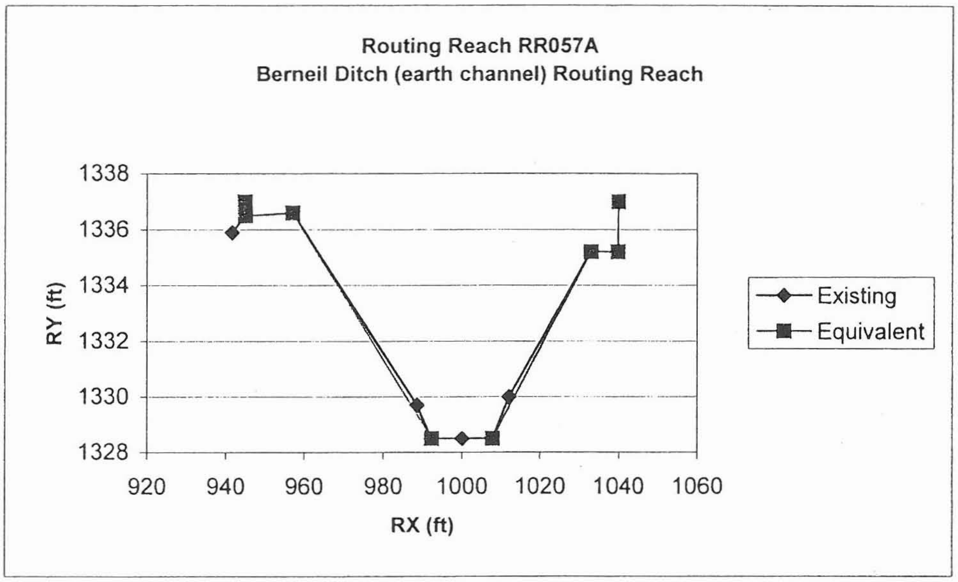
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.03	0.03	0.03





Routing Reach RR057A
Berneil Ditch (earth channel) Routing Reach
SCI Survey Section taken Approximately 1300 Feet West of Reed Rd.
Routing from 71st St. Channel to Reed Rd Alignment

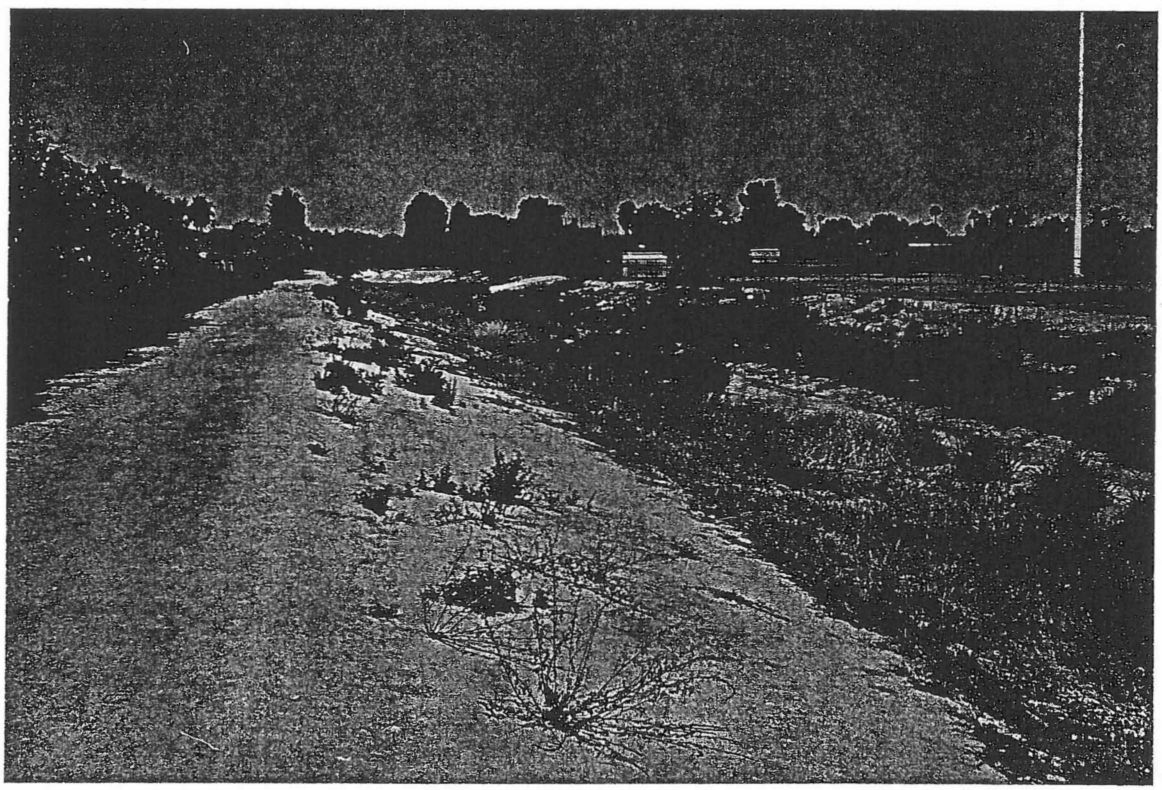
Existing Hydraulic Section	
RX (ft)	RY (ft)
941.5	1335.9
944.9	1336.5
957.0	1336.6
988.6	1329.7
992.3	1328.5
1000.0	1328.5
1007.8	1328.5
1012.0	1330.0
1033.0	1335.2
1039.7	1335.2



Equivalent 8-Point Hydraulic Section								
RX	944.8	944.9	957	992.3	1007.8	1033	1039.7	1039.8
RY	1337	1336.5	1336.6	1328.5	1328.5	1335.2	1335.2	1337

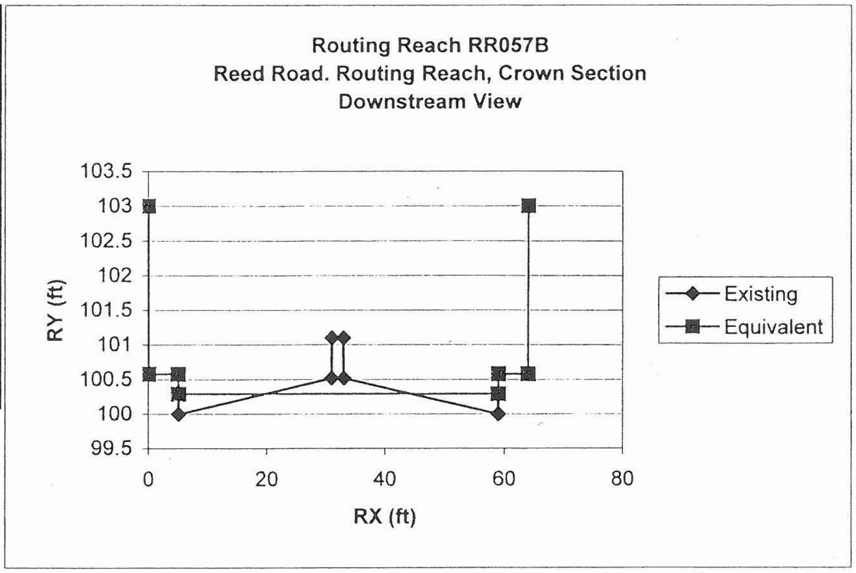
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.03	0.03	0.03

Upstream Elevation (ft)	1331.3
Downstream Elevation (ft)	1330.6
Reach Length (ft)	700
Slope (ft/ft)	0.001



Routing Reach RR057B
Reed Road Routing Reach, Shea to Berneil Ditch, Crown Section
Section taken Approximately 200 Feet South of Cochise Rd.

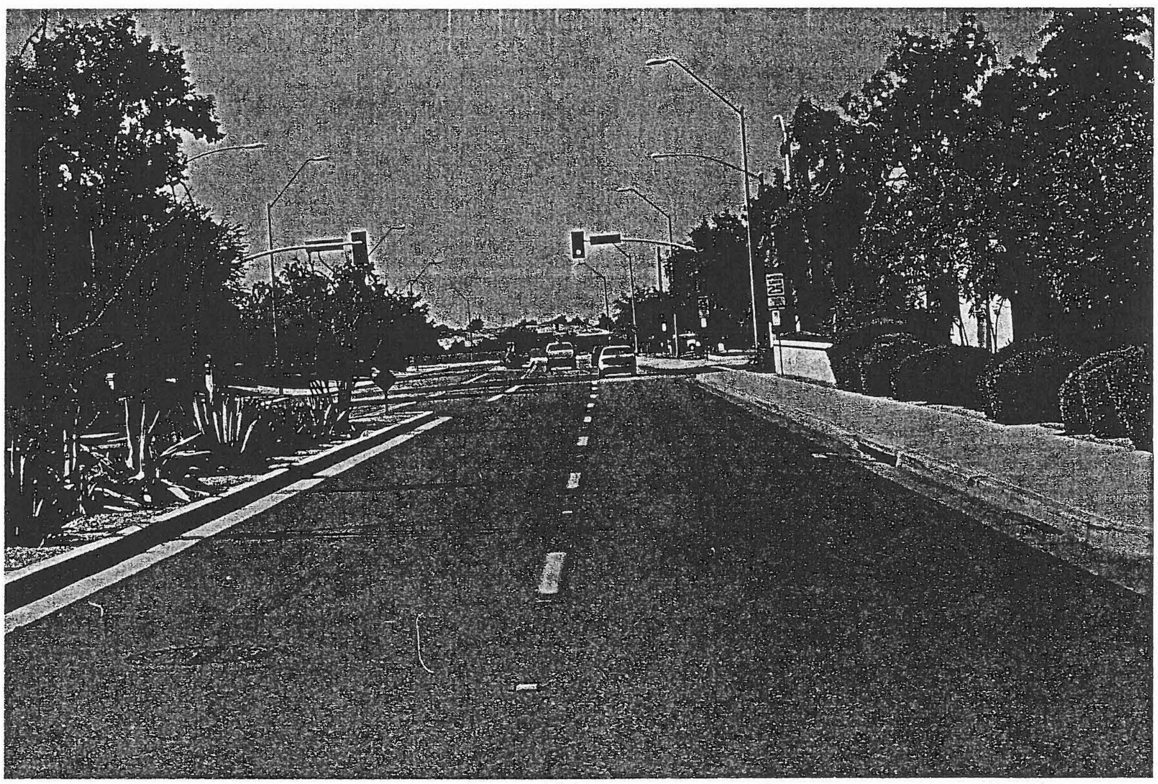
Existing Hydraulic Section		
Desc.	RX (ft)	RY (ft)
NG	0	100.58
NG	5	100.58
Toe	5.05	100
Median	30.95	100.52
Median	31	101.1
Median	33	101.1
Median	33.05	100.52
Toe	58.95	100
NG	59	100.58
NG	64	100.58



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	5	5.1	59	59.1	64	64.1
RY	103.0	100.6	100.6	100.3	100.3	100.6	100.6	103.0

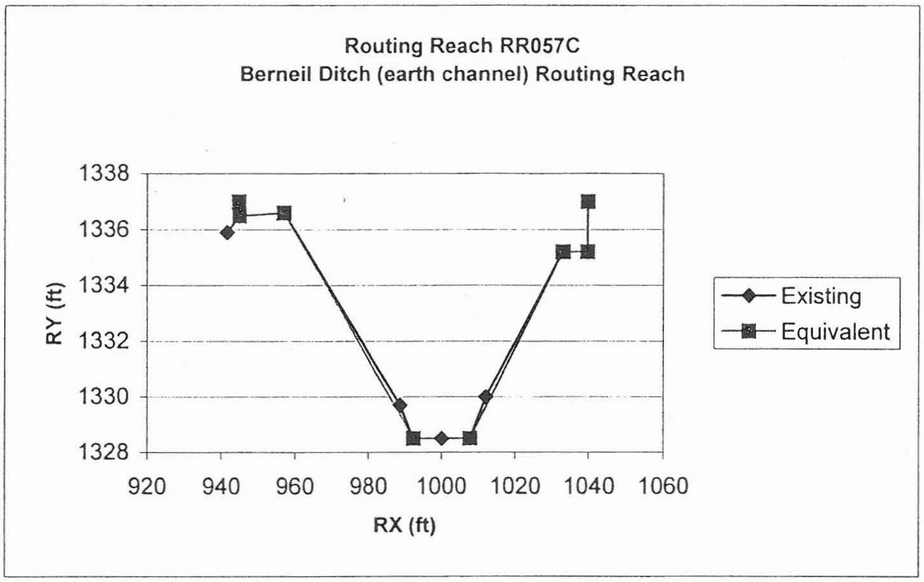
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.016	0.025

Upstream Elevation (ft)	1350
Downstream Elevation (ft)	1330
Reach Length (ft)	2640
Slope (ft/ft)	0.008



Routing Reach RR057C
Berneil Ditch (earth channel) Routing Reach
SCI Survey Section taken Approximately 1300 Feet West of Reed Rd.
Routing from Reed Rd Alignment to Mnt. View Channel Confluence

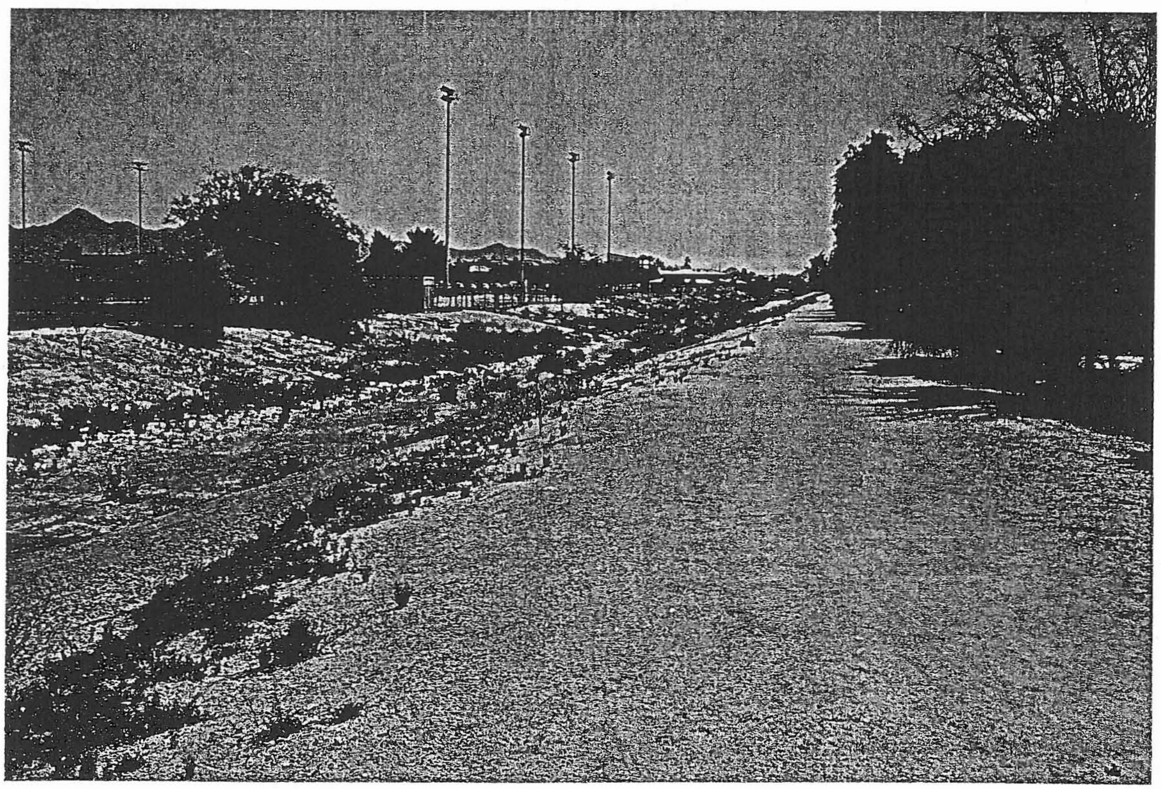
Existing Hydraulic Section	
RX (ft)	RY (ft)
941.5	1335.9
944.9	1336.5
957.0	1336.6
988.6	1329.7
992.3	1328.5
1000.0	1328.5
1007.8	1328.5
1012.0	1330.0
1033.0	1335.2
1039.7	1335.2



Equivalent 8-Point Hydraulic Section								
RX	944.8	944.9	957	992.3	1007.8	1033	1039.7	1039.8
RY	1337	1336.5	1336.6	1328.5	1328.5	1335.2	1335.2	1337

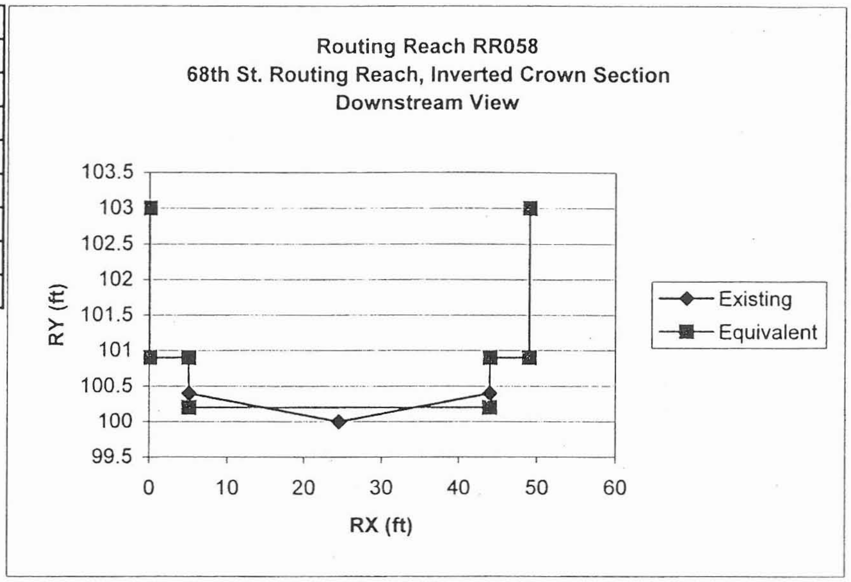
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.03	0.03	0.03

Upstream Elevation (ft)	1330.6
Downstream Elevation (ft)	1329.3
Reach Length (ft)	1300
Slope (ft/ft)	0.001



Routing Reach RR058
68th St. Routing Reach, Inverted Crown Section
Section taken Approximately 215 Feet North of Golddust Ave.

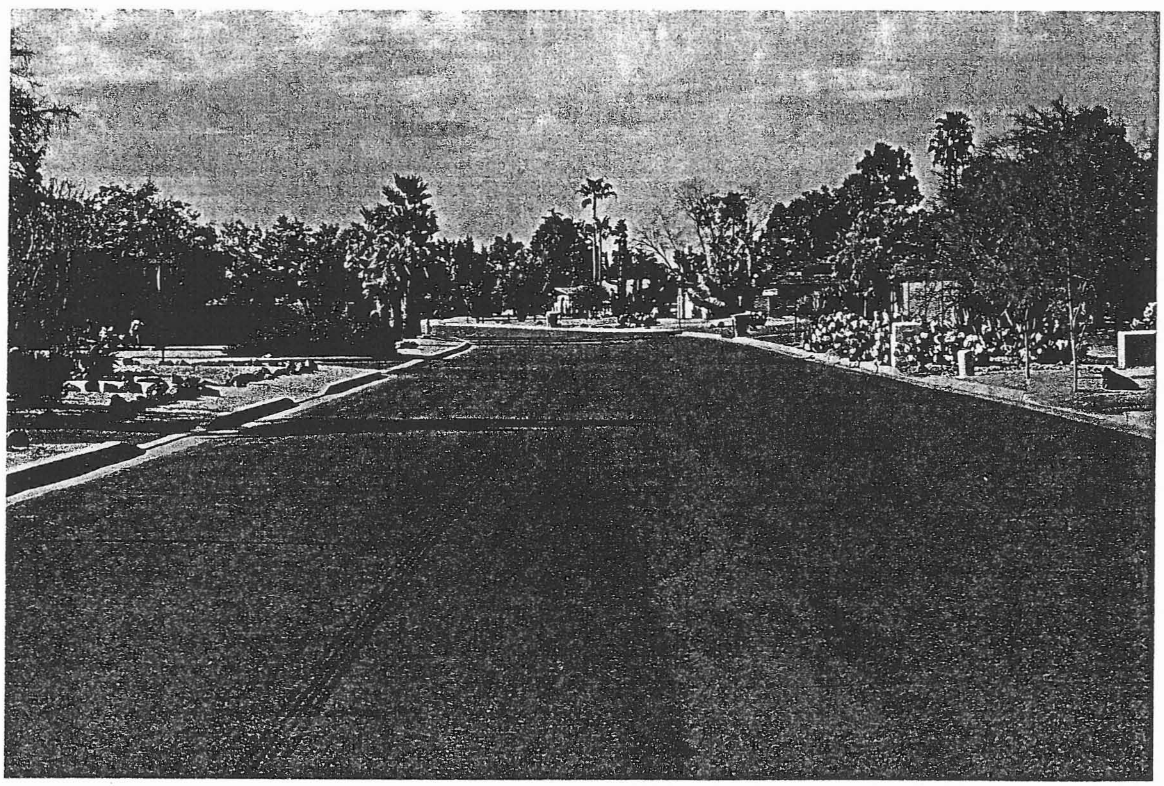
Existing Hydraulic Section		
Desc.	RX (ft)	RY (ft)
NG	0	100.9
Top	5	100.9
Toe	5.05	100.4
FLG	24.5	100
Toe	43.95	100.4
Top	44	100.9
NG	49	100.9



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	5	5.1	43.9	44	49	49.1
RY	103	100.9	100.9	100.2	100.2	100.9	100.9	103

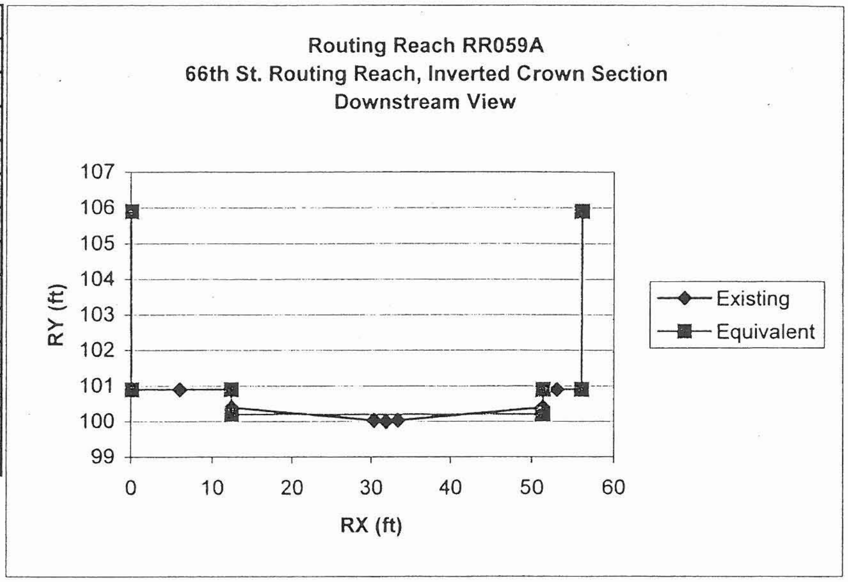
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.016	0.025

Upstream Elevation (ft)	1353
Downstream Elevation (ft)	1328.4
Reach Length (ft)	2750
Slope (ft/ft)	0.009



Routing Reach RR059A
66th St. Routing Reach, Cactus to Shea, Inverted Crown Section
Section taken Approximately 235 Feet South of Cholla Rd.

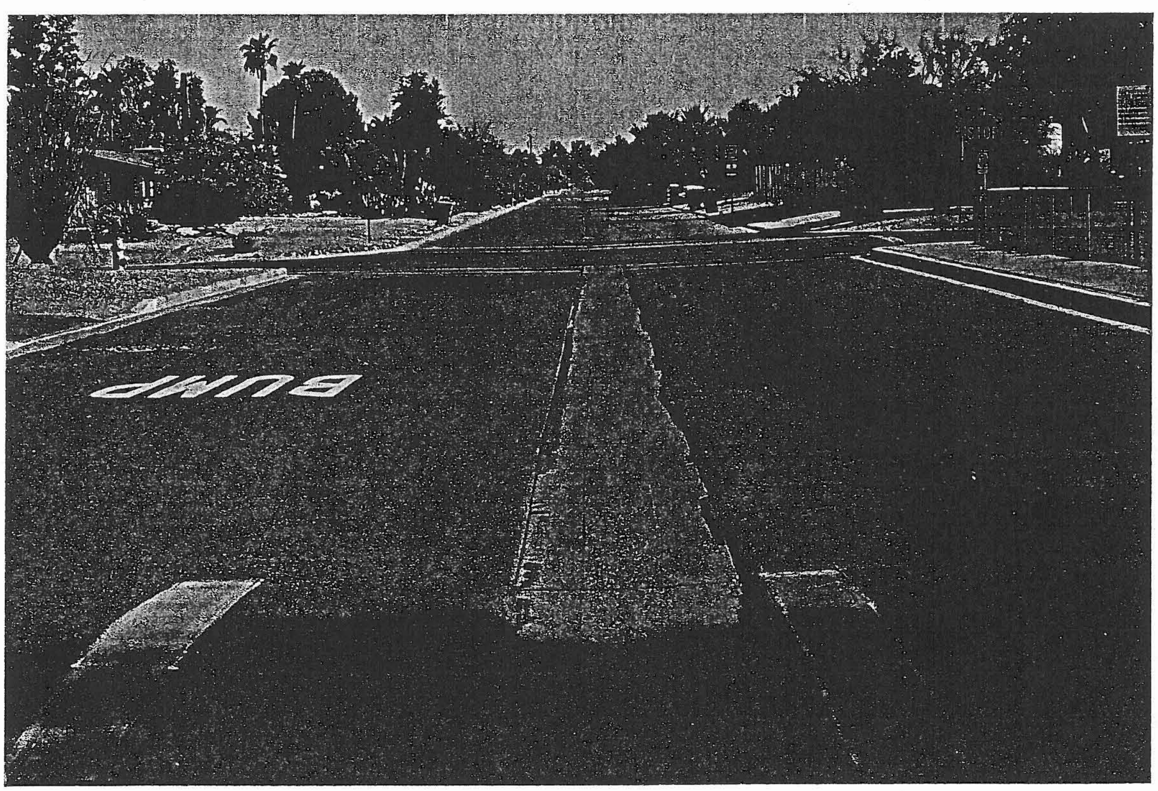
Existing Hydraulic Section		
Desc.	RX (ft)	RY (ft)
Wall	0	105.9
Wall	0.05	100.9
NG	6	100.9
Top	12.33	100.9
Curb	12.38	100.4
Gutter	30.33	100.03
C/L	31.83	100
Gutter	33.33	100.03
Curb	51.28	100.4
Top	51.33	100.9
NG	53	100.9
Fence	56	100.9



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	12.3	12.4	51.3	51.4	56	56.1
RY	105.9	100.9	100.9	100.2	100.2	100.9	100.9	105.9

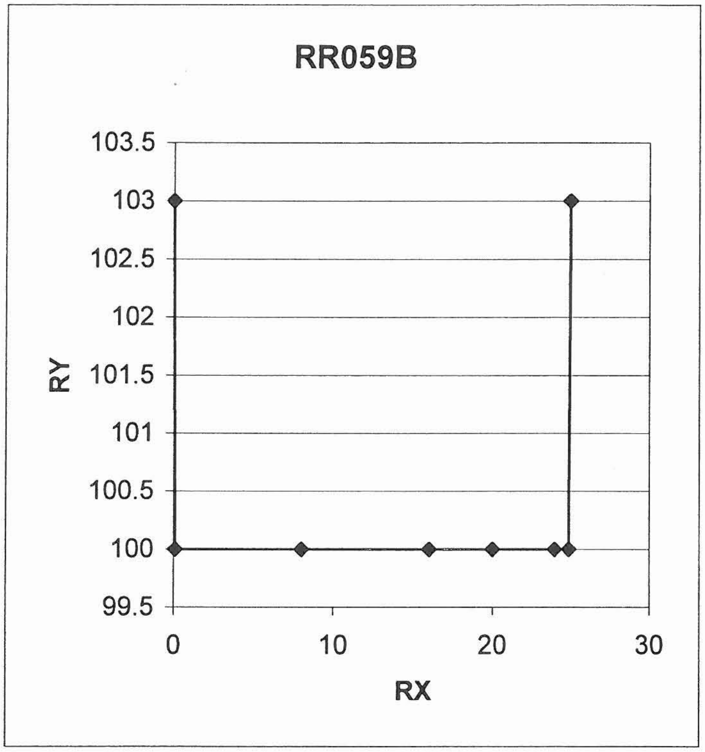
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.016	0.025

Upstream Elevation (ft)	1385
Downstream Elevation (ft)	1355
Reach Length (ft)	5400
Slope (ft/ft)	0.006



RR059B
ROUTE FLOW EAST DOWN SHEA BLVD FRONTAGE ROAD

RX	RY
0	103
0.1	100
8	100
16	100
20	100
24	100
24.9	100
25	103

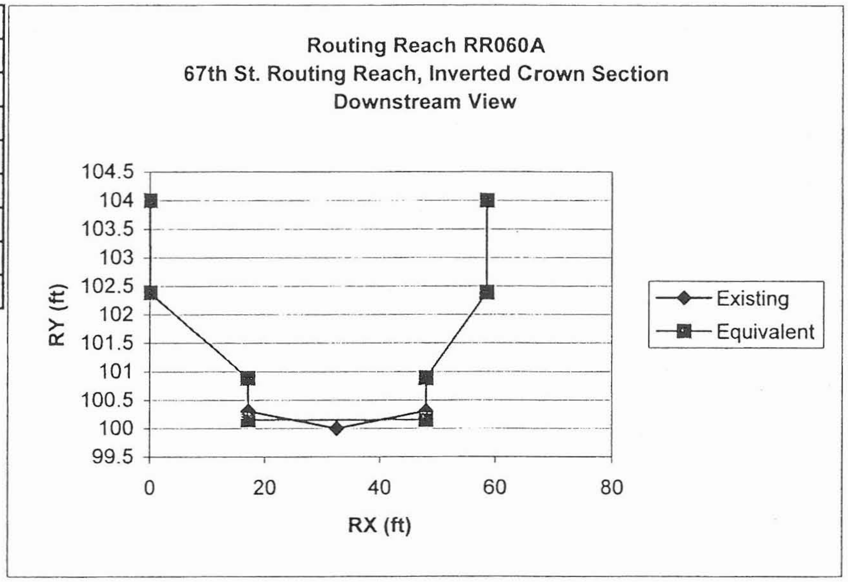


LOB	CHNL	ROB
0.016	0.016	0.016

USGE	
DSGE	
LENGTH	1250
SLOPE	0.005

Routing Reach RR060A
67th St. Routing Reach, Inverted Crown Section
Section taken Approximately 150 Feet North of Onyx Ave.

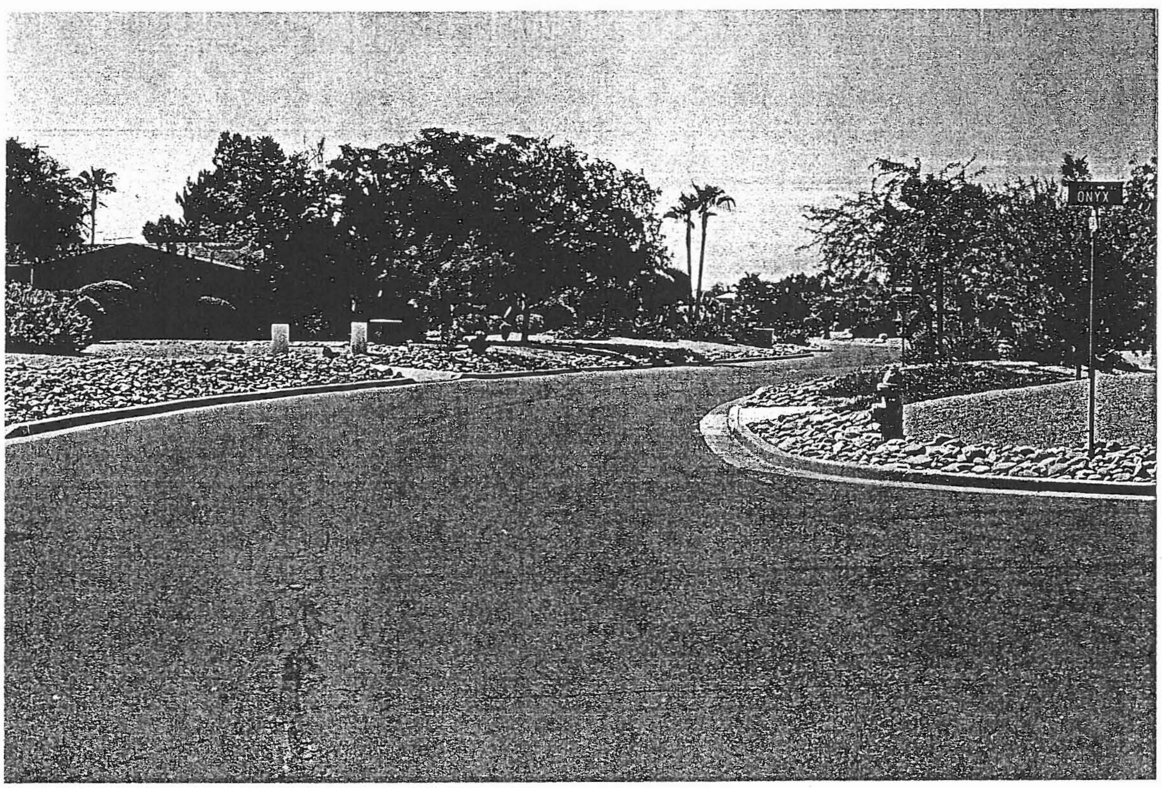
Existing Hydraulic Section		
Desc.	RX (ft)	RY (ft)
Wall	0	102.39
Wall	17	100.89
NG	17.05	100.31
Top	32.5	100
FLG	47.95	100.31
C/L	48	100.89
FLG	58.5	102.39



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	17	17.1	47.9	48	58.5	58.6
RY	104.0	102.4	100.9	100.2	100.2	100.9	102.4	104.0

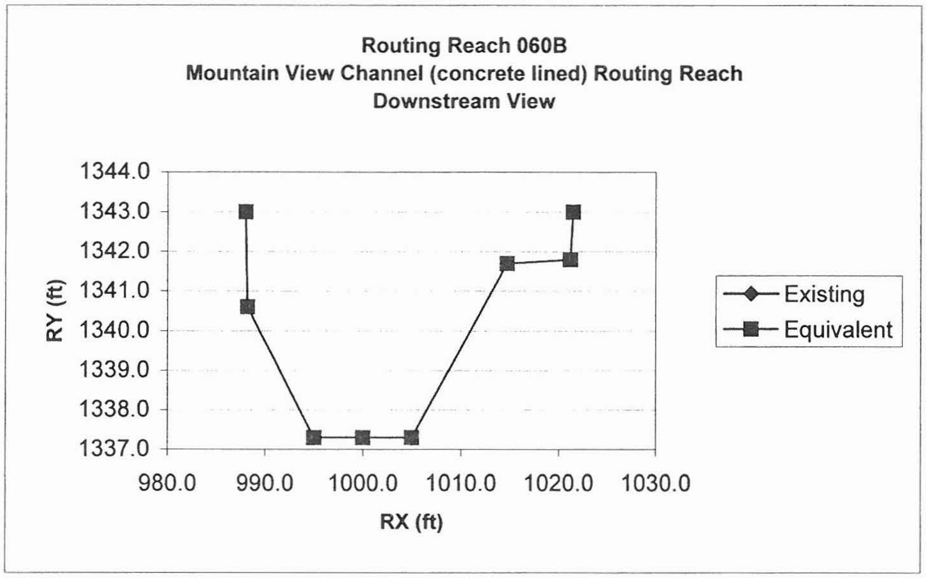
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.016	0.025

Upstream Elevation (ft)	1355
Downstream Elevation (ft)	1329
Reach Length (ft)	2600
Slope (ft/ft)	0.010



Routing Reach RR060B, 64th St to 67th St Alignment
Mountain View Channel (concrete lined) Routing Reach
SCI Survey, River STA 222+82

Existing Hydraulic Section	
RX (ft)	RY (ft)
988.2	1340.6
995.0	1337.3
1000.0	1337.3
1005.0	1337.3
1014.7	1341.7
1021.2	1341.8



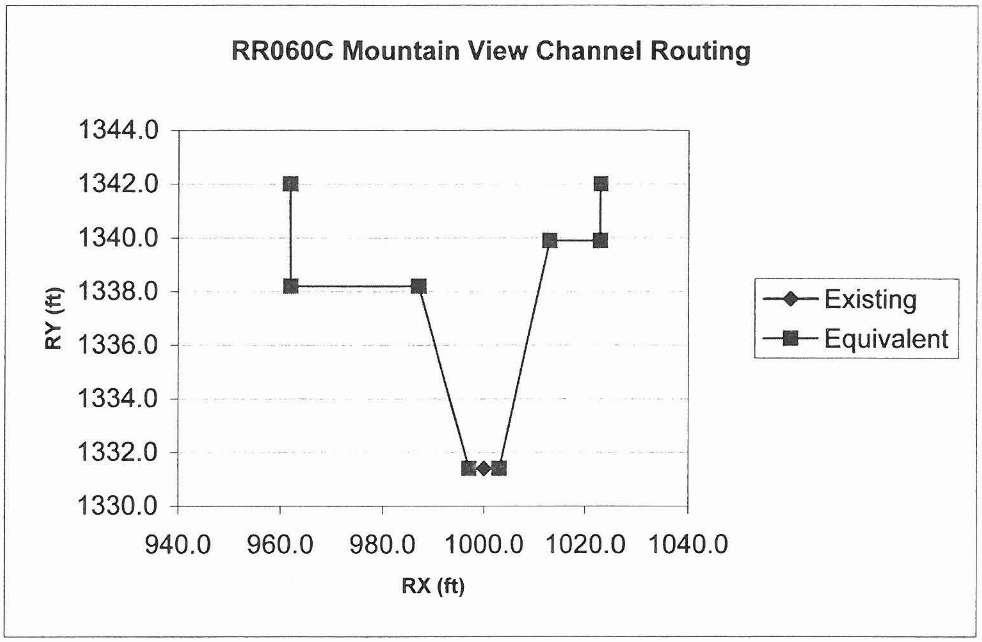
Equivalent 8-Point Hydraulic Section								
RX	988	988.2	995	1000	1005	1014.7	1021.2	1021.5
RY	1343	1340.6	1337.3	1337.3	1337.3	1341.7	1341.8	1343

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.03	0.018	0.018

Upstream Elevation (ft)	1338.3
Downstream Elevation (ft)	1333.2
Reach Length (ft)	2000
Slope (ft/ft)	0.003

Routing Reach RR060C, 67th St Alignment to 67th Berneil Ditch Confluence
Mountain View Channel (concrete lined) Routing Reach
SCI Survey, River STA 205+27

Existing Hydraulic Section	
RX (ft)	RY (ft)
962.0	1338.2
987.0	1338.2
997.0	1331.4
1000.0	1331.4
1003.0	1331.4
1013.0	1339.9
1023.0	1339.9



Eqivalent 8-Point Hydraulic Section								
RX	961.9	962	987	997	1003	1013	1023	1023.1
RY	1342	1338.2	1338.2	1331.4	1331.4	1339.9	1339.9	1342

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.03	0.018	0.018

USGE (ft)	1333.2
DSGE (ft)	1331.5
Reach Length (ft)	500
Slope (ft/ft)	0.003

Routing Reach RR061C
Storm drain of unknown size under Paradise Ln from 64th St to Jackrabbit Park east basin.
Outfall storm drain to Jackrabbit Park is 60-in diam.

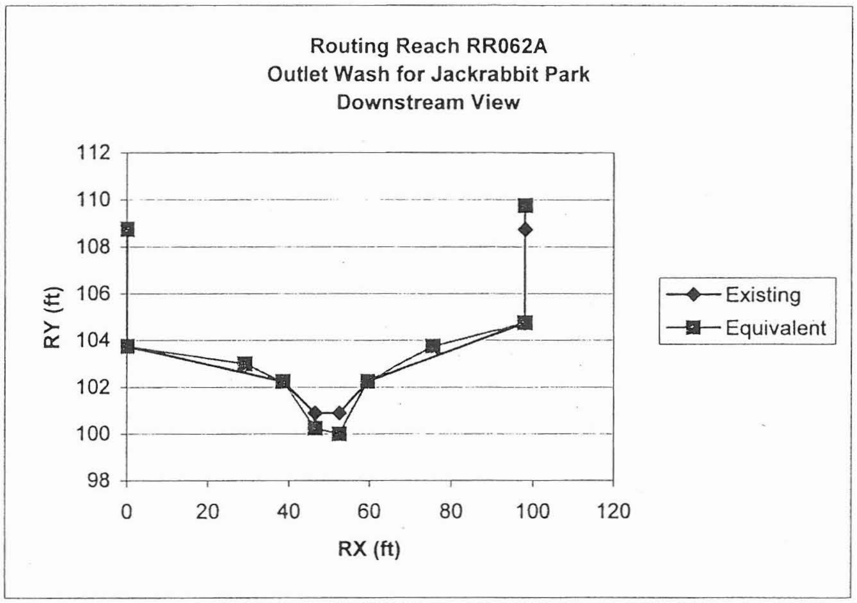
Length (ft)	Slope (ft./ft.)	Diameter (ft)	Roughness
1600	0.005	5	0.013

Assumed slope of 0.005 ft/ft.

Unknown pipe diameter for routing, but diameter = 5 ft at outfall to Jackrabbit Park.

Routing Reach RR062A
Outlet Wash for Jackrabbit Park
Section taken Approximately 1,250 Feet South of Jackrabbit Park

Existing Hydraulic Section		
Desc.	RX (ft)	RY (ft)
Wall	0	108.75
Wall	0.05	103.75
NG	29	103
Top	38.5	102.25
BC	46.5	100.25
BC	52.5	100
Top	59.5	102.25
NG	75.5	103.75
Wall	98	104.75
Wall	98.05	109.75



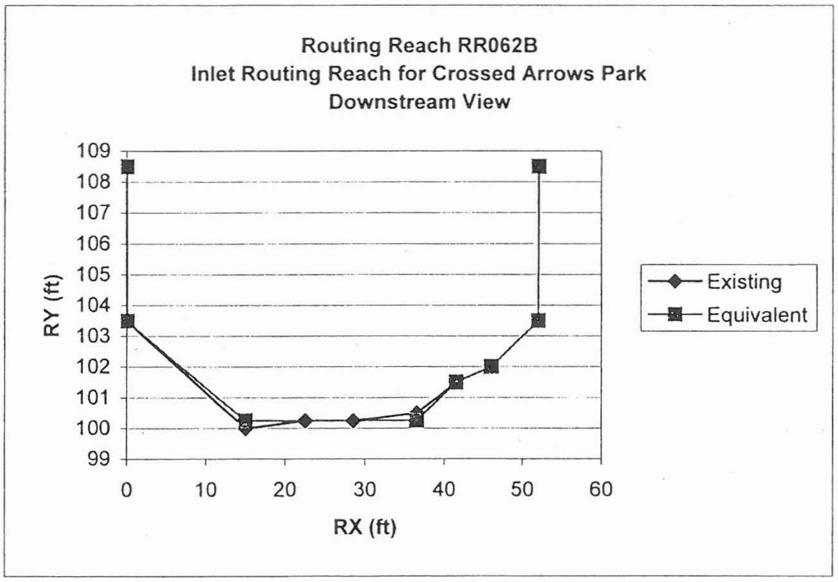
Equivalent 8-Point Hydraulic Section								
RX	0	0.1	38.5	46.5	52.5	59.5	98	98.1
RY	108.8	103.8	102.3	100.9	100.9	102.3	104.8	108.8

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.045	0.025

Upstream Elevation (ft)	1463
Downstream Elevation (ft)	1457
Reach Length (ft)	2750
Slope (ft/ft)	0.002

Routing Reach RR062B
Inlet Routing Reach for Crossed Arrows Park
Section taken Approximately 150 Feet North of Crossed Arrows Park

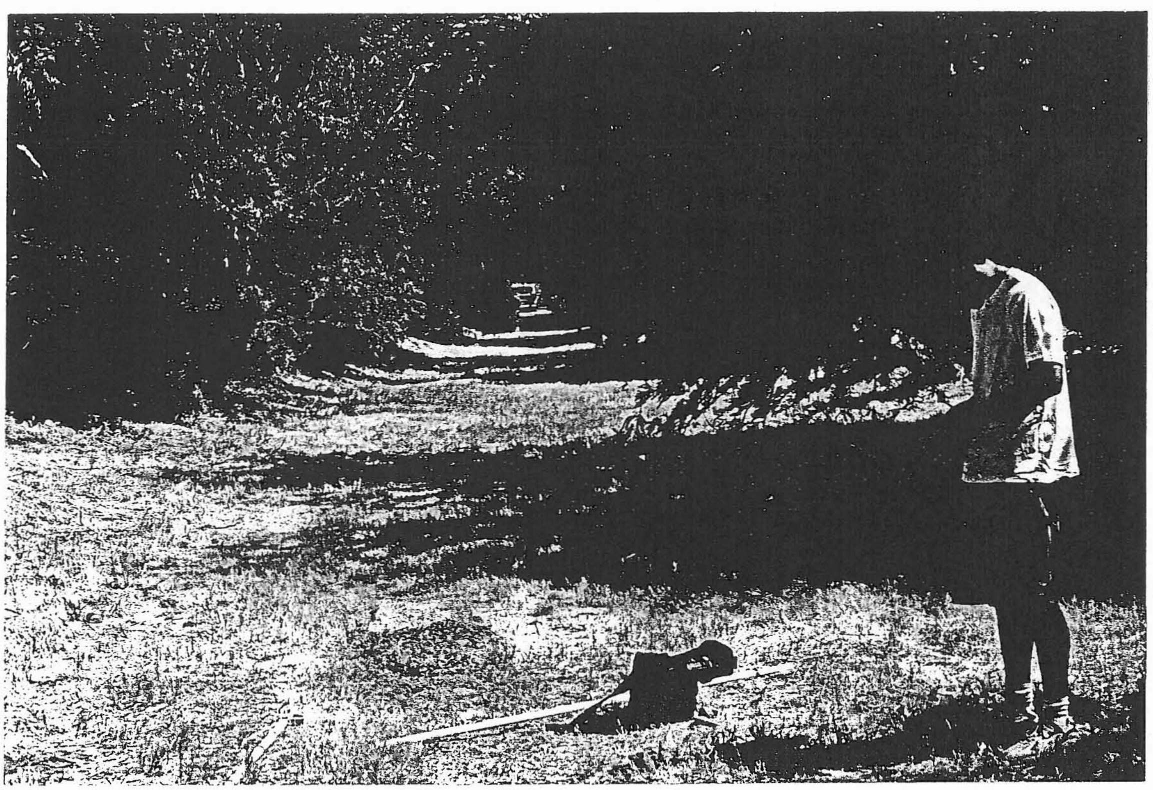
Existing Hydraulic Section		
Desc.	RX (ft)	RY (ft)
Wall	0	108.5
Wall	0.05	103.5
NG	15	100
NG	22.5	100.25
NG	28.5	100.25
Top	36.5	100.5
Bottom	41.5	101.5
Bottom	46	102
Top	52	103.5
Wall	52.05	108.5



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	15	36.5	41.5	46	52	52.1
RY	108.5	103.5	100.3	100.3	101.5	102.0	103.5	108.5

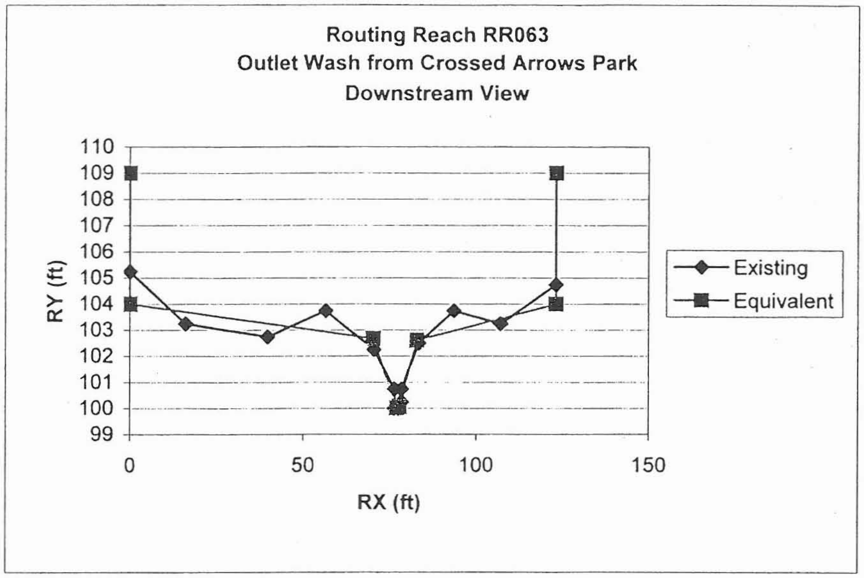
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.035	0.030	0.035

Upstream Elevation (ft)	1457
Downstream Elevation (ft)	1443.5
Reach Length (ft)	1450
Slope (ft/ft)	0.009



Routing Reach RR063
Section taken Approximately 250 Feet Downstream of Crossed Arrows Park
Outlet Wash from Crossed Arrows Park

Existing Hydraulic Section		
Desc.	RX (ft)	RY (ft)
Wall	0	105.25
NG	16	103.25
NG	39.5	102.75
NG	56.5	103.75
Top	70.5	102.25
Toe	76.5	100.75
NG	76.5	100
C/L	77.5	100
NG	78.5	100.25
Toe	78.5	100.75
Top	83.5	102.5
NG	93.5	103.75
NG	107	103.25
Wall	123	104.75



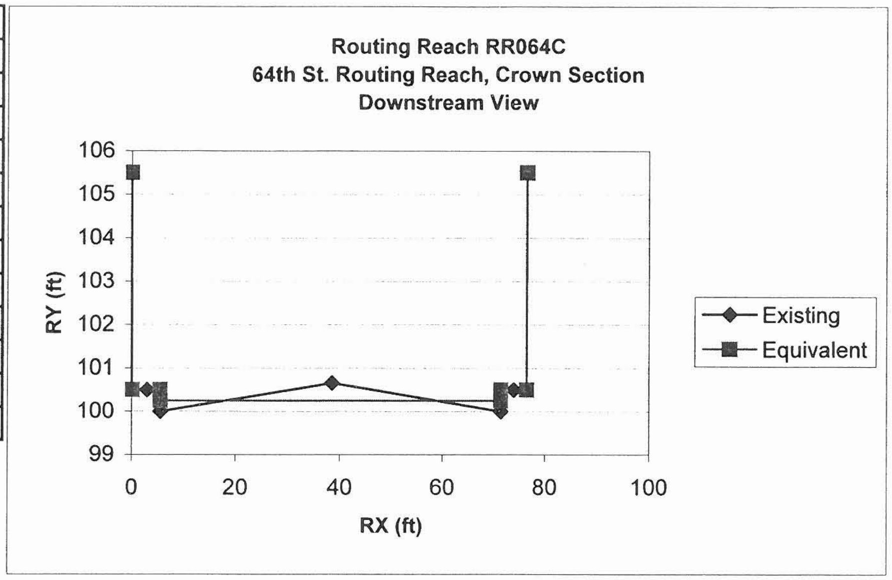
Equivalent 8-Point Hydraulic Section								
RX	0	0.1	70.3	77.1	77.8	83	123	123.1
RY	109.0	104.0	102.7	100.0	100.1	102.6	104.0	109.0

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.03	0.03	0.03

Upstream Elevation (ft)	1431.9
Downstream Elevation (ft)	1412.9
Reach Length (ft)	2800
Slope (ft/ft)	0.007

Routing Reach RR064C
64th St. Routing Reach, Hearn to Tbird
Section taken Approximately 400 Feet North of Sweetwater Rd.

Existing Hydraulic Section		
Desc.	RX (ft)	RY (ft)
Wall	0	105.5
Wall	0.05	100.5
NG	3	100.5
Top	5.5	100.5
FLG	5.55	100
C/L	38.5	100.66
FLG	71.45	100
Top	71.5	100.5
NG	74	100.5
Wall	76.5	100.5
Wall	76.55	105.5



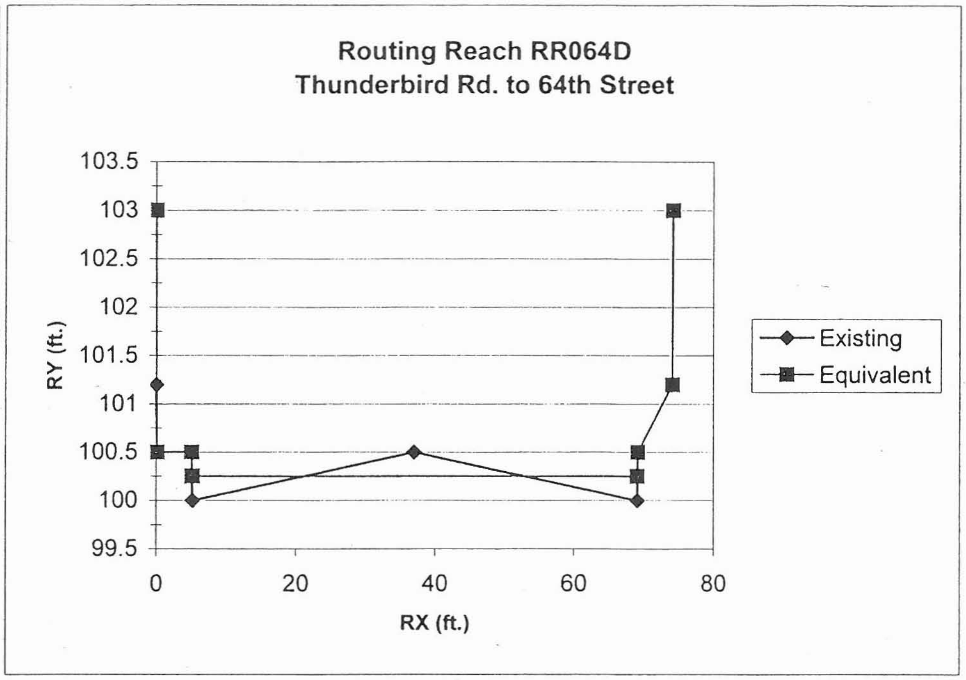
Equivalent 8-Point Hydraulic Section								
RX	0	0.1	5.5	5.6	71.4	71.5	76.5	76.6
RY	105.5	100.5	100.5	100.3	100.3	100.5	100.5	105.5

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.016	0.025

Upstream Elevation (ft)	1426.5
Downstream Elevation (ft)	1422
Reach Length (ft)	1450
Slope (ft/ft)	0.003

Routing Reach RR064D
Tbird Street Section to 64th Street
Tbird Rd Cross-Sectin Taken at 66th Street

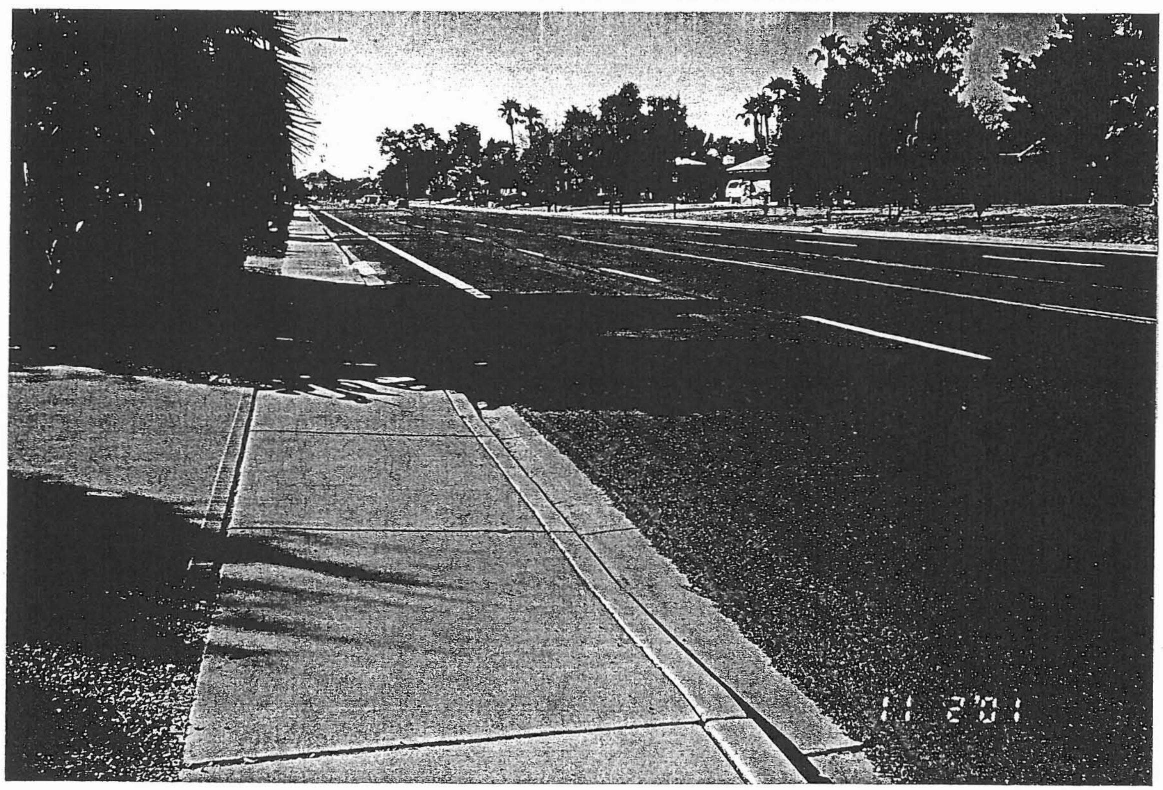
Hydraulic Section	
RX	RY
0	101.2
0.1	100.5
5	100.5
5.1	100
37	100.5
68.9	100
69	100.5
74	101.2



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	5	5.1	68.9	69	74	74.1
RY	103	100.5	100.5	100.25	100.25	100.5	101.2	103

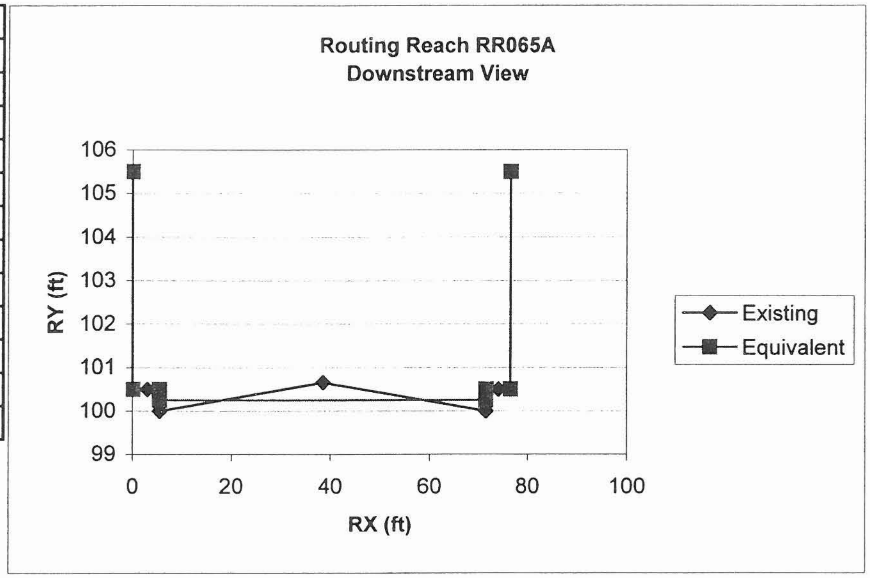
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.016	0.025

Length (ft)	1250
USGE (ft)	1423
DSGE (ft)	1422
slope (ft/ft)	0.001



Routing Reach RR065A
64th St. Routing Reach, South on 64th St. to Delcoa
Section taken Approximately 400 Feet North of Sweetwater Rd.

Existing Hydraulic Section		
Desc.	RX (ft)	RY (ft)
Wall	0	105.5
Wall	0.05	100.5
NG	3	100.5
Top	5.5	100.5
FLG	5.55	100
C/L	38.5	100.66
FLG	71.45	100
Top	71.5	100.5
NG	74	100.5
Wall	76.5	100.5
Wall	76.55	105.5



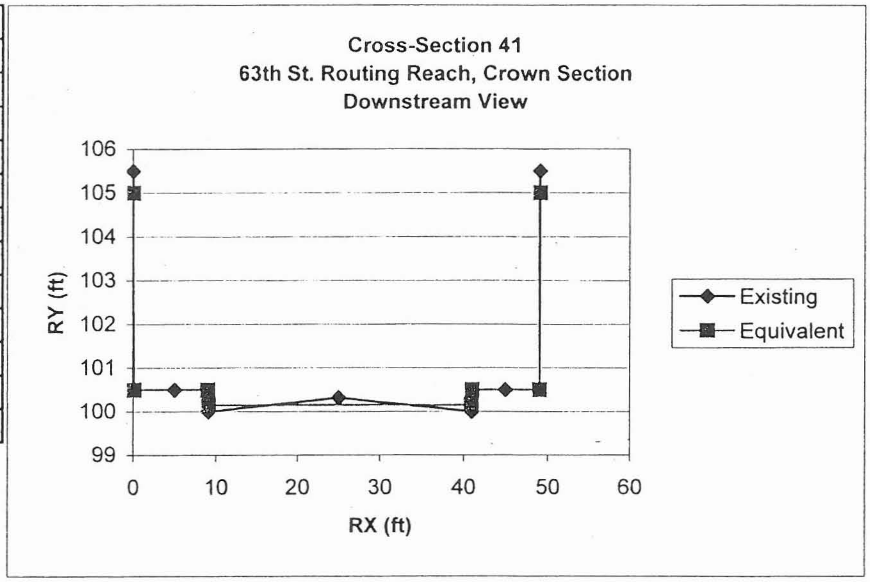
Equivalent 8-Point Hydraulic Section								
RX	0	0.1	5.5	5.6	71.4	71.5	76.5	76.6
RY	105.5	100.5	100.5	100.3	100.3	100.5	100.5	105.5

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.016	0.025

Upstream Elevation (ft)	1422
Downstream Elevation (ft)	1407
Reach Length (ft)	800
Slope (ft/ft)	0.019

Routing Reach RR065B
63th St. Routing Reach, Crown Section
Section taken Approximately 140 Feet South of Voltaire Dr.

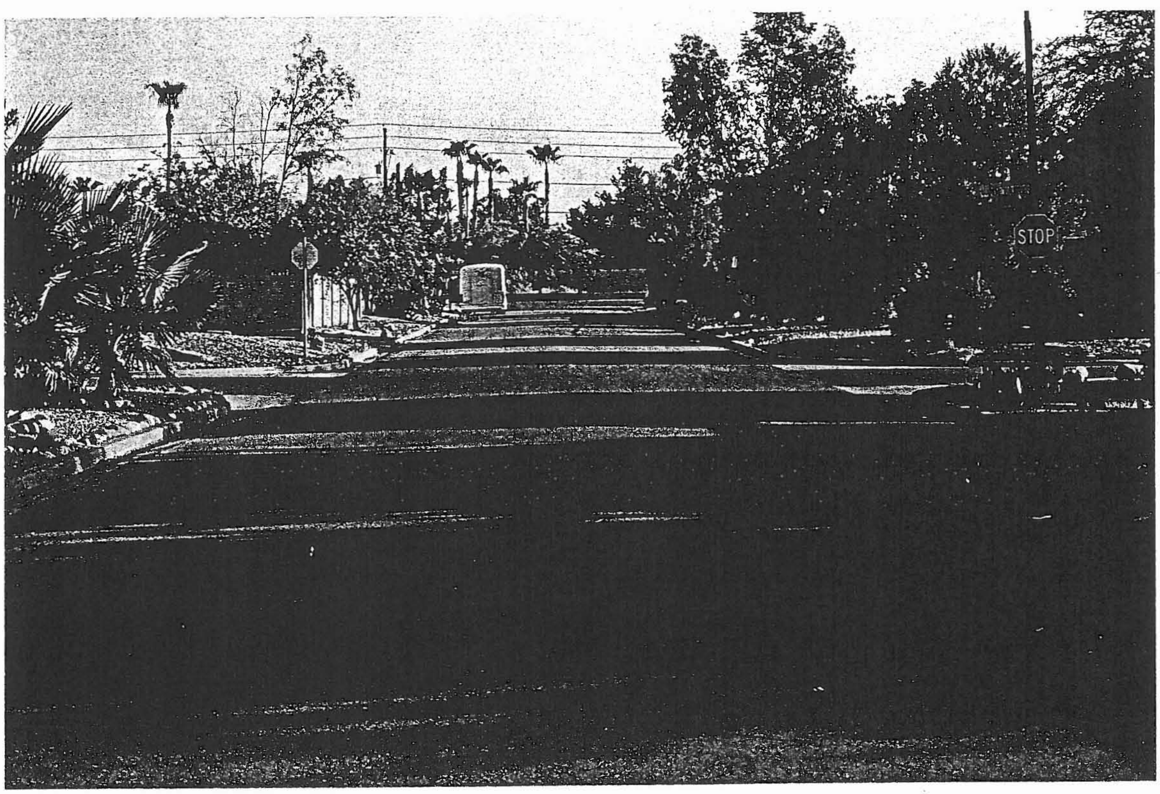
Existing Hydraulic Section		
Desc.	RX (ft)	RY (ft)
Wall	0	105.5
Wall	0.05	100.5
NG	5	100.5
Top	9	100.5
FLG	9.05	100
C/L	25	100.32
FLG	40.95	100
Top	41	100.5
NG	45	100.5
Wall	49	100.5
Wall	49.05	105.5



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	9	9.1	40.9	41	49	49.1
RY	105	100.5	100.5	100.2	100.2	100.5	100.5	105.0

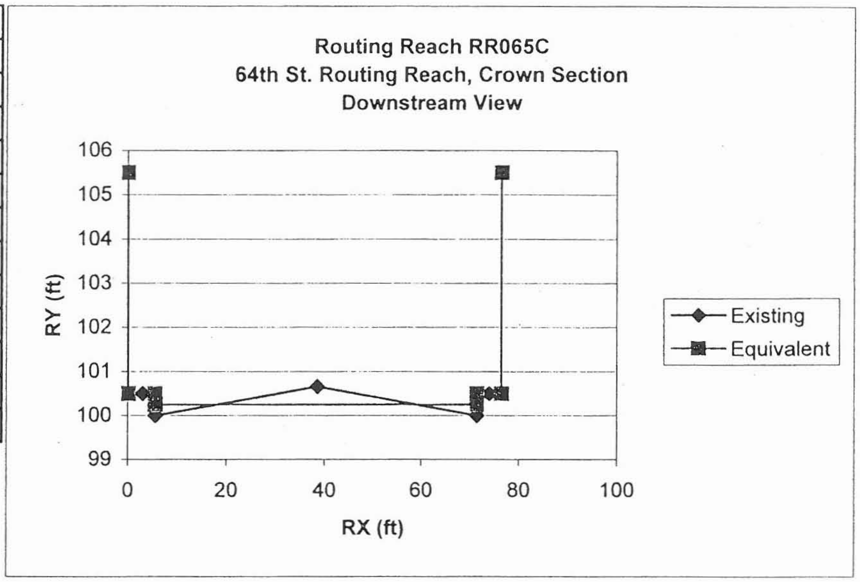
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.016	0.025

Upstream Elevation (ft)	1412
Downstream Elevation (ft)	1407
Reach Length (ft)	1300
Slope (ft/ft)	0.004



Routing Reach RR065C
64th St. Routing Reach, Delcoa to Cactus, Crown Section
Section taken Approximately 400 Feet North of Sweetwater Rd.

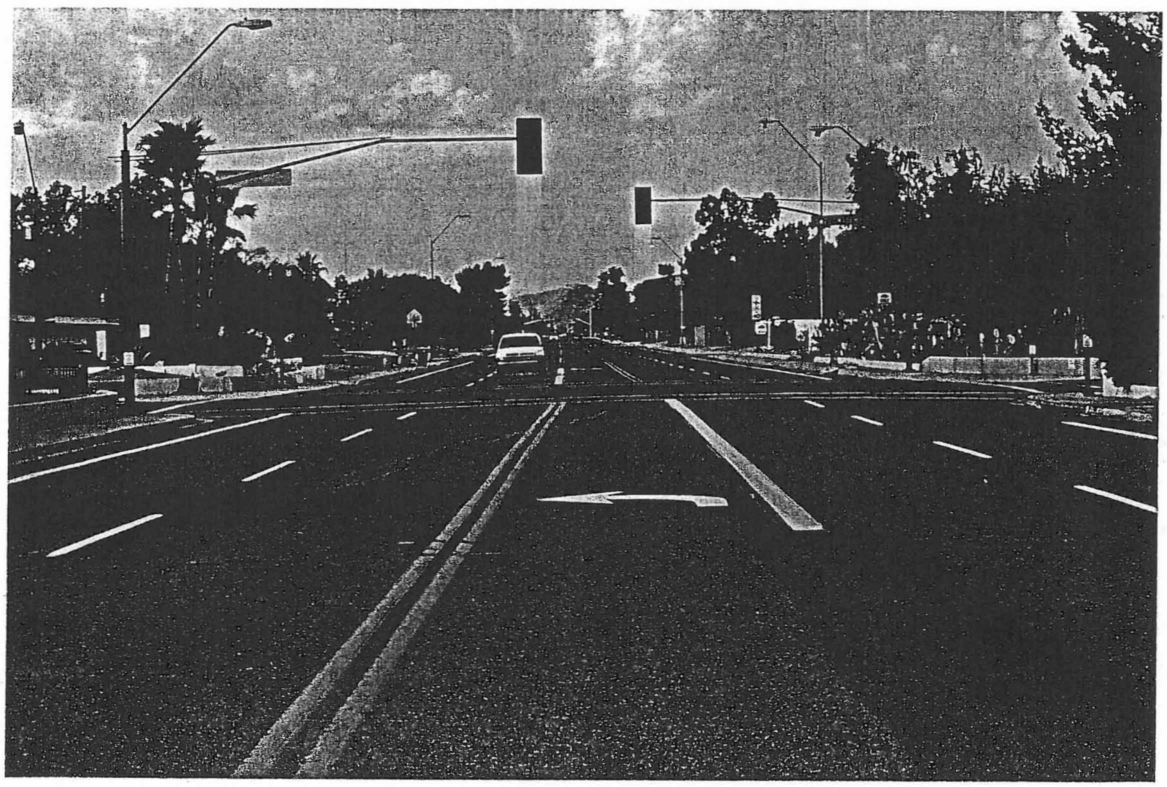
Existing Hydraulic Section		
Desc.	RX (ft)	RY (ft)
Wall	0	105.5
Wall	0.05	100.5
NG	3	100.5
Top	5.5	100.5
FLG	5.55	100
C/L	38.5	100.66
FLG	71.45	100
Top	71.5	100.5
NG	74	100.5
Wall	76.5	100.5
Wall	76.55	105.5



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	5.5	5.6	71.4	71.5	76.5	76.6
RY	105.5	100.5	100.5	100.3	100.3	100.5	100.5	105.5

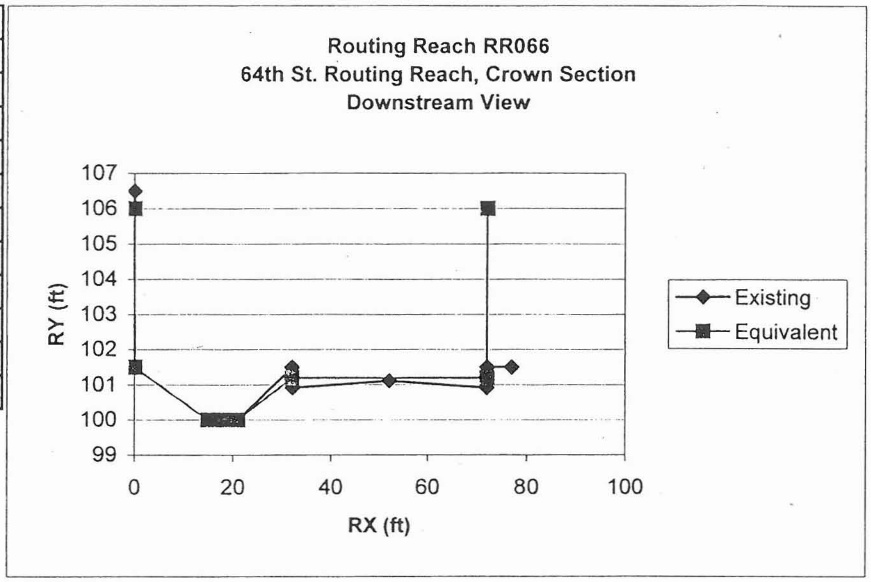
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.016	0.025

Upstream Elevation (ft)	1407
Downstream Elevation (ft)	1384
Reach Length (ft)	4500
Slope (ft/ft)	0.005



Routing Reach RR066
64th St. Routing Reach, Cactus Rd to Gary Rd.
Section taken Approximately 300 Feet South of Sunnyside Dr.

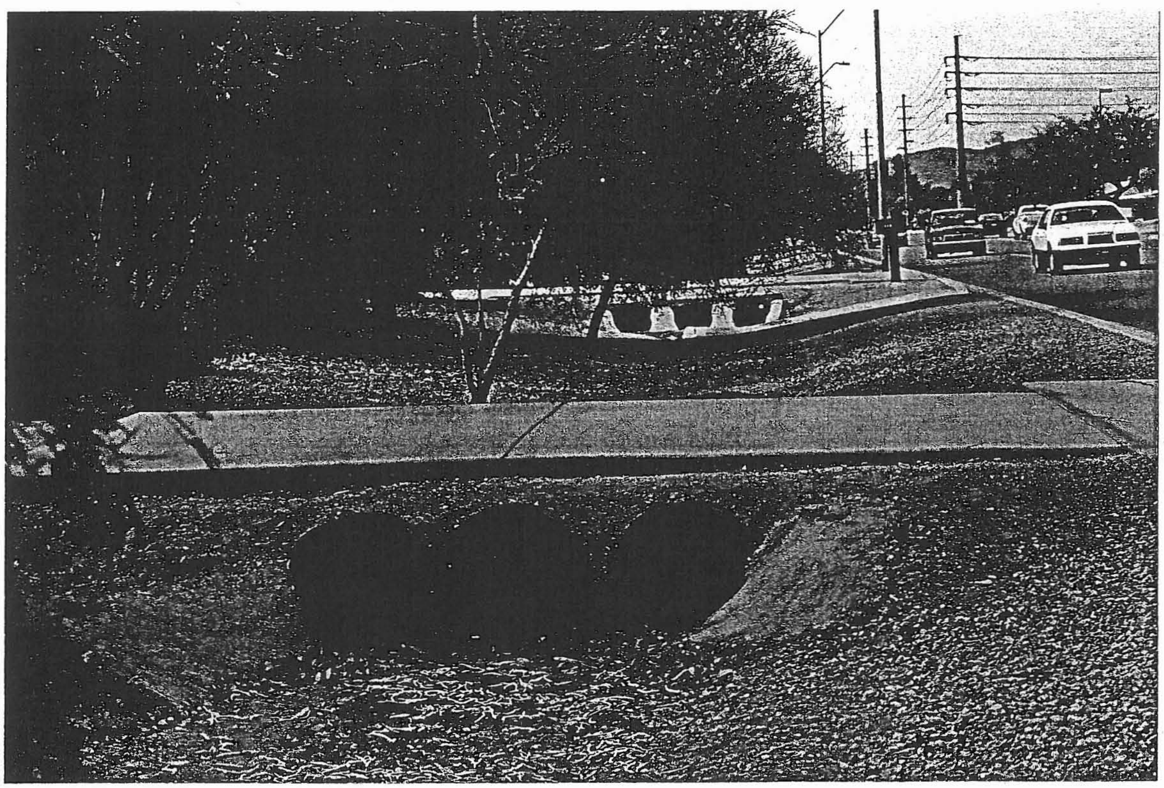
Existing Hydraulic Section		
Desc.	RX (ft)	RY (ft)
Wall	0	106.5
NG	0.05	101.5
Toe	15	100
Toe	21	100
NG	32	101.5
FLG	32.05	100.92
CL	52	101.12
FLG	71.95	100.92
NG	72	101.5
NG	77	101.5



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	15	18	21	32	72	72.1
RY	106	101.5	100	100	100	101.2	101.2	106

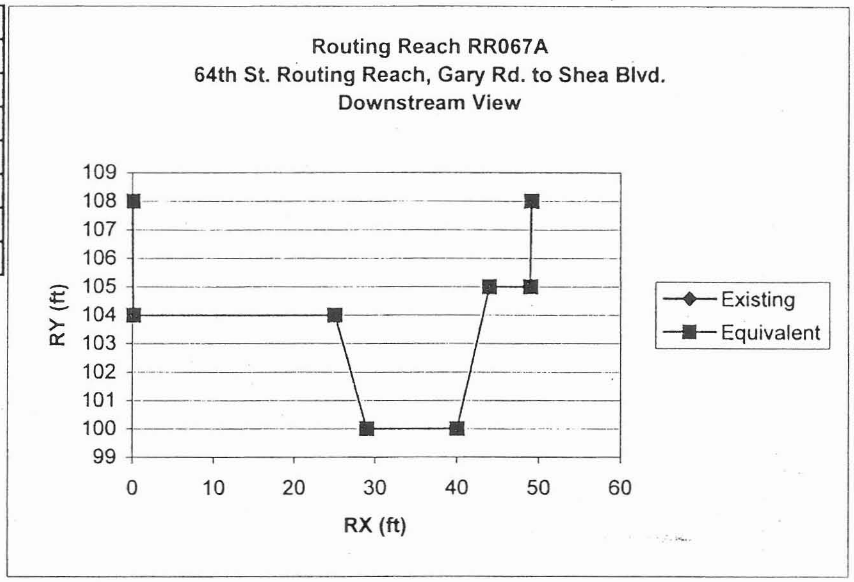
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.025	0.016

Upstream Elevation (ft)	1384
Downstream Elevation (ft)	1367
Reach Length (mi.)	3300
Slope (ft/ft)	0.005



Routing Reach RR067A
64th St. Routing Reach, Gary Rd. to Shea
Section taken Approximately 200 Feet North of Desert Cove Ave.

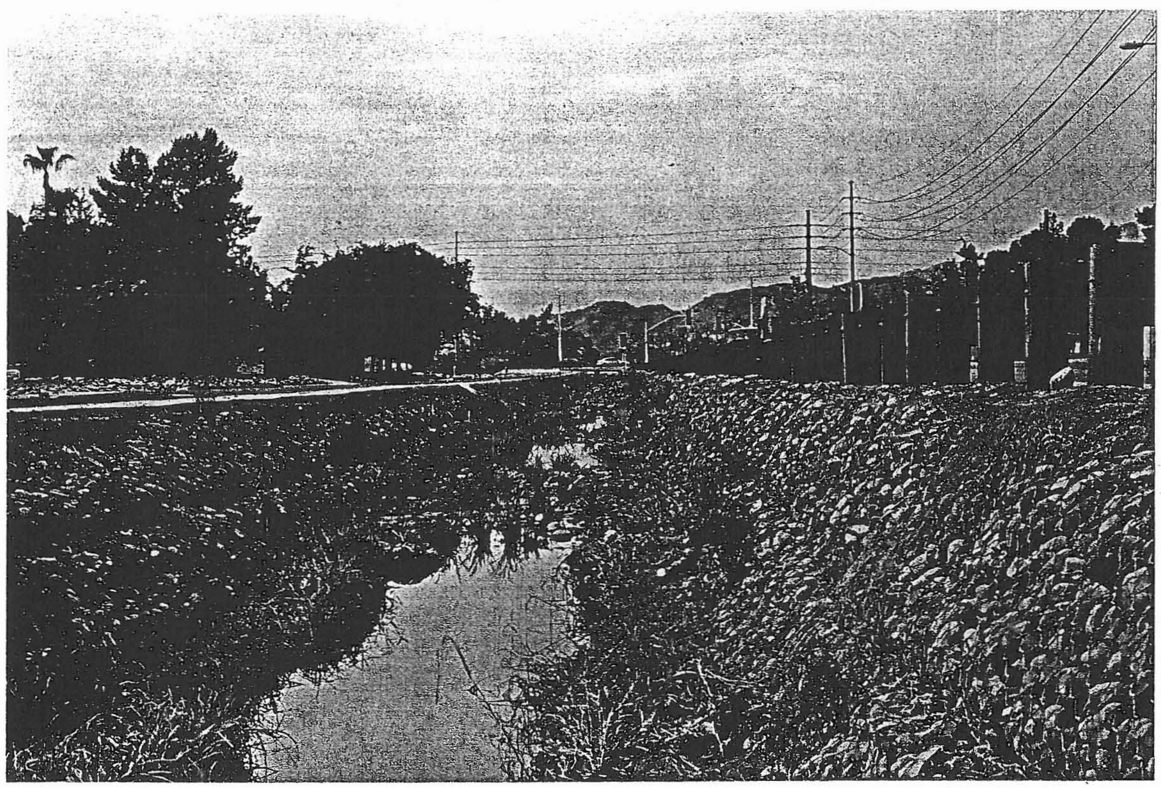
Existing Hydraulic Section		
Desc.	RX (ft)	RY (ft)
	0	104
Top	25	104
Toe	29	100
Toe	40	100
Top	44	105
	49	105



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	25	29	40	44	49	49.1
RY	108	104	104	100	100	105	105	108

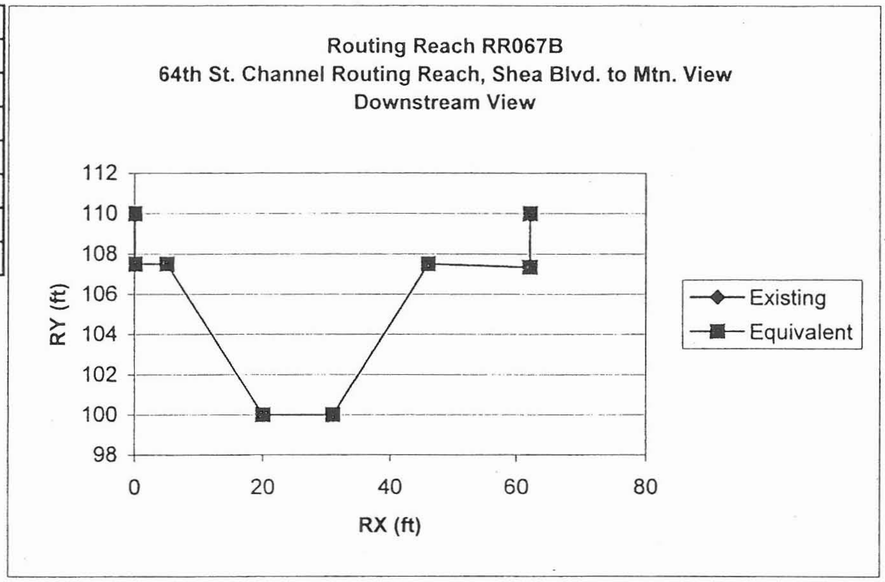
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.016	0.025	0.025

Upstream Elevation (ft)	1367
Downstream Elevation (ft)	1355
Reach Length (ft)	2100
Slope (ft/ft)	0.006



Routing Reach RR067B
64th St. Channel Routing Reach from Shea to Mountain View.
Section taken at Gold Dust. Gabion Side Slopes.

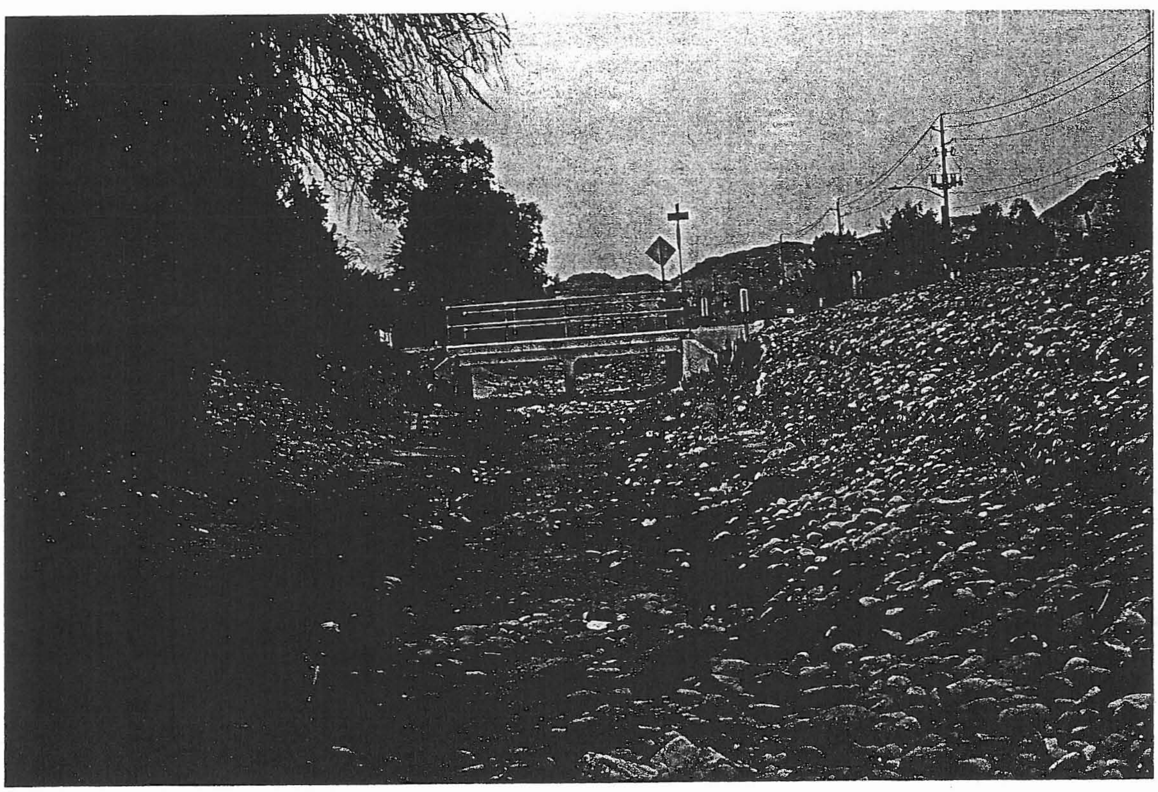
Existing Hydraulic Section		
Desc.	RX (ft)	RY (ft)
NG	0	107.5
Top	5	107.5
Toe	20	100
Toe	31	100
Top	46	107.5
64th St.	62	107.34



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	5	20	31	46	62	62.1
RY	110	107.5	107.5	100	100	107.5	107.3	110

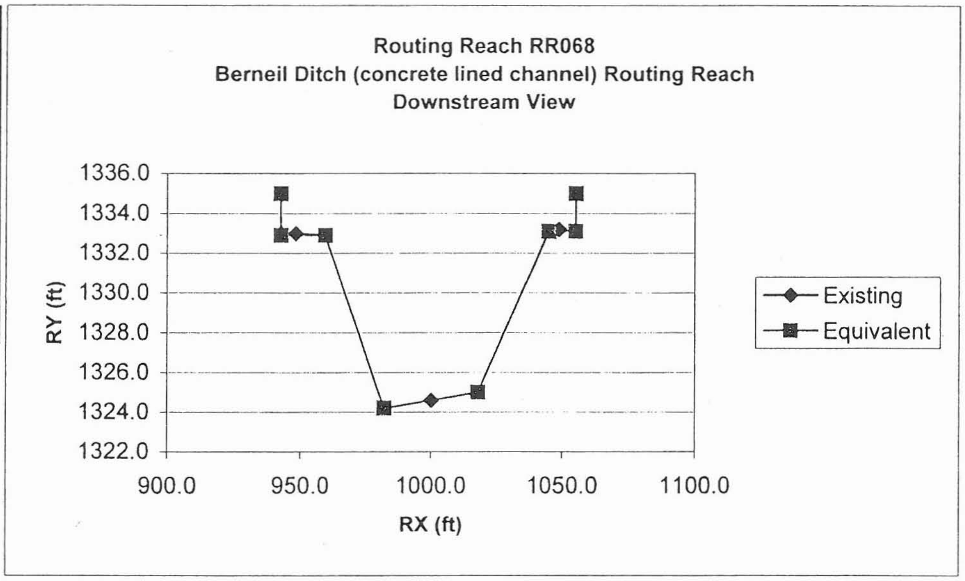
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.025	0.025

Upstream Elevation (ft)	1355
Downstream Elevation (ft)	1340
Reach Length (ft)	2500
Slope (ft/ft)	0.006



Routing Reach RR068
Berneil Ditch (concrete lined channel) Routing Reach
Section Taken Between Two 90 Degree Bends
SCI Survey, River STA 145+26

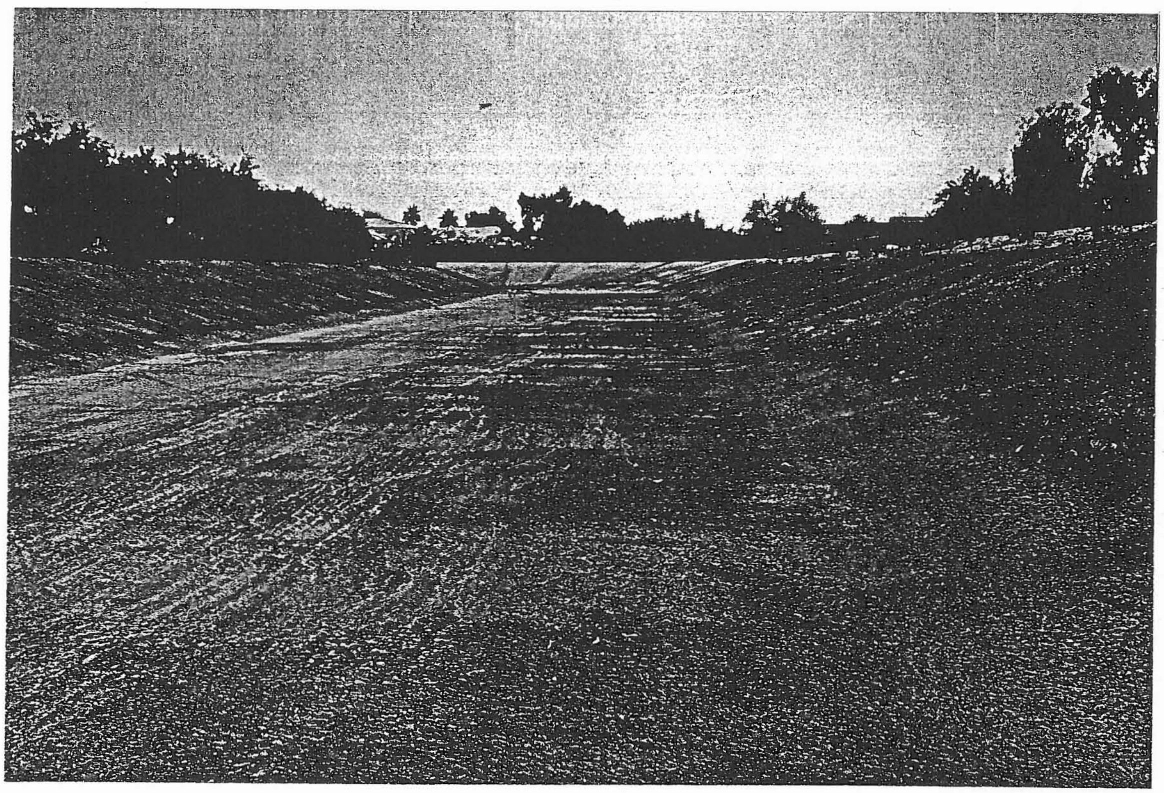
Existing Hydraulic Section	
RX (ft)	RY (ft)
942.5	1333.0
948.1	1333.0
959.3	1332.9
982.1	1324.2
1000.0	1324.6
1017.9	1325.0
1044.9	1333.1
1048.8	1333.2



Equivalent 8-Point Hydraulic Section								
RX	942.4	942.5	959.3	982.1	1017.9	1044.9	1055	1055.1
RY	1335	1332.9	1332.9	1324.2	1325	1333.1	1333.1	1335

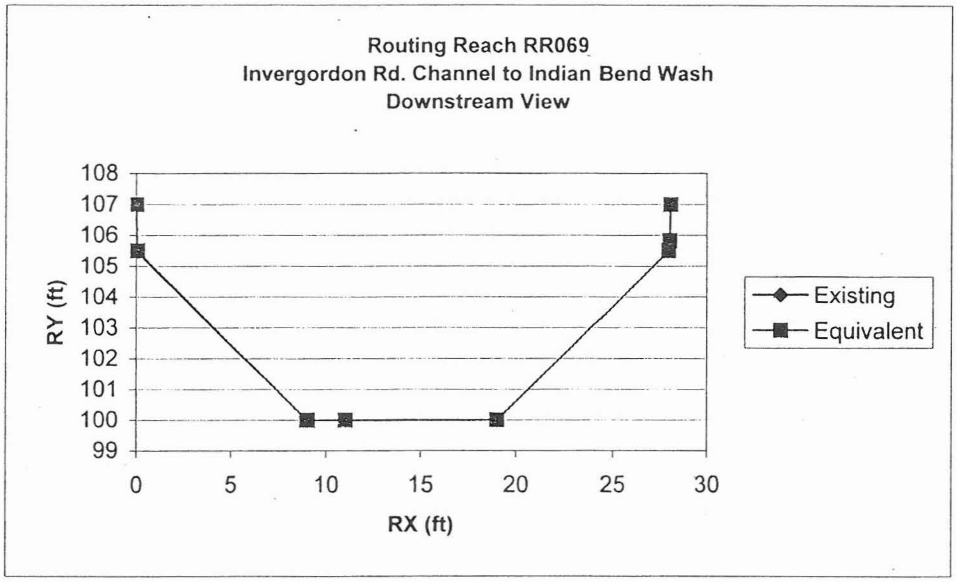
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.018	0.018	0.018

Upstream Elevation (ft)	1328.4
Downstream Elevation (ft)	1320.3
Reach Length (ft)	3800
Slope (ft/ft)	0.002



Routing Reach RR069
Invergordon Rd. Channel from Mountain View Channel Flow Split to IBW, Gabion Lined
Section taken Approximately 200 Feet North of Arabian Way

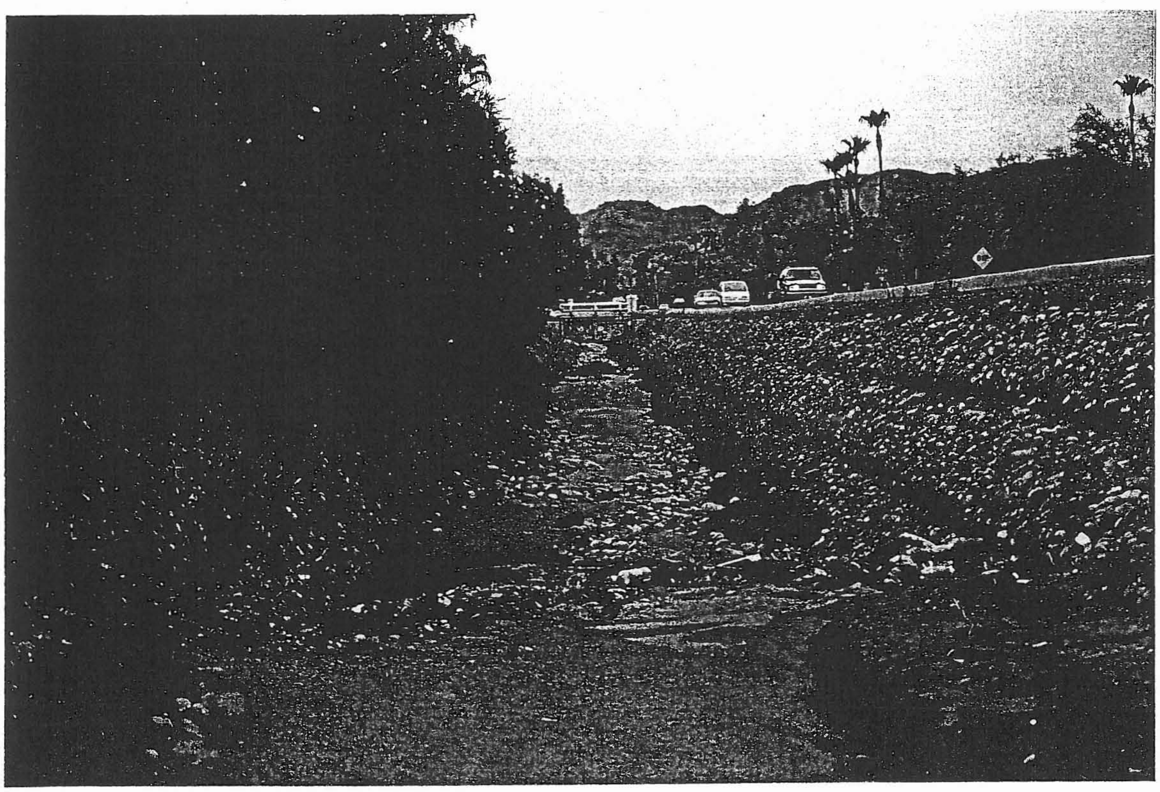
Existing Hydraulic Section	
RX (ft)	RY (ft)
0	105.5
9	100
19	100
27.95	105.5
28	105.83



Equivalent 8-Point Hydraulic Section								
RX	0	0.1	9	11	19	27.9	28	28.1
RY	107	105.5	100	100	100	105.5	105.8	107

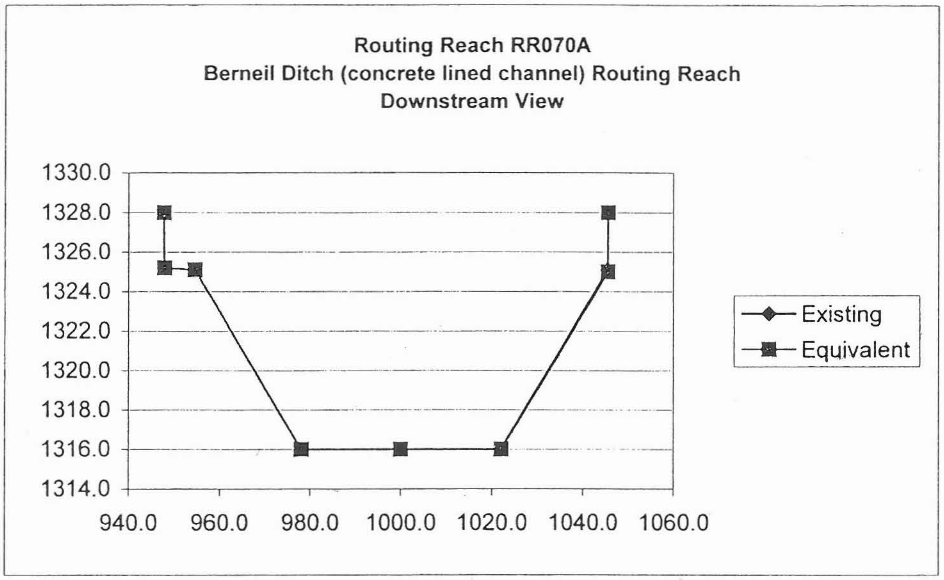
Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.025	0.025	0.025

Upstream Elevation (ft)	1340
Downstream Elevation (ft)	1320
Reach Length (ft)	4100
Slope (ft/ft)	0.005



Routing Reach RR070A
Berneil Ditch (concrete lined channel) Routing Reach
Section taken Approximately 315 Feet South of Doubletree Ranch Rd.
SCI Survey, River STA 119+48

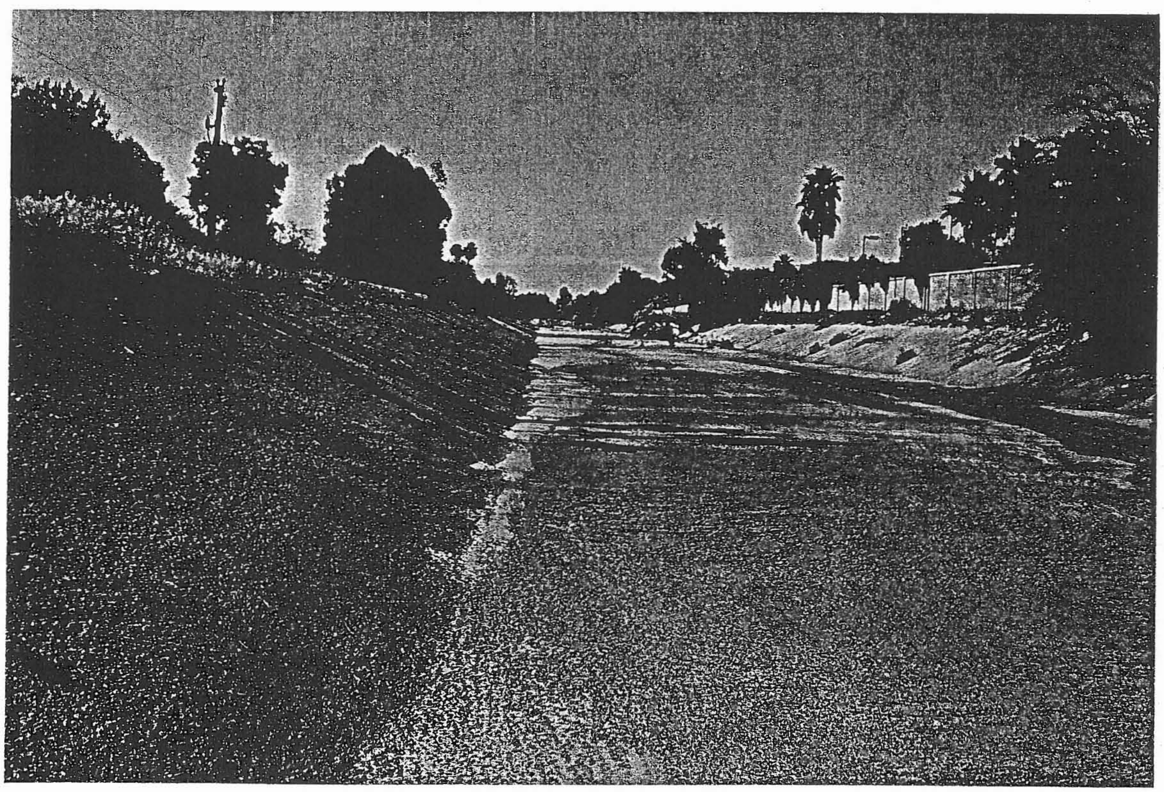
Existing Hydraulic Section	
RX (ft)	RY (ft)
947.9	1325.2
954.6	1325.1
978.1	1316.0
1000.0	1316.0
1022.0	1316.0
1045.5	1325.1



Equivalent 8-Point Hydraulic Section								
RX	947.8	947.9	954.6	978.1	1000	1022	1045.5	1045.6
RY	1328	1325.2	1325.1	1316	1316	1316	1325	1328

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.018	0.018	0.018

Upstream Elevation (ft)	1320.3
Downstream Elevation (ft)	1312.3
Reach Length (ft)	2500
Slope (ft/ft)	0.003

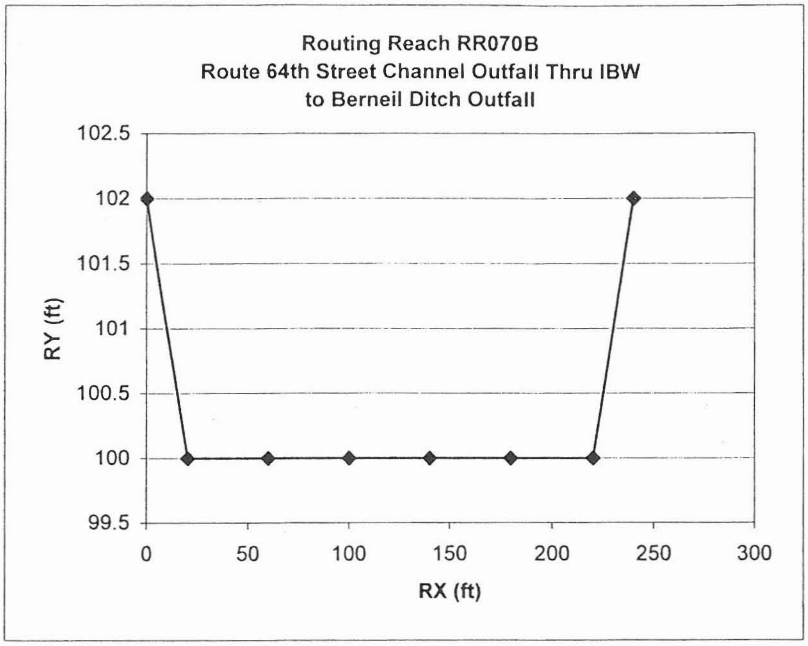


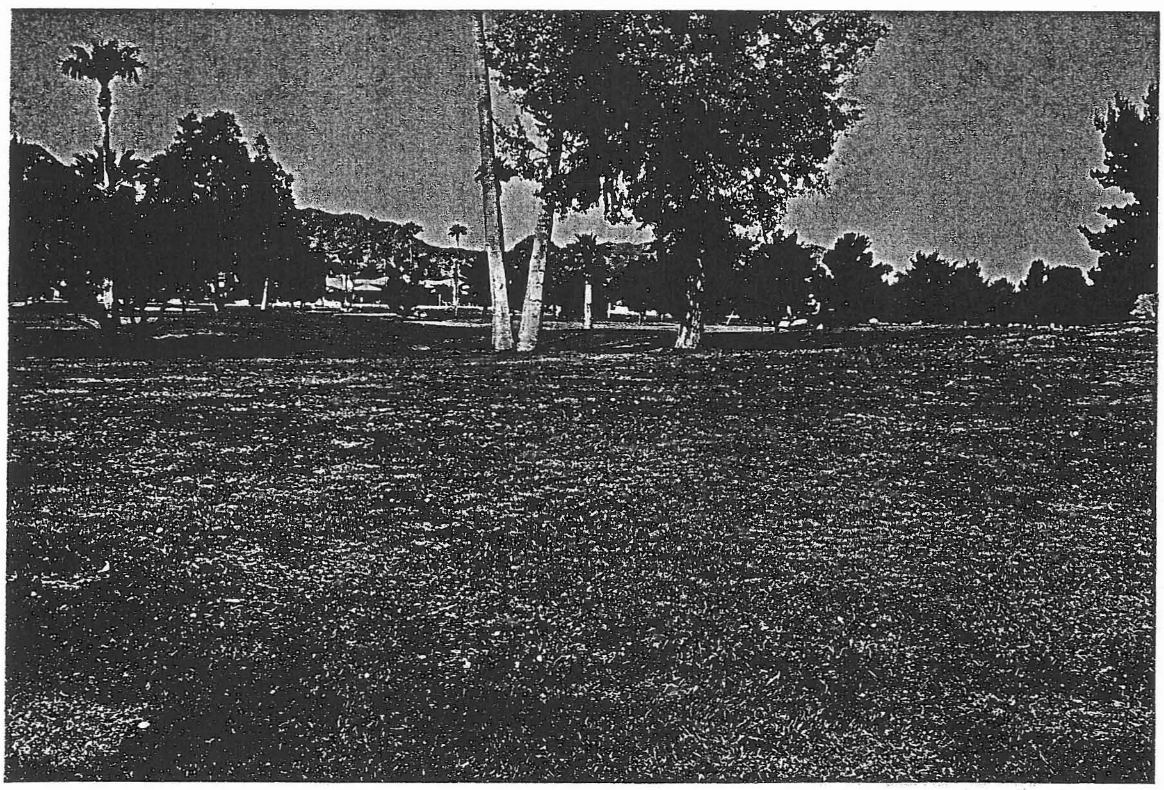
Routing Reach RR070B
Route 64th Street Channel Outfall Thru IBW to Berneil Ditch Outfall

Hydraulic Section	
RX	RY
0	102
20	100
60	100
100	100
140	100
180	100
220	100
240	102

Length (ft)	1800
USGE (ft)	1320
DSGE (ft)	1312.3
Slope(ft/ft)	0.004

Manning's Roughness Coefficient		
Left Bank	Channel	Right Bank
0.03	0.03	0.03





Diversion Data and Calculations

DV/DR009
Worksheet for Circular Channel

Project Description	
Worksheet	DV009
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.013	
Slope	0.011900	ft/ft
Diameter	36	in

Results		
Depth	3.00	ft
Discharge	72.76	cfs
Flow Area	7.1	ft²
Wetted Perimeter	9.42	ft
Top Width	0.00	ft
Critical Depth	2.69	ft
Percent Full	100.0	%
Critical Slope	0.010499	ft/ft
Velocity	10.29	ft/s
Velocity Head	1.65	ft
Specific Energy	0.00	ft
Froude Number	0.00	
Maximum Discharg	78.26	cfs
Discharge Full	72.76	cfs
Slope Full	0.011900	ft/ft
Flow Type		

DV/DR010
Worksheet for Circular Channel

Project Description	
Worksheet	DV010
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.013	
Slope	0.002800	ft/ft
Diameter	42	in

Results		
Depth	3.50	ft
Discharge	53.23	cfs
Flow Area	9.6	ft^2
Wetted Perimeter	11.00	ft
Top Width	0.00	ft
Critical Depth	2.28	ft
Percent Full	100.0	%
Critical Slope	0.004845	ft/ft
Velocity	5.53	ft/s
Velocity Head	0.48	ft
Specific Energy	3.98	ft
Froude Number	0.00	
Maximum Discharg	57.26	cfs
Discharge Full	53.23	cfs
Slope Full	0.002800	ft/ft
Flow Type	N/A	

DX013/DR013

RR013, Greenway Rd
Worksheet for Irregular Channel

Project Description	
Project File	q:\15586\haestad\sci155~1.fm2
Worksheet	RR013, Greenway Rd Routing, 100yr, 6hr
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data

Channel Slope 0.002000 ft/ft

Water Surface Elevation 100.50 ft

Elevation range: 100.00 ft to 101.50 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	100.50	0.00	5.00	0.025
5.00	100.50	5.00	47.00	0.016
5.10	100.00	47.00	52.00	0.025
26.00	100.50			
46.90	101.00			
47.00	101.50			
52.00	101.50			

Results		
Wtd. Mannings Coefficient	0.016	
Discharge	8.54	cfs
Flow Area	5.25	ft²
Wetted Perimeter	21.42	ft
Top Width	21.00	ft
Height	0.50	ft
Critical Depth	100.40	ft
Critical Slope	0.006547	ft/ft
Velocity	1.63	ft/s
Velocity Head	0.04	ft
Specific Energy	100.54	ft
Froude Number	0.57	
Flow is subcritical.		

CAPACITY AT TOP-OF-CURB

REMAINDER FLOW (DX013) FLOWS WEST DOWN GREEWAY ROAD (RR014). DIVERTED FLOW (DR013) SPILLS OVER SOUTH SIDE OF GREENWAY RD AND IS ROUTED THROUGH SB019 TO AIRPORT DETENTION BASIN.

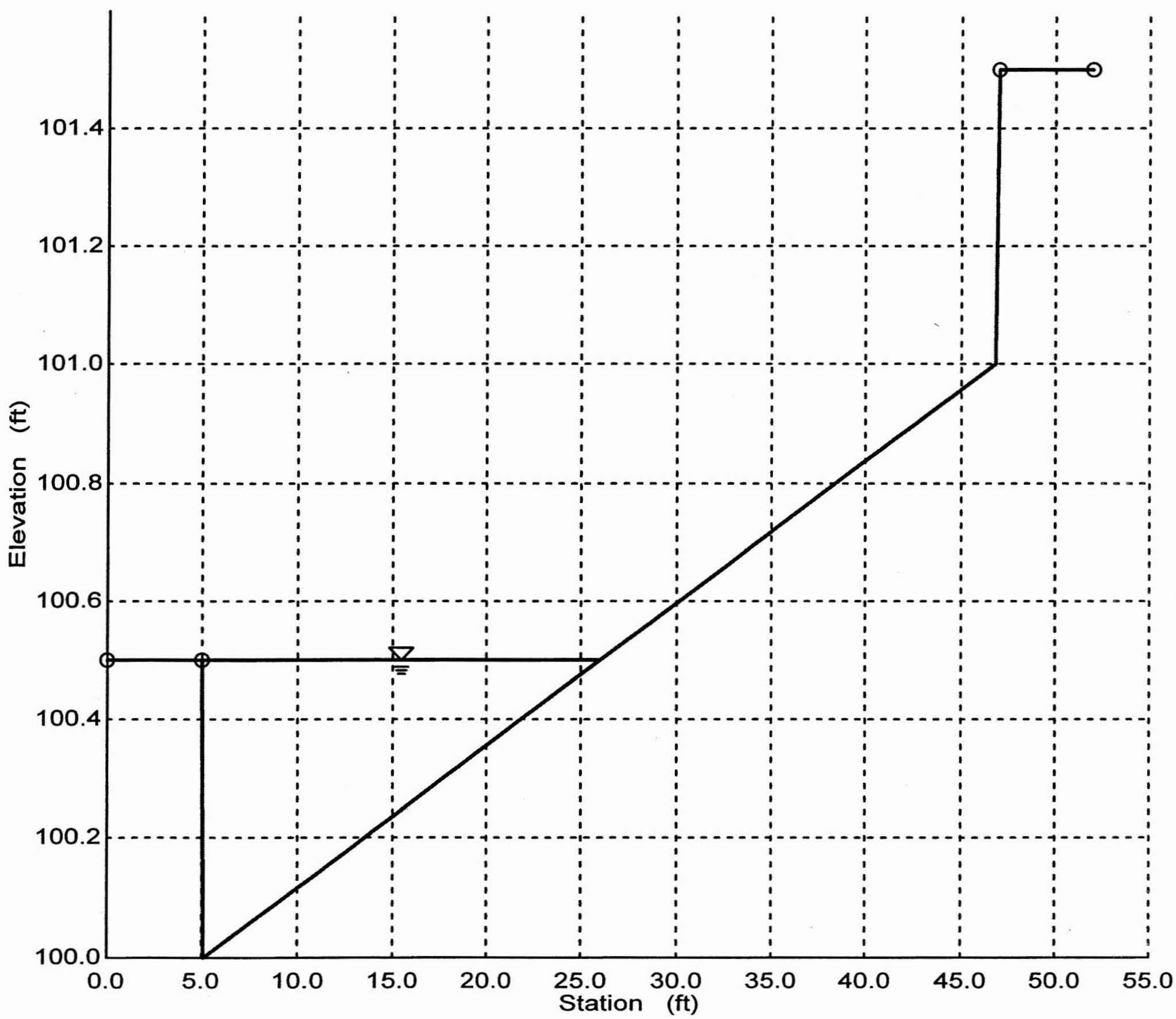
DX013/DR013 BASED ON CAPACITY OF RR013 AND 33-INCH DIAMETER SD IN GREENWAY RD (9 CFS + 58 CFS).

DI	0	850	1500	2000	3000
DQ	0	783	1433	1933	2933

RR013, Greenway Rd
Cross Section for Irregular Channel

Project Description	
Project File	q:\15586\haestad\sci155~1.fm2
Worksheet	RR013, Greenway Rd Routing, 100yr, 6hr
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data		
Wtd. Mannings Coefficient	0.016	
Channel Slope	0.002000	ft/ft
Water Surface Elevation	100.50	ft
Discharge	8.54	cfs



DV013
Worksheet for Circular Channel

Project Description	
Project File	q:\15586\haestad\sci155~1.fm2
Worksheet	DV013
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.012000	ft/ft
Diameter	33.00	in

Results		
Depth	2.75	ft
Discharge	57.93	cfs
Flow Area	5.94	ft²
Wetted Perimeter	8.64	ft
Top Width	0.00	ft
Critical Depth	2.46	ft
Percent Full	100.00	
Critical Slope	0.010619	ft/ft
Velocity	9.75	ft/s
Velocity Head	1.48	ft
Specific Energy	FULL	ft
Froude Number	FULL	
Maximum Discharge	62.32	cfs
Full Flow Capacity	57.93	cfs
Full Flow Slope	0.012000	ft/ft

DV/DR016
Worksheet for Circular Channel

Project Description	
Worksheet	DV016
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.013	
Slope	0.005000	ft/ft
Diameter	30	in

Results		
Depth	2.50	ft
Discharge	29.00	cfs
Flow Area	4.9	ft²
Wetted Perimeter	7.85	ft
Top Width	0.00	ft
Critical Depth	1.84	ft
Percent Full	100.0	%
Critical Slope	0.006317	ft/ft
Velocity	5.91	ft/s
Velocity Head	0.54	ft
Specific Energy	0.00	ft
Froude Number	0.00	
Maximum Discharg	31.20	cfs
Discharge Full	29.00	cfs
Slope Full	0.005000	ft/ft
Flow Type		

DV/DR017
Worksheet for Circular Channel

Project Description	
Worksheet	DV017
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.013	
Slope	0.005000	ft/ft
Diameter	60	in

Results		
Depth	5.00	ft
Discharge	184.15	cfs
Flow Area	19.6	ft²
Wetted Perimeter	15.71	ft
Top Width	0.00	ft
Critical Depth	3.89	ft
Percent Full	100.0	%
Critical Slope	0.005556	ft/ft
Velocity	9.38	ft/s
Velocity Head	1.37	ft
Specific Energy	0.00	ft
Froude Number	0.00	
Maximum Discharg	198.09	cfs
Discharge Full	184.15	cfs
Slope Full	0.005000	ft/ft
Flow Type		

DV/DR20A1
Worksheet for Circular Channel

Project Description	
Worksheet	DV20A1, 90" SD
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.013	
Slope	0.005600	ft/ft
Diameter	90	in

Results		
Depth	7.50	ft
Discharge	574.59	cfs
Flow Area	44.2	ft²
Wetted Perimeter	23.56	ft
Top Width	0.00	ft
Critical Depth	6.17	ft
Percent Full	100.0	%
Critical Slope	0.005564	ft/ft
Velocity	13.01	ft/s
Velocity Head	2.63	ft
Specific Energy	0.00	ft
Froude Number	0.00	
Maximum Discharg	618.09	cfs
Discharge Full	574.59	cfs
Slope Full	0.005600	ft/ft
Flow Type		

DV/DR20B1
Worksheet for Circular Channel

Project Description	
Worksheet	DV20B1
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.013	
Slope	0.005000	ft/ft
Diameter	60	in

Results		
Depth	5.00	ft
Discharge	184.15	cfs
Flow Area	19.6	ft²
Wetted Perimeter	15.71	ft
Top Width	0.00	ft
Critical Depth	3.89	ft
Percent Full	100.0	%
Critical Slope	0.005556	ft/ft
Velocity	9.38	ft/s
Velocity Head	1.37	ft
Specific Energy	0.00	ft
Froude Number	0.00	
Maximum Discharg	198.09	cfs
Discharge Full	184.15	cfs
Slope Full	0.005000	ft/ft
Flow Type		

DY2032

CACTUS PARK
EXISTING CONDITIONS
Scottsdale Road Corridor DMP
SCI #15586

LP020B

Culvert SE,SV,SQ		
Contour Elev. (ft)	Cum. Storage+ (acre-ft)	Discharge*** (cfs)
1370*	0	0
1374	0.0012	0
1375	0.0044	0
1377	0.40	0
1378	1.78	3
1379	4.35	8
1384	47.13	32
1387.8**	92.18	48
1390	121.37	58

USED IN HEC-1 MODEL, LP020B STEP

**Overflow elevation @ 1387.8

***Discharge equal to friction slope discharge less 184cfs low flow bypass (60" diam. SD flowing full)

See attached culvert discharge calculations

+See attached storage estimation calc sheet

Spillway SW, SE	
Width (ft)	Elevation (ft)
0	1388
40.8	1387.8
76.2	1387.8
139.3	1388.5
229	1388.3
317.1	1388.8
400	1389.2
523.5	1389.7

USED IN HEC-1 MODEL, LP020B STEP

Culvert & Spillway SE, SV, SQ		
Contour Elev. (ft)	Cum. Storage (acre-ft)	Discharge (cfs)
1370*	0	0
1374	0.0012	0
1375	0.0044	0
1377	0.40	0
1378	1.78	3
1379	4.35	8
1384	47.13	32
1387.8**	92.18	48
1390	121.37	3458++

→ DISCHARGE = OUTLET PIPE Q − 184 CFS (SEE ATTACHED)

**Overflow elevation @ 1387.8

++See attached weir calculations

DY2032:

DI	0	48	3458	(3458 = 58 + 3400)
DQ	0	0	3400	

→ WEIR Q @ WSEL 1390 FT

↳ OUTLET PIPE Q @ WSEL 1390 FT

Cactus Park Detention Basin
LP020B

Storage Estimation					
Contour Elev. (ft)	Contour Area (FT^2)	Contour Area (AC)	Average Area (AC)	Inc. Storage (AC-FT)	Cum. Storage (AC-FT)
1370*	0	0	-	-	-
1374	27.03	0.00062	0.00031	0.0012	0.0012
1375	251.97	0.0058	0.0032	0.003202	0.0044
1376	5015.04	0.12	0.06	0.06	0.065
1377	24317.10	0.56	0.34	0.34	0.40
1378	95777.84	2.20	1.38	1.38	1.78
1379	128106.69	2.94	2.57	2.57	4.35
1380	313973.70	7.21	5.07	5.07	9.42
1381	361872.89	8.31	7.76	7.76	17.18
1382	427602.27	9.82	9.06	9.06	26.24
1383	454745.63	10.44	10.13	10.13	36.37
1384	482694.22	11.08	10.76	10.76	47.13
1385	499874.25	11.48	11.28	11.28	58.41
1386	518474.47	11.90	11.69	11.69	70.10
1387	535345.69	12.29	12.10	12.10	82.20
SPILLWAY 1387.8**	551510.91	12.66	12.48	9.98	92.18
1388	555552.21	12.75	12.71	2.54	94.72
1390	605554.37	13.90	13.33	26.66	121.37

Storage Estimation Based on City of Scottsdale Quarter Section No. 31-45 topo and Cactus Park contour drawing.

** SPILLWAY ELEV, AREA INTERPOLATED

60-INCH DIAMETER CACTUS PARK DET BASIN OUTLET PIPE FRICTION SLOPE AND WATER SURFACE ELEVATION ESTIMATION

Manning's equation used to estimate friction slope, S_o:

$Q = (1.49/n)(A)(R_h)^{2/3}(S_o)^{1/2}$

n =	0.013
Diameter =	5 ft
Area =	19.6 sq ft
Wetted Perimeter =	15.7 ft
Hydraulic Radius =	1.25 ft
Pipe Invert @ Outfall =	1355 ft
Top-of-Pipe @ Outfall =	1360 ft
Pipe Length =	3500 ft

Q (cfs)	S_o (ft/ft)	Elevation at Cactus Park (ft)
140	0.0029	1370.1
165	0.0040	1374.0
171	0.0043	1375.0
182	0.0049	1377.0
187	0.0051	1378.0
192	0.0054	1378.9
216	0.0068	1384.0
232	0.0079	1387.7
242	0.0086	1390.1

Cactus Park Overflow @ Elev 1387.8 Ft.

Q = 184 cfs is full flow capacity for 60" diameter concrete storm drain, n = 0.013, S = 0.005 – LOW FLOW BYPASS

WEIR EQUATION:

$Q = CLH^{3/2}$

$Q = (3)(523.5)(1390 - 1388.32)^{3/2}$

↳ APPROX AVG SPILLWAY ELEV OF IRREGULAR SHAPED SPILLWAY

$Q = 3400$ CFS

DV/DR024
Worksheet for Circular Channel

Project Description	
Worksheet	DV024
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.013	
Slope	0.004200	ft/ft
Diameter	54	in

Results		
Depth	4.50	ft
Discharge	127.44	cfs
Flow Area	15.9	ft²
Wetted Perimeter	14.14	ft
Top Width	0.00	ft
Critical Depth	3.32	ft
Percent Full	100.0	%
Critical Slope	0.005239	ft/ft
Velocity	8.01	ft/s
Velocity Head	1.00	ft
Specific Energy	0.00	ft
Froude Number	0.00	
Maximum Discharg	137.08	cfs
Discharge Full	127.44	cfs
Slope Full	0.004200	ft/ft
Flow Type		

DV/DR036
Worksheet for Circular Channel

Project Description	
Worksheet	DV036
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.013	
Slope	0.002590	ft/ft
Diameter	84	in

Results		
Depth	7.00	ft
Discharge	325.10	cfs
Flow Area	38.5	ft²
Wetted Perimeter	21.99	ft
Top Width	0.00	ft
Critical Depth	4.75	ft
Percent Full	100.0	%
Critical Slope	0.004016	ft/ft
Velocity	8.45	ft/s
Velocity Head	1.11	ft
Specific Energy	0.00	ft
Froude Number	0.00	
Maximum Discharg	349.71	cfs
Discharge Full	325.10	cfs
Slope Full	0.002590	ft/ft
Flow Type		

ARIZONA DEPARTMENT OF TRANSPORTATION
DRAINAGE DESIGN SECTION

09-05-2001

PROJECT NAME- SDALE RD CORRID DMP TRACS NO.-
HIGHWAY NAME- PARADISE LN DESIGNER - GSB
LOCATION - JUST EAST OF 64TH ST CHECKER - PAGE
Ver 3.40: December 1995 DV038

DR/DV038

CURB OPENING INLET -- ON GRADE

GUTTER FLOW HYDRAULICS
GUTTER DESCRIPTION

Roadway Grade-% Per cent--G	=	0.500 ESTIMATED
Roadway Cross-Slope-Ft./Ft.--Sx	=	0.020
Shoulder Width-Ft.--	=	10.000
Shoulder Slope-Ft./Ft.--Ss	=	0.020
Gutter Width-Ft.--W	=	1.417
Gutter Slope-Ft./Ft.--Sw	=	0.059
Gutter Depression-Inches--	=	1.000
Manning's 'N	=	0.016
Flow-CFS--Q	=	4.274
SPREAD-Ft.--T	=	13.918
Average Velocity-V-fps	=	2.163
FLOW in Gutter-CFS--Q	=	1.204
% Flow in Gutter-CFS	=	28.175
Velocity of Flow in Gutter-fps	=	2.914
Depth at Curb Line-Inches--d	=	4.000 @ TC

CURB OPENING--ADOT STD. C-15.20

Flow-CFS--Q	=	4.274
Gutter Velocity at INLET-fps	=	3.871
GUTTER FLOW at INLET-CFS--Q	=	2.304
Depth at INLET Curb Line-Inches--d	=	7.540
Local Gutter Depression-Inches	=	4.000
Length of opening: TOTAL Intercept--Ft.	=	9.828
Capture Ratio -- CURB OPENING	=	0.800

LENGTH	Efficiency	Q(Captured)	Q(By-Pass)
3.083	0.492	2.104	2.171
6.583	0.864	3.693	0.582
9.583	0.999	4.269	0.006
13.583	1.000	4.274	0.000
20.583	1.000	4.274	0.000

4 CATCH BASINS: 2@L=10' ; 1@L=17' ; 1@L=20'
CAPACITY EA = ± 4CFS TOTAL CAPTURE = $\boxed{16CFS}$

ARIZONA DEPARTMENT OF TRANSPORTATION
DRAINAGE DESIGN SECTION

09-05-2001

PROJECT NAME- SDALE RD CORRID DMP TRACS NO.-
HIGHWAY NAME- 64 TH ST DESIGNER - GSB
LOCATION - JUST NORTH OF PARADISE LN CHECKER - PAGE
Ver 3.40: December 1995

DV/DR038

CURB OPENING INLET -- ON GRADE

GUTTER FLOW HYDRAULICS
GUTTER DESCRIPTION

Roadway Grade-% Per cent--G	=	1.000 APPROXIMATED FROM AS-BUILT
Roadway Cross-Slope-Ft./Ft.--Sx	=	0.020
Shoulder Width-Ft.--	=	10.000
Shoulder Slope-Ft./Ft.--Ss	=	0.020
Gutter Width-Ft.--W	=	1.417
Gutter Slope-Ft./Ft.--Sw	=	0.059
Gutter Depression-Inches--	=	1.000
Manning's 'N	=	0.016
Flow-CFS--Q	=	20.560
SPREAD-Ft.--T	=	22.251
Average Velocity-V-fps	=	4.120
FLOW in Gutter-CFS--Q	=	3.609
% Flow in Gutter-CFS	=	17.553
Velocity of Flow in Gutter-fps	=	5.557
Depth at Curb Line-Inches--d	=	6.000 @TC

CURB OPENING--ADOT STD. C-15.20

Flow-CFS--Q	=	20.560
Gutter Velocity at INLET-fps	=	6.189
GUTTER FLOW at INLET-CFS--Q	=	4.663
Depth at INLET Curb Line-Inches--d	=	7.881
Local Gutter Depression-Inches	=	2.000
Length of opening: TOTAL Intercept--Ft.	=	45.457
Capture Ratio -- CURB OPENING	=	0.800

LENGTH	Efficiency	Q(Captured)	Q(By-Pass)
3.083	0.119	2.442	18.119
6.583	0.245	5.046	15.515
9.583	0.347	7.134	13.426
13.583	0.472	9.708	10.853
20.583	0.662	13.615	6.945

4 CATCH BASINS TOTAL @ L=20' EA
CAPACITY EA = ±13 CFS TOTAL = 4×13 = $\boxed{52 CFS}$

ARIZONA DEPARTMENT OF TRANSPORTATION
DRAINAGE DESIGN SECTION

09-10-2001

PROJECT NAME- SDALE RD CORRID DMP   TRACS NO.-
HIGHWAY NAME- 64th AND GREENWAY - DIVERT   DESIGNER -
LOCATION - DY039   CHECKER -   PAGE
Ver 3.40: December 1995

CURB OPENING INLET -- ON GRADE

GUTTER FLOW HYDRAULICS
GUTTER DESCRIPTION

Roadway Grade-% Per cent--G	=	0.840
Roadway Cross-Slope-Ft./Ft.--Sx	=	0.020
Shoulder Width-Ft.--	=	10.000
Shoulder Slope-Ft./Ft.--Ss	=	0.020
Gutter Width-Ft.--W	=	1.416
Gutter Slope-Ft./Ft.--Sw	=	0.059
Gutter Depression-Inches--	=	0.999
Manning's 'N	=	0.016
Flow-CFS--Q	=	18.848
SPREAD-Ft.--T	=	22.253
Average Velocity-V-fps	=	3.776
FLOW in Gutter-CFS--Q	=	3.306
% Flow in Gutter-CFS	=	17.539
Velocity of Flow in Gutter-fps	=	5.093
Depth at Curb Line-Inches--d	=	6.000

CURB OPENING--ADOT STD. C-15.20

Flow-CFS--Q	=	18.848
Gutter Velocity at INLET-fps	=	5.672
GUTTER FLOW at INLET-CFS--Q	=	4.271
Depth at INLET Curb Line-Inches--d	=	7.881
Local Gutter Depression-Inches	=	2.000
Length of opening: TOTAL Intercept--Ft.	=	41.598
Capture Ratio -- CURB OPENING	=	0.800

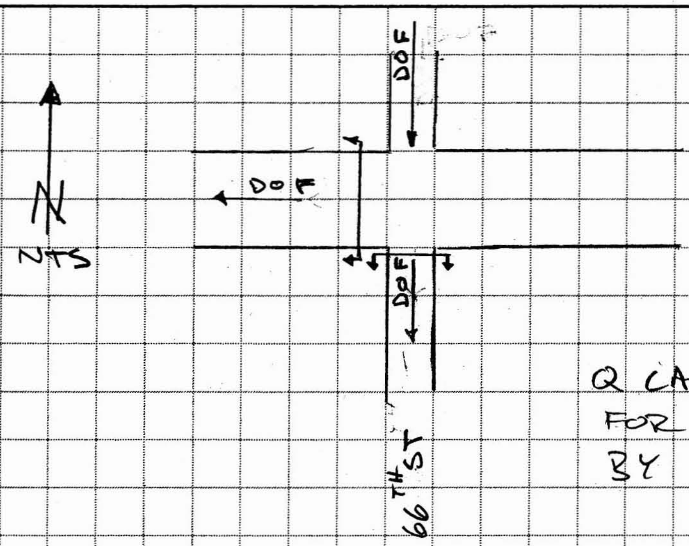
LENGTH	Efficiency	Q(Captured)	Q(By-Pass)
3.083	0.129	2.440	16.408
6.583	0.267	5.025	13.823
9.583	0.376	7.084	11.764
13.583	0.509	9.596	9.252
20.583	0.707	13.334	5.514

∴ 2 - 36 FT CB'S → Q = 35 CFS

Stanley Consultants INC.

Project No. 15586 Page No.
Subject FLOW SPLIT @ TBIRD & 66TH ST
DV043/DR043

Computed by Date
Checked by Date
Approved by Date
Sheet No. of



CROSS-SECTIONS ESTIMATED FROM SITE RECON. SEE ATTACHED.

Q CALCULATED BY NORMAL DEPTH FOR TBIRD SECTION. Q CALCULATED BY WEIR EQ. FOR 66TH ST.:

$Q = CLH^{3/2}$; $C = 2.6$, $L = 32$

	TBIRD		66TH ST		
ELEVATION	d	Q	H	Q	TOTAL Q
(TBIRD GUT) 100	0	0	0	0	0
100.25	.25	15	0	0	15
100.50	.50	95	0	0	95
100.75	.75	295	.25	10	305
101	1.0	570	.50	30	600
101.25	1.25	985	.75	55	1040
101.50	1.50	1440	1.0	85	1525
101.75	1.75	1960	1.25	115	2075

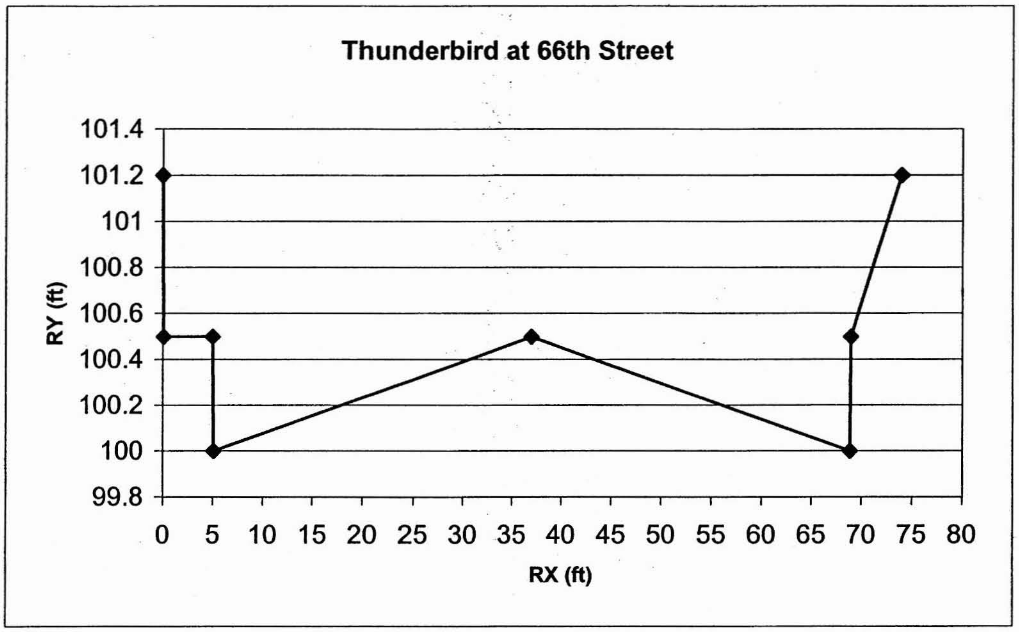
DI	0	15	95	305	600	1040	1525	2075
DQ	0	15	95	295	570	985	1440	1960

DV043 SPILLS OVER SOUTH SIDE OF TBIRD AND FLOWS DOWN 66TH STREET. DR043 FLOWS WEST ON TBIRD.

DY/DR043

T-bird @ 66th Street

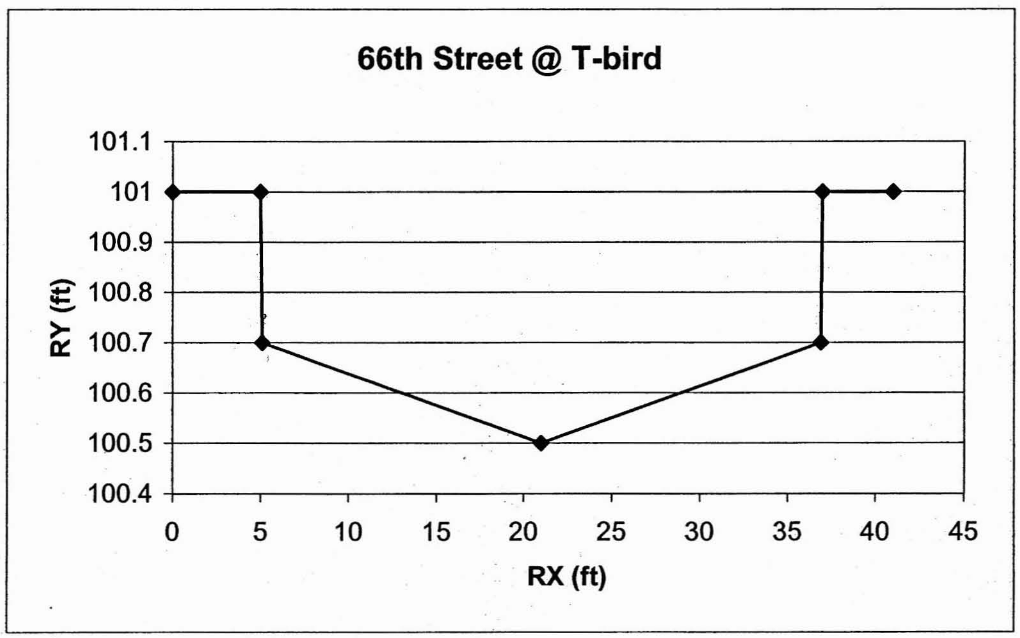
Hydraulic Section	
RX	RY
0	101.2
0.1	100.5
5	100.5
5.1	100
37	100.5
68.9	100
69	100.5
74	101.2



64-foot curb-to-curb width
5-foot sidewalk on left side
Natural ground (property) on right side
Slope from east to west on T-bird = 5.8ft / 225ft = 0.026
T-bird and 66th St cross-sections taken using same vertical control

66th Street @ T-bird

Hydraulic Section	
RX	RY
0	101
5	101
5.1	100.7
21	100.5
36.9	100.7
37	101
41	101



4-inch gutter height
Curb-to-curb width is 32 feet
4-foot sidewalk for right overbank
Natural ground for left overbank
T-bird and 66th St cross-sections taken using same vertical control

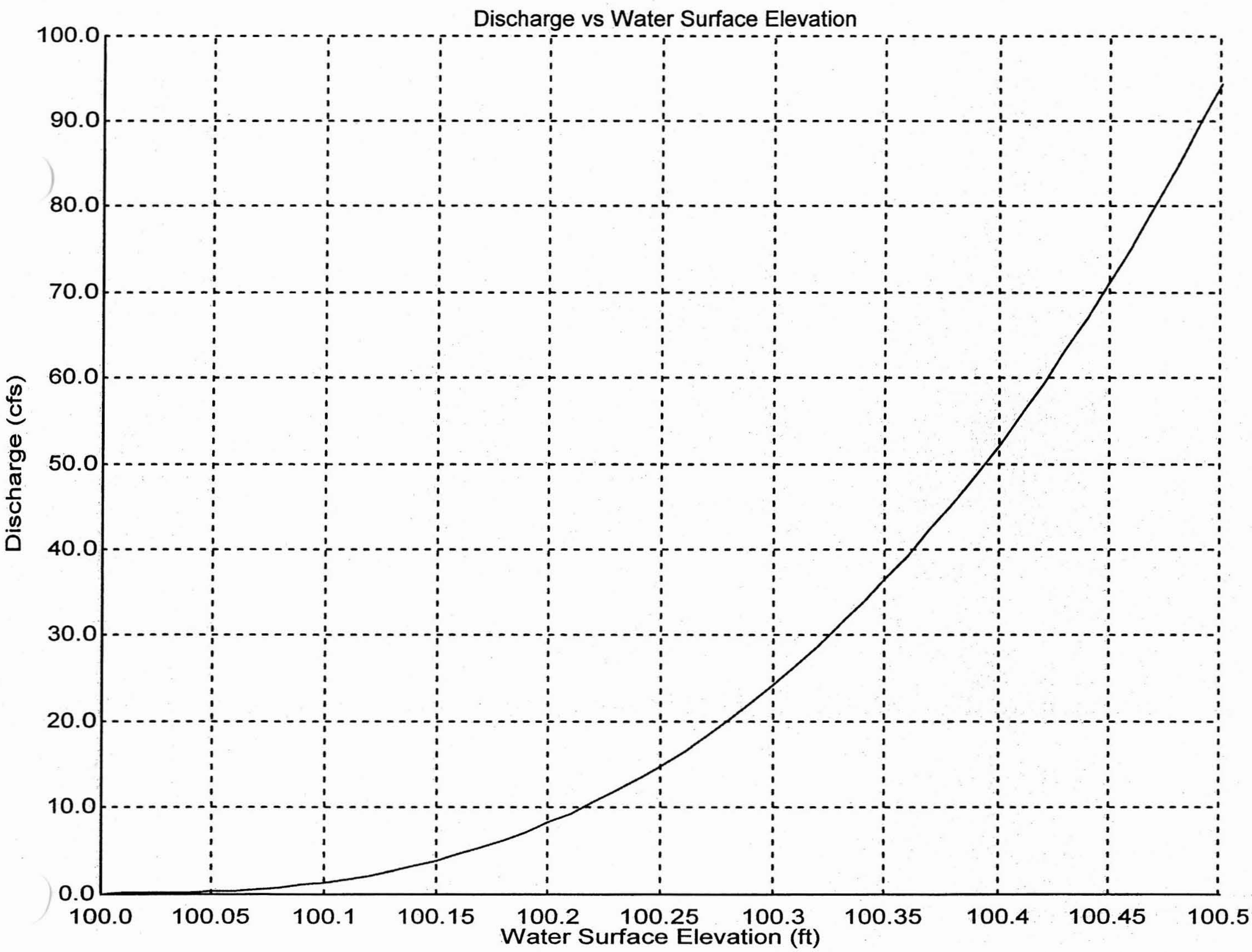
#15586
DY043/DR043

Curve
Plotted Curves for Irregular Channel

Project Description	
Project File	q:\15586\haestad\sci 1558.fm2
Worksheet	T-bird X-section @ 66th Street
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Constant Data	
Channel Slope	0.026000 ft/ft

Input Data			
	Minimum	Maximum	Increment
Water Surface Elevation	100.00	100.50	0.01 ft
	GUTTER	TOP-OF-CURB	



DY/DR043

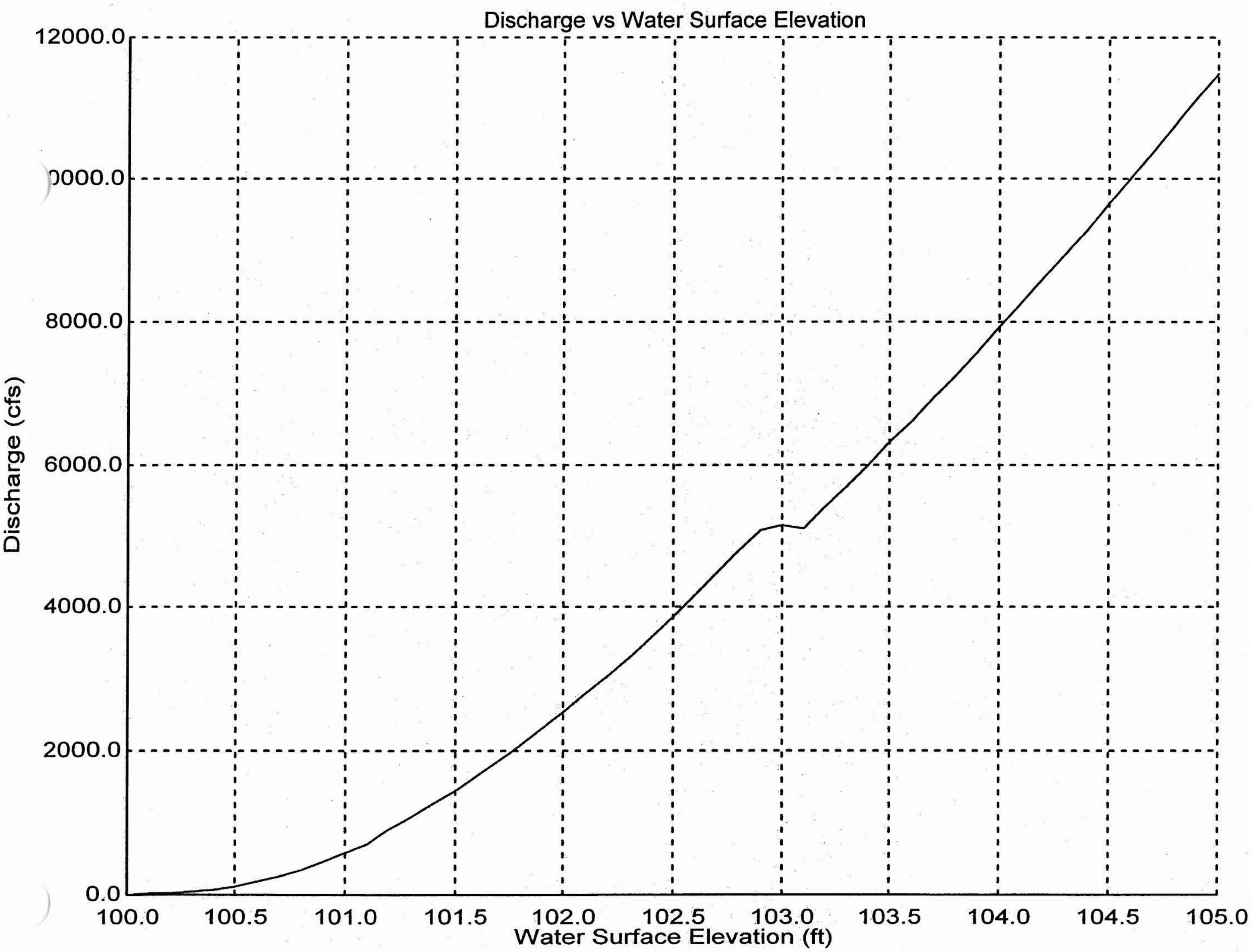
Curve
Plotted Curves for Irregular Channel

Project Description	
Project File	q:\15586\haestad\sci 1558.fm2
Worksheet	T-bird X-section @ 66th Street
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Constant Data	
Channel Slope	0.026000 ft/ft

Input Data	Minimum	Maximum	Increment
Water Surface Elevation	100.00	105.00	0.10 ft

GUTTER



DY/DR045

T-bird x-sect. @ 66th Street
Worksheet for Irregular Channel

Project Description	
Project File	q:\15586\haestad\sci 1558.fm2
Worksheet	T-bird X-section @ 66th Street
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data

Channel Slope 0.026000 ft/ft

Water Surface Elevation 100.50 ft

Elevation range: 100.00 ft to 105.00 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	105.00	0.00	5.00	0.025
0.10	100.50	5.00	69.00	0.016
5.00	100.50	69.00	74.10	0.030
5.10	100.00			
37.00	100.50			
68.90	100.00			
69.00	100.50			
74.00	101.20			
74.10	105.00			

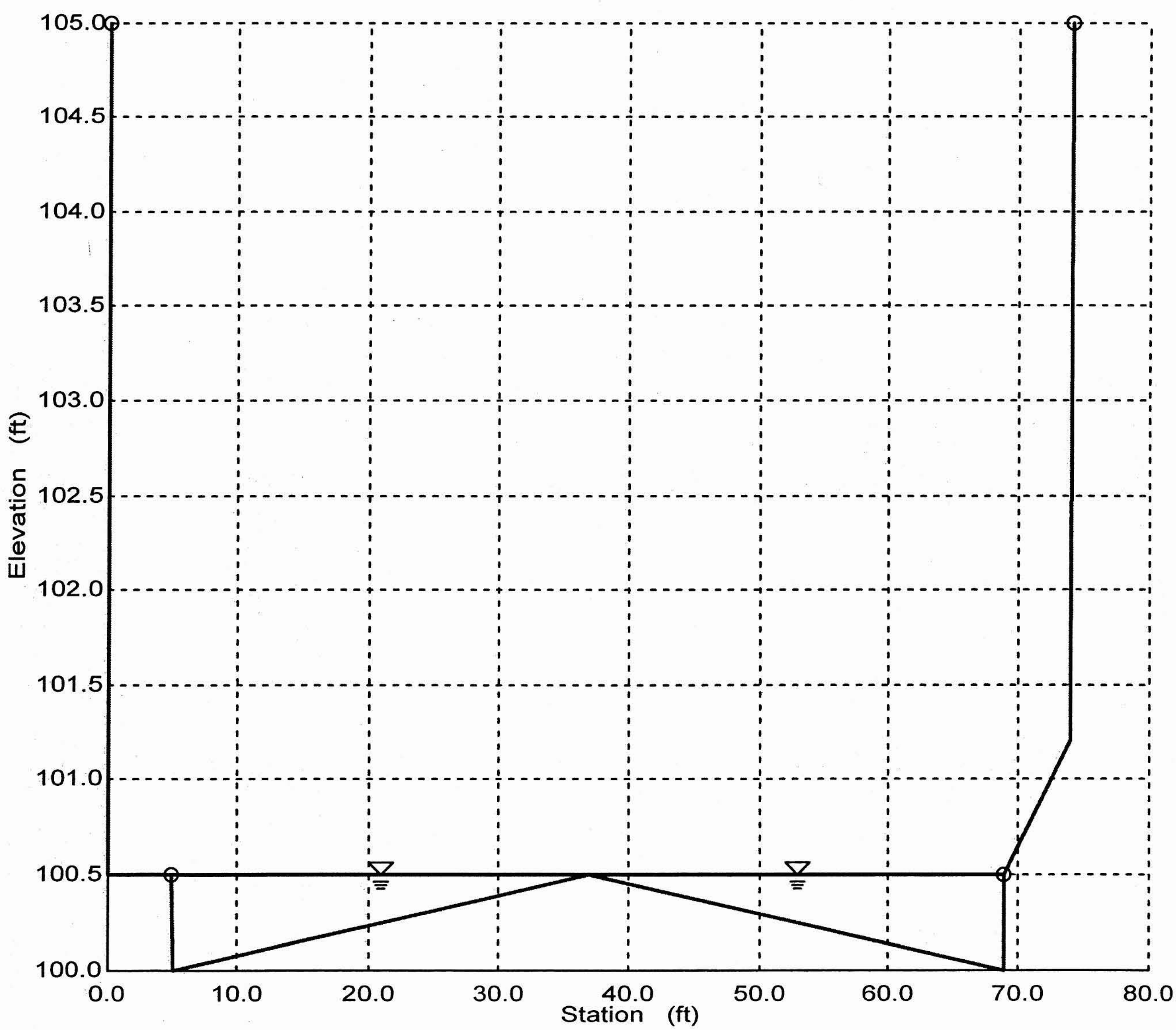
Results		
Wtd. Mannings Coefficient	0.016	
Discharge	94.27	cfs
Flow Area	16.00	ft²
Wetted Perimeter	64.83	ft
Top Width	64.00	ft
Height	0.50	ft
Critical Depth	100.66	ft
Critical Slope	0.005301	ft/ft
Velocity	5.89	ft/s
Velocity Head	0.54	ft
Specific Energy	101.04	ft
Froude Number	2.08	
Flow is supercritical.		
Flow is divided.		

DV/DR043

T-bird x-sect. @ 66th Street
Cross Section for Irregular Channel

Project Description	
Project File	q:\15586\haestad\sci 1558.fm2
Worksheet	T-bird X-section @ 66th Street
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data		
Wtd. Mannings Coefficient	0.016	
Channel Slope	0.026000	ft/ft
Water Surface Elevation	100.50	ft
Discharge	94.27	cfs



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Project No. 15586 Page No.

Subject DX044A / DR044A

Computed by Date

Checked by Date

Approved by Date

Sheet No. of

CATCH BASINS JUST NORTH OF CACTUS RD. ON 65TH PL.
FLOW SPLIT REFLECTS PORTION OF FLOW THAT WILL BE
CONVEYED EAST TO 66TH ST (DX044A) AND PORTION
OF FLOW THAT WILL BE CONVEYED WEST TO 64TH ST.

APPROXIMATELY 1/2 OF 1/3 OF THE TOTAL Q WILL
BE DIVERTED TO 64TH ST. CHANNEL

PEAK Q @ AD044 ≈ 295 CFS

$(1/3)\ 295\ \text{CFS} = 98\ \text{CFS}$

$(1/2)\ 98\ \text{CFS} = 49\ \text{CFS}$

∴ UP TO 49 CFS WILL BE CONVEYED BY THE
42-INCH SD FROM 65TH PL TO 64TH ST CHANNEL

SC 3004R4 898

DV/DR044A
Worksheet for Circular Channel

Project Description	
Worksheet	DV044A
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.013	
Slope	0.003000	ft/ft
Diameter	42	in

Results		
Depth	3.50	ft
Discharge	55.10	cfs
Flow Area	9.6	ft^2
Wetted Perimeter	11.00	ft
Top Width	0.00	ft
Critical Depth	2.32	ft
Percent Full	100.0	%
Critical Slope	0.004938	ft/ft
Velocity	5.73	ft/s
Velocity Head	0.51	ft
Specific Energy	0.00	ft
Froude Number	0.00	
Maximum Discharg	59.27	cfs
Discharge Full	55.10	cfs
Slope Full	0.003000	ft/ft
Flow Type		

DV/DR044B
Worksheet for Circular Channel

Project Description	
Worksheet	DV044B
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.013	
Slope	0.002600	ft/ft
Diameter	60	in

Results		
Depth	5.00	ft
Discharge	132.79	cfs
Flow Area	19.6	ft²
Wetted Perimeter	15.71	ft
Top Width	0.00	ft
Critical Depth	3.30	ft
Percent Full	100.0	%
Critical Slope	0.004355	ft/ft
Velocity	6.76	ft/s
Velocity Head	0.71	ft
Specific Energy	0.00	ft
Froude Number	0.00	
Maximum Discharg	142.85	cfs
Discharge Full	132.79	cfs
Slope Full	0.002600	ft/ft
Flow Type		

DV/DR046
Worksheet for Circular Channel

Project Description	
Worksheet	DV046
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.013	
Slope	0.004160	ft/ft
Diameter	96	in

Results		
Depth	8.00	ft
Discharge	588.24	cfs
Flow Area	50.3	ft^2
Wetted Perimeter	25.13	ft
Top Width	0.00	ft
Critical Depth	6.18	ft
Percent Full	100.0	%
Critical Slope	0.004688	ft/ft
Velocity	11.70	ft/s
Velocity Head	2.13	ft
Specific Energy	0.00	ft
Froude Number	0.00	
Maximum Discharg	632.77	cfs
Discharge Full	588.24	cfs
Slope Full	0.004160	ft/ft
Flow Type		

DY048/DR048 (MESCAL PARK)

60-INCH DIAMETER OUTLET PIPE FROM MESCAL PARK TO 71st ST CHANNEL
FRICTION SLOPE AND WATER SURFACE ELEVATION ESTIMATION

Manning's equation used to estimate Mescal Park outlet pipe friction slope, So:
Q = (1.49/n)(A)(Rh)2/3(So)1/2

n =	0.013
Diameter =	5 ft
Area =	19.625 sq ft
Wetted Perimeter =	15.7 ft
Hydraulic Radius =	1.25 ft
Pipe Invert @ Outfall	1351.14 ft
Top-of-Pipe @ Outfall	1356.14 ft
Pipe Length =	1200 ft

Q (cfs)	S_o (ft/ft)	Elevation at Cactus Park (ft)
1	0.0000	1356.1
102	0.0015	1358.0
148	0.0032	1360.0
166	0.0040	1361.0
182	0.0049	1362.0
205	0.0062	1363.5
218	0.0070	1364.5
224	0.0074	1365.0

Overflow spillway @ elev. 1363.5 ft

Q = 83 cfs is full flow capacity for 60" diameter storm drain, n = 0.013, S = 0.001

MESCAL PARK OVERFLOW:

$Q = CLH^{3/2}$; C = 3.0, L = 300 FT

EL	Q
1363.5	0
1364.5	900
1365.0	1655

→

EL	TOTAL Q
1354.5	0
1356	1
1358	102
1360	148
1361	166
1362	182
1363.5	205
1364.5	1,118
1365	1879

DY048 ROUTED THRU 60-INCH DIAM OUTLET PIPE
DR048 OVERFLOW ROUTED DOWN 68TH PL.

DI	0	200	1,118	1879
DQ	0	0	900	1655

DV/DR049, 1-18" DIAM SD
Worksheet for Circular Channel

Project Description	
Worksheet	DV049, 1-18" CONC. S
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.013	
Slope	0.005000	ft/ft
Diameter	18	in

Results		
Depth	1.50	ft
Discharge	7.43	cfs
Flow Area	1.8	ft²
Wetted Perimeter	4.71	ft
Top Width	0.00	ft
Critical Depth	1.06	ft
Percent Full	100.0	%
Critical Slope	0.007032	ft/ft
Velocity	4.20	ft/s
Velocity Head	0.27	ft
Specific Energy	0.00	ft
Froude Number	0.00	
Maximum Discharg	7.99	cfs
Discharge Full	7.43	cfs
Slope Full	0.005000	ft/ft
Flow Type		

DV/DR049, 1-24" DIAM SD
Worksheet for Circular Channel

Project Description	
Worksheet	DV049, 1-24" CONC. S
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.013	
Slope	0.005000	ft/ft
Diameter	24	in

Results		
Depth	2.00	ft
Discharge	16.00	cfs
Flow Area	3.1	ft²
Wetted Perimeter	6.28	ft
Top Width	0.00	ft
Critical Depth	1.44	ft
Percent Full	100.0	%
Critical Slope	0.006612	ft/ft
Velocity	5.09	ft/s
Velocity Head	0.40	ft
Specific Energy	0.00	ft
Froude Number	0.00	
Maximum Discharg	17.21	cfs
Discharge Full	16.00	cfs
Slope Full	0.005000	ft/ft
Flow Type		

DV/DR049, 1-30" DIAM SD
Worksheet for Circular Channel

Project Description	
Worksheet	DV049, 1-30" CONC. S
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.013	
Slope	0.005000	ft/ft
Diameter	30	in

Results		
Depth	2.50	ft
Discharge	29.00	cfs
Flow Area	4.9	ft²
Wetted Perimeter	7.85	ft
Top Width	0.00	ft
Critical Depth	1.84	ft
Percent Full	100.0	%
Critical Slope	0.006317	ft/ft
Velocity	5.91	ft/s
Velocity Head	0.54	ft
Specific Energy	0.00	ft
Froude Number	0.00	
Maximum Discharg	31.20	cfs
Discharge Full	29.00	cfs
Slope Full	0.005000	ft/ft
Flow Type		

DV/DR050
Worksheet for Circular Channel

Project Description	
Worksheet	DV050
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.013	
Slope	0.005400	ft/ft
Diameter	48	in

Results		
Depth	4.00	ft
Discharge	105.55	cfs
Flow Area	12.6	ft²
Wetted Perimeter	12.57	ft
Top Width	0.00	ft
Critical Depth	3.11	ft
Percent Full	100.0	%
Critical Slope	0.005992	ft/ft
Velocity	8.40	ft/s
Velocity Head	1.10	ft
Specific Energy	0.00	ft
Froude Number	0.00	
Maximum Discharg	113.54	cfs
Discharge Full	105.55	cfs
Slope Full	0.005400	ft/ft
Flow Type		

CURRENT DATE: 03-15-2002 FILE DATE: 03-15-2002
CURRENT TIME: 09:26:53 FILE NAME: WINDMILL

DY/DR054A
CULVERT @ GOLD DUST
BEHIND WINDMILL
PLAZA

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.0

CULV NO.	SITE DATA			CULVERT SHAPE, MATERIAL, INLET				
	INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)	BARRELS SHAPE MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	41.22	30.66	1600.03	1 RCB	10.00	3.00	.013	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs) FILE: WINDMILL DATE: 03-15-2002

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
41.22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	1
42.40	32.5	32.5	0.0	0.0	0.0	0.0	0.0	0.00	1
43.08	65.0	65.0	0.0	0.0	0.0	0.0	0.0	0.00	1
43.64	97.5	97.5	0.0	0.0	0.0	0.0	0.0	0.00	1
44.16	130.0	130.0	0.0	0.0	0.0	0.0	0.0	0.00	1
44.33	141.0	141.0	0.0	0.0	0.0	0.0	0.0	0.00	1
44.73	195.0	165.6	0.0	0.0	0.0	0.0	0.0	28.75	6
44.84	227.5	172.2	0.0	0.0	0.0	0.0	0.0	54.31	4
44.93	260.0	177.6	0.0	0.0	0.0	0.0	0.0	79.85	3
45.02	292.5	182.8	0.0	0.0	0.0	0.0	0.0	107.34	3
45.11	325.0	187.1	0.0	0.0	0.0	0.0	0.0	135.82	3
44.52	152.2	152.2	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: WINDMILL DATE: 03-15-2002

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
41.22	0.000	0.00	0.00	0.00
42.40	0.000	32.50	0.00	0.00
43.08	0.000	65.00	0.00	0.00
43.64	0.000	97.50	0.00	0.00
44.16	0.000	130.00	0.00	0.00
44.33	0.000	141.00	0.00	0.00
44.73	-0.006	195.00	0.62	0.32
44.84	-0.008	227.50	1.01	0.44
44.93	-0.005	260.00	2.55	0.98
45.02	-0.005	292.50	2.40	0.82
45.11	-0.004	325.00	2.06	0.63

<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

CULVERT @ GOLD DUS

CURRENT DATE: 03-15-2002 FILE DATE: 03-15-2002
CURRENT TIME: 09:26:53 FILE NAME: WINDMILL

PERFORMANCE CURVE FOR CULVERT 1 - 1(10.00 (ft) BY 3.00 (ft)) RCB

DIS- CHARGE FLOW (cfs)	HEAD- WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	41.22	0.00	-10.56	0-NF	0.00	0.00	0.00	0.00	0.00	0.00
32.50	42.40	1.18	-8.57	1-S2n	0.55	0.69	0.49	0.67	6.62	2.80
65.00	43.08	1.86	-7.93	1-S2n	0.86	1.10	0.80	0.98	8.15	3.49
97.50	43.64	2.42	-7.03	1-S2n	1.11	1.44	1.04	1.23	9.40	3.95
130.00	44.16	2.94	-5.86	1-S2n	1.34	1.74	1.24	1.43	10.47	4.30
141.00	44.33	3.11	-5.40	1-S2n	1.42	1.84	1.34	1.49	10.53	4.41
165.63	44.73	3.51	-4.26	1-S2n	1.57	2.05	1.45	1.77	11.45	4.83
172.18	44.84	3.62	-3.93	1-S2n	1.62	2.10	1.50	1.91	11.48	5.05
177.61	44.93	3.71	-3.65	1-S2n	1.65	2.14	1.54	2.05	11.50	5.24
182.76	45.02	3.80	-3.37	1-S2n	1.68	2.19	1.59	2.17	11.53	5.41
187.12	45.10	3.88	-3.13	1-S2n	1.71	2.22	1.62	2.29	11.55	5.57

El. inlet face invert 41.22 ft El. outlet invert 30.66 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **************

INLET STATION	0.00 ft
INLET ELEVATION	41.22 ft
OUTLET STATION	1600.00 ft
OUTLET ELEVATION	30.66 ft
NUMBER OF BARRELS	1
SLOPE (V/H)	0.0066
CULVERT LENGTH ALONG SLOPE	1600.03 ft

***** CULVERT DATA SUMMARY ************************

BARREL SHAPE	BOX
BARREL SPAN	10.00 ft
BARREL RISE	3.00 ft
BARREL MATERIAL	CONCRETE
BARREL MANNING'S n	0.013
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE (90-45 DEG.)
INLET DEPRESSION	NONE

CULVERT @ GOLD DUST

CURRENT DATE: 03-15-2002
CURRENT TIME: 09:26:53

FILE DATE: 03-15-2002
FILE NAME: WINDMILL

TAILWATER

******* REGULAR CHANNEL CROSS SECTION ****************

BOTTOM WIDTH	14.00 ft
SIDE SLOPE H/V (X:1)	5.0
CHANNEL SLOPE V/H (ft/ft)	0.007
MANNING'S n (.01-0.1)	0.030
CHANNEL INVERT ELEVATION	30.66 ft
CULVERT NO.1 OUTLET INVERT ELEVATION	30.66 ft

******* UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (cfs)	W.S.E. (ft)	FROUDE NUMBER	DEPTH (ft)	VEL. (f/s)	SHEAR (psf)
0.00	30.66	0.000	0.00	0.00	0.00
32.50	31.33	0.605	0.67	2.80	0.29
65.00	31.64	0.621	0.98	3.49	0.43
97.50	31.89	0.629	1.23	3.95	0.54
130.00	32.09	0.634	1.43	4.30	0.62
141.00	32.15	0.636	1.49	4.41	0.65
195.00	32.43	0.641	1.77	4.83	0.77
227.50	32.57	0.643	1.91	5.05	0.83
260.00	32.71	0.645	2.05	5.24	0.89
292.50	32.83	0.647	2.17	5.41	0.95
325.00	32.95	0.649	2.29	5.57	1.00

ROADWAY OVERTOPPING DATA

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH	1590.00 ft
CREST LENGTH	100.00 ft
OVERTOPPING CREST ELEVATION	44.52 ft

DV/DR061
Worksheet for Circular Channel

Project Description	
Worksheet	DV061
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.013	
Slope	0.005000	ft/ft
Diameter	36	in

Results		
Depth	3.00	ft
Discharge	47.16	cfs
Flow Area	7.1	ft²
Wetted Perimeter	9.42	ft
Top Width	0.00	ft
Critical Depth	2.24	ft
Percent Full	100.0	%
Critical Slope	0.006095	ft/ft
Velocity	6.67	ft/s
Velocity Head	0.69	ft
Specific Energy	0.00	ft
Froude Number	0.00	
Maximum Discharg	50.73	cfs
Discharge Full	47.16	cfs
Slope Full	0.005000	ft/ft
Flow Type		

DV/DR063A
Worksheet for Circular Channel

Project Description	
Worksheet	DV063A
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.013	
Slope	0.005000	ft/ft
Diameter	48	in

Results		
Depth	4.00	ft
Discharge	101.57	cfs
Flow Area	12.6	ft²
Wetted Perimeter	12.57	ft
Top Width	0.00	ft
Critical Depth	3.05	ft
Percent Full	100.0	%
Critical Slope	0.005777	ft/ft
Velocity	8.08	ft/s
Velocity Head	1.02	ft
Specific Energy	0.00	ft
Froude Number	0.00	
Maximum Discharg	109.25	cfs
Discharge Full	101.57	cfs
Slope Full	0.005000	ft/ft
Flow Type		

DV/DR067A
Worksheet for Circular Channel

Project Description	
Worksheet	DV067A
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.013	
Slope	0.002500	ft/ft
Diameter	30	in

Results		
Depth	2.50	ft
Discharge	20.51	cfs
Flow Area	4.9	ft^2
Wetted Perimeter	7.85	ft
Top Width	0.00	ft
Critical Depth	1.54	ft
Percent Full	100.0	%
Critical Slope	0.005133	ft/ft
Velocity	4.18	ft/s
Velocity Head	0.27	ft
Specific Energy	0.00	ft
Froude Number	0.00	
Maximum Discharg	22.06	cfs
Discharge Full	20.51	cfs
Slope Full	0.002500	ft/ft
Flow Type		

Stanley Consultants INC.

Project No. 15586 Page No.

Subject DY0673 - FLOW SPLIT AT 64TH ST & SHEA BLVD

Computed by B SCHACK Date 2-25-02

Checked by Date

Approved by Date

Sheet No. of

- FROTAGE ROAD ASSUMED EL = 104 FT
- CULVERT OVERTOPPING EL = 106 FT

EL	CULVERT CAPACITY	FRONTAG ROAD CAPACITY	TOTAL CAPACITY
104	381	—	381
105	523	156	679
106	654	472	1126

DI	0	381	679	1126
DQ	0	381	523	654

(SEE ATTACHED HY-8 REPORT & NORMAL DEPTH RATING CURVE)

SC 3004R4 898

Table
Rating Table for Rectangular Channel

Project Description	
Worksheet	RR059B, 64th St/Shea Blvd Frontage Roa
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data	
Mannings Coefficient	0.016
Slope	0.005000 ft/ft
Bottom Width	25.00 ft

Attribute	Minimum	Maximum	Increment
Depth (ft)	0.00	2.00	0.25

EL
'04

Depth (ft)	Discharge (cfs)	Velocity (ft/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)
0.00	N/A	N/A	N/A	N/A	N/A
0.25	16.07	2.57	6.2	25.50	25.00
0.50	50.38	4.03	12.5	26.00	25.00
0.75	97.77	5.21	18.8	26.50	25.00
1.00	155.96	6.24	25.0	27.00	25.00
1.25	223.47	7.15	31.3	27.50	25.00
1.50	299.21	7.98	37.5	28.00	25.00
1.75	382.32	8.74	43.7	28.50	25.00
2.00	472.11	9.44	50.0	29.00	25.00

05

CURRENT DATE: 02-25-2002
CURRENT TIME: 13:58:03

FILE DATE: 02-25-2002
FILE NAME: SHEA64TH

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.0

CULV NO.	SITE DATA			CULVERT SHAPE, MATERIAL, INLET				
	INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)	BARRELS SHAPE MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	100.21	100.00	35.00	2 RCB	10.00	4.00	.013	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs) FILE: SHEA64TH DATE: 02-25-2002

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
100.21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	1
102.58	120.0	120.0	0.0	0.0	0.0	0.0	0.0	0.00	1
103.05	240.0	240.0	0.0	0.0	0.0	0.0	0.0	0.00	1
103.50	309.0	309.0	0.0	0.0	0.0	0.0	0.0	0.00	1
104.68	480.0	480.0	0.0	0.0	0.0	0.0	0.0	0.00	1
105.57	600.0	600.0	0.0	0.0	0.0	0.0	0.0	0.00	1
106.24	720.0	682.2	0.0	0.0	0.0	0.0	0.0	35.65	4
106.54	840.0	715.6	0.0	0.0	0.0	0.0	0.0	120.15	3
106.81	960.0	736.5	0.0	0.0	0.0	0.0	0.0	222.18	3
107.08	1080.0	735.7	0.0	0.0	0.0	0.0	0.0	340.24	3
107.32	1200.0	733.4	0.0	0.0	0.0	0.0	0.0	460.80	3
106.00	653.6	653.6	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

104.00 381
105.00 523

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: SHEA64TH DATE: 02-25-2002

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
100.21	0.000	0.00	0.00	0.00
102.58	0.000	120.00	0.00	0.00
103.05	0.000	240.00	0.00	0.00
103.50	0.000	309.00	0.00	0.00
104.68	0.000	480.00	0.00	0.00
105.57	0.000	600.00	0.00	0.00
106.24	-0.005	720.00	2.12	0.29
106.54	-0.008	840.00	4.26	0.51
106.81	-0.002	960.00	1.33	0.14
107.08	-0.006	1080.00	4.11	0.38
107.32	-0.008	1200.00	5.80	0.48

<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

CURRENT DATE: 02-25-2002
CURRENT TIME: 13:58:03

FILE DATE: 02-25-2002
FILE NAME: SHEA64TH

PERFORMANCE CURVE FOR CULVERT 1 - 2(10.00 (ft) BY 4.00 (ft)) RCB

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	100.21	0.00	-0.21	0-NF	0.00	0.00	0.00	0.00	0.00	0.00
120.00	102.58	1.78	2.37	1-S2n	0.84	1.04	0.88	1.63	6.85	5.25
240.00	103.05	2.79	2.84	1-S2n	1.31	1.65	1.41	2.35	8.49	6.42
309.00	103.50	3.29	3.14	1-S2n	1.55	1.95	1.68	2.68	9.17	6.90
480.00	104.68	4.47	4.04	5-S2n	2.09	2.62	2.30	3.36	10.43	7.78
600.00	105.57	5.36	4.94	5-S2n	2.43	3.04	2.69	3.75	11.15	8.26
682.24	106.24	6.03	5.70	4-FFt	2.66	3.31	2.66	4.10	12.83	8.68
715.60	106.54	6.33	6.20	4-FFt	2.75	3.42	2.75	4.42	13.01	9.04
736.49	106.82	6.52	6.61	4-FFt	2.81	3.49	4.00	4.71	9.21	9.36
735.65	107.09	6.51	6.88	4-FFt	2.80	3.48	4.00	4.98	9.20	9.66
733.39	107.33	6.49	7.12	4-FFt	2.80	3.48	4.00	5.24	9.17	9.93

El. inlet face invert 100.21 ft El. outlet invert 100.00 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **************

INLET STATION	0.00 ft
INLET ELEVATION	100.21 ft
OUTLET STATION	35.00 ft
OUTLET ELEVATION	100.00 ft
NUMBER OF BARRELS	2
SLOPE (V/H)	0.0060
CULVERT LENGTH ALONG SLOPE	35.00 ft

***** CULVERT DATA SUMMARY ************************

BARREL SHAPE	BOX
BARREL SPAN	10.00 ft
BARREL RISE	4.00 ft
BARREL MATERIAL	CONCRETE
BARREL MANNING'S n	0.013
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE (90-45 DEG.)
INLET DEPRESSION	NONE

CURRENT DATE: 02-25-2002 FILE DATE: 02-25-2002
CURRENT TIME: 13:58:03 FILE NAME: SHEA64TH

TAILWATER

******* REGULAR CHANNEL CROSS SECTION ****************

BOTTOM WIDTH	10.00 ft
SIDE SLOPE H/V (X:1)	2.5
CHANNEL SLOPE V/H (ft/ft)	0.006
MANNING'S n (.01-0.1)	0.025
CHANNEL INVERT ELEVATION	100.00 ft
CULVERT NO.1 OUTLET INVERT ELEVATION	100.00 ft

******* UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (cfs)	W.S.E. (ft)	FROUDE NUMBER	DEPTH (ft)	VEL. (f/s)	SHEAR (psf)
0.00	100.00	0.000	0.00	0.00	0.00
120.00	101.63	0.726	1.63	5.25	0.61
240.00	102.35	0.738	2.35	6.42	0.88
309.00	102.68	0.742	2.68	6.90	1.00
480.00	103.36	0.749	3.36	7.78	1.26
600.00	103.75	0.752	3.75	8.26	1.40
720.00	104.10	0.756	4.10	8.68	1.53
840.00	104.42	0.758	4.42	9.04	1.65
960.00	104.71	0.761	4.71	9.36	1.76
1080.00	104.98	0.763	4.98	9.66	1.87
1200.00	105.24	0.765	5.24	9.93	1.96

ROADWAY OVERTOPPING DATA

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH	32.00 ft
CREST LENGTH	100.00 ft
OVERTOPPING CREST ELEVATION	106.00 ft

Gage Data, IDF Curves, Photographs and Normal Depth Calculations

71ST ST CHANNEL
FLOODING PHOTOS
& STORM FREQUENCY
ESTIMATION

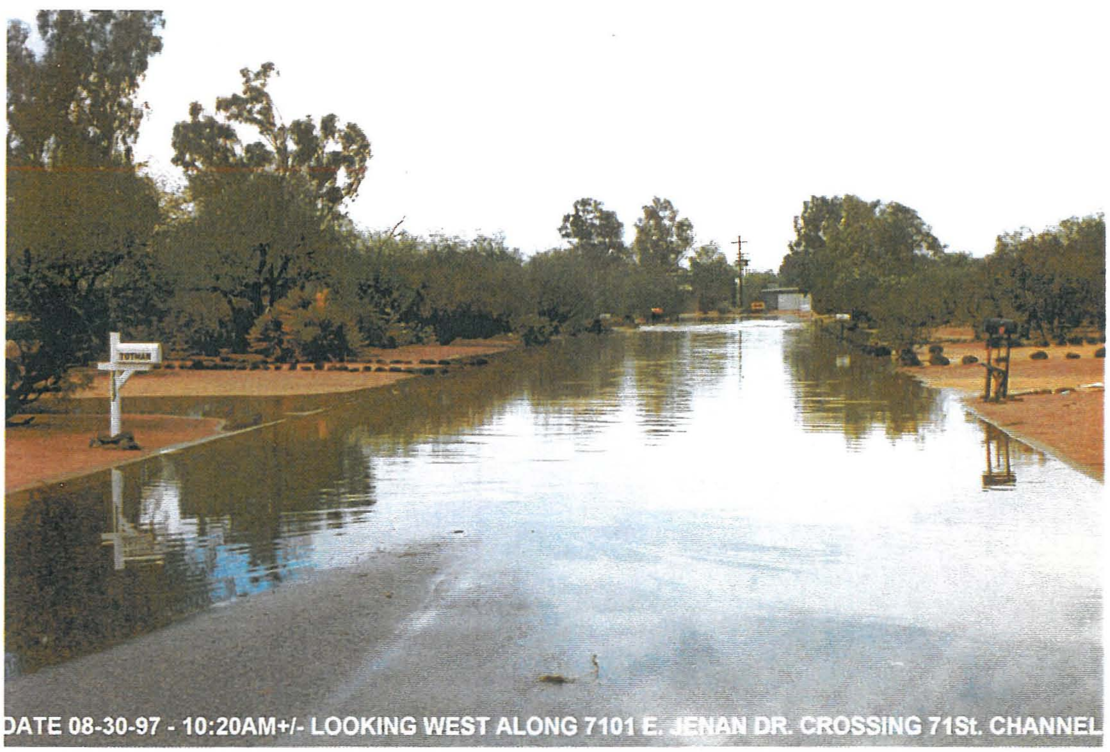

NORTH FROM E. JENAN DR.


10.20AM+/- 71St. CHANNEL
SOUTH FROM E. JENAN DR.

DATE 08-30-97 - 10:20AM+/- 71ST. CHANNEL LOOKING SOUTH ACCROSS E. JENAN DR.

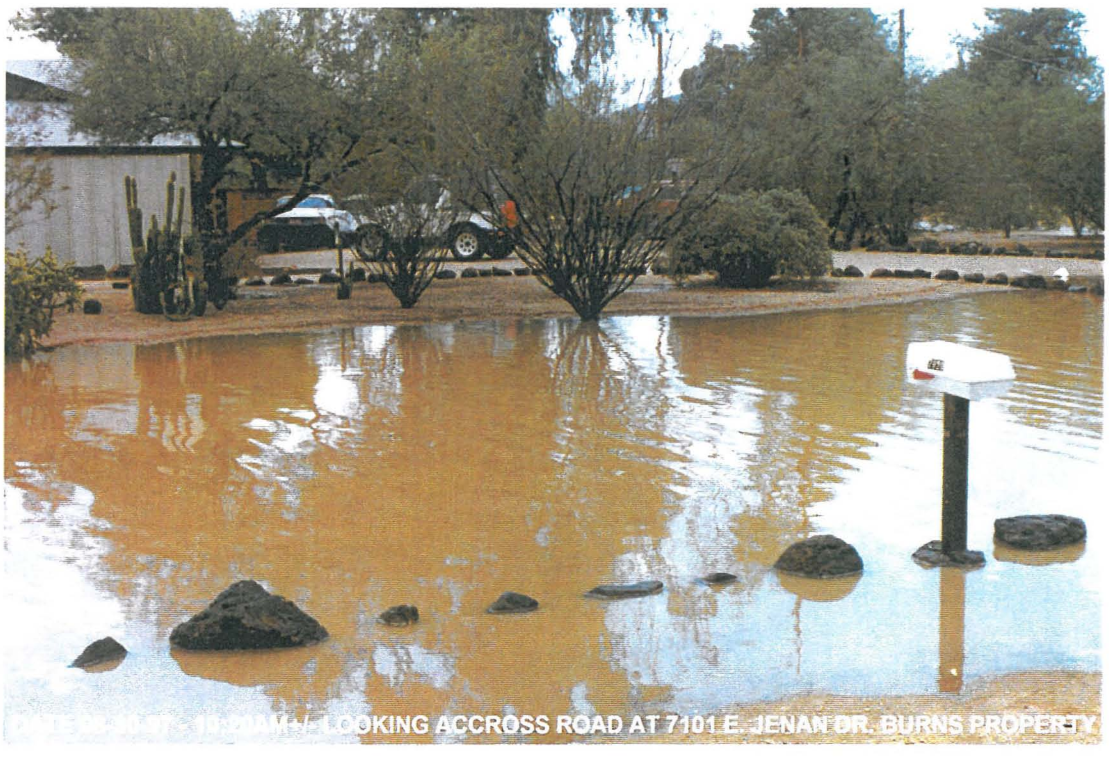
DATE 08-30-97 - 10:20[illegible] LOOKING [illegible] E. JENAN [illegible]

DATE 08-30-97 - 10:20AM+/- AT 71 St. CHANNEL LOOKING WEST ALONG 7101 E. JENAN DR.



DATE 08-30-97 - 10:20AM+/- LOOKING WEST ALONG 7101 E. JENAN DR. CROSSING 71St. CHANNEL

DATE 08-30-97 - 10:20AM+/- LOOKING SOUTHW



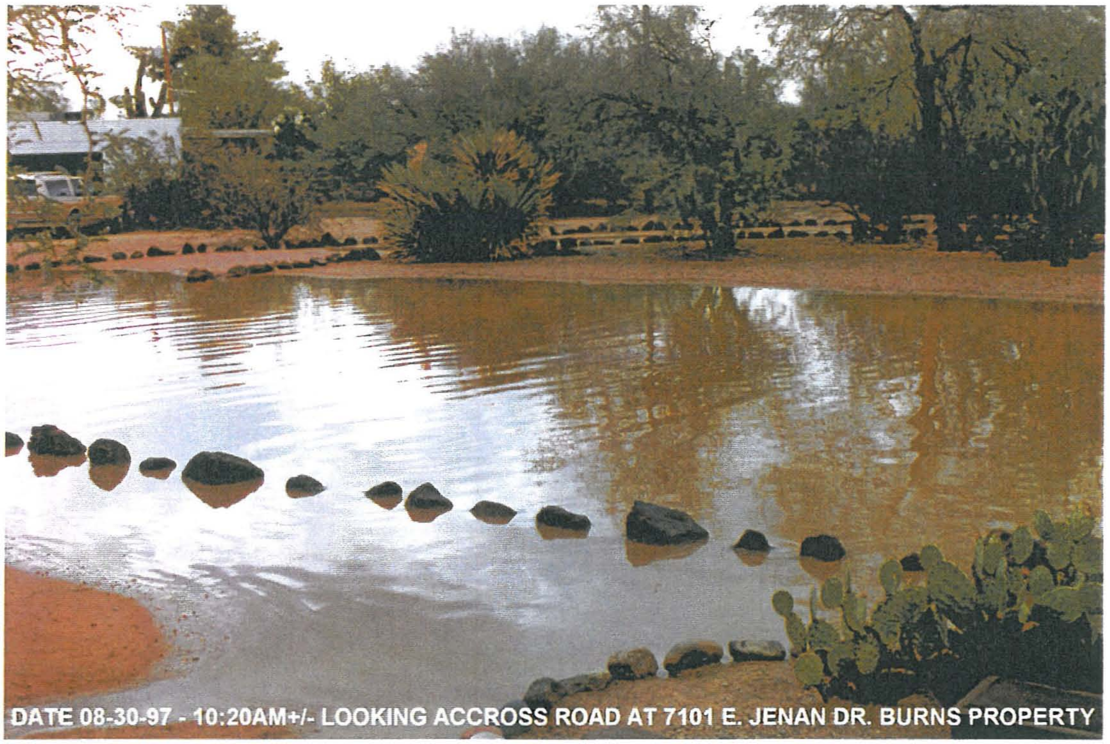
OKING ACCROSS ROAD AT 7101 E. JENAN DR. BURNS PROPERTY

DATE 08-30-97 - 10:20AM+/- LOOKING WEST ALONG E. JENAN DR.
BURNS PROPERTY TO THE LEFT

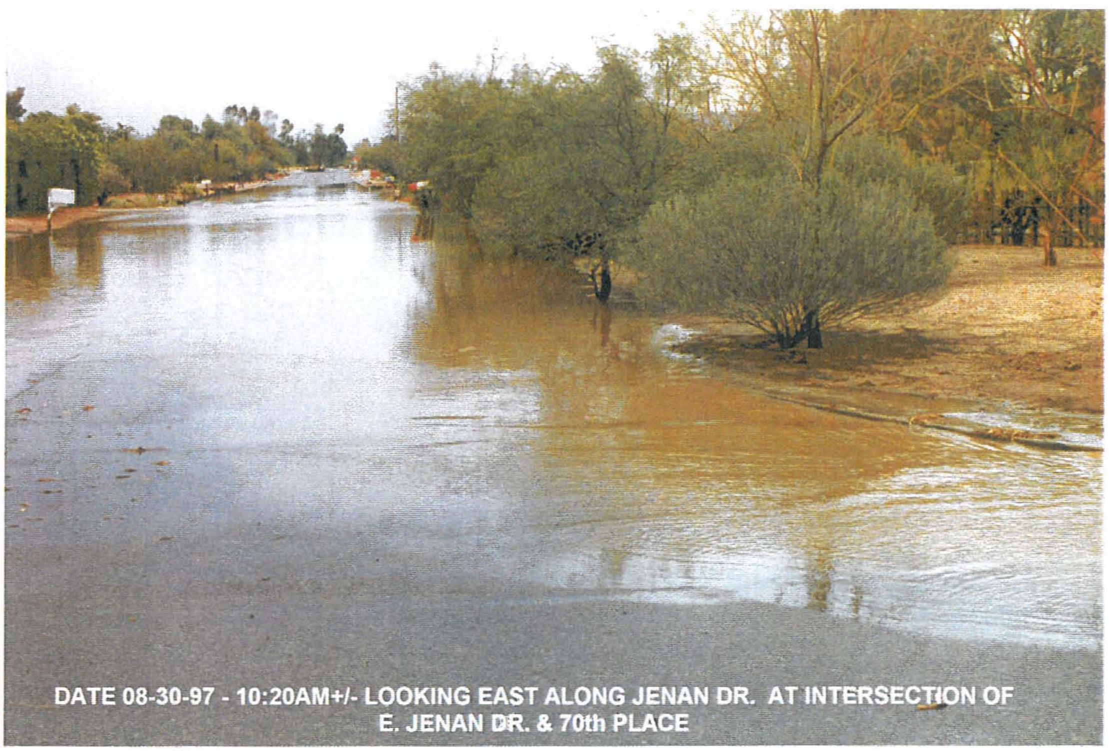
DATE 08-30-97 - 10:20AM+/- LOOKING ACCROSS ROAD AT 7101 [illegible] D[illegible]URNS PROPERTY

DATE 08-30-97 - 10:20AM+/- LOOKING EAST ALONG JENAN DR. FROM THE INTERSECTION OF E. JENAN DR. & 70th PLACE

DATE 08-30-97 - 10:20AM+/- LOOKING AT 7101 E. JENAN DR. BURNS PROPERTY



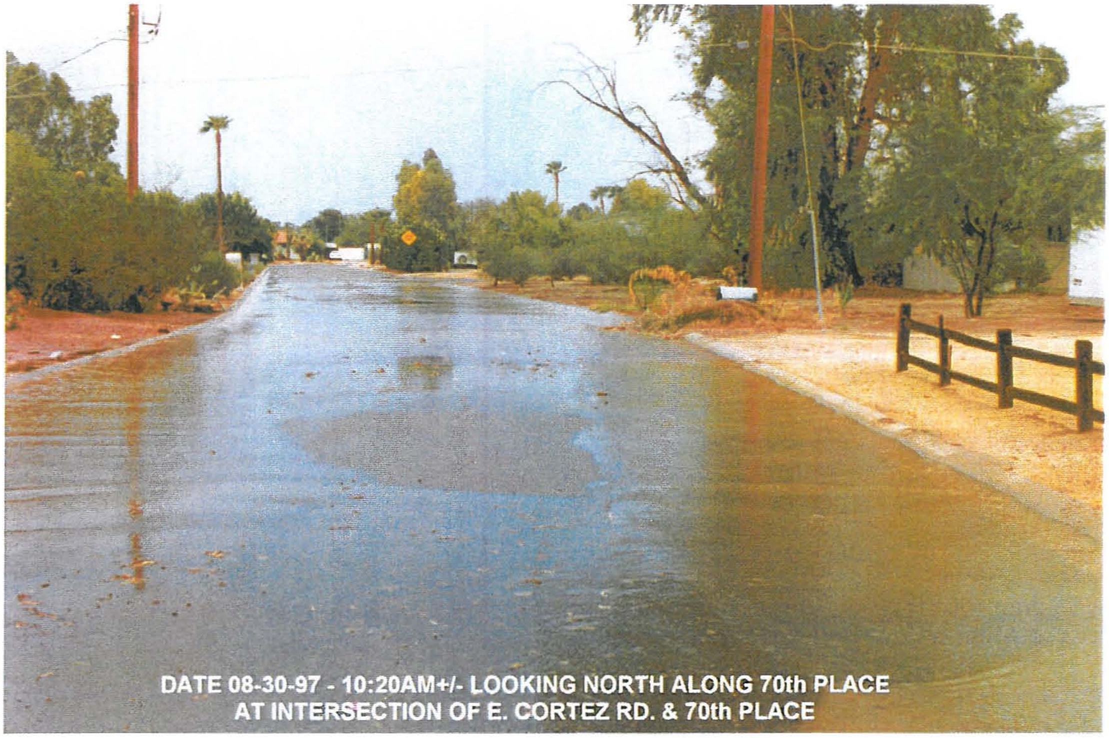
DATE 08-30-97 - 10:20AM+/- LOOKING ACCROSS ROAD AT 7101 E. JENAN DR. BURNS PROPERTY



DATE 08-30-97 - 10:20AM+/- LOOKING EAST ALONG JENAN DR. AT INTERSECTION OF
E. JENAN DR. & 70th PLACE

DATE 08-30-97 - 10:20AM+/- LOOKING SOUTHWEST ACROSS ROAD AT
7101 E. JENAN DR. BURNS NORTHWEST PROPERTY CORNER

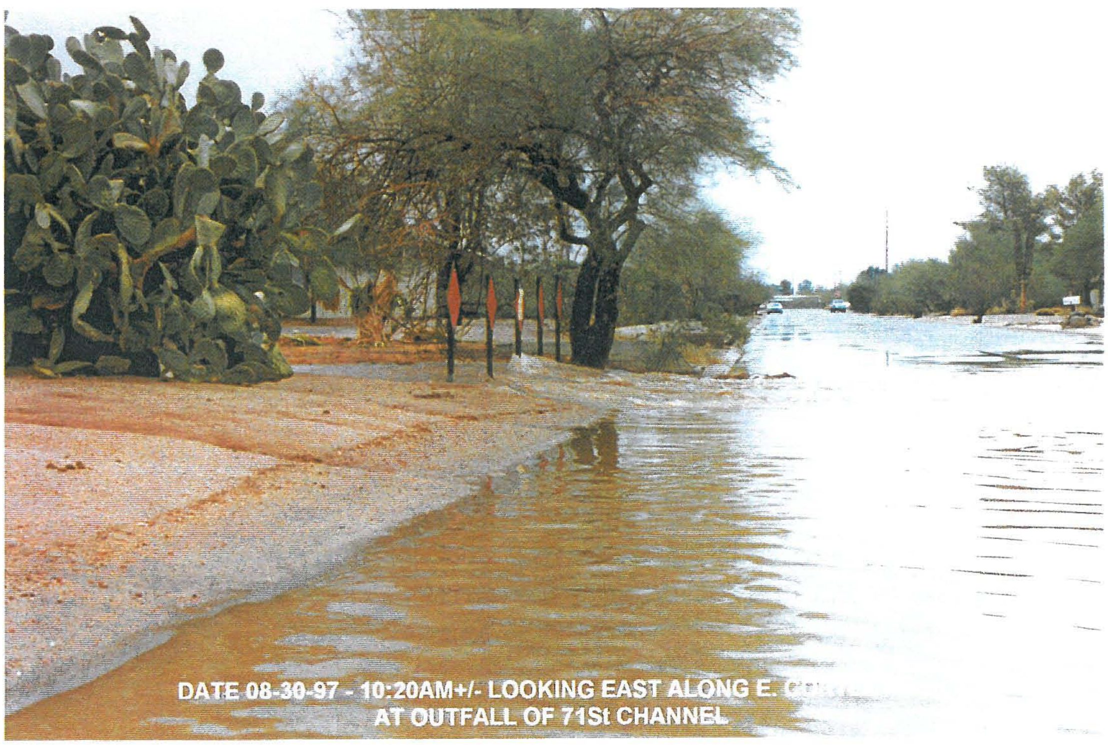
DATE 08-30-97 - 10:20AM+/- LOOKING SOUTH ALONG 70th PLACE
AT INTERSECTION OF E. JENAN DR. & 70th PLACE



DATE 08-30-97 - 10:20AM+/- LOOKING NORTH ALONG 70th PLACE
AT INTERSECTION OF E. CORTEZ RD. & 70th PLACE

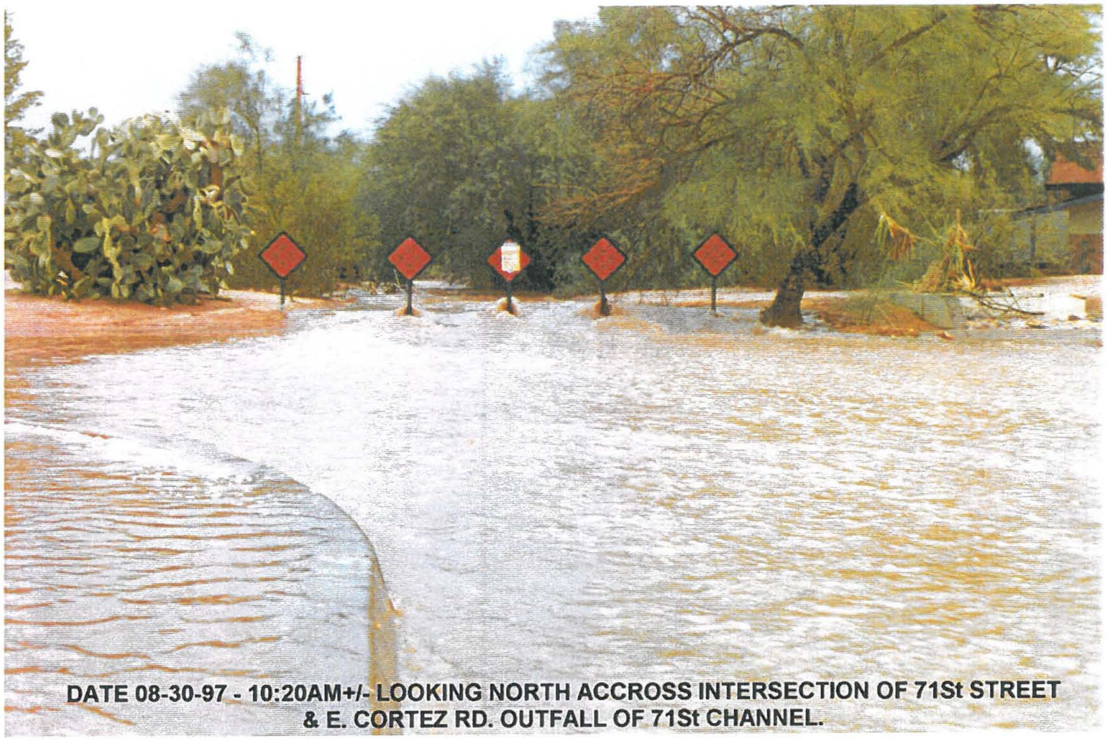
DATE 08-30-97 - 10:20AM+/- LOOKING AT NORTHEAST CORNER OF
INTERSECTION E. CORTEZ RD. & 70th PLACE

DATE 08-30-97 - 10:20AM+/- LOOKING AT NORTHWEST CORNER OF
INTERSECTION E. CORTEZ RD. & 70th PLACE



DATE 08-30-97 - 10:20AM+/- LOOKING EAST ALONG E. C
AT OUTFALL OF 71St CHANNEL

APPROX 70 CFS



DATE 08-30-97 - 10:20AM+/- LOOKING NORTH ACCROSS INTERSECTION OF 71St STREET & E. CORTEZ RD. OUTFALL OF 71St CHANNEL.

8/30/97 STORM EVENT
THUNDERBIRD
ACADEMY PRECIP.
GAGE

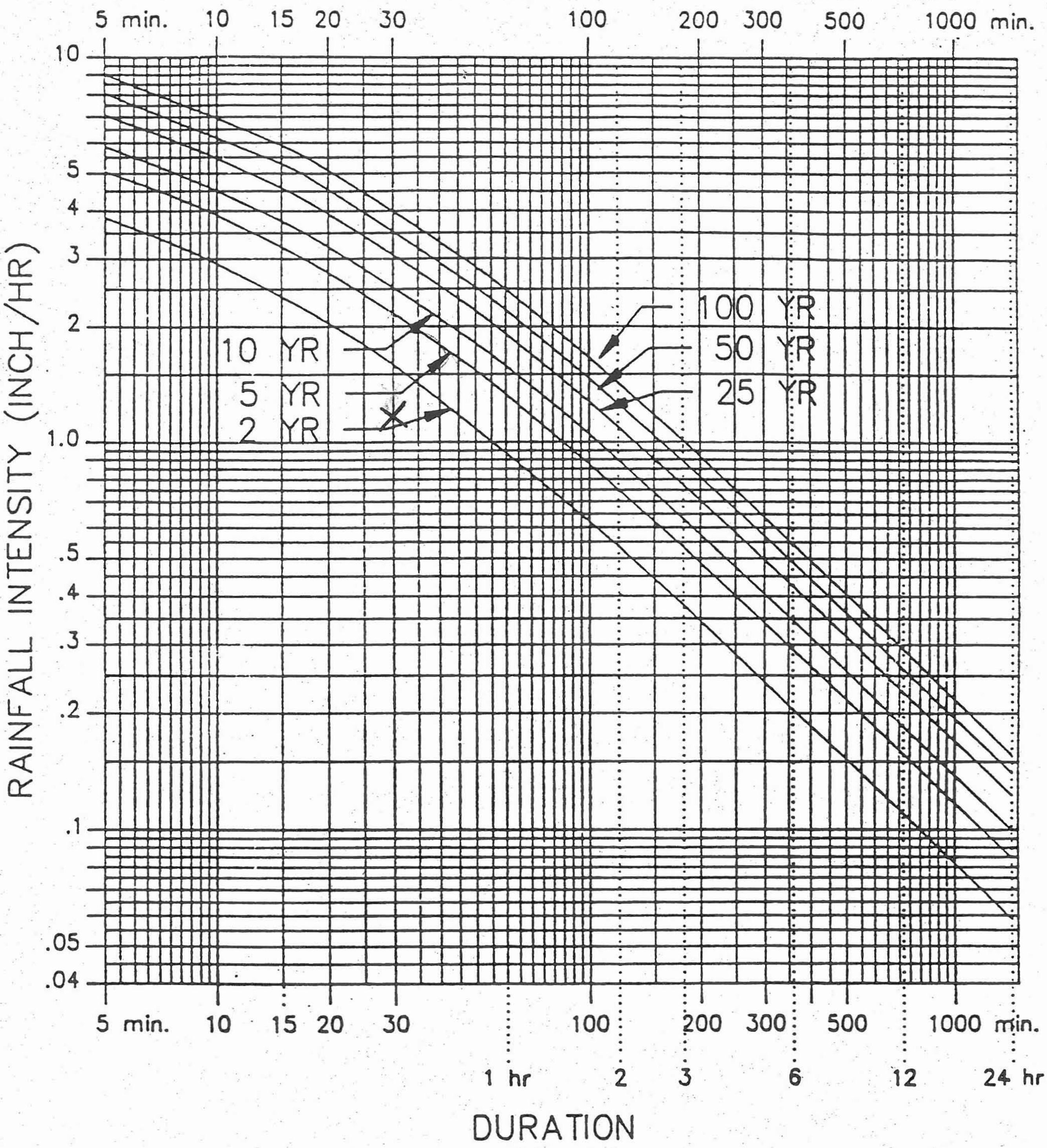


Figure 3.2
Rainfall Intensity-Duration-Frequency Relation
(Phoenix Metro Area)

FCD HYDROLOGY, VOLUME I

FCDMC ALERT System Data Display

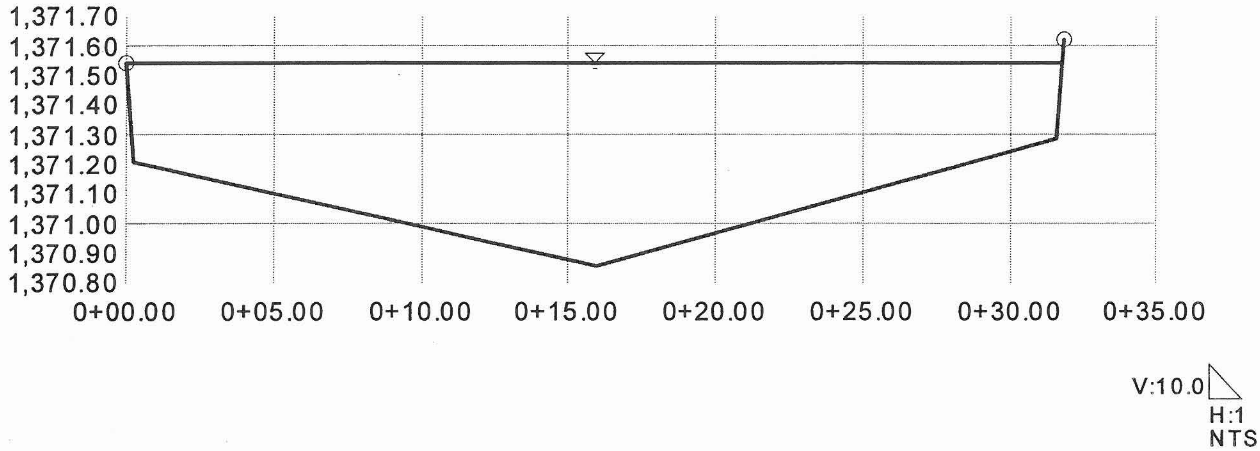
4630 Thunderbird Academy
Precipitation Gage

Date	Time	inches	Rate/hour
08/30/1997	10:14:37	4.06	0.62
08/30/1997	10:10:47	4.02	1.28
08/30/1997	10:08:56	3.98	1.34
08/30/1997	10:07:10	3.94	2.12
08/30/1997	10:06:03	3.90	1.94
08/30/1997	10:04:50	3.86	2.10
08/30/1997	10:02:35	3.78	1.65
08/30/1997	10:01:09	3.74	1.45
08/30/1997	09:59:31	3.70	1.21
08/30/1997	09:55:37	3.62	0.92
08/30/1997	09:50:28	3.54	0.81
08/30/1997	09:47:33	3.50	0.78
08/30/1997	09:44:32	3.46	0.00

71st Street Top-of-Curb Capacity, Station 360+88
Cross Section for Irregular Channel

Project Description	
Worksheet	71st St Normal Depth
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data		
Mannings Coefficient	0.016	
Slope	0.006700	ft/ft
Water Surface Elevation	1,371.54	ft
Elevation Range	1,370.86 to 1,371.62	
Discharge	70.77	cfs



71st Street Top-of-Curb Capacity, Station 360+88
Worksheet for Irregular Channel

Project Description	
Worksheet	71st St Normal Depth
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data		
Slope	0.006700	ft/ft
Water Surface Elevation	1,371.54	ft

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Metho	Horton's Method

Results		
Mannings Coefficient	0.016	
Elevation Range	1,370.86 to 1,371.62	
Discharge	70.77	cfs
Flow Area	15.3	ft²
Wetted Perimeter	32.10	ft
Top Width	31.80	ft
Actual Depth	0.68	ft
Critical Elevation	1,371.60	ft
Critical Slope	0.004667	ft/ft
Velocity	4.63	ft/s
Velocity Head	0.33	ft
Specific Energy	1,371.87	ft
Froude Number	1.18	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+31.86	0.016

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	1,371.54
0+00.25	1,371.21
0+15.93	1,370.86
0+31.61	1,371.29
0+31.86	1,371.62

Stanley Consultants INC.

Project No. 15586 Page No.

Subject 71st ST X-SECT - NORMAL DEPTH CALCULATION DATA X-SECT & CHNL SLOPE

Computed by Date

Checked by Date

Approved by Date

Sheet No. of

HEC-RAS STATION 360+88

STATION	ELEV
0	1371.54
.25	1371.21
15.93	1370.86
31.61	1371.29
31.86	1371.62

$$\text{slope} = \frac{1372.05 - 1369.45}{387.42} = 0.0067 \ FT/FT$$

Level Pool Data

Table 4.0. Summary of 100- and 10-Year, 6-Hour Level Pool Data (HEC-1 15586C.DAT and 15586C10.DAT, Respectively)

HEC-1 ID	Basin Name	Low Elevation (ft)	Overflow Elevation (ft)	Storage Volume at Overflow Elevation (ac-ft)	Total 6-Hr Peak Inflow (cfs)		Total 6-Hr Peak Outflow (cfs)		Peak Stage (ft)		Volume in Storage at 6-Hr Peak Stage (ac-ft)	
					100-Yr	10-Yr	100-Yr	10-Yr	100-Yr	10-Yr	100-Yr	10-Yr
LP019*	Airport	1426.7	1432.0	33.6	1307	620	587	331	1432.1	1429.9	33.6	16.4
LP021*^	Thunderbird Industrial	1426.0	1430.0	4.4	355	181	339	160	1430.7	1430.3	5.6	4.9
LP020B*	Cactus	1370.0	1387.8	92.2	1823	830	749	40	1388.9	1385.9	92.2	69.7
LP031A	Kierland #1	54.5	76.0	57.9	1142	548	108	15	75.0	69.0	50.9	16.9
LP033	Kierland #2	35.0	65.0	230.0	320	136	**	**	42.5	40.5	25.6	17.3
LP034	Kierland #3	32.0	42.0	26.0	401	211	120	18	40.9	38.0	23.0	14.7
LP040	Kierland #4	31.0	40.0	20.6	857	341	578	116	39.7	38.1	19.1	12.1
LP041*	Sandpiper	25.0	33.5	29.4	583	119	56	36	33.6	29.6	29.4	6.2
LP048*	Mescal	1354.5	1363.5	38.1	713	394	338	147	1363.7	1360.6	38.1	21.3
LP061*	Jackrabbit	1463.0	1470.0	41.6	901	456	121	50	1470.7	1469.0	41.6	29.4
LP062*	Crossed Arrows	1432.0	1438.0	25.8	662	301	236	56	1438.3	1437.1	25.8	18.4
LP063*^	Thunderbird Road	1412.0	1417.0	5.1	412	192	386	137	1417.9	1417.1	5.1	5.4
				604.7							**390.0**	**232.7**

*Basins that overflow for the 100-year, 6-hour event

^Basins that overflow for the 10-year, 6-hour event

**No outflow except by small diameter bleedoff pipe

Note: Approximate Total Volume of 100-yr, 6-hr Hydrograph at AD070 = 660 ac-ft

Note: Approximate Total Volume of 10-yr, 6-hr Hydrograph at AD070 = 340 ac-ft

10-17-02

LP019
City of Scottsdale Airport Basin
SE, SV, SQ

Storage Estimation					
Contour Elev. (ft)	Contour Area (ft^2)	Average Area (ft^2)	Inc. Storage (ft^3)	Cum. Storage (ft^3)	Cum. Storage (acre-ft)
1426.7	0	-	-	-	-
1427	68750	34375	10312.5	10312.5	0.2
1428	234375	151562.5	151562.5	161875	3.7
1429	301250	267812.5	267812.5	429687.5	9.9
1430	329375	315312.5	315312.5	745000	17.1
1431	359375	344375	344375	1089375	25.0
1432*	386250	372812.5	372812.5	1462187.5	33.6
1433	426250	406250	406250	1868437.5	42.9

CULVET OUTLET SE,SV,SQ		
Contour Elev. (ft)	Cum. Storage (acre-ft)	Discharge (cfs)
1426.7	0.0	0
1427	0.2	20
1428	3.7	80
1429	9.9	220
1430	17.1	340
1431	25.0	440
1432*	33.6	560
1433	42.9	640

SPILLWAY X-SECTION	
SW	SE
0	1433
60.4	1432
247.2	1432
378.8	1433

*Overflow Elevation

SE, SV, SQ and Spillway X-Sect. estimations based on AirportBase2001.dwg, provided by Gilbertson Associates, Inc. and SCI survey data

Stanley Consultants INC.

Project No. 15586 Page No.

Subject SCOTTSDALE AIRPORT DETENTION BASIN SE, SW, SQ & WEIR

Computed by B SCHACK Date 10-17-02

Checked by Date

Approved by Date

Sheet No. of

ASSUMPTIONS / KNOWNS:

2 - 10' x 3' RCB (B = 10', D = 3')

INV. ELEV = 1426.7'

OVERFLOW ELEV = 1432'

IRREGULAR SHAPED SPILLWAY

BASIN DISCHARGE ESTIMATION FOR 2-10' x 3' RCB:

ELEV	HW/D	Q/B	Q	TOTAL Q
1426.7	—	—	—	—
1427.0	0.1	"		20*
1428.0	0.4	4	40	80
1429.0	0.8	11	110	220
1430.0	1.1	17	170	340
1431.0	1.4	22	220	440
1432.0	1.8	28	280	560
1433.0	2.1	32	320	640

TOTAL Q = (Q)(2)

* INTERPOLATED

IRREGULAR SHAPED WEIR SECTION:

SW	0	60.4	247.2	378.8
SE	1433	1432	1432	1433

SC 3004R4 898

10-17-02

SCI #15586
SDALE AIRPORT
DETENTION BASIN
OUTLET ESTIMATION
2-10'x3'
INV EL = 1426.7'
OVERFLOW EL = 1432'

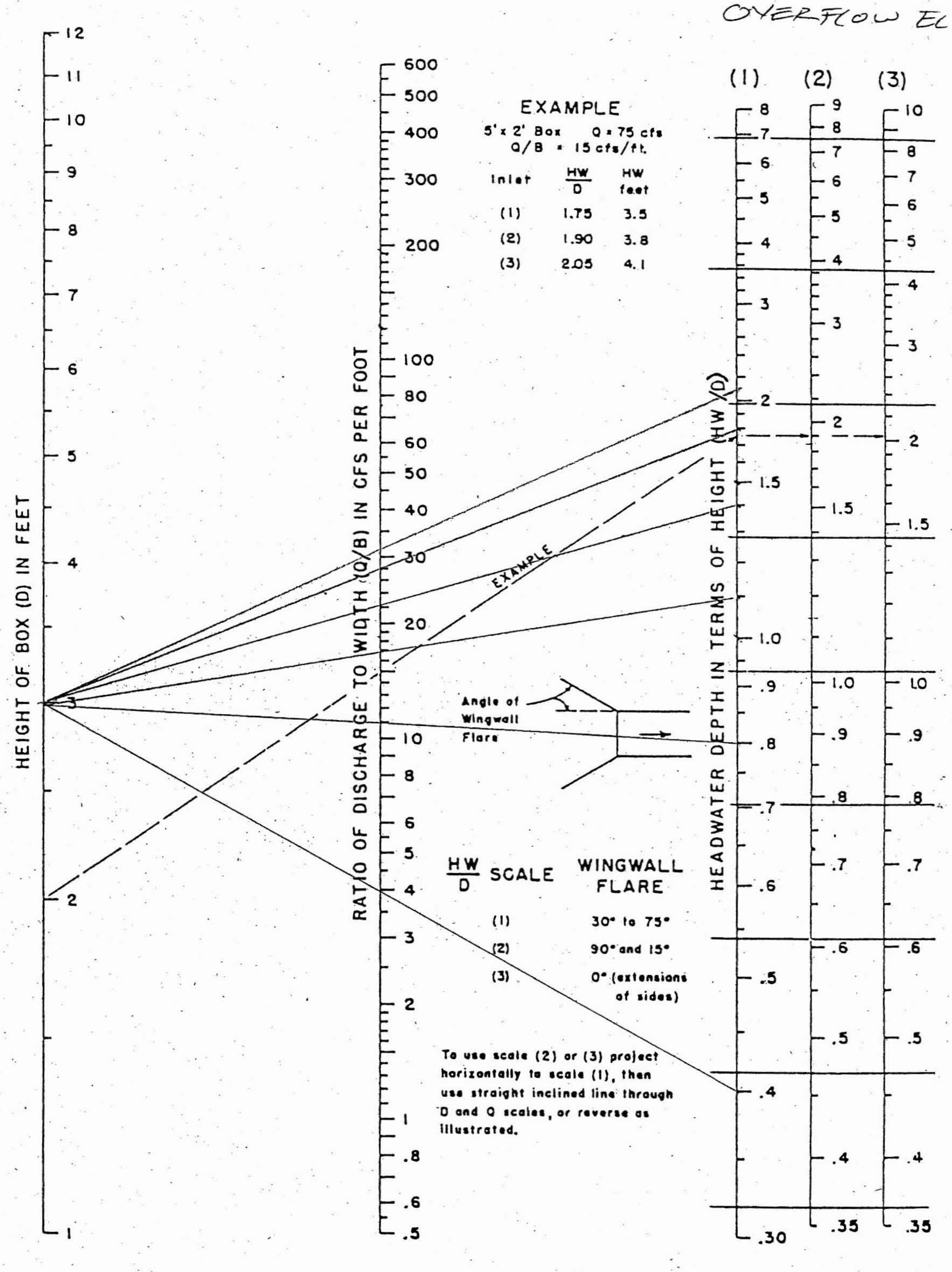


Figure 5.26
Headwater Depth for Box Culverts with Inlet Control
(USDOT, FHWA, HDS-5, 1985)

SDALE AIRPORT - SCI SURVEY POINTS

Point Listing made Tue Nov 27 09:57:42 2001

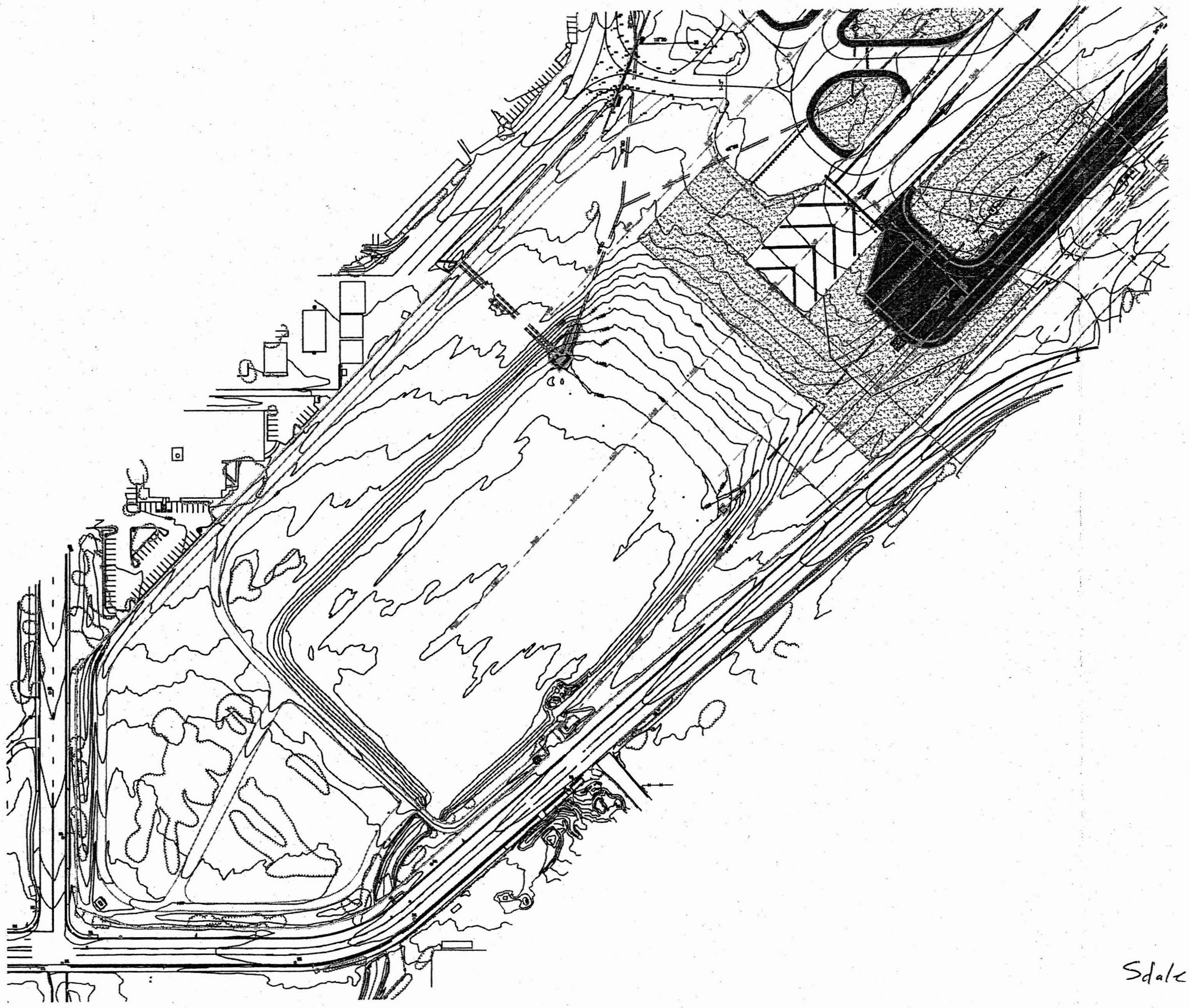
Drawing Name: scottsdale basins1
Project Name: scottsdale basins
Project Path: Q:\15586\graphics\AutoCAD\scottsdale basins\
Username: 6445

Number	Northing	Easting	Elevation	Raw Desc	Fu
15	951359.1177	698980.1525	1441.84	NGS AIRPORT	NG
1115	951359.1100	698980.1499	0.00	.	.
2300	950933.4255	698463.9459	1428.98	C/L 36" SD	C/
2301	950939.1967	698470.1380	1429.00	C/L 36" SD	C/
2302	950980.7113	698510.6136	1429.16	C/L 42" SD	C/
2303	950955.1282	698499.4725	1428.87	F/L	F/
2304	950925.9961	698491.3628	1428.94	F/L	F/
2305	950908.2574	698481.8164	1429.60	F/L	F/
2306	950962.5874	698439.2871	1437.86	TOP	TC
2307	951061.0566	698536.7812	1439.14	TOP	TC
2308	951199.1440	698678.3663	1441.10	TOP	TC
2309	951067.5189	698812.4284	1440.06	TOP	TC
2310	950919.8500	698956.1435	1439.34	TOP	TC
2311	950855.6848	699024.6314	1438.59	TOP	TC
2312	950720.1442	698891.1842	1437.56	TOP	TC
2313	950575.1476	698758.0949	1434.78	TOP	TC
2314	950418.5565	698623.8919	1433.54	TOP	TC
2315	950252.4476	698437.1425	1432.08	TOP	TC
2316	950146.4342	698305.3866	1431.45	TOP	TC
2317	950134.4671	698272.6938	1430.53	COR HEAD WALL	CC
2318	950133.8319	698260.5789	1433.69	COR HEAD WALL	CC
2319	950141.6305	698252.6072	1434.22	C/L HEAD WALL	C/
2320	950149.4165	698244.5129	1433.60	COR HEAD WALL	CC
2321	950160.2577	698244.7864	1430.91	COR HEAD WALL	CC
2322	950136.8814	698233.6720	1430.72	COR HEAD WALL	CC
2323	950122.5956	698248.2288	1430.67	COR HEAD WALL	CC
2324	950129.5618	698241.1514	1430.65	C/L HEAD WALL	C/
2325	950084.4780	698222.2489	1431.48	TOP	TC
2326	950093.0997	698213.9445	1426.15	TOE	TC
2327	950102.1493	698204.5013	1426.14	TOE	TC
2328	950108.3988	698195.9540	1431.06	TOP	TC
2329	949996.8550	698160.4033	1428.80	COR HEAD WALL	CC
2331	950003.7661	698172.4187	1428.90	C/L HEAD WALL	C/
2332	950175.4107	698211.2839	1432.53	TOP	TC
2333	950252.8466	698125.1745	1433.35	TOP	TC
2334	950403.6387	697961.6703	1433.83	TOP	TC
2335	950499.3577	697991.9225	1433.02	TOP	TC
2336	950662.3655	698146.8253	1433.48	TOP	TC
2337	950821.1747	698302.6404	1435.26	TOP	TC
2338	950879.1542	698488.0683	1428.52	TOE	TC
2339	950847.6372	698595.0215	1429.31	TOE	TC
2340	950712.6689	698733.3942	1429.04	TOE	TC
2341	950693.7157	698794.6106	1428.81	C/L 24" SD	C,
2342	950684.4381	698781.4664	1428.91	F/L	F,
2343	950676.9791	698771.5665	1428.62	F/L	F,
2344	950656.2996	698761.7250	1429.00	TOE	T(
2345	950512.3644	698632.3253	1428.29	TOE	T(
2346	950364.6478	698495.2690	1427.97	TOE	T(
2347	950259.5156	698390.8727	1426.78	TOE	T(
2348	950171.7778	698290.0692	1426.93	TOE	T(
2349	950195.6986	698237.2470	1426.89	TOE	T(
2350	950296.2077	698134.0271	1427.17	TOE	T(
2351	950409.4281	698021.8672	1427.89	TOE	T(
2352	950468.1749	698013.4272	1428.21	TOE	T(
2353	950581.1675	698121.1012	1428.53	TOE	T(
2354	950724.7868	698263.5177	1429.33	TOE	T(
2355	950870.5805	698410.6811	1429.88	TOE	T(
2356	950740.2787	698472.9374	1428.11	NG	N(
2357	950609.5215	698604.5925	1428.01	NG	N(

SDALE AIRPORT - SCI SURVEY POINTS

Number	Northing	Easting	Elevation	Raw Desc	Fu
2358	950456.2267	698456.6801	1427.54	NG	NG
2359	950304.1239	698311.0598	1426.67	NG	NG
2360	950399.4268	698210.8172	1426.87	NG	NG
2361	950545.1687	698360.4931	1427.06	NG	NG
2362	950629.0075	698276.1095	1427.92	NG	NG
2363	950498.8052	698147.7780	1427.14	NG	NG
2364	950290.0360	697980.4962	1431.84	NG	NG
2365	950128.9287	698121.9606	1430.64	NG	NG
2366	949974.7717	698069.9209	1432.13	TOP BERM	TC
2367	949965.8037	697935.1575	1431.74	TOP BERM	TC
2368	949969.2080	697789.1772	1431.24	TOP BERM	TC
2369	949968.7957	697714.2451	1430.57	TOP BERM	TC
2370	949995.1409	697658.2128	1430.29	TOP BERM	TC
2371	949996.8286	697680.5916	1427.22	COR CATCH BASIN	CC
2372	949998.7749	697683.3399	1427.28	COR CATCH BASIN	CC
2373	949992.7249	697688.4484	1427.34	COR CATCH BASIN	CC
2374	949990.4194	697685.8821	1427.31	COR CATCH BASIN	CC
2375	949983.3216	697684.5065	1428.43	CONC. COR	CC
2376	949991.9661	697695.2799	1428.33	CONC. COR	CC
2377	950005.7242	697684.1821	1428.33	CONC. COR	CC
2378	949996.8991	697673.3939	1428.55	CONC. COR	CC
2379	950098.6614	697659.2260	1432.53	TOP BERM	TC
2380	950194.9556	697659.4755	1433.52	TOP BERM	TC
2381	950349.3243	697660.9689	1434.76	TOP BERM	TC
2382	950422.9303	697678.6810	1434.48	TOP BERM	TC
2383	950405.9923	697730.2671	1433.03	NG	NG
2384	950049.7825	697728.3965	1429.22	NG	NG
2385	950028.3027	697845.1937	1429.94	NG	NG
2386	950296.7724	697892.2295	1431.23	NG	NG
2399	949890.8844	698149.6117	1428.80	COR HEAD WALL	CC
2400	949903.3929	698173.2235	1428.76	COR HEAD WALL	CC
2401	949896.4605	698161.5878	1428.72	HEAD WALL	E
2402	949814.0528	698121.8937	1428.48	TOP	TC
2403	949807.9048	698127.5488	1424.76	TOE	TC
2404	949800.3315	698133.2060	1424.64	TOE	TC
2405	949794.1641	698137.0952	1428.05	TOP	TC

SCI #15586



1" = 200'
1' CONTOURS
(Topo provided by Gilbertson Assoc.)

Sdale Airport Det. Basin

LP020B

Culvert SE,SV,SQ		
Contour Elev. (ft)	Cum. Storage+ (acre-ft)	Discharge*** (cfs)
1370*	0	0
1374	0.0012	0
1375	0.0044	0
1377	0.40	0
1378	1.78	3
1379	4.35	8
1384	47.13	32
1387.8**	92.18	48
1390	121.37	58

USED IN HEC-1 MODEL, LP020B STEP

**Overflow elevation @ 1387.8

***Discharge equal to friction slope discharge less 184cfs low flow bypass (60" diam. SD flowing full)

See attached culvert discharge calculations

+See attached storage estimation calc sheet

Spillway SW, SE	
Width (ft)	Elevation (ft)
0	1388
40.8	1387.8
76.2	1387.8
139.3	1388.5
229	1388.3
317.1	1388.8
400	1389.2
523.5	1389.7

USED IN HEC-1 MODEL LP020B STEP

Culvert & Spillway SE, SV, SQ		
Contour Elev. (ft)	Cum. Storage (acre-ft)	Discharge (cfs)
1370*	0	0
1374	0.0012	0
1375	0.0044	0
1377	0.40	0
1378	1.78	3
1379	4.35	8
1384	47.13	32
1387.8**	92.18	48
1390	121.37	3458++

→ DISCHARGE = OUTLET PIPE Q − 184 CFS (SEE ATTACHED)

**Overflow elevation @ 1387.8

++See attached weir calculations

DV20B2:

→ WEIR Q @ WSEL 1390 FT

DI	0	48	3458	(3458 = 58 + 3400)
DQ	0	0	3400	

↳ OUTLET PIPE Q @ WSEL 1390 FT

CACTUS PARK
EXISTING CONDITIONS

Cactus Park Detention Basin
LP020B

Storage Estimation					
Contour Elev. (ft)	Contour Area (FT^2)	Contour Area (AC)	Average Area (AC)	Inc. Storage (AC-FT)	Cum. Storage (AC-FT)
1370*	0	0	-	-	-
1374	27.03	0.00062	0.00031	0.0012	0.0012
1375	251.97	0.0058	0.0032	0.003202	0.0044
1376	5015.04	0.12	0.06	0.06	0.065
1377	24317.10	0.56	0.34	0.34	0.40
1378	95777.84	2.20	1.38	1.38	1.78
1379	128106.69	2.94	2.57	2.57	4.35
1380	313973.70	7.21	5.07	5.07	9.42
1381	361872.89	8.31	7.76	7.76	17.18
1382	427602.27	9.82	9.06	9.06	26.24
1383	454745.63	10.44	10.13	10.13	36.37
1384	482694.22	11.08	10.76	10.76	47.13
1385	499874.25	11.48	11.28	11.28	58.41
1386	518474.47	11.90	11.69	11.69	70.10
1387	535345.69	12.29	12.10	12.10	82.20
PILLWAY 1387.8**	551510.91	12.66	12.48	9.98	92.18
1388	555552.21	12.75	12.71	2.54	94.72
1390	605554.37	13.90	13.33	26.66	121.37

Storage Estimation Based on City of Scottsdale Quarter Section No. 31-45 topo and Cactus Park contour drawing.

** SPILLWAY ELEV, AREA INTERPOLATED

60-INCH DIAMETER CACTUS PARK DET BASIN OUTLET PIPE FRICTI0N SLOPE AND WATER SURFACE ELEVATION ESTIMATION

Manning's equation used to estimate friction slope, S_o:

$Q = (1.49/n)(A)(R_h)^{2/3}(S_o)^{1/2}$

n =	0.013
Diameter =	5 ft
Area =	19.6 sq ft
Wetted Perimeter =	15.7 ft
Hydraulic Radius =	1.25 ft
Pipe Invert @ Outfall =	1355 ft
Top-of-Pipe @ Outfall =	1360 ft
Pipe Length =	3500 ft

Q (cfs)	S_o (ft/ft)	Elevation at Cactus Park (ft)
140	0.0029	1370.1
165	0.0040	1374.0
171	0.0043	1375.0
182	0.0049	1377.0
187	0.0051	1378.0
192	0.0054	1378.9
216	0.0068	1384.0
232	0.0079	1387.7
242	0.0086	1390.1

Cactus Park Overflow @ Elev 1387.8 Ft.

Q = 184 cfs is full flow capacity for 60" diameter concrete storm drain, n = 0.013, S = 0.005 – LOW FLOW BYPASS

WEIR EQUATION:

$Q = CLH^{3/2}$

$Q = (3)(523.5)(1390 - 1388.32)^{3/2}$

APPROX AVG SPILLWAY ELEV. OF IRREGULAR SHAPED SPILLWAY

Q = 3400 CFS

CACTUS PARK DET BASIN - SCI SURVEY POINTS

Point Listing made Tue Nov 27 12:29:01 2001

Drawing Name: scottsdale basins1
Project Name: scottsdale basins
Project Path: Q:\15586\graphics\AutoCAD\scottsdale basins\
Username: 6445

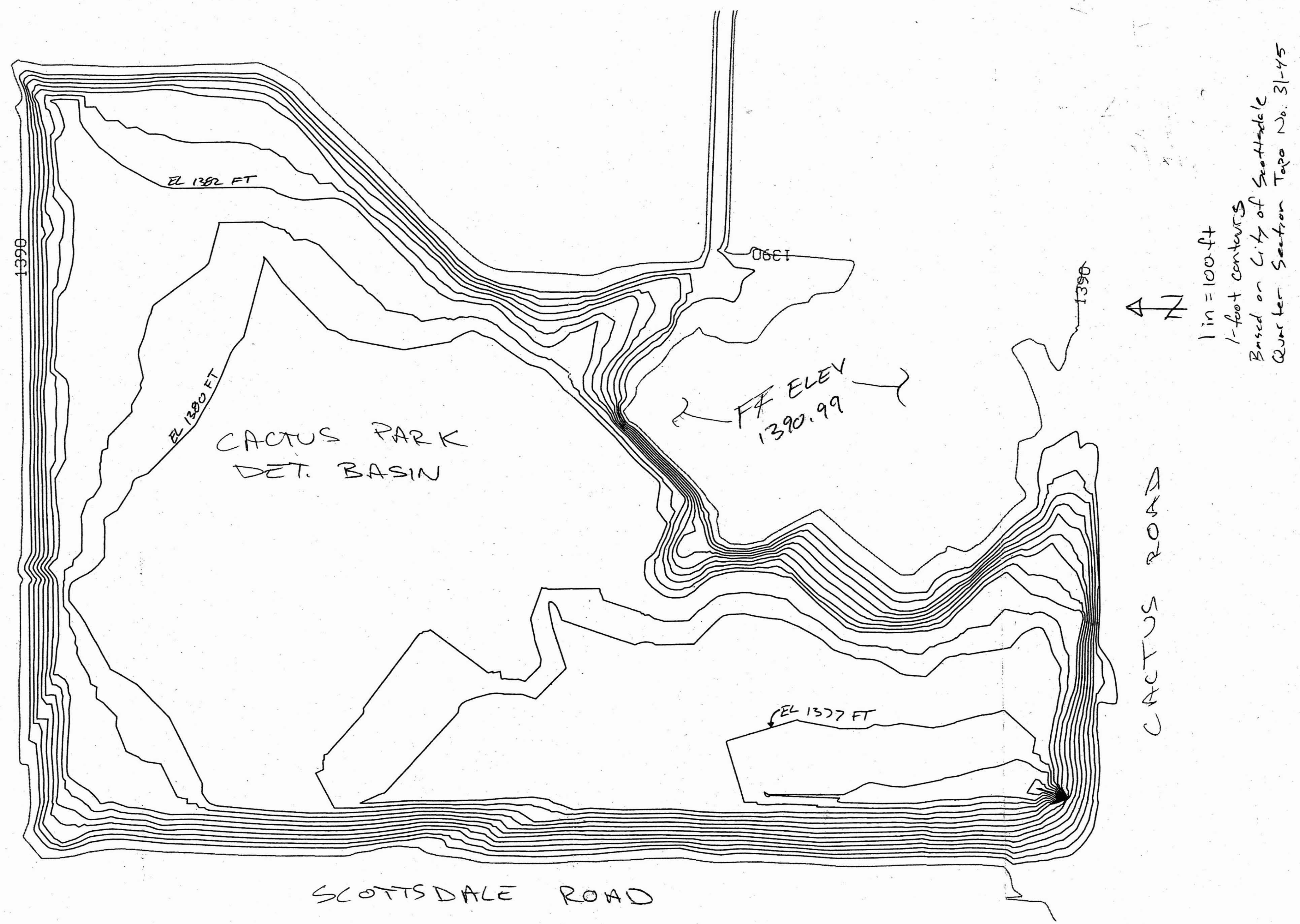
Number	Northing	Easting	Elevation	Raw Desc	Fu
8	944622.7842	697162.6296	1389.61	BCHH	BC
2000	945056.1540	697834.2906	1386.12	F/L	F/
2001	945056.4385	697840.5306	1387.06	F/L	F/
2002	945028.4210	698147.5098	1387.69	F/L	F/
2003	945024.3035	698167.6424	1388.52	F/L	F/
2004	945022.0574	698176.8718	1388.64	GUTTER	GU
2005	945060.2363	697826.5088	1386.23	F/L	F/
2006	945720.3302	698003.2704	1382.81	F/L	F/
2007	945734.5253	698024.7131	1386.71	F/L	F/
2008	945747.3423	698039.3969	1388.37	F/L	F/
2009	945754.3291	698048.8649	1389.65	C/L HEAD WALL	C/
2010	945757.7515	698046.1705	1390.60	COR CATCH BASIN	CC
2011	945750.3489	698049.4080	1390.26	COR CATCH BASIN	CC
2012	945763.3430	698057.1981	1390.58	COR CATCH BASIN	CC
2013	945755.9123	698060.2474	1390.59	COR CATCH BASIN	CC
2014	945761.2385	698064.4079	1389.62	F/L	F/
2015	945758.6783	698584.8196	1390.81	F/L	F/
2016	945764.3970	698627.2662	1391.80	F/L	F/
2017	945785.1773	698668.5797	1392.08	F/L	F/
2018	945719.6470	697995.9308	1384.35	F/L	F/
2019	945739.5611	697995.4761	1384.90	F/L	F/
2020	945754.1623	697997.6693	1391.23	C/L HEAD WALL	C/
2021	945753.3848	698001.1491	1391.65	COR CATCH BASIN	CC
2022	945765.0484	698001.5610	1390.75	COR CATCH BASIN	CC
2023	945765.6986	697993.6555	1392.66	COR CATCH BASIN	CC
2024	945753.5067	697993.0798	1393.24	COR CATCH BASIN	CC
2025	945766.3468	697997.3210	1392.99	F/L	F/
2026	945774.3821	697996.2287	1395.13	F/L	F/
2027	945880.5004	697997.5841	1395.45	F/L	F/
2028	945713.3009	697543.3496	1381.24	F/L	F/
2029	945742.4761	697543.7932	1387.58	F/L	F/
2030	945777.1032	697543.3978	1397.02	F/L	F/
2031	945778.0878	697543.9006	1395.44	C/L OPENING 8'	C/
2032	945779.2599	697543.5509	1395.57	F/L	F/
2033	945894.8870	697515.8789	1396.17	F/L	F/
2034	945724.5354	697292.3873	1384.90	COR CATCH BASIN	CC
2035	945732.3399	697286.2542	1386.77	COR CATCH BASIN	CC
2036	945743.7683	697270.3631	1389.89	COR CATCH BASIN	CC
2037	945736.0633	697260.4091	1389.93	COR CATCH BASIN	CC
2038	945717.6994	697267.2247	1386.79	COR CATCH BASIN	CC
2039	945709.8819	697273.4947	1384.95	COR CATCH BASIN	CC
2040	945713.5931	697277.7939	1384.94	C/L SD PIPE	C/
2041	945728.3035	697288.8469	1385.76	C/L SD PIPE	C/
2042	945736.6651	697266.4503	1388.30	C/L SD PIPE	C/
2043	945769.7020	697242.7013	1398.43	F/L	F/
2044	945791.4028	697244.5513	1394.17	F/L	F/
2045	945855.2780	697222.4920	1395.79	GUTTER	GU
2046	945754.5281	697221.4956	1394.97	GUTTER	GU
2047	945643.1850	697220.5024	1394.17	GUTTER	GU
2048	945545.8620	697219.6636	1393.63	GUTTER	GU
2049	945445.2741	697218.4737	1393.15	GUTTER	GU
2050	945342.5786	697217.8841	1392.86	GUTTER	GU
2051	945245.5305	697217.0628	1392.56	GUTTER	GU
2052	945246.4507	697181.3551	1393.14	GUTTER	GU
2053	945248.3862	697165.2422	1393.10	GUTTER	GU
2054	945255.4780	697129.3611	1392.42	GUTTER	GU
2055	945582.3287	697132.1844	1393.94	GUTTER	GU
2056	945580.9114	697168.1234	1394.64	GUTTER	GU
2057	945577.7229	697184.1358	1394.54	GUTTER	GU

CACTUS PARK DET BASIN - SCI SURVEY POINTS

Number	Northing	Easting	Elevation	Raw Desc	Fu
2058	945580.2577	697219.9758	1393.82	GUTTER	GU
2059	945142.9855	697216.1394	1391.97	GUTTER	GU
2060	944905.8562	697214.4368	1391.09	GUTTER	GU
2061	944865.8080	697223.7971	1391.22	GUTTER	GU
2062	944801.1638	697223.3250	1390.93	GUTTER	GU
2063	944730.6123	697212.8576	1390.28	GUTTER	GU
2064	944687.7380	697212.2960	1390.05	GUTTER	GU
2065	945045.8976	697589.3675	1390.99	FINISH FLOOR	FI
2066	944733.7222	697312.2164	1374.57	F/L	F/
2067	944724.4770	697308.1141	1373.85	F/L	F/
2068	944730.1114	697297.2645	1377.83	COR CATCH BASIN	CC
2069	944721.8512	697299.9482	1379.22	COR CATCH BASIN	CC
2070	944715.4200	697299.8035	1381.64	COR CATCH BASIN	CC
2071	944714.2819	697303.0829	1381.61	C/L SD PIPE	C/
2072	944712.9161	697306.2052	1381.73	COR CATCH BASIN	CC
2073	944717.6704	697309.8823	1379.19	COR CATCH BASIN	CC
2074	944721.7828	697317.9495	1377.77	COR CATCH BASIN	CC
2075	944889.9658	697232.4823	1390.97	B/WALK	B/
2076	944799.9422	697231.6814	1391.61	B/WALK	B/
2077	944742.4320	697223.1855	1390.98	B/WALK	B/
2078	944687.8154	697224.6352	1390.78	B/WALK	B/
2079	944673.7157	697242.9081	1390.74	B/WALK	B/
2080	944662.8601	697223.6751	1390.10	GUTTER	GU
2081	944656.1247	697242.9980	1390.00	GUTTER	GU
2082	944655.3991	697342.0872	1388.53	GUTTER	GU
2083	944654.8515	697445.5087	1387.90	GUTTER	GU
2084	944654.0380	697559.1076	1387.32	GUTTER	GU
2085	944653.2739	697667.7990	1386.91	GUTTER	GU
2086	944652.0034	697800.4414	1387.40	GUTTER	GU
2087	944651.7478	697902.0755	1387.85	GUTTER	GU
2088	944650.7912	698032.5639	1388.39	GUTTER	GU
2089	944649.8114	698145.5682	1388.84	GUTTER	GU
2090	944654.3997	698146.0017	1389.57	EDGE WALK	ED
2091	944662.4108	698146.3365	1389.71	EDGE WALK	ED
2092	944659.9396	698023.3586	1389.11	EDGE WALK	ED
2093	944667.5384	698022.5519	1389.24	EDGE WALK	ED
2094	944663.1687	697940.0293	1388.75	EDGE WALK	ED
2095	944655.4737	697939.7884	1388.72	EDGE WALK	ED
2096	944661.8649	697851.7666	1388.27	EDGE WALK	ED
2097	944669.5283	697852.4117	1388.31	EDGE WALK	ED
2098	944659.4431	697761.9890	1388.00	EDGE WALK	ED
2099	944667.3714	697762.6294	1388.46	EDGE WALK	ED
2100	944662.2173	697698.9564	1387.77	EDGE WALK	ED
2101	944654.3844	697700.5082	1387.62	EDGE WALK	ED
2102	944653.6842	697699.8367	1387.56	EDGE WALK	ED
2103	944654.0465	697663.5686	1387.42	EDGE WALK	ED
2104	944655.1861	697662.8953	1387.54	EDGE WALK	ED
2105	944662.8439	697663.4752	1387.79	EDGE WALK	ED
2106	944668.5191	697589.9404	1387.87	EDGE WALK	ED
2107	944660.7775	697590.1683	1387.82	EDGE WALK	ED
2108	944655.5751	697522.7681	1388.01	EDGE WALK	ED
2109	944655.0083	697522.1846	1387.97	EDGE WALK	ED
2110	944663.1953	697522.4688	1388.23	EDGE WALK	ED
2111	944664.0146	697478.2724	1388.24	EDGE WALK	ED
2112	944655.3060	697479.1950	1388.18	EDGE WALK	ED
2113	944656.1189	697478.7231	1388.23	EDGE WALK	ED
2114	944663.0849	697411.0050	1388.49	EDGE WALK	ED
2115	944670.7026	697410.6644	1388.65	EDGE WALK	ED
2116	944664.6094	697338.6628	1389.33	EDGE WALK	ED
2117	944656.7438	697339.1084	1389.13	EDGE WALK	ED
2118	944656.0822	697338.7593	1389.15	EDGE WALK	ED
2119	944656.5143	697306.6283	1389.71	EDGE WALK	ED
2120	944657.2425	697305.8920	1389.78	EDGE WALK	ED

CACTUS PARK DET BASIN - SCI SURVEY POINTS

Number	Northing	Easting	Elevation	Raw Desc	Fu
2121	944665.1241	697306.7966	1390.01	EDGE WALK	ED
2122	944665.2443	697265.2720	1390.44	EDGE WALK	ED
2123	944672.6281	697267.2727	1390.37	EDGE WALK	ED
2124	944678.0326	697358.1212	1390.81	TOP WALL	TC
2125	944683.4420	697363.9393	1390.83	TOP WALL	TC
2126	944682.7338	697424.6245	1390.78	TOP WALL	TC
2127	944682.4970	697469.6965	1390.67	TOP OF WALL	TC
2128	944683.0687	697500.8966	1390.38	TOP OF WALL	TC
2129	944678.5533	697563.8015	1390.06	TOP OF WALL	TC
2130	944678.1446	697621.7346	1390.07	TOP OF WALL	TC
2131	944652.7033	697751.4137	1387.24	GUTTER	GU
2132	944622.8179	697752.1224	1387.03	C/L PVMT	C/
2133	944584.9237	697751.0876	1385.84	GUTTER	GU



CACTUS PARK
DET BASIN
CONTOUR DRAWING

Crossed Arrows Park Basin, SE, SV, SQ
LP062

Storage Estimation					
Contour Elev. (ft)	Contour Area (ft^2)	Average Area (ft^2)	Inc. Storage (ft^3)	Cum. Storage (ft^3)	Cum. Storage (acre-ft)
1432	18100	-	-	-	-
1433	59720	38910	38910	38910	0.9
1434	130115	94917.5	94917.5	133827.5	3.1
1435	186000	158057.5	158057.5	291885	6.7
1436	225000	205500	205500	497385	11.4
1437	310000	267500	267500	764885	17.6
1438*	409000	359500	359500	1124385	25.8
1439	489000	449000	449000	1573385	36.1

Storage estimation based on SCI survey data.

SE,SV,SQ		
Contour Elev. (ft)	Cum. Storage (acre-ft)	Discharge (cfs)
1432	0	1
1433	0.9	1
1434	3.1	12
1435	6.7	23
1436	11.4	43
1437	17.6	55
1438*	25.8	65
1439	36.1	671

*Overflow Elevation

Stanley Consultants INC

Project No. 15586 Page No.

Subject CROSSED ARROWS PARK

DISCHARGE ESTIMATION

Computed by Date

Checked by Date

Approved by Date

Sheet No. of

2 - 24 INCH CONCRETE PIPE CULVERTS

INVERT ELEVATION = 1433.15 FT

SEE ATTACHED FIGURE 5.20

	ELEVATION (FT)	HW/D	Q (CFS)	2X Q (CFS)	
	1433	0	0	0	
	1434	0.4	5.5	11	(INTERPOLATE)
	1435	0.9	11	22	
	1436	1.4	19	38	
	1437	1.9	25	50	
(SPILLWAY)	1438	2.4	30	60	
	1439	2.9	33	66	

WEIR EQ: $Q = CLH^{3/2}$; $L = 200$ FT

$C = 3.0$

ELEVATION (FT)	H (FT)	Q (CFS)
1439	1	600

15 IN LOW FLOW BLEEDOFF @ ELEV 1427.77 FT

PIPE FLOWING FULL, $S = 0.005$, $n = 0.013$ → $Q = 5$ CFS

INLET CONTROL, $HW/D = 6$ → $Q = 15$ CFS

TO ACCOUNT FOR LOW FLOW BLEEDOFF, 1 CFS ADDED TO LOW HEAD Q AND 5 CFS ADDED TO HIGH HEAD Q.

ELEVATION (FT)	DISCHARGE (CFS)
1433	1
1434	12
1435	23
1436	43
1437	55
1438	65
1439	671

SC 3020 R2 199

SCI #15586
CROSSED ARROWS
DET. BASIN
OUTLET

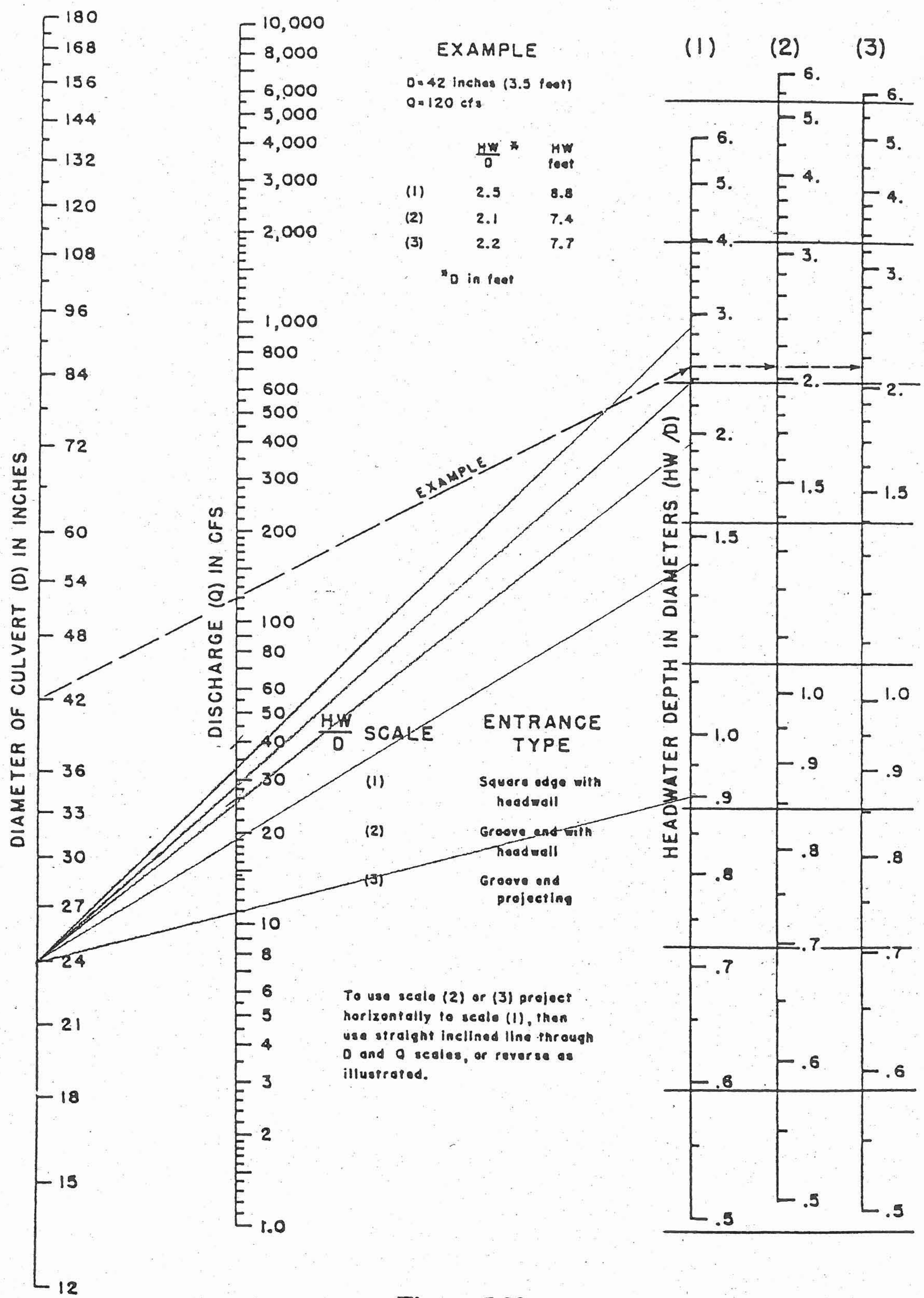


Figure 5.20
Headwater Depth for Concrete Pipe Culverts with Inlet Control
(USDOT, FHWA, HDS-5, 1985)

CROSSED ARROWS DET BASIN - SCI SURVEY POINTS

Point Listing made Tue Nov 27 10:43:48 2001

Drawing Name: scottsdale basins1
Project Name: scottsdale basins
Project Path: Q:\15586\graphics\AutoCAD\scottsdale basins\
Username: 6445

Number	Northing	Easting	Elevation	Raw Desc	Fu
1116	952731.9867	690599.5424	1438.67	CP BASE PT.	C
1121	953859.5838	689999.0856	1441.46	b/c	b
1122	953864.4456	690019.6257	1441.77	ng	n
1123	953861.9299	690066.7311	1441.22	ng	n
1124	953797.0516	690055.8847	1439.52	ng	n
3109	953744.0127	690051.0312	1439.21	ng	n
3110	953732.1816	690024.3418	1440.62	ng	n
3111	953670.8919	689997.1712	1440.54	b/c	b
3112	953669.4707	689958.8257	1440.91	b/c	b
3113	953645.3283	689942.2394	1441.23	b/c	b
3114	953635.4626	689866.0038	1441.36	b/c	b
3115	953639.3766	689537.5471	1441.73	b/c	b
3116	953558.8736	689558.1188	1439.93	ng @ fence	n
3117	953561.3052	689634.9233	1446.66	top	t
3118	953557.9149	689710.6368	1445.16	top	t
3119	953557.3259	689838.9671	1447.61	top	t
3120	953501.7363	689849.7738	1442.33	toe	t
3121	953269.3357	689966.2492	1437.86	CP REBAR	C
3122	952731.9867	690599.5424	1438.09	CP "X" ON CONC	C
3123	953503.7651	689760.1460	1441.28	toe	t
3124	953502.5722	689669.3835	1441.27	toe	t
3125	953546.8260	689563.4634	1439.79	toe	t
3126	953447.6798	689556.9572	1439.23	ng @ fence	n
3127	953337.1751	689555.5941	1438.54	ng @ fence	n
3128	953245.1641	689554.6576	1438.16	ng @ fence	n
3129	953073.0561	689552.5097	1436.39	ng @ fence	n
3130	953182.1010	689632.4414	1439.67	top	t
3131	953080.9072	689625.9319	1439.02	top	t
3132	953066.1871	689707.6123	1441.99	top	t
3133	952975.1660	689901.5919	1440.68	top	t
3134	952911.1200	690048.1590	1442.14	top	t
3135	952864.8574	690140.5252	1442.00	top	t
3136	952931.4488	690166.4189	1433.29	toe	t
3137	952965.2001	690055.1118	1434.07	toe	t
3138	952995.8946	689948.4487	1434.98	toe	t
3139	953124.7929	689699.6784	1436.85	toe	t
3140	953174.0406	689726.4667	1441.19	top of mound	t
3141	953170.1048	689843.5140	1443.65	top of mound	t
3142	953157.3962	689770.4716	1437.97	ng	n
3143	953215.2960	689773.8335	1438.65	ng	n
3144	953246.8586	689657.2250	1438.53	ng	n
3145	953356.5300	689656.4467	1439.35	ng	n
3146	953426.8157	689659.3820	1440.05	ng	n
3147	953422.9833	689772.2813	1440.71	ng	n
3148	953306.7694	689775.7784	1439.87	ng	n
3149	953216.4186	689882.2710	1438.47	ng	n
3150	953348.9754	689901.6281	1438.84	ng	n
3151	953462.8777	689888.1520	1442.21	ng	n
3152	953589.4877	689964.4200	1439.84	ng	n
3153	953597.4175	690014.4044	1439.91	ng	n
3154	953640.5368	690029.8878	1440.11	ng	n
3155	953666.2646	690036.7218	1440.24	ng	n
3156	953672.5046	690008.5321	1439.16	c/l swail	c
3157	953661.2144	690026.4825	1438.64	c/l swail	c
3158	953634.4262	690047.4005	1438.46	c/l swail	c
3159	953951.3909	690024.1075	1443.11	ng @ wall	n
3160	953950.0264	690193.6365	1443.03	ng @ wall	n
3161	953974.2737	690293.7552	1443.92	ng@cor wall	
3162	953673.4378	690340.9380	1438.78	edge sw	e

CROSSED ARROWS DET BASIN - SCI SURVEY POINTS

Point Listing made Tue Nov 27 10:43:48 2001

Number	Northing	Easting	Elevation	Raw Desc	Fu
3163	953673.1103	690332.5071	1438.45	gutter	g
3164	953672.2709	690331.0803	1438.71	t/c	t
3165	953696.9601	690378.1110	1441.83	ng	n
3166	953680.7874	690357.8432	1441.46	ng	n
3167	953676.6891	690325.8379	1439.08	ng	n
3168	953669.5652	690226.5684	1438.66	ng	n
3169	953667.5403	690064.3924	1438.70	ng	n
3170	953523.9643	689987.0909	1438.81	ng	n
3171	953517.0149	690039.8314	1437.26	ng	n
3172	953498.3325	690169.9685	1437.09	ng	n
3173	953516.7434	690251.0530	1436.98	ng	n
3174	953524.5050	690299.6700	1436.82	ng	n
3175	953507.1781	690340.9828	1437.68	ng	n
3176	953512.8404	690381.4521	1439.41	ng	n
3177	953547.7985	690419.6546	1442.03	ng @ wall	
3178	953503.2816	690415.8228	1438.75	ng	n
3179	953504.7531	690356.1738	1437.81	edge sw	e
3180	953502.8526	690347.8726	1437.37	gutter	g
3181	953502.1782	690346.4101	1437.65	t/c	t
3182	953408.8143	690305.6370	1435.68	ng	n
3183	953335.9519	690254.4036	1434.41	ng	n
3184	953277.4551	690226.6043	1433.85	ng	n
3185	953191.6575	690260.7839	1433.73	ng	n
3186	953323.1324	690166.4020	1435.19	ng	n
3187	953388.5834	690076.6421	1435.85	ng	n
3188	953438.4651	690130.8105	1437.08	ng	n
3189	953423.5083	690208.6029	1436.72	ng	n
3190	953373.8063	690202.5958	1435.64	ng	n
3191	953401.5058	690141.3418	1439.77	top of mound	t
3192	953408.3078	690241.8334	1439.58	top of mound	t
3193	953334.2639	690343.7965	1440.04	top of mound	t
3194	953338.2799	690386.2260	1436.84	t/c	t
3195	953338.6394	690387.4833	1436.57	gutter	g
3196	953341.5409	690395.4358	1436.77	edge sw	e
3197	953357.5972	690056.6420	1437.39	ng	n
3198	953257.6148	689994.7226	1437.62	ng	n
3199	953158.2421	689933.2236	1437.73	ng	n
3200	953088.9865	689910.0694	1437.19	ng	n
3201	953031.9848	690005.8078	1435.61	ng	n
3202	953127.4951	690071.1030	1436.35	ng	n
3203	953252.7195	690155.7869	1435.90	ng	n
3204	953187.1868	690237.7186	1433.96	ng	n
3205	953102.9754	690176.8884	1434.39	ng	n
3206	953007.0709	690091.2408	1433.91	ng	n
3207	953059.8388	690407.7773	1432.72	cp nail	c
3208	953743.8441	690340.6021	1439.15	edge sw	e
3209	953743.4047	690332.6758	1438.77	gutter	g
3210	953743.2684	690330.7587	1439.19	t/c	t
3211	953764.7656	690341.2689	1439.08	cor conc	c
3212	953763.9531	690332.9669	1439.08	cor conc	c
3213	953763.4372	690326.8617	1439.26	c/l 3" vg	c
3214	953811.3025	690314.9314	1439.25	c/l 3" vg	c
3215	953920.3629	690301.8759	1439.91	c/l 3" vg	c
3216	953922.8470	690299.5139	1440.38	edge riprap	e
3217	953938.4605	690292.6843	1441.00	edge riprap	e
3218	953953.2785	690299.5396	1440.55	edge riprap	e
3219	953950.0654	690311.7873	1441.16	edge riprap	e
3220	953921.2294	690303.7147	1440.23	edge riprap	e
3221	953935.6128	690308.0935	1440.85	edge brick	e
3222	953924.3069	690305.3919	1440.66	edge brick	e
3223	953937.8495	690357.6460	1441.74	edge brick	e
3224	953927.0610	690357.1062	1441.63	edge brick	e
3225	953949.6062	690245.2582	1443.11	ng@cor wall	

CROSSED ARROWS DET BASIN - SCI SURVEY POINTS

Number	Northing	Easting	Elevation	Raw Desc	Fu
3226	953974.3157	690364.7885	1443.28	ng@ wall	r
3227	953903.2473	690329.8740	1444.10	ng	r
3228	953913.0307	690372.9121	1443.17	ng	r
3229	953833.3388	690375.6352	1442.39	ng	r
3230	953828.4325	690347.9017	1441.01	ng	r
3231	953823.6137	690324.2607	1440.47	ng	r
3232	953768.4620	690342.1747	1439.56	ng	r
3233	953727.5222	690379.4130	1441.88	ng	r
3234	953708.4005	690353.6827	1441.11	ng	r
3235	953625.0931	690385.9301	1441.66	ng@cor wall	
3236	953451.2920	690462.2367	1441.07	ng@cor wall	
3237	953441.3908	690442.0663	1438.50	ng	r
3238	953350.1791	690479.9472	1438.48	ng	r
3239	953357.7926	690504.1777	1439.33	ng	r
3240	953236.3732	690562.0146	1438.32	ng	r
3241	953230.9271	690552.9118	1439.12	ng	r
3242	953219.4993	690538.8433	1437.77	ng	r
3243	953192.7810	690582.1605	1437.45	c/l 7" vg	c
3244	953206.7273	690613.9649	1437.82	c/l 7" vg	c
3245	953178.5061	690565.7951	1436.50	c/l 7" vg	c
3246	953083.6486	690609.5055	1435.84	ng	r
3247	953089.0853	690623.1126	1438.43	ng	r
3248	953045.0138	690625.7859	1435.76	ng	r
3249	952969.3534	690657.9610	1435.19	ng	r
3250	952972.0725	690675.3547	1437.91	ng@cor wall	r
3251	952943.7675	690677.7029	1438.03	ng@cor wall	r
3252	952939.3107	690661.4253	1434.91	ng	r
3253	952836.3473	690670.5394	1434.59	ng	r
3254	952837.9988	690684.5886	1436.45	ng	r
3255	952785.2844	690625.7967	1441.10	top	t
3256	952886.3524	690629.4821	1439.20	top	t
3257	952989.6137	690604.6183	1438.96	top	t
3258	953109.0118	690561.1244	1439.01	top	t
3259	953224.7311	690499.9155	1441.19	top	t
3260	953319.9661	690459.4933	1442.60	top	t
3261	953434.4602	690402.6658	1442.14	top	t
3262	953267.6939	690429.0185	1436.33	edge sw	e
3263	953263.6716	690421.6055	1436.04	gutter	g
3264	953259.5775	690422.1763	1436.30	t/c	t
3265	953160.0121	690502.8417	1435.54	cor s/w	c
3266	953151.2229	690501.8881	1435.61	cor s/w	c
3267	953157.1258	690492.2390	1435.78	t/c	t
3268	953149.1675	690498.8384	1435.48	c/l 3" vg	c
3269	953036.2909	690540.0904	1434.72	c/l 3" vg	c
3270	952927.0355	690564.1001	1434.17	c/l 3" vg	c
3271	952819.0472	690563.0993	1433.36	c/l 3" vg	c
3272	952861.0647	690564.3269	1433.90	edge brick	e
3273	952859.3526	690546.2186	1433.24	edge brick	e
3274	952855.5880	690541.0413	1433.12	edge brick	e
3275	952798.9830	690514.1232	1433.29	edge brick	e
3276	952789.1342	690518.7832	1433.55	edge brick	e
3277	952785.2054	690538.3202	1433.47	edge brick	e
3278	952790.4629	690545.9292	1434.85	cor head wall	c
3279	952785.3017	690539.3006	1434.96	cor head wall	c
3280	952783.2110	690552.0247	1437.01	cor head wall	c
3281	952789.0845	690559.6453	1436.99	cor head wall	c
3282	952809.4528	690562.4695	1434.58	cor head wall	c
3283	952788.0226	690556.7040	1433.20	c/l 24" pipe	c
3284	952785.6252	690553.5250	1433.10	c/l 24" pipe	c
3285	952749.7350	690614.2960	1440.08	edge conc	e
3286	952743.2814	690619.0438	1439.97	edge conc	e
3287	952734.1567	690607.7645	1438.63	edge conc	e
3288	952720.5571	690590.9376	1438.55	edge conc	e

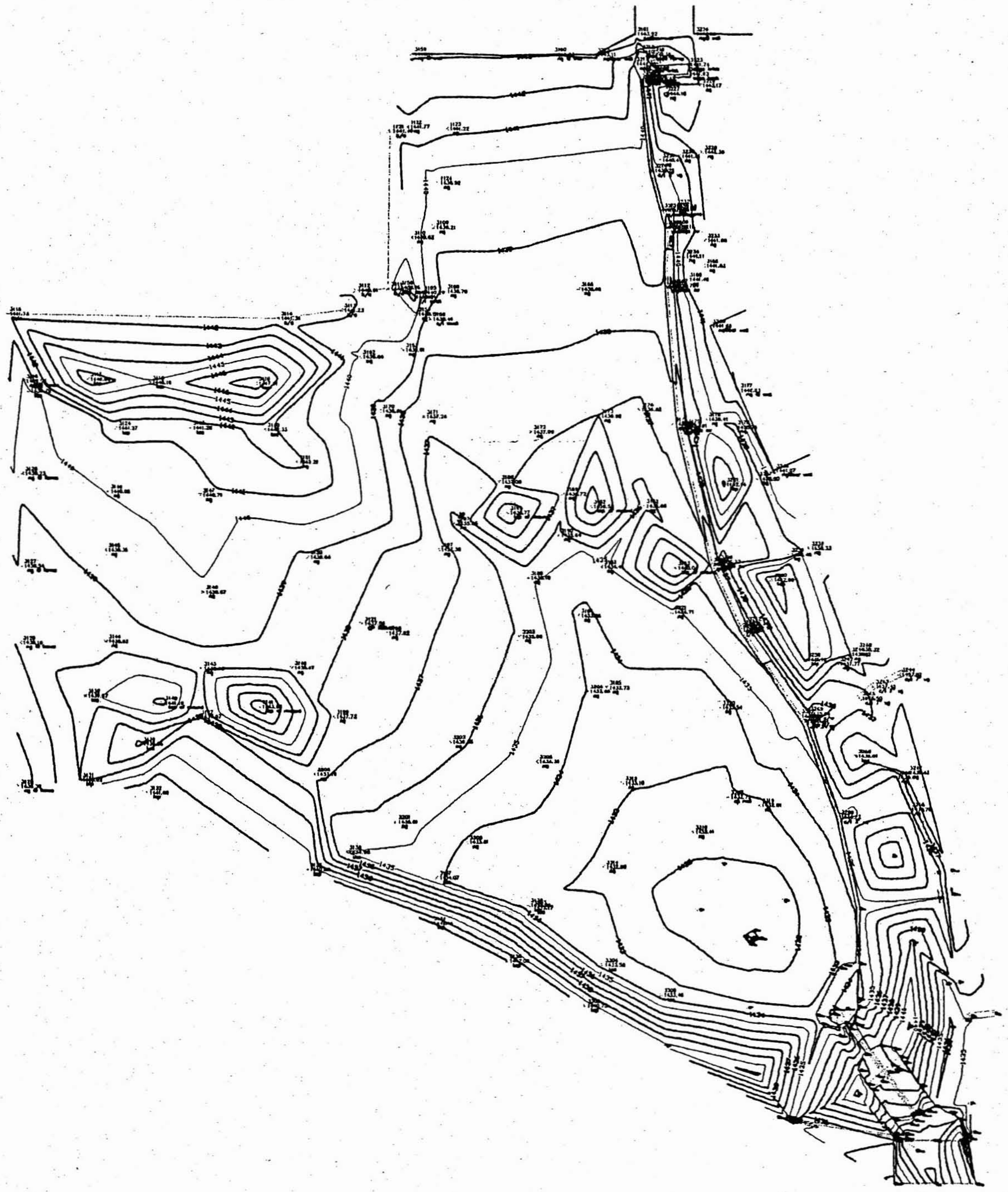
CROSSED ARROWS DET BASIN - SCI SURVEY POINTS

Number	Northing	Easting	Elevation	Raw Desc	Fu
3289	952711.1277	690579.6127	1439.51	edge conc	e
3290	952717.5433	690574.8866	1439.52	edge conc	e
3291	952726.6646	690586.0770	1438.56	edge conc	e
3292	952740.4453	690602.8638	1438.73	edge conc	e
3293	952749.9923	690614.2135	1440.08	edge brick	e
3294	952759.8161	690606.5844	1440.19	edge brick	e
3295	952763.4775	690589.3762	1438.90	edge brick	e
3296	952752.9869	690571.2009	1438.76	edge brick	e
3297	952734.1272	690565.0711	1439.68	edge brick	e
3298	952717.5990	690574.6786	1439.59	edge brick	e
3299	952705.6587	690562.6890	1441.33	top	t
3300	952729.2915	690440.3223	1441.20	top	t
3301	952763.2979	690331.8809	1440.30	top	t
3302	952810.8780	690234.7418	1440.75	top	t
3303	952928.7874	690169.8172	1433.17	toe	t
3304	952859.8142	690255.9828	1433.50	toe	t
3305	952823.4491	690326.9060	1433.46	toe	t
3306	952808.2651	690431.1867	1433.18	toe	t
3307	952883.7870	690433.9603	1431.16	cor conc	c
3308	952893.9915	690426.9039	1431.10	cor conc	c
3309	952901.6328	690437.8940	1431.17	cor conc	c
3310	952891.4195	690445.0115	1431.03	cor conc	c
3311	952892.7296	690435.9069	1430.63	c/l 2.5x3.5 grat	c
3312	952891.8800	690436.4737	1427.77	c/l 15" pipe	c
3313	952925.5471	690372.1943	1431.25	ng	n
3314	952976.9390	690257.2792	1432.80	ng	n
3315	953077.1270	690279.9610	1433.10	ng	n
3316	953018.2226	690364.9813	1432.41	ng	n
3317	952980.2155	690400.3465	1431.92	ng	n
3318	952936.1352	690474.3726	1431.57	ng	n
3319	953050.1078	690445.1901	1432.81	ng	n
3320	953167.2929	690397.5488	1433.54	ng	n
3321	953281.3398	690339.8048	1434.71	ng	n
3322	952743.2372	690619.2412	1439.52	edge brick	e
3323	952715.7707	690638.7177	1438.38	edge brick	e
3324	952690.5240	690657.4321	1434.02	edge brick	e
3325	952675.1031	690686.3714	1432.98	edge brick	e
3326	952656.2427	690693.7772	1432.52	edge brick	e
3327	952649.1342	690691.3642	1432.32	edge brick	e
3328	952649.6369	690653.7809	1432.21	edge brick	e
3329	952650.2058	690620.6992	1432.23	edge brick	e
3330	952658.4132	690621.3930	1432.49	edge brick	e
3331	952659.4182	690607.2533	1434.46	edge brick	e
3332	952675.8910	690605.8379	1435.84	edge brick	e
3333	952711.1624	690579.6209	1438.97	edge brick	e
3334	952673.7581	690632.6291	1433.68	cor head wall	c
3335	952669.0567	690626.5497	1433.74	cor head wall	c
3336	952669.4154	690626.0176	1433.77	cor head wall	c
3337	952681.0640	690627.5008	1436.36	cor head wall	c
3338	952686.9704	690635.1101	1436.34	cor head wall	c
3339	952685.2591	690647.1653	1433.78	cor head wall	c
3340	952684.6128	690647.2835	1433.73	cor head wall	c
3341	952680.0978	690641.0040	1433.79	cor head wall	c
3342	952684.5368	690633.2921	1432.29	c/l 24" pipe	c
3343	952682.1710	690630.2629	1432.25	c/l 24" pipe	c
3344	952657.4898	690620.2288	1432.55	cor head wall	c
3345	952657.5967	690608.1932	1435.49	cor head wall	c
3346	952653.1786	690607.9662	1435.53	cor head wall	c
3347	952653.0577	690620.2332	1432.38	cor head wall	c
3348	952655.2798	690608.7111	1432.27	c/l 24" pipe	c
3349	952674.6394	690483.4412	1432.66	c/l 24" pipe	c
3350	952672.9696	690479.2260	1433.82	cor head wall	c
3351	952672.2443	690483.6796	1434.69	cor head wall	c

CROSSED ARROWS DET BASIN - SCI SURVEY POINTS

Number	Northing	Easting	Elevation	Raw Desc	Fu
3352	952673.6943	690483.9261	1435.36	cor head wall	c
3353	952675.5816	690484.1947	1435.36	cor head wall	c
3354	952677.0451	690484.5116	1434.61	cor head wall	c
3355	952677.8783	690480.0536	1433.64	cor head wall	c
3356	952649.5882	690608.2049	1435.89	cor culvert	c
3357	952648.6463	690688.7190	1436.35	cor culvert	c
3358	952651.9989	690698.1618	1436.41	cor culvert	c
3359	952659.3403	690702.9070	1436.42	cor culvert	c
3360	952597.7473	690706.6406	1436.58	cor culvert	c
3361	952599.1451	690607.1737	1437.22	cor culvert	c
3362	952597.9603	690657.2565	1431.89	flow line	f
3363	952649.4309	690657.8938	1432.29	flow line	f
3364	952682.9251	690677.8564	1432.84	ng	r
3365	952693.7146	690698.8446	1435.74	ng	r
3366	952784.3088	690676.1613	1433.83	ng	r
3367	952792.7095	690692.8005	1434.90	c/l 3"vg	c
3368	952797.4947	690699.6935	1435.13	c/l 7"vg	c
3369	952800.2178	690728.5050	1435.27	c/l 7"vg	c

CROSSED ARROWS PARK



N

1" = 200'

1' - CONTOURS

CROSSED ARROWS PARK
DETENTION BASIN

SCI SURVEY DATA/CONTOURS

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Jackrabbit Park Basin, SE, SV, SQ
LP061

East Basin Storage Estimation					
Contour Elev. (ft)	Contour Area (ft^2)	Average Area (ft^2)	Inc. Storage (ft^3)	Cum. Storage (ft^3)	Cum. Storage (acre-ft)
1463	0	-	-	-	-
1464	61805	30902.5	30902.5	30902.5	0.7
1465	157300	109552.5	109552.5	140455	3.2
1466	194590	175945	175945	316400	7.3
1467	218385	206487.5	206487.5	522887.5	12.0
1468	238270	228327.5	228327.5	751215	17.2
1469	258690	248480	248480	999695	22.9
1470*	277000	267845	267845	1267540	29.1
1471	285000	281000	281000	1548540	35.5
1472	297000	291000	291000	1839540	42.2

Storage estimation based on SCI survey data.

West Basin Storage Estimation					
Contour Elev. (ft)	Contour Area (ft^2)	Average Area (ft^2)	Inc. Storage (ft^3)	Cum. Storage (ft^3)	Cum. Storage (acre-ft)
1467	50985	-	-	-	-
1468	128040	89512.5	89512.5	89512.5	2.1
1469	251100	189570	189570	279082.5	6.4
1470*	280000	265550	265550	544632.5	12.5
1471	299000	289500	289500	834132.5	19.1
1472	325000	312000	312000	1146132.5	26.3

Storage estimation based on SCI survey data.

SE,SV,SQ		
Contour Elev. (ft)	Cum. Storage (acre-ft)	Discharge (cfs)
1463	0.0	0
1464	0.7	8
1465	3.2	16
1466	7.3	28
1467	12.0	37
1468	19.3	45
1469	29.4	50
1470*	41.6	55
1471	54.7	150
1472	68.5	320

*Overflow Elevation

Stanley Consultants INC.

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Subject JACKRABBIT PARK

DETENTION BASIN DISCHARGE ESTIMATION

Computed by Date

Checked by Date

Approved by Date

Sheet No. of

30 INCH CONCRETE PIPE
INVERT ELEVATION = 1462.94 FT
SEE ATTACHED FIG. 5.20

	ELEVATION (FT)	HW/D	Q (CFS)	
	1463	0	0	
	1464	0.4	8	(INTERPOLATED)
	1465	0.8	16	
	1466	1.2	28	
	1467	1.6	37	
	1468	2.0	45	
	1469	2.4	50	
(SPILLWAY)	1470	2.8	55	
	1471	3.2	60	
	1472	3.6	65	

WEIR EQ: $Q = CLH^{3/2}$; $C = 3.0$, $L = 30$ FT

ELEVATION (FT)	H (FT)	Q (CFS)
1471	1.0	90
1472	2.0	255

∴

ELEVATION (FT)	DISCHARGE (CFS)
1463	0
1464	8
1465	16
1466	28
1467	37
1468	45
1469	50
1470	55
1471	150
1472	320

SCI #15586
JACKRABBIT PARK
OUTLET PIPE

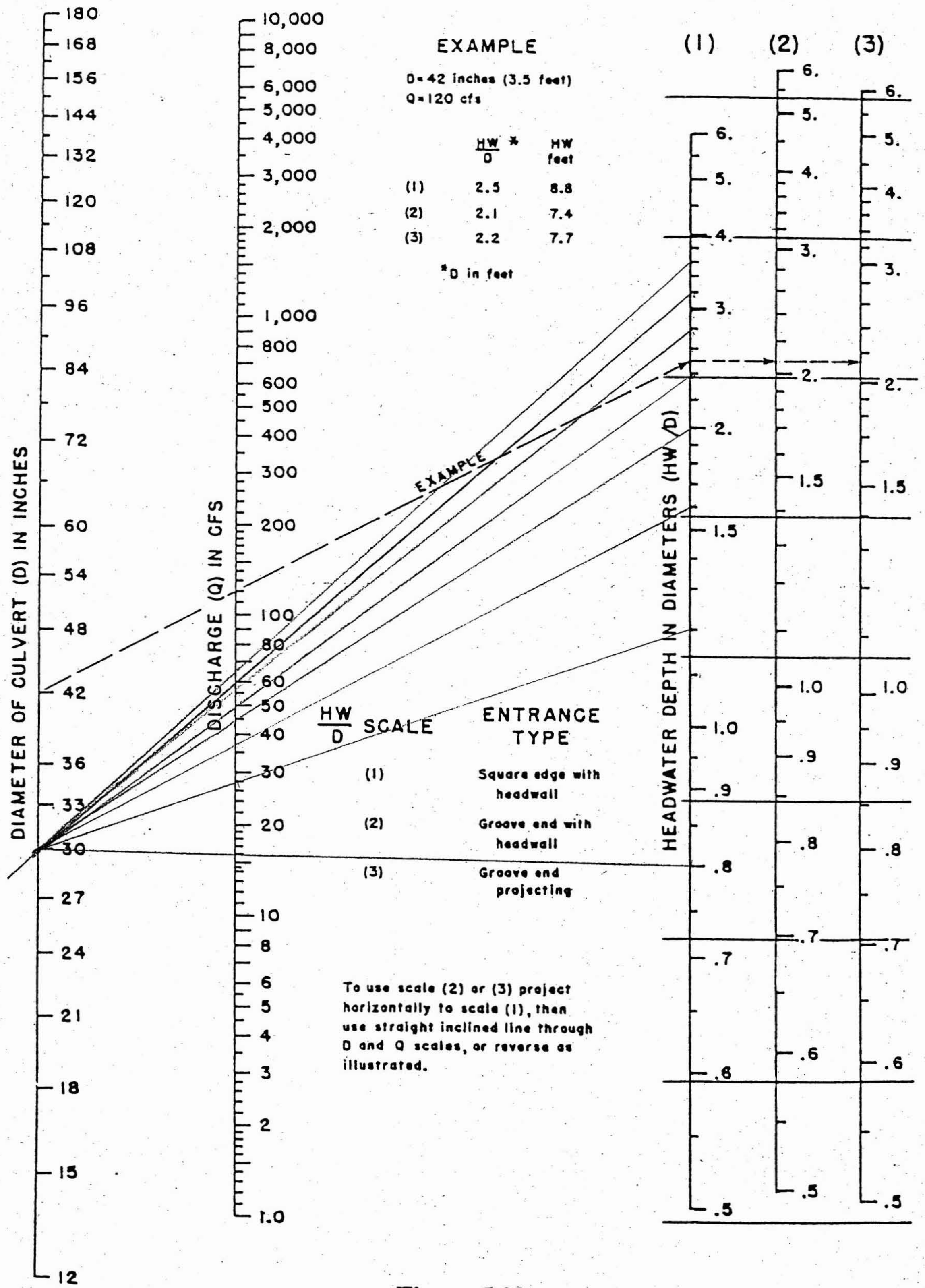


Figure 5.20
Headwater Depth for Concrete Pipe Culverts with Inlet Control
(USDOT, FHWA, HDS-5, 1985)

JACKRABBIT PARK DET BASIN - SEI SURVEY POINTS

Drawing Name: scottsdale basins1
Project Name: scottsdale basins
Project Path: Q:\15586\graphics\AutoCAD\scottsdale basins\
Username: 6445

Number	Northing	Easting	Elevation	Raw Desc	Fu
4003	958235.2099	689436.2919	1473.59	cp nail	cp
4004	958226.2517	688388.8465	1468.87	cp nail	cp
4005	958360.7679	688252.3237	1468.81	edge riprap	ec
4006	958350.2818	688231.8363	1471.72	edge riprap	ec
4007	958351.4570	688216.4405	1471.36	edge riprap	ec
4008	958380.7149	688193.3674	1469.82	edge riprap	ec
4009	958386.3098	688186.5047	1471.46	edge riprap	ec
4010	958384.0749	688178.7857	1472.66	edge riprap	ec
4011	958410.4132	688178.7088	1472.52	edge riprap	ec
4012	958422.8807	688178.8589	1472.57	edge riprap	ec
4013	958414.4955	688187.6574	1470.98	edge riprap	ec
4014	958401.8093	688199.6537	1470.68	edge riprap	ec
4015	958380.2471	688214.7676	1468.49	edge riprap	ec
4016	958369.3934	688241.7948	1468.30	edge riprap	ec
4017	958426.5006	688172.4479	1472.38	c/l 6 ft scupper	c/
4018	958416.2878	688178.7178	1472.46	c/l 6 ft scupper	c/
4019	958400.6065	688172.7233	1472.56	c/l 6 ft scupper	c/
4020	958331.2266	688172.5097	1472.68	b/c	b/
4021	958270.7773	688172.2651	1471.65	b/c	b/
4022	958187.0392	688171.9625	1469.90	b/c	b/
4023	958129.0662	688171.7043	1468.65	b/c	b/
4024	958115.4470	688177.3364	1468.21	b/c	b/
4025	958109.5724	688191.4084	1468.50	b/c	b/
4026	958109.1615	688268.2097	1468.55	b/c	b/
4027	958108.5990	688359.4978	1468.86	b/c	b/
4028	958107.9646	688473.2952	1469.00	b/c	b/
4029	958107.2246	688579.4552	1469.21	b/c	b/
4030	958106.6062	688680.8023	1469.52	b/c	b/
4031	958105.8679	688794.4179	1469.71	b/c	b/
4032	958105.2334	688897.5507	1469.93	b/c	b/
4033	958104.9116	688950.2646	1469.67	c/l 30 ft d/w	c/
4034	958104.2637	689054.0343	1470.36	b/c	b/
4035	958103.5261	689167.7382	1470.53	b/c	b/
4036	958102.7421	689261.1267	1470.81	b/c	b/
4037	958102.0795	689382.5800	1470.64	b/c	b/
4038	958101.8930	689426.0194	1470.53	b/c	b/
4039	958111.4124	689344.3918	1470.63	toe	tc
4040	958111.6028	689191.1775	1470.57	toe	tc
4041	958112.1840	689089.8273	1470.35	toe	tc
4042	958111.0318	689004.7834	1470.18	toe	tc
4043	958111.2954	688905.0830	1469.91	toe	tc
4044	958111.9231	688807.5593	1469.69	toe	tc
4045	958112.5784	688707.0528	1469.46	toe	tc
4046	958113.6609	688614.5865	1469.24	toe	tc
4047	958114.8987	688516.0266	1468.99	toe	tc
4048	958115.4191	688419.8888	1468.84	toe	tc
4049	958115.9156	688320.1445	1468.68	toe	tc
4050	958116.6016	688238.1628	1468.38	toe	tc
4051	958119.0886	688191.9641	1468.46	toe	tc
4052	958131.0292	688183.5142	1468.44	toe	tc
4053	958214.6893	688183.1119	1470.28	toe	tc
4054	958289.5772	688183.1634	1471.64	toe	tc
4055	958321.7253	688182.9388	1472.24	toe	tc
4056	958370.2104	688179.9217	1472.85	toe	tc
4057	958374.4451	688186.6663	1473.16	t/b	t/
4058	958291.3181	688193.6037	1473.71	t/b	t/
4059	958227.6779	688193.2538	1472.56	t/b	t/
4060	958185.6792	688194.9234	1472.30	t/b	t/
4061	958152.1206	688211.2799	1472.43	t/b	t/

JACKRABBIT PARK DET BASIN - SCI SURVEY POINTS

Number	Northing	Easting	Elevation	Raw Desc	Fu
4062	958139.0716	688301.3267	1473.06	t/b	t/
4063	958135.5974	688376.7072	1472.19	t/b	t/
4064	958135.6068	688449.2833	1472.35	t/b	t/
4065	958133.1029	688571.2765	1472.82	t/b	t/
4066	958132.1224	688662.5325	1472.99	t/b	t/
4067	958136.5844	688716.8839	1474.04	t/b	t/
4068	958132.4996	688822.3759	1472.60	t/b	t/
4069	958131.0068	688891.0077	1472.29	t/b	t/
4070	958126.6959	688986.8499	1472.60	t/b	t/
4071	958124.1339	689081.1307	1472.52	t/b	t/
4072	958122.9159	689198.0306	1472.74	t/b	t/
4073	958161.1015	689209.1350	1465.54	c/l 10ft riprap	c/
4074	958156.2918	689133.2987	1465.88	c/l 10ft riprap	c/
4075	958158.2053	689030.9651	1466.55	c/l 10ft riprap	c/
4076	958169.7435	688924.3642	1466.28	c/l 10ft riprap	c/
4077	958163.2413	688914.9251	1468.02	cor hdwall	cc
4078	958161.9990	688901.8189	1469.04	cor hdwall	cc
4079	958167.2329	688900.4744	1469.08	cor hdwall	cc
4080	958164.9941	688901.9338	1466.40	c/l 18" rgrcp	c/
4081	958148.8404	688827.1105	1466.23	c/l 18" rgrcp	c/
4082	958151.6377	688827.2634	1469.66	cor hdwall	cc
4083	958146.6137	688828.3504	1469.66	cor hdwall	cc
4084	958146.0521	688828.1467	1469.66	cor hdwall	cc
4085	958151.1941	688816.8122	1467.95	cor hdwall	cc
4086	958158.1763	688818.0658	1465.80	c/l 10ft riprap	c/
4087	958175.1303	688758.1929	1466.45	c/l 10ft riprap	c/
4088	958177.9378	688687.8349	1466.71	c/l 10ft riprap	c/
4089	958168.2759	688613.8007	1466.92	c/l 10ft riprap	c/
4090	958166.5912	688538.6020	1467.17	c/l 10ft riprap	c/
4091	958167.9724	688443.0852	1467.54	c/l 10ft riprap	c/
4092	958162.5397	688352.3086	1467.34	c/l 10ft riprap	c/
4093	958168.7569	688292.1701	1467.52	c/l 10ft riprap	c/
4094	958167.3456	688263.6237	1467.61	c/l 10ft riprap	c/
4095	958345.6166	688249.4225	1469.41	toe	tc
4096	958328.4816	688215.6461	1469.88	toe	tc
4097	958251.4532	688209.5093	1468.96	toe	tc
4098	958192.6676	688215.6946	1468.86	toe	tc
4099	958167.5762	688234.4633	1468.62	toe	tc
4100	958161.2755	688259.9672	1468.07	toe	tc
4101	958176.5990	688267.1324	1468.15	n/g	n/
4102	958169.0812	688367.0158	1467.91	n/g	n/
4103	958177.1777	688466.5332	1468.13	n/g	n/
4104	958172.7254	688577.8019	1467.63	n/g	n/
4105	958186.2065	688687.0639	1467.62	n/g	n/
4106	958181.9562	688766.9136	1467.20	n/g	n/
4107	958175.4581	688797.5150	1467.06	n/g	n/
4108	958159.7021	688826.8172	1468.00	n/g	n/
4109	958179.3843	688843.2356	1468.57	n/g	n/
4110	958154.9100	688887.7096	1471.17	n/g	n/
4113	958171.7565	689002.1071	1467.36	n/g	n/
4114	958166.3856	689090.1114	1466.74	n/g	n/
4115	958168.7864	689203.6568	1466.12	n/g	n/
4116	958262.9796	689208.2628	1467.54	n/g	n/
4117	958265.7556	689089.8134	1467.83	n/g	n/
4118	958267.7410	688983.6202	1467.98	n/g	n/
4119	958268.2332	688877.4253	1468.26	n/g	n/
4120	958269.4953	688768.6519	1468.54	n/g	n/
4121	958272.6162	688659.5837	1468.54	n/g	n/
4122	958267.8466	688555.9054	1469.00	n/g	n/
4123	958267.7028	688445.4263	1469.18	n/g	n/
4124	958268.4666	688321.3861	1469.64	n/g	n/
4125	958357.2649	688282.4161	1468.30	n/g	n/
4126	958359.7943	688336.9399	1468.45	n/g	n/

JACKRABBIT PARK DET BASIN - SCI SURVEY POINTS

Number	Northing	Easting	Elevation	Raw Desc	Fu
4127	958371.5126	688392.0372	1468.47	n/g	n/
4128	958367.7376	688471.6852	1468.02	n/g	n/
4129	958359.6434	688610.7792	1467.95	n/g	n/
4130	958345.1259	688640.6995	1468.36	n/g	n/
4131	958360.3068	688682.0949	1467.99	n/g	n/
4132	958352.4834	688779.9136	1467.49	n/g	n/
4133	958357.2632	688886.2180	1467.54	n/g	n/
4134	958357.2382	688991.0208	1467.04	n/g	n/
4135	958355.8455	689092.8129	1466.69	n/g	n/
4136	958352.2029	689177.2657	1466.68	n/g	n/
4137	958336.7471	689217.3072	1466.75	n/g	n/
4138	958347.5010	689255.6038	1466.70	n/g	n/
4139	958345.4754	689221.0302	1468.31	top of mound	tc
4140	958356.8149	689253.6009	1466.24	c/l 10ft riprap	c/
4141	958360.1351	689178.7349	1466.23	c/l 10ft riprap	c/
4142	958364.3445	689074.7567	1466.19	c/l 10ft riprap	c/
4143	958363.7585	688971.2471	1466.53	c/l 10ft riprap	c/
4144	958361.0117	688844.9493	1467.11	c/l 10ft riprap	c/
4145	958364.2164	688744.0247	1467.09	c/l 10ft riprap	c/
4146	958370.8877	688643.0039	1467.16	c/l 10ft riprap	c/
4147	958356.2510	688642.3355	1470.27	top of mound	tc
4148	958371.9279	688515.4598	1467.50	c/l 10ft riprap	c/
4149	958380.1766	688409.9969	1467.92	c/l 10ft riprap	c/
4150	958370.4953	688344.6175	1468.03	c/l 10ft riprap	c/
4151	958368.2039	688269.8142	1468.08	c/l 10ft riprap	c/
4152	958401.2568	688214.7705	1473.11	t/b	t/
4153	958396.0428	688302.6444	1474.45	t/b	t/
4154	958397.9610	688335.5074	1474.14	t/b	t/
4155	958403.7573	688370.0968	1472.72	t/b	t/
4156	958402.4862	688462.3111	1472.80	t/b	t/
4157	958398.8423	688567.7497	1472.49	t/b	t/
4158	958399.0484	688613.7820	1472.54	t/b	t/
4159	958401.5190	688627.0249	1471.36	c/l 20ft riprap	c/
4160	958386.9133	688626.8329	1469.68	c/l 20ft riprap	c/
4161	958399.8303	688639.9365	1472.48	t/b	t/
4162	958396.4075	688681.0860	1472.64	t/b	t/
4163	958389.2075	688684.9116	1472.47	cor hdwall	cc
4164	958390.9495	688689.5000	1472.45	cor hdwall	cc
4165	958376.9829	688689.0930	1468.28	cor hdwall	cc
4166	958377.5955	688706.4066	1469.03	cor hdwall	cc
4167	958389.2586	688687.7876	1467.68	c/l 24" pipe	c/
4168	958395.8248	688770.3208	1473.14	t/b	t/
4169	958396.9680	688844.0479	1473.75	t/b	t/
4170	958396.5787	688957.0461	1472.75	t/b	t/
4171	958397.5353	689024.7423	1472.93	t/b	t/
4172	958405.1181	689024.5210	1471.74	4ft v/g	4f
4173	958406.0156	688851.7859	1471.72	4ft v/g	4f
4174	958406.1957	688787.7545	1471.73	4ft v/g	4f
4175	958406.4595	688665.9860	1471.15	4ft v/g	4f
4176	958406.8801	688535.1599	1471.50	4ft v/g	4f
4177	958407.9348	688423.5418	1471.88	4ft v/g	4f
4178	958408.0603	688320.3994	1471.95	4ft v/g	4f
4179	958408.4302	688208.9936	1471.99	4ft v/g	4f
4180	958421.9938	688197.4867	1473.52	gnd at wall	gr
4181	958421.0702	688322.0787	1473.57	gnd at wall	gr
4182	958420.0481	688426.0976	1473.38	gnd at wall	gr
4183	958419.6691	688537.1879	1473.27	gnd at wall	gr
4184	958419.1427	688619.7347	1473.18	gnd at wall	gr
4185	958419.0037	688665.9909	1473.04	cor wall at gnd	cc
4186	958418.5619	688685.7213	1473.42	cor wall at gnd	cc
4187	958417.9918	688776.8171	1473.31	gnd at wall	gr
4188	958417.2086	688884.3449	1473.49	gnd at wall	gr
4189	958416.4218	688986.6484	1473.58	gnd at wall	gr

JACKRABBIT PARK DET BASIN - SCI SURVEY POINTS

Number	Northing	Easting	Elevation	Raw Desc	Fu
4190	958415.9009	689106.8229	1473.92	gnd at wall	gr
4191	958113.3803	689451.8770	1470.42	b/c	b/
4192	958135.5837	689460.2606	1470.94	b/c	b/
4193	958226.5773	689460.7395	1471.55	b/c	b/
4194	958327.6336	689461.1129	1472.15	b/c	b/
4195	958416.4692	689461.4311	1472.69	b/c	b/
4196	958378.6734	689461.3152	1472.41	c/l 15ft c/b	c/
4197	958412.7236	689452.1970	1473.51	cor wall at gnd	cc
4198	958414.2631	689367.0853	1473.99	gnd at walld	gr
4199	958415.2095	689257.7645	1474.12	gnd at walld	gr
4200	958415.6883	689184.5119	1473.89	gnd at walld	gr
4201	958403.6168	689195.1953	1471.60	4ft v/g	4f
4202	958403.1129	689266.8926	1472.07	4ft v/g	4f
4203	958403.0560	689370.2479	1472.46	4ft v/g	4f
4204	958402.6838	689424.6715	1473.05	4ft v/g	4f
4205	958394.3135	689439.6378	1473.48	t/b	t/
4206	958397.9549	689397.8723	1473.37	t/b	t/
4207	958397.8101	689371.1677	1473.10	t/b	t/
4208	958390.5177	689281.0398	1474.44	t/b	t/
4209	958393.9147	689222.0276	1472.98	t/b	t/
4210	958398.9714	689206.3367	1471.41	c/l 20ft riprap	c/
4211	958347.6828	689309.6156	1465.98	c/l 10ft riprap	c/
4212	958361.8190	689386.4271	1465.68	c/l 10ft riprap	c/
4213	958372.7517	689404.8945	1467.46	cor hdwall	cc
4214	958385.9922	689420.7573	1471.73	cor hdwall	cc
4215	958382.0420	689424.3154	1471.72	cor hdwall	cc
4216	958370.3580	689419.1621	1467.36	cor hdwall	cc
4217	958366.8487	689425.9599	1469.13	cor hdwall	cc
4218	958361.5179	689426.0936	1469.12	cor hdwall	cc
4219	958357.2520	689418.9759	1467.23	cor hdwall	cc
4220	958383.2614	689421.7224	1466.16	c/l 36" pipe	c
4221	958364.0502	689425.4427	1465.18	c/l 36" pipe	c
4222	958354.6254	689441.1629	1473.04	t/b	t/
4223	958276.9775	689435.5983	1474.94	t/b	t/
4224	958213.4231	689437.5487	1472.91	t/b	t/
4225	958154.1643	689438.6438	1472.72	t/b	t/
4226	958125.2640	689417.7475	1472.34	t/b	t/
4227	958127.6232	689355.8857	1472.81	t/b	t/
4228	958135.1940	689310.0492	1474.36	t/b	t/
4229	958126.1270	689257.5972	1473.24	t/b	t/
4230	958168.2474	689250.3728	1465.52	c/l 10ft riprap	c/
4231	958175.1613	689323.1174	1465.38	c/l 10ft riprap	c/
4232	958159.5406	689397.6944	1465.00	c/l 10ft riprap	c/
4233	958154.7822	689416.7498	1467.22	cor hdwall	cc
4234	958158.6927	689423.8684	1469.19	cor hdwall	cc
4235	958164.3656	689423.9853	1469.17	cor hdwall	cc
4236	958168.4695	689416.9111	1467.27	cor hdwall	cc
4237	958161.5799	689423.4466	1465.40	c/l 36" pipe	c/
4238	958171.5074	689413.0547	1465.84	toe	tc
4239	958287.1488	689403.5681	1467.23	toe	tc
4240	958354.1844	689413.3332	1465.50	toe	tc
4241	958352.0773	689385.2945	1466.19	n/g	n/
4242	958339.3625	689315.7458	1466.36	n/g	n/
4243	958257.6899	689287.2785	1467.22	n/g	n/
4244	958244.9659	689367.3886	1466.81	n/g	n/
4245	958170.4607	689372.9899	1465.57	n/g	n/
4246	958185.6397	689300.7087	1466.22	n/g	n/
4247	958110.4508	689317.9999	1470.64	toe	tc
4248	958111.1749	689417.1149	1470.59	toe	tc
4249	958128.3762	689443.0908	1470.90	toe	tc
4250	958174.4609	689448.7855	1471.04	toe	tc
4251	958280.1535	689449.8257	1471.75	toe	tc
4252	958384.7483	689450.2460	1472.26	toe	tc

JACKRABBIT PARK DET BASIN - SCI SURVEY POINTS

Number	Northing	Easting	Elevation	Raw Desc	Fu
4253	958379.0692	689501.7883	1472.22	c/l 6ft scupper	c/
4254	958368.6795	689508.5272	1472.25	c/l 6ft scupper	c/
4255	958423.6793	689502.7220	1472.60	b/cr	b/
4256	958291.3663	689502.1466	1471.79	b/cr	b/
4257	958191.2972	689501.7520	1471.23	b/cr	b/
4258	958140.7031	689501.5264	1470.96	b/c	b/
4259	958014.0503	689500.9356	1469.54	b/c	b/
4260	957970.8747	689500.8806	1469.03	b/c	b/
4261	957957.2158	689506.5951	1468.59	b/c	b/
4262	957951.3913	689516.4975	1468.93	b/c	b/
4263	957966.7191	689632.1387	1469.68	b/c	b/
4264	958000.7476	689724.6635	1470.20	b/c	b/
4265	958006.1414	689715.2253	1470.13	toe	tc
4266	957976.1433	689632.5465	1469.71	toe	tc
4267	957961.4090	689518.4275	1469.09	toe	tc
4268	957973.8011	689513.4271	1469.02	toe	tc
4269	958120.4578	689511.6779	1470.83	toe	tc
4270	958216.1873	689512.2923	1471.24	toe	tc
4271	958294.2856	689512.6388	1471.93	toe	tc
4272	958336.8848	689515.7640	1472.46	t/b	t/
4273	958310.3046	689515.1130	1472.47	t/b	t/
4274	958290.3436	689522.4477	1472.52	t/b	t/
4275	958193.5483	689523.8974	1472.60	t/b	t/
4276	958103.8172	689523.7737	1472.52	t/b	t/
4277	958015.6187	689528.9907	1473.14	t/b	t/
4278	957988.2792	689538.1199	1474.20	t/b	t/
4279	957988.9235	689604.4459	1472.53	t/b	t/
4280	958019.3100	689700.7261	1472.59	t/b	t/
4281	958034.8839	689693.4009	1468.91	toe	tc
4282	958003.1890	689596.8976	1469.66	toe	tc
4283	958006.4472	689550.4749	1469.41	toe	tc
4284	958082.4235	689542.1992	1468.83	toe	tc
4285	958143.3822	689552.2108	1466.95	toe	tc
4286	958153.1535	689552.8313	1466.43	cor hdwall	cc
4287	958156.8794	689545.4410	1468.20	cor hdwall	cc
4288	958162.4578	689545.5042	1468.24	cor hdwall	cc
4289	958166.7379	689552.5177	1466.40	cor hdwall	cc
4290	958193.7820	689559.5921	1465.17	toe	tc
4291	958261.8230	689553.5348	1465.99	toe	tc
4292	958307.6836	689563.0773	1465.88	toe	tc
4293	958315.7837	689558.8346	1464.42	toe	tc
4294	958311.2506	689543.8173	1464.68	toe	tc
4295	958321.6420	689531.7321	1464.85	toe	tc
4296	958321.1695	689528.3585	1466.28	cor hdwall	cc
4297	958329.3656	689528.8893	1468.47	cor hdwall	cc
4298	958332.0581	689533.2754	1468.47	cor hdwall	cc
4299	958328.3189	689540.5323	1466.38	cor hdwall	cc
4300	958330.0289	689531.5505	1464.39	c/l 36" pipe	c/
4301	958342.1129	689524.1246	1469.98	c/l 8ft swale	c/
4302	958358.3735	689514.9910	1471.04	c/l 8ft swale	c/
4303	958353.1617	689524.7873	1471.54	c/l 5ft v/g	c/
4304	958361.4903	689540.6930	1472.21	c/l 5ft v/g	c/
4305	958363.9492	689674.0732	1472.54	c/l 5ft v/g	c/
4306	958368.8938	689682.5638	1472.66	gnd at wall	gr
4307	958358.9657	689664.1057	1472.99	t/bl	t/
4308	958360.0529	689568.9948	1473.12	t/b	t/
4309	958349.8708	689528.7061	1472.19	t/b	t/
4310	958370.1009	689522.0716	1472.92	cor at wall	cc
4311	958265.7777	689696.3286	1464.66	control	cc
4312	958159.9337	689545.9697	1464.23	c/l 36" pipe	c/
4313	958159.5035	689560.8895	1464.22	c/l 10ft riprap	c/
4314	958190.6634	689567.8603	1464.24	c/l 10ft riprap	c/
4315	958213.6490	689599.8326	1464.40	c/l 10ft riprap	c/

JACKRABBIT PARK DET BASIN - SCZ SURVEY POINTS

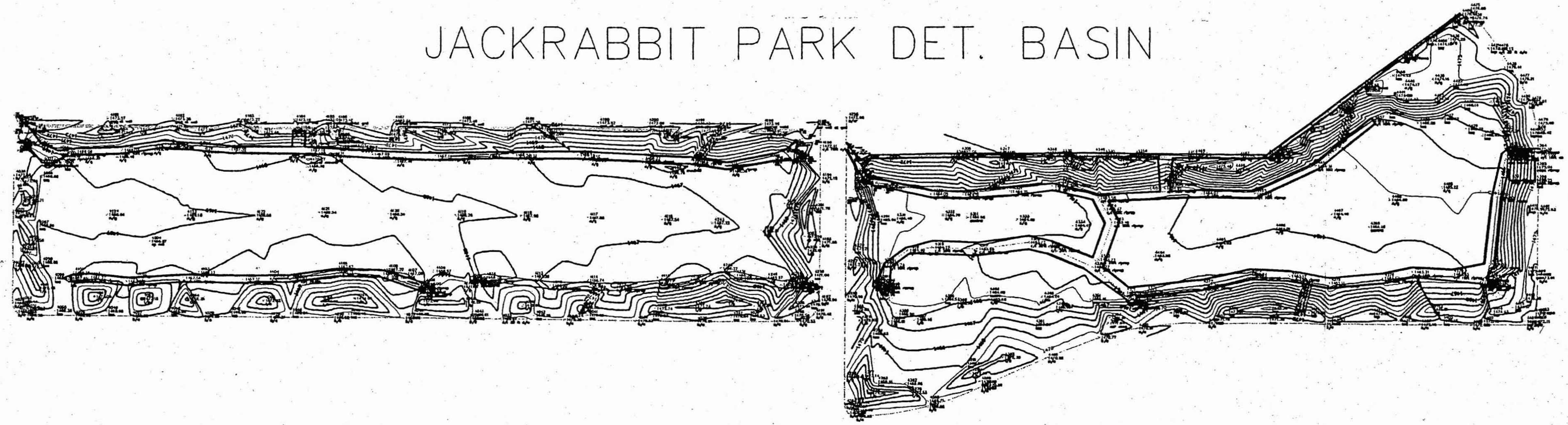
Number	Northing	Easting	Elevation	Raw Desc	Fu
4316	958218.1302	689639.9288	1464.27	c/l 20ft riprap	c/
4317	958215.5259	689711.0365	1463.88	c/l 20ft riprap	c/
4318	958226.2038	689792.4269	1463.72	c/l 20ft riprap	c/
4319	958218.9131	689824.7315	1463.50	c/l 20ft riprap	c/
4320	958187.4106	689894.7220	1463.27	c/l 20ft riprap	c/
4321	958146.4716	689946.3095	1463.12	c/l 20ft riprap	c/
4322	958198.9297	689904.3835	1463.23	c/l 20ft riprap	c/
4323	958257.6476	689925.8577	1463.48	c/l 20ft riprap	c/
4324	958278.7807	689913.8929	1463.47	c/l 10ft riprap	c/
4325	958296.7983	689904.3819	1463.58	c/l 10ft riprap	c/
4326	958314.4546	689830.4860	1464.14	c/l 10ft riprap	c/
4327	958306.2282	689764.6200	1464.21	c/l 10ft riprap	c/
4328	958301.2696	689687.9354	1464.51	c/l 10ft riprap	c/
4329	958302.4656	689637.2678	1464.05	c/l 10ft riprap	c/
4330	958316.2097	689570.0266	1464.65	c/l 10ft riprap	c/
4331	958264.0794	689579.1008	1465.49	n/g	n/
4332	958269.2330	689656.4831	1464.70	n/g	n/
4333	958262.1763	689775.0237	1464.69	n/g	n/
4334	958253.2116	689863.9962	1464.41	n/g	n/
4335	958321.6696	689843.1068	1464.88	c/l 20ft riprap	c/
4336	958346.9368	689843.9310	1471.04	c/l 20ft riprap	c/
4337	958363.0833	689843.4730	1472.67	c/l 20ft riprap	c/
4338	958363.0970	689750.8238	1472.99	c/l 5ft v/g	c/
4339	958365.4151	689843.0416	1472.69	c/l 5ft v/g	c/
4340	958364.9199	689911.7415	1473.71	c/l 5ft v/g	c/
4341	958363.5149	689960.3971	1473.03	c/l 5ft v/g	c/
4342	958355.3520	689939.5297	1475.21	t/b	t/
4343	958355.3526	689889.9866	1475.24	t/b	t/
4344	958357.5413	689868.3974	1473.99	t/b	t/
4345	958357.4384	689808.9028	1473.50	t/b	t/
4346	958350.6244	689741.8029	1474.29	t/b	t/
4347	958368.6110	689744.0847	1473.00	gnd at wall	gr
4348	958368.2812	689818.7078	1473.42	gnd at wall	gr
4349	958367.6801	689896.1652	1473.86	gnd at wall	gr
4350	958365.2724	689963.7149	1473.01	gnd at wall	gr
4351	958137.0217	689890.8086	1464.61	toe	tc
4352	958140.7268	689814.4767	1464.24	toe	tc
4353	958147.0444	689728.4209	1464.09	toe	tc
4354	958136.1216	689656.0183	1464.53	toe	tc
4355	958113.2277	689583.4682	1465.50	toe	tc
4356	958101.4213	689570.5613	1466.81	t/b	t/
4357	958104.4958	689611.8292	1466.45	t/b	t/
4358	958129.9124	689676.2651	1465.98	t/b	t/
4359	958136.0376	689730.0019	1465.98	t/b	t/
4360	958124.0726	689833.1465	1466.68	t/b	t/
4361	958096.7845	689800.9241	1467.94	toe	tc
4362	958044.2283	689752.9668	1472.30	t/b	t/
4363	958106.9231	689922.4515	1471.81	t/b	t/
4364	958098.8440	689919.6090	1471.84	cor conc	cc
4365	958250.1188	690336.4178	1464.46	control	cc
4366	958136.9519	689948.1950	1464.82	cor hdwall	cc
4367	958127.4354	689955.6996	1466.91	cor hdwall	cc
4368	958128.3463	689961.3745	1466.86	cor hdwall	cc
4369	958139.8108	689965.5961	1464.78	cor hdwall	cc
4370	958128.4678	689958.4137	1462.94	c/l 30" pipe	c/
4371	958148.5216	689979.8958	1462.69	c/l 15ft riprap	c/
4372	958158.4818	690067.4668	1462.70	c/l 15ft riprap	c/
4373	958174.2866	690144.9336	1462.94	c/l 15ft riprap	c/
4374	958171.2943	690207.7977	1463.12	c/l 15ft riprap	c/
4375	958161.2021	690272.4612	1463.11	c/l 15ft riprap	c/
4376	958168.5518	690359.5092	1463.53	c/l 15ft riprap	c/
4377	958178.0034	690406.9755	1463.31	c/l 15ft riprap	c/
4378	958174.4549	690469.7173	1463.63	c/l 15ft riprap	c/

Number	Northing	Easting	Elevation	Raw Desc	Fu
4379	958170.8991	690524.1908	1465.04	cor hdwall	cc
4380	958161.8129	690529.2306	1470.78	cor hdwall	cc
4381	958155.6067	690523.1533	1470.79	cor hdwall	cc
4382	958160.3460	690514.0629	1465.04	cor hdwall	cc
4383	958159.1336	690525.5580	1464.24	c/l 60" pipe	c/
4384	958190.3713	690529.3581	1464.58	c/l 15ft riprap	c/
4385	958295.7701	690541.0271	1464.83	c/l 15ft riprap	c/
4386	958371.6817	690556.5302	1466.48	cor hdwall	cc
4387	958367.0587	690566.8247	1468.51	cor hdwall	cc
4388	958361.5856	690566.8126	1468.57	cor hdwall	cc
4389	958356.6177	690556.1365	1466.57	cor hdwall	cc
4390	958363.3454	690556.1952	1466.51	f/l	f/
4391	958364.2066	690565.7238	1464.86	c/l 24" pipe	c/
4392	958375.6013	690559.6114	1468.17	edge riprap	ec
4393	958372.9783	690572.3504	1470.60	edge riprap	ec
4394	958372.6071	690601.5201	1475.10	edge riprap	ec
4395	958343.9808	690601.3493	1475.04	edge riprap	ec
4396	958323.5294	690601.2472	1475.25	edge riprap	ec
4397	958324.6024	690560.9922	1467.96	edge riprap	ec
4398	958318.4516	690600.9479	1475.28	toe	tc
4399	958174.3890	690599.8155	1473.69	toe	tc
4400	958112.8653	690599.2265	1472.45	toe	tc
4401	958100.5304	690585.4788	1472.40	toe	tc
4402	958100.7688	690517.1151	1472.40	toe	tc
4403	958101.2052	690453.3093	1472.15	toe	tc
4404	958101.7565	690386.6525	1471.89	toe	tc
4405	958102.6720	690273.4360	1471.51	toe	tc
4406	958103.2295	690173.2409	1471.39	toe	tc
4407	958103.9131	690086.8061	1471.15	toe	tc
4408	958115.1063	690019.7451	1472.02	top	tc
4409	958115.8807	690107.5535	1473.57	top	tc
4410	958121.0577	690177.1875	1475.38	top	tc
4411	958114.5580	690238.8131	1473.69	top	tc
4412	958112.6967	690341.9386	1473.08	top	tc
4413	958119.5476	690437.5199	1475.81	top	tc
4414	958115.7276	690532.3100	1474.43	top	tc
4415	958123.0855	690566.3749	1474.57	top	tc
4416	958136.7008	690584.0523	1475.30	top	tc
4417	958179.5290	690587.0360	1475.14	top	tc
4418	958278.1032	690589.5816	1476.10	top	tc
4419	958397.9662	690590.6235	1475.65	top	tc
4420	958450.7843	690575.4510	1476.49	top	tc
4421	958532.3863	690528.1825	1476.70	top	tc
4422	958475.1265	690468.7474	1474.53	top	tc
4423	958452.9075	690438.2645	1474.53	top	tc
4424	958452.6696	690388.7234	1474.43	top	tc
4425	958429.3678	690366.6246	1466.38	toe	tc
4426	958414.1889	690415.8757	1466.09	toe	tc
4427	958420.9808	690454.1837	1466.62	toe	tc
4428	958442.6271	690486.0177	1468.14	toe	tc
4429	958404.4419	690492.6712	1466.72	toe	tc
4430	958394.6040	690517.8004	1466.65	toe	tc
4431	958447.9705	690531.7513	1469.32	toe	tc
4432	958400.9346	690548.6143	1467.27	toe	tc
4433	958398.2291	690600.0027	1475.42	toe	tc
4434	958444.2540	690588.3356	1475.81	toe	tc
4435	958502.7120	690553.7951	1476.41	toe	tc
4436	958547.3918	690464.1500	1474.25	n/g	n/
4437	958570.0582	690492.7969	1477.37	top	tc
4438	958581.3394	690499.6519	1476.74	toe	tc
4439	958484.1441	690439.3020	1474.16	n/g	n/
4440	958475.3028	690391.8475	1474.17	n/g	n/
4441	958457.8640	690378.3673	1473.96	top	tc

JACKRABBIT PARK DET BASIN - SCI SURVEY POINTS

Number	Northing	Easting	Elevation	Raw Desc	Fu
4442	958573.0071	690467.2083	1476.64	top	tc
4443	958545.0380	690428.2231	1476.36	top	tc
4444	958517.0491	690389.6682	1476.37	top	tc
4445	958465.8127	690328.0322	1476.38	top	tc
4446	958431.9301	690284.0982	1476.36	top	tc
4447	958385.5911	690219.5259	1475.69	top	tc
4448	958358.1005	690180.0435	1474.85	top	tc
4449	958341.2260	690118.1495	1474.91	top	tc
4450	958345.7626	690087.5889	1475.48	top	tc
4451	958350.3741	690010.6676	1471.11	c/l 20ft riprap	c/
4452	958322.7150	690010.2597	1466.00	c/l 20ft riprap	c/
4453	958311.6264	690009.8393	1464.61	c/l 15ft riprap	c/
4454	958303.3927	690067.1183	1464.07	c/l 10ft riprap	c/
4455	958301.6511	690152.6275	1464.23	c/l 10ft riprap	c/
4456	958345.9193	690249.6730	1464.36	c/l 10ft riprap	c/
4457	958418.1210	690343.6746	1465.87	c/l 10ft riprap	c/
4458	958490.0949	690376.9301	1474.23	toe	tc
4459	958539.6017	690444.0643	1474.16	toe	tc
4460	958587.9305	690483.4349	1476.82	3ft vg	3f
4461	958520.3858	690390.5941	1476.11	3ft vg	3f
4462	958473.1732	690326.4038	1475.55	3ft vg	3f
4463	958442.3028	690285.4432	1475.16	4ft v/g	4f
4464	958406.6984	690237.3812	1474.78	5ft vg	5f
4465	958368.9444	690186.5673	1474.24	5ft vg	5f
4466	958360.8409	690171.9819	1474.11	5ft vg	5f
4467	958361.0907	690125.4552	1473.65	5ft vg	5f
4468	958362.9280	690042.6079	1473.03	5ft vg	5f
4469	958365.0715	690054.8010	1473.20	gnd @ fence	gr
4470	958364.5855	690171.5223	1473.88	gnd @ fence	gr
4471	958371.3698	690185.3482	1474.18	gnd @ fence	gr
4472	958475.1006	690326.0079	1475.52	gnd @ fence	gr
4473	958522.3867	690390.5930	1476.10	gnd @ fence	gr
4474	958580.5406	690470.2505	1476.63	gnd @cor fence	gr
4475	958596.7620	690496.7852	1476.88	b/c	b/
4476	958532.0186	690541.2320	1476.12	c/l 30 ft d/w	c/
4477	958483.8694	690574.2863	1476.21	b/c	b/
4478	958448.1562	690593.3581	1475.91	b/c	b/
4479	958413.6078	690603.8037	1475.60	b/c	b/
4480	958364.4278	690607.4317	1475.05	c/l 18ft cb	c/
4481	958276.7520	690606.8290	1475.62	b/c	b/
4482	958168.7035	690605.9226	1473.61	b/c	b/
4483	958113.6079	690605.4115	1472.55	b/c	b/
4484	958100.0771	690599.6439	1472.11	b/c	b/
4485	958094.4236	690585.6012	1472.54	b/c	b/
4486	958094.8403	690500.4433	1472.34	b/c	b/
4487	958095.3475	690418.0501	1472.18	b/c	b/
4488	958096.6443	690264.9085	1471.65	b/c	b/
4489	958097.9910	690076.2502	1471.20	b/c	b/
4490	958090.2726	689966.1243	1470.81	b/c	b/
4491	958076.2722	689905.9281	1470.77	b/c	b/
4492	958043.5497	689821.3205	1470.66	b/c	b/
4493	957996.6363	689715.4157	1470.05	b/c	b/
4494	958204.6474	689991.0800	1463.96	n/g	n/
4495	958224.5648	690087.5082	1464.03	n/g	n/
4496	958246.5082	690182.7643	1464.01	n/g	n/
4497	958270.6799	690276.6173	1464.49	n/g	n/
4498	958292.8005	690371.0734	1464.89	n/g	n/
4499	958312.3876	690452.7625	1465.22	n/g	n/

JACKRABBIT PARK DET. BASIN



N

1" = 200'

1' - CONTOURS

JACKRABBIT PARK DET. BASIN

SCI SURVEY DATA / CONTOURS

Q:\15586\GRAPHICS\AUTOCAD\SCOTTSDALE BASINS\DWG\SCOTTSDALE BASINS2.DWG

64th and Thunderbird Detention Basin, SE, SV, SQ
LP063

Storage Estimation					
Contour Elev. (ft)	Contour Area (ft^2)	Average Area (ft^2)	Inc. Storage (ft^3)	Cum. Storage (ft^3)	Cum. Storage (acre-ft)
1412	0	-	-	-	-
1413	2830	1415	1415	1415	0.03
1414	29275	16052.5	16052.5	17467.5	0.4
1415	60675	44975	44975	62442.5	1.4
1416	80525	70600	70600	133042.5	3.1
1417*	98375	89450	89450	222492.5	5.1
1418**	98375	98375	98375	320867.5	7.4
1419**	98375	98375	98375	419242.5	9.6

Storage estimation based on SCI survey data.

SE,SV,SQ		
Contour Elev. (ft)	Cum. Storage (acre-ft)	Discharge (cfs)
1412	0	0
1413	0.03	11
1414	0.4	21
1415	1.4	45
1416	3.1	60
1417*	5.1	95
1418**	7.4	410
1419**	9.6	980

*Overflow elevation.

**Assumed contour area for weir overflow calculations.

Stanley Consultants INC.

Project No. 15586 Page No.

Subject 64TH & THUNDERBIRD RETENTION / DETENTION

Computed by Date

Checked by Date

Approved by Date

Sheet No. of

48 INCH CONCRETE PIPE CULVERT
INVERT ELEVATION 1412 FT (ASSUMED)
SEE ATTACHED FIG. 5.20

	ELEVATION (FT)	HW/D	Q (CFS)	
	1412	0	0	
	1413	.25	11	(INTERPOLATED)
	1414	.50	21	
	1415	.75	45	
	1416	1.0	60	
(OVERFLOW)	1417	1.25	95	
	1418	1.50	110	
	1419	1.75	130	

OVERFLOW ESTIMATED USING WEIR EQUATION.

WEIR EQ: $Q = CLH^{3/2}$

$C = 3.0$

$L = 100$ FT (ASSUMED OVERFLOW AT EAST AND WEST ENDS OF BASIN)

ELEVATION (FT)	H (FT)	Q (CFS)
1418	1	300
1419	2	850

ELEVATION (FT)	Q (CFS)
1412	0
1413	11
1414	21
1415	45
1416	60
1417	95
1418	410
1419	980

SC 3020 B2 199

SCI # 15586
64TH ST. & TBIRD
OUTLET PIPE

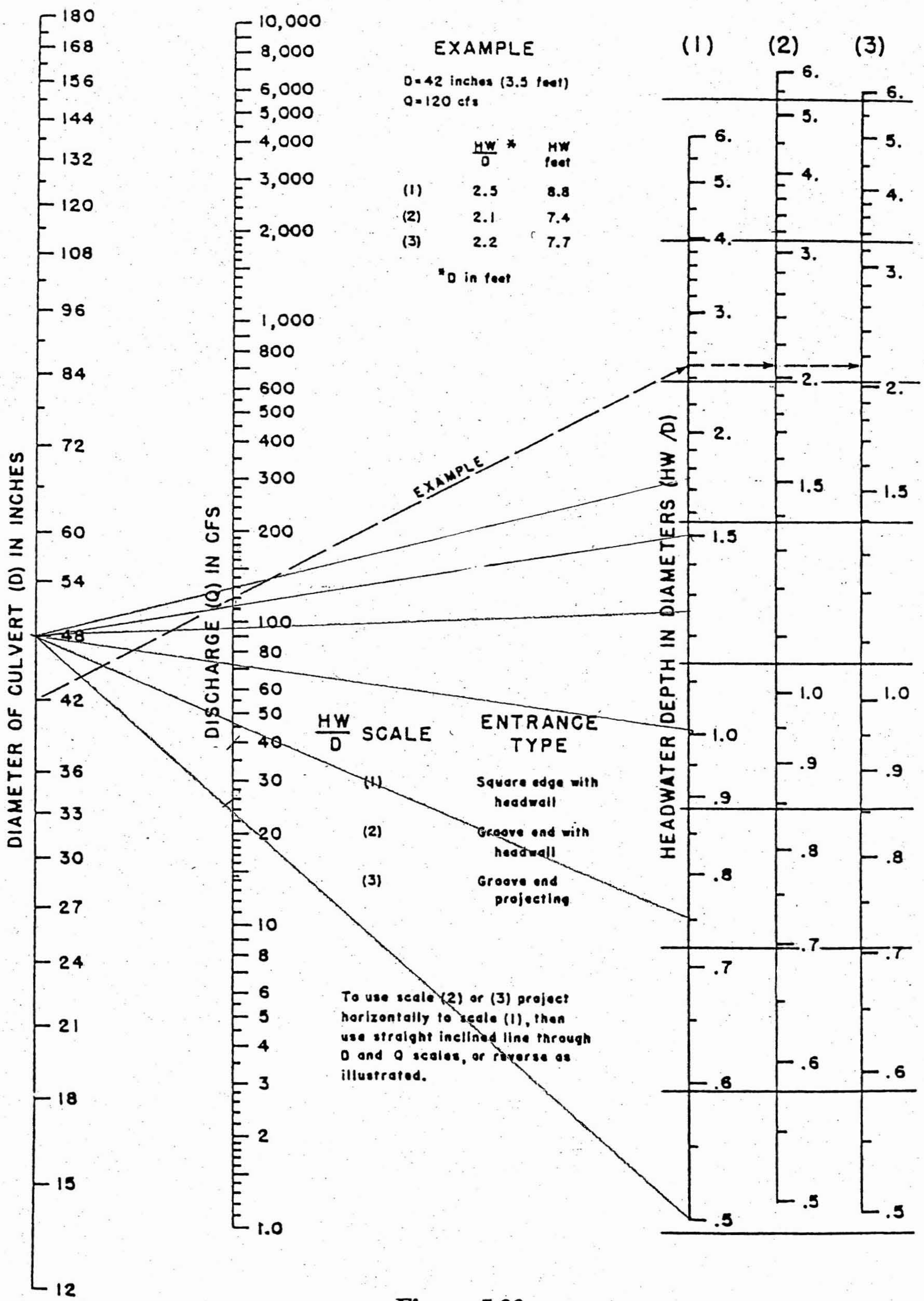


Figure 5.20
Headwater Depth for Concrete Pipe Culverts with Inlet Control
(USDOT, FHWA, HDS-5, 1985)

64TH ST & TBIRD DET. BASIN - SCI SURVEY POINTS

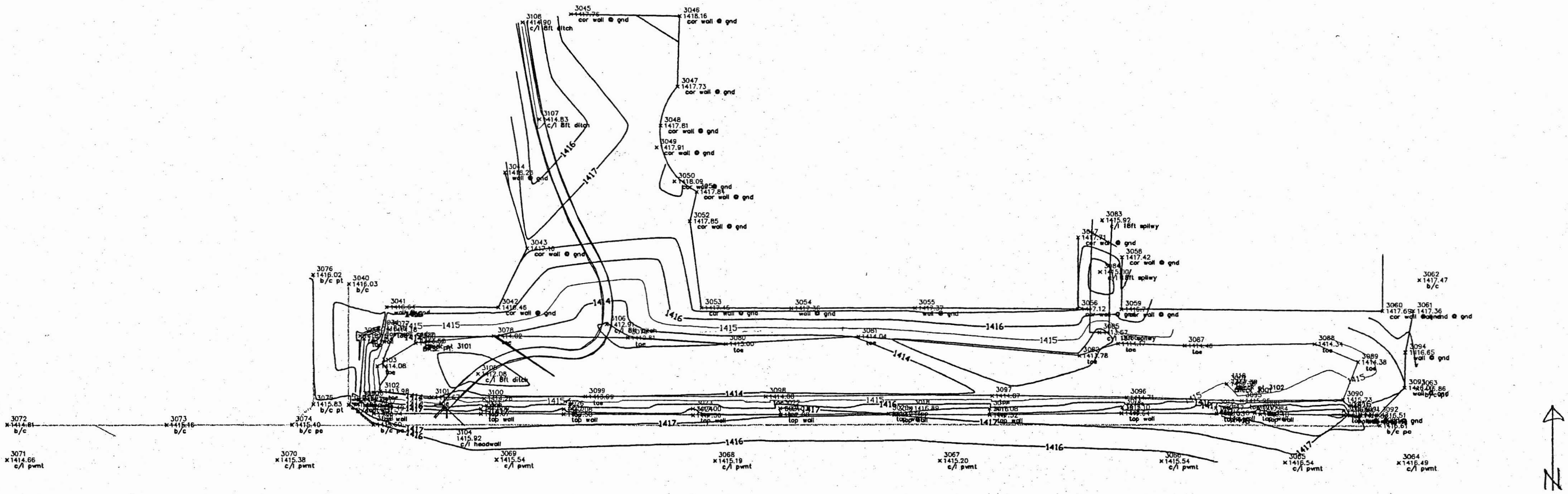
Point Listing made Tue Nov 27 10:33:31 2001

Drawing Name: scottsdale basins1
Project Name: scottsdale basins
Project Path: Q:\15586\graphics\AutoCAD\scottsdale basins\
Username: 6445

Number	Northing	Easting	Elevation	Raw Desc	Fu
1117	950070.9037	690950.3044	1413.52	CP	C
1118	950032.7007	691708.5754	1414.38	CP	C
1119	950032.6602	691708.5642	1367.39	check pt 3102	c
1120	950070.8766	690950.2380	1366.66	check pt 3101	c
3000	950069.0032	690948.9222	1413.52	BASE PT.	B
3001	950030.8003	691707.1917	1414.38	CP	C
3002	950030.7907	691707.1413	1414.37	check 3001	c
3003	949992.5908	691849.2186	1416.61	b/c pc	b
3004	950001.6203	691830.4633	1416.66	wall opening	w
3005	950001.9219	691821.1061	1417.21	wall opening	w
3006	950002.3954	691815.8891	1419.14	top wall	t
3007	950006.5565	691815.5849	1418.35	top	t
3008	950008.1213	691737.3963	1417.84	top	t
3009	950002.8038	691738.3931	1418.40	top wall	t
3010	950003.8532	691733.2269	1418.35	top wall	t
3011	950004.0352	691702.4704	1418.18	top wall	t
3012	950003.0332	691697.2923	1418.03	top wall	t
3013	950008.6296	691696.5561	1417.57	top	t
3014	950009.1183	691608.4071	1417.10	top	t
3015	950003.3172	691607.6319	1417.64	top wall	t
3016	950001.9619	691484.1108	1417.32	top wall	t
3017	950007.6749	691484.1078	1417.08	top	t
3018	950008.0817	691409.9564	1416.89	top	t
3019	950002.2839	691394.8668	1417.04	top wall	t
3020	950003.2094	691389.6362	1417.04	top wall	t
3021	950002.7325	691289.5436	1417.08	top wall	t
3022	950008.4874	691288.9709	1417.03	top	t
3023	950008.8604	691206.6968	1417.00	top	t
3024	950002.9794	691206.8292	1417.36	top wall	t
3025	950003.6851	691087.1390	1417.50	top wall	t
3026	950008.2124	691087.1016	1417.08	top	t
3027	950008.5801	691009.9024	1417.00	top	t
3028	950003.9388	691009.9226	1417.67	top wall	t
3029	950004.4572	690909.7820	1417.74	top wall	t
3030	950012.9484	690895.4530	1417.77	top wall	t
3031	950017.3043	690895.5922	1417.75	top wall	t
3032	950017.3336	690896.6699	1418.09	top wall	t
3033	950075.6133	690897.1865	1418.15	top wall	t
3034	950082.4568	690914.6739	1418.16	top wall end	t
3035	950072.7919	690901.1396	1417.84	top	t
3036	950017.7182	690900.3723	1417.47	top	t
3037	950009.6669	690911.4818	1417.49	top	t
3038	949994.4591	690909.3252	1415.60	b/c pc	b
3039	950012.8016	690886.5987	1415.68	b/c pt	b
3040	950123.4419	690887.0758	1416.03	b/c	b
3041	950101.9820	690922.0217	1416.64	wall @ gnd	w
3042	950101.3815	691026.3031	1416.46	cor wall @ gnd	c
3043	950156.1455	691053.2046	1417.16	cor wall @ gnd	c
3044	950226.6276	691032.1591	1418.23	wall @ gnd	w
3045	950374.4672	691092.7834	1417.76	cor wall @ gnd	c
3046	950373.0767	691193.6385	1418.16	cor wall @ gnd	c
3047	950307.2137	691192.3461	1417.73	cor wall @ gnd	c
3048	950270.6152	691176.8116	1417.81	cor wall @ gnd	c
3049	950250.3683	691173.2185	1417.91	cor wall @ gnd	c
3050	950218.8088	691189.7667	1418.09	cor wall @ gnd	c
3051	950209.0232	691210.1922	1417.84	cor wall @ gnd	c
3052	950181.7115	691203.9670	1417.85	cor wall @ gnd	c
3053	950101.4456	691214.9746	1417.45	cor wall @ gnd	c
3054	950100.6004	691299.6440	1417.36	wall @ gnd	w

64TH ST & TBIRD DET. BASIN - SCI SURVEY POINTS

Number	Northing	Easting	Elevation	Raw Desc	Fu
3055	950100.1604	691414.3195	1417.37	wall @ gnd	w
3056	950099.6273	691566.9968	1417.12	cor wall @ gnd	c
3057	950165.9870	691567.2103	1417.71	cor wall @ gnd	c
3058	950147.6178	691608.1711	1417.42	cor wall @ gnd	c
3059	950099.2878	691607.6047	1416.74	cor wall @ gnd	c
3060	950098.2565	691851.6420	1417.69	cor wall @ gnd	c
3061	950098.2348	691879.6172	1417.36	wall end @ gnd	w
3062	950126.7965	691884.9768	1417.47	b/c	b
3063	950026.6622	691883.3860	1416.86	b/c pt	b
3064	949958.2188	691867.0383	1416.49	c/l pvmt	c
3065	949958.3242	691761.5089	1416.54	c/l pvmt	c
3066	949958.8429	691644.9885	1415.54	c/l pvmt	c
3067	949959.6917	691437.3516	1415.20	c/l pvmt	c
3068	949960.7573	691227.4666	1415.19	c/l pvmt	c
3069	949961.6518	691024.5853	1415.54	c/l pvmt	c
3070	949962.2525	690820.2439	1415.38	c/l pvmt	c
3071	949963.4544	690567.8377	1414.66	c/l pvmt	c
3072	949995.8850	690567.8708	1414.81	b/c	b
3073	949995.1485	690717.0557	1415.16	b/c	b
3074	949994.6270	690834.0353	1415.40	b/c pc	b
3075	950013.6156	690853.7572	1415.83	b/c pt	b
3076	950132.2600	690853.8107	1416.02	b/c pt	b
3077	950081.2710	690924.4337	1414.18	toe	t
3078	950075.1364	691022.0888	1414.02	toe	t
3079	950073.8712	691146.6206	1412.81	toe	t
3080	950068.3082	691237.8244	1413.00	toe	t
3081	950074.1158	691361.3953	1414.04	toe	t
3082	950056.6047	691568.4631	1413.78	toe	t
3083	950182.1528	691589.4144	1415.92	c/l 18ft spllwy	c
3084	950133.9796	691587.8160	1415.00	c/l 18ft spllwy	c
3085	950077.9801	691586.9805	1413.57	c/l 18ft spllwy	c
3086	950067.6870	691604.3722	1414.17	toe	t
3087	950065.6932	691666.6883	1414.46	toe	t
3088	950068.0158	691788.5617	1414.34	toe	t
3089	950051.2045	691829.0041	1414.38	toe	t
3090	950016.8355	691815.1194	1415.73	toe	t
3091	950002.7015	691831.0558	1416.43	wall @ gnd	w
3092	950002.2692	691847.8280	1416.51	wall @ gnd	w
3093	950027.5590	691872.1268	1416.00	wall @ gnd	w
3094	950060.1289	691872.8160	1416.65	wall @ gnd	w
3095	950015.1539	691721.1292	1415.25	toe	t
3096	950018.1801	691612.3448	1414.71	toe	t
3097	950019.7835	691486.3289	1414.07	toe	t
3098	950019.6364	691275.6753	1414.08	toe	t
3099	950019.8434	691106.9679	1413.99	toe	t
3100	950018.0239	691012.8723	1414.28	toe	t
3101	950019.2643	690963.7404	1413.67	toe	t
3102	950024.9456	690916.0620	1413.98	toe	t
3103	950047.9717	690913.4194	1414.08	toe	t
3104	950010.2824	690976.3839	1415.92	c/l headwall	c
3105	950040.4514	691007.3587	1412.08	c/l 8ft ditch	c
3106	950086.0705	691127.0257	1412.91	c/l 8ft ditch	c
3107	950276.1770	691064.4404	1414.83	c/l 8ft ditch	c
3108	950366.6438	691048.0252	1414.90	c/l 8ft ditch	c



1" = 100'

1'-CONTOURS

64TH STREET & THUNDERBIRD RD.
DETENTION BASIN

SCI SURVEY DATA/CONTOURS

Q:\15586\GRAPHICS\AUTOCAD\SCOTTSDALE
BASINS\DWG\SCOTTSDALE BASINS1.DWG

Stanley Consultants INC.

Project No. 15586 Page No.

Subject TBIRD INDUSTRIAL DET BASIN

Computed by Date

Checked by Date

Approved by Date

Sheet No. of

OUTLET CONSISTS OF 18-INCH DIAMETER SD WITH 12-INCH DIAMETER ORFICE PLATE. OVERFLOW CONSISTS OF TBIRD RD @ 76TH ST ACTING AS BROAD CRESTED WEIR.

EL	PIPE Q (SEE ATTACHED FIG. 5.20)
1426	0
1428	5
1430	7 (SPILLWAY)
1431	8

WEIR EQ: $Q = CLH^{3/2}$

Q @ EL 1431:

$$Q = (3.0)(150\ FT)(1)^{3/2} = 450\ CFS$$

(SE) ∴ EL	(SQ) TOTAL Q	(SY) STORAGE (SEE ATTACHED TOPO)
1426	0 CFS	0 AC-FT
1428	5 CFS	1.65 AC-FT
1430	7 CFS	4.38 AC-FT
1431	458 CFS	6.03 AC-FT

SCI # 15586
L?OZI

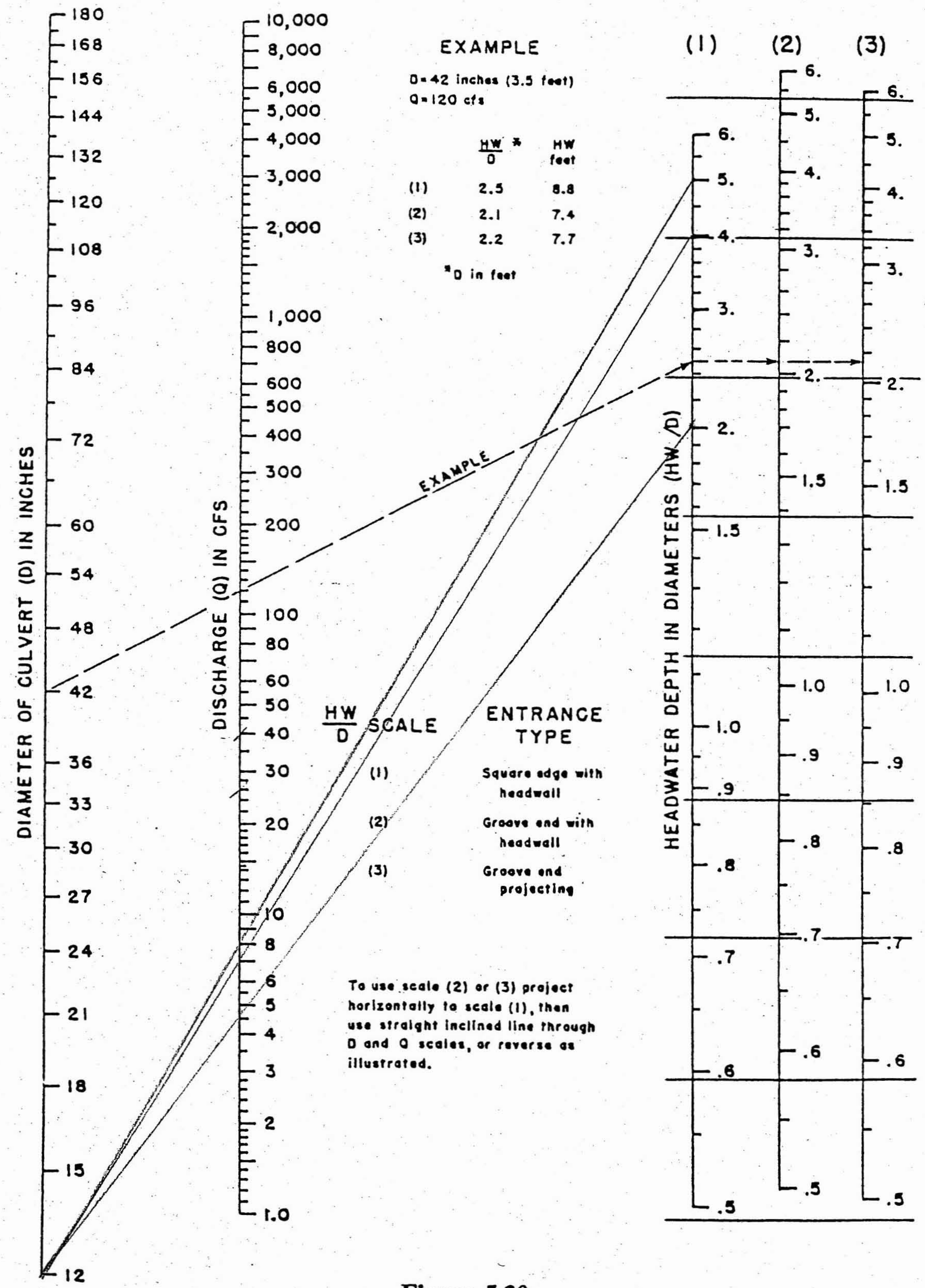
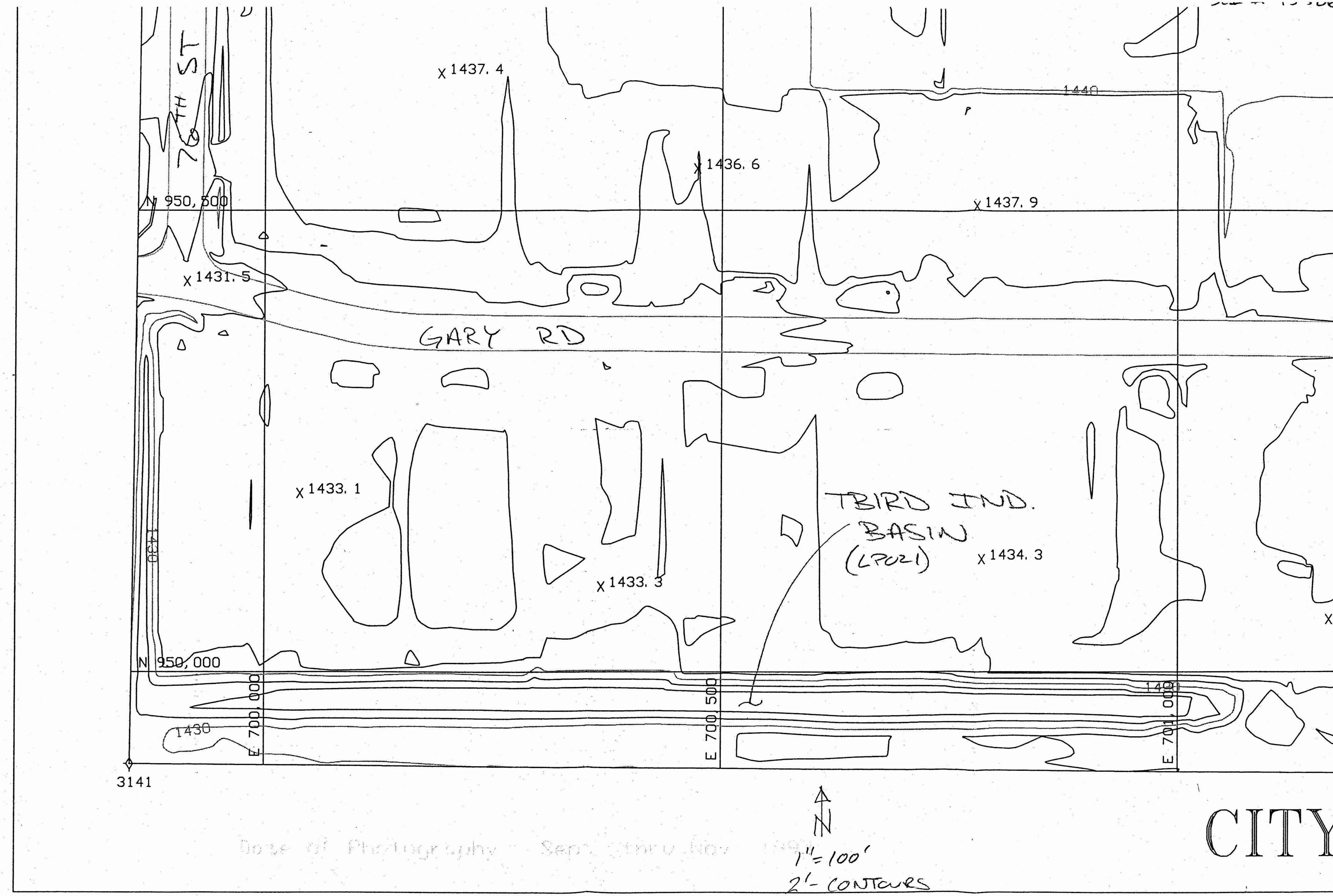


Figure 5.20
Headwater Depth for Concrete Pipe Culverts with Inlet Control
(USDOT, FHWA, HDS-5, 1985)



SE	1426	1428	1430	1431
SY	0	1.65	4.38	6.03
SQ	0	5	7	458

TBIRD IND. DET BASIN
LP021
TOPO PROVIDED BY SDALE
QUARTER SECTION NO. 33-46

3-15-02

EXISTING COND.

Mescal Park Basin
LP048

Storage Estimation					
Contour Elev. (ft)	Contour Area (ft^2)	Average Area (ft^2)	Inc. Storage (ft^3)	Cum. Storage (ft^3)	Cum. Storage (acre-ft)
1354.5	43495	-	-	-	-
1356	165131	104313	156469.5	156469.5	3.6
1358	184366	174748.5	349497	505966.5	11.6
1360	203102	193734	387468	893434.5	20.5
1361*	212445	207773.5	207773.5	1101208	21.8
1362	221788	217116.5	217116.5	1318324.5	30.3
1363.5**	233010	227399	341098.5	1659423	38.1
1364.5***	233010	233010	233010	1892433	43.4

Storage estimation based on City of Scottsdale Quarter Section No. 29-44 and SCI survey data.

SE,SV,SQ		
Contour Elev. (ft)	Cum. Storage (acre-ft)	Discharge (cfs)
1354.5	0.0	0
1356	3.6	1
1358	11.6	96
1360	20.5	137
1361*	21.8	153
1362	30.3	169
1363.5**	38.1	189
1364.5***	43.4	1102

*Interpolated contour area
**Overflow spillway elevation
***Assumed contour area

60-INCH DIAMETER OUTLET PIPE FROM MESCAL PARK TO 71st ST CHANNEL FRICTION SLOPE AND WATER SURFACE ELEVATION ESTIMATION

Manning's equation used to estimate Mescal Park outlet pipe friction slope, So:
Q = (1.49/n)(A)(Rh)2/3(So)1/2

n =	0.013
Diameter =	5 ft
Area =	19.625 sq ft
Wetted Perimeter =	15.7 ft
Hydraulic Radius =	1.25 ft
Pipe Invert @ Outfall =	1351.14 ft
Top-of-Pipe @ Outfall	1356.14 ft
Pipe Length =	1400 ft

Q (cfs)	S_o (ft/ft)	Elevation at Mescal Park (ft)
1	0.0000	1356.1
96	0.0014	1358.0
137	0.0028	1360.0
153	0.0034	1361.0
169	0.0042	1362.0
189	0.0052	1363.5
202	0.0060	1364.5
224	0.0074	1366.5

Overflow spillway @ elev. 1363.5 ft
Q = 83 cfs is full flow capacity for 60" diameter storm drain, n = 0.013, S = 0.001

MESCAL PARK OVERFLOW:

$Q = CLH^{3/2}$; $C = 3.0$; $L = 300$ FT

Q @ EL 1364.5 FT $= (3.0)(300\text{ FT})(1\text{ FT})^{3/2}$
$= 900$ CFS

TOTAL Q @ EL 1364.5 FT $= 900 + 202$
$= 1102$ CFS

MESCAL PARK DET BASIN - SCI SURVEY POINTS

Point Listing made Tue Nov 27 09:12:25 2001

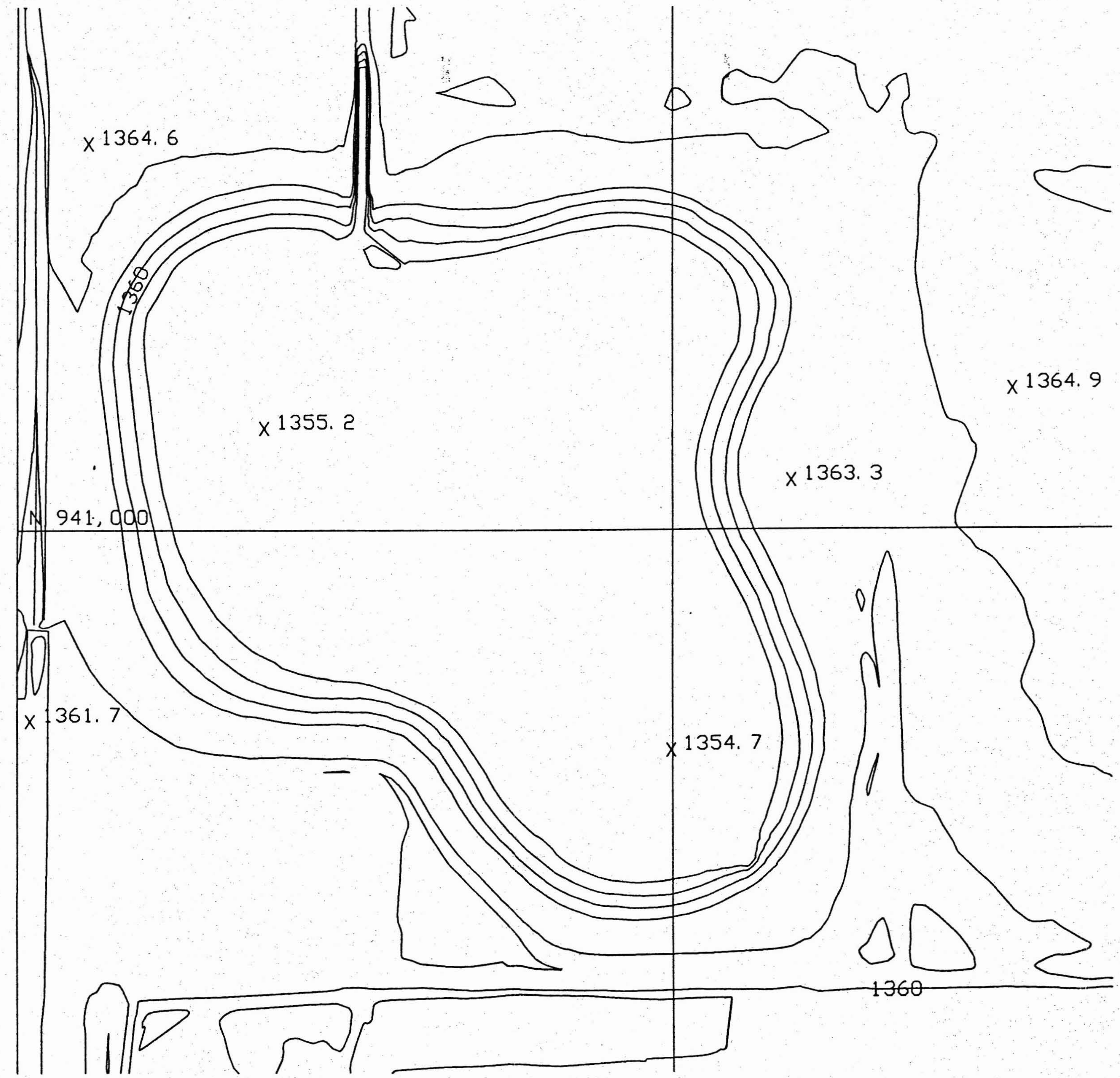
Drawing Name: scottsdale basins1
Project Name: scottsdale basins
Project Path: Q:\15586\graphics\AutoCAD\scottsdale basins\
Username: 6445

Number	Northing	Easting	Elevation	Raw Desc	Fu
2144	941358.6420	694785.7392	1364.66	GUTTER	GU
2145	941507.0611	694786.3389	1365.30	GUTTER	GU
2146	941609.9153	694786.7305	1365.57	GUTTER	GU
2147	941706.9454	694787.0227	1366.09	GUTTER	GU
2148	941705.2185	694769.7478	1365.69	C/L PVMT	C/
2149	941706.1151	694752.7267	1365.92	GUTTER	GU
2150	941606.4285	694752.3610	1365.52	GUTTER	GU
2151	941604.0608	694768.0656	1365.39	C/L PVMT	C/
2152	941506.4466	694766.6619	1365.08	C/L PVMT	C/
2153	941506.7215	694751.8663	1365.18	GUTTER	GU
2154	941404.3912	694751.6032	1364.82	GUTTER	GU
2155	941393.9758	694769.3014	1364.70	C/L PVMT	C/
2156	941314.1924	694789.9159	1364.80	COR RIP RAP	CO
2157	941313.7702	694745.8159	1364.82	COR RIP RAP	CO
2158	941254.4740	694725.6786	1363.41	COR RIP RAP	CO
2159	941219.9141	694726.3275	1356.51	COR RIP RAP	CO
2160	941220.8030	694747.1966	1358.89	COR HEAD WALL	CO
2161	941219.4950	694780.8432	1358.85	COR HEAD WALL	CO
2162	941204.2373	694809.5149	1355.93	COR RIP RAP	CO
2163	941240.2276	694811.7405	1363.38	COR RIP RAP	CO
2164	941240.7948	694780.5269	1363.84	COR HEAD WALL	CO
2165	941242.1060	694747.4351	1363.65	COR HEAD WALL	CO
2166	941241.2059	694758.5533	1363.60	C/L SD PIPE	C/
2167	941240.8570	694766.8875	1363.56	C/L SD PIPE	C/
2168	940742.0014	695051.3677	1361.27	COR HEAD WALL	CO
2169	940744.9758	695054.3905	1361.21	C/L SD PIPE	C/
2170	940747.2916	695056.5745	1361.27	COR HEAD WALL	CO
2171	940760.0381	695057.9786	1358.56	COR HEAD WALL	CO
2172	940741.7675	695038.3594	1358.56	COR HEAD WALL	CO
2173	940749.7824	694922.5737	1354.30	C/L 18" CMP	C/
2174	940754.9547	694899.5437	1354.52	C/L 18" SD	C/
2175	940699.5901	694859.5697	1359.29	2.5X2.5 CB	2.
2176	940699.7620	694806.2408	1359.30	2.5X2.5 CB	2.
2177	940760.1065	694805.6273	1359.54	2.5X2.5 CB	2.
2178	940685.3212	694783.6245	1360.39	NG	NG
2179	940808.6304	694780.6286	1360.14	NG	NG
2180	940808.8555	694582.6181	1361.30	NG	NG
2181	940690.4190	694583.0213	1361.46	NG	NG
2182	940658.4821	694593.3932	1361.51	GND @ WALL	GN
2183	940658.5091	694819.9750	1361.28	GND @ WALL	GN
2184	940658.2745	695065.4150	1361.01	GND @ WALL	GN
2185	940799.3990	695158.0758	1360.92	GND @ WALL	GN
2186	940960.1573	695158.8385	1362.45	GND @ WALL	GN
2187	941211.1312	695159.6021	1363.31	GND @ WALL	GN
2188	941244.4324	694631.0388	1363.55	TOP	TO
2189	941128.3267	694557.6788	1361.54	TOP	TO
2190	941026.9505	694567.2974	1363.43	TOP	TO
2191	940925.8803	694585.8931	1363.51	TOP	TO
2192	940852.0300	694654.4587	1363.25	TOP	TO
2193	940843.6856	694756.1847	1363.66	TOP	TO
2194	940776.4923	694834.8283	1363.22	TOP	TO
2195	940709.9741	694913.0651	1363.31	TOP	TO
2196	940706.2484	695014.3127	1363.55	TOP	TO
2197	940768.1049	695093.2350	1363.52	TOP	TO
2198	940866.4828	695108.1765	1363.54	TOP	TO
2199	940966.6008	695075.4210	1363.73	TOP	TO
2200	941113.3008	695076.1514	1363.69	TOP	TO
2201	941205.4955	695067.0390	1363.59	TOP	TO
2202	941251.8600	694990.2309	1363.54	TOP	TO

MESCAL PARK DET BASIN - SCI SURVEY POINTS

Number	Northing	Easting	Elevation	Raw Desc	Fu
2203	941245.0128	694877.7720	1363.45	TOP	TC
2387	941200.9037	694636.1895	1355.60	TOE	TC
2388	941020.6174	694610.4485	1355.40	TOE	TC
2389	940889.2543	694739.6767	1355.03	TOE	TC
2390	940793.1664	694873.0980	1354.44	TOE	TC
2391	940740.8532	694975.6389	1354.61	TOE	TC
2392	940865.6645	695065.2575	1354.72	TOE	TC
2393	941118.4179	695032.3837	1355.34	TOE	TC
2394	941214.5038	694969.1686	1355.39	TOE	TC
2395	941135.4287	694925.0175	1355.17	BOTTOM	BC
2396	940963.3750	694935.9604	1354.67	BOTTOM	BC
2397	940961.3086	694786.0122	1354.62	BOTTOM	BC
2398	941104.9271	694718.0716	1355.16	BOTTOM	BC

SDALE RD CORRIDOR DMP
SCI # 15586



1" = 100'
MESCAL PARK
DET. BASIN

2'- CONTOURS

TOPO PROVIDED BY THE
CITY OF SCOTTSDALE
QUARTER SECT. NO. 29-44

APPENDIX B

SCOTTSDALE ROAD CORRIDOR DRAINAGE MASTER PLAN
10- and 100-YEAR, 6-HOUR HEC-1 OUTPUT FILES

10-Year, 6-Hour HEC-1 Model (15586C10.txt)

100-Year, 6-Hour HEC-1 Model (15586C.txt)

10-Year, 6-Hour HEC-1 Model (15586C10.txt)

```
1*****************************************                               *****************************************
 *                                       *                               *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                               *  U.S. ARMY CORPS OF ENGINEERS         *
 *             JUN   1998                *                               *  HYDROLOGIC ENGINEERING CENTER        *
 *           VERSION 4.1                 *                               *        609 SECOND STREET              *
 *                                       *                               *    DAVIS, CALIFORNIA 95616            *
 *  RUN DATE   17OCT02  TIME  12:50:06   *                               *        (916) 756-1104                 *
 *                                       *                               *                                       *
 *****************************************                               *****************************************
```

HEC-1 15586C10.TXT
Existing Conditions
10-Yr, 6-Hr

```
                    X     X  XXXXXXX   XXXXX          X
                    X     X  X        X     X        XX
                    X     X  X        X               X
                    XXXXXXX  XXXX     X       XXXXX   X
                    X     X  X        X               X
                    X     X  X        X     X         X
                    X     X  XXXXXXX   XXXXX         XXX
```

```
          THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

          THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
          THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
          NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
          DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
          KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


1                                        HEC-1 INPUT                                                    PAGE  1

        LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

          1          ID   Project ID: 15586B10 - Major Basin: 01 - Return Period: 10 Years
          2          ID        SCOTTSDALE ROAD CORRIDOR DRAINAGE MASTER PLAN
          3          ID        FCD 2000C030                        SCI # 15586
          4          ID        10YR, 6HR FUTURE LAND USE CONDITION
          5          ID        HYDROGRAPH MODEL "15586B10"    HEC-1 MODEL INPUT FILENAME: 15586B10.DAT
          6          ID
          7          ID        SUMMARY APPROACH, METHOD, PRECIP AND ASSUMPTION:
          8          ID        1.  10YR, 6HR RAINFALL EVENT, MULTI-STORM JD RECORD OPTION,
          9          ID            6HR DISTRIBUTION PATTERNS #1 THRU #5 WITH 15 MIN TIME INCREM
         10          ID            (FCDMC, HYDROLOGY MANUAL, TABLE 2.4)
         11          ID        2.  POINT PRECIP = 3.20 IN
         12          ID        3.  PRECIP AERIAL REDUCTION FACTOR = 1.00 BASED ON 0.01 SQ MI BASIN
         13          ID                                         = 0.994 BASED ON 0.50 SQ MI BASIN
         14          ID                                         = 0.975 BASED ON 2.80 SQ MI BASIN
         15          ID                                         = 0.922 BASED ON 16.00 SQ MI BASIN
         16          ID                                         = 0.812 BASED ON 90.00 SQ MI BASIN
         17          ID                                         = 0.570 BASED ON 500.00 SQ MI BASIN
         18          ID        4.  BASIN AREAS ADJUSTED @ KEY HYDROGRAPH COMBINATION STEPS TO REFLECT
         19          ID            AREA CORRECTED DUE TO MULTI-STORM OPTION
         20          ID        5.  FUTURE COMPLETELY DEVELOPED CONDITION LAND USE
         21          ID        6.  CLARK UNIT HYDROGRAPH WITH URBAN TIME-AREA
         22          ID        7.  GREEN-AMPT LOSS RATES
         23          ID        8.  NORMAL DEPTH STORAGE REACH ROUTING TYPICALLY USED FOR OPEN CHANNELS
         24          ID            (SEE NOTE # 10)
         25          ID        9.  KINEMATIC WAVE REACH ROUTING TYPICALLY USED FOR PIPE
         26          ID            (SEE NOTE # 10)
         27          ID        10. HYDROLOGIC ROUTING STEPS THAT COULD BE MODELED USING EITHER
         28          ID            KINEMATIC WAVE OR NORMAL DEPTH (COMBINED SURFACE AND STORM DRAIN
         29          ID            PIPE FLOW) WERE TYPICALLY MODELED USING THE PREDOMINANT FLOW
         30          ID            CHARACTERISTIC.
         31          ID        11. LEVEL POOL MODIFIED PULS STORAGE ROUTING @ REGIONAL DETENTION BASINS
         32          ID        12. NO INDIVIDUAL PRIVATE ON-LOT RETENTION/DETENTION IS REFLECTED
         33          ID        13. COMPUTATION TIME INTERVAL = 5 MINUTES
         34          ID        14. CALCULATIONS MADE WITH HEC-1, VERSION 4.1
         35          ID        15. 10- AND 100-YR HEC1 MODELS DIFFER BY Tc & R, RAINFALL AND
         36          ID            CONTRIBUTING AREAS AT ADDITIONS
         37          ID
         38          ID        KEY TO HYDROGRAPH OPERATIONS:
         39          ID            "SB" = GENERATE RUNOFF HYDROGRAPH FROM SUB-BASIN
         40          ID            "AD" = COMBINE HYDROGRAPHS
         41          ID            "RR" = ROUTE HYDROGRAPH THRU DOWNSTREAM REACH
         42          ID            "LP" = ROUTE HYDROGRAPH THRU LEVEL POOL STORAGE
         43          ID            "DV" = DIVERT HYDROGRAPH
         44          ID            "DR" = RETRIEVE PREVIOUSLY DIVERTED HYDROGRAPH
         45          ID
                     *DIAGRAM
         46          IT      5                300
         47          IO      5
         48          IN     15
         49          JD   2.03     0.01
         50          PC  0.000    0.008    0.016    0.025    0.033    0.041    0.050    0.058    0.066    0.074
         51          PC  0.087    0.099    0.118    0.138    0.216    0.377    0.834    0.911    0.931    0.950
         52          PC  0.962    0.972    0.983    0.991    1.000
         53          JD  2.017     0.50
         54          JD  1.979     2.80
1                                        HEC-1 INPUT                                                    PAGE  2

        LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

         55          PC  0.000    0.009    0.016    0.025    0.034    0.042    0.051    0.059    0.067    0.076
         56          PC  0.087    0.100    0.120    0.163    0.252    0.451    0.694    0.837    0.900    0.938
         57          PC  0.950    0.963    0.975    0.988    1.000
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134            RC   0.025   0.016   0.025    1250  0.0020    0.00
135            RX     0.0     5.0     5.1    26.0    46.9    47.0    52.0    52.1
136            RY   100.0   100.5   100.0   100.5   101.0   101.5   101.5   105.0
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LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

137            KK   SB013   BASIN
138            KM           CP @ 76TH ST AND GREENWAY RD
139            BA   0.040
140            LG    0.15    0.25    4.65    0.38      60
141            UC   0.192   0.142
142            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
143            UA     100

144            KK  AD013A   COMBINE HYDROGRAPHS RR013A AND SB013
145            HC       2    0.24

146            KK   DR010   RETRIEVE PREVIOUSLY SPLIT HYDROGRAPH ASSOC WITH GREENWAY-HAYDEN LOOP
147            KM           SUMP OVERFLOW TO 76TH ST SOUTH
148            DR   DR010

149            KK  RR013B   ROUTE   REACH
150            KM           ROUTE HYDROGRAPH DR010 THRU REACH RR013B, 76TH ST TO GREENWAY RD
151            RS       1    FLOW       0
152            RC   0.025   0.016   0.025     550  0.0090    0.00
153            RX     0.0     0.1     5.0     5.1    44.9    45.0    50.0    50.1
154            RY   103.0   100.5   100.5   100.1   100.1   100.5   100.5   103.0

155            KK  AD013B   COMBINE HYDROGRAPHS AD013A AND RR013B
156            HC       2    0.36

157            KK   DV013   SPLIT FLOW. REMAINDER FLOW (DV013) IS BASED ON CAPACITY OF GREENWAY
158            KM           ROAD STREET SECTION (RR013A) AND 33IN SD PIPE FLOWING FULL.  DV013
159            KM           FLOWS WEST DOWN GREENWAY RD (RR014).  DIVERTED FLOW (DR013) SPILLS
160            KM           OVER SOUTH SIDE OF GREENWAY ROAD AND IS ROUTED THRU SB019 TO AIRPORT
161            KM           DETENTION BASIN.
162            DT   DR013
163            DI       0     850    1500    2000
164            DQ       0     783    1433    1933

165            KK   RR014   ROUTE   REACH
166            KM           ROUTE HYDROGRAPH AD013 THRU REACH RR014, GREENWAY RD STREET SECTION
167            KM           TO SUMP AT 73RD ST
168            RS       1    FLOW       0
169            RC   0.025   0.016   0.025    1500  0.0020    0.00
170            RX     0.0     0.1     7.0     7.1    48.9    49.0    54.0    54.1
171            RY   105.0   102.0   100.5   100.0   101.0   101.5   101.5   105.0

172            KK   SB014   BASIN
173            KM           CP @ 73RD ST AND GREENWAY RD
174            BA   0.030
175            LG    0.15    0.25    4.65    0.38      60
176            UC   0.329   0.287
177            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
178            UA     100
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LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

179            KK   AD014   COMBINE HYDROGRAPHS RR014 AND SB014
180            HC       2    0.06
               * THE FOLLOWING DIVERT AND ROUTING STEPS ARE DE-ACTIVATED IN THIS MODEL BECAUSE
               * THE PRIMARY OVERFLOW OF THE SUMP IS DIRECTLY WEST TO SCOTTSDALE ROAD.
               * KK DV014   SPLIT FLOW. REMAINDER FLOW ASSOC WITH DV014 BASED ON CAPACITY OF
               * KM         36IN STORM DRAIN GOING WEST TOWARD G-H LOOP @ S=0.0020 (FROM SD
               * KM         PLANS). DIVERTED FLOW ASSOC WITH DQ (DR014) OVERFLOWS SUMP AND
               * KM         GOES SOUTH IN 73RD ST TOWARD BUTHERUS.
               * DT DR014
               * DI   0       30      60     100     200     400     600
               * DQ   0        0      30      70     170     370     470
               * KKRR011B
               * KM         ROUTE HYDROGRAPH DV014 THRU REACH RR011B, 36IN DIA SD PIPE
               * RK   477    .002    .013            CIRC       3

181            KK  RR011B   ROUTE   REACH
182            KM           ROUTE HYDROGRAPH AD014 THRU REACH RR011B, LANDSCAPED SWALE JUST SOUTH
183            KM           OF GREENWAY-HAYDEN LOOP
184            RS       1    FLOW       0
185            RC   0.030   0.030   0.030     500  0.0050    0.00
186            RX     0.0     0.1    10.0    22.0    52.0    64.0    74.0    74.1
187            RY   105.0   102.0   102.0   100.0   100.0   102.0   102.0   105.0

188            KK  AD011B   COMBINE HYDROGRAPHS AD011A AND RR011B
189            KM           TOTAL Q @ GREENWAY-HAYDEN AND SCOTTSDALE RD FROM NORTH AND EAST
190            HC       2    0.32

191            KK  RR015A   ROUTE   REACH
192            KM           ROUTE HYDROGRAPH AD011B THRU REACH RR015A, SDALE RD STREET SECTION
193            KM           FROM GREENWAY-HAYDEN LOOP TO BUTHERUS. STORM DRAIN DISREGARDED.
194            RS       1    FLOW       0
195            RC   0.025   0.016   0.025    1000  0.0068    0.00
196            RX     0.0     0.1    10.5    10.6    98.5    98.6   103.5   103.6
197            RY   103.0   100.5   100.5   100.3   100.3   100.5   100.5   103.0
               * THE FOLLOWING DIVERT RETRIEVAL AND ADDITION STEPS ARE DE-ACTIVATED IN THIS
               * MODEL ALONG WITH THE PREVIOUS DV014 STEP
               * KK DR014   RETRIEVE PREVIOUSLY SPLIT HYDROGRAPH ASSOC WITH GREENWAY ROAD/73RD
               * KM         SUMP OVERFLOW SOUTH ON 73RD ST
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 260          DQ      0     50    100    184    184    184    184    184    184

 261          KK  RR018   ROUTE  REACH
 262          KM          ROUTE HYDROGRAPH DV017 THRU REACH RR018, OVERLAND THRU AIRPORT
 263          KM          CROSS-SECTION REFLECTS NORTH AND SOUTH DRAINAGE SWALES ALONG RUNWAY
 264          RS      6    FLOW      0
 265          RC  0.025  0.025  0.025   3400 0.0100   0.00
 266          RX    0.0    0.1   25.0   50.0  100.0  150.0  299.9  300.0
 267          RY  455.0  451.5  451.5  451.5  451.5  451.5  451.5  455.0

 268          KK  SB018   BASIN
 269          KM          CP @ NORTHEAST SIDE OF AIRPORT DETENTION BASIN
 270          BA  0.150
 271          LG   0.20   0.25   4.65   0.27     60
 272          UC  0.396  0.287
 273          UA      0    5.0   16.0   30.0   65.0   77.0   84.0   90.0   94.0   97.0
 274          UA    100

 275          KK  AD018   COMBINE HYDROGRAPHS RR018 AND SB018
 276          KM          TOTAL Q ENTERING AIRPORT DETENTION BASIN FROM NORTHEAST
 277          HC      2   0.39
1                                     HEC-1 INPUT                                       PAGE 8

 LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 278          KK  SB019   BASIN
 279          KM          CP @ AIRPORT DETENTION BASIN, INCLUDING DET BASIN
 280          BA  0.190
 281          LG   0.16   0.25   4.65   0.36     60
 282          UC  0.467  0.464
 283          UA      0    5.0   16.0   30.0   65.0   77.0   84.0   90.0   94.0   97.0
 284          UA    100

 285          KK  DR013   RETRIEVE GREENWAY ROAD DIVERTED FLOW
 286          DR  DR013

 287          KK RR019A   ROUTE  REACH
 288          KM          ROUTE HYDROGRAPH DR013 THRU REACH RR019A
 289          KM          75TH STREET ROUTING SECTION
 290          RS      1    FLOW      0
 291          RC  0.020  0.016  0.020   1800 0.0080   0.00
 292          RX    0.0    0.1    5.0    5.1   44.9   45.0   50.0   50.1
 293          RY  104.0  100.5  100.5  100.3  100.3  100.5  100.5  104.0

 294          KK RR019B   ROUTE  REACH
 295          KM          ROUTE HYDROGRAPH RR019A THRU REACH RR019B
 296          KM          AIRPORT DRIVE ROUTING SECTION TO SDALE AIRPORT DETENTION BASIN
 297          RS      2    FLOW      0
 298          RC  0.020  0.016  0.020   3700 0.0070   0.00
 299          RX    0.0    0.1    5.0    5.1   32.9   33.0   38.0   38.1
 300          RY  103.0  100.8  100.8  100.3  100.3  100.8  100.8  103.0

 301          KK  AD019   COMBINE HYDROGRAPHS AD018, SB019 AND RR019B
 302          KM          TOTAL Q ENTERING AIRPORT DETENTION BASIN
 303          HC      3   0.91

 304          KK  LP019   ROUTE AD019 FLOW THRU EXIST AIRPORT DET BASIN
 305          KM          PRIMARY OUTLET CONSISTS OF 2-10'X3' RCB CULVERTS.  INLET CONTROL
 306          KM          IS ASSUMED.  OVERFLOW OCCURS AT EL. 1432 FT.
 307          RS      1    STOR      0
 308          SV      0    0.2    3.7    9.9   17.1   25.0   33.6   42.9
 309          SQ      0     20     80    220    340    440    560    640
 310          SE 1426.7   1427   1428   1429   1430   1431   1432   1433
 311          ST   1432  378.8      3    1.5
 312          SW      0   60.4  247.2  378.8
 313          SE   1433   1432   1432   1433

 314          KK RR015C   ROUTE  REACH
 315          KM          ROUTE HYDROGRAPH LP019 THRU REACH RR015C, TRAP CHANNEL TO SDALE RD
 316          RS      1    FLOW      0
 317          RC  0.025  0.018  0.025   1200 0.0040   0.00
 318          RX    0.0    0.1    5.0   13.0   22.0   30.0   35.0   35.1
 319          RY  106.0  104.0  104.0  100.0  100.0  104.0  104.0  106.0
1                                     HEC-1 INPUT                                       PAGE 9

 LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 320          KK AD015B   COMBINE HYDROGRAPHS AD015A AND RR015C, TOTAL Q @ SDALE RD CHANNEL
 321          HC      2   1.48

 322          KK RR020A   ROUTE  REACH
 323          KM          ROUTE HYDROGRAPH AD015B THRU REACH RR020A
 324          KM          SDALE RD LANDSCAPED CHANNEL TO SUTTON DR
 325          RS      1    FLOW      0
 326          RC  0.030  0.018  0.016    700 0.0100   0.00
 327          RX    0.0    0.1   21.8   46.7   77.2   95.9  204.9  205.0
 328          RY  430.0  425.0  424.3  419.8  419.7  424.8  424.8  430.0

 329          KK RR020B   ROUTE  REACH
 330          KM          ROUTE HYDROGRAPH RR020A THRU REACH RR020B
 331          KM          GABION AND CONC LINED CHANNEL, SUTTON DR TO SWEETWATER
 332          RS      1    FLOW      0
 333          RC  0.030  0.018  0.016   1400 0.0050   0.00
 334          RX    0.0    0.1   14.0   18.0   35.5   41.0  128.0  128.1
 335          RY  105.0  103.5  103.0  100.5  100.5  103.3  103.3  105.0

 336          KK RR020C
 337          KM          ROUTE HYDROGRAPH RR020B THRU REACH RR020C
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416          KM           CP @ CACTUS PARK BASIN FROM NORTH
417          BA    0.270
418          LG     0.25    0.25    4.65    0.37      32
419          UC    0.571   0.520
420          UA        0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
421          UA      100

422          KK   AD20B1  COMBINE HYDROGRAPHS AD020A, AD023 AND SB020B
423          KM           TOTAL INFLOW TO CACTUS PARK DET BASIN FROM WEST, EAST AND NORTH
424          HC        3    2.14

425          KK   DV20B1  SPLIT FLOW. DQ IS BASED ON CAPACITY OF 1-60IN SD PIPE @
426          KM           S=0.005 FT/FT REPRESENTING LOW FLOW BYPASS @ CACTUS PARK BASIN.
427          KM           HYDROGRAPH ASSOC WITH DQ (DR020B1) IS NOT ROUTED THRU BASIN,
428          KM           BUT IS RECALLED LATER AND COMBINED WITH SCOTTSDALE RD STREET FLOW
429          KM           BYPASS AND ROUTED AS STREET FLOW DOWN SCOTTSDALE RD FROM CACTUS TO
430          KM           SUMP NORTH OF MESCAL. REMAINDER FLOW (DV020B) IS ROUTED THRU LEVEL
431          KM           POOL.
432          DT   DR20B1
433          DI        0      50     100     184     300     500    1000    2000
434          DQ        0      50     100     184     184     184     184     184

435          KK   LP020B  ROUTE HYDROGRAPH DV020B THRU CACTUS PARK DET BASIN.
436          KM           PRIMARY OUTLET CONSISTS OF 1-60IN DIAM SD. PIPE DISCHARGE BASED ON
437          KM           OUTLET CONTROL FRICT SLOPE. Q ASSOCIATED WITH SQ CARD CALCULATED
438          KM           AS DIFFERENCE BETWEEN FRICT SLOPE Q AND 184CFS LOW FLOW BYPASS Q.
439          KM           IT IS ASSUMED THAT LOW FLOW BYPASS DOES NOT IMPACT OUTLET PIPE
440          KM           HYDRAULICS. PIPE OUTLET INVERT ELEV ESTIMATED @ 1370FT FROM PLANS.
441          KM           OVERFLOW SECTION IS THE CONC SIDEWALK NORTH SIDE OF CACTUS RD BETW
442          KM           SCOTTSDALE RD AND DRIVEWAY ENTRANCE TO PARK. AVG ELEV OF OVERFLOW IS
443          KM           APPROX 1387.8. FINISHED FLOOR ELEVATION OF REC BUILDING IS 1390.99FT.
444          RS        1    STOR       0
445          SV        0  0.0012  0.0044    0.40    1.78    4.35   47.13   92.18  121.37
446          SQ        0       0       0       0       3       8      32      48      58
447          SE   1370.0  1374.0  1375.0  1377.0  1378.0  1379.0  1384.0  1387.8  1390.0
448          ST   1387.8   523.5       3     1.5
449          SW        0    40.8    76.2   139.3   229.0   317.1     400   523.5
450          SE     1388  1387.8  1387.8  1388.5  1388.3  1388.8  1389.2  1389.7

451          KK   DV20B2  SPLIT FLOW.  DIVERSION USED TO REFLECT SPILLWAY OVERFLOW CONVEYED
452          KM           DOWN 73RD STREET AND WEST DOWN SUNNYSIDE DRIVE TO SDALE RD.
453          KM           REMAINDER FLOW ROUTED THRU CACTUS PARK 60IN DIAM OUTLET PIPE.
454          DT   DR20B2
455          DI        0      48    3458
456          DQ        0       0    3400
1                                   HEC-1 INPUT                                                PAGE 12

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

457          KK   DR20B1  RETRIEVE PREVIOUSLY SPLIT HYDROGRAPH ASSOC WITH LOW FLOW BYPASS
458          KM           @ CACTUS PARK DET BASIN
459          DR   DR20B1

460          KK   AD20B2  COMBINE DV20B2 AND DR20B1 HYDROGRAPHS
461          HC        2    2.14

462          KK   RR2427
463          KM           ROUTE HYDROGRAPH AD20B2 THRU REACH RR2427
464          KM           60IN DIA SD SOUTH IN SDALE RD, WEST IN CHOLLA, SOUTH IN 71ST CHANNEL
465          RK     3500    .007    .013            CIRC       5

466          KK    SB025  BASIN
467          KM           CP @ 70TH ST & TBIRD
468          BA    0.140
469          LG     0.16    0.25    4.65    0.38      65
470          UC    0.358   0.304
471          UA        0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
472          UA      100

473          KK    RR026  ROUTE   REACH
474          KM           ROUTE HYDROGRAPH SB025 THRU REACH RR026, 70TH ST INV & NORMAL CROWN
475          RS        2    FLOW       0
476          RC    0.030   0.016   0.030    5750  0.0070    0.00
477          RX      0.0     0.1     6.0     7.6    37.5    39.0    42.0    42.1
478          RY    105.0   100.8   100.3   100.1   100.1   100.3   100.8   105.0

479          KK    SB026  BASIN
480          KM           CP @ CACTUS RD AND 70TH ST
481          BA    0.440
482          LG     0.28    0.25    4.65    0.38      29
483          UC    0.504   0.302
484          UA        0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
485          UA      100

486          KK    AD026  COMBINE HYDROGRAPHS RR026 AND SB026
487          HC        2    0.58

488          KK    RR027  ROUTE   REACH
489          KM           ROUTE HYDROGRAPH AD026 THRU REACH RR027, CHANNEL AND INV CROWN STREET
490          RS        1    FLOW       0
491          RC    0.025   0.016   0.025    3250  0.0050    0.00
492          RX      0.0     0.1    33.0    33.1    64.0    64.1    73.5    73.6
493          RY    105.0   102.9   100.9   100.2   100.2   100.9   101.9   105.0

494          KK    SB027  BASIN
495          KM           CP @ 71ST ST CHANNEL APPROX 650FT SOUTH OF CHOLLA ST
496          BA    0.120
497          LG     0.30    0.25    4.65    0.36      20
498          UC    0.296   0.216
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568            KK   DV031   DIVERT INITIAL FLOW (4 CFS) TO LP033 (KIERLAND BASIN 2)
569            KM           THIS STEP CORRESPONDS TO CVL DIVRT1
570            KM           NOTE: THERE IS NO ROUTING REACH STEP IN THE CVL MODEL IMMEDIATELY
571            KM           FOLLOWING THIS DIVERT ASSOCIATED WITH THE REMAINDER FLOW. THE
572            KM           DIVERTED FLOW IS RECALLED LATER AND ADDED TO THE INFLOW TO LP033
573            KM           (KIERLAND BASIN 2). THE REMAINDER FLOW (DV031) IS LATER ADDED
574            KM           DIRECTLY TO THE INFLOW TO LP034 (KIERLAND BASIN 3).
575            DT   DR031
576            DI       0       4      18      50     200
577            DQ       0       4       4       4       4

578            KK   SB032   BASIN
579            KM           CORRESPONDS TO CVL SA104, 103 AND 101; BA = SUM OF CVL BASIN AREAS
580            BA   0.030
581            LG    0.22    0.25    4.65    0.47      16
582            UC   0.592   0.704
583            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
584            UA     100
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LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


585            KK  RR031D   ROUTE   REACH
586            KM           ROUTE HYDROGRAPH SB032 THRU REACH RR031D, OPEN CHANNEL TO KIERLAND
587            KM           BASIN #2. THIS STEP CORRESPONDS TO CVL R301
588            RS       2    ELEV      10
589            RC   0.035   0.035   0.035    1200  0.0016    0.00
590            RX    55.0    60.0    70.0    90.0   110.0   130.0   140.0   145.0
591            RY    20.0    15.0    15.0    15.0    10.0    15.0    15.0    20.0

592            KK   SB033   BASIN
593            KM           CORRESPONDS TO CVL SA21, 61, 42, 60 AND 41; BA = SUM OF CVL AREAS
594            BA   0.140
595            LG    0.18    0.25    4.65    0.46      30
596            UC   0.421   0.293
597            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
598            UA     100

599            KK   DR031   RETRIEVE LP031 OUTFLOW; THIS STEP CORRESPONDS TO CVL DRT1
600            DR   DR031

601            KK   AD033   COMBINE RR031D, SB033 AND DR031,
602            KM           THIS STEP CORRESPONDS TO CVL C221A
603            HC       3    0.31

604            KK   LP033   ROUTE FLOW THRU KIERLAND BASIN #2, THIS STEP CORRESPONDS TO CVL RET2
605            RS       1    ELEV      35
606            SV       0    8.62   15.39    23.0    54.0   230.0
607            SQ       0     .01     .01     .01     .01     .01
608            SE      35      38      40      42      48      65

609            KK   RR034
610            KM           ROUTE LP033 THRU RR034, PIPE; THIS STEP CORRESPONDS TO CVL R430
611            RK    1200     .01    .012            CIRC     3.5

612            KK   SB034   BASIN
613            KM           CORRESPONDS TO CVL SA52, 30, 9, 50 AND 26; BA = SUM OF CVL AREAS
614            BA   0.180
615            LG    0.11    0.25    4.65    0.39      71
616            UC   0.363   0.267
617            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
618            UA     100

619            KK   AD034   COMBINE DV031, RR034 AND SB034,
620            KM           THIS STEP CORRESPONDS TO CVL C252
621            HC       3    0.88

622            KK   LP034   ROUTE FLOW THRU KIERLAND BASIN #3, THIS STEP CORRESPONDS TO CVL RET3
623            RS       1    ELEV      33
624            SV       0    4.08    20.0    21.6    23.3      26
625            SQ       0      18      18      18     146     667
626            SE      32      34      40    40.5      41      42
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LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


627            KK   DV034   DIVERT LP034  THIS STEP CORRESPONDS TO CVL DIV910 ONLY THE SPLIT IS
628            KM           REVERSED. REMAINDER FLOW (DV034) OVERFLOWS SOUTH TO 69TH ST.
629            KM           DIVERTED FLOW (DR034) BLEEDS OFF TO RET LP040 (KIERLAND BASIN #4)
630            KM           AND WILL BE RECALLED LATER
631            DT   DR034
632            DI       0      18      30     200
             * DQ       0       0      12     182  (ORIGINAL CVL DQ RECORD)
633            DQ       0      18      18      18

634            KK   RR035   ROUTE   REACH
635            KM           ROUTE HYDROGRAPH DV034 THRU REACH RR035, 69TH ST INV CROWN
636            RS       3    FLOW       0
637            RC   0.030   0.016   0.030    3000  0.0050    0.00
638            RX     0.0     0.1     9.0    10.5    40.8    42.3    51.3    51.4
639            RY   106.0   101.0   100.6   100.1   100.1   100.6   101.3   106.0

640            KK   SB035   BASIN
641            KM           CP @ TBIRD RD AND 69TH ST
642            BA   0.110
643            LG    0.25    0.25    4.65    0.38      45
644            UC   0.392   0.302
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 722          RX     0.0     0.1     8.5     8.6    96.5    96.6   105.0   105.1
 723          RY   102.0   100.5   100.5   100.3   100.3   100.5   100.5   102.0

 724          KK   SB024   BASIN
 725          KM           CP @ SUMP IN SCOTTSDALE RD APPROX 300FT NORTH OF MESCAL ST
 726          BA   0.110
 727          LG    0.24    0.25    4.65    0.38      43
 728          UC   0.479   0.552
 729          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 730          UA     100

 731          KK  AD024C   COMBINE HYDROGRAPHS RR024D AND SB024.
 732          HC       2    0.33

 733          KK   DV024   SPLIT FLOW. DQ IS BASED ON CAPACITY OF 54 IN. SD PIPE IN SDALE RD @
 734          KM           S=0.0042 FT/FT. HYDROGRAPH ASSOC WITH DQ (DR024) GOES SOUTH
 735          KM           IN SCOTTSDALE RD BY STORM DRAIN TO MESCAL ST, THEN TURNS WEST AND
 736          KM           OUTFALLS TO 71ST ST CHANNEL. REMAINDER FLOW (DV024) OVERFLOWS SUMP
 737          KM           IN SCOTTSDALE RD AND GOES WEST BY OPEN CHANNEL IN DRAINAGE EASEMENT
 738          KM           ALONG NORTH SIDE OF COMMERCIAL OFFICE PARCEL TO 71ST ST CHANNEL.
 739          DT   DR024
 740          DI       0      50     100     200     300     500    1000
 741          DQ       0      50     100     127     127     127     127

 742          KK  RR024E   ROUTE   REACH
 743          KM           ROUTE HYDROGRAPH DV024 THRU REACH RR024E,
 744          KM           OPEN CHANNEL ALONG NORTH SIDE OF COMMERCIAL OFFICE PARCEL
 745          RS       1    FLOW       0
 746          RC   0.025   0.016   0.025     700  0.0070    0.00
 747          RX     0.0     0.1    10.0    10.1    40.9    41.0    51.0    51.1
 748          RY   105.0   100.3   100.3   100.2   100.2   100.3   100.3   105.0

 749          KK  AD037B   COMBINE HYDROGRAPHS AD027B, AD037A AND RR024E
 750          KM           TOTAL Q 71ST ST CHANNEL APPROX 300FT NORTH OF MESCAL ST
 751          HC       3    3.18

 752          KK  RR037B   ROUTE   REACH
 753          KM           ROUTE HYDROGRAPH AD037B THRU REACH RR037B,
 754          KM           71ST STREET CHANNEL TO MESCAL ST
 755          RS       1    FLOW       0
 756          RC   0.035   0.018   0.035     300  0.0270    0.00
 757          RX   952.0   952.1   962.2   992.0  1007.8  1036.0  1046.0  1046.1
 758          RY   367.0   363.6   363.6   355.0   355.1   362.0   362.0   367.0
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 759          KK   DR024   RETRIEVE DR024 SDALE RD SD @ SUMP APPROX 300FT NORTH OF MESCAL
 760          DR   DR024

 761          KK  RR024F
 762          KM           ROUTE DR024 THRU REACH RR024F
 763          KM           STORM DRAIN FLOW SDALE RD TO MESCAL TO 71ST ST CHANNEL
 764          KM           1-5FT x 6FT RCB @ S=0.0015FT/FT UNDER MESCAL FROM SDALE RD TO 71ST
 765          RK     900   .0015    .013                    TRAP       5     .01

 766          KK  AD037C   COMBINE HYDROGRAPHS RR037B AND RR024F
 767          KM           TOTAL Q 71ST ST CHANNEL @ JUST SOUTH OF MESCAL ST
 768          HC       2    3.38

 769          KK  RR037C   ROUTE   REACH
 770          KM           ROUTE HYDROGRAPH AD037C THRU REACH RR037C,
 771          KM           71ST STREET CHANNEL, MESCAL ST TO MESCAL DET BASIN OUTFALL PIPE
 772          RS       1    FLOW       0
 773          RC   0.035   0.030   0.035     500  0.0080    0.00
 774          RX   964.1   964.2   974.1   996.2  1003.8  1027.0  1037.0  1037.1
 775          RY   362.0   360.5   360.5   353.5   353.5   360.0   360.0   362.0
              * ***************************************************************************
              *  THE FOLLOWING SEQUENCE INVOLVING THE KIERLAND DEVELOPMENT WAS DERIVED, IN   *
              *  PART, BASED ON THE KIERLAND MASTER DRAINAGE REPORT BY COE & VAN LOO (CVL)   *
              *  TITLED: ADDENDUM TO MASTER DRAINAGE REPORT FOR KIERLAND AND DATED REVISED   *
              *  3-13-95. IN THIS SEQUENCE, CVL ONSITE SUB-BASINS WERE GENERALLY             *
              *  COMBINED TO FORM SINGLE SUB-BASINS CORRESPONDING TO SB028, SB031, SB032,    *
              *  SB033 AND SB034 AS NOTED AT THE SUB-BASIN STEPS THAT FOLLOW. ALL OF THE     *
              *  KIERLAND ONSITE ROUTING REACH AND LEVEL POOL ROUTING STEPS IN THIS SEQUENCE *
              *  WERE TAKEN DIRECTLY FROM THE CVL HEC1 MODEL AS NOTED AT THOSE HYDROGRAPH    *
              *  STEPS. THE BASIS FOR THIS DATA IS CVL HEC1 MODEL H1G100A.PS1 DATED 10-01-94.*
              * ***************************************************************************

 776          KK   SB038   BASIN
 777          KM           CORRESPONDS TO CVL SUBBASINS SA1, 100, AND 6; BASIN AREA IS FROM SCI
 778          BA   0.120
 779          LG    0.25    0.25    4.65    0.38      45
 780          UC   0.304   0.243
 781          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 782          UA     100

 783          KK   DV038   SPLIT FLOW. DQ IS BASED ON CAPACITY OF EIGHT ON-GRADE CATCH BASINS
 784          KM           LOC @ INTERSECTION OF 64TH ST AND PARADISE LANE (CONSTRUCTED 1997?)
 785          KM           CONSISTING OF 4 CB'S @ L=20FT ON 64TH ST AND 2 CB'S @ L=10FT, 1 CB
 786          KM           @ L=17FT AND 1 CB @ L=20 FT ON PARADISE LN JUST EAST OF 64TH ST.
 787          KM           INTERCEPTED FLOW (HYDROGRAPH DR038) DRAINS WEST IN STORM DRAIN OF
 788          KM           UNK DIAM UNDER PARADISE LN TO JACKRABBIT PARK DET BASIN. REMAINDER
 789          KM           FLOW (DV038) FLOWS PAST CB'S AND GOES SOUTH ON 64TH ST.
 790          KM           NOTE: THIS DIVERSION APPARENTLY DID NOT EXIST @ TIME OF KIERLAND
 791          KM           REPORT BECAUSE IT IS NOT INCLUDED IN CVL HEC-1 MODEL.
 792          DT   DR038
 793          DI       0      20      40      68      80     100     200     500
 794          DQ       0      20      40      68      68      68      68      68
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 874          SQ     170     500
 875          SE      25    25.1      27      28      29      30      31      32      33    33.5
 876          SE    34.5      35

 877          KK   DV041    DIVERT LP041. THIS STEP CORRESPONDS TO CVL DIV920 EXCEPT THE
 878          KM            REMAINDER AND DIVERTED FLOWS ARE REVERSED. REMAINDER FLOW (DV041)
 879          KM            OVERFLOWS SPILLWAY TO 67TH ST @ HEARN. DIVERTED FLOW (DR041) IS
 880          KM            STORM DRAIN LOW FLOW IN HEARN TO 64TH ST AND WILL BE RECALLED LATER
 881          DT   DR041
 882          DI    44.2     170     500
              * DQ     0   125.8   455.8 (ORIGIONAL CVL DQ RECORD)
 883          DQ    44.2    44.2    44.2
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 884          KK   RR043    ROUTE   REACH
 885          KM            ROUTE DV041 THRU REACH RR043 DOWN 67TH ST TO TBIRD
 886          RS       2     FLOW      0
 887          RC   0.025   0.016   0.025    1800  0.0070    0.00
 888          RX     0.0     0.1    24.3    24.4    56.2    56.3    96.5    96.6
 889          RY   107.0   102.0   100.5   100.3   100.3   100.5   102.5   107.0

 890          KK   SB043    BASIN
 891          KM            CP @ 67TH ST AND TBIRD
 892          BA   0.080
 893          LG    0.28    0.25    4.65    0.36      31
 894          UC   0.388   0.308
 895          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 896          UA     100

 897          KK   AD043    COMBINE RR043 AND SB043
 898          HC       2     0.08

 899          KK   DV043    SPLIT FLOW. REMAINDER FLOW (DV043) SPILLS OVER SOUTH SIDE OF TBIRD
 900          KM            AND GOES DOWN 66TH ST. DIVERTED FLOW (DR043) GOES WEST ON TBIRD
 901          KM            TO 64TH ST AND WILL BE RECALLED LATER
 902          DT   DR043
 903          DI       0      15      95     305     600    1040    1525    2075
 904          DQ       0      15      95     295     570     985    1440    1960

 905          KK   RR044    ROUTE   REACH
 906          KM            ROUTE HYDROGRAPH DV043 THRU REACH RR044,
 907          KM            66TH ST (BOTH NORMAL AND INV CROWN) TO CACTUS
 908          RS       4     FLOW      0
 909          RC   0.025   0.016   0.025    5250  0.0070    0.00
 910          RX     0.0     0.1     8.8    10.3    40.3    41.8    50.5    50.6
 911          RY   105.5   100.3   100.3   100.1   100.1   100.3   100.3   105.5

 912          KK   SB044    BASIN
 913          KM            CP @ CACTUS RD AND 66TH ST
 914          BA   0.180
 915          LG    0.28    0.25    4.65    0.38      31
 916          UC   0.521   0.515
 917          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 918          UA     100

 919          KK   AD044    COMBINE RR044 AND SB044
 920          HC       2     0.18

 921          KK  DV044A    SPLIT FLOW. CATCH BASIN(S) JUST NORTH OF CACTUS ON 65TH PL.
 922          KM            APPROX 1/2 OF 1/3 OF TOTAL AD044 Q DRAINS WEST TO 64TH ST STORM DRAIN
 923          KM            (DR044A), UP TO PIPE FLOWING FULL CAPACITY OF 55 CFS.  REMAINDER FLOW
 924          KM            (DV044A) CONVEYED EAST TO 66TH ST SPLIT. CACTUS ROAD SD CONSISTS OF
 925          KM            42IN DIAM PIPE @ S=0.0030 FT/FT.
 926          DT  DR044A
 927          DI       0      25      50     100     200     300     400
 928          DQ       0       4       8      17      33      50      55
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 929          KK  DV044B    SPLIT FLOW BASED ON CAPACITY OF 60 IN. SD PIPE IN CACTUS RD
 930          KM            @ S=0.0026 FT/FT. REMAINDER FLOW (DV044B) ROUTED EAST IN CACTUS THEN
 931          KM            SOUTH IN 68TH ST AND EVENTUALLY DISCHARGES TO MESCAL PARK DET BASIN.
 932          KM            HYDROGRAPH ASSOC WITH DQ (DR044B) OVERFLOWS CACTUS ROAD AND FLOWS
 933          KM            SOUTH IN 66TH ST.
 934          DT  DR044B
 935          DI       0      50     100     150     200     300     400     500    1000
 936          DQ       0       0       0      17      67     167     267     367     867

 937          KK  RR4446
 938          KM            ROUTE DV044B THRU REACH RR4446
 939          KM            STORM DRAIN FLOW EAST IN CACTUS RD TO 68TH ST
 940          RK    1110   .0026    .013            CIRC       5

 941          KK   DR036    RETRIEVE DR036 CACTUS RD STORM DRAIN FLOW
 942          DR   DR036

 943          KK  RR3646
 944          KM            ROUTE DR036 THRU REACH RR3646
 945          KM            STORM DRAIN FLOW WEST IN CACTUS RD TO 68TH ST
 946          RK     580   .0026    .013            CIRC     5.5

 947          KK   SB045    BASIN
 948          KM            CP @ 68TH ST & TBIRD
 949          BA   0.030
 950          LG    0.27    0.25    4.65    0.38      38
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1029           KK  AD037D   COMBINE HYDROGRAPHS AD037C AND RR037D
1030           KM           CP @ 71ST ST CHANNEL APPROX 500FT SOUTH OF MESCAL ST
1031           HC       2    4.08

1032           KK  RR049A   ROUTE   REACH
1033           KM           ROUTE HYDROGRAPH AD037D THRU REACH RR049A, 71ST STREET CHANNEL.
1034           KM           MOSTLY LANDSCAPED EARTH CHANNEL
1035           RS       1    FLOW       0
1036           RC   0.030   0.018   0.030    1450  0.0070    0.00
1037           RX   974.1   974.1   991.0   996.2  1000.0  1003.8  1027.0  1027.1
1038           RY   365.0   360.5   355.7   353.5   353.5   353.5   360.0   365.0

1039           KK   SB049   BASIN
1040           KM           CP @ 71ST ST CHANNEL @ SHEA BLVD BOX CULVERT
1041           BA   0.140
1042           LG    0.14    0.25    4.65    0.38      70
1043           UC   0.338   0.202
1044           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
1045           UA     100

1046           KK   DR048   RETRIEVE MESCAL PARK OVERFLOW
1047           DR   DR048

1048           KK  RR049B   ROUTE   REACH
1049           KM           ROUTE HYDROGRAPH DR048 THRU REACH RR049B SOUTH ON 68TH PL AND
1050           KM           EAST ON SHEA BLVD TO SUMP NEAR 70TH ST (REED RD).
1051           RS       1    FLOW       0
1052           RC   0.025   0.015   0.025    2500  0.0040    0.00
1053           RX     0.0    20.0    24.0    24.5    56.5    57.0    63.0    63.1
1054           RY   102.3   100.3   100.3   100.2   100.2   100.3   100.3   102.3

1055           KK  AD049A   COMBINE SB049 AND RR049B HYDROGRAPHS
1056           HC       2    0.14

1057           KK   DV049   SPLIT FLOW. REMAINDER FLOW (DV049) IS BASED ON COMBINED CAPACITY OF
1058           KM           1-30IN, 1-24IN AND 2-18IN DIAM CONC SD PIPES THAT ENTER THE 71ST ST
1059           KM           CHANNEL BOX CULVERT @ SHEA BLVD (ON NORTH SIDE OF SHEA), ALL @
1060           KM           ASSUMED S=0.005FT/FT. DIVERTED FLOW, DQ (DR049) OVERFLOWS SUMP IN
1061           KM           SHEA BLVD JUST WEST OF 70TH ST (REED ROAD) AND FLOWS SOUTH ON REED.
1062           DT   DR049
1063           DI       0      30      63     100     150     200     300     400     800
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LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1064           DQ       0       0       3      40      90     140     240     340     740

1065           KK   SB050   BASIN
1066           KM           CP @ SCOTTSDALE RD AND SHEA BLVD
1067           BA   0.040
1068           LG    0.10    0.25    4.65    0.38      80
1069           UC   0.254   0.214
1070           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
1071           UA     100

1072           KK   DV050   SPLIT FLOW. REMAINDER FLOW (DV050) IS BASED ON CAPACITY OF 48IN DIAM
1073           KM           STORM DRAIN PIPE IN SHEA BLVD @ S=0.00524 FT/FT AND IS ROUTED WEST IN
1074           KM           SHEA TO 71ST ST CHANNEL. HYDROGRAPH ASSOC WITH DQ (DR050) FLOWS
1075           KM           SOUTH ON SCOTTSDALE ROAD PAST SHEA INTERSECTION.
1076           DT   DR050
1077           DI       0      50     105     200     400
1078           DQ       0       0       0      95     295

1079           KK  RR049C
1080           KM           ROUTE DV050 THRU REACH RR049C
1081           KM           STORM DRAIN IN SHEA TO 71ST ST CHANNEL
1082           RK     580    .005    .013            CIRC       4

1083           KK  AD049B   COMBINE HYDROGRAPHS RR049A, DV049 AND RR049C
1084           KM           TOTAL COMBINED FLOW @ SHEA AND 71ST ST CHAN FROM NORTH, EAST & WEST
1085           HC       3    4.16

1086           KK  RR051A   ROUTE   REACH
1087           KM           ROUTE HYDROGRAPH AD049 THRU REACH RR051A, 71ST STREET CHANNEL.
1088           KM           CONC "V" CHANNEL, SHEA TO COCHISE
1089           RS       1    FLOW       0
1090           RC   0.018   0.018   0.018    1300  0.0040    0.00
1091           RX   989.2   989.3   989.4   993.8  1000.0  1006.2  1008.7  1009.0
1092           RY   350.0   347.0   345.2   338.2   338.1   338.0   345.2   350.0

1093           KK  RR051B   ROUTE   REACH
1094           KM           ROUTE HYDROGRAPH RR051A THRU REACH RR051B,
1095           KM           CONC "V" CHANNEL, COCHISE TO GOLD DUST
1096           RS       1    FLOW       0
1097           RC   0.030   0.018   0.030    1300  0.0030    0.00
1098           RX   970.1   970.2   971.2   991.3  1000.0  1008.7  1039.1  1039.2
1099           RY   340.0   339.0   338.0   332.5   332.5   332.4   339.3   340.0

1100           KK  RR051C   ROUTE   REACH
1101           KM           ROUTE HYDROGRAPH RR051B THRU REACH RR051C
1102           KM           LANDSCAPED EARTH CHANNEL, FROM GOLD DUST TO BERNEIL DITCH
1103           RS       1    FLOW       0
1104           RC   0.035   0.035   0.035    1300  0.0030    0.00
1105           RX   969.9   983.6   994.4  1000.0  1002.3  1005.4  1016.9  1033.2
1106           RY   340.9   336.6   335.1   335.1   335.0   336.4   336.7   341.9
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LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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 1189        KK   SB055   BASIN
 1190        KM           CP ON SCOTTSDALE RD @ MTN VIEW, NOT BERNEIL ABOVE 71ST ST CHANNEL
 1191        BA   0.053
 1192        LG    0.11    0.25    4.65    0.38      78
 1193        UC   0.300   0.322
 1194        UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 1195        UA     100
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 LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 1196        KK  AD055B   COMBINE HYDROGRAPHS RR055C AND SB055
 1197        KM           TOTAL Q IN SCOTTSDALE ROAD FLOWING SOUTH AT MTN VIEW
 1198        HC       2    0.05

 1199        KK   DV055   SPLIT FLOW. REMAINDER FLOW (DV055) ENTERS BERNEIL DITCH. DIVERTED
 1200        KM           FLOW (DR055) GOES SOUTH DOWN SDALE RD AND LEAVES STUDY. FLOW SPLIT
 1201        KM           ASSUMES ALL FLOW ON EAST SIDE OF SDALE RD AND HALF OF FLOW ON WEST
 1202        KM           SIDE OF SDALE RD CONTINUES SOUTH PAST MTN VIEW. DIVERTED FLOW
 1203        KM           GOING SOUTH ON SCOTTSDALE RD WILL BE RECALLED AT END OF MODEL, AND
 1204        KM           ADDED TO DR054B. OTHER HALF OF FLOW ON WEST SIDE SDALE RD GOES INTO
 1205        KM           BERNEIL DITCH
 1206        DT   DR055
 1207        DI       0     100     200     400     600     800
 1208        DQ       0      75     150     300     450     600

 1209        KK  DR054A   RETRIEVE FLOW FROM GOLD DUST CULVERT @ SE COR WINDMILL PLAZA
 1210        DR  DR054A

 1211        KK  RR054B
 1212        KM           ROUTE DR054A THRU REACH RR054B,
 1213        KM           1-10X3 RCB STORM DRAIN THRU MONTIERRA APTS TO SDALE RD
 1214        RK    1600   .0066    .013            TRAP      10     .01

 1215        KK   SB054   BASIN
 1216        KM           CP @ SCOTTSDALE RD AND MTN VIEW
 1217        BA   0.110
 1218        LG    0.18    0.25    4.65    0.38      61
 1219        UC   0.442   0.413
 1220        UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 1221        UA     100

 1222        KK    AD054  COMBINE HYDROGRAPHS RR054B AND SB054
 1223        KM           TOTAL FLOW APPROACHING EAST SIDE SDALE RD @ MTN VIEW
 1224        HC       2    0.38

 1225        KK  DV054B   SPLIT FLOW. REMAINDER FLOW (DV054B) ENTERS BERNEIL DITCH VIA RCB
 1226        KM           UNDER SDALE RD @ MTN VIEW. Q ASSOCIATED WITH DV054B BASED ON FLOWING
 1227        KM           FULL CAPACITY OF 1-10X3 RCB THRU MONTIERRA APTS (APPROX 160 CFS).
 1228        KM           DIVERTED FLOW (DR054B) IS ADDED TO DR055 @ END OF MODEL AND GOES
 1229        KM           SOUTH DOWN SDALE ROAD LEAVING STUDY.
 1230        DT  DR054B
 1231        DI       0     100     200     400     600     800
 1232        DQ       0       0      40     240     440     640

 1233        KK  AD055C   COMBINE HYDROGRAPHS DV055 AND DV054B
 1234        KM           TOTAL Q @ START OF BERNEIL DITCH JUST WEST OF SCOTTSDALE ROAD
 1235        HC       2    0.43
             * ****************************************************************************
             * NOTE: IN ALL THE ROUTING STEPS THAT FOLLOW REGARDING THE BERNEIL DITCH, IT IS
             * ASSUMED THAT ALL OF THE FLOW IN THE DITCH REMAINS IN THE DITCH EVEN THOUGH
             * HISTORICAL ACCOUNTS AND THE HEC-RAS BACKWATER MODEL INDICATE THAT FLOW BREAKS
             * OUT OF THE CHANNEL AND GOES SOUTH. IF THIS OCCURS, THE BREAKOUT FLOW WOULD GO
             * DIRECTLY TO THE INDIAN BEND WASH AND WOULD NOT RETURN TO THE BERNEIL DITCH.
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 LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 1236        KK  RR055D   ROUTE   REACH
 1237        KM           ROUTE HYDROGRAPH AD055C THRU REACH RR055D,
 1238        KM           BERNEIL DITCH EARTH CHANNEL SCOTTSDALE RD TO 71ST ST CHANNEL
 1239        RS       1    FLOW       0
 1240        RC   0.030   0.030   0.030     600  0.0010    0.00
 1241        RX   944.0   944.2   947.5   962.2   990.1  1000.0  1009.9  1035.8
 1242        RY   334.4   334.4   335.2   335.4   331.5   331.4   331.2   337.5

 1243        KK  AD055D   COMBINE HYDROGRAPHS AD051 AND RR055D
 1244        KM           TOTAL Q IN BERNEIL DITCH @ CONFL BERNEIL DITCH AND 71ST ST CHANNEL
 1245        HC       2    4.68

 1246        KK  RR057A   ROUTE   REACH
 1247        KM           ROUTE HYDROGRAPH AD055D THRU REACH RR057A,
 1248        KM           BERNEIL DITCH EARTH CHANNEL FROM 71ST ST CHANNEL TO REED RD ALIGN
 1249        RS       1    FLOW       0
 1250        RC   0.030   0.030   0.030     700  0.0010    0.00
 1251        RX   944.8   944.9   957.0   992.3  1007.8  1033.0  1039.7  1039.8
 1252        RY   337.0   336.5   336.6   328.5   328.5   335.2   335.2   337.0

 1253        KK   DR049   RETRIEVE OVERFLOW OF SHEA BLVD SUMP JUST WEST OF 70TH ST (REED RD)
 1254        DR   DR049

 1255        KK  RR057B   ROUTE   REACH
 1256        KM           ROUTE HYDROGRAPH DR049 THRU REACH RR057B, REED RD STREET SECT FROM
 1257        KM           SHEA BLVD TO BERNEIL DITCH. DISREGARD STORM DRAIN CONVEYANCE.
 1258        RS       1    FLOW       0
 1259        RC   0.025   0.016   0.025    2640  0.0080    0.00
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1336          BA   0.190
1337          LG    0.27    0.25    4.65    0.39      32
1338          UC   0.617   0.692
1339          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
1340          UA     100

1341          KK  SB061B   BASIN
1342          KM           CP @ 60TH ST AND JACKRABBIT PARK DET BASIN
1343          BA   0.110
1344          LG    0.30    0.25    4.65    0.37      22
1345          UC   0.463   0.554
1346          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
1347          UA     100

1348          KK   DV061   SPLIT FLOW. REMAINDER FLOW (DV061) IS BASED ON CAPACITY OF 60TH ST
1349          KM           36 IN. DIA STORM DRAIN THAT DISCHARGES INTO JACKRABBIT DET BASIN
1350          KM           WEST. DIVERTED FLOW DQ(DR061B) IS FLOW-BY IN 60TH ST AND CONTINUES
1351          KM           SOUTH, LEAVING THE STUDY AREA.
1352          DT  DR061B
1353          DI       0      47     100     150     200     300     400     800
1354          DQ       0       0      53     103     153     253     353     753

1355          KK   DR038   RETRIEVE FLOW INTERCEPTED BY CATCH BASINS @ 64TH ST AND PARADISE LN
1356          DR   DR038

1357          KK  RR061C
1358          KM           ROUTE DR038 THRU REACH RR061C, SD OF UNK SIZE UNDER PARADISE LN FROM
1359          KM           64TH ST TO JACKRABBIT PARK EAST BASIN. OUTFALL SD TO JACKRABBIT PARK
1360          KM           IS 60IN DIAM. FOR ROUTING PURPOSES, DIAM = 60IN, S = 0.005(ASSUMED)
1361          RK    1600    .005    .013            CIRC       5

1362          KK  SB061C   BASIN
1363          KM           CP @ JACKRABBIT PARK DET BASIN (EAST BASIN) FROM NORTH AND EAST
1364          BA   0.270
1365          LG    0.23    0.25    4.65    0.38      46
1366          UC   0.425   0.312
1367          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
1368          UA     100
1                                            HEC-1 INPUT                                             PAGE 33

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1369          KK  AD061A   COMBINE HYDROGRAPHS SB061C AND RR061C, TOTAL INFLOW TO JACKRBT EAST
1370          HC       2    0.33

1371          KK  AD061B   COMBINE HYDROGRAPHS SB061A, DV061 AND AD061A; TOTAL INFLOW TO
1372          KM           JACKRABBIT PARK DET BASINS (EAST AND WEST)
1373          HC       3    0.63

1374          KK   LP061   ROUTE FLOW THRU JACKRABBIT PARK DET BASIN, COMBINED EAST AND WEST.
1375          KM           PRIMARY OUTLET IS 1-30IN DIAM SD PIPE UNDER PARADISE LN.
1376          KM           OVERFLOW CONSISTS OF CONC SPILLWAY PAD JUST NORTH OF PARADISE LN
1377          RS       1    STOR       0
1378          SV       0     0.7     3.2     7.3    12.0    19.3    29.4    41.6    54.7    68.5
1379          SQ       0       8      16      28      37      45      50      55     150     320
1380          SE  1463.0  1464.0  1465.0  1466.0  1467.0  1468.0  1469.0  1470.0  1471.0  1472.0

1381          KK  RR062A   ROUTE   REACH
1382          KM           ROUTE HYDROGRAPH LP061 THRU REACH RR062A,
1383          KM           EARTH CHANNEL FROM PARADISE LN TO GREENWAY RD
1384          RS       4    FLOW       0
1385          RC   0.025   0.045   0.025    2750  0.0020    0.00
1386          RX     0.0     0.1    38.5    46.5    52.5    59.5    98.0    98.1
1387          RY   108.8   103.8   102.3   100.9   100.9   102.3   104.8   108.8

1388          KK  RR062B   ROUTE   REACH
1389          KM           ROUTE HYDROGRAPH RR062A THRU REACH RR062B,
1390          KM           EARTH CHANNEL FROM GREENWAY RD TO CROSSED ARROWS PARK DET BASIN
1391          RS       1    FLOW       0
1392          RC   0.035   0.030   0.035    1450  0.0090    0.00
1393          RX     0.0     0.1    15.0    36.5    41.5    46.0    52.0    52.1
1394          RY   108.5   103.5   100.3   100.3   101.5   102.0   103.5   108.5

1395          KK   SB062   BASIN
1396          KM           CP @ CROSSED ARROWS PARK DET BASIN
1397          BA   0.340
1398          LG    0.24    0.25    4.65    0.39      43
1399          UC   0.438   0.291
1400          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
1401          UA     100

1402          KK   AD062   COMBINE HYDROGRAPHS RR062B AND SB062
1403          KM           TOTAL INFLOW TO CROSSED ARROWS PARK DET BASIN
1404          HC       2    0.97

1405          KK   LP062   ROUTE FLOW THRU CROSSED ARROWS PARK DET BASIN
1406          KM           PRIMARY SPILLWAY CONSISTS OF 2-24IN DIAM CONC PIPES
1407          KM           OVERFLOW SPILLWAY CONSISTS OF LEVEL BROAD CREST WEIR @ EL1438, L=200'
1408          KM           15IN LOW FLOW BLEEDOFF:  PIPE FLOWING FULL = 5CFS; ASSUMING INLET
1409          KM           CONTROL -> HW/D = 6 WITH Q = 15 CFS.  ADJUST FOR LOW FLOW BLEEDOFF
1410          KM           BY ADDING 1CFS AT LOW HEAD AND 5 CFS AT HIGH HEAD.
1411          RS       1    STOR       0
1412          SV       0     0.9     3.1     6.7    11.4    17.6    25.8    36.1
1413          SQ       1       1      12      23      43      55      65     671
1414          SE  1432.0  1433.0  1434.0  1435.0  1436.0  1437.0  1438.0  1439.0
1                                            HEC-1 INPUT                                             PAGE 34

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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 1495          RC   0.025   0.016   0.025    1250  0.0010    0.00
 1496          RX     0.0     0.1     5.0     5.1    68.9    69.0    74.0    74.1
 1497          RY   103.0   100.5   100.5   100.3   100.3   100.5   101.2   103.0

 1498          KK  AD064C   COMBINE HYDROGRAPHS DV063B, AD064B AND RR064D
 1499          KM           TOTAL Q IN 64TH ST AT TBIRD FROM WEST, NORTH AND EAST
 1500          HC       3    2.58
1                                     HEC-1 INPUT                                          PAGE 36

 LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 1501          KK  RR065A   ROUTE   REACH
 1502          KM           ROUTE HYDROGRAPH AD064C THRU REACH RR065A DOWN 64TH ST TO DELCOA AVE
 1503          RS       1    FLOW       0
 1504          RC   0.025   0.016   0.025     800  0.0190    0.00
 1505          RX     0.0     0.1     5.5     5.6    71.4    71.5    76.5    76.6
 1506          RY   105.5   100.5   100.5   100.3   100.3   100.5   100.5   105.5

 1507          KK  DR063B   RETRIEVE TBIRD BASIN WEST END OVERFLOW
 1508          DR  DR063B

 1509          KK  RR065B   ROUTE   REACH
 1510          KM           ROUTE HYDROGRAPH DR063B THRU REACH RR065B SOUTH ON 63RD ST AND
 1511          KM           EAST ON DELCOA AVE TO 64TH ST
 1512          RS       1    FLOW       0
 1513          RC   0.025   0.016   0.025    1300  0.0040    0.00
 1514          RX     0.0     0.1     9.0     9.1    40.9    41.0    49.0    49.1
 1515          RY   105.0   100.5   100.5   100.2   100.2   100.5   100.5   105.0

 1516          KK  AD065A   COMBINE HYDROGRAPHS RR065A AND RR065B
 1517          HC       2    3.18

 1518          KK  RR065C   ROUTE   REACH
 1519          KM           ROUTE HYDROGRAPH AD065A THRU REACH RR065C DOWN 64TH ST FROM DELCOA
 1520          KM           TO CACTUS
 1521          RS       2    FLOW       0
 1522          RC   0.025   0.016   0.025    4500  0.0050    0.00
 1523          RX     0.0     0.1     5.5     5.6    71.4    71.5    76.5    76.6
 1524          RY   105.0   100.5   100.5   100.3   100.3   100.5   100.5   105.0

 1525          KK   SB065   BASIN
 1526          KM           CP @ 64TH ST AND CACTUS
 1527          BA   0.440
 1528          LG    0.29    0.25    4.65    0.38      28
 1529          UC   0.517   0.315
 1530          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 1531          UA     100

 1532          KK  AD065B   COMBINE HYDROGRAPHS RR065C AND SB065
 1533          KM           TOTAL Q IN 64TH ST AT CACTUS
 1534          HC       2    3.62

 1535          KK   RR066   ROUTE   REACH
 1536          KM           ROUTE HYDROGRAPH AD065B THRU REACH RR066 DOWN 64TH ST FROM CACTUS
 1537          KM           TO GARY RD
 1538          RS       1    FLOW       0
 1539          RC   0.025   0.025   0.016    3300  0.0050    0.00
 1540          RX     0.0     0.1    15.0    18.0    21.0    32.0    72.0    72.1
 1541          RY   106.0   101.5   100.0   100.0   100.0   101.2   101.2   106.0
1                                     HEC-1 INPUT                                          PAGE 37

 LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 1542          KK   SB066   BASIN
 1543          KM           CP @ 64TH ST AND GARY RD
 1544          BA   0.120
 1545          LG    0.25    0.25    4.65    0.37      38
 1546          UC   0.350   0.260
 1547          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 1548          UA     100

 1549          KK   AD066   COMBINE HYDROGRAPHS RR066 AND SB066
 1550          KM           TOTAL Q IN 64TH ST AT GARY RD
 1551          HC       2    3.74

 1552          KK  RR067A   ROUTE   REACH
 1553          KM           ROUTE HYDROGRAPH AD066 THRU REACH RR067A DOWN 64TH ST CHANNEL FROM
 1554          KM           GARY RD TO SHEA BLVD
 1555          RS       1    FLOW       0
 1556          RC   0.016   0.025   0.025    2100  0.0060    0.00
 1557          RX     0.0     0.1    25.0    29.0    40.0    44.0    49.0    49.1
 1558          RY   108.0   104.0   104.0   100.0   100.0   105.0   105.0   108.0

 1559          KK  SB067A   BASIN
 1560          KM           CP @ 64TH ST AND MOUNTAIN VIEW ROAD ALIGN
 1561          BA   0.100
 1562          LG    0.30    0.25    4.65    0.38      24
 1563          UC   0.400   0.299
 1564          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 1565          UA     100

 1566          KK  DV067A   SPLIT FLOW. 30IN DIAM STORM DRAIN AT SHEA BLVD FLOWS WEST @ ASSUMED
 1567          KM           S=0.0025 FT/FT. REMAINDER FLOW (DV067B) GOES SOUTH IN 64TH ST
 1568          KM           CHANNEL. DIVERTED FLOW (DR067A) GOES WEST OUT OF PROJECT AREA.
 1569          DT  DR067A
 1570          DI       0      50     100     150     200     400
 1571          DQ       0      21      21      21      21      21
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1649          HC       2    2.63

1650          KK  AD057C    COMBINE HYDROGRAPHS AD058B AND AD057A
1651          KM            TOTAL Q BERNEIL DITCH JUST DS FROM CONFL WITH MTN VIEW CHANNEL
1652          HC       2    7.56

1653          KK   RR068    ROUTE   REACH
1654          KM            ROUTE HYDROGRAPH AD057B THRU REACH RR068 SOUTH TO DBL TREE RANCH RD
1655          RS       1     FLOW       0
1656          RC   0.018    0.018   0.018     3800  0.0020     0.00
1657          RX   942.4    942.5   959.3    982.1  1017.9   1044.9  1055.0  1055.1
1658          RY   335.0    332.9   332.9    324.2   325.0    333.1   333.1   335.0

1659          KK   SB068    BASIN
1660          KM            CP @ BERNEIL DITCH AND DOUBLE TREE RANCH RD
1661          BA   0.110
1662          LG    0.30     0.25    4.65     0.38      24
1663          UC   0.938    1.403
1664          UA       0      5.0    16.0     30.0    65.0     77.0    84.0    90.0    94.0    97.0
1665          UA     100

1666          KK   AD068    COMBINE HYDROGRAPHS RR068 AND SB068
1667          KM            TOTAL Q IN BERNEIL DITCH @ DBL TREE
1668          HC       2     7.67

1669          KK  RR070A    ROUTE   REACH
1670          KM            ROUTE HYDROGRAPH AD068 THRU REACH RR070A SOUTH FROM DBL TREE TO IBW
1671          RS       1     FLOW       0
1672          RC   0.018    0.018   0.018     2500  0.0030     0.00
1673          RX   947.8    947.9   954.6    978.1  1000.0   1022.0  1045.5  1045.6
1674          RY   328.0    325.2   325.1    316.0   316.0    316.0   325.0   328.0
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1675          KK  DR067C    RETRIEVE SPLIT FLOW SOUTH IN INVERGORDON CHANNEL FROM CONC FLOW
1676          KM            SPLIT STRUCTURE @ MTN VIEW CHANNEL
1677          DR  DR067C

1678          KK   RR069    ROUTE   REACH
1679          KM            ROUTE HYDROGRAPH DR067C THRU REACH RR069 SOUTH IN INVERGORDON RD
1680          KM            CHANNEL TO IBW. GABION LINED CHANNEL
1681          RS       1     FLOW       0
1682          RC   0.025    0.025   0.025     4100  0.0050     0.00
1683          RX     0.0      0.1     9.0     11.0    19.0     27.9    28.0    28.1
1684          RY   107.0    105.5   100.0    100.0   100.0    105.5   105.8   107.0

1685          KK   SB069    BASIN
1686          KM            CP @ 64TH ST AND INDIAN BEND WASH
1687          BA   0.140
1688          LG    0.30     0.25    4.65     0.38      24
1689          UC   0.696    0.878
1690          UA       0      5.0    16.0     30.0    65.0     77.0    84.0    90.0    94.0    97.0
1691          UA     100

1692          KK   AD069    COMBINE HYDROGRAPHS RR069 AND SB069
1693          KM            TOTAL Q IN INVERGORDON ROAD CHANNEL @ INDIAN BEND WASH
1694          HC       2     2.11

1695          KK  RR070B    ROUTE   REACH
1696          KM            ROUTE HYDROGRAPH AD069 THRU REACH RR070B IN IBW TO BERNEIL DITCH
1697          RS       1     FLOW       0
1698          RC   0.030    0.030   0.030     1800  0.0040     0.00
1699          RX     0.0     20.0    60.0    100.0   140.0    180.0   220.0   240.0
1700          RY   102.0    100.0   100.0    100.0   100.0    100.0   100.0   102.0

1701          KK   SB070    BASIN
1702          KM            NOTE: MINOR SUMP IN DBL TREE RANCH RD JUST WEST OF BERNEIL IS IGNORED
1703          BA   0.140
1704          LG    0.30     0.25    4.65     0.38      24
1705          UC   0.542    0.543
1706          UA       0      5.0    16.0     30.0    65.0     77.0    84.0    90.0    94.0    97.0
1707          UA     100

1708          KK   AD070    COMBINE HYDROGRAPHS RR070A, RR070B AND SB070
1709          KM            TOTAL Q FROM BERNEIL DITCH AND INVERGORDON RD CHANNEL @ CP IN IBW
1710          KM            @ BERNEIL DITCH.  TOTAL FLOW FROM ENTIRE STUDY AREA (NOT COUNTING
1711          KM            FLOW THAT HAS LEFT STUDY @ 7 LOCATIONS).
1712          HC       3     9.61

1713          KK   DR055    RETRIEVE FLOW GOING SOUTH ON SDALE RD PAST MTN VIEW RD
1714          DR   DR055

1715          KK  DR054B    RETRIEVE SURFACE FLOW FROM SB054
1716          DR  DR054B
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1717          KK  AD5455    COMBINE HYDROGRAPHS DR055, DR054B
1718          KM            TOTAL SURFACE Q @ SDALE AND MTN VIEW RDS THAT DID NOT ENTER BERNEIL
1719          KM            DITCH GOES SOUTH OUT OF STUDY
1720          HC       2    .60
1721          ZZ
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1

SCHEMATIC DIAGRAM OF STREAM NETWORK

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INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW
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            .         .         .         V
            .         .         .         V
245         .         .         .    RR012A
            .         .         .         V
            .         .         .         V
249         .         .         .    RR1217
            .         .         .         .
            .         .         .         .
252         .     AD017......................
            .         .
            .         .
258         .         .------->  DR017
254         .     DV017
            .         V
            .         V
261         .     RR018
            .         .
            .         .
268         .         .     SB018
            .         .         .
            .         .         .
275         .     AD018...........
            .         .
            .         .
278         .         .     SB019
            .         .         .
            .         .         .
286         .         .         .         .<-------   DR013
285         .         .         .     DR013
            .         .         .         V
            .         .         .         V
287         .         .         .    RR019A
            .         .         .         V
            .         .         .         V
294         .         .         .    RR019B
            .         .         .         .
            .         .         .         .
301         .     AD019......................
            .         V
            .         V
304         .     LP019
            .         V
            .         V
314         .    RR015C
            .         .
            .         .
320    AD015B...........
            V
            V
322    RR020A
            V
            V
329    RR020B
            V
            V
336    RR020C
            .
            .
345         .------->  DR20A1
341    DV20A1
            .
            .
348         .    SB020A
            .         .
            .         .
357         .         .         .<-------   DR20A1
355         .         .    DR20A1
            .         .         .
            .         .         .
361         .         .         .------->   DR20A2
358         .         .    DV20A2
            .         .         .
            .         .         .
364    AD020A.....................
            .
            .
367         .     SB021
            .         V
            .         V
374         .     LP021
            .         V
            .         V
382         .     RR022
            .         .
            .         .
389         .         .     SB022
            .         .         .
            .         .         .
396         .     AD022...........
            .         V
            .         V
398         .     RR023
            .         .
            .         .
405         .         .     SB023
            .         .         .
            .         .         .
412         .     AD023...........
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                                       V
604            .           .       LP033
               .           .           V
               .           .           V
609            .           .       RR034
               .           .           .
               .           .           .
612            .           .           .       SB034
               .           .           .           .
               .           .           .           .
619            .       AD034........................
               .           V
               .           V
622            .       LP034
               .           .
               .           .
631            .           .------->  DR034
627            .       DV034
               .           V
               .           V
634            .       RR035
               .           .
               .           .
640            .           .       SB035
               .           .           .
               .           .           .
647            .       AD035............
               .           V
               .           V
649            .       RR036
               .           .
               .           .
655            .           .       SB036
               .           .           .
               .           .           .
662            .       AD036............
               .           .
               .           .
669            .           .------->  DR036
664            .       DV036
               .           V
               .           V
672            .      RR037A
               .           .
               .           .
678            .           .       SB037
               .           .           .
               .           .           .
685            .      AD037A............
               .           .
               .           .
691            .           .           .<------- DR20A2
689            .           .      DR20A2
               .           .           V
               .           .           V
692            .           .      RR024A
               .           .           .
               .           .           .
700            .           .           .           .<------- DR20B2
699            .           .           .      DR20B2
               .           .           .           V
               .           .           .           V
701            .           .           .      RR024B
               .           .           .           V
               .           .           .           V
708            .           .           .      RR024C
               .           .           .           .
               .           .           .           .
715            .           .      AD024B............
               .           .           V
               .           .           V
717            .           .      RR024D
               .           .           .
               .           .           .
724            .           .           .       SB024
               .           .           .           .
               .           .           .           .
731            .           .      AD024C............
               .           .           .
               .           .           .
739            .           .           .------->  DR024
733            .           .       DV024
               .           .           V
               .           .           V
742            .           .      RR024E
               .           .           .
               .           .           .
749       AD037B........................
               V
               V
752       RR037B           .
               .           .
               .           .
760            .           .<-------  DR024
759            .       DR024
               .           V
               .           V
761            .      RR024F
               .           .
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                                                    V
 954            .           .           .      RR046A
                .           .           .           V
                .           .           .           V
 961            .           .           .      RR046B
                .           .           .           .
                .           .           .           .
 968            .           .           .           .       SB046
                .           .           .           .           .
                .           .           .           .           .
 975            .           .           .      AD046A............
                .           .           .           .
                .           .           .           .
 978            .      AD046B........................
                .           .
                .           .
 985            .           .------->  DR046
 981            .       DV046
                .           V
                .           V
 988            .      RR047A
                .           V
                .           V
 992            .      RR4748
                .           .
                .           .
 999            .           .       SB048
                .           .           .
                .           .           .
1006            .       AD048............
                .           V
                .           V
1009            .       LP048
                .           .
                .           .
1022            .           .------->  DR048
1018            .       DV048
                .           V
                .           V
1025            .      RR037D
                .           .
                .           .
1029       AD037D............
                V
                V
1032       RR049A
                .
                .
1039            .       SB049
                .           .
                .           .
1047            .           .           .<-------  DR048
1046            .           .       DR048
                .           .           V
                .           .           V
1048            .           .      RR049B
                .           .           .
                .           .           .
1055            .      AD049A............
                .           .
                .           .
1062            .           .------->  DR049
1057            .       DV049
                .           .
                .           .
1065            .           .       SB050
                .           .           .
                .           .           .
1076            .           .           .------->  DR050
1072            .           .       DV050
                .           .           V
                .           .           V
1079            .           .      RR049C
                .           .           .
                .           .           .
1083       AD049B........................
                V
                V
1086       RR051A
                V
                V
1093       RR051B
                V
                V
1100       RR051C
                .
                .
1107            .       SB051
                .           .
                .           .
1114        AD051............
                .
                .
1117            .       SB052
                .           .
                .           .
1126            .           .------->  DR052
1124            .       DV052
                .           V
                .           V
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1291           .           .       SB047
                                       .
1298           .      AD047.............
                           V
                           V
1300           .      RR058
                           .
1307           .           .       SB058
                           .           .
1314           .     AD058A.............
                           .
1317           .           .           .<-------  DR044B
1316           .           .      DR044B
                                       V
                                       V
1318           .           .      RR059A
                                       .
1325           .           .           .       SB059
                                       .           .
1332           .           .      AD059A............
                                       .
1334           .           .           .      SB061A
                                                   .
1341           .           .           .           .      SB061B
                                                               .
1352           .           .           .           .           .------->  DR061B
1348           .           .           .           .       DV061
                                                               .
1356           .           .           .           .           .           .<-------  DR038
1355           .           .           .           .           .       DR038
                                                                           V
                                                                           V
1357           .           .           .           .           .      RR061C
                                                                           .
1362           .           .           .           .           .           .      SB061C
                                                                           .           .
1369           .           .           .           .           .      AD061A............
                                                               .           .
1371           .           .           .      AD061B.........................
                                                   V
                                                   V
1374           .           .           .       LP061
                                                   V
                                                   V
1381           .           .           .      RR062A
                                                   V
                                                   V
1388           .           .           .      RR062B
                                                   .
1395           .           .           .           .       SB062
                                                               .
1402           .           .           .       AD062............
                                                   V
                                                   V
1405           .           .           .       LP062
                                                   V
                                                   V
1415           .           .           .       RR063
                                                   .
1422           .           .           .           .       SB063
                                                               .
1429           .           .           .       AD063............
                                                   V
                                                   V
1432           .           .           .       LP063
                                                   .
1442           .           .           .           .------->  DR063A
1439           .           .           .      DV063A
                                                   .
1449           .           .           .           .------->  DR063B
1445           .           .           .      DV063B
                                                   .
1453           .           .           .           .           .<-------  DR041
1452           .           .           .           .       DR041
                                                               V
                                                               V
1454           .           .           .           .      RR064A
                                                               .
1463           .           .           .           .           .           .<-------  DR039
```

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                    .         .         .         .         .
1622                .         .         .    AD067B..........
                    .         .         .         .
                    .         .         .         .
1628                .         .         .         .-------> DR067C
1625                .         .         .    DV067C
                    .         .         .         V
                    .         .         .         V
1631                .         .         .    RR060B
                    .         .         .         .
                    .         .         .         .
1637                .         .    AD060B..........
                    .         .         V
                    .         .         V
1640                .         .    RR060C
                    .         .         .
                    .         .         .
1647                .    AD058B..........
                    .         .
                    .         .
1650           AD057C..........
                    V
                    V
1653            RR068
                    .
                    .
1659                .     SB068
                    .         .
                    .         .
1666            AD068..........
                    V
                    V
1669           RR070A
                    .
                    .
1677                .         .<------- DR067C
1675                .    DR067C
                    .         V
                    .         V
1678                .     RR069
                    .         .
                    .         .
1685                .         .     SB069
                    .         .         .
                    .         .         .
1692                .     AD069..........
                    .         V
                    .         V
1695                .    RR070B
                    .         .
                    .         .
1701                .         .     SB070
                    .         .         .
                    .         .         .
1708            AD070....................
                    .
                    .
1714                .         .<------- DR055
1713                .     DR055
                    .         .
                    .         .
1716                .         .         .<------- DR054B
1715                .         .    DR054B
                    .         .         .
                    .         .         .
1717                .     AD5455..........

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
```

```
1*****************************************                     ****************************************
 *                                       *                     *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                     *   U.S. ARMY CORPS OF ENGINEERS       *
 *             JUN   1998                *                     *   HYDROLOGIC ENGINEERING CENTER      *
 *           VERSION 4.1                 *                     *        609 SECOND STREET             *
 *                                       *                     *     DAVIS, CALIFORNIA 95616          *
 *  RUN DATE    17OCT02  TIME  12:50:06  *                     *         (916) 756-1104               *
 *                                       *                     *                                      *
 *****************************************                     ****************************************
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Project ID: 15586B10 - Major Basin: 01 - Return Period: 10 Years
     SCOTTSDALE ROAD CORRIDOR DRAINAGE MASTER PLAN
     FCD 2000C030                      SCI # 15586
     10YR, 6HR FUTURE LAND USE CONDITION
     HYDROGRAPH MODEL "15586B10"    HEC-1 MODEL INPUT FILENAME: 15586B10.DAT

     SUMMARY APPROACH, METHOD, PRECIP AND ASSUMPTION:
     1.  10YR, 6HR RAINFALL EVENT, MULTI-STORM JD RECORD OPTION,
         6HR DISTRIBUTION PATTERNS #1 THRU #5 WITH 15 MIN TIME INCREM
         (FCDMC, HYDROLOGY MANUAL, TABLE 2.4)
     2.  POINT PRECIP = 3.20 IN
     3.  PRECIP AERIAL REDUCTION FACTOR = 1.00 BASED ON 0.01 SQ MI BASIN
                                        = 0.994 BASED ON 0.50 SQ MI BASIN
                                        = 0.975 BASED ON 2.80 SQ MI BASIN
                                        = 0.922 BASED ON 16.00 SQ MI BASIN
                                        = 0.812 BASED ON 90.00 SQ MI BASIN
                                        = 0.570 BASED ON 500.00 SQ MI BASIN
     4.  BASIN AREAS ADJUSTED @ KEY HYDROGRAPH COMBINATION STEPS TO REFLECT
```

```
59 PI          PRECIPITATION PATTERN
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .01
                   .01       .01       .00       .01       .00       .00       .00       .00       .00       .00
                   .00       .00       .01       .00       .00       .00       .00       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .02       .02       .02       .03
                   .03       .03       .06       .06       .06       .07       .07       .07       .04       .04
                   .04       .02       .02       .02       .01       .01       .01       .01       .01       .01
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00

62 JD          INDEX STORM NO. 5
                  STRM        1.65  PRECIPITATION DEPTH
                  TRDA       90.00  TRANSPOSITION DRAINAGE AREA

63 PI          PRECIPITATION PATTERN
                   .01       .01       .01       .00       .00       .00       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .02       .02       .02       .03
                   .03       .03       .05       .05       .05       .05       .05       .05       .04       .04
                   .04       .02       .02       .02       .02       .02       .02       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01

66 JD          INDEX STORM NO. 6
                  STRM        1.16  PRECIPITATION DEPTH
                  TRDA      500.00  TRANSPOSITION DRAINAGE AREA

67 PI          PRECIPITATION PATTERN
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .02       .02       .02       .03
                   .03       .03       .04       .04       .04       .04       .04       .04       .04       .04
                   .04       .03       .03       .03       .02       .02       .02       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01

     *** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT


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     *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1


     *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1


     *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  2


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*** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

+		DV013	35.	4.17	4.	1.	1.	.36
+	ROUTED TO	RR014	28.	4.25	4.	1.	1.	.36
+	HYDROGRAPH AT	SB014	35.	4.17	5.	1.	1.	.03
+	2 COMBINED AT	AD014	60.	4.17	9.	2.	2.	.06
+	ROUTED TO	RR011B	60.	4.25	9.	2.	2.	.06
+	2 COMBINED AT	AD011B	400.	4.17	63.	16.	15.	.32
+	ROUTED TO	RR015A	398.	4.17	63.	16.	15.	.32
+	ROUTED TO	RR015B	351.	4.33	63.	16.	15.	.32
+	HYDROGRAPH AT	SB015	255.	4.17	40.	10.	10.	.25
+	2 COMBINED AT	AD015A	576.	4.25	102.	26.	25.	.57
+	HYDROGRAPH AT	SB016	108.	4.08	15.	4.	4.	.09
+	DIVERSION TO	DR016	58.	4.00	12.	3.	3.	.09
+	HYDROGRAPH AT	DV016	50.	4.08	3.	1.	1.	.09
+	ROUTED TO	RR017	31.	4.42	3.	1.	1.	.09
+	HYDROGRAPH AT	SB017	137.	4.08	15.	4.	4.	.09
+	HYDROGRAPH AT	DR009	47.	4.33	11.	3.	3.	.06
+	ROUTED TO	RR012A	47.	4.33	11.	3.	3.	.06
+	ROUTED TO	RR1217	47.	4.42	11.	3.	3.	.06
+	3 COMBINED AT	AD017	165.	4.08	28.	7.	7.	.24
+	DIVERSION TO	DR017	155.	4.08	27.	7.	7.	.24
+	HYDROGRAPH AT	DV017	10.	4.08	1.	0.	0.	.24
+	ROUTED TO	RR018	6.	4.58	1.	0.	0.	.24
+	HYDROGRAPH AT	SB018	179.	4.17	24.	6.	6.	.15
+	2 COMBINED AT	AD018	179.	4.17	25.	6.	6.	.39
+	HYDROGRAPH AT	SB019	167.	4.25	30.	8.	7.	.19
+	HYDROGRAPH AT	DR013	413.	4.17	45.	11.	11.	.36
+	ROUTED TO	RR019A	404.	4.17	45.	11.	11.	.36
+	ROUTED TO	RR019B	384.	4.25	45.	11.	11.	.36
+	3 COMBINED AT	AD019	620.	4.25	96.	24.	23.	.91
+	ROUTED TO	LP019	331.	4.67	95.	24.	23.	.91
+	ROUTED TO	RR015C	332.	4.67	95.	24.	23.	.91
+	2 COMBINED AT	AD015B	721.	4.42	189.	48.	47.	1.48
+	ROUTED TO	RR020A	722.	4.42	189.	48.	47.	1.48
+	ROUTED TO	RR020B	717.	4.42	189.	48.	47.	1.48

	2 COMBINED AT							
+		AD027B	533.	4.33	203.	74.	71.	2.84
	HYDROGRAPH AT							
+		SB028	174.	4.17	25.	6.	6.	.13
	ROUTED TO							
+		RR031A	166.	4.17	25.	6.	6.	.13
	HYDROGRAPH AT							
+		SB029	208.	4.08	24.	6.	6.	.18
	2 COMBINED AT							
+		AD031A	373.	4.17	49.	12.	12.	.31
	ROUTED TO							
+		RR031B	370.	4.17	49.	12.	12.	.31
	HYDROGRAPH AT							
+		SB030	107.	4.17	14.	3.	3.	.10
	ROUTED TO							
+		RR031C	95.	4.25	14.	3.	3.	.10
	HYDROGRAPH AT							
+		SB031	110.	4.08	9.	2.	2.	.12
	3 COMBINED AT							
+		AD031B	548.	4.17	71.	18.	17.	.53
	ROUTED TO							
+		LP031A	15.	5.67	15.	14.	14.	.53
	DIVERSION TO							
+		DR031	4.	.00	4.	4.	4.	.53
	HYDROGRAPH AT							
+		DV031	11.	5.67	11.	10.	10.	.53
	HYDROGRAPH AT							
+		SB032	13.	4.33	3.	1.	1.	.03
	ROUTED TO							
+		RR031D	12.	4.58	3.	1.	1.	.03
	HYDROGRAPH AT							
+		SB033	128.	4.17	16.	4.	4.	.14
	HYDROGRAPH AT							
+		DR031	4.	.00	4.	4.	4.	.53
	3 COMBINED AT							
+		AD033	136.	4.17	22.	9.	8.	.31
	ROUTED TO							
+		LP033	0.	4.58	0.	0.	0.	.31
	ROUTED TO							
+		RR034	0.	4.67	0.	0.	0.	.31
	HYDROGRAPH AT							
+		SB034	228.	4.17	31.	8.	8.	.18
	3 COMBINED AT							
+		AD034	211.	4.17	39.	18.	17.	.88
	ROUTED TO							
+		LP034	18.	3.92	18.	17.	16.	.88
	DIVERSION TO							
+		DR034	18.	3.92	18.	17.	16.	.88
	HYDROGRAPH AT							
+		DV034	0.	.00	0.	0.	0.	.88
	ROUTED TO							
+		RR035	0.	.00	0.	0.	0.	.88
	HYDROGRAPH AT							
+		SB035	113.	4.17	15.	4.	4.	.11
	2 COMBINED AT							
+		AD035	113.	4.17	15.	4.	4.	.11
	ROUTED TO							
+		RR036	88.	4.50	15.	4.	4.	.11
	HYDROGRAPH AT							
+		SB036	66.	4.25	13.	3.	3.	.13
	2 COMBINED AT							
+		AD036	149.	4.42	28.	7.	7.	.24
	DIVERSION TO							
+		DR036	149.	4.42	28.	7.	7.	.24
	HYDROGRAPH AT							
+		DV036	0.	.00	0.	0.	0.	.24
	ROUTED TO							

+	ROUTED TO	RR041	115.	4.75	37.	25.	24.	1.33
+	HYDROGRAPH AT	SB041	38.	4.17	4.	1.	1.	.04
+	2 COMBINED AT	AD041	106.	4.83	38.	25.	24.	1.71
+	ROUTED TO	LP041	36.	5.92	35.	25.	24.	1.71
+	DIVERSION TO	DR041	36.	5.92	35.	25.	24.	1.71
+	HYDROGRAPH AT	DV041	0.	.00	0.	0.	0.	1.71
+	ROUTED TO	RR043	0.	.00	0.	0.	0.	1.71
+	HYDROGRAPH AT	SB043	75.	4.17	9.	2.	2.	.08
+	2 COMBINED AT	AD043	75.	4.17	9.	2.	2.	.08
+	DIVERSION TO	DR043	75.	4.17	9.	2.	2.	.08
+	HYDROGRAPH AT	DV043	0.	.00	0.	0.	0.	.08
+	ROUTED TO	RR044	0.	.00	0.	0.	0.	.08
+	HYDROGRAPH AT	SB044	120.	4.25	21.	5.	5.	.18
+	2 COMBINED AT	AD044	120.	4.25	21.	5.	5.	.18
+	DIVERSION TO	DR044A	20.	4.25	3.	1.	1.	.18
+	HYDROGRAPH AT	DV044A	99.	4.25	17.	4.	4.	.18
+	DIVERSION TO	DR044B	0.	4.25	0.	0.	0.	.18
+	HYDROGRAPH AT	DV044B	99.	4.25	17.	4.	4.	.18
+	ROUTED TO	RR4446	98.	4.25	17.	4.	4.	.18
+	HYDROGRAPH AT	DR036	149.	4.42	28.	7.	7.	.24
+	ROUTED TO	RR3646	148.	4.42	28.	7.	7.	.24
+	HYDROGRAPH AT	SB045	21.	4.17	4.	1.	1.	.03
+	ROUTED TO	RR046A	17.	4.50	4.	1.	1.	.03
+	ROUTED TO	RR046B	17.	4.58	4.	1.	1.	.03
+	HYDROGRAPH AT	SB046	140.	4.25	22.	6.	5.	.19
+	2 COMBINED AT	AD046A	149.	4.25	26.	7.	6.	.22
+	3 COMBINED AT	AD046B	362.	4.33	69.	18.	17.	.61
+	DIVERSION TO	DR046	0.	.00	0.	0.	0.	.61
+	HYDROGRAPH AT	DV046	362.	4.33	69.	18.	17.	.61
+	ROUTED TO	RR047A	360.	4.33	69.	18.	17.	.61
+	ROUTED TO	RR4748	356.	4.42	69.	18.	17.	.61
+	HYDROGRAPH AT	SB048	80.	4.17	9.	2.	2.	.09
+	2 COMBINED AT	AD048	394.	4.33	77.	19.	19.	.70

+		DR050	0.	.00	0.	0.	0.	.04
+	ROUTED TO	RR055B	0.	.00	0.	0.	0.	.04
+	2 COMBINED AT	AD055A	0.	.00	0.	0.	0.	.00
+	ROUTED TO	RR055C	0.	.00	0.	0.	0.	.00
+	HYDROGRAPH AT	SB055	65.	4.08	10.	2.	2.	.05
+	2 COMBINED AT	AD055B	65.	4.08	10.	2.	2.	.05
+	DIVERSION TO	DR055	49.	4.08	7.	2.	2.	.05
+	HYDROGRAPH AT	DV055	16.	4.08	2.	1.	1.	.05
+	HYDROGRAPH AT	DR054A	141.	4.25	24.	6.	6.	.27
+	ROUTED TO	RR054B	138.	4.25	24.	6.	6.	.27
+	HYDROGRAPH AT	SB054	105.	4.17	17.	4.	4.	.11
+	2 COMBINED AT	AD054	240.	4.25	41.	10.	10.	.38
+	DIVERSION TO	DR054B	80.	4.25	5.	1.	1.	.38
+	HYDROGRAPH AT	DV054B	160.	4.17	36.	9.	9.	.38
+	2 COMBINED AT	AD055C	176.	4.17	38.	10.	9.	.43
+	ROUTED TO	RR055D	174.	4.25	38.	10.	9.	.43
+	2 COMBINED AT	AD055D	942.	4.50	349.	112.	108.	4.68
+	ROUTED TO	RR057A	940.	4.50	349.	112.	108.	4.68
+	HYDROGRAPH AT	DR049	141.	4.08	9.	2.	2.	.14
+	ROUTED TO	RR057B	111.	4.25	9.	2.	2.	.14
+	2 COMBINED AT	AD057A	962.	4.50	353.	113.	109.	4.78
+	ROUTED TO	RR057C	952.	4.58	352.	112.	108.	4.78
+	HYDROGRAPH AT	SB057	231.	4.08	24.	6.	6.	.15
+	2 COMBINED AT	AD057B	993.	4.50	371.	117.	113.	4.93
+	HYDROGRAPH AT	DR046	0.	.00	0.	0.	0.	.61
+	ROUTED TO	RR047B	0.	.00	0.	0.	0.	.61
+	HYDROGRAPH AT	SB047	126.	4.25	21.	5.	5.	.19
+	2 COMBINED AT	AD047	126.	4.25	21.	5.	5.	.19
+	ROUTED TO	RR058	118.	4.33	21.	5.	5.	.19
+	HYDROGRAPH AT	SB058	51.	4.17	6.	2.	2.	.06
+	2 COMBINED AT	AD058A	156.	4.33	27.	7.	7.	.25
+	HYDROGRAPH AT	DR044B	0.	4.25	0.	0.	0.	.18
+	ROUTED TO	RR059A	0.	4.50	0.	0.	0.	.18
+	HYDROGRAPH AT	SB059	144.	4.25	24.	6.	6.	.23

	ROUTED TO							
+		RR064D	72.	4.25	9.	2.	2.	.08
	3 COMBINED AT							
+		AD064C	132.	4.33	53.	29.	28.	2.58
	ROUTED TO							
+		RR065A	132.	4.42	53.	29.	28.	2.58
	HYDROGRAPH AT							
+		DR063B	21.	4.50	2.	0.	0.	1.19
	ROUTED TO							
+		RR065B	18.	4.67	2.	0.	0.	1.19
	2 COMBINED AT							
+		AD065A	132.	4.33	55.	30.	29.	3.18
	ROUTED TO							
+		RR065C	116.	4.75	51.	29.	28.	3.18
	HYDROGRAPH AT							
+		SB065	366.	4.17	48.	12.	12.	.44
	2 COMBINED AT							
+		AD065B	275.	4.33	83.	37.	36.	3.62
	ROUTED TO							
+		RR066	262.	4.50	83.	37.	36.	3.62
	HYDROGRAPH AT							
+		SB066	129.	4.17	15.	4.	4.	.12
	2 COMBINED AT							
+		AD066	305.	4.42	93.	40.	39.	3.74
	ROUTED TO							
+		RR067A	303.	4.50	93.	40.	39.	3.74
	HYDROGRAPH AT							
+		SB067A	89.	4.17	10.	3.	3.	.10
	DIVERSION TO							
+		DR067A	21.	4.00	4.	1.	1.	.10
	HYDROGRAPH AT							
+		DV067A	68.	4.17	7.	2.	2.	.10
	2 COMBINED AT							
+		AD067A	319.	4.50	97.	41.	39.	3.84
	DIVERSION TO							
+		DR067B	319.	4.50	97.	41.	39.	3.84
	HYDROGRAPH AT							
+		DV067B	0.	.00	0.	0.	0.	3.84
	ROUTED TO							
+		RR059B	0.	.00	0.	0.	0.	3.84
	2 COMBINED AT							
+		AD059B	207.	4.42	31.	8.	7.	.23
	ROUTED TO							
+		RR060A	201.	4.50	30.	8.	7.	.23
	HYDROGRAPH AT							
+		SB060	265.	4.08	32.	8.	8.	.18
	2 COMBINED AT							
+		AD060A	353.	4.17	62.	16.	15.	.41
	HYDROGRAPH AT							
+		DR067B	319.	4.50	97.	41.	39.	3.84
	ROUTED TO							
+		RR067B	314.	4.58	97.	41.	39.	3.84
	HYDROGRAPH AT							
+		SB067B	70.	4.17	9.	2.	2.	.09
	2 COMBINED AT							
+		AD067B	337.	4.50	103.	42.	41.	3.93
	DIVERSION TO							
+		DR067C	169.	4.50	51.	21.	20.	3.93
	HYDROGRAPH AT							
+		DV067C	169.	4.50	51.	21.	20.	3.93
	ROUTED TO							
+		RR060B	167.	4.58	51.	21.	20.	3.93
	2 COMBINED AT							
+		AD060B	372.	4.42	101.	34.	33.	2.38
	ROUTED TO							
+		RR060C	372.	4.42	101.	34.	33.	2.38
	2 COMBINED AT							

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5623E+01 EXCESS= .0000E+00 OUTFLOW= .5624E+01 BASIN STORAGE= .3934E-10 PERCENT ERROR= .0

FOR STORM = 2 STORM AREA (SQ MI) = .50
RR012A MANE .83 46.78 261.63 1.75 5.00 46.66 260.00 1.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5585E+01 EXCESS= .0000E+00 OUTFLOW= .5586E+01 BASIN STORAGE= .3596E-10 PERCENT ERROR= .0

FOR STORM = 3 STORM AREA (SQ MI) = 2.80
RR012A MANE .96 36.44 266.72 1.66 5.00 36.36 265.00 1.66

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5314E+01 EXCESS= .0000E+00 OUTFLOW= .5314E+01 BASIN STORAGE= .3716E-10 PERCENT ERROR= .0

FOR STORM = 4 STORM AREA (SQ MI) = 16.00
RR012A MANE .97 28.96 267.16 1.53 5.00 28.85 265.00 1.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4911E+01 EXCESS= .0000E+00 OUTFLOW= .4911E+01 BASIN STORAGE= .4134E-10 PERCENT ERROR= .0

FOR STORM = 5 STORM AREA (SQ MI) = 90.00
RR012A MANE .91 21.18 266.71 1.32 5.00 21.14 270.00 1.32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4220E+01 EXCESS= .0000E+00 OUTFLOW= .4220E+01 BASIN STORAGE= .4240E-10 PERCENT ERROR= .0

FOR STORM = 6 STORM AREA (SQ MI) = 500.00
RR012A MANE 1.04 12.62 272.76 .92 5.00 12.62 275.00 .92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2948E+01 EXCESS= .0000E+00 OUTFLOW= .2948E+01 BASIN STORAGE= .4220E-10 PERCENT ERROR= .0

FOR STORM = 1 STORM AREA (SQ MI) = .01
RR1217 MANE 1.68 46.96 263.33 1.76 5.00 46.73 265.00 1.76

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5625E+01 EXCESS= .0000E+00 OUTFLOW= .5629E+01 BASIN STORAGE= .9052E-09 PERCENT ERROR= -.1

FOR STORM = 2 STORM AREA (SQ MI) = .50
RR1217 MANE 1.68 46.62 263.51 1.75 5.00 46.41 265.00 1.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5587E+01 EXCESS= .0000E+00 OUTFLOW= .5590E+01 BASIN STORAGE= .1367E-08 PERCENT ERROR= -.1

FOR STORM = 3 STORM AREA (SQ MI) = 2.80
RR1217 MANE 1.83 36.33 268.95 1.66 5.00 36.27 270.00 1.66

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5315E+01 EXCESS= .0000E+00 OUTFLOW= .5316E+01 BASIN STORAGE= .7944E-09 PERCENT ERROR= .0

FOR STORM = 4 STORM AREA (SQ MI) = 16.00
RR1217 MANE 1.92 28.85 269.13 1.54 5.00 28.84 270.00 1.54

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4912E+01 EXCESS= .0000E+00 OUTFLOW= .4913E+01 BASIN STORAGE= .7484E-09 PERCENT ERROR= .0

FOR STORM = 5 STORM AREA (SQ MI) = 90.00
RR1217 MANE 1.98 21.12 273.40 1.32 5.00 21.08 270.00 1.32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4221E+01 EXCESS= .0000E+00 OUTFLOW= .4222E+01 BASIN STORAGE= .1244E-08 PERCENT ERROR= .0

FOR STORM = 6 STORM AREA (SQ MI) = 500.00
RR1217 MANE 2.24 12.60 278.26 .92 5.00 12.60 280.00 .92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2948E+01 EXCESS= .0000E+00 OUTFLOW= .2949E+01 BASIN STORAGE= .1048E-08 PERCENT ERROR= .0

FOR STORM = 1 STORM AREA (SQ MI) = .01
RR020C MANE .42 846.18 265.90 1.29 5.00 842.10 265.00 1.29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1021E+03 EXCESS= .0000E+00 OUTFLOW= .1021E+03 BASIN STORAGE= .1655E-03 PERCENT ERROR= .0

FOR STORM = 2 STORM AREA (SQ MI) = .50
RR020C MANE .42 838.30 265.67 1.28 5.00 834.85 265.00 1.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1013E+03 EXCESS= .0000E+00 OUTFLOW= .1013E+03 BASIN STORAGE= .1655E-03 PERCENT ERROR= .0

FOR STORM = 3 STORM AREA (SQ MI) = 2.80
RR020C MANE .53 648.71 270.56 1.18 5.00 648.43 270.00 1.18

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          FOR STORM = 6  STORM AREA (SQ MI) =      500.00
            RR034  MANE         2.56       .01   1496.44       .00      5.00       .01   1495.00          .00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1383E-01 EXCESS= .0000E+00 OUTFLOW= .1377E-01 BASIN STORAGE= .6974E-04 PERCENT ERROR=    -.1

          FOR STORM = 1  STORM AREA (SQ MI) =         .01
           RR024F  MANE          .76    119.88    280.43       .70      5.00    119.86    280.00          .70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1225E+02 EXCESS= .0000E+00 OUTFLOW= .1225E+02 BASIN STORAGE= .5261E-07 PERCENT ERROR=     .0

          FOR STORM = 2  STORM AREA (SQ MI) =         .50
           RR024F  MANE          .68    119.07    280.51       .69      5.00    119.03    280.00          .69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1213E+02 EXCESS= .0000E+00 OUTFLOW= .1213E+02 BASIN STORAGE= .5798E-07 PERCENT ERROR=     .0

          FOR STORM = 3  STORM AREA (SQ MI) =        2.80
           RR024F  MANE          .77     81.41    286.82       .49      5.00     80.76    285.00          .49

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8687E+01 EXCESS= .0000E+00 OUTFLOW= .8688E+01 BASIN STORAGE= .5078E-07 PERCENT ERROR=     .0

          FOR STORM = 4  STORM AREA (SQ MI) =       16.00
           RR024F  MANE          .99     36.18    261.93       .30      5.00     36.14    260.00          .30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5293E+01 EXCESS= .0000E+00 OUTFLOW= .5294E+01 BASIN STORAGE= .5855E-07 PERCENT ERROR=     .0

          FOR STORM = 5  STORM AREA (SQ MI) =       90.00
           RR024F  MANE         1.10     22.64    262.21       .24      5.00     22.54    260.00          .24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4179E+01 EXCESS= .0000E+00 OUTFLOW= .4179E+01 BASIN STORAGE= .6706E-07 PERCENT ERROR=     .0

          FOR STORM = 6  STORM AREA (SQ MI) =      500.00
           RR024F  MANE         1.22     13.09    267.89       .17      5.00     13.06    270.00          .17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2905E+01 EXCESS= .0000E+00 OUTFLOW= .2906E+01 BASIN STORAGE= .5543E-07 PERCENT ERROR=     .0

          FOR STORM = 1  STORM AREA (SQ MI) =         .01
           RR4446  MANE          .65     99.86    256.13       .90      5.00     98.76    255.00          .90

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8626E+01 EXCESS= .0000E+00 OUTFLOW= .8627E+01 BASIN STORAGE= .2459E-10 PERCENT ERROR=     .0

          FOR STORM = 2  STORM AREA (SQ MI) =         .50
           RR4446  MANE          .66     99.15    256.30       .89      5.00     97.90    255.00          .89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8554E+01 EXCESS= .0000E+00 OUTFLOW= .8556E+01 BASIN STORAGE= .2653E-10 PERCENT ERROR=     .0

          FOR STORM = 3  STORM AREA (SQ MI) =        2.80
           RR4446  MANE          .73     59.70    261.50       .71      5.00     59.56    260.00          .71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6771E+01 EXCESS= .0000E+00 OUTFLOW= .6772E+01 BASIN STORAGE= .2585E-10 PERCENT ERROR=     .0

          FOR STORM = 4  STORM AREA (SQ MI) =       16.00
           RR4446  MANE          .76     40.60    261.56       .57      5.00     40.52    260.00          .57

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5505E+01 EXCESS= .0000E+00 OUTFLOW= .5505E+01 BASIN STORAGE= .2342E-10 PERCENT ERROR=     .0

          FOR STORM = 5  STORM AREA (SQ MI) =       90.00
           RR4446  MANE          .90     22.90    261.78       .43      5.00     22.80    260.00          .43

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4143E+01 EXCESS= .0000E+00 OUTFLOW= .4143E+01 BASIN STORAGE= .2436E-10 PERCENT ERROR=     .0

          FOR STORM = 6  STORM AREA (SQ MI) =      500.00
           RR4446  MANE          .96     13.16    267.29       .30      5.00     13.14    270.00          .30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2879E+01 EXCESS= .0000E+00 OUTFLOW= .2879E+01 BASIN STORAGE= .2674E-10 PERCENT ERROR=     .0

          FOR STORM = 1  STORM AREA (SQ MI) =         .01
           RR3646  MANE          .35    150.03    265.58      1.11      5.00    149.45    265.00         1.11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1423E+02 EXCESS= .0000E+00 OUTFLOW= .1423E+02 BASIN STORAGE= .2021E-11 PERCENT ERROR=     .0

          FOR STORM = 2  STORM AREA (SQ MI) =         .50
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .2337E+02 EXCESS= .0000E+00 OUTFLOW= .2338E+02 BASIN STORAGE= .1796E-08 PERCENT ERROR= .0

FOR STORM = 5 STORM AREA (SQ MI) = 90.00
RR4748 MANE 1.28 92.41 271.97 .55 5.00 92.34 270.00 .55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1782E+02 EXCESS= .0000E+00 OUTFLOW= .1782E+02 BASIN STORAGE= .7704E-08 PERCENT ERROR= .0

FOR STORM = 6 STORM AREA (SQ MI) = 500.00
RR4748 MANE 1.33 54.53 277.84 .38 5.00 54.38 275.00 .38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1239E+02 EXCESS= .0000E+00 OUTFLOW= .1239E+02 BASIN STORAGE= .3394E-08 PERCENT ERROR= .0

FOR STORM = 1 STORM AREA (SQ MI) = .01
RR037D MANE 1.15 154.24 307.13 1.01 5.00 154.20 305.00 1.01

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3785E+02 EXCESS= .0000E+00 OUTFLOW= .3784E+02 BASIN STORAGE= .6735E-02 PERCENT ERROR= .0

FOR STORM = 2 STORM AREA (SQ MI) = .50
RR037D MANE 1.15 153.86 307.26 1.00 5.00 153.83 305.00 1.00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3751E+02 EXCESS= .0000E+00 OUTFLOW= .3750E+02 BASIN STORAGE= .6731E-02 PERCENT ERROR= .0

FOR STORM = 3 STORM AREA (SQ MI) = 2.80
RR037D MANE 1.20 118.14 311.92 .78 5.00 118.09 310.00 .78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2914E+02 EXCESS= .0000E+00 OUTFLOW= .2913E+02 BASIN STORAGE= .6690E-02 PERCENT ERROR= .0

FOR STORM = 4 STORM AREA (SQ MI) = 16.00
RR037D MANE 1.22 99.34 312.25 .62 5.00 99.33 310.00 .62

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2324E+02 EXCESS= .0000E+00 OUTFLOW= .2324E+02 BASIN STORAGE= .6653E-02 PERCENT ERROR= .0

FOR STORM = 5 STORM AREA (SQ MI) = 90.00
RR037D MANE 1.42 66.90 316.43 .45 5.00 66.89 315.00 .45

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1697E+02 EXCESS= .0000E+00 OUTFLOW= .1696E+02 BASIN STORAGE= .6630E-02 PERCENT ERROR= .0

FOR STORM = 6 STORM AREA (SQ MI) = 500.00
RR037D MANE 1.57 40.69 323.54 .30 5.00 40.67 325.00 .30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1103E+02 EXCESS= .0000E+00 OUTFLOW= .1102E+02 BASIN STORAGE= .6592E-02 PERCENT ERROR= .0

FOR STORM = 1 STORM AREA (SQ MI) = .01
RR049C MANE .45 61.04 245.47 1.76 5.00 60.59 245.00 1.76

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3749E+01 EXCESS= .0000E+00 OUTFLOW= .3749E+01 BASIN STORAGE= .4277E-12 PERCENT ERROR= .0

FOR STORM = 2 STORM AREA (SQ MI) = .50
RR049C MANE .44 60.59 245.66 1.75 5.00 60.13 245.00 1.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3723E+01 EXCESS= .0000E+00 OUTFLOW= .3723E+01 BASIN STORAGE= .4293E-12 PERCENT ERROR= .0

FOR STORM = 3 STORM AREA (SQ MI) = 2.80
RR049C MANE .44 37.38 245.54 1.66 5.00 37.25 245.00 1.66

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3543E+01 EXCESS= .0000E+00 OUTFLOW= .3543E+01 BASIN STORAGE= .4413E-12 PERCENT ERROR= .0

FOR STORM = 4 STORM AREA (SQ MI) = 16.00
RR049C MANE .44 28.53 245.56 1.53 5.00 28.43 245.00 1.54

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3274E+01 EXCESS= .0000E+00 OUTFLOW= .3274E+01 BASIN STORAGE= .4372E-12 PERCENT ERROR= .0

FOR STORM = 5 STORM AREA (SQ MI) = 90.00
RR049C MANE .36 19.48 245.75 1.32 5.00 19.38 245.00 1.32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2814E+01 EXCESS= .0000E+00 OUTFLOW= .2814E+01 BASIN STORAGE= .4312E-12 PERCENT ERROR= .0

FOR STORM = 6 STORM AREA (SQ MI) = 500.00
RR049C MANE .56 10.27 255.13 .92 5.00 10.27 255.00 .92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1965E+01 EXCESS= .0000E+00 OUTFLOW= .1965E+01 BASIN STORAGE= .4366E-12 PERCENT ERROR= .0

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          FOR STORM = 3  STORM AREA (SQ MI) =       2.80
            RR061C  MANE          .85     68.00    242.11       1.05       5.00      68.00    245.00          1.05

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .6709E+01 EXCESS= .0000E+00 OUTFLOW= .6710E+01 BASIN STORAGE= .3285E-10 PERCENT ERROR=     .0

          FOR STORM = 4  STORM AREA (SQ MI) =      16.00
            RR061C  MANE          .91     55.21    247.25        .93       5.00      55.08    250.00           .93

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .5939E+01 EXCESS= .0000E+00 OUTFLOW= .5939E+01 BASIN STORAGE= .3249E-10 PERCENT ERROR=     .0

          FOR STORM = 5  STORM AREA (SQ MI) =      90.00
            RR061C  MANE          .95     32.22    251.16        .74       5.00      32.20    250.00           .74

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .4761E+01 EXCESS= .0000E+00 OUTFLOW= .4762E+01 BASIN STORAGE= .3406E-10 PERCENT ERROR=     .0

          FOR STORM = 6  STORM AREA (SQ MI) =     500.00
            RR061C  MANE         1.16     17.15    256.66        .52       5.00      17.11    255.00           .52

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .3316E+01 EXCESS= .0000E+00 OUTFLOW= .3316E+01 BASIN STORAGE= .3313E-10 PERCENT ERROR=     .0

1                          SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LP019
                        (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

     PLAN  1 ...............              INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                              ELEVATION       1426.70          1432.00          1432.00
                              STORAGE              0.               34.              34.
                              OUTFLOW              0.              560.             560.

                RATIO    MAXIMUM      MAXIMUM     MAXIMUM     MAXIMUM    DURATION     TIME OF      TIME OF
                 OF     RESERVOIR      DEPTH      STORAGE     OUTFLOW    OVER TOP   MAX OUTFLOW    FAILURE
                 PMF     W.S.ELEV    OVER DAM      AC-FT        CFS       HOURS        HOURS        HOURS

                1.00     1430.20        .00          19.        360.        .00         4.58          .00

     PLAN  2 ...............              INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                              ELEVATION       1426.70          1432.00          1432.00
                              STORAGE              0.               34.              34.
                              OUTFLOW              0.              560.             560.

                RATIO    MAXIMUM      MAXIMUM     MAXIMUM     MAXIMUM    DURATION     TIME OF      TIME OF
                 OF     RESERVOIR      DEPTH      STORAGE     OUTFLOW    OVER TOP   MAX OUTFLOW    FAILURE
                 PMF     W.S.ELEV    OVER DAM      AC-FT        CFS       HOURS        HOURS        HOURS

                1.00     1430.18        .00          18.        358.        .00         4.58          .00

     PLAN  3 ...............              INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                              ELEVATION       1426.70          1432.00          1432.00
                              STORAGE              0.               34.              34.
                              OUTFLOW              0.              560.             560.

                RATIO    MAXIMUM      MAXIMUM     MAXIMUM     MAXIMUM    DURATION     TIME OF      TIME OF
                 OF     RESERVOIR      DEPTH      STORAGE     OUTFLOW    OVER TOP   MAX OUTFLOW    FAILURE
                 PMF     W.S.ELEV    OVER DAM      AC-FT        CFS       HOURS        HOURS        HOURS

                1.00     1429.54        .00          14.        285.        .00         4.67          .00

     PLAN  4 ...............              INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                              ELEVATION       1426.70          1432.00          1432.00
                              STORAGE              0.               34.              34.
                              OUTFLOW              0.              560.             560.

                RATIO    MAXIMUM      MAXIMUM     MAXIMUM     MAXIMUM    DURATION     TIME OF      TIME OF
                 OF     RESERVOIR      DEPTH      STORAGE     OUTFLOW    OVER TOP   MAX OUTFLOW    FAILURE
                 PMF     W.S.ELEV    OVER DAM      AC-FT        CFS       HOURS        HOURS        HOURS

                1.00     1429.02        .00          10.        222.        .00         4.67          .00

     PLAN  5 ...............              INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                              ELEVATION       1426.70          1432.00          1432.00
                              STORAGE              0.               34.              34.
                              OUTFLOW              0.              560.             560.

                RATIO    MAXIMUM      MAXIMUM     MAXIMUM     MAXIMUM    DURATION     TIME OF      TIME OF
                 OF     RESERVOIR      DEPTH      STORAGE     OUTFLOW    OVER TOP   MAX OUTFLOW    FAILURE
                 PMF     W.S.ELEV    OVER DAM      AC-FT        CFS       HOURS        HOURS        HOURS

                1.00     1428.47        .00           7.        146.        .00         4.75          .00

     PLAN  6 ...............              INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                              ELEVATION       1426.70          1432.00          1432.00
                              STORAGE              0.               34.              34.
```

100-Year, 6-Hour HEC-1 Model (15586C.txt)

```
1******************************************                    ****************************************
 *                                        *                    *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *                    *   U.S. ARMY CORPS OF ENGINEERS       *
 *              JUN   1998                *                    *   HYDROLOGIC ENGINEERING CENTER      *
 *            VERSION 4.1                 *                    *        609 SECOND STREET             *
 *                                        *                    *     DAVIS, CALIFORNIA 95616          *
 *  RUN DATE   17OCT02  TIME  13:23:48    *                    *         (916) 756-1104               *
 *                                        *                    *                                      *
******************************************                    ****************************************
```

HEC-1 15586C.TXT
Existing Conditions
100-Yr, 6-Hr

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                    X     X  XXXXXXX   XXXXX         X
                    X     X  X        X     X       XX
                    X     X  X        X              X
                    XXXXXXX  XXXX     X      XXXXX   X
                    X     X  X        X              X
                    X     X  X        X     X        X
                    X     X  XXXXXXX   XXXXX        XXX
```

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      THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

      THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
      THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
      NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
      DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
      KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM
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      LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

        1         ID   Project ID: 15586B - Major Basin: 01 - Return Period: 100 Years
        2         ID
        3         ID        SUMMARY APPROACH, METHOD, PRECIP AND ASSUMPTION:
        4         ID        1.  100YR, 6HR RAINFALL EVENT, MULTI-STORM JD RECORD OPTION,
        5         ID            6HR DISTRIBUTION PATTERNS #1 THRU #5 WITH 15 MIN TIME INCREM
        6         ID            (FCDMC, HYDROLOGY MANUAL, TABLE 2.4)
        7         ID        2.  POINT PRECIP = 3.20 IN
        8         ID        3.  PRECIP AERIAL REDUCTION FACTOR = 1.00 BASED ON 0.01 SQ MI BASIN
        9         ID                                         = 0.994 BASED ON 0.50 SQ MI BASIN
       10         ID                                         = 0.975 BASED ON 2.80 SQ MI BASIN
       11         ID                                         = 0.922 BASED ON 16.00 SQ MI BASIN
       12         ID                                         = 0.812 BASED ON 90.00 SQ MI BASIN
       13         ID                                         = 0.570 BASED ON 500.00 SQ MI BASIN
       14         ID        4.  BASIN AREAS ADJUSTED @ KEY HYDROGRAPH COMBINATION STEPS TO REFLECT
       15         ID            AREA CORRECTED DUE TO MULTI-STORM OPTION
       16         ID        5.  FUTURE COMPLETELY DEVELOPED CONDITION LAND USE
       17         ID        6.  CLARK UNIT HYDROGRAPH WITH URBAN TIME-AREA
       18         ID        7.  GREEN-AMPT LOSS RATES
       19         ID        8.  NORMAL DEPTH STORAGE REACH ROUTING TYPICALLY USED FOR OPEN CHANNELS
       20         ID            (SEE NOTE # 10)
       21         ID        9.  KINEMATIC WAVE REACH ROUTING TYPICALLY USED FOR PIPE
       22         ID            (SEE NOTE # 10)
       23         ID        10. HYDROLOGIC ROUTING STEPS THAT COULD BE MODELED USING EITHER
       24         ID            KINEMATIC WAVE OR NORMAL DEPTH (COMBINED SURFACE AND STORM DRAIN
       25         ID            PIPE FLOW) WERE TYPICALLY MODELED USING THE PREDOMINANT FLOW
       26         ID            CHARACTERISTIC.
       27         ID        11. LEVEL POOL MODIFIED PULS STORAGE ROUTING @ REGIONAL DETENTION BASINS
       28         ID        12. NO INDIVIDUAL PRIVATE ON-LOT RETENTION/DETENTION IS REFLECTED
       29         ID        13. COMPUTATION TIME INTERVAL = 5 MINUTES
       30         ID        14. CALCULATIONS MADE WITH HEC-1, VERSION 4.1
       31         ID
       32         ID        KEY TO HYDROGRAPH OPERATIONS:
       33         ID            "SB" = GENERATE RUNOFF HYDROGRAPH FROM SUB-BASIN
       34         ID            "AD" = COMBINE HYDROGRAPHS
       35         ID            "RR" = ROUTE HYDROGRAPH THRU DOWNSTREAM REACH
       36         ID            "LP" = ROUTE HYDROGRAPH THRU LEVEL POOL STORAGE
       37         ID            "DV" = DIVERT HYDROGRAPH
       38         ID            "DR" = RETRIEVE PREVIOUSLY DIVERTED HYDROGRAPH
       39         ID
                  *DIAGRAM
       40         IT       5                 300
       41         IO       5
       42         IN      15
       43         JD    3.20    0.01
       44         PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
       45         PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
       46         PC   0.962   0.972   0.983   0.991   1.000
       47         JD   3.179    0.50
       48         JD   3.120    2.80
       49         PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
       50         PC   0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
       51         PC   0.950   0.963   0.975   0.988   1.000
       52         JD   2.950    16.0
       53         PC   0.000   0.009   0.020   0.030   0.048   0.063   0.076   0.090   0.105   0.119
       54         PC   0.135   0.152   0.175   0.222   0.304   0.472   0.670   0.796   0.868   0.912
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      LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

       55         PC   0.946   0.960   0.973   0.987   1.000
       56         JD   2.598    90.0
       57         PC   0.000   0.021   0.035   0.051   0.071   0.087   0.105   0.125   0.143   0.160
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  58          PC   0.179   0.201   0.232   0.281   0.364   0.500   0.658   0.773   0.841   0.888
  59          PC   0.927   0.945   0.964   0.982   1.000
  60          JD   1.824   500.0
  61          PC   0.000   0.024   0.043   0.059   0.078   0.098   0.119   0.141   0.162   0.186
  62          PC   0.212   0.239   0.271   0.321   0.408   0.515   0.627   0.735   0.814   0.864
  63          PC   0.907   0.930   0.954   0.977   1.000

  64          KK   SB009   BASIN
  65          KM           CP @ GREENWAY-HAYDEN LOOP & PARADISE LN
  66          BA   0.060
  67          LG    0.10    0.25    4.65    0.38      80
  68          UC   0.504   0.486
  69          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  70          UA     100

  71          KK   DV009   SPLIT FLOW. DQ IS BASED ON CAPACITY OF 80TH ST SD TRUNK CONSISTING
  72          KM           OF 1-36IN DIA RCP @ S=0.0119 FT/FT. HYDROGRAPH ASSOC WITH DQ (DR009)
  73          KM           WILL BE RECALLED LATER IN MODEL AND ROUTED SOUTH IN 80TH ST STORM
  74          KM           DRAIN. REMAINDER FLOW (DV009) ROUTED DOWN GREENWAY-HAYDEN LOOP
  75          KM           THRU SB010.
  76          DT   DR009
  77          DI       0      25      50      73     100     200     300
  78          DQ       0      25      50      73      73      73      73

  79          KK   RR010   ROUTE   REACH
  80          KM           ROUTE HYDROGRAPH DV009 THRU REACH RR010, GREENWAY-HAYDEN STREET SECT
  81          RS       4    FLOW       0
  82          RC   0.025   0.016   0.025    3300  0.0090    0.00
  83          RX     0.0     0.1    10.0    10.1    79.0    79.1    89.0    89.1
  84          RY   103.0   100.5   100.5   100.3   100.3   100.5   100.5   103.0

  85          KK   SB010   BASIN
  86          KM           CP @ GREENWAY-HAYDEN SUMP JUST EAST OF 76TH ST.
  87          KM           DRAINAGE AREA REFLECTS TOTAL SB010 AREA (0.36 SQ MI) LESS THE
  88          KM           THAT PART OF SB010 NORTH OF PARADISE LANE (0.20 SQ MI). THE AREA
  89          KM           NORTH OF PARADISE LANE IS CONSIDERED NON-CONTRIBUTING BECAUSE IT HAS
  90          KM           DETENTION PROVIDED IN LARGE, CENTRALIZED BASINS PROTECTED BY
  91          KM           DRAINAGE EASEMENTS. Tc AND R VALUES ARE BASED ON TOTAL DRAINAGE AREA.
  92          BA   0.160
  93          LG    0.12    0.25    4.65    0.38      71
  94          UC   0.308   0.166
  95          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  96          UA     100

  97          KK   AD010   COMBINE HYDROGRAPHS RR010 AND SB010
  98          HC       2    0.17
1                                             HEC-1 INPUT                                            PAGE 3

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


  99          KK   DV010   SPLIT FLOW. REMAINDER FLOW (DV010) IS BASED ON CAPACITY OF SD TRUNK
 100          KM           DRAINING WEST IN GREENWAY-HAYDEN LOOP CONSISTING OF 1-42 IN RCP
 101          KM           @ S=0.0028FT/FT (FROM SD PLANS).  DIVERTED FLOW ASSOC WITH DQ (DR010)
 102          KM           OVERFLOWS SUMP AND GOES SOUTH ON 76TH ST TO GREENWAY RD
 103          DT   DR010
 104          DI       0      50     100     150     200     300     400     500
 105          DQ       0       0      43      93     143     243     343     443

 106          KK  RR011A
 107          KM           ROUTE HYDROGRAPH DV010 THRU REACH RR011A, 48IN DIA SD IN G-H LOOP
 108          RK    2400   .0016    .013            CIRC       4

 109          KK   SB011   BASIN
 110          KM           CP @ GREENWAY-HAYDEN LOOP AND SCOTTSDALE RD
 111          BA   0.220
 112          LG    0.12    0.25    4.65    0.38      71
 113          UC   0.288   0.186
 114          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 115          UA     100

 116          KK  AD011A   COMBINE HYDROGRAPHS RR011A AND SB011
 117          HC       2    0.24

 118          KK   SB012   BASIN
 119          KM           CP @ GREENWAY RD AND 78TH ST
 120          BA   0.200
 121          LG    0.15    0.25    4.65    0.38      60
 122          UC   0.263   0.185
 123          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 124          UA     100
              * THE FOLLOWING STEP DE-ACTIVATED FOR 100 YEAR MODEL BECAUSE 80TH ST STORM DRAIN
              * IS ALREADY AT MAX CAPACITY FROM DV009 STEP
              * KK DV012   SPLIT FLOW. DIVERTED FLOW ASSOC WITH DQ IS BASED ON CAPACITY OF
              * KM         CB @ MCCLAIN DR (AKA CAROL ANN LN) NEAR 78TH ST AND CB @ SOUTH
              * KM         END OF 80TH ST CULDESAC WHICH DRAIN TO 80TH ST STORM DRAIN.
              * KM         REMAINDER FLOW ASSOC WITH DV012 CONCENTRATES @ GREENWAY AND 78TH ST
              * DT DR012
              * DI     0       5      10      17      50     100     300     500
              * DQ     0       5      10      17      17      17      17      17

 125          KK  RR013A   ROUTE   REACH
 126          KM           ROUTE HYDROGRAPH SB012 THRU REACH RR013A, GREENWAY RD STREET SECTION
 127          RS       1    FLOW       0
 128          RC   0.025   0.016   0.025    1250  0.0020    0.00
 129          RX     0.0     5.0     5.1    26.0    46.9    47.0    52.0    52.1
 130          RY   100.0   100.5   100.0   100.5   101.0   101.5   101.5   105.0

 131          KK   SB013   BASIN
 132          KM           CP @ 76TH ST AND GREENWAY RD
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     133           BA   0.040
     134           LG    0.15    0.25    4.65    0.38      60
     135           UC   0.158   0.114
     136           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
     137           UA     100
1                                          HEC-1 INPUT                                            PAGE  4

  LINE             ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


     138           KK  AD013A   COMBINE HYDROGRAPHS RR013A AND SB013
     139           HC       2    0.24

     140           KK   DR010   RETRIEVE PREVIOUSLY SPLIT HYDROGRAPH ASSOC WITH GREENWAY-HAYDEN LOOP
     141           KM           SUMP OVERFLOW TO 76TH ST SOUTH
     142           DR   DR010

     143           KK  RR013B   ROUTE   REACH
     144           KM           ROUTE HYDROGRAPH DR010 THRU REACH RR013B, 76TH ST TO GREENWAY RD
     145           RS       1    FLOW       0
     146           RC   0.025   0.016   0.025     550  0.0090    0.00
     147           RX     0.0     0.1     5.0     5.1    44.9    45.0    50.0    50.1
     148           RY   103.0   100.5   100.5   100.1   100.1   100.5   100.5   103.0

     149           KK  AD013B   COMBINE HYDROGRAPHS AD013A AND RR013B
     150           HC       2    0.39

     151           KK   DV013   SPLIT FLOW. REMAINDER FLOW (DV013) IS BASED ON CAPACITY OF GREENWAY
     152           KM           ROAD STREET SECTION (RR013A) AND 33IN SD PIPE FLOWING FULL.  DV013
     153           KM           FLOWS WEST DOWN GREENWAY RD (RR014).  DIVERTED FLOW (DR013) SPILLS
     154           KM           OVER SOUTH SIDE OF GREENWAY ROAD AND IS ROUTED THRU SB019 TO AIRPORT
     155           KM           DETENTION BASIN.
     156           DT   DR013
     157           DI       0     850    1500    2000
     158           DQ       0     783    1433    1933

     159           KK   RR014   ROUTE   REACH
     160           KM           ROUTE HYDROGRAPH AD013 THRU REACH RR014, GREENWAY RD STREET SECTION
     161           KM           TO SUMP AT 73RD ST
     162           RS       1    FLOW       0
     163           RC   0.025   0.016   0.025    1500  0.0020    0.00
     164           RX     0.0     0.1     7.0     7.1    48.9    49.0    54.0    54.1
     165           RY   105.0   102.0   100.5   100.0   101.0   101.5   101.5   105.0

     166           KK   SB014   BASIN
     167           KM           CP @ 73RD ST AND GREENWAY RD
     168           BA   0.030
     169           LG    0.15    0.25    4.65    0.38      60
     170           UC   0.254   0.215
     171           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
     172           UA     100

     173           KK   AD014   COMBINE HYDROGRAPHS RR014 AND SB014
     174           HC       2    0.06
                   * THE FOLLOWING DIVERT AND ROUTING STEPS ARE DE-ACTIVATED IN THIS MODEL BECAUSE
                   * THE PRIMARY OVERFLOW OF THE SUMP IS DIRECTLY WEST TO SCOTTSDALE ROAD.
                   * KK DV014   SPLIT FLOW. REMAINDER FLOW ASSOC WITH DV014 BASED ON CAPACITY OF
                   * KM         36IN STORM DRAIN GOING WEST TOWARD G-H LOOP @ S=0.0020 (FROM SD
                   * KM         PLANS). DIVERTED FLOW ASSOC WITH DQ (DR014) OVERFLOWS SUMP AND
                   * KM         GOES SOUTH IN 73RD ST TOWARD BUTHERUS.
                   * DT DR014
                   * DI     0      30      60     100     200     400     600
                   * DQ     0       0      30      70     170     370     470
                   * KKRR011B
                   * KM         ROUTE HYDROGRAPH DV014 THRU REACH RR011B, 36IN DIA SD PIPE
                   * RK   477    .002    .013            CIRC       3
1                                          HEC-1 INPUT                                            PAGE  5

  LINE             ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


     175           KK  RR011B   ROUTE   REACH
     176           KM           ROUTE HYDROGRAPH AD014 THRU REACH RR011B, LANDSCAPED SWALE JUST SOUTH
     177           KM           OF GREENWAY-HAYDEN LOOP
     178           RS       1    FLOW       0
     179           RC   0.030   0.030   0.030     500  0.0050    0.00
     180           RX     0.0     0.1    10.0    22.0    52.0    64.0    74.0    74.1
     181           RY   105.0   102.0   102.0   100.0   100.0   102.0   102.0   105.0

     182           KK  AD011B   COMBINE HYDROGRAPHS AD011A AND RR011B
     183           KM           TOTAL Q @ GREENWAY-HAYDEN AND SCOTTSDALE RD FROM NORTH AND EAST
     184           HC       2    0.30

     185           KK  RR015A   ROUTE   REACH
     186           KM           ROUTE HYDROGRAPH AD011B THRU REACH RR015A, SDALE RD STREET SECTION
     187           KM           FROM GREENWAY-HAYDEN LOOP TO BUTHERUS. STORM DRAIN DISREGARDED.
     188           RS       1    FLOW       0
     189           RC   0.025   0.016   0.025    1000  0.0068    0.00
     190           RX     0.0     0.1    10.5    10.6    98.5    98.6   103.5   103.6
     191           RY   103.0   100.5   100.5   100.3   100.3   100.5   100.5   103.0
                   * THE FOLLOWING DIVERT RETRIEVAL AND ADDITION STEPS ARE DE-ACTIVATED IN THIS
                   * MODEL ALONG WITH THE PREVIOUS DV014 STEP
                   * KK DR014   RETRIEVE PREVIOUSLY SPLIT HYDROGRAPH ASSOC WITH GREENWAY ROAD/73RD
                   * KM         SUMP OVERFLOW SOUTH ON 73RD ST
                   * DR DR014
                   * KKRR015B   ROUTE   REACH
                   * KM         ROUTE HYDROGRAPH DR014 THRU REACH RR015B, 73RD ST TO BUTHERUS TO
                   * KM         SCOTTSDALE RD - - STREET SECTION (HYDRAULIC APPROXIMATED BASED ON
                   * KM         RR013A)
                   * RS     1    FLOW       0
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                * RC 0.025   0.016   0.025    4150   0.011    0.00
                * RX   0.0     7.0     7.1    28.0    48.9    49.0    54.5    54.6
                * RY 102.5   101.0   100.4   100.0   100.4   101.0   101.0   102.5
                * KKAD015A   COMBINE HYDROGRAPHS RR015A AND RR015B
                * HC     2

 192            KK  RR015B   ROUTE   REACH
 193            KM           ROUTE HYDROGRAPH RR015A THRU REACH RR015B, SDALE RD STREET SECTION
 194            KM           FROM BUTHERUS TO TBIRD. STORM DRAIN DISREGARDED.
 195            RS       1    FLOW       0
 196            RC   0.025   0.016   0.025    4150  0.0110    0.00
 197            RX     0.0     0.1    10.5    10.6    98.5    98.6   103.5   103.6
 198            RY   103.0   100.5   100.5   100.3   100.3   100.5   100.5   103.0

 199            KK   SB015   BASIN
 200            KM           CP @ CONFL OF SDALE RD CHANNEL AND AIRPORT DET BASIN OUTFALL CHANNEL
 201            KM           JUST SOUTH OF THUNDERBIRD ROAD
 202            BA   0.250
 203            LG    0.16    0.25    4.65    0.37      60
 204            UC   0.333   0.273
 205            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 206            UA     100
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LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 207            KK  AD015A   COMBINE HYDROGRAPHS RR015B AND SB015, TOTAL Q FROM NORTH
 208            HC       2    0.55

 209            KK   SB016   BASIN
 210            KM           CP @ 2-30IN SD PIPE OUTFALL FROM AIRPORT TO HAYDEN RD CHANNEL
 211            BA   0.090
 212            LG    0.20    0.25    4.65    0.27      60
 213            UC   0.250   0.225
 214            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 215            UA     100

 216            KK   DV016   SPLIT FLOW. DQ IS BASED ON CAPACITY OF 2-30IN SD PIPES @ ASSUMED
 217            KM           S=0.005 FT/FT.  HYDROGRAPH ASSOC WITH DQ (DR016) LEAVES STUDY AREA
 218            KM           AND FLOWS TO HAYDEN CHANNEL.  REMAINDER FLOW (DV016) ROUTED THRU
 219            KM           AIRPORT (RR017) TO SOUTHWEST.
 220            DT   DR016
 221            DI       0      25      58     100     200     300
 222            DQ       0      25      58      58      58      58

 223            KK   RR017   ROUTE   REACH
 224            KM           ROUTE HYDROGRAPH DV016 THRU REACH RR017, OVERLAND THRU AIRPORT
 225            KM           CROSS-SECTION REFLECTS NORTH AND SOUTH DRAINAGE SWALES ALONG RUNWAY
 226            RS       3    FLOW       0
 227            RC   0.025   0.025   0.025    2400  0.0120    0.00
 228            RX     0.0     0.1    25.0    50.0   100.0   150.0   299.9   300.0
 229            RY   455.0   451.5   451.5   451.5   451.5   451.5   451.5   455.0

 230            KK   SB017   BASIN
 231            KM           CP @ OUTFALL OF 1-60IN SD PIPE
 232            BA   0.090
 233            LG    0.20    0.25    4.65    0.27      60
 234            UC   0.200   0.152
 235            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 236            UA     100

 237            KK   DR009   RETRIEVE PREVIOUSLY SPLIT HYDROGRAPH ASSOC WITH 80TH ST STORM DRAIN
 238            DR   DR009

 239            KK  RR012A
 240            KM           ROUTE HYDROGRAPH DR009 THRU REACH RR012A, 36IN DIA SD IN 80TH ST
 241            KM           SOUTH FROM PARADISE LANE
 242            RK    2000   .0122    .013            CIRC       3
                * THE FOLLOWING STEPS DE-ACTIVATED FOR 100 YEAR MODEL BECAUSE 80TH ST STORM
                * DRAIN IS ALREADY AT MAX CAPACITY FROM DV009 STEP
                * KK DR012   RETRIEVE PREVIOUSLY SPLIT HYDROGRAPH ASSOC WITH CATCH BASIN
                * KM         CAPACITY ON MCCLAIN AND ON 80TH ST
                * DR DR012
                * KK AD012   COMBINE HYDROGRAPHS RR012A AND DR012, TOTAL Q SOUTH IN 80TH ST SD
                * HC     2
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LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 243            KK  RR1217
 244            KM           ROUTE HYDROGRAPH DR010 THRU REACH RR1217, 36IN DIA SD PIPE
 245            RK    3200    .006   0.013            CIRC     3.0

 246            KK   AD017   COMBINE HYDROGRAPHS RR017, SB017 AND RR1217
 247            HC       3    0.23

 248            KK   DV017   SPLIT FLOW. DQ IS BASED ON CAPACITY OF 1-60IN SD PIPE @ ASSUMED
 249            KM           S=0.005 FT/FT. HYDROGRAPH ASSOC WITH DQ (DR017) LEAVES STUDY AREA
 250            KM           AND FLOWS TO HAYDEN CHANNEL. REMAINDER FLOW (DV017) ROUTED THRU
 251            KM           AIRPORT (RR018) TO SOUTHWEST.
 252            DT   DR017
 253            DI       0      50     100     200     300     400     500     600    1000
 254            DQ       0      50     100     184     184     184     184     184     184

 255            KK   RR018   ROUTE   REACH
 256            KM           ROUTE HYDROGRAPH DV017 THRU REACH RR018, OVERLAND THRU AIRPORT
 257            KM           CROSS-SECTION REFLECTS NORTH AND SOUTH DRAINAGE SWALES ALONG RUNWAY
 258            RS       6    FLOW       0
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 259            RC   0.025   0.025   0.025    3400  0.0100    0.00
 260            RX     0.0     0.1    25.0    50.0   100.0   150.0   299.9   300.0
 261            RY   455.0   451.5   451.5   451.5   451.5   451.5   451.5   455.0

 262            KK   SB018   BASIN
 263            KM           CP @ NORTHEAST SIDE OF AIRPORT DETENTION BASIN
 264            BA   0.150
 265            LG    0.20    0.25    4.65    0.27      60
 266            UC   0.304   0.214
 267            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 268            UA     100

 269            KK   AD018   COMBINE HYDROGRAPHS RR018 AND SB018
 270            KM           TOTAL Q ENTERING AIRPORT DETENTION BASIN FROM NORTHEAST
 271            HC       2    0.38

 272            KK   SB019   BASIN
 273            KM           CP @ AIRPORT DETENTION BASIN, INCLUDING DET BASIN
 274            BA   0.190
 275            LG    0.16    0.25    4.65    0.36      60
 276            UC   0.354   0.341
 277            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 278            UA     100

 279            KK   DR013   RETRIEVE GREENWAY ROAD DIVERTED FLOW
 280            DR   DR013

 281            KK  RR019A   ROUTE   REACH
 282            KM           ROUTE HYDROGRAPH DR013 THRU REACH RR019A
 283            KM           75TH STREET ROUTING SECTION
 284            RS       1    FLOW       0
 285            RC   0.020   0.016   0.020    1800  0.0080    0.00
 286            RX     0.0     0.1     5.0     5.1    44.9    45.0    50.0    50.1
 287            RY   104.0   100.5   100.5   100.3   100.3   100.5   100.5   104.0
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 288            KK  RR019B   ROUTE   REACH
 289            KM           ROUTE HYDROGRAPH RR019A THRU REACH RR019B
 290            KM           AIRPORT DRIVE ROUTING SECTION TO SDALE AIRPORT DETENTION BASIN
 291            RS       2    FLOW       0
 292            RC   0.020   0.016   0.020    3700  0.0070    0.00
 293            RX     0.0     0.1     5.0     5.1    32.9    33.0    38.0    38.1
 294            RY   103.0   100.8   100.8   100.3   100.3   100.8   100.8   103.0

 295            KK   AD019   COMBINE HYDROGRAPHS AD018, SB019 AND RR019B
 296            KM           TOTAL Q ENTERING AIRPORT DETENTION BASIN
 297            HC       3    0.93

 298            KK   LP019   ROUTE AD019 FLOW THRU EXIST AIRPORT DET BASIN
 299            KM           PRIMARY OUTLET CONSISTS OF 2-10'X3' RCB CULVERTS.  INLET CONTROL
 300            KM           IS ASSUMED.  OVERFLOW OCCURS AT EL. 1432 FT.
 301            RS       1    STOR       0
 302            SV       0     0.2     3.7     9.9    17.1    25.0    33.6    42.9
 303            SQ       0      20      80     220     340     440     560     640
 304            SE  1426.7    1427    1428    1429    1430    1431    1432    1433
 305            ST    1432   378.8       3     1.5
 306            SW       0    60.4   247.2   378.8
 307            SE    1433    1432    1432    1433

 308            KK  RR015C   ROUTE   REACH
 309            KM           ROUTE HYDROGRAPH LP019 THRU REACH RR015C, TRAP CHANNEL TO SDALE RD
 310            RS       1    FLOW       0
 311            RC   0.025   0.018   0.025    1200  0.0040    0.00
 312            RX     0.0     0.1     5.0    13.0    22.0    30.0    35.0    35.1
 313            RY   106.0   104.0   104.0   100.0   100.0   104.0   104.0   106.0

 314            KK  AD015B   COMBINE HYDROGRAPHS AD015A AND RR015C, TOTAL Q @ SDALE RD CHANNEL
 315            HC       2    1.48

 316            KK  RR020A   ROUTE   REACH
 317            KM           ROUTE HYDROGRAPH AD015B THRU REACH RR020A
 318            KM           SDALE RD LANDSCAPED CHANNEL TO SUTTON DR
 319            RS       1    FLOW       0
 320            RC   0.030   0.018   0.016     700  0.0100    0.00
 321            RX     0.0     0.1    21.8    46.7    77.2    95.9   204.9   205.0
 322            RY   430.0   425.0   424.3   419.8   419.7   424.8   424.8   430.0

 323            KK  RR020B   ROUTE   REACH
 324            KM           ROUTE HYDROGRAPH RR020A THRU REACH RR020B
 325            KM           GABION AND CONC LINED CHANNEL, SUTTON DR TO SWEETWATER
 326            RS       1    FLOW       0
 327            RC   0.030   0.018   0.016    1400  0.0050    0.00
 328            RX     0.0     0.1    14.0    18.0    35.5    41.0   128.0   128.1
 329            RY   105.0   103.5   103.0   100.5   100.5   103.3   103.3   105.0
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 330            KK  RR020C
 331            KM           ROUTE HYDROGRAPH RR020B THRU REACH RR020C
 332            KM           PREDOMINANT CONVEYANCE IS 90IN DIA SD PIPE ALONG SDALE RD WITH
 333            KM           OUTFALL TO CACTUS PARK BASIN
 334            RK    1480    .006    .013            CIRC     7.5

 335            KK  DV20A1   SPLIT FLOW. REMAINDER FLOW IS BASED ON CAPACITY OF 1-90IN SD PIPE
 336            KM           @ S=0.0056FT/FT DISCHARGING INTO CACTUS PARK BASIN. HYDROGRAPH ASSOC
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 337       KM          WITH DQ (DR20A1) REMAINS IN SCOTTSDALE RD STREET SECTION, PART OF
 338       KM          WHICH BYPASSES CACTUS PARK BASIN AND CONTINUING SOUTH ON SDALE ROAD.
 339       DT  DR20A1
 340       DI       0    100     500    1000    1500
 341       DQ       0      0       0     425     925

 342       KK  SB020A  BASIN
 343       KM          CP @ NW CORNER CACTUS PARK DETENTION BASIN
 344       BA   0.060
 345       LG    0.18   0.25    4.65    0.38      55
 346       UC   0.338  0.552
 347       UA       0    5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 348       UA     100

 349       KK  DR20A1  RETRIEVE PREVIOUSLY SPLIT HYDROGRAPH ASSOC WITH SCOTTSDALE RD
 350       KM          STREET SECTION CONVEYANCE
 351       DR  DR20A1

 352       KK  DV20A2  SPLIT SDALE RD SURFACE FLOW 50/50 TO REFLECT FLOW ON EAST SIDE OF
 353       KM          SDALE RD ENTERING PARK.  SPLIT FLOW (DQ) IS ROUTED DOWN SDALE RD TO
 354       KM          SUMP NORTH OF MESCAL. REMAINDER FLOW ENTERS CACTUS PARK.
 355       DT  DR20A2
 356       DI       0    100     500    1000    2000
 357       DQ       0     50     250     500    1000

 358       KK  AD020A  COMBINE HYDROGRAPHS DV20A1, SB020A AND DV20A2
 359       KM          TOTAL Q ENTERING CACTUS PARK DETENTION BASIN FROM SCOTTSDALE ROAD
 360       HC       3   1.10

 361       KK   SB021  BASIN
 362       KM          CP @ TBIRD INDUSTRIAL DET BASIN
 363       BA   0.140
 364       LG    0.15   0.25    4.65    0.38      60
 365       UC   0.246  0.176
 366       UA       0    5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 367       UA     100

 368       KK   LP021  ROUTE FLOW THRU TBIRD INDUSTRIAL DET BASIN
 369       KM          PRIMARY OUTLET CONSISTS OF 18IN SD PIPE WITH 12IN DIA ORIFICE PLATE
 370       KM          OVERFLOW CONSISTS OF TBIRD RD @ 76TH ST ACTING AS BROAD CRESTED WIER
 371       KM       0
 372       RS       1   STOR       0
 373       SV       0   1.65    4.38    6.03
 374       SQ       0      5       7     458
 375       SE  1426.0 1428.0  1430.0  1431.0
1                                       HEC-1 INPUT                                            PAGE 10

LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 376       KK   RR022  ROUTE   REACH
 377       KM          ROUTE HYDROGRAPH LP021 THRU REACH RR022, 76TH ST
 378       KM          DISREGARD 18IN DIAM SD
 379       RS       2   FLOW       0
 380       RC   0.030  0.030   0.016    2800  0.0090    0.00
 381       RX     0.0    0.1     5.0     8.5    12.0    19.0    66.0    66.1
 382       RY   105.0  102.0   102.0   101.0   100.0   102.0   102.9   105.0

 383       KK   SB022  BASIN
 384       KM          CP @ CONC CHANNEL @ 76TH ST ALIGN JUST SOUTH OF SWEETWATER AVE
 385       BA   0.240
 386       LG    0.30   0.25    4.65    0.38      24
 387       UC   0.321  0.200
 388       UA       0    5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 389       UA     100

 390       KK   AD022  COMBINE HYDROGRAPHS RR022 AND SB022
 391       HC       2   0.38

 392       KK   RR023  ROUTE   REACH
 393       KM          ROUTE HYDROGRAPH AD022 THRU REACH RR023
 394       KM          CONC TRAP CHANNEL THRU BUENAVANTE SUBD, OUTFALL TO CACTUS PARK BASIN
 395       RS       1   FLOW       0
 396       RC   0.018  0.018   0.018    2250  0.0110    0.00
 397       RX     0.0    0.1     9.0    11.0    15.0    17.0    26.0    26.1
 398       RY   109.5  104.5   100.0   100.0   100.0   100.0   104.5   109.5

 399       KK   SB023  BASIN
 400       KM          CP @ CACTUS PARK BASIN FROM EAST
 401       BA   0.170
 402       LG    0.26   0.25    4.65    0.38      43
 403       UC   0.313  0.201
 404       UA       0    5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 405       UA     100

 406       KK   AD023  COMBINE HYDROGRAPHS RR023 AND SB023
 407       KM          TOTAL INFLOW TO CACTUS PARK DET BASIN FROM EAST
 408       HC       2   0.55

 409       KK  SB020B  BASIN
 410       KM          CP @ CACTUS PARK BASIN FROM NORTH
 411       BA   0.270
 412       LG    0.25   0.25    4.65    0.37      32
 413       UC   0.404  0.354
 414       UA       0    5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 415       UA     100

 416       KK  AD20B1  COMBINE HYDROGRAPHS AD020A, AD023 AND SB020B
 417       KM          TOTAL INFLOW TO CACTUS PARK DET BASIN FROM WEST, EAST AND NORTH
 418       HC       3   1.92
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 419          KK  DV20B1   SPLIT FLOW. DQ IS BASED ON CAPACITY OF 1-60IN SD PIPE @
 420          KM           S=0.005 FT/FT REPRESENTING LOW FLOW BYPASS @ CACTUS PARK BASIN.
 421          KM           HYDROGRAPH ASSOC WITH DQ (DR020B1) IS NOT ROUTED THRU BASIN,
 422          KM           BUT IS RECALLED LATER AND COMBINED WITH SCOTTSDALE RD STREET FLOW
 423          KM           BYPASS AND ROUTED AS STREET FLOW DOWN SCOTTSDALE RD FROM CACTUS TO
 424          KM           SUMP NORTH OF MESCAL. REMAINDER FLOW (DV020B) IS ROUTED THRU LEVEL
 425          KM           POOL.
 426          DT  DR20B1
 427          DI       0      50     100     184     300     500    1000    2000
 428          DQ       0      50     100     184     184     184     184     184

 429          KK  LP020B   ROUTE HYDROGRAPH DV020B THRU CACTUS PARK DET BASIN.
 430          KM           PRIMARY OUTLET CONSISTS OF 1-60IN DIAM SD. PIPE DISCHARGE BASED ON
 431          KM           OUTLET CONTROL FRICT SLOPE. Q ASSOCIATED WITH SQ CARD CALCULATED
 432          KM           AS DIFFERENCE BETWEEN FRICT SLOPE Q AND 184CFS LOW FLOW BYPASS Q.
 433          KM           IT IS ASSUMED THAT LOW FLOW BYPASS DOES NOT IMPACT OUTLET PIPE
 434          KM           HYDRAULICS. PIPE OUTLET INVERT ELEV ESTIMATED @ 1370FT FROM PLANS.
 435          KM           OVERFLOW SECTION IS THE CONC SIDEWALK NORTH SIDE OF CACTUS RD BETW
 436          KM           SCOTTSDALE RD AND DRIVEWAY ENTRANCE TO PARK. AVG ELEV OF OVERFLOW IS
 437          KM           APPROX 1387.8. FINISHED FLOOR ELEVATION OF REC BUILDING IS 1390.99FT.
 438          RS       1    STOR       0
 439          SV       0  0.0012  0.0044    0.40    1.78    4.35   47.13   92.18  121.37
 440          SQ       0       0       0       0       3       8      32      48      58
 441          SE  1370.0  1374.0  1375.0  1377.0  1378.0  1379.0  1384.0  1387.8  1390.0
 442          ST  1387.8   523.5       3     1.5
 443          SW       0    40.8    76.2   139.3   229.0   317.1     400   523.5
 444          SE    1388  1387.8  1387.8  1388.5  1388.3  1388.8  1389.2  1389.7

 445          KK  DV20B2   SPLIT FLOW.  DIVERSION USED TO REFLECT SPILLWAY OVERFLOW CONVEYED
 446          KM           DOWN 73RD STREET AND WEST DOWN SUNNYSIDE DRIVE TO SDALE RD.
 447          KM           REMAINDER FLOW ROUTED THRU CACTUS PARK 60IN DIAM OUTLET PIPE.
 448          DT  DR20B2
 449          DI       0      48    3458
 450          DQ       0       0    3400

 451          KK  DR20B1   RETRIEVE PREVIOUSLY SPLIT HYDROGRAPH ASSOC WITH LOW FLOW BYPASS
 452          KM           @ CACTUS PARK DET BASIN
 453          DR  DR20B1

 454          KK  AD20B2   COMBINE DV20B2 AND DR20B1 HYDROGRAPHS
 455          HC       2    0.44

 456          KK  RR2427
 457          KM           ROUTE HYDROGRAPH AD20B2 THRU REACH RR2427
 458          KM           60IN DIA SD SOUTH IN SDALE RD, WEST IN CHOLLA, SOUTH IN 71ST CHANNEL
 459          RK    3500    .007    .013            CIRC       5

 460          KK   SB025   BASIN
 461          KM           CP @ 70TH ST & TBIRD
 462          BA   0.140
 463          LG    0.16    0.25    4.65    0.38      65
 464          UC   0.275   0.226
 465          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 466          UA     100
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 467          KK   RR026   ROUTE   REACH
 468          KM           ROUTE HYDROGRAPH SB025 THRU REACH RR026, 70TH ST INV & NORMAL CROWN
 469          RS       2    FLOW       0
 470          RC   0.030   0.016   0.030    5750  0.0070    0.00
 471          RX     0.0     0.1     6.0     7.6    37.5    39.0    42.0    42.1
 472          RY   105.0   100.8   100.3   100.1   100.1   100.3   100.8   105.0

 473          KK   SB026   BASIN
 474          KM           CP @ CACTUS RD AND 70TH ST
 475          BA   0.440
 476          LG    0.28    0.25    4.65    0.38      29
 477          UC   0.354   0.204
 478          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 479          UA     100

 480          KK   AD026   COMBINE HYDROGRAPHS RR026 AND SB026
 481          HC       2    0.58

 482          KK   RR027   ROUTE   REACH
 483          KM           ROUTE HYDROGRAPH AD026 THRU REACH RR027, CHANNEL AND INV CROWN STREET
 484          RS       1    FLOW       0
 485          RC   0.025   0.016   0.025    3250  0.0050    0.00
 486          RX     0.0     0.1    33.0    33.1    64.0    64.1    73.5    73.6
 487          RY   105.0   102.9   100.9   100.2   100.2   100.9   101.9   105.0

 488          KK   SB027   BASIN
 489          KM           CP @ 71ST ST CHANNEL APPROX 650FT SOUTH OF CHOLLA ST
 490          BA   0.120
 491          LG    0.30    0.25    4.65    0.36      20
 492          UC   0.225   0.159
 493          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 494          UA     100

 495          KK  AD027A   COMBINE HYDROGRAPHS RR027 AND SB027
 496          KM           CP @ 71ST ST CHANNEL APPROX 650FT SOUTH OF CHOLLA STREET
 497          HC       2    0.70
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 498         KK  AD027B   COMBINE HYDROGRAPHS RR2427 AND AD027A
 499         KM           RR2427 HYDROGRAPH REFLECTS 60IN DIA SD SOUTH IN SDALE RD,
 500         KM           WEST IN CHOLLA, AND OUTFALLS SOUTH IN 71ST CHANNEL
 501         HC       2    1.14
             * ***********************************************************************
             *  THE FOLLOWING SEQUENCE INVOLVING THE KIERLAND DEVELOPMENT WAS DERIVED, IN   *
             *  PART, BASED ON THE KIERLAND MASTER DRAINAGE REPORT BY COE & VAN LOO (CVL)  *
             *  TITLED: ADDENDUM TO MASTER DRAINAGE REPORT FOR KIERLAND AND DATED REVISED  *
             *  3-13-95. IN THIS SEQUENCE, CVL ONSITE SUB-BASINS WERE GENERALLY            *
             *  COMBINED TO FORM SINGLE SUB-BASINS CORRESPONDING TO SB028, SB031, SB032,   *
             *  SB033 AND SB034 AS NOTED AT THE SUB-BASIN STEPS THAT FOLLOW. ALL OF THE    *
             *  KIERLAND ONSITE ROUTING REACH AND LEVEL POOL ROUTING STEPS IN THIS SEQUENCE *
             *  WERE TAKEN DIRECTLY FROM THE CVL HEC1 MODEL AS NOTED AT THOSE HYDROGRAPH   *
             *  STEPS. THE BASIS FOR THIS DATA IS CVL HEC1 MODEL H1G100A.PS1 DATED 10-01-94.*
             * ***********************************************************************
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 502         KK   SB028   BASIN
 503         KM           CORRESPONDS, IN PART, TO CVL SA4, SA40, AND OFFSITE 5
 504         KM           BASIN AREA IS FROM SCI
 505         BA   0.134
 506         LG    0.10    0.25    4.65    0.38      79
 507         UC   0.271   0.215
 508         UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 509         UA     100

 510         KK  RR031A   ROUTE   REACH
 511         KM           ROUTE HYDROGRAPH SB028 THRU REACH RR031A, OPEN CHANNEL
 512         KM           THIS STEP CORRESPONDS TO CVL R415
 513         RS       1    ELEV      10
 514         RC   0.035   0.035   0.035    1500  0.0065    0.00
 515         RX    55.0    60.0    73.0    97.0   103.0   127.0   140.0   145.0
 516         RY    20.0    16.0    16.0    10.0    10.0    16.0    16.0    20.0

 517         KK   SB029   BASIN
 518         KM           CORRESPONDS TO CVL SUBBASINS SA3 AND SA90, BASIN AREA IS FROM SCI
 519         BA   0.180
 520         LG    0.25    0.25    4.65    0.38      45
 521         UC   0.263   0.168
 522         UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 523         UA     100

 524         KK  AD031A   COMBINE HYDROGRAPHS RR031A AND SB029, CORRESPONDS TO CVL C291
 525         HC       2    0.31

 526         KK  RR031B   ROUTE   REACH
 527         KM           ROUTE HYDROGRAPH AD031A THRU REACH RR031B, OPEN CHANNEL
 528         KM           THIS STEP CORRESPONDS TO CVL R491
 529         RS       1    ELEV      10
 530         RC   0.035   0.035   0.035     800  0.0100    0.00
 531         RX    55.0    60.0    70.0    90.0   110.0   130.0   140.0   145.0
 532         RY    20.0    15.0    15.0    10.0    10.0    15.0    15.0    20.0

 533         KK   SB030   BASIN
 534         KM           CORRESPONDS TO CVL SUBBASINS SA2, 105, 106; BASIN AREA IS FROM SCI
 535         BA   0.100
 536         LG    0.25    0.25    4.65    0.38      45
 537         UC   0.246   0.213
 538         UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 539         UA     100

 540         KK  RR031C   ROUTE   REACH
 541         KM           ROUTE HYDROGRAPH SB030 THRU REACH RR031C, OPEN CHANNEL
 542         KM           THIS STEP CORRESPONDS TO CVL R404
 543         RS       2    ELEV      10
 544         RC   0.035   0.035   0.035    1950  0.0100    0.00
 545         RX    55.0    60.0    70.0    90.0   110.0   130.0   140.0   145.0
 546         RY    20.0    15.0    15.0    15.0    15.0    15.0    15.0    20.0
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 547         KK   SB031   BASIN
 548         KM           CORRESPONDS TO CVL SUBBASINS SA20 AND SA91, BASIN AREA IS FROM SCI
 549         BA   0.120
 550         LG    0.20    0.25    4.65    0.50       6
 551         UC   0.233   0.134
 552         UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 553         UA     100

 554         KK  AD031B   COMBINE HYDROGRAPHS RR031B, RR031C AND SB031
 555         KM           THIS STEP CORRESPONDS TO CVL C220
 556         HC       3    0.53

 557         KK  LP031A   ROUTE FLOW THRU KIERLAND BASIN #1, THIS STEP CORRESPONDS TO CVL RET1
 558         RS       1    ELEV      60
 559         SV       0    .094    1.01    3.36    7.21   12.85   21.01   31.61   43.94   57.92
 560         SQ       0       4    13.6      14    14.4    14.8    15.2    15.5    15.8     200
 561         SE    54.5      60      62      64      66      68      70      72      74      76

 562         KK   DV031   DIVERT INITIAL FLOW (4 CFS) TO LP033 (KIERLAND BASIN 2)
 563         KM           THIS STEP CORRESPONDS TO CVL DIVRT1
 564         KM           NOTE: THERE IS NO ROUTING REACH STEP IN THE CVL MODEL IMMEDIATELY
 565         KM           FOLLOWING THIS DIVERT ASSOCIATED WITH THE REMAINDER FLOW. THE
 566         KM           DIVERTED FLOW IS RECALLED LATER AND ADDED TO THE INFLOW TO LP033
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567          KM          (KIERLAND BASIN 2). THE REMAINDER FLOW (DV031) IS LATER ADDED
568          KM          DIRECTLY TO THE INFLOW TO LP034 (KIERLAND BASIN 3).
569          DT   DR031
570          DI       0       4      18      50     200
571          DQ       0       4       4       4       4

572          KK   SB032  BASIN
573          KM          CORRESPONDS TO CVL SA104, 103 AND 101; BA = SUM OF CVL BASIN AREAS
574          BA   0.030
575          LG    0.22    0.25    4.65    0.47      16
576          UC   0.392   0.445
577          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
578          UA     100

579          KK  RR031D  ROUTE   REACH
580          KM          ROUTE HYDROGRAPH SB032 THRU REACH RR031D, OPEN CHANNEL TO KIERLAND
581          KM          BASIN #2. THIS STEP CORRESPONDS TO CVL R301
582          RS       2    ELEV      10
583          RC   0.035   0.035   0.035    1200  0.0016    0.00
584          RX    55.0    60.0    70.0    90.0   110.0   130.0   140.0   145.0
585          RY    20.0    15.0    15.0    15.0    10.0    15.0    15.0    20.0

586          KK   SB033  BASIN
587          KM          CORRESPONDS TO CVL SA21, 61, 42, 60 AND 41; BA = SUM OF CVL AREAS
588          BA   0.140
589          LG    0.18    0.25    4.65    0.46      30
590          UC   0.300   0.201
591          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
592          UA     100
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

593          KK   DR031  RETRIEVE LP031 OUTFLOW; THIS STEP CORRESPONDS TO CVL DRT1
594          DR   DR031

595          KK   AD033  COMBINE RR031D, SB033 AND DR031,
596          KM          THIS STEP CORRESPONDS TO CVL C221A
597          HC       3    0.19

598          KK   LP033  ROUTE FLOW THRU KIERLAND BASIN #2, THIS STEP CORRESPONDS TO CVL RET2
599          RS       1    ELEV      35
600          SV       0    8.62   15.39    23.0    54.0   230.0
601          SQ       0     .01     .01     .01     .01     .01
602          SE      35      38      40      42      48      65

603          KK   RR034
604          KM          ROUTE LP033 THRU RR034, PIPE; THIS STEP CORRESPONDS TO CVL R430
605          RK    1200     .01    .012            CIRC     3.5

606          KK   SB034  BASIN
607          KM          CORRESPONDS TO CVL SA52, 30, 9, 50 AND 26; BA = SUM OF CVL AREAS
608          BA   0.180
609          LG    0.11    0.25    4.65    0.39      71
610          UC   0.279   0.199
611          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
612          UA     100

613          KK   AD034  COMBINE DV031, RR034 AND SB034,
614          KM          THIS STEP CORRESPONDS TO CVL C252
615          HC       3    0.88

616          KK   LP034  ROUTE FLOW THRU KIERLAND BASIN #3, THIS STEP CORRESPONDS TO CVL RET3
617          RS       1    ELEV      33
618          SV       0    4.08    20.0    21.6    23.3      26
619          SQ       0      18      18      18     146     667
620          SE      32      34      40    40.5      41      42

621          KK   DV034  DIVERT LP034  THIS STEP CORRESPONDS TO CVL DIV910 ONLY THE SPLIT IS
622          KM          REVERSED. REMAINDER FLOW (DV034) OVERFLOWS SOUTH TO 69TH ST.
623          KM          DIVERTED FLOW (DR034) BLEEDS OFF TO RET LP040 (KIERLAND BASIN #4)
624          KM          AND WILL BE RECALLED LATER
625          DT   DR034
626          DI       0      18      30     200
             * DQ     0       0      12     182  (ORIGINAL CVL DQ RECORD)
627          DQ       0      18      18      18

628          KK   RR035  ROUTE   REACH
629          KM          ROUTE HYDROGRAPH DV034 THRU REACH RR035, 69TH ST INV CROWN
630          RS       3    FLOW       0
631          RC   0.030   0.016   0.030    3000  0.0050    0.00
632          RX     0.0     0.1     9.0    10.5    40.8    42.3    51.3    51.4
633          RY   106.0   101.0   100.6   100.1   100.1   100.6   101.3   106.0
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

634          KK   SB035  BASIN
635          KM          CP @ TBIRD RD AND 69TH ST
636          BA   0.110
637          LG    0.25    0.25    4.65    0.38      45
638          UC   0.288   0.214
639          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
640          UA     100

641          KK   AD035  COMBINE HYDROGRAPHS RR035 AND SB035
642          HC       2    0.86
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643            KK   RR036   ROUTE   REACH
644            KM           ROUTE HYDROGRAPH AD035 THRU REACH RR036, 69TH ST/PL INV & NORM CROWN
645            RS       3    FLOW       0
646            RC   0.030   0.016   0.030     5400  0.0070     0.00
647            RX     0.0     0.1    12.5     14.0    44.0     45.5     56.0     56.1
648            RY   105.0   100.3   100.3    100.1   100.1    100.3    100.3    105.0

649            KK   SB036   BASIN
650            KM           CP @ CACTUS RD AND 69TH PL
651            BA   0.130
652            LG    0.30    0.25    4.65     0.38      24
653            UC   0.388   0.460
654            UA       0     5.0    16.0     30.0    65.0     77.0     84.0     90.0     94.0     97.0
655            UA     100

656            KK   AD036   COMBINE HYDROGRAPHS RR036 AND SB036
657            HC       2    0.99

658            KK   DV036   SPLIT FLOW. DQ IS BASED ON CAPACITY OF 1-84 IN SD PIPE IN CACTUS RD
659            KM           @ S=0.00259 FT/FT. HYDROGRAPH ASSOC WITH DQ (DR036) GOES WEST IN
660            KM           CACTUS THEN SOUTH IN 68TH ST AND EVENTUALLY DISCHARGES TO MESCAL PARK
661            KM           DET BASIN. REMAINDER FLOW (DV036) OVERFLOWS SUMP IN CACTUS RD AND IS
662            KM           ROUTED SOUTH DOWN 70TH ST (RR037A) THRU SB037.
663            DT   DR036
664            DI       0      50     100      200     325      500     1000
665            DQ       0      50     100      200     325      325      325

666            KK  RR037A   ROUTE   REACH
667            KM           ROUTE HYDROGRAPH DV036 THRU REACH RR037A, MOSTLY 70TH ST INV CROWN
668            RS       2    FLOW       0
669            RC   0.030   0.016   0.030     3500  0.0060     0.00
670            RX     0.0     0.1     8.5      8.6    39.4     39.5     48.0     48.1
671            RY   105.0   101.9   100.9    100.2   100.2    100.9    101.9    105.0

672            KK   SB037   BASIN
673            KM           CP @ 71ST ST CHANNEL APPROX 300FT NORTH OF MESCAL ST
674            BA   0.210
675            LG    0.29    0.25    4.65     0.37      25
676            UC   0.321   0.213
677            UA       0     5.0    16.0     30.0    65.0     77.0     84.0     90.0     94.0     97.0
678            UA     100
1                                           HEC-1 INPUT                                            PAGE 17

LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


679            KK  AD037A   COMBINE HYDROGRAPHS RR037A AND SB037,
680            KM           HYDROGRAPH REPRESENTS FLOW ENTERING 71ST ST CHANNEL FROM WEST
681            KM           APPROX 300FT NORTH OF MESCAL ST (APPROX 650FT SOUTH OF CHOLLA ST)
682            HC       2    0.28

683            KK  DR20A2   RETRIEVE PREVIOUSLY SPLIT HYDROGRAPH ASSOC WITH SCOTTSDALE RD
684            KM           STREET SECTION BYPASS OF CACTUS PARK BASIN
685            DR  DR20A2

686            KK  RR024A   ROUTE   REACH
687            KM           ROUTE HYDROGRAPH DR20A2 THRU REACH RR024A, SDALE RD STREET SECTION
688            KM           FROM CACTUS TO SUNNYSIDE DR.
689            RS       2    FLOW       0
690            RC   0.025   0.016   0.025      700  0.0140     0.00
691            RX     0.0     0.1     8.5      8.6    96.5     96.6    105.0    105.1
692            RY   102.0   100.5   100.5    100.3   100.3    100.5    100.5    102.0

693            KK  DR20B2   RETRIEVE PREVIOUSLY SPLIT HYDROGRAPH ASSOC WITH CACTUS PARK OVERFLOW
694            DR  DR20B2

695            KK  RR024B   ROUTE   REACH
696            KM           ROUTE HYDROGRAPH DR20B2 THRU REACH RR024B, 73RD STREET SECTION
697            KM           FROM CACTUS TO SUNNYSIDE DR.
698            RS       1    FLOW       0
699            RC   0.035   0.035   0.035      500  0.0040     0.00
700            RX     0.0     0.1     4.0      6.5     9.0     13.0     13.1     13.2
701            RY   105.0   103.0   100.5    100.0   100.5    102.0    103.0    105.0

702            KK  RR024C   ROUTE   REACH
703            KM           ROUTE HYDROGRAPH RR024B THRU REACH RR024C, SUNNYSIDE DR SECTION
704            KM           FROM 73RD STREET TO SDALE ROAD.
705            RS       1    FLOW       0
706            RC   0.025   0.016   0.025      600  0.0030     0.00
707            RX     0.0     0.1     5.0      5.1    35.9     36.0     41.0     41.1
708            RY   105.0   100.5   100.5    100.2   100.2    100.5    100.6    105.0

709            KK  AD024B   COMBINE HYDROGRAPHS RR024A AND RR024C.
710            HC       2    1.92

711            KK  RR024D   ROUTE   REACH
712            KM           ROUTE HYDROGRAPH AD024B THRU REACH RR024D, SDALE RD SECTION
713            KM           FROM SUNNYSIDE TO SUMP NORTH OF MESCAL ST.
714            RS       2    FLOW       0
715            RC   0.025   0.016   0.025     2600  0.0040     0.00
716            RX     0.0     0.1     8.5      8.6    96.5     96.6    105.0    105.1
717            RY   102.0   100.5   100.5    100.3   100.3    100.5    100.5    102.0

718            KK   SB024   BASIN
719            KM           CP @ SUMP IN SCOTTSDALE RD APPROX 300FT NORTH OF MESCAL ST
720            BA   0.110
721            LG    0.24    0.25    4.65     0.38      43
722            UC   0.354   0.395
723            UA       0     5.0    16.0     30.0    65.0     77.0     84.0     90.0     94.0     97.0
724            UA     100
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 725          KK  AD024C   COMBINE HYDROGRAPHS RR024D AND SB024.
 726          HC       2    2.03

 727          KK   DV024   SPLIT FLOW. DQ IS BASED ON CAPACITY OF 54 IN. SD PIPE IN SDALE RD @
 728          KM           S=0.0042 FT/FT. HYDROGRAPH ASSOC WITH DQ (DR024) GOES SOUTH
 729          KM           IN SCOTTSDALE RD BY STORM DRAIN TO MESCAL ST, THEN TURNS WEST AND
 730          KM           OUTFALLS TO 71ST ST CHANNEL. REMAINDER FLOW (DV024) OVERFLOWS SUMP
 731          KM           IN SCOTTSDALE RD AND GOES WEST BY OPEN CHANNEL IN DRAINAGE EASEMENT
 732          KM           ALONG NORTH SIDE OF COMMERCIAL OFFICE PARCEL TO 71ST ST CHANNEL.
 733          DT   DR024
 734          DI       0      50     100     200     300     500    1000
 735          DQ       0      50     100     127     127     127     127

 736          KK  RR024E   ROUTE   REACH
 737          KM           ROUTE HYDROGRAPH DV024 THRU REACH RR024E,
 738          KM           OPEN CHANNEL ALONG NORTH SIDE OF COMMERCIAL OFFICE PARCEL
 739          RS       1    FLOW       0
 740          RC   0.025   0.016   0.025     700  0.0070    0.00
 741          RX     0.0     0.1    10.0    10.1    40.9    41.0    51.0    51.1
 742          RY   105.0   100.3   100.3   100.2   100.2   100.3   100.3   105.0

 743          KK  AD037B   COMBINE HYDROGRAPHS AD027B, AD037A AND RR024E
 744          KM           TOTAL Q 71ST ST CHANNEL APPROX 300FT NORTH OF MESCAL ST
 745          HC       3    3.05

 746          KK  RR037B   ROUTE   REACH
 747          KM           ROUTE HYDROGRAPH AD037B THRU REACH RR037B,
 748          KM           71ST STREET CHANNEL TO MESCAL ST
 749          RS       1    FLOW       0
 750          RC   0.035   0.018   0.035     300  0.0270    0.00
 751          RX   952.0   952.1   962.2   992.0  1007.8  1036.0  1046.0  1046.1
 752          RY   367.0   363.6   363.6   355.0   355.1   362.0   362.0   367.0

 753          KK   DR024   RETRIEVE DR024 SDALE RD SD @ SUMP APPROX 300FT NORTH OF MESCAL
 754          DR   DR024

 755          KK  RR024F
 756          KM           ROUTE DR024 THRU REACH RR024F
 757          KM           STORM DRAIN FLOW SDALE RD TO MESCAL TO 71ST ST CHANNEL
 758          KM           1-5FT x 6FT RCB @ S=0.0015FT/FT UNDER MESCAL FROM SDALE RD TO 71ST
 759          RK     900   .0015    .013            TRAP       5     .01

 760          KK  AD037C   COMBINE HYDROGRAPHS RR037B AND RR024F
 761          KM           TOTAL Q 71ST ST CHANNEL @ JUST SOUTH OF MESCAL ST
 762          HC       2    3.45

 763          KK  RR037C   ROUTE   REACH
 764          KM           ROUTE HYDROGRAPH AD037C THRU REACH RR037C,
 765          KM           71ST STREET CHANNEL, MESCAL ST TO MESCAL DET BASIN OUTFALL PIPE
 766          RS       1    FLOW       0
 767          RC   0.035   0.030   0.035     500  0.0080    0.00
 768          RX   964.1   964.2   974.1   996.2  1003.8  1027.0  1037.0  1037.1
 769          RY   362.0   360.5   360.5   353.5   353.5   360.0   360.0   362.0
              * ***********************************************************************
              *  THE FOLLOWING SEQUENCE INVOLVING THE KIERLAND DEVELOPMENT WAS DERIVED, IN   *
              *  PART, BASED ON THE KIERLAND MASTER DRAINAGE REPORT BY COE & VAN LOO (CVL)   *
              *  TITLED: ADDENDUM TO MASTER DRAINAGE REPORT FOR KIERLAND AND DATED REVISED   *
              *  3-13-95. IN THIS SEQUENCE, CVL ONSITE SUB-BASINS WERE GENERALLY            *
              *  COMBINED TO FORM SINGLE SUB-BASINS CORRESPONDING TO SB028, SB031, SB032,   *
              *  SB033 AND SB034 AS NOTED AT THE SUB-BASIN STEPS THAT FOLLOW. ALL OF THE    *
              *  KIERLAND ONSITE ROUTING REACH AND LEVEL POOL ROUTING STEPS IN THIS SEQUENCE *
              *  WERE TAKEN DIRECTLY FROM THE CVL HEC1 MODEL AS NOTED AT THOSE HYDROGRAPH   *
              *  STEPS. THE BASIS FOR THIS DATA IS CVL HEC1 MODEL H1G100A.PS1 DATED 10-01-94.*
              * ***********************************************************************
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 770          KK   SB038   BASIN
 771          KM           CORRESPONDS TO CVL SUBBASINS SA1, 100, AND 6; BASIN AREA IS FROM SCI
 772          BA   0.120
 773          LG    0.25    0.25    4.65    0.38      45
 774          UC   0.233   0.181
 775          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 776          UA     100

 777          KK   DV038   SPLIT FLOW. DQ IS BASED ON CAPACITY OF EIGHT ON-GRADE CATCH BASINS
 778          KM           LOC @ INTERSECTION OF 64TH ST AND PARADISE LANE (CONSTRUCTED 1997?)
 779          KM           CONSISTING OF 4 CB'S @ L=20FT ON 64TH ST AND 2 CB'S @ L=10FT, 1 CB
 780          KM           @ L=17FT AND 1 CB @ L=20 FT ON PARADISE LN JUST EAST OF 64TH ST.
 781          KM           INTERCEPTED FLOW (HYDROGRAPH DR038) DRAINS WEST IN STORM DRAIN OF
 782          KM           UNK DIAM UNDER PARADISE LN TO JACKRABBIT PARK DET BASIN. REMAINDER
 783          KM           FLOW (DV038) FLOWS PAST CB'S AND GOES SOUTH ON 64TH ST.
 784          KM           NOTE: THIS DIVERSION APPARENTLY DID NOT EXIST @ TIME OF KIERLAND
 785          KM           REPORT BECAUSE IT IS NOT INCLUDED IN CVL HEC-1 MODEL.
 786          DT   DR038
 787          DI       0      20      40      68      80     100     200     500
 788          DQ       0      20      40      68      68      68      68      68

 789          KK   RR039   ROUTE   REACH
 790          KM           ROUTE HYDROGRAPH DV038 THRU REACH RR039, 64TH ST FROM PARADISE LN
 791          KM           TO GREENWAY RD. THIS STEP CORRESPONDS TO CVL R602
 792          RS       1    ELEV       9
 793          RC   0.015   0.015   0.015    2600  0.0092    0.00
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 794     RX    50.0    60.0    60.1    99.0   101.0   140.0   140.1   150.0
 795     RY    17.0    15.0     9.0    10.0    10.0     9.0    15.0    17.0

 796     KK   SB039   BASIN
 797     KM           MOSTLY 64TH ST. THIS OFFSITE AREA WAS NOT INCLUDED IN CVL MODEL
 798     BA   0.030
 799     LG    0.20    0.25    4.65    0.38      57
 800     UC   0.188   0.180
 801     UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 802     UA     100

 803     KK   AD039   COMBINE HYDROGRAPHS RR039 AND SB039,
 804     KM           THIS STEP CORRESPONDS TO CVL C206
 805     HC       2    0.12

 806     KK   DV039   SPLIT FLOW. 64TH & GREENWAY - DIVERT STORM DRAIN FLOW FROM 64TH ST
 807     KM           TO GOLF COURSE UP TO 35 CFS. THIS STEP CORRESPONDS TO CVL DIV900.
 808     KM           DIVERTED FLOW (DR039) RETRIEVED LATER TO ROUTE SOUTH ON 64TH ST.
 809     KM           CVL PLANS SHOW 4-36FT CB'S ON 64TH ST JUST NORTH OF GREENWAY.
 810     KM           HOWEVER, ONLY 2-36FT CB'S WERE CONSTRUCTED.
 811     DT   DR039
 812     DI      10      35      70     200     300     500     700
 813     DQ       0       0      35     165     265     465     665
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 814     KK  RR040    ROUTE   REACH
 815     KM           ROUTE HYDROGRAPH DV039 THRU REACH RR040,
 816     KM           THIS STEP CORRESPONDS TO CVL R406, R471, R472, R473 & R481.
 817     KM           REACH LENGTH IS SUMMATION OF CVL REACH LENGTHS.  WEIGHTED SLOPE
 818     KM           BASED ON CVL REACH LENGTHS AND SLOPES.
 819     RS       8    ELEV      10
 820     RC   0.035   0.035   0.035    3660  0.0075    0.00
 821     RX    55.0    60.0    70.0    90.0   110.0   130.0   140.0   145.0
 822     RY    20.0    15.0    15.0    10.0    10.0    15.0    15.0    20.0

 823     KK   SB040   BASIN
 824     KM           NOTE: THIS CORRESPONDS TO CVL SUBBASINS SA25, 160, 162, 120, 130,
 825     KM           80, 27, 28, 23, 102, 111, 170, 171, 11, 24, 70, 8 AND 10
 826     KM           BASIN AREA = SUM OF CVL BASIN AREAS
 827     BA   0.410
 828     LG    0.20    0.25    4.65    0.46      24
 829     UC   0.346   0.195
 830     UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 831     UA     100

 832     KK   DR034   RETRIEVE BASIN #3 BLEEDOFF OUTFLOW
 833     DR   DR034

 834     KK   AD040   COMBINE HYDROGRAPHS RR040, SB040 AND DR034
 835     KM           THIS STEP CORRESPONDS TO CVL C281
 836     HC       3    0.56

 837     KK   LP040   ROUTE FLOW THRU KIERLAND BASIN #4 TO SANDPIPER PARK
 838     KM           24" OUTLET PIPE & 53' WEIR
 839     KM           THIS STEP CORRESPONDS TO CVL RET4
 840     RS       1    ELEV      31
 841     SV       0       0    1.02    2.35    4.04    5.94    9.78    11.8    15.8   20.64
 842     SQ       0    18.4    19.2    19.9    20.6    21.3    22.3      96     344     690
 843     SE      31      32      33      34      35      36    37.4      38      39      40

 844     KK   RR041   ROUTE   REACH
 845     KM           ROUTE HYDROGRAPH LP040 THRU REACH RR041, OPEN CHAN TO SANDPIPER PARK
 846     KM           THIS STEP CORRESPONDS TO CVL R440
 847     RS       1    ELEV      10
 848     RC   0.035   0.035   0.035     600  0.0067    0.00
 849     RX    55.0    60.0    70.0    90.0   110.0   130.0   140.0   145.0
 850     RY    20.0    15.0    15.0    10.0    10.0    15.0    15.0    20.0

 851     KK   SB041   BASIN
 852     KM           CORRESPONDS TO CVL SA140 AND SA133; BA = SUM OF CVL BASIN AREAS
 853     BA   0.040
 854     LG    0.21    0.25    4.65    0.43      25
 855     UC   0.250   0.195
 856     UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 857     UA     100
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 858     KK   AD041   COMBINE RR041 AND SB041
 859     KM           THIS STEP CORRESPONDS TO CVL C282
 860     HC       2    0.60

 861     KK   LP041   ROUTE FLOW THROUGH SANDPIPER PARK DETENTION BASIN
 862     KM           LOW FLOW STORM DRAIN AND 42FT OVERFLOW WEIR
 863     KM           THIS STEP CORRESPONDS TO CVL RET5
 864     RS       1    ELEV      25
 865     SV       0     .04     .25     1.0     4.5     7.6    12.3    18.4    25.5    29.4
 866     SV    37.2    40.0
 867     SQ       0    22.6    31.6    33.8    35.9    37.9    39.8    41.6    43.3    44.2
 868     SQ     170     500
 869     SE      25    25.1      27      28      29      30      31      32      33    33.5
 870     SE    34.5      35

 871     KK   DV041   DIVERT LP041. THIS STEP CORRESPONDS TO CVL DIV920 EXCEPT THE
 872     KM           REMAINDER AND DIVERTED FLOWS ARE REVERSED. REMAINDER FLOW (DV041)
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 873          KM             OVERFLOWS SPILLWAY TO 67TH ST @ HEARN. DIVERTED FLOW (DR041) IS
 874          KM             STORM DRAIN LOW FLOW IN HEARN TO 64TH ST AND WILL BE RECALLED LATER
 875          DT   DR041
 876          DI    44.2      170     500
              * DQ     0    125.8   455.8 (ORIGIONAL CVL DQ RECORD)
 877          DQ    44.2     44.2    44.2

 878          KK   RR043     ROUTE   REACH
 879          KM             ROUTE DV041 THRU REACH RR043 DOWN 67TH ST TO TBIRD
 880          RS       2      FLOW       0
 881          RC   0.025    0.016   0.025     1800  0.0070     0.00
 882          RX     0.0      0.1    24.3     24.4    56.2     56.3     96.5     96.6
 883          RY   107.0    102.0   100.5    100.3   100.3    100.5    102.5    107.0

 884          KK   SB043     BASIN
 885          KM             CP @ 67TH ST AND TBIRD
 886          BA   0.080
 887          LG    0.28     0.25    4.65     0.36      31
 888          UC   0.283    0.217
 889          UA       0      5.0    16.0     30.0    65.0     77.0     84.0     90.0     94.0     97.0
 890          UA     100

 891          KK   AD043     COMBINE RR043 AND SB043
 892          HC       2     0.21

 893          KK   DV043     SPLIT FLOW. REMAINDER FLOW (DV043) SPILLS OVER SOUTH SIDE OF TBIRD
 894          KM             AND GOES DOWN 66TH ST. DIVERTED FLOW (DR043) GOES WEST ON TBIRD
 895          KM             TO 64TH ST AND WILL BE RECALLED LATER
 896          DT   DR043
 897          DI       0       15      95      305     600     1040     1525     2075
 898          DQ       0       15      95      295     570      985     1440     1960
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 899          KK   RR044     ROUTE   REACH
 900          KM             ROUTE HYDROGRAPH DV043 THRU REACH RR044,
 901          KM             66TH ST (BOTH NORMAL AND INV CROWN) TO CACTUS
 902          RS       4      FLOW       0
 903          RC   0.025    0.016   0.025     5250  0.0070     0.00
 904          RX     0.0      0.1     8.8     10.3    40.3     41.8     50.5     50.6
 905          RY   105.5    100.3   100.3    100.1   100.1    100.3    100.3    105.5

 906          KK   SB044     BASIN
 907          KM             CP @ CACTUS RD AND 66TH ST
 908          BA   0.180
 909          LG    0.28     0.25    4.65     0.38      31
 910          UC   0.371    0.353
 911          UA       0      5.0    16.0     30.0    65.0     77.0     84.0     90.0     94.0     97.0
 912          UA     100

 913          KK   AD044     COMBINE RR044 AND SB044
 914          HC       2     0.18

 915          KK  DV044A     SPLIT FLOW. CATCH BASIN(S) JUST NORTH OF CACTUS ON 65TH PL.
 916          KM             APPROX 1/2 OF 1/3 OF TOTAL AD044 Q DRAINS WEST TO 64TH ST STORM DRAIN
 917          KM             (DR044A), UP TO PIPE FLOWING FULL CAPACITY OF 55 CFS.  REMAINDER FLOW
 918          KM             (DV044A) CONVEYED EAST TO 66TH ST SPLIT. CACTUS ROAD SD CONSISTS OF
 919          KM             42IN DIAM PIPE @ S=0.0030 FT/FT.
 920          DT  DR044A
 921          DI       0       25      50      100     200      300      400
 922          DQ       0        4       8       17      33       50       55

 923          KK  DV044B     SPLIT FLOW BASED ON CAPACITY OF 60 IN. SD PIPE IN CACTUS RD
 924          KM             @ S=0.0026 FT/FT. REMAINDER FLOW (DV044B) ROUTED EAST IN CACTUS THEN
 925          KM             SOUTH IN 68TH ST AND EVENTUALLY DISCHARGES TO MESCAL PARK DET BASIN.
 926          KM             HYDROGRAPH ASSOC WITH DQ (DR044B) OVERFLOWS CACTUS ROAD AND FLOWS
 927          KM             SOUTH IN 66TH ST.
 928          DT  DR044B
 929          DI       0       50     100      150     200      300      400      500     1000
 930          DQ       0        0       0       17      67      167      267      367      867

 931          KK  RR4446
 932          KM             ROUTE DV044B THRU REACH RR4446
 933          KM             STORM DRAIN FLOW EAST IN CACTUS RD TO 68TH ST
 934          RK    1110    .0026    .013             CIRC        5

 935          KK   DR036     RETRIEVE DR036 CACTUS RD STORM DRAIN FLOW
 936          DR   DR036

 937          KK  RR3646
 938          KM             ROUTE DR036 THRU REACH RR3646
 939          KM             STORM DRAIN FLOW WEST IN CACTUS RD TO 68TH ST
 940          RK     580    .0026    .013             CIRC      5.5
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 941          KK   SB045     BASIN
 942          KM             CP @ 68TH ST & TBIRD
 943          BA   0.030
 944          LG    0.27     0.25    4.65     0.38      38
 945          UC   0.283    0.386
 946          UA       0      5.0    16.0     30.0    65.0     77.0     84.0     90.0     94.0     97.0
 947          UA     100

 948          KK  RR046A     ROUTE   REACH
 949          KM             ROUTE HYDROGRAPH SB045 THRU REACH RR046A,
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 950          KM          68TH ST BOTH NORMAL AND INV CROWN TO LARKSPUR
 951          RS       2   FLOW      0
 952          RC   0.025  0.016   0.025    3800  0.0080    0.00
 953          RX     0.0    0.1     5.0     5.0    45.0    45.1    52.0    52.1
 954          RY   103.0  100.9   100.9   100.2   100.2    10.9   100.9   103.0

 955          KK  RR046B  ROUTE   REACH
 956          KM          ROUTE HYDROGRAPH RR046A THRU REACH RR046B,
 957          KM          GRASS LINED TRAP CHANNEL, LARKSPUR TO CACTUS RD
 958          RS       1   FLOW      0
 959          RC   0.030  0.030   0.030    1400  0.0070    0.00
 960          RX     0.0    0.1     4.0     6.5     6.6     9.0    13.0    13.1
 961          RY   105.0  103.0   100.5   100.0   100.0   100.5   102.0   105.0

 962          KK   SB046  BASIN
 963          KM          CP @ CACTUS RD AND 68TH ST
 964          BA   0.190
 965          LG    0.28   0.25    4.65    0.38      33
 966          UC   0.342  0.304
 967          UA       0    5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 968          UA     100

 969          KK  AD046A  COMBINE HYDROGRAPHS RR046B AND SB046
 970          KM          CP @ CACTUS RD & 68TH ST, SURFACE FLOW FROM NORTH
 971          HC       2   0.22

 972          KK  AD046B  COMBINE HYDROGRAPHS RR4446, RR3646 AND AD046A
 973          KM          TOTAL SD FLOW FROM EAST AND WEST AND SURFACE FLOW FROM NORTH
 974          HC       3   1.03

 975          KK   DV046  SPLIT FLOW. REMAINDER FLOW (DV046) IS BASED ON CAPACITY OF 1-96IN
 976          KM          DIAM CIP CONC SD PIPE @ S=0.00416 SOUTH IN 68TH ST, UPPER REACH OF
 977          KM          OUTFALL TO MESCAL PARK DET BASIN. HYDROGRAPH ASSOC WITH DQ (DR046)
 978          KM          OVERFLOWS CACTUS ROAD AND FLOWS SOUTH IN 68TH ST.
 979          DT   DR046
 980          DI       0    300     588    1000    1500
 981          DQ       0      0       0     412     912

 982          KK  RR047A
 983          KM          ROUTE DV046 THRU REACH RR047A, 1-96IN DIAM STORM DRAIN OUTFALL SOUTH
 984          KM          IN 68TH ST FROM CACTUS RD TO JUST SOUTH OF JENAN DR.
 985          RK    1500   .004    .013            CIRC       8
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 986          KK  RR4748
 987          KM          ROUTE RR047A THRU REACH RR4748, EQUIVILENT OF 2-78IN DIAM STORM DRAIN
 988          KM          OUTFALL SOUTH IN 68TH ST FROM JENAN DR TO CHOLLA THEN EAST IN CHOLLA
 989          KM          TO 68TH PL THEN SOUTH TO MESCAL PARK DETENTION BASIN.
 990          KM          PIPE FLOWING FULL, 2-78IN DIAM SD = 575 CFS
 991          KM          PIPE FLOWING FULL, 1-102IN DIAM SD = 590 CFS
 992          RK    2300   .003    .013            CIRC     8.5

 993          KK   SB048  BASIN
 994          KM          CP @ 68TH PL, SURFACE INFLOW TO MESCAL PARK DET BASIN
 995          BA   0.090
 996          LG    0.29   0.25    4.65    0.39      22
 997          UC   0.238  0.218
 998          UA       0    5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 999          UA     100

1000          KK   AD048  COMBINE HYDROGRAPHS RR4748 AND SB048
1001          KM          TOTAL COMB STORM DRAIN AND SURFACE FLOW INTO MESCAL PARK DET BASIN
1002          HC       2   0.98

1003          KK   LP048  ROUTE FLOW THRU MESCAL PARK DET BASIN
1004          KM          PRIMARY OUTLET CONSISTS OF 1-60IN DIAM OUTLET PIPE UNDER OUTLET
1005          KM          CONTROL.  OVERFLOW IS TOP OF BASIN ELEV 1363.5 @ SW CORNER OF PARK.
1006          KM          SPILLWAY ACTS AS BROAD CRESTED WIER WITH ESTIMATED EFFECTIVE LENGTH
1007          KM          OF 300FT.
1008          RS       1   STOR      0
1009          SV       0    3.6    11.6    20.5    21.8    30.3    38.1    43.4
1010          SQ       0      1      96     137     153     169     189    1102
1011          SE  1354.5 1356.0  1358.0  1360.0  1361.0  1362.0  1363.5  1364.5

1012          KK   DV048  SPLIT FLOW.  FLOW DIVERSION TO REFLECT MESCAL PARK OVERFLOW WHICH
1013          KM          WILL LATER BE ROUTED THRU SB049.  REMAINDER FLOW (DV048) IS ROUTED
1014          KM          THRU 60IN DIAM SD OUTFALLING INTO 71ST ST CHANNEL.  DIVERTED FLOW
1015          KM          (DR048) WILL BE RECALLED AND ROUTED DOWN 68TH PL AND SHEA BLVD.
1016          DT   DR048
1017          DI       0    200    1118    1879
1018          DQ       0      0     900    1655

1019          KK  RR037D
1020          KM          ROUTE LP048 THRU REACH RR037D 60IN DIA STORM DRAIN OUTFALL TO
1021          KM          71ST ST CHANNEL
1022          RK    1400   .001    .013            CIRC       5

1023          KK  AD037D  COMBINE HYDROGRAPHS AD037C AND RR037D
1024          KM          CP @ 71ST ST CHANNEL APPROX 500FT SOUTH OF MESCAL ST
1025          HC       2   4.12

1026          KK  RR049A  ROUTE   REACH
1027          KM          ROUTE HYDROGRAPH AD037D THRU REACH RR049A, 71ST STREET CHANNEL.
1028          KM          MOSTLY LANDSCAPED EARTH CHANNEL
1029          RS       1   FLOW      0
1030          RC   0.030  0.018   0.030    1450  0.0070    0.00
1031          RX   974.1  974.1   991.0   996.2  1000.0  1003.8  1027.0  1027.1
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1032          RY   365.0   360.5   355.7   353.5   353.5   353.5   360.0   365.0
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1033          KK   SB049   BASIN
1034          KM           CP @ 71ST ST CHANNEL @ SHEA BLVD BOX CULVERT
1035          BA   0.140
1036          LG    0.14    0.25    4.65    0.38      70
1037          UC   0.263   0.153
1038          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
1039          UA     100

1040          KK   DR048   RETRIEVE MESCAL PARK OVERFLOW
1041          DR   DR048

1042          KK  RR049B   ROUTE   REACH
1043          KM           ROUTE HYDROGRAPH DR048 THRU REACH RR049B SOUTH ON 68TH PL AND
1044          KM           EAST ON SHEA BLVD TO SUMP NEAR 70TH ST (REED RD).
1045          RS       1    FLOW       0
1046          RC   0.025   0.015   0.025    2500  0.0040    0.00
1047          RX     0.0    20.0    24.0    24.5    56.5    57.0    63.0    63.1
1048          RY   102.3   100.3   100.3   100.2   100.2   100.3   100.3   102.3

1049          KK  AD049A   COMBINE SB049 AND RR049B HYDROGRAPHS
1050          HC       2    0.45

1051          KK   DV049   SPLIT FLOW. REMAINDER FLOW (DV049) IS BASED ON COMBINED CAPACITY OF
1052          KM           1-30IN, 1-24IN AND 2-18IN DIAM CONC SD PIPES THAT ENTER THE 71ST ST
1053          KM           CHANNEL BOX CULVERT @ SHEA BLVD (ON NORTH SIDE OF SHEA), ALL @
1054          KM           ASSUMED S=0.005FT/FT. DIVERTED FLOW, DQ (DR049) OVERFLOWS SUMP IN
1055          KM           SHEA BLVD JUST WEST OF 70TH ST (REED ROAD) AND FLOWS SOUTH ON REED.
1056          DT   DR049
1057          DI       0      30      63     100     150     200     300     400     800
1058          DQ       0       0       3      40      90     140     240     340     740

1059          KK   SB050   BASIN
1060          KM           CP @ SCOTTSDALE RD AND SHEA BLVD
1061          BA   0.040
1062          LG    0.10    0.25    4.65    0.38      80
1063          UC   0.213   0.176
1064          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
1065          UA     100

1066          KK   DV050   SPLIT FLOW. REMAINDER FLOW (DV050) IS BASED ON CAPACITY OF 48IN DIAM
1067          KM           STORM DRAIN PIPE IN SHEA BLVD @ S=0.00524 FT/FT AND IS ROUTED WEST IN
1068          KM           SHEA TO 71ST ST CHANNEL. HYDROGRAPH ASSOC WITH DQ (DR050) FLOWS
1069          KM           SOUTH ON SCOTTSDALE ROAD PAST SHEA INTERSECTION.
1070          DT   DR050
1071          DI       0      50     105     200     400
1072          DQ       0       0       0      95     295

1073          KK  RR049C
1074          KM           ROUTE DV050 THRU REACH RR049C
1075          KM           STORM DRAIN IN SHEA TO 71ST ST CHANNEL
1076          RK     580    .005    .013            CIRC       4
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1077          KK  AD049B   COMBINE HYDROGRAPHS RR049A, DV049 AND RR049C
1078          KM           TOTAL COMBINED FLOW @ SHEA AND 71ST ST CHAN FROM NORTH, EAST & WEST
1079          HC       3    4.23

1080          KK  RR051A   ROUTE   REACH
1081          KM           ROUTE HYDROGRAPH AD049 THRU REACH RR051A, 71ST STREET CHANNEL.
1082          KM           CONC "V" CHANNEL, SHEA TO COCHISE
1083          RS       1    FLOW       0
1084          RC   0.018   0.018   0.018    1300  0.0040    0.00
1085          RX   989.2   989.3   989.4   993.8  1000.0  1006.2  1008.7  1009.0
1086          RY   350.0   347.0   345.2   338.2   338.1   338.0   345.2   350.0

1087          KK  RR051B   ROUTE   REACH
1088          KM           ROUTE HYDROGRAPH RR051A THRU REACH RR051B,
1089          KM           CONC "V" CHANNEL, COCHISE TO GOLD DUST
1090          RS       1    FLOW       0
1091          RC   0.030   0.018   0.030    1300  0.0030    0.00
1092          RX   970.1   970.2   971.2   991.3  1000.0  1008.7  1039.1  1039.2
1093          RY   340.0   339.0   338.0   332.5   332.5   332.4   339.3   340.0

1094          KK  RR051C   ROUTE   REACH
1095          KM           ROUTE HYDROGRAPH RR051B THRU REACH RR051C
1096          KM           LANDSCAPED EARTH CHANNEL, FROM GOLD DUST TO BERNEIL DITCH
1097          RS       1    FLOW       0
1098          RC   0.035   0.035   0.035    1300  0.0030    0.00
1099          RX   969.9   983.6   994.4  1000.0  1002.3  1005.4  1016.9  1033.2
1100          RY   340.9   336.6   335.1   335.1   335.0   336.4   336.7   341.9

1101          KK   SB051   BASIN
1102          KM           CP @ 71ST ST CHANNEL AND BERNEIL DITCH
1103          BA   0.090
1104          LG    0.17    0.25    4.65    0.38      64
1105          UC   0.233   0.180
1106          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
1107          UA     100

1108          KK   AD051   COMBINE HYDROGRAPHS RR051C AND SB051
1109          KM           TOTAL FLOW IN 71ST ST CHANNEL @ CONFL 71ST ST CHANNEL & BERNEIL
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1110         HC      2    4.32

1111         KK  SB052   BASIN
1112         KM          CP @ SOUTH END OF 75TH ST CULDESAC, BELOW CHOLLA
1113         BA  0.170
1114         LG   0.29    0.25    4.65    0.38      26
1115         UC  0.392   0.371
1116         UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
1117         UA    100

1118         KK  DV052   SPLIT FLOW 50/50. REMAINDER FLOW (DV052) GOES WEST IN CONC LINED
1119         KM          CHANNEL. DIVERTED FLOW (DR052) GOES EAST AND LEAVES STUDY
1120         DT  DR052
1121         DI      0      50     100     200     300     400
1122         DQ      0      25      50     100     150     200
1                                        HEC-1 INPUT                                          PAGE 27

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1123         KK RR053A   ROUTE   REACH
1124         KM          ROUTE HYDROGRAPH DV052 THRU REACH RR053A,
1125         KM          CONC TRAP CHANNEL TO 74TH ST LOOP
1126         RS      1    FLOW       0
1127         RC  0.025   0.018   0.025     900  0.0020    0.00
1128         RX    0.0     0.1     2.0    10.0    13.0    21.0    23.0    23.1
1129         RY  110.0   104.0   104.0   100.0   100.0   104.0   104.0   110.0

1130         KK RR053B
1131         KM          ROUTE RR053A THRU REACH RR053B,
1132         KM          8FT X 3FT RCB STORM DRAIN THRU COMM/RET PARCEL TO SHEA BLVD
1133         RK   1300    .004    .013            TRAP       8     .01

1134         KK  SB053   BASIN
1135         KM          CP @ SHEA BLVD @ NE CORNER OF WINDMILL PLAZA
1136         BA  0.100
1137         LG   0.20    0.25    4.65    0.38      52
1138         UC  0.275   0.221
1139         UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
1140         UA    100

1141         KK  AD053   COMBINE HYDROGRAPHS RR053B AND SB053
1142         HC      2    0.27

1143         KK RR054A   ROUTE   REACH
1144         KM          ROUTE HYDROGRAPH AD053 THRU REACH RR054A, SHEA TO GOLD DUST.
1145         KM          UPPER REACH IS 1-10X3 RCB. LOWER REACH IS USED TO REPRESENT ROUTING
1146         KM          SECTION AND CONSISTS OF CONC TRAP CHANNEL BEHIND WINDMILL PLAZA
1147         RS      1    FLOW       0
1148         RC  0.018   0.018   0.016    1200  0.0025    0.00
1149         RX    0.0     0.1     6.0    10.0    12.0    33.0    59.0    59.1
1150         RY  107.0   100.0   100.0   100.0   100.0   101.8   102.3   103.3

1151         KK DV054A   SPLIT FLOW.  DIVERTED FLOW (DR054A) BASED ON FLOWING FULL CAPACITY
1152         KM          (APPROX 160 CFS) ASSOCIATED WITH 1-10X3 RCB THRU MONTIERRA APTS
1153         KM          SOUTH OF GOLD DUST. REMAINDER FLOW (DV054A) WILL SURFACE DRAIN TO
1154         KM          INTERSECTION SCOTTSDALE RD AND GOLD DUST VIA WINDMILL ALLEY
1155         DT DR054A
1156         DI      0     100     160     300     400     500     600     700
1157         DQ      0     100     160     160     160     160     160     160

1158         KK RR055A   ROUTE   REACH
1159         KM          ROUTE HYDROGRAPH DR054A THRU REACH RR055A,
1160         KM          ALLEY ON SOUTH SIDE WINDMILL NORTH SIDE GOLD DUST
1161         RS      1    FLOW       0
1162         RC  0.025   0.025   0.025     600  0.0014    0.00
1163         RX    0.0     0.1     0.2     0.3    25.3    25.4    25.5    25.6
1164         RY  103.0   103.0   103.0   100.0   100.0   103.0   103.0   103.0
1                                        HEC-1 INPUT                                          PAGE 28

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1165         KK  DR050   RETRIEVE SURFACE BYPASS FLOW FROM SCOTTSDALE/SHEA INTERSECTION
1166         DR  DR050

1167         KK RR055B   ROUTE   REACH
1168         KM          ROUTE HYDROGRAPH DR050 THRU REACH RR055B,
1169         KM          SCOTTSDALE ROAD FROM SHEA TO GOLD DUST
1170         RS      1    FLOW       0
1171         RC  0.025   0.016   0.025    1320  0.0060    0.00
1172         RX    0.0     0.1     8.5     8.6    96.4    96.5   104.9   105.0
1173         RY  103.0   100.5   100.5   100.3   100.3   100.5   100.5   103.0

1174         KK AD055A   COMBINE HYDROGRAPHS RR055A AND RR055B, Q IN SDALE RD @ GOLD DUST
1175         HC      2    0.34

1176         KK RR055C   ROUTE   REACH
1177         KM          ROUTE HYDROGRAPH AD055A THRU REACH RR055C, SDALE RD FROM GOLD DUST
1178         KM          TO MTN VIEW
1179         RS      1    FLOW       0
1180         RC  0.025   0.016   0.025    1320  0.0060    0.00
1181         RX    0.0     0.1     8.5     8.6    96.4    96.5   104.9   105.0
1182         RY  103.0   100.5   100.5   100.3   100.3   100.5   100.5   103.0

1183         KK  SB055   BASIN
1184         KM          CP ON SCOTTSDALE RD @ MTN VIEW, NOT BERNEIL ABOVE 71ST ST CHANNEL
1185         BA  0.053
1186         LG   0.11    0.25    4.65    0.38      78
1187         UC  0.242   0.253
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1188        UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
1189        UA    100

1190        KK  AD055B   COMBINE HYDROGRAPHS RR055C AND SB055
1191        KM           TOTAL Q IN SCOTTSDALE ROAD FLOWING SOUTH AT MTN VIEW
1192        HC      2     0.39

1193        KK   DV055   SPLIT FLOW. REMAINDER FLOW (DV055) ENTERS BERNEIL DITCH. DIVERTED
1194        KM           FLOW (DR055) GOES SOUTH DOWN SDALE RD AND LEAVES STUDY. FLOW SPLIT
1195        KM           ASSUMES ALL FLOW ON EAST SIDE OF SDALE RD AND HALF OF FLOW ON WEST
1196        KM           SIDE OF SDALE RD CONTINUES SOUTH PAST MTN VIEW. DIVERTED FLOW
1197        KM           GOING SOUTH ON SCOTTSDALE RD WILL BE RECALLED AT END OF MODEL, AND
1198        KM           ADDED TO DR054B. OTHER HALF OF FLOW ON WEST SIDE SDALE RD GOES INTO
1199        KM           BERNEIL DITCH
1200        DT   DR055
1201        DI      0     100     200     400     600     800
1202        DQ      0      75     150     300     450     600

1203        KK  DR054A   RETRIEVE FLOW FROM GOLD DUST CULVERT @ SE COR WINDMILL PLAZA
1204        DR  DR054A

1205        KK  RR054B
1206        KM           ROUTE DR054A THRU REACH RR054B,
1207        KM           1-10X3 RCB STORM DRAIN THRU MONTIERRA APTS TO SDALE RD
1208        RK   1600   .0066    .013            TRAP      10      .01
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1209        KK   SB054   BASIN
1210        KM           CP @ SCOTTSDALE RD AND MTN VIEW
1211        BA  0.110
1212        LG   0.18    0.25    4.65    0.38      61
1213        UC  0.338   0.307
1214        UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
1215        UA    100

1216        KK   AD054   COMBINE HYDROGRAPHS RR054B AND SB054
1217        KM           TOTAL FLOW APPROACHING EAST SIDE SDALE RD @ MTN VIEW
1218        HC      2     0.24

1219        KK  DV054B   SPLIT FLOW. REMAINDER FLOW (DV054B) ENTERS BERNEIL DITCH VIA RCB
1220        KM           UNDER SDALE RD @ MTN VIEW. Q ASSOCIATED WITH DV054B BASED ON FLOWING
1221        KM           FULL CAPACITY OF 1-10X3 RCB THRU MONTIERRA APTS (APPROX 160 CFS).
1222        KM           DIVERTED FLOW (DR054B) IS ADDED TO DR055 @ END OF MODEL AND GOES
1223        KM           SOUTH DOWN SDALE ROAD LEAVING STUDY.
1224        DT  DR054B
1225        DI      0     100     200     400     600     800
1226        DQ      0       0      40     240     440     640

1227        KK  AD055C   COMBINE HYDROGRAPHS DV055 AND DV054B
1228        KM           TOTAL Q @ START OF BERNEIL DITCH JUST WEST OF SCOTTSDALE ROAD
1229        HC      2     0.39
            * ****************************************************************************
            * NOTE: IN ALL THE ROUTING STEPS THAT FOLLOW REGARDING THE BERNEIL DITCH, IT IS
            * ASSUMED THAT ALL OF THE FLOW IN THE DITCH REMAINS IN THE DITCH EVEN THOUGH
            * HISTORICAL ACCOUNTS AND THE HEC-RAS BACKWATER MODEL INDICATE THAT FLOW BREAKS
            * OUT OF THE CHANNEL AND GOES SOUTH. IF THIS OCCURS, THE BREAKOUT FLOW WOULD GO
            * DIRECTLY TO THE INDIAN BEND WASH AND WOULD NOT RETURN TO THE BERNEIL DITCH.
            * ****************************************************************************

1230        KK  RR055D   ROUTE   REACH
1231        KM           ROUTE HYDROGRAPH AD055C THRU REACH RR055D,
1232        KM           BERNEIL DITCH EARTH CHANNEL SCOTTSDALE RD TO 71ST ST CHANNEL
1233        RS      1     FLOW       0
1234        RC  0.030   0.030   0.030     600  0.0010    0.00
1235        RX  944.0   944.2   947.5   962.2   990.1  1000.0  1009.9  1035.8
1236        RY  334.4   334.4   335.2   335.4   331.5   331.4   331.2   337.5

1237        KK  AD055D   COMBINE HYDROGRAPHS AD051 AND RR055D
1238        KM           TOTAL Q IN BERNEIL DITCH @ CONFL BERNEIL DITCH AND 71ST ST CHANNEL
1239        HC      2     4.75

1240        KK  RR057A   ROUTE   REACH
1241        KM           ROUTE HYDROGRAPH AD055D THRU REACH RR057A,
1242        KM           BERNEIL DITCH EARTH CHANNEL FROM 71ST ST CHANNEL TO REED RD ALIGN
1243        RS      1     FLOW       0
1244        RC  0.030   0.030   0.030     700  0.0010    0.00
1245        RX  944.8   944.9   957.0   992.3  1007.8  1033.0  1039.7  1039.8
1246        RY  337.0   336.5   336.6   328.5   328.5   335.2   335.2   337.0
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1247        KK   DR049   RETRIEVE OVERFLOW OF SHEA BLVD SUMP JUST WEST OF 70TH ST (REED RD)
1248        DR   DR049

1249        KK  RR057B   ROUTE   REACH
1250        KM           ROUTE HYDROGRAPH DR049 THRU REACH RR057B, REED RD STREET SECT FROM
1251        KM           SHEA BLVD TO BERNEIL DITCH. DISREGARD STORM DRAIN CONVEYANCE.
1252        RS      1     FLOW       0
1253        RC  0.025   0.016   0.025    2640  0.0080    0.00
1254        RX    0.0     0.1     5.0     5.1    59.0    59.1    64.0    64.1
1255        RY  103.0   100.6   100.6   100.3   100.3   100.6   100.6   103.0

1256        KK  AD057A   COMBINE HYDROGRAPHS RR057A AND RR057B
1257        KM           TOTAL Q BERNEIL DITCH AT REED RD ALIGNMENT
1258        HC      2     5.28
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1259          KK  RR057C   ROUTE   REACH
1260          KM           ROUTE HYDROGRAPH AD057A THRU REACH RR057C,
1261          KM           BERNEIL DITCH EARTH CHANNEL FROM REED RD ALIGN TO 68TH ST ALIGN
1262          RS       1    FLOW       0
1263          RC   0.030   0.030   0.030    1300  0.0010    0.00
1264          RX   944.8   944.9   957.0   992.3  1007.8  1033.0  1039.7  1039.8
1265          RY   337.0   336.5   336.6   328.5   328.5   335.2   335.2   337.0

1266          KK   SB057   BASIN
1267          KM           CP NEAR SW COR CHAPARRAL HIGH SCHOOL
1268          BA   0.150
1269          LG    0.18    0.25    4.65    0.36      59
1270          UC   0.221   0.127
1271          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
1272          UA     100

1273          KK  AD057B   COMBINE HYDROGRAPHS RR057C AND SB057
1274          KM           TOTAL Q BERNEIL DITCH NEAR SW COR CHAPARRAL HIGH
1275          HC       2    5.28

1276          KK   DR046   RETRIEVE SURFACE OVERFLOW FROM CACTUS ROAD SOUTH ON 68TH ST
1277          DR   DR046

1278          KK  RR047B   ROUTE   REACH
1279          KM           ROUTE HYDROGRAPH DR046 THRU REACH RR047,
1280          KM           68TH ST INV CROWN FROM CACTUS RD TO SHEA BLVD
1281          RS       3    FLOW       0
1282          RC   0.025   0.016   0.025    5500  0.0060    0.00
1283          RX     0.0     0.1    10.0    10.1    45.9    46.0    74.0    74.1
1284          RY   105.0   100.9   100.9   100.2   100.2   100.9   102.4   105.0

1285          KK   SB047   BASIN
1286          KM           CP 68TH ST AND SHEA BLVD COMBO DIP AND LOW FLOW CULVERT/SD XING
1287          BA   0.190
1288          LG    0.28    0.25    4.65    0.37      28
1289          UC   0.371   0.337
1290          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
1291          UA     100
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1292          KK   AD047   COMBINE HYDROGRAPHS RR047B AND SB047
1293          HC       2    0.33

1294          KK   RR058   ROUTE   REACH
1295          KM           ROUTE HYDROGRAPH AD047 THRU REACH RR058,
1296          KM           68TH ST INV CROWN FROM SHEA TO MTN VIEW CHANNEL (NEAR BERNEIL CONFL)
1297          RS       1    FLOW       0
1298          RC   0.025   0.016   0.025    2750  0.0090    0.00
1299          RX     0.0     0.1     5.0     5.1    43.9    44.0    49.0    49.1
1300          RY   103.0   100.9   100.9   100.2   100.2   100.9   100.9   103.0

1301          KK   SB058   BASIN
1302          KM           CP 68TH ST AND MTN VIEW CHANNEL
1303          BA   0.060
1304          LG    0.30    0.25    4.65    0.38      24
1305          UC   0.246   0.247
1306          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
1307          UA     100

1308          KK  AD058A   COMBINE HYDROGRAPHS RR058 AND SB058
1309          HC       2    0.39

1310          KK  DR044B   RETRIEVE SURFACE OVERFLOW FROM CACTUS ROAD SOUTH ON 66TH ST
1311          DR  DR044B

1312          KK  RR059A   ROUTE   REACH
1313          KM           ROUTE HYDROGRAPH DR044 THRU REACH RR059A,
1314          KM           66TH ST INV CROWN FROM CACTUS RD TO SHEA BLVD
1315          RS       2    FLOW       0
1316          RC   0.025   0.016   0.025    5400  0.0060    0.00
1317          RX     0.0     0.1    12.3    12.4    51.3    51.4    56.0    56.1
1318          RY   105.9   100.9   100.9   100.2   100.2   100.9   100.9   105.9

1319          KK   SB059   BASIN
1320          KM           CP 66TH ST AND SHEA BLVD COMBO DIP AND LOW FLOW CULVERT/SD XING
1321          BA   0.230
1322          LG    0.30    0.25    4.65    0.38      25
1323          UC   0.396   0.335
1324          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
1325          UA     100

1326          KK  AD059A   COMBINE HYDROGRAPHS RR059A AND SB059
1327          HC       2    0.30

1328          KK  SB061A   BASIN
1329          KM           CP @ JACKRABBIT PARK DET BASIN (WEST BASIN) FROM NORTH AND WEST
1330          BA   0.190
1331          LG    0.27    0.25    4.65    0.39      32
1332          UC   0.433   0.467
1333          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
1334          UA     100
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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1335      KK  SB061B   BASIN
1336      KM           CP @ 60TH ST AND JACKRABBIT PARK DET BASIN
1337      BA   0.110
1338      LG    0.30    0.25    4.65    0.37      22
1339      UC   0.325   0.374
1340      UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
1341      UA     100

1342      KK  DV061B   SPLIT FLOW. REMAINDER FLOW (DV061B) IS BASED ON CAPACITY OF 60TH ST
1343      KM           36 IN. DIA STORM DRAIN THAT DISCHARGES INTO JACKRABBIT DET BASIN
1344      KM           WEST. DIVERTED FLOW DQ(DR061B) IS FLOW-BY IN 60TH ST AND CONTINUES
1345      KM           SOUTH, LEAVING THE STUDY AREA.
1346      DT  DR061B
1347      DI       0      47     100     150     200     300     400     800
1348      DQ       0       0      53     103     153     253     353     753

1349      KK   DR038   RETRIEVE FLOW INTERCEPTED BY CATCH BASINS @ 64TH ST AND PARADISE LN
1350      DR   DR038

1351      KK  RR061C
1352      KM           ROUTE DR038 THRU REACH RR061C, SD OF UNK SIZE UNDER PARADISE LN FROM
1353      KM           64TH ST TO JACKRABBIT PARK EAST BASIN. OUTFALL SD TO JACKRABBIT PARK
1354      KM           IS 60IN DIAM. FOR ROUTING PURPOSES, DIAM = 60IN, S = 0.005(ASSUMED)
1355      RK    1600    .005    .013            CIRC       5

1356      KK  SB061C   BASIN
1357      KM           CP @ JACKRABBIT PARK DET BASIN (EAST BASIN) FROM NORTH AND EAST
1358      BA   0.270
1359      LG    0.23    0.25    4.65    0.38      46
1360      UC   0.313   0.222
1361      UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
1362      UA     100

1363      KK  AD061A   COMBINE HYDROGRAPHS SB061C AND RR061C, TOTAL INFLOW TO JACKRBT EAST
1364      HC       2    0.30

1365      KK  AD061B   COMBINE HYDROGRAPHS SB061A, DV061B AND AD061A; TOTAL INFLOW TO
1366      KM           JACKRABBIT PARK DET BASINS (EAST AND WEST)
1367      HC       3    0.60

1368      KK   LP061   ROUTE FLOW THRU JACKRABBIT PARK DET BASIN, COMBINED EAST AND WEST.
1369      KM           PRIMARY OUTLET IS 1-30IN DIAM SD PIPE UNDER PARADISE LN.
1370      KM           OVERFLOW CONSISTS OF CONC SPILLWAY PAD JUST NORTH OF PARADISE LN
1371      RS       1    STOR       0
1372      SV       0     0.7     3.2     7.3    12.0    19.3    29.4    41.6    54.7    68.5
1373      SQ       0       8      16      28      37      45      50      55     150     320
1374      SE  1463.0  1464.0  1465.0  1466.0  1467.0  1468.0  1469.0  1470.0  1471.0  1472.0

1375      KK  RR062A   ROUTE   REACH
1376      KM           ROUTE HYDROGRAPH LP061 THRU REACH RR062A,
1377      KM           EARTH CHANNEL FROM PARADISE LN TO GREENWAY RD
1378      RS       4    FLOW       0
1379      RC   0.025   0.045   0.025    2750  0.0020    0.00
1380      RX     0.0     0.1    38.5    46.5    52.5    59.5    98.0    98.1
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LINE      ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1381      RY   108.8   103.8   102.3   100.9   100.9   102.3   104.8   108.8

1382      KK  RR062B   ROUTE   REACH
1383      KM           ROUTE HYDROGRAPH RR062A THRU REACH RR062B,
1384      KM           EARTH CHANNEL FROM GREENWAY RD TO CROSSED ARROWS PARK DET BASIN
1385      RS       1    FLOW       0
1386      RC   0.035   0.030   0.035    1450  0.0090    0.00
1387      RX     0.0     0.1    15.0    36.5    41.5    46.0    52.0    52.1
1388      RY   108.5   103.5   100.3   100.3   101.5   102.0   103.5   108.5

1389      KK   SB062   BASIN
1390      KM           CP @ CROSSED ARROWS PARK DET BASIN
1391      BA   0.340
1392      LG    0.24    0.25    4.65    0.39      43
1393      UC   0.321   0.206
1394      UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
1395      UA     100

1396      KK   AD062   COMBINE HYDROGRAPHS RR062B AND SB062
1397      KM           TOTAL INFLOW TO CROSSED ARROWS PARK DET BASIN
1398      HC       2    0.94

1399      KK   LP062   ROUTE FLOW THRU CROSSED ARROWS PARK DET BASIN
1400      KM           PRIMARY SPILLWAY CONSISTS OF 2-24IN DIAM CONC PIPES
1401      KM           OVERFLOW SPILLWAY CONSISTS OF LEVEL BROAD CREST WEIR @ EL1438, L=200'
1402      KM           15IN LOW FLOW BLEEDOFF:  PIPE FLOWING FULL = 5CFS; ASSUMING INLET
1403      KM           CONTROL -> HW/D = 6 WITH Q = 15 CFS.  ADJUST FOR LOW FLOW BLEEDOFF
1404      KM           BY ADDING 1CFS AT LOW HEAD AND 5 CFS AT HIGH HEAD.
1405      RS       1    STOR       0
1406      SV       0     0.9     3.1     6.7    11.4    17.6    25.8    36.1
1407      SQ       1       1      12      23      43      55      65     671
1408      SE  1432.0  1433.0  1434.0  1435.0  1436.0  1437.0  1438.0  1439.0

1409      KK   RR063   ROUTE   REACH
1410      KM           ROUTE HYDROGRAPH LP062 THRU REACH RR063,
1411      KM           EARTH CHANNEL FROM CROSSED ARROWS PARK DET BASIN TO TBIRD DET BASIN
1412      RS       2    FLOW       0
1413      RC   0.030   0.030   0.030    2800  0.0070    0.00
1414      RX     0.0     0.1    70.3    77.1    77.8    83.0   123.0   123.1
1415      RY   109.0   104.0   102.7   100.0   100.1   102.6   104.0   109.0

1416      KK   SB063   BASIN
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1417          KM           CP @ TBIRD DET BASIN, THUNDERBIRD RD JUST WEST OF 64TH ST
1418          BA    0.220
1419          LG     0.24    0.25    4.65    0.38      47
1420          UC    0.338   0.244
1421          UA        0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
1422          UA      100

1423          KK    AD063   COMBINE HYDROGRAPHS RR063 AND SB063
1424          KM            TOTAL INFLOW TO TBIRD ROAD DET BASIN
1425          HC        2    1.16
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1426          KK    LP063   ROUTE FLOW THRU TBIRD ROAD DET BASIN
1427          KM            48IN DIA LOW FLOW STORM DRAIN OUTLET PIPE, SURFACE OVERFLOW @ EAST
1428          KM            AND WEST ENDS OF BASIN BEGINNING @ ELEV 1418
1429          RS        1    STOR       0
1430          SV        0     0.3     0.4     1.4     3.1     5.1     7.4     9.6
1431          SQ        0      11      21      45      60      95     410     980
1432          SE   1412.0  1413.0  1414.0  1415.0  1416.0  1417.0  1418.0  1419.0

1433          KK  DV063A    SPLIT FLOW. REMAINDER FLOW (DV063A) SPILLS OUT OF BASIN @ EAST AND
1434          KM            WEST ENDS. DIVERTED FLOW (DR063A) IS DIVERTED WEST OUT OF STUDY AREA
1435          KM            BY 48IN DIA STORM DRAIN @ ASSUMED S=0.005 FT/FT UNDER TBIRD ROAD
1436          DT  DR063A
1437          DI        0      11      21      45      60      95     410     980
1438          DQ        0      11      21      45      60      95     110     130

1439          KK  DV063B    YES ALREADY, SPLIT FLOW AGAIN. REMAINDER FLOW (DV063B) SPILLS OUT OF
1440          KM            BASIN @ ITS EAST END INTO 64TH ST. DIVERTED FLOW (DR063B) SPILLS OUT
1441          KM            OF BASIN AT ITS WEST END INTO TBIRD AND DOWN 63RD STREET.
1442          KM            BOTH ENDS OF BASIN HAVE ESSENTIALLY SAME ELEV AND SAME LENGTH
1443          DT  DR063B
1444          DI        0      50     100     150     200     300     500     800
1445          DQ        0      25      50      75     100     150     250     400

1446          KK    DR041   RETRIEVE STORM DRAIN OUTLET LOW FLOW FROM SANDPIPER PARK
1447          DR    DR041

1448          KK  RR064A    ROUTE    REACH
1449          KM            ROUTE DR041 THRU REACH RR064A ALONG HEARN RD STORM DRAIN TO 64TH ST
1450          KM            THIS STEP CORRESPONDS TO CVL R450
1451          RS        2    ELEV       7
1452          RC    0.015   0.015   0.015    1600  0.0019    0.00
1453          RX     50.0    60.0    60.1    98.0   102.0   140.0   140.1   150.0
1454          RY     17.0    15.0     9.0     7.0     7.0     9.0    15.0    17.0

1455          KK    DR039   RETRIEVE FLOW FROM SPLIT AT 64TH ST AND GREENWAY
1456          KM            THIS STEP CORRESPONDS TO CVL D900
1457          DR    DR039

1458          KK  RR064B    ROUTE    REACH
1459          KM            ROUTE DR039 THRU REACH RR064B DOWN 64TH ST TO HEARN.
1460          KM            THIS STEP CORRESPONDS TO CVL ROUTING R407, R431 AND R432
1461          RS        1    ELEV       9
1462          RC    0.015   0.015   0.015    2550  0.0094    0.00
1463          RX     50.0    60.0    60.1    98.0   102.0   140.0   140.1   150.0
1464          RY     17.0    15.0     9.0    10.0    10.0     9.0    15.0    17.0

1465          KK  AD064A    COMBINE RR064A AND RR064B
1466          HC        2    0.57
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1467          KK  RR064C    ROUTE    REACH
1468          KM            ROUTE AD064A THRU REACH RR064C DOWN 64TH ST FROM HEARN TO TBIRD
1469          RS        1    FLOW       0
1470          RC    0.025   0.016   0.025    1450  0.0030    0.00
1471          RX      0.0     0.1     5.5     5.6    71.5    71.6    76.5    76.6
1472          RY    105.5   100.5   100.5   100.3   100.3   100.5   100.5   105.5

1473          KK    SB064   BASIN
1474          KM            NOTE: CORRESPONDS, IN PART, TO CVL SUBBASINS SA131, 132, 134, 7
1475          KM            AND 150; CP @ 64TH ST AND HEARN. BASIN AREA IS FROM SCI
1476          BA    0.140
1477          LG     0.26    0.25    4.65    0.39      34
1478          UC    0.346   0.349
1479          UA        0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
1480          UA      100

1481          KK  AD064B    COMBINE RR064C AND SB064
1482          KM            TOTAL Q IN 64TH ST APPROACHING TBIRD FROM NORTH
1483          HC        2    0.71

1484          KK    DR043   RETRIEVE FLOW GOING WEST IN TBIRD FROM 66TH ST AND TBIRD DIVERSION
1485          DR    DR043

1486          KK  RR064D    ROUTE    REACH
1487          KM            ROUTE HYDROGRAPH DR043 THRU REACH RR064D TBIRD STREET SECT TO 64TH ST
1488          RS        4    FLOW       0
1489          RC    0.025   0.016   0.025    1250  0.0010    0.00
1490          RX      0.0     0.1     5.0     5.1    68.9    69.0    74.0    74.1
1491          RY    103.0   100.5   100.5   100.3   100.3   100.5   101.2   103.0

1492          KK  AD064C    COMBINE HYDROGRAPHS DV063B, AD064B AND RR064D
1493          KM            TOTAL Q IN 64TH ST AT TBIRD FROM WEST, NORTH AND EAST
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1494           HC        3    1.50

1495           KK   RR065A    ROUTE   REACH
1496           KM             ROUTE HYDROGRAPH AD064C THRU REACH RR065A DOWN 64TH ST TO DELCOA AVE
1497           RS        1     FLOW       0
1498           RC    0.025    0.016   0.025      800  0.0190     0.00
1499           RX      0.0      0.1     5.5      5.6    71.4     71.5     76.5     76.6
1500           RY    105.5    100.5   100.5    100.3   100.3    100.5    100.5    105.5

1501           KK   DR063B    RETRIEVE TBIRD BASIN WEST END OVERFLOW
1502           DR   DR063B

1503           KK   RR065B    ROUTE   REACH
1504           KM             ROUTE HYDROGRAPH DR063B THRU REACH RR065B SOUTH ON 63RD ST AND
1505           KM             EAST ON DELCOA AVE TO 64TH ST
1506           RS        1     FLOW       0
1507           RC    0.025    0.016   0.025     1300  0.0040     0.00
1508           RX      0.0      0.1     9.0      9.1    40.9     41.0     49.0     49.1
1509           RY    105.0    100.5   100.5    100.2   100.2    100.5    100.5    105.0
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LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1510           KK   AD065A    COMBINE HYDROGRAPHS RR065A AND RR065B
1511           HC        2     2.08

1512           KK   RR065C    ROUTE   REACH
1513           KM             ROUTE HYDROGRAPH AD065A THRU REACH RR065C DOWN 64TH ST FROM DELCOA
1514           KM             TO CACTUS
1515           RS        2     FLOW       0
1516           RC    0.025    0.016   0.025     4500  0.0050     0.00
1517           RX      0.0      0.1     5.5      5.6    71.4     71.5     76.5     76.6
1518           RY    105.0    100.5   100.5    100.3   100.3    100.5    100.5    105.0

1519           KK    SB065    BASIN
1520           KM             CP @ 64TH ST AND CACTUS
1521           BA    0.440
1522           LG     0.29     0.25    4.65     0.38      28
1523           UC    0.363    0.213
1524           UA        0      5.0    16.0     30.0    65.0     77.0     84.0     90.0     94.0     97.0
1525           UA      100

1526           KK   AD065B    COMBINE HYDROGRAPHS RR065C AND SB065
1527           KM             TOTAL Q IN 64TH ST AT CACTUS
1528           HC        2     2.52

1529           KK    RR066    ROUTE   REACH
1530           KM             ROUTE HYDROGRAPH AD065B THRU REACH RR066 DOWN 64TH ST FROM CACTUS
1531           KM             TO GARY RD
1532           RS        1     FLOW       0
1533           RC    0.025    0.025   0.016     3300  0.0050     0.00
1534           RX      0.0      0.1    15.0     18.0    21.0     32.0     72.0     72.1
1535           RY    106.0    101.5   100.0    100.0   100.0    101.2    101.2    106.0

1536           KK    SB066    BASIN
1537           KM             CP @ 64TH ST AND GARY RD
1538           BA    0.120
1539           LG     0.25     0.25    4.65     0.37      38
1540           UC    0.263    0.189
1541           UA        0      5.0    16.0     30.0    65.0     77.0     84.0     90.0     94.0     97.0
1542           UA      100

1543           KK    AD066    COMBINE HYDROGRAPHS RR066 AND SB066
1544           KM             TOTAL Q IN 64TH ST AT GARY RD
1545           HC        2     2.64

1546           KK   RR067A    ROUTE   REACH
1547           KM             ROUTE HYDROGRAPH AD066 THRU REACH RR067A DOWN 64TH ST CHANNEL FROM
1548           KM             GARY RD TO SHEA BLVD
1549           RS        1     FLOW       0
1550           RC    0.016    0.025   0.025     2100  0.0060     0.00
1551           RX      0.0      0.1    25.0     29.0    40.0     44.0     49.0     49.1
1552           RY    108.0    104.0   104.0    100.0   100.0    105.0    105.0    108.0
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LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1553           KK   SB067A    BASIN
1554           KM             CP @ 64TH ST AND MOUNTAIN VIEW ROAD ALIGN
1555           BA    0.100
1556           LG     0.30     0.25    4.65     0.38      24
1557           UC    0.283    0.204
1558           UA        0      5.0    16.0     30.0    65.0     77.0     84.0     90.0     94.0     97.0
1559           UA      100

1560           KK   DV067A    SPLIT FLOW. 30IN DIAM STORM DRAIN AT SHEA BLVD FLOWS WEST @ ASSUMED
1561           KM             S=0.0025 FT/FT. REMAINDER FLOW (DV067B) GOES SOUTH IN 64TH ST
1562           KM             CHANNEL. DIVERTED FLOW (DR067A) GOES WEST OUT OF PROJECT AREA.
1563           DT   DR067A
1564           DI        0       50     100      150     200      400
1565           DQ        0       21      21       21      21       21

1566           KK   AD067A    COMBINE SB067A AND DV067A, 64TH ST CHANNEL @ CULVERT UNDER SHEA
1567           HC        2     2.74

1568           KK   DV067B    SPLIT FLOW BASED ON RELATIVE CAPACITIES OF 64TH ST CHANNEL, FRONTAGE
1569           KM             ROAD ALONG NORTH SIDE OF SHEA AND CULVERT UNDER SHEA. REMAINDER FLOW
1570           KM             GOES EAST ALONG FRONTAGE ROAD TO 66TH STREET. DIVERTED FLOW GOES
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1571        KM              SOUTH DOWN 64TH ST CHANNEL.
1572        DT  DR067B
1573        DI       0        381      679     1126
1574        DQ       0        381      523      654

1575        KK  RR059B      ROUTE   REACH
1576        KM              ROUTE REACH DOWN FRONTAGE ROAD
1577        RS       1       FLOW        0
1578        RC   0.016      0.016    0.016     1250  0.0050     0.00
1579        RX     0.0        0.1      8.0     16.0    20.0     24.0     24.9     25.0
1580        RY   103.0      100.0    100.0    100.0   100.0    100.0    100.0    103.0

1581        KK  AD059B      ADD RR059B AND AD059A
1582        HC       2       1.02

1583        KK  RR060A      ROUTE   REACH
1584        KM              ROUTE HYDROGRAPH AD059B THRU REACH RR060,
1585        KM              66TH/67TH ST INV CROWN FROM SHEA BLVD TO MTN VIEW CHANNEL
1586        KM              (APPROX 500FT WEST OF CONFL WITH BERNEIL DITCH)
1587        RS       1       FLOW        0
1588        RC   0.025      0.016    0.025     2600  0.0100     0.00
1589        RX     0.0        0.1     17.0     17.1    47.9     48.0     58.5     58.6
1590        RY   104.0      102.4    100.9    100.2   100.2    100.9    102.4    104.0

1591        KK   SB060      BASIN
1592        KM              CP 67TH ST AND MTN VIEW CHANNEL
1593        BA   0.180
1594        LG    0.12       0.25     4.65     0.38      74
1595        UC   0.254      0.158
1596        UA       0        5.0     16.0     30.0    65.0     77.0     84.0     90.0     94.0     97.0
1597        UA     100
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LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1598        KK  AD060A      COMBINE HYDROGRAPHS RR060A AND SB060, @ 67TH ST AND MTN VIEW CHANNEL
1599        HC       2       1.20

1600        KK  DR067B      RETRIEVE FLOW IN 64TH ST CHANNEL JUST SOUTH OF SHEA
1601        DR  DR067B

1602        KK  RR067B      ROUTE   REACH
1603        KM              ROUTE HYDROGRAPH DR067B THRU REACH RR067B DOWN 64TH ST CHANNEL FROM
1604        KM              SHEA TO MTN VIEW
1605        RS       1       FLOW        0
1606        RC   0.025      0.025    0.025     2500  0.0060     0.00
1607        RX     0.0        0.1      5.0     20.0    31.0     46.0     62.0     62.1
1608        RY   110.0      107.5    107.5    100.0   100.0    107.5    107.3    110.0

1609        KK  SB067B      BASIN
1610        KM              CP @ 64TH ST AND MOUNTAIN VIEW ROAD ALIGN
1611        BA   0.090
1612        LG    0.30       0.25     4.65     0.38      24
1613        UC   0.292      0.257
1614        UA       0        5.0     16.0     30.0    65.0     77.0     84.0     90.0     94.0     97.0
1615        UA     100

1616        KK  AD067B      COMBINE HYDROGRAPHS RR067B AND SB067B
1617        KM              TOTAL Q IN 64TH ST CHANNEL AT MTN VIEW CHANNEL
1618        HC       2       2.11

1619        KK  DV067C      SPLIT FLOW. 50/50 FLOW SPLIT @ 64TH ST CHANNEL AND MTN VIEW CHANNEL.
1620        KM              REMAINDER FLOW (DV067C) GOES EAST IN MTN VIEW CHANNEL. DIVERTED FLOW
1621        KM              (DR067C) GOES SOUTH IN 64TH ST (INVERGORDON RD) CHANNEL TO IBW.
1622        DT  DR067C
1623        DI       0        100      500     1000    2000
1624        DQ       0         50      250      500    1000

1625        KK  RR060B      ROUTE   REACH
1626        KM              ROUTE HYDROGRAPH DV067C THRU REACH RR060B EAST IN MTN VIEW CHANNEL
1627        RS       1       FLOW        0
1628        RC   0.030      0.018    0.018     2000  0.0030     0.00
1629        RX   988.0      988.2    995.0   1000.0  1005.0   1014.7   1021.2   1021.5
1630        RY   343.0      340.6    337.3    337.3   337.3    341.7    341.8    343.0

1631        KK  AD060B      COMBINE HYDROGRAPHS AD060A AND RR060B
1632        KM              TOTAL Q IN MTN VIEW CHANNEL @ 67TH STREET
1633        HC       2       2.26

1634        KK  RR060C      ROUTE   REACH
1635        KM              ROUTE HYDROGRAPH AD060B THRU REACH RR060C EAST IN MTN VIEW CHANNEL
1636        KM              TO COFLUENCE WITH BERNEIL DITCH
1637        RS       1       FLOW        0
1638        RC   0.030      0.018    0.018      500  0.0030     0.00
1639        RX   961.9      962.0    987.0    997.0  1003.0   1013.0   1023.0   1023.1
1640        RY   342.0      338.2    338.2    331.4   331.4    339.9    339.9    342.0
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LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1641        KK  AD058B      COMBINE HYDROGRAPHS AD058A AND RR060C
1642        KM              TOTAL Q MTN VIEW CHANNEL @ CONFL WITH BERNEIL DITCH
1643        HC       2       2.65

1644        KK  AD057C      COMBINE HYDROGRAPHS AD058B AND AD057A
1645        KM              TOTAL Q BERNEIL DITCH JUST DS FROM CONFL WITH MTN VIEW CHANNEL
1646        HC       2       7.93
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1647             KK   RR068   ROUTE   REACH
1648             KM           ROUTE HYDROGRAPH AD057B THRU REACH RR068 SOUTH TO DBL TREE RANCH RD
1649             RS       1    FLOW       0
1650             RC   0.018   0.018   0.018     3800  0.0020     0.00
1651             RX   942.4   942.5   959.3    982.1  1017.9   1044.9   1055.0   1055.1
1652             RY   335.0   332.9   332.9    324.2   325.0    333.1    333.1    335.0

1653             KK   SB068   BASIN
1654             KM           CP @ BERNEIL DITCH AND DOUBLE TREE RANCH RD
1655             BA   0.110
1656             LG    0.30    0.25    4.65     0.38      24
1657             UC   0.633   0.907
1658             UA       0     5.0    16.0     30.0    65.0     77.0     84.0     90.0     94.0     97.0
1659             UA     100

1660             KK   AD068   COMBINE HYDROGRAPHS RR068 AND SB068
1661             KM           TOTAL Q IN BERNEIL DITCH @ DBL TREE
1662             HC       2    8.04

1663             KK  RR070A   ROUTE   REACH
1664             KM           ROUTE HYDROGRAPH AD068 THRU REACH RR070A SOUTH FROM DBL TREE TO IBW
1665             RS       1    FLOW       0
1666             RC   0.018   0.018   0.018     2500  0.0030     0.00
1667             RX   947.8   947.9   954.6    978.1  1000.0   1022.0   1045.5   1045.6
1668             RY   328.0   325.2   325.1    316.0   316.0    316.0    325.0    328.0

1669             KK  DR067C   RETRIEVE SPLIT FLOW SOUTH IN INVERGORDON CHANNEL FROM CONC FLOW
1670             KM           SPLIT STRUCTURE @ MTN VIEW CHANNEL
1671             DR  DR067C

1672             KK   RR069   ROUTE   REACH
1673             KM           ROUTE HYDROGRAPH DR067C THRU REACH RR069 SOUTH IN INVERGORDON RD
1674             KM           CHANNEL TO IBW. GABION LINED CHANNEL
1675             RS       1    FLOW       0
1676             RC   0.025   0.025   0.025     4100  0.0050     0.00
1677             RX     0.0     0.1     9.0     11.0    19.0     27.9     28.0     28.1
1678             RY   107.0   105.5   100.0    100.0   100.0    105.5    105.8    107.0

1679             KK   SB069   BASIN
1680             KM           CP @ 64TH ST AND INDIAN BEND WASH
1681             BA   0.140
1682             LG    0.30    0.25    4.65     0.38      24
1683             UC   0.471   0.569
1684             UA       0     5.0    16.0     30.0    65.0     77.0     84.0     90.0     94.0     97.0
1685             UA     100
1                                          HEC-1 INPUT                                              PAGE 40

 LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1686             KK   AD069   COMBINE HYDROGRAPHS RR069 AND SB069
1687             KM           TOTAL Q IN INVERGORDON ROAD CHANNEL @ INDIAN BEND WASH
1688             HC       2    1.20

1689             KK  RR070B   ROUTE   REACH
1690             KM           ROUTE HYDROGRAPH AD069 THRU REACH RR070B IN IBW TO BERNEIL DITCH
1691             RS       1    FLOW       0
1692             RC   0.030   0.030   0.030     1800  0.0040     0.00
1693             RX     0.0    20.0    60.0    100.0   140.0    180.0    220.0    240.0
1694             RY   102.0   100.0   100.0    100.0   100.0    100.0    100.0    102.0

1695             KK   SB070   BASIN
1696             KM           NOTE: MINOR SUMP IN DBL TREE RANCH RD JUST WEST OF BERNEIL IS IGNORED
1697             BA   0.140
1698             LG    0.30    0.25    4.65     0.38      24
1699             UC   0.375   0.360
1700             UA       0     5.0    16.0     30.0    65.0     77.0     84.0     90.0     94.0     97.0
1701             UA     100

1702             KK   AD070   COMBINE HYDROGRAPHS RR070A, RR070B AND SB070
1703             KM           TOTAL Q FROM BERNEIL DITCH AND INVERGORDON RD CHANNEL @ CP IN IBW
1704             KM           @ BERNEIL DITCH.  TOTAL FLOW FROM ENTIRE STUDY AREA (NOT COUNTING
1705             KM           FLOW THAT HAS LEFT STUDY @ 7 LOCATIONS).
1706             HC       3    9.60

1707             KK   DR055   RETRIEVE FLOW GOING SOUTH ON SDALE RD PAST MTN VIEW RD
1708             DR   DR055

1709             KK  DR054B   RETRIEVE SURFACE FLOW FROM SB054
1710             DR  DR054B

1711             KK  AD5455   COMBINE HYDROGRAPHS DR055, DR054B
1712             KM           TOTAL SURFACE Q @ SDALE AND MTN VIEW RDS THAT DID NOT ENTER BERNEIL
1713             KM           DITCH GOES SOUTH OUT OF STUDY
1714             HC       2    .60
1715             ZZ
1
               SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.     (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

  64       SB009
             .
             .
  76         .------->   DR009
  71       DV009
             V
             V
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  79      RR010
              .
              .
  85          .       SB010
              .           .
              .           .
  97      AD010............
              .
              .
 103          .------->   DR010
  99      DV010
              V
              V
 106     RR011A
              .
              .
 109          .       SB011
              .           .
              .           .
 116     AD011A............
              .
              .
 118          .       SB012
              .           V
              .           V
 125          .      RR013A
              .           .
              .           .
 131          .           .       SB013
              .           .           .
              .           .           .
 138          .      AD013A............
              .           .
              .           .
 142          .           .           .<-------   DR010
 140          .           .       DR010
              .           .           V
              .           .           V
 143          .           .      RR013B
              .           .           .
              .           .           .
 149          .      AD013B............
              .           .
              .           .
 156          .           .------->   DR013
 151          .       DV013
              .           V
              .           V
 159          .       RR014
              .           .
              .           .
 166          .           .       SB014
              .           .           .
              .           .           .
 173          .       AD014............
              .           V
              .           V
 175          .      RR011B
              .           .
              .           .
 182     AD011B............
              V
              V
 185     RR015A
              V
              V
 192     RR015B
              .
              .
 199          .       SB015
              .           .
              .           .
 207     AD015A............
              .
              .
 209          .       SB016
              .           .
              .           .
 220          .           .------->   DR016
 216          .       DV016
              .           V
              .           V
 223          .       RR017
              .           .
              .           .
 230          .           .       SB017
              .           .           .
              .           .           .
 238          .           .           .           .<-------   DR009
 237          .           .           .       DR009
              .           .           .           V
              .           .           .           V
 239          .           .           .      RR012A
              .           .           .           V
              .           .           .           V
 243          .           .           .      RR1217
              .           .           .           .
              .           .           .           .
 246          .       AD017........................
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252           .           .------->   DR017
248           .       DV017
              .           V
              .           V
255           .       RR018
              .           .
              .           .
262           .           .       SB018
              .           .           .
              .           .           .
269           .       AD018............
              .           .
              .           .
272           .           .       SB019
              .           .           .
              .           .           .
280           .           .           .           .<-------   DR013
279           .           .           .       DR013
              .           .           .           V
              .           .           .           V
281           .           .           .      RR019A
              .           .           .           V
              .           .           .           V
288           .           .           .      RR019B
              .           .           .           .
              .           .           .           .
295           .       AD019........................
              .           V
              .           V
298           .       LP019
              .           V
              .           V
308           .      RR015C
              .           .
              .           .
314      AD015B............
              V
              V
316      RR020A
              V
              V
323      RR020B
              V
              V
330      RR020C
              .
              .
339           .------->  DR20A1
335      DV20A1
              .
              .
342           .      SB020A
              .           .
              .           .
351           .           .           .<-------   DR20A1
349           .           .      DR20A1
              .           .           .
              .           .           .
355           .           .           .------->   DR20A2
352           .           .      DV20A2
              .           .           .
              .           .           .
358      AD020A........................
              .
              .
361           .       SB021
              .           V
              .           V
368           .       LP021
              .           V
              .           V
376           .       RR022
              .           .
              .           .
383           .           .       SB022
              .           .           .
              .           .           .
390           .       AD022............
              .           V
              .           V
392           .       RR023
              .           .
              .           .
399           .           .       SB023
              .           .           .
              .           .           .
406           .       AD023............
              .           .
              .           .
409           .           .      SB020B
              .           .           .
              .           .           .
416      AD20B1........................
              .
              .
426           .------->  DR20B1
419      DV20B1
              V
              V
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429      LP020B
              .
448           .-------> DR20B2
445      DV20B2
              .
              .
453           .           .<-------  DR20B1
451           .      DR20B1
              .           .
              .           .
454      AD20B2............
              V
              V
456      RR2427
              .
              .
460           .       SB025
              .           V
              .           V
467           .       RR026
              .           .
              .           .
473           .           .       SB026
              .           .           .
              .           .           .
480           .       AD026............
              .           V
              .           V
482           .       RR027
              .           .
              .           .
488           .           .       SB027
              .           .           .
              .           .           .
495           .      AD027A............
              .           .
              .           .
498      AD027B............
              .
              .
502           .       SB028
              .           V
              .           V
510           .      RR031A
              .           .
              .           .
517           .           .       SB029
              .           .           .
              .           .           .
524           .      AD031A............
              .           V
              .           V
526           .      RR031B
              .           .
              .           .
533           .           .       SB030
              .           .           V
              .           .           V
540           .           .      RR031C
              .           .           .
              .           .           .
547           .           .           .       SB031
              .           .           .           .
              .           .           .           .
554           .      AD031B........................
              .           V
              .           V
557           .      LP031A
              .           .
              .           .
569           .           .------->  DR031
562           .       DV031
              .           .
              .           .
572           .           .       SB032
              .           .           V
              .           .           V
579           .           .      RR031D
              .           .           .
              .           .           .
586           .           .           .       SB033
              .           .           .           .
              .           .           .           .
594           .           .           .           .           .<-------  DR031
593           .           .           .           .       DR031
              .           .           .           .           .
              .           .           .           .           .
595           .           .       AD033........................
              .           .           V
              .           .           V
598           .           .       LP033
              .           .           V
              .           .           V
603           .           .       RR034
              .           .           .
              .           .           .
606           .           .           .       SB034
              .           .           .           .
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613           .       AD034.........................
              .           V
              .           V
616           .       LP034
              .           .
              .           .
625           .           .------->  DR034
621           .       DV034
              .           V
              .           V
628           .       RR035
              .           .
              .           .
634           .           .       SB035
              .           .           .
              .           .           .
641           .       AD035............
              .           V
              .           V
643           .       RR036
              .           .
              .           .
649           .           .       SB036
              .           .           .
              .           .           .
656           .       AD036............
              .           .
              .           .
663           .           .------->  DR036
658           .       DV036
              .           V
              .           V
666           .      RR037A
              .           .
              .           .
672           .           .       SB037
              .           .           .
              .           .           .
679           .      AD037A............
              .           .
              .           .
685           .           .           .<-------  DR20A2
683           .           .      DR20A2
              .           .           V
              .           .           V
686           .           .      RR024A
              .           .           .
              .           .           .
694           .           .           .           .<-------  DR20B2
693           .           .           .      DR20B2
              .           .           .           V
              .           .           .           V
695           .           .           .      RR024B
              .           .           .           V
              .           .           .           V
702           .           .           .      RR024C
              .           .           .           .
              .           .           .           .
709           .           .      AD024B............
              .           .           V
              .           .           V
711           .           .      RR024D
              .           .           .
              .           .           .
718           .           .           .       SB024
              .           .           .           .
              .           .           .           .
725           .           .      AD024C............
              .           .           .
              .           .           .
733           .           .           .------->  DR024
727           .           .       DV024
              .           .           V
              .           .           V
736           .           .      RR024E
              .           .           .
              .           .           .
743      AD037B........................
              V
              V
746      RR037B
              .
              .
754           .           .<-------  DR024
753           .       DR024
              .           V
              .           V
755           .      RR024F
              .           .
              .           .
760      AD037C............
              V
              V
763      RR037C
              .
              .
770           .       SB038
              .           .
              .           .
786           .           .------->  DR038
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777           .      DV038
              .          V
              .          V
789           .      RR039
              .          .
              .          .
796           .          .       SB039
              .          .           .
              .          .           .
803           .      AD039............
              .          .
              .          .
811           .          .------->   DR039
806           .      DV039
              .          V
              .          V
814           .      RR040
              .          .
              .          .
823           .          .       SB040
              .          .           .
              .          .           .
833           .          .           .          .<-------  DR034
832           .          .           .      DR034
              .          .           .          .
              .          .           .          .
834           .      AD040.......................
              .          V
              .          V
837           .      LP040
              .          V
              .          V
844           .      RR041
              .          .
              .          .
851           .          .       SB041
              .          .           .
              .          .           .
858           .      AD041............
              .          V
              .          V
861           .      LP041
              .          .
              .          .
875           .          .------->   DR041
871           .      DV041
              .          V
              .          V
878           .      RR043
              .          .
              .          .
884           .          .       SB043
              .          .           .
              .          .           .
891           .      AD043............
              .          .
              .          .
896           .          .------->   DR043
893           .      DV043
              .          V
              .          V
899           .      RR044
              .          .
              .          .
906           .          .       SB044
              .          .           .
              .          .           .
913           .      AD044............
              .          .
              .          .
920           .          .------->  DR044A
915           .     DV044A
              .          .
              .          .
928           .          .------->  DR044B
923           .     DV044B
              .          V
              .          V
931           .     RR4446
              .          .
              .          .
936           .          .           .<-------   DR036
935           .          .       DR036
              .          .           V
              .          .           V
937           .          .      RR3646
              .          .           .
              .          .           .
941           .          .           .      SB045
              .          .           .          V
              .          .           .          V
948           .          .           .     RR046A
              .          .           .          V
              .          .           .          V
955           .          .           .     RR046B
              .          .           .          .
              .          .           .          .
962           .          .           .          .       SB046
              .          .           .          .           .
              .          .           .          .           .
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 969           .           .           .     AD046A............
               .           .           .          .
               .           .           .          .
 972           .      AD046B.......................
               .           .
               .           .
 979           .           .------->  DR046
 975           .       DV046
               .           V
               .           V
 982           .      RR047A
               .           V
               .           V
 986           .      RR4748
               .           .
               .           .
 993           .           .       SB048
               .           .           .
               .           .           .
1000           .       AD048............
               .           V
               .           V
1003           .       LP048
               .           .
               .           .
1016           .           .------->  DR048
1012           .       DV048
               .           V
               .           V
1019           .      RR037D
               .           .
               .           .
1023      AD037D............
               V
               V
1026      RR049A
               .
               .
1033           .       SB049
               .           .
               .           .
1041           .           .           .<-------  DR048
1040           .           .       DR048
               .           .           V
               .           .           V
1042           .           .      RR049B
               .           .           .
               .           .           .
1049           .      AD049A............
               .           .
               .           .
1056           .           .------->  DR049
1051           .       DV049
               .           .
               .           .
1059           .           .       SB050
               .           .           .
               .           .           .
1070           .           .           .------->  DR050
1066           .           .       DV050
               .           .           V
               .           .           V
1073           .           .      RR049C
               .           .           .
               .           .           .
1077      AD049B........................
               V
               V
1080      RR051A
               V
               V
1087      RR051B
               V
               V
1094      RR051C
               .
               .
1101           .       SB051
               .           .
               .           .
1108       AD051............
               .
               .
1111           .       SB052
               .           .
               .           .
1120           .           .------->  DR052
1118           .       DV052
               .           V
               .           V
1123           .      RR053A
               .           V
               .           V
1130           .      RR053B
               .           .
               .           .
1134           .           .       SB053
               .           .           .
               .           .           .
1141           .       AD053............
```

```
               .           V
               .           V
1143           .      RR054A
               .           .
               .           .
1155           .           .------->  DR054A
1151           .      DV054A
               .           V
               .           V
1158           .      RR055A
               .           .
               .           .
1166           .           .           .<-------  DR050
1165           .           .       DR050
               .           .           V
               .           .           V
1167           .           .      RR055B
               .           .           .
               .           .           .
1174           .      AD055A............
               .           V
               .           V
1176           .      RR055C
               .           .
               .           .
1183           .           .       SB055
               .           .           .
               .           .           .
1190           .      AD055B............
               .           .
               .           .
1200           .           .------->  DR055
1193           .       DV055
               .           .
               .           .
1204           .           .           .<-------  DR054A
1203           .           .      DR054A
               .           .           V
               .           .           V
1205           .           .      RR054B
               .           .           .
               .           .           .
1209           .           .           .       SB054
               .           .           .           .
               .           .           .           .
1216           .           .       AD054............
               .           .           .
               .           .           .
1224           .           .           .------->  DR054B
1219           .           .      DV054B
               .           .           .
               .           .           .
1227           .      AD055C............
               .           V
               .           V
1230           .      RR055D
               .           .
               .           .
1237      AD055D............
               V
               V
1240      RR057A
               .
               .
1248           .           .<-------  DR049
1247           .       DR049
               .           V
               .           V
1249           .      RR057B
               .           .
               .           .
1256      AD057A............
               V
               V
1259      RR057C
               .
               .
1266           .       SB057
               .           .
               .           .
1273      AD057B............
               .
               .
1277           .           .<-------  DR046
1276           .       DR046
               .           V
               .           V
1278           .      RR047B
               .           .
               .           .
1285           .           .       SB047
               .           .           .
               .           .           .
1292           .       AD047............
               .           V
               .           V
1294           .       RR058
               .           .
               .           .
1301           .           .       SB058
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1308          .      AD058A............

1311          .           .           .<-------  DR044B
1310          .           .      DR044B
              .           .           V
              .           .           V
1312          .           .      RR059A

1319          .           .           .       SB059
              .           .           .           .
1326          .           .      AD059A............

1328          .           .           .      SB061A

1335          .           .           .           .      SB061B

1346          .           .           .           .           .------->  DR061B
1342          .           .           .           .      DV061B

1350          .           .           .           .           .           .<-------  DR038
1349          .           .           .           .           .       DR038
              .           .           .           .           .           V
              .           .           .           .           .           V
1351          .           .           .           .           .      RR061C

1356          .           .           .           .           .           .      SB061C
              .           .           .           .           .           .           .
1363          .           .           .           .           .      AD061A............

1365          .           .           .      AD061B........................
              .           .           .           V
              .           .           .           V
1368          .           .           .       LP061
              .           .           .           V
              .           .           .           V
1375          .           .           .      RR062A
              .           .           .           V
              .           .           .           V
1382          .           .           .      RR062B

1389          .           .           .           .       SB062
              .           .           .           .           .
1396          .           .           .       AD062............
              .           .           .           V
              .           .           .           V
1399          .           .           .       LP062
              .           .           .           V
              .           .           .           V
1409          .           .           .       RR063

1416          .           .           .           .       SB063
              .           .           .           .           .
1423          .           .           .       AD063............
              .           .           .           V
              .           .           .           V
1426          .           .           .       LP063

1436          .           .           .           .------->  DR063A
1433          .           .           .      DV063A

1443          .           .           .           .------->  DR063B
1439          .           .           .      DV063B

1447          .           .           .           .           .<-------  DR041
1446          .           .           .           .       DR041
              .           .           .           .           V
              .           .           .           .           V
1448          .           .           .           .      RR064A

1457          .           .           .           .           .           .<-------  DR039
1455          .           .           .           .           .       DR039
              .           .           .           .           .           V
              .           .           .           .           .           V
1458          .           .           .           .           .      RR064B
              .           .           .           .           .           .
1465          .           .           .           .      AD064A............
              .           .           .           .           V
              .           .           .           .           V
1467          .           .           .           .      RR064C
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1473                                                  SB064
1481                                        AD064B.........
1485                                                      .<-------  DR043
1484                                                  DR043
                                                          V
                                                          V
1486                                                 RR064D
1492                              AD064C.......................
                                       V
                                       V
1495                              RR065A
1502                                             .<-------  DR063B
1501                                        DR063B
                                                 V
                                                 V
1503                                        RR065B
1510                              AD065A.........
                                       V
                                       V
1512                              RR065C
1519                                         SB065
1526                              AD065B.........
                                       V
                                       V
1529                               RR066
1536                                         SB066
1543                               AD066.........
                                       V
                                       V
1546                              RR067A
1553                                        SB067A
1563                                             .------->  DR067A
1560                                        DV067A
1566                              AD067A.........
1572                                   .------->  DR067B
1568                              DV067B
                                       V
                                       V
1575                              RR059B
1581                    AD059B.........
                             V
                             V
1583                    RR060A
1591                               SB060
1598                    AD060A.........
1601                                   .<-------  DR067B
1600                              DR067B
                                       V
                                       V
1602                              RR067B
1609                                        SB067B
1616                              AD067B.........
1622                                   .------->  DR067C
1619                              DV067C
                                       V
                                       V
1625                              RR060B
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                .           .           .           .
1631            .           .      AD060B............
                .           .           V
                .           .           V
1634            .           .      RR060C
                .           .           .
                .           .           .
1641            .      AD058B............
                .           .
                .           .
1644       AD057C............
                V
                V
1647        RR068
                .
                .
1653            .       SB068
                .           .
                .           .
1660        AD068............
                V
                V
1663       RR070A
                .
                .
1671            .           .<-------  DR067C
1669            .      DR067C
                .           V
                .           V
1672            .       RR069
                .           .
                .           .
1679            .           .       SB069
                .           .           .
                .           .           .
1686            .       AD069............
                .           V
                .           V
1689            .      RR070B
                .           .
                .           .
1695            .           .       SB070
                .           .           .
                .           .           .
1702        AD070........................
                .
                .
1708            .           .<-------  DR055
1707            .       DR055
                .           .
                .           .
1710            .           .           .<-------  DR054B
1709            .           .      DR054B
                .           .           .
                .           .           .
1711            .      AD5455............
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(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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1****************************************                                 ***************************************
 *                                       *                                 *                                     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                 *   U.S. ARMY CORPS OF ENGINEERS      *
 *             JUN   1998                *                                 *   HYDROLOGIC ENGINEERING CENTER     *
 *           VERSION 4.1                 *                                 *        609 SECOND STREET            *
 *                                       *                                 *     DAVIS, CALIFORNIA 95616         *
 *  RUN DATE   17OCT02  TIME  13:23:48   *                                 *        (916) 756-1104               *
 *                                       *                                 *                                     *
 ****************************************                                  ***************************************
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Project ID: 15586B - Major Basin: 01 - Return Period: 100 Years

SUMMARY APPROACH, METHOD, PRECIP AND ASSUMPTION:

1. 100YR, 6HR RAINFALL EVENT, MULTI-STORM JD RECORD OPTION, 6HR DISTRIBUTION PATTERNS #1 THRU #5 WITH 15 MIN TIME INCREM (FCDMC, HYDROLOGY MANUAL, TABLE 2.4)
2. POINT PRECIP = 3.20 IN
3. PRECIP AERIAL REDUCTION FACTOR = 1.00 BASED ON 0.01 SQ MI BASIN
   = 0.994 BASED ON 0.50 SQ MI BASIN
   = 0.975 BASED ON 2.80 SQ MI BASIN
   = 0.922 BASED ON 16.00 SQ MI BASIN
   = 0.812 BASED ON 90.00 SQ MI BASIN
   = 0.570 BASED ON 500.00 SQ MI BASIN
4. BASIN AREAS ADJUSTED @ KEY HYDROGRAPH COMBINATION STEPS TO REFLECT AREA CORRECTED DUE TO MULTI-STORM OPTION
5. FUTURE COMPLETELY DEVELOPED CONDITION LAND USE
6. CLARK UNIT HYDROGRAPH WITH URBAN TIME-AREA
7. GREEN-AMPT LOSS RATES
8. NORMAL DEPTH STORAGE REACH ROUTING TYPICALLY USED FOR OPEN CHANNELS (SEE NOTE # 10)
9. KINEMATIC WAVE REACH ROUTING TYPICALLY USED FOR PIPE (SEE NOTE # 10)
10. HYDROLOGIC ROUTING STEPS THAT COULD BE MODELED USING EITHER KINEMATIC WAVE OR NORMAL DEPTH (COMBINED SURFACE AND STORM DRAIN PIPE FLOW) WERE TYPICALLY MODELED USING THE PREDOMINANT FLOW CHARACTERISTIC.
11. LEVEL POOL MODIFIED PULS STORAGE ROUTING @ REGIONAL DETENTION BASINS
12. NO INDIVIDUAL PRIVATE ON-LOT RETENTION/DETENTION IS REFLECTED

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                         13. COMPUTATION TIME INTERVAL = 5 MINUTES
                         14. CALCULATIONS MADE WITH HEC-1, VERSION 4.1

                         KEY TO HYDROGRAPH OPERATIONS:
                             "SB" = GENERATE RUNOFF HYDROGRAPH FROM SUB-BASIN
                             "AD" = COMBINE HYDROGRAPHS
                             "RR" = ROUTE HYDROGRAPH THRU DOWNSTREAM REACH
                             "LP" = ROUTE HYDROGRAPH THRU LEVEL POOL STORAGE
                             "DV" = DIVERT HYDROGRAPH
                             "DR" = RETRIEVE PREVIOUSLY DIVERTED HYDROGRAPH


 41 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                       NMIN           5  MINUTES IN COMPUTATION INTERVAL
                      IDATE       1   0  STARTING DATE
                      ITIME        0000  STARTING TIME
                         NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE       2   0  ENDING DATE
                     NDTIME        0055  ENDING TIME
                      ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL     .08 HOURS
                       TOTAL TIME BASE   24.92 HOURS

          ENGLISH UNITS
               DRAINAGE AREA           SQUARE MILES
               PRECIPITATION DEPTH     INCHES
               LENGTH, ELEVATION       FEET
               FLOW                    CUBIC FEET PER SECOND
               STORAGE VOLUME          ACRE-FEET
               SURFACE AREA            ACRES
               TEMPERATURE             DEGREES FAHRENHEIT

 43 JD          INDEX STORM NO. 1
                       STRM        3.20  PRECIPITATION DEPTH
                       TRDA         .01  TRANSPOSITION DRAINAGE AREA

 44 PI            PRECIPITATION PATTERN
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                      .00      .00      .00      .01      .01      .01      .01      .01      .01      .03
                      .03      .03      .05      .05      .05      .15      .15      .15      .03      .03
                      .03      .01      .01      .01      .01      .01      .01      .00      .00      .00
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                      .00      .00

 47 JD          INDEX STORM NO. 2
                       STRM        3.18  PRECIPITATION DEPTH
                       TRDA         .50  TRANSPOSITION DRAINAGE AREA

  0 PI            PRECIPITATION PATTERN
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                      .00      .00      .00      .01      .01      .01      .01      .01      .01      .03
                      .03      .03      .05      .05      .05      .15      .15      .15      .03      .03
                      .03      .01      .01      .01      .01      .01      .01      .00      .00      .00
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                      .00      .00

 48 JD          INDEX STORM NO. 3
                       STRM        3.12  PRECIPITATION DEPTH
                       TRDA        2.80  TRANSPOSITION DRAINAGE AREA

 49 PI            PRECIPITATION PATTERN
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                      .00      .00      .00      .01      .01      .01      .01      .01      .01      .03
                      .03      .03      .07      .07      .07      .08      .08      .08      .05      .05
                      .05      .02      .02      .02      .01      .01      .01      .00      .00      .00
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                      .00      .00

 52 JD          INDEX STORM NO. 4
                       STRM        2.95  PRECIPITATION DEPTH
                       TRDA       16.00  TRANSPOSITION DRAINAGE AREA

 53 PI            PRECIPITATION PATTERN
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .01
                      .01      .01      .00      .01      .00      .00      .00      .00      .00      .00
                      .00      .00      .01      .00      .00      .00      .00      .01      .01      .01
                      .01      .01      .01      .01      .01      .01      .02      .02      .02      .03
                      .03      .03      .06      .06      .06      .07      .07      .07      .04      .04
                      .04      .02      .02      .02      .01      .01      .01      .01      .01      .01
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                      .00      .00

 56 JD          INDEX STORM NO. 5
                       STRM        2.60  PRECIPITATION DEPTH
                       TRDA       90.00  TRANSPOSITION DRAINAGE AREA

 57 PI            PRECIPITATION PATTERN
                      .01      .01      .01      .00      .00      .00      .01      .01      .01      .01
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                    .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                    .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                    .01       .01       .01       .01       .01       .01       .02       .02       .02       .03
                    .03       .03       .05       .05       .05       .05       .05       .05       .04       .04
                    .04       .02       .02       .02       .02       .02       .02       .01       .01       .01
                    .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                    .01       .01

  60 JD         INDEX STORM NO. 6
                    STRM       1.82  PRECIPITATION DEPTH
                    TRDA     500.00  TRANSPOSITION DRAINAGE AREA

  61 PI           PRECIPITATION PATTERN
                    .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                    .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                    .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                    .01       .01       .01       .01       .01       .01       .02       .02       .02       .03
                    .03       .03       .04       .04       .04       .04       .04       .04       .04       .04
                    .04       .03       .03       .03       .02       .02       .02       .01       .01       .01
                    .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                    .01       .01
          WARNING EXCESS AT PONDING LESS THAN ZERO FOR PERIOD. EXCESS SET TO ZERO
          WARNING EXCESS AT PONDING LESS THAN ZERO FOR PERIOD. EXCESS SET TO ZERO

WARNING --- ROUTED OUTFLOW (     601.) IS GREATER THAN MAXIMUM OUTFLOW (     322.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (     896.) IS GREATER THAN MAXIMUM OUTFLOW (     322.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (     941.) IS GREATER THAN MAXIMUM OUTFLOW (     322.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (     885.) IS GREATER THAN MAXIMUM OUTFLOW (     322.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (     801.) IS GREATER THAN MAXIMUM OUTFLOW (     322.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (     718.) IS GREATER THAN MAXIMUM OUTFLOW (     322.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (     645.) IS GREATER THAN MAXIMUM OUTFLOW (     322.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (     579.) IS GREATER THAN MAXIMUM OUTFLOW (     322.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (     519.) IS GREATER THAN MAXIMUM OUTFLOW (     322.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (     465.) IS GREATER THAN MAXIMUM OUTFLOW (     322.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (     417.) IS GREATER THAN MAXIMUM OUTFLOW (     322.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (     372.) IS GREATER THAN MAXIMUM OUTFLOW (     322.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (     329.) IS GREATER THAN MAXIMUM OUTFLOW (     322.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (     544.) IS GREATER THAN MAXIMUM OUTFLOW (     322.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (     870.) IS GREATER THAN MAXIMUM OUTFLOW (     322.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (     921.) IS GREATER THAN MAXIMUM OUTFLOW (     322.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (     875.) IS GREATER THAN MAXIMUM OUTFLOW (     322.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (     793.) IS GREATER THAN MAXIMUM OUTFLOW (     322.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (     713.) IS GREATER THAN MAXIMUM OUTFLOW (     322.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (     640.) IS GREATER THAN MAXIMUM OUTFLOW (     322.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (     574.) IS GREATER THAN MAXIMUM OUTFLOW (     322.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (     515.) IS GREATER THAN MAXIMUM OUTFLOW (     322.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (     461.) IS GREATER THAN MAXIMUM OUTFLOW (     322.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (     413.) IS GREATER THAN MAXIMUM OUTFLOW (     322.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (     368.) IS GREATER THAN MAXIMUM OUTFLOW (     322.) IN STORAGE-OUTFLOW TABLE

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WARNING --- ROUTED OUTFLOW (     338.) IS GREATER THAN MAXIMUM OUTFLOW (     322.) IN STORAGE-OUTFLOW TABLE
        *** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

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WARNING --- ROUTED OUTFLOW (   2297.) IS GREATER THAN MAXIMUM OUTFLOW (   1832.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2392.) IS GREATER THAN MAXIMUM OUTFLOW (   1832.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2337.) IS GREATER THAN MAXIMUM OUTFLOW (   1832.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2188.) IS GREATER THAN MAXIMUM OUTFLOW (   1832.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   1969.) IS GREATER THAN MAXIMUM OUTFLOW (   1832.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   1862.) IS GREATER THAN MAXIMUM OUTFLOW (   1832.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   1955.) IS GREATER THAN MAXIMUM OUTFLOW (   1832.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   1882.) IS GREATER THAN MAXIMUM OUTFLOW (   1832.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   1946.) IS GREATER THAN MAXIMUM OUTFLOW (   1832.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2277.) IS GREATER THAN MAXIMUM OUTFLOW (   1832.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2370.) IS GREATER THAN MAXIMUM OUTFLOW (   1832.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2314.) IS GREATER THAN MAXIMUM OUTFLOW (   1832.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2167.) IS GREATER THAN MAXIMUM OUTFLOW (   1832.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   1950.) IS GREATER THAN MAXIMUM OUTFLOW (   1832.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   1914.) IS GREATER THAN MAXIMUM OUTFLOW (   1832.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   1862.) IS GREATER THAN MAXIMUM OUTFLOW (   1832.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2172.) IS GREATER THAN MAXIMUM OUTFLOW (   2048.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2553.) IS GREATER THAN MAXIMUM OUTFLOW (   2048.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2695.) IS GREATER THAN MAXIMUM OUTFLOW (   2048.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2654.) IS GREATER THAN MAXIMUM OUTFLOW (   2048.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2502.) IS GREATER THAN MAXIMUM OUTFLOW (   2048.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2278.) IS GREATER THAN MAXIMUM OUTFLOW (   2048.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2048.) IS GREATER THAN MAXIMUM OUTFLOW (   2048.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2056.) IS GREATER THAN MAXIMUM OUTFLOW (   2048.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2153.) IS GREATER THAN MAXIMUM OUTFLOW (   2048.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2532.) IS GREATER THAN MAXIMUM OUTFLOW (   2048.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2672.) IS GREATER THAN MAXIMUM OUTFLOW (   2048.) IN STORAGE-OUTFLOW TABLE
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WARNING --- ROUTED OUTFLOW (   2630.) IS GREATER THAN MAXIMUM OUTFLOW (   2048.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2479.) IS GREATER THAN MAXIMUM OUTFLOW (   2048.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2259.) IS GREATER THAN MAXIMUM OUTFLOW (   2048.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2077.) IS GREATER THAN MAXIMUM OUTFLOW (   2048.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2544.) IS GREATER THAN MAXIMUM OUTFLOW (   2048.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2784.) IS GREATER THAN MAXIMUM OUTFLOW (   2048.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2807.) IS GREATER THAN MAXIMUM OUTFLOW (   2048.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2684.) IS GREATER THAN MAXIMUM OUTFLOW (   2048.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2476.) IS GREATER THAN MAXIMUM OUTFLOW (   2048.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2233.) IS GREATER THAN MAXIMUM OUTFLOW (   2048.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2097.) IS GREATER THAN MAXIMUM OUTFLOW (   2048.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2058.) IS GREATER THAN MAXIMUM OUTFLOW (   2048.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (   2522.) IS GREATER THAN MAXIMUM OUTFLOW (   2048.) IN STORAGE-OUTFLOW TABLE
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WARNING --- ROUTED OUTFLOW (   2068.) IS GREATER THAN MAXIMUM OUTFLOW (   2048.) IN STORAGE-OUTFLOW TABLE
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RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	SB009	94.	4.25	18.	5.	4.	.06		
+	DIVERSION TO	DR009	73.	4.08	17.	4.	4.	.06		
+	HYDROGRAPH AT	DV009	21.	4.25	1.	0.	0.	.06		
+	ROUTED TO	RR010	12.	4.58	1.	0.	0.	.06		
+	HYDROGRAPH AT	SB010	418.	4.08	46.	12.	11.	.16		
+	2 COMBINED AT	AD010	418.	4.08	47.	12.	11.	.17		
+	DIVERSION TO	DR010	361.	4.08	27.	7.	6.	.17		
+	HYDROGRAPH AT	DV010	57.	3.75	20.	5.	5.	.17		
+	ROUTED TO	RR011A	57.	3.92	20.	5.	5.	.17		
+	HYDROGRAPH AT	SB011	557.	4.08	64.	16.	15.	.22		
+	2 COMBINED AT	AD011A	614.	4.08	84.	21.	20.	.24		
+	HYDROGRAPH AT	SB012	498.	4.08	54.	14.	13.	.20		
+	ROUTED TO	RR013A	472.	4.08	54.	14.	13.	.20		
+	HYDROGRAPH AT	SB013	122.	4.00	11.	3.	3.	.04		
+	2 COMBINED AT	AD013A	577.	4.08	65.	16.	16.	.24		
+	HYDROGRAPH AT	DR010	361.	4.08	27.	7.	6.	.17		
+	ROUTED TO	RR013B	357.	4.08	27.	7.	6.	.17		

+	2 COMBINED AT	AD013B	933.	4.08	91.	23.	22.	.39
+	DIVERSION TO	DR013	866.	4.08	84.	21.	20.	.39
+	HYDROGRAPH AT	DV013	67.	4.08	7.	2.	2.	.39
+	ROUTED TO	RR014	59.	4.25	7.	2.	2.	.39
+	HYDROGRAPH AT	SB014	71.	4.08	8.	2.	2.	.03
+	2 COMBINED AT	AD014	122.	4.17	15.	4.	4.	.06
+	ROUTED TO	RR011B	122.	4.17	15.	4.	4.	.06
+	2 COMBINED AT	AD011B	726.	4.08	99.	25.	24.	.30
+	ROUTED TO	RR015A	705.	4.17	99.	25.	24.	.30
+	ROUTED TO	RR015B	645.	4.25	98.	25.	24.	.30
+	HYDROGRAPH AT	SB015	513.	4.08	67.	17.	16.	.25
+	2 COMBINED AT	AD015A	1123.	4.17	165.	42.	40.	.55
+	HYDROGRAPH AT	SB016	214.	4.08	25.	6.	6.	.09
+	DIVERSION TO	DR016	58.	3.75	15.	4.	4.	.09
+	HYDROGRAPH AT	DV016	156.	4.08	10.	2.	2.	.09
+	ROUTED TO	RR017	103.	4.33	10.	2.	2.	.09
+	HYDROGRAPH AT	SB017	244.	4.00	25.	6.	6.	.09
+	HYDROGRAPH AT	DR009	73.	4.08	17.	4.	4.	.06
+	ROUTED TO	RR012A	73.	4.17	17.	4.	4.	.06
+	ROUTED TO	RR1217	73.	4.25	17.	4.	4.	.06
+	3 COMBINED AT	AD017	336.	4.08	52.	13.	13.	.23
+	DIVERSION TO	DR017	184.	3.92	42.	11.	10.	.23
+	HYDROGRAPH AT	DV017	152.	4.08	10.	2.	2.	.23
+	ROUTED TO	RR018	92.	4.58	10.	2.	2.	.23
+	HYDROGRAPH AT	SB018	355.	4.08	41.	10.	10.	.15
+	2 COMBINED AT	AD018	359.	4.08	51.	13.	12.	.38
+	HYDROGRAPH AT	SB019	353.	4.17	51.	13.	12.	.19
+	HYDROGRAPH AT	DR013	866.	4.08	84.	21.	20.	.39
+	ROUTED TO	RR019A	833.	4.17	84.	21.	20.	.39
+	ROUTED TO	RR019B	817.	4.17	84.	21.	20.	.39
+	3 COMBINED AT	AD019	1307.	4.17	178.	45.	43.	.93
+	ROUTED TO	LP019	587.	4.58	176.	45.	43.	.93
+	ROUTED TO	RR015C	586.	4.58	176.	45.	43.	.93

+	2 COMBINED AT	AD015B	1317.	4.25	329.	84.	81.	1.48
+	ROUTED TO	RR020A	1317.	4.25	329.	84.	81.	1.48
+	ROUTED TO	RR020B	1307.	4.33	329.	84.	81.	1.48
+	ROUTED TO	RR020C	1306.	4.33	329.	84.	81.	1.48
+	DIVERSION TO	DR20A1	731.	4.33	91.	23.	22.	1.48
+	HYDROGRAPH AT	DV20A1	575.	4.17	238.	62.	59.	1.48
+	HYDROGRAPH AT	SB020A	85.	4.17	16.	4.	4.	.06
+	HYDROGRAPH AT	DR20A1	731.	4.33	91.	23.	22.	1.48
+	DIVERSION TO	DR20A2	365.	4.33	46.	11.	11.	1.48
+	HYDROGRAPH AT	DV20A2	365.	4.33	46.	11.	11.	1.48
+	3 COMBINED AT	AD020A	1040.	4.33	301.	77.	74.	1.10
+	HYDROGRAPH AT	SB021	355.	4.08	38.	9.	9.	.14
+	ROUTED TO	LP021	339.	4.08	32.	9.	9.	.14
+	ROUTED TO	RR022	310.	4.25	32.	9.	9.	.14
+	HYDROGRAPH AT	SB022	508.	4.08	48.	12.	12.	.24
+	2 COMBINED AT	AD022	765.	4.17	78.	22.	21.	.38
+	ROUTED TO	RR023	746.	4.17	78.	22.	21.	.38
+	HYDROGRAPH AT	SB023	383.	4.08	40.	10.	10.	.17
+	2 COMBINED AT	AD023	1079.	4.17	117.	31.	30.	.55
+	HYDROGRAPH AT	SB020B	439.	4.17	59.	15.	14.	.27
+	3 COMBINED AT	AD20B1	2007.	4.25	456.	119.	114.	1.92
+	DIVERSION TO	DR20B1	184.	3.58	135.	38.	37.	1.92
+	HYDROGRAPH AT	DV20B1	1823.	4.25	321.	80.	77.	1.92
+	ROUTED TO	LP020B	749.	4.92	155.	61.	59.	1.92
+	DIVERSION TO	DR20B2	699.	4.92	108.	27.	26.	1.92
+	HYDROGRAPH AT	DV20B2	50.	4.92	47.	34.	33.	1.92
+	HYDROGRAPH AT	DR20B1	184.	3.58	135.	38.	37.	1.92
+	2 COMBINED AT	AD20B2	235.	4.75	162.	71.	69.	.44
+	ROUTED TO	RR2427	235.	4.75	162.	71.	69.	.44
+	HYDROGRAPH AT	SB025	326.	4.08	39.	10.	9.	.14
+	ROUTED TO	RR026	282.	4.25	39.	10.	9.	.14
+	HYDROGRAPH AT	SB026	917.	4.08	93.	23.	22.	.44
+	2 COMBINED AT	AD026	1105.	4.17	130.	33.	31.	.58
	ROUTED TO							

+		RR027	1026.	4.25	130.	33.	31.	.58
+	HYDROGRAPH AT	SB027	282.	4.08	24.	6.	6.	.12
+	2 COMBINED AT	AD027A	1171.	4.17	151.	38.	37.	.70
+	2 COMBINED AT	AD027B	1253.	4.17	307.	108.	105.	1.14
+	HYDROGRAPH AT	SB028	330.	4.08	41.	10.	10.	.13
+	ROUTED TO	RR031A	312.	4.17	41.	10.	10.	.13
+	HYDROGRAPH AT	SB029	444.	4.08	43.	11.	10.	.18
+	2 COMBINED AT	AD031A	735.	4.08	84.	21.	20.	.31
+	ROUTED TO	RR031B	713.	4.17	84.	21.	20.	.31
+	HYDROGRAPH AT	SB030	228.	4.08	24.	6.	6.	.10
+	ROUTED TO	RR031C	208.	4.17	24.	6.	6.	.10
+	HYDROGRAPH AT	SB031	271.	4.08	19.	5.	5.	.12
+	3 COMBINED AT	AD031B	1142.	4.08	126.	32.	30.	.53
+	ROUTED TO	LP031A	108.	4.83	38.	21.	20.	.53
+	DIVERSION TO	DR031	4.	.00	4.	4.	4.	.53
+	HYDROGRAPH AT	DV031	104.	4.83	34.	17.	16.	.53
+	HYDROGRAPH AT	SB032	39.	4.17	5.	1.	1.	.03
+	ROUTED TO	RR031D	35.	4.33	5.	1.	1.	.03
+	HYDROGRAPH AT	SB033	300.	4.08	29.	7.	7.	.14
+	HYDROGRAPH AT	DR031	4.	.00	4.	4.	4.	.53
+	3 COMBINED AT	AD033	320.	4.08	38.	13.	12.	.19
+	ROUTED TO	LP033	0.	4.08	0.	0.	0.	.19
+	ROUTED TO	RR034	0.	4.33	0.	0.	0.	.19
+	HYDROGRAPH AT	SB034	446.	4.08	52.	13.	13.	.18
+	3 COMBINED AT	AD034	401.	4.08	79.	28.	28.	.88
+	ROUTED TO	LP034	120.	4.92	42.	23.	23.	.88
+	DIVERSION TO	DR034	18.	3.58	18.	17.	17.	.88
+	HYDROGRAPH AT	DV034	102.	4.92	24.	6.	6.	.88
+	ROUTED TO	RR035	98.	5.17	24.	6.	6.	.88
+	HYDROGRAPH AT	SB035	246.	4.08	27.	7.	6.	.11
+	2 COMBINED AT	AD035	214.	4.08	49.	13.	12.	.86
+	ROUTED TO	RR036	182.	4.33	49.	13.	12.	.86
+	HYDROGRAPH AT	SB036	177.	4.17	26.	7.	6.	.13
+	2 COMBINED AT	AD036	317.	4.25	72.	18.	18.	.99

+	DIVERSION TO	DR036	294.	4.33	71.	18.	18.	.99
+	HYDROGRAPH AT	DV036	24.	4.25	1.	0.	0.	.99
+	ROUTED TO	RR037A	8.	4.50	1.	0.	0.	.99
+	HYDROGRAPH AT	SB037	436.	4.08	43.	11.	10.	.21
+	2 COMBINED AT	AD037A	436.	4.08	44.	11.	11.	.28
+	HYDROGRAPH AT	DR20A2	365.	4.33	46.	11.	11.	1.48
+	ROUTED TO	RR024A	366.	4.33	46.	11.	11.	1.48
+	HYDROGRAPH AT	DR20B2	699.	4.92	108.	27.	26.	1.92
+	ROUTED TO	RR024B	698.	4.92	108.	27.	26.	1.92
+	ROUTED TO	RR024C	692.	4.92	108.	27.	26.	1.92
+	2 COMBINED AT	AD024B	836.	4.92	151.	38.	36.	1.92
+	ROUTED TO	RR024D	827.	5.00	151.	38.	36.	1.92
+	HYDROGRAPH AT	SB024	179.	4.17	26.	7.	6.	.11
+	2 COMBINED AT	AD024C	857.	5.00	173.	43.	42.	2.03
+	DIVERSION TO	DR024	127.	4.25	61.	16.	15.	2.03
+	HYDROGRAPH AT	DV024	730.	5.00	111.	28.	27.	2.03
+	ROUTED TO	RR024E	729.	5.00	111.	28.	27.	2.03
+	3 COMBINED AT	AD037B	1350.	4.33	432.	140.	135.	3.05
+	ROUTED TO	RR037B	1350.	4.33	432.	140.	135.	3.05
+	HYDROGRAPH AT	DR024	127.	4.25	61.	16.	15.	2.03
+	ROUTED TO	RR024F	127.	4.33	62.	16.	15.	2.03
+	2 COMBINED AT	AD037C	1448.	4.33	487.	154.	149.	3.45
+	ROUTED TO	RR037C	1446.	4.33	487.	154.	149.	3.45
+	HYDROGRAPH AT	SB038	289.	4.08	29.	7.	7.	.12
+	DIVERSION TO	DR038	68.	3.75	16.	4.	4.	.12
+	HYDROGRAPH AT	DV038	221.	4.08	13.	3.	3.	.12
+	ROUTED TO	RR039	187.	4.17	13.	3.	3.	.12
+	HYDROGRAPH AT	SB039	75.	4.00	8.	2.	2.	.03
+	2 COMBINED AT	AD039	244.	4.17	21.	5.	5.	.12
+	DIVERSION TO	DR039	209.	4.17	13.	3.	3.	.12
+	HYDROGRAPH AT	DV039	35.	3.83	8.	2.	2.	.12
+	ROUTED TO	RR040	36.	4.25	8.	2.	2.	.12
+	HYDROGRAPH AT	SB040	845.	4.08	80.	20.	19.	.41

+	HYDROGRAPH AT	DR034	18.	3.58	18.	17.	17.	.88
+	3 COMBINED AT	AD040	857.	4.08	102.	39.	38.	.56
+	ROUTED TO	LP040	578.	4.33	84.	37.	36.	.56
+	ROUTED TO	RR041	583.	4.33	84.	37.	36.	.56
+	HYDROGRAPH AT	SB041	88.	4.08	8.	2.	2.	.04
+	2 COMBINED AT	AD041	612.	4.33	90.	38.	38.	.60
+	ROUTED TO	LP041	56.	5.58	45.	38.	37.	.60
+	DIVERSION TO	DR041	44.	5.92	43.	37.	37.	.60
+	HYDROGRAPH AT	DV041	12.	5.58	1.	0.	0.	.60
+	ROUTED TO	RR043	11.	5.67	1.	0.	0.	.60
+	HYDROGRAPH AT	SB043	172.	4.08	17.	4.	4.	.08
+	2 COMBINED AT	AD043	172.	4.08	19.	5.	5.	.21
+	DIVERSION TO	DR043	168.	4.08	19.	5.	5.	.21
+	HYDROGRAPH AT	DV043	4.	4.08	0.	0.	0.	.21
+	ROUTED TO	RR044	1.	4.50	0.	0.	0.	.21
+	HYDROGRAPH AT	SB044	293.	4.17	39.	10.	9.	.18
+	2 COMBINED AT	AD044	293.	4.17	39.	10.	9.	.18
+	DIVERSION TO	DR044A	49.	4.17	6.	2.	2.	.18
+	HYDROGRAPH AT	DV044A	244.	4.17	32.	8.	8.	.18
+	DIVERSION TO	DR044B	111.	4.17	6.	2.	1.	.18
+	HYDROGRAPH AT	DV044B	133.	4.00	26.	7.	6.	.18
+	ROUTED TO	RR4446	133.	4.08	26.	7.	6.	.18
+	HYDROGRAPH AT	DR036	294.	4.33	71.	18.	18.	.99
+	ROUTED TO	RR3646	294.	4.33	71.	18.	18.	.99
+	HYDROGRAPH AT	SB045	49.	4.17	7.	2.	2.	.03
+	ROUTED TO	RR046A	41.	4.33	7.	2.	2.	.03
+	ROUTED TO	RR046B	40.	4.42	7.	2.	2.	.03
+	HYDROGRAPH AT	SB046	337.	4.17	41.	10.	10.	.19
+	2 COMBINED AT	AD046A	358.	4.17	48.	12.	12.	.22
+	3 COMBINED AT	AD046B	714.	4.17	142.	36.	35.	1.03
+	DIVERSION TO	DR046	128.	4.17	6.	2.	2.	1.03
+	HYDROGRAPH AT	DV046	588.	4.25	136.	35.	33.	1.03
+	ROUTED TO	RR047A	588.	4.33	136.	35.	33.	1.03
	ROUTED TO							

+		RR4748	588.	4.33	136.	35.	33.	1.03
+	HYDROGRAPH AT	SB048	189.	4.08	18.	4.	4.	.09
+	2 COMBINED AT	AD048	713.	4.17	152.	39.	38.	.98
+	ROUTED TO	LP048	338.	4.83	143.	38.	36.	.98
+	DIVERSION TO	DR048	136.	4.83	8.	2.	2.	.98
+	HYDROGRAPH AT	DV048	203.	4.83	135.	35.	34.	.98
+	ROUTED TO	RR037D	202.	4.92	135.	35.	34.	.98
+	2 COMBINED AT	AD037D	1557.	4.33	590.	184.	178.	4.12
+	ROUTED TO	RR049A	1548.	4.42	590.	184.	178.	4.12
+	HYDROGRAPH AT	SB049	378.	4.08	40.	10.	10.	.14
+	HYDROGRAPH AT	DR048	136.	4.83	8.	2.	2.	.98
+	ROUTED TO	RR049B	92.	4.92	8.	2.	2.	.98
+	2 COMBINED AT	AD049A	378.	4.08	52.	13.	13.	.45
+	DIVERSION TO	DR049	318.	4.08	26.	6.	6.	.45
+	HYDROGRAPH AT	DV049	60.	3.67	25.	6.	6.	.45
+	HYDROGRAPH AT	SB050	105.	4.08	12.	3.	3.	.04
+	DIVERSION TO	DR050	0.	4.08	0.	0.	0.	.04
+	HYDROGRAPH AT	DV050	105.	4.08	12.	3.	3.	.04
+	ROUTED TO	RR049C	105.	4.08	12.	3.	3.	.04
+	3 COMBINED AT	AD049B	1644.	4.33	620.	193.	186.	4.23
+	ROUTED TO	RR051A	1644.	4.42	620.	193.	186.	4.23
+	ROUTED TO	RR051B	1643.	4.42	620.	193.	186.	4.23
+	ROUTED TO	RR051C	1632.	4.42	620.	193.	186.	4.23
+	HYDROGRAPH AT	SB051	228.	4.08	25.	6.	6.	.09
+	2 COMBINED AT	AD051	1703.	4.42	639.	198.	191.	4.32
+	HYDROGRAPH AT	SB052	263.	4.17	35.	9.	8.	.17
+	DIVERSION TO	DR052	131.	4.17	17.	4.	4.	.17
+	HYDROGRAPH AT	DV052	131.	4.17	17.	4.	4.	.17
+	ROUTED TO	RR053A	128.	4.17	17.	4.	4.	.17
+	ROUTED TO	RR053B	127.	4.25	17.	4.	4.	.17
+	HYDROGRAPH AT	SB053	227.	4.08	25.	6.	6.	.10
+	2 COMBINED AT	AD053	332.	4.17	43.	11.	10.	.27
+	ROUTED TO	RR054A	325.	4.17	43.	11.	10.	.27
+	DIVERSION TO	DR054A	160.	4.00	33.	8.	8.	.27

+	HYDROGRAPH AT	DV054A	165.	4.17	9.	2.	2.	.27
+	ROUTED TO	RR055A	160.	4.25	9.	2.	2.	.27
+	HYDROGRAPH AT	DR050	0.	4.08	0.	0.	0.	.04
+	ROUTED TO	RR055B	0.	4.17	0.	0.	0.	.04
+	2 COMBINED AT	AD055A	160.	4.25	9.	2.	2.	.34
+	ROUTED TO	RR055C	140.	4.33	9.	2.	2.	.34
+	HYDROGRAPH AT	SB055	123.	4.08	16.	4.	4.	.05
+	2 COMBINED AT	AD055B	220.	4.25	25.	6.	6.	.39
+	DIVERSION TO	DR055	165.	4.25	19.	5.	5.	.39
+	HYDROGRAPH AT	DV055	55.	4.25	6.	2.	2.	.39
+	HYDROGRAPH AT	DR054A	160.	4.00	33.	8.	8.	.27
+	ROUTED TO	RR054B	160.	4.08	34.	8.	8.	.27
+	HYDROGRAPH AT	SB054	214.	4.17	30.	7.	7.	.11
+	2 COMBINED AT	AD054	374.	4.17	63.	16.	15.	.24
+	DIVERSION TO	DR054B	214.	4.17	19.	5.	5.	.24
+	HYDROGRAPH AT	DV054B	160.	3.92	44.	11.	11.	.24
+	2 COMBINED AT	AD055C	215.	4.25	50.	13.	12.	.39
+	ROUTED TO	RR055D	213.	4.33	50.	13.	12.	.39
+	2 COMBINED AT	AD055D	1860.	4.42	682.	209.	202.	4.75
+	ROUTED TO	RR057A	1854.	4.42	682.	209.	202.	4.75
+	HYDROGRAPH AT	DR049	318.	4.08	26.	6.	6.	.45
+	ROUTED TO	RR057B	281.	4.17	26.	6.	6.	.45
+	2 COMBINED AT	AD057A	1917.	4.42	689.	211.	204.	5.28
+	ROUTED TO	RR057C	1902.	4.50	689.	211.	203.	5.28
+	HYDROGRAPH AT	SB057	413.	4.00	40.	10.	10.	.15
+	2 COMBINED AT	AD057B	2003.	4.42	722.	220.	212.	5.28
+	HYDROGRAPH AT	DR046	128.	4.17	6.	2.	2.	1.03
+	ROUTED TO	RR047B	91.	4.42	6.	2.	2.	1.03
+	HYDROGRAPH AT	SB047	314.	4.17	40.	10.	10.	.19
+	2 COMBINED AT	AD047	364.	4.33	51.	13.	12.	.33
+	ROUTED TO	RR058	354.	4.42	51.	13.	12.	.33
+	HYDROGRAPH AT	SB058	120.	4.08	12.	3.	3.	.06
+	2 COMBINED AT	AD058A	403.	4.33	63.	16.	15.	.39

+	HYDROGRAPH AT	DR044B	111.	4.17	6.	2.	1.	.18
+	ROUTED TO	RR059A	63.	4.42	6.	2.	1.	.18
+	HYDROGRAPH AT	SB059	371.	4.17	47.	12.	11.	.23
+	2 COMBINED AT	AD059A	389.	4.17	53.	13.	13.	.30
+	HYDROGRAPH AT	SB061A	258.	4.17	41.	10.	10.	.19
+	HYDROGRAPH AT	SB061B	171.	4.17	22.	5.	5.	.11
+	DIVERSION TO	DR061B	124.	4.17	9.	2.	2.	.11
+	HYDROGRAPH AT	DV061B	47.	3.92	13.	3.	3.	.11
+	HYDROGRAPH AT	DR038	68.	3.75	16.	4.	4.	.12
+	ROUTED TO	RR061C	68.	3.83	16.	4.	4.	.12
+	HYDROGRAPH AT	SB061C	589.	4.08	66.	16.	16.	.27
+	2 COMBINED AT	AD061A	657.	4.08	81.	20.	20.	.30
+	3 COMBINED AT	AD061B	901.	4.08	134.	34.	32.	.60
+	ROUTED TO	LP061	121.	5.08	70.	34.	32.	.60
+	ROUTED TO	RR062A	119.	5.42	70.	34.	32.	.60
+	ROUTED TO	RR062B	119.	5.42	70.	34.	32.	.60
+	HYDROGRAPH AT	SB062	753.	4.08	80.	20.	19.	.34
+	2 COMBINED AT	AD062	662.	4.08	133.	52.	51.	.94
+	ROUTED TO	LP062	236.	4.50	96.	51.	49.	.94
+	ROUTED TO	RR063	218.	4.75	96.	51.	49.	.94
+	HYDROGRAPH AT	SB063	454.	4.08	54.	14.	13.	.22
+	2 COMBINED AT	AD063	412.	4.17	137.	63.	61.	1.16
+	ROUTED TO	LP063	386.	4.25	133.	63.	61.	1.16
+	DIVERSION TO	DR063A	109.	4.25	86.	51.	50.	1.16
+	HYDROGRAPH AT	DV063A	278.	4.25	47.	12.	11.	1.16
+	DIVERSION TO	DR063B	139.	4.25	23.	6.	6.	1.16
+	HYDROGRAPH AT	DV063B	139.	4.25	23.	6.	6.	1.16
+	HYDROGRAPH AT	DR041	44.	5.92	43.	37.	37.	.60
+	ROUTED TO	RR064A	44.	5.92	43.	37.	36.	.60
+	HYDROGRAPH AT	DR039	209.	4.17	13.	3.	3.	.12
+	ROUTED TO	RR064B	179.	4.25	13.	3.	3.	.12
+	2 COMBINED AT	AD064A	206.	4.25	55.	41.	39.	.57
+	ROUTED TO	RR064C	190.	4.33	55.	40.	39.	.57
	HYDROGRAPH AT							

+		SB064	233.	4.17	31.	8.	7.	.14
+	2 COMBINED AT	AD064B	370.	4.25	81.	47.	46.	.71
+	HYDROGRAPH AT	DR043	168.	4.08	19.	5.	5.	.21
+	ROUTED TO	RR064D	163.	4.17	19.	5.	5.	.21
+	3 COMBINED AT	AD064C	549.	4.25	114.	55.	54.	1.50
+	ROUTED TO	RR065A	546.	4.25	114.	55.	54.	1.50
+	HYDROGRAPH AT	DR063B	139.	4.25	23.	6.	6.	1.16
+	ROUTED TO	RR065B	130.	4.33	23.	6.	6.	1.16
+	2 COMBINED AT	AD065A	592.	4.33	130.	59.	57.	2.08
+	ROUTED TO	RR065C	568.	4.42	129.	59.	57.	2.08
+	HYDROGRAPH AT	SB065	888.	4.08	92.	23.	22.	.44
+	2 COMBINED AT	AD065B	935.	4.33	201.	78.	75.	2.52
+	ROUTED TO	RR066	909.	4.42	201.	78.	75.	2.52
+	HYDROGRAPH AT	SB066	280.	4.08	28.	7.	7.	.12
+	2 COMBINED AT	AD066	994.	4.42	223.	83.	80.	2.64
+	ROUTED TO	RR067A	987.	4.42	223.	83.	80.	2.64
+	HYDROGRAPH AT	SB067A	215.	4.08	20.	5.	5.	.10
+	DIVERSION TO	DR067A	21.	3.83	4.	1.	1.	.10
+	HYDROGRAPH AT	DV067A	194.	4.08	16.	4.	4.	.10
+	2 COMBINED AT	AD067A	1032.	4.42	234.	86.	83.	2.74
+	DIVERSION TO	DR067B	627.	4.42	190.	75.	73.	2.74
+	HYDROGRAPH AT	DV067B	406.	4.42	44.	11.	11.	2.74
+	ROUTED TO	RR059B	404.	4.42	44.	11.	11.	2.74
+	2 COMBINED AT	AD059B	890.	4.33	111.	28.	27.	1.02
+	ROUTED TO	RR060A	872.	4.33	111.	28.	27.	1.02
+	HYDROGRAPH AT	SB060	487.	4.08	53.	13.	13.	.18
+	2 COMBINED AT	AD060A	1027.	4.33	158.	40.	38.	1.20
+	HYDROGRAPH AT	DR067B	627.	4.42	190.	75.	73.	2.74
+	ROUTED TO	RR067B	621.	4.50	190.	75.	72.	2.74
+	HYDROGRAPH AT	SB067B	172.	4.08	18.	5.	4.	.09
+	2 COMBINED AT	AD067B	717.	4.33	208.	80.	77.	2.11
+	DIVERSION TO	DR067C	359.	4.33	104.	40.	38.	2.11
+	HYDROGRAPH AT	DV067C	359.	4.33	104.	40.	38.	2.11
+	ROUTED TO	RR060B	357.	4.42	104.	40.	38.	2.11

+	2 COMBINED AT	AD060B	1190.	4.33	241.	75.	72.	2.26
+	ROUTED TO	RR060C	1183.	4.33	241.	75.	72.	2.26
+	2 COMBINED AT	AD058B	1379.	4.33	281.	85.	82.	2.65
+	2 COMBINED AT	AD057C	2981.	4.42	934.	287.	277.	7.93
+	ROUTED TO	RR068	2938.	4.50	933.	287.	277.	7.93
+	HYDROGRAPH AT	SB068	89.	4.33	22.	6.	5.	.11
+	2 COMBINED AT	AD068	2988.	4.50	948.	291.	280.	8.04
+	ROUTED TO	RR070A	2981.	4.50	948.	291.	280.	8.04
+	HYDROGRAPH AT	DR067C	359.	4.33	104.	40.	38.	2.11
+	ROUTED TO	RR069	350.	4.50	104.	40.	38.	2.11
+	HYDROGRAPH AT	SB069	161.	4.25	28.	7.	7.	.14
+	2 COMBINED AT	AD069	496.	4.42	132.	47.	45.	1.20
+	ROUTED TO	RR070B	475.	4.50	132.	47.	45.	1.20
+	HYDROGRAPH AT	SB070	219.	4.17	28.	7.	7.	.14
+	3 COMBINED AT	AD070	3336.	4.50	1061.	331.	319.	9.60
+	HYDROGRAPH AT	DR055	165.	4.25	19.	5.	5.	.39
+	HYDROGRAPH AT	DR054B	214.	4.17	19.	5.	5.	.24
+	2 COMBINED AT	AD5455	336.	4.25	37.	9.	9.	.60

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	DT	INTERPOLATED TO COMPUTATION INTERVAL PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)

FOR STORM = 1 STORM AREA (SQ MI) = .01

RR011A	MANE	2.06	57.00	230.43	1.13	5.00	57.00	235.00	1.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1022E+02 EXCESS= .0000E+00 OUTFLOW= .1022E+02 BASIN STORAGE= .1362E-08 PERCENT ERROR= -.1

FOR STORM = 2 STORM AREA (SQ MI) = .50

RR011A	MANE	2.06	57.00	230.60	1.12	5.00	57.00	235.00	1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1018E+02 EXCESS= .0000E+00 OUTFLOW= .1018E+02 BASIN STORAGE= .1279E-08 PERCENT ERROR= -.1

FOR STORM = 3 STORM AREA (SQ MI) = 2.80

RR011A	MANE	2.01	57.00	224.71	1.24	5.00	57.00	225.00	1.24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1121E+02 EXCESS= .0000E+00 OUTFLOW= .1122E+02 BASIN STORAGE= .7846E-09 PERCENT ERROR= .0

FOR STORM = 4 STORM AREA (SQ MI) = 16.00

RR011A	MANE	2.05	57.00	229.52	1.38	5.00	57.00	230.00	1.38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1247E+02 EXCESS= .0000E+00 OUTFLOW= .1247E+02 BASIN STORAGE= .8672E-09 PERCENT ERROR= .0

FOR STORM = 5 STORM AREA (SQ MI) = 90.00

RR011A	MANE	2.02	57.00	235.05	1.42	5.00	57.00	240.00	1.42

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1287E+02 EXCESS= .0000E+00 OUTFLOW= .1288E+02 BASIN STORAGE= .8464E-09 PERCENT ERROR= .0

FOR STORM = 6 STORM AREA (SQ MI) = 500.00

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        RR011A  MANE          2.03      51.15     257.13        1.18        5.00      51.15     255.00          1.18

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1073E+02 EXCESS= .0000E+00 OUTFLOW= .1073E+02 BASIN STORAGE= .1011E-08 PERCENT ERROR=     .0

       FOR STORM = 1  STORM AREA (SQ MI) =        .01
        RR012A  MANE           .81      73.00     247.03        2.70        5.00      73.00     250.00          2.70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8645E+01 EXCESS= .0000E+00 OUTFLOW= .8646E+01 BASIN STORAGE= .3158E-10 PERCENT ERROR=     .0

       FOR STORM = 2  STORM AREA (SQ MI) =        .50
        RR012A  MANE           .82      73.00     247.28        2.69        5.00      73.00     250.00          2.69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8603E+01 EXCESS= .0000E+00 OUTFLOW= .8603E+01 BASIN STORAGE= .3509E-10 PERCENT ERROR=     .0

       FOR STORM = 3  STORM AREA (SQ MI) =       2.80
        RR012A  MANE           .85      69.62     257.14        2.73        5.00      69.61     260.00          2.73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8733E+01 EXCESS= .0000E+00 OUTFLOW= .8734E+01 BASIN STORAGE= .3290E-10 PERCENT ERROR=     .0

       FOR STORM = 4  STORM AREA (SQ MI) =      16.00
        RR012A  MANE           .81      55.28     261.24        2.53        5.00      55.25     260.00          2.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8093E+01 EXCESS= .0000E+00 OUTFLOW= .8094E+01 BASIN STORAGE= .3079E-10 PERCENT ERROR=     .0

       FOR STORM = 5  STORM AREA (SQ MI) =      90.00
        RR012A  MANE           .82      40.34     261.87        2.17        5.00      40.23     260.00          2.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6934E+01 EXCESS= .0000E+00 OUTFLOW= .6934E+01 BASIN STORAGE= .3404E-10 PERCENT ERROR=     .0

       FOR STORM = 6  STORM AREA (SQ MI) =     500.00
        RR012A  MANE          1.04      21.60     267.16        1.45        5.00      21.52     265.00          1.45

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4652E+01 EXCESS= .0000E+00 OUTFLOW= .4652E+01 BASIN STORAGE= .3253E-10 PERCENT ERROR=     .0

       FOR STORM = 1  STORM AREA (SQ MI) =        .01
        RR1217  MANE          1.55      73.00     253.41        2.70        5.00      73.00     255.00          2.70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8649E+01 EXCESS= .0000E+00 OUTFLOW= .8652E+01 BASIN STORAGE= .1071E-08 PERCENT ERROR=     .0

       FOR STORM = 2  STORM AREA (SQ MI) =        .50
        RR1217  MANE          1.55      73.00     261.35        2.69        5.00      73.00     255.00          2.69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8606E+01 EXCESS= .0000E+00 OUTFLOW= .8610E+01 BASIN STORAGE= .9368E-09 PERCENT ERROR=     .0

       FOR STORM = 3  STORM AREA (SQ MI) =       2.80
        RR1217  MANE          1.59      69.51     262.58        2.73        5.00      69.21     260.00          2.73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8735E+01 EXCESS= .0000E+00 OUTFLOW= .8739E+01 BASIN STORAGE= .8981E-09 PERCENT ERROR=     .0

       FOR STORM = 4  STORM AREA (SQ MI) =      16.00
        RR1217  MANE          1.65      55.19     262.99        2.53        5.00      54.98     265.00          2.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8095E+01 EXCESS= .0000E+00 OUTFLOW= .8097E+01 BASIN STORAGE= .6188E-09 PERCENT ERROR=     .0

       FOR STORM = 5  STORM AREA (SQ MI) =      90.00
        RR1217  MANE          1.82      40.21     263.54        2.17        5.00      40.16     265.00          2.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6935E+01 EXCESS= .0000E+00 OUTFLOW= .6936E+01 BASIN STORAGE= .1144E-08 PERCENT ERROR=     .0

       FOR STORM = 6  STORM AREA (SQ MI) =     500.00
        RR1217  MANE          1.97      21.52     268.98        1.45        5.00      21.52     270.00          1.45

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4652E+01 EXCESS= .0000E+00 OUTFLOW= .4653E+01 BASIN STORAGE= .6197E-09 PERCENT ERROR=     .0

       FOR STORM = 1  STORM AREA (SQ MI) =        .01
        RR020C  MANE           .46    1575.11     255.91        2.25        5.00    1557.74     255.00          2.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1772E+03 EXCESS= .0000E+00 OUTFLOW= .1772E+03 BASIN STORAGE= .1655E-03 PERCENT ERROR=     .0

       FOR STORM = 2  STORM AREA (SQ MI) =        .50
        RR020C  MANE           .46    1563.03     256.10        2.23        5.00    1546.07     255.00          2.23
```

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1758E+03 EXCESS= .0000E+00 OUTFLOW= .1758E+03 BASIN STORAGE= .1655E-03 PERCENT ERROR= .0

FOR STORM = 3 STORM AREA (SQ MI) = 2.80
RR020C MANE .46 1170.14 260.77 2.05 5.00 1166.56 260.00 2.05

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1621E+03 EXCESS= .0000E+00 OUTFLOW= .1621E+03 BASIN STORAGE= .1655E-03 PERCENT ERROR= .0

FOR STORM = 4 STORM AREA (SQ MI) = 16.00
RR020C MANE .49 935.23 265.48 1.85 5.00 934.90 265.00 1.85

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1460E+03 EXCESS= .0000E+00 OUTFLOW= .1460E+03 BASIN STORAGE= .1655E-03 PERCENT ERROR= .0

FOR STORM = 5 STORM AREA (SQ MI) = 90.00
RR020C MANE .51 680.38 266.13 1.53 5.00 678.79 265.00 1.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1209E+03 EXCESS= .0000E+00 OUTFLOW= .1209E+03 BASIN STORAGE= .1655E-03 PERCENT ERROR= .0

FOR STORM = 6 STORM AREA (SQ MI) = 500.00
RR020C MANE .51 342.85 275.46 .97 5.00 342.81 275.00 .97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7660E+02 EXCESS= .0000E+00 OUTFLOW= .7660E+02 BASIN STORAGE= .1655E-03 PERCENT ERROR= .0

FOR STORM = 1 STORM AREA (SQ MI) = .01
RR2427 MANE 1.17 234.75 286.90 6.09 5.00 234.73 285.00 6.09

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1430E+03 EXCESS= .0000E+00 OUTFLOW= .1429E+03 BASIN STORAGE= .1391E+00 PERCENT ERROR= .0

FOR STORM = 2 STORM AREA (SQ MI) = .50
RR2427 MANE 1.19 234.69 286.63 6.08 5.00 234.66 285.00 6.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1428E+03 EXCESS= .0000E+00 OUTFLOW= .1426E+03 BASIN STORAGE= .1391E+00 PERCENT ERROR= .0

FOR STORM = 3 STORM AREA (SQ MI) = 2.80
RR2427 MANE 1.29 233.99 298.08 6.11 5.00 233.97 300.00 6.11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1436E+03 EXCESS= .0000E+00 OUTFLOW= .1434E+03 BASIN STORAGE= .1391E+00 PERCENT ERROR= .0

FOR STORM = 4 STORM AREA (SQ MI) = 16.00
RR2427 MANE 1.28 233.02 321.87 6.35 5.00 233.01 320.00 6.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1491E+03 EXCESS= .0000E+00 OUTFLOW= .1490E+03 BASIN STORAGE= .1388E+00 PERCENT ERROR= .0

FOR STORM = 5 STORM AREA (SQ MI) = 90.00
RR2427 MANE 1.27 229.08 362.35 6.18 5.00 229.07 360.00 6.18

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1452E+03 EXCESS= .0000E+00 OUTFLOW= .1450E+03 BASIN STORAGE= .1224E+00 PERCENT ERROR= .0

FOR STORM = 6 STORM AREA (SQ MI) = 500.00
RR2427 MANE 1.21 205.48 346.41 4.39 5.00 205.48 345.00 4.39

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1031E+03 EXCESS= .0000E+00 OUTFLOW= .1030E+03 BASIN STORAGE= .5784E-01 PERCENT ERROR= .0

FOR STORM = 1 STORM AREA (SQ MI) = .01
RR034 MANE 2.50 .01 1495.62 .00 5.00 .01 1495.00 .00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1774E-01 EXCESS= .0000E+00 OUTFLOW= .1766E-01 BASIN STORAGE= .7635E-04 PERCENT ERROR= .0

FOR STORM = 2 STORM AREA (SQ MI) = .50
RR034 MANE 2.51 .01 1496.65 .00 5.00 .01 1495.00 .00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1774E-01 EXCESS= .0000E+00 OUTFLOW= .1768E-01 BASIN STORAGE= .7631E-04 PERCENT ERROR= -.1

FOR STORM = 3 STORM AREA (SQ MI) = 2.80
RR034 MANE 2.48 .01 1497.13 .00 5.00 .01 1495.00 .00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1775E-01 EXCESS= .0000E+00 OUTFLOW= .1769E-01 BASIN STORAGE= .7682E-04 PERCENT ERROR= -.1

FOR STORM = 4 STORM AREA (SQ MI) = 16.00
RR034 MANE 2.50 .01 1496.19 .00 5.00 .01 1495.00 .00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1778E-01 EXCESS= .0000E+00 OUTFLOW= .1771E-01 BASIN STORAGE= .7652E-04 PERCENT ERROR= .0

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        FOR STORM = 5  STORM AREA (SQ MI) =       90.00
          RR034  MANE         2.51       .01   1495.71       .00      5.00       .01   1495.00          .00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1775E-01 EXCESS= .0000E+00 OUTFLOW= .1767E-01 BASIN STORAGE= .7624E-04 PERCENT ERROR=     .0

        FOR STORM = 6  STORM AREA (SQ MI) =      500.00
          RR034  MANE         2.59       .01   1496.54       .00      5.00       .01   1495.00          .00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1647E-01 EXCESS= .0000E+00 OUTFLOW= .1640E-01 BASIN STORAGE= .7453E-04 PERCENT ERROR=    -.1

        FOR STORM = 1  STORM AREA (SQ MI) =         .01
          RR024F  MANE         .65    127.00    251.43       .29      5.00    127.00    255.00          .29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3121E+02 EXCESS= .0000E+00 OUTFLOW= .3121E+02 BASIN STORAGE= .6941E-07 PERCENT ERROR=     .0

        FOR STORM = 2  STORM AREA (SQ MI) =         .50
          RR024F  MANE         .65    127.00    251.61       .29      5.00    127.00    255.00          .29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3113E+02 EXCESS= .0000E+00 OUTFLOW= .3114E+02 BASIN STORAGE= .8465E-07 PERCENT ERROR=     .0

        FOR STORM = 3  STORM AREA (SQ MI) =        2.80
          RR024F  MANE         .77    127.00    257.18       .29      5.00    127.00    260.00          .29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3088E+02 EXCESS= .0000E+00 OUTFLOW= .3088E+02 BASIN STORAGE= .8190E-07 PERCENT ERROR=     .0

        FOR STORM = 4  STORM AREA (SQ MI) =       16.00
          RR024F  MANE         .61    127.00    266.76       .27      5.00    127.00    270.00          .27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2926E+02 EXCESS= .0000E+00 OUTFLOW= .2926E+02 BASIN STORAGE= .8058E-07 PERCENT ERROR=     .0

        FOR STORM = 5  STORM AREA (SQ MI) =       90.00
          RR024F  MANE         .74    100.95    281.56       .11      5.00    100.74    280.00          .11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1175E+02 EXCESS= .0000E+00 OUTFLOW= .1175E+02 BASIN STORAGE= .7222E-07 PERCENT ERROR=

        FOR STORM = 6  STORM AREA (SQ MI) =      500.00
          RR024F  MANE        1.13     22.28    262.00       .04      5.00     22.20    260.00          .04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4579E+01 EXCESS= .0000E+00 OUTFLOW= .4580E+01 BASIN STORAGE= .6484E-07 PERCENT ERROR=     .0

        FOR STORM = 1  STORM AREA (SQ MI) =         .01
          RR4446  MANE         .62    133.00    241.53      1.37      5.00    133.00    245.00         1.37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1311E+02 EXCESS= .0000E+00 OUTFLOW= .1311E+02 BASIN STORAGE= .2020E-10 PERCENT ERROR=     .0

        FOR STORM = 2  STORM AREA (SQ MI) =         .50
          RR4446  MANE         .62    133.00    241.70      1.36      5.00    133.00    245.00         1.36

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1305E+02 EXCESS= .0000E+00 OUTFLOW= .1305E+02 BASIN STORAGE= .2180E-10 PERCENT ERROR=     .0

        FOR STORM = 3  STORM AREA (SQ MI) =        2.80
          RR4446  MANE         .60    133.00    251.72      1.39      5.00    133.00    255.00         1.39

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1336E+02 EXCESS= .0000E+00 OUTFLOW= .1337E+02 BASIN STORAGE= .2339E-10 PERCENT ERROR=     .0

        FOR STORM = 4  STORM AREA (SQ MI) =       16.00
          RR4446  MANE         .77    110.34    251.80      1.23      5.00    109.70    255.00         1.23

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1182E+02 EXCESS= .0000E+00 OUTFLOW= .1182E+02 BASIN STORAGE= .2288E-10 PERCENT ERROR=     .0

        FOR STORM = 5  STORM AREA (SQ MI) =       90.00
          RR4446  MANE         .71     72.49    256.26       .92      5.00     72.46    255.00          .92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8852E+01 EXCESS= .0000E+00 OUTFLOW= .8853E+01 BASIN STORAGE= .2245E-10 PERCENT ERROR=

        FOR STORM = 6  STORM AREA (SQ MI) =      500.00
          RR4446  MANE         .92     22.48    261.73       .47      5.00     22.42    260.00          .47

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4541E+01 EXCESS= .0000E+00 OUTFLOW= .4541E+01 BASIN STORAGE= .2016E-10 PERCENT ERROR=     .0
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FOR STORM = 1  STORM AREA (SQ MI) =        .01
  RR3646  MANE          .29   325.00    250.87       .77      5.00    325.00    255.00         .77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4075E+02 EXCESS= .0000E+00 OUTFLOW= .4075E+02 BASIN STORAGE= .2604E-11 PERCENT ERROR=    .0

FOR STORM = 2  STORM AREA (SQ MI) =        .50
  RR3646  MANE          .29   325.00    250.83       .76      5.00    325.00    255.00         .76

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3992E+02 EXCESS= .0000E+00 OUTFLOW= .3992E+02 BASIN STORAGE= .2748E-11 PERCENT ERROR=    .0

FOR STORM = 3  STORM AREA (SQ MI) =       2.80
  RR3646  MANE          .38   247.35    260.45       .57      5.00    247.26    260.00         .57

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3027E+02 EXCESS= .0000E+00 OUTFLOW= .3027E+02 BASIN STORAGE= .2666E-11 PERCENT ERROR=    .0

FOR STORM = 4  STORM AREA (SQ MI) =      16.00
  RR3646  MANE          .45   179.30    260.73       .37      5.00    178.81    260.00         .37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1978E+02 EXCESS= .0000E+00 OUTFLOW= .1978E+02 BASIN STORAGE= .1958E-11 PERCENT ERROR=    .0

FOR STORM = 5  STORM AREA (SQ MI) =      90.00
  RR3646  MANE          .35   114.00    260.71       .28      5.00    113.54    265.00         .28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1483E+02 EXCESS= .0000E+00 OUTFLOW= .1483E+02 BASIN STORAGE= .2168E-11 PERCENT ERROR=    .0

FOR STORM = 6  STORM AREA (SQ MI) =     500.00
  RR3646  MANE          .57    36.04    275.65       .15      5.00     36.03    275.00         .15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7821E+01 EXCESS= .0000E+00 OUTFLOW= .7821E+01 BASIN STORAGE= .1960E-09 PERCENT ERROR=    .0

FOR STORM = 1  STORM AREA (SQ MI) =        .01
  RR047A  MANE          .59   588.00    246.70      1.32      5.00    588.00    250.00        1.32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7255E+02 EXCESS= .0000E+00 OUTFLOW= .7255E+02 BASIN STORAGE= .1281E-09 PERCENT ERROR=    .0

FOR STORM = 2  STORM AREA (SQ MI) =        .50
  RR047A  MANE          .61   588.00    246.42      1.30      5.00    588.00    250.00        1.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7158E+02 EXCESS= .0000E+00 OUTFLOW= .7158E+02 BASIN STORAGE= .1381E-09 PERCENT ERROR=    .0

FOR STORM = 3  STORM AREA (SQ MI) =       2.80
  RR047A  MANE          .49   588.00    256.32      1.18      5.00    588.00    260.00        1.18

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6473E+02 EXCESS= .0000E+00 OUTFLOW= .6473E+02 BASIN STORAGE= .1012E-09 PERCENT ERROR=    .0

FOR STORM = 4  STORM AREA (SQ MI) =      16.00
  RR047A  MANE          .60   450.65    256.13       .91      5.00    449.39    260.00         .91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4973E+02 EXCESS= .0000E+00 OUTFLOW= .4973E+02 BASIN STORAGE= .9436E-10 PERCENT ERROR=    .0

FOR STORM = 5  STORM AREA (SQ MI) =      90.00
  RR047A  MANE          .55   290.11    260.83       .68      5.00    289.81    260.00         .68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3728E+02 EXCESS= .0000E+00 OUTFLOW= .3728E+02 BASIN STORAGE= .1119E-09 PERCENT ERROR=    .0

FOR STORM = 6  STORM AREA (SQ MI) =     500.00
  RR047A  MANE          .76    91.91    265.97       .36      5.00     91.83    265.00         .36

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1954E+02 EXCESS= .0000E+00 OUTFLOW= .1954E+02 BASIN STORAGE= .2208E-08 PERCENT ERROR=    .0

FOR STORM = 1  STORM AREA (SQ MI) =        .01
  RR4748  MANE          .88   588.00    252.15      1.32      5.00    588.00    255.00        1.32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7258E+02 EXCESS= .0000E+00 OUTFLOW= .7259E+02 BASIN STORAGE= .1318E-08 PERCENT ERROR=    .0

FOR STORM = 2  STORM AREA (SQ MI) =        .50
  RR4748  MANE          .86   588.00    252.18      1.30      5.00    588.00    255.00        1.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7161E+02 EXCESS= .0000E+00 OUTFLOW= .7162E+02 BASIN STORAGE= .9506E-09 PERCENT ERROR=    .0

FOR STORM = 3  STORM AREA (SQ MI) =       2.80
  RR4748  MANE          .85   587.79    260.42      1.18      5.00    587.72    260.00        1.18
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .6475E+02 EXCESS= .0000E+00 OUTFLOW= .6476E+02 BASIN STORAGE= .1569E-08 PERCENT ERROR=    .0

          FOR STORM = 4  STORM AREA (SQ MI) =      16.00
           RR4748  MANE          .92    449.22    260.86       .91      5.00    449.07    260.00        .91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4975E+02 EXCESS= .0000E+00 OUTFLOW= .4976E+02 BASIN STORAGE= .1490E-08 PERCENT ERROR=

          FOR STORM = 5  STORM AREA (SQ MI) =      90.00
           RR4748  MANE          .96    289.56    261.67       .68      5.00    288.35    260.00        .68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3729E+02 EXCESS= .0000E+00 OUTFLOW= .3730E+02 BASIN STORAGE= .9555E-09 PERCENT ERROR=    .0

          FOR STORM = 6  STORM AREA (SQ MI) =     500.00
           RR4748  MANE         1.30     91.73    268.16       .36      5.00     91.51    270.00        .36

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1954E+02 EXCESS= .0000E+00 OUTFLOW= .1954E+02 BASIN STORAGE= .7699E-08 PERCENT ERROR=    .0

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
           RR037D  MANE         1.05    203.79    287.09      1.39      5.00    203.50    290.00       1.39

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7244E+02 EXCESS= .0000E+00 OUTFLOW= .7243E+02 BASIN STORAGE= .6943E-02 PERCENT ERROR=    .0

          FOR STORM = 2  STORM AREA (SQ MI) =        .50
           RR037D  MANE         1.04    203.57    286.97      1.38      5.00    203.35    290.00       1.38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7205E+02 EXCESS= .0000E+00 OUTFLOW= .7204E+02 BASIN STORAGE= .6939E-02 PERCENT ERROR=    .0

          FOR STORM = 3  STORM AREA (SQ MI) =       2.80
           RR037D  MANE         1.16    201.98    293.13      1.30      5.00    201.92    295.00       1.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6769E+02 EXCESS= .0000E+00 OUTFLOW= .6768E+02 BASIN STORAGE= .6914E-02 PERCENT ERROR=    .0

          FOR STORM = 4  STORM AREA (SQ MI) =      16.00
           RR037D  MANE         1.19    172.69    307.43      1.02      5.00    172.61    305.00       1.02

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5324E+02 EXCESS= .0000E+00 OUTFLOW= .5323E+02 BASIN STORAGE= .6802E-02 PERCENT ERROR=    .0

          FOR STORM = 5  STORM AREA (SQ MI) =      90.00
           RR037D  MANE         1.23    140.30    302.38       .75      5.00    140.07    305.00        .74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3894E+02 EXCESS= .0000E+00 OUTFLOW= .3894E+02 BASIN STORAGE= .6715E-02 PERCENT ERROR=    .0

          FOR STORM = 6  STORM AREA (SQ MI) =     500.00
           RR037D  MANE         1.39     70.74    308.33       .36      5.00     70.69    310.00        .36

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1886E+02 EXCESS= .0000E+00 OUTFLOW= .1886E+02 BASIN STORAGE= .6611E-02 PERCENT ERROR=    .0

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
           RR049C  MANE          .38    104.88    244.85      2.86      5.00    104.87    245.00       2.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6108E+01 EXCESS= .0000E+00 OUTFLOW= .6108E+01 BASIN STORAGE= .4135E-12 PERCENT ERROR=    .0

          FOR STORM = 2  STORM AREA (SQ MI) =        .50
           RR049C  MANE          .38    104.69    244.99      2.85      5.00    104.68    245.00       2.85

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6069E+01 EXCESS= .0000E+00 OUTFLOW= .6069E+01 BASIN STORAGE= .4247E-12 PERCENT ERROR=    .0

          FOR STORM = 3  STORM AREA (SQ MI) =       2.80
           RR049C  MANE          .37     64.41    240.96      2.73      5.00     64.35    245.00       2.73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5830E+01 EXCESS= .0000E+00 OUTFLOW= .5830E+01 BASIN STORAGE= .4389E-12 PERCENT ERROR=    .0

          FOR STORM = 4  STORM AREA (SQ MI) =      16.00
           RR049C  MANE          .38     49.68    241.08      2.53      5.00     49.65    245.00       2.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5402E+01 EXCESS= .0000E+00 OUTFLOW= .5402E+01 BASIN STORAGE= .4157E-12 PERCENT ERROR=    .0

          FOR STORM = 5  STORM AREA (SQ MI) =      90.00
           RR049C  MANE          .46     34.56    245.37      2.17      5.00     34.55    245.00       2.17
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .4629E+01 EXCESS= .0000E+00 OUTFLOW= .4628E+01 BASIN STORAGE= .4314E-12 PERCENT ERROR=    .0

          FOR STORM = 6  STORM AREA (SQ MI) =      500.00
           RR049C  MANE           .48     16.38    254.97       1.46       5.00      16.38    255.00          1.46

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3105E+01 EXCESS= .0000E+00 OUTFLOW= .3105E+01 BASIN STORAGE= .4180E-12 PERCENT ERROR=    .0

          FOR STORM = 1  STORM AREA (SQ MI) =         .01
           RR053B  MANE           .71    128.81    251.46        .96       5.00     127.33    255.00           .97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8742E+01 EXCESS= .0000E+00 OUTFLOW= .8747E+01 BASIN STORAGE= .3631E-06 PERCENT ERROR=   -.1

          FOR STORM = 2  STORM AREA (SQ MI) =         .50
           RR053B  MANE           .71    127.61    251.64        .96       5.00     126.21    255.00           .96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8662E+01 EXCESS= .0000E+00 OUTFLOW= .8665E+01 BASIN STORAGE= .4033E-06 PERCENT ERROR=    .0

          FOR STORM = 3  STORM AREA (SQ MI) =        2.80
           RR053B  MANE           .87     83.18    256.11        .83       5.00      82.82    255.00           .83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7507E+01 EXCESS= .0000E+00 OUTFLOW= .7510E+01 BASIN STORAGE= .4088E-06 PERCENT ERROR=    .0

          FOR STORM = 4  STORM AREA (SQ MI) =       16.00
           RR053B  MANE           .92     61.33    256.55        .69       5.00      60.88    255.00           .69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6264E+01 EXCESS= .0000E+00 OUTFLOW= .6266E+01 BASIN STORAGE= .3839E-06 PERCENT ERROR=    .0

          FOR STORM = 5  STORM AREA (SQ MI) =       90.00
           RR053B  MANE          1.03     37.90    260.54        .50       5.00      37.90    260.00           .50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4495E+01 EXCESS= .0000E+00 OUTFLOW= .4496E+01 BASIN STORAGE= .4026E-06 PERCENT ERROR=    .0

          FOR STORM = 6  STORM AREA (SQ MI) =      500.00
           RR053B  MANE          1.47     10.43    268.00        .24       5.00      10.40    265.00           .24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2140E+01 EXCESS= .0000E+00 OUTFLOW= .2141E+01 BASIN STORAGE= .4851E-06 PERCENT ERROR=    .0

          FOR STORM = 1  STORM AREA (SQ MI) =         .01
           RR054B  MANE           .74    160.00    242.12       1.17       5.00     160.00    245.00          1.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1680E+02 EXCESS= .0000E+00 OUTFLOW= .1680E+02 BASIN STORAGE= .2545E-05 PERCENT ERROR=    .0

          FOR STORM = 2  STORM AREA (SQ MI) =         .50
           RR054B  MANE           .73    160.00    241.55       1.16       5.00     160.00    245.00          1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1672E+02 EXCESS= .0000E+00 OUTFLOW= .1673E+02 BASIN STORAGE= .2431E-05 PERCENT ERROR=    .0

          FOR STORM = 3  STORM AREA (SQ MI) =        2.80
           RR054B  MANE           .61    160.00    241.62       1.24       5.00     160.00    245.00          1.24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1781E+02 EXCESS= .0000E+00 OUTFLOW= .1781E+02 BASIN STORAGE= .2192E-05 PERCENT ERROR=    .0

          FOR STORM = 4  STORM AREA (SQ MI) =       16.00
           RR054B  MANE           .65    156.48    256.35       1.16       5.00     156.30    255.00          1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1664E+02 EXCESS= .0000E+00 OUTFLOW= .1664E+02 BASIN STORAGE= .2886E-05 PERCENT ERROR=    .0

          FOR STORM = 5  STORM AREA (SQ MI) =       90.00
           RR054B  MANE           .79    101.04    256.67        .89       5.00     100.37    255.00           .89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1285E+02 EXCESS= .0000E+00 OUTFLOW= .1285E+02 BASIN STORAGE= .2384E-05 PERCENT ERROR=    .0

          FOR STORM = 6  STORM AREA (SQ MI) =      500.00
           RR054B  MANE          1.07     36.08    262.40        .50       5.00      35.95    265.00           .50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7181E+01 EXCESS= .0000E+00 OUTFLOW= .7182E+01 BASIN STORAGE= .2483E-05 PERCENT ERROR=    .0

          FOR STORM = 1  STORM AREA (SQ MI) =         .01
           RR061C  MANE           .76     68.00    226.69       1.24       5.00      68.00    230.00          1.24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7949E+01 EXCESS= .0000E+00 OUTFLOW= .7951E+01 BASIN STORAGE= .2865E-10 PERCENT ERROR=    .0
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         FOR STORM = 2  STORM AREA (SQ MI) =        .50
          RR061C  MANE          .76     68.00    226.84      1.24      5.00     68.00    230.00         1.24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7920E+01 EXCESS= .0000E+00 OUTFLOW= .7922E+01 BASIN STORAGE= .3239E-10 PERCENT ERROR=    .0

         FOR STORM = 3  STORM AREA (SQ MI) =       2.80
          RR061C  MANE          .88     68.00    222.59      1.40      5.00     68.00    225.00         1.40

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8986E+01 EXCESS= .0000E+00 OUTFLOW= .8988E+01 BASIN STORAGE= .3179E-10 PERCENT ERROR=    .0

         FOR STORM = 4  STORM AREA (SQ MI) =      16.00
          RR061C  MANE          .92     68.00    227.49      1.46      5.00     68.00    230.00         1.46

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9368E+01 EXCESS= .0000E+00 OUTFLOW= .9369E+01 BASIN STORAGE= .2935E-10 PERCENT ERROR=    .0

         FOR STORM = 5  STORM AREA (SQ MI) =      90.00
          RR061C  MANE          .77     68.00    236.72      1.37      5.00     68.00    240.00         1.37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8766E+01 EXCESS= .0000E+00 OUTFLOW= .8767E+01 BASIN STORAGE= .3140E-10 PERCENT ERROR=    .0

         FOR STORM = 6  STORM AREA (SQ MI) =     500.00
          RR061C  MANE          .99     27.56    252.38       .82      5.00     27.54    255.00          .82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5232E+01 EXCESS= .0000E+00 OUTFLOW= .5232E+01 BASIN STORAGE= .2973E-10 PERCENT ERROR=    .0

1                               SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LP019
                            (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

     PLAN  1 ...............              INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                              ELEVATION      1426.70          1432.00          1432.00
                              STORAGE             0.              34.              34.
                              OUTFLOW             0.             560.             560.

               RATIO      MAXIMUM      MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF      TIME OF
                 OF      RESERVOIR      DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW    FAILURE
                PMF       W.S.ELEV    OVER DAM     AC-FT       CFS       HOURS        HOURS        HOURS

               1.00      1432.83        .83         41.        626.       .67         4.58          .00

     PLAN  2 ...............              INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                              ELEVATION      1426.70          1432.00          1432.00
                              STORAGE             0.              34.              34.
                              OUTFLOW             0.             560.             560.

               RATIO      MAXIMUM      MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF      TIME OF
                 OF      RESERVOIR      DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW    FAILURE
                PMF       W.S.ELEV    OVER DAM     AC-FT       CFS       HOURS        HOURS        HOURS

               1.00      1432.78        .78         41.        622.       .67         4.58          .00

     PLAN  3 ...............              INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                              ELEVATION      1426.70          1432.00          1432.00
                              STORAGE             0.              34.              34.
                              OUTFLOW             0.             560.             560.

               RATIO      MAXIMUM      MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF      TIME OF
                 OF      RESERVOIR      DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW    FAILURE
                PMF       W.S.ELEV    OVER DAM     AC-FT       CFS       HOURS        HOURS        HOURS

               1.00      1431.70        .00         31.        523.       .00         4.58          .00

     PLAN  4 ...............              INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                              ELEVATION      1426.70          1432.00          1432.00
                              STORAGE             0.              34.              34.
                              OUTFLOW             0.             560.             560.

               RATIO      MAXIMUM      MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF      TIME OF
                 OF      RESERVOIR      DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW    FAILURE
                PMF       W.S.ELEV    OVER DAM     AC-FT       CFS       HOURS        HOURS        HOURS

               1.00      1430.77        .00         23.        417.       .00         4.67          .00

     PLAN  5 ...............              INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                              ELEVATION      1426.70          1432.00          1432.00
                              STORAGE             0.              34.              34.
                              OUTFLOW             0.             560.             560.

               RATIO      MAXIMUM      MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF      TIME OF
                 OF      RESERVOIR      DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW    FAILURE
```

PMF	W.S.ELEV	OVER DAM	AC-FT	CFS	HOURS	HOURS	HOURS
1.00	1429.71	.00	15.	306.	.00	4.58	.00

PLAN 6 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1426.70	1432.00	1432.00
STORAGE	0.	34.	34.
OUTFLOW	0.	560.	560.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1428.45	.00	6.	142.	.00	4.75	.00

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SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION LP020B
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1370.00	1387.80	1387.80
STORAGE	0.	92.	92.
OUTFLOW	0.	48.	48.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1389.19	1.39	111.	987.	3.00	4.75	.00

PLAN 2 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1370.00	1387.80	1387.80
STORAGE	0.	92.	92.
OUTFLOW	0.	48.	48.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1389.18	1.38	111.	970.	3.00	4.75	.00

PLAN 3 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1370.00	1387.80	1387.80
STORAGE	0.	92.	92.
OUTFLOW	0.	48.	48.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1389.01	1.21	108.	727.	2.92	4.92	.00

PLAN 4 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1370.00	1387.80	1387.80
STORAGE	0.	92.	92.
OUTFLOW	0.	48.	48.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1388.72	.92	104.	398.	2.50	5.33	.00

PLAN 5 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1370.00	1387.80	1387.80
STORAGE	0.	92.	92.
OUTFLOW	0.	48.	48.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1387.11	.00	84.	45.	.00	6.00	.00

PLAN 6 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1370.00	1387.80	1387.80
STORAGE	0.	92.	92.
OUTFLOW	0.	48.	48.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1381.81	.00	28.	21.	.00	5.75	.00

*** NORMAL END OF HEC-1 ***

APPENDIX C

SCOTTSDALE ROAD CORRIDOR DRAINAGE MASTER PLAN
RECOMMENDED ALTERNATIVE
SUPPORTING DOCUMENTS AND CALCULATIONS

Recommended Alternative 10-Year HEC-1 Input
(ALT10.TXT)

Recommended Alternative 100-Year HEC-1 Input
(ALT100.TXT)

Recommended Alternative 10-Year Summary Report
(ALT10.TXT)

Recommended Alternative 100-Year HEC-1 Summary Report
(ALT100.TXT)

Supporting Calculations for Recommended Alternative
10- and 100-Year Hydrology

Recommended Alternative 10-Year HEC-1 Input
(ALT10.TXT)

HEC-1 ALT10.TXT
RECOMMENDED
ALTERNATIVE
10-YR, 6-HR

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ID Project ID: 15586B10 - Major Basin: 01 - Return Period: 10 Years
ID       SCOTTSDALE ROAD CORRIDOR DRAINAGE MASTER PLAN
ID       FCD 2000C030                         SCI #15586
ID       10YR, 6HR FUTURE LAND USE CONDITION
ID       HYDROGRAPH MODEL "PALT10"     HEC-1 MODEL INPUT FILENAME: PALT10.DAT
ID
ID
ID       THE FOLLOWING CHANGES HAVE BEEN MADE TO THE EXISTING CONDITION
ID       HEC1 MODEL TO REFLECT THE PREFFERED ALTERNATIVE HYDROLOGIC CONDITIONS:
ID
ID       -SDALE ROAD CHANNEL ROUTING REACHES, FROM SDALE AIRPORT
ID        OUTFALL CHANNEL CONFL TO SWEETWATER AVE (RR020A AND RR020B),
ID        HAVE BEEN CHANGED FROM CHANNEL SECTIONS TO STREET SECTIONS.
ID        THE PREFERRED ALTERNATIVE CONSISTS OF A STORM DRAIN TRUNKLINE WITH
ID        CATCH BASINS REPLACING THE SDALE RD CHANNEL, STARTING AT TBIRD RD
ID        AND CONNECTING TO EXIST 90 IN DIAM PIPE AT SWEETWATER AVE.  HYDROLOGIC
ID        ROUTING THAT COULD EITHER BE MODELED AS STORAGE ROUTING OR KINEMATIC
ID        WAVE ROUTING WAS TYPICALLY MODELED AS A STORAGE ROUTING REACH.
ID
ID       -CACTUS PARK DET BASIN (LP020B) OVERFLOW SPILLWAY ELEVATION RAISED FROM
ID        1387.8 TO 1390.0 FT.
ID
ID       -DIVERSION DV/DR20B2 CHANGE TO REFLECT IMPROVED CONDITIONS AT CACTUS
ID        PARK.
ID
ID       -MESCAL PARK DET BASIN (LP048) BASIN PERIMETER ELEV RAISED BY ONE FOOT
ID        FROM 1363.5 TO 1364.5 FT. BASIN VOLUME INCREASED BY ABOUT 1 AC-FT.
ID
ID       -DIVERSION DV/DR048 CHANGE TO REFLECT IMPROVED CONDITIONS AT MESCAL
ID        PARK.
ID
ID       -UPPER 71ST STREET CHANNEL FOR APPROX 570 FT NORTH OF SAHUARO DR
ID        REFLECTS HARDENED PREFFERED ALT CHANNEL SECTION GEOMETRY AND "n" VALUE
ID        IN RR049A.
ID
ID       -UPPER 71ST STREET CHANNEL, FOR APPROX 300 FT NORTH OF MESCAL ST
ID        (RR037B), SLOPE FLATTENED SLIGHTLY TO REFLECT MINOR CHANNEL ADJUSTMENT
ID        DUE TO NEW 72 IN DIAM PIPE. CHANNEL GEOMETRY UNCHANGED.
ID
ID       -BERNEIL DITCH ROUTING (RR055D, RR057A & RR057C) FROM SDALE RD TO
ID        MTN VIEW CHANNEL CONFLUENCE CHANGED TO REFLECT PREFERRED ALT CHANNEL
ID        SECTION AND SLOPE.  CHANNEL CONVEYANCE CAPACITY INCREASED BY
ID        INCREASING THE CHANNEL X-SECTIONAL AREA AND HARD LINING CHANNEL.
ID        PROPOSED UNIFORM CHANNEL SLOPE EQUAL TO 0.00101 FT/FT.
ID
ID
ID       SUMMARY APPROACH, METHOD, PRECIP AND ASSUMPTION:
ID       1.  10YR, 6HR RAINFALL EVENT, MULTI-STORM JD RECORD OPTION,
ID           6HR DISTRIBUTION PATTERNS #1 THRU #5 WITH 15 MIN TIME INCREM
ID           (FCDMC, HYDROLOGY MANUAL, TABLE 2.4)
ID       2.  POINT PRECIP = 3.20 IN
ID       3.  PRECIP AERIAL REDUCTION FACTOR = 1.00 BASED ON 0.01 SQ MI BASIN
ID                                          = 0.994 BASED ON 0.50 SQ MI BASIN
ID                                          = 0.975 BASED ON 2.80 SQ MI BASIN
ID                                          = 0.922 BASED ON 16.00 SQ MI BASIN
ID                                          = 0.812 BASED ON 90.00 SQ MI BASIN
ID                                          = 0.570 BASED ON 500.00 SQ MI BASIN
ID       4.  BASIN AREAS ADJUSTED @ KEY HYDROGRAPH COMBINATION STEPS TO REFLECT
ID           AREA CORRECTED DUE TO MULTI-STORM OPTION
ID       5.  FUTURE COMPLETELY DEVELOPED CONDITION LAND USE
ID       6.  CLARK UNIT HYDROGRAPH WITH URBAN TIME-AREA
ID       7.  GREEN-AMPT LOSS RATES
ID       8.  NORMAL DEPTH STORAGE REACH ROUTING TYPICALLY USED FOR OPEN CHANNELS
ID           (SEE NOTE # 10)
ID       9.  KINEMATIC WAVE REACH ROUTING TYPICALLY USED FOR PIPE
ID           (SEE NOTE # 10)
ID       10. HYDROLOGIC ROUTING STEPS THAT COULD BE MODELED USING EITHER
ID           KINEMATIC WAVE OR NORMAL DEPTH (COMBINED SURFACE AND STORM DRAIN
ID           PIPE FLOW) WERE TYPICALLY MODELED USING THE PREDOMINANT FLOW
ID           CHARACTERISTIC.
ID       11. LEVEL POOL MODIFIED PULS STORAGE ROUTING @ REGIONAL DETENTION BASINS
ID       12. NO INDIVIDUAL PRIVATE ON-LOT RETENTION/DETENTION IS REFLECTED
ID       13. COMPUTATION TIME INTERVAL = 5 MINUTES
ID       14. CALCULATIONS MADE WITH HEC-1, VERSION 4.1
ID       15. 10- AND 100-YR HEC1 MODELS DIFFER BY Tc & R, RAINFALL AND
ID           CONTRIBUTING AREAS AT ADDITIONS
ID
ID       KEY TO HYDROGRAPH OPERATIONS:
ID           "SB" = GENERATE RUNOFF HYDROGRAPH FROM SUB-BASIN
ID           "AD" = COMBINE HYDROGRAPHS
ID           "RR" = ROUTE HYDROGRAPH THRU DOWNSTREAM REACH
ID           "LP" = ROUTE HYDROGRAPH THRU LEVEL POOL STORAGE
ID           "DV" = DIVERT HYDROGRAPH
ID           "DR" = RETRIEVE PREVIOUSLY DIVERTED HYDROGRAPH
ID
*DIAGRAM
IT     5                     300
IO     5
IN    15
JD  2.03     0.01
PC 0.000    0.008    0.016    0.025    0.033    0.041    0.050    0.058    0.066    0.074
PC 0.087    0.099    0.118    0.138    0.216    0.377    0.834    0.911    0.931    0.950
PC 0.962    0.972    0.983    0.991    1.000
JD 2.017     0.50
JD 1.979     2.80
PC 0.000    0.009    0.016    0.025    0.034    0.042    0.051    0.059    0.067    0.076
PC 0.087    0.100    0.120    0.163    0.252    0.451    0.694    0.837    0.900    0.938
PC 0.950    0.963    0.975    0.988    1.000
JD 1.872     16.0
PC 0.000    0.009    0.020    0.030    0.048    0.063    0.076    0.090    0.105    0.119
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PC 0.135   0.152   0.175   0.222   0.304   0.472   0.670   0.796   0.868   0.912
PC 0.946   0.960   0.973   0.987   1.000
JD 1.648   90.0
PC 0.000   0.021   0.035   0.051   0.071   0.087   0.105   0.125   0.143   0.160
PC 0.179   0.201   0.232   0.281   0.364   0.500   0.658   0.773   0.841   0.888
PC 0.927   0.945   0.964   0.982   1.000
JD 1.157   500.0
PC 0.000   0.024   0.043   0.059   0.078   0.098   0.119   0.141   0.162   0.186
PC 0.212   0.239   0.271   0.321   0.408   0.515   0.627   0.735   0.814   0.864
PC 0.907   0.930   0.954   0.977   1.000
KK SB009   BASIN
KM         CP @ GREENWAY-HAYDEN LOOP & PARADISE LN
BA 0.060
LG  0.10    0.25    4.65    0.38      80
UC 0.654   0.649
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK DV009   SPLIT FLOW. DQ IS BASED ON CAPACITY OF 80TH ST SD TRUNK CONSISTING
KM         OF 1-36IN DIA RCP @ S=0.0119 FT/FT. HYDROGRAPH ASSOC WITH DQ (DR009)
KM         WILL BE RECALLED LATER IN MODEL AND ROUTED SOUTH IN 80TH ST STORM
KM         DRAIN. REMAINDER FLOW (DV009) ROUTED DOWN GREENWAY-HAYDEN LOOP
KM         THRU SB010.
DT DR009
DI     0      25      50      73     100     200     300
DQ     0      25      50      73      73      73      73
KK RR010   ROUTE   REACH
KM         ROUTE HYDROGRAPH DV009 THRU REACH RR010, GREENWAY-HAYDEN STREET SECT
RS     4    FLOW       0
RC 0.025   0.016   0.025    3300  0.0090    0.00
RX   0.0     0.1    10.0    10.1    79.0    79.1    89.0    89.1
RY 103.0   100.5   100.5   100.3   100.3   100.5   100.5   103.0
KK SB010   BASIN
KM         CP @ GREENWAY-HAYDEN SUMP JUST EAST OF 76TH ST.
KM         DRAINAGE AREA REFLECTS TOTAL SB010 AREA (0.36 SQ MI) LESS THE
KM         THAT PART OF SB010 NORTH OF PARADISE LANE (0.20 SQ MI). THE AREA
KM         NORTH OF PARADISE LANE IS CONSIDERED NON-CONTRIBUTING BECAUSE IT HAS
KM         DETENTION PROVIDED IN LARGE, CENTRALIZED BASINS PROTECTED BY
KM         DRAINAGE EASEMENTS. Tc AND R VALUES ARE BASED ON TOTAL DRAINAGE AREA.
BA 0.160
LG  0.12    0.25    4.65    0.38      71
UC 0.400   0.222
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD010   COMBINE HYDROGRAPHS RR010 AND SB010
HC     2    0.16
KK DV010   SPLIT FLOW. REMAINDER FLOW (DV010) IS BASED ON CAPACITY OF SD TRUNK
KM         DRAINING WEST IN GREENWAY-HAYDEN LOOP CONSISTING OF 1-42 IN RCP
KM         @ S=0.0028FT/FT (FROM SD PLANS).  DIVERTED FLOW ASSOC WITH DQ (DR010)
KM         OVERFLOWS SUMP AND GOES SOUTH ON 76TH ST TO GREENWAY RD
DT DR010
DI     0      50     100     150     200     300     400     500
DQ     0       0      43      93     143     243     343     443
KKRR011A
KM         ROUTE HYDROGRAPH DV010 THRU REACH RR011A, 48IN DIA SD IN G-H LOOP
RK  2400   .0016    .013            CIRC       4
KK SB011   BASIN
KM         CP @ GREENWAY-HAYDEN LOOP AND SCOTTSDALE RD
BA 0.220
LG  0.12    0.25    4.65    0.38      71
UC 0.371   0.246
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KKAD011A   COMBINE HYDROGRAPHS RR011A AND SB011
HC     2    0.26
KK SB012   BASIN
KM         CP @ GREENWAY RD AND 78TH ST
BA 0.200
LG  0.15    0.25    4.65    0.38      60
UC 0.342   0.247
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
* THE FOLLOWING STEP DE-ACTIVATED FOR 100 YEAR MODEL BECAUSE 80TH ST STORM DRAIN
* IS ALREADY AT MAX CAPACITY FROM DV009 STEP
* KK DV012   SPLIT FLOW. DIVERTED FLOW ASSOC WITH DQ IS BASED ON CAPACITY OF
* KM         CB @ MCCLAIN DR (AKA CAROL ANN LN) NEAR 78TH ST AND CB @ SOUTH
* KM         END OF 80TH ST CULDESAC WHICH DRAIN TO 80TH ST STORM DRAIN.
* KM         REMAINDER FLOW ASSOC WITH DV012 CONCENTRATES @ GREENWAY AND 78TH ST
* DT DR012
* DI     0       5      10      17      50     100     300     500
* DQ     0       5      10      17      17      17      17      17
KKRR013A   ROUTE   REACH
KM         ROUTE HYDROGRAPH SB012 THRU REACH RR013A, GREENWAY RD STREET SECTION
RS     1    FLOW       0
RC 0.025   0.016   0.025    1250  0.0020    0.00
RX   0.0     5.0     5.1    26.0    46.9    47.0    52.0    52.1
RY 100.0   100.5   100.0   100.5   101.0   101.5   101.5   105.0
KK SB013   BASIN
KM         CP @ 76TH ST AND GREENWAY RD
BA 0.040
LG  0.15    0.25    4.65    0.38      60
UC 0.192   0.142
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KKAD013A   COMBINE HYDROGRAPHS RR013A AND SB013
HC     2    0.24
KK DR010   RETRIEVE PREVIOUSLY SPLIT HYDROGRAPH ASSOC WITH GREENWAY-HAYDEN LOOP
KM         SUMP OVERFLOW TO 76TH ST SOUTH
DR DR010
KKRR013B   ROUTE   REACH
KM         ROUTE HYDROGRAPH DR010 THRU REACH RR013B, 76TH ST TO GREENWAY RD
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RS     1    FLOW        0
RC 0.025   0.016   0.025     550  0.0090    0.00
RX   0.0     0.1     5.0     5.1    44.9    45.0    50.0    50.1
RY 103.0   100.5   100.5   100.1   100.1   100.5   100.5   103.0
KKAD013B   COMBINE HYDROGRAPHS AD013A AND RR013B
HC     2    0.36
KK DV013   SPLIT FLOW. REMAINDER FLOW (DV013) IS BASED ON CAPACITY OF GREENWAY
KM         ROAD STREET SECTION (RR013A) AND 33IN SD PIPE FLOWING FULL.  DV013
KM         FLOWS WEST DOWN GREENWAY RD (RR014).  DIVERTED FLOW (DR013) SPILLS
KM         OVER SOUTH SIDE OF GREENWAY ROAD AND IS ROUTED THRU SB019 TO AIRPORT
KM         DETENTION BASIN.
DT DR013
DI     0     850    1500    2000
DQ     0     783    1433    1933
KK RR014   ROUTE   REACH
KM         ROUTE HYDROGRAPH AD013 THRU REACH RR014, GREENWAY RD STREET SECTION
KM         TO SUMP AT 73RD ST
RS     1    FLOW        0
RC 0.025   0.016   0.025    1500  0.0020    0.00
RX   0.0     0.1     7.0     7.1    48.9    49.0    54.0    54.1
RY 105.0   102.0   100.5   100.0   101.0   101.5   101.5   105.0
KK SB014   BASIN
KM         CP @ 73RD ST AND GREENWAY RD
BA 0.030
LG  0.15    0.25    4.65    0.38      60
UC 0.329   0.287
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD014   COMBINE HYDROGRAPHS RR014 AND SB014
HC     2    0.06
* THE FOLLOWING DIVERT AND ROUTING STEPS ARE DE-ACTIVATED IN THIS MODEL BECAUSE
* THE PRIMARY OVERFLOW OF THE SUMP IS DIRECTLY WEST TO SCOTTSDALE ROAD.
* KK DV014   SPLIT FLOW. REMAINDER FLOW ASSOC WITH DV014 BASED ON CAPACITY OF
* KM         36IN STORM DRAIN GOING WEST TOWARD G-H LOOP @ S=0.0020 (FROM SD
* KM         PLANS). DIVERTED FLOW ASSOC WITH DQ (DR014) OVERFLOWS SUMP AND
* KM         GOES SOUTH IN 73RD ST TOWARD BUTHERUS.
* DT DR014
* DI     0      30      60     100     200     400     600
* DQ     0       0      30      70     170     370     470
* KKRR011B
* KM         ROUTE HYDROGRAPH DV014 THRU REACH RR011B, 36IN DIA SD PIPE
* RK   477    .002    .013            CIRC       3
KKRR011B   ROUTE   REACH
KM         ROUTE HYDROGRAPH AD014 THRU REACH RR011B, LANDSCAPED SWALE JUST SOUTH
KM         OF GREENWAY-HAYDEN LOOP
RS     1    FLOW        0
RC 0.030   0.030   0.030     500  0.0050    0.00
RX   0.0     0.1    10.0    22.0    52.0    64.0    74.0    74.1
RY 105.0   102.0   102.0   100.0   100.0   102.0   102.0   105.0
KKAD011B   COMBINE HYDROGRAPHS AD011A AND RR011B
KM         TOTAL Q @ GREENWAY-HAYDEN AND SCOTTSDALE RD FROM NORTH AND EAST
HC     2    0.32
KKRR015A   ROUTE   REACH
KM         ROUTE HYDROGRAPH AD011B THRU REACH RR015A, SDALE RD STREET SECTION
KM         FROM GREENWAY-HAYDEN LOOP TO BUTHERUS. STORM DRAIN DISREGARDED.
RS     1    FLOW        0
RC 0.025   0.016   0.025    1000  0.0068    0.00
RX   0.0     0.1    10.5    10.6    98.5    98.6   103.5   103.6
RY 103.0   100.5   100.5   100.3   100.3   100.5   100.5   103.0
* THE FOLLOWING DIVERT RETRIEVAL AND ADDITION STEPS ARE DE-ACTIVATED IN THIS
* MODEL ALONG WITH THE PREVIOUS DV014 STEP
* KK DR014   RETRIEVE PREVIOUSLY SPLIT HYDROGRAPH ASSOC WITH GREENWAY ROAD/73RD
* KM         SUMP OVERFLOW SOUTH ON 73RD ST
* DR DR014
* KKRR015B   ROUTE   REACH
* KM         ROUTE HYDROGRAPH DR014 THRU REACH RR015B, 73RD ST TO BUTHERUS TO
* KM         SCOTTSDALE RD - - STREET SECTION (HYDRAULIC APPROXIMATED BASED ON
* KM         RR013A)
* RS     1    FLOW        0
* RC 0.025   0.016   0.025    4150   0.011    0.00
* RX   0.0     7.0     7.1    28.0    48.9    49.0    54.5    54.6
* RY 102.5   101.0   100.4   100.0   100.4   101.0   101.0   102.5
* KKAD015A   COMBINE HYDROGRAPHS RR015A AND RR015B
* HC     2
KKRR015B   ROUTE   REACH
KM         ROUTE HYDROGRAPH RR015A THRU REACH RR015B, SDALE RD STREET SECTION
KM         FROM BUTHERUS TO TBIRD. STORM DRAIN DISREGARDED.
RS     1    FLOW        0
RC 0.025   0.016   0.025    4150  0.0110    0.00
RX   0.0     0.1    10.5    10.6    98.5    98.6   103.5   103.6
RY 103.0   100.5   100.5   100.3   100.3   100.5   100.5   103.0
KK SB015   BASIN
KM         CP @ CONFL OF SDALE RD CHANNEL AND AIRPORT DET BASIN OUTFALL CHANNEL
KM         JUST SOUTH OF THUNDERBIRD ROAD
BA 0.250
LG  0.16    0.25    4.65    0.37      60
UC 0.433   0.365
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KKAD015A   COMBINE HYDROGRAPHS RR15B2 AND SB015, TOTAL Q FROM NORTH AT
KM         SDALE RD AND SDALE AIRPORT DETENTION BASIN OUTLET CHANNEL.
HC     2    0.57
KK SB016   BASIN
KM         CP @ 2-30IN SD PIPE OUTFALL FROM AIRPORT TO HAYDEN RD CHANNEL
BA 0.090
LG  0.20    0.25    4.65    0.27      60
UC 0.321   0.297
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK DV016   SPLIT FLOW. DQ IS BASED ON CAPACITY OF 2-30IN SD PIPES @ ASSUMED
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KM          S=0.005 FT/FT.  HYDROGRAPH ASSOC WITH DQ (DR016) LEAVES STUDY AREA
KM          AND FLOWS TO HAYDEN CHANNEL.  REMAINDER FLOW (DV016) ROUTED THRU
KM          AIRPORT (RR017) TO SOUTHWEST.
DT DR016
DI     0       25      58     100     200     300
DQ     0       25      58      58      58      58
KK RR017    ROUTE   REACH
KM          ROUTE HYDROGRAPH DV016 THRU REACH RR017, OVERLAND THRU AIRPORT
KM          CROSS-SECTION REFLECTS NORTH AND SOUTH DRAINAGE SWALES ALONG RUNWAY
RS     3     FLOW       0
RC 0.025    0.025   0.025    2400  0.0120    0.00
RX   0.0      0.1    25.0    50.0   100.0   150.0   299.9   300.0
RY 455.0    451.5   451.5   451.5   451.5   451.5   451.5   455.0
KK SB017    BASIN
KM          CP @ OUTFALL OF 1-60IN SD PIPE
BA 0.090
LG  0.20     0.25    4.65    0.27      60
UC 0.242    0.187
UA     0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK DR009    RETRIEVE PREVIOUSLY SPLIT HYDROGRAPH ASSOC WITH 80TH ST STORM DRAIN
DR DR009
KKRR012A
KM          ROUTE HYDROGRAPH DR009 THRU REACH RR012A, 36IN DIA SD IN 80TH ST
KM          SOUTH FROM PARADISE LANE
RK  2000    .0122    .013            CIRC       3
* THE FOLLOWING STEPS DE-ACTIVATED FOR 100 YEAR MODEL BECAUSE 80TH ST STORM
* DRAIN IS ALREADY AT MAX CAPACITY FROM DV009 STEP
* KK DR012    RETRIEVE PREVIOUSLY SPLIT HYDROGRAPH ASSOC WITH CATCH BASIN
* KM          CAPACITY ON MCCLAIN AND ON 80TH ST
* DR DR012
* KK AD012    COMBINE HYDROGRAPHS RR012A AND DR012, TOTAL Q SOUTH IN 80TH ST SD
* HC     2
KKRR1217
KM          ROUTE HYDROGRAPH DR010 THRU REACH RR1217, 36IN DIA SD PIPE
RK  3200     .006   0.013            CIRC     3.0
KK AD017    COMBINE HYDROGRAPHS RR017, SB017 AND RR1217
HC     3     0.24
KK DV017    SPLIT FLOW. DQ IS BASED ON CAPACITY OF 1-60IN SD PIPE @ ASSUMED
KM          S=0.005 FT/FT. HYDROGRAPH ASSOC WITH DQ (DR017) LEAVES STUDY AREA
KM          AND FLOWS TO HAYDEN CHANNEL. REMAINDER FLOW (DV017) ROUTED THRU
KM          AIRPORT (RR018) TO SOUTHWEST.
DT DR017
DI     0       50     100     200     300     400     500     600    1000
DQ     0       50     100     184     184     184     184     184     184
KK RR018    ROUTE   REACH
KM          ROUTE HYDROGRAPH DV017 THRU REACH RR018, OVERLAND THRU AIRPORT
KM          CROSS-SECTION REFLECTS NORTH AND SOUTH DRAINAGE SWALES ALONG RUNWAY
RS     6     FLOW       0
RC 0.025    0.025   0.025    3400  0.0100    0.00
RX   0.0      0.1    25.0    50.0   100.0   150.0   299.9   300.0
RY 455.0    451.5   451.5   451.5   451.5   451.5   451.5   455.0
KK SB018    BASIN
KM          CP @ NORTHEAST SIDE OF AIRPORT DETENTION BASIN
BA 0.150
LG  0.20     0.25    4.65    0.27      60
UC 0.396    0.287
UA     0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD018    COMBINE HYDROGRAPHS RR018 AND SB018
KM          TOTAL Q ENTERING AIRPORT DETENTION BASIN FROM NORTHEAST
HC     2     0.39
KK SB019    BASIN
KM          CP @ AIRPORT DETENTION BASIN, INCLUDING DET BASIN
BA 0.190
LG  0.16     0.25    4.65    0.36      60
UC 0.467    0.464
UA     0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK DR013    RETRIEVE GREENWAY ROAD DIVERTED FLOW
DR DR013
KKRR019A    ROUTE   REACH
KM          ROUTE HYDROGRAPH DR013 THRU REACH RR019A
KM          75TH STREET ROUTING SECTION
RS     1     FLOW       0
RC 0.020    0.016   0.020    1800  0.0080    0.00
RX   0.0      0.1     5.0     5.1    44.9    45.0    50.0    50.1
RY 104.0    100.5   100.5   100.3   100.3   100.5   100.5   104.0
KKRR019B    ROUTE   REACH
KM          ROUTE HYDROGRAPH RR019A THRU REACH RR019B
KM          AIRPORT DRIVE ROUTING SECTION TO SDALE AIRPORT DETENTION BASIN
RS     2     FLOW       0
RC 0.020    0.016   0.020    3700  0.0070    0.00
RX   0.0      0.1     5.0     5.1    32.9    33.0    38.0    38.1
RY 103.0    100.8   100.8   100.3   100.3   100.8   100.8   103.0
KK AD019    COMBINE HYDROGRAPHS AD018, SB019 AND RR019B
KM          TOTAL Q ENTERING AIRPORT DETENTION BASIN
HC     3     0.91
KK LP019    ROUTE AD019 FLOW THRU EXIST AIRPORT DET BASIN
KM          PRIMARY OUTLET CONSISTS OF 2-10'X3' RCB CULVERTS.  INLET CONTROL
KM          IS ASSUMED.  OVERFLOW OCCURS AT EL. 1432 FT.
RS     1     STOR       0
SV     0      0.2     3.7     9.9    17.1    25.0    33.6    42.9
SQ     0       20      80     220     340     440     560     640
SE1426.7     1427    1428    1429    1430    1431    1432    1433
ST  1432    378.8       3     1.5
SW     0     60.4   247.2   378.8
SE  1433     1432    1432    1433
KKRR015C    ROUTE   REACH
KM          ROUTE HYDROGRAPH LP019 THRU REACH RR015C, TRAP CHANNEL TO SDALE RD
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RS     1    FLOW      0
RC 0.025   0.018   0.025    1200  0.0040    0.00
RX   0.0     0.1     5.0    13.0    22.0    30.0    35.0    35.1
RY 106.0   104.0   104.0   100.0   100.0   104.0   104.0   106.0
KKAD015B   COMBINE HYDROGRAPHS AD015A AND RR015C, TOTAL Q @ SDALE RD CHANNEL
HC     2    1.48
KKRR020A   ROUTE   REACH
KM         ROUTE HYDROGRAPH AD015B THRU REACH RR020A.
KM         EXISTING CONDITION OPEN CHANNEL REPLACED WITH STORM DRAIN.
KM         PREFERRED ALT MODELED AS SDALE RD STREET SECTION TO SUTTON DR.
RS     1    FLOW      0
RC 0.025   0.016   0.025     700  0.0100    0.00
RX   0.0     0.1     8.5     8.6    96.5    96.6   105.0   105.1
RY 102.0   100.5   100.5   100.3   100.3   100.5   100.5   102.0
KKRR020B   ROUTE   REACH
KM         ROUTE HYDROGRAPH RR020A THRU REACH RR020B
KM         EXISTING CONDITION OPEN CHANNEL REPLACED WITH STORM DRAIN.
KM         PREFERRED ALT MODELED AS SDALE RD STREET SECTION TO SWEETWATER AVE.
RS     1    FLOW      0
RC 0.025   0.016   0.025    1400  0.0050    0.00
RX   0.0     0.1     8.5     8.6    96.5    96.6   105.0   105.1
RY 102.0   100.5   100.5   100.3   100.3   100.5   100.5   102.0
KKRR020C
KM         ROUTE HYDROGRAPH RR020B THRU REACH RR020C
KM         PREDOMINANT CONVEYANCE IS 90IN DIA SD PIPE ALONG SDALE RD WITH
KM         OUTFALL TO CACTUS PARK BASIN
RK  1480    .006    .013            CIRC     7.5
KKDV20A1   SPLIT FLOW. REMAINDER FLOW IS BASED ON CAPACITY OF 1-90IN SD PIPE
KM         @ S=0.0056FT/FT DISCHARGING INTO CACTUS PARK BASIN. HYDROGRAPH ASSOC
KM         WITH DQ (DR20A1) REMAINS IN SCOTTSDALE RD STREET SECTION, PART OF
KM         WHICH BYPASSES CACTUS PARK BASIN AND CONTINUING SOUTH ON SDALE ROAD.
DTDR20A1
DI     0     100     500    1000    1500
DQ     0       0       0     425     925
KKSB020A   BASIN
KM         CP @ NW CORNER CACTUS PARK DETENTION BASIN
BA 0.060
LG  0.18    0.25    4.65    0.38      55
UC 0.446   0.751
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KKDR20A1   RETRIEVE PREVIOUSLY SPLIT HYDROGRAPH ASSOC WITH SCOTTSDALE RD
KM         STREET SECTION CONVEYANCE
DRDR20A1
KKDV20A2   SPLIT SDALE RD SURFACE FLOW 50/50 TO REFLECT FLOW ON EAST SIDE OF
KM         SDALE RD ENTERING PARK.  SPLIT FLOW (DQ) IS ROUTED DOWN SDALE RD TO
KM         SUMP NORTH OF MESCAL. REMAINDER FLOW ENTERS CACTUS PARK.
DTDR20A2
DI     0     100     500    1000    2000
DQ     0      50     250     500    1000
KKAD020A   COMBINE HYDROGRAPHS DV20A1, SB020A AND DV20A2
KM         TOTAL Q ENTERING CACTUS PARK DETENTION BASIN FROM SCOTTSDALE ROAD
HC     3    1.32
KK SB021   BASIN
KM         CP @ TBIRD INDUSTRIAL DET BASIN
BA 0.140
LG  0.15    0.25    4.65    0.38      60
UC 0.321   0.236
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK LP021   ROUTE FLOW THRU TBIRD INDUSTRIAL DET BASIN
KM         PRIMARY OUTLET CONSISTS OF 18IN SD PIPE WITH 12IN DIA ORIFICE PLATE
KM         OVERFLOW CONSISTS OF TBIRD RD @ 76TH ST ACTING AS BROAD CRESTED WIER
KM     0
RS     1    STOR      0
SV     0    1.65    4.38    6.03
SQ     0       5       7     458
SE1426.0  1428.0  1430.0  1431.0
KK RR022   ROUTE   REACH
KM         ROUTE HYDROGRAPH LP021 THRU REACH RR022, 76TH ST
KM         DISREGARD 18IN DIAM SD
RS     2    FLOW      0
RC 0.030   0.030   0.016    2800  0.0090    0.00
RX   0.0     0.1     5.0     8.5    12.0    19.0    66.0    66.1
RY 105.0   102.0   102.0   101.0   100.0   102.0   102.9   105.0
KK SB022   BASIN
KM         CP @ CONC CHANNEL @ 76TH ST ALIGN JUST SOUTH OF SWEETWATER AVE
BA 0.240
LG  0.30    0.25    4.65    0.38      24
UC 0.458   0.296
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD022   COMBINE HYDROGRAPHS RR022 AND SB022
HC     2    0.38
KK RR023   ROUTE   REACH
KM         ROUTE HYDROGRAPH AD022 THRU REACH RR023
KM         CONC TRAP CHANNEL THRU BUENAVANTE SUBD, OUTFALL TO CACTUS PARK BASIN
RS     1    FLOW      0
RC 0.018   0.018   0.018    2250  0.0110    0.00
RX   0.0     0.1     9.0    11.0    15.0    17.0    26.0    26.1
RY 109.5   104.5   100.0   100.0   100.0   100.0   104.5   109.5
KK SB023   BASIN
KM         CP @ CACTUS PARK BASIN FROM EAST
BA 0.170
LG  0.26    0.25    4.65    0.38      43
UC 0.425   0.282
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD023   COMBINE HYDROGRAPHS RR023 AND SB023
KM         TOTAL INFLOW TO CACTUS PARK DET BASIN FROM EAST
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HC      2     0.55
KKSB020B     BASIN
KM           CP @ CACTUS PARK BASIN FROM NORTH
BA 0.270
LG  0.25      0.25     4.65     0.37        32
UC 0.571      0.520
UA      0       5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA    100
KKAD20B1     COMBINE HYDROGRAPHS AD020A, AD023 AND SB020B
KM           TOTAL INFLOW TO CACTUS PARK DET BASIN FROM WEST, EAST AND NORTH
HC      3     2.14
KKDV20B1     SPLIT FLOW. DQ IS BASED ON CAPACITY OF 1-60IN SD PIPE @
KM           S=0.005 FT/FT REPRESENTING LOW FLOW BYPASS @ CACTUS PARK BASIN.
KM           HYDROGRAPH ASSOC WITH DQ (DR020B1) IS NOT ROUTED THRU BASIN,
KM           BUT IS RECALLED LATER AND COMBINED WITH SCOTTSDALE RD STREET FLOW
KM           BYPASS AND ROUTED AS STREET FLOW DOWN SCOTTSDALE RD FROM CACTUS TO
KM           SUMP NORTH OF MESCAL. REMAINDER FLOW (DV020B) IS ROUTED THRU LEVEL
KM           POOL.
DTDR20B1
DI      0        50      100      184      300      500     1000     2000
DQ      0        50      100      184      184      184      184      184
KKLP020B     ROUTE HYDROGRAPH DV020B THRU CACTUS PARK DET BASIN
KM           PRIMARY OUTLET CONSISTS OF 1-60IN DIAM SD. PIPE DISCHARGE BASED ON
KM           OUTLET CONTROL FRICT SLOPE. Q ASSOCIATED WITH SQ CARD CALCULATED
KM           AS DIFFERENCE BETWEEN FRICT SLOPE Q AND 184CFS LOW FLOW BYPASS Q.
KM           IT IS ASSUMED THAT LOW FLOW BYPASS DOES NOT IMPACT OUTLET PIPE
KM           HYDRAULICS. PIPE OUTLET INVERT ELEV ESTIMATED @ 1370FT FROM PLANS.
KM           OVERFLOW SECTION IS THE CONC SIDEWALK NORTH SIDE OF CACTUS RD BETW
KM           SCOTTSDALE RD AND DRIVEWAY ENTRANCE TO PARK.  RAISED SPILLWAY ELEV
KM           APPROX 2 FT FROM 1387.8 TO 1390 FT TO REFLECT PREFERRED ALT.
KM           FINISHED FLOOR ELEV OF REC BUILDING IS 1390.99 FT.
RS      1     STOR        0
SV      0  0.0012   0.0044     0.40     1.78     4.35    47.13   121.37      135
SQ      0        0        0        0        3        8       32       58       62
SE1370.0   1374.0   1375.0   1377.0   1378.0   1379.0   1384.0   1390.0  1391.0
ST1390.0      450        3      1.5
SW      0     450
SE  1390     1390
KKDV20B2     SPLIT FLOW.  DIVERSION USED TO REFLECT SPILLWAY OVERFLOW CONVEYED
KM           DOWN 73RD STREET AND WEST DOWN SUNNYSIDE DRIVE TO SDALE RD.
KM           REMAINDER FLOW ROUTED THRU CACTUS PARK 60IN DIAM OUTLET PIPE.
DTDR20B2
DI      0        58     1412
DQ      0         0     1350
KKDR20B1     RETRIEVE PREVIOUSLY SPLIT HYDROGRAPH ASSOC WITH LOW FLOW BYPASS
KM           @ CACTUS PARK DET BASIN
DRDR20B1
KKAD20B2     COMBINE DV20B2 AND DR20B1 HYDROGRAPHS
HC      2     2.14
KKRR2427
KM           ROUTE HYDROGRAPH AD20B2 THRU REACH RR2427
KM           60IN DIA SD SOUTH IN SDALE RD, WEST IN CHOLLA, SOUTH IN 71ST CHANNEL
RK  3500      .007     .013              CIRC        5
KK SB025     BASIN
KM           CP @ 70TH ST & TBIRD
BA 0.140
LG  0.16      0.25     4.65     0.38        65
UC 0.358      0.304
UA      0       5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA    100
KK RR026     ROUTE    REACH
KM           ROUTE HYDROGRAPH SB025 THRU REACH RR026, 70TH ST INV & NORMAL CROWN
RS      2     FLOW        0
RC 0.030     0.016    0.030     5750   0.0070     0.00
RX    0.0       0.1      6.0      7.6     37.5     39.0     42.0     42.1
RY 105.0     100.8    100.3    100.1    100.1    100.3    100.8    105.0
KK SB026     BASIN
KM           CP @ CACTUS RD AND 70TH ST
BA 0.440
LG  0.28      0.25     4.65     0.38        29
UC 0.504      0.302
UA      0       5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA    100
KK AD026     COMBINE HYDROGRAPHS RR026 AND SB026
HC      2     0.58
KK RR027     ROUTE    REACH
KM           ROUTE HYDROGRAPH AD026 THRU REACH RR027, CHANNEL AND INV CROWN STREET
RS      1     FLOW        0
RC 0.025     0.016    0.025     3250   0.0050     0.00
RX    0.0       0.1     33.0     33.1     64.0     64.1     73.5     73.6
RY 105.0     102.9    100.9    100.2    100.2    100.9    101.9    105.0
KK SB027     BASIN
KM           CP @ 71ST ST CHANNEL APPROX 650FT SOUTH OF CHOLLA ST
BA 0.120
LG  0.30      0.25     4.65     0.36        20
UC 0.296      0.216
UA      0       5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA    100
KKAD027A     COMBINE HYDROGRAPHS RR027 AND SB027
KM           CP @ 71ST ST CHANNEL APPROX 650FT SOUTH OF CHOLLA STREET
HC      2     0.70
KKAD027B     COMBINE HYDRORAPHS RR2427 AND AD027A
KM           RR2427 HYDROGRAPH REFLECTS 60IN DIA SD SOUTH IN SDALE RD,
KM           WEST IN CHOLLA, AND OUTFALLS SOUTH IN 71ST CHANNEL
HC      2     2.84
* ***********************************************************************
*  THE FOLLOWING SEQUENCE INVOLVING THE KIERLAND DEVELOPMENT WAS DERIVED, IN   *
*  PART, BASED ON THE KIERLAND MASTER DRAINAGE REPORT BY COE & VAN LOO (CVL)   *
*  TITLED: ADDENDUM TO MASTER DRAINAGE REPORT FOR KIERLAND AND DATED REVISED   *
*  3-13-95. IN THIS SEQUENCE, CVL ONSITE SUB-BASINS WERE GENERALLY             *
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*  COMBINED TO FORM SINGLE SUB-BASINS CORRESPONDING TO SB028, SB031, SB032,     *
*  SB033 AND SB034 AS NOTED AT THE SUB-BASIN STEPS THAT FOLLOW. ALL OF THE      *
*  KIERLAND ONSITE ROUTING REACH AND LEVEL POOL ROUTING STEPS IN THIS SEQUENCE *
*  WERE TAKEN DIRECTLY FROM THE CVL HEC1 MODEL AS NOTED AT THOSE HYDROGRAPH    *
*  STEPS. THE BASIS FOR THIS DATA IS CVL HEC1 MODEL H1G100A.PS1 DATED 10-01-94.*
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KK SB028    BASIN
KM          CORRESPONDS, IN PART, TO CVL SA4, SA40, AND OFFSITE 5
KM          BASIN AREA IS FROM SCI
BA 0.134
LG  0.10     0.25     4.65     0.38       79
UC 0.342    0.278
UA     0     5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
KKRR031A    ROUTE   REACH
KM          ROUTE HYDROGRAPH SB028 THRU REACH RR031A, OPEN CHANNEL
KM          THIS STEP CORRESPONDS TO CVL R415
RS     1     ELEV      10
RC 0.035    0.035    0.035     1500  0.0065     0.00
RX  55.0     60.0     73.0     97.0    103.0    127.0    140.0    145.0
RY  20.0     16.0     16.0     10.0     10.0     16.0     16.0     20.0
KK SB029    BASIN
KM          CORRESPONDS TO CVL SUBBASINS SA3 AND SA90, BASIN AREA IS FROM SCI
BA 0.180
LG  0.25     0.25     4.65     0.38       45
UC 0.354    0.233
UA     0     5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
KKAD031A    COMBINE HYDROGRAPHS RR031A AND SB029, CORRESPONDS TO CVL C291
HC     2     0.31
KKRR031B    ROUTE   REACH
KM          ROUTE HYDROGRAPH AD031A THRU REACH RR031B, OPEN CHANNEL
KM          THIS STEP CORRESPONDS TO CVL R491
RS     1     ELEV      10
RC 0.035    0.035    0.035      800  0.0100     0.00
RX  55.0     60.0     70.0     90.0    110.0    130.0    140.0    145.0
RY  20.0     15.0     15.0     10.0     10.0     15.0     15.0     20.0
KK SB030    BASIN
KM          CORRESPONDS TO CVL SUBBASINS SA2, 105, 106; BASIN AREA IS FROM SCI
BA 0.100
LG  0.25     0.25     4.65     0.38       45
UC 0.321    0.286
UA     0     5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
KKRR031C    ROUTE   REACH
KM          ROUTE HYDROGRAPH SB030 THRU REACH RR031C, OPEN CHANNEL
KM          THIS STEP CORRESPONDS TO CVL R404
RS     2     ELEV      10
RC 0.035    0.035    0.035     1950  0.0100     0.00
RX  55.0     60.0     70.0     90.0    110.0    130.0    140.0    145.0
RY  20.0     15.0     15.0     15.0     15.0     15.0     15.0     20.0
KK SB031    BASIN
KM          CORRESPONDS TO CVL SUBBASINS SA20 AND SA91, BASIN AREA IS FROM SCI
BA 0.120
LG  0.20     0.25     4.65     0.50        6
UC 0.333    0.200
UA     0     5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
KKAD031B    COMBINE HYDROGRAPHS RR031B, RR031C AND SB031
KM          THIS STEP CORRESPONDS TO CVL C220
HC     3     0.53
KKLP031A    ROUTE FLOW THRU KIERLAND BASIN #1, THIS STEP CORRESPONDS TO CVL RET1
RS     1     ELEV      60
SV     0     .094     1.01     3.36     7.21    12.85    21.01    31.61    43.94    57.92
SQ     0        4     13.6       14     14.4     14.8     15.2     15.5     15.8      200
SE  54.5       60       62       64       66       68       70       72       74       76
KK DV031    DIVERT INITIAL FLOW (4 CFS) TO LP033 (KIERLAND BASIN 2)
KM          THIS STEP CORRESPONDS TO CVL DIVRT1
KM          NOTE: THERE IS NO ROUTING REACH STEP IN THE CVL MODEL IMMEDIATELY
KM          FOLLOWING THIS DIVERT ASSOCIATED WITH THE REMAINDER FLOW. THE
KM          DIVERTED FLOW IS RECALLED LATER AND ADDED TO THE INFLOW TO LP033
KM          (KIERLAND BASIN 2). THE REMAINDER FLOW (DV031) IS LATER ADDED
KM          DIRECTLY TO THE INFLOW TO LP034 (KIERLAND BASIN 3).
DT DR031
DI     0        4       18       50      200
DQ     0        4        4        4        4
KK SB032    BASIN
KM          CORRESPONDS TO CVL SA104, 103 AND 101; BA = SUM OF CVL BASIN AREAS
BA 0.030
LG  0.22     0.25     4.65     0.47       16
UC 0.592    0.704
UA     0     5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
KKRR031D    ROUTE   REACH
KM          ROUTE HYDROGRAPH SB032 THRU REACH RR031D, OPEN CHANNEL TO KIERLAND
KM          BASIN #2. THIS STEP CORRESPONDS TO CVL R301
RS     2     ELEV      10
RC 0.035    0.035    0.035     1200  0.0016     0.00
RX  55.0     60.0     70.0     90.0    110.0    130.0    140.0    145.0
RY  20.0     15.0     15.0     15.0     10.0     15.0     15.0     20.0
KK SB033    BASIN
KM          CORRESPONDS TO CVL SA21, 61, 42, 60 AND 41; BA = SUM OF CVL AREAS
BA 0.140
LG  0.18     0.25     4.65     0.46       30
UC 0.421    0.293
UA     0     5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
KK DR031    RETRIEVE LP031 OUTFLOW; THIS STEP CORRESPONDS TO CVL DRT1
DR DR031
KK AD033    COMBINE RR031D, SB033 AND DR031,
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KM          THIS STEP CORRESPONDS TO CVL C221A
HC      3    0.31
KK LP033    ROUTE FLOW THRU KIERLAND BASIN #2, THIS STEP CORRESPONDS TO CVL RET2
RS      1    ELEV      35
SV      0   8.62   15.39    23.0    54.0   230.0
SQ      0    .01     .01     .01     .01     .01
SE     35     38      40      42      48      65
KK RR034
KM          ROUTE LP033 THRU RR034, PIPE; THIS STEP CORRESPONDS TO CVL R430
RK  1200     .01    .012            CIRC     3.5
KK SB034    BASIN
KM          CORRESPONDS TO CVL SA52, 30, 9, 50 AND 26; BA = SUM OF CVL AREAS
BA 0.180
LG  0.11    0.25    4.65    0.39      71
UC 0.363   0.267
UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA    100
KK AD034    COMBINE DV031, RR034 AND SB034,
KM          THIS STEP CORRESPONDS TO CVL C252
HC      3    0.88
KK LP034    ROUTE FLOW THRU KIERLAND BASIN #3, THIS STEP CORRESPONDS TO CVL RET3
RS      1    ELEV      33
SV      0   4.08    20.0    21.6    23.3      26
SQ      0     18      18      18     146     667
SE     32     34      40    40.5      41      42
KK DV034    DIVERT LP034  THIS STEP CORRESPONDS TO CVL DIV910 ONLY THE SPLIT IS
KM          REVERSED. REMAINDER FLOW (DV034) OVERFLOWS SOUTH TO 69TH ST.
KM          DIVERTED FLOW (DR034) BLEEDS OFF TO RET LP040 (KIERLAND BASIN #4)
KM          AND WILL BE RECALLED LATER
DT DR034
DI      0     18      30     200
* DQ     0       0      12     182  (ORIGINAL CVL DQ RECORD)
DQ      0     18      18      18
KK RR035    ROUTE   REACH
KM          ROUTE HYDROGRAPH DV034 THRU REACH RR035, 69TH ST INV CROWN
RS      3    FLOW       0
RC 0.030   0.016   0.030    3000  0.0050    0.00
RX    0.0    0.1     9.0    10.5    40.8    42.3    51.3    51.4
RY  106.0  101.0   100.6   100.1   100.1   100.6   101.3   106.0
KK SB035    BASIN
KM          CP @ TBIRD RD AND 69TH ST
BA 0.110
LG  0.25    0.25    4.65    0.38      45
UC 0.392   0.302
UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA    100
KK AD035    COMBINE HYDROGRAPHS RR035 AND SB035
HC      2    0.11
KK RR036    ROUTE   REACH
KM          ROUTE HYDROGRAPH AD035 THRU REACH RR036, 69TH ST/PL INV & NORM CROWN
RS      3    FLOW       0
RC 0.030   0.016   0.030    5400  0.0070    0.00
RX    0.0    0.1    12.5    14.0    44.0    45.5    56.0    56.1
RY  105.0  100.3   100.3   100.1   100.1   100.3   100.3   105.0
KK SB036    BASIN
KM          CP @ CACTUS RD AND 69TH PL
BA 0.130
LG  0.30    0.25    4.65    0.38      24
UC 0.563   0.695
UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA    100
KK AD036    COMBINE HYDROGRAPHS RR036 AND SB036
HC      2    0.24
KK DV036    SPLIT FLOW. DQ IS BASED ON CAPACITY OF 1-84 IN SD PIPE IN CACTUS RD
KM          @ S=0.00259 FT/FT. HYDROGRAPH ASSOC WITH DQ (DR036) GOES WEST IN
KM          CACTUS THEN SOUTH IN 68TH ST AND EVENTUALLY DISCHARGES TO MESCAL PARK
KM          DET BASIN. REMAINDER FLOW (DV036) OVERFLOWS SUMP IN CACTUS RD AND IS
KM          ROUTED SOUTH DOWN 70TH ST (RR037A) THRU SB037.
DT DR036
DI      0      50     100     200     325     500    1000
DQ      0      50     100     200     325     325     325
KKRR037A    ROUTE   REACH
KM          ROUTE HYDROGRAPH DV036 THRU REACH RR037A, MOSTLY 70TH ST INV CROWN
RS      2    FLOW       0
RC 0.030   0.016   0.030    3500  0.0060    0.00
RX    0.0    0.1     8.5     8.6    39.4    39.5    48.0    48.1
RY  105.0  101.9   100.9   100.2   100.2   100.9   101.9   105.0
KK SB037    BASIN
KM          CP @ 71ST ST CHANNEL APPROX 300FT NORTH OF MESCAL ST
BA 0.210
LG  0.29    0.25    4.65    0.37      25
UC 0.454   0.314
UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA    100
KKAD037A    COMBINE HYDROGRAPHS RR037A AND SB037,
KM          HYDROGRAPH REPRESENTS FLOW ENTERING 71ST ST CHANNEL FROM WEST
KM          APPROX 300FT NORTH OF MESCAL ST (APPROX 650FT SOUTH OF CHOLLA ST)
HC      2    0.21
KKDR20A2    RETRIEVE PREVIOUSLY SPLIT HYDROGRAPH ASSOC WITH SCOTTSDALE RD
KM          STREET SECTION BYPASS OF CACTUS PARK BASIN
DRDR20A2
KKRR024A    ROUTE   REACH
KM          ROUTE HYDROGRAPH DR20A2 THRU REACH RR024A, SDALE RD STREET SECTION
KM          FROM CACTUS TO SUNNYSIDE DR.
RS      2    FLOW       0
RC 0.025   0.016   0.025     700  0.0140    0.00
RX    0.0    0.1     8.5     8.6    96.5    96.6   105.0   105.1
RY  102.0  100.5   100.5   100.3   100.3   100.5   100.5   102.0
KKDR20B2    RETRIEVE PREVIOUSLY SPLIT HYDROGRAPH ASSOC WITH CACTUS PARK OVERFLOW
DRDR20B2
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KKRR024B    ROUTE   REACH
KM          ROUTE HYDROGRAPH DR20B2 THRU REACH RR024B, 73RD STREET SECTION
KM          FROM CACTUS TO SUNNYSIDE DR.
RS      1    FLOW       0
RC 0.035    0.035   0.035     500  0.0040    0.00
RX    0.0     0.1     4.0     6.5     9.0    13.0    13.1    13.2
RY 105.0    103.0   100.5   100.0   100.5   102.0   103.0   105.0
KKRR024C    ROUTE   REACH
KM          ROUTE HYDROGRAPH RR024B THRU REACH RR024C, SUNNYSIDE DR SECTION
KM          FROM 73RD STREET TO SDALE ROAD.
RS      1    FLOW       0
RC 0.025    0.016   0.025     600  0.0030    0.00
RX    0.0     0.1     5.0     5.1    35.9    36.0    41.0    41.1
RY 105.0    100.5   100.5   100.2   100.2   100.5   100.6   105.0
KKAD024B    COMBINE HYDROGRAPHS RR024A AND RR024C.
HC      2    0.22
KKRR024D    ROUTE   REACH
KM          ROUTE HYDROGRAPH AD024B THRU REACH RR024D, SDALE RD SECTION
KM          FROM SUNNYSIDE TO SUMP NORTH OF MESCAL ST.
RS      2    FLOW       0
RC 0.025    0.016   0.025    2600  0.0040    0.00
RX    0.0     0.1     8.5     8.6    96.5    96.6   105.0   105.1
RY 102.0    100.5   100.5   100.3   100.3   100.5   100.5   102.0
KK SB024    BASIN
KM          CP @ SUMP IN SCOTTSDALE RD APPROX 300FT NORTH OF MESCAL ST
BA 0.110
LG  0.24     0.25    4.65    0.38      43
UC 0.479    0.552
UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA    100
KKAD024C    COMBINE HYDROGRAPHS RR024D AND SB024.
HC      2    0.33
KK DV024    SPLIT FLOW. DQ IS BASED ON CAPACITY OF 54 IN. SD PIPE IN SDALE RD @
KM          S=0.0042 FT/FT. HYDROGRAPH ASSOC WITH DQ (DR024) GOES SOUTH
KM          IN SCOTTSDALE RD BY STORM DRAIN TO MESCAL ST, THEN TURNS WEST AND
KM          OUTFALLS TO 71ST ST CHANNEL. REMAINDER FLOW (DV024) OVERFLOWS SUMP
KM          IN SCOTTSDALE RD AND GOES WEST BY OPEN CHANNEL IN DRAINAGE EASEMENT
KM          ALONG NORTH SIDE OF COMMERCIAL OFFICE PARCEL TO 71ST ST CHANNEL.
DT DR024
DI      0      50     100     200     300     500    1000
DQ      0      50     100     127     127     127     127
KKRR024E    ROUTE   REACH
KM          ROUTE HYDROGRAPH DV024 THRU REACH RR024E,
KM          OPEN CHANNEL ALONG NORTH SIDE OF COMMERCIAL OFFICE PARCEL
RS      1    FLOW       0
RC 0.025    0.016   0.025     700  0.0070    0.00
RX    0.0     0.1    10.0    10.1    40.9    41.0    51.0    51.1
RY 105.0    100.3   100.3   100.2   100.2   100.3   100.3   105.0
KKAD037B    COMBINE HYDROGRAPHS AD027B, AD037A AND RR024E
KM          TOTAL Q 71ST ST CHANNEL APPROX 300FT NORTH OF MESCAL ST
HC      3    3.18
KKRR037B    ROUTE   REACH
KM          ROUTE HYDROGRAPH AD037B THRU REACH RR037B,
KM          71ST STREET CHANNEL TO MESCAL ST
RS      1    FLOW       0
RC 0.035    0.018   0.035     300  0.0035    0.00
RX 952.0    952.1   962.2   992.0  1007.8  1036.0  1046.0  1046.1
RY 367.0    363.6   363.6   355.0   355.1   362.0   362.0   367.0
KK DR024    RETRIEVE DR024 SDALE RD SD @ SUMP APPROX 300FT NORTH OF MESCAL
DR DR024
KKRR024F
KM          ROUTE DR024 THRU REACH RR024F
KM          STORM DRAIN FLOW SDALE RD TO MESCAL TO 71ST ST CHANNEL
KM          1-5FT x 6FT RCB @ S=0.0015FT/FT UNDER MESCAL FROM SDALE RD TO 71ST
RK    900   .0015    .013            TRAP       5     .01
KKAD037C    COMBINE HYDROGRAPHS RR037B AND RR024F
KM          TOTAL Q 71ST ST CHANNEL @ JUST SOUTH OF MESCAL ST
HC      2    3.38
KKRR037C    ROUTE   REACH
KM          ROUTE HYDROGRAPH AD037C THRU REACH RR037C,
KM          71ST STREET CHANNEL, MESCAL ST TO MESCAL DET BASIN OUTFALL PIPE
RS      1    FLOW       0
RC 0.035    0.035   0.035     500  0.0080    0.00
RX 964.1    964.2   974.1   996.2  1003.8    1027    1037  1037.1
RY    362   360.5   360.5   353.5   353.5     360     360     362
* ***************************************************************************
*  THE FOLLOWING SEQUENCE INVOLVING THE KIERLAND DEVELOPMENT WAS DERIVED, IN   *
*  PART, BASED ON THE KIERLAND MASTER DRAINAGE REPORT BY COE & VAN LOO (CVL)   *
*  TITLED: ADDENDUM TO MASTER DRAINAGE REPORT FOR KIERLAND AND DATED REVISED   *
*  3-13-95. IN THIS SEQUENCE, CVL ONSITE SUB-BASINS WERE GENERALLY             *
*  COMBINED TO FORM SINGLE SUB-BASINS CORRESPONDING TO SB028, SB031, SB032,    *
*  SB033 AND SB034 AS NOTED AT THE SUB-BASIN STEPS THAT FOLLOW. ALL OF THE     *
*  KIERLAND ONSITE ROUTING REACH AND LEVEL POOL ROUTING STEPS IN THIS SEQUENCE *
*  WERE TAKEN DIRECTLY FROM THE CVL HEC1 MODEL AS NOTED AT THOSE HYDROGRAPH    *
*  STEPS. THE BASIS FOR THIS DATA IS CVL HEC1 MODEL H1G100A.PS1 DATED 10-01-94.*
* ***************************************************************************
KK SB038    BASIN
KM          CORRESPONDS TO CVL SUBBASINS SA1, 100, AND 6; BASIN AREA IS FROM SCI
BA 0.120
LG  0.25     0.25    4.65    0.38      45
UC 0.304    0.243
UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA    100
KK DV038    SPLIT FLOW. DQ IS BASED ON CAPACITY OF EIGHT ON-GRADE CATCH BASINS
KM          LOC @ INTERSECTION OF 64TH ST AND PARADISE LANE (CONSTRUCTED 1997?)
KM          CONSISTING OF 4 CB'S @ L=20FT ON 64TH ST AND 2 CB'S @ L=10FT, 1 CB
KM          @ L=17FT AND 1 CB @ L=20 FT ON PARADISE LN JUST EAST OF 64TH ST.
KM          INTERCEPTED FLOW (HYDROGRAPH DR038) DRAINS WEST IN STORM DRAIN OF
KM          UNK DIAM UNDER PARADISE LN TO JACKRABBIT PARK DET BASIN. REMAINDER
KM          FLOW (DV038) FLOWS PAST CB'S AND GOES SOUTH ON 64TH ST.
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KM         NOTE: THIS DIVERSION APPARENTLY DID NOT EXIST @ TIME OF KIERLAND
KM         REPORT BECAUSE IT IS NOT INCLUDED IN CVL HEC-1 MODEL.
DT DR038
DI    0      20      40      68      80     100     200     500
DQ    0      20      40      68      68      68      68      68
KK RR039   ROUTE   REACH
KM         ROUTE HYDROGRAPH DV038 THRU REACH RR039, 64TH ST FROM PARADISE LN
KM         TO GREENWAY RD. THIS STEP CORRESPONDS TO CVL R602
RS    1     ELEV      9
RC 0.015   0.015   0.015    2600  0.0092    0.00
RX  50.0    60.0    60.1    99.0   101.0   140.0   140.1   150.0
RY  17.0    15.0     9.0    10.0    10.0     9.0    15.0    17.0
KK SB039   BASIN
KM         MOSTLY 64TH ST. THIS OFFSITE AREA WAS NOT INCLUDED IN CVL MODEL
BA 0.030
LG  0.20    0.25    4.65    0.38      57
UC 0.225   0.220
UA    0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA  100
KK AD039   COMBINE HYDROGRAPHS RR039 AND SB039,
KM         THIS STEP CORRESPONDS TO CVL C206
HC    2     0.09
KK DV039   SPLIT FLOW. 64TH & GREENWAY - DIVERT STORM DRAIN FLOW FROM 64TH ST
KM         TO GOLF COURSE UP TO 35 CFS. THIS STEP CORRESPONDS TO CVL DIV900.
KM         DIVERTED FLOW (DR039) RETRIEVED LATER TO ROUTE SOUTH ON 64TH ST.
KM         CVL PLANS SHOW 4-36FT CB'S ON 64TH ST JUST NORTH OF GREENWAY.
KM         HOWEVER, ONLY 2-36FT CB'S WERE CONSTRUCTED.
DT DR039
DI   10      35      70     200     300     500     700
DQ    0       0      35     165     265     465     665
KKRR040    ROUTE   REACH
KM         ROUTE HYDROGRAPH DV039 THRU REACH RR040,
KM         THIS STEP CORRESPONDS TO CVL R406, R471, R472, R473 & R481.
KM         REACH LENGTH IS SUMMATION OF CVL REACH LENGTHS.  WEIGHTED SLOPE
KM         BASED ON CVL REACH LENGTHS AND SLOPES.
RS    8     ELEV     10
RC 0.035   0.035   0.035    3660  0.0075    0.00
RX  55.0    60.0    70.0    90.0   110.0   130.0   140.0   145.0
RY  20.0    15.0    15.0    10.0    10.0    15.0    15.0    20.0
KK SB040   BASIN
KM         NOTE: THIS CORRESPONDS TO CVL SUBBASINS SA25, 160, 162, 120, 130,
KM         80, 27, 28, 23, 102, 111, 170, 171, 11, 24, 70, 8 AND 10
KM         BASIN AREA = SUM OF CVL BASIN AREAS
BA 0.410
LG  0.20    0.25    4.65    0.46      24
UC 0.496   0.291
UA    0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA  100
KK DR034   RETRIEVE BASIN #3 BLEEDOFF OUTFLOW
DR DR034
KK AD040   COMBINE HYDROGRAPHS RR040, SB040 AND DR034
KM         THIS STEP CORRESPONDS TO CVL C281
HC    3     1.33
KK LP040   ROUTE FLOW THRU KIERLAND BASIN #4 TO SANDPIPER PARK
KM         24" OUTLET PIPE & 53' WEIR
KM         THIS STEP CORRESPONDS TO CVL RET4
RS    1     ELEV     31
SV    0       0    1.02    2.35    4.04    5.94    9.78    11.8    15.8   20.64
SQ    0    18.4    19.2    19.9    20.6    21.3    22.3      96     344     690
SE   31      32      33      34      35      36    37.4      38      39      40
KK RR041   ROUTE   REACH
KM         ROUTE HYDROGRAPH LP040 THRU REACH RR041, OPEN CHAN TO SANDPIPER PARK
KM         THIS STEP CORRESPONDS TO CVL R440
RS    1     ELEV     10
RC 0.035   0.035   0.035     600  0.0067    0.00
RX  55.0    60.0    70.0    90.0   110.0   130.0   140.0   145.0
RY  20.0    15.0    15.0    10.0    10.0    15.0    15.0    20.0
KK SB041   BASIN
KM         CORRESPONDS TO CVL SA140 AND SA133; BA = SUM OF CVL BASIN AREAS
BA 0.040
LG  0.21    0.25    4.65    0.43      25
UC 0.346   0.280
UA    0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA  100
KK AD041   COMBINE RR041 AND SB041
KM         THIS STEP CORRESPONDS TO CVL C282
HC    2     1.71
KK LP041   ROUTE FLOW THROUGH SANDPIPER PARK DETENTION BASIN
KM         LOW FLOW STORM DRAIN AND 42FT OVERFLOW WEIR
KM         THIS STEP CORRESPONDS TO CVL RET5
RS    1     ELEV     25
SV    0     .04     .25     1.0     4.5     7.6    12.3    18.4    25.5    29.4
SV 37.2    40.0
SQ    0    22.6    31.6    33.8    35.9    37.9    39.8    41.6    43.3    44.2
SQ  170     500
SE   25    25.1      27      28      29      30      31      32      33    33.5
SE 34.5      35
KK DV041   DIVERT LP041. THIS STEP CORRESPONDS TO CVL DIV920 EXCEPT THE
KM         REMAINDER AND DIVERTED FLOWS ARE REVERSED. REMAINDER FLOW (DV041)
KM         OVERFLOWS SPILLWAY TO 67TH ST @ HEARN. DIVERTED FLOW (DR041) IS
KM         STORM DRAIN LOW FLOW IN HEARN TO 64TH ST AND WILL BE RECALLED LATER
DT DR041
DI  44.2     170     500
* DQ     0   125.8   455.8 (ORIGIONAL CVL DQ RECORD)
DQ  44.2    44.2    44.2
KK RR043   ROUTE   REACH
KM         ROUTE DV041 THRU REACH RR043 DOWN 67TH ST TO TBIRD
RS    2     FLOW      0
RC 0.025   0.016   0.025    1800  0.0070    0.00
RX   0.0     0.1    24.3    24.4    56.2    56.3    96.5    96.6
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RY 107.0    102.0   100.5   100.3   100.3   100.5   102.5   107.0
KK SB043    BASIN
KM          CP @ 67TH ST AND TBIRD
BA 0.080
LG  0.28     0.25    4.65    0.36      31
UC 0.388    0.308
UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA    100
KK AD043    COMBINE RR043 AND SB043
HC      2    0.08
KK DV043    SPLIT FLOW. REMAINDER FLOW (DV043) SPILLS OVER SOUTH SIDE OF TBIRD
KM          AND GOES DOWN 66TH ST. DIVERTED FLOW (DR043) GOES WEST ON TBIRD
KM          TO 64TH ST AND WILL BE RECALLED LATER
DT DR043
DI      0      15      95     305     600    1040    1525    2075
DQ      0      15      95     295     570     985    1440    1960
KK RR044    ROUTE   REACH
KM          ROUTE HYDROGRAPH DV043 THRU REACH RR044,
KM          66TH ST (BOTH NORMAL AND INV CROWN) TO CACTUS
RS      4    FLOW       0
RC 0.025    0.016   0.025    5250  0.0070    0.00
RX    0.0     0.1     8.8    10.3    40.3    41.8    50.5    50.6
RY 105.5    100.3   100.3   100.1   100.1   100.3   100.3   105.5
KK SB044    BASIN
KM          CP @ CACTUS RD AND 66TH ST
BA 0.180
LG  0.28     0.25    4.65    0.38      31
UC 0.521    0.515
UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA    100
KK AD044    COMBINE RR044 AND SB044
HC      2    0.18
KKDV044A    SPLIT FLOW. CATCH BASIN(S) JUST NORTH OF CACTUS ON 65TH PL.
KM          APPROX 1/2 OF 1/3 OF TOTAL AD044 Q DRAINS WEST TO 64TH ST STORM DRAIN
KM          (DR044A), UP TO PIPE FLOWING FULL CAPACITY OF 55 CFS.  REMAINDER FLOW
KM          (DV044A) CONVEYED EAST TO 66TH ST SPLIT. CACTUS ROAD SD CONSISTS OF
KM          42IN DIAM PIPE @ S=0.0030 FT/FT.
DTDR044A
DI      0      25      50     100     200     300     400
DQ      0       4       8      17      33      50      55
KKDV044B    SPLIT FLOW BASED ON CAPACITY OF 60 IN. SD PIPE IN CACTUS RD
KM          @ S=0.0026 FT/FT. REMAINDER FLOW (DV044B) ROUTED EAST IN CACTUS THEN
KM          SOUTH IN 68TH ST AND EVENTUALLY DISCHARGES TO MESCAL PARK DET BASIN.
KM          HYDROGRAPH ASSOC WITH DQ (DR044B) OVERFLOWS CACTUS ROAD AND FLOWS
KM          SOUTH IN 66TH ST.
DTDR044B
DI      0      50     100     150     200     300     400     500    1000
DQ      0       0       0      17      67     167     267     367     867
KKRR4446
KM          ROUTE DV044B THRU REACH RR4446
KM          STORM DRAIN FLOW EAST IN CACTUS RD TO 68TH ST
RK   1110   .0026    .013            CIRC       5
KK DR036    RETRIEVE DR036 CACTUS RD STORM DRAIN FLOW
DR DR036
KKRR3646
KM          ROUTE DR036 THRU REACH RR3646
KM          STORM DRAIN FLOW WEST IN CACTUS RD TO 68TH ST
RK    580   .0026    .013            CIRC     5.5
KK SB045    BASIN
KM          CP @ 68TH ST & TBIRD
BA 0.030
LG  0.27     0.25    4.65    0.38      38
UC 0.388    0.548
UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA    100
KKRR046A    ROUTE   REACH
KM          ROUTE HYDROGRAPH SB045 THRU REACH RR046A,
KM          68TH ST BOTH NORMAL AND INV CROWN TO LARKSPUR
RS      2    FLOW       0
RC 0.025    0.016   0.025    3800  0.0080    0.00
RX    0.0     0.1     5.0     5.0    45.0    45.1    52.0    52.1
RY 103.0    100.9   100.9   100.2   100.2    10.9   100.9   103.0
KKRR046B    ROUTE   REACH
KM          ROUTE HYDROGRAPH RR046A THRU REACH RR046B,
KM          GRASS LINED TRAP CHANNEL, LARKSPUR TO CACTUS RD
RS      1    FLOW       0
RC 0.030    0.030   0.030    1400  0.0070    0.00
RX    0.0     0.1     4.0     6.5     6.6     9.0    13.0    13.1
RY 105.0    103.0   100.5   100.0   100.0   100.5   102.0   105.0
KK SB046    BASIN
KM          CP @ CACTUS RD AND 68TH ST
BA 0.190
LG  0.28     0.25    4.65    0.38      33
UC 0.479    0.441
UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA    100
KKAD046A    COMBINE HYDROGRAPHS RR046B AND SB046
KM          CP @ CACTUS RD & 68TH ST, SURFACE FLOW FROM NORTH
HC      2    0.22
KKAD046B    COMBINE HYDROGRAPHS RR4446, RR3646 AND AD046A
KM          TOTAL SD FLOW FROM EAST AND WEST AND SURFACE FLOW FROM NORTH
HC      3    0.61
KK DV046    SPLIT FLOW. REMAINDER FLOW (DV046) IS BASED ON CAPACITY OF 1-96IN
KM          DIAM CIP CONC SD PIPE @ S=0.00416 SOUTH IN 68TH ST, UPPER REACH OF
KM          OUTFALL TO MESCAL PARK DET BASIN. HYDROGRAPH ASSOC WITH DQ (DR046)
KM          OVERFLOWS CACTUS ROAD AND FLOWS SOUTH IN 68TH ST.
DT DR046
DI      0     300     588    1000    1500
DQ      0       0       0     412     912
KKRR047A
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KM          ROUTE DV046 THRU REACH RR047A, 1-96IN DIAM STORM DRAIN OUTFALL SOUTH
KM          IN 68TH ST FROM CACTUS RD TO JUST SOUTH OF JENAN DR.
RK  1500     .004    .013             CIRC      8
KKRR4748
KM          ROUTE RR047A THRU REACH RR4748, EQUIVILENT OF 2-78IN DIAM STORM DRAIN
KM          OUTFALL SOUTH IN 68TH ST FROM JENAN DR TO CHOLLA THEN EAST IN CHOLLA
KM          TO 68TH PL THEN SOUTH TO MESCAL PARK DETENTION BASIN.
KM          PIPE FLOWING FULL, 2-78IN DIAM SD = 575 CFS
KM          PIPE FLOWING FULL, 1-102IN DIAM SD = 590 CFS
RK  2300     .003    .013             CIRC      8.5
KK SB048    BASIN
KM          CP @ 68TH PL, SURFACE INFLOW TO MESCAL PARK DET BASIN
BA 0.090
LG  0.29     0.25    4.65    0.39       22
UC 0.321     0.304
UA     0      5.0    16.0    30.0     65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD048    COMBINE HYDROGRAPHS RR4748 AND SB048
KM          TOTAL COMB STORM DRAIN AND SURFACE FLOW INTO MESCAL PARK DET BASIN
HC     2     0.70
KK LP048    ROUTE FLOW THRU MESCAL PARK DET BASIN
KM          PRIMARY OUTLET CONSISTS OF 1-60IN DIAM OUTLET PIPE UNDER OUTLET
KM          CONTROL.  EXIST OVERFLOW AT BASIN ELEV 1363.5 @ SW CORNER OF PARK.
KM          EXISTING SPILLWAY ACTS AS BROAD CRESTED WIER WITH ESTIMATED
KM          EFFECTIVE LENGTH OF 300FT.  IMPROVED CONDITION FOR RECOMMENDED
KM          ALTERNATIVE CONSISTS OF RAISING BERM ELEVATION APPROX 1-FOOT.
KM          MATERIAL USED TO RAISE SPILLWAY IS EXCAVATED FROM NE CORNER OF PARK.
KM          SPILLWAY LENGTH REDUCED FROM 300 FEET TO 50 FEET, SPILLWAY
KM          ELEVATION UNCHANGED.  BASIN VOLUME INCREASE APPROX 1 AC-FT.
KO     2       2
RS     1     STOR       0
SV     0     3.72   11.84   20.98    22.40   31.02    39.0    44.4
SQ     0        1      96     137      153     169     189     352
SE1354.5   1356.0  1358.0  1360.0   1361.0  1362.0  1363.5  1364.5
KK DV048    SPLIT FLOW.  FLOW DIVERSION TO REFLECT MESCAL PARK OVERFLOW WHICH
KM          WILL LATER BE ROUTED THRU SB049.  REMAINDER FLOW (DV048) IS ROUTED
KM          THRU 60IN DIAM SD OUTFALLING INTO 71ST ST CHANNEL.  DIVERTED FLOW
KM          (DR048) WILL BE RECALLED AND ROUTED DOWN 68TH PL AND SHEA BLVD.
DT DR048
DI     0      189     352    1004
DQ     0        0     150     780
KKRR037D
KM          ROUTE LP048 THRU REACH RR037D 60IN DIA STORM DRAIN OUTFALL TO
KM          71ST ST CHANNEL
RK  1400     .001    .013             CIRC      5
KKAD037D    COMBINE HYDROGRAPHS AD037C AND RR037D
KM          CP @ 71ST ST CHANNEL APPROX 500FT SOUTH OF MESCAL ST
HC     2     4.08
KKRR049A    ROUTE   REACH
KM          ROUTE HYDROGRAPH AD037D THRU REACH RR049A, 71ST STREET CHANNEL.
KM          EXIST COND MOSTLY LANDSCAPED EARTH CHANNEL.  PREFERRED ALTERNATIVE
KM          REFLECTS WIDER, HARDENED CHANNEL ABOVE SAHUARO DR FOR APPROX 570 FT.
RS     1     FLOW       0
RC 0.025    0.018   0.025    1450   0.0070    0.00
RX 973.9      974     984     996     1004    1016    1024  1024.1
RY   360    357.5   357.5   351.5    351.5   357.5   357.5     360
KK SB049    BASIN
KM          CP @ 71ST ST CHANNEL @ SHEA BLVD BOX CULVERT
BA 0.140
LG  0.14     0.25    4.65    0.38       70
UC 0.338    0.202
UA     0      5.0    16.0    30.0     65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK DR048    RETRIEVE MESCAL PARK OVERFLOW
DR DR048
KKRR049B    ROUTE   REACH
KM          ROUTE HYDROGRAPH DR048 THRU REACH RR049B SOUTH ON 68TH PL AND
KM          EAST ON SHEA BLVD TO SUMP NEAR 70TH ST (REED RD).
RS     1     FLOW       0
RC 0.025    0.015   0.025    2500   0.0040    0.00
RX   0.0     20.0    24.0    24.5     56.5    57.0    63.0    63.1
RY 102.3    100.3   100.3   100.2    100.2   100.3   100.3   102.3
KKAD049A    COMBINE SB049 AND RR049B HYDROGRAPHS
HC     2     0.14
KK DV049    SPLIT FLOW. REMAINDER FLOW (DV049) IS BASED ON COMBINED CAPACITY OF
KM          1-30IN, 1-24IN AND 2-18IN DIAM CONC SD PIPES THAT ENTER THE 71ST ST
KM          CHANNEL BOX CULVERT @ SHEA BLVD (ON NORTH SIDE OF SHEA), ALL @
KM          ASSUMED S=0.005FT/FT. DIVERTED FLOW, DQ (DR049) OVERFLOWS SUMP IN
KM          SHEA BLVD JUST WEST OF 70TH ST (REED ROAD) AND FLOWS SOUTH ON REED.
DT DR049
DI     0       30      63     100      150     200     300     400     800
DQ     0        0       3      40       90     140     240     340     740
KK SB050    BASIN
KM          CP @ SCOTTSDALE RD AND SHEA BLVD
BA 0.040
LG  0.10     0.25    4.65    0.38       80
UC 0.254    0.214
UA     0      5.0    16.0    30.0     65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK DV050    SPLIT FLOW. REMAINDER FLOW (DV050) IS BASED ON CAPACITY OF 48IN DIAM
KM          STORM DRAIN PIPE IN SHEA BLVD @ S=0.00524 FT/FT AND IS ROUTED WEST IN
KM          SHEA TO 71ST ST CHANNEL. HYDROGRAPH ASSOC WITH DQ (DR050) FLOWS
KM          SOUTH ON SCOTTSDALE ROAD PAST SHEA INTERSECTION.
DT DR050
DI     0       50     105     200      400
DQ     0        0       0      95      295
KKRR049C
KM          ROUTE DV050 THRU REACH RR049C
KM          STORM DRAIN IN SHEA TO 71ST ST CHANNEL
RK   580     .005    .013             CIRC      4
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KKAD049B   COMBINE HYDROGRAPHS RR049A, DV049 AND RR049C
KM         TOTAL COMBINED FLOW @ SHEA AND 71ST ST CHAN FROM NORTH, EAST & WEST
HC     3    4.16
KKRR051A   ROUTE   REACH
KM         ROUTE HYDROGRAPH AD049 THRU REACH RR051A, 71ST STREET CHANNEL.
KM         CONC "V" CHANNEL, SHEA TO COCHISE
RS     1    FLOW       0
RC 0.018   0.018   0.018    1300  0.0040    0.00
RX 989.2   989.3   989.4   993.8  1000.0  1006.2  1008.7  1009.0
RY 350.0   347.0   345.2   338.2   338.1   338.0   345.2   350.0
KKRR051B   ROUTE   REACH
KM         ROUTE HYDROGRAPH RR051A THRU REACH RR051B,
KM         CONC "V" CHANNEL, COCHISE TO GOLD DUST
RS     1    FLOW       0
RC 0.030   0.018   0.030    1300  0.0030    0.00
RX 970.1   970.2   971.2   991.3  1000.0  1008.7  1039.1  1039.2
RY 340.0   339.0   338.0   332.5   332.5   332.4   339.3   340.0
KKRR051C   ROUTE   REACH
KM         ROUTE HYDROGRAPH RR051B THRU REACH RR051C
KM         LANDSCAPED EARTH CHANNEL, FROM GOLD DUST TO BERNEIL DITCH
RS     1    FLOW       0
RC 0.035   0.035   0.035    1300  0.0030    0.00
RX 969.9   983.6   994.4  1000.0  1002.3  1005.4  1016.9  1033.2
RY 340.9   336.6   335.1   335.1   335.0   336.4   336.7   341.9
KK SB051   BASIN
KM         CP @ 71ST ST CHANNEL AND BERNEIL DITCH
BA 0.090
LG  0.17    0.25    4.65    0.38      64
UC 0.296   0.234
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD051   COMBINE HYDROGRAPHS RR051C AND SB051
KM         TOTAL FLOW IN 71ST ST CHANNEL @ CONFL 71ST ST CHANNEL & BERNEIL
HC     2    4.25
KK SB052   BASIN
KM         CP @ SOUTH END OF 75TH ST CULDESAC, BELOW CHOLLA
BA 0.170
LG  0.29    0.25    4.65    0.38      26
UC 0.567   0.558
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK DV052   SPLIT FLOW 50/50. REMAINDER FLOW (DV052) GOES WEST IN CONC LINED
KM         CHANNEL. DIVERTED FLOW (DR052) GOES EAST AND LEAVES STUDY
DT DR052
DI     0      50     100     200     300     400
DQ     0      25      50     100     150     200
KKRR053A   ROUTE   REACH
KM         ROUTE HYDROGRAPH DV052 THRU REACH RR053A,
KM         CONC TRAP CHANNEL TO 74TH ST LOOP
RS     1    FLOW       0
RC 0.025   0.018   0.025     900  0.0020    0.00
RX   0.0     0.1     2.0    10.0    13.0    21.0    23.0    23.1
RY 110.0   104.0   104.0   100.0   100.0   104.0   104.0   110.0
KKRR053B
KM         ROUTE RR053A THRU REACH RR053B,
KM         8FT X 3FT RCB STORM DRAIN THRU COMM/RET PARCEL TO SHEA BLVD
RK  1300    .004    .013            TRAP       8     .01
KK SB053   BASIN
KM         CP @ SHEA BLVD @ NE CORNER OF WINDMILL PLAZA
BA 0.100
LG  0.20    0.25    4.65    0.38      52
UC 0.363   0.301
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD053   COMBINE HYDROGRAPHS RR053B AND SB053
HC     2    0.27
KKRR054A   ROUTE   REACH
KM         ROUTE HYDROGRAPH AD053 THRU REACH RR054A, SHEA TO GOLD DUST.
KM         UPPER REACH IS 1-10X3 RCB. LOWER REACH IS USED TO REPRESENT ROUTING
KM         SECTION AND CONSISTS OF CONC TRAP CHANNEL BEHIND WINDMILL PLAZA
RS     1    FLOW       0
RC 0.018   0.018   0.016    1200  0.0025    0.00
RX   0.0     0.1     6.0    10.0    12.0    33.0    59.0    59.1
RY 107.0   100.0   100.0   100.0   100.0   101.8   102.3   103.3
KKDV054A   SPLIT FLOW.  DIVERTED FLOW (DR054A) BASED ON FLOWING FULL CAPACITY
KM         (APPROX 160 CFS) ASSOCIATED WITH 1-10X3 RCB THRU MONTIERRA APTS
KM         SOUTH OF GOLD DUST. REMAINDER FLOW (DV054A) WILL SURFACE DRAIN TO
KM         INTERSECTION SCOTTSDALE RD AND GOLD DUST VIA WINDMILL ALLEY
DTDR054A
DI     0     100     160     300     400     500     600     700
DQ     0     100     160     160     160     160     160     160
KKRR055A   ROUTE   REACH
KM         ROUTE HYDROGRAPH DR054A THRU REACH RR055A,
KM         ALLEY ON SOUTH SIDE WINDMILL NORTH SIDE GOLD DUST
RS     1    FLOW       0
RC 0.025   0.025   0.025     600  0.0014    0.00
RX   0.0     0.1     0.2     0.3    25.3    25.4    25.5    25.6
RY 103.0   103.0   103.0   100.0   100.0   103.0   103.0   103.0
KK DR050   RETRIEVE SURFACE BYPASS FLOW FROM SCOTTSDALE/SHEA INTERSECTION
DR DR050
KKRR055B   ROUTE   REACH
KM         ROUTE HYDROGRAPH DR050 THRU REACH RR055B,
KM         SCOTTSDALE ROAD FROM SHEA TO GOLD DUST
RS     1    FLOW       0
RC 0.025   0.016   0.025    1320  0.0060    0.00
RX   0.0     0.1     8.5     8.6    96.4    96.5   104.9   105.0
RY 103.0   100.5   100.5   100.3   100.3   100.5   100.5   103.0
KKAD055A   COMBINE HYDROGRAPHS RR055A AND RR055B, Q IN SDALE RD @ GOLD DUST
HC     2  0.0001
KKRR055C   ROUTE   REACH
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KM          ROUTE HYDROGRAPH AD055A THRU REACH RR055C, SDALE RD FROM GOLD DUST
KM          TO MTN VIEW
RS     1     FLOW       0
RC 0.025    0.016   0.025    1320  0.0060    0.00
RX   0.0      0.1     8.5     8.6    96.4    96.5    104.9    105.0
RY 103.0    100.5   100.5   100.3   100.3   100.5    100.5    103.0
KK SB055    BASIN
KM          CP ON SCOTTSDALE RD @ MTN VIEW, NOT BERNEIL ABOVE 71ST ST CHANNEL
BA 0.053
LG  0.11     0.25    4.65    0.38      78
UC 0.300    0.322
UA     0      5.0    16.0    30.0    65.0    77.0     84.0     90.0     94.0     97.0
UA   100
KKAD055B    COMBINE HYDROGRAPHS RR055C AND SB055
KM          TOTAL Q IN SCOTTSDALE ROAD FLOWING SOUTH AT MTN VIEW
HC     2     0.05
KK DV055    SPLIT FLOW. REMAINDER FLOW (DV055) ENTERS BERNEIL DITCH. DIVERTED
KM          FLOW (DR055) GOES SOUTH DOWN SDALE RD AND LEAVES STUDY. FLOW SPLIT
KM          ASSUMES ALL FLOW ON EAST SIDE OF SDALE RD AND HALF OF FLOW ON WEST
KM          SIDE OF SDALE RD CONTINUES SOUTH PAST MTN VIEW. DIVERTED FLOW
KM          GOING SOUTH ON SCOTTSDALE RD WILL BE RECALLED AT END OF MODEL, AND
KM          ADDED TO DR054B. OTHER HALF OF FLOW ON WEST SIDE SDALE RD GOES INTO
KM          BERNEIL DITCH
DT DR055
DI     0      100     200     400     600     800
DQ     0       75     150     300     450     600
KKDR054A    RETRIEVE FLOW FROM GOLD DUST CULVERT @ SE COR WINDMILL PLAZA
DRDR054A
KKRR054B
KM          ROUTE DR054A THRU REACH RR054B,
KM          1-10X3 RCB STORM DRAIN THRU MONTIERRA APTS TO SDALE RD
RK  1600    .0066    .013            TRAP      10     .01
KK SB054    BASIN
KM          CP @ SCOTTSDALE RD AND MTN VIEW
BA 0.110
LG  0.18     0.25    4.65    0.38      61
UC 0.442    0.413
UA     0      5.0    16.0    30.0    65.0    77.0     84.0     90.0     94.0     97.0
UA   100
KK AD054    COMBINE HYDROGRAPHS RR054B AND SB054
KM          TOTAL FLOW APPROACHING EAST SIDE SDALE RD @ MTN VIEW
HC     2     0.38
KKDV054B    SPLIT FLOW. REMAINDER FLOW (DV054B) ENTERS BERNEIL DITCH VIA RCB
KM          UNDER SDALE RD @ MTN VIEW. Q ASSOCIATED WITH DV054B BASED ON FLOWING
KM          FULL CAPACITY OF 1-10X3 RCB THRU MONTIERRA APTS (APPROX 160 CFS).
KM          DIVERTED FLOW (DR054B) IS ADDED TO DR055 @ END OF MODEL AND GOES
KM          SOUTH DOWN SDALE ROAD LEAVING STUDY.
DTDR054B
DI     0      100     200     400     600     800
DQ     0        0      40     240     440     640
KKAD055C    COMBINE HYDROGRAPHS DV055 AND DV054B
KM          TOTAL Q @ START OF BERNEIL DITCH JUST WEST OF SCOTTSDALE ROAD
HC     2     0.43
* ********************************************************************************
* NOTE: IN ALL THE ROUTING STEPS THAT FOLLOW REGARDING THE BERNEIL DITCH, IT IS
* ASSUMED THAT ALL OF THE FLOW IN THE DITCH REMAINS IN THE DITCH EVEN THOUGH
* HISTORICAL ACCOUNTS AND THE HEC-RAS BACKWATER MODEL INDICATE THAT FLOW BREAKS
* OUT OF THE CHANNEL AND GOES SOUTH. IF THIS OCCURS, THE BREAKOUT FLOW WOULD GO
* DIRECTLY TO THE INDIAN BEND WASH AND WOULD NOT RETURN TO THE BERNEIL DITCH.
* ********************************************************************************
KKRR055D    ROUTE   REACH
KM          ROUTE HYDROGRAPH AD055C THRU REACH RR055D. EXIST BERNEIL DITCH EARTH
KM          CHANNEL FROM SCOTTSDALE RD TO 71ST ST CHANNEL CHANGED TO HARD LINED
KM          CHANNEL WITH INCREASED X-SECTIONAL AREA.  SLOPE CHANGED FROM 0.0011
KM          FT/FT TO 0.00101 FT/FT.
RS     1     FLOW       0
RC 0.030    0.018   0.018     600 0.00101    0.00
RX 944.2    947.5   962.2   976.9  1016.9  1035.8 1035.81 1035.82
RY 334.4    335.2   335.4   330.6   330.6   337.5     338   339.0
KKAD055D    COMBINE HYDROGRAPHS AD051 AND RR055D
KM          TOTAL Q IN BERNEIL DITCH @ CONFL BERNEIL DITCH AND 71ST ST CHANNEL
HC     2     4.68
KKRR057A    ROUTE   REACH
KM          ROUTE HYDROGRAPH AD055D THRU REACH RR057A. EXIST BERNEIL DITCH EARTH
KM          CHANNEL FROM 71ST ST CHANNEL TO REED RD ALIGN CHANGED TO HARD
KM          LINED CHANNEL WITH INCREASED X-SECTIONAL AREA.  SLOPE CHANGED FROM
KM          0.0011 FT/FT TO 0.00101 FT/FT.
RS     1     FLOW       0
RC 0.030    0.018   0.018     700 0.00101    0.00
RX 947.5    950.0   965.2   983.4  1023.5  1043.1  1043.2  1043.3
RY 336.0    336.1   336.6   330.1   330.1   337.3   338.3   338.1
KK DR049    RETRIEVE OVERFLOW OF SHEA BLVD SUMP JUST WEST OF 70TH ST (REED RD)
DR DR049
KKRR057B    ROUTE   REACH
KM          ROUTE HYDROGRAPH DR049 THRU REACH RR057B, REED RD STREET SECT FROM
KM          SHEA BLVD TO BERNEIL DITCH. DISREGARD STORM DRAIN CONVEYANCE.
RS     1     FLOW       0
RC 0.025    0.016   0.025    2640  0.0080    0.00
RX   0.0      0.1     5.0     5.1    59.0    59.1    64.0    64.1
RY 103.0    100.6   100.6   100.3   100.3   100.6   100.6   103.0
KKAD057A    COMBINE HYDROGRAPHS RR057A AND RR057B
KM          TOTAL Q BERNEIL DITCH AT REED RD ALIGNMENT
HC     2     4.78
KKRR057C    ROUTE   REACH
KM          ROUTE HYDROGRAPH AD057A THRU REACH RR057C.
KM          EXIST BERNEIL DITCH EARTH CHANNEL FROM REED RD ALIGN TO 68TH ST
KM          ALIGN CHANGED TO HARD LINED CHANNEL WITH INCREASED X-SECTIONAL
KM          AREA.  SLOPE CHANGED FROM 0.0011 FT/FT TO 0.00101 FT/FT.
KM          ALIGN
RS     1     FLOW       0
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RC 0.030   0.018   0.018    1300 0.00101    0.00
RX 941.5   944.9   957.0   976.4  1016.4  1033.0  1035.0  1039.7
RY 335.9   336.5   336.6   328.9   328.9   335.2   335.2   335.2
KK SB057   BASIN
KM         CP NEAR SW COR CHAPARRAL HIGH SCHOOL
BA 0.150
LG  0.18    0.25    4.65    0.36      59
UC 0.275   0.161
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KKAD057B   COMBINE HYDROGRAPHS RR057C AND SB057
KM         TOTAL Q BERNEIL DITCH NEAR SW COR CHAPARRAL HIGH
HC     2    4.93
KK DR046   RETRIEVE SURFACE OVERFLOW FROM CACTUS ROAD SOUTH ON 68TH ST
DR DR046
KKRR047B   ROUTE   REACH
KM         ROUTE HYDROGRAPH DR046 THRU REACH RR047,
KM         68TH ST INV CROWN FROM CACTUS RD TO SHEA BLVD
RS     3    FLOW       0
RC 0.025   0.016   0.025    5500  0.0060    0.00
RX   0.0     0.1    10.0    10.1    45.9    46.0    74.0    74.1
RY 105.0   100.9   100.9   100.2   100.2   100.9   102.4   105.0
KK SB047   BASIN
KM         CP 68TH ST AND SHEA BLVD COMBO DIP AND LOW FLOW CULVERT/SD XING
BA 0.190
LG  0.28    0.25    4.65    0.37      28
UC 0.529   0.500
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD047   COMBINE HYDROGRAPHS RR047B AND SB047
HC     2    0.19
KK RR058   ROUTE   REACH
KM         ROUTE HYDROGRAPH AD047 THRU REACH RR058,
KM         68TH ST INV CROWN FROM SHEA TO MTN VIEW CHANNEL (NEAR BERNEIL CONFL)
RS     1    FLOW       0
RC 0.025   0.016   0.025    2750  0.0090    0.00
RX   0.0     0.1     5.0     5.1    43.9    44.0    49.0    49.1
RY 103.0   100.9   100.9   100.2   100.2   100.9   100.9   103.0
KK SB058   BASIN
KM         CP 68TH ST AND MTN VIEW CHANNEL
BA 0.060
LG  0.30    0.25    4.65    0.38      24
UC 0.338   0.352
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KKAD058A   COMBINE HYDROGRAPHS RR058 AND SB058
HC     2    0.25
KKDR044B   RETRIEVE SURFACE OVERFLOW FROM CACTUS ROAD SOUTH ON 66TH ST
DRDR044B
KKRR059A   ROUTE   REACH
KM         ROUTE HYDROGRAPH DR044 THRU REACH RR059A,
KM         66TH ST INV CROWN FROM CACTUS RD TO SHEA BLVD
RS     2    FLOW       0
RC 0.025   0.016   0.025    5400  0.0060    0.00
RX   0.0     0.1    12.3    12.4    51.3    51.4    56.0    56.1
RY 105.9   100.9   100.9   100.2   100.2   100.9   100.9   105.9
KK SB059   BASIN
KM         CP 66TH ST AND SHEA BLVD COMBO DIP AND LOW FLOW CULVERT/SD XING
BA 0.230
LG  0.30    0.25    4.65    0.38      25
UC 0.571   0.503
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KKAD059A   COMBINE HYDROGRAPHS RR059A AND SB059
HC     2    0.23
KKSB061A   BASIN
KM         CP @ JACKRABBIT PARK DET BASIN (WEST BASIN) FROM NORTH AND WEST
BA 0.190
LG  0.27    0.25    4.65    0.39      32
UC 0.617   0.692
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KKSB061B   BASIN
KM         CP @ 60TH ST AND JACKRABBIT PARK DET BASIN
BA 0.110
LG  0.30    0.25    4.65    0.37      22
UC 0.463   0.554
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK DV061   SPLIT FLOW. REMAINDER FLOW (DV061) IS BASED ON CAPACITY OF 60TH ST
KM         36 IN. DIA STORM DRAIN THAT DISCHARGES INTO JACKRABBIT DET BASIN
KM         WEST. DIVERTED FLOW DQ(DR061B) IS FLOW-BY IN 60TH ST AND CONTINUES
KM         SOUTH, LEAVING THE STUDY AREA.
DTDR061B
DI     0      47     100     150     200     300     400     800
DQ     0       0      53     103     153     253     353     753
KK DR038   RETRIEVE FLOW INTERCEPTED BY CATCH BASINS @ 64TH ST AND PARADISE LN
DR DR038
KKRR061C
KM         ROUTE DR038 THRU REACH RR061C, SD OF UNK SIZE UNDER PARADISE LN FROM
KM         64TH ST TO JACKRABBIT PARK EAST BASIN. OUTFALL SD TO JACKRABBIT PARK
KM         IS 60IN DIAM. FOR ROUTING PURPOSES, DIAM = 60IN, S = 0.005(ASSUMED)
RK  1600    .005    .013            CIRC       5
KKSB061C   BASIN
KM         CP @ JACKRABBIT PARK DET BASIN (EAST BASIN) FROM NORTH AND EAST
BA 0.270
LG  0.23    0.25    4.65    0.38      46
UC 0.425   0.312
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
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KKAD061A   COMBINE HYDROGRAPHS SB061C AND RR061C, TOTAL INFLOW TO JACKRBT EAST
HC     2    0.33
KKAD061B   COMBINE HYDROGRAPHS SB061A, DV061 AND AD061A; TOTAL INFLOW TO
KM         JACKRABBIT PARK DET BASINS (EAST AND WEST)
HC     3    0.63
KK LP061   ROUTE FLOW THRU JACKRABBIT PARK DET BASIN, COMBINED EAST AND WEST.
KM         PRIMARY OUTLET IS 1-30IN DIAM SD PIPE UNDER PARADISE LN.
KM         OVERFLOW CONSISTS OF CONC SPILLWAY PAD JUST NORTH OF PARADISE LN
RS     1    STOR      0
SV     0     0.7    3.2     7.3    12.0    19.3    29.4    41.6    54.7    68.5
SQ     0       8     16      28      37      45      50      55     150     320
SE1463.0  1464.0 1465.0  1466.0  1467.0  1468.0  1469.0  1470.0  1471.0  1472.0
KKRR062A   ROUTE   REACH
KM         ROUTE HYDROGRAPH LP061 THRU REACH RR062A,
KM         EARTH CHANNEL FROM PARADISE LN TO GREENWAY RD
RS     4    FLOW      0
RC 0.025   0.045  0.025    2750  0.0020    0.00
RX   0.0     0.1   38.5    46.5    52.5    59.5    98.0    98.1
RY 108.8   103.8  102.3   100.9   100.9   102.3   104.8   108.8
KKRR062B   ROUTE   REACH
KM         ROUTE HYDROGRAPH RR062A THRU REACH RR062B,
KM         EARTH CHANNEL FROM GREENWAY RD TO CROSSED ARROWS PARK DET BASIN
RS     1    FLOW      0
RC 0.035   0.030  0.035    1450  0.0090    0.00
RX   0.0     0.1   15.0    36.5    41.5    46.0    52.0    52.1
RY 108.5   103.5  100.3   100.3   101.5   102.0   103.5   108.5
KK SB062   BASIN
KM         CP @ CROSSED ARROWS PARK DET BASIN
BA 0.340
LG  0.24    0.25   4.65    0.39      43
UC 0.438   0.291
UA     0     5.0   16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD062   COMBINE HYDROGRAPHS RR062B AND SB062
KM         TOTAL INFLOW TO CROSSED ARROWS PARK DET BASIN
HC     2    0.97
KK LP062   ROUTE FLOW THRU CROSSED ARROWS PARK DET BASIN
KM         PRIMARY SPILLWAY CONSISTS OF 2-24IN DIAM CONC PIPES
KM         OVERFLOW SPILLWAY CONSISTS OF LEVEL BROAD CREST WEIR @ EL1438, L=200'
KM         15IN LOW FLOW BLEEDOFF:  PIPE FLOWING FULL = 5CFS; ASSUMING INLET
KM         CONTROL -> HW/D = 6 WITH Q = 15 CFS.  ADJUST FOR LOW FLOW BLEEDOFF
KM         BY ADDING 1CFS AT LOW HEAD AND 5 CFS AT HIGH HEAD.
RS     1    STOR      0
SV     0     0.9    3.1     6.7    11.4    17.6    25.8    36.1
SQ     1       1     12      23      43      55      65     671
SE1432.0  1433.0 1434.0  1435.0  1436.0  1437.0  1438.0  1439.0
KK RR063   ROUTE   REACH
KM         ROUTE HYDROGRAPH LP062 THRU REACH RR063,
KM         EARTH CHANNEL FROM CROSSED ARROWS PARK DET BASIN TO TBIRD DET BASIN
RS     2    FLOW      0
RC 0.030   0.030  0.030    2800  0.0070    0.00
RX   0.0     0.1   70.3    77.1    77.8    83.0   123.0   123.1
RY 109.0   104.0  102.7   100.0   100.1   102.6   104.0   109.0
KK SB063   BASIN
KM         CP @ TBIRD DET BASIN, THUNDERBIRD RD JUST WEST OF 64TH ST
BA 0.220
LG  0.24    0.25   4.65    0.38      47
UC 0.454   0.339
UA     0     5.0   16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD063   COMBINE HYDROGRAPHS RR063 AND SB063
KM         TOTAL INFLOW TO TBIRD ROAD DET BASIN
HC     2    1.19
KK LP063   ROUTE FLOW THRU TBIRD ROAD DET BASIN
KM         48IN DIA LOW FLOW STORM DRAIN OUTLET PIPE, SURFACE OVERFLOW @ EAST
KM         AND WEST ENDS OF BASIN BEGINNING @ ELEV 1418
RS     1    STOR      0
SV     0     0.3    0.4     1.4     3.1     5.1     7.4     9.6
SQ     0      11     21      45      60      95     410     980
SE1412.0  1413.0 1414.0  1415.0  1416.0  1417.0  1418.0  1419.0
KKDV063A   SPLIT FLOW. REMAINDER FLOW (DV063A) SPILLS OUT OF BASIN @ EAST AND
KM         WEST ENDS. DIVERTED FLOW (DR063A) IS DIVERTED WEST OUT OF STUDY AREA
KM         BY 48IN DIA STORM DRAIN @ ASSUMED S=0.005 FT/FT UNDER TBIRD ROAD
DTDR063A
DI     0      11     21      45      60      95     410     980
DQ     0      11     21      45      60      95     110     130
KKDV063B   YES ALREADY, SPLIT FLOW AGAIN. REMAINDER FLOW (DV063B) SPILLS OUT OF
KM         BASIN @ ITS EAST END INTO 64TH ST. DIVERTED FLOW (DR063B) SPILLS OUT
KM         OF BASIN AT ITS WEST END INTO TBIRD AND DOWN 63RD STREET.
KM         BOTH ENDS OF BASIN HAVE ESSENTIALLY SAME ELEV AND SAME LENGTH
DTDR063B
DI     0      50    100     150     200     300     500     800
DQ     0      25     50      75     100     150     250     400
KK DR041   RETRIEVE STORM DRAIN OUTLET LOW FLOW FROM SANDPIPER PARK
DR DR041
KKRR064A   ROUTE   REACH
KM         ROUTE DR041 THRU REACH RR064A ALONG HEARN RD STORM DRAIN TO 64TH ST
KM         THIS STEP CORRESPONDS TO CVL R450
RS     2    ELEV      7
RC 0.015   0.015  0.015    1600  0.0019    0.00
RX  50.0    60.0   60.1    98.0   102.0   140.0   140.1   150.0
RY  17.0    15.0    9.0     7.0     7.0     9.0    15.0    17.0
KK DR039   RETRIEVE FLOW FROM SPLIT AT 64TH ST AND GREENWAY
KM         THIS STEP CORRESPONDS TO CVL D900
DR DR039
KKRR064B   ROUTE   REACH
KM         ROUTE DR039 THRU REACH RR064B DOWN 64TH ST TO HEARN.
KM         THIS STEP CORRESPONDS TO CVL ROUTING R407, R431 AND R432
RS     1    ELEV      9
RC 0.015   0.015  0.015    2550  0.0094    0.00
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RX  50.0    60.0    60.1    98.0   102.0   140.0   140.1   150.0
RY  17.0    15.0     9.0    10.0    10.0     9.0    15.0    17.0
KKAD064A    COMBINE RR064A AND RR064B
HC     2     1.76
KKRR064C    ROUTE   REACH
KM          ROUTE AD064A THRU REACH RR064C DOWN 64TH ST FROM HEARN TO TBIRD
RS     1     FLOW       0
RC 0.025    0.016   0.025    1450  0.0030    0.00
RX   0.0      0.1     5.5     5.6    71.5    71.6    76.5    76.6
RY 105.5    100.5   100.5   100.3   100.3   100.5   100.5   105.5
KK SB064    BASIN
KM          NOTE: CORRESPONDS, IN PART, TO CVL SUBBASINS SA131, 132, 134, 7
KM          AND 150; CP @ 64TH ST AND HEARN. BASIN AREA IS FROM SCI
BA 0.140
LG  0.26     0.25    4.65    0.39      34
UC 0.479    0.501
UA     0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KKAD064B    COMBINE RR064C AND SB064
KM          TOTAL Q IN 64TH ST APPROACHING TBIRD FROM NORTH
HC     2     1.90
KK DR043    RETRIEVE FLOW GOING WEST IN TBIRD FROM 66TH ST AND TBIRD DIVERSION
DR DR043
KKRR064D    ROUTE   REACH
KM          ROUTE HYDROGRAPH DR043 THRU REACH RR064D TBIRD STREET SECT TO 64TH ST
RS     4     FLOW       0
RC 0.025    0.016   0.025    1250  0.0010    0.00
RX   0.0      0.1     5.0     5.1    68.9    69.0    74.0    74.1
RY 103.0    100.5   100.5   100.3   100.3   100.5   101.2   103.0
KKAD064C    COMBINE HYDROGRAPHS DV063B, AD064B AND RR064D
KM          TOTAL Q IN 64TH ST AT TBIRD FROM WEST, NORTH AND EAST
HC     3     2.58
KKRR065A    ROUTE   REACH
KM          ROUTE HYDROGRAPH AD064C THRU REACH RR065A DOWN 64TH ST TO DELCOA AVE
RS     1     FLOW       0
RC 0.025    0.016   0.025     800  0.0190    0.00
RX   0.0      0.1     5.5     5.6    71.4    71.5    76.5    76.6
RY 105.5    100.5   100.5   100.3   100.3   100.5   100.5   105.5
KKDR063B    RETRIEVE TBIRD BASIN WEST END OVERFLOW
DRDR063B
KKRR065B    ROUTE   REACH
KM          ROUTE HYDROGRAPH DR063B THRU REACH RR065B SOUTH ON 63RD ST AND
KM          EAST ON DELCOA AVE TO 64TH ST
RS     1     FLOW       0
RC 0.025    0.016   0.025    1300  0.0040    0.00
RX   0.0      0.1     9.0     9.1    40.9    41.0    49.0    49.1
RY 105.0    100.5   100.5   100.2   100.2   100.5   100.5   105.0
KKAD065A    COMBINE HYDROGRAPHS RR065A AND RR065B
HC     2     3.18
KKRR065C    ROUTE   REACH
KM          ROUTE HYDROGRAPH AD065A THRU REACH RR065C DOWN 64TH ST FROM DELCOA
KM          TO CACTUS
RS     2     FLOW       0
RC 0.025    0.016   0.025    4500  0.0050    0.00
RX   0.0      0.1     5.5     5.6    71.4    71.5    76.5    76.6
RY 105.0    100.5   100.5   100.3   100.3   100.5   100.5   105.0
KK SB065    BASIN
KM          CP @ 64TH ST AND CACTUS
BA 0.440
LG  0.29     0.25    4.65    0.38      28
UC 0.517    0.315
UA     0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KKAD065B    COMBINE HYDROGRAPHS RR065C AND SB065
KM          TOTAL Q IN 64TH ST AT CACTUS
HC     2     3.62
KK RR066    ROUTE   REACH
KM          ROUTE HYDROGRAPH AD065B THRU REACH RR066 DOWN 64TH ST FROM CACTUS
KM          TO GARY RD
RS     1     FLOW       0
RC 0.025    0.025   0.016    3300  0.0050    0.00
RX   0.0      0.1    15.0    18.0    21.0    32.0    72.0    72.1
RY 106.0    101.5   100.0   100.0   100.0   101.2   101.2   106.0
KK SB066    BASIN
KM          CP @ 64TH ST AND GARY RD
BA 0.120
LG  0.25     0.25    4.65    0.37      38
UC 0.350    0.260
UA     0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD066    COMBINE HYDROGRAPHS RR066 AND SB066
KM          TOTAL Q IN 64TH ST AT GARY RD
HC     2     3.74
KKRR067A    ROUTE   REACH
KM          ROUTE HYDROGRAPH AD066 THRU REACH RR067A DOWN 64TH ST CHANNEL FROM
KM          GARY RD TO SHEA BLVD
RS     1     FLOW       0
RC 0.016    0.025   0.025    2100  0.0060    0.00
RX   0.0      0.1    25.0    29.0    40.0    44.0    49.0    49.1
RY 108.0    104.0   104.0   100.0   100.0   105.0   105.0   108.0
KKSB067A    BASIN
KM          CP @ 64TH ST AND MOUNTAIN VIEW ROAD ALIGN
BA 0.100
LG  0.30     0.25    4.65    0.38      24
UC 0.400    0.299
UA     0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KKDV067A    SPLIT FLOW. 30IN DIAM STORM DRAIN AT SHEA BLVD FLOWS WEST @ ASSUMED
KM          S=0.0025 FT/FT. REMAINDER FLOW (DV067B) GOES SOUTH IN 64TH ST
KM          CHANNEL. DIVERTED FLOW (DR067A) GOES WEST OUT OF PROJECT AREA.
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DTDR067A
DI     0      50     100     150     200     400
DQ     0      21      21      21      21      21
KKAD067A   COMBINE SB067A AND DV067A, 64TH ST CHANNEL @ CULVERT UNDER SHEA
HC     2     3.84
KKDV067B   SPLIT FLOW BASED ON RELATIVE CAPACITIES OF 64TH ST CHANNEL, FRONTAGE
KM         ROAD ALONG NORTH SIDE OF SHEA AND CULVERT UNDER SHEA. REMAINDER FLOW
KM         GOES EAST ALONG FRONTAGE ROAD TO 66TH STREET. DIVERTED FLOW GOES
KM         SOUTH DOWN 64TH ST CHANNEL.
DTDR067B
DI     0     381     679    1126
DQ     0     381     523     654
KKRR059B   ROUTE   REACH
KM         ROUTE REACH DOWN FRONTAGE ROAD
RS     1    FLOW       0
RC 0.016   0.016   0.016    1250  0.0050    0.00
RX   0.0     0.1     8.0    16.0    20.0    24.0    24.9    25.0
RY 103.0   100.0   100.0   100.0   100.0   100.0   100.0   103.0
KKAD059B   ADD RR059B AND AD059A
HC     2    0.23
KKRR060A   ROUTE   REACH
KM         ROUTE HYDROGRAPH AD059B THRU REACH RR060,
KM         66TH/67TH ST INV CROWN FROM SHEA BLVD TO MTN VIEW CHANNEL
KM         (APPROX 500FT WEST OF CONFL WITH BERNEIL DITCH)
RS     1    FLOW       0
RC 0.025   0.016   0.025    2600  0.0100    0.00
RX   0.0     0.1    17.0    17.1    47.9    48.0    58.5    58.6
RY 104.0   102.4   100.9   100.2   100.2   100.9   102.4   104.0
KK SB060   BASIN
KM         CP 67TH ST AND MTN VIEW CHANNEL
BA 0.180
LG  0.12    0.25    4.65    0.38      74
UC 0.321   0.205
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KKAD060A   COMBINE HYDROGRAPHS RR060A AND SB060, @ 67TH ST AND MTN VIEW CHANNEL
HC     2    0.41
KKDR067B   RETRIEVE FLOW IN 64TH ST CHANNEL JUST SOUTH OF SHEA
DRDR067B
KKRR067B   ROUTE   REACH
KM         ROUTE HYDROGRAPH DR067B THRU REACH RR067B DOWN 64TH ST CHANNEL FROM
KM         SHEA TO MTN VIEW
RS     1    FLOW       0
RC 0.025   0.025   0.025    2500  0.0060    0.00
RX   0.0     0.1     5.0    20.0    31.0    46.0    62.0    62.1
RY 110.0   107.5   107.5   100.0   100.0   107.5   107.3   110.0
KKSB067B   BASIN
KM         CP @ 64TH ST AND MOUNTAIN VIEW ROAD ALIGN
BA 0.090
LG  0.30    0.25    4.65    0.38      24
UC 0.417   0.382
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KKAD067B   COMBINE HYDROGRAPHS RR067B AND SB067B
KM         TOTAL Q IN 64TH ST CHANNEL AT MTN VIEW CHANNEL
HC     2    3.93
KKDV067C   SPLIT FLOW. 50/50 FLOW SPLIT @ 64TH ST CHANNEL AND MTN VIEW CHANNEL.
KM         REMAINDER FLOW (DV067C) GOES EAST IN MTN VIEW CHANNEL. DIVERTED FLOW
KM         (DR067C) GOES SOUTH IN 64TH ST (INVERGORDON RD) CHANNEL TO IBW.
DTDR067C
DI     0     100     500    1000    2000
DQ     0      50     250     500    1000
KKRR060B   ROUTE   REACH
KM         ROUTE HYDROGRAPH DV067C THRU REACH RR060B EAST IN MTN VIEW CHANNEL
RS     1    FLOW       0
RC 0.030   0.018   0.018    2000  0.0030    0.00
RX 988.0   988.2   995.0  1000.0  1005.0  1014.7  1021.2  1021.5
RY 343.0   340.6   337.3   337.3   337.3   341.7   341.8   343.0
KKAD060B   COMBINE HYDROGRAPHS AD060A AND RR060B
KM         TOTAL Q IN MTN VIEW CHANNEL @ 67TH STREET
HC     2    2.38
KKRR060C   ROUTE   REACH
KM         ROUTE HYDROGRAPH AD060B THRU REACH RR060C EAST IN MTN VIEW CHANNEL
KM         TO COFLUENCE WITH BERNEIL DITCH
RS     1    FLOW       0
RC 0.030   0.018   0.018     500  0.0030    0.00
RX 961.9   962.0   987.0   997.0  1003.0  1013.0  1023.0  1023.1
RY 342.0   338.2   338.2   331.4   331.4   339.9   339.9   342.0
KKAD058B   COMBINE HYDROGRAPHS AD058A AND RR060C
KM         TOTAL Q MTN VIEW CHANNEL @ CONFL WITH BERNEIL DITCH
HC     2    2.63
KKAD057C   COMBINE HYDROGRAPHS AD058B AND AD057A
KM         TOTAL Q BERNEIL DITCH JUST DS FROM CONFL WITH MTN VIEW CHANNEL
HC     2    7.56
KK RR068   ROUTE   REACH
KM         ROUTE HYDROGRAPH AD057B THRU REACH RR068 SOUTH TO DBL TREE RANCH RD
RS     1    FLOW       0
RC 0.018   0.018   0.018    3800  0.0020    0.00
RX 942.4   942.5   959.3   982.1  1017.9  1044.9  1055.0  1055.1
RY 335.0   332.9   332.9   324.2   325.0   333.1   333.1   335.0
KK SB068   BASIN
KM         CP @ BERNEIL DITCH AND DOUBLE TREE RANCH RD
BA 0.110
LG  0.30    0.25    4.65    0.38      24
UC 0.938   1.403
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD068   COMBINE HYDROGRAPHS RR068 AND SB068
KM         TOTAL Q IN BERNEIL DITCH @ DBL TREE
HC     2    7.67
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KKRR070A   ROUTE   REACH
KM         ROUTE HYDROGRAPH AD068 THRU REACH RR070A SOUTH FROM DBL TREE TO IBW
RS     1     FLOW        0
RC 0.018   0.018   0.018    2500  0.0030    0.00
RX 947.8   947.9   954.6   978.1  1000.0  1022.0  1045.5  1045.6
RY 328.0   325.2   325.1   316.0   316.0   316.0   325.0   328.0
KKDR067C   RETRIEVE SPLIT FLOW SOUTH IN INVERGORDON CHANNEL FROM CONC FLOW
KM         SPLIT STRUCTURE @ MTN VIEW CHANNEL
DRDR067C
KK RR069   ROUTE   REACH
KM         ROUTE HYDROGRAPH DR067C THRU REACH RR069 SOUTH IN INVERGORDON RD
KM         CHANNEL TO IBW. GABION LINED CHANNEL
RS     1     FLOW        0
RC 0.025   0.025   0.025    4100  0.0050    0.00
RX   0.0     0.1     9.0    11.0    19.0    27.9    28.0    28.1
RY 107.0   105.5   100.0   100.0   100.0   105.5   105.8   107.0
KK SB069   BASIN
KM         CP @ 64TH ST AND INDIAN BEND WASH
BA 0.140
LG  0.30    0.25    4.65    0.38      24
UC 0.696   0.878
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD069   COMBINE HYDROGRAPHS RR069 AND SB069
KM         TOTAL Q IN INVERGORDON ROAD CHANNEL @ INDIAN BEND WASH
HC     2    2.11
KKRR070B   ROUTE   REACH
KM         ROUTE HYDROGRAPH AD069 THRU REACH RR070B IN IBW TO BERNEIL DITCH
RS     1     FLOW        0
RC 0.030   0.030   0.030    1800  0.0040    0.00
RX   0.0    20.0    60.0   100.0   140.0   180.0   220.0   240.0
RY 102.0   100.0   100.0   100.0   100.0   100.0   100.0   102.0
KK SB070   BASIN
KM         NOTE: MINOR SUMP IN DBL TREE RANCH RD JUST WEST OF BERNEIL IS IGNORED
BA 0.140
LG  0.30    0.25    4.65    0.38      24
UC 0.542   0.543
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD070   COMBINE HYDROGRAPHS RR070A, RR070B AND SB070
KM         TOTAL Q FROM BERNEIL DITCH AND INVERGORDON RD CHANNEL @ CP IN IBW
KM         @ BERNEIL DITCH.  TOTAL FLOW FROM ENTIRE STUDY AREA (NOT COUNTING
KM         FLOW THAT HAS LEFT STUDY @ 7 LOCATIONS).
KO     2       2
HC     3    9.61
KK DR055   RETRIEVE FLOW GOING SOUTH ON SDALE RD PAST MTN VIEW RD
DR DR055
KKDR054B   RETRIEVE SURFACE FLOW FROM SB054
DRDR054B
KKAD5455   COMBINE HYDROGRAPHS DR055, DR054B
KM         TOTAL SURFACE Q @ SDALE AND MTN VIEW RDS THAT DID NOT ENTER BERNEIL
KM         DITCH GOES SOUTH OUT OF STUDY
HC     2   .60
ZZ
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Recommended Alternative 100-Year HEC-1 Input
(ALT100.TXT)

HEC-1 ALT100.TXT
RECOMMENDED
ALTERNATIVE
100-YR, 6-HR

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ID Project ID: 15586B - Major Basin: 01 - Return Period: 100 Years
ID
ID       SCOTTSDALE ROAD CORRIDOR DRAINAGE MASTER PLAN
ID       FCD 2000C030                       SCI #15586
ID       100YR, 6HR FUTURE LAND USE CONDITION
ID       HYDROGRAPH MODEL "PALT100"  HEC-1 MODEL INPUT FILENAME: PALT100.DAT
ID
ID
ID       THE FOLLOWING CHANGES HAVE BEEN MADE TO THE EXISTING CONDITION
ID       HEC1 MODEL TO REFLECT THE PREFFERED ALTERNATIVE HYDROLOGIC CONDITIONS:
ID
ID       -SDALE ROAD CHANNEL ROUTING REACHES, FROM SDALE AIRPORT
ID        OUTFALL CHANNEL CONFL TO SWEETWATER AVE (RR020A AND RR020B),
ID        HAVE BEEN CHANGED FROM CHANNEL SECTIONS TO STREET SECTIONS.
ID        THE PREFERRED ALTERNATIVE CONSISTS OF A STORM DRAIN TRUNKLINE WITH
ID        CATCH BASINS REPLACING THE SDALE RD CHANNEL, STARTING AT TBIRD RD
ID        AND CONNECTING TO EXIST 90 IN DIAM PIPE AT SWEETWATER AVE.  HYDROLOGIC
ID        ROUTING THAT COULD EITHER BE MODELED AS STORAGE ROUTING OR KINEMATIC
ID        WAVE ROUTING WAS TYPICALLY MODELED AS A STORAGE ROUTING REACH.
ID
ID       -CACTUS PARK DET BASIN (LP020B) OVERFLOW SPILLWAY ELEVATION RAISED FROM
ID        1387.8 TO 1390.0 FT.
ID
ID       -DIVERSION DV/DR20B2 CHANGE TO REFLECT IMPROVED CONDITIONS AT CACTUS
ID        PARK.
ID
ID       -MESCAL PARK DET BASIN (LP048) BASIN PERIMETER ELEV RAISED BY ONE FOOT
ID        FROM 1363.5 TO 1364.5 FT. BASIN VOLUME INCREASED BY ABOUT 1 AC-FT.
ID
ID       -DIVERSION DV/DR048 CHANGE TO REFLECT IMPROVED CONDITIONS AT MESCAL
ID        PARK.
ID
ID       -UPPER 71ST STREET CHANNEL FOR APPROX 570 FT NORTH OF SAHUARO DR
ID        REFLECTS HARDENED PREFFERED ALT CHANNEL SECTION GEOMETRY AND "n" VALUE
ID        IN RR049A.
ID
ID       -UPPER 71ST STREET CHANNEL, FOR APPROX 300 FT NORTH OF MESCAL ST
ID        (RR037B), SLOPE FLATTENED SLIGHTLY TO REFLECT MINOR CHANNEL ADJUSTMENT
ID        DUE TO NEW 72 IN DIAM PIPE. CHANNEL GEOMETRY UNCHANGED.
ID
ID       -BERNEIL DITCH ROUTING (RR055D, RR057A & RR057C) FROM SDALE RD TO
ID        MTN VIEW CHANNEL CONFLUENCE CHANGED TO REFLECT PREFERRED ALT CHANNEL
ID        SECTION AND SLOPE.  CHANNEL CONVEYANCE CAPACITY INCREASED BY
ID        INCREASING THE CHANNEL X-SECTIONAL AREA AND HARD LINING CHANNEL.
ID        PROPOSED UNIFORM CHANNEL SLOPE EQUAL TO 0.00101 FT/FT.
ID
ID
ID       SUMMARY APPROACH, METHOD, PRECIP AND ASSUMPTION:
ID       1.  100YR, 6HR RAINFALL EVENT, MULTI-STORM JD RECORD OPTION,
ID           6HR DISTRIBUTION PATTERNS #1 THRU #5 WITH 15 MIN TIME INCREM
ID           (FCDMC, HYDROLOGY MANUAL, TABLE 2.4)
ID       2.  POINT PRECIP = 3.20 IN
ID       3.  PRECIP AERIAL REDUCTION FACTOR = 1.00 BASED ON 0.01 SQ MI BASIN
ID                                          = 0.994 BASED ON 0.50 SQ MI BASIN
ID                                          = 0.975 BASED ON 2.80 SQ MI BASIN
ID                                          = 0.922 BASED ON 16.00 SQ MI BASIN
ID                                          = 0.812 BASED ON 90.00 SQ MI BASIN
ID                                          = 0.570 BASED ON 500.00 SQ MI BASIN
ID       4.  BASIN AREAS ADJUSTED @ KEY HYDROGRAPH COMBINATION STEPS TO REFLECT
ID           AREA CORRECTED DUE TO MULTI-STORM OPTION
ID       5.  FUTURE COMPLETELY DEVELOPED CONDITION LAND USE
ID       6.  CLARK UNIT HYDROGRAPH WITH URBAN TIME-AREA
ID       7.  GREEN-AMPT LOSS RATES
ID       8.  NORMAL DEPTH STORAGE REACH ROUTING TYPICALLY USED FOR OPEN CHANNELS
ID           (SEE NOTE # 10)
ID       9.  KINEMATIC WAVE REACH ROUTING TYPICALLY USED FOR PIPE
ID           (SEE NOTE # 10)
ID       10. HYDROLOGIC ROUTING STEPS THAT COULD BE MODELED USING EITHER
ID           KINEMATIC WAVE OR NORMAL DEPTH (COMBINED SURFACE AND STORM DRAIN
ID           PIPE FLOW) WERE TYPICALLY MODELED USING THE PREDOMINANT FLOW
ID           CHARACTERISTIC.
ID       11. LEVEL POOL MODIFIED PULS STORAGE ROUTING @ REGIONAL DETENTION BASINS
ID       12. NO INDIVIDUAL PRIVATE ON-LOT RETENTION/DETENTION IS REFLECTED
ID       13. COMPUTATION TIME INTERVAL = 5 MINUTES
ID       14. CALCULATIONS MADE WITH HEC-1, VERSION 4.1
ID
ID       KEY TO HYDROGRAPH OPERATIONS:
ID           "SB" = GENERATE RUNOFF HYDROGRAPH FROM SUB-BASIN
ID           "AD" = COMBINE HYDROGRAPHS
ID           "RR" = ROUTE HYDROGRAPH THRU DOWNSTREAM REACH
ID           "LP" = ROUTE HYDROGRAPH THRU LEVEL POOL STORAGE
ID           "DV" = DIVERT HYDROGRAPH
ID           "DR" = RETRIEVE PREVIOUSLY DIVERTED HYDROGRAPH
ID
*DIAGRAM
IT     5                     300
IO     5
IN    15
JD  3.20    0.01
PC 0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
PC 0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
PC 0.962   0.972   0.983   0.991   1.000
JD 3.179    0.50
JD 3.120    2.80
PC 0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
PC 0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
PC 0.950   0.963   0.975   0.988   1.000
JD 2.950    16.0
PC 0.000   0.009   0.020   0.030   0.048   0.063   0.076   0.090   0.105   0.119
PC 0.135   0.152   0.175   0.222   0.304   0.472   0.670   0.796   0.868   0.912
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PC 0.946   0.960    0.973    0.987    1.000
JD 2.598    90.0
PC 0.000   0.021    0.035    0.051    0.071    0.087    0.105    0.125    0.143    0.160
PC 0.179   0.201    0.232    0.281    0.364    0.500    0.658    0.773    0.841    0.888
PC 0.927   0.945    0.964    0.982    1.000
JD 1.824   500.0
PC 0.000   0.024    0.043    0.059    0.078    0.098    0.119    0.141    0.162    0.186
PC 0.212   0.239    0.271    0.321    0.408    0.515    0.627    0.735    0.814    0.864
PC 0.907   0.930    0.954    0.977    1.000
KK SB009   BASIN
KM         CP @ GREENWAY-HAYDEN LOOP & PARADISE LN
BA 0.060
LG  0.10    0.25     4.65     0.38      80
UC 0.504   0.486
UA     0     5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
KK DV009   SPLIT FLOW. DQ IS BASED ON CAPACITY OF 80TH ST SD TRUNK CONSISTING
KM         OF 1-36IN DIA RCP @ S=0.0119 FT/FT. HYDROGRAPH ASSOC WITH DQ (DR009)
KM         WILL BE RECALLED LATER IN MODEL AND ROUTED SOUTH IN 80TH ST STORM
KM         DRAIN. REMAINDER FLOW (DV009) ROUTED DOWN GREENWAY-HAYDEN LOOP
KM         THRU SB010.
DT DR009
DI     0      25       50       73      100      200      300
DQ     0      25       50       73       73       73       73
KK RR010   ROUTE    REACH
KM         ROUTE HYDROGRAPH DV009 THRU REACH RR010, GREENWAY-HAYDEN STREET SECT
RS     4    FLOW        0
RC 0.025   0.016    0.025     3300   0.0090     0.00
RX   0.0     0.1     10.0     10.1     79.0     79.1     89.0     89.1
RY 103.0   100.5    100.5    100.3    100.3    100.5    100.5    103.0
KK SB010   BASIN
KM         CP @ GREENWAY-HAYDEN SUMP JUST EAST OF 76TH ST.
KM         DRAINAGE AREA REFLECTS TOTAL SB010 AREA (0.36 SQ MI) LESS THE
KM         THAT PART OF SB010 NORTH OF PARADISE LANE (0.20 SQ MI). THE AREA
KM         NORTH OF PARADISE LANE IS CONSIDERED NON-CONTRIBUTING BECAUSE IT HAS
KM         DETENTION PROVIDED IN LARGE, CENTRALIZED BASINS PROTECTED BY
KM         DRAINAGE EASEMENTS. Tc AND R VALUES ARE BASED ON TOTAL DRAINAGE AREA.
BA 0.160
LG  0.12    0.25     4.65     0.38      71
UC 0.308   0.166
UA     0     5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
KK AD010   COMBINE HYDROGRAPHS RR010 AND SB010
HC     2    0.17
KK DV010   SPLIT FLOW. REMAINDER FLOW (DV010) IS BASED ON CAPACITY OF SD TRUNK
KM         DRAINING WEST IN GREENWAY-HAYDEN LOOP CONSISTING OF 1-42 IN RCP
KM         @ S=0.0028FT/FT (FROM SD PLANS).  DIVERTED FLOW ASSOC WITH DQ (DR010)
KM         OVERFLOWS SUMP AND GOES SOUTH ON 76TH ST TO GREENWAY RD
DT DR010
DI     0      50      100      150      200      300      400      500
DQ     0       0       43       93      143      243      343      443
KKRR011A
KM         ROUTE HYDROGRAPH DV010 THRU REACH RR011A, 48IN DIA SD IN G-H LOOP
RK  2400   .0016     .013              CIRC        4
KK SB011   BASIN
KM         CP @ GREENWAY-HAYDEN LOOP AND SCOTTSDALE RD
BA 0.220
LG  0.12    0.25     4.65     0.38      71
UC 0.288   0.186
UA     0     5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
KKAD011A   COMBINE HYDROGRAPHS RR011A AND SB011
HC     2    0.24
KK SB012   BASIN
KM         CP @ GREENWAY RD AND 78TH ST
BA 0.200
LG  0.15    0.25     4.65     0.38      60
UC 0.263   0.185
UA     0     5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
* THE FOLLOWING STEP DE-ACTIVATED FOR 100 YEAR MODEL BECAUSE 80TH ST STORM DRAIN
* IS ALREADY AT MAX CAPACITY FROM DV009 STEP
* KK DV012   SPLIT FLOW. DIVERTED FLOW ASSOC WITH DQ IS BASED ON CAPACITY OF
* KM         CB @ MCCLAIN DR (AKA CAROL ANN LN) NEAR 78TH ST AND CB @ SOUTH
* KM         END OF 80TH ST CULDESAC WHICH DRAIN TO 80TH ST STORM DRAIN.
* KM         REMAINDER FLOW ASSOC WITH DV012 CONCENTRATES @ GREENWAY AND 78TH ST
* DT DR012
* DI     0       5       10       17       50      100      300      500
* DQ     0       5       10       17       17       17       17       17
KKRR013A   ROUTE    REACH
KM         ROUTE HYDROGRAPH SB012 THRU REACH RR013A, GREENWAY RD STREET SECTION
RS     1    FLOW        0
RC 0.025   0.016    0.025     1250   0.0020     0.00
RX   0.0     5.0      5.1     26.0     46.9     47.0     52.0     52.1
RY 100.0   100.5    100.0    100.5    101.0    101.5    101.5    105.0
KK SB013   BASIN
KM         CP @ 76TH ST AND GREENWAY RD
BA 0.040
LG  0.15    0.25     4.65     0.38      60
UC 0.158   0.114
UA     0     5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
KKAD013A   COMBINE HYDROGRAPHS RR013A AND SB013
HC     2    0.24
KK DR010   RETRIEVE PREVIOUSLY SPLIT HYDROGRAPH ASSOC WITH GREENWAY-HAYDEN LOOP
KM         SUMP OVERFLOW TO 76TH ST SOUTH
DR DR010
KKRR013B   ROUTE    REACH
KM         ROUTE HYDROGRAPH DR010 THRU REACH RR013B, 76TH ST TO GREENWAY RD
RS     1    FLOW        0
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RC 0.025   0.016   0.025     550  0.0090    0.00
RX   0.0     0.1     5.0     5.1    44.9    45.0    50.0    50.1
RY 103.0   100.5   100.5   100.1   100.1   100.5   100.5   103.0
KKAD013B   COMBINE HYDROGRAPHS AD013A AND RR013B
HC     2     0.39
KK DV013   SPLIT FLOW. REMAINDER FLOW (DV013) IS BASED ON CAPACITY OF GREENWAY
KM         ROAD STREET SECTION (RR013A) AND 33IN SD PIPE FLOWING FULL.  DV013
KM         FLOWS WEST DOWN GREENWAY RD (RR014).  DIVERTED FLOW (DR013) SPILLS
KM         OVER SOUTH SIDE OF GREENWAY ROAD AND IS ROUTED THRU SB019 TO AIRPORT
KM         DETENTION BASIN.
DT DR013
DI     0     850    1500    2000
DQ     0     783    1433    1933
KK RR014   ROUTE   REACH
KM         ROUTE HYDROGRAPH AD013 THRU REACH RR014, GREENWAY RD STREET SECTION
KM         TO SUMP AT 73RD ST
RS     1    FLOW       0
RC 0.025   0.016   0.025    1500  0.0020    0.00
RX   0.0     0.1     7.0     7.1    48.9    49.0    54.0    54.1
RY 105.0   102.0   100.5   100.0   101.0   101.5   101.5   105.0
KK SB014   BASIN
KM         CP @ 73RD ST AND GREENWAY RD
BA 0.030
LG  0.15    0.25    4.65    0.38      60
UC 0.254   0.215
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD014   COMBINE HYDROGRAPHS RR014 AND SB014
HC     2    0.06
* THE FOLLOWING DIVERT AND ROUTING STEPS ARE DE-ACTIVATED IN THIS MODEL BECAUSE
* THE PRIMARY OVERFLOW OF THE SUMP IS DIRECTLY WEST TO SCOTTSDALE ROAD.
* KK DV014   SPLIT FLOW. REMAINDER FLOW ASSOC WITH DV014 BASED ON CAPACITY OF
* KM         36IN STORM DRAIN GOING WEST TOWARD G-H LOOP @ S=0.0020 (FROM SD
* KM         PLANS). DIVERTED FLOW ASSOC WITH DQ (DR014) OVERFLOWS SUMP AND
* KM         GOES SOUTH IN 73RD ST TOWARD BUTHERUS.
* DT DR014
* DI     0      30      60     100     200     400     600
* DQ     0       0      30      70     170     370     470
* KKRR011B
* KM         ROUTE HYDROGRAPH DV014 THRU REACH RR011B, 36IN DIA SD PIPE
* RK   477    .002    .013            CIRC       3
KKRR011B   ROUTE   REACH
KM         ROUTE HYDROGRAPH AD014 THRU REACH RR011B, LANDSCAPED SWALE JUST SOUTH
KM         OF GREENWAY-HAYDEN LOOP
RS     1    FLOW       0
RC 0.030   0.030   0.030     500  0.0050    0.00
RX   0.0     0.1    10.0    22.0    52.0    64.0    74.0    74.1
RY 105.0   102.0   102.0   100.0   100.0   102.0   102.0   105.0
KKAD011B   COMBINE HYDROGRAPHS AD011A AND RR011B
KM         TOTAL Q @ GREENWAY-HAYDEN AND SCOTTSDALE RD FROM NORTH AND EAST
HC     2    0.30
KKRR015A   ROUTE   REACH
KM         ROUTE HYDROGRAPH AD011B THRU REACH RR015A, SDALE RD STREET SECTION
KM         FROM GREENWAY-HAYDEN LOOP TO BUTHERUS. STORM DRAIN DISREGARDED.
RS     1    FLOW       0
RC 0.025   0.016   0.025    1000  0.0068    0.00
RX   0.0     0.1    10.5    10.6    98.5    98.6   103.5   103.6
RY 103.0   100.5   100.5   100.3   100.3   100.5   100.5   103.0
* THE FOLLOWING DIVERT RETRIEVAL AND ADDITION STEPS ARE DE-ACTIVATED IN THIS
* MODEL ALONG WITH THE PREVIOUS DV014 STEP
* KK DR014   RETRIEVE PREVIOUSLY SPLIT HYDROGRAPH ASSOC WITH GREENWAY ROAD/73RD
* KM         SUMP OVERFLOW SOUTH ON 73RD ST
* DR DR014
* KKRR015B   ROUTE   REACH
* KM         ROUTE HYDROGRAPH DR014 THRU REACH RR015B, 73RD ST TO BUTHERUS TO
* KM         SCOTTSDALE RD - - STREET SECTION (HYDRAULIC APPROXIMATED BASED ON
* KM         RR013A)
* RS     1    FLOW       0
* RC 0.025   0.016   0.025    4150   0.011    0.00
* RX   0.0     7.0     7.1    28.0    48.9    49.0    54.5    54.6
* RY 102.5   101.0   100.4   100.0   100.4   101.0   101.0   102.5
* KKAD015A   COMBINE HYDROGRAPHS RR015A AND RR015B
* HC     2
KKRR015B   ROUTE   REACH
KM         ROUTE HYDROGRAPH RR015A THRU REACH RR015B, SDALE RD STREET SECTION
KM         FROM BUTHERUS TO TBIRD. STORM DRAIN DISREGARDED.
RS     1    FLOW       0
RC 0.025   0.016   0.025    4150  0.0110    0.00
RX   0.0     0.1    10.5    10.6    98.5    98.6   103.5   103.6
RY 103.0   100.5   100.5   100.3   100.3   100.5   100.5   103.0
KK SB015   BASIN
KM         CP @ CONFL OF SDALE RD CHANNEL AND AIRPORT DET BASIN OUTFALL CHANNEL
KM         JUST SOUTH OF THUNDERBIRD ROAD
BA 0.250
LG  0.16    0.25    4.65    0.37      60
UC 0.333   0.273
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KKAD015A   COMBINE HYDROGRAPHS RR015B AND SB015, TOTAL Q FROM NORTH
HC     2    0.55
KK SB016   BASIN
KM         CP @ 2-30IN SD PIPE OUTFALL FROM AIRPORT TO HAYDEN RD CHANNEL
BA 0.090
LG  0.20    0.25    4.65    0.27      60
UC 0.250   0.225
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK DV016   SPLIT FLOW. DQ IS BASED ON CAPACITY OF 2-30IN SD PIPES @ ASSUMED
KM         S=0.005 FT/FT.  HYDROGRAPH ASSOC WITH DQ (DR016) LEAVES STUDY AREA
KM         AND FLOWS TO HAYDEN CHANNEL.  REMAINDER FLOW (DV016) ROUTED THRU
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KM          AIRPORT (RR017) TO SOUTHWEST.
DT DR016
DI     0       25      58      100     200     300
DQ     0       25      58      58      58      58
KK RR017    ROUTE   REACH
KM          ROUTE HYDROGRAPH DV016 THRU REACH RR017, OVERLAND THRU AIRPORT
KM          CROSS-SECTION REFLECTS NORTH AND SOUTH DRAINAGE SWALES ALONG RUNWAY
RS     3     FLOW       0
RC 0.025    0.025   0.025    2400  0.0120     0.00
RX   0.0      0.1    25.0    50.0   100.0    150.0    299.9   300.0
RY 455.0    451.5   451.5   451.5   451.5    451.5    451.5   455.0
KK SB017    BASIN
KM          CP @ OUTFALL OF 1-60IN SD PIPE
BA 0.090
LG  0.20     0.25    4.65    0.27      60
UC 0.200    0.152
UA     0      5.0    16.0    30.0    65.0     77.0     84.0    90.0    94.0    97.0
UA   100
KK DR009    RETRIEVE PREVIOUSLY SPLIT HYDROGRAPH ASSOC WITH 80TH ST STORM DRAIN
DR DR009
KKRR012A
KM          ROUTE HYDROGRAPH DR009 THRU REACH RR012A, 36IN DIA SD IN 80TH ST
KM          SOUTH FROM PARADISE LANE
RK  2000    .0122    .013            CIRC        3
* THE FOLLOWING STEPS DE-ACTIVATED FOR 100 YEAR MODEL BECAUSE 80TH ST STORM
* DRAIN IS ALREADY AT MAX CAPACITY FROM DV009 STEP
* KK DR012    RETRIEVE PREVIOUSLY SPLIT HYDROGRAPH ASSOC WITH CATCH BASIN
* KM          CAPACITY ON MCCLAIN AND ON 80TH ST
* DR DR012
* KK AD012    COMBINE HYDROGRAPHS RR012A AND DR012, TOTAL Q SOUTH IN 80TH ST SD
* HC     2
KKRR1217
KM          ROUTE HYDROGRAPH DR010 THRU REACH RR1217, 36IN DIA SD PIPE
RK  3200     .006   0.013            CIRC      3.0
KK AD017    COMBINE HYDROGRAPHS RR017, SB017 AND RR1217
HC     3     0.23
KK DV017    SPLIT FLOW. DQ IS BASED ON CAPACITY OF 1-60IN SD PIPE @ ASSUMED
KM          S=0.005 FT/FT. HYDROGRAPH ASSOC WITH DQ (DR017) LEAVES STUDY AREA
KM          AND FLOWS TO HAYDEN CHANNEL. REMAINDER FLOW (DV017) ROUTED THRU
KM          AIRPORT (RR018) TO SOUTHWEST.
DT DR017
DI     0       50     100     200     300      400      500     600    1000
DQ     0       50     100     184     184      184      184     184     184
KK RR018    ROUTE   REACH
KM          ROUTE HYDROGRAPH DV017 THRU REACH RR018, OVERLAND THRU AIRPORT
KM          CROSS-SECTION REFLECTS NORTH AND SOUTH DRAINAGE SWALES ALONG RUNWAY
RS     6     FLOW       0
RC 0.025    0.025   0.025    3400  0.0100     0.00
RX   0.0      0.1    25.0    50.0   100.0    150.0    299.9   300.0
RY 455.0    451.5   451.5   451.5   451.5    451.5    451.5   455.0
KK SB018    BASIN
KM          CP @ NORTHEAST SIDE OF AIRPORT DETENTION BASIN
BA 0.150
LG  0.20     0.25    4.65    0.27      60
UC 0.304    0.214
UA     0      5.0    16.0    30.0    65.0     77.0     84.0    90.0    94.0    97.0
UA   100
KK AD018    COMBINE HYDROGRAPHS RR018 AND SB018
KM          TOTAL Q ENTERING AIRPORT DETENTION BASIN FROM NORTHEAST
HC     2     0.38
KK SB019    BASIN
KM          CP @ AIRPORT DETENTION BASIN, INCLUDING DET BASIN
BA 0.190
LG  0.16     0.25    4.65    0.36      60
UC 0.354    0.341
UA     0      5.0    16.0    30.0    65.0     77.0     84.0    90.0    94.0    97.0
UA   100
KK DR013    RETRIEVE GREENWAY ROAD DIVERTED FLOW
DR DR013
KKRR019A    ROUTE   REACH
KM          ROUTE HYDROGRAPH DR013 THRU REACH RR019A
KM          75TH STREET ROUTING SECTION
RS     1     FLOW       0
RC 0.020    0.016   0.020    1800  0.0080     0.00
RX   0.0      0.1     5.0     5.1    44.9     45.0     50.0    50.1
RY 104.0    100.5   100.5   100.3   100.3    100.5    100.5   104.0
KKRR019B    ROUTE   REACH
KM          ROUTE HYDROGRAPH RR019A THRU REACH RR019B
KM          AIRPORT DRIVE ROUTING SECTION TO SDALE AIRPORT DETENTION BASIN
RS     2     FLOW       0
RC 0.020    0.016   0.020    3700  0.0070     0.00
RX   0.0      0.1     5.0     5.1    32.9     33.0     38.0    38.1
RY 103.0    100.8   100.8   100.3   100.3    100.8    100.8   103.0
KK AD019    COMBINE HYDROGRAPHS AD018, SB019 AND RR019B
KM          TOTAL Q ENTERING AIRPORT DETENTION BASIN
HC     3     0.93
KK LP019    ROUTE AD019 FLOW THRU EXIST AIRPORT DET BASIN
KM          PRIMARY OUTLET CONSISTS OF 2-10'X3' RCB CULVERTS.  INLET CONTROL
KM          IS ASSUMED.  OVERFLOW OCCURS AT EL. 1432 FT.
RS     1     STOR       0
SV     0      0.2     3.7     9.9    17.1     25.0     33.6    42.9
SQ     0       20      80     220     340      440      560     640
SE1426.7     1427    1428    1429    1430     1431     1432    1433
ST  1432    378.8       3     1.5
SW     0     60.4   247.2   378.8
SE  1433     1432    1432    1433
KKRR015C    ROUTE   REACH
KM          ROUTE HYDROGRAPH LP019 THRU REACH RR015C, TRAP CHANNEL TO SDALE RD
RS     1     FLOW       0
RC 0.025    0.018   0.025    1200  0.0040     0.00
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RX   0.0     0.1     5.0    13.0    22.0    30.0    35.0    35.1
RY 106.0   104.0   104.0   100.0   100.0   104.0   104.0   106.0
KKAD015B   COMBINE HYDROGRAPHS AD015A AND RR015C, TOTAL Q @ SDALE RD CHANNEL
KO     2       2
HC     2    1.48
KKRR020A   ROUTE   REACH
KM         ROUTE HYDROGRAPH AD015B THRU REACH RR020A.
KM         EXISTING CONDITION OPEN CHANNEL REPLACED WITH STORM DRAIN.
KM         PREFERRED ALT MODELED AS SDALE RD STREET SECTION TO SUTTON DR.
RS     1    FLOW       0
RC 0.025   0.016   0.025     700  0.0100    0.00
RX   0.0     0.1     8.5     8.6    96.5    96.6   105.0   105.1
RY 102.0   100.5   100.5   100.3   100.3   100.5   100.5   102.0
KKRR020B   ROUTE   REACH
KM         ROUTE HYDROGRAPH RR020A THRU REACH RR020B
KM         EXISTING CONDITION OPEN CHANNEL REPLACED WITH STORM DRAIN.
KM         PREFERRED ALT MODELED AS SDALE RD STREET SECTION TO SWEETWATER AVE.
RS     1    FLOW       0
RC 0.025   0.016   0.025    1400  0.0050    0.00
RX   0.0     0.1     8.5     8.6    96.5    96.6   105.0   105.1
RY 102.0   100.5   100.5   100.3   100.3   100.5   100.5   102.0
KKRR020C
KM         ROUTE HYDROGRAPH RR020B THRU REACH RR020C
KM         PREDOMINANT CONVEYANCE IS 90IN DIA SD PIPE ALONG SDALE RD WITH
KM         OUTFALL TO CACTUS PARK BASIN
RK  1480    .006    .013            CIRC     7.5
KKDV20A1   SPLIT FLOW. REMAINDER FLOW IS BASED ON CAPACITY OF 1-90IN SD PIPE
KM         @ S=0.0056FT/FT DISCHARGING INTO CACTUS PARK BASIN. HYDROGRAPH ASSOC
KM         WITH DQ (DR20A1) REMAINS IN SCOTTSDALE RD STREET SECTION, PART OF
KM         WHICH BYPASSES CACTUS PARK BASIN AND CONTINUING SOUTH ON SDALE ROAD.
DTDR20A1
DI     0     100     500    1000    1500
DQ     0       0       0     425     925
KKSB020A   BASIN
KM         CP @ NW CORNER CACTUS PARK DETENTION BASIN
BA 0.060
LG  0.18    0.25    4.65    0.38      55
UC 0.338   0.552
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KKDR20A1   RETRIEVE PREVIOUSLY SPLIT HYDROGRAPH ASSOC WITH SCOTTSDALE RD
KM         STREET SECTION CONVEYANCE
DRDR20A1
KKDV20A2   SPLIT SDALE RD SURFACE FLOW 50/50 TO REFLECT FLOW ON EAST SIDE OF
KM         SDALE RD ENTERING PARK.  SPLIT FLOW (DQ) IS ROUTED DOWN SDALE RD TO
KM         SUMP NORTH OF MESCAL. REMAINDER FLOW ENTERS CACTUS PARK.
DTDR20A2
DI     0     100     500    1000    2000
DQ     0      50     250     500    1000
KKAD020A   COMBINE HYDROGRAPHS DV20A1, SB020A AND DV20A2
KM         TOTAL Q ENTERING CACTUS PARK DETENTION BASIN FROM SCOTTSDALE ROAD
HC     3    1.10
KK SB021   BASIN
KM         CP @ TBIRD INDUSTRIAL DET BASIN
BA 0.140
LG  0.15    0.25    4.65    0.38      60
UC 0.246   0.176
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK LP021   ROUTE FLOW THRU TBIRD INDUSTRIAL DET BASIN
KM         PRIMARY OUTLET CONSISTS OF 18IN SD PIPE WITH 12IN DIA ORIFICE PLATE
KM         OVERFLOW CONSISTS OF TBIRD RD @ 76TH ST ACTING AS BROAD CRESTED WIER
KM     0
RS     1    STOR       0
SV     0    1.65    4.38    6.03
SQ     0       5       7     458
SE1426.0  1428.0  1430.0  1431.0
KK RR022   ROUTE   REACH
KM         ROUTE HYDROGRAPH LP021 THRU REACH RR022, 76TH ST
KM         DISREGARD 18IN DIAM SD
RS     2    FLOW       0
RC 0.030   0.030   0.016    2800  0.0090    0.00
RX   0.0     0.1     5.0     8.5    12.0    19.0    66.0    66.1
RY 105.0   102.0   102.0   101.0   100.0   102.0   102.9   105.0
KK SB022   BASIN
KM         CP @ CONC CHANNEL @ 76TH ST ALIGN JUST SOUTH OF SWEETWATER AVE
BA 0.240
LG  0.30    0.25    4.65    0.38      24
UC 0.321   0.200
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD022   COMBINE HYDROGRAPHS RR022 AND SB022
HC     2    0.38
KK RR023   ROUTE   REACH
KM         ROUTE HYDROGRAPH AD022 THRU REACH RR023
KM         CONC TRAP CHANNEL THRU BUENAVANTE SUBD, OUTFALL TO CACTUS PARK BASIN
RS     1    FLOW       0
RC 0.018   0.018   0.018    2250  0.0110    0.00
RX   0.0     0.1     9.0    11.0    15.0    17.0    26.0    26.1
RY 109.5   104.5   100.0   100.0   100.0   100.0   104.5   109.5
KK SB023   BASIN
KM         CP @ CACTUS PARK BASIN FROM EAST
BA 0.170
LG  0.26    0.25    4.65    0.38      43
UC 0.313   0.201
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD023   COMBINE HYDROGRAPHS RR023 AND SB023
KM         TOTAL INFLOW TO CACTUS PARK DET BASIN FROM EAST
HC     2    0.55
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KKSB020B    BASIN
KM          CP @ CACTUS PARK BASIN FROM NORTH
BA 0.270
LG  0.25     0.25    4.65    0.37      32
UC 0.404    0.354
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KKAD20B1    COMBINE HYDROGRAPHS AD020A, AD023 AND SB020B
KM          TOTAL INFLOW TO CACTUS PARK DET BASIN FROM WEST, EAST AND NORTH
HC     3     1.92
KKDV20B1    SPLIT FLOW. DQ IS BASED ON CAPACITY OF 1-60IN SD PIPE @
KM          S=0.005 FT/FT REPRESENTING LOW FLOW BYPASS @ CACTUS PARK BASIN.
KM          HYDROGRAPH ASSOC WITH DQ (DR020B1) IS NOT ROUTED THRU BASIN,
KM          BUT IS RECALLED LATER AND COMBINED WITH SCOTTSDALE RD STREET FLOW
KM          BYPASS AND ROUTED AS STREET FLOW DOWN SCOTTSDALE RD FROM CACTUS TO
KM          SUMP NORTH OF MESCAL. REMAINDER FLOW (DV020B) IS ROUTED THRU LEVEL
KM          POOL.
DTDR20B1
DI     0      50     100     184     300     500    1000    2000
DQ     0      50     100     184     184     184     184     184
KKLP020B    ROUTE HYDROGRAPH DV020B THRU CACTUS PARK DET BASIN
KM          PRIMARY OUTLET CONSISTS OF 1-60IN DIAM SD. PIPE DISCHARGE BASED ON
KM          OUTLET CONTROL FRICT SLOPE. Q ASSOCIATED WITH SQ CARD CALCULATED
KM          AS DIFFERENCE BETWEEN FRICT SLOPE Q AND 184CFS LOW FLOW BYPASS Q.
KM          IT IS ASSUMED THAT LOW FLOW BYPASS DOES NOT IMPACT OUTLET PIPE
KM          HYDRAULICS. PIPE OUTLET INVERT ELEV ESTIMATED @ 1370FT FROM PLANS.
KM          OVERFLOW SECTION IS THE CONC SIDEWALK NORTH SIDE OF CACTUS RD BETW
KM          SCOTTSDALE RD AND DRIVEWAY ENTRANCE TO PARK.  RAISED SPILLWAY ELEV
KM          APPROX 2 FT FROM 1387.8 TO 1390 FT TO REFLECT PREFERRED ALT.
KM          FINISHED FLOOR ELEV OF REC BUILDING IS 1390.99 FT.
RS     1     STOR      0
SV     0  0.0012  0.0044    0.40    1.78    4.35   47.13  121.37     135
SQ     0       0       0       0       3       8      32      58      62
SE1370.0  1374.0  1375.0  1377.0  1378.0  1379.0  1384.0  1390.0 1391.0
ST1390.0     450       3     1.5
SW     0     450
SE  1390    1390
KKDV20B2    SPLIT FLOW.  DIVERSION USED TO REFLECT SPILLWAY OVERFLOW CONVEYED
KM          DOWN 73RD STREET AND WEST DOWN SUNNYSIDE DRIVE TO SDALE RD.
KM          REMAINDER FLOW ROUTED THRU CACTUS PARK 60IN DIAM OUTLET PIPE.
DTDR20B2
DI     0      58    1412
DQ     0       0    1350
KKDR20B1    RETRIEVE PREVIOUSLY SPLIT HYDROGRAPH ASSOC WITH LOW FLOW BYPASS
KM          @ CACTUS PARK DET BASIN
DRDR20B1
KKAD20B2    COMBINE DV20B2 AND DR20B1 HYDROGRAPHS
HC     2     0.44
KKRR2427
KM          ROUTE HYDROGRAPH AD20B2 THRU REACH RR2427
KM          60IN DIA SD SOUTH IN SDALE RD, WEST IN CHOLLA, SOUTH IN 71ST CHANNEL
RK  3500     .007    .013            CIRC       5
KK SB025    BASIN
KM          CP @ 70TH ST & TBIRD
BA 0.140
LG  0.16     0.25    4.65    0.38      65
UC 0.275    0.226
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK RR026    ROUTE   REACH
KM          ROUTE HYDROGRAPH SB025 THRU REACH RR026, 70TH ST INV & NORMAL CROWN
RS     2     FLOW      0
RC 0.030    0.016   0.030    5750  0.0070    0.00
RX   0.0      0.1     6.0     7.6    37.5    39.0    42.0    42.1
RY 105.0    100.8   100.3   100.1   100.1   100.3   100.8   105.0
KK SB026    BASIN
KM          CP @ CACTUS RD AND 70TH ST
BA 0.440
LG  0.28     0.25    4.65    0.38      29
UC 0.354    0.204
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD026    COMBINE HYDROGRAPHS RR026 AND SB026
HC     2     0.58
KK RR027    ROUTE   REACH
KM          ROUTE HYDROGRAPH AD026 THRU REACH RR027, CHANNEL AND INV CROWN STREET
RS     1     FLOW      0
RC 0.025    0.016   0.025    3250  0.0050    0.00
RX   0.0      0.1    33.0    33.1    64.0    64.1    73.5    73.6
RY 105.0    102.9   100.9   100.2   100.2   100.9   101.9   105.0
KK SB027    BASIN
KM          CP @ 71ST ST CHANNEL APPROX 650FT SOUTH OF CHOLLA ST
BA 0.120
LG  0.30     0.25    4.65    0.36      20
UC 0.225    0.159
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KKAD027A    COMBINE HYDROGRAPHS RR027 AND SB027
KM          CP @ 71ST ST CHANNEL APPROX 650FT SOUTH OF CHOLLA STREET
HC     2     0.70
KKAD027B    COMBINE HYDRORAPHS RR2427 AND AD027A
KM          RR2427 HYDROGRAPH REFLECTS 60IN DIA SD SOUTH IN SDALE RD,
KM          WEST IN CHOLLA, AND OUTFALLS SOUTH IN 71ST CHANNEL
HC     2     1.14
* ***************************************************************************
*  THE FOLLOWING SEQUENCE INVOLVING THE KIERLAND DEVELOPMENT WAS DERIVED, IN  *
*  PART, BASED ON THE KIERLAND MASTER DRAINAGE REPORT BY COE & VAN LOO (CVL)  *
*  TITLED: ADDENDUM TO MASTER DRAINAGE REPORT FOR KIERLAND AND DATED REVISED  *
*  3-13-95. IN THIS SEQUENCE, CVL ONSITE SUB-BASINS WERE GENERALLY            *
*  COMBINED TO FORM SINGLE SUB-BASINS CORRESPONDING TO SB028, SB031, SB032,   *
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*  SB033 AND SB034 AS NOTED AT THE SUB-BASIN STEPS THAT FOLLOW. ALL OF THE      *
*  KIERLAND ONSITE ROUTING REACH AND LEVEL POOL ROUTING STEPS IN THIS SEQUENCE *
*  WERE TAKEN DIRECTLY FROM THE CVL HEC1 MODEL AS NOTED AT THOSE HYDROGRAPH     *
*  STEPS. THE BASIS FOR THIS DATA IS CVL HEC1 MODEL H1G100A.PS1 DATED 10-01-94.*
* ******************************************************************************
KK SB028    BASIN
KM          CORRESPONDS, IN PART, TO CVL SA4, SA40, AND OFFSITE 5
KM          BASIN AREA IS FROM SCI
BA 0.134
LG  0.10     0.25     4.65     0.38       79
UC 0.271    0.215
UA     0     5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
KKRR031A    ROUTE   REACH
KM          ROUTE HYDROGRAPH SB028 THRU REACH RR031A, OPEN CHANNEL
KM          THIS STEP CORRESPONDS TO CVL R415
RS     1     ELEV       10
RC 0.035    0.035    0.035     1500  0.0065     0.00
RX  55.0     60.0     73.0     97.0    103.0    127.0    140.0    145.0
RY  20.0     16.0     16.0     10.0     10.0     16.0     16.0     20.0
KK SB029    BASIN
KM          CORRESPONDS TO CVL SUBBASINS SA3 AND SA90, BASIN AREA IS FROM SCI
BA 0.180
LG  0.25     0.25     4.65     0.38       45
UC 0.263    0.168
UA     0     5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
KKAD031A    COMBINE HYDROGRAPHS RR031A AND SB029, CORRESPONDS TO CVL C291
HC     2     0.31
KKRR031B    ROUTE   REACH
KM          ROUTE HYDROGRAPH AD031A THRU REACH RR031B, OPEN CHANNEL
KM          THIS STEP CORRESPONDS TO CVL R491
RS     1     ELEV       10
RC 0.035    0.035    0.035      800  0.0100     0.00
RX  55.0     60.0     70.0     90.0    110.0    130.0    140.0    145.0
RY  20.0     15.0     15.0     10.0     10.0     15.0     15.0     20.0
KK SB030    BASIN
KM          CORRESPONDS TO CVL SUBBASINS SA2, 105, 106; BASIN AREA IS FROM SCI
BA 0.100
LG  0.25     0.25     4.65     0.38       45
UC 0.246    0.213
UA     0     5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
KKRR031C    ROUTE   REACH
KM          ROUTE HYDROGRAPH SB030 THRU REACH RR031C, OPEN CHANNEL
KM          THIS STEP CORRESPONDS TO CVL R404
RS     2     ELEV       10
RC 0.035    0.035    0.035     1950  0.0100     0.00
RX  55.0     60.0     70.0     90.0    110.0    130.0    140.0    145.0
RY  20.0     15.0     15.0     15.0     15.0     15.0     15.0     20.0
KK SB031    BASIN
KM          CORRESPONDS TO CVL SUBBASINS SA20 AND SA91, BASIN AREA IS FROM SCI
BA 0.120
LG  0.20     0.25     4.65     0.50        6
UC 0.233    0.134
UA     0     5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
KKAD031B    COMBINE HYDROGRAPHS RR031B, RR031C AND SB031
KM          THIS STEP CORRESPONDS TO CVL C220
HC     3     0.53
KKLP031A    ROUTE FLOW THRU KIERLAND BASIN #1, THIS STEP CORRESPONDS TO CVL RET1
RS     1     ELEV       60
SV     0     .094     1.01     3.36     7.21    12.85    21.01    31.61    43.94    57.92
SQ     0        4     13.6       14     14.4     14.8     15.2     15.5     15.8      200
SE  54.5       60       62       64       66       68       70       72       74       76
KK DV031    DIVERT INITIAL FLOW (4 CFS) TO LP033 (KIERLAND BASIN 2)
KM          THIS STEP CORRESPONDS TO CVL DIVRT1
KM          NOTE: THERE IS NO ROUTING REACH STEP IN THE CVL MODEL IMMEDIATELY
KM          FOLLOWING THIS DIVERT ASSOCIATED WITH THE REMAINDER FLOW. THE
KM          DIVERTED FLOW IS RECALLED LATER AND ADDED TO THE INFLOW TO LP033
KM          (KIERLAND BASIN 2). THE REMAINDER FLOW (DV031) IS LATER ADDED
KM          DIRECTLY TO THE INFLOW TO LP034 (KIERLAND BASIN 3).
DT DR031
DI     0        4       18       50      200
DQ     0        4        4        4        4
KK SB032    BASIN
KM          CORRESPONDS TO CVL SA104, 103 AND 101; BA = SUM OF CVL BASIN AREAS
BA 0.030
LG  0.22     0.25     4.65     0.47       16
UC 0.392    0.445
UA     0     5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
KKRR031D    ROUTE   REACH
KM          ROUTE HYDROGRAPH SB032 THRU REACH RR031D, OPEN CHANNEL TO KIERLAND
KM          BASIN #2. THIS STEP CORRESPONDS TO CVL R301
RS     2     ELEV       10
RC 0.035    0.035    0.035     1200  0.0016     0.00
RX  55.0     60.0     70.0     90.0    110.0    130.0    140.0    145.0
RY  20.0     15.0     15.0     15.0     10.0     15.0     15.0     20.0
KK SB033    BASIN
KM          CORRESPONDS TO CVL SA21, 61, 42, 60 AND 41; BA = SUM OF CVL AREAS
BA 0.140
LG  0.18     0.25     4.65     0.46       30
UC 0.300    0.201
UA     0     5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
KK DR031    RETRIEVE LP031 OUTFLOW; THIS STEP CORRESPONDS TO CVL DRT1
DR DR031
KK AD033    COMBINE RR031D, SB033 AND DR031,
KM          THIS STEP CORRESPONDS TO CVL C221A
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HC      3     0.19
KK LP033     ROUTE FLOW THRU KIERLAND BASIN #2, THIS STEP CORRESPONDS TO CVL RET2
RS      1     ELEV      35
SV      0     8.62   15.39    23.0    54.0   230.0
SQ      0      .01     .01     .01     .01     .01
SE     35       38      40      42      48      65
KK RR034
KM           ROUTE LP033 THRU RR034, PIPE; THIS STEP CORRESPONDS TO CVL R430
RK   1200      .01    .012            CIRC     3.5
KK SB034     BASIN
KM           CORRESPONDS TO CVL SA52, 30, 9, 50 AND 26; BA = SUM OF CVL AREAS
BA 0.180
LG  0.11     0.25    4.65    0.39      71
UC 0.279     0.199
UA      0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA    100
KK AD034     COMBINE DV031, RR034 AND SB034,
KM           THIS STEP CORRESPONDS TO CVL C252
HC      3     0.88
KK LP034     ROUTE FLOW THRU KIERLAND BASIN #3, THIS STEP CORRESPONDS TO CVL RET3
RS      1     ELEV      33
SV      0     4.08    20.0    21.6    23.3      26
SQ      0       18      18      18     146     667
SE     32       34      40    40.5      41      42
KK DV034     DIVERT LP034  THIS STEP CORRESPONDS TO CVL DIV910 ONLY THE SPLIT IS
KM           REVERSED. REMAINDER FLOW (DV034) OVERFLOWS SOUTH TO 69TH ST.
KM           DIVERTED FLOW (DR034) BLEEDS OFF TO RET LP040 (KIERLAND BASIN #4)
KM           AND WILL BE RECALLED LATER
DT DR034
DI      0       18      30     200
* DQ      0        0      12     182  (ORIGINAL CVL DQ RECORD)
DQ      0       18      18      18
KK RR035     ROUTE   REACH
KM           ROUTE HYDROGRAPH DV034 THRU REACH RR035, 69TH ST INV CROWN
RS      3     FLOW       0
RC 0.030     0.016   0.030    3000  0.0050    0.00
RX    0.0      0.1     9.0    10.5    40.8    42.3    51.3    51.4
RY 106.0     101.0   100.6   100.1   100.1   100.6   101.3   106.0
KK SB035     BASIN
KM           CP @ TBIRD RD AND 69TH ST
BA 0.110
LG  0.25     0.25    4.65    0.38      45
UC 0.288     0.214
UA      0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA    100
KK AD035     COMBINE HYDROGRAPHS RR035 AND SB035
HC      2     0.86
KK RR036     ROUTE   REACH
KM           ROUTE HYDROGRAPH AD035 THRU REACH RR036, 69TH ST/PL INV & NORM CROWN
RS      3     FLOW       0
RC 0.030     0.016   0.030    5400  0.0070    0.00
RX    0.0      0.1    12.5    14.0    44.0    45.5    56.0    56.1
RY 105.0     100.3   100.3   100.1   100.1   100.3   100.3   105.0
KK SB036     BASIN
KM           CP @ CACTUS RD AND 69TH PL
BA 0.130
LG  0.30     0.25    4.65    0.38      24
UC 0.388     0.460
UA      0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA    100
KK AD036     COMBINE HYDROGRAPHS RR036 AND SB036
HC      2     0.99
KK DV036     SPLIT FLOW. DQ IS BASED ON CAPACITY OF 1-84 IN SD PIPE IN CACTUS RD
KM           @ S=0.00259 FT/FT. HYDROGRAPH ASSOC WITH DQ (DR036) GOES WEST IN
KM           CACTUS THEN SOUTH IN 68TH ST AND EVENTUALLY DISCHARGES TO MESCAL PARK
KM           DET BASIN. REMAINDER FLOW (DV036) OVERFLOWS SUMP IN CACTUS RD AND IS
KM           ROUTED SOUTH DOWN 70TH ST (RR037A) THRU SB037.
DT DR036
DI      0       50     100     200     325     500    1000
DQ      0       50     100     200     325     325     325
KKRR037A     ROUTE   REACH
KM           ROUTE HYDROGRAPH DV036 THRU REACH RR037A, MOSTLY 70TH ST INV CROWN
RS      2     FLOW       0
RC 0.030     0.016   0.030    3500  0.0060    0.00
RX    0.0      0.1     8.5     8.6    39.4    39.5    48.0    48.1
RY 105.0     101.9   100.9   100.2   100.2   100.9   101.9   105.0
KK SB037     BASIN
KM           CP @ 71ST ST CHANNEL APPROX 300FT NORTH OF MESCAL ST
BA 0.210
LG  0.29     0.25    4.65    0.37      25
UC 0.321     0.213
UA      0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA    100
KKAD037A     COMBINE HYDROGRAPHS RR037A AND SB037,
KM           HYDROGRAPH REPRESENTS FLOW ENTERING 71ST ST CHANNEL FROM WEST
KM           APPROX 300FT NORTH OF MESCAL ST (APPROX 650FT SOUTH OF CHOLLA ST)
HC      2     0.28
KKDR20A2     RETRIEVE PREVIOUSLY SPLIT HYDROGRAPH ASSOC WITH SCOTTSDALE RD
KM           STREET SECTION BYPASS OF CACTUS PARK BASIN
DRDR20A2
KKRR024A     ROUTE   REACH
KM           ROUTE HYDROGRAPH DR20A2 THRU REACH RR024A, SDALE RD STREET SECTION
KM           FROM CACTUS TO SUNNYSIDE DR.
RS      2     FLOW       0
RC 0.025     0.016   0.025     700  0.0140    0.00
RX    0.0      0.1     8.5     8.6    96.5    96.6   105.0   105.1
RY 102.0     100.5   100.5   100.3   100.3   100.5   100.5   102.0
KKDR20B2     RETRIEVE PREVIOUSLY SPLIT HYDROGRAPH ASSOC WITH CACTUS PARK OVERFLOW
DRDR20B2
KKRR024B     ROUTE   REACH
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KM          ROUTE HYDROGRAPH DR20B2 THRU REACH RR024B, 73RD STREET SECTION
KM          FROM CACTUS TO SUNNYSIDE DR.
RS      1     FLOW        0
RC 0.035    0.035    0.035      500  0.0040     0.00
RX    0.0     0.1      4.0      6.5     9.0     13.0     13.1     13.2
RY 105.0    103.0    100.5    100.0   100.5    102.0    103.0    105.0
KKRR024C    ROUTE    REACH
KM          ROUTE HYDROGRAPH RR024B THRU REACH RR024C, SUNNYSIDE DR SECTION
KM          FROM 73RD STREET TO SDALE ROAD.
RS      1     FLOW        0
RC 0.025    0.016    0.025      600  0.0030     0.00
RX    0.0     0.1      5.0      5.1    35.9     36.0     41.0     41.1
RY 105.0    100.5    100.5    100.2   100.2    100.5    100.6    105.0
KKAD024B    COMBINE HYDROGRAPHS RR024A AND RR024C.
HC      2    1.92
KKRR024D    ROUTE    REACH
KM          ROUTE HYDROGRAPH AD024B THRU REACH RR024D, SDALE RD SECTION
KM          FROM SUNNYSIDE TO SUMP NORTH OF MESCAL ST.
RS      2     FLOW        0
RC 0.025    0.016    0.025     2600  0.0040     0.00
RX    0.0     0.1      8.5      8.6    96.5     96.6    105.0    105.1
RY 102.0    100.5    100.5    100.3   100.3    100.5    100.5    102.0
KK SB024    BASIN
KM          CP @ SUMP IN SCOTTSDALE RD APPROX 300FT NORTH OF MESCAL ST
BA 0.110
LG  0.24     0.25     4.65     0.38      43
UC 0.354    0.395
UA      0     5.0     16.0     30.0    65.0     77.0     84.0     90.0     94.0     97.0
UA    100
KKAD024C    COMBINE HYDROGRAPHS RR024D AND SB024.
HC      2    2.03
KK DV024    SPLIT FLOW. DQ IS BASED ON CAPACITY OF 54 IN. SD PIPE IN SDALE RD @
KM          S=0.0042 FT/FT. HYDROGRAPH ASSOC WITH DQ (DR024) GOES SOUTH
KM          IN SCOTTSDALE RD BY STORM DRAIN TO MESCAL ST, THEN TURNS WEST AND
KM          OUTFALLS TO 71ST ST CHANNEL. REMAINDER FLOW (DV024) OVERFLOWS SUMP
KM          IN SCOTTSDALE RD AND GOES WEST BY OPEN CHANNEL IN DRAINAGE EASEMENT
KM          ALONG NORTH SIDE OF COMMERCIAL OFFICE PARCEL TO 71ST ST CHANNEL.
DT DR024
DI      0      50      100      200     300      500     1000
DQ      0      50      100      127     127      127      127
KKRR024E    ROUTE    REACH
KM          ROUTE HYDROGRAPH DV024 THRU REACH RR024E,
KM          OPEN CHANNEL ALONG NORTH SIDE OF COMMERCIAL OFFICE PARCEL
RS      1     FLOW        0
RC 0.025    0.016    0.025      700  0.0070     0.00
RX    0.0     0.1     10.0     10.1    40.9     41.0     51.0     51.1
RY 105.0    100.3    100.3    100.2   100.2    100.3    100.3    105.0
KKAD037B    COMBINE HYDROGRAPHS AD027B, AD037A AND RR024E
KM          TOTAL Q 71ST ST CHANNEL APPROX 300FT NORTH OF MESCAL ST
HC      3    3.05
KKRR037B    ROUTE    REACH
KM          ROUTE HYDROGRAPH AD037B THRU REACH RR037B,
KM          71ST STREET CHANNEL TO MESCAL ST
RS      1     FLOW        0
RC 0.035    0.018    0.035      300  0.0035     0.00
RX 952.0    952.1    962.2    992.0  1007.8   1036.0   1046.0   1046.1
RY 367.0    363.6    363.6    355.0   355.1    362.0    362.0    367.0
KK DR024    RETRIEVE DR024 SDALE RD SD @ SUMP APPROX 300FT NORTH OF MESCAL
DR DR024
KKRR024F
KM          ROUTE DR024 THRU REACH RR024F
KM          STORM DRAIN FLOW SDALE RD TO MESCAL TO 71ST ST CHANNEL
KM          1-5FT x 6FT RCB @ S=0.0015FT/FT UNDER MESCAL FROM SDALE RD TO 71ST
RK    900   .0015     .013              TRAP         5      .01
KKAD037C    COMBINE HYDROGRAPHS RR037B AND RR024F
KM          TOTAL Q 71ST ST CHANNEL @ JUST SOUTH OF MESCAL ST
HC      2    3.45
KKRR037C    ROUTE    REACH
KM          ROUTE HYDROGRAPH AD037C THRU REACH RR037C,
KM          71ST STREET CHANNEL, MESCAL ST TO MESCAL DET BASIN OUTFALL PIPE
RS      1     FLOW        0
RC 0.035    0.030    0.035      500  0.0080     0.00
RX 964.1    964.2    974.1    996.2  1003.8   1027.0   1037.0   1037.1
RY 362.0    360.5    360.5    353.5   353.5    360.0    360.0    362.0
* ***********************************************************************
*  THE FOLLOWING SEQUENCE INVOLVING THE KIERLAND DEVELOPMENT WAS DERIVED, IN  *
*  PART, BASED ON THE KIERLAND MASTER DRAINAGE REPORT BY COE & VAN LOO (CVL)  *
*  TITLED: ADDENDUM TO MASTER DRAINAGE REPORT FOR KIERLAND AND DATED REVISED  *
*  3-13-95. IN THIS SEQUENCE, CVL ONSITE SUB-BASINS WERE GENERALLY            *
*  COMBINED TO FORM SINGLE SUB-BASINS CORRESPONDING TO SB028, SB031, SB032,   *
*  SB033 AND SB034 AS NOTED AT THE SUB-BASIN STEPS THAT FOLLOW. ALL OF THE    *
*  KIERLAND ONSITE ROUTING REACH AND LEVEL POOL ROUTING STEPS IN THIS SEQUENCE *
*  WERE TAKEN DIRECTLY FROM THE CVL HEC1 MODEL AS NOTED AT THOSE HYDROGRAPH   *
*  STEPS. THE BASIS FOR THIS DATA IS CVL HEC1 MODEL H1G100A.PS1 DATED 10-01-94.*
* ***********************************************************************
KK SB038    BASIN
KM          CORRESPONDS TO CVL SUBBASINS SA1, 100, AND 6; BASIN AREA IS FROM SCI
BA 0.120
LG  0.25     0.25     4.65     0.38      45
UC 0.233    0.181
UA      0     5.0     16.0     30.0    65.0     77.0     84.0     90.0     94.0     97.0
UA    100
KK DV038    SPLIT FLOW. DQ IS BASED ON CAPACITY OF EIGHT ON-GRADE CATCH BASINS
KM          LOC @ INTERSECTION OF 64TH ST AND PARADISE LANE (CONSTRUCTED 1997?)
KM          CONSISTING OF 4 CB'S @ L=20FT ON 64TH ST AND 2 CB'S @ L=10FT, 1 CB
KM          @ L=17FT AND 1 CB @ L=20 FT ON PARADISE LN JUST EAST OF 64TH ST.
KM          INTERCEPTED FLOW (HYDROGRAPH DR038) DRAINS WEST IN STORM DRAIN OF
KM          UNK DIAM UNDER PARADISE LN TO JACKRABBIT PARK DET BASIN. REMAINDER
KM          FLOW (DV038) FLOWS PAST CB'S AND GOES SOUTH ON 64TH ST.
KM          NOTE: THIS DIVERSION APPARENTLY DID NOT EXIST @ TIME OF KIERLAND
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KM          REPORT BECAUSE IT IS NOT INCLUDED IN CVL HEC-1 MODEL.
DT DR038
DI     0      20      40      68      80     100     200     500
DQ     0      20      40      68      68      68      68      68
KK RR039    ROUTE   REACH
KM          ROUTE HYDROGRAPH DV038 THRU REACH RR039, 64TH ST FROM PARADISE LN
KM          TO GREENWAY RD. THIS STEP CORRESPONDS TO CVL R602
RS     1     ELEV       9
RC 0.015    0.015   0.015    2600  0.0092    0.00
RX  50.0     60.0    60.1    99.0   101.0   140.0   140.1   150.0
RY  17.0     15.0     9.0    10.0    10.0     9.0    15.0    17.0
KK SB039    BASIN
KM          MOSTLY 64TH ST. THIS OFFSITE AREA WAS NOT INCLUDED IN CVL MODEL
BA 0.030
LG  0.20     0.25    4.65    0.38      57
UC 0.188    0.180
UA     0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD039    COMBINE HYDROGRAPHS RR039 AND SB039,
KM          THIS STEP CORRESPONDS TO CVL C206
HC     2     0.12
KK DV039    SPLIT FLOW. 64TH & GREENWAY - DIVERT STORM DRAIN FLOW FROM 64TH ST
KM          TO GOLF COURSE UP TO 35 CFS. THIS STEP CORRESPONDS TO CVL DIV900.
KM          DIVERTED FLOW (DR039) RETRIEVED LATER TO ROUTE SOUTH ON 64TH ST.
KM          CVL PLANS SHOW 4-36FT CB'S ON 64TH ST JUST NORTH OF GREENWAY.
KM          HOWEVER, ONLY 2-36FT CB'S WERE CONSTRUCTED.
DT DR039
DI    10       35      70     200     300     500     700
DQ     0        0      35     165     265     465     665
KKRR040     ROUTE   REACH
KM          ROUTE HYDROGRAPH DV039 THRU REACH RR040,
KM          THIS STEP CORRESPONDS TO CVL R406, R471, R472, R473 & R481.
KM          REACH LENGTH IS SUMMATION OF CVL REACH LENGTHS.  WEIGHTED SLOPE
KM          BASED ON CVL REACH LENGTHS AND SLOPES.
RS     8     ELEV      10
RC 0.035    0.035   0.035    3660  0.0075    0.00
RX  55.0     60.0    70.0    90.0   110.0   130.0   140.0   145.0
RY  20.0     15.0    15.0    10.0    10.0    15.0    15.0    20.0
KK SB040    BASIN
KM          NOTE: THIS CORRESPONDS TO CVL SUBBASINS SA25, 160, 162, 120, 130,
KM          80, 27, 28, 23, 102, 111, 170, 171, 11, 24, 70, 8 AND 10
KM          BASIN AREA = SUM OF CVL BASIN AREAS
BA 0.410
LG  0.20     0.25    4.65    0.46      24
UC 0.346    0.195
UA     0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK DR034    RETRIEVE BASIN #3 BLEEDOFF OUTFLOW
DR DR034
KK AD040    COMBINE HYDROGRAPHS RR040, SB040 AND DR034
KM          THIS STEP CORRESPONDS TO CVL C281
HC     3     0.56
KK LP040    ROUTE FLOW THRU KIERLAND BASIN #4 TO SANDPIPER PARK
KM          24" OUTLET PIPE & 53' WEIR
KM          THIS STEP CORRESPONDS TO CVL RET4
RS     1     ELEV      31
SV     0        0    1.02    2.35    4.04    5.94    9.78    11.8    15.8   20.64
SQ     0     18.4    19.2    19.9    20.6    21.3    22.3      96     344     690
SE    31       32      33      34      35      36    37.4      38      39      40
KK RR041    ROUTE   REACH
KM          ROUTE HYDROGRAPH LP040 THRU REACH RR041, OPEN CHAN TO SANDPIPER PARK
KM          THIS STEP CORRESPONDS TO CVL R440
RS     1     ELEV      10
RC 0.035    0.035   0.035     600  0.0067    0.00
RX  55.0     60.0    70.0    90.0   110.0   130.0   140.0   145.0
RY  20.0     15.0    15.0    10.0    10.0    15.0    15.0    20.0
KK SB041    BASIN
KM          CORRESPONDS TO CVL SA140 AND SA133; BA = SUM OF CVL BASIN AREAS
BA 0.040
LG  0.21     0.25    4.65    0.43      25
UC 0.250    0.195
UA     0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD041    COMBINE RR041 AND SB041
KM          THIS STEP CORRESPONDS TO CVL C282
HC     2     0.60
KK LP041    ROUTE FLOW THROUGH SANDPIPER PARK DETENTION BASIN
KM          LOW FLOW STORM DRAIN AND 42FT OVERFLOW WEIR
KM          THIS STEP CORRESPONDS TO CVL RET5
RS     1     ELEV      25
SV     0      .04     .25     1.0     4.5     7.6    12.3    18.4    25.5    29.4
SV  37.2     40.0
SQ     0     22.6    31.6    33.8    35.9    37.9    39.8    41.6    43.3    44.2
SQ   170      500
SE    25     25.1      27      28      29      30      31      32      33    33.5
SE  34.5       35
KK DV041    DIVERT LP041. THIS STEP CORRESPONDS TO CVL DIV920 EXCEPT THE
KM          REMAINDER AND DIVERTED FLOWS ARE REVERSED. REMAINDER FLOW (DV041)
KM          OVERFLOWS SPILLWAY TO 67TH ST @ HEARN. DIVERTED FLOW (DR041) IS
KM          STORM DRAIN LOW FLOW IN HEARN TO 64TH ST AND WILL BE RECALLED LATER
DT DR041
DI  44.2      170     500
* DQ     0  125.8   455.8 (ORIGIONAL CVL DQ RECORD)
DQ  44.2     44.2    44.2
KK RR043    ROUTE   REACH
KM          ROUTE DV041 THRU REACH RR043 DOWN 67TH ST TO TBIRD
RS     2     FLOW       0
RC 0.025    0.016   0.025    1800  0.0070    0.00
RX   0.0      0.1    24.3    24.4    56.2    56.3    96.5    96.6
RY 107.0    102.0   100.5   100.3   100.3   100.5   102.5   107.0
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KK SB043    BASIN
KM          CP @ 67TH ST AND TBIRD
BA 0.080
LG  0.28     0.25    4.65    0.36      31
UC 0.283    0.217
UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA    100
KK AD043    COMBINE RR043 AND SB043
HC      2    0.21
KK DV043    SPLIT FLOW. REMAINDER FLOW (DV043) SPILLS OVER SOUTH SIDE OF TBIRD
KM          AND GOES DOWN 66TH ST. DIVERTED FLOW (DR043) GOES WEST ON TBIRD
KM          TO 64TH ST AND WILL BE RECALLED LATER
DT DR043
DI      0      15      95     305     600    1040    1525    2075
DQ      0      15      95     295     570     985    1440    1960
KK RR044    ROUTE   REACH
KM          ROUTE HYDROGRAPH DV043 THRU REACH RR044,
KM          66TH ST (BOTH NORMAL AND INV CROWN) TO CACTUS
RS      4    FLOW       0
RC 0.025    0.016   0.025    5250  0.0070    0.00
RX    0.0     0.1     8.8    10.3    40.3    41.8    50.5    50.6
RY 105.5    100.3   100.3   100.1   100.1   100.3   100.3   105.5
KK SB044    BASIN
KM          CP @ CACTUS RD AND 66TH ST
BA 0.180
LG  0.28     0.25    4.65    0.38      31
UC 0.371    0.353
UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA    100
KK AD044    COMBINE RR044 AND SB044
HC      2    0.18
KKDV044A    SPLIT FLOW. CATCH BASIN(S) JUST NORTH OF CACTUS ON 65TH PL.
KM          APPROX 1/2 OF 1/3 OF TOTAL AD044 Q DRAINS WEST TO 64TH ST STORM DRAIN
KM          (DR044A), UP TO PIPE FLOWING FULL CAPACITY OF 55 CFS.  REMAINDER FLOW
KM          (DV044A) CONVEYED EAST TO 66TH ST SPLIT. CACTUS ROAD SD CONSISTS OF
KM          42IN DIAM PIPE @ S=0.0030 FT/FT.
DTDR044A
DI      0      25      50     100     200     300     400
DQ      0       4       8      17      33      50      55
KKDV044B    SPLIT FLOW BASED ON CAPACITY OF 60 IN. SD PIPE IN CACTUS RD
KM          @ S=0.0026 FT/FT. REMAINDER FLOW (DV044B) ROUTED EAST IN CACTUS THEN
KM          SOUTH IN 68TH ST AND EVENTUALLY DISCHARGES TO MESCAL PARK DET BASIN.
KM          HYDROGRAPH ASSOC WITH DQ (DR044B) OVERFLOWS CACTUS ROAD AND FLOWS
KM          SOUTH IN 66TH ST.
DTDR044B
DI      0      50     100     150     200     300     400     500    1000
DQ      0       0       0      17      67     167     267     367     867
KKRR4446
KM          ROUTE DV044B THRU REACH RR4446
KM          STORM DRAIN FLOW EAST IN CACTUS RD TO 68TH ST
RK   1110   .0026    .013            CIRC       5
KK DR036    RETRIEVE DR036 CACTUS RD STORM DRAIN FLOW
DR DR036
KKRR3646
KM          ROUTE DR036 THRU REACH RR3646
KM          STORM DRAIN FLOW WEST IN CACTUS RD TO 68TH ST
RK    580   .0026    .013            CIRC     5.5
KK SB045    BASIN
KM          CP @ 68TH ST & TBIRD
BA 0.030
LG  0.27     0.25    4.65    0.38      38
UC 0.283    0.386
UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA    100
KKRR046A    ROUTE   REACH
KM          ROUTE HYDROGRAPH SB045 THRU REACH RR046A,
KM          68TH ST BOTH NORMAL AND INV CROWN TO LARKSPUR
RS      2    FLOW       0
RC 0.025    0.016   0.025    3800  0.0080    0.00
RX    0.0     0.1     5.0     5.0    45.0    45.1    52.0    52.1
RY 103.0    100.9   100.9   100.2   100.2    10.9   100.9   103.0
KKRR046B    ROUTE   REACH
KM          ROUTE HYDROGRAPH RR046A THRU REACH RR046B,
KM          GRASS LINED TRAP CHANNEL, LARKSPUR TO CACTUS RD
RS      1    FLOW       0
RC 0.030    0.030   0.030    1400  0.0070    0.00
RX    0.0     0.1     4.0     6.5     6.6     9.0    13.0    13.1
RY 105.0    103.0   100.5   100.0   100.0   100.5   102.0   105.0
KK SB046    BASIN
KM          CP @ CACTUS RD AND 68TH ST
BA 0.190
LG  0.28     0.25    4.65    0.38      33
UC 0.342    0.304
UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA    100
KKAD046A    COMBINE HYDROGRAPHS RR046B AND SB046
KM          CP @ CACTUS RD & 68TH ST, SURFACE FLOW FROM NORTH
HC      2    0.22
KKAD046B    COMBINE HYDROGRAPHS RR4446, RR3646 AND AD046A
KM          TOTAL SD FLOW FROM EAST AND WEST AND SURFACE FLOW FROM NORTH
HC      3    1.03
KK DV046    SPLIT FLOW. REMAINDER FLOW (DV046) IS BASED ON CAPACITY OF 1-96IN
KM          DIAM CIP CONC SD PIPE @ S=0.00416 SOUTH IN 68TH ST, UPPER REACH OF
KM          OUTFALL TO MESCAL PARK DET BASIN. HYDROGRAPH ASSOC WITH DQ (DR046)
KM          OVERFLOWS CACTUS ROAD AND FLOWS SOUTH IN 68TH ST.
DT DR046
DI      0     300     588    1000    1500
DQ      0       0       0     412     912
KKRR047A
KM          ROUTE DV046 THRU REACH RR047A, 1-96IN DIAM STORM DRAIN OUTFALL SOUTH
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KM          IN 68TH ST FROM CACTUS RD TO JUST SOUTH OF JENAN DR.
RK  1500     .004    .013              CIRC      8
KKRR4748
KM          ROUTE RR047A THRU REACH RR4748, EQUIVILENT OF 2-78IN DIAM STORM DRAIN
KM          OUTFALL SOUTH IN 68TH ST FROM JENAN DR TO CHOLLA THEN EAST IN CHOLLA
KM          TO 68TH PL THEN SOUTH TO MESCAL PARK DETENTION BASIN.
KM          PIPE FLOWING FULL, 2-78IN DIAM SD = 575 CFS
KM          PIPE FLOWING FULL, 1-102IN DIAM SD = 590 CFS
RK  2300     .003    .013              CIRC      8.5
KK SB048    BASIN
KM          CP @ 68TH PL, SURFACE INFLOW TO MESCAL PARK DET BASIN
BA 0.090
LG  0.29    0.25    4.65    0.39      22
UC 0.238    0.218
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD048    COMBINE HYDROGRAPHS RR4748 AND SB048
KM          TOTAL COMB STORM DRAIN AND SURFACE FLOW INTO MESCAL PARK DET BASIN
HC     2    0.98
KK LP048    ROUTE FLOW THRU MESCAL PARK DET BASIN
KM          PRIMARY OUTLET CONSISTS OF 1-60IN DIAM OUTLET PIPE UNDER OUTLET
KM          CONTROL.  EXIST OVERFLOW AT BASIN ELEV 1363.5 @ SW CORNER OF PARK.
KM          EXISTING SPILLWAY ACTS AS BROAD CRESTED WIER WITH ESTIMATED
KM          EFFECTIVE LENGTH OF 300FT.  IMPROVED CONDITION FOR RECOMMENDED
KM          ALTERNATIVE CONSISTS OF RAISING BERM ELEVATION APPROX 1-FOOT.
KM          MATERIAL USED TO RAISE SPILLWAY IS EXCAVATED FROM NE CORNER OF PARK.
KM          SPILLWAY LENGTH REDUCED FROM 300 FEET TO 50 FEET, SPILLWAY
KM          ELEVATION UNCHANGED.  BASIN VOLUME INCREASE APPROX 1 AC-FT.
KO     2       2
RS     1     STOR      0
SV     0    3.72   11.84   20.98   22.40   31.02    39.0    44.4
SQ     0       1      96     137     153     169     189     352
SE1354.5  1356.0  1358.0  1360.0  1361.0  1362.0  1363.5  1364.5
KK DV048    SPLIT FLOW.  FLOW DIVERSION TO REFLECT MESCAL PARK OVERFLOW WHICH
KM          WILL LATER BE ROUTED THRU SB049.  REMAINDER FLOW (DV048) IS ROUTED
KM          THRU 60IN DIAM SD OUTFALLING INTO 71ST ST CHANNEL.  DIVERTED FLOW
KM          (DR048) WILL BE RECALLED AND ROUTED DOWN 68TH PL AND SHEA BLVD.
DT DR048
DI     0     189     352    1004
DQ     0       0     150     780
KKRR037D
KM          ROUTE LP048 THRU REACH RR037D 60IN DIA STORM DRAIN OUTFALL TO
KM          71ST ST CHANNEL
RK  1400     .001    .013              CIRC      5
KKAD037D    COMBINE HYDROGRAPHS AD037C AND RR037D
KM          CP @ 71ST ST CHANNEL APPROX 500FT SOUTH OF MESCAL ST
HC     2    4.12
KKRR049A    ROUTE   REACH
KM          ROUTE HYDROGRAPH AD037D THRU REACH RR049A, 71ST STREET CHANNEL.
KM          EXIST COND MOSTLY LANDSCAPED EARTH CHANNEL.  PREFERRED ALTERNATIVE
KM          REFLECTS WIDER, HARDENED CHANNEL ABOVE SAHUARO DR FOR APPROX 570 FT.
RS     1     FLOW      0
RC 0.025   0.018   0.025    1450  0.0070    0.00
RX 973.9     974     984     996    1004    1016    1024  1024.1
RY   360   357.5   357.5   351.5   351.5   357.5   357.5     360
KK SB049    BASIN
KM          CP @ 71ST ST CHANNEL @ SHEA BLVD BOX CULVERT
BA 0.140
LG  0.14    0.25    4.65    0.38      70
UC 0.263    0.153
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK DR048    RETRIEVE MESCAL PARK OVERFLOW
DR DR048
KKRR049B    ROUTE   REACH
KM          ROUTE HYDROGRAPH DR048 THRU REACH RR049B SOUTH ON 68TH PL AND
KM          EAST ON SHEA BLVD TO SUMP NEAR 70TH ST (REED RD).
RS     1     FLOW      0
RC 0.025   0.015   0.025    2500  0.0040    0.00
RX   0.0    20.0    24.0    24.5    56.5    57.0    63.0    63.1
RY 102.3   100.3   100.3   100.2   100.2   100.3   100.3   102.3
KKAD049A    COMBINE SB049 AND RR049B HYDROGRAPHS
HC     2    0.45
KK DV049    SPLIT FLOW. REMAINDER FLOW (DV049) IS BASED ON COMBINED CAPACITY OF
KM          1-30IN, 1-24IN AND 2-18IN DIAM CONC SD PIPES THAT ENTER THE 71ST ST
KM          CHANNEL BOX CULVERT @ SHEA BLVD (ON NORTH SIDE OF SHEA), ALL @
KM          ASSUMED S=0.005FT/FT. DIVERTED FLOW, DQ (DR049) OVERFLOWS SUMP IN
KM          SHEA BLVD JUST WEST OF 70TH ST (REED ROAD) AND FLOWS SOUTH ON REED.
DT DR049
DI     0      30      63     100     150     200     300     400     800
DQ     0       0       3      40      90     140     240     340     740
KK SB050    BASIN
KM          CP @ SCOTTSDALE RD AND SHEA BLVD
BA 0.040
LG  0.10    0.25    4.65    0.38      80
UC 0.213    0.176
UA     0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK DV050    SPLIT FLOW. REMAINDER FLOW (DV050) IS BASED ON CAPACITY OF 48IN DIAM
KM          STORM DRAIN PIPE IN SHEA BLVD @ S=0.00524 FT/FT AND IS ROUTED WEST IN
KM          SHEA TO 71ST ST CHANNEL. HYDROGRAPH ASSOC WITH DQ (DR050) FLOWS
KM          SOUTH ON SCOTTSDALE ROAD PAST SHEA INTERSECTION.
DT DR050
DI     0      50     105     200     400
DQ     0       0       0      95     295
KKRR049C
KM          ROUTE DV050 THRU REACH RR049C
KM          STORM DRAIN IN SHEA TO 71ST ST CHANNEL
RK   580     .005    .013              CIRC      4
KKAD049B    COMBINE HYDROGRAPHS RR049A, DV049 AND RR049C
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KM        TOTAL COMBINED FLOW @ SHEA AND 71ST ST CHAN FROM NORTH, EAST & WEST
HC     3   4.23
KKRR051A  ROUTE   REACH
KM        ROUTE HYDROGRAPH AD049 THRU REACH RR051A, 71ST STREET CHANNEL.
KM        CONC "V" CHANNEL, SHEA TO COCHISE
RS     1   FLOW       0
RC 0.018  0.018   0.018    1300  0.0040     0.00
RX 989.2  989.3   989.4   993.8  1000.0  1006.2  1008.7  1009.0
RY 350.0  347.0   345.2   338.2   338.1   338.0   345.2   350.0
KKRR051B  ROUTE   REACH
KM        ROUTE HYDROGRAPH RR051A THRU REACH RR051B,
KM        CONC "V" CHANNEL, COCHISE TO GOLD DUST
RS     1   FLOW       0
RC 0.030  0.018   0.030    1300  0.0030     0.00
RX 970.1  970.2   971.2   991.3  1000.0  1008.7  1039.1  1039.2
RY 340.0  339.0   338.0   332.5   332.5   332.4   339.3   340.0
KKRR051C  ROUTE   REACH
KM        ROUTE HYDROGRAPH RR051B THRU REACH RR051C
KM        LANDSCAPED EARTH CHANNEL, FROM GOLD DUST TO BERNEIL DITCH
RS     1   FLOW       0
RC 0.035  0.035   0.035    1300  0.0030     0.00
RX 969.9  983.6   994.4  1000.0  1002.3  1005.4  1016.9  1033.2
RY 340.9  336.6   335.1   335.1   335.0   336.4   336.7   341.9
KK SB051  BASIN
KM        CP @ 71ST ST CHANNEL AND BERNEIL DITCH
BA 0.090
LG  0.17   0.25    4.65    0.38      64
UC 0.233  0.180
UA     0    5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD051  COMBINE HYDROGRAPHS RR051C AND SB051
KM        TOTAL FLOW IN 71ST ST CHANNEL @ CONFL 71ST ST CHANNEL & BERNEIL
HC     2   4.32
KK SB052  BASIN
KM        CP @ SOUTH END OF 75TH ST CULDESAC, BELOW CHOLLA
BA 0.170
LG  0.29   0.25    4.65    0.38      26
UC 0.392  0.371
UA     0    5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK DV052  SPLIT FLOW 50/50. REMAINDER FLOW (DV052) GOES WEST IN CONC LINED
KM        CHANNEL. DIVERTED FLOW (DR052) GOES EAST AND LEAVES STUDY
DT DR052
DI     0     50     100     200     300     400
DQ     0     25      50     100     150     200
KKRR053A  ROUTE   REACH
KM        ROUTE HYDROGRAPH DV052 THRU REACH RR053A,
KM        CONC TRAP CHANNEL TO 74TH ST LOOP
RS     1   FLOW       0
RC 0.025  0.018   0.025     900  0.0020     0.00
RX   0.0    0.1     2.0    10.0    13.0    21.0    23.0    23.1
RY 110.0  104.0   104.0   100.0   100.0   104.0   104.0   110.0
KKRR053B
KM        ROUTE RR053A THRU REACH RR053B,
KM        8FT X 3FT RCB STORM DRAIN THRU COMM/RET PARCEL TO SHEA BLVD
RK  1300   .004    .013            TRAP       8     .01
KK SB053  BASIN
KM        CP @ SHEA BLVD @ NE CORNER OF WINDMILL PLAZA
BA 0.100
LG  0.20   0.25    4.65    0.38      52
UC 0.275  0.221
UA     0    5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD053  COMBINE HYDROGRAPHS RR053B AND SB053
HC     2   0.27
KKRR054A  ROUTE   REACH
KM        ROUTE HYDROGRAPH AD053 THRU REACH RR054A, SHEA TO GOLD DUST.
KM        UPPER REACH IS 1-10X3 RCB. LOWER REACH IS USED TO REPRESENT ROUTING
KM        SECTION AND CONSISTS OF CONC TRAP CHANNEL BEHIND WINDMILL PLAZA
RS     1   FLOW       0
RC 0.018  0.018   0.016    1200  0.0025     0.00
RX   0.0    0.1     6.0    10.0    12.0    33.0    59.0    59.1
RY 107.0  100.0   100.0   100.0   100.0   101.8   102.3   103.3
KKDV054A  SPLIT FLOW.  DIVERTED FLOW (DR054A) BASED ON FLOWING FULL CAPACITY
KM        (APPROX 160 CFS) ASSOCIATED WITH 1-10X3 RCB THRU MONTIERRA APTS
KM        SOUTH OF GOLD DUST. REMAINDER FLOW (DV054A) WILL SURFACE DRAIN TO
KM        INTERSECTION SCOTTSDALE RD AND GOLD DUST VIA WINDMILL ALLEY
DTDR054A
DI     0    100     160     300     400     500     600     700
DQ     0    100     160     160     160     160     160     160
KKRR055A  ROUTE   REACH
KM        ROUTE HYDROGRAPH DR054A THRU REACH RR055A,
KM        ALLEY ON SOUTH SIDE WINDMILL NORTH SIDE GOLD DUST
RS     1   FLOW       0
RC 0.025  0.025   0.025     600  0.0014     0.00
RX   0.0    0.1     0.2     0.3    25.3    25.4    25.5    25.6
RY 103.0  103.0   103.0   100.0   100.0   103.0   103.0   103.0
KK DR050  RETRIEVE SURFACE BYPASS FLOW FROM SCOTTSDALE/SHEA INTERSECTION
DR DR050
KKRR055B  ROUTE   REACH
KM        ROUTE HYDROGRAPH DR050 THRU REACH RR055B,
KM        SCOTTSDALE ROAD FROM SHEA TO GOLD DUST
RS     1   FLOW       0
RC 0.025  0.016   0.025    1320  0.0060     0.00
RX   0.0    0.1     8.5     8.6    96.4    96.5   104.9   105.0
RY 103.0  100.5   100.5   100.3   100.3   100.5   100.5   103.0
KKAD055A  COMBINE HYDROGRAPHS RR055A AND RR055B, Q IN SDALE RD @ GOLD DUST
HC     2   0.34
KKRR055C  ROUTE   REACH
KM        ROUTE HYDROGRAPH AD055A THRU REACH RR055C, SDALE RD FROM GOLD DUST
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KM          TO MTN VIEW
RS     1     FLOW       0
RC 0.025    0.016   0.025     1320  0.0060    0.00
RX   0.0      0.1     8.5      8.6    96.4    96.5   104.9   105.0
RY 103.0    100.5   100.5    100.3   100.3   100.5   100.5   103.0
KK SB055    BASIN
KM          CP ON SCOTTSDALE RD @ MTN VIEW, NOT BERNEIL ABOVE 71ST ST CHANNEL
BA 0.053
LG  0.11     0.25    4.65     0.38       78
UC 0.242    0.253
UA     0      5.0    16.0     30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KKAD055B    COMBINE HYDROGRAPHS RR055C AND SB055
KM          TOTAL Q IN SCOTTSDALE ROAD FLOWING SOUTH AT MTN VIEW
HC     2     0.39
KK DV055    SPLIT FLOW. REMAINDER FLOW (DV055) ENTERS BERNEIL DITCH. DIVERTED
KM          FLOW (DR055) GOES SOUTH DOWN SDALE RD AND LEAVES STUDY. FLOW SPLIT
KM          ASSUMES ALL FLOW ON EAST SIDE OF SDALE RD AND HALF OF FLOW ON WEST
KM          SIDE OF SDALE RD CONTINUES SOUTH PAST MTN VIEW. DIVERTED FLOW
KM          GOING SOUTH ON SCOTTSDALE RD WILL BE RECALLED AT END OF MODEL, AND
KM          ADDED TO DR054B. OTHER HALF OF FLOW ON WEST SIDE SDALE RD GOES INTO
KM          BERNEIL DITCH
DT DR055
DI     0      100     200      400     600     800
DQ     0       75     150      300     450     600
KKDR054A    RETRIEVE FLOW FROM GOLD DUST CULVERT @ SE COR WINDMILL PLAZA
DRDR054A
KKRR054B
KM          ROUTE DR054A THRU REACH RR054B,
KM          1-10X3 RCB STORM DRAIN THRU MONTIERRA APTS TO SDALE RD
RK  1600    .0066    .013             TRAP      10     .01
KK SB054    BASIN
KM          CP @ SCOTTSDALE RD AND MTN VIEW
BA 0.110
LG  0.18     0.25    4.65     0.38       61
UC 0.338    0.307
UA     0      5.0    16.0     30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD054    COMBINE HYDROGRAPHS RR054B AND SB054
KM          TOTAL FLOW APPROACHING EAST SIDE SDALE RD @ MTN VIEW
HC     2     0.24
KKDV054B    SPLIT FLOW. REMAINDER FLOW (DV054B) ENTERS BERNEIL DITCH VIA RCB
KM          UNDER SDALE RD @ MTN VIEW. Q ASSOCIATED WITH DV054B BASED ON FLOWING
KM          FULL CAPACITY OF 1-10X3 RCB THRU MONTIERRA APTS (APPROX 160 CFS).
KM          DIVERTED FLOW (DR054B) IS ADDED TO DR055 @ END OF MODEL AND GOES
KM          SOUTH DOWN SDALE ROAD LEAVING STUDY.
DTDR054B
DI     0      100     200      400     600     800
DQ     0        0      40      240     440     640
KKAD055C    COMBINE HYDROGRAPHS DV055 AND DV054B
KM          TOTAL Q @ START OF BERNEIL DITCH JUST WEST OF SCOTTSDALE ROAD
HC     2     0.39
* *******************************************************************************
* NOTE: IN ALL THE ROUTING STEPS THAT FOLLOW REGARDING THE BERNEIL DITCH, IT IS
* ASSUMED THAT ALL OF THE FLOW IN THE DITCH REMAINS IN THE DITCH EVEN THOUGH
* HISTORICAL ACCOUNTS AND THE HEC-RAS BACKWATER MODEL INDICATE THAT FLOW BREAKS
* OUT OF THE CHANNEL AND GOES SOUTH. IF THIS OCCURS, THE BREAKOUT FLOW WOULD GO
* DIRECTLY TO THE INDIAN BEND WASH AND WOULD NOT RETURN TO THE BERNEIL DITCH.
* *******************************************************************************
KKRR055D    ROUTE   REACH
KM          ROUTE HYDROGRAPH AD055C THRU REACH RR055D. EXIST BERNEIL DITCH EARTH
KM          CHANNEL FROM SCOTTSDALE RD TO 71ST ST CHANNEL CHANGED TO HARD LINED
KM          CHANNEL WITH INCREASED X-SECTIONAL AREA.  SLOPE CHANGED FROM 0.0011
KM          FT/FT TO 0.00101 FT/FT.
RS     1     FLOW       0
RC 0.030    0.018   0.018      600 0.00101    0.00
RX 944.2    947.5   962.2    976.9  1016.9  1035.8 1035.81 1035.82
RY 334.4    335.2   335.4    330.6   330.6   337.5     338   339.0
KKAD055D    COMBINE HYDROGRAPHS AD051 AND RR055D
KM          TOTAL Q IN BERNEIL DITCH @ CONFL BERNEIL DITCH AND 71ST ST CHANNEL
HC     2     4.75
KKRR057A    ROUTE   REACH
KM          ROUTE HYDROGRAPH AD055D THRU REACH RR057A. EXIST BERNEIL DITCH EARTH
KM          CHANNEL FROM 71ST ST CHANNEL TO REED RD ALIGN CHANGED TO HARD
KM          LINED CHANNEL WITH INCREASED X-SECTIONAL AREA.  SLOPE CHANGED FROM
KM          0.0011 FT/FT TO 0.00101 FT/FT.
RS     1     FLOW       0
RC 0.030    0.018   0.018      700 0.00101    0.00
RX 947.5    950.0   965.2    983.4  1023.5  1043.1  1043.2  1043.3
RY 336.0    336.1   336.6    330.1   330.1   337.3   338.3   338.1
KK DR049    RETRIEVE OVERFLOW OF SHEA BLVD SUMP JUST WEST OF 70TH ST (REED RD)
DR DR049
KKRR057B    ROUTE   REACH
KM          ROUTE HYDROGRAPH DR049 THRU REACH RR057B, REED RD STREET SECT FROM
KM          SHEA BLVD TO BERNEIL DITCH. DISREGARD STORM DRAIN CONVEYANCE.
RS     1     FLOW       0
RC 0.025    0.016   0.025     2640  0.0080    0.00
RX   0.0      0.1     5.0      5.1    59.0    59.1    64.0    64.1
RY 103.0    100.6   100.6    100.3   100.3   100.6   100.6   103.0
KKAD057A    COMBINE HYDROGRAPHS RR057A AND RR057B
KM          TOTAL Q BERNEIL DITCH AT REED RD ALIGNMENT
HC     2     5.28
KKRR057C    ROUTE   REACH
KM          ROUTE HYDROGRAPH AD057A THRU REACH RR057C.
KM          EXIST BERNEIL DITCH EARTH CHANNEL FROM REED RD ALIGN TO 68TH ST
KM          ALIGN CHANGED TO HARD LINED CHANNEL WITH INCREASED X-SECTIONAL
KM          AREA.  SLOPE CHANGED FROM 0.0011 FT/FT TO 0.00101 FT/FT.
KM          ALIGN
RS     1     FLOW       0
RC 0.030    0.018   0.018     1300 0.00101    0.00
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RX 941.5    944.9    957.0    976.4  1016.4  1033.0  1035.0  1039.7
RY 335.9    336.5    336.6    328.9   328.9   335.2   335.2   335.2
KK SB057    BASIN
KM          CP NEAR SW COR CHAPARRAL HIGH SCHOOL
BA 0.150
LG  0.18     0.25     4.65     0.36       59
UC 0.221    0.127
UA     0      5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
KKAD057B    COMBINE HYDROGRAPHS RR057C AND SB057
KM          TOTAL Q BERNEIL DITCH NEAR SW COR CHAPARRAL HIGH
HC     2     5.28
KK DR046    RETRIEVE SURFACE OVERFLOW FROM CACTUS ROAD SOUTH ON 68TH ST
DR DR046
KKRR047B    ROUTE   REACH
KM          ROUTE HYDROGRAPH DR046 THRU REACH RR047,
KM          68TH ST INV CROWN FROM CACTUS RD TO SHEA BLVD
RS     3     FLOW        0
RC 0.025    0.016    0.025     5500  0.0060     0.00
RX   0.0      0.1     10.0     10.1    45.9     46.0     74.0     74.1
RY 105.0    100.9    100.9    100.2   100.2    100.9    102.4    105.0
KK SB047    BASIN
KM          CP 68TH ST AND SHEA BLVD COMBO DIP AND LOW FLOW CULVERT/SD XING
BA 0.190
LG  0.28     0.25     4.65     0.37       28
UC 0.371    0.337
UA     0      5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
KK AD047    COMBINE HYDROGRAPHS RR047B AND SB047
HC     2     0.33
KK RR058    ROUTE   REACH
KM          ROUTE HYDROGRAPH AD047 THRU REACH RR058,
KM          68TH ST INV CROWN FROM SHEA TO MTN VIEW CHANNEL (NEAR BERNEIL CONFL)
RS     1     FLOW        0
RC 0.025    0.016    0.025     2750  0.0090     0.00
RX   0.0      0.1      5.0      5.1    43.9     44.0     49.0     49.1
RY 103.0    100.9    100.9    100.2   100.2    100.9    100.9    103.0
KK SB058    BASIN
KM          CP 68TH ST AND MTN VIEW CHANNEL
BA 0.060
LG  0.30     0.25     4.65     0.38       24
UC 0.246    0.247
UA     0      5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
KKAD058A    COMBINE HYDROGRAPHS RR058 AND SB058
HC     2     0.39
KKDR044B    RETRIEVE SURFACE OVERFLOW FROM CACTUS ROAD SOUTH ON 66TH ST
DRDR044B
KKRR059A    ROUTE   REACH
KM          ROUTE HYDROGRAPH DR044 THRU REACH RR059A,
KM          66TH ST INV CROWN FROM CACTUS RD TO SHEA BLVD
RS     2     FLOW        0
RC 0.025    0.016    0.025     5400  0.0060     0.00
RX   0.0      0.1     12.3     12.4    51.3     51.4     56.0     56.1
RY 105.9    100.9    100.9    100.2   100.2    100.9    100.9    105.9
KK SB059    BASIN
KM          CP 66TH ST AND SHEA BLVD COMBO DIP AND LOW FLOW CULVERT/SD XING
BA 0.230
LG  0.30     0.25     4.65     0.38       25
UC 0.396    0.335
UA     0      5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
KKAD059A    COMBINE HYDROGRAPHS RR059A AND SB059
HC     2     0.30
KKSB061A    BASIN
KM          CP @ JACKRABBIT PARK DET BASIN (WEST BASIN) FROM NORTH AND WEST
BA 0.190
LG  0.27     0.25     4.65     0.39       32
UC 0.433    0.467
UA     0      5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
KKSB061B    BASIN
KM          CP @ 60TH ST AND JACKRABBIT PARK DET BASIN
BA 0.110
LG  0.30     0.25     4.65     0.37       22
UC 0.325    0.374
UA     0      5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
KKDV061B    SPLIT FLOW. REMAINDER FLOW (DV061B) IS BASED ON CAPACITY OF 60TH ST
KM          36 IN. DIA STORM DRAIN THAT DISCHARGES INTO JACKRABBIT DET BASIN
KM          WEST. DIVERTED FLOW DQ(DR061B) IS FLOW-BY IN 60TH ST AND CONTINUES
KM          SOUTH, LEAVING THE STUDY AREA.
DTDR061B
DI     0       47      100      150      200      300      400      800
DQ     0        0       53      103      153      253      353      753
KK DR038    RETRIEVE FLOW INTERCEPTED BY CATCH BASINS @ 64TH ST AND PARADISE LN
DR DR038
KKRR061C
KM          ROUTE DR038 THRU REACH RR061C, SD OF UNK SIZE UNDER PARADISE LN FROM
KM          64TH ST TO JACKRABBIT PARK EAST BASIN. OUTFALL SD TO JACKRABBIT PARK
KM          IS 60IN DIAM. FOR ROUTING PURPOSES, DIAM = 60IN, S = 0.005(ASSUMED)
RK  1600     .005     .013              CIRC        5
KKSB061C    BASIN
KM          CP @ JACKRABBIT PARK DET BASIN (EAST BASIN) FROM NORTH AND EAST
BA 0.270
LG  0.23     0.25     4.65     0.38       46
UC 0.313    0.222
UA     0      5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
KKAD061A    COMBINE HYDROGRAPHS SB061C AND RR061C, TOTAL INFLOW TO JACKRBT EAST
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HC      2    0.30
KKAD061B    COMBINE HYDROGRAPHS SB061A, DV061B AND AD061A; TOTAL INFLOW TO
KM          JACKRABBIT PARK DET BASINS (EAST AND WEST)
HC      3    0.60
KK LP061    ROUTE FLOW THRU JACKRABBIT PARK DET BASIN, COMBINED EAST AND WEST.
KM          PRIMARY OUTLET IS 1-30IN DIAM SD PIPE UNDER PARADISE LN.
KM          OVERFLOW CONSISTS OF CONC SPILLWAY PAD JUST NORTH OF PARADISE LN
RS      1    STOR       0
SV      0     0.7     3.2     7.3    12.0    19.3    29.4    41.6    54.7    68.5
SQ      0       8      16      28      37      45      50      55     150     320
SE1463.0  1464.0  1465.0  1466.0  1467.0  1468.0  1469.0  1470.0  1471.0  1472.0
KKRR062A    ROUTE   REACH
KM          ROUTE HYDROGRAPH LP061 THRU REACH RR062A,
KM          EARTH CHANNEL FROM PARADISE LN TO GREENWAY RD
RS      4    FLOW       0
RC 0.025    0.045   0.025    2750  0.0020    0.00
RX    0.0     0.1    38.5    46.5    52.5    59.5    98.0    98.1
RY 108.8    103.8   102.3   100.9   100.9   102.3   104.8   108.8
KKRR062B    ROUTE   REACH
KM          ROUTE HYDROGRAPH RR062A THRU REACH RR062B,
KM          EARTH CHANNEL FROM GREENWAY RD TO CROSSED ARROWS PARK DET BASIN
RS      1    FLOW       0
RC 0.035    0.030   0.035    1450  0.0090    0.00
RX    0.0     0.1    15.0    36.5    41.5    46.0    52.0    52.1
RY 108.5    103.5   100.3   100.3   101.5   102.0   103.5   108.5
KK SB062    BASIN
KM          CP @ CROSSED ARROWS PARK DET BASIN
BA 0.340
LG  0.24     0.25    4.65    0.39      43
UC 0.321    0.206
UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA    100
KK AD062    COMBINE HYDROGRAPHS RR062B AND SB062
KM          TOTAL INFLOW TO CROSSED ARROWS PARK DET BASIN
HC      2    0.94
KK LP062    ROUTE FLOW THRU CROSSED ARROWS PARK DET BASIN
KM          PRIMARY SPILLWAY CONSISTS OF 2-24IN DIAM CONC PIPES
KM          OVERFLOW SPILLWAY CONSISTS OF LEVEL BROAD CREST WEIR @ EL1438, L=200'
KM          15IN LOW FLOW BLEEDOFF:  PIPE FLOWING FULL = 5CFS; ASSUMING INLET
KM          CONTROL -> HW/D = 6 WITH Q = 15 CFS.  ADJUST FOR LOW FLOW BLEEDOFF
KM          BY ADDING 1CFS AT LOW HEAD AND 5 CFS AT HIGH HEAD.
RS      1    STOR       0
SV      0     0.9     3.1     6.7    11.4    17.6    25.8    36.1
SQ      1       1      12      23      43      55      65     671
SE1432.0  1433.0  1434.0  1435.0  1436.0  1437.0  1438.0  1439.0
KK RR063    ROUTE   REACH
KM          ROUTE HYDROGRAPH LP062 THRU REACH RR063,
KM          EARTH CHANNEL FROM CROSSED ARROWS PARK DET BASIN TO TBIRD DET BASIN
RS      2    FLOW       0
RC 0.030    0.030   0.030    2800  0.0070    0.00
RX    0.0     0.1    70.3    77.1    77.8    83.0   123.0   123.1
RY 109.0    104.0   102.7   100.0   100.1   102.6   104.0   109.0
KK SB063    BASIN
KM          CP @ TBIRD DET BASIN, THUNDERBIRD RD JUST WEST OF 64TH ST
BA 0.220
LG  0.24     0.25    4.65    0.38      47
UC 0.338    0.244
UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA    100
KK AD063    COMBINE HYDROGRAPHS RR063 AND SB063
KM          TOTAL INFLOW TO TBIRD ROAD DET BASIN
HC      2    1.16
KK LP063    ROUTE FLOW THRU TBIRD ROAD DET BASIN
KM          48IN DIA LOW FLOW STORM DRAIN OUTLET PIPE, SURFACE OVERFLOW @ EAST
KM          AND WEST ENDS OF BASIN BEGINNING @ ELEV 1418
RS      1    STOR       0
SV      0     0.3     0.4     1.4     3.1     5.1     7.4     9.6
SQ      0      11      21      45      60      95     410     980
SE1412.0  1413.0  1414.0  1415.0  1416.0  1417.0  1418.0  1419.0
KKDV063A    SPLIT FLOW. REMAINDER FLOW (DV063A) SPILLS OUT OF BASIN @ EAST AND
KM          WEST ENDS. DIVERTED FLOW (DR063A) IS DIVERTED WEST OUT OF STUDY AREA
KM          BY 48IN DIA STORM DRAIN @ ASSUMED S=0.005 FT/FT UNDER TBIRD ROAD
DTDR063A
DI      0      11      21      45      60      95     410     980
DQ      0      11      21      45      60      95     110     130
KKDV063B    YES ALREADY, SPLIT FLOW AGAIN. REMAINDER FLOW (DV063B) SPILLS OUT OF
KM          BASIN @ ITS EAST END INTO 64TH ST. DIVERTED FLOW (DR063B) SPILLS OUT
KM          OF BASIN AT ITS WEST END INTO TBIRD AND DOWN 63RD STREET.
KM          BOTH ENDS OF BASIN HAVE ESSENTIALLY SAME ELEV AND SAME LENGTH
DTDR063B
DI      0      50     100     150     200     300     500     800
DQ      0      25      50      75     100     150     250     400
KK DR041    RETRIEVE STORM DRAIN OUTLET LOW FLOW FROM SANDPIPER PARK
DR DR041
KKRR064A    ROUTE   REACH
KM          ROUTE DR041 THRU REACH RR064A ALONG HEARN RD STORM DRAIN TO 64TH ST
KM          THIS STEP CORRESPONDS TO CVL R450
RS      2    ELEV       7
RC 0.015    0.015   0.015    1600  0.0019    0.00
RX   50.0    60.0    60.1    98.0   102.0   140.0   140.1   150.0
RY   17.0    15.0     9.0     7.0     7.0     9.0    15.0    17.0
KK DR039    RETRIEVE FLOW FROM SPLIT AT 64TH ST AND GREENWAY
KM          THIS STEP CORRESPONDS TO CVL D900
DR DR039
KKRR064B    ROUTE   REACH
KM          ROUTE DR039 THRU REACH RR064B DOWN 64TH ST TO HEARN.
KM          THIS STEP CORRESPONDS TO CVL ROUTING R407, R431 AND R432
RS      1    ELEV       9
RC 0.015    0.015   0.015    2550  0.0094    0.00
RX   50.0    60.0    60.1    98.0   102.0   140.0   140.1   150.0
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RY  17.0     15.0      9.0     10.0     10.0      9.0     15.0     17.0
KKAD064A    COMBINE RR064A AND RR064B
HC     2     0.57
KKRR064C    ROUTE   REACH
KM          ROUTE AD064A THRU REACH RR064C DOWN 64TH ST FROM HEARN TO TBIRD
RS     1     FLOW        0
RC 0.025    0.016    0.025     1450  0.0030     0.00
RX   0.0      0.1      5.5      5.6    71.5     71.6     76.5     76.6
RY 105.5    100.5    100.5    100.3   100.3    100.5    100.5    105.5
KK SB064    BASIN
KM          NOTE: CORRESPONDS, IN PART, TO CVL SUBBASINS SA131, 132, 134, 7
KM          AND 150; CP @ 64TH ST AND HEARN. BASIN AREA IS FROM SCI
BA 0.140
LG  0.26     0.25     4.65     0.39       34
UC 0.346    0.349
UA     0      5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
KKAD064B    COMBINE RR064C AND SB064
KM          TOTAL Q IN 64TH ST APPROACHING TBIRD FROM NORTH
HC     2     0.71
KK DR043    RETRIEVE FLOW GOING WEST IN TBIRD FROM 66TH ST AND TBIRD DIVERSION
DR DR043
KKRR064D    ROUTE   REACH
KM          ROUTE HYDROGRAPH DR043 THRU REACH RR064D TBIRD STREET SECT TO 64TH ST
RS     4     FLOW        0
RC 0.025    0.016    0.025     1250  0.0010     0.00
RX   0.0      0.1      5.0      5.1    68.9     69.0     74.0     74.1
RY 103.0    100.5    100.5    100.3   100.3    100.5    101.2    103.0
KKAD064C    COMBINE HYDROGRAPHS DV063B, AD064B AND RR064D
KM          TOTAL Q IN 64TH ST AT TBIRD FROM WEST, NORTH AND EAST
HC     3     1.50
KKRR065A    ROUTE   REACH
KM          ROUTE HYDROGRAPH AD064C THRU REACH RR065A DOWN 64TH ST TO DELCOA AVE
RS     1     FLOW        0
RC 0.025    0.016    0.025      800  0.0190     0.00
RX   0.0      0.1      5.5      5.6    71.4     71.5     76.5     76.6
RY 105.5    100.5    100.5    100.3   100.3    100.5    100.5    105.5
KKDR063B    RETRIEVE TBIRD BASIN WEST END OVERFLOW
DRDR063B
KKRR065B    ROUTE   REACH
KM          ROUTE HYDROGRAPH DR063B THRU REACH RR065B SOUTH ON 63RD ST AND
KM          EAST ON DELCOA AVE TO 64TH ST
RS     1     FLOW        0
RC 0.025    0.016    0.025     1300  0.0040     0.00
RX   0.0      0.1      9.0      9.1    40.9     41.0     49.0     49.1
RY 105.0    100.5    100.5    100.2   100.2    100.5    100.5    105.0
KKAD065A    COMBINE HYDROGRAPHS RR065A AND RR065B
HC     2     2.08
KKRR065C    ROUTE   REACH
KM          ROUTE HYDROGRAPH AD065A THRU REACH RR065C DOWN 64TH ST FROM DELCOA
KM          TO CACTUS
RS     2     FLOW        0
RC 0.025    0.016    0.025     4500  0.0050     0.00
RX   0.0      0.1      5.5      5.6    71.4     71.5     76.5     76.6
RY 105.0    100.5    100.5    100.3   100.3    100.5    100.5    105.0
KK SB065    BASIN
KM          CP @ 64TH ST AND CACTUS
BA 0.440
LG  0.29     0.25     4.65     0.38       28
UC 0.363    0.213
UA     0      5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
KKAD065B    COMBINE HYDROGRAPHS RR065C AND SB065
KM          TOTAL Q IN 64TH ST AT CACTUS
HC     2     2.52
KK RR066    ROUTE   REACH
KM          ROUTE HYDROGRAPH AD065B THRU REACH RR066 DOWN 64TH ST FROM CACTUS
KM          TO GARY RD
RS     1     FLOW        0
RC 0.025    0.025    0.016     3300  0.0050     0.00
RX   0.0      0.1     15.0     18.0    21.0     32.0     72.0     72.1
RY 106.0    101.5    100.0    100.0   100.0    101.2    101.2    106.0
KK SB066    BASIN
KM          CP @ 64TH ST AND GARY RD
BA 0.120
LG  0.25     0.25     4.65     0.37       38
UC 0.263    0.189
UA     0      5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
KK AD066    COMBINE HYDROGRAPHS RR066 AND SB066
KM          TOTAL Q IN 64TH ST AT GARY RD
HC     2     2.64
KKRR067A    ROUTE   REACH
KM          ROUTE HYDROGRAPH AD066 THRU REACH RR067A DOWN 64TH ST CHANNEL FROM
KM          GARY RD TO SHEA BLVD
RS     1     FLOW        0
RC 0.016    0.025    0.025     2100  0.0060     0.00
RX   0.0      0.1     25.0     29.0    40.0     44.0     49.0     49.1
RY 108.0    104.0    104.0    100.0   100.0    105.0    105.0    108.0
KKSB067A    BASIN
KM          CP @ 64TH ST AND MOUNTAIN VIEW ROAD ALIGN
BA 0.100
LG  0.30     0.25     4.65     0.38       24
UC 0.283    0.204
UA     0      5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
UA   100
KKDV067A    SPLIT FLOW. 30IN DIAM STORM DRAIN AT SHEA BLVD FLOWS WEST @ ASSUMED
KM          S=0.0025 FT/FT. REMAINDER FLOW (DV067B) GOES SOUTH IN 64TH ST
KM          CHANNEL. DIVERTED FLOW (DR067A) GOES WEST OUT OF PROJECT AREA.
DTDR067A
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DI     0      50     100     150     200     400
DQ     0      21      21      21      21      21
KKAD067A    COMBINE SB067A AND DV067A, 64TH ST CHANNEL @ CULVERT UNDER SHEA
HC     2     2.74
KKDV067B    SPLIT FLOW BASED ON RELATIVE CAPACITIES OF 64TH ST CHANNEL, FRONTAGE
KM          ROAD ALONG NORTH SIDE OF SHEA AND CULVERT UNDER SHEA. REMAINDER FLOW
KM          GOES EAST ALONG FRONTAGE ROAD TO 66TH STREET. DIVERTED FLOW GOES
KM          SOUTH DOWN 64TH ST CHANNEL.
DTDR067B
DI     0     381     679    1126
DQ     0     381     523     654
KKRR059B    ROUTE   REACH
KM          ROUTE REACH DOWN FRONTAGE ROAD
RS     1     FLOW      0
RC 0.016    0.016   0.016    1250  0.0050    0.00
RX   0.0      0.1     8.0    16.0    20.0    24.0    24.9    25.0
RY 103.0    100.0   100.0   100.0   100.0   100.0   100.0   103.0
KKAD059B    ADD RR059B AND AD059A
HC     2     1.02
KKRR060A    ROUTE   REACH
KM          ROUTE HYDROGRAPH AD059B THRU REACH RR060,
KM          66TH/67TH ST INV CROWN FROM SHEA BLVD TO MTN VIEW CHANNEL
KM          (APPROX 500FT WEST OF CONFL WITH BERNEIL DITCH)
RS     1     FLOW      0
RC 0.025    0.016   0.025    2600  0.0100    0.00
RX   0.0      0.1    17.0    17.1    47.9    48.0    58.5    58.6
RY 104.0    102.4   100.9   100.2   100.2   100.9   102.4   104.0
KK SB060    BASIN
KM          CP 67TH ST AND MTN VIEW CHANNEL
BA 0.180
LG  0.12     0.25    4.65    0.38      74
UC 0.254    0.158
UA     0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KKAD060A    COMBINE HYDROGRAPHS RR060A AND SB060, @ 67TH ST AND MTN VIEW CHANNEL
HC     2     1.20
KKDR067B    RETRIEVE FLOW IN 64TH ST CHANNEL JUST SOUTH OF SHEA
DRDR067B
KKRR067B    ROUTE   REACH
KM          ROUTE HYDROGRAPH DR067B THRU REACH RR067B DOWN 64TH ST CHANNEL FROM
KM          SHEA TO MTN VIEW
RS     1     FLOW      0
RC 0.025    0.025   0.025    2500  0.0060    0.00
RX   0.0      0.1     5.0    20.0    31.0    46.0    62.0    62.1
RY 110.0    107.5   107.5   100.0   100.0   107.5   107.3   110.0
KKSB067B    BASIN
KM          CP @ 64TH ST AND MOUNTAIN VIEW ROAD ALIGN
BA 0.090
LG  0.30     0.25    4.65    0.38      24
UC 0.292    0.257
UA     0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KKAD067B    COMBINE HYDROGRAPHS RR067B AND SB067B
KM          TOTAL Q IN 64TH ST CHANNEL AT MTN VIEW CHANNEL
HC     2     2.11
KKDV067C    SPLIT FLOW. 50/50 FLOW SPLIT @ 64TH ST CHANNEL AND MTN VIEW CHANNEL.
KM          REMAINDER FLOW (DV067C) GOES EAST IN MTN VIEW CHANNEL. DIVERTED FLOW
KM          (DR067C) GOES SOUTH IN 64TH ST (INVERGORDON RD) CHANNEL TO IBW.
DTDR067C
DI     0      100     500    1000    2000
DQ     0       50     250     500    1000
KKRR060B    ROUTE   REACH
KM          ROUTE HYDROGRAPH DV067C THRU REACH RR060B EAST IN MTN VIEW CHANNEL
RS     1     FLOW      0
RC 0.030    0.018   0.018    2000  0.0030    0.00
RX 988.0    988.2   995.0  1000.0  1005.0  1014.7  1021.2  1021.5
RY 343.0    340.6   337.3   337.3   337.3   341.7   341.8   343.0
KKAD060B    COMBINE HYDROGRAPHS AD060A AND RR060B
KM          TOTAL Q IN MTN VIEW CHANNEL @ 67TH STREET
HC     2     2.26
KKRR060C    ROUTE   REACH
KM          ROUTE HYDROGRAPH AD060B THRU REACH RR060C EAST IN MTN VIEW CHANNEL
KM          TO COFLUENCE WITH BERNEIL DITCH
RS     1     FLOW      0
RC 0.030    0.018   0.018     500  0.0030    0.00
RX 961.9    962.0   987.0   997.0  1003.0  1013.0  1023.0  1023.1
RY 342.0    338.2   338.2   331.4   331.4   339.9   339.9   342.0
KKAD058B    COMBINE HYDROGRAPHS AD058A AND RR060C
KM          TOTAL Q MTN VIEW CHANNEL @ CONFL WITH BERNEIL DITCH
HC     2     2.65
KKAD057C    COMBINE HYDROGRAPHS AD058B AND AD057A
KM          TOTAL Q BERNEIL DITCH JUST DS FROM CONFL WITH MTN VIEW CHANNEL
HC     2     7.93
KK RR068    ROUTE   REACH
KM          ROUTE HYDROGRAPH AD057B THRU REACH RR068 SOUTH TO DBL TREE RANCH RD
RS     1     FLOW      0
RC 0.018    0.018   0.018    3800  0.0020    0.00
RX 942.4    942.5   959.3   982.1  1017.9  1044.9  1055.0  1055.1
RY 335.0    332.9   332.9   324.2   325.0   333.1   333.1   335.0
KK SB068    BASIN
KM          CP @ BERNEIL DITCH AND DOUBLE TREE RANCH RD
BA 0.110
LG  0.30     0.25    4.65    0.38      24
UC 0.633    0.907
UA     0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD068    COMBINE HYDROGRAPHS RR068 AND SB068
KM          TOTAL Q IN BERNEIL DITCH @ DBL TREE
HC     2     8.04
KKRR070A    ROUTE   REACH
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KM        ROUTE HYDROGRAPH AD068 THRU REACH RR070A SOUTH FROM DBL TREE TO IBW
RS     1   FLOW      0
RC 0.018  0.018   0.018    2500  0.0030    0.00
RX 947.8  947.9   954.6   978.1  1000.0  1022.0  1045.5  1045.6
RY 328.0  325.2   325.1   316.0   316.0   316.0   325.0   328.0
KKDR067C  RETRIEVE SPLIT FLOW SOUTH IN INVERGORDON CHANNEL FROM CONC FLOW
KM        SPLIT STRUCTURE @ MTN VIEW CHANNEL
DRDR067C
KK RR069  ROUTE   REACH
KM        ROUTE HYDROGRAPH DR067C THRU REACH RR069 SOUTH IN INVERGORDON RD
KM        CHANNEL TO IBW. GABION LINED CHANNEL
RS     1   FLOW      0
RC 0.025  0.025   0.025    4100  0.0050    0.00
RX   0.0    0.1     9.0    11.0    19.0    27.9    28.0    28.1
RY 107.0  105.5   100.0   100.0   100.0   105.5   105.8   107.0
KK SB069  BASIN
KM        CP @ 64TH ST AND INDIAN BEND WASH
BA 0.140
LG  0.30   0.25    4.65    0.38      24
UC 0.471  0.569
UA     0    5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD069  COMBINE HYDROGRAPHS RR069 AND SB069
KM        TOTAL Q IN INVERGORDON ROAD CHANNEL @ INDIAN BEND WASH
HC     2   1.20
KKRR070B  ROUTE   REACH
KM        ROUTE HYDROGRAPH AD069 THRU REACH RR070B IN IBW TO BERNEIL DITCH
RS     1   FLOW      0
RC 0.030  0.030   0.030    1800  0.0040    0.00
RX   0.0   20.0    60.0   100.0   140.0   180.0   220.0   240.0
RY 102.0  100.0   100.0   100.0   100.0   100.0   100.0   102.0
KK SB070  BASIN
KM        NOTE: MINOR SUMP IN DBL TREE RANCH RD JUST WEST OF BERNEIL IS IGNORED
BA 0.140
LG  0.30   0.25    4.65    0.38      24
UC 0.375  0.360
UA     0    5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA   100
KK AD070  COMBINE HYDROGRAPHS RR070A, RR070B AND SB070
KM        TOTAL Q FROM BERNEIL DITCH AND INVERGORDON RD CHANNEL @ CP IN IBW
KM        @ BERNEIL DITCH.  TOTAL FLOW FROM ENTIRE STUDY AREA (NOT COUNTING
KM        FLOW THAT HAS LEFT STUDY @ 7 LOCATIONS).
HC     3   9.60
KK DR055  RETRIEVE FLOW GOING SOUTH ON SDALE RD PAST MTN VIEW RD
DR DR055
KKDR054B  RETRIEVE SURFACE FLOW FROM SB054
DRDR054B
KKAD5455  COMBINE HYDROGRAPHS DR055, DR054B
KM        TOTAL SURFACE Q @ SDALE AND MTN VIEW RDS THAT DID NOT ENTER BERNEIL
KM        DITCH GOES SOUTH OUT OF STUDY
HC     2  .60
ZZ
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Recommended Alternative 10-Year HEC-1 Summary Report
(ALT10.TXT)

HCL-I ALT10.TXT
RECOMMENDED
ALTERNATIVE

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	SB009	47.	4.33	11.	3.	3.	.06		
+	DIVERSION TO	DR009	47.	4.33	11.	3.	3.	.06		
+	HYDROGRAPH AT	DV009	0.	.00	0.	0.	0.	.06		
+	ROUTED TO	RR010	0.	.00	0.	0.	0.	.06		
+	HYDROGRAPH AT	SB010	214.	4.17	28.	7.	7.	.16		
+	2 COMBINED AT	AD010	214.	4.17	28.	7.	7.	.16		
+	DIVERSION TO	DR010	157.	4.17	11.	3.	3.	.16		
+	HYDROGRAPH AT	DV010	57.	3.92	16.	4.	4.	.16		
+	ROUTED TO	RR011A	57.	4.08	16.	4.	4.	.16		
+	HYDROGRAPH AT	SB011	286.	4.17	38.	10.	9.	.22		
+	2 COMBINED AT	AD011A	343.	4.17	55.	14.	13.	.26		
+	HYDROGRAPH AT	SB012	250.	4.08	32.	8.	8.	.20		
+	ROUTED TO	RR013A	246.	4.17	32.	8.	8.	.20		
+	HYDROGRAPH AT	SB013	65.	4.00	6.	2.	2.	.04		
+	2 COMBINED AT	AD013A	290.	4.17	38.	10.	9.	.24		
+	HYDROGRAPH AT	DR010	157.	4.17	11.	3.	3.	.16		
+	ROUTED TO	RR013B	159.	4.17	11.	3.	3.	.16		
+	2 COMBINED AT	AD013B	448.	4.17	49.	12.	12.	.36		
+	DIVERSION TO	DR013	413.	4.17	45.	11.	11.	.36		
+	HYDROGRAPH AT	DV013	35.	4.17	4.	1.	1.	.36		
+	ROUTED TO	RR014	28.	4.25	4.	1.	1.	.36		
+	HYDROGRAPH AT	SB014	35.	4.17	5.	1.	1.	.03		
+	2 COMBINED AT	AD014	60.	4.17	9.	2.	2.	.06		
+	ROUTED TO	RR011B	60.	4.25	9.	2.	2.	.06		
+	2 COMBINED AT	AD011B	400.	4.17	63.	16.	15.	.32		
+	ROUTED TO	RR015A	398.	4.17	63.	16.	15.	.32		
+	ROUTED TO	RR015B	351.	4.33	63.	16.	15.	.32		
+	HYDROGRAPH AT	SB015	255.	4.17	40.	10.	10.	.25		
+	2 COMBINED AT	AD015A	576.	4.25	102.	26.	25.	.57		
+	HYDROGRAPH AT	SB016	108.	4.08	15.	4.	4.	.09		
	DIVERSION TO									

+		DR016	58.	4.00	12.	3.	3.	.09
+	HYDROGRAPH AT	DV016	50.	4.08	3.	1.	1.	.09
+	ROUTED TO	RR017	31.	4.42	3.	1.	1.	.09
+	HYDROGRAPH AT	SB017	137.	4.08	15.	4.	4.	.09
+	HYDROGRAPH AT	DR009	47.	4.33	11.	3.	3.	.06
+	ROUTED TO	RR012A	47.	4.33	11.	3.	3.	.06
+	ROUTED TO	RR1217	47.	4.42	11.	3.	3.	.06
+	3 COMBINED AT	AD017	165.	4.08	28.	7.	7.	.24
+	DIVERSION TO	DR017	155.	4.08	27.	7.	7.	.24
+	HYDROGRAPH AT	DV017	10.	4.08	1.	0.	0.	.24
+	ROUTED TO	RR018	6.	4.58	1.	0.	0.	.24
+	HYDROGRAPH AT	SB018	179.	4.17	24.	6.	6.	.15
+	2 COMBINED AT	AD018	179.	4.17	25.	6.	6.	.39
+	HYDROGRAPH AT	SB019	167.	4.25	30.	8.	7.	.19
+	HYDROGRAPH AT	DR013	413.	4.17	45.	11.	11.	.36
+	ROUTED TO	RR019A	404.	4.17	45.	11.	11.	.36
+	ROUTED TO	RR019B	384.	4.25	45.	11.	11.	.36
+	3 COMBINED AT	AD019	620.	4.25	96.	24.	23.	.91
+	ROUTED TO	LP019	331.	4.67	95.	24.	23.	.91
+	ROUTED TO	RR015C	332.	4.67	95.	24.	23.	.91
+	2 COMBINED AT	AD015B	721.	4.42	189.	48.	47.	1.48
+	ROUTED TO	RR020A	723.	4.42	189.	48.	47.	1.48
+	ROUTED TO	RR020B	720.	4.42	189.	48.	47.	1.48
+	ROUTED TO	RR020C	717.	4.42	189.	48.	47.	1.48
+	DIVERSION TO	DR20A1	184.	4.42	16.	4.	4.	1.48
+	HYDROGRAPH AT	DV20A1	533.	4.42	173.	44.	43.	1.48
+	HYDROGRAPH AT	SB020A	39.	4.25	9.	2.	2.	.06
+	HYDROGRAPH AT	DR20A1	184.	4.42	16.	4.	4.	1.48
+	DIVERSION TO	DR20A2	92.	4.42	8.	2.	2.	1.48
+	HYDROGRAPH AT	DV20A2	92.	4.42	8.	2.	2.	1.48
+	3 COMBINED AT	AD020A	663.	4.42	190.	49.	47.	1.32
+	HYDROGRAPH AT	SB021	181.	4.08	22.	6.	5.	.14
+	ROUTED TO	LP021	160.	4.25	17.	6.	5.	.14
+	ROUTED TO	RR022	129.	4.42	17.	6.	5.	.14

+	HYDROGRAPH AT	SB022	208.	4.17	25.	6.	6.	.24
+	2 COMBINED AT	AD022	287.	4.33	40.	12.	11.	.38
+	ROUTED TO	RR023	278.	4.33	40.	12.	11.	.38
+	HYDROGRAPH AT	SB023	176.	4.17	22.	6.	5.	.17
+	2 COMBINED AT	AD023	403.	4.33	61.	17.	17.	.55
+	HYDROGRAPH AT	SB020B	179.	4.25	31.	8.	8.	.27
+	3 COMBINED AT	AD20B1	1015.	4.42	264.	70.	67.	2.14
+	DIVERSION TO	DR20B1	184.	3.83	116.	32.	31.	2.14
+	HYDROGRAPH AT	DV20B1	831.	4.42	149.	37.	36.	2.14
+	ROUTED TO	LP020B	40.	5.83	37.	25.	24.	2.14
+	DIVERSION TO	DR20B2	0.	.00	0.	0.	0.	2.14
+	HYDROGRAPH AT	DV20B2	40.	5.83	37.	25.	24.	2.14
+	HYDROGRAPH AT	DR20B1	184.	3.83	116.	32.	31.	2.14
+	2 COMBINED AT	AD20B2	224.	5.83	138.	57.	56.	2.14
+	ROUTED TO	RR2427	224.	5.83	138.	57.	56.	2.14
+	HYDROGRAPH AT	SB025	164.	4.17	23.	6.	6.	.14
+	ROUTED TO	RR026	138.	4.33	23.	6.	6.	.14
+	HYDROGRAPH AT	SB026	381.	4.17	49.	12.	12.	.44
+	2 COMBINED AT	AD026	485.	4.25	71.	18.	17.	.58
+	ROUTED TO	RR027	453.	4.33	71.	18.	17.	.58
+	HYDROGRAPH AT	SB027	130.	4.08	12.	3.	3.	.12
+	2 COMBINED AT	AD027A	498.	4.33	80.	20.	20.	.70
+	2 COMBINED AT	AD027B	533.	4.33	204.	74.	71.	2.84
+	HYDROGRAPH AT	SB028	174.	4.17	25.	6.	6.	.13
+	ROUTED TO	RR031A	166.	4.17	25.	6.	6.	.13
+	HYDROGRAPH AT	SB029	208.	4.08	24.	6.	6.	.18
+	2 COMBINED AT	AD031A	373.	4.17	49.	12.	12.	.31
+	ROUTED TO	RR031B	370.	4.17	49.	12.	12.	.31
+	HYDROGRAPH AT	SB030	107.	4.17	14.	3.	3.	.10
+	ROUTED TO	RR031C	95.	4.25	14.	3.	3.	.10
+	HYDROGRAPH AT	SB031	110.	4.08	9.	2.	2.	.12
+	3 COMBINED AT	AD031B	548.	4.17	71.	18.	17.	.53
+	ROUTED TO	LP031A	15.	5.67	15.	14.	14.	.53

+	DIVERSION TO	DR031	4.	.00	4.	4.	4.	.53
+	HYDROGRAPH AT	DV031	11.	5.67	11.	10.	10.	.53
+	HYDROGRAPH AT	SB032	13.	4.33	3.	1.	1.	.03
+	ROUTED TO	RR031D	12.	4.58	3.	1.	1.	.03
+	HYDROGRAPH AT	SB033	128.	4.17	16.	4.	4.	.14
+	HYDROGRAPH AT	DR031	4.	.00	4.	4.	4.	.53
+	3 COMBINED AT	AD033	136.	4.17	22.	9.	8.	.31
+	ROUTED TO	LP033	0.	4.58	0.	0.	0.	.31
+	ROUTED TO	RR034	0.	4.67	0.	0.	0.	.31
+	HYDROGRAPH AT	SB034	228.	4.17	31.	8.	8.	.18
+	3 COMBINED AT	AD034	211.	4.17	39.	18.	17.	.88
+	ROUTED TO	LP034	18.	3.92	18.	17.	16.	.88
+	DIVERSION TO	DR034	18.	3.92	18.	17.	16.	.88
+	HYDROGRAPH AT	DV034	0.	.00	0.	0.	0.	.88
+	ROUTED TO	RR035	0.	.00	0.	0.	0.	.88
+	HYDROGRAPH AT	SB035	113.	4.17	15.	4.	4.	.11
+	2 COMBINED AT	AD035	113.	4.17	15.	4.	4.	.11
+	ROUTED TO	RR036	88.	4.50	15.	4.	4.	.11
+	HYDROGRAPH AT	SB036	66.	4.25	13.	3.	3.	.13
+	2 COMBINED AT	AD036	149.	4.42	28.	7.	7.	.24
+	DIVERSION TO	DR036	149.	4.42	28.	7.	7.	.24
+	HYDROGRAPH AT	DV036	0.	.00	0.	0.	0.	.24
+	ROUTED TO	RR037A	0.	.00	0.	0.	0.	.24
+	HYDROGRAPH AT	SB037	180.	4.17	22.	6.	5.	.21
+	2 COMBINED AT	AD037A	180.	4.17	22.	6.	5.	.21
+	HYDROGRAPH AT	DR20A2	92.	4.42	8.	2.	2.	1.48
+	ROUTED TO	RR024A	92.	4.50	8.	2.	2.	1.48
+	HYDROGRAPH AT	DR20B2	0.	.00	0.	0.	0.	2.14
+	ROUTED TO	RR024B	0.	.00	0.	0.	0.	2.14
+	ROUTED TO	RR024C	0.	.00	0.	0.	0.	2.14
+	2 COMBINED AT	AD024B	145.	4.42	13.	3.	3.	.22
+	ROUTED TO	RR024D	125.	4.67	13.	3.	3.	.22
+	HYDROGRAPH AT	SB024	78.	4.25	14.	4.	4.	.11
	2 COMBINED AT							

+		AD024C	174.	4.58	27.	7.	7.	.33
+	DIVERSION TO	DR024	120.	4.58	24.	6.	6.	.33
+	HYDROGRAPH AT	DV024	54.	4.58	3.	1.	1.	.33
+	ROUTED TO	RR024E	54.	4.67	3.	1.	1.	.33
+	3 COMBINED AT	AD037B	615.	4.33	219.	78.	75.	3.18
+	ROUTED TO	RR037B	615.	4.33	219.	78.	75.	3.18
+	HYDROGRAPH AT	DR024	120.	4.58	24.	6.	6.	.33
+	ROUTED TO	RR024F	119.	4.67	24.	6.	6.	.33
+	2 COMBINED AT	AD037C	659.	4.33	235.	82.	79.	3.38
+	ROUTED TO	RR037C	658.	4.33	235.	82.	79.	3.38
+	HYDROGRAPH AT	SB038	141.	4.08	16.	4.	4.	.12
+	DIVERSION TO	DR038	68.	3.92	13.	3.	3.	.12
+	HYDROGRAPH AT	DV038	73.	4.08	3.	1.	1.	.12
+	ROUTED TO	RR039	53.	4.25	3.	1.	1.	.12
+	HYDROGRAPH AT	SB039	41.	4.08	5.	1.	1.	.03
+	2 COMBINED AT	AD039	84.	4.17	8.	2.	2.	.09
+	DIVERSION TO	DR039	49.	4.17	2.	1.	1.	.09
+	HYDROGRAPH AT	DV039	35.	4.00	6.	1.	1.	.09
+	ROUTED TO	RR040	36.	4.42	6.	1.	1.	.09
+	HYDROGRAPH AT	SB040	342.	4.17	42.	10.	10.	.41
+	HYDROGRAPH AT	DR034	18.	3.92	18.	17.	16.	.88
+	3 COMBINED AT	AD040	341.	4.17	60.	28.	27.	1.33
+	ROUTED TO	LP040	116.	4.75	37.	25.	24.	1.33
+	ROUTED TO	RR041	115.	4.75	37.	25.	24.	1.33
+	HYDROGRAPH AT	SB041	38.	4.17	4.	1.	1.	.04
+	2 COMBINED AT	AD041	106.	4.83	38.	25.	24.	1.71
+	ROUTED TO	LP041	36.	5.92	35.	25.	24.	1.71
+	DIVERSION TO	DR041	36.	5.92	35.	25.	24.	1.71
+	HYDROGRAPH AT	DV041	0.	.00	0.	0.	0.	1.71
+	ROUTED TO	RR043	0.	.00	0.	0.	0.	1.71
+	HYDROGRAPH AT	SB043	75.	4.17	9.	2.	2.	.08
+	2 COMBINED AT	AD043	75.	4.17	9.	2.	2.	.08
+	DIVERSION TO	DR043	75.	4.17	9.	2.	2.	.08
+	HYDROGRAPH AT	DV043	0.	.00	0.	0.	0.	.08

+	ROUTED TO	RR044	0.	.00	0.	0.	0.	.08
+	HYDROGRAPH AT	SB044	120.	4.25	21.	5.	5.	.18
+	2 COMBINED AT	AD044	120.	4.25	21.	5.	5.	.18
+	DIVERSION TO	DR044A	20.	4.25	3.	1.	1.	.18
+	HYDROGRAPH AT	DV044A	99.	4.25	17.	4.	4.	.18
+	DIVERSION TO	DR044B	0.	4.25	0.	0.	0.	.18
+	HYDROGRAPH AT	DV044B	99.	4.25	17.	4.	4.	.18
+	ROUTED TO	RR4446	98.	4.25	17.	4.	4.	.18
+	HYDROGRAPH AT	DR036	149.	4.42	28.	7.	7.	.24
+	ROUTED TO	RR3646	148.	4.42	28.	7.	7.	.24
+	HYDROGRAPH AT	SB045	21.	4.17	4.	1.	1.	.03
+	ROUTED TO	RR046A	17.	4.50	4.	1.	1.	.03
+	ROUTED TO	RR046B	17.	4.58	4.	1.	1.	.03
+	HYDROGRAPH AT	SB046	140.	4.25	22.	6.	5.	.19
+	2 COMBINED AT	AD046A	149.	4.25	26.	7.	6.	.22
+	3 COMBINED AT	AD046B	362.	4.33	69.	18.	17.	.61
+	DIVERSION TO	DR046	0.	.00	0.	0.	0.	.61
+	HYDROGRAPH AT	DV046	362.	4.33	69.	18.	17.	.61
+	ROUTED TO	RR047A	360.	4.33	69.	18.	17.	.61
+	ROUTED TO	RR4748	356.	4.42	69.	18.	17.	.61
+	HYDROGRAPH AT	SB048	80.	4.17	9.	2.	2.	.09
+	2 COMBINED AT	AD048	394.	4.33	77.	19.	19.	.70
+	ROUTED TO	LP048	146.	5.08	69.	18.	17.	.70
+	DIVERSION TO	DR048	0.	.00	0.	0.	0.	.70
+	HYDROGRAPH AT	DV048	146.	5.08	69.	18.	17.	.70
+	ROUTED TO	RR037D	146.	5.08	69.	18.	17.	.70
+	2 COMBINED AT	AD037D	712.	4.42	283.	95.	91.	4.08
+	ROUTED TO	RR049A	709.	4.42	283.	95.	91.	4.08
+	HYDROGRAPH AT	SB049	201.	4.08	24.	6.	6.	.14
+	HYDROGRAPH AT	DR048	0.	.00	0.	0.	0.	.70
+	ROUTED TO	RR049B	0.	.00	0.	0.	0.	.70
+	2 COMBINED AT	AD049A	201.	4.08	24.	6.	6.	.14
+	DIVERSION TO	DR049	141.	4.08	9.	2.	2.	.14

+	HYDROGRAPH AT	DV049	60.	3.83	15.	4.	4.	.14
+	HYDROGRAPH AT	SB050	61.	4.08	8.	2.	2.	.04
+	DIVERSION TO	DR050	0.	.00	0.	0.	0.	.04
+	HYDROGRAPH AT	DV050	61.	4.08	8.	2.	2.	.04
+	ROUTED TO	RR049C	60.	4.08	8.	2.	2.	.04
+	3 COMBINED AT	AD049B	792.	4.42	306.	101.	97.	4.16
+	ROUTED TO	RR051A	790.	4.42	306.	101.	97.	4.16
+	ROUTED TO	RR051B	789.	4.50	305.	100.	97.	4.16
+	ROUTED TO	RR051C	784.	4.50	305.	100.	97.	4.16
+	HYDROGRAPH AT	SB051	121.	4.08	15.	4.	4.	.09
+	2 COMBINED AT	AD051	822.	4.50	317.	104.	100.	4.25
+	HYDROGRAPH AT	SB052	101.	4.25	18.	5.	4.	.17
+	DIVERSION TO	DR052	51.	4.25	9.	2.	2.	.17
+	HYDROGRAPH AT	DV052	51.	4.25	9.	2.	2.	.17
+	ROUTED TO	RR053A	50.	4.33	9.	2.	2.	.17
+	ROUTED TO	RR053B	49.	4.33	9.	2.	2.	.17
+	HYDROGRAPH AT	SB053	109.	4.17	15.	4.	4.	.10
+	2 COMBINED AT	AD053	144.	4.17	24.	6.	6.	.27
+	ROUTED TO	RR054A	141.	4.25	24.	6.	6.	.27
+	DIVERSION TO	DR054A	141.	4.25	24.	6.	6.	.27
+	HYDROGRAPH AT	DV054A	0.	.00	0.	0.	0.	.27
+	ROUTED TO	RR055A	0.	.00	0.	0.	0.	.27
+	HYDROGRAPH AT	DR050	0.	.00	0.	0.	0.	.04
+	ROUTED TO	RR055B	0.	.00	0.	0.	0.	.04
+	2 COMBINED AT	AD055A	0.	.00	0.	0.	0.	.00
+	ROUTED TO	RR055C	0.	.00	0.	0.	0.	.00
+	HYDROGRAPH AT	SB055	65.	4.08	10.	2.	2.	.05
+	2 COMBINED AT	AD055B	65.	4.08	10.	2.	2.	.05
+	DIVERSION TO	DR055	49.	4.08	7.	2.	2.	.05
+	HYDROGRAPH AT	DV055	16.	4.08	2.	1.	1.	.05
+	HYDROGRAPH AT	DR054A	141.	4.25	24.	6.	6.	.27
+	ROUTED TO	RR054B	138.	4.25	24.	6.	6.	.27
+	HYDROGRAPH AT	SB054	105.	4.17	17.	4.	4.	.11
	2 COMBINED AT							

+		AD054	240.	4.25	41.	10.	10.	.38
+	DIVERSION TO	DR054B	80.	4.25	5.	1.	1.	.38
+	HYDROGRAPH AT	DV054B	160.	4.17	36.	9.	9.	.38
+	2 COMBINED AT	AD055C	176.	4.17	38.	10.	9.	.43
+	ROUTED TO	RR055D	175.	4.25	38.	10.	9.	.43
+	2 COMBINED AT	AD055D	940.	4.50	349.	112.	108.	4.68
+	ROUTED TO	RR057A	940.	4.50	349.	112.	108.	4.68
+	HYDROGRAPH AT	DR049	141.	4.08	9.	2.	2.	.14
+	ROUTED TO	RR057B	111.	4.25	9.	2.	2.	.14
+	2 COMBINED AT	AD057A	962.	4.50	353.	113.	108.	4.78
+	ROUTED TO	RR057C	958.	4.50	353.	112.	108.	4.78
+	HYDROGRAPH AT	SB057	231.	4.08	24.	6.	6.	.15
+	2 COMBINED AT	AD057B	1009.	4.50	371.	117.	113.	4.93
+	HYDROGRAPH AT	DR046	0.	.00	0.	0.	0.	.61
+	ROUTED TO	RR047B	0.	.00	0.	0.	0.	.61
+	HYDROGRAPH AT	SB047	126.	4.25	21.	5.	5.	.19
+	2 COMBINED AT	AD047	126.	4.25	21.	5.	5.	.19
+	ROUTED TO	RR058	118.	4.33	21.	5.	5.	.19
+	HYDROGRAPH AT	SB058	51.	4.17	6.	2.	2.	.06
+	2 COMBINED AT	AD058A	156.	4.33	27.	7.	7.	.25
+	HYDROGRAPH AT	DR044B	0.	4.25	0.	0.	0.	.18
+	ROUTED TO	RR059A	0.	4.50	0.	0.	0.	.18
+	HYDROGRAPH AT	SB059	144.	4.25	24.	6.	6.	.23
+	2 COMBINED AT	AD059A	144.	4.25	24.	6.	6.	.23
+	HYDROGRAPH AT	SB061A	101.	4.33	22.	6.	5.	.19
+	HYDROGRAPH AT	SB061B	66.	4.25	11.	3.	3.	.11
+	DIVERSION TO	DR061B	19.	4.25	1.	0.	0.	.11
+	HYDROGRAPH AT	DV061	47.	4.08	10.	3.	2.	.11
+	HYDROGRAPH AT	DR038	68.	3.92	13.	3.	3.	.12
+	ROUTED TO	RR061C	68.	4.00	13.	3.	3.	.12
+	HYDROGRAPH AT	SB061C	272.	4.17	37.	9.	9.	.27
+	2 COMBINED AT	AD061A	340.	4.17	50.	12.	12.	.33
+	3 COMBINED AT	AD061B	456.	4.17	80.	20.	19.	.63
+	ROUTED TO	LP061	50.	5.50	46.	20.	19.	.63

+	ROUTED TO	RR062A	50.	5.92	46.	20.	19.	.63
+	ROUTED TO	RR062B	50.	6.00	46.	20.	19.	.63
+	HYDROGRAPH AT	SB062	343.	4.17	45.	11.	11.	.34
+	2 COMBINED AT	AD062	301.	4.17	79.	30.	29.	.97
+	ROUTED TO	LP062	56.	6.17	55.	29.	28.	.97
+	ROUTED TO	RR063	56.	6.33	55.	29.	28.	.97
+	HYDROGRAPH AT	SB063	210.	4.17	30.	8.	7.	.22
+	2 COMBINED AT	AD063	192.	4.25	75.	36.	35.	1.19
+	ROUTED TO	LP063	137.	4.58	72.	36.	35.	1.19
+	DIVERSION TO	DR063A	97.	4.58	68.	35.	34.	1.19
+	HYDROGRAPH AT	DV063A	41.	4.50	3.	1.	1.	1.19
+	DIVERSION TO	DR063B	21.	4.50	2.	0.	0.	1.19
+	HYDROGRAPH AT	DV063B	21.	4.50	2.	0.	0.	1.19
+	HYDROGRAPH AT	DR041	36.	5.92	35.	25.	24.	1.71
+	ROUTED TO	RR064A	36.	6.08	35.	25.	24.	1.71
+	HYDROGRAPH AT	DR039	49.	4.17	2.	1.	1.	.09
+	ROUTED TO	RR064B	33.	4.33	2.	1.	1.	.09
+	2 COMBINED AT	AD064A	40.	4.33	35.	25.	24.	1.76
+	ROUTED TO	RR064C	37.	4.42	35.	25.	24.	1.76
+	HYDROGRAPH AT	SB064	97.	4.25	17.	4.	4.	.14
+	2 COMBINED AT	AD064B	100.	4.33	47.	28.	27.	1.90
+	HYDROGRAPH AT	DR043	75.	4.17	9.	2.	2.	.08
+	ROUTED TO	RR064D	72.	4.25	9.	2.	2.	.08
+	3 COMBINED AT	AD064C	132.	4.33	53.	29.	28.	2.58
+	ROUTED TO	RR065A	132.	4.42	53.	29.	28.	2.58
+	HYDROGRAPH AT	DR063B	21.	4.50	2.	0.	0.	1.19
+	ROUTED TO	RR065B	18.	4.67	2.	0.	0.	1.19
+	2 COMBINED AT	AD065A	132.	4.33	55.	30.	29.	3.18
+	ROUTED TO	RR065C	116.	4.75	51.	29.	28.	3.18
+	HYDROGRAPH AT	SB065	366.	4.17	48.	12.	12.	.44
+	2 COMBINED AT	AD065B	275.	4.33	83.	37.	36.	3.62
+	ROUTED TO	RR066	262.	4.50	83.	37.	36.	3.62
+	HYDROGRAPH AT	SB066	129.	4.17	15.	4.	4.	.12

+	2 COMBINED AT	AD066	305.	4.42	93.	40.	39.	3.74
+	ROUTED TO	RR067A	303.	4.50	93.	40.	39.	3.74
+	HYDROGRAPH AT	SB067A	89.	4.17	10.	3.	3.	.10
+	DIVERSION TO	DR067A	21.	4.00	4.	1.	1.	.10
+	HYDROGRAPH AT	DV067A	68.	4.17	7.	2.	2.	.10
+	2 COMBINED AT	AD067A	319.	4.50	97.	41.	39.	3.84
+	DIVERSION TO	DR067B	319.	4.50	97.	41.	39.	3.84
+	HYDROGRAPH AT	DV067B	0.	.00	0.	0.	0.	3.84
+	ROUTED TO	RR059B	0.	.00	0.	0.	0.	3.84
+	2 COMBINED AT	AD059B	207.	4.42	31.	8.	7.	.23
+	ROUTED TO	RR060A	201.	4.50	30.	8.	7.	.23
+	HYDROGRAPH AT	SB060	265.	4.08	32.	8.	8.	.18
+	2 COMBINED AT	AD060A	353.	4.17	62.	16.	15.	.41
+	HYDROGRAPH AT	DR067B	319.	4.50	97.	41.	39.	3.84
+	ROUTED TO	RR067B	314.	4.58	97.	41.	39.	3.84
+	HYDROGRAPH AT	SB067B	70.	4.17	9.	2.	2.	.09
+	2 COMBINED AT	AD067B	337.	4.50	103.	42.	41.	3.93
+	DIVERSION TO	DR067C	169.	4.50	51.	21.	20.	3.93
+	HYDROGRAPH AT	DV067C	169.	4.50	51.	21.	20.	3.93
+	ROUTED TO	RR060B	167.	4.58	51.	21.	20.	3.93
+	2 COMBINED AT	AD060B	372.	4.42	101.	34.	33.	2.38
+	ROUTED TO	RR060C	372.	4.42	101.	34.	33.	2.38
+	2 COMBINED AT	AD058B	456.	4.42	120.	39.	38.	2.63
+	2 COMBINED AT	AD057C	1311.	4.50	467.	149.	144.	7.56
+	ROUTED TO	RR068	1290.	4.58	467.	149.	144.	7.56
+	HYDROGRAPH AT	SB068	31.	4.58	11.	3.	3.	.11
+	2 COMBINED AT	AD068	1303.	4.58	473.	151.	145.	7.67
+	ROUTED TO	RR070A	1294.	4.67	473.	151.	145.	7.67
+	HYDROGRAPH AT	DR067C	169.	4.50	51.	21.	20.	3.93
+	ROUTED TO	RR069	161.	4.67	51.	21.	20.	3.93
+	HYDROGRAPH AT	SB069	58.	4.33	14.	4.	4.	.14
+	2 COMBINED AT	AD069	219.	4.67	66.	25.	24.	2.11
+	ROUTED TO	RR070B	207.	4.83	66.	25.	24.	2.11
	HYDROGRAPH AT							

+		SB070	84.	4.25	14.	4.	4.	.14
	3 COMBINED AT							
+		AD070	1414.	4.67	526.	172.	165.	9.61
	HYDROGRAPH AT							
+		DR055	49.	4.08	7.	2.	2.	.05
	HYDROGRAPH AT							
+		DR054B	80.	4.25	5.	1.	1.	.38
	2 COMBINED AT							
+		AD5455	115.	4.25	12.	3.	3.	.60
1								

Recommended Alternative 100-Year HEC-1 Summary Report
(ALT100.TXT)

HEC-1 HCT100.TXT
RECOMMENDED
ALTERNATIVE

RUNOFF SUMMARY

FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

+	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	SB009	94.	4.25	18.	5.	4.	.06		
+	DIVERSION TO	DR009	73.	4.08	17.	4.	4.	.06		
+	HYDROGRAPH AT	DV009	21.	4.25	1.	0.	0.	.06		
+	ROUTED TO	RR010	12.	4.58	1.	0.	0.	.06		
+	HYDROGRAPH AT	SB010	418.	4.08	46.	12.	11.	.16		
+	2 COMBINED AT	AD010	418.	4.08	47.	12.	11.	.17		
+	DIVERSION TO	DR010	361.	4.08	27.	7.	6.	.17		
+	HYDROGRAPH AT	DV010	57.	3.75	20.	5.	5.	.17		
+	ROUTED TO	RR011A	57.	3.92	20.	5.	5.	.17		
+	HYDROGRAPH AT	SB011	557.	4.08	64.	16.	15.	.22		
+	2 COMBINED AT	AD011A	614.	4.08	84.	21.	20.	.24		
+	HYDROGRAPH AT	SB012	498.	4.08	54.	14.	13.	.20		
+	ROUTED TO	RR013A	472.	4.08	54.	14.	13.	.20		
+	HYDROGRAPH AT	SB013	122.	4.00	11.	3.	3.	.04		
+	2 COMBINED AT	AD013A	577.	4.08	65.	16.	16.	.24		
+	HYDROGRAPH AT	DR010	361.	4.08	27.	7.	6.	.17		
+	ROUTED TO	RR013B	357.	4.08	27.	7.	6.	.17		
+	2 COMBINED AT	AD013B	933.	4.08	91.	23.	22.	.39		
+	DIVERSION TO	DR013	866.	4.08	84.	21.	20.	.39		
+	HYDROGRAPH AT	DV013	67.	4.08	7.	2.	2.	.39		
+	ROUTED TO	RR014	59.	4.25	7.	2.	2.	.39		
+	HYDROGRAPH AT	SB014	71.	4.08	8.	2.	2.	.03		
+	2 COMBINED AT	AD014	122.	4.17	15.	4.	4.	.06		
+	ROUTED TO	RR011B	122.	4.17	15.	4.	4.	.06		
+	2 COMBINED AT	AD011B	726.	4.08	99.	25.	24.	.30		
+	ROUTED TO	RR015A	705.	4.17	99.	25.	24.	.30		
+	ROUTED TO	RR015B	645.	4.25	98.	25.	24.	.30		
+	HYDROGRAPH AT	SB015	513.	4.08	67.	17.	16.	.25		
+	2 COMBINED AT	AD015A	1123.	4.17	165.	42.	40.	.55		
+	HYDROGRAPH AT	SB016	214.	4.08	25.	6.	6.	.09		
+	DIVERSION TO	DR016	58.	3.75	15.	4.	4.	.09		

+	HYDROGRAPH AT	DV016	156.	4.08	10.	2.	2.	.09
+	ROUTED TO	RR017	103.	4.33	10.	2.	2.	.09
+	HYDROGRAPH AT	SB017	244.	4.00	25.	6.	6.	.09
+	HYDROGRAPH AT	DR009	73.	4.08	17.	4.	4.	.06
+	ROUTED TO	RR012A	73.	4.17	17.	4.	4.	.06
+	ROUTED TO	RR1217	73.	4.25	17.	4.	4.	.06
+	3 COMBINED AT	AD017	336.	4.08	52.	13.	13.	.23
+	DIVERSION TO	DR017	184.	3.92	42.	11.	10.	.23
+	HYDROGRAPH AT	DV017	152.	4.08	10.	2.	2.	.23
+	ROUTED TO	RR018	92.	4.58	10.	2.	2.	.23
+	HYDROGRAPH AT	SB018	355.	4.08	41.	10.	10.	.15
+	2 COMBINED AT	AD018	359.	4.08	51.	13.	12.	.38
+	HYDROGRAPH AT	SB019	353.	4.17	51.	13.	12.	.19
+	HYDROGRAPH AT	DR013	866.	4.08	84.	21.	20.	.39
+	ROUTED TO	RR019A	833.	4.17	84.	21.	20.	.39
+	ROUTED TO	RR019B	817.	4.17	84.	21.	20.	.39
+	3 COMBINED AT	AD019	1307.	4.17	178.	45.	43.	.93
+	ROUTED TO	LP019	587.	4.58	176.	45.	43.	.93
+	ROUTED TO	RR015C	586.	4.58	176.	45.	43.	.93
+	2 COMBINED AT	AD015B	1317.	4.25	329.	84.	81.	1.48
+	ROUTED TO	RR020A	1316.	4.25	329.	84.	81.	1.48
+	ROUTED TO	RR020B	1308.	4.33	329.	84.	81.	1.48
+	ROUTED TO	RR020C	1307.	4.33	329.	84.	81.	1.48
+	DIVERSION TO	DR20A1	732.	4.33	91.	23.	22.	1.48
+	HYDROGRAPH AT	DV20A1	575.	4.17	238.	62.	59.	1.48
+	HYDROGRAPH AT	SB020A	85.	4.17	16.	4.	4.	.06
+	HYDROGRAPH AT	DR20A1	732.	4.33	91.	23.	22.	1.48
+	DIVERSION TO	DR20A2	366.	4.33	45.	11.	11.	1.48
+	HYDROGRAPH AT	DV20A2	366.	4.33	45.	11.	11.	1.48
+	3 COMBINED AT	AD020A	1040.	4.25	301.	77.	74.	1.10
+	HYDROGRAPH AT	SB021	355.	4.08	38.	9.	9.	.14
+	ROUTED TO	LP021	339.	4.08	32.	9.	9.	.14
+	ROUTED TO	RR022	310.	4.25	32.	9.	9.	.14

+	HYDROGRAPH AT	SB022	508.	4.08	48.	12.	12.	.24
+	2 COMBINED AT	AD022	765.	4.17	78.	22.	21.	.38
+	ROUTED TO	RR023	746.	4.17	78.	22.	21.	.38
+	HYDROGRAPH AT	SB023	383.	4.08	40.	10.	10.	.17
+	2 COMBINED AT	AD023	1079.	4.17	117.	31.	30.	.55
+	HYDROGRAPH AT	SB020B	439.	4.17	59.	15.	14.	.27
+	3 COMBINED AT	AD20B1	2012.	4.25	456.	119.	114.	1.92
+	DIVERSION TO	DR20B1	184.	3.58	135.	38.	37.	1.92
+	HYDROGRAPH AT	DV20B1	1828.	4.25	321.	80.	77.	1.92
+	ROUTED TO	LP020B	75.	6.08	67.	46.	45.	1.92
+	DIVERSION TO	DR20B2	16.	6.08	9.	2.	2.	1.92
+	HYDROGRAPH AT	DV20B2	58.	6.00	58.	44.	43.	1.92
+	HYDROGRAPH AT	DR20B1	184.	3.58	135.	38.	37.	1.92
+	2 COMBINED AT	AD20B2	242.	5.92	169.	83.	81.	.44
+	ROUTED TO	RR2427	242.	6.08	169.	83.	81.	.44
+	HYDROGRAPH AT	SB025	326.	4.08	39.	10.	9.	.14
+	ROUTED TO	RR026	282.	4.25	39.	10.	9.	.14
+	HYDROGRAPH AT	SB026	917.	4.08	93.	23.	22.	.44
+	2 COMBINED AT	AD026	1105.	4.17	130.	33.	31.	.58
+	ROUTED TO	RR027	1026.	4.25	130.	33.	31.	.58
+	HYDROGRAPH AT	SB027	282.	4.08	24.	6.	6.	.12
+	2 COMBINED AT	AD027A	1171.	4.17	151.	38.	37.	.70
+	2 COMBINED AT	AD027B	1253.	4.17	313.	119.	115.	1.14
+	HYDROGRAPH AT	SB028	330.	4.08	41.	10.	10.	.13
+	ROUTED TO	RR031A	312.	4.17	41.	10.	10.	.13
+	HYDROGRAPH AT	SB029	444.	4.08	43.	11.	10.	.18
+	2 COMBINED AT	AD031A	735.	4.08	84.	21.	20.	.31
+	ROUTED TO	RR031B	713.	4.17	84.	21.	20.	.31
+	HYDROGRAPH AT	SB030	228.	4.08	24.	6.	6.	.10
+	ROUTED TO	RR031C	208.	4.17	24.	6.	6.	.10
+	HYDROGRAPH AT	SB031	271.	4.08	19.	5.	5.	.12
+	3 COMBINED AT	AD031B	1142.	4.08	126.	32.	30.	.53
+	ROUTED TO	LP031A	108.	4.83	38.	21.	20.	.53
	DIVERSION TO							

+		DR031	4.	.00	4.	4.	4.	.53
+	HYDROGRAPH AT	DV031	104.	4.83	34.	17.	16.	.53
+	HYDROGRAPH AT	SB032	39.	4.17	5.	1.	1.	.03
+	ROUTED TO	RR031D	35.	4.33	5.	1.	1.	.03
+	HYDROGRAPH AT	SB033	300.	4.08	29.	7.	7.	.14
+	HYDROGRAPH AT	DR031	4.	.00	4.	4.	4.	.53
+	3 COMBINED AT	AD033	320.	4.08	38.	13.	12.	.19
+	ROUTED TO	LP033	0.	4.08	0.	0.	0.	.19
+	ROUTED TO	RR034	0.	4.33	0.	0.	0.	.19
+	HYDROGRAPH AT	SB034	446.	4.08	52.	13.	13.	.18
+	3 COMBINED AT	AD034	401.	4.08	79.	28.	28.	.88
+	ROUTED TO	LP034	120.	4.92	42.	23.	23.	.88
+	DIVERSION TO	DR034	18.	3.58	18.	17.	17.	.88
+	HYDROGRAPH AT	DV034	102.	4.92	24.	6.	6.	.88
+	ROUTED TO	RR035	98.	5.17	24.	6.	6.	.88
+	HYDROGRAPH AT	SB035	246.	4.08	27.	7.	6.	.11
+	2 COMBINED AT	AD035	214.	4.08	49.	13.	12.	.86
+	ROUTED TO	RR036	182.	4.33	49.	13.	12.	.86
+	HYDROGRAPH AT	SB036	177.	4.17	26.	7.	6.	.13
+	2 COMBINED AT	AD036	317.	4.25	72.	18.	18.	.99
+	DIVERSION TO	DR036	294.	4.33	71.	18.	18.	.99
+	HYDROGRAPH AT	DV036	24.	4.25	1.	0.	0.	.99
+	ROUTED TO	RR037A	8.	4.50	1.	0.	0.	.99
+	HYDROGRAPH AT	SB037	436.	4.08	43.	11.	10.	.21
+	2 COMBINED AT	AD037A	436.	4.08	44.	11.	11.	.28
+	HYDROGRAPH AT	DR20A2	366.	4.33	45.	11.	11.	1.48
+	ROUTED TO	RR024A	368.	4.33	45.	11.	11.	1.48
+	HYDROGRAPH AT	DR20B2	16.	6.08	9.	2.	2.	1.92
+	ROUTED TO	RR024B	16.	6.17	9.	2.	2.	1.92
+	ROUTED TO	RR024C	16.	6.25	9.	2.	2.	1.92
+	2 COMBINED AT	AD024B	368.	4.33	55.	14.	14.	1.92
+	ROUTED TO	RR024D	323.	4.50	51.	13.	13.	1.92
+	HYDROGRAPH AT	SB024	179.	4.17	26.	7.	6.	.11
+	2 COMBINED AT	AD024C	421.	4.42	72.	19.	18.	2.03

+	DIVERSION TO	DR024	127.	4.25	43.	12.	11.	2.03
+	HYDROGRAPH AT	DV024	294.	4.42	29.	7.	7.	2.03
+	ROUTED TO	RR024E	291.	4.42	29.	7.	7.	2.03
+	3 COMBINED AT	AD037B	1365.	4.33	365.	131.	127.	3.05
+	ROUTED TO	RR037B	1364.	4.33	365.	131.	127.	3.05
+	HYDROGRAPH AT	DR024	127.	4.25	43.	12.	11.	2.03
+	ROUTED TO	RR024F	127.	4.33	43.	12.	11.	2.03
+	2 COMBINED AT	AD037C	1461.	4.33	402.	141.	137.	3.45
+	ROUTED TO	RR037C	1458.	4.33	402.	141.	136.	3.45
+	HYDROGRAPH AT	SB038	289.	4.08	29.	7.	7.	.12
+	DIVERSION TO	DR038	68.	3.75	16.	4.	4.	.12
+	HYDROGRAPH AT	DV038	221.	4.08	13.	3.	3.	.12
+	ROUTED TO	RR039	187.	4.17	13.	3.	3.	.12
+	HYDROGRAPH AT	SB039	75.	4.00	8.	2.	2.	.03
+	2 COMBINED AT	AD039	244.	4.17	21.	5.	5.	.12
+	DIVERSION TO	DR039	209.	4.17	13.	3.	3.	.12
+	HYDROGRAPH AT	DV039	35.	3.83	8.	2.	2.	.12
+	ROUTED TO	RR040	36.	4.25	8.	2.	2.	.12
+	HYDROGRAPH AT	SB040	845.	4.08	80.	20.	19.	.41
+	HYDROGRAPH AT	DR034	18.	3.58	18.	17.	17.	.88
+	3 COMBINED AT	AD040	857.	4.08	102.	39.	38.	.56
+	ROUTED TO	LP040	578.	4.33	84.	37.	36.	.56
+	ROUTED TO	RR041	583.	4.33	84.	37.	36.	.56
+	HYDROGRAPH AT	SB041	88.	4.08	8.	2.	2.	.04
+	2 COMBINED AT	AD041	612.	4.33	90.	38.	38.	.60
+	ROUTED TO	LP041	56.	5.58	45.	38.	37.	.60
+	DIVERSION TO	DR041	44.	5.92	43.	37.	37.	.60
+	HYDROGRAPH AT	DV041	12.	5.58	1.	0.	0.	.60
+	ROUTED TO	RR043	11.	5.67	1.	0.	0.	.60
+	HYDROGRAPH AT	SB043	172.	4.08	17.	4.	4.	.08
+	2 COMBINED AT	AD043	172.	4.08	19.	5.	5.	.21
+	DIVERSION TO	DR043	168.	4.08	19.	5.	5.	.21
+	HYDROGRAPH AT	DV043	4.	4.08	0.	0.	0.	.21

+	ROUTED TO	RR044	1.	4.50	0.	0.	0.	.21
+	HYDROGRAPH AT	SB044	293.	4.17	39.	10.	9.	.18
+	2 COMBINED AT	AD044	293.	4.17	39.	10.	9.	.18
+	DIVERSION TO	DR044A	49.	4.17	6.	2.	2.	.18
+	HYDROGRAPH AT	DV044A	244.	4.17	32.	8.	8.	.18
+	DIVERSION TO	DR044B	111.	4.17	6.	2.	1.	.18
+	HYDROGRAPH AT	DV044B	133.	4.00	26.	7.	6.	.18
+	ROUTED TO	RR4446	133.	4.08	26.	7.	6.	.18
+	HYDROGRAPH AT	DR036	294.	4.33	71.	18.	18.	.99
+	ROUTED TO	RR3646	294.	4.33	71.	18.	18.	.99
+	HYDROGRAPH AT	SB045	49.	4.17	7.	2.	2.	.03
+	ROUTED TO	RR046A	41.	4.33	7.	2.	2.	.03
+	ROUTED TO	RR046B	40.	4.42	7.	2.	2.	.03
+	HYDROGRAPH AT	SB046	337.	4.17	41.	10.	10.	.19
+	2 COMBINED AT	AD046A	358.	4.17	48.	12.	12.	.22
+	3 COMBINED AT	AD046B	714.	4.17	142.	36.	35.	1.03
+	DIVERSION TO	DR046	128.	4.17	6.	2.	2.	1.03
+	HYDROGRAPH AT	DV046	588.	4.25	136.	35.	33.	1.03
+	ROUTED TO	RR047A	588.	4.33	136.	35.	33.	1.03
+	ROUTED TO	RR4748	588.	4.33	136.	35.	33.	1.03
+	HYDROGRAPH AT	SB048	189.	4.08	18.	4.	4.	.09
+	2 COMBINED AT	AD048	713.	4.17	152.	39.	38.	.98
+	ROUTED TO	LP048	251.	5.00	142.	37.	36.	.98
+	DIVERSION TO	DR048	57.	5.00	6.	2.	1.	.98
+	HYDROGRAPH AT	DV048	194.	5.00	136.	36.	35.	.98
+	ROUTED TO	RR037D	194.	5.08	136.	36.	35.	.98
+	2 COMBINED AT	AD037D	1568.	4.33	513.	172.	167.	4.12
+	ROUTED TO	RR049A	1559.	4.42	513.	172.	167.	4.12
+	HYDROGRAPH AT	SB049	378.	4.08	40.	10.	10.	.14
+	HYDROGRAPH AT	DR048	57.	5.00	6.	2.	1.	.98
+	ROUTED TO	RR049B	47.	5.25	6.	2.	1.	.98
+	2 COMBINED AT	AD049A	378.	4.08	49.	12.	12.	.45
+	DIVERSION TO	DR049	318.	4.08	22.	6.	5.	.45
	HYDROGRAPH AT							

+		DV049	60.	3.67	26.	7.	6.	.45
+	HYDROGRAPH AT	SB050	105.	4.08	12.	3.	3.	.04
+	DIVERSION TO	DR050	0.	4.08	0.	0.	0.	.04
+	HYDROGRAPH AT	DV050	105.	4.08	12.	3.	3.	.04
+	ROUTED TO	RR049C	105.	4.08	12.	3.	3.	.04
+	3 COMBINED AT	AD049B	1655.	4.33	542.	181.	175.	4.23
+	ROUTED TO	RR051A	1655.	4.42	542.	181.	175.	4.23
+	ROUTED TO	RR051B	1654.	4.42	542.	181.	174.	4.23
+	ROUTED TO	RR051C	1642.	4.42	542.	181.	174.	4.23
+	HYDROGRAPH AT	SB051	228.	4.08	25.	6.	6.	.09
+	2 COMBINED AT	AD051	1713.	4.42	562.	186.	179.	4.32
+	HYDROGRAPH AT	SB052	263.	4.17	35.	9.	8.	.17
+	DIVERSION TO	DR052	131.	4.17	17.	4.	4.	.17
+	HYDROGRAPH AT	DV052	131.	4.17	17.	4.	4.	.17
+	ROUTED TO	RR053A	128.	4.17	17.	4.	4.	.17
+	ROUTED TO	RR053B	127.	4.25	17.	4.	4.	.17
+	HYDROGRAPH AT	SB053	227.	4.08	25.	6.	6.	.10
+	2 COMBINED AT	AD053	332.	4.17	43.	11.	10.	.27
+	ROUTED TO	RR054A	325.	4.17	43.	11.	10.	.27
+	DIVERSION TO	DR054A	160.	4.00	33.	8.	8.	.27
+	HYDROGRAPH AT	DV054A	165.	4.17	9.	2.	2.	.27
+	ROUTED TO	RR055A	160.	4.25	9.	2.	2.	.27
+	HYDROGRAPH AT	DR050	0.	4.08	0.	0.	0.	.04
+	ROUTED TO	RR055B	0.	4.17	0.	0.	0.	.04
+	2 COMBINED AT	AD055A	160.	4.25	9.	2.	2.	.34
+	ROUTED TO	RR055C	140.	4.33	9.	2.	2.	.34
+	HYDROGRAPH AT	SB055	123.	4.08	16.	4.	4.	.05
+	2 COMBINED AT	AD055B	220.	4.25	25.	6.	6.	.39
+	DIVERSION TO	DR055	165.	4.25	19.	5.	5.	.39
+	HYDROGRAPH AT	DV055	55.	4.25	6.	2.	2.	.39
+	HYDROGRAPH AT	DR054A	160.	4.00	33.	8.	8.	.27
+	ROUTED TO	RR054B	160.	4.08	34.	8.	8.	.27
+	HYDROGRAPH AT	SB054	214.	4.17	30.	7.	7.	.11
+	2 COMBINED AT	AD054	374.	4.17	63.	16.	15.	.24

+	DIVERSION TO	DR054B	214.	4.17	19.	5.	5.	.24
+	HYDROGRAPH AT	DV054B	160.	3.92	44.	11.	11.	.24
+	2 COMBINED AT	AD055C	215.	4.25	50.	13.	12.	.39
+	ROUTED TO	RR055D	214.	4.33	50.	13.	12.	.39
+	2 COMBINED AT	AD055D	1869.	4.42	606.	198.	191.	4.75
+	ROUTED TO	RR057A	1866.	4.42	606.	198.	191.	4.75
+	HYDROGRAPH AT	DR049	318.	4.08	22.	6.	5.	.45
+	ROUTED TO	RR057B	281.	4.17	22.	6.	5.	.45
+	2 COMBINED AT	AD057A	1928.	4.42	615.	200.	193.	5.28
+	ROUTED TO	RR057C	1923.	4.42	615.	200.	193.	5.28
+	HYDROGRAPH AT	SB057	413.	4.00	40.	10.	10.	.15
+	2 COMBINED AT	AD057B	2027.	4.42	649.	209.	201.	5.28
+	HYDROGRAPH AT	DR046	128.	4.17	6.	2.	2.	1.03
+	ROUTED TO	RR047B	91.	4.42	6.	2.	2.	1.03
+	HYDROGRAPH AT	SB047	314.	4.17	40.	10.	10.	.19
+	2 COMBINED AT	AD047	364.	4.33	51.	13.	12.	.33
+	ROUTED TO	RR058	354.	4.42	51.	13.	12.	.33
+	HYDROGRAPH AT	SB058	120.	4.08	12.	3.	3.	.06
+	2 COMBINED AT	AD058A	403.	4.33	63.	16.	15.	.39
+	HYDROGRAPH AT	DR044B	111.	4.17	6.	2.	1.	.18
+	ROUTED TO	RR059A	63.	4.42	6.	2.	1.	.18
+	HYDROGRAPH AT	SB059	371.	4.17	47.	12.	11.	.23
+	2 COMBINED AT	AD059A	389.	4.17	53.	13.	13.	.30
+	HYDROGRAPH AT	SB061A	258.	4.17	41.	10.	10.	.19
+	HYDROGRAPH AT	SB061B	171.	4.17	22.	5.	5.	.11
+	DIVERSION TO	DR061B	124.	4.17	9.	2.	2.	.11
+	HYDROGRAPH AT	DV061B	47.	3.92	13.	3.	3.	.11
+	HYDROGRAPH AT	DR038	68.	3.75	16.	4.	4.	.12
+	ROUTED TO	RR061C	68.	3.83	16.	4.	4.	.12
+	HYDROGRAPH AT	SB061C	589.	4.08	66.	16.	16.	.27
+	2 COMBINED AT	AD061A	657.	4.08	81.	20.	20.	.30
+	3 COMBINED AT	AD061B	901.	4.08	134.	34.	32.	.60
+	ROUTED TO	LP061	121.	5.08	70.	34.	32.	.60

+	ROUTED TO	RR062A	119.	5.42	70.	34.	32.	.60
+	ROUTED TO	RR062B	119.	5.42	70.	34.	32.	.60
+	HYDROGRAPH AT	SB062	753.	4.08	80.	20.	19.	.34
+	2 COMBINED AT	AD062	662.	4.08	133.	52.	51.	.94
+	ROUTED TO	LP062	236.	4.50	96.	51.	49.	.94
+	ROUTED TO	RR063	218.	4.75	96.	51.	49.	.94
+	HYDROGRAPH AT	SB063	454.	4.08	54.	14.	13.	.22
+	2 COMBINED AT	AD063	412.	4.17	137.	63.	61.	1.16
+	ROUTED TO	LP063	386.	4.25	133.	63.	61.	1.16
+	DIVERSION TO	DR063A	109.	4.25	86.	51.	50.	1.16
+	HYDROGRAPH AT	DV063A	278.	4.25	47.	12.	11.	1.16
+	DIVERSION TO	DR063B	139.	4.25	23.	6.	6.	1.16
+	HYDROGRAPH AT	DV063B	139.	4.25	23.	6.	6.	1.16
+	HYDROGRAPH AT	DR041	44.	5.92	43.	37.	37.	.60
+	ROUTED TO	RR064A	44.	5.92	43.	37.	36.	.60
+	HYDROGRAPH AT	DR039	209.	4.17	13.	3.	3.	.12
+	ROUTED TO	RR064B	179.	4.25	13.	3.	3.	.12
+	2 COMBINED AT	AD064A	206.	4.25	55.	41.	39.	.57
+	ROUTED TO	RR064C	190.	4.33	55.	40.	39.	.57
+	HYDROGRAPH AT	SB064	233.	4.17	31.	8.	7.	.14
+	2 COMBINED AT	AD064B	370.	4.25	81.	47.	46.	.71
+	HYDROGRAPH AT	DR043	168.	4.08	19.	5.	5.	.21
+	ROUTED TO	RR064D	163.	4.17	19.	5.	5.	.21
+	3 COMBINED AT	AD064C	549.	4.25	114.	55.	54.	1.50
+	ROUTED TO	RR065A	546.	4.25	114.	55.	54.	1.50
+	HYDROGRAPH AT	DR063B	139.	4.25	23.	6.	6.	1.16
+	ROUTED TO	RR065B	130.	4.33	23.	6.	6.	1.16
+	2 COMBINED AT	AD065A	592.	4.33	130.	59.	57.	2.08
+	ROUTED TO	RR065C	568.	4.42	129.	59.	57.	2.08
+	HYDROGRAPH AT	SB065	888.	4.08	92.	23.	22.	.44
+	2 COMBINED AT	AD065B	935.	4.33	201.	78.	75.	2.52
+	ROUTED TO	RR066	909.	4.42	201.	78.	75.	2.52
+	HYDROGRAPH AT	SB066	280.	4.08	28.	7.	7.	.12
	2 COMBINED AT							

+		AD066	994.	4.42	223.	83.	80.	2.64
+	ROUTED TO	RR067A	987.	4.42	223.	83.	80.	2.64
+	HYDROGRAPH AT	SB067A	215.	4.08	20.	5.	5.	.10
+	DIVERSION TO	DR067A	21.	3.83	4.	1.	1.	.10
+	HYDROGRAPH AT	DV067A	194.	4.08	16.	4.	4.	.10
+	2 COMBINED AT	AD067A	1032.	4.42	234.	86.	83.	2.74
+	DIVERSION TO	DR067B	627.	4.42	190.	75.	73.	2.74
+	HYDROGRAPH AT	DV067B	406.	4.42	44.	11.	11.	2.74
+	ROUTED TO	RR059B	404.	4.42	44.	11.	11.	2.74
+	2 COMBINED AT	AD059B	890.	4.33	111.	28.	27.	1.02
+	ROUTED TO	RR060A	872.	4.33	111.	28.	27.	1.02
+	HYDROGRAPH AT	SB060	487.	4.08	53.	13.	13.	.18
+	2 COMBINED AT	AD060A	1027.	4.33	158.	40.	38.	1.20
+	HYDROGRAPH AT	DR067B	627.	4.42	190.	75.	73.	2.74
+	ROUTED TO	RR067B	621.	4.50	190.	75.	72.	2.74
+	HYDROGRAPH AT	SB067B	172.	4.08	18.	5.	4.	.09
+	2 COMBINED AT	AD067B	717.	4.33	208.	80.	77.	2.11
+	DIVERSION TO	DR067C	359.	4.33	104.	40.	38.	2.11
+	HYDROGRAPH AT	DV067C	359.	4.33	104.	40.	38.	2.11
+	ROUTED TO	RR060B	357.	4.42	104.	40.	38.	2.11
+	2 COMBINED AT	AD060B	1190.	4.33	241.	75.	72.	2.26
+	ROUTED TO	RR060C	1183.	4.33	241.	75.	72.	2.26
+	2 COMBINED AT	AD058B	1379.	4.33	281.	85.	82.	2.65
+	2 COMBINED AT	AD057C	3013.	4.33	870.	277.	268.	7.93
+	ROUTED TO	RR068	2968.	4.42	870.	277.	267.	7.93
+	HYDROGRAPH AT	SB068	89.	4.33	22.	6.	5.	.11
+	2 COMBINED AT	AD068	3018.	4.42	885.	281.	271.	8.04
+	ROUTED TO	RR070A	3013.	4.50	885.	281.	271.	8.04
+	HYDROGRAPH AT	DR067C	359.	4.33	104.	40.	38.	2.11
+	ROUTED TO	RR069	350.	4.50	104.	40.	38.	2.11
+	HYDROGRAPH AT	SB069	161.	4.25	28.	7.	7.	.14
+	2 COMBINED AT	AD069	496.	4.42	132.	47.	45.	1.20
+	ROUTED TO	RR070B	475.	4.50	132.	47.	45.	1.20
+	HYDROGRAPH AT	SB070	219.	4.17	28.	7.	7.	.14

+	3 COMBINED AT	AD070	3368.	4.50	1003.	322.	311.	9.60
+	HYDROGRAPH AT	DR055	165.	4.25	19.	5.	5.	.39
+	HYDROGRAPH AT	DR054B	214.	4.17	19.	5.	5.	.24
+	2 COMBINED AT	AD5455	336.	4.25	37.	9.	9.	.60

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Supporting Calculations for Recommended Alternative
10- and 100-Year Hydrology

CACTUS PARK DET BASIN
LP020B

Culvert SE,SV,SQ		
Contour Elev. (ft)	Cum. Storage (acre-ft)	Discharge (cfs)
1370	0	0
1374	0.0012	0
1375	0.0044	0
1377	0.40	0
1378	1.78	3
1379	4.35	8
1384	47.13	32
1390	121.37	58
1391	135	62

DISCHARGE = FRICTION SLOPE Q LESS 184 CFS FROM LOW FLOW BYPASS

OVERFLOW EL = 1390 FT

Spillway SW, SE	
Width (ft)	Elevation (ft)
0	1390
450	1390

ELEV 1390 FT AND WIDTH 450 FT USED TO MODEL IMPROVED SPILLWAY

Culvert & Spillway SE, SV, SQ		
Contour Elev. (ft)	Cum. Storage (acre-ft)	Discharge (cfs)
1370*	0	0
1374	0.0012	0
1375	0.0044	0
1377	0.40	0
1378	1.78	3
1379	4.35	8
1384	47.13	32
1390	121.37	58
1391	135	1412

1412 = (WEIR Q @ 1391) + (OUTLET Q @ WSEL 1391)
1412 = 1350 + 62

DY2032:

DI 0 58 1412

DQ 0 0 1350

Cactus Park Detention Basin
Preffered Alternative
LP020B

Storage Estimation					
Contour Elev. (ft)	Contour Area (FT^2)	Contour Area (AC)	Average Area (AC)	Inc. Storage (AC-FT)	Cum. Storage (AC-FT)
1370	0	0	-	-	-
1374	27.03	0.00062	0.00031	0.0012	0.0012
1375	251.97	0.0058	0.0032	0.0032025	0.0044
1376	5015.04	0.12	0.06	0.06	0.065
1377	24317.10	0.56	0.34	0.34	0.40
1378	95777.84	2.20	1.38	1.38	1.78
1379	128106.69	2.94	2.57	2.57	4.35
1380	313973.70	7.21	5.07	5.07	9.42
1381	361872.89	8.31	7.76	7.76	17.18
1382	427602.27	9.82	9.06	9.06	26.24
1383	454745.63	10.44	10.13	10.13	36.37
1384	482694.22	11.08	10.76	10.76	47.13
1385	499874.25	11.48	11.28	11.28	58.41
1386	518474.47	11.90	11.69	11.69	70.10
1387	535345.69	12.29	12.10	12.10	82.20
1388	555552.21	12.75	12.52	12.52	94.72
1390	605554.37	13.90	13.33	26.66	121.37
1391	605554.37	13.90	13.90	13.90	135.27

Storage Estimation Based on City of Scottsdale Quarter Section No. 31-45 topo and Cactus Park contour drawing.

CACTUS PARK PREFFERED ALT
SDALE RD CORRIDOR DMP
SCI #15586

LP020B

60-INCH DIAMETER CACTUS PARK DET BASIN OUTLET PIPE AND SPILLWAY RECONFIG

FRICTION SLOPE AND WATER SURFACE ELEVATION ESTIMATION

Manning's equation used to estimate friction slope, S_o:

$Q = (1.49/n)(A)(R_h)^{2/3}(S_o)^{1/2}$

n =	0.013	
Diameter =	5	ft
Area =	19.6	sq ft
Wetted Perimeter =	15.7	ft
Hydraulic Radius =	1.25	ft
Pipe Invert @ Outfall =	1355	ft
Top-of-Pipe @ Outfall =	1360	ft
Pipe Length =	3500	ft

Q (cfs)	S_o (ft/ft)	Elevation at Cactus Park (ft)	
140	0.0029	1370.1	
165	0.0040	1374.0	
171	0.0043	1375.0	
182	0.0049	1377.0	
187	0.0051	1378.0	
192	0.0054	1378.9	
216	0.0068	1384.0	
242	0.0086	1390.0	SPILLWAY EL
246	0.0088	1391.0	

Cactus Park Overflow @ Elev 1390 Ft.

Q = 184 cfs is full flow capacity for 60" diameter concrete storm drain, n = 0.013, S = 0.005

WEIR EQUATION:

$Q = C L H^{3/2}$

$Q = (3)(450)(1391 - 1390)^{3/2}$

$Q = 1350$ CFS

3/3

LP048

HEC2 MODEL: MESCAL 7.DAT

MESCAL PARK PREFERRED ALT

LP048

Scottsdale Rd. Corridor DMP
SCI #15586

7-24-02

60-INCH DIAMETER OUTLET PIPE FROM MESCAL PARK TO 71st ST CHANNEL
FRICTI0N SLOPE AND WATER SURFACE ELEVATION ESTIMATION

Manning's equation used to estimate Mescal Park outlet pipe friction slope, So:
Q = (1.49/n)(A)(Rh)2/3(So)1/2

n =	0.013
Diameter =	5 ft
Area =	19.625 sq ft
Wetted Perimeter =	15.7 ft
Hydraulic Radius =	1.25 ft
Pipe Invert @ Outfall =	1351.14 ft
Top-of-Pipe @ Outfall	1356.14 ft
Pipe Length =	1400 ft

Q (cfs)	S_o (ft/ft)	Elevation at Mescal Park (ft)
1	0.0000	1356.1
96	0.0014	1358.0
137	0.0028	1360.0
153	0.0034	1361.0
169	0.0042	1362.0
189	0.0052	1363.5
202	0.0060	1364.5
224	0.0074	1366.5

Overflow spillway @ elev. 1363.5 ft

Q = 83 cfs is full flow capacity for 60" diameter storm drain, n = 0.013, S = 0.001

WEIR OVERFLOW:

$Q = CLH^{3/2} = 3(50)(1)^{3/2} = 150 \rightarrow$ @ EL 1364.5

$3(50)(3)^{3/2} = 780 \rightarrow$ @ EL 1366.5

SV*	SQ	SE
0	0	1354.5
3.72	1	1356
11.84	96	1358
20.98	137	1360
22.40	153	1361
31.02	169	1362
39.00	189	1363.5
44.40	352	1364.5

(352 = 202 + 150)

DR048:
DV048 ROUTED THROUGH 60" DIAM OUTLET PIPE
DR048 DIVERTED DOWN 68TH PLACE

DI	0	189	352	1004
DQ	0	0	150	780

(1004 = 780 + 224)

* PEAK Q @ DR048 = 57 CFS

DEPTH OF FLOW @ SPILLWAY = 0.38 FT

PEAK Q @ LP048 = 251 CFS

*SV REFLECTS INCREASED STORAGE VOLUME DUE TO EXCAVATION OF NE CORNER OF BASIN, APPROX. 1 AC-FT EXCAVATED AND MATL USED TO RAISE PERIMETER ELEV.

1/1

APPENDIX D

SCOTTSDALE ROAD CORRIDOR DRAINAGE MASTER PLAN EXHIBITS, FIGURES AND DISKETTE

Exhibit 1 – USGS Topography

Figure 3 – Aerial Photograph

Exhibit 2 – Existing Major Drainage Facilities

Figure 4 – Sub-basin Delineation, Flow Paths and Routing Reaches

Exhibit 3 – Soil Survey Map

Exhibit 4 – Land Use

Exhibit 5 – HEC-1 Schematic

Diskette – HEC-1 Models

Plate 1 (Addendum to Master Drainage Report for Kierland)

Scottsdale Road Corridor
Drainage Master Plan
FCD 2000C030

Technical Section – Volume 1
HYDROLOGY ANALYSIS

DISKETTE TABLE OF CONTENTS

Scottsdale Road Corridor
Drainage Master Plan
FCD 2000C030

Technical Section – Volume 1
HYDROLOGY ANALYSIS

DISKETTE TABLE OF CONTENTS CONTINUED

LEGEND

STUDY BOUNDARY

SOURCE:
USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLES-
CURRYS CORNER (1982), PARADISE VALLEY (1982)

Stanley Consultants INC.

SCOTTSDALE ROAD CORRIDOR
DRAINAGE MASTER PLAN
(FCD2000C030)

EXHIBIT 1
USGS TOPOGRAPHY

NOV 2002
DATE

SCI # 15586
DRAWING FILE:
Q:\15586\GRAPHICS\DGN\HYDRO-EXBIFULL.dgn


RANGE 4 EAST
TOWNSHIP 4 NORTH
TOWNSHIP 3 NORTH
CENTRAL ARIZONA PROJECT CANAL
BELL ROAD
PARADISE LANE
GREENWAY ROAD
ACOMA DRIVE
HEARN ROAD
THUNDERBIRD ROAD
SWEETWATER AVENUE
LARKSPUR DRIVE
CACTUS ROAD
CHOLLA STREET
CHOLLA ROAD
SHEA BOULEVARD
MOUNTAIN VIEW ROAD
DOUBLETREE RANCH ROAD
INDIAN BEND WASH
MOCKINGBIRD LANE
McCORMICK PARKWAY
NORTHERN AVENUE
EASTWOOD LANE
56th STREET
60th STREET
64th STREET
68th STREET
69th STREET
70th STREET
71st STREET
76th STREET
80th STREET
84th STREET
SCOTTSDALE ROAD
HAYDEN ROAD
MILLER ROAD
INVERGORDON ROAD
INVERGORDON ROAD CHANNEL
FRANK LLOYD WRIGHT BOULEVARD
HAYDEN LOOP
BUTHERUS DRIVE
RAINTREE DRIVE
REDFIELD ROAD
SUTTON DRIVE
JOAN DE ARC AVENUE
MESCAL STREET
COCHISE ROAD
GOLD DUST AVENUE
CARON DRIVE
FANFOL DRIVE
MOUNTAIN VIEW CHANNEL
BERNEIL DITCH
HAYDEN ROAD CHANNEL
71st STREET CHANNEL
JACKRABBIT PARK DET BASIN
NORTH RANCH ELEM SCHOOL
KIERLAND DET BASIN
KIERLAND MASTER PLANNED COMMUNITY
KIERLAND DET BASIN #3
KIERLAND DET BASIN #4
SANDPIPER PARK DET BASIN
THE PROMENADE
HORIZON HIGH SCHOOL
DESERT SPRINGS ELEM SCHOOL
CROSSED ARROWS PARK DET BASIN
SCOTTSDALE AIRPARK MUNICIPAL AIRPORT
AIRPORT DET BASIN
THUNDERBIRD ROAD DET BASIN
THUNDERBIRD ADVENTIST ACADEMY
THUNDERBIRD INDUSTR DET BASIN
SERENA PARK
DESERT SHADOWS MIDDLE SCHOOL
SONORAN SKY ELEM SCHOOL
JEWISH COMMUNITY CAMPUS
CACTUS PARK DET BASIN
SEQUOYA ELEM SCHOOL
ORANGE TREE GOLF RESORT
COCOPAH MIDDLE SCHOOL
MESCAL PARK DET BASIN
SCOTTSDALE COUNTRY CLUB
CHAPARRAL HIGH SCHOOL
GAINEY RANCH
CAMELBACK GOLF CLUB
NORTH
SCALE: 1" = 1000'
LEGEND
STUDY BOUNDARY
CATCH BASIN
STORM DRAIN OR CULVERT
END SECTION OR HEADWALL
DRAINAGE CHANNEL
DETENTION BASIN
INVERTED CROWN STREET
DIP DRIVEWAY OR ROADWAY DIP CROSSING
SUMP LOW POINT IN ROAD PROFILE DRAINED BY STORM DRAIN SYSTEM
STORM DRAIN AND CULVERT KEY
36" 36 INCH DIAMETER PIPE
(2)12'x9'
NUMBER OF BARRELS
HEIGHT
WIDTH
Stanley Consultants INC.
SCOTTSDALE ROAD CORRIDOR DRAINAGE MASTER PLAN (FCD2000C030)
EXHIBIT 2
EXISTING MAJOR DRAINAGE FACILITIES
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SCI # 15586


RANGE 4 EAST
TOWNSHIP 4 NORTH
TOWNSHIP 3 NORTH
BELL ROAD
PARADISE LANE
GREENWAY ROAD
ACOMA DRIVE
THUNDERBIRD ROAD
SWEETWATER AVENUE
CACTUS ROAD
CHOLLA STREET
CHOLLA ROAD
SHEA BOULEVARD
MOUNTAIN VIEW ROAD
DOUBLETREE RANCH ROAD
INDIAN BEND WASH
INVERGORDON ROAD
SCOTTSDALE ROAD
HAYDEN ROAD
56th STREET
SCOTTSDALE MUNICIPAL AIRPARK AIRPORT
NORTH
SCALE: 1" = 1000'
SOIL SURVEY OF AGUILA-CAREFREE AREA, PARTS OF MARICOPA AND PINAL COUNTIES, ARIZONA; SOIL CONSERVATION SERVICE; APRIL 19, 1986
SOIL SURVEY OF EASTERN MARICOPA AND NORTHERN PINAL COUNTIES AREA, ARIZONA; SOIL CONSERVATION SERVICE; NOVEMBER 1974
LEGEND
STUDY BOUNDARY
SUB-BASIN BOUNDARY
70 SUB-BASIN NUMBER
SOIL BOUNDARY
50, Gm SOIL MAP UNIT NUMBER/SYMBOL (REFER TO TABLE 2.0 FOR SOIL DESCRIPTION AND DATA)
Stanley Consultants INC.
SCOTTSDALE ROAD CORRIDOR DRAINAGE MASTER PLAN (FCD2000C030)
EXHIBIT 3
SOIL SURVEY MAP
NOV 2002
DATE
SCI # 15586
LaA
Mv
Es
Gm


RANGE 4 EAST
TOWNSHIP 4 NORTH
TOWNSHIP 3 NORTH
BELL ROAD
PARADISE LANE
GREENWAY ROAD
ACOMA DRIVE
THUNDERBIRD ROAD
SWEETWATER AVENUE
CACTUS ROAD
CHOLLA STREET
CHOLLA ROAD
SHEA BOULEVARD
MOUNTAIN VIEW ROAD
DOUBLE TREE RANCH ROAD
MOCKINGBIRD LANE
McCORMICK PARKWAY
NORTHERN AVENUE
EASTWOOD LANE
SCOTTSDALE ROAD
HAYDEN ROAD
CENTRAL ARIZONA PROJECT CANAL
FRANK LLOYD WRIGHT BOULEVARD
GREENWAY HAYDEN LOOP
BUTHERUS DRIVE
RAINTREE DRIVE
REDFIELD ROAD
SUTTON DRIVE
JOAN DE ARC AVENUE
LARKSPUR DRIVE
MESCAL STREET
COCHISE ROAD
GOLD DUST AVENUE
MOUNTAIN VIEW CHANNEL
BERNEIL DITCH
INVERGORDON ROAD CHANNEL
INDIAN BEND WASH
56th STREET
60th STREET
64th STREET
68th STREET
76th STREET
84th STREET
JACKRABBIT PARK
NORTH RANCH ELEM SCHOOL
HORIZON HIGH SCHOOL
DESERT SPRINGS ELEM SCHOOL
CROSSED ARROWS PARK
KIERLAND PARK
GOLF COURSE
KIERLAND MASTER PLANNED COMMUNITY
SANDPIPER PARK
SANDPIPER ELEM SCHOOL
SCOTTSDALE MUNICIPAL AIRPORT
AIRPARK
THUNDERBIRD ADVENTIST ACADEMY (SCHOOL)
SONORAN SKY ELEM SCHOOL
JEWISH COMMUNITY CAMPUS (SCHOOL)
CACTUS PARK
SERENA PARK
DESERT SHADOWS MIDDLE SCHOOL
SEQUOYA ELEM SCHOOL
ORANGE TREE GOLF RESORT
COCOPAH MIDDLE SCHOOL
MESCAL PARK
SCOTTSDALE COUNTRY CLUB
CHAPARRAL HIGH SCHOOL
GAINEY RANCH
CAMELBACK GOLF CLUB
NORTH
SCALE: 1" = 1000'
LEGEND
STUDY BOUNDARY
LAND USE BOUNDARY
MDR MEDIUM DENSITY RESIDENTIAL
LDR LOW DENSITY RESIDENTIAL
VLDR VERY LOW DENSITY RESIDENTIAL
MFR MULTI-FAMILY RESIDENTIAL
IND INDUSTRIAL PARK
COMM COMMERCIAL, RETAIL, OFFICE, CHURCH, MOTEL, UTILITY
SUB-BASIN BOUNDARY
70 SUB-BASIN NUMBER
Stanley Consultants INC.
SCOTTSDALE ROAD CORRIDOR
DRAINAGE MASTER PLAN
(FCD2000C030)
EXHIBIT 4
LAND USE
NOV 2002
DATE
SCI # 15586
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RANGE 4 EAST
TOWNSHIP 4 NORTH
TOWNSHIP 3 NORTH
CENTRAL ARIZONA PROJECT CANAL
FRANK LLOYD WRIGHT BOULEVARD
THE PROMENADE
JACKRABBIT PARK
NORTH RANCH ELEM SCHOOL
HORIZON HIGH SCHOOL
DESERT SPRINGS ELEM SCHOOL
CROSSED ARROWS PARK
KIERLAND MASTER PLANNED COMMUNITY
SANDPIPER ELEM SCHOOL
SANDPIPER PARK
SCOTTSDALE AIRPARK MUNICIPAL AIRPORT
THUNDERBIRD ADVENTIST ACADEMY
JEWISH COMMUNITY CAMPUS
SONORAN SKY ELEM SCHOOL
SERENA PARK
DESERT SHADOWS MIDDLE SCHOOL
CACTUS PARK
SEQUOYA ELEM SCHOOL
ORANGE TREE GOLF RESORT
COCOPAH MIDDLE SCHOOL
MESCAL PARK
SCOTTSDALE COUNTRY CLUB
CHAPARRAL HIGH SCHOOL
MOUNTAIN VIEW CHANNEL
BERNEIL DITCH
GAINEY RANCH
CAMELBACK GOLF CLUB
INDIAN BEND WASH
BELL ROAD
PARADISE LANE
GREENWAY ROAD
ACOMA DRIVE
THUNDERBIRD ROAD
SWEETWATER AVENUE
CACTUS ROAD
CHOLLA STREET
CHOLLA ROAD
SHEA BOULEVARD
MOUNTAIN VIEW ROAD
DOUBLETREE RANCH ROAD
MOCKINGBIRD LANE
McCORMICK PARKWAY
NORTHERN AVENUE
ROYAL PALM ROAD
EASTWOOD LANE
SCOTTSDALE ROAD
HAYDEN ROAD
INVERGORDON ROAD
64th STREET CHANNEL
NORTH
SCALE: 1" = 1000'
LEGEND
STUDY BOUNDARY
SUB-BASIN BOUNDARY
68 SUB-BASIN NUMBER
TIME OF CONCENTRATION FLOW PATH ONLY
ROUTING REACH FLOW PATH ONLY
COMBINED TIME OF CONCENTRATION & ROUTING REACH FLOW PATH
FLOW DIVERSION
33 SECTION NUMBER
Stanley Consultants INC.
SCOTTSDALE ROAD CORRIDOR
DRAINAGE MASTER PLAN
(FCD2000C030)
FIGURE 4
DRAINAGE SUB-BASIN MAP
NOV 2002
DATE

Stanley Consultants INC.

SCOTTSDALE ROAD CORRIDOR DRAINAGE MASTER PLAN (FCD2000C030)

EXHIBIT 5

HEC-1 SCHEMATIC

NOV 2002

DATE

SCOTTSDALE ROAD CORRIDOR DRAINAGE MASTER PLAN

Stanley Consultants INC.

SCOTTSDALE ROAD CORRIDOR DRAINAGE MASTER PLAN (FCD2000C030)	
FIGURE 3 AERIAL PHOTOGRAPH	NOV 2002 DATE

SCI # 15586
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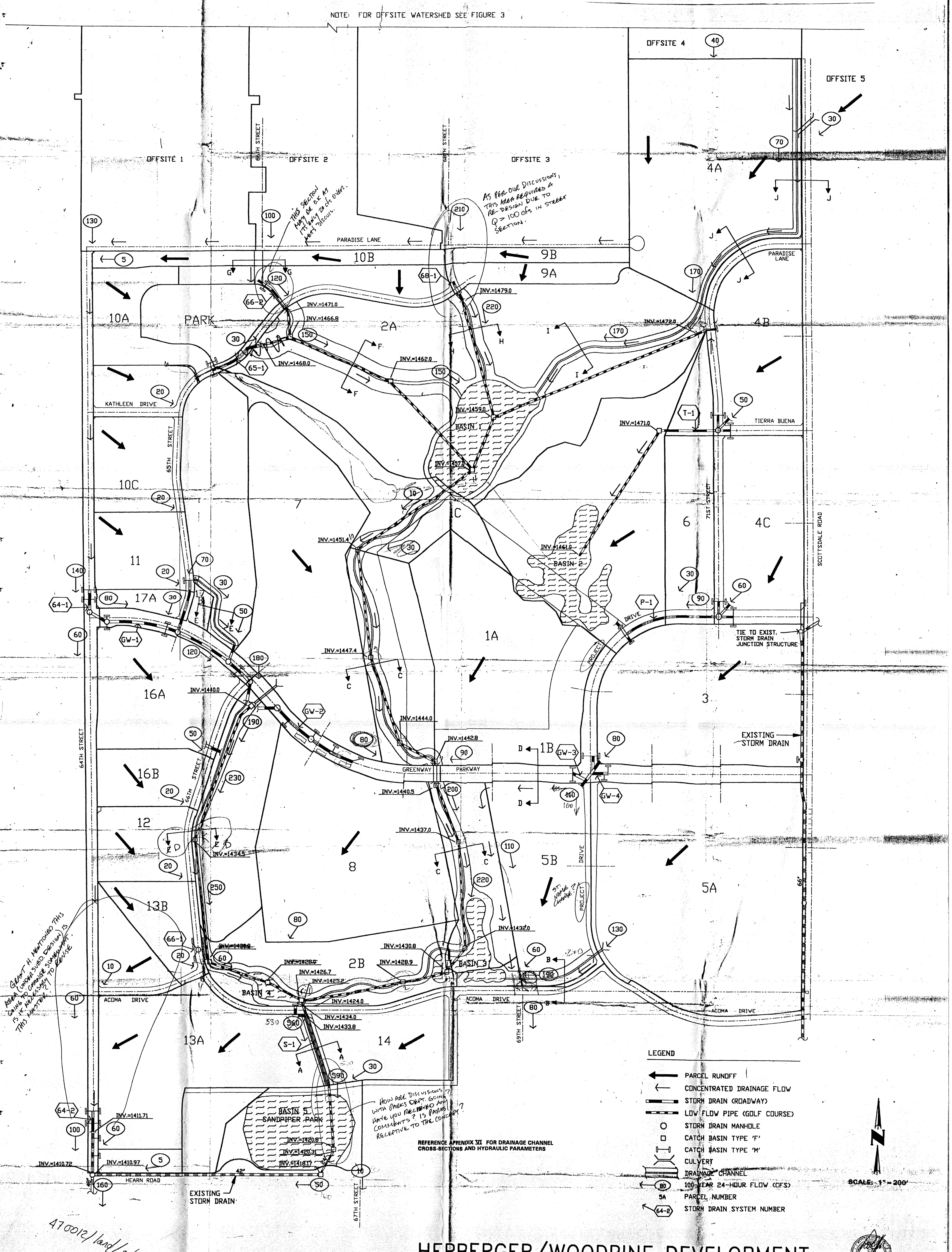

47OO12/land/sdmp

HERBERGER/WOODBINE DEVELOPMENT

CONCEPTUAL MASTER DRAINAGE PLAN

PLATE 1

CVL
COE & VAN LOO