PRELIMINARY DRAINAGE REPORT

Optima McDowell Mountain Village Scottsdale Road and Mayo Boulevard Scottsdale, Arizona

Prepared For:

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Prepared By:

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ARIZONA, USA.

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1.0 Introduction

1.1 Project Description

The applicant is proposing to construct a multi-family development on a 15.637+/- net acre parcel located at the northeast corner of Scottsdale Road and Mayo Boulevard. The project, Optima McDowell Mountain Village, is anticipated to consist of apartment and condominium buildings and amenities constructed over an underground parking garage which will have access to both Scottsdale Road and Mayo Boulevard.

1.2 Site Location

The proposed development encompasses approximately 15.637± net acres in a portion of the Southwest Quarter of Section 26, Township 4 North, Range 4 East of the Gila and Salt River Base and Meridian in Maricopa County, Arizona. More specifically, the parcel is bounded by the Loop 101 Freeway to the north, vacant State Land to the east, a car dealership to the south, and Scottsdale Road to the west. See **Appendix A** for the site location map and legal description. See **Appendix E** for a Context Aerial Map.

1.3 Purpose

This Preliminary Drainage Report is intended to satisfy City of Scottsdale requirements and demonstrate conformance to the regional drainage planning solutions implemented by other projects immediately south of the project. This report provides a description of the current storm water drainage patterns and systems and a description of the required and proposed drainage improvements.

1.4 Objectives

This report provides a drainage plan for the site that is intended to meet the drainage standards and guidelines of the City of Scottsdale and the Flood Control District of Maricopa County (FCDMC). In particular, this report will demonstrate the following:

- 1. Off-site flows are diverted around the site via the ADOT Freeway improvements, and the downstream City of Scottsdale box culverts and channel system located along the eastern side of the property.
- 2. The site drainage patterns will remain consistent with the existing hydrology patterns.
- 3. Permanent drainage facilities will have a positive outfall for flows exceeding storage capacity and any detained storm water will be disposed of within 36 hours via drywells and or bleed pipes.
- 4. Drainage facilities will be designed to retain pre vs post development flows. All runoff in excess of the retained storage capacity will be discharged into an adjacent channel which is already sized to handle existing conditions in the area.



2.0 Description of Existing Drainage Conditions and Characteristics

2.1 Existing On-Site Drainage Conditions

The site currently consists of vacant, undeveloped land with sparse desert vegetation throughout the site. The site is bounded by the Loop 101 Freeway to the north, vacant State Land to the east, a car dealership to the south, and Scottsdale Road to the west.

The site generally slopes from the north to the south at approximately 1.5%. The Crossroads East planning area lies immediately east of the site on the eastern side of the regional drainage channel that passes offsite flows around the eastern side of the site. **Appendix I**, includes the Scottsdale Road Drainage Report which discusses the Crossroads East planning and shows how the storm water from the site ultimately outfalls to Reach 11 (Dike 2) in the City of Phoenix.

In 2003, as part of a City of Scottsdale improvement project, 2 sets of double 6'x4' box culverts were installed in a 30' wide parcel of City owned land along the northern property line to intercept offsite flows from under the Loop 101 freeway. These box culverts discharge into a drainage channel that runs along the eastern property line which turns westerly near the southern property line before entering a triple 8'x3' box culvert that flows under Mayo Boulevard and enters the Bell Lexus site. **Appendix K** contains the as-built drawings for the Lund Channel design through the property.

The remainder of the existing site currently discharges as sheet flow onto Mayo Boulevard where flows are picked up in existing catch basins and conveyed to the aforementioned box culvert in Mayo Boulevard.

Refer to **Appendix F** for the Existing Conditions Topography Exhibit.

2.2 Existing Off-Site Drainage Conditions

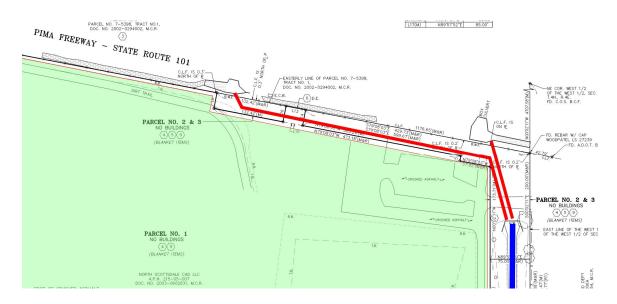
Upstream improvements, north of the freeway, were installed in 2007 as part of the One Scottsdale project. This project installed culverts and retention basins which reduced flows tributary to the original ADOT box culverts. See **Appendix L** One Scottsdale South Drainage Basin Improvement Plans for details.

An interim drainage channel was constructed immediately downstream of the project in 2009 that conveyed flows leaving the southern end of the Lund Channel Box Culvert under Mayo Boulevard to a double 8'x3' box culvert located just north of Princess Boulevard. See **Appendix M** Scottsdale Road Interim Drainage Channel.

The double 8'x3' box culvert under Scottsdale Road was also designed in 2009 as part of Segment 2 of Scottsdale Road improvements by the City of Scottsdale. Note: the Scottsdale Road improvements immediately adjacent to the site were constructed as Segment 1 construction. This double box culvert ultimately discharges west of Scottsdale Road and south of Princess Drive into Reach 11.



Subsequent extensions of the Lund Channel system were made across the "Bell Lexus" site immediately downstream of Mayo Boulevard and across the other downstream projects ultimately connecting to the existing $2-8^{\circ}x3^{\circ}$ box culverts under Scottsdale Road that discharge to Reach 11.



Existing drainage from Scottsdale Road is collected via catch basins which tie into the 36" diameter storm drain in Scottsdale Road that also eventually discharges to Reach 11. Mayo Boulevard drainage is also collected in catch basins that tie back into the existing "Lund Channel" box culverts under Mayo Boulevard which also discharge to Reach 11.

The original design for the ADOT Box culverts anticipated that a total of 600 cfs would be conveyed through the boxes and the "Lund Channel" adjacent to the subject property.

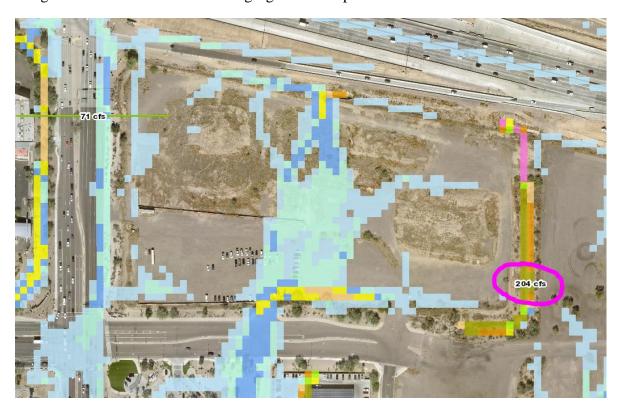
Updated Offsite Hydrology was included in the Final Drainage Report for the Interim Regional Drainage Channel prepared by Wood Patel in October 2008 (see Appendix O) and was utilized to design the downstream improvements based on flows that are significantly less than the original ADOT design flow rates. This hydrology is described in the report as follows:

"The 100 year design flow for the Interim Regional Drainage Channel is 300 cfs. This is based on a 100 year 6 hour design storm utilizing HEC-1. Results of this model are included in Appendix A (of the WP Report)... The included HEC-1 model is an expansion of the hydrology model completed for the One Scottsdale Master Drainage Plan by Wood Patel and Associates. The One Scottsdale development lies upstream of the project site to the north of the Loop 101 Freeway. The model was revised to expand to the south to include the proposed improvements. Flow from the Loop 101 Freeway culverts is now routed through the Interim Regional Drainage Channel (R33E.1). Runoff from the Adjacent State Land Parcel (ASLD) joins at the outfall culvert under Scottsdale Road



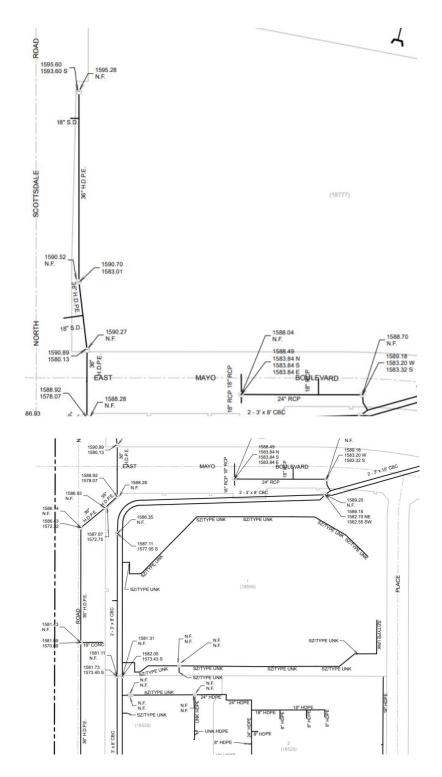
near Princess (CPPRIN). This downstream flow was used as the design flow from the entire channel." The conclusions from the WP report determined that the "Lund Channel" conveys 256 cfs and after inclusion of the other downstream tributary State Land area, the culverts under Scottsdale Road are subject to 300 cfs.

FLO-2D modeling has recently been prepared by the Maricopa County Flood Control District as part of the Pinnacle Peak West – Lower Rawhide analysis and indicate that the 100-year flows in the "Lund Channel" are 204 cfs with another 64 cfs reaching the site from the western ADOT culverts. These flows will actually combine for approximately 268 cfs as the model does not recognize that the 2 box culverts under the freeway combine. While FLO-2D is utilized as a planning tool, these results are consistent with the hydrology presented in the Wood Patel Report. This methodology and analysis have been accepted by the City of Scottsdale and will be used for the purposes of future site design considerations. The following figure is a snip of the FLO 2D results.



The below images are clipped from the City of Scottsdale Quarter Section maps showing storm drain infrastructure in the adjacent streets and also downstream through the Bell Lexus site.





A copy of the Crossroads East Planning Unit IV Drainage Report that provides more detail about the downstream box culverts and proposed developments is included in **Appendix C**.



Refer to **Appendix F** for the Existing Conditions Exhibit.

2.3 Context Relative to Adjacent Projects and Improvements

The site is located between the Loop 101 and Mayo Boulevard on the east side of Scottsdale Road. The Bell Lexus development lies immediately south. See **Appendix E** for Context Aerial of the site.

2.4 FEMA Flood Hazard Areas

The site is located in Flood Zone "AO" according to the Flood Insurance Rate Map 04013C1320L, dated October 16, 2013. Zone "AO" is designated by FEMA as "areas of flood depths of 1 foot (usually sheet flow on sloping terrain) average depths determined for areas of alluvial fan flooding, velocities also determined." Refer to Appendix B for the FEMA FIRMette map for the site. Efforts are currently underway to change the Flood Zone designation to Zone X similar to LOMR's recently approved immediately upstream of the Loop 101 freeway. This process will take up to 12 months, but planning and preliminary engineering is premised on the assumption that this effort will be completed by the end of 2022. Refer to **Appendix B** for current FEMA Flood Map.

The LOMR application has been approved by the City and was submitted to FEMA on June 29, 2022. FEMA comments are anticipated within 90 days.



3.0 Proposed Drainage Plan

3.1 General Description

In the analysis of the proposed drainage conditions the following items are considered:

- Area Types (concrete pavement, building, and desert landscaping)
- ➤ Magnitude of areas
- > Slopes
- > Storm Drain
- > Detention Basins

3.2 Proposed Site Conditions

As previously discussed, the existing eastern channel and downstream conveyance system was originally designed for the 100-year discharge of 600 cfs while the current Maricopa County Flood Control FLO 2D study and the 2009 Wood Patel report indicates that the revised flows in the eastern channel are actually 256-268 cfs. The interim regional drainage channel downstream of the property was conservatively designed for 300 cfs including the predeveloped conditions from the subject property. It is therefore proposed that this site be designed for the greater of pre vs post or first flush flows as it has been shown that runoff can be safely delivered to the Reach 11.

Site-generated storm water in excess of existing conditions storage requirement is proposed to be discharged to the regional drainage channel from the underground detention basin.

Most of the 15.637 +/- net acre property will be covered by an underground parking garage with the surface level of the garage set at elevation 1596.0. The fire loop road around the northern and eastern sides of the property is also at 1596.0. This elevation is above the top of bank elevation of the northern end of the existing channel on the east side of the property and 3.5 feet above the top of bank (1592.5) at the southern end of the channel.

With the proposed discharge point located at the southeast corner of the project, the onsite collection system will also serve to provide pre vs post storage and convey excess flows to the outfall location. This storage and conveyance tank is proposed to be a standalone tank located along the southern edge of the garage with the outlet pipe inverts to be located 3.5 feet below the finished floor elevation at 1592.5 Based on a single point of discharge, the overflow pipes will be designed for the 100-year flow which is calculated to be 37.6 cfs with 3-24" pipes extending to the bottom of the channel. Supporting calculations are located in **Appendix D** and **Appendix H**.



A new fire access road crossing of the channel is proposed to occur at the southern end of the channel. This crossing will require the installation of a triple 4'x8' box culvert that will be sized to match the existing culverts under Mayo Boulevard immediately downstream of the site. Note: The existing culverts were designed to convey the original 600 cfs assumed by ADOT. These box culverts may be reduced in size with final engineering design to match the capacity of the downstream conveyance system based on the 2009 hydrology discussed above.

3.3 Proposed Off-Site Conditions

Regional off-site storm water runoff from north of the Loop 101 onto Planning Unit IV is proposed to be handled in accordance with the Crossroads East Planning Unit IV Master Drainage Report located in **Appendix I**. Off-site storm water impacts beyond those discussed above are not anticipated due to the built-out condition of the upstream areas adjacent to the site.

3.4 Future Conditions

No future drainage impacts are anticipated for the site due to the previous development of areas upstream of the subject parcel. It is anticipated that undeveloped areas adjacent to the site will be developed in accordance with the Planning Unit IV Master Drainage Report and City of Scottsdale standards.

3.5 Storage Requirements

As previously noted, the site is submitting the documentation for a Stormwater Storage Waiver. Pre vs Post Detention will be provided based on the difference in C-values for the onsite tributary area. A C coefficient of 0.9 is assumed for the post developed conditions and 0.45 is utilized for the existing cleared desert conditions.

Delta Runoff Required Drainage **Basin** Land Use Rainfall Coefficient Volume (ft³) Area (ft²) 0.9-0.45 Garage 2.3" **Footprint** =0.45681,146 58,749 Basin A

Table 1: Pre- vs. Post Detention Volume Requirement

Volume Provided = 59,400 cf

3.6 Proposed Drainage Structures or Special Drainage Facilities

An underground retention vault will be constructed in the southeast corner of the site adjacent to the garage footprint to store the pre- vs post development volume. Based on preliminary calcs, it is assumed that the vault will extend to the bottom floor of the garage which is 16.5 feet below the outlet elevation. The cast in place vault is anticipated to be approximately 15' wide by 240 feet long resulted in a storage volume of 59,400 cf which exceeds the required 58,749 cf volume indicated in Table 1 above. While the basin is designed to scalp the flow from the 100-year storm, the overflow outlet will be



designed based on a ration method calculation based on the delta C values. Therefore, the overflow 100-year storm will discharge 37.6 cfs into the adjacent Lund Channel.

The invert of the outlet pipes to the basin will be set at 3.5 feet below the first-floor elevation of 1592.5, and is located above the top of bank of the adjacent regional drainage channel. The pipes will extend to bottom of the channel and outlet immediately upstream of the box culvert under Mayo Boulevard. All pipes will be equipped with a grate.

Dry Wells are designed to drain the tank in less than 36 hours at an initial rate of 0.1 cfs. Based on this rate, each drywell can drain 0.1 cf/sec x 36 hrs x60 min/hr x 60 sec/minute = 12,960 cf per drywell. A total of 5 dry wells are required to drain the tanks. These drywells will be installed in the bottom of the tanks at 50 foot intervals with one drywell located outside of the tank. As the dry wells are constructed, each dry well will be tested to determine actual infiltration rate and the number of required drywells may be reduced accordingly.

3.7 ADEQ AZPDES requirements

Prior to construction an executed Notice of Intent (NOI) shall be submitted to Arizona Department of Environmental Quality (ADEQ) in conformance with the Arizona Pollution Discharge Elimination System Permit (AZPDES) permit. The NOI and associated storm water management best management practices will remain active on the site until construction is complete and a Notice of Termination is filed with ADEQ in conformance with AZPDES permit.

3.8 Project Phasing

This project will be constructed in multiple phases. The retention vault will be constructed with Phase 1 but sized for the entire site.

4.0 Special Conditions

4.1 404 Discussion

No existing U.S. Army Corp of Engineers 404 jurisdictional washes are present on site that would be impacted by the proposed improvements.

4.2 Preservation of existing channel

No proposed disturbance to the "Lund Channel" located on the eastern edge of the property is proposed except for the proposed overflow pipe connection and the installation of the triple box culvert discussed in Section 3.2 above. Per City of Scottsdale requirements, contributing off-site upstream flows must be maintained in the post-development condition.



5.0 Data Analysis Methods

5.1 Hydrologic Procedures, Parameter Selection, and Assumptions

All roof drains from the proposed residential buildings and area drains from the landscaped areas located on top of the garage footprint will be sized by the MEP per building code requirements and will tie directly to the concrete detention vault which will be located within the underground garage. Courtyard inlets are designed to be placed on 30 feet placed grid lines. Refer to **Appendix G**, for the Preliminary Grading and Drainage Plans.

Hydrologic calculations for the site were performed using the rational equation in the FCDMC Drainage Design Manual Volume I, which is limited to drainage areas of up to 160 acres. A weighted runoff coefficient was used for the site based upon the large amount of landscaping located adjacent to perimeters of the site. The completed calculations for the Rational Method are included in **Appendix D**.

5.2 Hydraulic Procedures, Methods, Parameter Selection, and Assumptions

All flows for proposed conditions will be determined using the rational method as outlined by the Drainage Design Manual by Maricopa County Flood Control District. Since all pipe inlets and roof drains will be discharging to the cast in place vault descried above, a minimum time of concentration of 10 minutes has been used. All drainage basins will assume a runoff coefficient of 0.95 to account for the current land description. The delineated water shed used in calculation can be found in **Appendix J.**

The following criteria will be used to size the proposed pipes for on-site storm water conveyance:

- A maximum allowable 100-year ponding depth of six inches above the catch basin grate.
- A minimum of 12 inches of freeboard between the 100-year ponding depth and the building finish floor elevation.
- The tailwater condition for the 100-year event will be assumed to be the hydraulic grade line at the pipe connection location.
- The 10-year tailwater condition will be assumed to be free outfall.

StormCAD analysis for the 10-year and 100-year events will be provided with the final drainage report.



5.3 Storm Water Storage Calculation Methods and Assumptions

As stated above, the difference in pre vs post development runoff volumes will be stored in the retention tank. The standard formula for determining the required first flush storage volumes is as follows:

$$V_R = CPA/12$$

Where: $V_R = \text{storage volume required (cubic feet)}$

C = weighted runoff coefficient = 1.0

P = precipitation depth for First Flush = 0.50 inches

A = contributing drainage area to basin (square feet)

6.0 Conclusion

Based on the results of this final drainage report, the following can be concluded:

- An underground storage retention vault will be constructed adjacent to the garage footprint to store pre vs post development retention volume.
- Discharge from the underground vault will be via 3- 24" pipes into the Lund Channel
- Onsite Storm drainage systems consisting of area drain and roof drains will tie directly into the detention basin located adjacent to the garage footprint.
- The building finish floor elevations have been designed to be at least fourteen inches above the ultimate site outfall elevation.
- Off-site storm water from areas upstream of the site are currently and will remain routed around the site, in the existing Lund Channel and discharged at their historical flow path.
- A new box culvert will be installed at the southeast corner of the site across the Lund Channel to provide Fire Department access to the east side of the site.
- A separate LOMR effort is currently being submitted to FEMA by Kimley-Horn to remove the property from FEMA Zone "AO". All design is being performed assuming the site is reclassified as Zone X.
- All runoff generated in Scottsdale Road and Mayo Blvd are collected in existing catch basins and are not stored on-site and do not impact the site.



This drainage report is intended to provide a level of assurance that the site will adhere to all appropriate reviewing agency guidelines with respect to drainage and flood protection.

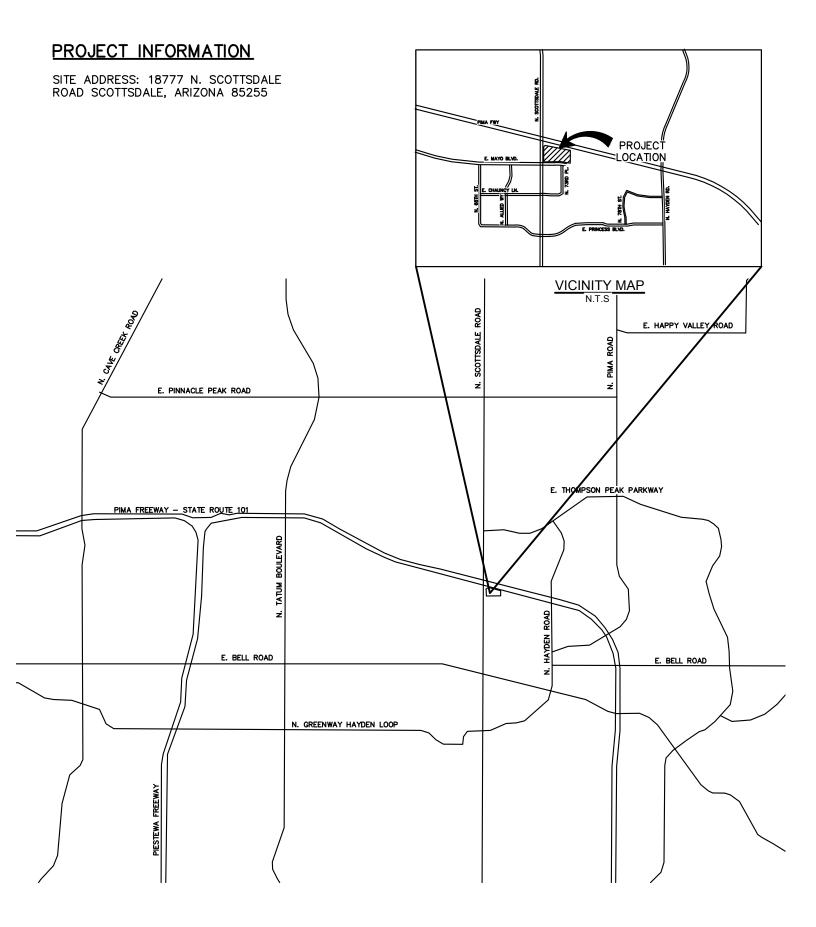
7.0 References

- 1. City of Scottsdale, *Design Standards and Policies Manual, Chapter 4: Grading and Drainage*, January 2010.
- 2. Federal Emergency Management Agency (FEMA), Flood Insurance Rate Map (FIRM) of Maricopa County, Arizona and Incorporated Areas, Panel 1320 of 4425, Map Number 0413C1320L, October 16, 2013.
- 3. Flood Control District of Maricopa County (FCDMC), *Drainage Design Manual for Maricopa County*, *Hydrology Volume*, *February* 2008.
- 4. Flood Control District of Maricopa County (FCDMC), *Drainage Design Manual for Maricopa County, Hydraulics Volume*, January 1996.
- 5. Kimley-Horn and Associates, Inc, Final Drainage Report for Improvement Plans for Scottsdale Road and Chauncey Lane, Crossroads East Planning Unit IV, August 2012.
- 6. City of Phoenix, Storm Water Policies and Standards, December 2013.
- 7. Kimley-Horn and Associates, Inc., *Final Drainage Report for Bell Lexus of North Scottsdale*, Scottsdale, Arizona, 2012.
- 8. Wood Patel and Associates, Final Drainage Report for the Interim Regional Drainage Channel October 2008



Appendix A

Site Location Map and Legal Descriptions









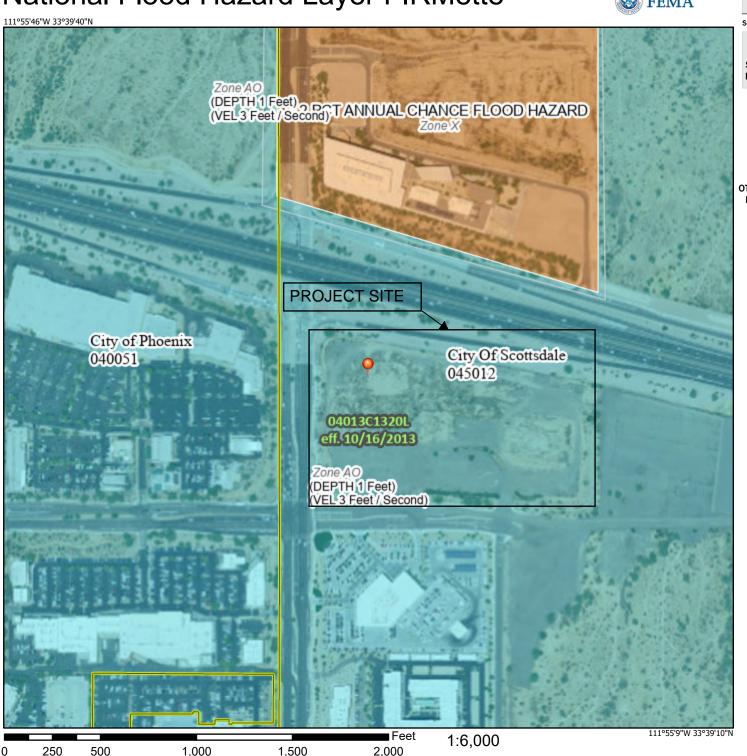
Appendix B

FEMA Flood Insurance Rate Map (FIRM)

National Flood Hazard Layer FIRMette

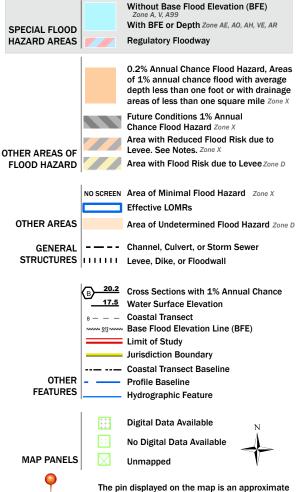


Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT



This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

point selected by the user and does not represent

an authoritative property location.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 11/22/2021 at 1:30 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



Appendix C

Crossroads East Final Drainage Report

FINAL DRAINAGE REPORT

Improvement plans for Scottsdale Road and Chauncey Lane; and

Crossroads East Planning Unit IV

Scottsdale, Arizona Plan check # 2519-2, 1442-12

Plan #1442-12	2
Case #	
Q-S#	
X Accepted	
Corrections	
M. Rahmann	8-14-12
Reviewed By	Date

Prepared For:

Diversified Partners, LLC

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FINAL DRAINAGE REPORT

Improvement plans for Scottsdale Road and Chauncey Lane; and

Crossroads East Planning Unit IV

Scottsdale, Arizona Plan check # 2519-2, 1442-12

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1.0 Introduction

1.1 Project Description

Diversified Partners, LLC is proposing development of a portion of Crossroads East Planning Unit IV (Planning Unit IV) at the southeast corner of Scottsdale Road and Mayo Boulevard for commercial use. The project is anticipated to consist of perimeter roadway and utility infrastructure for future multiple buildings with associated parking improvements.

1.2 Site Location

Proposed development, hereinafter referred to as the "sale parcel", encompasses approximately 29.4± gross acres in a portion of the Northwest Quarter of Section 33, Township 4 North, Range 4 East of the Gila and Salt River Base and Meridian in Maricopa County, Arizona. The sale parcel is a portion of Crossroads East Planning Unit IV (138± acres), and is zoned PCD. More specifically, the sale parcel is bounded by Mayo Boulevard and vacant undeveloped desert zoned PCD(C-4) to the north, vacant undeveloped desert zoned PCD to the east, vacant undeveloped desert and the Princess Resort zoned PCD to the south, and Scottsdale Road to the west. See *Appendix A* for the site location map and legal description; and, Figure 1 and 2 in Appendix E for a Context Aerial map and Grading and Drainage Plan.

1.3 Purpose

This Final Drainage Report for the Planning Unit IV is intended to satisfy the storm drainage master planning stipulation number 2.5 for Zoning Case 19-ZN-2002 with regards to Planning Unit IV, as well as more specific guidelines for the aforementioned commercial development infrastructure (sale parcel) in accordance with the City of Scottsdale drainage guidelines and standards. This report provides a description of the current storm water drainage patterns and systems, a description of required and proposed drainage off-site improvements, and outlines anticipated phasing for Planning Unit IV and the sale parcel.

1.4 Objectives

This final report provides a drainage plan for Planning Unit IV and the sale parcel that is intended to meet the drainage standards and guidelines of the City of Scottsdale and the Flood Control District of Maricopa County (FCDMC). In particular, the report will demonstrate the following:

- 1. Off-site storm water from the north being routed around the sale parcel development and discharging to the box culvert under Scottsdale Road at Princess Drive; consistent with current drainage patterns.
- 2. A delineation of land east and west of the natural drainage divide (hydrologic divide) that bisects Planning Unit IV; and, how drainage will be handled on each side.



- 3. Sale parcel development designating on and off-site drainage facilities, including temporary and permanent detention basins, for the 100-year, 2-hour storm event.
- 4. Temporary and permanent drainage facilities having positive outfall; and, any detained storm water being disposed of within 36 hours.
- 5. Drainage facilities being designed such that the 100-year, 2-hour post-development flow is collected and conveyed in such a manner as to not cause damage to buildings and property.
- 6. Future drainage requirements for the remainder of Planning Unit IV.



2.0 Description of Existing Drainage Conditions and Characteristics

2.1 General Description

Planning Unit IV's existing drainage conditions and characteristics have been classified into two areas, the sale parcel and the remainder of Planning Unit IV (or simply "remainder"), per the following descriptions:

Sale Parcel

This area consists of 29.4 gross acres of commercial development from the Chauncey Lane alignment to Mayo Boulevard, and from Scottsdale Road to the 73rd Place alignment.

Remainder of Planning Unit IV

This area consists of the remainder of acreage of Planning Unit IV from the sale parcel limits to Loop 101 and the Miller Road alignment, south to Princess Road and east to Scottsdale Road.

2.2 Existing Sale Parcel Drainage Conditions

The sale parcel currently consists of vacant desert and a seasonal use facility with an asphalt and gravel parking area. The sale parcel is bounded on the west by Scottsdale Road, on the north by Mayo Boulevard, on the east by the proposed east right-of-way of 73rd Place, and on the south by the proposed south right-of-way of Chauncey Lane.

The general topography of the sale parcel area is mildly sloping terrain at approximately 2%. A hydrologic divide bisects the sale parcel directing drainage to two separate facilities – Reach 11 (Dike 2) in the City of Phoenix and the TPC (Dike 3) in the City of Scottsdale (see Figure 3 of Appendix E). Storm water from land west of the hydrologic divide flows southwest toward the intersection of Scottsdale Road and Chauncey Lane, it then proceeds south along the east side Scottsdale Road in a swale to a box culvert under Scottsdale Road at Princess Boulevard where it is conveyed to Reach 11. An existing double-barrel 10'x3' arch culvert discharges off-site storm water onto the sale parcel at its northeast corner, west of the hydrologic divide (See photos 1 and 2 below). Storm water from this culvert proceeds south to a temporary detention basin at the center of the sale parcel, where it connects to "West Wash" identified on Figure 4 in Appendix E. "West Wash" flows southwest toward the intersection of Scottsdale Road and Chauncey Lane to the previously noted roadside swale that connects to the existing box culvert under Scottsdale Road at Princess Boulevard.





Photo 1: Downstream outlet from 10'x3' arch culvert.

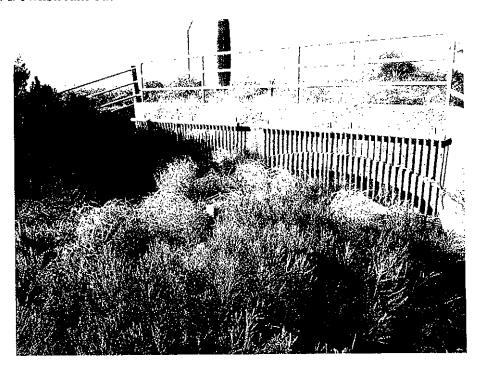


Photo 2: Upstream Inlet from 10'x3' arch culvert.

Storm water from land east of the hydrologic divide flows south/southeast toward "East Wash" identified on Figure 4 in *Appendix E*. "East Wash" flows south and intersects with



an existing channel along the north side of Princess Boulevard, continuing on to the TPC via a box culvert under Princess Boulevard.

2.3 Existing Remainder of Planning Unit IV Drainage Conditions

The remainder of Planning Unit IV currently consists of vacant desert and a gravel parking area along the Loop 101. The remainder is bounded on the west by Scottsdale Road and the sale parcel, on the north by Loop 101, on the east by the proposed Miller Road alignment, and the south by Princess Boulevard.

The general topography of the remainder is mildly sloping terrain at approximately 2%. A hydrologic divide bisects a portion of the remainder directing drainage to two separate facilities – Reach 11 (Dike 2) in the City of Phoenix and the TPC (Dike 3) in the City of Scottsdale (see Figure 3 of *Appendix E*). Storm water from land west of the hydrologic divide flows southwest toward a box culvert under Scottsdale Road at Princess Boulevard where it is conveyed to Reach 11.

Storm water from land east of the hydrologic divide flows south/southeast toward "East Wash" identified on Figure 4 in *Appendix E*. "East Wash" flows south and intersects with an existing channel along the north side of Princess Boulevard, continuing on to the TPC via a box culvert under Princess Boulevard. Two existing culverts under Loop 101 discharge off-site storm water onto the remainder along its north boundary, east of the hydrologic divide. Storm water from these culverts proceeds south in "East Wash" identified on Figure 4 in *Appendix E*. "East Wash" flows south toward Princess Boulevard to the previously noted roadside channel that connects to the existing box culvert under Princess Boulevard.

2.4 Existing Off-site Drainage Conditions

Four box culverts under the Loop 101 exist north of Planning Unit IV. The two western most box culverts (See Figure 4) discharge to arch culverts that combine to an open channel that is routed around property that is not part of Planning Unit IV; bringing flow south under Mayo Boulevard onto the sale parcel. The two eastern most box culverts (See Figure 4) discharge directly onto the gravel parking area on the remainder of Planning Unit IV. Off-site flows proceed through Planning Unit IV as described in Sections 2.2 and 2.3.

2.5 Context Relative to Adjacent Projects and Improvements

The proposed sale parcel is located south of Mayo Boulevard, east of Scottsdale Road, North of the proposed alignment of Chauncey Lane, and west of the proposed 73rd Street alignment. See Figure 1 in Appendix E for Context Aerial of the site.

2.6 FEMA Flood Hazard Areas

The sale parcel site is located in Flood Zone "A" according to the Flood Insurance Rate Map 04013C1245H, dated September 30, 2005. Zone "AO" is designated by FEMA as "areas of flood depths of 1 foot (usually sheet flow on sloping terrain) average depths



determined for areas of alluvial fan flooding, velocities also determined." Refer to Appendix B for the FEMA FIRMette map for the site. An elevation certificate will be required for any building to be constructed in this flood hazard designation.



3.0 Proposed Drainage Plan

3.1 General Description

Planning Unit IV's proposed drainage conditions and characteristics remain classified into two areas, the sale parcel area and the remainder of Planning Unit IV (or simply "remainder"), per the following descriptions:

Sale Parcel

This area consists of 29.4 gross acres of commercial development from the Chauncey Lane alignment to Mayo Boulevard and from Scottsdale Road to the 73rd Place alignment.

Remainder of Planning Unit IV

This area consists of the remainder of acreage of Planning Unit IV from the sale parcel limits to Loop 101 and the Miller Road alignment, south to Princess Road and west to Scottsdale Road.

In the analysis of the proposed drainage conditions the following items were considered:

- > Area Types (asphaltic pavement, building, and desert landscaping)
- > Magnitude of areas
- > Slopes
- > Storm Drain
- > Detention Basins

3.2 Proposed Sale Parcel Conditions

The sale parcel proposes a combination of in-kind contribution and detention for the 100-year, 2-hour storm event. In-kind contribution, in the form of a regional drainage channel, will be used to convey off-site flows around the sale parcel and for direct drainage of land west of the hydrologic divide. Detention will be used for land east of the hydrologic divide. To accommodate the off-site roadway drainage design of 73rd Place, the hydrologic divide was modified along the western boundary of 73rd place with an equivalent land area exchange between the land east and west of the hydrologic divide to maintain respective drainage areas and flows. See Figure 5 (Site Basin Delineation) for adjusted hydrologic divide location in relation to the Sale Parcel and Planning Unit IV.



West of Hydrologic Divide

Sale Parcel land west of the hydrologic divide is proposed to be captured in a channel/box culvert along Scottsdale Road. No permanent site surface or underground retention is required for this area due to the in-kind contribution and construction of a regional drainage channel/culvert along Scottsdale Road. The regional drainage channel's construction is planned to coincide with development of the sale parcel. It is the sale parcel developer's preference to utilize a box culvert to convey storm water around the site from Mayo Boulevard to Chauncey versus an open channel. South of Chauncey, the box culvert discharges to an open channel. If the development preferences for the sale parcel change from a box to an open channel, an amended drainage study will be provided to reflect that change.

Interim stormwater run-off from the site, prior to full development, will be captured in two temporary basins that will drain via catch basins connected to the proposed box culvert with 30" RCP. The temporary basins will collect the 100-year 2-hour storm water runoff from the sale parcel and bleed off the storm water through the aforementioned storm drain connections. Upon full development of the sale parcel, the temporary basins will be removed, the existing storm drain connections can be extended through the site. Additional storm drain connections to the box culvert may be added to accommodate the fully-developed 100 year peak flow. Locations and sizes of additional storm drain connections will be determined based upon the individual site development drainage plans.

Sale Parcel land west of the hydrologic divide is identified as basin ASLD1 in Figure 5 (Appendix E) with a concentration point of ASLDCT. Based upon the previously prepared Wood Patel HEC-1 model, with modifications outlined in section 5.1, the associated flows from the ASLD1 basin and the combined 100yr peak flow (on-site and off-site) at this concentration point are calculated to be 114 and 317 cfs, respectively. See Figure 5 (Appendix E) for the Site Basin Delineation Map Exhibit.

East of Hydrologic Divide

Drainage from the 100-year, 2-hour storm for land east of the hydrologic divide will be detained in a multiple surface detention basins located on the west side of the proposed 73rd Place alignment. These detention basins will drain to one another via storm drain pipes with orifice plates to restrict disposal rates ultimately out-falling to the southeast to the "East Wash", consistent with the current drainage pattern. The east side of 73rd Place and the south side of Chauncey Lane will drain to a roadside swale, discharging to the "East Wash" as an interim condition. The combined peak flow of the interim roadside swale and the bleed off basins is less than the undeveloped peak flow for the area discharging to the "East Wash," see Appendix D for calculations. Flows will continue on their current path to the box culvert that crosses south under Princess Boulevard and outfalls into the TPC golf course. See Figure 5 (*Appendix E*) for Site Basin Delineation Map Exhibit.



Future development along the east side of 73rd Place and south side of Chauncey Lane will be responsible for detaining the 100-year 2-hour storm for their adjacent half streets, unless a master drainage solution for the east of the hydrologic divide has been developed

3.3 Proposed Remainder of Planning Unit IV Conditions

The remainder of Planning Unit IV proposes a combination of in-kind contribution and future detention for the 100-year, 2-hour storm event. In-kind contribution, in the form of a regional drainage channel, will be used for drainage from land west of the hydrologic divide. Drainage from land east of the hydrologic divide will continue to on its historic path until future development occurs.

West of Hydrologic Divide

Remainder land west of the hydrologic divide is proposed to be captured in a channel along the east side of Scottsdale Road. No permanent site surface or underground retention will be provided for this area due to the in-kind contribution and construction of a regional drainage channel/culvert along Scottsdale Road. The regional drainage channels construction is planned to coincide with development of the sale parcel. Interim storm water runoff from the remainder parcel shall sheet flow into the open channel along Scottsdale Road. Future development of the remainder parcel may add storm drain connections to the drainage channel to accommodate proposed site development.

Remainder land west of the hydrologic divide is identified as basin ASLD2 in Figure 5 (Appendix E) with a concentration point of CPPRIN. Based upon the previously prepared Wood-Patel HEC-1 model, with modifications outlined in section 5.1, the associated flows from the ASLD2 basin and the combined 100 yr peak flow (on-site and off-site) at this concentration point are calculated to be 84 and 351 cfs, respectively. See Figure 5 (Appendix E) for Site Basin Delineation Exhibit.

East of Hydrologic Divide

The future development of this area will detain the 100-year, 2-hour storm in multiple surface detention basins as warranted by proposed improvements. The detention basins should be designed to discharge to an existing wash or drainage conveyance channel that ultimately connects to the existing drainage channel along the north side of Princess Boulevard, consistent with the current drainage patterns.

3.4 Proposed Off-site Conditions

Off-site storm water runoff from north of the 101 onto Planning Unit IV is proposed to be handled in the following manner.

Western two box culverts - Sale Parcel

The western two box culverts that convey storm water from north of the Loop 101 onto Planning Unit IV currently discharge onto the proposed sale parcel, west of the



hydrologic divide. With the development of the sale parcel, per the preference of the sale parcel owner, off-site storm water will be routed to the east side of Scottsdale Road and then south to Chauncey Lane via two 8'x3' box culverts (see *Appendix D* for calculations). South of Chauncey Lane, along the east side of Scottsdale Road, off-site storm water will be conveyed in an interim trapezoidal open channel with grade control structures to the existing box culvert under Scottsdale Road that connects to the Reach 11 (Dike 2). The flows in the box culvert and the interim open channel have been sized to accommodate the future fully-developed portions of ASLD1 and ALSD2 drainage basins. See Figure 5 (*Appendix* E) for site basin delineation map.

Eastern two box culverts - Remainder

Future development of this area will dictate how off-site flows are managed and routed to the existing channel on the north side of Princess Boulevard, consistent with the current drainage patterns.

It should be noted that discussions with the City of Scottsdale have revealed the channel north of Princess Boulevard is currently experiencing notable erosion and sediment transport. Drainage studies in conjunction with future development should explore channel armoring options.

3.5 Future Conditions

No future drainage impacts are anticipated for the sale parcel due to the proposed installation of the regional drainage channel/box culvert along the east side of Scottsdale Road from Mayo Boulevard to Princess Drive. The channel/box culvert adjacent to the sale parcel from Mayo Boulevard to Chauncey Lane will be constructed in its final configuration in accordance with the City of Scottsdale scenic corridor guidelines. The channel south of Chauncey Lane to the culvert under Scottsdale Road at Princess Boulevard will be an interim channel that may be modified for the needs of the adjacent future development. Individual future parcels of remainder Planning Unit IV will be responsible for their respective 100-year 2-hour detention depending upon their location in relation to the hydrologic divide.

3.6 Storm Water Storage Requirements

Sale Parcel surface detention basins have been designed to detain the on-site runoff volume associated with the 100-year, 2-hour storm for land east of the hydrologic divide. No permanent storm water storage will be provided for land west of the hydrologic divide due to the approved in-kind contribution to build a regional drainage channel along the east side of Scottsdale Road. Two interim storm water detention basins are proposed along Scottsdale Road next to the box culvert to allow for capturing of site generated storm water into the box culvert prior to full development.

Detention volume will be provided by multiple surface retention basins along the proposed 73rd Place and Chauncey Road alignments. The side slopes for the retention basin are a maximum of 4:1 with a maximum depth of 3 feet.



Future development within the remainder of Planning Unit IV will be required to provide at least one foot of freeboard from the basin overflow elevation to the finished floor elevation of any proposed buildings, in accordance with the City of Scottsdale design standards and policy manual.

The following Table summarizes proposed detention to be constructed as part of the sale parcel development by basin name, type, total contributing area to the basin, runoff coefficient for the contributing area, and the required and provided detention volume for the sale parcel and impacted areas of remainder land.



Table 1: On-site Detention Volume

Basin	Land Use	Runoff Coefficient	Drainage Area (ft²)	Required Volume (ft ³)	Provided Volume (ft³)	Surplus (ft³)
Α	Landscaping	0.45	3,703	350		
	Pavement	0.95	11,890	2,371		
			15,593	2,721	3,142	421

Basin	Land Use	Runoff Coefficient	Drainage Area (ft²)	Required Volume (ft ³)	Provided Volume (ft ³)	Surplus (ft³)
В	Landscaping	0.45	5,220	493		
	Pavement	0.95	32,641	6,509		
			37,861	7,002	7,588	586

Basin	Land Use	Runoff Coefficient	Drainage Area (ft²)	Required Volume (ft ³)	Provided Volume (ft³)	Surplus (ft ³)
С	Landscaping	0.45	13,164	1,244		
	Pavement	0.95	66,572	13,276		
			79,736	14,519	17,843	3,323

Basin	Land Use	Runoff Coefficient	Drainage Area (ft²)	Required Volume (ft ³)	Provided Volume (ft ³)	Surplus (ft ³)
D	Landscaping	0.45	449,197	42,432		
(Temp Basin)	Pavement	0.95	0_	0		
			449,197	42,432	44,212	1,780

Basin	Land Use	Runoff Coefficient	Drainage Area (ft²)	Required Volume (ft ³)	Provided Volume (ft ³)	Surplus (ft³)
E	Landscaping	0.45	396,700	37,473		
(Temp Basin)	Pavement	0.95	0	0		
			396,700	37,473	39,762	2,289

The detention basins are designed such that the 100-year, 2-hour runoff volume is disposed of via pipe flow and overland flow, See Figure 5 in *Appendix E* for Basin Delineation.

3.7 Pre- and Post-Development Runoff Characteristics at Concentration Points

The existing site consists primarily of vacant undeveloped desert. Current topography shows the site draining from northeast to southwest. Upon site development, Sale Parcel storm water west of the hydrologic divide will sheet flow to catch basins and then be conveyed through underground storm drain to the regional channel/box culvert along the east side Scottsdale Road. Sale Parcel storm water east of the hydrologic divide will sheet flow to curb openings/scuppers and then be conveyed through underground storm



drain to a series of connected detention basins that will allow the water to sheet flow south to the existing channel along the north side of Princess Boulevard, consistent with the current drainage patterns.

3.8 Proposed Drainage Structures or Special Drainage Facilities

Aesthetics and site access needs dictate that a portion of the regional drainage channel be proposed as a double-barrel box culvert. This box culvert is anticipated to connect to the existing culvert under Mayo Boulevard and extend around the perimeter of the Sale Parcel to the south side of the proposed Chauncey Lane alignment. The box culvert has been designed to accommodate the 100-year storm peak flow as a dry box. The final design will include a drainage easement, dedicated to the City of Scottsdale.

3.9 Project Phasing

This project will be constructed in a multiple phases as follows:

- 1. Regional Drainage Channel, 73rd Place, Chauncey Lane, and rough grading the remaining Sale Parcel area for site development.
- 2. Sale Parcel on-site development/improvement. Site development may occur in multiple sub-phases (A, B, C, etc) as market conditions warrant.
- 3. Remainder portions of Planning Unit IV. Development may occur in multiple sub-phases (A, B, C, etc) as market conditions warrant.



4.0 Special Conditions

4.1 404 Discussion

Per correspondence with the U.S. Army Corp of Engineers 404 jurisdictional washes are impacted by the proposed Regional Channel improvements, roadway improvements, and temporary drainage basins. A Nationwide permit with the Corp of Engineers has been obtained for the disturbance of the existing 404 jurisdictional wash on-site. See Appendix H for Corp of Engineers Certificate of Compliance with Department of the Army Nationwide Permit.



5.0 Data Analysis Methods

5.1 Hydrologic Procedures, Parameter Selection, and Assumptions

West of Hydrologic Divide

Hydrologic calculations for land west of the hydrologic divide were performed using the computer program HEC-1 as outlined for FCDMC Drainage Design Manual Volume I. The previously prepared IIEC-1 model for *Interim Regional Drainage Channel* prepared by Wood-Patel and Associates, Inc., was modified to maintain the previous NOAA 2 rainfall data with a change to the sale parcel hydrologic characteristics to reflect the fully developed condition of Planning Unit IV west of the hydrologic divide. In addition the HEC-1 model was modified to reflect the routing of off-site storm water through a box culvert, instead of an open channel to Chauncey Lane (per sale parcel owner's preference for box culvert versus channel), and the subdivision of the previous study's ASLD basin into a north basin, ASLD1, and a south basin, ASLD2.

The NOAA 2 rainfall data used in the previous study was unchanged from the previous approved HEC-1 model. The fully developed condition for land west of the hydrologic divide was achieved by increasing the impervious value of the of sub basin ASLD1 and ASLD2 to 95%. The results of the revised HEC-1 model are located in *Appendix C*. Figure 5, which identifies the drainage sub-basins and concentration points associated with the HEC-1 model, is located in *Appendix E*.

To accommodate the roadway alignment and grading of 73rd Place through the northern end of the hydrologic divide, a land swap between the east and west was utilized. The portion of land located east of the western right of way line of 73rd Place to the hydrologic divide line was exchanged for the equal land area located along the southern portion of the sale parcel See Figure 5, Site Basin Delineation, for the land swap area locations. Since the land area exchange is the same, the flow quantity and magnitudes east and west of the hydrologic divide should remain unchanged.

East of Hydrologic Divide

Hydrologic calculations for land east of the hydrologic divide were performed using the rational equation in the FCDMC Drainage Design Manual Volume I, which is limited to drainage areas of up to 160 acres using NOAA 14 rainfall data. A weighted runoff coefficient was used for the site for the large amount of desert landscaping located adjacent to 73rd Place and Chauncey Lane in the required landscape setbacks. All other drainage sub basins were modeled using a fully developed pavement runoff coefficient to account for future developments.

For analysis of the sale parcel east of the hydrologic divide, the site was sub-divided into sixteen sub-basins (ten sub-basins for the sale parcel, west half street of 73rd Place, and north half street of Chauncey Lane; six sub-basins for the remaining half streets) consisting of the pavement, landscaping, and future commercial. For each sub-basin, the



rational equation was used to calculate the peak flow at each concentration point for each basin. The results of the rational method are located in Appendix C. Figure 7, which identifies the drainage sub-basins, is located in *Appendix E*.

5.2 Hydraulic Procedures, Methods, Parameter Selection, and Assumptions West of Hydrologic Divide

The regional drainage channel along the east side of Scottsdale Road was evaluated using the computer programs StormCAD, by Bentley, for the box culvert routing, and HEC-RAS for the open channel routing and backwater analysis.

Using StormCAD the proposed box culvert from north of Mayo Boulevard to south of Chauncey Lane was analyzed for the 100-year peak flow of 317 cfs at the outlet (peak flow calculated at culvert outfall from modified HEC-1) with a total of 8 cfs being captured between inlets CB-50 and CB-55 and 309 cfs entering the upstream culvert entrance (conservative model due to future connections and flows at each connection). Headlosses at the bends/junctions of the box culverts were individually calculated and included in the analysis as a user defined values.

Using HEC-RAS, the interim channel south of Chauncey Lane to the existing box culvert that crosses Scottsdale Road at Princess Boulevard was analyzed for the peak flow of 351 cfs (peak flow calculated at Box culvert under Scottsdale Road from modified HEC-1 model). Cross sections were taken at the upstream and downstream of each grade control structure (See Figure 6: HEC-RAS Cross Section Locations). The upstream boundary condition was set to match the water surface elevation calculated at the outfall of the double 8'x3' box culvert. The downstream boundary condition was set at the water elevation that would match the calculated head for the dry crossing at the culvert entrance per the Scottsdale Road Drainage Report prepared by Dibble and Associates, Inc., in March 2009. Rip rap and grade control structures are proposed to maintain velocities below 6 feet per second in the main channel areas. Manning's n values for the channel were selected from the Maricopa County Flood Control District Hydraulics Manual.

East of Hydrologic Divide

The sale parcel site east of the hydrologic divide is divided into sixteen sub-basins that drain into an on-site detention basin. As described in Section 5.1, ten of the sub-basins include the sale parcel land and adjacent half street right-of-ways, and the other six include the remaining half street right-of-ways and the impacted remainder land. See Figure 7 in Appendix F for enlarged sub-basin boundaries.

All flows for proposed conditions were determined using the rational method as outlined by the *Drainage Design Manual by Maricopa County Flood Control District*. Due to the small nature of the watersheds for the individual sub-basins, a minimum time of concentration of five minutes was assumed. All of the drainage basins assume a runoff coefficients of 0.95 (100-year) and 0.85 (10-year) with the exception of the landscape



sub-basins. Due to the relatively large amount of landscaping in these areas, a weighted runoff coefficient was used for future landscape areas only (all other basins used a fully developed runoff coefficient). Per the *City of Scottsdale Design Standards and Policy Manual* (January 2010), the runoff coefficient for desert landscaping (no impervious weed barrier) is 0.45 for Hydrologic Soil Group B. The peak flows at the sub-basin concentration points were calculated using the rational method using NOAA 14 rainfall data (see *Appendix C* for hydrologic results).

The following criteria were used to size the proposed pipes and drainage inlets for on-site storm water conveyance and disposal:

- A maximum allowable 100-year ponding depth of 8 inches above the drainage inlet for roadway and contained within the road right-of-way.
- One dry lane in each direction for the 10-year spread in Chauncey Lane (Collector street classification).
- Stormwater contained within the curbs for the 10-year spread in 73rd Place (Local street classification).
- A maximum allowable 10-year ponding depth of 6 inches to contain all storm water runoff within the roadway. (6" depth max).
- Only negligible amount of flow is allowed to bypass the scuppers located at the hydrologic divide (less than 0.30 cfs)

Storm drain calculations and inlet calculations are included in Appendix D.

5.3 Storm Water Storage Calculation Methods and Assumptions

Storm water storage requirements were calculated per City of Scottsdale and Flood Control District of Maricopa County design standards. The standard formula for determining the required storage volumes for the 100-year, 2-hour storm is as follows:

Equation 2: Standard Formula for On-Site Storage Requirement

 $V_R = CPA/12$

Where: $V_R - \text{storage volume required (acre-feet)}$

C = weighted runoff coefficient

P = precipitation depth for 100-year, 2-hour event = 2.29 inches

A = contributing drainage area to basin (acres)



6.0 Conclusion

6.1 Overall Project

Based on the results of this final drainage report, the following can be concluded:

- Off-site storm water west of the hydrologic divide will be channelized (Regional Drainage Channel) and directed around the sale parcel.
- Off-site storm water east of the hydrologic divide will continue on its historic path.
- Sale Parcel drainage west of the hydrologic divide will be directed to the Regional Drainage Channel as part of the in-kind contribution.
- Storm drainage systems consisting of catch basins and storm drain pipe will be provided to collect and convey drainage to the Regional Drainage Channel.
- Surface detention will be provided to detain the post-development 100-year, 2-hour storm water for sale parcel land east of the hydrologic divide. Permanent basins for sale parcel site development and site development half-streets (west half of 73rd Place and north half of Chauncey Lane) will be provided on-site. Storm water for the east half of 73rd Place and the south half of Chauncey Lane will discharge into roadway swales with outfall to a natural wash.
- Surface detention basins east of the hydrologic divide will outfall/drain via pipe and overland flow toward the channel along Princess Boulevard.
- Storm drainage systems consisting of curb cuts, storm drain pipe, headwalls, and orifice plates will be provided to collect and convey drainage to the detention basins.
- Remainder site generated storm drainage will continue to flow in its current drainage pattern.
- Future building finish floor elevations will be designed at least fourteen inches above the ultimate site outfall elevation and at least 2 foot above the highest adjacent natural grade to provide one foot of clearance/freeboard from the depth of sheet flow.
- Based on the current Flood Insurance Rate Map (FRIM), the sale parcel is located in the Zone "AO". Any buildings in this Flood Zone will be designed above the depth of flow as indicated on the FIRM map with one foot of clearance/freeboard.
- Drainage easements are provided for the permanent and temporary surface detention basins and final Regional Drainage Channel/Culvert.



This final drainage report is intended to provide a level of assurance that the sale parcel and remainder of Planning Unit IV will adhere to all appropriate reviewing agency guidelines with respect to drainage and flood protection.



7.0 References

- 1. City of Scottsdale, Design Standards and Policies Manual, Chapter 4: Grading and Drainage, January 2010.
- 2. Dibble Engineering, Inc, Drainage Report for Scottsdale Road Frank Lloyd Wright Blvd to Thompson Peak Parkway Segment 2, March 2009.
- 3. Federal Emergency Management Agency (FEMA), Flood Insurance Rate Map (FIRM) of Maricopa County, Arizona and Incorporated Areas, Panel 2160 of 4350, Map Number 04013C2160F, September 30, 2005.
- 4. Flood Control District of Maricopa County (FCDMC), Drainage Design Manual for Maricopa County, Hydrology Volume, February, 2008.
- 5. Flood Control District of Maricopa County (FCDMC), Drainage Design Manual for Maricopa County, Hydraulies Volume, January, 1996.
- 6. Wood Patel and Associates, Inc, Final Drainage Report for Interim Regional Drainage Channel. October 2008.

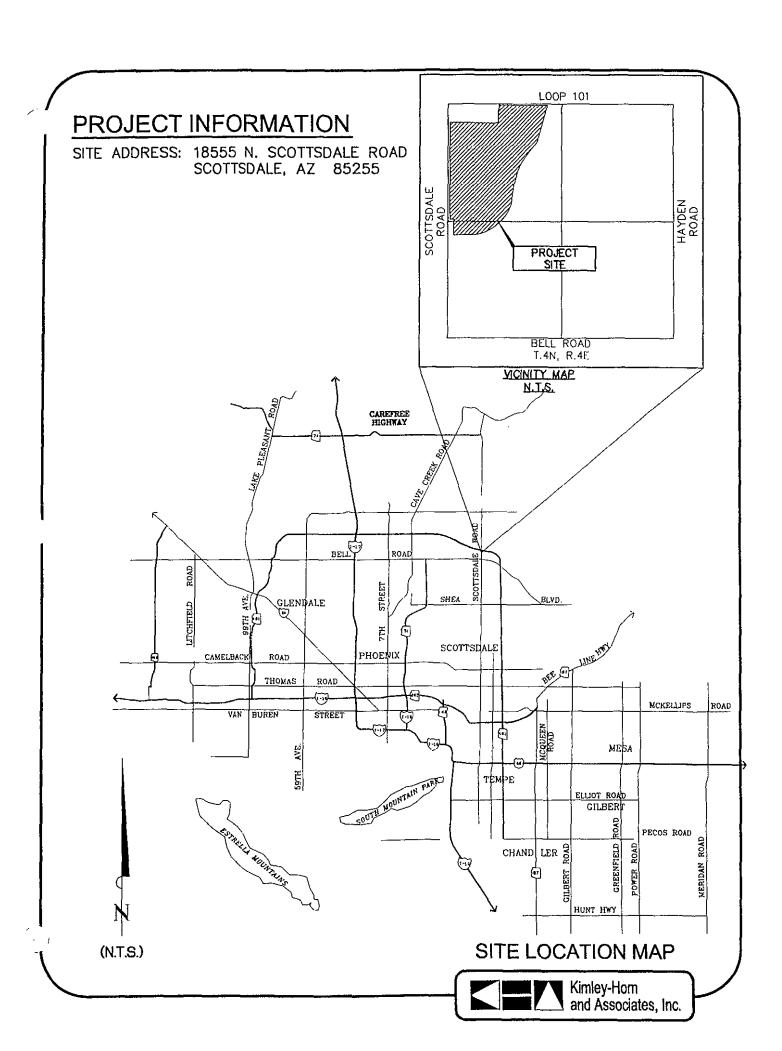


Appendix A

Site Location Map and Legal Descriptions

LEGAL DESCRIPTION:

TRACT 3A, STATE PLAT NO. 16, SOUTH CORE, ACCORDING TO BOOK 324 OF MAPS, PAGE 50, RECORDS OF MARICOPA COUNTY, ARIZONA.





Appendix B

FEMA Flood Insurance Rate Map (FIRM)





Appendix C

Hydrologic Calculations

HEC-1 Calculations

PLOOD HYDROGRAPH PACKAGE (HEC-1)
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

HEC-1 INPUT

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: DAMBERAK OUTFLOW SUBMERGENCE, SINGLE EVENT DAMAGE CALCULATION, DSS:MRITE STAGE FREQUENCY, DSS:RRAD TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
LINE
               τb
                      ONE SCOTTSDALE (STACKED 40S) POST DEVELOPMENT CONDITION 100-YR 6-HR STORM
               ID
                      OFFSI'TE HYDROLOGY & ONSITE HYDROLOGY FOR AREA GOVERNED BY PRE-POST CRITERIA
   3
               TD
                      OPTION A - ASLD CHANNEL
               ID
                      FILE: 100YR-N2.DAT
               ID
                             OPTION B - 34.1 ACRES OF ASLD PARCEL
               ID
                      BASED ON MODELS PREPARED BY: ROBERT L. WARD, P.E., CONSULTING ENGINEER
               ΪD
   8
                                         PR5W-100.6I
                                         C1.61 (CENTER DRIVE PROJECT)
S40EX100.61 (STACKED 40S EXISTING CONDITION)
  10
               ID
  11
               ID
               ΙD
  12
  13
               ĮD
                      ALL CURVE NUMBERS ADJUSTED TO 6-HOUR VALUES ON AUGUST 13, 2002
  14
               ID
                      100-YEAR, 6-HOUR HYPOTHETICAL STORM
  15
               ΙD
               ΊD
                      AREAL RAINFALL REDUCTION IS BASED ON A 14 SQUARE MILE STORM.
  17
               ID
               *DIAGRAM
               1T
                                               300
  19
               10
                        BEGIN GRAYHAWK - VILLAGE 1 DRAINAGE PLAN
                        PREPARED BY: GILBERTSON ASSOCIATES, INC., HEC-1 FILE: UDPLAN.DAT.
                        THIS GILBERTSON MODEL USES SCS UNIT HYDROGRAPH METHODOLOGY.
                       THE ORIGINAL MODEL WAS BASED ON A 1-MINUTE COMPUTATION INTERVAL.
               ĸκ
  20
  21
               КM
                         EXCESS RUNOFF FROM SUBAREA 1A1
  22
               KΜ
                         RAINFALL REGION 3
  23
                     .0188
               RA
               PH
  24
                                                                       2.99
                                      0.76
                                              1.50
                                                      2.54
                                                               2.81
                                                                               3.33
                                        36
  26
               UD
                     0.08
  28
               КM
                         DETENTION BASIN FOR SUBAREA 1A1
  29
               RS
                              STOR
               sv
  30
                              1.76
               SQ
                               20
  32
               SF
                         n
                               3.0
               ST
  3?
                      3.0
                               15
                                       2.8
                                               1.5
  34
               KK
                   RA1 - C4
               KM
                         ROUTE OUTFLOW FROM DET1A1 TO CP1C4
  35
                         TRIANGULAR CHANNEL PER PLANS (1182-E-94 AND 190-E-95)
SIDE SLOPE = 3:1 (H:V)
MAX DEPTH = 1.35 FT.
  36
               КM
  37
               \mathbf{K}\mathbf{M}
  าล
               KM
               RS
  39
                              FLOW
                                         -1
                    0.025
  40
                             0.025
                                     0.025
                                               670 0.0179
  4.1
               RX
                                              5.04 5.05
                                                                9.1
                     1.37
  12
               RY
                              1.36
                                      1.35
                                                 Ó
                                                               1.35
                                                                       1.36
                                                                               1.37
                                                                                                        PAGE 2
                                              HEC-1 INPUT
LIME
               TD.,...,2...,3...,4.....5....6...,7....8....9....10
  43
               KK
                      1C4
  44
               KM
                         EXCESS RUNOFF FROM SUBARRA 104
               BA
                     .005
  55
               ١٬S
```

```
48
                     CP1C4
  49
                KM
                          COMBINE HYDROGRAPHS FROM RAI C4 AND 1C4
                НC
  50
  51
                KK
                    RC4 - C3
                          ROUTE OUTFLOW FROM CPIC4 TO CPIC3I
TR'(ANGULAR CHANNEL PER PLANS (1192-E-94 AND 190-E 95)
SIDE SLOPE = 3:1 (H:V)
                KM
  52
  53
                KM
  55
                KM
                                          MAX DEPTH = 1.5 FT.
                RS
  56
                              FLOW
                                          - 1
  57
                RC
                     0.025
                              0.025
                                      0.025
                                                 400 0.020
  58
                ЯX
                         n
                                0.5
                                        1.0
                                                 4.49
                                                                           9.5
                                                                                     10
                      1.52
                RY
                                                                   1.5
                                                                          1.51
                                                                                   1.52
  59
                              1.51
                                         1.5
                                                   n
                                                            0
  60
                КK
                          EXCESS RUNOFF FROM SUBAREA 1Da3
  61
                KM
                      .0148
  62
                ВΛ
  63
                       .06
  6.1
                UD
  65
                ĸĸ
                    DE1Da3
                ки
                          DETENTION FOR SUBAREA 1Da3
  56
  67
                KM
                          OUTLET IS A 18" RGRCP WITH AN 8" ORIFICE PLATE PER PLANS (905-E-95)
  68
                RS
                               STOR
                sv
                               1.27
  70
                50
                         0
  71
                SE
                         0
                                3.0
                ST
                       3.0
                                         2.8
                                 15
                                                 1.5
  73
                кк
                      1Da4
                ки
                          EXCESS RUNOFF FROM SUBAREA 1Da4
  74
  75
                ВΛ
                        .01
  76
                T.S
                                 77
                                          38
  22
                       .05
                UD
  78
                KΚ
                    CP1Da4
  79
                KM
                          COMBINE HYDROGRAPHS FROM 1Da4 AND DE1Da3
                HC
  80
  81
                кк
                    DE1Da4
                          DETENTION FOR SUBAREA 1D34
OUTLET IS A 16" PVC WITH AN 8" ORIFICE PLATE PER FLANS (905-E-95)
  82
                KM
                KM
  83
                RS
                               STOR
  85
                sv
                         0
                               0.76
                SQ
                         0
  86
                                 4
  87
                                3.0
  88
                ST
                       3.0
                                         2.8
                                                 1.5
                                                HEC-1 INPUT
                                                                                                             PAGE 3
LINE
                ID......1....2....3.....4.....5.....6.....7.....8....9.....10
  89
                KK
  90
                KΜ
                          EXCESS RUNOFF FROM SUBAREA 1DaS
                       .004
  91
                EΑ
  92
  93
                UD
                       .08
  94
                ΚK
                ΚM
                          COMBINE HYDROGRAHS FROM RC4-C3, 1Da5 AND DE1Da4
  96
                ЯC
  97
                кк
  93
                км
                          ROUTE OUTFLOW FROM CP1C31 TO DET1C3
                          TRIANGULAR CHANNEL PER PLANS (1182-E-94 AND 190-E-95)
  99
                KM
                км
                                           SIDE SLOPE = 3:1 (H:V)
 100
 101
                KМ
                                           MAX DEPTH = 2.35 FT.
 102
                RS
                               FLOW
                                          -1
                     0.025
                                      0.025
                                                 850
                RC
                            0.025
0.5
                                                       0.005
 103
                                                8.04
                                       1.0
                                                        8.05
                                                                  15.1
                RY
*
 105
                      2.37
                               2.36
                                        2.35
                                                                          2.36
                                                                                   2.37
                       *START AT OFF-SITE BASIN ON THE NORTHEAST CORNER OF VILLAGE 1*
                кκ
 106
                КM
                          OFF-SITE CONTRIBUTING AREA LOCATED ON CITY'S LAND
 107
 108
                ΒA
                       .012
                LS
                                 77
 109
                UD
 110
                кк
 111
                ΚM
                          EXCESS RUNOFF FROM SUBAREA 1A2
 112
 113
                BA
                       .004
 114
                LS
                                 77
                UD
                        .06
 1.15
 116
                KK
                KM
                          EXCESS RUNOFF FROM SUBAREA 1A3
 117
                       .006
 118
                ВА
 119
                LS
 120
                UĐ
                        . 05
 121
                KK
 122
                KM
                           COMBINE HYDROGRAPHS FROM 1A1, Off-1A AND 1A3
                HC
 123
 124
                кк
 125
                KM
                          DETENTION BASIN FOR SUBAREA 1A3
                RS
 126
                              STOR
                                           0
                               0.38
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KK

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SQ
SE
ST
            128
                                    0
                                           2.5
15
            129
                                  2.5
                                                   2.8
                                                            1.5
            130
1
                                                           HEC-1 INPUT
                                                                                                                     PAGE 4
                           tD.....1....2....3.....4,....5.....6....7.....8.....9.....10
           LINE
            131
                           KM
                                     ROUTE OUTFLOW HYDROGRAPH FROM DET1A3 TO DET1A6
            132
            133
                                                  TRAPEZOIDAL CHANNEL (ASSUMED)
                                                    SIDE SLOPE = 5:1 (H:V)
MAX DUPTH = 1.0 FT.
BOT.WIDTH = 10.0 FT.
            134
                           KM
            1.35
                           KM
            136
                           ΚM
            137
                           RS
                                          FLOW
                                0.025
                                                            550 0.0145
                           RC
                                        0.025
                                                 0.025
            138
                                                   1.0
                                    0
                                                                                    21.5
                                                                                            22.0
            139
                           RX
                                                            6
                                                                    16
                                 1.02
                                          1.01
                                                                      0
                                                                            1.0
                                                                                    1.01
                                                                                             1.02
            140
                           RY
            141
                           КK
            142
                                     EXCESS RUNOFF FROM SUBAREA 1A6
                           KМ
            143
                                  .004
                                            77
            7-1-1
                           1.5
                                                    44
            145
                           UD
            146
                           КK
                                 COMBINE HYDROGRAPHS FROM RA3-A6 AND 1A6
            147
                           KM
            148
                           НC
            149
                           КK
                               DET1A6
                                     DETENTION BASIN FOR SUBAREA 1AG
            150
                           KM
            151
            152
                           sv
                                     n
                                          0.28
                           SO
                                    0
            153
                                           22
                                           2.5
                                                   2.8
            156
                           KK
                                  1A5
                                     EXCESS RUNOFF FROM SUBAREA 1A5
            157
                                  .016
            153
                           BA
                                            77
                                                    46
            159
                           LS
                           QD
            160
            161
                           КK
                                 COMBINE HYDROGRAPHS FROM DETIAG AND 1A5
                           КM
            162
            163
                           HС
            164
                           ĸк
                               DET1A5
                                     DETENTION BASIN FOR SUBAREA 1AS
            165
                           ΚM
            166
                           RS
                                          STOR
                                                   0
            167
                           SV
                                     0
                                          0.65
            168
                           sQ
                                            34
                           SE
                                           2.5
            170
                           ST
                                           15
                                                   2.8
                                                            1.5
            171
            172
                           KΜ
                                    EXCESS RUNOFF FROM SUBAREA 1A4
                                  .010
            173
                           EA
            174
                           LS
            175
                           UD
                                   .07
                                                           HEC-1 INPUT
                                                                                                                      PAGE 5
1
           LINE
                           ID.....1....2....3....4.....5.....6.....7....3.....9.....10
            176
                           КK
            177
                           KМ
                                     ROUTE OUTFLOW FROM DET1A4 TO DET1A7
                                                  TRAPEZOIDAL CHANNEL (ASSUMED)
            179
                           132
                                                     SIDE SLOPE = 10:1 (H:V)
MAX DEPTH = 1.0 FT.
            179
                           ΚM
            180
                                                     BOT.WIDTH = 10.0 FT
            181
                           КM
                           RS
                                          FLOW
            182
                           RC
                                 0.030
                                                 0.030
            133
                                         0.030
            184
                           RX
                                           0.5
                                                   1.0
                                                             11
                                                                     21
                                                                              31
                                                                                    31.5
                                                                                             32.0
                                 1.02
                                          1.01
                                                              0
                                                                             1.0
            185
                           RY
                                                                                    1.01
                                                                                             1.02
            186
                           кк
                                DET1A4
            187
                           KM
RS
                                     DETENTION BASIN FOR SUBARBA 1A4
             188
                                          STOR
                                     0
                                          0.37
            190
                           SO
                                     0
                                           11
                           SE
                                     0
                                           2.5
            191
                                                   2.8
            192
                           ST
                                   2.5
                                            15
                                                            1.5
            193
                           кк
                           K24
                                     EXCESS RUNOFF FROM SUBAREA 1A7
             194
                                  800.
                           BA
             19€
                           LS
                                            77
                                                    27
                                   .05
            197
                           UD
             198
                           кк
                                     COMBINE HYDROGRAPHS FROM DETIAS, DETIA4, AND 1A7
             199
                           KM
                           HC
            200
             201
                           KK
                                     DETENTION BASIN FOR SUBAREA 1A7
            202
                           KM
             203
                           RS
                                          STOR
                           sv
                                     0
                                          0.93
             205
                           50
                                     0
                                            11
                                           2.5
             206
                           SE
                                                   2.8
```

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209
                                           EXCESS RUNOFF FROM SUBAREA 1C1
                               KM
              210
                               BA
                                      .024
              211
                               LS
                                                           38
              212
                               UD
                                       .09
              213
                               KK
                                          COMBINE HYDROGRAPHS FROM DET1A7, AND 1C1
              214
                               KM
                                         2
              215
                              HC
              216
                               КK
                                    DETICI
                                           DETENTION BASIN FOR SUBAREA 1C1
              217
                               ИM
                                           STORAGE VOLUME PER PLANS (405-E-95)
                               KM
              219
                               ĸм
                                           OUTLET IS A 18" RGRCP PER PLANS (405-E-95)
                                                            0
              220
                               RS
                                         1
                                               STOR
              221
                               sv
                                                1.5
              222
                               SQ
                                                                   HEC-1 INPUT
                                                                                                                                      PAGE 6
            LINE
                               1 \\ 0 \\ \dots \\ 1 \\ \dots \\ 2 \\ \dots \\ 3 \\ \dots \\ 4 \\ \dots \\ 5 \\ \dots \\ 6 \\ \dots \\ 6 \\ \dots \\ 7 \\ \dots \\ 8 \\ \dots \\ 9 \\ \dots \\ 10 \\
              223
                                         0
              224
                                       3.6
                                                          2.8
                                                                    1.5
                               ST
              225
                               кк
                                       1C2
                                          EXCESS RUNOFF FROM SUBAREA 1C2
              226
                               KМ
                                      .024
              227
                               BA
              228
                                                  77
              229
                               UD
                                       .08
              230
                               ΚK
              231
                               ΚM
                                           COMBINE HYDROGRAPHS FROM DETIC1 AND 1C2
              232
                               HC
              233
                                           DETENTION BASIN FOR SUBAREA 1C2
              234
                               КM
                                           STORAGE VOLUME PER PLANS (405-E-95)
OUTLET IS A 18" RGRCP PER PLANS (405-E-95)
              235
                               ки
                               км
              237
                               RS
                                               STOR
                                                            0
              238
                               SV
                                         n
                                                0.39
              239
                                         0
                               SQ
                                                 14
              240
                               SE
                                                 3.6
              241
                               ST
                                       3.6
                                                  15
                                                          2.8
                                                                    1.5
              242
                               KK
                                    DE1C2B
              243
                               KM
                                           DETENTION BASIN FOR SUBAREAS 1C2
                                           STORAGE VOLUME PER PLANS (405-E-95)
OUTLET IS A 18" RGRCP PER PLANS (405-E-95)
              244
                               KM
              245
                               KM
              246
                                                STOR
                               RS
              247
                               SV
                                         a
                                               0.92
              248
                                                  14
                               SO
                                         0
              249
                               SE
              250
                               SТ
                                       3.6
                                                  15
                                                          2.8
                                                                    1.5
              251
                               КK
                                    DE1C2C
                                           DETENTION BASIN FOR SUBAREAS 1C2
STOPAGE VOLUME PER PLANS (405-E-95)
OUTLET IS A 18" RGRCP PER PLANS (405-E-95)
              252
              253
                               KМ
              254
                               KM
              255
                                                STOR
                               RS
              256
                               s٧
                                         0
                                                0.54
              257
                               SO
                                         0
                                                 14
                               SE
                                         0
                                                 3.6
              259
                               ST
                                                           2.8
                                                                    1.5
              260
                               кĸ
                                       1C3
              261
                                           EXCESS RUNOFF FROM SUBAREA 1C3
              262
                               ВΑ
                                       .026
                                                            35
              263
                               LS
                               UD
              265
                               ĸк
                                     CP1C3
                                           COMBINE HYDROGRAPHS FROM RCZ-C3, DETIC2C, AND 1C3
              266
                               км
              267
                               НC
                                                                   HEC-1 INPUT
                                                                                                                                      PAGE 7
1
             LINE
                               ID.....1....2....3.....4.....5.....6.....7....8.....9.....10
              268
                               КK
              269
270
                                           DETENTION BASIN FOR SUBARBAS 1C3
                               ĸм
                                           STORAGE VOLUME PER PLANS (405-E-95)
OUTLET IS A 6'W x 3'H CBC PER PLANS (1132-E-94 AND 190-E-95)
                               KM
              271
                               ΚM
              272
                               RS
                                                STOR
                                                             0
              273
                               sv
                                          ۵
                                                 1.4
              274
                                          O
                                                 150
                               SO
                               SE
                                                 3.5
              276
                               ST
                                        3.5
                                                  15
                                                           2.8
                                                                    1.5
              277
                               КK
                                    RC3COM
              278
                                           ROUTE OUTFLOW FROM DETICS TO WHERE DETCOM OUTFLOWS
                               КM
              279
                               КS
                                               FLOW
              280
                                     0.030
                                                        0.030
                                                                   1000
                               RC
                                               0.030
                                                                            0.016
                                                            10
                                                                     20
                                                                               30
                               RX
              282
                                               11 75
                                                         11.5
                                                                   10.0
                                                                             10.0
                                                                                       11.5
                                                                                              11.75
                                                                                                          12.0
              283
                               KΚ
                                      COMM
              234
                                           EXCESS RUNOFF FROM SUBAREA COMMERCIAL
                               КM
              285
                               ВΛ
                                        .03
              236
                               LS
                                                            90
                                        . 67
                               UD
```

208

KK

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DETENTION FOR SUBAREA COMMERCIAL
            289
                          KM
            290
                          RS
                                        STOR
            291
                          sν
                                   0
            292
                          SO
                                   0
                                          13
                          SE
            293
            294
            295
                          кĸ
                               CPCOM
            296
                          КM
                                     COMBINE HYDROGRAPHS FROM RC3COM AND COMM
            297
                          HC
            298
                          КK
                              COMOF1
                                    ROUTE CPCOM TO CPOFFI
            300
                          RS
                                        FLOW
                                               0.030
                                       0.030
            301
                          RC
                               0.030
                                                          900 0.0155
                                                                           40
                          RX
                                                  10
                                                           20
            302
                                       11.75
            303
                                                11.5
                                                                 10.0
                                                                         11.5
                                                                                11.75
                                                                                         12.0
            304
                          ĸк
                                OFF1
                                    EXCESS RUNOFF FROM SUBAREA OFF1
            305
                          ΚM
                          BA
LS
            306
                                 .02
                                          77
                                                  90
            307
                          UD
            308
            309
                          ĸк
                              DEOFF1
                          KM
                                    DETENTION FOR SUBAREA OFF1
            310
                          RS
                                        STOR
            312
                          sv
                                   0
                                         2.4
                          SO
            313
                                   0
                                          13
                                   ō
                                           3
            314
1
                                                        HEC-1 INPUT
                                                                                                                  PAGE 8
                          LINE
            315
                          ST
                                   3
                                          15
                                                 2.8
                                                          1.5
            316
                          ΚK
            317
                                    COMBINE HYDROGRAPHS FROM COMOFF AND DEOFF1
            318
                          НĊ
                          KΚ
                                    ROUTE CPOFF1 TO CPOFF3
            320
                          КИ
            321
                          RS
                                        FLOW
            322
                          RC
                               0.030
                                       0.030
                                                0.030
                                                          600
                                                                0.013
            323
                          RХ
                                                   10
                                                                   30
                                                                           40
                                                                                           50
            324
                          RY
                                12.0
                                       11.75
                                                11.5
                                                         10.0
                                                                 10.0
                                                                         11.5
                                                                                11.75
                                                                                         12.0
            325
                                    EXCESS RUNOFF FROM SUBAREA OFF3
            326
                          км
                                 .016
            327
                          BA
                          ъs
                                          77
                                                   90
            329
                          UD
                                 .07
            330
                          ĸĸ
            331
                          ΚM
                                    DETENTION FOR SUBAREA OFF3
            332
                          ŔS
                                        STOR
                          sν
            333
                                         2.24
                          SQ
                                          13
            334
            335
                          SF
                                   0
                                                  2.8
                                          15
                                                          1.5
            336
                          ST
                                   3
            337
                          ĸк
                               CPOFF3
                                     COMBINE HYDROGRAPHS FROM DEOFF3 AND OF10F3
            338
                          KМ
                          нс
            339
                                   START WEST SIDE OF STACKED 40 DESIGN CONCEPT CROSSING SCOTTSDALE RD
                                    1 CP
ROUTE CPOFF3 THROUGH SUB 33A
            340
                          КK
            341
                          KM
                                 1960 .0161
                          RK
            342
                                                .045
                          ĸк
                                 33A
            343
                                         SUB
                                     RUNOFF FROM SUB 33A, INCLUDES WEST SIDE OF CENTER DRIVE
            344
                          ΚM
                                 .054
            345
                          вλ
                                          77
            346
                          LS
                                  300
                                                  .05
            347
                          υκ
                                        0.020
                                                          100
                          RK
                                 2325
                                        .012
                                                 .015
                                                                 TRAP
                                                                           20
                                                                                    3
            349
                          КK
                                 33A3
                                          CP
            350
                          ко
                                     COMBINE SUB 33A, CP 33Al
            351
                          KM
            352
                          НC
                                   END WEST SIDE OF STACKED 40 DESIGN CONCEPT CROSSING SCOTTSDALE RD
                                   BEGIN GILBERTSON MODEL FOR GRAYHAWK - VILLAGE 1
START AT NORTHEAST CORNER OF PARCEL 1Db AND GO SOUTHWEST THROUGH
                                   PROPOSED PARK SITE.
                                                         HEC-1 INPUT
                                                                                                                  PAGE 9
1
           LINE
                          10.....1.....3.....3.....4.....5.....6......7.....3.....9.....10
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353 KK 10b

288

ĸК

DETCOM

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354
               ки
                         EXCESS RUNOFF FROM SUBAREA 1Db
 355
               B\Lambda
                       .04
                                77
 356
               LS
                       .06
357
               UD
358
                     DE1Db
                          DETENTION FOR SUBAREA 10b
               КM
359
 360
                ŔŜ
                              STOR
                                         U
 361
               SV
                         0
               SQ
SE
362
                         0
                                1.3
                         0
                               3.0
 363
               ST
                       3.0
                                       2.8
3 G 4
                                15
365
               KK
                      1Dal
                          EXCESS RUNOFF FROM SUBAREA 1Dal
 366
                КИ
                     .0039
 367
               BĄ
                                77
368
               L5
                                        35
               UĎ
                       .05
369
370
               KK
                   DE1Da1
                        DETENTION FOR SUBAREA 1Da1
371
               KM
                          CUTLET IS A 18" PVC WITH AN 8" ORIFICE PLATE PER PLANS (905-E-95)
372
               KM
 373
                         1
                              STOR
374
               SW
                             0.548
375
               SQ
                         0
 376
                SĒ
                         0
                               3.0
377
               ST
                       3.0
                               35
                                       2.8
                                                1.5
378
                ĸĸ
 379
                          EXCESS RUNOFF FROM SUBAREA 1Da2
                      .003
 380
               BA
 381
                LS
382
                ΩŪ
383
                KK
                    CP1Dab
                      COMBINE HYDROGRAPHS FROM 1Da2, DE1Db AND DE1Da1
 384
                KΜ
 385
               HC
386
               KK
                    RDabE2
 387
                          ROUTE OTFLOW FROM CP1Dab TO CP1Ea2
                          TRAPEZOIDAL CHANNEL PER PLANS (1182-E-94 AND 190-E-95)
SIDE SLOPE = 4:1 (H:V)
MAX DEPTH = 1.0 FT.
BOT.WIDTH = 3.0 FT.
 388
               KM
389
               KM
 390
                KM
 391
 392
                RS
                              FLOW.
                                         -1
                             0.030
                                      0.030
                                               1400 0.0171
                     0.030
 393
                RC
                                               5 8
                             0.5
                                        1.0
                                                                  12
                                                                         12.5
395
                Jξ.
                       1.2
                               1.1
                                        1.0
                                                                 1.0
                                                                          1.1
                                               HEC-1 INPUT
                                                                                                           PAGE 10
LINE
                rp...,.1.....2.....3.....4......5.....6.......7.....8......9.....10
 396
               FΚ
                         EXCESS RUNOFF FROM SUBARGA 1Ea1
 397
                ĽΜ
                      .019
 398
                HΑ
                LŞ
                                77
 400
                UD
                       .08
 401
                KK
                   DETEal
 402
                          DETENTION FOR SUBAREA 1Eal
                          OUTLET IS A 8" PVC CONNECTED TO AN 18" RGRCP (407-E-95)
 403
                KМ
                              STOR
 404
                RS
 405
                sv
                              1.54
 406
                SQ
                         0
 407
                SE
                         0
                                15
                                        2.8
                                                1.5
 408
                ST
                         3
 409
                КK
                      1Ea2
 410
                КM
                          EXCESS RUNOFF FROM SUBAREA 1Ea2
 411
                      .024
                ВΑ
 412
                LŞ
                                77
                                         39
 413
                UD
                       .06
 414
                LК
                         COMBINE HYDROGRAPHS FROM DETEAT AND TEa2
 415
                КM
 416
                HC
 417
                ХK
                   DE1Ea2
 410
                KМ
                          DETENTION FOR SUBARDA 1Ea2
 419
                RS
                           STOR
                                          0
 420
                s٧
                         0
 421
                SQ
                         0
                                10
 122
                SE
 423
                                        2.8
                                                 1.5
                ST
 424
                ĸк
                    CP1Ea2
                          COMBINE HYDROGRAPHS FROM DELEAR AND RDabER
                КM
 126
                нc
 427
                ΚK
 428
                          EXCESS RUNOFF FROM PROPOSED CITY'S PARK SITE
                      .021
 129
                BΑ
 430
                LS
 431
                บท
 432
                KK
                    SCROOL
 432
                          EXCESS RUNOFF FROM PROPOSED SCHOOL SITE
                KM
 434
                BA
                      .015
                                77
 435
                LS
                                          80
                       . 05
 435
                UD
```

ì

1 HEC-1 INPUT PAGE 11

```
LINE
               1D.....1....2....3....4....5.....6....7....8....9.....30
437
                   DETSCR
 438
               KM
                         DETENTION FOR SUBAREA SCHOOL
139
               RS.
                             STOR
               sv
440
                              1.3
 441
               SQ
                              13
442
               SE
                        0
                               15
443
               ST
                        3
                                      2.8
                                              1.5
 444
               KK
                         ROUTE OUTFLOW FROM DETSCH TO CPIEC
444
               KM
               RS
446
                            FLÓW
447
                    0.030
                           0.030
                                    0.030
                                              500
                                                    0.009
 148
               RX
                                                               25
                                                                     27 5
                                                                               3.0
                     12.0
                                                                              12.0
                           11.75
                                     11.5
                                                     10.0
                                                              11.5
449
               RY
                                             10.0
                                                                    11.75
 150
               ΚK
                      1Ec
451
452
               KM
                         EXCESS RUNOFF FROM SUBAREA 1EC
               BΑ
                    .0089
454
               UΒ
                      .06
               ĸк
455
                    DE1EC
156
               ΚM
                        DETENTION FOR SUBARFA 1EC
457
               RS
                        0
                             STOR
                                        0
               sν
458
                              0.8
               SO
 459
                              11
460
               SE
461
               ST
                               15
                                      2.8
                                              1.5
462
               ĸĸ.
163
               KM
                         COMBINE HYDROGRAPHS FROM SCHIZ AND DELEC
               HC
454
455
               KK
                        ROUTE OUTFLOW FROM CP1Ed TO CP1Ea2
466
               KM
467
               RS
                             FLOW
                    0.030 0.030
                                    0.030
                                                    0.009
 168
                                                               25
 469
               RZ
                                               10
                                                                      27.5
                                                                                30
               RY
                     12.0
                           11.75
                                     11.5
                                             10.0
                                                     10.0
                                                              11.5
                                                                    11.75
                                                                              12.0
470
471
               КK
                         COMBINE HYDROGRAPHS FROM CP1Ea2, 1EcEa2 AND PARK
472
               ΚM
               HC
473
               кк
474
                   REATPP
                        ROUTE CP1EA TO THOMPSON PEAK PARKWAY
475
               ки
                    0.030
477
               RC
                           0.030
                                    0.030
                                              750 0.0186
                                                               25
                                                                     27.5
178
               RX.
                              2,5
                                        5
                                               1.0
                                                      20
                                             10.0
                                                     10.0
                                                             11.5
                                                                    11.75
479
                     12.0
                           11.75
                                     11.5
                                             HEC-1 INPUT
                                                                                                      PAGE 12
LINE
               ID.....1....2....3....4....5....6....7....8.....9....10
480
               KK
                      lEb
                         EXCESS RUNOFF FROM SUBAREA 1Eb
481
               KM
 482
               ΒA
                    .0576
 463
               LS
                               77
                                       52
484
               UD
                      .08
 485
               KK
                  DETIED
                        DETENTION FOR PARCEL 1Eb
               KM
 486
               RS
 487
                             STOR
 488
               sv
                        0
 489
               SO
                        Ω
                               52
               SE
 490
 192
               ĶК
                     OFF2
 193
                         EXCESS RUNOFF FROM SUBAREA OFF2. PUMPED HOSPITAL FLOWS.
 194
               ΒA
                     .033
                               77
 495
               LS
                                       90
               ดบ
 496
 497
               КK
                   DEOFF2
                         DETENTION FOR SUBAREA OFF2. PUMPED HOSPITAL FLOWS.
               KM
 498
 499
               RS
 500
               sv
                        D
 501
                        0
               SO
                               13
 502
               SĒ
 503
               ST
                                      2.8
               кк
 504
                   CPOFF2
               К14
                         COMBINE HYDROGRAHPS REATPP, DETIED AND DEOFF2
 5.06
               RC
                       END GILBERTSON MODEL FOR GRAYHAWK - VILLAGE 1
                       START EAST SIDE OF STACKED 40 DESIGN
               ЯK
                    1Kr.1 ROUTE
```

ROUTE CPOFFS THROUGH SUB 1Kr

```
10
                                   840 .0135
                                                                    TRAP
            509
                            RK
                                                  .045
             510
                            KK
                                   1\,\mathrm{K}_{\perp}
                                           SUB
                                      R/O FROM SUB 1Kg
             511
                            KM
             512
                            KМ
                                      DA HAS BEEN REVISED TO REFLECT DEVELOPED SHAPE OF PARCEL 1K
                                 .0515
             513
                            ΒA
             514
                            LS
                                  0.15
                            UD
             515
1
                                                           REC-1 INPUT
                                                                                                                        FAGE 13
                            ID.....1.....2.....3......4.....5......6......7.....8......9.....10
           LINE
             516
                            кк
                                 DELIK
             517
                                      DETENTION FOR SUBAREA 1Kr
                            КИ
             518
                                          STOR
             519
                            sv
                                     0
                                            4.6
             520
                            SO
                                     0
                                            2.0
             521
                            SĒ
                                     0
                                                    2.8
                                                             1.5
             523
                                 1Kr.2 COMBINE
                                      COMBINE DET1K & 1Kr.1
             524
                            KΜ
             525
                            HC
                            KK
             526
                                 1M1', 1
                                         ROUTE
             527
                                      ROUTE 1Kr.2 THEOUGH SUB 1Mr
                            ĸМ
             528
                                  1200 .0149
                                                  .045
                                                                    TRAP
                                                                               10
                                                                                         2
                            RK
             529
                            KK
                                           SUB
                                   R/O FROM SUB 1Mr
             530
                            ĸм
                                      DA HAS BEEN REVISED TO REFLECT DEVELOPED SHAPE OF PARCEL 1M
             531
                            км
                                 .0537
             532
                            вλ
                            LS
             534
                            UD
                                   - 09
             535
                            KK
                                 DETIM
                                           DAM
                                      ROUTE SUB IM THROUGH DETENTION BASIN
             536
537
                            KM
                            RS
                                          STOR
                                                      0
             538
             539
                            SQ
                                     0
                                             20
                            SE
             540
                                     O
                                                    2.8
                            ST
                                             15
             541
             542
                            кк
                                 1Mr.2 COMBINE
             543
                            KM
                                      COMBINE DETIM & 1Mr.1
             544
                            HC
                                      STACKED 40 BASIN 33E.1 NORTH OF CENTER DR
                                      E SUB
R/O FROM SUB 33E
             545
                            KK
                                   33E
             546
                            KM
             547
                                  .0395
                            BA
             548
                            \mathbf{L}S
                                          0.02
             549
                            ЦК
                                   3.00
                                                  0.050
                                                             100
                                                                     TRAP
                                                                               20
             550
                            RK
                                  2130
                                          0.015
                                                  0.035
                                                                                                                        PAGE 14
                                                            HEC-1 INPUT
1
            LINE
                            ID......1....2.....3.....4.....5.....6.....7.....8.....9.....10
             551
                                  33BE
                                      RUNOFF FROM SUB 33BE. EAST SIDE OF CENTER DRIVE.
             552
                            км
                                  .0011
             553
                            BA
             554
                            LS
             555
                            UK
                                   300
                                          0.020
                                                    .035
                                                             100
                                                                     TRAP
                                                                               20
                                                                                         3
             556
                            RK
                                  2325
                                          .012
                                                    .015
             557
                            КK
                                 33E.2 COMBINE
                                       COMBINE 1Mr. 2 & 33E & 33BE. FLOW INTO CULVERT AND SD SYSTEM
             558
                            KM
             559
                            ΚM
                                      UNDER CENTER DRIVE.
             560
                            HС
             561
                            ĸκ
                                         ROUTE
                                      ROUTE 33E.2 ALONG EAST SIDE OF STACK 49 PARCEL TO FRONTAGE ROAD 2-54" PIPES. DIAMETER PROVIDED IN ROUTING IS EQUIVALENT DIA OF
             562
                            KM
             563
                            KМ
                                       BOTH PIPES.
             564
                            ΚM
             565
                            ĸΚ
                                  2250
                                          .0147
                                                    .015
                                                                     CIRC
                                                                              6.3
                                       INSERT EXISTING CONDITION SUBBASIN 33D
             566
                            KK
                                    330
                                            SUB
                            ΚМ
                                       RUNOFF FROM SUB 33D
             567
             568
                            ко
             569
                            BA
                                  0403
             570
                                             22
                            LS
             571
                                          .0213
                                                     .10
                            UК
                                                                                        3
             572
                            кK
                                   2250
                                          .0148
                                                    045
                                                                     TRAP
                                                                                20
```

```
573
                           КK
                                SHOET
                                          SUB
            574
                                     SUB SOUTH OF CENTER DRIVE, EASTERN SIDE OF PROPERTY, PLOWS TO
                           KM
            575
                                     EASTERN DIVERSION STRUCTURE.
            576
                           BA
                                 .0183
            577
                                                    86
                           LS
            579
                           UK
                                         .0075
                                                    . 05
            579
                           RK
                                 2000
                                          .008
                                                  .015
                                                                   CIRC
                                                                              5
            580
                           КK
                               CT13.0 COMBINE
            581
                           KO
            582
                               COMBINE R33E.2, SUB 33D, S40ET, & S40CN. FLOWS INTO JUNCTION STRUCTURE
                           км
            583
                           НC
            584
            585
                           KМ
                               DIVERT FLOW FROM BASIN DIRECTLY TO ADOT CULVERT 6
            586
                               FLOW TO ADOT CULVERT 6 OF 223 CFS
                           KM
                               P_ADOT
            597
                           DT
            588
                                           2.7
                                                  10.4
                                                          22.6
                                                                           58.4
                                                                                   80.8
                                                                                          105.4
                                                                                                  143.3
                                                                                                           191.9
                                246.9
                                                         419.9
            589
                           DI
                                        306.5
                                                 361.9
                                                          HEC-1 INPUT
1
                                                                                                                     PAGE 15
           LINE
                           ID.,...,1......2...,3......4.....5.....6......7.....8.....9.....10
            590
                                                          22.6
                                                                                    80.8
                           DQ
                                           2.7
                                                  10.4
                                                                           58.4
            591
                           DQ
                                185.7
                                         212.3
                                                 230.2
                                                         246.9
            592
                                           SUB
                               SUBBASIN 33C SOUTH OF CENTER DRIVE WEST SIDE OF PROPERTY
            593
                           ки
            594
                               MODIFIED AREA TO ACCOUNT FOR NEW SITE PLAN AND SUBS 04-27-06 - ADDED SOUTHWEST
                           XM
            595
                           BΑ
                               0.0296
            596
                           LS
            597
                           пк
                                  200
                                         .0063
                                                    .05
                                                            100
                                                                   CIRC
            598
                           RK
                                 1750
                                          017
                                                  .015
            599
                                S40CN
                           KK
                                           ŞUB
            600
                               SUB SOUTH OF CENTER DRIVE, CENTRAL BASIN FLOWING DIRECTLY INTO DET/RET
                           KM
            601
                           ΚМ
                               INCLUDES DETENTION EASIN
                                .0448
            602
                           BA
            603
                                            77
                           LS
                                                    87
            604
                                   250
                                         .0075
                                                    . 05
            605
                           RK
                                 1500
                                          .009
                                                   .015
                                                                   CIRC
                                                                            4.5
            606
                               CT13.1 COMBINE
                           КK
            607
                               COMBINE CT13.0, 33C PLOWS (Total Flow at the BASIN)
                           ĸм
            608
                           HС
            609
                           KK
                               D_BAS BY-PASS FLOW THROUGH d=2 PIPE (MAX q=30 CFS) BASIN GUTLETS PROVIDE
            610
                           KM
                               EQUIVALENT AMOUNT OF DISCHARGE
             611
                           ΚM
            612
                           DT
                               P-PIPE
                                                                                   300.0
                                                                                                    800.0
            613
                           DI
                                    0
                                           1 0
                                                  10.0
                                                           30.0
                                                                     30
                                                                          100.0
                                                                                           500.0
                                    0
                                                                     30
                                                                                              30
            614
                           DQ
                                                                              30
                                           1.0
                                                  10.0
                                                           30.0
            615
                           KK
                               D BASI
             616
                           ΚМ
                               DIVERT THE FIRST 1 AC-FT INTO THE SURFACE STORAGE
             617
                               D-BA$2
                                           1.0
                                                           40.0
                                                                   70.0
                                                                          100.0
                                                                                   300.0
                                                                                            500.0
                                                                                                    800.0
             618
                           DI
                                     O
                                           1.0
                                                   10.0
             619
                           DO
                                           1.0
                                                  10.0
                                                           40.0
                                                                   70.0
                                                                          100.0
                                                                                   300.0
                                                                                            500.0
                                                                                                    200.0
             620
                           КK
                               D SURF
             621
                                DIVERT FLOW INTO SUB_SURFACE STORAGE
                           ΚM
             622
                           ΚM
                                (1110', 10' DIAMETER PIPE, VOL = 2.0 Ac-Ft)
            623
                           KO
             624
                               D-SUBF
                           DΤ
             625
                                                   10.0
                                                           40.0
                                                                   70.0
                                                                          100.0
                                                                                   300.0
                                                                                            500.0
                                                                                                    800.0
                                           1.0
            626
                           DQ
                                           1.0
                                                   10.0
                                                           10.0
                                                                   70.0
                                                                          100.0
                                                                                   300.0
                                                                                           500.0
                                                                                                    800.0
1
                                                           HEC-1 INPUT
                                                                                                                      PAGE 16
                           ID.....1.....2......3......4......5......6......7.....8......9.....10
            LINE
             627
                           КK
                               B PIPE
             628
                                RETRIEVE DIVERTED PIPE FLOW
                           KM
             629
                                P-PIPE
             630
                           кκ
                                B_SURF
             631
                                RETRIEVE DIVERTED SURFACE FLOW
             632
                           DR
                               D-PAS2
             633
                           КK
                                 CS40B COMBINE
             634
                           KO
             635
                                COMBINE PIPE FLOW, DIVERETD SURPACE FLOW AND REMAINING SURFACE FLOW
                           KM
             636
                           HC
```

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638
                                 ко
                                      ROUTE DIVERTED FLOW THROUGH OFFLINE BASIN CONCEPT MAX H =5.9
                                      ASSUMED 1000'X 80' BASIN WITH 5:1 SIDE SLOPES 6 36" OUTLET 24" BLEED-OFF PIPE PLUS 20' WIDE SPILLWAY AT 3.8'
               640
                                 ΚM
                                 ки
               641
                                 RS
                                                  STOR
               642
                                                                - 1
               643
                                 sv
                                                  .001
                                                                         . 87
                                                                                  1.64
                                                                                            3.04
                                                                                                      4.49
                                                                                                                5.16
                                                                                                                           5.49
                                                                                                                                     5.82
               644
                                 SV
                                         6 15
                                                                                                                  5.4
               645
                                 SE
                                            0
                                                     . 8
                                                                1
                                                                           2
                                                                                               4
                                                                                                                            5.6
                                                                                                                                      5.8
               646
                                 SE
               647
                                 SL
                                                   3.14
                                                             0.62
                                                                         0.5\,
                                          3.8
               648
                                 SS
                                                     20
                                                              2.8
                                                                         1.5
               649
                                 KK
                                     P33E.1
               650
                                 ΚO
               651
                                      DIVIDE THE FLOW INTO TWO ADOT CULVERTS
               652
                                 DT
               653
                                 DI
                                                    100
                                                              200
                                                                         100
                                                                                   600
               654
                                 DO
                                            0
                                                     68
                                                                         272
                                                                                   408
                                                              136
               656
                                 KМ
                                      RETRIEVE DIVERTED ADOT CULVERT FLOW
               657
                                 DR
                                     P ADOT
               658
                                 KK
                                       33E.1 COMBINE
                                 ко
               659
                                      COMBINED DISCHARGE AT ADOT CULVERT 5 AND 6
               660
                                 НC
1
                                                                       HEC-1 INPUT
                                                                                                                                               PAGE 17
              LINE
                                 ID......1.....2.....3......4......5.....6......7.....8......9......10
               662
                                 KK R33E.1 ROUTE
               663
                                 KO
                                      ROUTE ADOT CULVERT 5 AND 6 FLOWS THROUGH ASLD LAND TO
               664
                                 KM
                                     UNION HILLS DRIVE (MAYO) AND 73RD PLACE.

ROUTE L=1600', TRAP SECTION BW=19' Z=5, TWmax=39'

ASSUME GRASS LINED CHANNEL N=.030 UP=1592.5 DWN=1582.66

1600 0.0088 0.03 TRAP 19 5
               665
               666
                                 КM
               667
               668
                                 RK
                                 КK
                                     ASLDR1 ROUTE
               669
               670
                                 ĸo
                                      ROUTE FLOWS PROM CHANNEL THROUGH BOX CULVERT ALONG UNION HILLS DRIVE (MAYO) TO SCOTTSDALE ROAD, SOUTH TO CHAUNCEY.

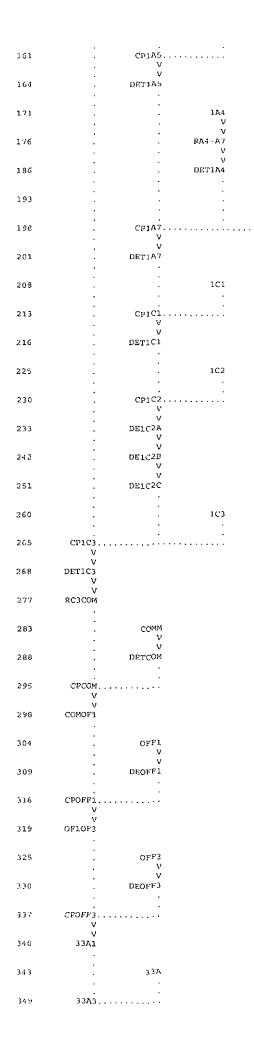
ROUTE L=1830', BOX SECTION W=8' H=3'

ASSUME CONCRTE LINED CHANNEL N=.013 UP=1582.55 DWN=1566.32

1830 0.0099 ,013 TRAP 16 0
               671
                                 836
               672
                                 KM
               673
               674
                                 ΚM
               675
                                 RK
                                 ĸк
               676
                                        ASLD1
                                                     SUB
               677
                                 ко
               678
                                      ASLD NORTH PARCEL DAST OF SCOTTSDALE ROAD AND NORTH OF CHAUNCEY LANE
               679
                                 Вλ
                                      0.0315
               680
                                 LS
                                 UK
                                                0.001
                                                            0.015
                                                                         100
               681
               682
                                 RK
                                        1400
                                               .0131
                                                                                  TRAP
                                                                                               17
               683
                                 KK
                                       ASLDCT COMBINE
               684
                                 KO
                                      COMEINED DISCHARGE AT ASLDR1 AND ASLD1 SUB BASIN
                                 KM
               685
               686
                                 HС
               687
                                 KK
                                      ASLDR2 ROUTE
               688
                                 ко
                                      ROUTE ASLOR1 AND ASLD1 SUB TO SCOTTSDALE ROAD
AND PRINCESS DRIVE
ROUTE L=1000', TRAP SECTION BW=17' Z=4, TWMmax=41'
ASSUME GRASS LINED CHANNEL N=.030 UP=1570.15 DWN=1548.60
1000 0.0075 0.03 TRAP 17 4
               689
                                 KM
               690
                                 ΚM
               691
               692
               693
                                 RК
                                 кк
                                        ASLD2
                                                     SUB
               694
                                 ΚQ
               695
               696
                                      ASLD SOUTH PARCEL EAST OF SCOTTSDALE ROAD AND NORTH OF CHAUNCEY LANE
               697
                                 BΛ
                                      0.0193
               698
                                 LS
                                                                78
                                                  .0022
               699
                                                            0.015
               700
                                 RK
                                          600
                                                  .0139
                                                             .015
                                                                                  TRAP
                                                                                               17
1
                                                                       HEC-1 INPUT
                                                                                                                                                PACE 18
                                 LIND
               701
                                     CPPRIN COMBINE
               702
                                 KO
                                      COMEINE ROUTED ROUTED ASLDCHNL WITH ASLD2
                703
                                 KM
               705
                                 KE E33C.2
```

KK S40BAS

```
RETRIEVE DIVEPTED PIPE FLOW
              707
                              ΚM
              0.8
                              DR
                                  D33C.2
                              KK
KO
              709
                                    $40WT
                                               SUB
              710
                                   SUB EAST OF SCOTTSDALE RD. FLOWING DIRECTLY INTO SCOTTSDALE RD CULVERT, TAKES SCOTTS RD HALF ST AND SCENIC CORRIDOR 0.0063
              711
                              KM
BA
              712
              713
714
                              LS
                                                          89
                              UК
                                                .01
                                                         .05
                              RK
                                      600
                                                .01
                                                        .015
                                                                           CIRC
                                                                                     4.5
              716
              717
718
719
                                    33C.2 COMBINE
                              KK
                              ко
                                   COMBINED DISCHARGE AT SCOTTSDALE ROAD CULVERT
              720
                              HC
              721
                              22
1
                   SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE
              (V) ROUTING
                                      (--->) DIVERSION OR PUMP FLOW
   NG.
              (.) CONNECTOR
                                      (<---) RETURN OF DIVERTED OR PUMPED FLOW
                 1Al
V
    20
    27
             DET1A1
    14
              RA1.-C4
    43
                               1C4
    18
               CP1C1.
    51
              RC4-C3
    50
                              1Dà3
                            DE1Da3
     55
                                            lDa4
    73
     78
                            CP1Da4
     81
                            DE1Da4
     8 å
                                            1Da5
     94
              CP1C3I
              RC3-C3
     97
                            Off-1A
   106
   111
                                              1A2
   116
                                                            1A3
                              CPA3
   121
   124
                            DET1A3
   131
                            RN3-A6
   141
                                              170
   146
                             CPIA6.
                            DET 1A6
   149
   156
                                              185
```



1A7

353	10b			
	V V			
358 . -	BEIDb			
365	•	1Da1 V		
370		V DE1Dal		
	•			
378 .	:		1D32	
383	***			
386	V RDabE2			
	NDQDD2			
396		1Eal V		
401		V DELEal		
			3=: 6	
409	•		1Ea2	
414	•	CP1Ea2 V		
417	· ·	V DE1Ea2		
24 .				
427		PARK		
	· ·	:	andro A.A.	
432	· · ·		SCHOOL V	
437	· ·		V DETSCH V	
444	· · · · · · · · · · · · · · · · · · ·		V V SCH12	
444		•		
450				1Ec V
455	 	•		V DE1EC
				:
462			ν	· · · · · · · · · · · · · · · · · · ·
465		:	V 1EcEa2	
471				
	. V			
474	REATPP			
480		1.Eb		
	· :	V V		
485	· · · · ·	DET1Eb		
492	· · ·	:	OFF2 V	
497			V V DEQFF2	
471			DEGFF2	
504	. CPOFF2.	••••••		
507	. v			
510	· .	1Kr V		
516	· · ·	V DET1K		
- 22.2		•		
523	. 1Kr.2. V			
526	. v . mr.1			

529	: :	
535		v Detim
F+0		
542		
545		33F
551		. 33BE
557	338.2	
561	. v	
261	. R33E.2	
566		33D
573		S40ET
580	. CT13.0	
587		> P_ADOT
584	_ D_ADOT	
592		33C
599		. S40CN
€06		
000	. (113.1	
€12 €09	. D_BAS	P-PIPE
£17		> D-BAS2
C15	. D_BAS1	
624 620	D_SURF	> D-SUBF
629		
627		B_PIPE
632		D-BAS2
630	•	. B_SURF
<i>ę</i> 33	. ν	
637	. V . S40BAS	
652		D33C.2
649	. P33E.1	
557 555	: :	P_ADOT
558		i
	. v	
562	. R33E.1 . V	
569	ASLDR1	
576		ASLD
€83		
687	. V . V . ASLUR2	
	:	
694		ASLD
701	CPPRIN	

708 <---- D33C.2 R33C.2 705 709 SIONT 717 33C.2.. (***) RUNOFF ALSO COMPUTED AT THIS LOCATION U.S. ARMY CORPS OF ENGINEERS HYDROLOGIC ENGINEERING CENTER FLOOD HYDROGRAPH PACKAGE (HEC-1) JUN 1998 609 SECOND STREET VERSION 4.1 DAVIS, CALIFORNIA 95616 RUN DATE 09AUG12 TIME 16:57:57 (916) 756-1104 ONE SCOTTSDALE (STACKED 40S) POST DEVELOPMENT CONDITION 100-YR 6-HR STORM OFFSITE HYDROLOGY & ONSITE HYDROLOGY FOR AREA GOVERNED BY PRE-POST CRITERIA OFTION A - ASLD CHANNEL FILE: 100YR-N2.DAT OPTION B - 34.1 ACRES OF ASLD PARCEL BASED ON MODELS PREPARED BY: ROBERT L. WARD, P.E., CONSULTING ENGINEER PR5W-100.6I C1.6I (CENTER DRIVE PROJECT) \$40EX100.61 (STACKED 40S EXISTING CONDITION) ALL CURVE NUMBERS ADJUSTED TO 6-HOUR VALUES ON AUGUST 13, 2002 100-YEAR, 6-HOUR HYPOTHETICAL STORM AREAL RAINFALL REDUCTION IS BASED ON A 14 SQUARE MILE STORM. 19 IO OUTPUT CONTROL VARIABLES 5 PRINT CONTROL IPRNT 0 PLOT CONTROL 0. HYDROGRAPH PLOT SCALE IPLOT OSCAL IT HYDROGRAPH TIME DATA 5 MINUTES IN COMPUTATION INTERVAL 0 STARTING DATE 00 STARTING TIME NMIN IDATE ITIME 0000 300 NUMBER OF HYDROGRAPH ORDINATES 0 ENDING DATE 0055 ENDING TIME NO NDDATE NOTIME 0055 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 CUBIC FEET PER SECOND FLOW STORAGE VOLUME ACRE-FEET SURFACE AREA TEMPERATURE ACRES DEGREES FAHRENHEIT 349 KK 33A3 CP 350 KO OUTPUT CONTROL VARIABLES 1 PRINT CONTROL 0 PLOT CONTROL IPRNT IPLOT OSCAL 0. HYDROGRAPH PLOT SCALE COMBINE SUB 33A, CP 33A1 352 HC HYDROGRAPH COMBINATION 2 NUMBER OF HYDROGRAPHS TO COMBINE ICOMP HYDROGRAPH AT STATION 33N3 SUM OF 2 HYDROGRAPHS

WOJE DA MON HRMN ORD FLOW DA MON HRMN ORD PLOW DA MON HRMN PLOW DA MON HRIMN ORD ORD 0000 0615 41. 1230 151 1845 226 0005 0620 77 40. 12.35 1850

1	0010	3	0.		1	0625	73	39.		1	1240 15	53 4.		1	1855 2	28 1.
1	0015	4	0.		i	0630	79	37.		i	1245 15		_	ī		
					_				-							
1	0050	5	0.	•	1	0635	30	36.	•	1		55 4.	•	1		:30 1.
ı	0025	6	0.	•	1	0640	81	35.	•	1		ა ნ 4.	•)	1910 2	1.
נ	0030	'7	1.	-	1	0645	8.2	34.	•	1	1300 19	57 4.	•	1	1915 2	1.
1	0035	8	1.	*	1	0650	8.3	33.		1	1305 19	58 4.	•	1	1920 2	:33 1.
1	0010	9	2.	4	1	0655	84	32.		1		59 4.		1		34 1.
1	00.15	10	3.		î	0700	85		_					î		
				-				31.	-	1			-			35 1.
1	0050	11	3.	•	1	0705	86	31.	•	1	1320 16		•	1		36 1.
1	0055	12	4.	-	1	0710	87	30.	•	1	1325 16	52 3.		1	1940 2	1.
1	0100	13	4.		1	0715	98	30.	*	1	1330 16	63 J.	•	1	1945 2	38 0.
1	0105	14	4.		1	0720	89	29.		1	1335 16			1		.39 0.
1	0110	15	5.		1	0725	90	28.	_	1		65 3.		1		40 0.
					_				-	_						
1	0115	16	5.	•	1	0730	91	28.	*	1		GG 3.	•	1		241 0.
1	0150	17	5.	•	1	0735	92	27.	*	1	1350 10	67 3.	*	1	2005 2	42 0.
1	0135	13	6.	-	ì	0740	93	26.	-	1	1355 10	68 3.	*	1	2010 2	43 0.
1	0130	19	6.	*	1	0745	94	26.	4	1	1400 10	69 3.	*	1	2015 2	:44 0.
1	0135	20	7.		1	0750	95	25.		1		70 3.		1		45 0.
ĩ	0110	21	7.		î				_			71 3.	_	î		
				-	-	0755	96	21.		1			-			
1	0115	22	₿.	•	I	0800	97	21.	•	1		72 2.	•	1		147 0.
1	0150	23	8.	*	1	0805	98	23.	•	1	1420 1	73 2.	*	1	2035 2	48 0.
ı	0155	24	9.	*	1	0810	99	22.	4	1	1425 17	74 2.		1	2040 2	49 0.
1	0200	25	9.	4	1	0815	100	22.	4	1	1430 1	75 2.		1	2045 2	250 0.
1	0295	26	10.		ī	0820	101	21.		1		76 2.		1		51 0.
î	0210	27	11.		î	0825	102			ī		77 2.		î		
				· ·				21.								252 0.
1	0215	28	11.	•	1	0830	103	20.		1		78 2.	*	1		253 0.
1	0230	29	12.	•	1	0835	104	19.	*	1	1450 1	79 2.	*	1	2105 2	254 0.
1	0225	30	13.	•	λ	0840	105	19.	*	l	1455 18	80 2.	*	1	2110 2	255 0.
1	0230	31	15.	*	1	0845	106	18.	+	1	1500 18	81 2.		1	2115 2	256 0.
ı	0235	32	18.		î	0850	107	18.		ī		82 2.	•	1		257 0.
ì			25.	_												
	0210	33		_	1	0855	108	17.	-	1				1		258 0.
1	0245	34	34.	•	1	0900	109	17.	*	1	1515 I		•	1		?59 O.
ı	025ი	35	45.	•	1	0905	1.10	16.	4	1	1520 18	85 2.	*	1	2135 2	260 0.
1	0255	36	60.	•	1	0910	111	16.	*	1	1525 18	86 2.		1	2140 3	261 0.
1	0320	37	109.		1	0915	112	15.	*	1		87 2.		1		262 0.
1	0305	38	232.		ī				4	ī		88 2.	_	ī		
						0920	113	15.	-				-			263 0.
1	0310	39	198.	•	1	0925	114	15.		1		89 2.	•	1		264 0.
1	0315	40	150.	*	1	0930	115	14.	*	1	1545 15	90 2.	•	1	2200 3	265 0.
1	0320	41	143.	•	1	0935	116	14.	•	1	1550 19	91 1.		1	2205 2	266 0.
1	0325	42	141.	-	1	0940	117	13.	•	1	1555 19	92 1.	*	1		267 0.
1	0330	43	135.		1	0945	118	13.		1		93 1.		ī		268 0.
1				_												
	0335	44	132.	-	1	0950	119	12.	-	1		94 1.	-	1		269 0.
ı	0340	45	138.	•	1	0955	120	12.	•	1		95 1.	•	1.		270 0.
1	0345	46	149.	*	.1	1000	121	12.	4	I	1615 19	96 1.	•	I	2230 2	?7ī 0.
1	0350	47	151.	*	1	1005	122	11.	*	1	1620 19	97 1.	•	1	2235 2	272 0.
1	0355	48	144.		1	1010	123	11.	•	1	1625 19	98 1.		1	2240 2	273 0.
1	0400	49	133.		1	1015	124	11.		1		99 1.		1		274 0.
ī	0405		123.		1				_			00 1.		1		
		50				1020	125	10.	-	1			-			275 0.
1	0410	51	114.	•	1	1025	126	10.	•	1		01 1.	•	1		276 0.
1	0415	52	107.	•	1	1030	127	10.	*	3	1645 20	02 1.	•	1	2300 2	277 0.
1	0420	53	99.	4	1	1035	129	9.	*	ı	1650 20	03 1.	•	1	2305	979 0.
1	0425	54	93.	*	1.	1040	129	9.	•	1	1655 26	04 1.	•	1	2310 2	279 0.
1	0430	55	88.	*	1	1045	130	9.	٠	1		05 1.	•	1		280 0.
1	0435	56	83.	4	ī	1050	131	9.		1		06 1.		ī		281 0.
ì	0410	57	78.		1	1055	132	9.		ì		07 1.	*	i		282 0.
				_												
1	0445	58	74.	•	1	1100	133	g.	•	1		08 1.	•	1		263 0.
1	0450	59	70.	•	1	1105	134	8.	*	1		09 1.	•)		284 0.
1	0455	60	67.	*	ı	1110	1?5	8.	*	1	1725 23	10 1.	•	1	2340 2	285 0.
1	0500	61	64.	*	1	1115	136	7.	*	1	1730 23	11 1.		1		286 0.
1	0505	62	61.	•	1	1120	137	7.		î		12 1.		1		287 0.
ī	0510	63	59.		î	1125	138	7.		î		13 1.		1		
										,			_			
1	05]5	64	56.	-	1	1130	139	7.	-	Ţ			•	2		289 0.
1	0520	65	54.	•	1	1135		6.	•	ι		15 1 .	•	2		290 0.
1	0525	66	53.	*	1	1140	141	6.	•	1	1755 2	16 1.	*	2	0010 2	291 0.
1.	0530	67	51.	•	1	1145	142	6.	•	1	1600 23	17 1.	•	2		292 ().
1	0535	68	50.	4	1	1150	143	6.		1			*	2		293 0.
î	0540	69	49.	*		1155	144	6.	*			19 1.		2		
					1				_	1						
1	0545	70	48.	-	1	1200	145	5.		1		20 1.	•	2		295 0.
1	0550	71	47.	-	1	1205	146	5.	•	1		21 1.	•	2		296 0.
1	0555	72	46.	•	1	1210	147	5.	•	1		22 1.	•	2	0040	297 0.
1	0600	73	45.	*	1	1215	148	5.	*	1	1830 23	23 1.	*	2	0045	298 0.
1	0605	74	44.	*	1	1220	149	5.	•	1		24 1.	•	2		299 0.
ì	0610	75	42.		ī			5.		î		25 1.		2		
ı.	0010	1.0	42.		т	1225	150	5.		T	104U Z.	. ا	-	2،	0055	300 0.
				-									•			

:	PEAK FLOW	TIME			MAXIMUM AVE	RAGE FLOW	
+	(CFS)	(HR)		6-HR	24 - HR	72-HR	24.92-HR
		,,	(CFS)				
4	232.	3.08		65.	19.	19.	19.
			(INCHES)	1.984	2.331	2.334	2.334
			(AC-FT)	32.	33.	38.	38.

CUMULATIVE AREA = .31 SQ MI

OUTPUT CONTROL VARIABLES
IPENT 5
IPLOT 0
QSCAL 0. 568 KO

5 PRINT CONTROL 0 PLOT CONTROL 0. HYDROGRAPH PLOT SCALE

CT13.0 * 580 KK COMBINE ******

591 KO

OUTPUT CONTROL VARIABLES
IPENT 1
IPLOT 0
QSCAL 0.

ONTROL VARIABLES
RNT 1 PRINT CONTROL
LOT 0 PLOT CONTROL
CAL 0. HYDROGRAPH PLOT SCALE
COMBINE R33E.2, SUB 33D, S40ET, & S40CN. FLOWS INTO JUNCTION STRUCTURE

583 HC

HYDROGRAPH COMBINATION 1COMP 3 NUMBER OF HYDROGRAPHS TO COMBINE

HYDROGRAPH AT STATION CT13.0 SUM OF 3 HYDROGRAPHS

								SOM OF 3 HY	JROGR								
*******		****	*******	• • • •	*****	******	*****	*			* * * * *	*********	*			* * * * *	
DA MO	N HRMN	ORD	FLOW	•	DA M	ON HRMN	ORD	FLOW *	DA :	MON HRMN	ORD	PLOW	*	DA M	ON HRMN	OKD	FLOW
1	0000	1	0.	•	1	0615	76	58.	1	1230	151	5.	•	1	1845	226	1.
1	0005	2	0.	•	1	0620	77	55. *	1	1235	152	5.	*	1	1850	227	1.
1	0010	3	0.	•	1	0625	78	53. •	1	1240	153	5.	•	1	1855	228	1.
1	0015 0020	4	٥.	:	1	0630	79	50. •	1	1245	154	5.	•	1	1900	229	1.
1	0025	5 6	0. 1.	-	1	0635 0640	80 13	48. *	1	1250 1255	155 156	5 -	•	1	1905	230	1.
1	0036	7	1.		1	0645	82	46. 44.	1	1300	157	5. 5.		1	1910 1915	231 232	Ι.
ī	0035	8	2.	+	î	0650	83	42.	î	1305	158	5.	4	ì	1920	233	1. 1.
ī	0046	9	3.	*	ī	0655	84	41.	1	1310	159	4.	*	ī	1925	234	1.
ı	0045	10	4.	-	1	0700	8.5	39. •	1	1315	160	1.	*	l	1930	235	1.
1	0050	11	5.	*	1	0705	86	38. •	1	1320	161	4.	-	1	1935	236	1.
1	0055	12	6.	•	1	0710	87	36. *	1	1325	162	٩.	•	ı	1940	237	1.
1	0100	13	6.	•	1	0715	88	35. *	1	1330	163	4.	*	1	1945	238	1.
1	0105 0110	14 15	7. 7.		1 1	0720 0725	89	34. * 32. *	1 1	1335 1340	164 165	4.	•	1 1	1950	239	1.
1	0115	16	8.	*	1	0725	90 91	32. * 31. *	1	1345	166	4.	-	1	1955 2000	240 241	1.
î	0120	17	9.		î	0735	92	30.	1	1350	167	4.	*	ì	2005	242	1. 1.
ı	0125	18	9.	•	1	0740	93	29.	ī	1355	168	4.	*	1	2010	243	1.
1	0130	19	10.	-	1	0745	94	28. •	1	1400	169	3.	•	1	2015	244	1.
1	0135	20	10.	•	1	0750	95	27. *	1	1405	170	3.	•	1	2020	245	1.
1	0140	21	11.	*	1	0755	96	26. *	1	1410	171	3.	•	1	2025	246	1.
1	0145	22	12.	•	1	0800	97	25. •	1	1115	172	3.	•	1	2030	217	1.
1	0150	23	12.	•	1	0805	98	25.	1	1420	173	3.	•	1	2035	248	1.
1	0155 0200	21 25	13. 14.		1 1	0810 0815	99 200	24.	1	1425 1430	174 175	3. 3.	-	1 1	2040	249	1.
i	0205	26	15.		1	0820	101	22.	1	1435	176	3.		1	2045 2050	250 251	1. 1.
ĩ	0210	27	16.		î	0825	102	22. •	î	1440	177	3.		î	2055	252	1.
1	0215	28	17.	*	1	0830	103	21. *	1	1445	178	ž.		ı	2100	253	1.
1	0220	29	19.	•	1	0835	104	20. •	1	1450	179	3.	•	1	2105	254	1.
1	0225	30	20.	٠	ı	0840	105	20. •	3	1455	180	3.	•	1	2110	255	3.
]	0230	31	21.	•	1	0845	106	19. *	1	1500	181	3.	*	1	2115	256	1.
1	0235	32	25.	•	1	0850	107	18.	ı	1505	182	3.	•	1	2120	257	1.
). 1	0240 0245	33 34	33.	-	1	0855	108	18. *	1	1510	183	2.	•	1	2125	258	0.
1	0250	35	41. 58.		1 1	0900 0905	109 110	17. * 17. *	1 1	1515 1520	184 135	2. 2.		1 1	2130 2135	259 260	0.
1	0255	36	77.	*	î	0910	111	16.	î	1525	186	2.		î	2140	261	0. 0.
1	0300	37	134.	•	ī	0915	112	16.	ī	1530	187	2.	*	ī	21.45	262	0.
1	0305	3.8	295.	•	1	0920	113	15. *	1	1535	188	2.	•	1	2150	263	0.
1	0319	39	340.	٠	1	0925	111	15. *	1	1540	189	2.	•	1	2155	264	٥.
1	0315	40	303.	٠	1	0930	115	14. *	1	1545	190	2.	•	1	2200	265	0.
1	0320	41	275.	*	1	0935	116	14. *	1	1550	191	2.	•	1	2205	266	0.
1	0325	42	257.	*	1	0940	117	14.	1	1555	192	2.	*	1	2210	267	o.
1	0339 0335	43 44	243. 226.		1 1	0945 0950	118	13. *	1	1600 1605	193 194	2.	-	1 1	2215	268	0.
1	0340	45	204.	•	ı	0955	119 120	13. * 12. *	1	1610	195	2. 2.		1	2220 2225	269 270	О. О.
ī	0345	46	184.	4	ī	1000	121	12. •	î	1615	196	2.	4	î	2230	271	0.
1	0350	47	168.	٠	1	1005	122	12. *	ī	1620	197	2.	*	ı.	2235	272	0.
ı	0355	48	156.		1	1010	123	11. *	1	1625	198	2.	•	1	2240	273	Ö,
ı	0400	49	147.	•	1	1015	124	11. *	1	1630	199	2.	•	1	2245	274	0.
1	0405	50	140.	*	1	1020	125	11. •	1	1635	200	2.	•	1	2250	275	0.
i	0410	51	134.	*	ı	1025	126	10.	1	1640	201	2.	•	I	2255	276	0.
1	0415 0420	52 53	129. 125.	•	1	1030	127	10.	1	1645	202	2.	•	1	2300	277	0.
1	0425	54	120.	-	1 1	1035 1040	128 129	10. • 10. •	1	1650 1655	203 204	2. 2.	-	ն 1	2305	278 279	0.
1	0430	55	116.		1	1045	130	9. •	1	1700	205	2.		1	2310 2315	280	0. 0.
1	0135	56	112.		1	1050	131	9 •	1	1705	206	i.		1	2320	281	0.
1	0110	57	108.	*	1	1055	132	9. •	3	1710	207	î.	*	1	2325	292	0.
1	0445	58	105.	*	1	1100	133	9 •	1	1715	208	1.	*	1	2330	283	0.
1	0450	59	101.	•	1	1105	134	8. •	1	1720	209	1.	•	1	2335	284	0.
1	0455	60	98.	*	1	1110	135	8. •	1	1725	210	1.	•	1	2340	285	0.
1	0500	61	95.	•	1	1115	136	8. •	1	1730	211	1.	•	1	2345	386	0.
1 1	0505 0510	62 63	92. 89.	-	1	1120 1125	137 138	3. •	1 1	1735 1740	212	1.	:	1	2350	287	0.
1	0515	64	86.		1 1	1130	139	g •		1745	213 214	1. 1.		1 2	2355 0000	288	0.
ì	0520	65	83.	•	1	1135	140	, ·	1	1750	215	1.	•	2	0005	589 289	0. 0.
1	0525	66	81.		î	1140	141	7	î	1755	216	1.		2	0010	291	o.
1	0530	67	78	•	ı	1145	142	7	1	1800	217	1.	*	2	0015		0.
1	0535	68	76.	*	1	1150	143	7. •	1	1805	218	1.	•	2	0020		Õ.
1	0540	69	74.	*	1	1155	144	6. *	1	1810	219	1.	•	2	0025	294	0.
1	0545	7.0	72.	•	2	1200	145	6. *	1	1815	220	1.	•	5	0030		o
1	0550	71	70.	•	1	1205	146	6. *	1	1820	221	1.	*	2	0035		0.
1	0555 0600	72	69.	*	1	1210	147	6. *	1	1825	222	1.	•	2	0040		0.
1 1	0605	73 74	66. 64.		1 1	1215 1220	148	6. •	1	1830 1835	223 224	1.		2	0045	298	0.
1	0610	75	61.		1	1225	149	6. • 6. •	ն 1	1840	2.25	1. 1.		2	0050 0055		0. 0.
-					-		,0	· · · · · · · · · · · · · · · · · · ·	•	10.0		• • •	•	-	30.73	., 00	٥.

6-HR 24-HR 72-HR 24.92-HR + (CFS) (HR)

(CFS) + 340. 3.17 92. 26.

92. 26. 25. 25. (INCHES) 1.960 2.259 2.259 2.259 (AC-FT) 45. 52. 52. 52.

CUMULATIVE AREA = .43 SQ MI

620 KK • D_SURF •

623 KO OUTPUT CONTROL VARIABLES

| 1 PRINT CONTROL | 1 PRINT CONTROL | 1 PLOT CONTROL | QSCAL | 0 | HYDROGRAPH PLOT SCALE

DT DIVERSION ISTAD DSTRMX

ISTAD D-SUBF DIVERSION HYDROGRAPH IDENTIFICATION
DSTRMX 2.00 MAXIMUM VOLUME TO BE DIVERTED

DOTANA 2.00 PRATHON VOLIQUE TO BE DIVERTED

DI INFLOW .00 1.00 10.00 40.00 70.00 100.00 300.00 500.00 800.00 DQ DIVERTED FLOW .00 1.00 10.00 40.00 70.00 100.00 300.00 500.00 800.00

DIVERSION HYDROGRAPH D-SUBF

				*								-	•			
DA MOI	N HRMN	ORD	FLOW		DA M	ON HRMN	ORD	FLOW	DA	MON HRMN	ORD	FLOW	• D	a mon hrmn	OPD	FLOW
•	0000	-	0		,	0635		•		1220	153	•	•			
1	0000	1	0.	•	1	0615	76	0.	1	1230	151	0.		1 1845	226	Ú.
1.	0005	2	0.		1	0620	77	v.	1	1235	152	0.		1 1850	227	0.
1	0010	3	0.	•	7	0625	78	٥. •	1	1240	153	0.		1 1355		0.
1	0015	4	0.	*	1	0630	79	0. *	1	1245	154	0.		1 1900	229	0.
1	0020	5	0.	*	1	0635	80	٥. ٠	1	1250	155	О.		1 1905	230	0.
ג	0025	Ç	٥.	*	1	0640	81	٥. +	1	1255	156	٥.		1 1910	251	θ.
1	0030	7	σ.	•	1	0645	82	0	1	1300	157	0.	•	1 1915	232	0.
1	0035	8	0.	•	1	0650	83	0.	1	1305	158	0.	*	1 1920	233	0.
1	0040	9	0.	•	1	0655	84	0. •	1	1310	159	0.	•	1 1925	234	0.
1	0045	10	0.		1	0700	85	0. *	1	1315	160	0.	•	1 1930	235	0.
1	0050	11	0.	*	1	0705	86	0. *	1	1320	161	0.	•	1 1935	2.16	0.
1	0055	12	0.	*	1	0710	87	0. *	1	1325	162	0.	•	1 1940	237	0.
1	0100	13	0.	*	1	0715	88	0. •	1	1330	163	0.	•	1 1945	238	0.
1	0105	14	ο.	•	1	0720	89	0. •	1	1335	164	0.		1 1950		ō.
1	0110	15	0.		1	0725	90	0.	1	1340	165	0.	*	1 1955		0.
1	0115	16	0.	*	1	0730	91	0. •	1	1345	166	0.		1 2000		0.
2	0120	17	0.	*	1	0735	92	g. •	1	1550	167	Q.		1 2005		0.
ï	0125	18	Û.	-	1	0740	93	ŭ. •	1	1355	160	Ö.		1 2010		0.
1	0130	19	0.		1	0745	94	ŭ. •	1	1400	169	ő.		1 2015		0.
î	0135	20	0.	*	1	0750	95	0.	î	1405	170	0.		1 2020		
î	0140	21	o.		î	0755	96	0. •	1	1410	171	0.		1 2025		0 -
ī	0145	22	0.		1	0800	97	0.	1	1415	172	0.		1 2030		0.
î	0150	23	0.		1	0805	98	•	1	1420	173	0.				0.
1		24	0.	_	î	0810		0.						1 2035		0.
	0155	25	0.		1		99	٠. •	1	1425	174	0.		1 2040		0.
1	0200			•		0815	100	0. *	1	1430	175	0.		1 2045		0.
1	0205	26	0.	•	1	0820	101	0.	1	1435	176	٥.		1 2050		0.
1	0210	27	0.		1	0825	102	٥. ٠	1	1140	177	o.		1 2055		0.
1	0215	28	0.	•	1	0630	103	J. *	1	1445	176	0.		1 2100		0.
1	0220	29	0.	4	1	0835	104	0. *	1	1450	179	0.		1 2105		0.
1.	0225	30	0.	*	7	0840	105	0. •	1	1455	180	0.		1 2110		0.
1	0230	31	0.	*	1	0845	106	٥. •	1	1500	181	0.		1 2115	256	0.
ı	0235	32	0.	*	1	0850	107	0. +	1	1505	182	0.		1 2120	257	0.
1	0240	33	0.	•	1	0855	103	0.	1	1510	183	0.	•	1 2125	258	0.
1	0245	34	ο.	•	1	0900	109	0. •	1	1515	184	О.	•	1 2130	259	0.
1	0250	35	0.	•	1	0905	110	0. •	1	1520	185	Û.	*	J. 2135	260	0.
1	0255	36	0.	•	1	0910	111	0. *	1	1525	186	0.	*	1 2140	261	0.
3	0300	37	53.	*	1	0915	112	0. •	1	1530	187	0.	•	1 2145	262	0.
ı	0305	39	237.	*	1	0920	113	0. *	1	1535	188	0.	•	1 2150	263	0.
I	0310	39	ű.	•	1	0925	114	0. •	1	1540	189	٥.	•	1 2155	264	0.
1	0315	40	Ο.	•	1	0930	115	0. •	1	1545	190	0.		1 2200		0.
1	0320	41	0.	•	1	0935	116	O. •	1	1550	191	0.		3 2205	266	0.
1	0325	42	0.		1	0940	117	0. •	1	1555	192	0.	•	1 2210		Ö.
1	0330	43	Ú.	*	ı	0945	118	0. +	1	1600	193	0.	•	1 2215		0.
1	0335	44	0.	-	1	0950	119	0. •	1	1605	194	0.		1 2220		0.
1	0340	45	0.	•	1	0955	120	0. •	1	1610	195	0.		1 2225		0.
1.	0345	16	0.		1	1000	121	9 .	1	1615	196	0.		1 2230		0.
ī	0350	47	0.	•	1	1005	122	0	1.	1620	197	0.		1 2235		0.
í	0355	48	ő.	4	ī	1010	123	0.	1	1625	198	0.		1 2240		
î	0100	49	0.		î	1015	124	0.	ì	1630	199	0.				0.
1	0405	50	0.	*	1	1020			1		200					0.
1	0410	51	0. 0.		1	1020	125	С.	_	1635		0.		1 2250		0.
					-		126	٠.	1.	1640	201	0.		1 2255		٥.
j	0415	52	0.	-	1	1030	127	0	1	1645	202	0.		1 2300		Ο.
1	0420	53	0.	•	1	1035	123	0. •	1	1650	203	0.		1 2305		0.
1	0425	54	0.	*	1	1040	129	0.	1	1655	204	(1.		1 2310		O.
1	0430	5.5	0.	•	1	1045	130	ly. •	1	1700	205	٥.		1 2315		0.
1	0435	56	0.	•	1	1050	131	n. •	1	1705	206	0.		1 2320		0.
ı	0440	57	0.	*	1	1055	122	n. •	1	1710	207	Ο.	•	1 2325	232	0.

1	0445	3-2	0.	*	1	1100	133	0.		1	1715	208	0.		1	2330	283	Ú.
ī	0450	59	ő.		ī	1105	134	0.	*	1	1720	209	o.	*	î	2335	284	0.
î	0455	60	ő.		ī	1110	135	0		î	1725	210	0.		7	2340	285	0.
•		61			1		-	ů.									_	
4	0500	-	c.	•	1	1115	136	0.	•	7	1730	211	О.	*	1	2345	296	٥.
1	0505	62	0.	*	1	1120	137	0.	•	ì.	1735	212	O.	•	1	2350	287	0.
1	0510	63	0.	•	1	1125	139	0.	•	1	1740	213	0.	•	1	2355	288	0.
1	0515	6.1	0.	-	,ì	1130	139	σ.	*	1	1745	214	0.	•	2	0000	229	σ.
1	0520	65	0.	•	1	1135	140	0.	•	1	1750	215	0.	•	2	0005	290	0.
1	0525	66	0.	•	1	1140	141	0.	•	1	1755	216	0.	•	2	007.0	291	0.
1	0530	67	Ο.	•	1	1145	142	Ο.	+	1	1800	217	0.	•	2	0015	292	0.
1	0535	68	0.	*	1	1150	143	0.		1	1805	218	0.	-	2	0050	293	0.
1	0540	69	0.	•	1	1155	144	0.	٠	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	Ο.	*	1	1200	145	0.	•	1	1315	220	0.	*	2	0030	295	6.
1	0550	71	0.	٠	1	1205	146	0.	*	1	1820	221	0.	•	2	0035	296	G.
1	0855	72	0.	٠	1	1210	147	0.	•	1	1825	222	0.	•	2	0040	297	O.
1	0000	73	0.		ı	1215	148	ο.	*	1	1830	223	0.	*	2	0015	298	0.
1	0605	74	0.	•	1	1220	149	0.	*	1	1835	224	Ο.		2	0050	299	٥.
1	0610	75	0.		1	1225	150	ρ.	٠	1	1840	225	0.	*	2	0055	300	ō.
						_	_				-			•				٧.

PEAK FLOW TIME 6-HR 24-HR 72-HR 24.92-HR
+ (CFS) (HR) (CFS)
+ 237. 3.08 (CFS) 1. 1. 1. 1. 1. (INCHES) 0.74 0.074 0

51 SQ MI

CUMULATIVE AREA -

HYDROGRAPH AT STATION D_SURF

ŊΛ	MON HRMN	ORD	FLOW	•	DA I	мом ними	ORD	FLOW	1 AG	имчн иом	ORD	FLOW	DA MO	MMAH MO	ORD	FLOW
ı	0000	1	0.	÷	1	0615	76	0.	1	1230	151	0.	1	1845	226	0.
1	0005	2	0.	•	ı	0620	77	0.	1	1235	152	0.	· ı	1850	227	0.
1	0010	3	0.	•	1	0625	78	0.	1	1240	153	0.	• 1	1855	228	0.
1	0015	4	0.	*	1	0630	79	0.	1	1245	154	0.	1	1900	229	0.
1	0020	5	0.	•	1	0635	80	0. *	1	1250	155	0.	1	1905	230	0 -
1	0025	в	٥.	*	1	0640	81	o. •	1	1255	156	0.	- 1	1910	231	0.
1	6030	7	0.	*	1	0645	82	0.	1	1300	157	0.	1	1915	232	0.
1	0035	8	0.	•	1	0650	83	0.	1	1305	158	0.	• 1	1920	233	0.
1	0040	3	o.	•	I	0655	81	0. *	1	1310	159	0.	Ţ	1925	234	0.
1	0045	10	0.	•	1	0700	35	0. *	1	1315	160	U - ·	· 1	1930	235	0.
1	0050	11	0.	•	1	0705	86	۰. •	1	1320	161	0.	1	1935	236	ο.
1	0055	12	0.		1	0710	87	٥. •	1	1325	162	0.	1	1910	237	0.
ı	0100	13	0.	*	1	0715	89	0.	1	1330	163	0.	1	1945	238	0.
1	0105	14	0.	*	1	0720	89	٥. •	1	1335	164	0.	1	1950	239	0.
3	9110	15	0.	*	1	0725	90	۰ . 0	1	1340	165	0.	1	1955	240	0.
1	9115	16	0.	•	ı	0730	91	٥. •	_	1345	166	υ.	• 1	2000	241	0.
1	0120	17	0.	•	1	0735	92	0.	1	1350	167	0.	1	2005	242	ο.
1	0125	18	O.	*	1	0740	93	0. •	1	1355	169	0.	1	2010	243	0.
1	0130	19	0.	*	1	0745	94	0.	1	1400	169	0.	1	2015	244	0.
1	0135	50	٥.	•	1	0750	95	0.	1	1405	170	0.	• 1	2020	245	0.
1	01.40	21	0.	•	1	0755	96	٥. ٠	1	1410	171	0.		2025	246	Ο.
1	0145	22	0.	•	1	0800	97	0.	1	1415	172	0.	• 1	2030	247	0.
1	0150	23	٥.	•	1	0805	98	٥. ٠	I	1420	173	0.	• 1	2035	248	0.
1	0155	24	0.	*	1	0810	99	٥. •	-	1425	174	0.	• 1	2040	249	Ο.
1	0200	25	0.	*	1	0815	100	0.	1	1430	175	0.	1	2045	250	0.
1	0205	26	0.	•	1	0850	101	٥. ٠	1	1435	176	0.	1	2050	251	0.
1	0210	27	0.	•	1	0325	102	0.		1440	177	0.	• 1	2055	252	Ο.
1	0215	28	0.	•	1	0830	103	0.	1	1445	178	0.	* 1	2100	253	0.
1	0220	29	0.	-	1	0935	101	٥. ٠	1	1450	179	0.	• 1	2105	254	٥.
1	0225	30	0.	•	1.	0840	105	0.	_	1455	180	0.	• 1	2110	255	0.
1	0230	31	0 -	•	1	0845	106	0.	1	1500	181	0.	• 1	2115	256	ο.
1	0235	32	0.	•	1	0850	107	0.	ı	1505	182	o.	1	2120	257	٥.
1	0240	33	0.	*	1	0855	108	٥. •	1	1510	183	0.	• 1	2125	258	0.
1	0245	34	٥.	*	1	0900	109	0.	1	1515	184	o.	• 1	2130	259	ο.
1	0250	35	0.	*	1	0905	110	0.	1	1520	185	o	• 1	2135	260	0.
1	0255	36	0.	-	1	0910	111	0.	*	1525	186	0.	1	2140	261	0.
2	0300	37	0.	-	1	3915	112	ø. •	_	1530	187	0.	1	2145	262	υ.
)	0305	38	126.	*	1	0920	113	0.	•	1535	188	0.	1	2150	263	0.
1	0310	39	309.	-	1 1	0925	114	0.	1	1540	189	0.	• 1	2155	264	0.
1	0315	40	189.	-		0930	115	0.	1	1545	190	0.	1	2200	265	0.
1	0320	41 42	1.31. 101.		1	0935	116	0.	1	1550	191	0.	• 1	2205	266	0.
1	0325			-	1	0940	117	0.	1	1555	192	0.	. 1	2210	267	0.
_	0330 0335	43 44	82. 60.		1	0945	118	٥.		1600	193	0.	1	2215	269	٥.
1	0340	45	38.	•	ì	0950	119	0.	. 1	1605 1610	194 195	0. 0.	1	2220	269	0.
1	0345	46	21.	- 2	1	0955	120	0.	. 1		196		1	2225	270	ດ.
1	0350	47	10.		ì	1000 1005	121 122	0.	1	1615 1620	197	0. 0.	1	2230	271	0.
1	0355	48	3.		1	1010	123	ο.	, ,	1625	157	0.	• 1 • 1	2235	272	0.
1	0400	19	ő.		1	1015	123	0.	1	1630	199	0.	· 1	2240	273	9.
1	0405	50	0.		ì	1020	125	o ·	1	1635	200	٥.	• 1	2245	274	0.
_	0410	51	ů.		3.	1025				1640	201		• 1	2250	275	٥.
1		52	0.	*	1.		126	0.	1			ú.		2255	276	٥.
1	0415 0420	53	0.		1	1030 1035	127	0.	1 1	1645 1650	202 203	٥. ٥.	• 1 • 1	2300	277	0.
1	0425	54	υ.		1		128							2305	273	0.
_	0430	55	0.		1	1040	129	0.	. 1	1655	204	0.	•]	2310	279	0.
1	0435	56	0.	-	1	1045	130	0.	1 1	1700 1705	205 206	ú. O.	• 1	2315	280	0.
1		57	0.	-	1	1050	131	0. '	1				• 1	2320	281	0.
_	0440	58	0. 6.			1055	132	0.	_	1710	207	0.	•]	2325	282	0.
1	0445 0450	58 59	θ.	-	1 1	1100 1105	133	0.	1	1715 1720	298 299	٥.	• 1	2330	283	0.
	9920		υ.				134	0. 1	1			Ο.	• 1	2335	284	0.
1		6.0	fi.		1	1110	1 3 5	^	. 7	1777	210		. 1	2246	*. O &	^
1 1 1	0455 0500	60 61	0. 0	:	1	1110 1115	135 136	0.	1	1725 1730	210 211	0. 0.	• 1 • 1	2340 2345	285 286	Ο. υ.

1	0505	62	0.	•	1	1120	137	٥.		1,	1735	212	0.		1	2350	287	0.
1	0510	6.3	ο.		1.	1125	138	υ.	•	1	1/40	213	ο.	•	3	2355	299	0.
1	0515	G4	0.	•	1	1130	139	0.		1	1715	214	0.		2	0000	289	0.
1	0520	65	0.	•	1	1135	140	0.	4	1	1750	215	0.	•	2	0005	290	0.
1	0525	66	٥.	•	1	1340	141	٥.	*	1	1755	216	0.	•	2	0010	291	0.
1	0530	67	0.	4	1	1.145	142	ο.	*	ι	1800	217	0.	•	2	0015	292	0.
1	0535	68	0.		1	1150	143	0.	٠	1	1805	218	0.		2	0020	293	0.
1	0540	69	0.	•	1	1155	144	0.	•	1	1810	219	ο.	-	2	0025	294	0.
1	0545	70	0.	*	1	1200	145	0.	•	1	1915	220	0.	*	2	0030	295	0.
1	0550	71	0.	•	1	1205	146	0.	•	1	1820	221	0.	*	2	0035	296	0.
1	0555	7.2	0.		1	1210	147	0.	*	l	1825	222	0.		2	0040	297	0.
1	0660	73	0.	*	1	1215	143	0.	•	1	1830	223	0.	•	2	0045	298	0.
ı	0665	74	0.	•	1	1220	149	Ο.	•	1	1835	224	υ.	*	2	0050	299	0.
1	0610	75	Ů.	-	1	1225	150	θ.		1	1840	225	ο.		2	0055	300	0.
									٠									

	PEAK FLOW	TIME			MAXIMUM AVE	RAGE FLOW	
+	(CFS)	(HR)		6-HR	24-HR	72-HR	24.92-HR
		•••••	(CFS)				
4.	309.	3.17		15.	4.	1.	4.
			(INCHES)	.271	.271	.271	.271
			(AC-FT)	7.	7.	7.	7.

CUMULATIVE AREA = .51 SQ MI

C33 KK CS40B * COMBINE

€34 КО OUTPUT CONTROL VARIABLES

TOWNTHOL VARIABLES
TERMT 1 PRINT CONTROL,
TPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE
COMBINE PIPE FLOW, DIVERETD SURFACE FLOW AND REMAINING SURFACE FLOW

HYDROGRAPH COMBINATION
ICOMP 3 NUMBER OF HYDROGRAPHS TO COMBINE 636 HC

HYDROGRAPH AT STATION C\$40B SUM OF 3 HYDROGRAPHS

DA	MON HRMN	ORD	FLOW	*	DA M	ON HRMN	ORD	FLOW		DA MO	N HRMN	ORD	FLOW	*	DA MON	HRMN	ORD	FLOW
1.	0000	1	0.	•	1	0615	76	3.	•	1	1230	151	0.	•	1	1845	226	0.
1	0005	2	0.	•	1	0620	77	2.	•	l	1235	152	0.	•	1	1850	227	0.
1	0010	3	0.	•	1	0625	78	2.	~	1	1240	153	0.	*	I	1855	228	υ.
1	0015	4	0.	*	ı	0630	79	1.	•	1	1245	154	0.	*	1	1900	229	0.
1	0020	5	1.	•	ı	0635	80	1.	•	1	1250	155	0.	*	1	1905	230	0.
1	0025	6	1.	•	1	0640	81	1.	*	1	1255	156	٥.	•	1	1910	231	0.
1	0030	7	2.	•	1	0645	82	1.	•	1	1300	157	Ο.	•	1	1915	232	0.
1	0035	8	2.	*	1	0650	83	1.	•	1	1305	158	0.	*	1	1920	233	0.
1	0040		3.	*	I	0655	8-1	1.	-	1	1310	159	Ο.	*	ī	1925	234	0.
1	0045	10	4.	•	1	0700	85	٠.	*	1	1315	160	0.	•	1	1930	235	0.
1	0050	11	4.	•	1	0705	86	٥.	*	ı	1320	161	0.	*	1	1935	236	0.
1	0055		4.	•	1	0710	87	0.	•	l	1325	162	Ο.	•	1	1940	237	Ο.
1	0100	13	5.	*	1	0715	33	0.	*	1	1330	163	0.	*	1	1945	239	0.
1	0105	14	5.	*	1	0720	89	٥.	•	1	1335	164	O.	*	1	1950	239	0.
1	0110	15	5.	-	1	0725	90	٠.	•	ī	1340	165	σ.	*	1	1955	240	ο.
1	0115	16	5.		1	0730	91	0.	*	3	1345	166	0.	*	1	2000	241	0.
1	0120	17	5.	•	1	0735	92	0.	•	1	1350	167	0.	•	1	2005	242	0.
1	0125		6.	*	1	0740	93	٠.	*	1	1355	168	٥.	•	1	2010	243	Ο.
1	0130		6.	•	1.	0745	9.1		*	1	1400	169	Ο.	•	1	2015	244	0.
1	0135	20	6.		1	0750	95	ο.	•	1	1:105	170	ο.	•	1	5050	215	0.
1	0140		6.	•	1	0755	96	٠.	•	1	1410	171	Ο.	•	1	2025	246	0.
1	01.45	22	7.	•	1	0800	97	٠.	•	1	1415	172	0.	•	1	5030	247	0.
1	0150		7.	•	1	0805	98	٧.	*	1	1420	173	0.	•	1	2035	248	0.
1	0155	24	7.	•	1	0810	99	υ.	•	1	1425	174	0.	*	1	2040	249	0.
1	0200	25	8.	*	1	0815	100	0.	•	1	1430	175	0.	•	1	2045	250	Ο.
1	0205		8.	*	1	0820	101	٠.	•	1	1435	176	0.	•	1	2050	251	ŭ.
1	0210	27	9.		1	0825	102	٧.	•	1	1440	177	ø.	•	1	2055	252	Ů.
1	0215	28	10.	•	1	0830	103	0.	•	1	1445	178	0.	•	1	2100	253	0.
1	0220	29	10.	*	1	0835	104	0.	•	1	1150	179	0.	•	1	2105	254	0.
1	0225	30	11.	•	1	0840	105	O.	•	1	1455	180	0.	*	1	2110	255	0.
1	0230		13.	•	1	0845	106	0.	•	1	1500	191	0.	•	1	2115	256	٥.
1	0235	32	19.	•	1	0850	107	0.	•	1	1505	182	0.	•	1	2120	257	0.
1	0240		28.	-	1	0855	106	0.		1	1510	183	0.	•	1	2125	∠58	Û.
1	0245	34	39.		1	0900	109	٥.		1	1515	194	0.	*	1	2130	259	0.
1	0250	35	53.	*	1	0205	110	٠.	•	1	1520	185	o.		1	2135	260	٥.
l.	0255		74.		1	6910	111	0.		1	1525	106	0.	•	1	2140	261	0.
1	0300		99.	•	1	6915	112	٧.	•	1	1530	187	0.	•	1	2145	262	0.
1	0305	38	156.	•	1	0920	113	0.	•	1	3535	188	n.	•	1	2150	263	o.
1	0310		339.	•	1	0925	114	0.		1	1510	199	o.	•	1	2155	264	o.
1	0315		219.	•	1	0930	115	٥.		1	1545	190	0.	•	1	2200	265	0.
1	0320	41	161.	•	1	0935	116	0.	•	1	1550	191	0.	•	1	2205	256	0.
1	0325	42	131.	٠	1	0940	117	ο.	•	1	1555	192	0.	•	1	2210	267	0.

FEMA PLACE	, ii	1136			6-HR		IMUM AV 24-HR	ERAGE FLC 72-H		24.	92-HR							
PEAK FLO		'IME					******	********				*****	******		* * * * * *	******		******
<u>.</u>	0010			٠	_		130	0.	*		1040	225	V.			מבטט	300	0.
1	0605 0610	74 75	4.	*	1 1	1220 1225	149 150	0. 0.	*	l l	1835 1840	224 225	0. 0.		5	0050 0055	299	0.
1	0600	73	5.		1	1215	148	٥.		1	1830	223	o.	*	5	0045	298	٥.
1	0555	72	5.	:	1	1210	147	0.		1	1825	222	0.		5	0040	297	ο.
1	0550	71	5.	*	1	1205	146	0.	•	1	1820	221	Ģ.	*	5	0035	29€	Ο.
1	0545	70	5.	*	1	1200	145	0.	•	1	1815	220	O.	*	5	0030	295	ο.
1	0540	69	5.	*	1	1155	144	0.	*	1	1810	219	0.	•	5	0025	294	0.
1	0535	68	5.	*	1	1150	343	0.	-	1	1805	218	0.	•	5	0020	293	Ο.
1	0530	67	S.	•	1	1145	142	0.	•	1	1900	217	0.	•	2	0015	292	0.
1	0525	66	6.	•	1	1140	141	٥.	•	1	1755	216	0.	•	2	0010	291	0.
ı.	0520	65	6.	*	1	1135	140	٥.	•	1	1750	215	٥.	•	2	0005	290	0.
1	0515	6.1	6.	•	1	1130	139	0.	*	1	1745	214	0.	*	2	0000	289	0.
1	0510	63	6.	•	1	1125	138	0.	*	1	1740	213	٥.	*)	2355	288	٥.
1	0505	62	7.	•	1	1120	137	0.	*	1	1735	212	٥.	*	1	2350	287	0.
1	0500	61	7.	•	1	1115	136	υ.	•	1	1730	211	0.	*	1	2345	296	0.
1	0455	60	7.	*	1	1110	135	0.	٠	1	1725	210	G.	•	1	2340	285	0.
1	0450	59	7.	•	1	1105	1.34	ο.	*	1	1720	209	٥.	•	1	2335	284	٥.
1	0145	58	8.	*	1	11.00	133	υ.	•	1	1715	208	G.	•	1	2330	283	0.
1	0440	57	9.	*	1	1055	132	0.	*	1	1710	207	<u>0</u> .	•	1	2325	282	0.
1	0435	56	11.	*	1	1050	131	0.	•	1	1705	206	G.	•	1	2320	281	Ο.
2	0430	55	12.	•	1	2 04 5	130	Ο.	*	1	1700	265	۵.	•	ı	2315	260	0.
1	0425	54	14.	*	1	1040	129	0.	•	1	1655	204	٥.	•	1	2310	279	0.
1	0420	53	16.	•	1	1035	128	0.	•	1,	1650	203	0.	*	1	2305	278	Ō.
1	0415	5.2	18.	*	1	1030	127	Ο.	*	3	1645	202	Ο.	•	1	3300	277	0.
1	0410	51	20.	•	1	1025	126	o.	*	1	1640	201	ο.	٠	1	2255	276	0.
1	0105	50	23.	*	1	1020	125	0.	*	1	1635	200	٥.	•	1	2250	275	0.
1	0400	49	27.	*	1	1015	124	0.	•	1	1630	199	٥.	*	1	2245	274	٥.
1	0355	49	33.	*	1	1010	123	ο.	•	1	1625	198	٥.	•	1	2240	273	0.
1	0350	47	40.	*	1	1005	122	ο.	•	1	1620	197	0.	*	1	2235	272	0.
3	0345	46	51.	*	1	1000	121	Ο.	*	ı	1615	196	0.	•	1	2230	271	0.
1	0,40	4.5	68.	٠	1	0955	120	ο.	•	1	1610	195	Ο.	•	1	2225	270	0.
1	0335	4.4	90.	*	1	0950	119	Ο.	•	1	1605	194	ο.	•	1	2220	269	0.
1																2215		

6-HR (IIR) (CFS) (CFS) 3.17 30. 7. 7. (INCHES) .510 . 544 .544 . 544 (AC-FT) 15. 15. 15. 15.

> CUMULATIVE AREA = .51 SQ MI

637 KK S40BAS

OUTPUT CONTROL VARIABLES 638 KO

1 PRINT CONTROL IPRNT 0 PLOT CONTROL IPLOT

QSCAL

CAL 0. HYDROGRAPH PLOT SCALE
ROUTE DIVERTED FLOW THROUGH OFFLINE BASIN CONCEPT MAX H =5.9
ASSUMED 1000'X 80' BASIN WITH 5:1 SIDE SLOPES & 36" OUTLET

24" ELEED-OFF PIRE PLUS 20' WIDE SPILLMAY AT 3.8'

HYDROGRAPH ROUTING DATA

642 RS STORAGE ROUTING

NSTPS NUMBER OF SUBREACHES

TYPE OF INITIAL CONDITION
INITIAL CONDITION STOR 1TYP

RSVRIC -1.00

.00 WORKING R AND D COEFFICIENT

643 SV STORAGE . 1 4.5 5.5 5.8 6.2 645 SE ELEVATION .00 2.00 3.00 .80 1.00 4.00 5.00 5.40 5.60 5.80

647 St. LOW-LEVEL OUTLET

ELEVL 1.00 ELEVATION AT CENTER OF OUTLET

CAREA CROSS-SECTIONAL AREA COEFFICIENT 3.14 COQL .62

EXPL .50 EXPONENT OF HEAD

6.00

648 SS SPILLWAY

CREL 3.80 SPILIWAY CREST ELEVATION

SPILLWAY WIDTH SPWID 20.00

COOW WEIR COEFFICIENT 2.80 EXPW 1.50 EXPONENT OF HEAD

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW ELEVATION	.00 .00	.00 1.00	15.21 1.95	16.18 2.07	17 27 2.22	13.53 2.41	19.98 2.64	21.68	23.70 3.30	26 13 3.80
OUTFLOW	26.75	28.89	33 54	41.63	54.26	72.26	96.63	128.34	168.36	217.65
ELEVATION	3.84	3.92	4 03		4.39	4.63	4.91	5.23	5.60	6.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.00	. 14	. 83	. 87	. 94	1.09	1.27	1.49	1.77
OUTFLOW	.00	.60	.00	15.21	15.61	16.18	17.27	18.53	19.98	21.68
ELEVATION	.00	.80	1.00	1.95	2.00	2.07	2.22	2.41	2.64	2.93
STORAGE	1.94	2.20	2.80	2.85	2.94	3.04	3.09	3.32	3.61	3.96
OUTFLOW	22.03	23.70	26.13	26.75	28.89	32.05	33.54	41.58	54.26	72.26
FLEVATION	3.00	3.30	3.80	3.94	3.92	4.00	4.03	4.19	4.39	4.63
STORAGE	4.36	4.49	4.88	5.16	5.48	5.82	6.15			
OUTFLOW	96.63	104.84	128.34	146.09	168.36	192.60	217.65			
ELEVATION	4.91	5.00	5.23	5.49	5.60	5.80	6.00			

HYDROGRAPH AT STATION \$40BAS

*****	****	****	*******	*******	******	٠.				******	*******		•••	**				*******	******	
DA MOI	I HRMN	CRD	CUTFLOW	STORAGE	STAGE	• • ;	DA MON	RRMN	ORD	OUTFLOW	STORAGE	STAGE	•	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1	0000	1	0.	. 0	. 8		1	0820		1.	.2	1.0		1		1640		0.	.1	1.0
1 1	0005 0010	2	0. 0.	.0		•	1	0825 0830		0. 0.	. 2	1.0		1		1645 1650		0.	.1	1.0
î	0015	4	0.	.0	. 8	٠	î	0835		0.	. 2	1.0		1		1655		0.	.1	1.0
1	0050	5	0.	. 0		•	1	0840		0.	. 2			1		1700	205	0.	. 1	1.0
1	0025	6	0.	. 0		•	1	0845		0.	. 2	1.0		1		1705		0.	. 1	1.0
1	0030 0035	7 8	0. 0.	.0		:	1	0850 0855		0. 0.	.2	1.0 1.0		1		1710 1715		0. 0.	.1	1.0
ī	0040	9	ŏ.	.1		•	1	0900		o.	.1	1.0		ī		1720		0.	. 1	1.0
J	0045	10	ο.	. 1		-	1	0905		υ.	.1	1.0		1		1725	210	0.	. 1	1.0
1	0050	11	0.	. 1		*	1	0910		0.	.1	1.0		1		1730		0.	. 1	1.0
1 1	0055 0190	12 13	0. 0.	. 1	1.0		1	0915 0920		0. 0.	.1 .1	1.0 1.0		1		1735 1740		0. 0.	.1	1.0
1	0105	14	1.	. 2	1.1		ì	0925		0.	. 1	1.0		1		1715		0.	.1 .1	1.0
1	0110	15	2.	.2	1.1	*	1	0930	115	0.	.1	1.0	٠	1		1750		0.	. 1	1.0
1	0115	16	2.	. 2		*	1	0935		0.	.1	1.0		1		1755		0.	. 1	1.0
1	0120 0125	17 18	3. 3.	.3	1.2		1	0940 0945		0. 0.	. 1 . 1	1.0 1.0		1		1800 1805		0. 0.	. 1	1.0
î	0130	19	3.	. 3		*	1	0950		0.	. 1	1.0		ì		1910		0.	.1 .1	1.0 1.0
1	0135	20	4.	. 3		•	1	0955		0.	. 1	1.0		1		1815		0.	.1	1.0
1	0140	21	4.	. 3	1.3		1	1000		0.	. 1	1.0		1		1820		0	. 1	1.0
1	0145 0150	22 23	4. 5.	. 3	1.3		1	1005		0. 0.	.1	1.0		1		1825 1830		0.	.1	1.0
1	0155	24	5. 5.	.4	1.3		1	1015		0.	. 1	1.0		1		1835		0. 0.	.1	1.0
1	0200	25	۶.	. 4	1.3		1	1020	125	ο.	.1	1.0		3		1840		0.	. 1	1.0
1	0205	26	6.	. 4		٠	1	1025		0.	. 1	1.0		1		1845		0.	. 1	1.0
1	0210 0215	27 28	€. 7.	, 4 , 1	1.4		1	1030 1035		0. 0.	.1	1.0		1		1850 1855		0 n	.1	1.0
1	0220	29	7.	. 5			î	1040		0.	.1	1.0		1		1900		0.	.1 .1	1.0
1	0225	30	9.	.5		٠	1	1045		0.	. 1	1.0		1		1905		0.	. 1	1.0
1	0230	33	8.	.5		•	1	1050		0.	. 1	1.0		1		1910		0.	. 1	1.0
l l	0235 0240	32 33	9. 11.	. 6 . 7	1.6	*	1	1055		0. 0.	. l . l	1.0		1		1915 1920		0.	-1	1.0
1	0245	34	14.	. 3	1.9		1	1105		0.	.1	1.0		1		1925		0. 0.	.1	1.0
1	0250	35	17.	1.0	2.1		1	1110	135	0.	.1	1.0		1		1930		0.	. î	1.0
1	0255	36	19.	1.3		•	1	1115		0.	.1	1.0		1		1935		0.	. 1	1.0
1	0300 0305	37 38	22. 25.	1.9 2.5	2.9 3.5		1	1120 1125		0.	. 1 . 1	1.0		3		1940 1945		0.	. 1	1.0
ī	0310	39	68.	3.9	4.6		ī	1130		0. 0.	.1	1.0		1		1950		0. 0.	.1	1.0
1	0315	40	141.	5.1	5.4	•	1	1135	140	0.	.1	1.0		1		1955		0.	.1	1.0
1	0320	41	159.	5.4		*	1	1140		٥.	. 1	1.0		1		2000		0.	. 1	1.0
1	0325 0330	42 43	154. 142.	5.3 5. 1		•	1	1145 1150		0. 0.	. 1 . 1	1.0		1		2005 2010		0. 0.	-1	1.0
î	0335	44	127.	4.9	5.2		î	1155		0.	.1	1.0		1		2015		0.	.1	1.0
1	0340	45	111.	4.6	5.1		1	1200		0.	.1	1.0		1		2020		0.	, 1	1.0
1	0345		93.	4.3	4.9		1	1205		0.	.1	1.0		1		2025		0.	. 1	1.0
1	0350 0355	47 18	77. 64.	4.0 3.8		•	1	1210 1215		o.	.1	1.0		1		2030 2035		0. 0.	. 1	1.0
1	0100		54.	3.6	4.4		î	1220		0.	.1	1.0		1		2040		0.	. I . 1	I.0 1.0
1	0405	50	46.	3.4		•	1	1225		0.	. 1	1.0	٠	1		2015	250	0.	.1	1.0
1	0410	51	40.	3.3	• • • -	•	1	1230		0.	. 1	1.0		1		2050		0.	. 1	1.0
1	0415 0420	52 53	36. 32.	3.1 3.0		•	1	1235 1240		0. 0.	. 1 . 1	1.0		1		2055 2100		0. 0.	.1	1.0 1.0
1	0425	54	29.	2.9		•	ī	1245		ő.	.1			ì		2105		õ.	.1	1.0
1	0130	55	27.	2.8	3.8	•	1	1250		0.	. 1	1.0		1		5110		O.	. 1	1.0
1	0435	56 57	26.	2.7	3.7	•	1	1255		0.	. 1	1.0		1		2115		0.	. 1	1.0
1	0440		25. 25.	2.6 2.5	3.7		1	1300		0.	.1	1.0		1		2120 2125		0.	.1	1.0 1.0
1	0150		24.	2.4	3.5		1	1310		õ.	. 1	1.0		1		2130		ő.	. 1	1.0
1	0455	60	24.	2.3	3.4		1	1315		Ο.	. 1	1.0		1		2135		0.	.1	1.0
1	0500	61	23.	2.2	3.3	•	1	1320		0.	. 1.	1.0		1		2140		0.	.1	1.0
1	0505 0510	62 63	23. 22.	2.0 1.9	3.2 3.1		1	1325 1330		0. 0.	. 1 . 1	1.0 1.0		1		2145 2150		0. 0.	.1	1.0
ī	0515		22.	1.8	3.0	*	î	1335		0.	.5	1.0		ī		2155		0.	. 1	1.0 1.0
1	0520	65	21.	1.7	2.9	•	1	1340	165	0.	.1	1.0		1		2200	265	0.	. 1	1.0
1	0525	66	21.	1.6	2.8		1	1345		0.	. 1	1.0		1		2205		0.	. 1	1.0
1	0530 0535	67 68	20. 19.	1.5 1.4	2.7		1	1350 1355		0. 0	.1	1.0 1.0		1		2210 2215		0. 0.	. 1 . 1	1.0
ì	0540		19.	1.3	2.5		1	1400		0.	.1	1.0		1		2220		0.	.1	1.0 1.0
1	0545	70	18.	1.2	2.4	*	1	1405	170	0.	. 1,	1.0	٠	ı		2225	270	0.	.1	1.0
1	0550	71	18.	1.1	2.3		1	1410		Ű.	. 1	3.0		1		2230		0	. 1	1.0
1 1	0555 0600	72 73	17. 16.	1.0	2.2		l l	1415 1420		0. 0.	.1	1.0 1.0		1		2235 2240		0. 0.	.1	1.0
ì	0605	74	16.	. 9	2.0		i	1425		0.	.1	1.0		1		2245		0.	.1	1.0 1.0
1	0610	75	15.	. 8	1.9	٠	1	1430	175	0.	. 1	1.0	•	1		2250	275	٥.	. 1	1.0
1	0615	76	13.	. 7	1.8			1435		0.	1	1.0				2255		0.	. 1	1.0
1	0020	//	11.	.7	1.7	•	Ţ	1450	111	0.	. 1	1.0	•	1		2300	211	Ο.	. 1	1.0

1	0625	78	10.	. 6	1.6		1	1445	178	0.	. 1	1.0		1	2305	278	0	. 1	1.0
1	0630	7.9	9.	. 5	1.6		1	1450		0.	. 1	1.0		1	2310		0.	. 1	1.0
1.	0635	9.0	З.	. 5	1.5	•	1	1455	180	0.	. 1	1.0	*	ì	2315	280	0.	. 1	1.0
1	0640	81	7.	. 5	1.4	٠	1	1500	181	0.	. 1	1.0		l	2320	281	0.	. 1	1.0
1.	0645	82	6.	. 4	1.4	•	1	1505	182	0.	. 1	1.0		1	2325	282	0.	. 1	1.0
1	0650	83	5 .	. 4	1.3	٠	1	1510	183	0.	. 1	1.0	•	1	2330	283	0.	. 1	1.0
1	0655	84	5.	. 4	1.3	*	1	1515	184	Ú.	. 1	1.0	•	1	2335	284	0.	.1	1.0
1	0700	35	4.	. 3	1.3	*	3.	1520	185	0.	. 1	1.0	•	1	2340	285	0.	. 1	1.0
1	0705	86	4.	. 3	1.2	*	1	1525	186	0.	. 1	1.0	•	l	2345	286	0.	. 3.	1.0
1	0710	87	3.	. 3	1.2	٠	1	1530	187	0.	. 1	1.0	4	l	2350	287	0.	. 1.	1.0
1	0715	88	3.	. 3	1.2	*	1	1535	188	0.	. 1	1.0	•	ì	2355	288	0.	. 1	1.0
1	0720	89	2.	. 2	1.1	*	1	1540	189	0.	. 1.	1.0	-	2	0000	289	0.	. 1	1.0
1	0725	90	2.	. 2	1.1	٠	1	1545	190	0.	. 1	1.0	•	2	0005	290	0.	. 1	1.0
1	0730	91	2.	, 2	1.1	*	1	1550	191	0.	. 1	1.0	• :	2	0010	291	0.	. 1	1.0
1	0735	92	2.	, 2	1.1	*	3.	1555	192	0.	. 1	1.0	• :	2	0015	292	0.	. 1	1.0
1	0740	93	1.	. 2	1.1	*	1	1600	193	0.	. 1	1.0	٠.	5	0020	293	0.	. 1	1.0
1	0745	94	1.	. 2	1.1	*	1	1605	194	0.	.1	1.0	• ;	2	0025	294	0.	. 1	1.0
3.	0750	95	1.	. 2	1.1	•	1	1610	195	0.	. 1	1 0	•	2	0030	295	0.	. 1	1.0
1	0755	96	1.	. 2	1.1	•	1	1615	196	0.	. 1	1.0	+	2	0035	296	0.	.1	1.0
1.	0800	97	1.	. 2	1.1	•	1	1620	197	0.	. 1	1.0	+	2	0040	297	0.	.1	1.0
1	0805	98	1.	. 2	1.0	*	1	1625	198	0.	. 1	1.0	•	2	0045	298	0.	.1	1.0
1	0910	99	1.	. 2	1.0	•	1	1630	199	0.	. 1	1.0	٠.	5	0050	299	0.	. 1	1.0
1	0815	100	1.	. 2	1.0	•	3	1635	200	0.	.1	1.0	•	2	0055	300	0.	. 1	1.0
						*							*						
••••						**			• • • • • • • •	*****							********	*********	
PEAK	FLOW	TIME					MAXII	MUM AVE	RAGE FLO	N.									
					6-HR			4 - HR	72-1		24.92-HR								
+ (C	FS)	(HR)																	
			(CF	S)															
	150	1 17			20			•7	-	,	7								

	PEAK FLOW	TIME			MAXIMUM AVER	RAGE FLOW	
				6-HR	24 - HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	159.	3.33		29.	7.	7.	7.
			(INCHES)	.532	. 539	.539	. 539
			(AC-FT)	14.	15.	15.	15.
I	PEAK STORAGE	TIME			MAXIMUM AVERA	AGE STORAGE	
				6-HR	24-HR	72-HR	24.92-HR
+	(AC-FT)	(HR)					
	5.	3.33		2.	1.	1.	1.
	PEAK STAGE	TIME			MAXIMUM AVER	RAGE STAGE	
				G-HR	24-HR	72-HR	24.92-HR
+	(FELT)	(HR)					
	5.52	3.33		2.64	1.42	1.40	1.40

CUMULATIVE AREA = .51 SQ MI

649 KK P33E.1

650 KQ OUTPUT CONTROL VARIABLES

CONTROL VARIABLES
FROM 1 PRINT CONTROL
LOT 0 PLOT CONTROL
CAL 0. HYDROGRAPH PLOT SCALE
DIVIDE THE FLOW INTO TWO ADDT CULVERTS I PLOT QSCAL

DΤ DIVERSION

ISTAD D33C.2 DIVERSION HYDROGRAPH IDENTIFICATION

Dί INFLOW .00 100.00 200.00 400.00 600.00 DIVERTED FLOW 68.00 136.00 272.00 408.00

DIVERSION HYDROGRAPH D33C.2

		* * * * *									* * * * * *	****	*****						* * * * * * * * * * *
DΛ	NON H	RIM	ORD	FLOW	•	DA M	ON HRMN	ORD	FLOW	•	DA I	40n hrmn	OBD	FLOW	•	DV WO	N HRMN	ORD	FLOW
										٠					•				
1	0	000	1	0.	•	1	0615	76	9.	٠	1	1230	151	0.	*	1	1945	226	Ο.
1	0	005	2	0.	٠	1	0620	77	6.	*	1	1235	152	O.	٠	1	1850	227	0.
1	0	010	3	Ο.	•	1	0625	78	7.	*	1	1240	153	٥.	*	1	1855	228	0.
1	0	015	4	0.	•	1	0630	79	б.	*	1	1245	154	0.	•	1	1900	229	0.
1	0	020	5	0.	*	1	0635	80	5.	•	1	1250	155	0.	*	1	1905	230	0.
1	0	025	6	ΰ.		1	0640	81	5.		1	1255	156	0.	*	1	1910	231	0.
1	0	030	7	0	٠	1	0645	82	4.	•	1	1300	157	0.	•	1	1915	232	o.
1	0	035	9	0.	•	1	0650	93	4.	•	1	1305	153	0.	•	1	1920	233	0.
1	0	040	9	0.	•	1	0655	34	3.	4	1	1310	159	0.	*	1	1925	234	0.
1	0	045	10	0.	4	1	0700	85	3.	•	1	1315	160	0.		1	1930	235	Ú.
1		050	11	ô.	+	1	0705	86	2.		1	1320	161	٥.	*	1	1935	236	o.
1		055	12	0.	•	1	0710	87	2.	*	1	1325	162	0.		ī	1940	237	0.
1		100	13	a		1	0715	88	2.		1	1330	163	0.	•	1	1945	238	ŏ.
1		105	14	1.		i	0720	89	2.	٠	i	1335	164	0.	*	ī	1950	239	o.
1		110	15	1.	,	î	0725	90	1.		1	1340	165	o.	*	î	1955	240	0.
1		115	16	1.		î	0730	91	1		1	1345	166	õ.		1	2000	241	0.
1		120	17	2.		ī	0735	92	1		,	1350	167	0.		1	2005	242	0.
ī		125	18	2.		1	0710	93	1		î	1355	165	0.		1	2010	243	0.
î		130	19	2.		í	0745	94	1		î	1400	169	0.		1	2015	244	
,		135	20	3.		,	0750	95	1.		1	1405	170	0.		1	7020		0.
,	4,1	T'3.⊃				,	0.750	,3	٠. ١	-	Τ,	1402	1.0	Ω.	-		7.020	245	U.

1	0140	21	3.		1	0755	96	1.	•	1	1410	171	0.		1	2025	246	ο.
1	0145	22	3.	-	1	0800	97	1.		1	1415	172	0.	•	1	2030	247	0.
ĵ.	0150	23	3.		ī	0805	98	i.		1	1420	173	0.		i	2035	248	0.
		24	3.	_	î	0310	99			î				_				
1	0155						-	0.	-		1425	174	0.	-	1	2040	249	0.
1	0200	25	4.	•	ı	0815	100	0.	•	1	1430	175	0.	*	1	2045	250	φ.
1	0205	26	4.	*	1	0820	101	0.	•	1	1435	176	0.	*	1	2050	251	0.
1	0210	27	4.		1	0925	102	0.	•	1	1440	177	0.		1	2055	252	0.
1	0215	28	5.	4	1	0830	103	0.	*	1	1445	178	0.		1	2100	253	9.
i	0220	29	5.		1	0835	104	ő.		1	1450	179	ű.		ì	2105	254	o.
î		30	5.	_	1	0840	105	0.		1					1			
-	0225			-			-		•		1455	180	Q.	•	-	2110	255	a.
1	0230	31	6.	•	1	0845	106	0.	•	1	1500	181	0.	*	J.	2115	25€	9.
1	0235	32	6.	4	1	0850	107	0.	*	ı	1505	182	0.	*	1	2120	257	ŋ.
1	0240	33	8.	*	ı	0855	108	0.	*	,	1510	183	0.	•		2125	258	9.
1.	0245	34	10.	•	1	0900	109	0.		1	1515	184	0.		1	2130	259	9.
1	0250	35	11.		1	0905	110	o.		1	1520	185	0.		1	2135	260	ő.
î	0255	ى د	13.		ì	0910	111	o.	_	ī	1525	186	ö.		ì		261	
				_										-	_	2140		0.
1	0300	37	15.	•	1	0915	112	0.		1	1530	187	0.	•	1	2145	262	٥.
1	0305	38	17.	*	1	0920	113	0.	•	1	1535	168	0.	•	1	2150	263	0.
1	0310	3.9	16.	•	1	0925	114	0.	•	1	1540	189	0.	*	1	2155	264	0.
1	0315	40	96.	•	1	0930	115	0.		1	1545	190	0.	•	1	2200	265	0.
ï	0320	41	108.		1	0935	116	o.		1	1550	191	0.	4	ī	2205	266	0.
î	0325	42	105.		î	0940	117	ů.		ī	1555	192	ő.	*	ī			
-		43	96.	_		0945		-		1						2210	267	0.
1	0330				1		118	0.			1600	193	0.	-	1	2215	268	0.
1	0335	44	86.	*	1	0,950	119	٥.		1	1605	194	ο.		2	2220	269	0.
1	0340	45	75.	*	1	0955	120	Ο.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	63.	*	1	1000	121	0.	*	1	1615	196	0.	•	1	2230	271	0.
1	0350	47	52.	•	1	1005	122	0.	*	1	1620	197	0.	•	1	2235	272	0.
1	0355	48	44.		1	1010	123	0.		1	1625	198	0.		ï	2240	273	0.
2	0400	49	37.		1	1015	124	ð.		ī	1630	199	0.		î	2245	274	
_		50	31.			1020	125							*				0.
1	0405			-	3			0.	•	1	1635	200	0.	-	1	2250	275	0.
ı	0410	51	27.	•	1	1025	126	٥.	•	1	1640	201	Ο.	*	1	2255	276	0.
1	0415	52	24.	*	1	1030	127	0.	*	1	1645	202	0.	•	1	2300	277	0.
1	0420	53	22.	*	1	1035	128	0.	*	l	1650	203	0.	•	ı	2305	278	0.
1	0425	54	19.	*	1	1040	129	0.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	18.		1	1045	130	0.	*	1	1700	205	0.		î	2315	280	0.
1	0435	56	18.		1	1050	131	0.		1	1705	206	0.		1		231	
				_										_		2320		0.
1	0440	57	17.	•	1	1055	132	0.		1	1710	207	0.	•	1	2325	285	0.
1	0445	58	17.	*	1	1100	133	0.	•	1	1715	209	Ο.	•	1	2330	283	0.
3	0450	59	17.	*	1	1105	134	0.	*	1	1720	209	е.	•	7	2335	284	٥.
1	0455	60	16.	*	1	1110	135	0.	*	1	1725	510	0.	٠	1	2340	285	0.
ı	0500	61	16.		1	1115	136	0.	•	1.	1730	211	0.	*	1	2345	286	0.
ī	0505	62	16.	*	ī	1120	137	Õ.	*	ī	1735	212	o.	4	ī	2350	287	o.
î	0510	63	15.		ì	1125	139	0.		î	1740	213	0.	*	ì			
_									-							2355	286	0.
1	0515	61	15.	•	1	1130	139	0.		1	1745	214	٥.		2	0000	289	0.
1	0520	65	14.	•	1	1135	3.40	0.	٠	1	1750	215	Ο.	*	2	0005	290	0.
1	0525	66	14.	*	1	1140	141	0.	*	1	1755	216	0.	•	2	0010	291	0.
ı	0530	67	14.	•	1	1145	142	0.	*	1	1800	217	0.	4	2	0015	292	0.
1	0535	66	. دُ 1	•	ī	1150	143	0.	*	1	1805	218	0.	*	2	0020	293	0.
ĩ	0540	69	13.	*	1	1155	144	0.	*	ī	1810	219	o.		2	0025	294	0.
1	0545	70	12.	*	1	1200	145	0.		1	1815	220	0.					
									- 1					-	2	0030	295	Ŭ.
1	0550	71	12.	:	1	1205	146	0.	•	1	1920	221	0.	•	2	0035	296	0 -
1	0555	72	12.	•	1	1210	147	0.	•	1	1825	222	0.	•	2	0040	297	0.
1	0600	73	11.	•	ı	1215	148	0.	*	1	1830	223	0.	•	2	0045	298	0.
1	0605	74	11.	•	1.	1220	149	0.		1	1835	224	0.	*	2	0050	299	0.
1	0610	75	10.	*	1	1225	150	0.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*									• •

,	PEAK FLOW	TIME			MAXIMUM AVES	RAGE FLOW	
	(CFS)	(HR)		6 - HR	24-HR	72-HR	24.92-HR
7	(0.5)	(1114)	(CFS)				
4.	108.	3,33		20.	5.	5.	5.
			(INCHES)	.362	.366	. 366	. 366
			(AC-FT)	10.	10.	10.	10.

CUMULATIVE AREA = .51 SQ MI

							RYDI	ROGRAPH AT .	STAT	LION	933E.1							
*****	• • • • • • • •		*********		****		*****		* * * *		• • • • • • • • • •	*****		• • •		******		*******
	W	ORD	FLOW	•	DA 1	MON HRMN	ORD	FLOW	*	D.3	MON HRMN	ORD	*** 211	•			000	E1 e11
DA I	MON HRMN	OKD	I. DOM		DW I	HOM BRIM	ORD	FLOW	-	DA	MON HIGHN	OKD	FLOW	-	TAR M	ON HRMN	ORD	FLON
1	0000	1	ú.	*	1	0615	76	4.		1	1230	151	0.		1	1845	256	0.
1	0005	2	o.	*	ì	0620	77	4.		1	1235	152	0.		ż	1850	227	0.
1	0010	3	0.		í	0625	78	3.	*	í	1240	153	0.		î	1855	228	0.
1	0015	ā	0.	•	į,	0630	79	3.	*	7	1245	154	a.		Ť	1900	229	o.
ì	0020	5	ů.		1	0635	80	3.	*	ī	1250	155	0.		î	1905	230	0.
î	0025	6	0.		1	0610	81	2.		1	1255	156	0.		î	1910	231	0.
í	0030	7	0.	•	1	0645	82	2.		1	1300	157	0.		î	1915	232	ŏ.
i	0035	8	0.		1	0650	83	2.		1	1305	158	0.		1	1920	233	ő.
ī	0040	9	0.	*	1	0655	84	1.	4	1	1310	159	õ.		ī	1925	234	o.
1	0045	10	0	•	1	0700	85	1.	*	1.	1315	160	õ.	٠	1	1930	235	0.
1	0050	11	0.	4	1	0705	86	1.	•	1	1320	161	٥.	*	1	1935	236	o.
1	0055	3.2	0.	+	1	0710	87	1.		1	1325	162	0.	٠	1	1940	237	0.
ī	0100	13	0.	•	1	0715	88	1.		3	1330	163	0.	٠	1	1945	238	o.
1	0105	14	0.	*	ı	0720	89	1.		3	1335	164	õ.		ī	1950	239	0.
1	0110	15	1.		٦	0725	90	1.	4	1	1340	1.65	ō.		1	1955	210	0.
1	0115	1.6	1.	٠	1	0730	91	1.	•	1	1345	166	õ.	•	1	2000	211	ů.
1	0120	17	1.	٠	1	0735	92	١.	•	1	1350	167	٥.	•	1	2005	242	o.
1	0125	18	1.		1	0740	93	ο.	•	1	1355	168	٥.	*	1	2010	243	ō.
1	0130	19	1.	•	1	0745	94	0.	•	1	1400	169	o.	•	1	2015	244	Ö.
ì	0135	20	ì.	٠	ī	0750	95	ō.	•	1	1405	1.70	ο.	•	ı	2020	245	0.
1	0140	21	1.		1	0755	96	0.	•	1	1410	l 71	ð.	*	ı	2025	216	0.
1	0145	22	1.	•	1	0800	97	0.	•	1	1415	172	Ú.	*	1	2030	247	o.
2	0150	23	2.	-	1	0805	98	ο.	•	3	1420	173	ο.	•	1	2035	24.9	0.
1	0155	24	2.	•	3	0810	99	0	•	3	1425	174	٥.	4	1	2040	249	ο.

1	0200	25	2.		1	0815	100		0.		1	1430	175	ΰ.		1	2045	250	0.
1	0205		2.	•	ì	0820			n.	•	î	1435	176	0.		l	2050	251	0.
ı	0210		2.	•	1	0325	102		0.	•	1	1440	177	0.	•	l	2055	252	0.
1 1	0215 0220		2.	:	1	0930			0.	:	1.		178	0.		1	2100	253	0.
1	0225		2. 2.		1 1	0935 0840	104 105		0. 0.		1 1	1450 1455	179 180	0. 0.	:	1	2105 2110	254 255	0. 0.
ī	0230		3.	*	ī	0845	106		0.	4	ī		181	0.		1	2115	256	σ.
1	0235		3.	*	1	0850	107		ο.	•	1	1505	182	0.	•	1.	2120	257	0.
1	0240		4.	٠	1	0855	108		٥.	•	1	1510	183	0.	•	1	2125	259	ο.
1 1	0245 0250		5. 5.	•	1	0960 0965			0.		1 1	1515 1520	184	0.	•	1	2130	259	0.
1	0255		5. 6.		l 1	0910			0. 0.		1	1525	185 186	0.	·	1	2135 2 140	260 261	0. 0.
1	0300		7.	4	ī	0915			0.		i	1530		G.		ì	2145	262	Õ.
1	0305		٤.	*	1	0930			0.	•	1	1535		G.]	2150	263	0.
1	0310		22.	*	1	0925			0.	•	1	1540		Ü.	•	1	2155	264	О.
1	0315 0320		45. 51.	-	1 1	0930 0935			0. 0.		1	1545 1550		O O.	•	1 1	2200 2205	265 266	0. 0.
1	0325		49.	•	î	0940			0.		ì	1555	192	0.	•	1	2203	267	0.
J	0330		45.	•	2		118		0.	•	1		193	ú.	*	1	2215	268	a.
1.	0335		41.	•	1		119		0.	•	1		194	0.	*	1	2220	269	0.
1	0340		35.		1		120		0.	•	1		195	٥.		1	2225	270	0.
1	0345 0350		30. 25.		1	1000 1005	121 122		0. 0.		1	1615 1620	196 197	0. 0.	:	1	2230 2235	271 272	0. 0.
î	0355		20.		î		123		0.		î	1625	198	0.		1	2240	273	0.
1	0400	-	17.	*	1	1015			0.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405		15.	*	1	1020			٠.	•	1	1635	200	0.	•	1	2250	275	0.
1	0410 0415		13. 11.	*	1 1	1025 1030			0. 0.	÷	1 1	1640 1645		0. 9.	:	1	2255	276	0.
1	0420		10.	-	1	1035			0.	•	1	1650		9. 9.		1. 1	2300 2305	277 278	0. 0.
ī	0425		9.	•	1		129		ΰ.	•	1	1655	204	ó.	4	1	2310	279	o.
1	0430		8.	*	1	1045			0.	•	3	1700	205	0.	*	1	2315	280	0.
ī	0435		8.	*	1		131		0.	•	1	1705	206	0.	*	1	2320	281	0.
1	0440 0445		8. 8.		1 1	1055 1100	132		0. 0.		l l	1716 1715	207 203	0. 0.	•	1	2325 2330	282 283	0.
ī	0150		8.		î	1105	134				ì	1720		0.		,	2335	284	0. 0.
ì	0155		8.	•	1	1110			0.	*	1	1725		ŭ.	•	1	2340	285	o.
1	0500			•	1	1115			٠.	•	1	1730		0.	•	1	2345	286	0.
1 1	0505 0510			*	1	1120			0.		1	1735		0.		1	2350	287	0.
1	0515				ì	1125 1130			0. 0.		ī	1740 1745		0. 0.		1 2	2355 0000	288 289	O. O.
î	0520		7.	*	ī	1135			0.		ĩ	1750		0.		2	0005	290	0.
1	0525		7.	*	2	1140	141		0.	*	2	1755	216	0.		2	0010	291	0.
1	0530			*	1	1145			~ .	4	1	1800	217	0.	•	2	0015	292	o.
1 1	0535 0540		6. 6.		1 1	1150 1155	143 144			:	1 1	1805 1810	218 219	0. 0.	:	2	0020	293	0.
1	0545		6.		1	1200	145		a.	à	ì	1615		0.		2	0025 0030	294 295	0. 0.
1	0550		6.	*	1	1205	146			•	1	1820	221	0.	*	2	0035	296	Õ.
1	0555		5.	•	l	1210	147			•	1	1825	555	0.		2	0040	297	0.
1	0600	_	5.	*	1	1215			•	•	1	1830	223	0.	•	2	0015	298	0.
1	0605 0610		5. 5.		1	1220 1225	149 150		υ. Ο.	:	1 1	1835 1840	224 225	0. 0.	•	2	0050 0055	299 300	0. 0.
-	***			•						•		10.0			•				
*****		*****	*********		*****		*****	*****	****	•••	****	******	*****	 	****	• • • •	*******		******
PEAK	FLOW	TIME			6 - HR		IMUM A 24-HR	VERAGE			24	92-HR							
(CF	?\$)	(HR)			O HR		- 11K		. 4 112	•	4.1.	26 115							
			(CFS)	ı			_					_							
	51.	3.33	(TMQUEE)		9.		2.		2.			2.							
			(INCHES) (AC-FT)		,170 5.		.172 5.		. 172			.172 5.							
			CUMULAT	CIVE A	AREA =		1 SO M	11											
			ÇÇÎ ÎGBÎNÎ					-											

658 KK COMBINE

650 KO

OUTPUT CONTROL VARIABLES
IPRNT 1
IPLOT 0
OSCAL 0.
IPNCH 0 DELES

1 PRINT CONTROL
0 PLOT CONTROL
0. HYDROGRAPH FLOT SCALE
0 PUNCH COMPUTED HYDROGRAPH
21 SAVE HYDROGRAPH ON THIS UNIT
1 FIRST ORDINATE PUNCHED OR SAVED
300 LAST ORDINATE PUNCHED OR SAVED
083 TIME INTERVAL IN HOURS IOUT ISAV1 ISAV2 1 300 TIMINT .083

COMBINED DISCHARGE AT ADOT CULVERT 5 AND 6

661 HC

HYDROGRAPH COMBINATION 1 COMP 2 NUMBER OF HYDROGRAPHS TO COMPINE

HYDROGRAPH AT STATION 3: SUM OF 2 HYDROGRAPHS

FLOW . DA MON HRMN ORD FLOW . DA MON HRMN ORD FLOW . DA MON HRMN ORD DA MON HRMN ORD FLOW

1	0000	1	O.		1	0615	76	62		1	1230	151	5 .		1	1945	226	1.
Ī	0005	2	ō.		ī	0620	77	59.		Ī.	1235	152	5.	*	1	1850	227	1.
	0010	3	0.		î					1					î			
1				-		0625	78	56.			1240	153	5.	-		1855	228	1.
1	0015	4	0.	*	1	0630	79	53.	*	ı	1245	154	5.	•)	1900	229	1.
1	0050	5	0.	*	1	0635	80	51.	*	1	1250	1.55	5.	*	1	1905	230	1.
l	0025	6	3		1	0640	31	48.	4	1	1255	156	5.	*	1	1910	231	1.
ר	0030	7	1.		1	0645	32	46.		1	1300	157	5.	-	1	1915	232	1.
í	0035	8	2.		ì	0650	83	44.		ī	1305	158		_	1			
													5.			1920	233	1.
1	0040	9	3.	•	I	0655	84	42.	•	I	1310	159	ત.	•	1	1925	231	I.
1	0045	10	4.	•	1	0700	85	40.	-	1	1315	160	4.	•	1	1930	235	1.
1	0050	11	5.		1	0705	86	39.	•	1	1320	161	4.	4	1	1935	236	1.
1	0055	12	6.	*	1	0710	87	37.	*	1	1325	162	4.	*	1	1940	237	1.
ī	0100	13	7.		ī	0715	98	36.		1	1330	163	4.	-	ī	1945	238	1.
			7		î					1				_				
1	01.05	14		-		0720	89	34.	-		1335	164	4.	-	1	1950	239	1.
1	0110	15	₿.	•	1	0725	90	33.	•	1	1340	165	4.	•	1	1955	240	1.
1	0115	16	9.	*	1	0730	91	32.	+	.7.	1345	166	4.	*	3	2000	241	1.
1	0120	17	9.	•	ı	0735	92	31.	*	1	1350	167	4.	•	1	2005	24.2	1.
1	0125	18	10.	•	1	0740	93	30.	*	1	1355	168	4.		1	2010	243	1.
ī	0130	19	11.		î	0745	94	29.	*	1	1400	169	3.		j		244	
_									4						_	2015		1.
]	0135	20	12.	•	1	0750	95	28.	•	1	1405	170	3.	•	1	2020	215	1.
1	0140	21	12.	*	1	0755	96	27.	•	1	1410	171	3.	*	3	2025	216	1.
l	0145	22	13.	•	1	0800	97	26.	*	1	1415	172	3.	•	l l	2030	247	1.
2	0150	23	14.	*	1	0805	98	25.	•	1	1420	173	3.	•	7	2035	248	Ι.
1	0155	21	15.		1	0810	99	24.		1	1425	174	3.		1	2040	249	1.
î	0200	25	16,		ī	0815	100	23.		1	1430	175	3.		ĵ	2045	250	
				-										_				1.
1	0205	26	17.	•	1	0820	101	22.	•	1	1435	176	3.	•	1	2050	251	1.
1	0210	27	18.	•	1	0825	102	22.	•	1	1440	177	3.	•	1	2055	252	1.
1	0215	28	19.	*	1	0330	103	21.	*	1	1415	178	3.	•	ı	2100	253	1.
1	0220	29	21.		1	0835	104	20.	4	1	1450	179	З.		1	2105	251	1.
1	0225	30	22.	-	1	0840	105	20.		2	1455	180	3.		i	2110	255	I.
ı	0230	31	24.		ī	0845		19.		ĩ	1500			_				
							106					181	3.	-	1	2115	256	1.
1	0235	32	28.	*	1	0850	107	18.	*	1	1505	182	З.	•	1	2120	257	1.
1	0240	33	37.	•	1	0855	1.08	18.	*	1	1510	183	2.	*	1	2125	258	0.
1	0.245	34	49.	•	1	0900	109	17.	*	1	1515	184	2.	•	1	2130	259	0.
1	0250	35	63.	•	1	0905	110	17.	*	1	1520	135	2.	•	1	2135	250	0.
ī	0255	36	83.		ī	0910	111	16.		ī	1525	186	2.		ī	2140	261	0.
					1				4									
1	0300	37	132,	•		0.915	112	16.	-	1	1530	187	2.	•	1	2145	262	0.
1	0305	38	215.	*	1	0920	113	15.	•	1	1535	188	2.	*	1	2150	263	0.
1	0310	39	245.	*	1	0925	114	15.	•	1	1540	189	2.	•	1	2155	264	0.
1	0315	40	256.	*	1	0930	115	14.	•	1	1545	190	2.	*	1	2200	265	ο.
ı	0320	41	249.		1	0935	116	14.		1	1550	191	2.		ì	2205	266	ő.
	0325	42	240.	_			117		_	î	1555	192		_				
1				-	1	0940		14.					2.	-	1	2210	267	0.
1	0330	4.3	329.	•	1	0945	113	13.		1	1600	193	2.	•	1	2215	268	0.
1	0335	44	216.	*	1	0950	119	13.	*	2	1605	194	2.	*	1	2220	269	û.
1	0340	45	200.		1	0955	120	12.	*	1	1610	195	2.		1	2225	270	0.
1	0345	46	184.	*	1	1000	121	12.	*	1	1615	196	2.		1	2230	271	Ö.
ī	0350	47	170.		ï	1005	122	12.		1	1620	197	2.		ī	2235	272	o.
ī				_	1				_	î								
	0355	48	159.	•	_	1010	123	11.	•		1625	198	2.	•	1	2240	273	0.
1	0400	49	151.	•	1	1015	124	11.	•	1	1630	199	2.	•	1	2245	274	0.
1	0405	50	144.	•	1	1020	125	11.	•	1	1635	200	2.	•	1	2250	275	0.
1	0410	51	138.	•	2	1025	126	10.	•	.2.	1640	201	2.	•	1	2255	276	Œ.
1	0415	52	133.	*	1	1030	127	10.	+	1	1645	202	2.	*	1	2300	277	0.
ī	0420	53	129.	*	1	1035	129	10.	*	i.	1650	203	2.	*	ĵ	2305	278	0.
i	0425	5.1	125.		î	1040	129	10.		î	1655	201	2.		í	2310	279	
				_										-				0.
1	0430	55	121.	-	1	1045	130	9.	-	1	1700	205	2.	•	1	2315	290	0.
1	0435	56	118.	*	1	1050	131	9.	•	1	1705	506	1.	•	1	2320	291	0.
1	0440	57	116.	•	1	1055	132	9.	•	1	1710	207	1.	•	1	2325	282	0.
1	0445	58	113.	•	1	1100	133	9.	*	1.	1715	209	1.	•	1	2330	283	0.
ī	0450	59	109.		1	1105	134	8.		1	1720	209	1.	-	î	2335	284	0.
ī	0155	60	106.	4	î	1110	135	8.		î	1725	210	1.		ì	2340	285	
_														-				0.
1	0500	61	102.	•	1	1115	136	8.	-	1	1730	211	1.	•	1	2345	286	0.
1	0505	62	99.	•	1	1120	137	8.	*	l,	1735	212	1.	•	1	2350	287	0.
1	0510	63	9€.	•	1	1125	138	8.	*	1	1740	213	1.	•	1	2355	288	0.
3	0515	61	93.	*	1	1130	139	7.	•	1	1745		1.	*	2	0000	289	0.
1	0520	65	90.		1	1135	140	7.		1	1750	215	j.		?	0005	290	ú.
1	0525	66	87.		ı	1140	141	7.	*	î	1755		1.		2			
				-					_							0010	291	0.
1	0530	67	85.	*	1	1145	142	7.	•	1	1800		1.	٠	2	0015	292	0.
1	0535	68	82.	*	1	1150	143	7.	*	1	1805		1.	*	2	0020	293	0.
1	0540	6.9	86.		1	1155	144	6.	•	1	1810	219	1.		2	0025	294	0.
1	0545	70	78.	*	1	1200	145	6.	•	1	1815		1.	*	2	0030	255	0.
ī	0550	71	75.		î	1205	146	6.		ī	1820		1.		2	0035	296	o.
	0555	72	73.		î	1210	147	6.	*	i	1825							
1				-					_				1.	·	5	0040	297	0.
1	0600	73	71.	•	1	1215	148	6.	-	1	1830		1.	•	2	0045	298	0.
1	0605	71	69.	*	1	1220	149	6.	•	1	1835		1.	*	2	0050	299	0.
1	0610	75	66.	•	1	1225	150	6.	*	1	1840	225	1.	•	2	0055	300	0.
				•					•					•				

PEAK FLOW	TIME			MAXIMUM AVER	AGE FLOW	
			6 - HTc	24 - HR	72-HR	24.92-HR
(CFS)	(HR)					
		(CPS)				
256.	3.25		91.	26.	25.	25.
		(INCHES)	1.655	1.917	1.918	1.918
		(AC-PT)	45.	52.	52.	52.
		CUMULATIV	E AREA -	.51 SQ MI		
	(CFS)	(CFS) (HR)	(CFS) (HR) (CFS) 256. 3.25 (INCHES) (AC-FT)	(CFS) (HR) (CFS) 256. 3.25 91. (INCHES) 1.655	(CFS) (HR) (CFS) 24-HR 24-HR (CFS) (CFS) 256. 3.25 91. 26. (INCHES) 1.655 1.917 (AC-FT) 45. 52.	(CFS) (HR) (CFS) (CFS) 24-HR 72-HR (CFS) (CFS) 256. 3.25 91. 26. 25. (INCHES) 1.655 1.917 1.918 (AC-FT) 45. 52. 52.

662 KK R33E.1 ROUTE

663 KD OUTPUT CONTROL VARIABLES IPRNT 1 PRINT CONTROL 0 PLOT CONTROL
9. HYDROGRAPH PLOT SCALE
0 PUNCH COMPUTED HYDROGRAPH IPLOT QSCAL 0 I PNCH IOUT 21 SAVE HYDROGRAPH ON THIS UNIT 1 FIRST ORDINATE PUNCHED OR SAVED 300 LAST ORDINATE PUNCHED OR SAVED ISAVı ISAV2 TIMINT .093 TIME INTERVAL IN HOURS

> ROUTE ADOT CULVERT 5 AND 6 FLOWS THROUGH ASLD LAND TO UNION HILLS DRIVE (MAYO) AND 73RD PLACE.
> ROUTE L=1600', TRAP SECTION EW=19' Z=5, TWMAX=39' ASSUME GRASS LINED CHANNEL N=.030 UP=1592.5 DWN=1582.66

HYDROGRAPH ROUTING DATA

669 RK

KINEMATIC WAVE STREAM ROUTING
L 1600. CHARREL LENGTH
S .0086 SLOPE

CHANNEL ROUGHNESS COEFFICIENT CONTRIBUTING AREA N .030

CA .00 TRAP SHAPE CHANNEL SHAPE

BOTTOM WIDTH OR DIAMETER SIDE SLOPE WID 19.00

5.00 NDXMIN MINIMUM NUMBER OF DX INTERVALS

COMPUTED KINEMATIC PARAMETERS VARIABLE TIME STEP (DT SHOWN IS A MINIMUM)

ELEMENT	VLDHV	М	DΤ	DX	PEAK	TIME TO	VOLUME	MAXIMUM
			(MIN)	(FT)	(CFS)	PEAK (MIN)	(IN)	CELERITY (FPS)
MAIN	. 98	1.43	1.31	532.33	255.46	197.57	1.92	7.46

CONTINUITY SUMMARY (AC-FT) - INFLOW: .5208E+02 EXCESS: .0000E+00 OUTFLOW: .5208E+02 BASIN STORAGE: .7950E-02 PERCENT ERROR:

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

. 0

MAIN 5.00 252.31 200.00 . 98 1.43 1.92

HYDROGRAPH AT STATION R33E.1

h		000		-				_										
A MON	HRMON	ORD	FLOW	•	DA M	N HRMN	ORD	FLOW	*	DA MON	HRMN	ORD	FLOW	•	DA MON	HRMN	ORD	FLO
1	0000	1	0.		1	0615	76	65.	*	1	1230	151	6.		1	1845	226	
1	0005	2	Û.	*	1	0620	77	62.		1	1235	152	5.	*	ī	1850	227	
1	0010	3	0.		î	0625	78	58.		ī	1240	153	5.		î	1855	228	
1	0015	4	0.		1	0630	79	55.	4	1	1245	154	5.		1	1900	229	
1	0020	5	o.		ī	0635	80	53.	*	1	1250	155	5.		3	1905	230	
1.	0025	6	0.	*	ì	0640	81	50.	*	1	1255	156	5.	*	ä	1910	231	
1	0030	7	ō.	•	ï	0645	82	48-		1	1300	157	5.	-	ï	1915	232	
1	0035	8	o.		1	0650	83	46.		1	1305	158	5.	•	1	1920	233	
1	0040	9	1.		1	0655	34	44.	*	ī	1310	159	5.		1	1925	234	
1	0045	10	2.		î	0700	85	42.		ī	1315	160	1.		î	1930	235	
1	0050	11	3.		ī	0705	86	40.	*	ī	1320	161	4.	4	ī	1935	236	
1	0055	12	5.		ī	0710	87	39.		î	1325	162	4.	•	ī	1940	237	
1	0100	13	6.	*	î	0715	88	37.	*	ī	1330	163	1.		i	1945	238	
1	0105	14	6.		î	0720	89	36.	*	î	1335	164	4.		ī	1950	239	
1	0110	15	7.		ĩ	0725	90	34.		1	1340	165	4.	*	ā	1955	2.10	
1	0115	16	8.	*	î	0730	91	33.		1	1345	1.66	4.		ì	2000	241	
1	0120	17	8.		1	0735	92	32.		î	1350	167	4.		î	2005	242	
1	0125	18	9.		î	0740	93	31.		ī	1355	168	4.		1	2010	243	
1	0130	19	10.		î	0745	94	30.		î	1400	169	4.		1	2015	243	
1	0135	20	11.	*	î	0750	95	29.		î	1405	170	4.		1	2013	245	
1	0140	21	11.	•	1	0755	96	28.		î	1410	171	3.		1	2025	246	
1	0145	22	12.		î	0800	97	27.	*	î	1415	172	3.		1	2023	247	
1	0150	23	13.		1	0805	98	26.		1	1420	173	3.	•	1	2035	248	
ĩ	0155	24	1.g.		1	0810	99	25.		i	1425	174	3.		ì	2040	249	
1	0200	25	15.		ì	0815	100	24.	*	î	1430	175	3.		1	2045	250	
1	0205	26	16		ì	0820	101	23.		î	1435	176	3.		1	2045	250	
ī	0210	27	17		1	0825	102	22.		î	1440	177	3. 3.		ı	2055		
1	0215	28	19		1	0825	103	22.		ı	1415	178	3.		1		252	
1	0220	29	19		1	0835	103	21.		1	1450	179	3.		1	2100	253	
î	0225	30	21		1	0840	105	20.		1	1455	130	3.		1	2105	254	
î	0230	31	22		ı 1	0845	105	20.		1	1500	180	3.		1	2110	255	
ī	0235	32	24					20. 19.		1	1505	182				2115	256	
1	0240	33	29.		1 1	0850 0855	107 109	13.	-	1	1510	183	3. 3.		1	2120	257	
1	0245	34	39.	-	1	0900		18.	-	1	1515	184	3.		1	2125	258	
1	0250	35	52		1	0905	109 110	18.		1	1520	185	2.		1	2130	259	
1	0255	36	52. 69.		l l			17.		l l	1525	186	2.	÷		2135	260	
ĵ	0300	37	101.	÷		0910	111	16.	ū	1	1530	186			1	2140	261	
1	0305	38	170		1	0915	112			1			2.		1	2115	262	
1	0305	39	230	-	1	0920	113	16.	:	1	1535	188	2.	:	1	2150	263	
1	0315	40	230. 251.		1	0925	114	15.	÷	1	1540	189	2.	:	1	2155	264	
1	0320	41		•	1	0930	115	15.	:		1545	190	2.		1	2200	265	
1	0320		252.	:	1	0935	116	14.		1	1550	191	2.	•	1	2205	266	
		42	244.	•	1	0940	117	14	•	1	1555	192	2.		1	2210	267	
1	0330	43	234.	•	1	0945	113	14.	•	1	1600	193	2.	•	1	2215	368	
	0335	4-1	223.	•	1	0.950	119	13.		1	1605	194	2.		1	2220	269	
1	0340	45	208	•	1	0955	120	13.	•	3	1610	195	2	•	3	2225	270	
1	0345	46	192	•	1	1,000	121	33.	•	3	1615	196	2.	•	1	2230	271	

ı	0350) 47	177.	-	1	1005	122	12.		1	1620	197	2.	*	1	2235	272	0
1	0355	5 48	165.	•	ı	1010	123	12.	*	1	1625	198	2	•	1	2240	273	0.
1	0400	49	155.	•	l	1015	124	11.	٠	1	1630	199	2.	•	1	2245	274	0.
1	0409	5 50	148.	•	1	1020	125	11.	*	1	1635	200	2.	٠	1	2250	275	0.
1	0410	51	141.	•	1	1025	126	11.	•	1	1640	201	2.	•	1	2255	276	0.
1	0415	5.2	136.	•	1	1030	127	11.	*	1	1645	202	2.	•	1	2300	277	0.
1	0420	53	132.	*	1.	1035	128	10.	•	1	1650	203	2.	*	1	2305	278	0.
1	0429	5 54	127.	*	1.	1040	129	10.	•	1	1655	201	2.	*	1	2310	279	0.
1	0430	55	123.	-	ı	1045	130	10.	•	1	1700	205	2.	٠	1	2315	280	0.
1	0439	5 56	120.	*	1	1050	131	9.	*	1	1705	206	2.	•	1	2320	281	0.
1	0440	57	117.		1	1055	132	9.	•	1	1710	207	2.	٠	1	2325	282	0.
1	0449	5 58	114.	•	1	1100	133	9.	•	1	1715	208	1.	•	1	2330	233	0.
1	0450	5.9	111.	4	1	1305	134	9.	4	1	1720	209	1.	•	1	2335	284	υ.
1	0455	60	108.	•	1	1110	135	8.	•	1	1725	210	1.	*	1	2340	285	0.
1	0500	61	104.	•	1	1115	1.36	8.	*	1	1730	211	1.	*	1	2345	286	0.
1	0505	6.2	101.	•	1	1120	137	8 .	•	1	1735	212	1.	*	1	2350	287	0.
1.	0.510	G 3	98.	•	1	1125	138	8.	•	1	1740	213	1.	•	1	2355	288	0.
1	0515	64	95.	-	1	1130	139	8.	*	1	1745	214	1.	*	2	0000	289	0.
1	0520	65	92.	•	1	1135	140	7.		1	1750	215	l.	٠	2	0005	290	0.
1	0525		89.	•	1	1140	141	7.	•	1	1755	216	1.	•	2	0010	291	0.
1	0530		87.	•	1	1145	112	7.	•	1	1800	217	1.	•	2	0015	292	0.
1	0535	63	84.	*	I	1150	143	7.	•	I	1805	218	ĭ.	•	2	0020	293	θ.
1	0540		92.	•	1	1155	144	7.	•	1	1810	219	1.	*	2	0025	291	0.
1	0545		79.	*	1	1200	145	7.	*	1	1815	220	1.	*	2	0030	295	0.
1	0550		77.	*	1	1205	146	6.	•	1	1820	221	1.	•	3.	0035	296	0.
1	0555		75.	•	1	1210	147	6.	•	1	1825	222	1.	•	2	0040	297	0.
1	0600		73.	*	1	1215	149	6.	•	1	1830	223	1.	•	2	0045	298	0.
1	0605		70.	*	1	1220	149	6.	•	1	1835	224	1	•	2	0050	299	0.
1	0610	75	68.	*	1	1225	150	6.	•	1	1340	225	1.	*	2	0055	300	0.
				-					*					•				
	******	*****		****	*****	*****	*****	*********	* * * *	*****		*****					* * * * • •	********
DESK	ET OU	m				547.14	T. 147 134 .	umphon of of										
PEAK	# LOW	TIME			C 115			VERAGE FLOW		24	מזו בח							
(CF	201	(HR)			6 - HR		24 - HR	72-HI	K	24.1	92 - HR							
, (Cr	91	(HK)	(CFS)															
. 2	52.	3.33	(CFS)		91.		26.	25			25.							
- 2		0.00			91.		20.	25			2							

1.917

52.

1.917

52.

669 KK ROUTE

(INCHES)

(AC-FT)

CUMULATIVE AREA =

1.655

15.

670 KO OUTPUT CONTROL VARIABLES

1 PRINT CONTROL 0 PLOT CONTROL LPRNT IPLOT OSCAL HYDROGRAPH PLOT SCALE PUNCH COMPUTED HYDROGRAPH SAVE HYDROGRAPH ON THIS UNIT FIRST ORDINATE PUNCHED OR SAVED IPNCH IOUT 21 ISAV1 LAST ORDINATE PUNCHED OR SAVED TIME INTERVAL IN HOURS ISAV2 300 TIMINT .083

1..917

.51 SQ MI

52.

ROUTE FLOWS FROM CHANNEL THROUGH BOX CULVERT ALONG UNION HILLS DRIVE (MAYO) TO SCOTTSDALE ROAD, SOUTH TO CHAUNCEY. ROUTE L=1630', BOX SECTION W=8' H=3' ASSUME CONCRTE LINED CHANNEL No. 013 UP=1582.55 DWN=1566.32

HYDROGRAPH ROUTING DATA

675 RK KINEMATIC WAVE STREAM ROUTING

L S 1830 CHANNEL LENGTH SLOPE .0089 .013 CHANNEL ROUGHNESS COEFFICIENT CONTRIBUTING AREA CHANNEL SHAPE BOTTOM WIDTH OR DIAMETER CA .00 TPAP SHAPE

WD 16.00

.00

SIDE SLOPE MINIMUM NUMBER OF DX INTERVALS NUXMIN

COMPUTED KINEMATIC PARAMETERS VARIABLE TIME STEP (DT SHOWN IS A MINIMUM)

ELEMENT	АНРНА	М	DT	DX	PEAK	TIME TO PEAK	VOLUME	MAXIMUM CELERITY
			(MIN)	(FT)	(CFS)	(MIN)	(IN)	(FPS)
M1 AN	1.70	1.67	. 56	610.00	252.12	200.80	1.92	20.96

CONTINUITY SUMMARY (AC-FT) - INPLOW- .5206E402 EXCESS .0000E100 OUTFLOW= .5205E402 BASIN STORAGE .8142E-02 PERCENT ERROR-.0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN 1.70 1.67 5.00 251.98 200.00 1 92

HYDROGRAPH AT STATION ASLDRI

				• • • • • • • • •		****				*****				,			*******
DA	MON I	IRMN	ORD	PLOW	*	DA M	ON HEMN	ORD	FLOW •	DA	MON HRMI	ORD 1	FLOW	• D	A MON HRMN	OM	FLOW
I		0000	ī	ø.		1	0615	76	66.	1	1230	151	6.	:	1 1845	226	1.
ĩ		0005	2	o.	*	î	0620	77	63. •	· î	123!		6.		1 1850	227	1.
1	0	010	3	0.	*	1	0625	78	59. +	1	1240		5.		1 1855	226	î.
1		0015	4	0.	*	1	0630	79	56.	1	1249		5.	*	1 1900	229	1.
1		020	5	0.	*	1	0635	80	54.	1	1250		5.		1 1.905	230	1.
1		0025	6	0.	•	1	0640	81	51. •	1	1255		S.		1 1910	231	1.
1		0030 0035	7 8	٥. ٥.	:	1	0645 0650	92	49.	1	1300		5 .		1 1915	232	1.
1		0040	9	0.		1	0655	83 84	47. 45.	1	1309 1310		<u>t</u> . 5.		1 1920 1 1925	233 234	1.
1		045	10	o.	*	ī	0700	85	43.	ī	1315		s.		1 1930	235	1. 1.
1		050	11	1.	•	1	0705	86	41.	1	1320		4.		1 1935	236	1.
1	C	0055	12	3.	•	1	0710	37	39. •	1	132	162	1.	•	1 1940	237	1.
1		0100	13	5.	•	1	0715	88	38. *	1	1330		4.	*	1 1945	238	1.
1		105	14	6.	*	1	0720	89	36.	-	1339		4.		1 1950	239	1.
1)110)115	15 16	6. 7.	•	1 1	0725 0730	90 91	35. * 34. *	_	1340 1345		4. 4.		1 1955 1 2000	210	ı.
ī		120	17	8.	*	1	0735	92	32.	1	1350		4.		1 2000 1 2005	241 242	1.
1		125	18	9.	*	1	0740	93	31.	. 1	1355		4.		2010	243	1.
1		130	19	9.	•	1	0745	94	30.	1	1400		4.		1 2015	244	î.
1		135	20	10.	•	ı	0750	95	29. •	3	1409	170	٥.	•	1 2020	245	1.
1		140	21	11.	•	1	0755	96	23.	_	1410		4.		1 2025	246	1.
1		145	22	12.	•	1	0800	97	27. *	-	1419		3.		1 2030	247	1.
1		150	23	12.		1	0805	98	26. * 25 *	1	1420		3.		2035	248	1.
1)155)200	24 25	13. 14.	-	1 1	0810 0815	99 100	25. • 24. •	_	1425 1430		3. 3.		1 2040	249	1.
i		205	26	15.		1	0820	101	21.	•	1435		3.		1 2045 1 2050	250 251	1. 1.
î		210	27	16.		î	0825	102	23.	1	1440		3.		1 2055	252	1.
1.		215	28	17.	•	1	0830	103	22. *	1	1445		3.		1 2100	253	1.
1		220	29	19.	•	1	0835	101	21. *	1	1450	179	3.	•	1 2105		1.
1		225	30	20.	•	1	0840	105	21. *	-	145		3.		1 2110	255	1.
1		230	31	21.	*	1	0845	106	30- •	-	1500		3.		1 2115	256	1.
1		235 240	32 33	23. 27.	:	1 1	0850	107	19. *	-	1509		3.		1 2120	257	1.
î		245	34	35.		1	0855 0900	108 109	19. * 18. *	1	1510 1515		3. 3.		1 2125 1 2130	258 259	1.
î		1250	35	47.		î	0905	110	18.	_	1520		3.		2135		1.
1		255	36	63.	•	1.	0910	111	17.		1529		3.		1 2140	261	1.
1	0	300	37	92.	*	1	0915	112	17. •	1	1530		2.		1 2145	262	1.
1		305	33	154.	4	1	0920	113	16.	1	1539	188	2.	•	1 2150	263	0.
1		310	39	218.	*	1	0925	114	16.	-	1540		2.		1 2155		0.
1		315	40	247. 252.	•	1	0930	115	15. *	_	1545		2.		1 2200	265	0.
1		320 325	41 42	246.	-	1 1	0935 0940	116 117	15. * 14. *	_	1550 1555		2. 2.		1 2205 i 2210	266 267	0.
1		330	43	236.		i	0945	118	14.	ī	1600		2.		1 2215		0. 0.
I		335	44	225.	•	1	0950	119	14. *	1	1609		2.		1 2220	269	õ.
1		340	45	211.	*	7	0955	120	13. *	1	1610		2.	*	1 2225	270	0.
1		345	46	196.	*	1	1000	121	13. *	-	1615		2.		2230	271	0.
1		350	17	180.		1	1005	122	12. *	_	1620		2.		1 2235	272	0.
1)355)400	48 49	168. 150.		1	1010 1015	123 124	12. * 12. *	1	162! 1630		2. 2.		1 2240 1 2245		0.
ī		1105	50	150.		î	1020	125	11.	1	1639		2.		1 2245 1 2250		0. 0.
1		410	51	143.		ĩ	1025	126	11.	1	1640		2.		1 2255		0.
1	C	415	52	137.	•	1	1030	127	11. *	1	1645		2.		1 2300		0.
1		420	53	133.	*	1	1035	128	10.	1	1650		2.		1 2305		Ú.
1		1425	54	128.	•	1	1040	1.29	10.	1	1655		2.		1 2310		0.
1)430)435	55 56	124. 121.	•	ı 1	1045 1050	130 131	10.	1	1700 1709		2. 2.		1 2315 1 2320		0.
Ī		1440	57	113.		1	1050	132	10. • 9. •		170:		2.		1 2320 1 2325		0. 0.
ī		445	58	115.	•	1	1100	133	9. •	1	1719		2.		1 2323		0.
1		450	59	112.	•	1	1105		9.	1		209	2.	•	1 2335		0.
1		155	60	109.	•	1	1110	135	9. •	1	172	210	1.	•	1 2340		0.
1		2500	61	105.	•	1	1115		8. *	-	173		1.	•	1 23-15		0.
1		505	62	102.	•	1	1120		8. *	1		212	1.		1 2350		0.
1)510)515	63 64	99. 96.	•	1 1		138	e. • 8. •	_	1740	213	1. 1.	*	1 2355 2 0000		0.
î		520	65	93.		1		139 140	8.	. 1	175		1.		2 0000 2 0005		0. 0.
1		525	66	90.		ī		141	7. *		1759		1.		2 0010		0.
1	0	530	67	87.	٠	1	1145		7. •		1800		ì.		2 0015		0.
1.		535	63	85.	•	1	1150	143	7. •			218	1.	•	2 0020	293	0.
1		540	69	82.	•	1		144	7.	1	1810		1.	•		294	0.
1		545	70	80, 78.	•	1	1,200	145	7.	-	1819		1.		2 0030		0.
1 1)550)555	71 72	75.		1 1	1205 1210	146 147	6 •	-	1829	221	1. 1.	:	2 0035		Û.
1.		600	73	73.	•	1	1215	149	6 •	_	1830		1.	•		297 298	0. 0.
1		605	74	21.		1		149	6. •			224	1.			299	0.
1		610	75	69.	*	1	1225		6. *	1		225	1.	•		300	o.
					•				•					•			
*****			****	*******			******	****		****	*****				*******		

1	PEAK FLOW	TIME			MAXIMUM AVE	RAGE FLOW	
				6-HR	24 - HR	72 - RR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
4	252.	3.33		91,	26.	25.	25.
			(INCHES)	1.656	1.917	1.917	1.917
			(AC-FT)	45.	52.	52.	52.

CUMULATIVE AREA = .51 SQ MT

...

```
ASLD .
676 KK
                            1
                                  SUB
677 KO
               OUTPUT CONTROL VARIABLES
                              1 PRINT CONTROL
                     IPRNT
                      I PLOT
                                     0 PLOT CONTROL
                     QSCAL
                                        HYDROGRAPH PLOT SCALE
                      LPNCH
                                        PUNCH COMPUTED HYDROGRAPH
                                       SAVE HYDROGRAPH ON THIS UNIT
FIRST ORDINATE PUNCHED OR SAVED
                      TOUT
                     ISAVI
                      ISAV2
                                   300 LAST ORDINATE PUNCHED OR SAVED
                     TIMINT
                                  .093 TIME INTERVAL IN HOURS
                        ASLD NORTH PARCEL EAST OF SCOTTSDALE ROAD AND NORTH OF CHAUNCEY LANE
              SUBBASIN RUNOFF DATA
679 BA
                SUBBASIN CHARACTERISTICS
                                  .03 SUBBASIN AREA
                      TAREA
                PRECIPITATION DATA
 24 PH
                                      DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM
                   .. HYDRO-35 .....
                                      TP-49 ....
                                                                             2-DAY 4-DAY 7-DAY 10-DAY .00 .00 .00
                5-MIN 15-MIN 60-MIN
                                                                     .00
                       1.50
                               2.54
                                                STORM AREA = 14.00
680 LS
                SCS LOSS RATE
                     STRTL
                                   .60 INITIAL ABSTRACTION
                     CRVNBR
                                 77.00 CURVE NUMBER
                     RTIME
                                 83.00 PERCENT IMPERVIOUS AREA
                KINEMATIC WAVE
                 OVERLAND-FLOW ELEMENT NO. 1
691 UK
                                 345. OVERLAND FLOW LENGTH
                     L
                         S
                                        ROUGHNESS COEFFICIENT
                                  .015
                                       PERCENT OF SUBBASIN
MINIMUM NUMBER OF DX INTERVALS
                        PA
                     DXMIN
                KINEMATIC WAVE
682 RK
                 MAIN CHANNEL
                                 1400.
                                        CHANNEL LENGTH
                        L
                                 .0131
                                        SLOPE
                         N
                                  .015
                                        CHANNEL ROUGHNESS COEFFICIENT
                                        CONTRIBUTING AREA
                        CA
                                   .03
                      SHAPE
                                  TRAP
                                        CHANNEL SHAPE
                        WD
                                 17.00
                                        BOTTOM WIDTH OR DIAMETER
                         Z
                                  4.00
                                        SIDE SLOPE
                     NDXMlN
                                        MINIMUM NUMBER OF DX INTERVALS
                     RUPSTQ
                                    NO
                                        ROUTE UPSTREAM HYDROGRAPH
                                     COMPUTED KINEMATIC PARAMETERS
                                          VARIABLE TIME STEP
                                         (DT SHOWN IS A MINIMUM)
                   ELEMENT
                             ALPHA
                                                  DT
                                                           DΧ
                                                                     PEAK
                                                                            TIME TO
                                                                                        VOLUME
                                                                                                  MUMIKAM
                                                                              PEAK
                                                                                                  CELERITY
                                                 (MIN)
                                                                    (CFS)
                                                                                         (IN)
                                                           (FT)
                                                                              (MIN)
                                                                                                   (FFS)
                  PLANEI
                               3.14
                                         1.67
                                                   3,19
                                                            69.00
                                                                     128.15
                                                                              165.47
                                                                                          2.68
                                                                                                    1.06
                                                                                                  12.81
                  MAIN
                               2.18
                                         1.44
                                                    . 64
                                                           166 67
                                                                     123.54
                                                                              186.54
                                                                                          2.89
CONTINUITY SUMMARY (AC-FT) - INFLOW: .0000E+00 EXCESS: .4844E+01 OUTFLOW: .4845E+01 BASIN STORAGE: .3741E-03 PERCENT ERROR
                                        INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL
                                                                    114.18 185.00
                                                   5.00
                                                HYDROGRAPH AT STATION
                                                                        ASLD
DA MON HRMN ORD
                                                                                                 LOSS EXCESS
      DA MON HEMN ORD
                          RAIN
                                                  COMP O
                                                                                                                 COMP O
                                 LOSS EXCESS
                                                                                         RAIN
             0000
                           .00
                                   .00
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             0005
                                  .00
                                          .01
                                                     0.
                                                                             1235
                                                                                  152
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             0010
                                          .01
                                                                             1240
                                                                                  153
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             0015
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                                          .01
                                                                             1245
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             0020
                           .01
                                  .00
                                          .01
                                                                             1250
                                                                                  155
                                                                                          .00
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             0025
                     6
                           .01
                                  .00
                                          .01
                                                      0.
                                                                             1255
                                                                                  156
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                                                                             1300
                                                                                  157
                                                                                                  .00
             0030
                                  .00
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                           .01
                                          .01
                                                     0.
             0035
                           .01
                                          .01
                                                                             1305
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). 1	0110 0115	15 16	.01 .01	.00 .00	.01 .01	2. 2.	:	1 1		165 166	. 00 . 00	.00	. 00 . 00	0. 0.
1	0120 0125	17 13	.01 .01	.00 .00	.01 .01	2.		1 1		167 168	.00	.00	.00	o. o.
1	0130	19	.01	.00	.01	2.	•	1	1400	169	.00	.00	.00	0.
1]	0135 0140	20 21	.01 .01	.00 .00	.01 .01	2. 2.	•	1 1		170 171	.00 .00	.00 .00	.00	0. 0.
1 1	0145 0150	22 23	.02	.00	.01 .01	3. 3.	:	1 1		172 173	.00	.00	.00	0. 0.
1	0155	24	.02	.00	.01	3.	•	1	1425	174	.00	.00	.00	0.
l l	0200 0205	25 26	.02 .02	.00 .00	.02	3. 3.	*	1 1		175 176	.00	.00	.00	0. 0.
ı	0210	27	.02	.00	.02	3.		1	1440	177	. 00	.00	.00	0.
1	0215 0220	28 29	.02 .02	.00 .00	.02 .02	4. 4.	•	1 1		178 179	.00 .00	.00 .00	. 00 . 00	0. 0.
i 1	0225 0230	30 31	.03	.00 .01	.02	1. 5.	•	1 1		180 181	.00 .00	.00 .00	.00	0. 0.
1	0235	32	.08	.01	.06	6.	*	1	1505	182	.00	.00	.00	0.
1	0240 0245	33 34	.09	.01 .02	.07 .08	10. 11.	:	1 1		183 184	.00	.00 .00	.00 .00	0. 0.
l ì	0250 0255	35 36	.14 .18	.02	.11 .15	19. 27.	*	1		185 186	.00 .00	.00	.00	ο.
1	0300	37	.40	.05	. 35	52.	*	1.	1530	187	.00	.00	.00	0. 0.
1	0305 0310	38 39	.69 .28	.06 .02	.63 .26	114. 99.	•	1 2		183 189	.00 .00	.00	.00	0. 9.
1	0315 0320	40	.15	.01	. 14	59.	•	1	1545	190	-00	.00	.00	0.
1	0325	41 42	.11 .09	.01	.10 .09	39. 29.		ı ı		191 192	.00	.00 .00	.00 .00	0. 0.
1 1	0330 0335	43 44	.08	.00 .00	.08 .03	23. 16.		1 1		193 194	.00 .00	.00 .00	.00	0. 0.
1	0340	4.5	.03	.00	.03	13.	*	1	1610	195	.00	.00	.00	0.
1	0345 0350	46 47	.03 .02	.00	.02	10. 3.	*	1 1		196 197	. 00 . 00	.00	.00 .00	0. 0.
l I	0355 0400	4 9 4 9	.02	.00 .00	.02	7, 6.	•	1 1		198 199	. 00 . 00	. 00 . 00	.00	0.
1	0405	50	.02	.00	.02	G .	•	1	1635	200	- 00	.00	.00	0. 0.
1 1	0410 0415	51 52	.02 .02	.00	.02 .02	· 5.	*	1 1		201 202	. 60 . 60	.00 .00	.00 -00	0. 0.
1	0420	53	.02	.00	.01	4.	•	1	1650	203	.00	.00	.00	0.
1	0425 0430	54 55	.02 .01	.00 .00	.01 .01	4.	÷	1 1		204 205	- 00 - 00	.00	.00 .00	Ú. O.
1 1	0435 0440	56 57	.01 .01	.00	.01	1. 4.	•	1 1		206 207	.00	.00	.00	0. 0.
1	0445	58	.01	.00	. 0 1.	3.	•	1	1715	208	.00	.00	.00	0.
1 1	0450 0455	59 60	.01 .01	.00 .00	.01 .01	3. 3.	*	1 1		209 210	.00	.00	.00	ი. o.
1	0500 0505	61 62	.01 .01	.00	.01	3. 3.	•	1 1		211 212	. 00 . 00	.00	.00	0.
ì	0510	63	.01	.00	.01	3.	•	1	1740	213	.00	.00	.00 .00	0. 0.
1 1	0515 0520	64 65	.01 .01	.00	.01 .01	3. 3.	•	1 1		214 215	.00 .00	.00	.00	υ. ο.
1	0525 0530	66 67	.01	.00	.01	2.	•	1	1755	216	.00	.00	.00	0.
1	0535	68	.01 .01	.00 .00	.01 .01	2. 2.		1 1		217 218	.00 .00	.00	.00 .00	0. 0.
1 1	0540 0545	69 70	.01	.00	.01 .01	2. 2.	•	1 1	1810 1815	219 220	- 00 - 00	.00	.00 .00	0. 0.
1	0550	71	.01	.00	.01	2.	•	ı	1820	221	.00	.00	.00	0.
1	0555 0600	72 73	.01 .01	.00	.01 .01	2. 2.	•	1 1	1825 1830	222 223	.00 -00	.00	.00 .00	0. 0.
l l	0605 0610	74 75	.00 .00	.00	.00	2. 2.	•	1 1		224 225	- 00 - 00	.00	.00	0.
1	0615	76	.00	.00	.00	1.	•	1	1845	226	.00	.00 .00	.00	0. 0.
1	0620 0625	77 78	.00	.00	.00 .00	1. 1.	*	1 1		227 228	.00 .00	.00	. 00 . 00	0. 0.
ì	0630	79	.00	.00	.00	1.	•	1	1900	229	.00	.00	.00	0.
1	0635 0640	80 81	.00	.00	.00 .00	1. 1.		1 1		230 231	.00	.00 .00	.00	0. 0.
1 1	0645 0650	82 83	.00 .00	.00 .00	.00	0. 0.	•	1 1	1915 1920	232 233	-00 -00	.00 .00	.00	0. 0.
1	0655	94	.00	.00	.00	0.	•	1	1925	234	.00	.00	.00	0.
1	0700 0705	85 86	.00 .00	.00	.00 .00	0. 0.	*	1 1		235 236	.00 .00	.00	.00	0. 0.
1	0710 0715	87 33	.00 .00	.00 .00	.00	O.	•	1 1		237 238	.00	.00	.00	O. O.
1	0720	39	.00	.00	.00	0.	•	1	1950	239	.00	.00	.00	0.
1 1	0725 0730	90 91	.00	.00	.00	0. 0.	*	1 1		240 241	.00	.00	.00	0. 0.
1	0735 0740	92 93	.00	.00 .00	.00 .00	0. 0.	•	1. 1	2005 2010	242 243	.00	.00	.00 .00	0.
1	0745	94	.00	.00	.00	0.	*	1	2015	244	.00	.00	.00	U. O.
1	0750 0755	95 96	.00 .00	.00	.00 .00	0. 0.	•	1 1.	2020 2025	245 246	-00 -00	.00 .00	.00 .00	0. 0.
1	0800	97 98	.00	.00	.00	0.	:	1	2030	247	. 00	. 90	.00	0.
I 1	0805 0810	99	.00 .00	. 00 - 00	.00	υ. Ο.	:	1 1	2035 2040	248 249	.00	. 90 . 90	.00	0. 0.
l 1		100 101	.00	.00	.00	0. 0.	•	1 1	2045 2050	250 251	- 00 - 00	.00	.00 .00	0. 0.
1	0825	102	.00	.00	.00	0.	•	1	2055	252	.00	.00	.00	0.
1	0835	103 104	.00	.00	.00	0. 0.		1 1	2100 2105	253 254	.00	.00 .00	.00	0. 0.
1. 1	0940	105 106	.00 .00	.00	.00	0. 0.	•	1 1	2110 2115	255	. 00	.00	.00	0.
1	0850	107	.00	.00	.00	O.	•	1	2120	256 257	.00	.00 .00	.00	0. 0.
1 1		103 109	.00 .00	.00	.00	0. 0.	•	1 1	2125 2130	259 259	.00	.00	.00 .60	0. 0.
)	0905	110	.00	.00	.00	0.	•	1	2135	260	. 00	.00	. 60	0.
1	0915	$\frac{111}{112}$.00	.00 .00	.00 .00	o. o.	:	1 1	2140 2145	261 262	. 00 . 00	.00 .00	. 00 . 00	ű. O.
1		113 114	.00	.00	.00	0. 0	:	1 1	2150 2155	263 264	00 .00	.00	. 00 . 00	0 . 0 .
1		115	.00	.00	.00	o	٠	1	2200	265	.00	.00	.00	0.

1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0940 0945 0950 0955 1000 1005 1010 1025 1020 1025 1030 1035	117 118 119 120 121 122 123 124 125 126 127	.00 .00 .00 .00 .00 .00 .00	.00 .00 .00 .00 .00 .00 .00	.00 .00 .00 .00 .00 .00 .00	0. 0. 0. 0. 0.	•	1 1 1 1 1	2210 2215 2220 2225 2230	267 268 269 270 271	.00 .00 .09 .09	00 .00 .00 .00	.00 .00 .00 .00 .00	0. 0. 0. 0.
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0950 0955 1000 1005 1010 1015 1020 1025 1030 1035	119 120 121 122 123 124 125 126	.00 00 .00 .00 .00	.00 .00 .00 .00 .00	.00 .00 .00 .00 .00	0. 0. 0. 0.	•	1 1 1	2220 2225 2230	269 270	. 00 . 00	.00	.00 .00 .00	0. 0. 0.
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0955 1000 1005 1010 1015 1020 1025 1030 1035	120 121 122 123 124 125 126	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .00 .00	0. 0. 0.	•	1	2225 2230	270	.00	.00	.00	0. 0.
1 1 1 1 1 1 1 1 1 1 1 1 1	1000 1005 1010 1015 1020 1025 1030 1035	121 122 123 124 125 126	.00	. 00 - 00 - 00 - 00	.00 .00 .00	0. 0. 0.	•	1	2230				.00	0.
1 1 1 1 1 1 1 1 1 1 1 1 1	1005 1010 1015 1020 1025 1030 1035	122 123 124 125 126	.00 .00 .00 .00	.00 .00 .00	.00 .00 .00	0. 0.	•			271	. 00	. 0.0		
1 1 1 1 1 1 1 1 1 1 1 1 1	1010 1015 1020 1025 1030 1035	123 124 125 126	.00 .00 .00	.00	.00	0.	•	1						9.
1 1 1 1 1 1 1 1 1 1 1 1 1	1015 1020 1025 1030 1035	124 125 126	.00	.00	.00				2235	272	.00	.00	.00	ó.
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1020 1025 1030 1035	125 126	.00			2	-	1	2240	273	و٥.	.00	.00	ó.
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1025 1030 1035	126		.00		0.	•	1	2215	274	.00	.00	. 00	0.
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1030 1035		.00		.00	0.		1	2250	275	.00	.00	. 00	o.
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1035	127		.00	.00	0.	•	1	2255	276	.00	.00	.00	o.
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			.00	.00	.00	0.		1	2300	277	. 00	.00	.00	0.
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3040	129	.00	.00	. 00	0.	+	1	2305	278	.00	.00	.00	0.
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		129	.00	.00	.00	0.	*	1	2310	279	.00	.00	.00	Ö.
1 1 1 1 1	1045	130	.00	.00	.00	0.	•	1	2315	280	.00	.00	.00	o.
1 1 1 1	1050	131	.00	- 00	.00	ο.		1	2320	281	-00	.00	.00	o.
1 1 1	1055	1.32	.00	- 00	.00	0.	•	1	2325	282	.00	.00	. 00	0.
1 1 1	1100	133	.00	.00	.00	0.	*	1	2330	283	. 00	.00	.00	ŭ.
J J	1105	1.34	.00	.00	.00	0.	•	1	2335	284	.00	.00	.00	0.
1	1110	135	.00	- 00	. 00	0.	*	1	2340	285	. 00	. 00	. 00	0.
	1115	136	.00	.00	.00	0.	4	3	2345	236	. 00	. 00	.00	0.
	1120	137	.00	.00	.00	♂.	*	1	2350	237	.00	.00	. 00	a.
7	1125	138	.00	.00	.00	0.	*	1	2355	288	.00	.00	.00	0.
1	1130	139	.00	.00	.00	0.	•	2	0000	289	.00	.00	.00	0,
1	1135	140	.00	. 00	.00	O.	•	2	0005	290	- 00	.00	. 00	o.
1	1140	141	.00	-00	.00	0.		2	0010	291	.00	.00	.00	0.
1	1145	142	.00	- 00	.00	0.	-	2	0015	292	.00	.00	.00	0.
1	1150	143	.00	.00	.00	0.	*	2	0020	293	.00	.00	.00	0.
1	1155	144	.00	.00	.00	0.	•	2	0025	294	.00	.00	.00	0.
1	1200	145	.00	. 20	.00	0	*	2	0030	295	.00	.00	.00	ű.
1	1205	146	.00	-00	.00	0.	*	2	0035	296	.00	.00	.00	0.
3	1210	147	.00	.00	.00	Ο.	*	2	0040	297	.00	.00	.00	0.
1	1215	148	.00	.00	.00	0.		2	0045	298	. 00	.00	. 00	o.
1	1220	149	.00	.00	.00	0.	*	2	0050	299	. 00	. 00	-00	o.
,1	1225	150	.00	.00	. 00	С.	•	2	0055	300	.00	.00	.00	ō.
							•							* .
******			******	*****				******	*****	*****		******	******	

TOTAL RAINFALL, = 3.22, TOTAL LOSS = .34, TOTAL EXCESS :: 2.88

1	PEAK FLOW	TIME			MAXIMUM AVER	AGE FLOW	
	(CFS)	(HR)		6-HR	24-HR	72-HR	24.92-HR
,	(CFS)	(пк)	(CFS)				
٠	114.	3.08		10.	2.	2.	2.
			(INCHES)	2,860	2.888	2.888	2.888
			(AC-FT)	5.	S .	5.	5,
			CUMULATIV	E AREA =	.03 SQ MI		

683 KK * ASLDC * T COMBINE

684 KO OUTPUT CONTROL VARIABLES

I FRIT 1 PRINT CONTROL
IPROT 0 PLOT CONTROL
OSCAL 0. HYDROGRAPH PLOT SCALE
IPROH 0 PUNCH COMPUTED HYDROGRAPH
IOUT 21 SAVE HYDROGRAPH ON THIS UNIT
ISAVI 1 FIRST ORDINATE PUNCHED OR SAVED
ISAVZ 300 LAST ORDINATE PUNCHED OR SAVED
TIMINT .083 TIME INTERVAL IN HOURS

COMBINED DISCHARGE AT ASLDR1 AND ASLD1 SUB PASIN

686 HC HYDROGRAPH COMBINATION

ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

HYDROGRAPH AT STATION ASLDC SUM OF 2 HYDROGRAPHS

			****	******				***	* * * 4 4 * * *	*******			* * * * * * * *	*****		* * * * *	• • • • • • • •		******	
					•						*					•				
AG	MON	HRMN	ORD	FLOW	•	DA I	MON HR	IN	ORD	FLOW	•	DA MO	N HRMN	OBD	FLOW	•	DA MOI	N HRMN	ORD	FLOW
					*						•					*				
1		0000	1	0.	•	1	06	15	76	67.	•	1	1230	151	6.	•	1	1845	22€	1.
1		0005	2	0.	•	1	06:	20	77	54.	•	1	1235	152	6.	٠	1	1850	227	1.
1		0010	3	0.	•	1	06	25	78	60.	*	1	1240	153	5,	٠	1	1855	228	i.
1		0015	4	0.	•	1	06	30	79	57.	٠	1	1245	154	5,	,	3	1900	229	1.
1		0020	5	0.	*	1	06	35	0.8	54.	•	1	1250	155	5.	•	1	1905	230	î.
1		0025	Ģ	0.	٠	1	06-	40	81	52.	•	1.	1255	156	5.	•	1	1910	231	1.
1		0030	7	Ů.	•	1	06	15	82	49.	*	1	1300	157	5.	•	1	1915	232	1.
1		0035	8	1.	•	1	06	50	83	47.	•	1	1305	158	5.	•	1	1920	233	1.
1		0040	9	1.	•	1	06	55	64	15.	•	1	1310	159	5.	•	1	1925	234	1.
1		0045	10	1.	•	1	07	00	85	43.	٠	1	1315	160	5.	•	1	1930	235	1.
ı		0050	11	2.	+	1	07	05	86	41.	•	ì	1320	161	4.	*	1	1935	236	1.
1		0055	12	5.	•	1	07	10	6.7	39.	•	1	1325	162	4.	•	1	1940	237	1.
ī		0100	1.3	6.	•	1	0.7	15	88	33.	•	1	1330	163	4	•	1	1946	228	1

	41.00	1.4	• • • • • • • • • • • • • • • • • • • •	_		6.720					1005								
1	0105	14	7.	-	1	0720	89	36.	•	1	1335	164	4		•	1	1950	239	1.
1	0110	15	8.	-	1	0725	90	35.	•	1	1340	165	-3		•	1	1955	240	1.
1	0115	16	9.	*	1	0730	91	34.	*	1	1345	166	4		*	1	2000	241	1.
1	0120	17	10.	•	1	0735	92	32.	•	1	1350	167	4		•	1	2005	242	l.
1	0125	18	11.	•	1	0740	93	31.		1	1355	168	4		•	1	2010	243	ã.
1	0130	19	12		1	0745	94	30.		ī	1400	169	4		_	ī		244	
-		20		_											_		2015		1.
1	0135		13.	-	7	0750	95	29.	•	1	1105	170	4		•	1	2020	245	1.
ı	0140	21	13.	•	1	0755	96	28.		1	1410	171	4		•	1	2025	246	1.
1	0145	22	14.	•	1	0800	97	27.	٠	1	1415	172	3		•	1	2030	247	1.
1	0150	2.3	15.	*	1	0305	98	26.	+	1	1420	173			4	1	2035	248	1.
1	0155	2·i	16.		1	0810	99	25.		ī	1425	174	3			1	2040	249	1.
ī	0200	25	17.		ī	0815	100	24.		î	1430	175	3		_	1			
									-						-		2045	250	1.
1	0205	26	18.	•	1	0820	101	21.	•	1	1435	176	3		-	1	2050	251	1.
3.	0210	27	20.	*	1	0825	102	23.	*	1	1440	177	3		*	3	2055	253	1.
1	0215	3.0	21.	•	1	0830	103	22.	*	1	1445	179	3		•	1	2100	253	1.
1	0220	29	23.	•	1	0835	101	21.	•	1	1450	1/9	3		-	I	2105	254	1
1	0225	30	24.	+	1	0840	105	21.		1	1455	180	3		*	1	2110	255	1.
1	0230	31	26.		ì	0845	106	20.		ĩ.	1500	181			_	ì	2115	256	
ī	0235	32	30.		1	0850	107	19.	_	ï	1505	182				-			1.
									Ţ				3		-	1	2120	257	l.
1	0240	33	37.	•	1	0855	108	19.	•	1	1510	183	3		•	1	2125	258	1.
1	0245	34	49.	•	7	0900	109	13.	-	1	1515	184	3		•	I	2130	259	1.
1	0250	35	67.	*	1	0905	110	18.	4	1	1520	185	3		+	1	2135	260	1.
1	0255	36	91.		1	0910	111	17.		1	1525	186	3	_	•	1	2140	261	1.
1	0300	37	144.		1	0915	112	17.	*	1	1530	187	2			1	2145	262	1.
1	0305	38	268.		ī	0920	113	16.		1	1535	188	3			ì	2150	263	
ī	0310	39	317.		î	0925	224		_	1	1540	199							0.
								16.					2			1	2155	261	0.
1	0315	40	305.	•	1	0930	115	15.	•	1	1545	190	2		•	1	2200	2€5	0.
1	0320	41	291.	•	1	0935	116	15.	٠	1	1550	191	2		•	1	2205	266	0.
1	0325	42	275.	•	1	0440	117	14.	*	1	1555	192	2		•	1	2210	267	0.
1	0330	4.3	2£0.		1	0945	119	14.		1	1600	193	2:		*	1	2215	263	0.
1	0335	4.4	243.	•	1	0950	119	14.		1	1605	194	2			1	2220	269	o.
7	0340	45	225.		1	0955	120	13.		1	1610	195	2		•	ī	2225	270	0.
i	0345	46	206.	_	1	1000	121			ī	1615		2			1			
-		_						13.				196					2230	271	ο.
1	0350	47	1.89.	•	1	1005	122	12.		1	1620	197	2		*	1	2235	272	٥.
1	0355	48	175.	•	ı	1010	123	12.		1	1625	198	2		•	1	2240	273	0.
ג	0400	4.9	164.	*	ג	1015	124	12.	*	1	1630	199	2		*	1	2245	274	0.
1	0105	50	155.	•	1	1020	125	11.	*	1	1635	200	2		•	1	2250	275	0.
1	0410	51	148.	*	1	1025	126	11.		1	1640	201	2		•	1	2255	276	0.
1	0415	52	142.		1	1030	127	11.		1	1645	202	2		+	ì	2300	277	0.
ī	0420	53	137.		î	1035	128	10.		ī	1650	203	2		_	1			
-															-		2305	278	0.
1	0425	54	133.	•	1	1040	129	10.	•	1	1655	201	2		•	1	2310	279	ø.
1	0430	55	128.	•	1	1045	130	10.	•	1	1700	205	2		•	1	2315	280	0.
1	0435	56	125.	•	1	1050	131	10.	*	1	1705	206	2		•	1	2320	281	0.
1	0440	57	122.	-	1	1055	132	9.	•	1	1710	207	2		*	1	2325	282	0.
1	0145	58	119.	*	1	1100	133	9.	*	1	1715	208	2		•	a	2330	203	0.
1	0450	59	115.		1	1105	134	9.		1	1720	209	2		*	1	2335	284	0.
1	0455	60	112.		1	1110	135	9.	*	1.	1725	210	ī			î	2340	285	
1	0500	61	108.		1		136	8.	_	1	1730				_				0.
1				-		1115			-			211	1		-	1	2345	286	0.
	0505	62	105.	•	1	1120	137	8.	*	1	1735	212	1.		•	1	2350	287	0.
1	0510	63	102.	•	1.	1125	138	8.	*	1	1740	213	1.		•	1	2355	288	υ.
1	0515	64	98.	*	1	1130	139	а.	•	1	1745	211	1		•	2	0000	289	0.
1	0520	65	95.	*	1	1135	140	8.	٠	1	1750	215	1		*	2	0005	290	0.
1	0525	66	93.	•	1	1140	141	7.	*	1	1755	216	1		•	2	0010	291.	0.
1	0530	67	90.		ī	1145	142	7.		1	1800	217	1			2	0015	292	0.
ī	0535	68	87.		î	1150	143	7.	-	î	1805	218	i			2	0020	293	0.
ī	0540	69	85.		1	1155	144	7.		1		219							
_				-					-		1810		3		-	2	0025	294	0.
1	0545	70	82.	•	1	1200	145	7.	•	1	1815	220	ı,		•	2	0030	295	0.
1	0550	71	80.	*	1	1205	146	6.	*	1	1320	221	1		•	2	0035	296	0.
1,	0555	72	77.	•	1	1210	147	С.	•	1	1825	222	1		4	2	0040	297	0.
1	0600	73	75.	*	1	1215	148	6.	*	1	1830	223	1		•	2	0045	298	0.
1	0605	7.1	73.	•	1	1220	149	6.	*	1	1835	224	1		•	2	0050	299	o.
ı	0610	75	70.	*	1	1225	150	6.	*	1	1840	225	ī			2	0055	300	0.
													^	-			00.7.3		٠.

!	PEAK FLOW	TIME			MAXIMUM AVER	AGE FLOW	
+.	(CFS)	(HR)		G-HR	24 - RR	72-HR	24.92-HR
		•	(CFS)				
4.	317,	3.17		100.	29.	28.	29.
			(INCHES)	1.714	1.973	1.974	1.974
			(AC-FT)	49.	57.	57.	57.
			CUMULATIV	E AREA =	.54 SQ MI		

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687 KK
                 AS LDR2
                                   ROUTE
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688 KO OUTPUT CONTROL VARIABLES

(ABLES

1 PRINT CONTROL

0 PLOT CONTROL

0. HYDROGRAPH PLOT SCALE

0 PUNCH COMPUTED HYDROGRAPH

21 SAVE HYDROGRAPH ON THIS UNIT

1 FIRST ORDINATE PUNCHED OR SAVED

300 LAST ORDINATE PUNCHED OR SAVED

.003 TIME INTERVAL IN HOURS IPRNT IPLOT QSCAL IPNCH IGUT ISAV1 ISAV2 TIMINT

ROUTE ASLDRI AND ASLDI SUB TO SCOTTSDALE ROAD AND PRINCESS DRIVE ROUTE L-1000', TRAP SECTION BW-17' Z=4, TWM8x.41' ASSUME GRASS LINED CHANNEL N=.030 UP=1570.15 DWN-1540.60

HYLROGRAPH ROUTING DATA

693 RE

KINEMATIC WAVE STREAM ROUTING

L 1000. CHANNEL LENGTH
S .0075 SLOPE
N .030 CHANNEL ROUGHNESS COEPFICIENT
CA .00 CONTRIBUTING AREA
SHAPE TRAP CHANNEL SHAPE
WD 17.00 BOTTOM WIDTH OR DIAMETER
Z 4.00 SIDE SLOPE
NDXMIN 2 MINIMUM NUMBER OF DX INTERVALS

COMPUTED KINEMATIC PARAMETERS VARIABLE TIME STEP (DT SHOWN IS A MINIMUM)

ELEMENT	ALPHA	М	DT.	DX	PEAK	TIME TO PEAK	VOLUME	MAXIMUM CELERITY
			(MIN)	(FT)	(CFS)	(MIM)	(IN)	(FPS)
MAIN	. 94	1.44	. 72	333.33	316.25	191.53	1.97	7.98

CONTINUITY SUMMARY (AC-FT) - INFLOW: .5692E+02 EXCESS: .0000E+00 OUTFLOW: .5692E+02 BASIN STORAGE: .5511E-02 PERCENT ERROR:

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

. 0

94 1.44 5.00 NIAM 308.60 195.00 1.97

							HYDRO	GRAPH AT ST	INTIO	N AS	LDR2							
****	*****	******	*******	••••	*****	******	******				****	*****	******				******	******
DA MO	N HRMN	ORD	PLOW	*	DA M	ON HRMN	ORD	FLOW	• D.	MON A	HRMN	ORD	PLOW	•	DA MO	ON HRMN	ORD	FLOW
1	0000	1	0.	٠	1	0615	76	69.		1	1230	151	6.	*	1	1845	226	1.
1	0005	2	0.	•	1	0620	77	65.		1	1235	152	6.		1	1850	227	1.
1	0010	3	0.	•	1	0625	78	62.	• :	1	1240	153	6.	*	1	1855	228	1.
1	0015	4	0.	٠	1	0630	79	59.	•		1245	154	5.	•	1	1900	229	1.
1	0020	5	0.	*	1	0635	80	56.			1250	155	5.	٠	1	1905	230	1.
1	0025	G	0.	•	1	0640	31	53.			1255	156	5.	•	1	1910	231	1.
1	0030	7	0.	•	1	0615	92	50.			1300	157	5.	*	ı	1915	232	1.
1.	0035	8	0.	•	1	0650	83	48.			1305	158	5.	*	1	1920	233	1.
1	0040	Ğ	0.	•	1	0655	84	46.			1310	159	5.	•	1	1925	234	1.
1	0045	10	1.	•	1	6700	85	44.			1315	160	5.	•	1	1930	235	1.
1	0050	11	1.	•	1	0705	86	42.			1320	161	5.	*	1	1935	236	1.
1	0055	12	2.	•	1	0710	87	40.			1325	162	4.	•	1	1940	237	1.
1	0100	13	4.		1	0715	88	39.			1330	163	4.	•	1	1945	230	٦.
1	0105	14	6.	•	1	0720	89	37.			1335	164	1.	*	1	1950	239	1.
1	0110	15	8.	*	1	0725	90	36.			1340	165	4.	•	1	1955	240	1.
1	0115	16	9.	*	1	0730	91	34.			1345	166	1.	*	1.	2000	241	1.
1	0120	17	9.	*)	0735	92	33.			1350	167	4.	*	1	2005	242	1.
1	0125	18	10.	•	ı	0740	93	32.			1355	168	4.	•	1	2010	243	1.
1	0130	19	11.	•	1	0745	94	31.			1400	169	4.	•	1	2015	244	1.
1	0135	20	12.	-	1	0750	95	30.			1405	170	1.)	2020	245	1.
1	0140	21	13.		1	0755	96	29.			1410	171	4.	•	1	2025	246	1.
1	0145	22	14.	•	1	0800	97	28.			1415	172	4.	*	1	2030	247	1.
_	0150	23	15.	Ī	1	0805	98	27.			1420	173	3.	•	1	2035	248	1.
1	0155	24	16.	-	1	0810	99	26.			1425	174	3.	•	1	2040	249	1.
1	0200	25	17.		1	9815	100	25.			1430	175	3.	•	1	2045	250	1.
1	0205 0210	26	18.		1	0820	101	24.			1435	176	3.		1	2050	251	1.
ì	0210	27 28	19. 20.		1 1	0825 0830	102 103	23. 23.			1440 1445	177 178	3. 3.	•	1 1	2055	252	1.
1	0215	29	20.		1			22.			1450	179	3.	•		2100	253	1.
	0225	30	22.	-	1	0835	104 105					180		·	1	2105	254	1.
1	0230	31.	23. 25.	-	1	0840 0845	105	21.			1455 1500	161	3. 3.	•). 1	2110	255	1.
ī	0235	32	28.	-	i	0850	107	20			1505	182	3. 3.	- 1	1	2115 2120	256 257	1.
1	0240	33	33.		à	0855	108	19.			1510	183	3.	-	1	2125	257	1.
ì	0245	34	43.		î	0.900	109	19.			1515	184	3.		1			1.
ī	0250	35	58.		1	0905	110	18.			1520	185	3.		ı.	2130	259	1.
1	0255	36	81.		1	0910	111	18.			1525	186	3. 3.	-	1	2135 2140	260 261	1.
1	0300	37	124.		1	0915	112				1530	187	3.	-	1	2145	262	1.
1	0305	38	230		à	0920	113	16.			1535	188	2.	•	ì	2145	263	1.
ī	0310	39	303.		î	0925	114	16.			1540	189	2.		î	2155	264	1.
ī	0315	40	309.	٠	1	0930	115	16.			1515	190	2.		i	2200	265	0.
ī	0320	41	295.		1	0935	116	15.			1550	191	2.		ì	2205	266	0.
ī	0325	42	279.		ı	0940	117	15.			1555	192	2.	•	î	2210	267	0.
1	0330	43	264		ī	0945	118	14			1600	193	2.		1	2215	268	0.
ā	0335	4.4	248.		ā	0950	119	14.			1605	194	2.		î	2220	269	0.
ĩ	0340	45	230	4	î	0955	120	13.			1610	195	2.	٠	ī	2225	270	0.
ī	0345	16	212	•	1	1000	121	13.			1615	196	2.		ī	2230	271	0.
î	0350	47	194.		î	1005	122	13.			1620	197	2.		1	2235	272	0.
1	0355	46	179		ī	1010	123	12.			1625	198	2.	*	ĵ	2240	273	ů.
1	0400	49	167	*	i	1015	124				1630	199	2.	*	í	2245	274	ο.
ì	0405	50	158	•	ī	1020	125	12.			1635	200	2.		1	2250	275	0.
1	0410	51	151.		1	1025	126	11.			1610	201	2.	+	i	2255	276	0.
1	0415	52	144.	•	ı	1030	127	11.	•		1645	202	2.		1	2300	277	o.
1	0420	53	139	•	1	1035	128	11.			1650	203	2.		í	2305	278	0.
1	0425	54	134.	*	ā	1040	129	16.			1655	204	2.		ì	2310	279	Û.
ī	0430	55	130.	•	î	1045	130	16.			1700	205	2.	•	î	2315	280	0.
i	0135	56	126.	٠	î	1050	131	16			1705	206	2.		î	2320	281	0.
ī	0140	57	123.		ī	1055	132	10.			1710	207	2.		ì	2325	282	0.
î	0115	58	120.		i	1100	133	9.			1715	208	2.		ì	2330	283	0.
1	0450	59	117		ĵ	1105	131	ý.			1220	209	2.		1	2335	284	Ú.
1	0455	60	113		í	1110	1.35	9.			1725	210	2.		1	2340	285	0.
•	0100		~			1110	ر د	٠.		-	2. 3	S 10	<i>~</i> .	-	_	2340	20.0	υ.

1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0500 0505 0515 0515 0525 0525 0535 0535 0545 0545 0550 0605 0605	61 62 63 64 65 66 67 69 70 71 72 73 74	110. 106. 103. 100. 97. 94. 91. 88. 86. 83. 81. 78. 76.	. 1 . 1 . 1 . 1 . 1 . 1 . 1 . 1 . 1 . 1	1125 1130 1135 1140 1145 1150 1155 1200 1205	137 138 139 140 141 142 143 144 145 146 147 143 149	9. 8. 8. 8. 9. 7. 7. 7. 7. 6. 6.		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	735 740 745 750 755 800 805 810 825 830 835	214 215 216 217 218 219 229	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1		1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2345 2350 2355 0000 0005 0015 0020 0025 0030 0035 0040 0045	287 288 239 290 291 292 293 294 295 296 297 298 299	0. 0. 0. 0. 0. 0. 0. 0. 0. 0.
PEAK FLO	W	TIME			MAX	VA NUMI	ERAGE FL	ow.									
(CFS)		(HR)		6 - HI	(C	24 - HR	72-1	HR	24.92-H	R							
+ 309.		3.25	(CFS) (INCHES) (AC-FI)	100	5	29. 1.974 57.	2: 1.9 5		28 1.97 57	4							
			CUMULAT	rive Area :	5	4 SQ MI											
694 KK		ASLI	· *** **,	2 SUB	*** ***	*** ***	*** ***	***		•• ,		*** *** :	*** **	• •••	** **	* ***	••• •••
	•	****															
695 KQ			IPRNT IPLOT QSCAL IPNCH IOUT ISAV1 ISAV2 IMINT	0 0. 0 21 1 360	PRINT PLOT C HYDROG PUNCH SAVE H FIRST LAST C	ONTROL RAPH PL COMPUTE YDROGRA ORDINATE RDINATE NTERVAL	GT SCALE D HYDROG PH ON TH E PUNCHE FUNCHED IN HOUR	IS UNI D OR S OR S S	SAVED AVED	1 OF	CHAUNCE	y Lane					
		SUBBASIN	1 RUNOFF	DATA													
697 BA		SUBBAS	SIN CHARA TAREA	ACTERISTICS .02	SABBUR	TN AREA											
		PRECLI	MOTTATIC	DATA													
24 PK				5			TP-40		HETICAL S								
		5-M1N .76		60-MIN 2.54	2-HR 2.81	2.99	3.33	. 1	. 00		2-DAY .00	4-DAY .00	7-DAY .00				
698 LS			OSS RATE STRTL CRVN9R RTIMP	.60 77.08	INITIA CURVE PERCEN	AL ABSTR NUMBER	M AREA = ACTION VIOUS AR		. 00								
699 UK			NTIC WAVI RLAND-FLO E S N PA DXMIN	OW ELEMENT 269. .0022 .015 100.0	OVERLA SLOPE ROUGHN PERCEN	ESS COE	FFICIENT		VAI.S								
700 RK		I'AM	ATIC WAVE N CHANNEL S N CA SHAPE WD Z NDXMIN RUPSIQ	L 500. .0139 .015 .02 TRAP 17.00 4.00	CONTRI CHANNE BOTTON SIDE S MINIMU	EL ROUGH BUTING EL SHAPE 1 WIDTH GLOPE IM NUMBE	NESS COE AREA	TER INTER RAPH									
				CC	VAF	RIABLE T	TIC PARAM TME STEP										
		ELI	EMENT.	ALPHA	М	ירם		DX	PEAK		TIME TO PEAK	VOI'N	ME	MAXIMUM CELERIT			
		PI.AI	NE1	1.66	1.67	(MIN		FT) 53.80	(CFS) 87.2	24	(MIN) 185.04	(IN 2.) 70	(FPS)			

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2955E+01 OUTFLOW= .2863E+01 BASIN STORAGE= .7801E-04 PERCENT ERROR. .1

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN 2.56 1.44 5.00 86.18 185.00 2.80

							HYDROGRAPH A	T STATI	on Asli						
,	DΛ	мои нами	ORD	RAIN	LOSS	EXCESS	COMP Q		DA MON		ORD	RAIN	Loss	EXCESS	COMP Q
	1	0000	1	.00	.00	.00	ο.	:	1	1230	151	.00	.00	.00	Ο.
	1	0005	2	.01	.00	.01	0.		1	1235	152	.00	.00	.00	0.
	1	0010	3	.01	.00	.01	Ō.	•	1	1240	153	.00	.00	.00	0.
	1	0015	4	.01	.00	.01	ο.	•	1	1245	154	.00	.00	.00	0.
	1	0020	5	.01	.00	.01	0.	•	1	1250	155	.00	.00	-00	0.
	1	0025	6	.01	.00	.01	0.	*		1255	156	.00	.00	.00	0.
	1	0030	7	.01	.00	.01	1.	*		1300	157	-00	.00	.00	0.
	1	0035 0040	3 9	.01	- 00	.01	1.	*		1305	158	.00	.00	.00	0.
	1 1.	0045	10	.01 .01	. 00 . 00	.01 .01	1. 1.		1 1	1310 1315	159 160	.00	.00	.00	0 . 0 .
	1	0050	11	.01	.00	.01	1.			1320	161	.00	.00	.00	0.
	1	0055	12	.01	.00	.01	1.	*		1325	162	.00	.00	.00	0.
	1	0100	13	.01	.00	.01	1.	*	1	1330	163	.00	.00	. 00	0.
	1	0105	14	.01	.00	.01	1.	•		1335	164	.00	.00	.00	0.
	1	0110	15	. ស្1	. 00	. 01	1.	•	1	1340	165	.00	.00	- 00	0.
	1	0115	16	. 01.	.00	.01	1.	*	1	1345	166	.00	.00	- 00	0.
	1	0120 0125	17 18	.01 .01	.00	.01 .01	1.		1 1	1350 1355	167 168	.00	.00	.00	0.
	1	0130	19	.01	.00	.01	1.		î	1400	169	.00	.00	.00	0. 0.
	1	0135	20	.01	.00	. ű 1.	1.		ī	1405	170	.00	.00	.00	0.
	1	0140	21	.01	.00	.01	2.	•		1410	171	.00	.00	.00	0.
	1	0145	22	.02	.00	.01	2.	*	1	1415	172	.00	.00	.00	٥.
	1	0150	23	.02	.00	.01	2.	*		1420	173	.00	.00	.00	0.
	1	0155	24	.02	-00	.01	2.	*		1425	174	.00	.00	.00	0.
	1	0200 0205	25	.02	.00	.01	2.			1430	175	. 00	.00	.00	0.
	1	0210	26 27	.02	. 00 . 00	.02	2. 2.	·	1 1	1435 1440	176 177	.00	.00 .00	.00 .00	0. 0.
	î	0215	28	.02	.00	.02	2.	*	1	1445	178	.00	.00	.00	0.
	1	0220	29	.02	.01	.02	3.	*	1	1450	179	.00	.00	.00	0.
	1	0225	30	.03	.01	.02	3.	•	1	1455	180	.00	.00	.00	o.
	1	0230	31	.03	.01	.02	3.	•	1	1500	181	.00	.00	.00	U.
	1	0235	32	.09	. 02	.06	5.		1	1505	182	.00	.00	.00	0.
	1	0240 0245	33 34	.09 .10	.02 .02	.07 .08	9. 10.] 1	1510 1515	183 184	.00 .00	.00	.00	0.
	1	0250	35	.14	.02	.11	13.	•		1520	185	.00	.00	.00	0. 0.
	î	0255	36	.18	.03	. 14	19.			1525	186	. 00	.00	.00	0.
	1	0300	37	.40	.06	. 34	40.	•		1530	187	.00	.00	.00	0.
	1	0305	33	.69	.08	.61	84.	*	1	1535	188	.00	.00	.00	0.
	ı	0310	39	.28	.03	. 25	18.	*	1	1540	189	.00	.00	.00	0.
	1	0315	40	.15	.01	.14	27.	•		1545	190	.00	.00	.00	0.
	1	0320 0325	41 42	.11 .09	.01	.10 .09	19. 15.	-	1 1	1550 1555	191 192	.00	.00	.00	0.
	1	0330	43	.08	.01	.07	12.		1	1600	193	.00	.00	.00 .00	0. 0.
	1	0335	44	. 03	.00	.03	9.	•	ī	1605	194	.00	.00	.00	0.
	1	0340	45	.03	.00	.03	6.	•	1	1610	195	.00	.00	.00	0.
	1	0345	16	.03	.00	.02	5.	•	1	1615	196	.00	.00	.00	0.
	1	0350	17	.02	.00	.02	٥.	•	1	1620	197	.00	.00	-00	0.
	1	0355 0400	48 49	.02 .02	. 00 . 00	.02 .02	4. 3.	-	1 I	1625 1630	198 199	.00 .00	.00	.00	0.
	i	0405	50	.02	.00	.02	3.	•	î	1635	200	.00	.00	.00	0. 0.
	1	0410	51	.02	.00	.02	3.	•	ï	1640	201	.00	.00	-00	0.
	1	0415	52	.02	.00	.02	3.	•	1	1645	202	.00	.00	.00	0.
	1	0420	53	.02	.00	.01	2.	*	1	1650	203	.00	.00	.00	0.
	1	0425	54	.02	.00	.01	2.	•	1	1655	204	.00	-00	.00	0.
	1	0430	55 56	.01	. 00	.01	2.	•	1 1	1700		.00	.00	. 00	0.
	1	0435 0440	57	.01 .01	.00	. 0). . 0 1	2. 2.		i	1705 1710	206 207	.00	.00	.00	0.
	î	0445	58	.01	.00	.01	2.	•	ī	1715	208	.00	.00	.00	0. 0.
	1	0450	59	.01	.00	.01	2.	•	1	1720	209	.00	.00	.00	ű.
	1	0455	60	.01	.00	.01	2.	•	1	1725	210	.00	.00	. 00	0.
	1	0500	61	.01	.00	.01	2.	•	1	1730	211	.00	.00	.00	0.
	1	0505	62	.01	.00	.01	2.	•	1	1735	212	. 00	.00	.00	ο.
	1	0510 0515	63	.01 .01	.00	. 0.1	2.	•	1 1	1740	213	.00	.00	. 00	٥.
	1	05.15	64 65	.01	. 00 . 00	.01 .01	1. 1.		1	1745 1750	214 215	.00	.00	.00	0.
	1	0525	66	.01	.00	.01	1.	•	i	1755	216	.00	.00	.00	0. 0.
	1	0530	67	.01	.00	.01	1.	•	ĩ	1800	217	.00	.00	.00	0.
	1	0535	69	. 01	.00	.01	2.	•	1	1805	218	. 00	.00	. 00	0.
	1	0640	69	.01	.00	.01	1.	*	1	1810	219	.00	.00	.00	0.
	1	0545	70	.01	.00	.01	1.	•	1	1815	220	.00	.00	.00	0.
	1	0550	71	.01	.00	.01	1.	•	1	1820	221	.00	.00	.00	0.
	1	0555	72	.01	.00	.01	1.	:	1	1825	222	.00	.00	.00	0.
	1	0600 0605	73 74	.01	.00	. 0.1 . 0.0	ī. 1.		1	1836 1835	223 224	.00	.00 .00	.00	υ. 0
	1	0610	75	.00	.00	.00	1.	•	1	1840	225	.00	.00	.00	0. 0.
	ì	0615	76	.00	.00	.00	j.		î	1845	226	.00	.00	.00	0.
	1	0620	22	.00	.00	.00	0.	•	1	1850	227	.00	.00	.00	0.
	1	0625	78	.00	.00	.00	0.	•	1	1855	228	.00	.00	.00	0.
	1	0630	79	.00	.00	.00	0.	•	1	1900	229	.00	.00	.00	0.
	3	0635	90 01	.00	.00	00	0.		1	1905	230	.00	.00	.00	0.
	1 1	0540 0545	81 82	.00 .00	.00	.00 .00	0. 0.	:	1 1	1910 1915	$\frac{231}{272}$.00	.00	.00	0. 0.
	•	0.7,13	J.,	,	.00	.00	٠.		•	,		. 01/	.00	.00	U.

0650 83 .00 .00 .00 1920 233 . 00 .00 0. 1 0655 84 .00 .00 .00 0. 1925 234 .00 .00 .00 0700 85 .00 .00 .00 1930 235 0. .00 .00 .00 0. 0705 86 .00 .00 .00 1935 236 - 90 .00 .00 0. 0710 67 .00 .03 . 00 1940 237 - 60 .00 .00 0715 88 .00 .00 .00 0. 1945 239 . 20 .00 .00 0. 0720 89 .00 .00 1950 239 .00 .00 0. . 50 .00 0. 0725 90 .00 1955 240 . 00 ٥. 91 0730 .00 .00 .00 0. 2000 241 . 00 .00 .00 0735 92 .00 .00 .00 0. 2005 212 .00 .00 .00 0. 0740 93 .00 .00 0. 2010 243 .00 .00 .00 0. 0745 94 .00 .00 .00 0. 2015 244 .00 .00 95 0. .00 0750 .00 .00 .00 2020 245 .00 .00 0 0755 216 96 .00 .00 .00 2025 . 00 ٥. . 00 . 00 o. 0800 97 .00 2030 .00 .00 .00 0. 0805 98 .00 .00 .00 0. 2035 248 .00 .00 . 00 0810 çy .00 .00 .00 0. 2040 249 -00 .00 . 00 0. 0815 100 .00 .00 .00 2045 250 .00 0. .00 .00 0. 0820 101 .00 .00 .00 2050 251 . 00 0. 0825 102 .00 .00 .00 Ο. 2055 252 .00 .00 .00 0. 103 .00 .00 253 0930 .00 2100 .00 0. .00 .00 0. .00 0835 .00 .00 0. 2105 254 - 00 .00 .00 0. 0640 105 .00 .00 .00 ٥. 2110 255 . 00 .00 0845 106 .00 .00 .00 ٥. 2115 256 .00 . 00 . 00 0 0850 107 .00 .00 257 .00 Ο. 2120 .00 .00 -00 0. 0855 108 .00 .00 .00 ٥. 2125 253 .00 . 00 .00 0900 109 .00 .00 .00 ٥. 2130 259 .00 .00 0 0905 110 .00 260 .00 .00 2135 ٥. .00 .00 .00 Ú. 0910 111 .00 .00 2140 261 .00 .00 .00 0. 0915 112 .00 .00 .00 0. 2145 262 .00 .00 .00 0920 113 .00 .00 263 .00 0. 2150 .00 .00 .00 0. 111 0925 .00 .00 .00 2155 264 . 00 .00 .00 0. 0930 115 .00 .00 .00 0. 2200 265 .00 .00 266 267 0935 116 .00 . 00 . 0.0 0. 2205 .00 .00 .00 0. 0940 117 .00 .00 2210 .00 .00 0. .00 .00 0. 0945 118 .00 .00 .00 0. 2215 268 .00 .00 .00 0. ٥. 0950 119 .00 .00 .00 2220 269 - 00 . 90 0955 120 .00 .00 .00 0. 2225 270 .00 .00 . 60 121 2230 1000 .00 .00 .00 0. 271 .00 .00 0. .00 1005 122 .00 .00 .00 0. 2235 272 -00 .00 1010 123 .00 . 00 .00 O. 2240 273 .00 . ეე . 00 124 .00 2245 274 .00 .00 1015 ٥. . 00 .00 .00 0. 125 2250 1020 .00 .00 .00 275 .00 .00 .00 0. 276 277 1025 126 .00 . 00 .00 0. 2255 . 00 .00 -00 127 1030 .00 .00 2300 .00 0. .00 .00 . 0.0 0. 1035 128 .00 . 00 .00 2305 278 .00 .00 0. .00 0. 1040 1.29 .00 .00 .00 0. 2310 279 .00 .00 .00 1045 130 . 00 . 00 . 00 0. 2315 280 .00 .00 -00 0. 131 .00 .00 1050 .00 2320 231 0. .00 .00 .00 0. 1055 132 .00 .00 .00 2...25 282 .00 .00 .00 ú. 1100 133 0.0 0.0 0.0 n 2330 วถา 00 .00 . 00 .00 134 .00 1105 .00 2335 284 .00 .00 0. .00 0. 1110 135 .00 .00 .00 2340 285 .00 .00 .00 0. 1115 136 .00 .00 .00 ٥. 2345 286 .00 .00 137 .00 .00 1120 .00 0. 2350 287 .00 .00 .00 Ô. 1125 138 .00 .00 .00 2355 288 .00 0. .00 00 0. 1130 139 .00 .00 .00 0000 289 .00 .00 -00 1135 140 .00 . 00 .00 n 0005 290 .00 .00 .00 0. 141 .00 .00 0010 1140 .00 291 .00 ٥. .00 .00 ů. 1145 142 . იი 0015 .00 .00 .00 .00 ο. 1150 143 .00 . 00 .00 Q. 0020 293 .00 .00 .00 0025 1155 144 .00 .00 294 .00 0. .00 .00 .00 0. .00 1200 .00 .00 0030 295 .00 .00 ٥. .00 0. 1205 146 .00 .00 .00 0. 0035 396 .00 .00 147 3210 .00 .00 .00 0. 0040 297 .00 -00 .00 0. 148 .00 .00 0045 1215 .00 298 .00 ú. -00 .00 Ú. 1220 149 .00 .00 .00 0050 299 .00 .00 0. 1225 150 .00 .00 .00 ٥. 0055 300 .00 .00 .00

3.22. TOTAL LOSS = TOTAL RAINFALL = .44, TOTAL EXCESS = 2.78 PEAK FLOW TIME MAXIMUM AVERAGE FLOW 6-HR 24 - HR 72 - HR 24.92~HR (CFS) (HR) (CFS) 84. 3.08 6. 2.777 1. 2.795 3. 1. 2.795 3. (INCHES) 2.795 (AC-FT)

CUMULATIVE AREA =

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761 KK CPPRIN COMBINE
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702 KO OU

OUTPUT CONTROL VARIABLES

LPRNT 1 PRINT CONTROL

1 PLOT 0 PLOT CONTROL

QSCAL 0. HYDROGRAPH PLOT SCALE

IPNCH 0 PUNCH COMPUTED HYDROG

PNCH 0 PUNCH COMPUTED HYDROGRAPH IOUT 21 SAVE HYDROGRAPH ON THIS UNIT

.02 SQ MI

1 FIRST ORDINATE PUNCHED OR SAVED 300 LAST ORDINATE PUNCHED OR SAVED .083 TIME INTERVAL IN HOURS ISAVI ISAV? TIMINT

COMBINE ROUTED ROUTED ASLDCHNL WITH ASLD2

704 RC

HYDROGRAPH COMBINATION
2 NUMBER OF HYDROGRAPHS TO COMBINE

HYDROGRAPH AT STATION CPPRIN SUM OF 2 HYDROGRAPHS

******					*****				*****		*****	******		******		**********
DA MON	HRMN	ORI)	FLOW	•	DA MON	нгми	ORD	FLOW *	DA MON	HKMN	ORD	FLOW	*	DA MON HRM	n ord	FLOW
1	0000	1	0.		1	0615	76	69. •	1	1230	151	6.	:	1 184	5 226	1
1	0005	2	0.	•	1	0620	77	66. +		1235	152	6.	•	1 185		1.
1	0010	3	0.	•	ı	0625	78	62. •		1240	153	6.	•	1 195		1.
I	0015	-1	0.	•	1	0630	79	59. •	1	1245	154	5.	*	I 190		1.
1	0020	5	0. 0.	•	1	0635	80	56.		1250	155	5.	*	1 190		1.
1 1	0025 0030	6 7	1.		1 1	0640 0645	91 82	53.		1255 1300	156 157	5.	:	1 191 1 191		1.
î	0035	8	1.		1	0650	83	51. • 48. •		1305	158	5. 5.		1 191 1 192		1. 1.
1	0040	9	1.	*	ì	0655	84	16.		1310	159	5.	*	1 192		1.
1	0045	10	2.	•	1	0700	85	44. *		1315	160	5.		1 193		1.
1	0050	11	2.	*	1	0705	86	42.	1	1320	161	5.	٠	1 193		1.
1	0055	12	3.	•	1	0710	87	40. *		1325	162	4.	•	1 194		1.
1	0100	13	5.	•	1	0715	88	39.		1330	163	4.	•	1 194		1.
1	0105 0110	14 15	8. 9.	•	1 1	0720	89	37. *		1335	164	4.	•	1 195		1.
1 1	0115	16	10.		1	0725 0730	90 91	36. 34.		1340 1345	165 166	4.		1 195 1 200		1.
î	0120	17	11,	*	î	0735	92	33.		1350	167	4.		1 200		1. 1.
ī	0125	18	12.	•	ī	0740	93	32.		1355	168	4.		1 201		1.
1	0130	19	12.	*	1	0745	94	31. *		1400	169	4.	•	1 201		1.
1	0135	20	13.	•	1	0750	95	30. •	1	1405	170	4.	•	1 202		1.
1	0140	21	14.	•	1	0755	95	29. •		1410	171	4.	•	1 202		1.
1	0145	22	15.	•	1	0800	97	28.		1415	172	4.	•	1 203		1.
1	0150	23	16.		1	0805	98	27.		1420	173	Э.	*	1 203		1.
1 1	0155 0200	24 25	17. 19.		1 1	0810 0815	99	26.		1425	174	3.	•	1 204		1.
ì	0205	26	20.		1	0820	100	25. • 24. •		1430 1435	175 176	3. 3.		I 204 1 205		1.
i	0210	27	21.		í	0925	102	23. *		1440	177	3.		1. 205		1. 1.
1	0215	28	23.	*	1	0830	103	23. •		1445	178	3.		1 210		1.
ı	0330	29	24.	•	1	0835	104	22. •	1	1450	179	3.	•	1 210		1.
)	0225	30	26.	٠	1	0840	105	21.		1455	180	3.	٠	1 211	0 255	1.
1	0230	31	28.	*	1	0815	106	21.		1500	181	3.	*	1 211		1.
1	0235	32	32.		1	0850	107	20. 4		1505	182	3 -	*	1 212		1.
1	0240 0245	33 34	40. 53.	-	1 1	0855 0900	108 109	19. * 19. *		1510 1515	183 184	3. 3.		1 212		1.
3	0250	35	72.		i	0905	110	18.		1520	185	3.		1 213 1 213		1. 1.
ī	0255	36	106.		ī	0910	111	18. *		1525	186	3.		1 214		1.
1	0300	37	164.	•	1	0915	112	17. *		1530	187	3.	•	1 214		1.
1	0305	38	314.	•	1	0920	113	17. *	1	1535	188	2.	*	1 215		1.
1	0310	39	351.	*	1	0925	114	1€. *	1	1540	189	2.	*	1 215	5 264	1.
1	0315	40	336.	•	1	0930	115	16. •		1545	190	2.	•	1 220		0.
j	0320	11	314.	•	1	0935	116	15.	l	1550	191	2.	•	1 220		Ο.
1 ใ	0325 0330	42 43	294. 277.		1 1	0940 0945	117 118	15.	1 1	1555 1600	$\frac{192}{193}$	2. 2.		1 221		0.
i	0335	44	257.	*	1	0950	119	14. * 14. *		1605	194	2.		1 221 1 222		0. 0.
ĵ	0340	45	236.		ì	0955	120	13.	ī	1610	195	2.		1 222		O.
1	0345	46	217.	•	1	1000	121	13. *	1	1615	196	2.		1 223		ð.
1	0350	47	198.	*	1	1005	122	13. *	1	1620	197	2.	•	1 223		0.
1	0355	48	183.	*	1	1010	123	12. *	1	1625	198	2.	•	1 224	0 273	0.
1	0400	19	171.	*	1	1015	124	12.	1	1630	199	2	•	1 224		0.
1	0405	50	161.	•	1	1020	125	12.	1	1635	200	2.	*	1 225		0.
1	0410 0415	51 52	153. 147.	-	l 1	1025	126 127	11. *	1 1	1640 1645	201 202	2. 2.	:	1 225 1 230		0
ĵ	0420	53	141.		1	1035	129	11.	1	2650	203	2.		1 230		0. 0.
ī	0425	54	137.	•	ī	1040	129	10.	ì	1655	204	2.	•	1 231		0.
1	0430	55	132.	٠	1	1045	130	10.	1	1700	205	2.	٠	1 231		O.
1	0435	56	128.	*	1	1050	131	10. •	1	1705	206	2.	*	1 232	0 261	0.
1	0440	57	125.	*	1	1055	132	10. *	1	1710	267	2.	*	1 232		Ú.
1	0445	58	122.	*	1	1100		9, •	1	1715		2.	•	1 233		o.
1	0450 0455	59 60	118. 115.		1 1	1105 1110		9. *	1	1720	209	2.	•	1 233		0.
1	0500	61	111.		1	1115	135 136	9. + 9. +	1	1725 1730	210 211	2. 1.	:	1 234 1 234		ø.
ĩ	0505	62	108.		ì	1120	137	8. •	î	1735	212	1.		1 234 1 235		O.
1	0510	63	104.	•	1	1125	138	3 *	1	1740	213	1.	•	1 235		0.
1	0515	64	101.	•	1	1130	139	8. *	1	1745	214	1.	٠	2 000		Õ,
1	0520	65	98.	•	1	1135	140	8. •	1	1750	215	1.	•	2 000		o.
ı	0525	66	95.	•	1	1110	141	8. •	1	1755	216	1.	•	2 001	0 291	0.
1	0530	67	92.	•	י	1145	142	7. •	2	1800	217	1.	•	2 001		0.
1	0535	68	90.	•	1	1150	143	7. •	1	1805	218	1.	•	2 002		0.
1	0540 0545	69 70	87.	•	1	1155	144	7. *	1	1810	219	1.		2 002		0.
1	0550	70 71	84. 82.		l l	1200 1205	145 146	7. •	1	1815 1820	220	1. 1.	•	2 003		0.
1	0555	72	80.		1	1210	147	6.	Ţ	1825	223 222	1.		2 003 2 004		0.
î	0600	73	77	•	1	1215	148	6 •	1	1930	223	1.		2 004		0. 0.
1	0605	7.1	75.	•	1	1220	149	6. *	1	1835	224	1.	*	2 005		0.
3	0610	75	72.	٠	1	1225	150	6. •	1	1810	225	1.	•	2 005		٥.
				•									•			

PEAK FLOW TIME

(HR)

MAXIMUM AVERAGE PLOW 24-HR 72-HR

6-108

24.92-HR

(CFS) 29, 2.003 60. 351. 3.17 105. (INCHES) 1.744 2.002 2.003 60. 52. (AC-FT)

> CUMULATIVE AREA = .56 SQ MI

R33C.2 705 KK

OUTPUT CONTROL VARIABLES
IPRNT 1 706 KO

IPRINT 1 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE
RETRIEVE DIVERTED PIPE FLOW

RETRIEVE DIVERSION HYDROGRAPH 708 DR

D33C.2 DIVERSION HYDROGRAPH IDENTIFICATION ISTAD

HYDROGRAPH AT STATION R33C.2

		****	********		*****	******	****	*********		* * * * * * * * * *	****	*******	+++			****	********
				•					•				•				
DA	MON HRMN	ORD	FLOW	•	DA 1	ON HRMN	ORD	PLOW	• DA	MON HRMN	ORD	FLOW	•	DA MON I	IRMN	ORD	FLOW
				٠					*				*				
1	0000	2	٥.	•	1	0615	76	9.	. 1	1230	151	0.	•	1 1	845	226	0.
1	0005	2	0.	•	1	0620	77	8.	• 1	1235	152	0.	•	1 3	.850	227	0.
1	0010	3	0.		1.	0625	78	7.	• 1	1240	153	0.			.855	228	0.
1	0015	4	0.	*	1	0630	79	6.	+ 1	1245	154	0.	•		900	229	0.
1	0020	5	0.	*	1	0635	80	5.	+ 1	1250	155	0.	•		905	230	0.
1	0025	G	0.	•	1	0640	81	5.	• 1	1255	156	ø.	*		910	231	0.
1	0030	7	0.	•	1	0645	82	4.	• 1	1300	157	0.			915	232	0.
1	0035	8	0.		1	0650	83	4.	* 1	1305	158	0.	•		920	233	0.
1	0040	9	0.		1	0655	84	3.	• 1	1310	159	0.	•		925	234	o.
1	0045	10	0.	*	1	0700	85	3.	* 1		160	0.			1930	235	0.
1	0050	11	0.		1	0705	86	2.	* 1	1320	161	o.			935	236	0.
1	0055	12	0.	•	1	0710	87	2.	. 1	1325	163	0.			940	237	ů.
ī	0100	13	o.	•	î	0715	88	2.	1	1330	163	0.			945	238	0.
1	0105	14	1.		1	0720	89	2.	• ī	1335	164	Ö.			950	239	0.
1	0110	15	1.		î	0725	90	1.	• î		165	0.			1955	240	0.
î	0115	16	1.		1	0730	91	1.	• 1	1345	165	0.		-	2000	241	0.
î	0120	17	2.	•	ī	0735	92	1.	• î	1350	167	0.			2005	242	0.
1	0125	13	2.		1	0740	93		• 1	1355	163						
1	0130	19	2.		ì			1.	• 1			0.			010	243	0.
1	0135	20	3.		ì	0745 0750	94 95	1.	- 1 - 1	1400 1405	169 170	0.	÷		2015	244	0.
				-				3.					-		3020	245	0.
1	0140	21	3.	Ī	1	0755	96	1.	. 1	1410	171	0.			2025	246	0.
1	0145	22	3.	-	1	0800	97	1.	1	1415	172	0.			3030	247	0.
1	0150	23	3.	-	1	0805	98	1.	* 1	1420	173	0.	•		2035	248	٥.
1	0155	24	3.	-	1	0810	99	0.	- 1	1425	174	0.	*		2040	249	0.
2	0200	25	4.	•	1	0815	100	ύ .	* 1		175	0.	*		045	250	0.
1	0205	26	4.	•	1	0820	101	٥.	* 1	1435	176	0.	*		2050	251	0.
1	0210	27	4.	•	1	0825	102	0.	• 1	1440	177	0.	•		2055	252	0.
1	0215	23	5.	*	1	0830	103	0.	* 1	1445	178	0.	•		2100	253	0.
1	0550	29	5.	•	1	0835	104	0.	• 1		179	Ο.	*		2105	254	0.
1	0225	30	5.	•	1	0840	105	Ú.	• 1		150	υ.	*		5110	255	Ű.
1	0230	31	6.	•	1	0845	106	0.	• 1	1500	181	0.	•		2115	256	0.
1	0235	33	6.	•	1	0850	107	0.	* 1		182	0.	•		2120	257	0.
1	0240	33	8.	•	1	0855	108	0.	* 1		183	٥.	•		2125	258	0.
1	0245	34	10.	•	1	0900	109	0.	• 1		184	0.	*	1 2	2130	259	0.
1	0250	35	11.	•	1	0905	110	٥.	* 1	1520	185	0.	•	1 2	2135	260	0.
1	0255	36	13.	•	1	0910	111	0.	* l		186	0.	٠	1 2	2140	261	0.
1	0300	37	15.	•)	0915	112	0.	* 1.	1530	137	0.	•	1 2	2145	262	0.
1	0305	38	17.	*	1	0920	113	0.	• 1	1535	138	0.	•	1 2	2150	263	0.
1	0310	39	46.	*	1	0925	114	0.	* 1	1540	189	0.	*	1 2	2155	264	0.
1	0315	40	96.	*	1	0930	115	σ.	• 1	1545	190	0.	•	1 2	200	265	0.
ı,	0320	41	108.	*	1	0935	116	0.	. 1	1550	191	O.	*	1 :	205	266	Ο.
1	0325	42	105.	•	1	0940	117	0.	• 1	1555	192	0.	*	1 :	2210	267	0.
1	0330	43	96.	*	1	0945	118	٥.	* 1		193	0.	*	1	2215	268	0.
1	0335	44	86.	*	1.	0950	119	0.	* 1	1605	194	0.	•	1	2220	269	٥.
1	0340	45	75.	٠	1	0955	120	0.	• 1	1510	195	0.	•	1 2	2225	270	0.
1	0345	46	63.	•	1	1000	151	0.	• 1	1615	196	0.	•	1 :	2230	271	0.
1	0350	17	52.		1	1005	122	0.	* 1	1620	197	0.	•	1	2235	272	0.
1	0355	43	44.	*	1	1010	123	0.	. 1	1625	198	0.	٠	1	240	273	0.
1	0400	4.9	37.	•	1	1015	124	0.	* 1	1630	199	0.	٠	1	2245	274	٥.
1	0405	50	31.	*	1	1020	125	0.	1	1635	200	0.	*	1	2250	2.75	0.
1	0410	51	27.	•	1	1025	126	0.	1	1640	201	0.	*	1 :	2255	276	0.
1	0415	52	24.	•	1	1030	127	0.	• 1	1645	203	0.	•	1 :	2300	277	0.
1	0420	53	22.	•	3	1035	128	0.	* 1	1650	203	0.	٠	1	2305	278	0.
1	0425	54	19.	•	1	1040	129	0.	- 1	1655	204	ð.	•		2310	279	ō
1	0430	55	18.	•	1	1045	130	0.	• 1	1700	205	0.	*		2315	280	Ō.
1	0435	56	18.	•	1	1050	131	0.	•]		206	0.	*		2320	281	0.
1	0410	57	17.	٠	1	1055	132	Ö.	* 1	1710	207	0.	٠		2325	282	o.
1	0445	58	17.		1	1100	133	0.	• 1		208	0.	•		2330	283	0.
1	0450	59	17.	•	1	1105	134	0.	• 1		505	0.			2335	284	ů.
1	0455	60	16.	•	1	1110	135	0.	• ī	1725	210	Ö.	*		2340	285	0.
1	0500	61	16.		1	1115	136	Ü.	· 1		211	ő.			2315	286	Ğ.
3	0505	62	16.	4	3	1120	137	0	. 1		212	0.			2250	287	ő.
,	0510	63	1.5.		í	1125	133	0.	• î			0.			2355	288	ű.
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0515
                                             1130
                                                   139
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   3
          0520
0525
                 6.5
                           14.
                                             1135
                                                   140
                                                                                 1750
                                                                                       215
                                                                                                                    0005
                                                                                                                          290
                 66
                           14.
                                             1140
                                                   141
                                                                                 1755
                                                                                       216
                                                                                                   0.
                                                                                                                    0010
                                                                                                                          291
                                                                                                                                      0.
          0530
                                                                                       217
                                                   1.42
                                                                                 1800
                                                                                                                    0015
                                                                                                                          292
                                             1145
                                                                                                                                      ο.
          0535
                 68
                           13.
                                                                                 1805
                                                                                       218
                                                                                                                    0020
                                                                                                                          293
                                             1150
                                                                                                                                      ø.
          0540
                 69
                           13.
                                             1155
                                                   144
                                                                                 1810
                                                                                       219
                                                                                                   0.
                                                                                                                    0025
                                                                                                                          294
          0545
                 70
                           12.
                                                                                 1815
                                             1200
                                                   145
                                                                                       230
                                                                                                   0.
                                                                                                                    0030
                                                                                                                          295
                                                                                                                                      0.
          0550
                           12.
                                                                                       221
                                             1205
                                                   146
                                                                                1820
                                                                                                                    0035
                                                                                                                          296
                                                                                                                                      0.
          0555
                 72
                           12.
                                             1210
                                                   147
                                                                                 1825
                                                                                       222
                                                                                                                    0040
                                                                                                                          297
          0600
                 73
                                             1215
1220
                           11.
                                                   148
                                                                                1830
                                                                                       223
                                                                                                   ٥.
                                                                                                                    0045
                                                                                                                          298
          0605
                                                                                       224
                                                                                                                    0050
                                                                                                                          299
                                                                                 1835
                                                                                                   0.
                                                   149
                                                                                                                                      ٥.
          0610
                 75
                           10.
                                                                                 1840
                                                                                       225
                                             1225
                                                   150
                                                                                                                    0055
PEAK FLOW
               TIME
                                               MAXIMUM AVERAGE FLOW
                                       6-HR
                                                  24-HR
                                                               72 - HR
                                                                          24.92-HR
  (CFS)
               (HR)
                           (CFS)
    106.
               3.33
                                       20.
                        (INCHES)
                                       .329
                                                    .333
                                                                               .333
                                                                 .333
                         (AC-FT)
                                                                               10.
                                       10.
                                                    10.
                                                                 10.
                         CUMULATIVE AREA =
                                                .00 SO MI
                  S40WT
709 KK
                                     SUB
710 KO
                 OUTPUT CONTROL VARIABLES
                                        1 PRINT CONTROL
                        1 PLOT
                                        0 PLOT CONTROL
                                       ٥.
                           CAL 0. HYDROGRAPH PLOT SCALE
SUB BAST OF SCOTTSDALE RD, FLOWING DIRECTLY INTO SCOTTSDALE RD
                        OSCAL
                           CULVERT, TAKES SCOTTS RD HALF ST AND SCENIC CORRIDOR
               SUBBASIN RUNOFF DATA
                 SUBBASIN CHARACTERISTICS
713 BA
                       TAREA
                                     .01 SUBBASIN AREA
                 PRECIPITATION DATA
 24 PH
                                         DEPTHS FOR G-PERCENT HYPOTHETICAL STORM
                    ... нүрко-35 .
                                          ..... TP-40 ....
                 5-MIN 15-MIN 60-MIN
                                            2-HR
                                                    3 - HF.
                                                             6-HR
                                                                     12-HR
                                                                             24-HR
                                                                                      2-DAY
                                                                                             4-DAY 7-DAY 10-DAY
                          1.50
                                                                      .00
                                                                               .00
                                                                                                .00
                                                                                                        .00
                   .76
                                   2.54
                                            2.81
                                                    2.99
                                                             3.33
                                                                                        .00
                                                     STORM AREA = 14.00
714 LS
                 SCS LOSS RATE
                       STRTL
                                       .60 INITIAL ABSTRACTION
                      CRYMER
                                    77.00
                                            CURVE NUMBER
                       RTIMP
                                    39.00 PERCENT IMPERVIOUS AREA
                 KINEMATIC WAVE
715 UK
                   OVERLAND-FLOW ELEMENT NG. 1
                                      50. OVERLAND FLOW LENGTH
                            s
                                     .0100
                                            SLOPE
                            N
                                      . 050
                                            ROUGHNESS COEFFICIENT
                           PΛ
                                            PERCENT OF SUBBASIN
                                    100.0
                       DXMIN
                                           MINIMUM NUMBER OF DX INTERVALS
                 KINEMATIC WAVE
716 RK
                   MAIN CHANNEL
                                            CHANNEL LENGTH
                                     600.
                                     .0100
                                            SLOPE
                            N
                                            CHANNEL ROUGHNESS COEFFICIENT
                                     .015
                                            CONTRIBUTING AREA
                                       .01
                       SHAPE
                                            CHANNEL SHAPE
                           WD
                                     4.50
                                            BOTTOM WIDTH OR DIAMETER
                                      .00
                                            SIDE SLOPE
                      NIMXCIN
                                            MINIMUM NUMBER OF DX INTERVALS
                      RUPSTO
                                       NO
                                            ROUTE UPSTREAM HYDROGRAPH
                                         COMPUTED KINEMATIC PARAMETERS
                                             VARIABLE TIME STEP
(DT SHOWN IS A MINIMUM)
                    ELEMENT
                                AL ÞHA
                                                       DT
                                                                  DX
                                                                            PEAK
                                                                                     TIME TO
                                                                                                  VOLUME
                                                                                                             MEMICKAM
                                                                                       PEAK
                                                                                                             CELERITY
                                                                  (FT)
                                                                            (CPS)
                                                      (MIN)
                                                                                      (MIN)
                                                                                                   (IN)
                                                                                                              (FPS)
                   PLANET
                                  2.98
                                             1.67
                                                          .43
                                                                  10.00
                                                                             41.73
                                                                                       184.84
                                                                                                    3.00
                                                                                                              12.50
                                                                 200.00
                                  5.89
                                             1.25
                                                          .33
                                                                             11.72
                                                                                       184.75
                                                                                                    3.00
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HYDROGRAPH AT STATION S40WT

DΑ	MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	•	DΛ	MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
ì	0000	1	.00	.00	.00	0.	•	1	1230	151	.00	. 00	.00	٥.
1	0005	3	.01	.00	.01	0.	•	1	1235	152	.00	.00	. 20	0.
1	0010	3	.01	.00	.01	0.		1	1240	153	.00	.00	. 90	0.
1	0015 0020	4 5	.01 .01	.00	. 01	0. 0.	•	1 1	1245 1250	154 155	. 00	.00	- 00	٥.
ì	0025	6	.01	.00	.01 .01	0.	Ţ	1.	1255	156	.00 .00	.00	.00	0. 0.
ī	0030	7	.01	.00	.01	ű.	•	1	1300	157	.00	.00	.00	0.
1	0035	8	.01	.00	.01	0.	•	1	1305	153	.00	.00	-00	0.
1	0040	9	.01	. 30	.01	٥.	•	1	1310	159	.00	.00	. 00	ø.
1	0045	10	.01	.00	.01	0.	•	1	1315	160	.00	.00	.00	0.
1	0050	11	.01	.00	.01	0.	•	1	1320	161	.00	.00	.00	0.
1	0055 0100	12 13	.01 .01	.00	.01 .01	0. 0.		1 1	1325 1330	162 163	.00	.00	.00 -00	0. 0.
ì	0105	14	.01	.00	.01	o.		1	1335	164	.00	.00	.00	0.
1	0110	15	.01	.00	.01	o.	*	1	1340	165	.00	.00	.00	0.
1	0115	16	.01	.00	.01	0.	*	1	1345	166	.00	.00	.00	Ö.
1	0120	17	.01	.00	.01	1.	*	1	1350	167	.00	.00	- 00	0.
1	0125	18	.01	.00	.01	1.	•	1	1355	168	.00	.00	- 00	0.
1 1	0130 0135	19 20	.01 .01	.00	.01	1.	-	1	1400	169	.00	.00	.00	0.
1	0140	21	.01	.00	.01 .01	1. 1.		1. 1	1405 1410	170 171	.00	.00	.00	0. 0.
1	0145	22	.02	.00	.01	1.		î	1415	172	.00	.00	.00	0.
1	0150	23	.02	.00	.01	1.	*	1	1420	173	,00	. 00	.00	0.
1	0155	24	.02	.00	.02	1.	•	1	1425	174	.00	.00	.00	0.
1	0200	25	.02	.00	.02	ι.	•	1	1430	175	.00	.00	. 00	0.
1	0205	26	.02	.00	02	1.	•	1	1435	176	.00	.00	-00	0.
1	0210 0215	27 28	.02	.00	.02	1.	•	1. 1	1440	177	.00	.00	.00	0.
1	0220	29	.02 .02	. 00 . 00	.02 .02	1. 1.		1	1445 1450	179 179	.00	. 00 . 00	.00 .00	ø.
1	0225	30	.03	.00	.02	1.		1	1455	180	.00	.00	.00	0. 0.
ı	0230	31	.03	.00	.03	ī.	*	1	1500	181	.00	.00	- 00	ö.
1	0235	32	.08	.01	.07	3.	*	1	1505	182	.00	.00	.00	0.
I	02:0	33	.09	-01	.08	4.	•	1	1510	183	.00	.00	. 00	0.
1	0245	3.4	.10	.01	.09	4.	*	1	1515	184	.00	.00	. 00	0.
1	0250 0255	35	.14	.01	.12	6.	•	1	1520	185	.00	.00	.00	0.
1 1	0300	36 37	.18 .40	. 02 . 03	.16	8. 18.		1	1525 1530	186 187	.00	.00	.00	0. 0.
ĵ	0305	38	.69	- 04	.65	31.	*	î	1535	188	.00	.00	.00	0.
1	0310	39	.28	.01	. 26	13.		1	1510	159	.00	.00	.00	0.
1	0315	40	. 15	. 01	.15	7.	•	1	1545	190	.00	.00	.00	٥.
1	0320	41	.11	. 00	.10	5.	•	3	1550	191	.00	.00	.00	0.
1	0325	42	. 0.9	.00	.09	4.	•	1	1555	192	. 00	.00	. 00	0.
1	0330 0335	43	- 08	.00	.08	4.	•	1	1600	193	.00	.00	. 00	o.
1	0340	44 45	.03	.00	.03 .03	2. 1.		1	1605 1610	194 195	.00	.00	.00	0.
ī	0345	46	.03	.00	.03	1.	*	1	1615	196	.00	.00	.00	0. 0.
ì	0350	47	.02	.00	.02	ī.	•	ı	1620	197	.00	.00	.00	0.
1	0355	48	.02	.00	.02	1.	•	ı	1625	198	.00	.00	.00	0.
1	0400	49	.02	.00	.02	1.	•	1	1630	199	.00	.00	.00	0.
1	0405	50	.02	.00	.02	ı.		1	1635	200	.00	.00	.00	0.
1	0410 0415	51 52	.02	.00	.02 .02	1. 1.		1 1	1640 1645	201 202	.00	.00	.00	Ü.
î	0420	53	.02	.00	.02	1.	•	î	1650	203	.00	.00	.00	0. 0.
1	0425	54	.02	.00	.01	î.	•	1	1655	204	.00	.00	.00	0.
1	0430	55	.01	.00	.01	1.	•	1	1700	205	.00	.00	.00	0.
1	0435	56	.01	.00	.01	1.	•	1	1705	206	.00	.00	.00	0.
2	0410	57	.01	.00	.01	1.	•	1	1710	207	.00	.00	.00	Û.
1	0445	58	.01	.00	.01	1.	•	1	1715	208	.00	.00	.00	0.
1 1	0450 0455	59 60	.01 .01	.00	.01 .01	1. 1.	-	1 1	1720 1725	209 210	.00	.00 .00	.00	0.
ĺ	0500	61	.01	.00	.01	1.	•	ì	1730	211	.00	.00	.00	0. 0.
ī	0505	62	.01	. 00	. 01	1.		1	1735	212	.00	.00	.00	0.
1	0510	63	.01	.00	.01	0.	*	1	1740	213	.00	.00	.00	0.
1	0515	64	.01	. 00	.01	o.	•	1	1745	214	.00	.00	.00	0.
1	0520	65 66	.01	.00	.01	0.		1	1750	215	.00	.00	.00	0.
1	0525 0530	66 67	. 01. . 01.	.00	.01	0. 0.		1	1755 1800	216 217	.00	.00	.00	0.
1	0535	68	.01	.00	.01 .01	0.		1	1805	218	.00	.00	.00	0. 0.
1	0540	69	.01	.00	.01	0.	•	ï	1810	219	.00	.00	.00	0.
1	0545	70	.01	.00	.01	0.	•	1	1815	220	.00	.00	.00	ō.
1	0550	71	.01	.00	.01	0.	•	1	1820	221	.00	.00	.00	0.
1	0555	72	.01	.00	.01	0.	•	1	1825	222	.00	0.0	.00	٥.
1	0600	73	.01	.00	.01	0.		1	1830	223	.00	.00	.00	0.
1	0605 0610	74 75	.00	.00	.00	0.	•	1 1	1835	224	.00	.00	.00	0.
1	0615	76	.00	.00 .00	.00 .00	0. 0.	÷	1	1840 1845	225 226	.00	.00	.00	0.
1	0620	77	.00	.00	.00	0.	•	ı	1850	227	.00	.00	.00	0. 0.
ī	0625	78	.00	.00	.00	õ.	•	î	1855	228	.00	.00	.00	0.
ī	0630	79	.00	.00	.00	Õ.	•	1	1900	229	.00	.00	.00	0.
1	0635	80	.00	.00	.00	0.	•	1	1905	230	.00	.00	.00	o.
1	0640	91	.00	.00	.00	0.	•	1	1910	231	.00	.00	.00	0.
1	0645	82	.00	.00	. 00	0.	•	1	1915	232	.00	.00	.00	0.
ì	0650	83 84	.00	.00	.00	0.		,	1920	233	.00	.00	.00	0.
1 1	0655 0700	84 85	.00	.00	.00 .00	0. 0.		1 1	1925 1930	234 235	.00	.00	.00	0.
I	0705	86	.00	.00	.00	0.	•	1	1935	236	. 00	.00 00	.00 .00	0. 0.
1	0710	87	.00	.00	.00	Ü.	•	1	1940	237	.00	.00	.00	0.
1	0715	88	.00	.00	.00	0.	•	ı	1945	238	.00	.00	.00	0.
1	0.750	89	00	.00	.00	0.	•	l.	1950	239	.00	.60	.00	ŭ.
1	0725	90	0.0	.00	.00	0.		ì.	1955	240				

1	ù730	91	.00	.00	.00	δ.	L	1	2000	241	.00	.00	.00	9.
1	0735	92	.00	.00	.00	O.	•	1	2005	242	.00	.00	.00	9.
1	0740	93	.00	.00	. 00	G.	4	1	2010	243	.00	.00	0.0	ō.
1	0745	94	.00	.00	.00	ű.	•	ı	2015	244	.00	.00	.00	o.
1	0750	95	.00	. 00	.00	G.		2	2020	245	.00	.00	. 00	o.
1	0755	96	.00	.00	.00	Ο.	•	ı	2025	246	.00	.00	.00	o.
ī	0800	97	.00	.00	.00	o.	•	1	2030	247	.00	.00	.00	0.
ī	0805	98	.00	.00	.00	ů.		î	2035	248	. 00	.00	.00	0.
1	0310	99	.00	.00	.00	o.	_	ì	2040	249	.00	.00	.00	0
i	0815	100	.00	.00	.00	0.		1.	2045	250	.00	.00	.00	
1	0820	101	.00	.00	.00	0.		1	2050	251	.00	.00	.00	0.
1	0825	102	.00	.00	.00	0.		1	2055	252	.00	.00		0.
		102	.00	.00			_			253			.00	0.
1		104			.00	o.	-	1	2100		.00	.00	.00	0.
1	0835		.00	.00	. 00	٥.	•	1	2105	254	. 00	.00	. 00	0.
1		105	.00	.00	.00	٥.	*	1	2110	255	.00	.00	.00	0.
1	0345	106	.00	.00	.00	٥.	-	1	2115	256	.00	.00	.00	o .
1	0850	107	.00	.00	.00	0.	•	1	2120	257	.00	.00	.00	0.
1	0855	108	.00	.00	.00	ο.	•	1	2125	258	.00	.00	.00	0.
1		109	.00	.00	.00	0.	•	1	2130	25%	.00	.00	.00	0.
1		110	.00	.00	.00	0.	•	1.	2135	260	.00	.00	.00	٥.
1	0910	111	.00	.00	.00	9.	•	1	2140	261	.00	.00	.00	0.
1	0515	112	.00	.00	.00	o.	•	1	2145	262	.00	.00	.00	0.
1	0920	113	.00	.00	.00	٥.		1	2150	263	.00	.00	.00	٥.
1	0925	114	.00	.00	.00	Ο.	•	1	2155	264	.00	.00	.00	0.
1	0930	115	.00	.00	.00	0.	*	1	2200	265	.00	.00	.00	0.
1	0935	116	.00	.00	.00	ο,	•	1	2205	266	.00	.00	.00	0.
1	0940	117	.00	. (10	.00	0.	*	1	2210	267	.00	.00	.00	0.
1	0945	118	.00	.00	.00	ο.	*	1	2215	268	. 00	.00	.00	0.
1	0950	119	.00	.00	.00	0.	*	1	2220	269	.00	.00	.00	0.
1		120	.00	.00	.00	Û.	*	ı	2225	270	.00	.00	.00	Û.
1		121	.00	.00	.00	0.	•	ī	2230	271	.00	.00	.00	0.
ī		122	.00	.00	.00	0.		ī	2235	272	.00	.00	.00	0.
î		123	.00	.00	.00	Ü.		î	2210	273	.00	.00	.00	0.
3		124	.00	.00	.00	0.	*	î	2245	274	.00	.00	.00	0.
1		125	.00	.00	.00	0.		i	2250	275	.00	.00	.00	
1		126	.00	.00	.00	0.		1	2255	276	.00	.00	.00	0.
1		127	.00	. 00	.00	0.	_	1	2300	277	.00	.00		0.
1		128	.00		.00		_		2305	278			.00	0.
1		129	.00	.00	.00	0. 0.	-	1 1			.00	.00	.00	0.
							-	-	2310	279	.00	.00	. 00	0.
1		130	.00	.00	.00	0.		1	2315	290	. 00	.00	-00	0.
1		131	.00	.00	.00	0.		1	2320	281	.00	.00	.00	0.
ı		132	.00	.00	.00	0.	*	1	2325	282	.00	.00	.00	0.
1		133	.00	.00	.00	0.	*	1	2330	283	.00	.00	.00	0.
1		134	.00	.00	.00	0.	•	3.	2335	234	- 00	.00	.00	0.
1		135	.00	.00	.00	0.		1	2340	285	.00	.00	.00	0.
1		136	. 00	. 00	. 00	ο.	*	,1	2345	286	. 00	. 00	.00	0.
1		137	.00	. 00	.00	0.	•	1	2350	287	.00	.00	.00	0.
1		138	.00	.00	.00	0.	•	1	2355	288	.00	.00	.00	0.
1		139	.00	.00	.00	ο.	•	2	0000	289	.00	.00	.00	0.
1	1135	140	.00	.00	.00	0.	*	2	0005	290	. Ծն	.00	. 66	Ù.
1	1140	141	.00	.00	.00	0.	•	3	0010	291	. 00	.00	.00	0.
1		142	.00	.00	.00	0.	•	2	0015	292	. 00	.00	.00	0.
1	1150	143	.00	.00	.00	0.	•	2	0020	293	.00	.00	.00	٥.
1	1155	144	.00	.00	.00	G .	•	2	0025	294	.00	.00	.00	0.
1	1200	145	.00	.00	.00	0.	•	2	0030	295	.00	.00	.00	0
1		146	.00	.00	.00	0.		2	0035	296	.00	.00	.00	Ö.
1		147	.00	.00	.00	o.	*	2	0040	297	.00	.00	.00	0.
ï	1215	148	.00	.00	.00	Õ.	*	2	0045	298	.00	.00	.00	0.
1	1220	119	.00	.00	.00	0.	•	2	0050	299	.00	.00	.00	0.
ī		150	.00	.00	. 33	ű.		2	0055	300	.00	.00	.00	0.
-			•			٥.		-	5.55			. 5 0		٠.

TOTAL RAINFALL = 3.22, TOTAL LOSS = .22, TOTAL EXCESS = 3.00

1	PEAK FLOW	TIME			MAXIMUM AVE	RAGE FLOW	
+	(CFS)	(HR)		6-HR	24 - HR	72-HR	24.92-HR
			(CPS)				
+	31.	3.08		2.	1.	0.	0.
			(INCHES)	3.004	3.013	3.013	3.013
			(AC-FT)	1.	1.	1.	1.

CUMULATIVE AREA = .01 SQ MI

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33C.2 •
717 KK
                             COMBINE
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718 KO OUTPUT CONTROL VARIABLES

OMINGL VARIABLES
RNT 1 PRINT CONTROL
LOT 0 PLOT CONTROL
CAL 0. HYDROGRAPH PLOT SCALE
COMBINED DISCHARGE AT SCOTTSDALE ROAD CULVERT IPRNT IPLOT

720 BC

HYDROGRAPH COMBINATION 2 NUMBER OF HYDROGRAPHS TO COMBINE

		GRD	FLOW	*				-						4			
				•	DA MON	HRMN	ORD	FLOW	מט	MON	HRMN	ORD	FLOW	•	DA MON HRMH	OKD	PLOW
	0000	1	0.		1	0615	76	9. •	1		1230	151	0.	•	1 1845	226	0.
1	0005	2	Ö.	•	ì	0620	77	8. *	î		1235	152	o.	•	1 1850	227	0.
	0010	3	0.	*	1	0625	78	7. •	1		1240	153	Ο.	•	1 1855	228	0.
	0015	4	o.	*	1	0630	79	6. •	1		1245	154	0.	•	1 1900	229	0.
	0020 0025	5 6	0. 0.	*	1 1	0635 0640	80 81	5. • 5. •	1		1250 1255	155 156	0. 0.	•	1 1905 1 1910	230	0.
	0030	7	0.	4	1	0645	82	1. *	ı l		1300	157	0.		1 1910 1 1915	231 232	0. 0.
	0035	8	٥.	•	ī	0650	83	4.	ī		1305	156	Ű.	*	1 1920	233	0.
	0040	9	0.	•	1	0655	84	3. *	1		1310	159	0.	•	1 1925	234	0.
	0045	10	0.		ì	0700	85	2.	1		1315	160	ο.	•	1 1930		0.
	0050 0055	11 12	0. 0.		1 1	0705 0710	86 37	2. * 2. *	1 1		1320 1325	161 162	0. 0.	÷	1 1935 1 1940		0.
	0100	13	1.		1	0715	88	2.	1		1330	163	0.		1 1945	238	0. 0.
	0105	14	1.	•	1	0720	89	2.	1		1335	164	0.		1 1950	239	Ö.
	0110	15	2.	*	1	0725	90	1. •	1		1340	165	ø.	•	1 1955	240	0.
	0115	16	2.	*	1	0730	91	1. *	1		1345	166	0.	*	1 2000	241	0.
	0120 0125	17 18	2. 3.	•	1 1	0735 0740	92 93	1. *	1		1350 1355	167 168	0. 0.	•	1 2005 1 2010	242 243	0.
	0130	19	3.	•	1	0745	94	1.	1		1400	169	0.	-	2015	244	0. 0.
	0135	20	3.	•	1	0750	95	a. •	1		1405	170	0.	•	1 2020		o.
	0140	21	3.	•	1	0755	96	1. *	1		1410	171	υ.	•	1 2025		0.
	0145	22	4.	*	1	0900	97		1		1415	172	0.	•	1 2030		0.
	0150 0155	23 24	4.	•	1 1	0805 0810	98 99	3. * 6. *	1 1		1420 1425	173 174	0. 0.	-	1 2035 1 2040	248 249	0, 0.
	0200	25	5.		1	0815	100	0.	1		1430	175	0.		1 2015		0.
	5205	26	5.	*	1	0820	101	0. •	1		1435	176	0.	•	1 2050	251	o.
	9210	27	5.	*	1	0825	102	0. •	1		1440	177	0.	*	1 2055	252	0 -
	0215	28	6.	*	1	0830	103	0. *	1		1445	178	0.	:	1 2100		0.
	0220 0225	29 30	6. 6.		1 1	0835 0840	104 105	o. •	1		1450 1455	179 180	0. 0.		1 2105 1 2110	254 255	0. 0.
	0230	31	7.	*	î	0845	106	ŏ. +	î		1500	181	0.	•	1 2115		0.
	0235	32	9.	*	1	0850	107	0. •	1		1505	182	0.	•	1 2120		o.
	0240	33	11.	•	1	0855	108	ŋ. •	1		1510	183	0 -	*	1 2125	258	0 -
	0245	34	14. 17.	•	1	0900	109	0.	1		1515	184	٥.		1 2130		0.
	0250 0255	35 36	21.		1 1	0905 0910	110 111	0. *	1		1526 1525	185 186	0. 0.	-	1 2135 1 2140		0. 0.
	0300	37	33.	•	ì	0915	112	o. •	î		1530	187	0.		1 2145		0.
1	0305	38	48.	•	1	0920	113	٥. ٠	1		1535	189	0.		1 2150		0.
	0310	39	59.	*	1	0925	114	0.	1		1540	189	0.	•	1 2155		0.
	0315	40	103.	•	1	0930	115	0.	I		1545	190	0.		I 2200	265	0.
	0320 0325	41 42	114. 109.	·	1	0935 0940	116 117	0. • 0. •	1		1550 1555	191 192	0. 0.		1 2205 1 2210		0. 0.
	0330	43	100.	•	i	0945	118	0.	î		1600	193	õ.	•	1 2215		0.
	0335	4.1	89.	•	1	0950	119	℧. ■	1		1605	194	0.	•	1 2220	269	0.
	0340	45	77.	*	1	0955	120	0. *	1		1610	195	0.	•	1 2225		0.
	0345 0350	46 47	64. 53.		1 1	1000 1005	121 122	0. • 0. •	1		1615 1620	196 197	0. 0.	*	1 2230 1 2235		0. 0.
	0355	48	45.		ī	1010	123	0.	ī		1625	198	0.		1 2240		0.
	0400	49	38.	•	1	1015	124	0. •	1		1630	199	0.	•	1 2245		o.
	0405	50	32.	•	1	1020	125	0.	1		1635	200	0.	•	1 2250		0.
	0410	51	28.	•	1	1025	126	0.	1		1640	201	0.	•	1 2255		6 .
	0415 0420	52 53	25. 22.	-	1 1	1030 1035	127 128	0. *	1		1645 1650	202 203	0. 0.		1 2300 1 2305		o. o.
	0425	51	20.		1	1040	129	0.	1		1655	204	0.	•	1 2310		0.
	0430	55	19.	٠	1	1045	130	0. •	1		1700	205	0.	•	1 2315		0.
	0435	56	18.	*	1	1050	131	0. *	1		1705	206	0.	*	1 2320		O.
	0440 0445	57 58	18. 19.		1	1055 1100	132	0. *	1		1710 1715	207 208	0. 0.		1 2325		0.
	0450	59	17.		1 1	1105	133 134	0. •	1		1720		o.	+	1 2330 1 2335	283 284	0.
	0455	60	17.		1	1110		0.	ī		1725		0.	•		285	0.
	0500	61	16.	•	1		136	0. •	1		1730	211	ο.	•	1 2345	286	0.
	0505	62	16.	*	1	1120	137	0. *	1		1735		0.	*	1 2350		0.
	0510 0515	63 64	16. 15.		1 1.	1125 1130		0. • 0. •	1		1740 1745		0. 0.			288	0.
	0520	65	15.		1.		140	0.	I.		1750		0.	÷		289 290	0. 0.
	0525	66	15.		ī		141	ŏ. <i>*</i>	1		1755		0.	•		291	0.
1	0530	67	14.	*	1	1145	142	0. •	1		1800		0 -	*	2 0015	292	0.
	0535	68	14.	•	1		143	0. •	1		1805		0.			293	0.
	0540 0545	69 70	13. 13.	•	1 1	1155 1200	144	0. •	1		1810 1815		0. 0.			294	0.
	0550	71	12,		1		145 146	0. *	1		1820		0.			295 296	0. 0.
	0555	72	12,		î	1210	147	ð. +	1		1825		õ.		2 0040		0.
1	0600	73	11.	*	1	1215	148	O. •	1.		1820	223	0.	+	2 0045	299	0.
	0605	74	11.	*	1	1220		0. •	1		1835		0.	•		299	0.
1	0610	75	10.	•	1.	1225	150	0. *	1		1840	225	0.	•	2 0055	300	0.
*******	• • • • •		*******		*****		* * * * * .						********		******	*****	*********

	PEAK FLOW	TIME			MAXIMUM AVE	RAGE PLOW	
				6-HR	24-HR	72 - HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	114.	3.33		22	€.	5.	5.
			(INCHES)	32.144	32.619	32.619	32.619
			(AC-FT)	11.	11.	11.	11.
			CUMULATIV	E AREA 🐷	.01 SQ MI		

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF	AVERAGE FLOW FOR MAXIMUM PERIOD	BASIN APEA	MAXIMUM STAGE	TIME OF
OPERATION	STATION	1, 13, 130	PEAK		APEA	STAGE	MAX STAC

•					6-HOUR	24 - HOUR	72 - HOUR			
F	HYDROGRAPH AT	1A1	44.	3.17	4 .	1.	1.	.02		
+ +	ROUTED TO	DETIAL	12.	3.50	4.	1.	1.	.02	1.73	3.50
+ +	ROUTED TO	FA1 - C4	11.	3.50	4.	1.	1.	. 02	. 91	₃.50
+	нуdrograph ат	1C4	9.	3.17	1.	0.	0.	.00		
+	2 COMBINED AT	CP1C4	15.	3.17	4.	ι.	1.	.02		
+	ROUTED TO	RC4 - C3	15.	3.25	đ.	1.	1.	. 02	1.05	3.25
+	HYDROGRAPH AT	1Da3	38.	3.08	3.	1.	1.	.01		
+	ROUTED TO	DE1Da3	3.	3.67	2.	1.	1.	.01	2.51	3.67
+	HYDROGRAPH AT	1Da4	29.	3.08	2.	1.	1.	.01		
+	2 COMBINED AT	CP1Da4	30.	3.08	4.	1.	1.	.02		
+ 	ROUTED TO	DF1Da4	6.	3.58	4.	1.	1.	. 02	3.14	3.58
+	HYDROGRAPH AT	10a5	7.	3.17	1.	0.	0.	.00		
+	3 COMBINED AT	CP1C3I	25.	3.17	9.	3.	3.	.05		
+ +	ROUTED TO	RC3-C3	24.	3,25	9.	3.	3.	. 05	1.52	3.25
+	нүркосрдрн Ат	Off-1A	21.	3.08	2.	0.	0.	.01		
+	HYDROGRAPH AT	1A2	11.	3.08	1.	0.	0.	.00		
+	HYDROGRAPH AT	1A3	18.	3.08	1.	0.	0.	.01		
+	3 COMBINED AT	CPA3	50.	3.03	1.	1,	1.	.02		
+ +	ROUTED TO	Deti A3	33.	3.17	4.	1.	1.	.02	2.84	3.17
+	ROUTED TO	FA3-A6	35.	3.25	4.	1.	1.	. 02	. 60	3.25
+	HYDROGRAPH AT	1A6	12.	3.03	1.	0.	0.	.00		
*	2 COMBINED AT	CP1A6	40.	3.25	5.	1.	1.	.03		
+ +	ROUTED TO	DET1A6	35.	3.33	5.	1.	1.	.03	2.67	3.33
*	HYDROGRAPH AT	1A5	42.	3.08	4.	1.	1.	. 02		
+	2 COMBINED AT	CP1 N 5	59.	3.25	8.	2.	2.	. 04		
+	ROUTED TO	DET172	53.	3.33	8.	2.	2.	. 04	2.96	3.33
+	HYDROGRAPH AT	144	27.	3.08	2.	1.	1.	. 01		
ŀ •+	ROUTED TO	RA4 - A7	25.	3.17	2.	ι.	1.	.01	.50	3.17
† +	ROUTED TO	DET1A4	74.	3.33	2.	1.).	. 01	2.65	3.33

4	HYDROGRAPH AT	1A7	21.	3.08	2.	0.	0.	.01		
+	3 COMBINED AT	CP1A7	74.	3.33	12.	3.	3.	. 06		
,	ROUTED 'TO	DET1A7	66.	3.42	32.	3.	3.	.06	3.62	3.42
	HYDROGRAPH AT	101	57.	3.17	5.	1.	2 -	. 02		
F	2 COMBINED AT	CP1C1	85.	3.33	17.	4.	4.	.08		
+	ROUTED TO	DET1C1	78.	3.50	16.	4.	4.	.08	4.86	3.50
+	HYDROGRAPH AT	102	54.	3.17	5.	1.	1.	. 02		
+	2 COMBINED AT	CP1C2	92,	3.50	21,	6.	5.	.11		
+-	ROUTED TO	DE1C2A	93,	3.50	21,	G.	5.	. 11	5.05	3.50
+ +	ROUTED TO	DE1C2B	90.	2.50	21.	6.	s.	, 11	5.02	3.50
+	ROUTED TO	DE1C2C	92.	3.50	21.	6.	5.	.11	5.01	3.50
+	HYDROGRAPH AT	1C3	68.	3.08	5.	1.	1.	.03		
1	3 COMBINED AT	CP1C3	128.	3.50	33.	10.	9.	.19		
+	ROUTED TO	DET1C3	109.	3.67	33.	10.	9.	.19	2.55	3.67
+ +	ROUTED TO	RC3COM	108.	3.67	33.	10.	9.	.15	11.14	3.67
+	HYDROGRAPH AT	MMOD	110.	3.08	10.	2.	2.	.03		
+ +	ROUTED TO	DETCOM	11.	3.67	7,	2.	2.	. 03	2.55	3.67
+	2 COMBINED AT	CPCOM	119.	3.67	41.	12.	12.	. 22		
++	ROUTED TO	COMOF1	119.	3.75	41.	12.	12.	. 22	11.20	3.75
+	HYDROGRAPH AT	CFV1	34.	3.03	€.	2.	2.	.02		
+	ROUTED TO	DEOFF1	11.	3.50	6.	2.	2.	.02	2.61	3.50
+	2 COMBINED AT	CPOFF1	130.	3.75	46.	14.	13.	. 24		
+ +	ROUTED TO	OF10F3	129.	3.75	46.	11.	13.	. 24	11.31	3.75
+	HYDROGRAPH AT	OFF3	58.	3.08	5.	1.	1.	. 02		
++	ROUTED TO	DEOFF3	10.	3.50	5.	1.	1.	. 02	2.20	3.50
+	3 COMBINED AT	CPOFF3	138,	3.75	51	15.	14.	. 25		
+	ROUTED TO	33A1	137.	3.83	51.	15.	14.	. 25		
+	HYDROGRAPH AT	33A	213.	3.08	17.	4.	4.	. 05		
4	2 COMBINED AT	33A3	232.	3.00	65.	19.	19.	. 31		
+	HYDROGRAPH AT	1Db	104.	3.08	8.	2.	2.	. 04		

+	ROUTED TO	DEIDD	13.	3.58	7.	2.	2.	.04	2.99	3.58
+	HYDROGRAPH A'T	lDal	25.	3.08	2.	Ο.	٥.	.01		
<u>د</u> •	ROUTED TO	DEIDal	4.	3.50	2.	0.	0.	.01	2.95	3.50
+	HYDROGRAPH AT	1Da2	5.	3,17	O .	0.	0.	. 00		
+	3 COMBINED AT	CP1Dab	18.	3.50	9.	3.	3.	.05		
+	ROUTED TO	RDabE2	18.	3.50	9.	3.	3.	.05	.75	3.50
+	HYDROGRAPH AT	1Ea1	44.	3.17	4.	1.	1.	.02		
+	ROUTED TO	DETEAT	4.	3.75	3.	1.	1.	. 02	2.91	3.75
+	HYDROGRAPH AT	1Ea2	65.	3.08	5.	ı.	1.	. 02		
4	2 COMBINED AT	CP1Ea2	66.	3.08	7.	2.	2.	.01		
+ +	ROUTED TO	DE1Ea2	16.	3.50	7.	2.	2.	.01	3.25	3.50
+	2 COMBINED AT	CP1Ea2	34.	3.50	16.	5.	5.	.09		
+	HYDROGRAPH AT	PARK	37.	3.09	3.	1.	1.	.02		
+	HYDROGRAPH AT	SCHOOL	59.	3.08	5.	1.	1.	.01		
+ +	ROUTED TO	DETSCH	12.	3.42	4.	1.	1.	.01	2.84	3.42
+ +	ROUTED TO	SCH12	12.	3.42	4.	1.	1.	.01	10.43	3.42
+	HYDROGRAPH AT	1 Ec	33.	3.08	3.	1.	1.	.01		
+ +	ROUTED TO	DE1Ec	9.	3.33	3.	1.	1.	.01	2.47	3.33
+	2 COMBINED AT	CP1Ec	21.	3.42	7.	2.	2.	. 62		
+	ROUTED TO	1EcEa2	21.	3.42	7.	2.	2.	. 62	10.59	3.12
+	3 COMBINED AT	CP1Ea	67.	3.17	26.	7.	7.	.14		
+ +	ROUTED TO	REaTPP	67.	3.17	26.	7.	7.	.14	10.92	3.17
4	HYDROGRAPH AT	1Eb	151.	3.17	14.	4.	3.	.06		
+	ROUTED TO	DETIED	39.	3.50	13.	4.	3.	. 06	2.26	3.50
+	HYDROGRAPH AT	OFF2	121.	3.09	11.	3.	3.	. 93		
+ 4	ROUTED TO	DEOPF2	11.	3.67	8.	3.	3.	. 03	2.59	3.67
4	3 COMBINED AT	CPOFF2	115.	3.50	46.	14.	13.	. 23		
+	ROUTED TO	1Kr.1	115.	3.50	46.	14.	13.	. 23		
+	HYDROGRAPH AT	185	119.	3.17	13.	3.	3.	. 05		
	ROUTED TO									

+		DET1K	18.	3.75	11.	Ĩ.	3.	. 05	2.77	3.75
4	2 COMBINED AT	1Kr.2	132.	3.50	57.	17.	16.	. 28		
+	ROUTED TO	1Mr.1	132.	3.50	57.	17.	16.	.23		
1	HYDROGRAPH AT	1Mr	152.	3.17	14.	4.	3.	.05		
1 4	ROUTED TO	DETIM	49.	3.42	13.	4.	3.	. 05	3.70	3.42
ı	2 COMBINED AT	1Mx:2	179.	3.50	70.	20.	20.	. 34		
*	HYDROGRAPH AT	33E	160.	3.68	12.	3.	3.	. 04		
1	HYDROGRAPH AT	33 5 E	Э.	3.17	o.	0.	0.	.00		
4	3 COMBINED AT	33E.2	225.	3.17	81.	24.	23.	. 33		
r	ROUTED TO	R33E.2	224.	3.17	81.	24.	23.	. 38		
1	HYDROGRAPH AT	33D	61.	3.17	5.	1.	1.	.04		
+	HYDROGRAPH AT	SAOET	76.	3.08	6.	1.	1.	. 02		
+	3 COMBINED AT	CT13.0	340.	3.17	92.	26.	25.	.43		
+	DIVERSION TO	P_ADOT	223.	3.17	82.	24.	23.	. 43		
+	HYDROGRAPH AT	D_ADOT	117.	3.17	10.	3.	2.	. 43		
+	HYDROGRAPH AT	33C	126.	3.08	9.	2.	2.	. 03		
+	HYDROGRAPH AT	S40CN	190.	3.08	14.	1.	3.	. 01		
4	3 COMBINED AT	CT13.1	393.	3.08	34.	8.	8.	. 51		
+	DIVERSION TO	P-PIPE	30.	3.09	13.	3.	3.	.51		
+	HYDROGRAPH AT	D_BAS	363.	3.08	21.	5.	5.	.51		
*	DIVERSION TO	D-BAS2	69.	3.08	2.	1.	0.	. 51		
٠	HYDROGRAPH AT	D_BAS1	363.	3.09	19.	5.	5.	.51		
1	DIVERSION TO	D-SUBF	237.	3.17	4.	1.	1.	.51		
+	HYDROGRAPH AT	D_SURF	309.	3.17	15.	4.	4.	. 51		
+	HYDROGRAPH AT	B_PIPE	٦٥.	2.75	13.	3.	3.	.00		
+	HYDROGRAPH AT	B_SURF	69.	3.00	2.	1.	О.	.00		
+	3 COMBINED AT	CS40B	339.	3.17	30.	7.	7.	. 51		
+	ROUTED TO	S40BAS	159.	3.33	29.	7.	7.	. 51	5.52	3.33
4	DIVERSION TO	D33C.2	108.	3.33	20.	5.	5.	. 51		
+	HYDROGRAPH AT	P33E.1	51.	3.33	9.	2.	2.	.51		
+	HYDROGRAPH AT	R_ADOT	223.	3.17	82.	24.	23.	. 00		
+	2 COMBINED AT	33E.1	256.	3.25	91.	26.	25.	.51		
1	ROUTED TO	R37E.I	252	3.33	91.	26.	25.	. 51		

ROUTED TO		ASIDRI	252.	3.33	91.	26.	25.	.51			
НУDROGRAPH	TA	ASLD	114.	3.08	10.	2	2.	.03			
2 COMBINED	АТ	ASLDC	317.	3.17	100.	29.	28.	. 54			
ROUTED TO											
+ HYDROGRAPH		ASLDR2	309.	3.25	100.	29.	28.	. 54			
1 .		ASLD	84.	3.08	6.	1.	1.	.02			
+ COMBINED		CPPRIN	351.	3.17	105.	30.	29.	.56			
HYDROGRAPH +		R33C.2	108.	3.33	20.	s.	5.	.00			
HYDROGRAPH +	AT	S40WT	31.	3.08	2.	1.	0.	.01			
> COMBINED	AT .	33C.2	114.	3.33	22.	6.	5.	.01			
1			SUMMA	RY OF KI	INEMATIC WAV	E - MUSKING	UM-CUNGE ROUT	TING			
			(FLOW IS	DIRECT RUNC	FF WITHOUT		LATED TO			
QATZI	ELEMEN	T DT	PEAK	TIME PEA		JME DT	PEAK COMPUTATION		VOLUME		
		(MIM)	(CFS)		NIN) (II	1) (MIN)	(CFS)	(MIN)	(1N)		
33A1	MANE	1.88	138.05	228	.99 2.2	5.00	137.32	230.00	2.21		
CONTINUITY SUMMARY	(AC-FT)	- INFLOW=	.2975E+02	EXCESS=	.0000E+00 (OUTFLOW= .29	74E+02 BASIN	STORAGE:	.7425E-02 PERCENT	r error=	. 0
33A	MANE	. 94	229.59	196	.25 2.5	5.00	213.27	185.00	2.93		
CONTINUITY SUMMARY	(AC-FT)	- INFLOW=	.0000E+06	EXCESS=	.8419E+01 (OUTFLOW84	24E+01 BASIN	STORAGE:	.3781E-03 PERCEN	r error-	1
1Kr.1	MANE	. 88	115.21	210	.94 2.3	20 5.00	115.14	210.00	2.20		
CONTINUITY SUMMARY	(AC-FT)	- TNETOW	27026+05	nyenes-	00005+00	niret.ow. 27	02E+02 BASIN	STORAGE=	3400F-00 PERCEN	T EEPOP-	. 0
										. Ziikok-	. •
1Mx.1	MANE	1.04	132.38	212	.01 2.3	22 5.00	131.65	210.00	2.22		
CONTINUITY SUMMARY	(AC-FT)	- INFLOW=	.3341E+02	EXCESS.	.0000E+00	00TFLOW≃ .33	41E+02 BASIN	STORAGE=	.5096E-02 PERCEN	Γ EFROR =	- 0
33E	MANE	1.58	168.66	186	.51 2.5	90 5.00	159.64	.185.00	2.91		
CONTINUITY SUMMARY	(AC-FT)	- INFLOW=	.0000E+00	EXCESS=	.6117E+01 (OUTFLOW= .61	11E+01 BASIN	STORAGE=	.8650E-04 PERCEN	T ERROR=	. 1
33BE	MANE	3.45	3.22	190	.32 2.	78 5.00	3.18	190.00	2.78		
CONTINUITY SUMMARY	(AC-FT)	- INFLOW=	.0000E+00	EXCESS =	.1633E+00 (OUTFLOW= .16	30E+00 BASIN	STORAGE=	.1193E-04 PERCEN	T ERROR:	. 2
R33E.2	MANE	. 67	224.58	190	.57 2.	34 5.00	224.36	190.00	2.34		
CONTINUITY SUMMARY	(AC-FT)	- INFLOW=	.4687E+02	EXCESS=	.0000E+00	OUTFLOW= .46	87E+02 BASIN	STORAGE=	.1478E-02 PERCEN	T ERROR=	. 0
330	MANE	2.02	64.29	192	,41 1.:	22 5.00	61.02	190.00	1,22		
CONTINUITY SUMMARY	(AC-FT)	- INFLOW=	.0000E+00	EXCESS=	.2639E+01	OUTFLOW= .26	27E+01 BASIN	STORAGE=	.1983E-03 PERCEN	T ERROR-	. 5
S40ET	MANE	. 85	79.65	5 186	.49 2.	94 5.00	76.00	185.00	2.95		
CONTINUITY SUMMARY	(AC-FT)	- INFLOW=	.0000E+00	EXCESS-	.2673F+01	OUTFLOW= .28	371E+01 BASIN	STORAGE=	.1120E-03 PERCEN	T ERROR=	. 0
33C	MANE	.51	129.46	5 185	.80 2.	96 5.00	125.66	185.00	2.97		
CONTINUITY SUMMARY	(AC. 1999	- TMIT ON	በበበላዊ ተባለ	PYCECC-	AEUSE DI	Outest Ow = - 2.6	(7584A1 BACTU	STORAGE	19520-ია ნისტის	IT' EDDOD-	. 1
	MANE	. 57			.05 2.			185.00	2.97		
CONTINUITY SUMMARY	(AC-FT)	- INFLOW-	.0000E+00	EXCESS-	70a0E+01	OUTFLOW= .70)77E+01 PASIN	"HDARGE"	.4086E 03 PERCEN	T ERROR-	. 0

1	RBBE.1 MANE	1.31	255.46 197	7.67	1.92	5.00 252	.31 200.00	1.92		
CONTINUITY S	UMMARY (AC-FT) -	INFLOW= .5208	E+02 EXCESS	00001:+0	0 OUTFLOW.	.5208E+02 J	BASIN STORAGE-	.795011-02 PERCE	YT ERROR-	. 0
i	ASLDRI MANE	. 56 2	252.12 200	0.80	1.92	5.00 251	.98 200.00	1.92		
COMMINUTTY S	UMMARY (AC-FT) -	INFLOW= .5200	F+02 EXCESS	0000E+0	0 OUTFLOW:	.5205E+02 F	BASIN STORACE:	.9142E-02 PERCEN	NT ERROR≃	. 0
	ASLD MANE	. 64 1	23.54 180	5.54	2.98	5.00 114	.18 185.00	2.89		
CONTINUITY S	UMMARY (AC-FT) -	INFLOW= .0000	DE+00 EXCESS	4844E+0	1 OUTFLOW=	.4845F+01 1	BASIN STORAGE:	.3741E-03 PERCE	VT ERROR≃	. 0
i	ASLDR2 MANE	.72	316.25 193	1 53	1.97	5.00 308	.60 195.00	1.97		
CONTINUITY S	UMMARY (AC-FT) -	INFLOW= .5692	2E+02 EXCESS	= .0000E+0	O OUTFLOW:	.5692E+02 F	BASIN STORAGE:	.5511E-02 PERCEN	NT ERROR=	. 0
	ASLD MANE	.36	84.72 189	i.20	2.78	5.00 84	.16 185.00	2.80		
CONTINUITY S	UMMARY (AC-FT) -	INFLOW= .0000	E+00 EXCESS	2365E+0	1 OUTFLOW=	.2863E+01 F	BASIN STORAGE-	7801E-04 PERCEN	NT ERROR=	. 1
	S40WT MANE	.33	31.72 18-	1.75	3.00	5.00 31	.47 185.00	3.01		
CONTINUITY S	UMMARY (AC-FT) -	INFLOW= .0000	E+00 EXCESS	= .1909E+0	1 OUTFLOW=	.1008E+01 E	BASIN STORAGE=	.4454E-05 PERCE	NT ERROR=	. 1
1			OF DAM OVER				FION DETIAL EACH FORMATION)			
PLAN 1			INITIAL		SPILLWAY (OF OF DAM			
		ELEVATION STORAGE OUTFLOW		.00 0. 0.	3 - 0 20 20	2.	3.00 2. 20.			
	RATIO	MUMIKAM	MAXIMUM	MAXIMUM	MAXIMUM			TIME OF		
	OF PMF 1 00	RESERVOIR W.S.ELEV	DEFTH OVER DAM	STORAGE AC-FT	OUTFLOW CFS 12.	HOURS	P MAX OUTFLOW HOURS 3.50	FAILURE HOURS		
1	1 00	SUMMARY	.00 OF DAM OVER ARE FOR INTI		EACH ANALYS	SIS FOR STA				
PLAN 1		ELEVATION	INITIAL	VALUE	SPILLMAY (OP OF DAM 3.00			
		STORAGE OUTFLOW		0.		1.	1.			
	RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS			TIME OF FAILURE HOURS		
i.	1.00		.00 OF DAM OVER ARE FOR INT				3.67 FION DEIDa4 EACH FORMATION	.00		
PLAN 1		ELEVATION	INTTIAL	VALUE	SPILLWAY (OP OF DAM			
		STORAGE OUTFLOW		0.		1.	1.			
	PATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS			TIME OF FAILURE HOURS		
ı	1.00		.14 OF DAM OVER ARE FOR INT				3.58 Tion DETIA3 EACH FORMATION	.00		
PLAN 1		ELEVATION STORAGE OUTFLOW	INITIAL	VALUE .00 0			OP OF DAM 2.50 0. 22.			
	RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEFTH OVER DAM	MAXIMUM STORAGE AC+FT	MAXIMUM OUTFLOW CPS			TIME OF W FAILURE HOURS		

2.84 .34 0. 33. .25 3.17
SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DETIAG
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

.00

1.00

	ИАЛУ	l		ELEVATION STORAGE OUTFLOW	TNITIAL	VALUE .00 0	SPILLWAY CRE 2.50 0. 22.	ST TOP	OF DAM 2.50 0. 22.	
		1	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		:	1.00				35. EACH ANALYSIS STEP USED D			.00
	PLAN	1		ELEVATION STORAGE OUTFLOW	INITIAL	VALUE .00 0.	SPILLWAY CRE 2.50 1. 34.	ST TOP	OF DAM 2.50 1. 34.	
		I	RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CPS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1		:	1.00				53. EACH ANALYSIS STEP USED D			.00
	PLAN	1		ELEVATION STORAGE OUTFLOW	INITIAL	VALUE .00 0. 0.	SPILLWAY CRE 2.50 0.	ST TOP	OF DAM 2.50 0. 11.	
		1	RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH GVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS		TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1		:	1.00	2.65 SUMMARY (PEAKS SHOWN			EACH ANALYSIS			. 00
	PLAN	ı		ELEVATION STORAGE OUTFLOW	INITIAL	VALUE: .00 0.	SPILLWAY CRE 2.50 1. 11.	ST TOP	OF DAM 2.50 1. 11.	
		1	RAT'IO 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		;	1.00				66. EACH ANALYSIS STEP USED I			.00
	PLAN	1		ELEVATION STORAGE OUTFLOW	INITIAL	VALUE .00 0.	SPILLWAY CRE 3.50 2. 14.	ST TOP	OF DAM 3.60 2. 14.	
		1	RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CPS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FATLURE HOURS
1			1.00				78. EACH ANALYSIS STEP USED U			.00
	PLAN	1		ELEVATION STORAGE OUTFLOW	INITIAL	VALUE .00 0. 0.	SPILLWAY CRE 3.60 0.	est top	OF DAM 3.60 0. 14.	
		:	rat'10 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			1.00				93. EACH ANALYSIS STEP USED			.00
	PLAN	1		ELEVATION STORAGE OUTFLOW	INITIAL	VALUE .00 0. 0.	SPILLWAY CRE 3.60 1.	est top	GF DAM 3.60 1. 14.	
			PATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVFR DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CPS	DUPATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
			1.00	5.02	1.42	1.	50.	2.92	3.50	.00

1

			(PEARS SHOWN	ARE FOR INT	ERNAL TIME	. SIEP USED I	CICING BREAK	THE POSSIBILITIES	
	PLAN	1	ELEVATION STORAGE OUTFLOW	[NJT1AL	VALUE .00 0 0.	SPILLWAY CRE 3.60 1. 14.	EST TOP	OF DAM 3.60 1.	
		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		1.00				92. EACH ANALYSIS STEP USED D			.00
	PLAN	1	ELEVATION STORAGE OUTFLOW	INITIAL	. VALUE .00 0. 0.	SPILIMAY CRE 3.50 1. 150.		OF DAM 3.50 1. 150.	
		RATIO OF EMP	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		1.00				109. EACH ANALYSIS STEP USED I			.00
	PLAN	1	ELEVATION STORAGE OUTFLOW	INITIAL	. VALUE .00 0. 0.	SPILLWAY CRE 3.00 4. 13.	est top	OF DAM 3.00 4. 13.	
		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		1.00				11. EACH ANALYSIS STEP USED E			.00
	PLAN	1	ELEVATION STORAGE OUTFLOW	тигтты.	, VALUE .00 0. 0.	SPILLWAY CRE 3.00 2. 13.	est top	OF DAM 3.00 2. 13.	
		RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM HTGED MAG SEVO	MAXIMUM STORAGE AC ·FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1		1.00				11. REACH ANALYSIS E STEP USED			.00
	PLAN	1	ELEVATION STORAGE OUTFLOW	INITINI	VALUE .00 0. 0.	SPILLWAY CRI 3.00 2. 13.	est top	OF DAM 3.00 2. 13.	
		RATIO OF PMF	MAXIMUM RESERVOIR W.S.DLEV	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		1.00	2.20 SUMMARY (PEAKS SHOWN	.00 OF DAM OVER ARE FOR INT	2. RTOPPING/BE PERNAL TIME	10. REACH ANALYSIS STEP USED I	.00 S FOR STATI DURING BREA	3.50 ON DE1Db CH FORMATION)	.00
	PLAN	1	ELEVATION STORAGE OUTFLOW	INITINI	VALUE .00 0. 0.	SPILLWAY CRI 3.00 3. 13.		OF DAM 3.00 3.	
		RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAX IMUM HTGED MAG REVO	MAXIMUM STORAGE AC-FT	MAXIMUM OUTPLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1		1.00				13. «EACH ANALYSTS E STEP USED		3.58 ON DEIDAI CH FORMATION)	.00
	PIJAN	1	ELEVATION STORAGE OUTFLOW		.00 0. 0.	SPILLWAY CRI 3.00 1.		OF DAM 3.00 1.	
		RATIO	MAXIMUM	MUMLXARI	MAXIMUM		MO FTANUD	TIME OF	TIME OF

		OF PMF	RESERVOIR W.S.ELEV			OUTFLOW CFS			FAILURE HOURS
1		1.00				4. EACH ANALYSIS STEP USED D			.00
	PLAN	1	ELEVATION STORAGE OUTFLOW			SPILLWAY CRE 3.00 2. 4.		OF DAM 3.00 2. 4.	
		RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	DEFLH	STORAGE	OUTFLOW	OVER TOP	TIME OF MAX OUTFLOW HOURS	
1		1.00				4. EACH ANALYSIS STEP USED D		ON DELEA2	.00
	PLAN	1	ELEVATION STORAGE OUTFLOW			SPILLWAY CRE 3.00 2. 10.		OF DAM 3.00 2. 10.	
		RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	DEPTH	STORAGE		OVER TOP	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1		1.00			ropping/br	16. EACH ANALYSIS STEP USED D	FOR STATIC	ON DETSCH	.00
	PILAN	1	ELEVATION STORAGE OUTFLOW			SPILLWAY CRE 3.00 1. 13.		OF DAM 3.00 1. 13.	
		RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	DEPTH	STORAGE		OVER TOP	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1		1.00				12. EACH AMALYSIS STEP USED E	FOR STATIC		.00
	PLAN	1	ELEVATION STOPAGE OUTPLOW	INITIAL		SPILLWAY CRE 3.00 1. 11.		OF DAM 3.00 1. 11.	
		ratio Of PMF	MAXIMUM RESERVOIR W.S.ELEV		MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS		TIME OF MAX OUTFLOW HOURS	
1		1.00				9. REACH ANALYSIS STEP USED I			.00
	PLAN	1	ELEVATION STORAGE OUTFLOW	INITIAL	VALUE .00 0. 0.	SPILLWAY CRE 3.00 5. 52.	EST TOP	OF DAM 3.00 5. 52.	
		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
ι		1.00				39. KEACH ANALYSIS E STEP USED I		3.50 ON DEOFF2 CH FORMATION)	.00
	PLAN	1	ELEVATION STORAGE OUTFLOW	INITIAL	VALUE .00 0. 0.	SPILLWAY CRE 3.00 5. 13.	EST TOP	OF DAM 3.00 5. 13.	
		RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW Crs	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1		1.00				REACH ANALYSIS		3.67 ON DETIK CH FORMATION)	.00
	PLAN	I	ELEVATION STORAGE	INITYAL	VALUE .00	SPILLWAY CRI 3.00 5.		OF DAM 3.00 5.	

	RATIO OF	MAXIMUM RESERVOIR	MAXIMUM DEPTH	MAXIMUM STORAGE	MAXIMUM OUTFLOW	DURATION OVER TOP	TIME OF	TIME OF
	PWE	W.S.ELEV	OVER DAM	AC ·FT	CFS	HOURS	HOURS	HOURS
	1.00	2.77 SUMMARY (PEAKS SHOWN			18. EACH ANALYSI STEP USED		3.75 ON DETIM CH FORMATION)	.00
PLAN	1	ELEVATION	INTTIAL	.00	SPILLWAY CR 3.00		OF DAM 3.00	
		STORAGE		0.	3. 20.		3. 20.	
	RATIO OF	MAXIMUM RESERVOIR	MAXIMUM DEPTH	MAXIMUM STORAGE	MAXIMUM OUTFLOW	DUKATION OVER TOP	TIME OF	TIME OF
	PMF	W.S.ELEV	OVER DAM	AC-FT	CFS	HOURS	HOURS	HOURS
	1.00	3.70	.70	4.	49.	.83	3.42	.00

OUTFLOW

0. 20.

20.

*** NORMAL END OF HEC-1 ***

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Appendix D

Hydraulic/Hydrology Calculations

Peak Flow Calculations Using The Rational Method

Project: Proj #: Optima McDowell Mountain Village

Date: 2/23/22 Prep by: DJH Check by: MLD

Base Sheet Prepared By GA, Version 2

Source of Rainfall Data --->NOAA Atlas 14

Rainfall Depth-Duration-Frequency (D-D-F), (inch)												
Storm			Time									
Fequency	5 min	60 min										
10-Yr	0.42 0.63 0.78 1.05 1.30											
100-Yr	0.65	0.99	1.23	1.66	2.05							
Derived Ra	infall Inten	sity-Duration	on-Freque	ency (I-D-	·F), (in/hr)							
10-Yr	4.98	3.79	3.13	2.10	1.30							
100-Yr	7.81	5.95	4.92	3.32	2.05							

Attach source and supporting data for rainfall depths

AF for 0	Cw per C	W _{10-Yr}
Freq.	Typical	Applic.
2-Yr	1.00	1.00
5-Yr	1.00	1.00
10-Yr	1.00	1.00
25-Yr	1.10	1.00
50-Yr	1.20	1.00
100-Yr	1.25	1.00

AF=Frequency Adjustment Factor

Drainage A	\rea ID:						Tc,calc m	nethod:	1=Papadal	kis and Ka	ızan, 2=A	vg Veloc.			10-Yr					100-Yr	٢	
							1 Tc,calc=11.4*L^0.5*Kb^0.52*S^-0.31*i^-0.38				Cw for ea	ch frequer	ncy is adjus	sted as a t	unction of	the 100-ye	ar value p	er the tat	ole above			
Concent.	Contributing	Total	Base	Flow	Approx	Approx	Average	K_b	m	b	K_b	Initial/lot	Minim a	llowed T	c,tot =	10.0	Q	Minim a	allowed T	c,tot =	10.0	Q
Point	Sub-basins	Area	Cw	Path, L	High pt	Low pt	Slope	Class				Тс	Cw	Tc,calc	Tc,tot	i	10-Yr	Cw	Tc,calc	Tc,tot	i	100-Yr
#		(ac)	(2-10 yr)	(ft)	(ft)	(ft)	ft/ft	A>D				(min)	AF=1.00	(min)	(min)	(in/hr)	(cfs)	AF=1.00	(min)	(min)	(in/hr)	(cfs)
V	V	V	V	V	V	V	V	V				V										
Pre v Post	1	15.64	0.50	1306.2	1600.00	1593.0	0.0150	Α	-0.00625	0.04	0.0325	10	0.50	8.5	18.5	2.92	22.9	0.50	6.9	16.9	4.81	37.6
100-Yr 2-Hr	1	15.64	0.95	1306	1600	1593	0.0150	Α	-0.00625	0.04	0.0325	10	0.95	8.5	18.5	2.92	43.4	0.95	6.9	16.9	4.81	71.5
								Α	-0.00625	0.04	#NUM!	0		#####	#NUM!	#NUM!	######		#####	#####	#NUM!	######
								Α	-0.00625	0.04	#NUM!	0		#####	#NUM!	#NUM!	######		#####	#####	#NUM!	######
								Α	-0.00625	0.04	#NUM!	0		#####	#NUM!	#NUM!	######		#####	#####	#NUM!	######
								Α	-0.00625	0.04	#NUM!	0		#####	#NUM!	#NUM!	######		#####	#####	#NUM!	######

Point precipitation frequency estimates (inches)

NOAA Atlas 14 Volume 1 Version 5 Data type: Precipitation depth Time series type: Partial duration

Project area: Southwest Location n; Arizona USA

Station Name: -Latitude: 33.6562° Longitude: -111.9232° Elevation (USGS): 1594.27 ft

PRECIPITATION FREQUENCY ESTIMATES

by duration	1	2	5	10	25	50	100	200	500
5-min:	0.196	0.256	0.346	0.415	0.507	0.578	0.651	0.724	0.822
10-min:	0.299	0.39	0.526	0.631	0.772	0.88	0.991	1.1	1.25
15-min:	0.37	0.483	0.652	0.782	0.957	1.09	1.23	1.37	1.55
30-min:	0.498	0.651	0.878	1.05	1.29	1.47	1.66	1.84	2.09
60-min:	0.617	0.805	1.09	1.3	1.6	1.82	2.05	2.28	2.59
2-hr:	0.72	0.931	1.24	1.48	1.8	2.04	2.3	2.55	2.89
3-hr:	0.794	1.02	1.33	1.58	1.92	2.2	2.48	2.78	3.19
6-hr:	0.956	1.21	1.54	1.81	2.17	2.45	2.74	3.04	3.45
12-hr:	1.08	1.36	1.72	1.99	2.37	2.66	2.96	3.26	3.66
24-hr:	1.26	1.6	2.07	2.44	2.96	3.37	3.8	4.25	4.88
2-day:	1.37	1.74	2.28	2.71	3.31	3.78	4.29	4.81	5.54
4-day:	1.57	2	2.66	3.18	3.94	4.55	5.21	5.92	6.92
7-day:	1.77	2.27	3.01	3.61	4.48	5.18	5.93	6.74	7.88
10-day:	1.92	2.46	3.26	3.91	4.83	5.57	6.37	7.21	8.41
20-day:	2.39	3.07	4.06	4.82	5.85	6.65	7.48	8.32	9.47
30-day:	2.8	3.61	4.77	5.66	6.86	7.78	8.74	9.72	11
45-day:	3.27	4.22	5.58	6.59	7.95	8.97	10	11.1	12.5
60-day:	3.63	4.7	6.19	7.29	8.73	9.81	10.9	12	13.4

Date/time (GMT): Wed Feb 23 23:39:34 2022

pyRunTime: 0.0254480838776



Appendix E

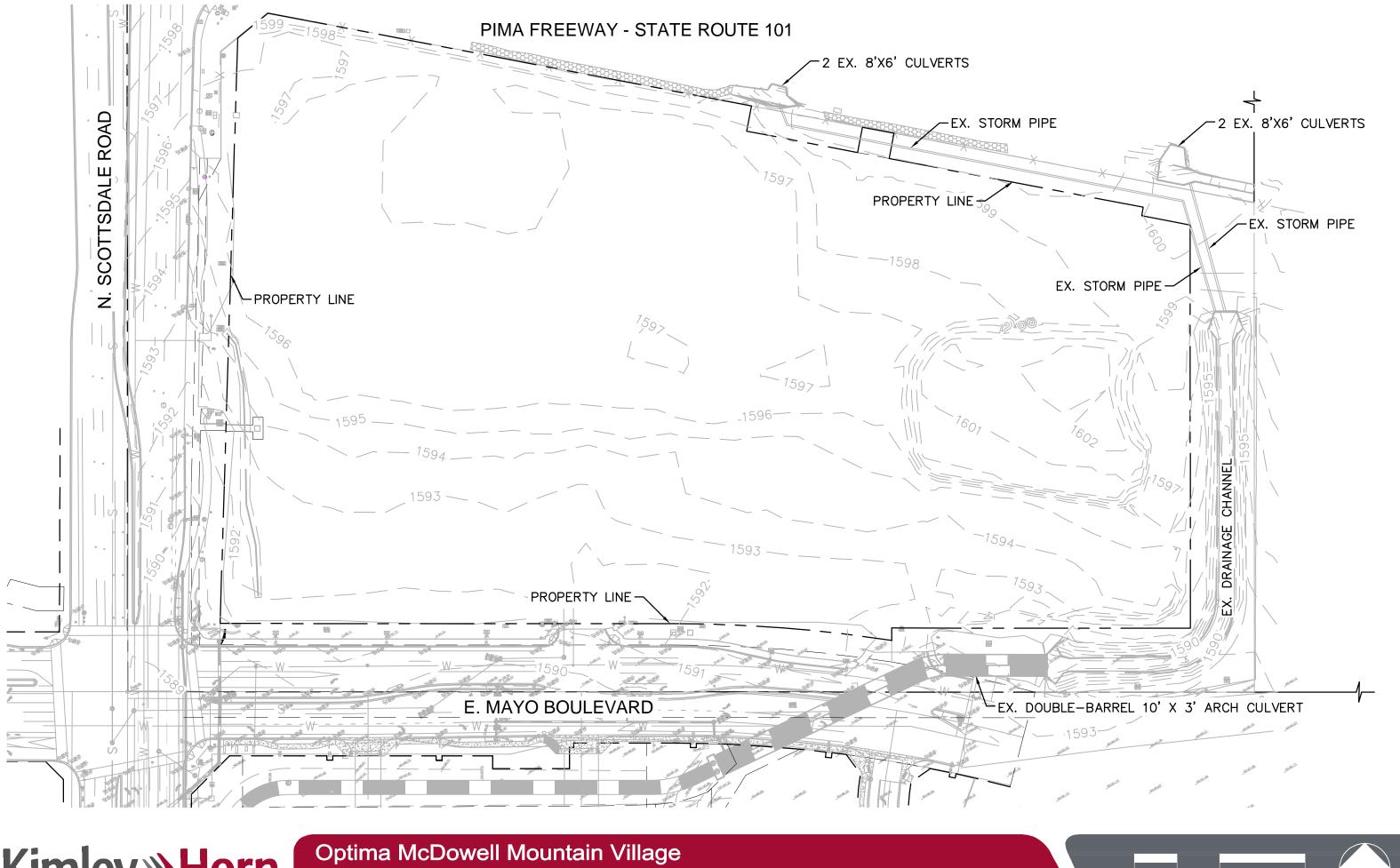
Contextual Aerial Plan





Appendix F

Existing Conditions Topographic Map

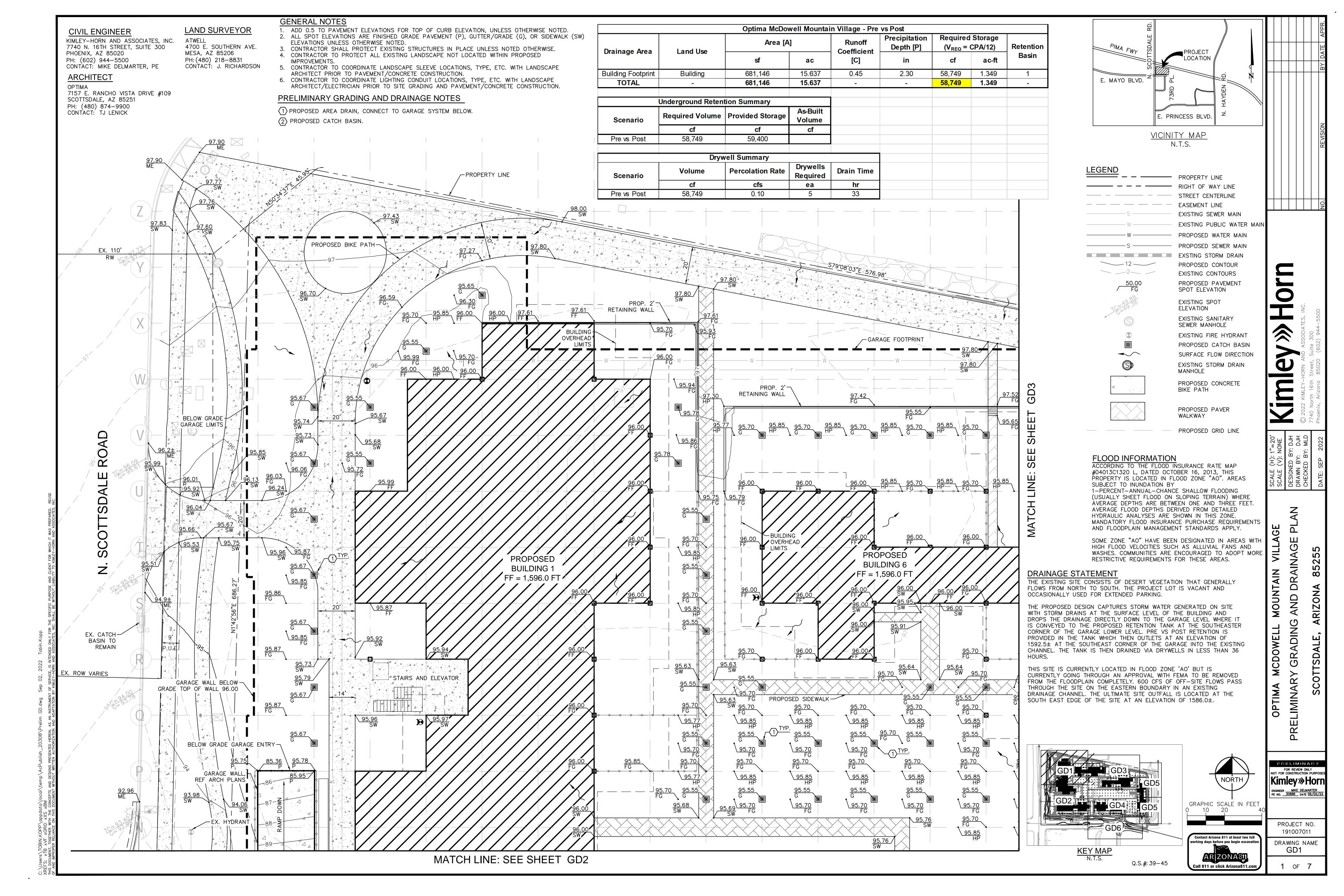


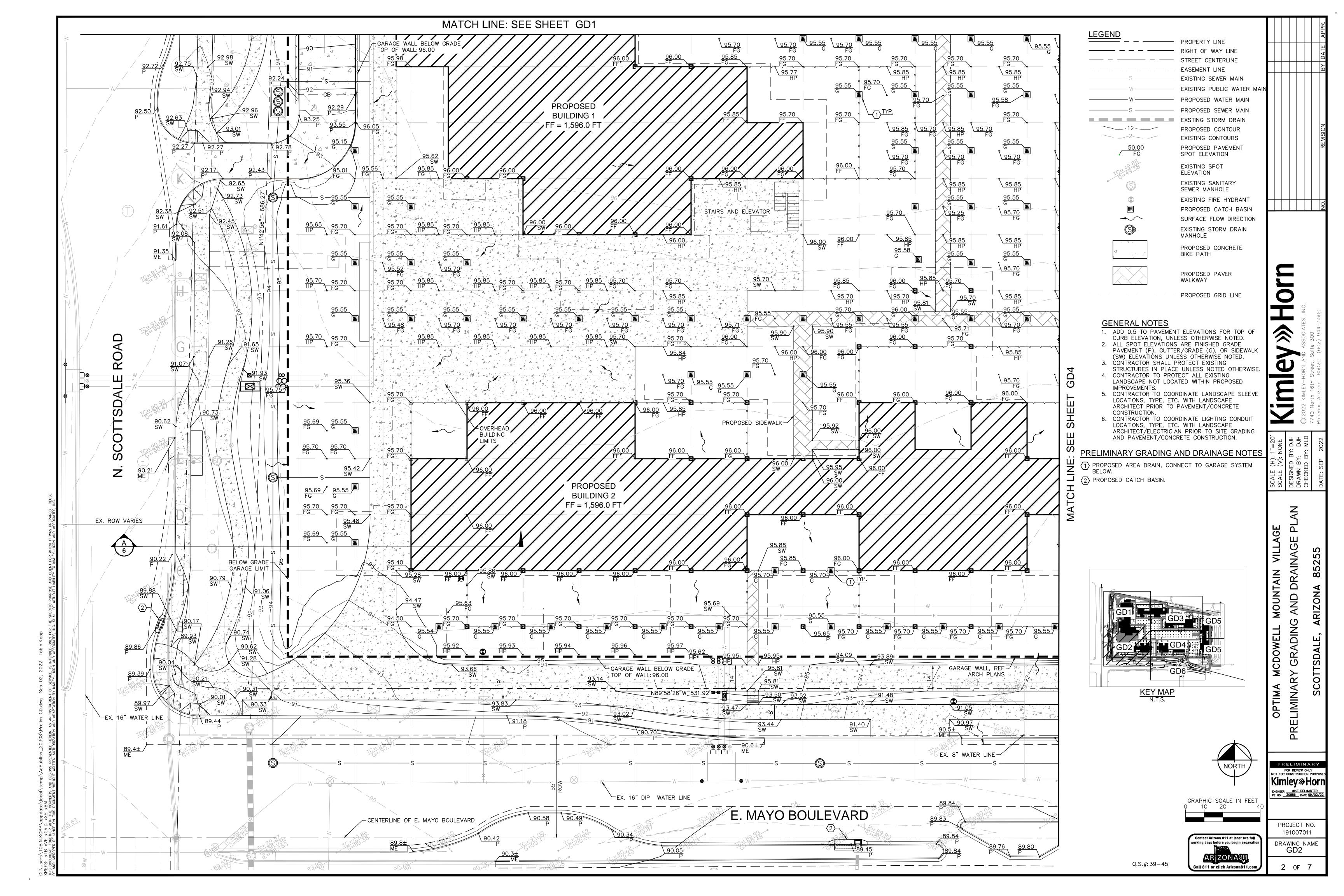


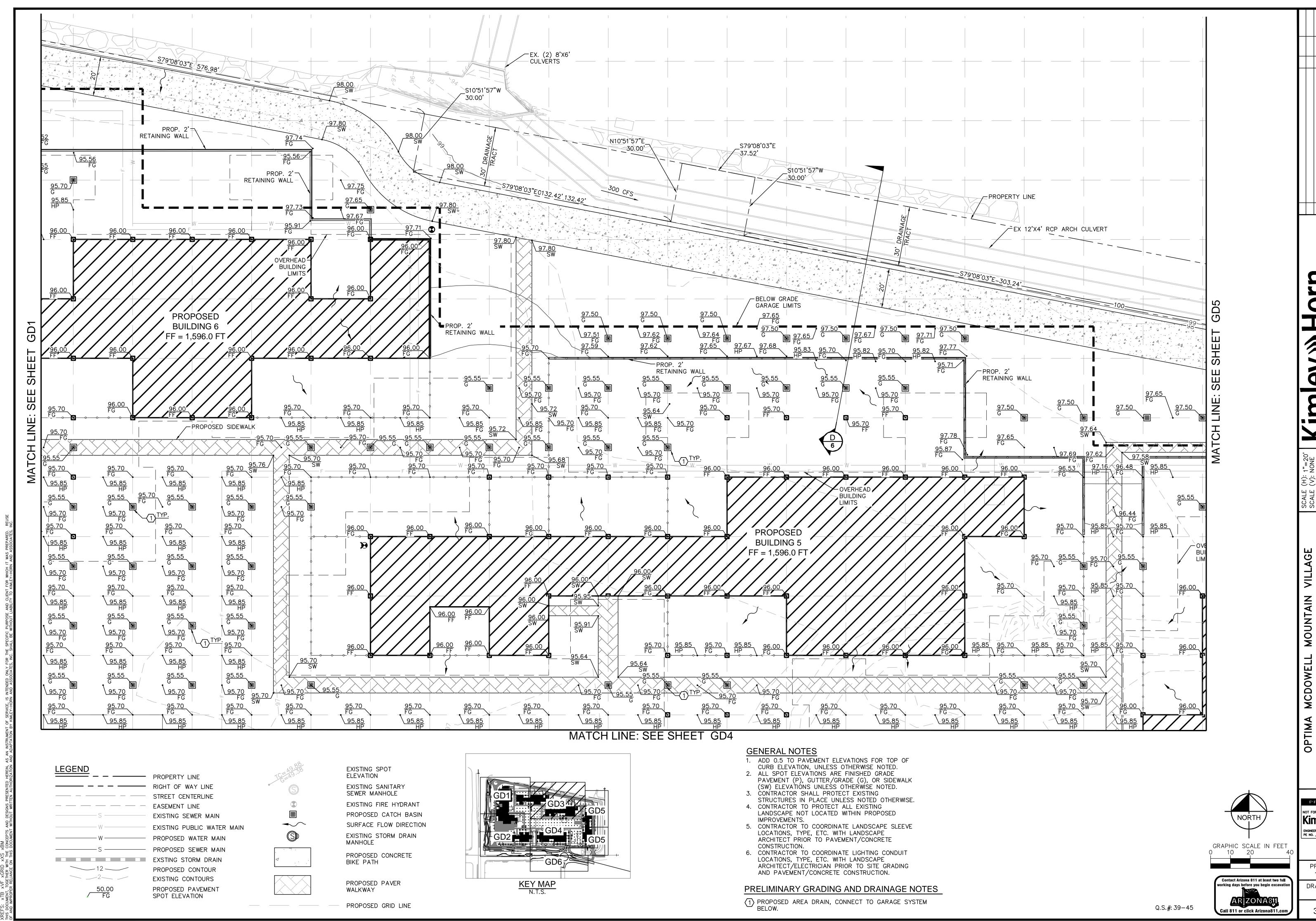


Appendix G

Preliminary Grading and Drainage Plan







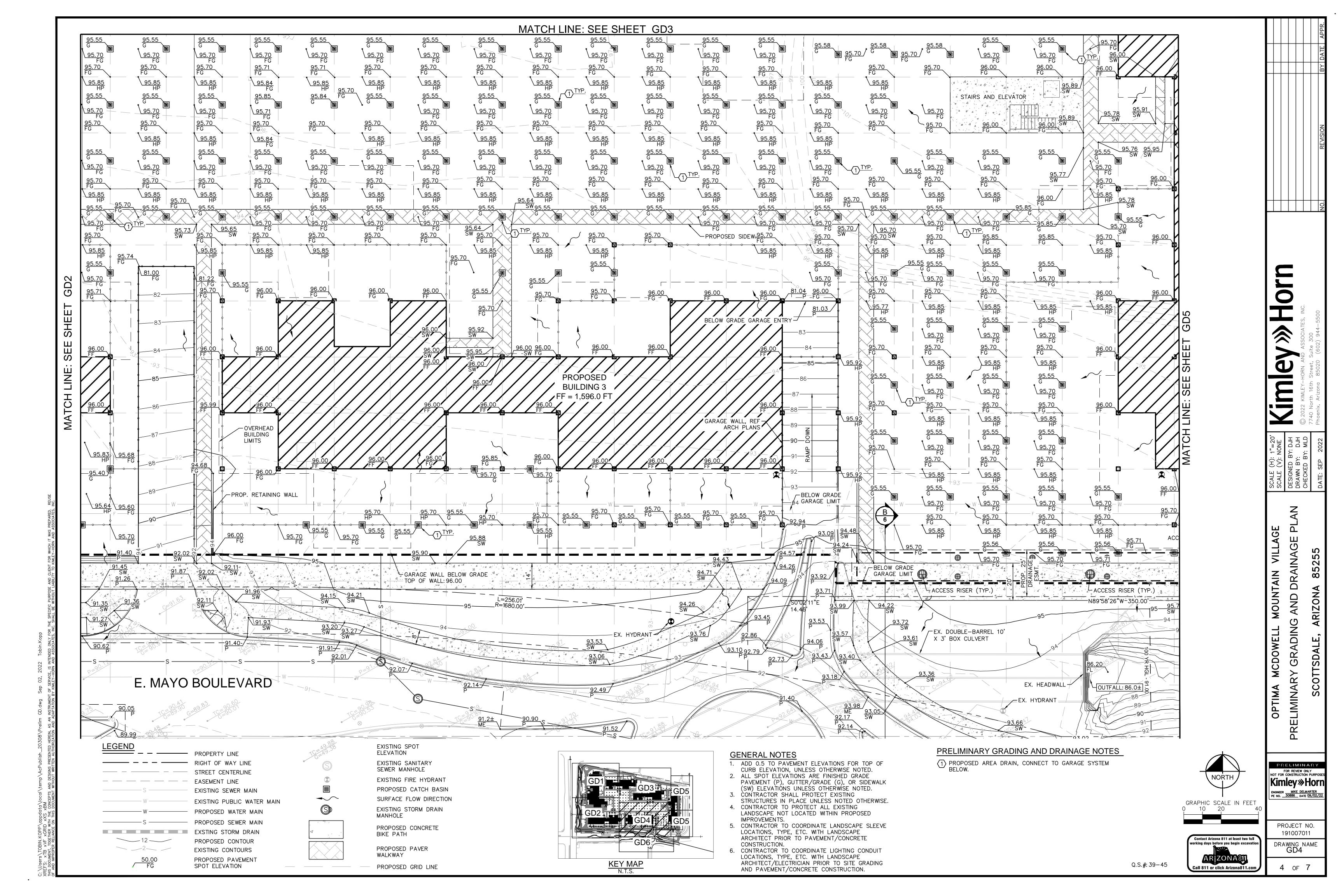
DRAINAGE AND GRADING

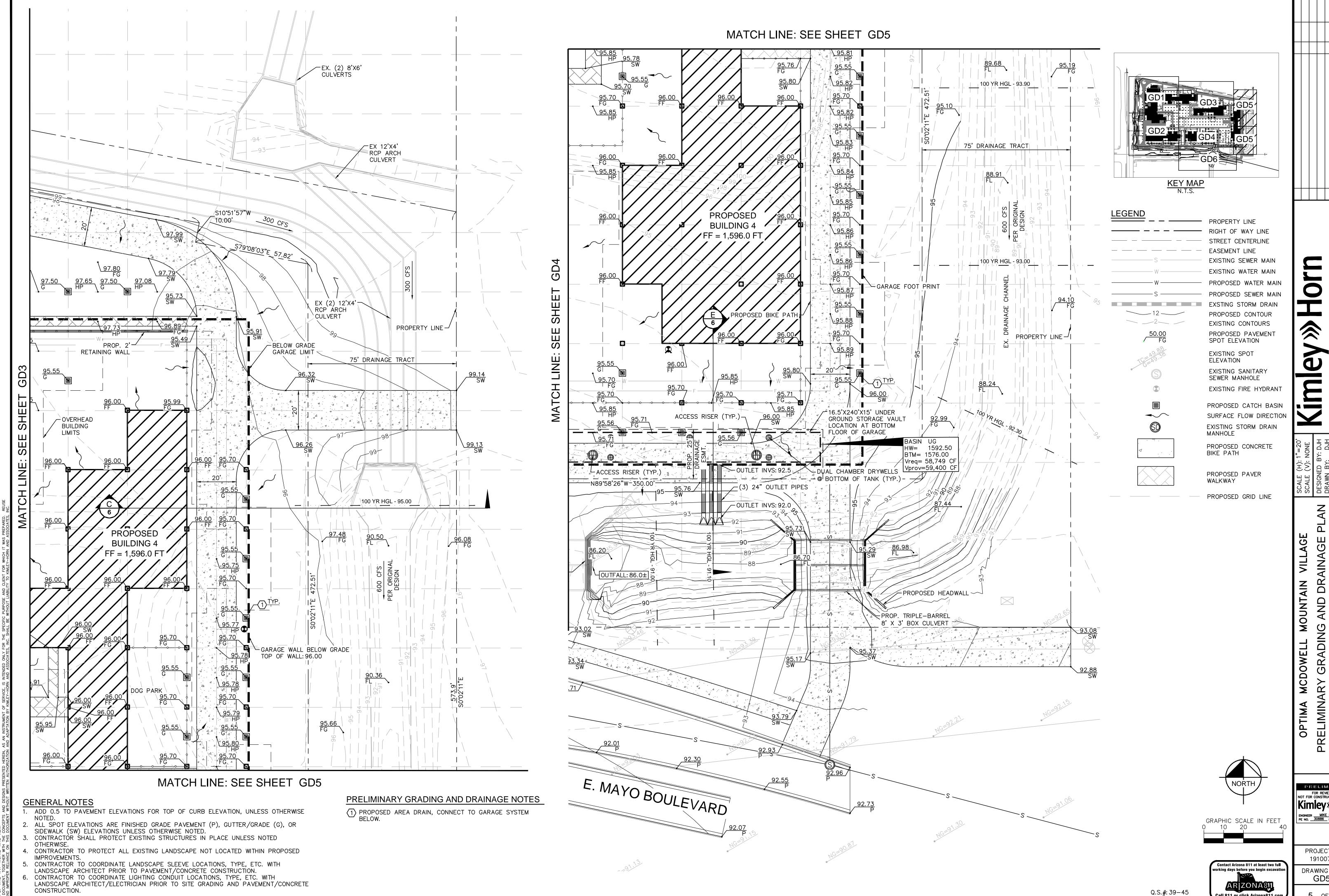
5 MCDO **PRELIMINARY** SCOT

PRELIMINARY FOR REVIEW ONLY
NOT FOR CONSTRUCTION PURI ||Kimley»Horn ENGINEER MIKE DELMARTER
PE NO. 30886 DATE 09/02/2

PROJECT NO. 191007011 DRAWING NAME

GD3 3 OF 7





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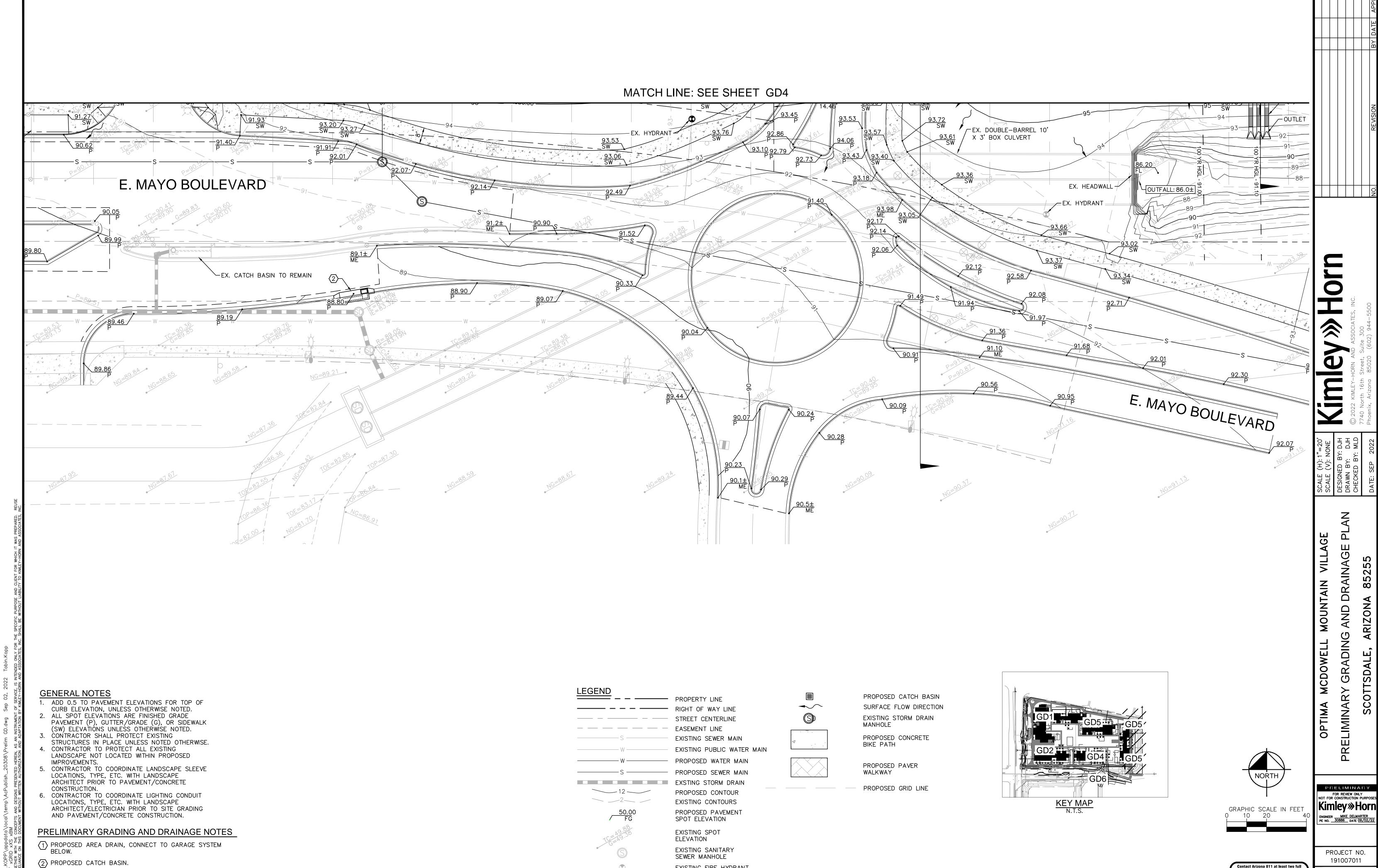
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5 OF 7

Call 811 or click Arizona811.com



EXISTING FIRE HYDRANT

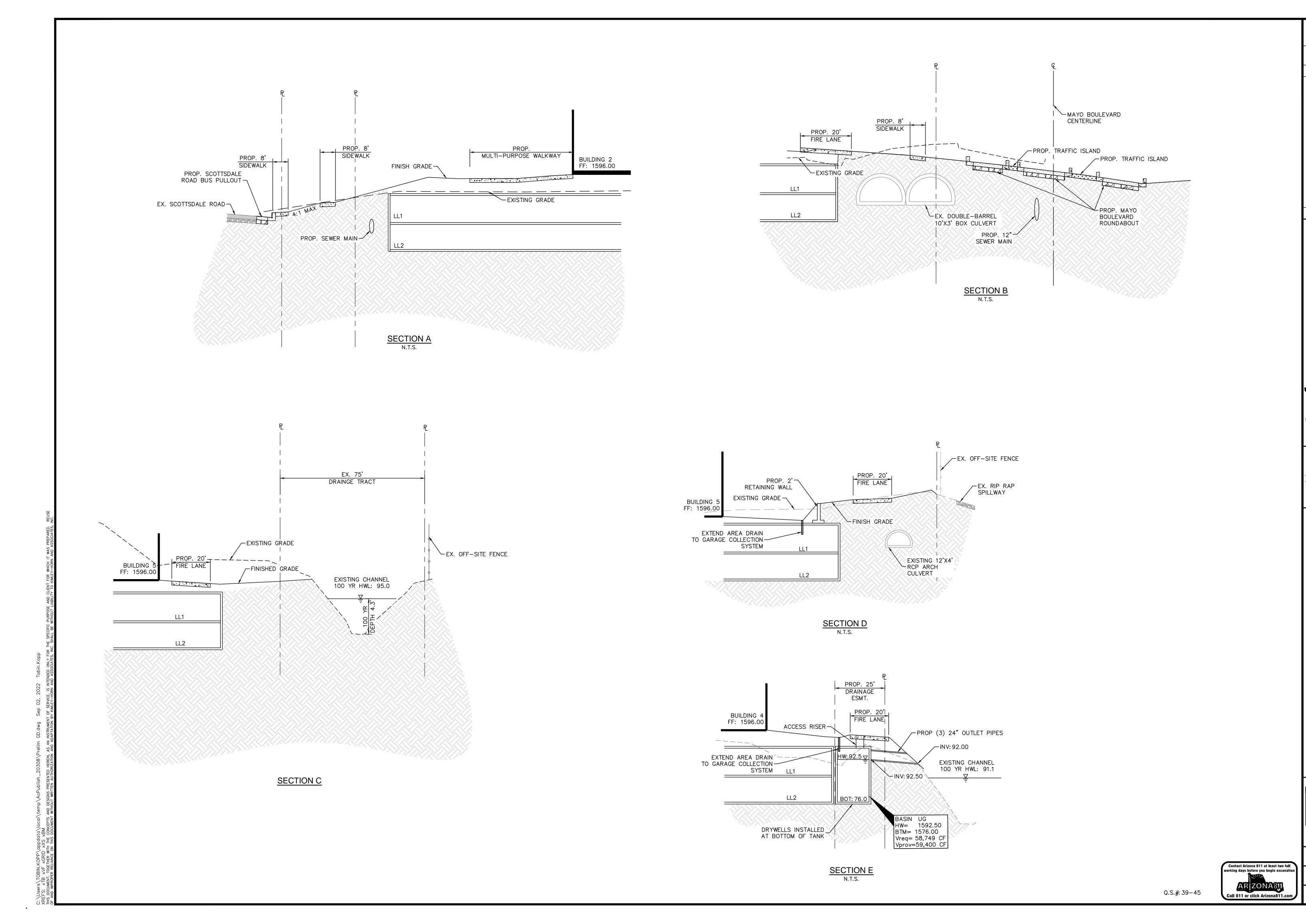
Contact Arizona 811 at least two full

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PE NO. 30886 DATE 09/02/22

> PROJECT NO. 191007011 DRAWING NAME

GD7

7 OF 7



Appendix H

Basin Outlet Calculations

24" Outlet Pipe

	2-7	Outlet i ipe
Project Description		
Friction Mothed	Manning	
Friction Method	Formula	
Solve For	Discharge	
Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.020 ft/ft	
Normal Depth	24.0 in	
Diameter	24.0 in	
Results		
Discharge	31.99 cfs	
Flow Area	3.1 ft ²	
Wetted Perimeter	6.3 ft	
Hydraulic Radius	6.0 in	
Top Width	0.00 ft	
Critical Depth	22.7 in	
Percent Full	100.0 %	
Critical Slope	0.017 ft/ft	
Velocity	10.18 ft/s	
Velocity Head	1.61 ft	
Specific Energy	3.61 ft	
Froude Number	(N/A)	
Maximum Discharge	34.41 cfs	
Discharge Full	31.99 cfs	
Slope Full	0.020 ft/ft	
Flow Type	Supercritical	
GVF Input Data		
Downstream Depth	0.0 in	
Length	0.0 ft	
Number Of Steps	0	
GVF Output Data		
Upstream Depth	0.0 in	
Profile Description	N/A	
Profile Headloss	0.00 ft	
Average End Depth Over Rise	0.0 %	
Normal Depth Over Rise	100.0 %	
Downstream Velocity	Infinity ft/s	
Upstream Velocity	Infinity ft/s	
Normal Depth	24.0 in	
Critical Depth	22.7 in	
Channel Slope	0.020 ft/ft	
Critical Slope	0.017 ft/ft	



Appendix I

Scottsdale Road Drainage Report

DRAINAGE REPORT

SCOTTSDALE ROAD

FRANK LLOYD WRIGHT BLVD to THOMPSON PEAK PARKWAY

SEGMENT 2

March 2009

Prepared For:



City of Scottsdale
Capital Project Management
Transportation Capital Improvement
Program - Major Streets

By:



7500 North Dreamy Draw Drive, Suite 200 Phoenix, Arizona 85020



DRAINAGE REPORT

PROJ. #S7005

SCOTTSDALE ROAD — FRANK LLOYD WRIGHT BLVD TO THOMPSON PEAK PKWY SEGMENT 2

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FINAL DRAINAGE REPORT

PROJ. #S7005

SCOTTSDALE ROAD — FRANK LLOYD WRIGHT BLVD TO THOMPSON PEAK PKWY
SEGMENT 2

I. INTRODUCTION

A. General

This drainage report is prepared for the City of Scottsdale as part of the Segment 2 roadway improvements design of Scottsdale Road from Frank Lloyd Wright Boulevard to Thompson Peak Parkway in Scottsdale, Arizona. The drainage portions of the project include on-site roadway drainage design, as well as design to accommodate off-site runoff crossing the project corridor. This report presents the project background, drainage analysis, and results for the project. The project location is shown on **Figure 1** on the following page.

The improvements to Scottsdale Road are being constructed in two separate segments. Segment 1 extends from Scottsdale Road centerline station 148+00, just south of Union Hills Boulevard, to the Loop 101, Pima Freeway. Also included in this segment are (1) improvements to Union Hills Boulevard extending from Scottsdale Road, Union Hills centerline station 10+00, to Union Hills centerline station 19+82.37 (EOP) and (2) the offsite flow conveyance system for the Lund Cadillac development at the intersection of Union Hills Boulevard and Scottsdale Road. Segment 2 extends from Frank Lloyd Wright Boulevard to Scottsdale Road centerline station 148+00, just south of Union Hills Boulevard, and from the Loop 101, Pima Freeway to Thompson Peak Parkway. This report documents the design of Segment 2. At the time of the writing of this report, construction of Segment 1 is complete. For documentation of Segment 1 of this project refer to *Drainage Report, Frank Lloyd Wright Blvd to Thompson Peak Parkway – Segment 1 100%*, by Dibble Engineering.

The improvements proposed for Scottsdale Road consist of widening the roadway to provide three 12-foot driving lanes in each direction, with a 4-foot bike lane and a 24-foot median, and the addition of concrete curb, gutter, and sidewalk. Where it is necessary, culverts will be

added underneath the roadway to allow off-site flow to pass through the corridor unobstructed and at their historic locations.

B. Study Area

Existing drainage patterns along the project alignment are generally from the northeast to the southwest. The U.S. Bureau of Reclamation (BOR) has constructed large storm water storage embankments along the upstream (north) side of the CAP Canal that impound all runoff generated north of the canal. The Powerline Channel bisects the contributing

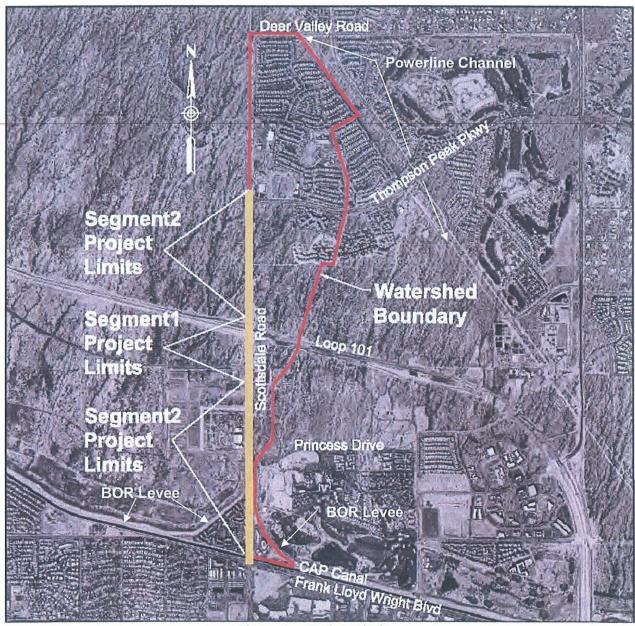


Figure 1 - Project Limits

watershed area and diverts runoff away from the project reducing the peak discharges reaching the roadway. The resulting watershed contributing to drainage across the project corridor has been delineated and is shown on Figure 1. The project is located within FEMA flood zone AO consisting of shallow sheet flow flooding conditions on sloping terrain. Within the project limits, the FEMA maps indicate average flooding depths of 1 foot with velocities in the range of 3 to 4 feet-per-second. The sheet flow flooding conditions are being modified as development takes place within the watershed. The developments are providing on-site retention and providing channelization to control the flow and fix its location. Development is rapidly occurring adjacent to the existing roadway resulting in a mix of fully improved roadway sections with full curb and gutter and older roadway sections with no curb and gutter and dip crossings at existing washes. The existing roadway drainage is described by reach as follows:

Frank Lloyd Wright Blvd. to Princess Drive

The BOR embankments wrap to the north on both sides of Scottsdale Road to contain runoff and allow the roadway profile to drop down to the CAP Canal bridge elevation. The embankments extend northerly to near Princess Drive. Due to the lower elevation, runoff generated south of the embankment terminus cannot be drained by gravity into the impoundment area. Off-site runoff generated within this area is currently contained in retention areas constructed with the developments on both sides of the road. The retention areas currently have no outfall to drain the basins. Pavement runoff generated in this area either drains into the retention basins or drains to the CAP canal service road. The CAP does not accept offsite runoff into the canal right-of-way, so this project will need to identify an alternate means of disposing of the runoff.

Princess Drive to Mayo Boulevard

There is a dip crossing at Chauncey Lane that conveys the runoff from a natural wash on the east side of the road into an improved, landscaped channel constructed as part of the Automotive Group Realty automall. The improved channel drains southerly along the west side of Scottsdale Road to the south side of the automall development where it ends. Runoff reaching the southerly limit of the channel fills the channel and spills out into the roadway shoulder area and continues south to a point where it drains into a

small natural wash that drains into culverts under Princess Drive and into the BOR impoundment area. A second dip section just north of Princess Drive directs runoff accumulating along the east side of Scottsdale Road into the small natural wash into an existing culvert beneath Princess Drive and into the impoundment area.

Loop 101 to Thompson Peak Parkway

The land adjacent to Scottsdale Road is currently unimproved between Loop 101 and Thompson Peak Parkway. Runoff currently crosses the roadway in dip sections at three locations. The crossings are at approximate stations 183+00, 189+00, and 200+00.

There is an existing dip crossing about 400 feet north of Thompson Peak parkway near station 211+00. The Discount Tire corporate offices have been constructed on the northeast corner of Scottsdale Road and Thompson Peak Parkway. This development diverts offsite flow from the north and northeast across Scottsdale Road prior to Thompson Peak Parkway. On-site retention and landscaping has been completed outside the City ROW. The on-site retention basins drain through 3-36 inch pipes under Thompson Peak Parkway into an existing wash that continues to the south. The 3-36 inch pipes also convey Thompson Peak Parkway roadway drainage.

C. Existing Drainage Studies

All areas of the Scottsdale Road project corridor are planned for development in the coming years. A number of drainage reports exist for these developments, and are being investigated for use in the design of the current improvements. The following projects are currently planned or are completed for the Scottsdale Road project corridor.

- ☐ Final Drainage Report, Pima Freeway 9A, Part II, reference #10
- □ Drainage Study, Core North/Core South, reference #15
- □ Interim Regional Drainage Channel, reference #18
- Master Drainage Report for North Scottsdale Gateway, reference #4
- □ Palisene-Paradise Ridge Conceptual Drainage Plan Report, reference #6

D. Corps of Engineers 404 Permit

The U.S. Army Corps of Engineers (COE) has determined that the One Scottsdale (formerly the Stacked 40's) development north of Union Hills Boulevard does not contain jurisdictional washes. Existing jurisdictional washes upstream of the One Scottsdale have been rerouted due to upstream development, cutting off natural wash flow to the area. As there are no significant crossings of Scottsdale Road that do not originate on the One Scottsdale property, there are no jurisdictional waters in the project area and a 404 permit is not required. The delineation determination letter from the COE is contained in **Appendix E**. The Arizona State Land Department (ASLD) has obtained a 404 permit for the entire Paradise Ridge development. The special conditions from that permit will apply to any property obtained from the ASLD within the permitted area.

II. DESIGN CRITERIA

The City of Scottsdale's drainage requirements as stated in the City of Scottsdale, Arizona Design Standards and Policies Manual (DSPM), August 2007, Chapter 4, as well as the Drainage Design Manual for Maricopa County, Arizona, Volume I, Hydrology, January 1, 1995, (Hydrology Manual), and Drainage Design Manual for Maricopa County, Arizona, Volume II, Hydraulics, January 28, 1996, (Hydraulics Manual), will be used as the basis for design. Discussions of specific design criteria are in the sections that follow.

A. Rainfall

As mentioned in Section I.C., a number of drainage studies have already been prepared along the Scottsdale Road corridor to support the design of various developments and the Loop 101, Pima Freeway. A significant portion of the offsite flow design of this project will be based on the rainfall runoff results provided within these previous studies. These projects are listed in section I.C. Figure 2 displays the portions of the project watershed studied within these existing drainage studies, along with proposed offsite drainage features. It can be seen in Figure 2 that the entire project watershed has been studied within the previous studies, and drainage features will be designed based on the results of the corresponding study.

For pavement runoff, and where previous studies of off-site flows require supplementation, rainfall values are obtained from the DSPM isopluvials (for volume calculations) and city-wide IDF curves presented as DSPM *Figure 4.1-3* (maximum discharge calculations).



Figure 2 - Contributing Existing Drainage Studies Map

Exhibit of the areas of the project watershed analyzed by previous drainage studies.

Existing Drainage Studies

- A Paradise Ridge (Reference #6)
 B Pima Freeway 9A, Part II
 (Reference #10)
 C Interim Regional Drainage
 Channel (Reference #18)
- North Scottsdale Gateway (Reference #4)

B. Roadway Inundation

Runoff is allowed to collect in the two right-most driving lanes and bicycle lane for a maximum allowable spread of 29.5 feet from the face of vertical curb. Pavement drainage is collected in curb opening catch basins and MAG scuppers. The following criteria apply to the on-site drainage:

- ❖ A Manning's n value of 0.015 (normal asphalt) will be used for street flow.
- Streets will be designed to carry runoff from a 10-year peak storm. Arterial streets and major collectors will be designed to maintain a single 12-foot dry driving lane in each direction. The peak flows from a 100-year storm will be carried within the cross-section between the right-of-way lines, will be below finished floor of adjacent buildings, and will not produce a depth above the street greater than 8 inches.
- In cases where the peak flows from the design storm exceed the street capacity, underground pipes of sufficient size to carry the excess will be installed.
- Roadside ditches are to be sized to prevent the 10-year storm runoff from saturating the pavement sub-grade.

In addition to the above City of Scottsdale requirements, the following criteria from the Hydraulics Manual have also been adopted for roadway drainage.

- Trapezoidal channel bottoms are a minimum of 4 feet wide for maintenance purposes.
- V-shaped channels are allowed in lieu of a 4-foot trapezoidal channel.

C. Catch Basins & Scuppers

Catch basins are placed as necessary to meet the roadway inundation criteria and at intersections to prevent cross street flow. Curb opening catch basins will be City of Phoenix Standard P1569-1. Area inlet catch basins will be MAG Standard 537, type 'G'. Scuppers will be MAG Standard 206. The interception capacity of catch basins and scuppers is reduced to account for plugging by debris. Grated catch basin capacity is reduced by 50% in sump conditions and by 40% in continuous grade conditions. Curb opening catch basin and scupper capacity is reduced by 20% in both continuous grade and sump conditions.

D. Storm Drains

If a storm drain system is deemed necessary, it will be sized for 10-year inlet flows and will limit the hydraulic grade line to a minimum of 6 inches below the inlet structures using a Manning's n value of 0.013 for precast concrete pipe and 0.011 for smooth walled HDPE pipe.

- The minimum pipe size is 24 inch for mainline storm drains in the pavement and 15 inch for catch basin connector pipes.
- Pipes will be deep enough to not project into the pavement structural section.
- ❖ Maximum spacing of manholes is 300 ft for pipes up to 30 in diameter, 400 ft for pipes larger than 30 in and smaller than 48 in, and 500 ft for pipes 48 in and larger.

Pipes will be designed to accommodate inlets with 100% capture efficiency. Minimum flowing full velocities of 3 ft/s and maximum flowing full velocity of 10 ft/s will be maintained unless restricted by minimum pipe size requirements. The design will, if possible, avoid the interception of an off-site natural wash with the intent of collecting it and putting it into a pipe or underground storm sewer system. If there is no alternative to the routing of an open channel into a piped system, water will be first routed into a sediment or debris basin. The capacity of the conduit should be 100 percent of the design discharge plus 30 percent to accommodate any sediment and debris.

E. Open Channels

- Regional channels will be designed to convey the 100-year planned-to-date conditions peak discharge within the channel banks.
- The design channel depth is the normal flow depth plus freeboard. Required freeboard is 0.25 times the sum of flow depth plus velocity head with a minimum of 1 foot.
- ❖ Froude numbers for channel design are to be less than or equal to 0.86 for subcritical flow. Super-critical flow will be avoided whenever possible.
- ❖ If possible, the minimum channel bend radius will be 3-times the channel top width at the depth of flow.
- Longitudinal channel slopes may be set as steeply as possible within the limitations of the channel material design allowable tractive shear and the limitation on Froude number.
- Surface runoff entering the channel from the side will be directed to enter the channel at planned locations with side spillways. This will limit the possibility of rill erosion for earth channels. Where the top of channel projects above the adjacent existing ground (fill situations), a parallel channel or swale will be used to convey

runoff to a planned channel inflow point. Additional right-of-way may be required in these areas. The parallel auxiliary drainage channel should generally be a v-shaped swale.

F. Off-site Runoff Cross-Road Drainage

It will be necessary to construct a number of culverts beneath Scottsdale Road. The location of these culverts and offsite conveyance channels can be seen in **Figure 2**. As stated in the DSPM, cross road culverts for major collector and arterial streets will be designed to convey the 50-year storm underneath the roadway, with no overtopping; and 100-year storm flows over and above the 50 year values will be conveyed over the roadway with a depth not to exceed 6 inches. However, the proposed profile for Scottsdale Road along the project corridor consists of a nearly continuous grade from north to south, with dip sections at natural wash locations removed. If runoff generated by the 100-year storm were to overtop the curb and gutter, it would be directed down the street, not directly over it. Therefore, culverts will be designed to convey the 100-year storm with no roadway overtopping.

- ❖ Box Culverts will have a minimum height of 4 feet for maintenance purposes, unless physical constraints make a 3 foot box necessary.
- Culverts constructed with channels will be designed to the same 100-year design discharge as used for the channel.

III. HYDROLOGY

A. Introduction

The vast majority of the hydrology for the area has been developed as part of a number of drainage studies for new developments fronting Scottsdale Road and the Loop 101 – Pima Freeway. These studies are listed here and are described in more detail in *Section B. Offsite Methodology*.

- ☐ Final Drainage Report, Pima Freeway 9A, Part II, reference #10
- □ Interim Regional Drainage Channel, reference #18
- ☐ Hydrology Analysis, Paradise Ridge, reference #6
- Master Drainage Report for North Scottsdale Gateway, reference #4

In areas where existing studies require supplementation, and in the design of the pavement drainage, the Rational Method has been employed.

B. Offsite Methodology

Figure 2 displays the portions of the project watershed studied within previous drainage studies, along with proposed offsite drainage features.

B.1 Final Drainage Report, Pima Freeway 9A, Part II

This hydrology study was performed by HDR Engineering Inc. for ADOT to aid in the design of SR101 from Scottsdale Road to Pima Road, resulting in a total watershed area of 15.71 square miles. The study is a combination of portions of several different models that have been prepared for the area by various consultants since 1992. Hydrologic analysis was performed using the U.S. Army Corps of Engineers HEC-1 Flood Hydrograph Package, Version 4.0.3E. The results of this study were used to size pass-through culverts beneath the freeway. In Segment 1 of this project, the results are used to design the Lund Cadillac culvert and channel system. A conservative measure, given that the study has since been revised, and flow rates reduced, within the *Core North/Core South* study.

B.2 Interim Regional Drainage Channel

In 2008 the City contracted with Wood, Patel & Associates to design an interim drainage channel to connect the Lund Channel System to a proposed box culvert approximately 150' north of Princess Drive. Hydrology was done for this channel that incorporated changes made

to the watershed due to the **One Scottsdale** development area north of the Loop 101, i.e. the series of parcels fronting Scottsdale Road on the east side from Loop 101 to Thompson Peak Parkway. One Scottsdale was formerly known as the Stacked 40's. The resulting 100-year peak runoff for the channel is 300 cfs.

B.3 Hydrology Analysis, Paradise Ridge

This hydrology study was performed by Bob Ward, P.E., as a subconsultant to Entranco Biological Resource Group. Paradise Ridge is a proposed subdivision development on the western edge of Scottsdale Road, extending from Mayo Boulevard to Deer Valley Road. The purpose of the study was to assist in the development of jurisdictional "404" washes and to prepare a Master Drainage Plan for Paradise Ridge. The study pieces together a number of previous studies to establish off-site flow patterns impacting the Paradise Ridge property. Minor modifications were made to these models to provide connections to jurisdictional wash inflow points along the east boundary of Paradise Ridge. As part of the development of a Master Drainage Plan a post development runoff model was developed, with anticipated regional drainage features in place on the Paradise Ridge property. Hydrologic analysis was performed using the U.S. Army Corps of Engineers HEC-1 Flood Hydrograph Package, Version 4.0.3E. In the current project, the results of the Paradise Ridge study are used to design Scottsdale Road offsite drainage elements north of Loop 101 and south of Deer Valley Road. The study does not incorporate proposed improvements to One Scottsdale. As One Scottsdale is developed they will need to incorporate any improvements made to Scottsdale Road in the current project based on the results of the Paradise Ridge study.

B.4 Master Drainage Report for North Scottsdale Gateway

This hydrology study was performed by Development Coordination Group, Ltd for Byxbee Development Partners, LLC. North Scottsdale Gateway (NSG) is a triangular shaped site located on the east side of Scottsdale Road, adjacent to and north of the Central Arizona Project Canal (CAP). The site is roughly 18 total acres in size. The site is of particular interest because it is the downstream boundary of flow along Scottsdale Road, before reaching the CAP canal. The site is almost completely protected from offsite flows by the Bureau of Reclamation Levee and

basin system, the only exception being runoff from Scottsdale road and right-of-way south of Princess Drive, and the levee bank itself. The site receives runoff from the entire roadway right-of-way section, except at the downstream end, where roadway runoff is allowed to drain directly onto the CAP canal service road and canal. Hydrologic analysis for the study was performed using the Rational Method. In the current project, the city has been instructed that the CAP canal is not an allowable depository of storm runoff, and runoff presently reaching the service road and the canal must be diverted to an alternative outfall. Also, the NSG property has no acceptable outfall to drain their basins except by evaporation and percolation. A prior commitment was made by the city to connect to the NSG basin system and provide a bleed-off outfall as part of this Scottsdale Road improvement project. The results of the North Scottsdale Gateway study are modified to account for the improved roadway. These results are used to improve North Scottsdale Gateway retention basins for the increased Scottsdale Road runoff and to design a site outfall for the North Scottsdale Gateway Property.

B.6 Powerline Corridor Channel

The Powerline Corridor Channel currently ends about 1,500-feet southeast of Thompson Peak Parkway, capturing and diverting regional flows to the southeast. The *Core North/Core South* hydrology model is structured to include this channel at its current level of construction. Plans are underway to extend the Powerline Corridor Channel southeast to the COS Water Campus. This construction will not impact the portion of the existing studies used for the current project, design flows would remain unchanged with the new channel in place.

C. Onsite Methodology

The rational method is used for runoff calculations for roadway drainage design using a site specific Intensity-Duration-Frequency relationship, checked against the curves presented as *Figure 4.1-3* in the DSPM to ensure the higher intensity is used. This I-D-F relation is also shown in **Appendix A.** The Papadakis and Kazan time of concentration equation from the Hydrology Manual is used to calculate the inlet time (overland flow time) for each inlet. The overland flow time for all inlets is 5 minutes. This value is input into *Hydraflow*. To for the system is

calculated by *Hydraflow*: travel time in the storm drain pipe is computed based on the pipe flowing full velocity and added to the surface runoff times of concentration to obtain the totaled time of concentration for storm drain design.

D. Design Assumptions

The hydrology for this project models the 100-year event (10-year for roadway runoff design) for watershed and land-use conditions as planned by the above referenced developments.

IV. HYDRAULICS

A. Roadway Drainage

A.1 Methodology

The current project represents the full build out of the roadway with complete curb and gutter. Pavement and inlet hydraulic calculations are based on procedures contained in the Federal Highway Administration Hydraulic Engineering Circular No. 12 *Drainage of Highway Pavements*, 1996 and are performed within *Hydraflow v.10.0.0.6* design software.

Storm drain hydraulic grade line calculations are performed by *Hydraflow*, and are made using an iterative procedure that applies Bernoulli's energy equation between downstream and upstream ends of each line in the system. Manning's equation is used to determine head losses due to pipe friction. *Hydraflow* estimates junction losses by using the City of Los Angeles Thompson equation. Manhole losses are computed as K times the velocity head. The values of K are input manually into *Hydraflow* based on criteria adapted from FHWA Hydraulic Engineering Circular No. 12.

A.2 Assumptions

The following assumptions are made in performing the pavement drainage analysis:

- 1. A minimum time of concentration of five minutes is used.
- The 10-year design discharge used for inlet sizing is based on the runoff generated within the proposed right-of-way.
- 3. The C factor for runoff generated within the right-of-way is is 0.95...
- 4. The gutter flow reduction factor for parked vehicles is 1.0, since parking will not be allowed along Scottsdale Road.

B. Channels

B.1 Methodology

Channels are sized using Manning's equation for developed conditions 100-year peak discharges with freeboard using velocity and tractive shear as the primary design parameter. To minimize the overall channel width, the channel cross-section and slope in each channel reach is set to meet an acceptable design velocity.

B.2 Channel Lining

Due to the natural steepness of the ground slope of the area, some channels have a tractive shear value requiring a rip-rap lining to eliminate scour and head cutting. The Manning roughness coefficient, n, is a measure of the flow resistance or relative roughness of a channel. The flow resistance is affected by many factors including bed material, cross section irregularities, depth of flow, vegetation, channel alignment, channel shape, obstructions, suspended material and bed-load. The Arizona Department of Water Resources *Manual for Engineering Analysis of Fluvial Systems* provides an equation for calculating an n-value based on the size of bed material. The base Manning's n-value for 6" dumped rip-rap material is calculated from the following equation;

$$n_b = 0.0395 \times D_{so}^{(1/6)}$$

Where D_{50} = Diameter, in feet, in which 50% of the particles (by weight) are smaller.

This equation yields a base Manning's n-value of 0.034 for the 6" dumped rip-rap.

B.3 Channel Cross Section

Channels are a trapezoidal section with 3 to 1 to 4 to 1 sideslopes. Where a riprap lining is used, a 3 to 1 sideslope is allowable. In an effort to keep velocities low, roadside channels are generally wide and shallow—less than 3 feet in depth.

C. Culverts

New culverts are sized using standard culvert design methodology considering inlet or outlet control as presented in Federal Highway Administration, Hydraulic Design Series No. 5, *Hydraulic Design of Highway Culverts*, September 1985. The calculations check for inlet control, pipe barrel (friction), or tail water control. The condition resulting in the highest computed headwater elevation governs.

V. RESULTS & RECOMMENDATIONS

A. Pavement Drainage Design

The roadway pavement drainage design uses a combination of scuppers with roadside drainage ditches and storm drain. This portion of Scottsdale Road contains few sumps in the roadway profile. Therefore, management of inlet flow-by of gutter flow at intersections governed the selection of spacing and sizing for scuppers and curb inlets along Scottsdale Road. Gutter spread is kept within the design criteria at the design spacing. Gutter depths do not exceed six inches. Hydraflow surface drainage calculations and drainage area calculations can be found in **Appendix B**; Hydraflow surface drainage models provided are described below:

File Name	Description
SurfaceCalcs_West.stm	Surface runoff model for the west halfstreet of
···· · · · · · · · · · · · · · · · ·	Scottsdale Road between Frank Lloyd Wright Blvd and Thompson Peak Pkwy.
SurfaceCalcs_Seg1_East.stm	Surface runoff model for the east halfstreet of
	Scottsdale Road between Stations 141+93 &
	168+04.
SurfaceCalcs_East_N_101.stm	Surface runoff model for east halfstreet of
	Scottsdale Road between the Loop 101 and
	Thompson Peak Parkway.
SurfaceCalcs_East_S_Chauncey.str	m Surface runoff model for east halfstreet of
	Scottsdale Road between Frank Lloyd Wright and
	Chauncey Lane.

Scuppers are MAG Standard 206, modified to remove the concrete spillway and sidewalk; in order to accommodate the future construction of detached concrete sidewalks along the roadway corridor riprap spillways will be used. Inlet lengths vary from 12 feet to 16 feet. Catch basins are COP Standard P1569-1 M1 or M2.

Two underground storm drain systems exist on the project. The first is located at the northwest corner of Scottsdale Road and Princess Drive. This short 10-year system conveys Scottsdale Road and Princess Drive runoff to an existing culvert beneath Princess Drive. This model is provided in **Appendix B**, filename *Princess_Stormdrain.stm*. A second underground

storm drain is designed to provide an outfall for retention basins fronting the North Scottsdale Gateway property. This system is described in more detail in **Section V.D.**

B. Offsite Hydrology

Offsite hydrology results are summarized in the following table and Figure 3.

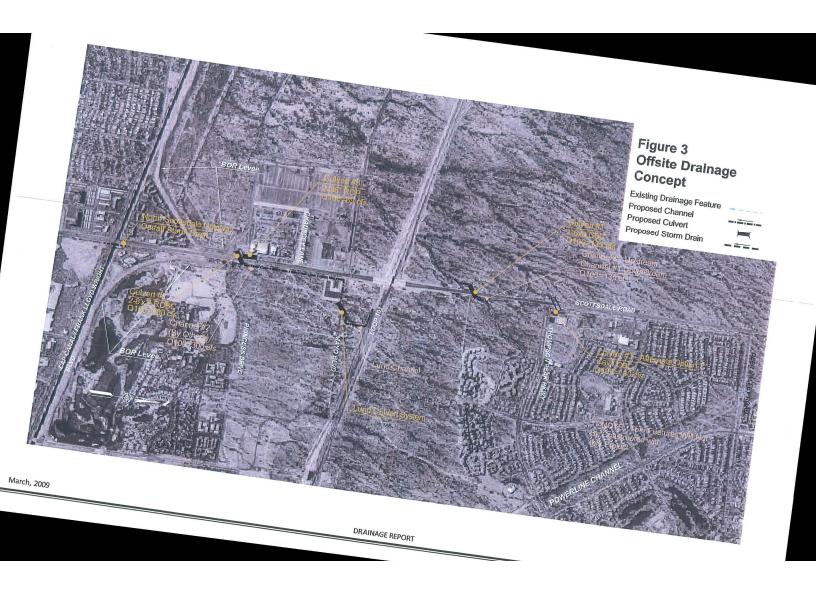
Table 1 – Offsite Design Flow Summary

Hydraulic Structure	Location	Source Drainage Report	100-year Flow
Culvert #1	0.37 mi. South of Thompson Peak Parkway	Paradise Ridge, Bob Ward	224 cfs
Culvert #2	150 ft North of Princess Drive	Interim Regional Drainage Channel, Wood Patel	300 cfs
Culvert #3	2-36" Pipes Automall Frontage (Connects to Culvert #2)	Current Study	76 cfs
Channel #1	0.37 mi. South of Thompson Peak Parkway	Paradise Ridge, Bob Ward	224 cfs
Channel #2	Chauncey to Culvert #2	Interim Regional Drainage Channel, Wood Patel	300 cfs

C. Offsite Drainage Design

There are three offsite drainage features being constructed as part of the Scottsdale Road Segment 2 improvements. Flow rates for each drainage element are presented in **Table 1** and **Figure 3**.

Channel#1/Culvert#1 is located 0.37 miles south of Thompson Peak Parkway, approximate Scottsdale Road centerline station 188+25. Culvert #1 is a single barrel 10'x3' concrete box culvert (CBC). It crosses the intersection of Scottsdale Road and Center Street from Northeast to Southwest at a 48 degree angle. Channel #1 is designed to accept runoff from existing washes and concentrate runoff at the culvert inlet. It is a shallow trapezoidal channel, with a 10 ft. bottom width, 3:1 sideslopes, and a depth of 3 feet. The relatively short channel is riprap lined due to a steep design slope, chosen to match existing grades. Also, an additional segment of Channel #1 has been designed downstream of Culvert #1 to return the runoff to its historic location. Culvert and channel calculations can be found in **Appendix C**.



One Scottsdale (formerly known as the Stack 40's) are a series of parcels planned for commercial development in the coming years. They front Scottsdale Road on the eastern side from Union Hills Drive to Thompson Peak Parkway, and they are being designed concurrently with this project. As part of One Scottsdale, the Scottsdale Road scenic easement where Culvert #1 is being constructed will be redesigned. It will be necessary for the scenic easement to be designed to incorporate the culverts and drainage concept described in this report.

Culvert#2 is located 150 feet north of Princess Drive, approximate Scottsdale Road centerline station 125+00. Culvert #2 is a double barrel 8'x 3' CBC until it leaves the roadway corridor, at which point it becomes a double barrel 8'x4' CBC. This then ties into the existing box culvert beneath Princess Drive. Calculations for this culvert are done using XPStorm software and are provided in **Appendix C**. Channel #2 is being designed by Wood, Patel & Associates and is documented in Reference #18.

Culvert #3

Culvert #2 also receives runoff from the frontage of the Automotive Group Realty automall by way of 2-36" storm drain pipes. The existing channel fronting the automall has been designed to accommodate additional offsite flow. However, at the southern end of the automall property there is no outfall for the channel, it simply ends. Culvert #3 begins here and ties into the box culvert (Culvert #2) crossing Scottsdale Road. As part of this drainage plan the existing low flow crossing at Chauncey Lane is removed and offsite flow is directed south in a channel (Channel #2) designed by Wood, Patel, & Associates. This greatly reduces the runoff reaching the automall frontage. The 100-year peak flow used for the design of Culvert #3 is 76 cfs. The peak flow was calculated using the Rational Method. The time of concentration was calculated based on pipe travel time for the Scottsdale Road storm drain outfalling to the automall frontage (36") plus the travel time in the frontage channel itself. The drainage area includes the drainage area contributing to the Scottsdale Road storm drain, the area of the automall frontage, and the west half-street pavement area between Union Hills Drive and the scupper at station 131+60. Calculations are provided in Appendix C.

D. North Scottsdale Gateway Retention and Outfall Design

As stated in section III.B.4, North Scottsdale Gateway (NSG) is a triangular shaped site located on the east side of Scottsdale Road, adjacent to and north of the Central Arizona Project Canal (CAP). The property was originally designed to retain both the onsite and offsite 100-year 2hr storm runoff, for which there existed no outfall and which ponded on the site prior to development. The total area of offsite runoff is bounded by the western limit of the Scottsdale Road right-of-way to the west, Princess Drive to the north, the BOR flood control berm to the east, and the CAP canal to south. See **Figure 2** on page 7.

With the widening of Scottsdale Road, the area of paved surface has increased beyond that which the previous drainage design anticipated. Also, the widened roadway extends into the area of the scenic corridor that is currently used for retention. The goal of the current project is to maximize the remaining area within the scenic corridor for retention and provide a system outfall to drain the basins and reduce the likelihood of stormwater runoff entering the CAP canal.

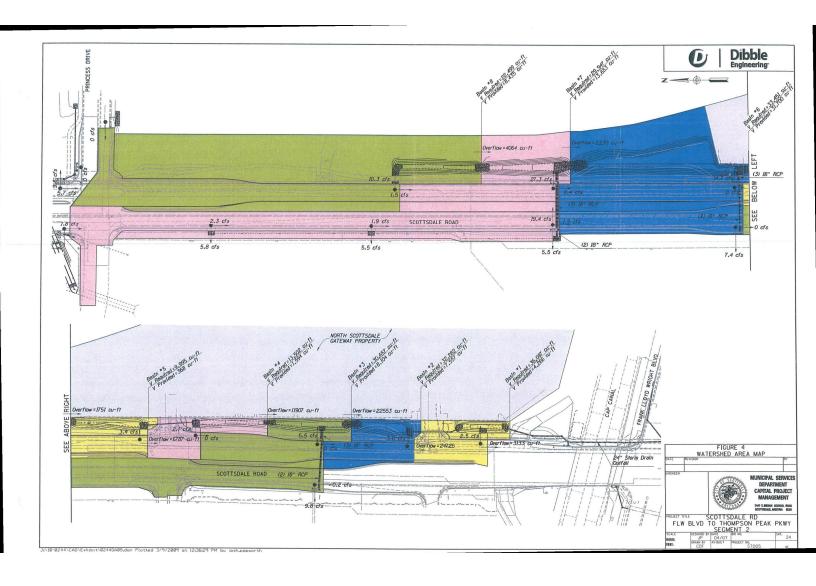
In calculating runoff volume, the relevant watershed area was divided into onsite and offsite areas. Onsite areas refer to the NSG property, the scenic easement, and the roadway half-street fronting the NSG. Offsite areas correspond to the western half street and the area upstream of the NSG property up to Princess Drive. Runoff generated north of Princess Drive drains to conveyances that outfall to the BOR storage impoundment areas. **Figure 4** shows the drainage area boundaries for each proposed retention basin.

Data for the runoff generated on the NSG property is obtained from the drainage report for the project *Master Drainage Report for North Scottsdale Gateway*. Offsite, roadway, and scenic easement runoff volumes are calculated using the equation presented din section 4-1.807 of the DSPM. These calculations were done using a spreadsheet and can be found in **Appendix D**.

During the planning stage of this project, when it was discovered that the retention basins existing in the scenic easement fronting the NSG would not be large enough to accommodate the 100 year 2 hour runoff volume for both the onsite and offsite runoff reaching the development and the CAP boundary, alternatives were presented to the city for consideration. It was decided at that time that retention basins would be used in the remaining scenic easement area, and a 24 inch outflow pipe would extend from the southernmost basin, across the canal and Frank Lloyd Wright Boulevard, finally tying into an existing 24 inch storm drain at the Promenade development. It was understood that this option would likely not provide 100yr or 10-yr retention of the watershed area (including the NSG property) but runoff in excess of the provided capacity would outfall in a controlled manner to Scottsdale Road and continue south. Meeting minutes relevant to these discussions are provided in Appendix D. Table 2 and Figure 4 present the summary of runoff calculations and the capacity of the associated retention basins. Retention basins are cascading, each overflowing into the next or returning to the street when its capacity is exceeded. Small diameter drain pipes connect each basin so they may drain slowly. It can be seen in Table 2 that the percent of the 100-year and 10-year volumes that are provided are 72% and 81% respectively. This suggests that the peak runoff values from these storms will be attenuated significantly, reducing the load on the 24" outfall pipe. Based on modeling of the 24" storm drain outfall system, its capacity is approximately 22cfs. However, because of the uncertainties associated with the capacity of the Promenade storm drain it is possible that the system could back up and not be capable of draining runoff from the NSG retention basins. This would be a relatively rare occurrence and last for a short duration. The Hydraflow model for the NSG outfall storm drain system is provided in Appendix **D**, titled FLW_Stormdrain.stm.

Table 2 - North Scottsdale Gateway Retention Summary

	e z – North Scottsdai			
100 yr 2 hr - Proposed De				
	Volume	Volume		Cumulative
	Req'd	Provided	Difference	Difference
TOTAL BASIN #8	22499	8435	14064	14064
TOTAL BASIN #7	15883	13653	2230	16294
TOTAL BASIN #6	17157	31700	-14543	1751
TOTAL BASIN #5	8204	3168	5036	6787
TOTAL BASIN #4	6715	1594	5121	11907
TOTAL BASIN #3	18750	8104	10646	22553
TOTAL BASIN #2	9729	7557	2172	24725
TOTAL BASIN #1	11372	4766	6606	31331
Total	110308	78977		31331
			% Provided	0.72
10 CHave Brancad	Davies			
10 yr 6 Hour - Proposed		Material		0 1
10 yr 6 Hour - Proposed	Volume	Volume		Cumulative
	Volume Req'd	Provided	Difference	Difference
TOTAL BASIN #8	Volume Req'd 16649	Provided 8435	8214	Difference 8214
	Volume Req'd	8435 13653		Difference
TOTAL BASIN #8	Volume Req'd 16649	8435 13653 31700	8214 -1900 -19004	Difference 8214
TOTAL BASIN #8 TOTAL BASIN #7	Volume Req'd 16649 11753	8435 13653	8214 -1900	Difference 8214 6314
TOTAL BASIN #8 TOTAL BASIN #7 TOTAL BASIN #6	Volume Req'd 16649 11753 12696	8435 13653 31700	8214 -1900 -19004	Difference 8214 6314 0
TOTAL BASIN #8 TOTAL BASIN #7 TOTAL BASIN #6 TOTAL BASIN #5	Volume Req'd 16649 11753 12696 6071	8435 13653 31700 3168	8214 -1900 -19004 2903	8214 6314 0 2903
TOTAL BASIN #8 TOTAL BASIN #7 TOTAL BASIN #6 TOTAL BASIN #5 TOTAL BASIN #4	Volume Req'd 16649 11753 12696 6071 4969	8435 13653 31700 3168 1594	8214 -1900 -19004 2903 3375	8214 6314 0 2903 6277
TOTAL BASIN #8 TOTAL BASIN #7 TOTAL BASIN #6 TOTAL BASIN #5 TOTAL BASIN #4 TOTAL BASIN #3	Volume Req'd 16649 11753 12696 6071 4969 13875	8435 13653 31700 3168 1594 8104	8214 -1900 -19004 2903 3375 5771	8214 6314 0 2903 6277 12048
TOTAL BASIN #8 TOTAL BASIN #7 TOTAL BASIN #6 TOTAL BASIN #5 TOTAL BASIN #4 TOTAL BASIN #3 TOTAL BASIN #2	Volume Req'd 16649 11753 12696 6071 4969 13875 7200	8435 13653 31700 3168 1594 8104 7557	8214 -1900 -19004 2903 3375 5771 -357	8214 6314 0 2903 6277 12048 11691
TOTAL BASIN #8 TOTAL BASIN #7 TOTAL BASIN #6 TOTAL BASIN #5 TOTAL BASIN #4 TOTAL BASIN #3 TOTAL BASIN #2 TOTAL BASIN #1	Volume Req'd 16649 11753 12696 6071 4969 13875 7200 8415	8435 13653 31700 3168 1594 8104 7557 4766	8214 -1900 -19004 2903 3375 5771 -357	8214 6314 0 2903 6277 12048 11691 15340
TOTAL BASIN #8 TOTAL BASIN #7 TOTAL BASIN #6 TOTAL BASIN #5 TOTAL BASIN #4 TOTAL BASIN #3 TOTAL BASIN #2 TOTAL BASIN #1	Volume Req'd 16649 11753 12696 6071 4969 13875 7200 8415	8435 13653 31700 3168 1594 8104 7557 4766	8214 -1900 -19004 2903 3375 5771 -357	Difference 8214 6314 0 2903 6277 12048 11691 15340



In order to convey the 100-yr 2-hr runoff volume to the retention basins, scuppers, catchbasins and cross road culverts south of Princess Drive have been designed for the 100-year peak flows using the rational method. Output from the 100-year Hydraflow surface calculations and culvert calculations are provided in **Appendix D**. The following models are provided:

File Name	Description
100+74.44.stm	Analysis of cross road culvert at Station 100+74.44.
	100-year peak flow.
107+23.stm	Analysis of cross road culvert at Station 107+23.
	100-year peak flow.
111+82.stm	Analysis of cross road culvert at Station 111+82.
	100-year peak flow.

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18. Wood, Patel & Associates, Interim Regional Drainage Channel, May 2008.

ADOT - HIGHWAY DRAINAGE DESIGN MANUAL - HYDROLOGY RAINFALL DEPTH-DURATION-FREQUENCY (D-D-F) WORKSHEET

Project No.: 10-0244.2 TRACS No: N/A

Project Name: Scottsdale Road - Frank Lloyd Wright to Date: 22-Mar-07

Thompson Peak Pkwy

Location/Sta: MARICOPA COUNTY, AZ

Designer: Josh Papworth

PART A		PART B	
		======	
Rainfall Depths from Iso	opluvials:	2-year, 1-hour =	0.93 in.
2-year, 6-hour =	1.30 in.	100-year, 1-hour =	2.52 in.
2-year, 24-hour =	1.70 in.	2-year, 2-hour =	1.05 in.
100-year, 6-hour =	3.30 in.	2-year, 3-hour =	1.14 in.
100-year, 24-hour=	4.05 in.	2-year, 12-hour =	1.50 in.
		100 - year, 2-hour =	2.79 in.
		100-year, 3-hour =	2.97 in.
		100-year, 12-hour=	3.68 in.

PART C

8)

2-year, 5-min ≈	0.31 in.	Duration -	Ratio	-
2-year, 10-min =	0.47 in.	(Min) 2	-yr 100	D-yr
2-year, 15-min =	0.57 in.	5	0.34	0.30
2-year, 30-min =	0.76 in.	10	0.51	0.46
100-year, 5-min =	0.76 in.	15	0.62	0.59
100-year, 10-min =	1.16 in.	30	0.82	0.80
100-year, 15-min =	1.49 in.			
100-year, 30-min =	2.02 in.			

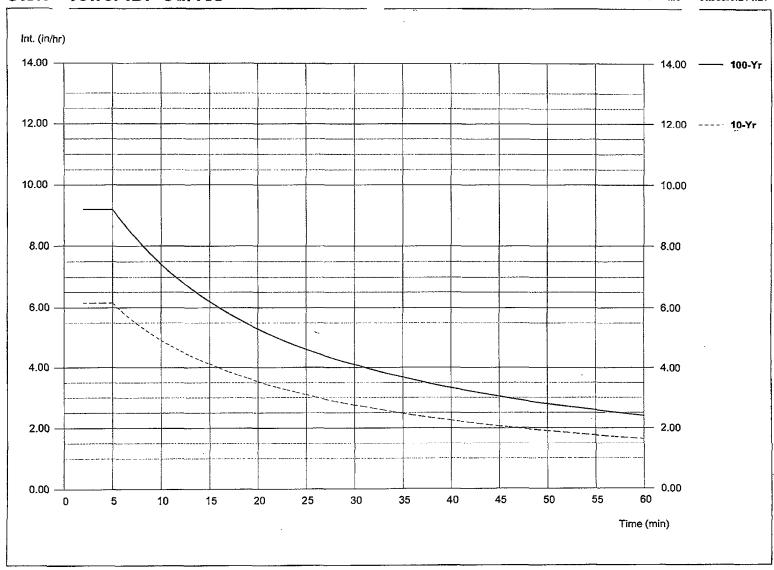
PART D & E

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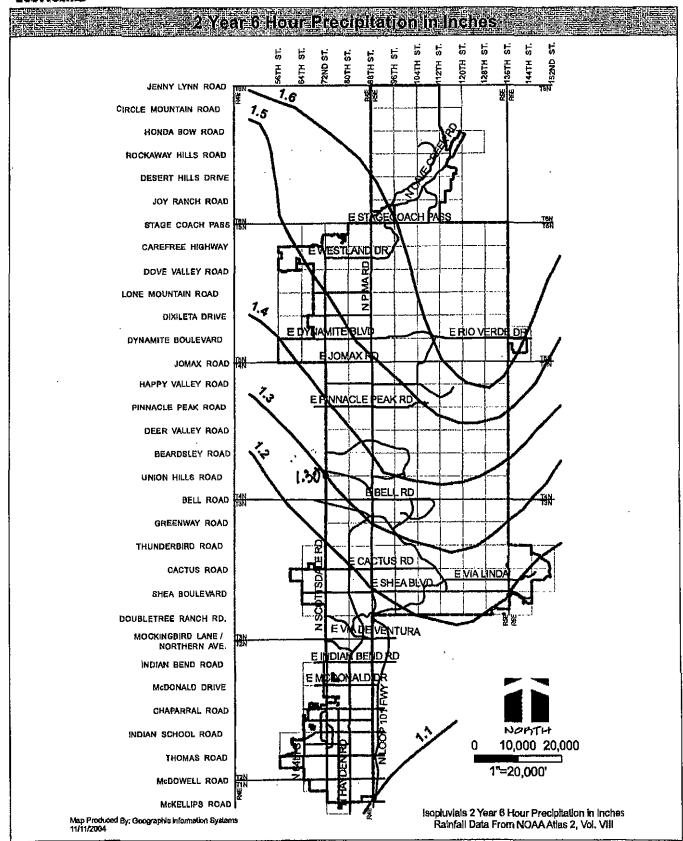
				Rain	fall Depth, (i	n)	
				Fre	quency (yrs)	
Duration		2-yr	5-уі	r <u>10-</u> y	r 25-yr	50-yr	500-yr
5-min	=	0.	31 0	.42 0	60 0.60	0.68	0.94
10-min	=	0.4	47 0	.64	0.9	2 1.04	1.44
15-min	=	0.9	57 0	.80	95 1.10	3 1.33	1.86
30-min	=	0.	76 1	.07	28 1.5	7 1.80	2.53
1-hour	=	0.9	93 1	.33	59 1.90	6 2.2 4	3.17
2-hour	=	1.0	05 1	.49	2.1	7 2.48	3.50
3-hour	=	1.1	14 1	.59	2.32	2 2.64	3,71
6-hour	=	1.3	30 1	.79 2	18 2.59	2.95	4.12
12-hour	=	1.5	50 2	.03	39 2.90	3.29	4.57
24-hour	=	1.	70 2	.27	66 3.2°	1 3.63	5.02

Storm Sewer IDF Curves

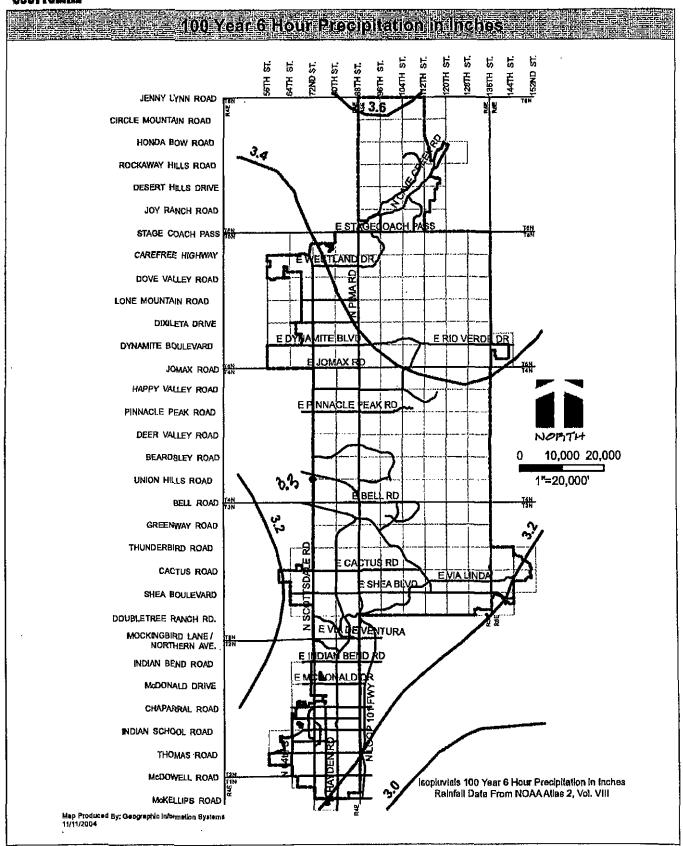
IDH Tile" "ottsdaleiDH,IDH



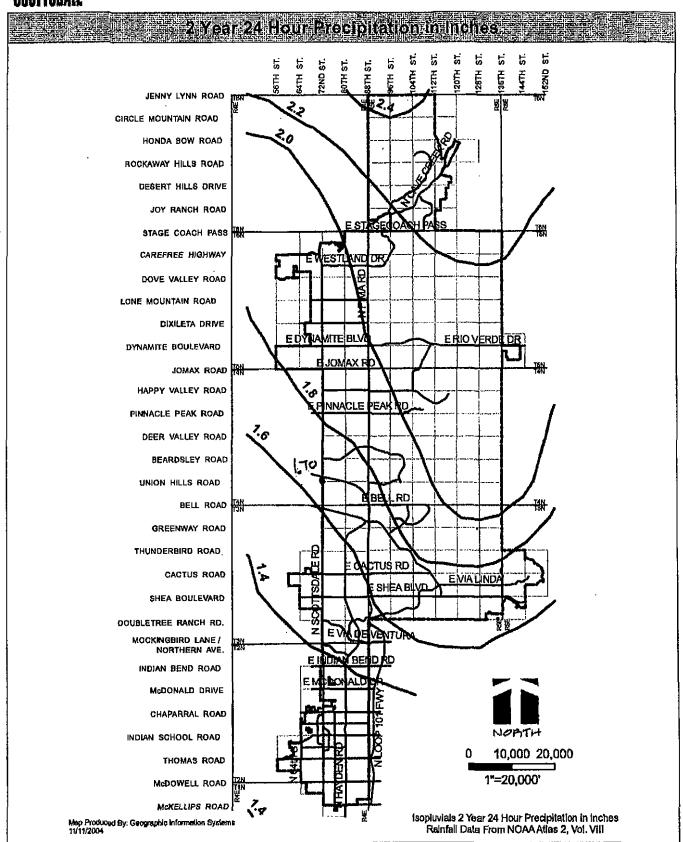




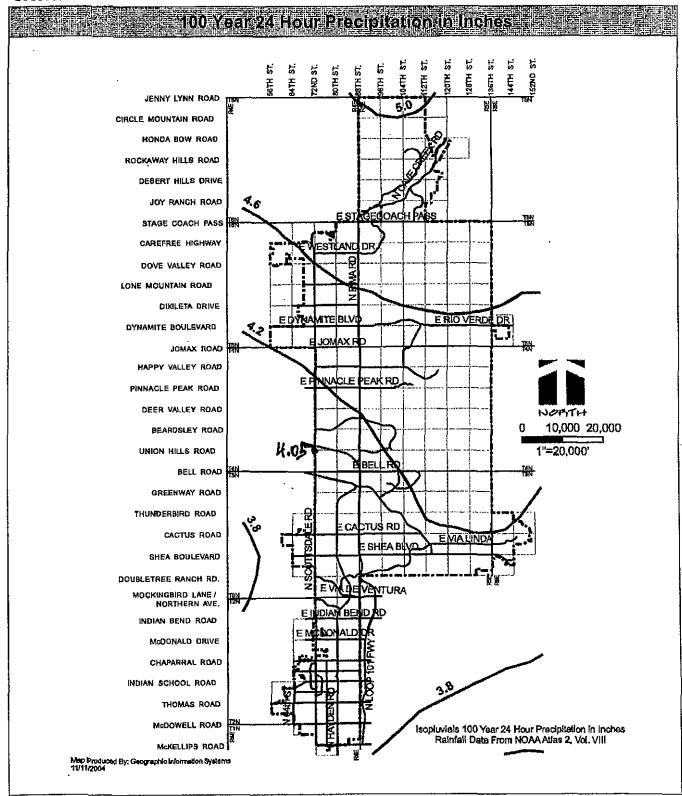






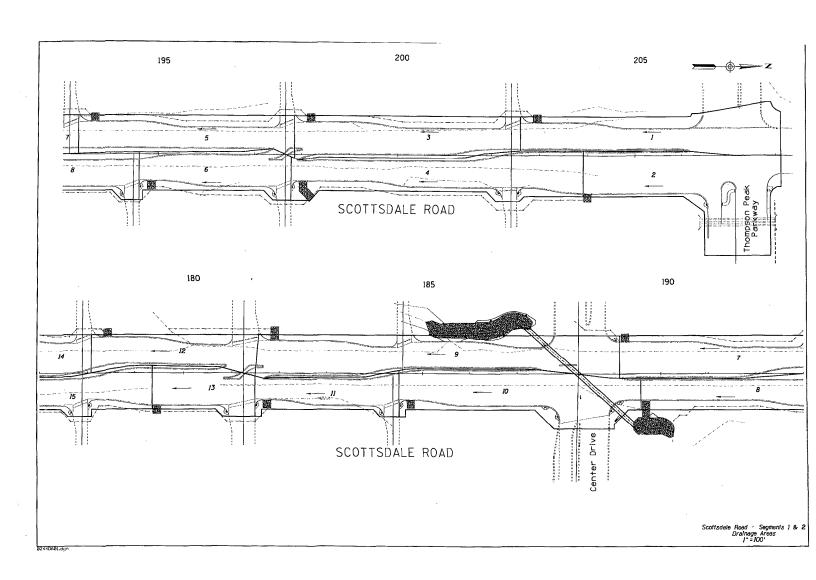


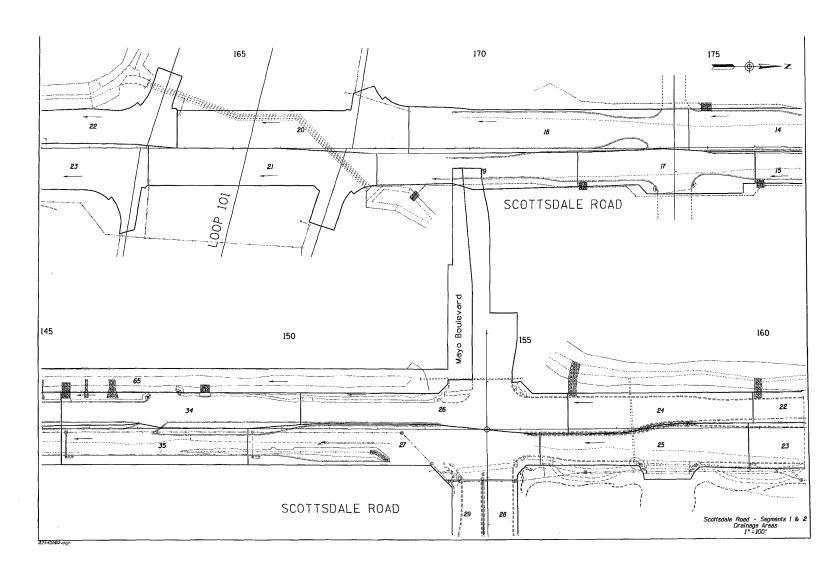


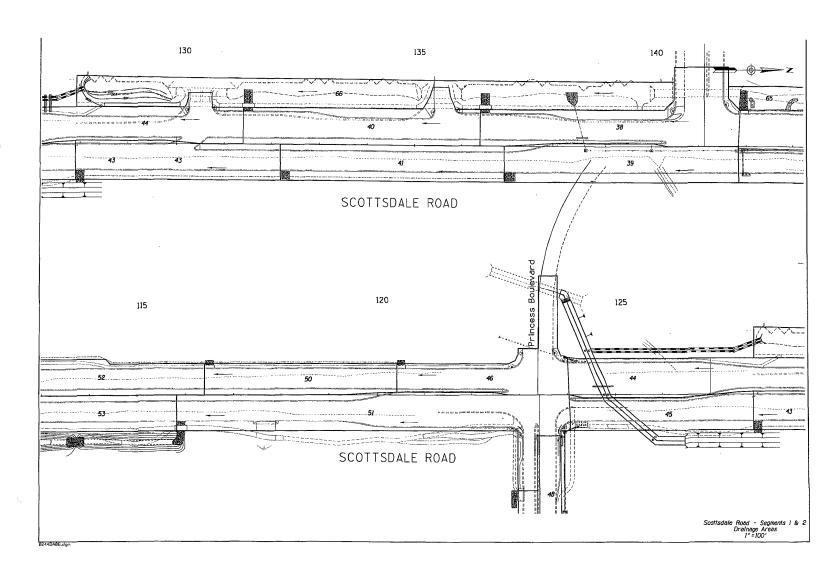


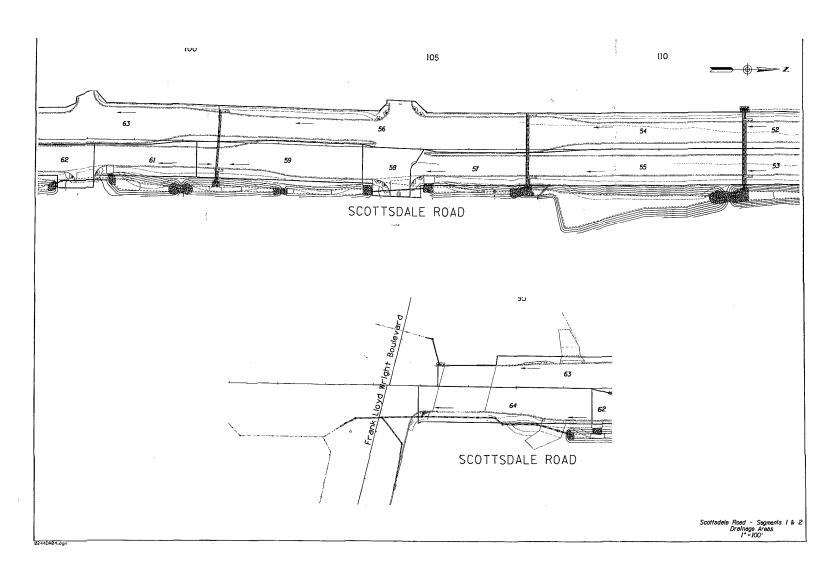
Scottsdale Road - Segment 2 Drainage Area Summary Sheet

Drainage				
Area	AREA (ac)	S-J (ft/ft)	S-x (ft/ft)	Lc (min.)
1	0.998	0.016	0.022	5
2	1,284	0.025	0.020	5
3	0.917	0.015	0.018	5
4	1.118	0.015	0.022	5
6	0.784	0.015	0.020	5
6	0.611	0.015	0.021	5
7	0.844	0.018	0.010	5
8	0.836	0.017	0.014	5
9	1.377	0.015	0.018	5
10	1.077	0.006	0.020	5
11	0.492	0.011	0,024	5
12	0.553	0.015	0.025	5
13	0.443	0.020	0.019	5
14	0.696	0.024	0.019	5
15	0.593	0.012	0.026	5
16	0.398	0.012	0.020	5
17	0.703	0.013	0.025 0.020	5
18	0.800	0.018		
19	0.674	0.017	0.020	5 5
20 21	0.989	0.018 0.013	0.020 0.020	5
	0.951	0.013	0.020	5
22	0.741 0.844	0.015	0.024	5
23	0.653	0.007	0.014	5
25	0.845	0.007	0.022	5
26	1.510	0.016	0.026	5
27	1.245	0.010	0.022	5
28	0.242	0.0072	0.013	5
29	0.238	0.0041	0.023	5
30	0.221	0.0055	0.017	5
31	0.809	0.0000	0.021	5
32	0.400	0.0040	0.023	5
33	0.694	0.0000	0.03	5
34	0.819	0.013	0.023	5
35	0.701	0.013	0.016	5
36	0.627	0.012	0.009	5
37	0,597	0.013	0.012	5
38	1,148	0.017	0.025	5
39	0.889	0.016	0.022	5
40	0.911	0.011	0.025	5
41	0.814	0.016	0.022	5
42	0.877	0.018	0.014	5
43	0.770	0.007	0.021	5
44	1.310	0.013	0.010	5
45	0.632	0.009	0.011	5
46	0.718	0.014	0.024	5
47	0.785	0.014	0.021	5
48	0.252	0.0060	0.017	5
49	0.100	0.0120	0.023	5
50	0.591	0.012	0.021	5
51	0.699	0.012	0.023	5
52	0.750	0.014	0.022	5
53	0.793	0.014	0.022	5
54	0.797	0.006	0.024	5
55	0.778	0.005	0.028	5
56	1.140	0.009	0.033	5
57	0.390	0.013	0.027	5
58	0.238	0.017	0.009	5
59	0.832	0.006	0.022	5
60	0.818	0.006	0.025	5
61	0.337	0.010	0.029	5
62	0.278	0.008	0.031	5
63	0.424	0.012	0.015	5
64	0.623	0.012	0.019	5
65	2.960	ļ	ļ <u>-</u>	5
66	2.060	-	·	5









DIBBLE & ASSOCIATES CONSULTING ENGINEERS

23-Mar-07 10-0244 JEP

Scottsdale Road

8JF

Channel Design

 Date
 23-Mar-07

 Job No.
 10-0244

 By
 JEP

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 Chk'd
 BJF

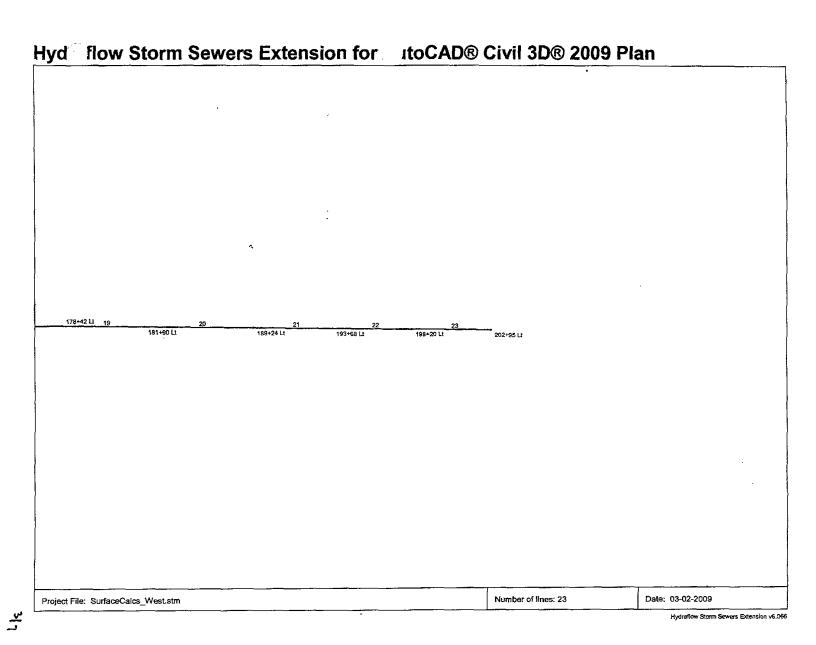
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Channel: INPUT DATA:		SCOTTSDA	E ROAL) - Typical	Calculation	for Roadsid	e Ditch - 1	0Yr							
Manning's n =		0.024 C	ompacte	d Soil											
T allow =		0.30 lb	/ft^2												
Sideslope Left =		4.0 :1													
Sideslope Right =		4.0 :1													
Bottom slope =		0.0 p	ercent								_				
												Topwid	ith		
Reach	Slope	BW (ft)	t B	e e e e e e e e e e e e e e e e e e e		and the Comme	DSP		F (\$						
Roadside Ditch	0.0150	0.0	0.0	0.92	4.43	0.024	15.0	1.15	0.42	1.00	1.92	7.36	15.36	22.08	0.20
Roadside Ditch	0.0150	0.0	0.0	0.79	4.00	0.024	10.0	1.12	0.36	1.00	1.79	6.32	14.32	18.97	0.17
Roadside Ditch	0.0150	0.0	0.0	0.61	3.37	0.024	5.0	1.07	0.28	1.00	1.61	4.88	12.88	14.63	0.12
Roadside Ditch	0.0100	0.0	0.0	0.99	3.80	0.024	15.0	0.95	0.30	1.00	1.99	7.94	15.94	23.83	0.15
Roadside Ditch	0.0100	0.0	0.0	0.85	3.44	0.024	10.0	0.93	0.26	1.00	1.85	6.82	14.82	20.47	0.12
Roadside Ditch	0.0100	0.0	0.0	0.66	2.89	0.024	5.0	0.89	0.20	1.00	1.66	5.26	13,26	15.78	0.09
Roadside Ditch	0.0050	0.0	0.0	1.13	2.93	0.024	15.0	0.69	0.17	1.00	2.13	9.05	17.05	27.14	0.09
Roadside Ditch	0.0050	0.0	0.0	0.97	2.65	0.024	10.0	0.67	0.15	1.00	1.97	7.77	15.77	23,31	0.07
Roadside Ditch	0.0050	0.0	0.0	0.75	2.23	0.024	5.0	0,64	0.11	1.00	1.75	5.99	13.99	17.97	0.05

Hyd. How Storm Sewers Extension for 110CAD® Civil 3D® 2009 Plan Outfall 93+40 Lt 136+50 Ltt 0 Number of lines: 23 Date: 03-02-2009 Project File: SurfaceCalcs_West.stm

7

Hyd	.flow Stor	m Sewe	ers Exte	nsion fo	or. utoC	CAD®	Civil 3D® 2	2009 PI	an	
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+95 년 11	145+50 Lt 12	150+50 ktdSC 1	155+25 LI S& 2	160+00 k⇔SC 3	163+91 Lt	16	168+71 L47	18 74+95 Lt	178+42 Lt 19	181+901
Į.									•	
								•		
Project F	ile: SurfaceCalcs_West	.stm					Number of lines; 23		Date: 03-02-2009	
										Course Extension of Of



Storr Sewer Tabulation

Page 1

Sta	tion	Len	Dmg	Area	Rnoff	Are	axC	Т	:	Rain	Total	Cap full	Vel	Pi	pe	Invert	Elev	HGĻ	Elev	Grnd / R	im Elev	Line ID
.ine	То		Incr	Total	COBIL	incr	Total	Inlet	Syst	(n)	flow	Tull		Size	Slope	Up	Dn	Up	Dn	Up	Dn	
	Line	(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
	End	50.0	1.06	20.99	0.95	1.01	19.94	5,0	310.9	0.4	7.52	0.00	0.27	72	0.00	1.00	1.00	7.00	7.00	0.00	-0.00	Dummy Line
	1	840.0	1.14	19.93	0.95	1.08	18.93	5,0	295.7	0.4	7.49	0.00	0.26	72	0.00	1.00	1.00	7.00	7.00	0.00	0.00	Dummy Line
}	2	730.0	0.80	18.79	0.95	0.76	17.85	5.0	282.4	0.4	7.38	0.00	0.26	72	0.00	1.00	1.00	7.00	7.00	0.00	0.00	Dummy Line
, ,	3	270.0	0.75	17.99	0.95	0.71	17.09	5.0	277.4	0,4	7.18	0.00	0.25	72	0.00	1.00	1.00	7.01	7.00	0.00	0.00	Dummy Line
;	4	470.0	0.59	17.24	0.95	0.56	16.38	5.0	268.6	0.4	7.10	0.00	0.25	72	0.00	1.00	1.00	7.01	7.01	0.00	0.00	Dummy Line
	5	400.0	0.72	16,65	0.95	0.68	15.82	5.0	261.1	0.4	7.04	0.00	0.25	72	0.00	1.00	1.00	7.01	7.01	0.00	0.00	Dummy Line
	6	365.0	0.43	15.93	0.95	0.41	15,13	5.0	254.2	0,5	6.91	0.00	0.24	72	0.00	1.00	1.00	7.01	7.01	0.00	0.00	Dummy Line
3	7	235.0	0.88	15.50	0.95	0.84	14.73	5.0	249.8	0.5	6.84	0.00	0.24	72	0.00	1.00	1.00	7.01	7,01	0.00	0,00	Dummy Line
1	8	500.0	0.91	14.62	0.95	0.86	13.89	5.0	240.1	0.5	6.70	0.00	0.24	72	0.00	1.00	1.00	7.01	7.01	0.00	0.00	Dummy Line
0	9	355.0	1.15	13.71	0.95	1.09	13.02	5.0	233.1	0.5	6.46	0.00	0.23	72	0.00	1.00	1.00	7.01	7.01	0.00	0.00	Dummy Line
1	10	500.0	0.63	12.56	0.95	0.60	11.93	5.0	222.8	0.5	6.18	0.00	0.22	72	0.00	1.00	1.00	7.01	7.01	0.00	0.00	Dummy Line
12	11	475.0	0.82	11.93	0.95	0.78	11.33	5.0	213.0	0.5	6.12	0.00	0.22	72	0.00	1.00	1.00	7.01	7.01	0.00	0.00	Dummy Line
13	12	475.0	1.51	11.11	0.95	1.43	10.55	5.0	203.0	0.6	5.96	0.00	0.21	72	0.00	1.00	1.00	7.01	7.01	0.00	0.00	Dummy Line
14	13	391.0	0.79	9.60	0.95	0.75	9.12	5.0	194.0	0,6	5.38	0.00	0.19	72	0.00	1.00	1.00	7.02	7.01	0.00	0,00	Dummy Line
15	14	475.0	0.75	8.81	0.95	0.71	8.37	5.0	182.6	0.6	5.22	0.00	0.18	72	0.00	1.00	1.00	7.02	7,02	0.00	0.00	Dummy Line
16	15	391.0	0.68	8.06	0.95	0.65	7.66	5.0	172.9	0.7	5.02	0.00	0.18	72	0.00	1.00	1.00	7.02	7.02	0.00	0.00	Dummy Line
7	16	874.0	1.20	7.38	0.95	1.14	7.01	5.0	152.1	0.7	5.18	0.00	0.18	72	0.00	1.00	1.00	7.02	7.02	0.00	0.00	Dummy Line
8	17	359.2	0.70	6.18	0.95	0.67	5.87	5.0	142.4	0.8	4.60	0.00	0.16	72	0.00	1.00	1.00	7.02	7.02	0.00	0.00	Dummy Line
9	18	540.0	0.55	5.48	0.95	0.52	5.21	5.0	127.3	0.9	4.52	0.00	0.16	72	0.00	1.00	1.00	7.02	7.02	0.00	0.00	Dummy Line
20	19	515.0	1.38	4.93	0.95	1.31	4,68	5.0	112.9	1.0	4.52	0.00	0.16	72	0.00	1.00	1.00	7.02	7.02	0.00	0.00	Dummy Line
21	20	685.0	0.84	3.55	0.95	0.80	3.37	5.0	89.6	1.2	3.99	0.00	0.14	72	0.00	1.00	1.00	7.02	7.02	0.00	0.00	Dummy Line
•			0.54										1									
							L									Atumbo	of lines:			Pun Da	te: 03-22	2007
Pro	ject Fil	le: Surfa	iceCalc	s_West.s	stm		.				_					Number	or lines: 2			- Aun Da		
TOP	ES: Inte	ensity =	129.35 /	(Inlet tir	me + 15.	50) ^ 1.6	01; Rét	um perío	od = 10	Yrs.												

Storm Sewer Labulation

Page 2

Star	don	Len	Drng	Area	Rnoff	Аге	ахС	Т	;	Rain	Total flow	Cap	Vel	Pi	pe	Invert	Elev	HGL	Elev	Grad / R	im Elev	Line ID
.ine	То		Incr	Total	coerr	Incr	Total	Inlet	Syst	(1)	TIOW	וועד		Size	Slope	Up	Dn	Up	Dn	Up	Dn	
	Line	(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
22	21	500.0	0.79	2.71	0.95	0.75	2.57	5.0	69.8	1.5	3.75	0.00	0.13	72	0.00	1.00	1.00	7.02	7.02	0.00	0.00	D
23	22		0.92	1,92	0.95	0.73	1.82	5.0	45.4	2.1	3.74	0.00	0.13	72	0.00	1,00	1.00	7.02		1	0.00	Dummy Line
24	23	500.0	1.00	1.00	0.95	0.95	0.95	5.0	5,0	6.1	5.84	0.00	0.13	72	0.00	1.00	1.00	7.02	7.02 7.02	0.00	0.00	Dummy Line
-4	23	500.0	1.00	1.00	0.55	0.95	0.93	3.0	3.0	6.1	3.04	0.00	0.21	12	0,00	1.00	1.00	7.02	7.02	0.00	0.00	Dummy Line
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Pro	ject Fil	e: Surfa	ceCalc	_West.s	stm											Number	of lines: 2	24		Run Da	te: 03-22	2007

4OTES: Intensity = 129.35 / (Inlet time + 15.50) ^ 1.01; Réturn period = 10 Yr

Inle(leport

Line No	Iniet ID	Q = CIA	Q	Q	Q byp	Junc type	Curb	Inlet	G	rate inle	t				Gutter				Inlet						
		(cfs)	(cfs)	(cfs)	(cfs)	type	Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	No.			
1	93+40 Lt	6.19	0.00	4.92	1.27	Curb	3.0	12.80	0.00	0.00	0.00	0.012	1.42	0.058	0.015	0.015	0.30	15.86	0.47	14.67	3.0	Off			
2	100+78 Lt	6.66	0.00	6.66	0.00	Curb	3.0	16.00	0.00	0.00	0.00	0.009	1.42	0.058	0.033	0.015	0.38	10.59	0.57	9.76	3.0	1			
3	107+24 Lt	4.67	0.07	4.74	0.00	Curb	3.0	16.00	0.00	0.00	0.00	Sag	1.42	0.058	0.024	0.000	0.26	8.84	0.46	8.84	3.0	Off			
4	111+80 Lt	4.38	0.72	5.03	0.07	Сить	3.0	16.00	0.00	0.00	0.00	0.014	1.42	0.058	0.022	0.015	0.30	11.27	0.47	10.09	3.0	3			
5	116+50 Lt	3.44	0.73	3.45	0.72	Curb	3.0	9.60	0.00	0.00	0.00	0.012	1.42	0.058	0.021	0.015	0.28	11.07	0.45	9.76	3.0	4			
6	120+50 Lt	4.20	0.04	3.51	0.73	Curb	3.0	9.60	0.00	0.00	0.00	0.014	1.42	0.058	0.024	0.015	0.29	9.95	0.46	8.67	3.0	5			
7	124+20Lt	7.65	2.88	10.49	0.04	Curb	3.0	29,60	0.00	0.00	0.00	0.010	1.42	0.058	0.013	0.015	0.35	22.59	0.52	21.68	3.0	6			
8	131+60 Lt	5.32	3.11	5.55	2.88	Curb	3.0	9.60	0.00	0.00	0.00	0.011	1.42	0.058	0.025	0.015	0.38	13.25	0.56	12.40	3.0	7			
9	136+50 Lt	6.71	3.55	7.15	3.11	Curb	3.0	12.80	0.00	0.00	0.00	0.017	1.42	0.058	0.025	0.015	0.37	13.13	0.56	12.28	3.0	8			
10	141+95 Lt	3.68	3.64	3.77	3.55	Curb	3.0	9.60	0.00	0.00	0.00	0.012	1.42	0.058	0.009	0.015	0.28	23.27	0.45	22.00	3.0	9			
11	145+50 Lt	4.79	4.35	5.49	3.64	Curb	3.0	9.60	0.00	0.00	0.00	0.013	1.42	0.058	0.023	0.015	0.37	13.93	0.55	13.04	3.0	10			
12	150+50 Lt SC 1	8.82	1.35	5.82	4.35	Curb	3.0	9.60	0.00	0.00	0.00	0.016	1.42	0.058	0.026	0.015	0.38	12.91	. 0.56	12.08	3.0	11			
13	155+25 Lt SC 2	4.61	1.40	4.67	1.35	Curb	3.0	9.60	0.00	0.00	0.00	0.007	1.42	0.058	0.021	0.015	0.35	14.12	0.53	13.19	3.0	12			
14	160+00 Lt SC 3	4.38	1.08	4.06	1.40	Curb	3.0	9.60	0.00	0.00	0.00	0.015	1.42	0.058	0.024	0.015	0.31	10.82	0.48	9.67	3.0	13			
15	163+91 Lt	3.97	2.38	5.27	1.08	Curb	3.0	12.80	0.00	0.00	0.00	0.013	1.42	0.058	0.020	0.015	0.32	13.20	0.49	12.10	3.0	14			
16	168+71 Lt	7.01	1.27	5.90	2,38	Curb	3.0	12.80	0.00	0.00	0.00	0.018	1.42	0.058	0.020	0.015	0.33	13.75	0.50	12.70	3.0	15			
17	174+95 Lt	4.09	3.90	6.72	1.27	Curb	3.0	12.80	0.00	0.00	0.00	0.012	1.42	0.058	0.029	0.015	0.38	11.65	0.56	10.79	3.0	16			
18	178+42 Lt	3.21	6.31	5.62	3.90	Curb	3.0	9.60	0.00	0.00	0.00	0.015	1.42	0.058	0.025	0.015	0.37	13.09	0.55	12.20	3.0	17			
19	181+90 Lt	8.06	3.96	5.72	6.31	Curb	3.0	9.60	0.00	0.00	0.00	0.015	1.42	0.058	0.018	0.015	0.37	17.51	0.55	16.67	3.0	18			
20	189+24 Lt	4.90	2.78	3.73	3.96	Curb	3.0	9.60	0.00	0.00	00.0	0.018	1.42	0.058	0.010	0.015	0.27	20.58	0,44	19.20	3.0	19			
21	193+68 Lt	4.61	2.75	4.58	2.78	Curb	3.0	9.60	0.00	0.00	0.00	0.015	1.42	0.058	0.020	0.015	0.33	13.60	0.50	12.55	3.0	20			
22	198+20 Lt	5.37	1.75	4.37	2.75	Curb	3.0	9.60	0.00	0.00	0.00	0.015	1.42	0.058	0.018	0.015	0.31	14.34	0.49	13.22	3.0	21			
23	202+95 Lt	5.84	0.00	4.09	1.75	Curb	3.0	9.60	0.00	0.00	0.00	0.016	1.42	0.058	0.022	0.015	0.31	11.59	0.48	10.41	3.0	22			

Project File: SurfaceCalcs_West.stm

Number of lines: 23

Run Date: 03-02-2009

NOTES: Inlet N-Values = 0.016; Intensity = 129.35 / (Inlet time + 15.50) ^ 1.01; Return period = 10 Yrs : Indicates Known Q added. All curb Inlets are Horiz throat.

Inlet leport

Line No	Inlet ID	Q = CIA	Q	Q	Q byp	June type	Çurb	inlet	G	rate Inle	t				Gutter					Inlet		Вур
		(cfs)	(cfs)	(cfs)	(cfs)	урв	Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	No.
1	93+40 Lt	9.26	0.50	6.44	2.42			40.00		0.00	0.00	0.040										
2	100+78 Lt		0.58	6.41	3.43	Curb	3.0	12.80	0.00	0.00	0.00	0.012	1.42	0.058	0.015	0.015	0.35	19.00	0.52	18.00	3.0	Off
3	100+78 Lt	9.96 6 ₋ 99	0.00	9.38	0.58	Curb	3.0	16.00	0.00	0.00	0.00	0.009	1.42	0.058	0.033	0.015	0.44	12.35	0.63	11.64	3.0	1
4	111+80 Lt	6.55	1.96	8.33	1.96	Curb	3.0	16.00	0.00	0.00	0.00	Sag	1.42	0.058	0.024	0.000	0.37	13.53	0.57	13.53	3.0	Off
5	116+50 Lt	5.16	4.02	5.43	3.74	Curb	3.0	16.00 9.60	0.00	0.00	0.00	0.014	1.42	0.058	0.022	0.015	0.38	14.77	0.56	13.91	3.0	3
6	120+50 Lt	6.29	3.40	5.67	4.02	Curb			0.00	0.00	0.00	0.012	1,42	0.058	0.021	0.015	-	14.97	0.55	14.10	3.0	4
_				1	}		3.0	9.60			1		}			}	0,38	13.70	0.56	12.83	3.0	5
7	124+20Lt	11.45	9.53	17.57	3.40	Curb	3.0	29.60	0.00	0.00	0.00	0.010	1,42	0.058	0.013	0.015	0.43	29.39	0.61	28.72	3.0	6
8	131+60 Lt	7.96	9.89	8.32	9.53	Curb	3.0	9.60	0.00	0.00	0.00	0.011	1.42	0.058	0.025	0.015	0.49	17.65	0.67	17.00	3.0	7
9	136+50 Lt	10.05	10.27	10.44	9.89	Curb	3.0	12.80	0.00	0.00	0.00	i i	1.42	0.058	0.025	0.015	0.47	17.05	0.66	16.40	3.0	8
10	141+95 Lt	5.51	10.12	5.35	10.27	Curb	3.0	9.60	0.00	0.00	0.00	0.012	1.42	0.058	0.009	0.015	0.35	31.16	0.52	30.22	3.0	9
11	145+50 Lt	7.17	10.78	7.83	10.12	Curb	3.0	9.60	0.00	0.00	0.00	0.013	1.42	0.058	0.023	0.015	0.46	18.01	0.65	17.35	3.0	10
12	150+50 Lt SC 1	13.20	5.62	8.03	10.78	Curb	3.0	9.60	0.00	0.00	0.00	0.016	1.42	0.058	0.026	0.015	0.47	16.33	0.66	15.69	3.0	11
13	155+25 Lt SC 2	6.90	5.87	7.15	5.62	Curb	3.0	9.60	0.00	0.00	0.00	0.007	1.42	0.058	0.021	0.015	0.45	18.83	0.63	18.19	3.0	12
14	160+00 Lt SC 3	6.55	5.64	6.33	5.87	Curb	3.0	9.60	0.00	0.00	0.00	0.015	1.42	0.058	0.024	0.015	0.40	14.74	0.58	13.96	3.0	13
15	163+91 Lt	5.94	8.03	8.33	5.64	Curb	3.0	12.80	0.00	0.00	0.00	0.013	1.42	0.058	0.020	0.015	0.41	17.85	0.59	17.10	3.0	14
16	168+71 Lt	10.49	6.16	8.62	8.03	Curb	3.0	12.80	0.00	0.00	0.00	0.018	1.42	0.058	0.020	0.015	0.41	17.95	0.59	17.20	3.0	15
17	174+95 Lt	6.12	10.55	10.50	6.16	Curb	3.0	12.80	0.00	0.00	0.00	0.012	1.42	0.058	0.029	0.015	0.49	15.41	0.68	14.79	3.0	16
18	178+42 Lt	4.81	13.70	7.96	10.55	Curb	3.0	9.60	0.00	0.00	0.00	0.015	1.42	0.058	0.025	0.015	0.47	16.85	0.65	16.20	3.0	17
19	181+90 Lt	12.06	9.22	7.57	13.70	Curb	3.0	9.60	0.00	0.00	0.00	0.015	1.42	0.058	0.018	0.015	0.45	21.79	0.63	21.11	3.0	18
20	189+24 Lt	7.34	6.79	4.91	9.22	Curb	3.0	9.60	0.00	0.00	0.00	0.018	1.42	0.058	0.010	0.015	0.33	25.98	0.50	25.00	3.0	19
21	193+68 Lt	6.90	6.04	6.15	6.79	Curb	3.0	9.60	0.00	0.00	0.00	0.015	1.42	0.058	0.020	0.015	0.39	16.90	0.57	16.10	3.0	20
22	198+20 Lt	8.04	3.63	5.64	6.04	Curb	3.0	9.60	0.00	0.00	0.00	0.015	1.42	0.058	0.018	0.015	0.37	17.34	0.55	16.44	3.0	21
23	202+95 Lt	8.74	0.00	5.11	3.63	Curb	3.0	9.60	0.00	0.00	0.00	0.016	1.42	0.058	0.022	0.015	0.35	13.54	0.53	12.55	3.0	22

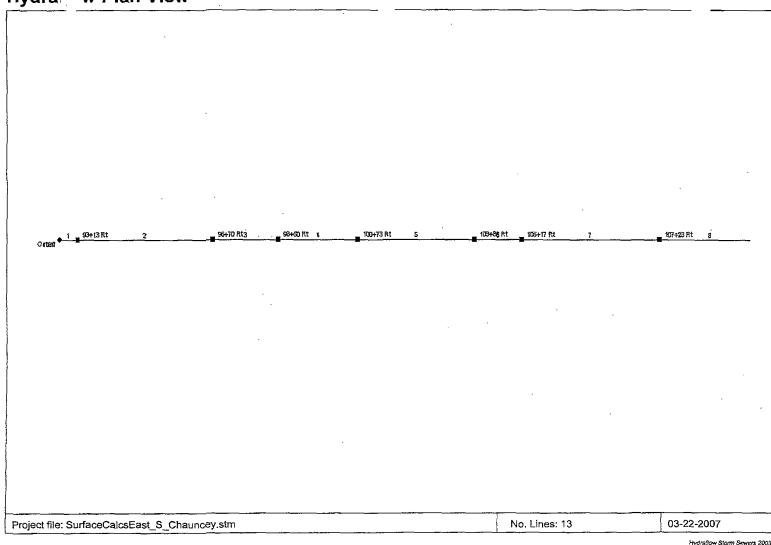
Project File: SurfaceCalcs_West.stm

Number of lines: 23

Run Date: 03-02-2009

NOTES: Inlet N-Values = 0.016; Intensity = 301.57 / (Inlet time + 18.30) ^ 1.11; Return period = 100 Yrs ; * Indicates Known Q added. All curb Inlets are Horiz throat.

Hydrat w Plan View





Hydraf w Plan View

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956±73 B¢	111±91.Rt	۵	115490 R1	fB.		124+19 Et	11	126+00 Rt	12	132+30 Rt	13	137+00	P.t
107+25 FtB	111+80 Rt	9	115 19 0 Rt	10		124+19 Rt	_11	128+00 Rt	12	132+30 Rt	13	137+00	Rt
107+25 RB	111+80 Rt	9	115 19 0.Rt	10		124+19 Ft		122H00 Rt	12	132+30 Rt	. 13	137+00	Rt
107+23 R≵	111+80 Rt	9	115+90 Rt	D)		124+19 Rt		122+100 Rt	12	132+30 Rt		137+00	Rt
197∓25 R¢	111+80.Rt	9.	115+90 Rt	10		124+19 Rt		128+30 Rt	12	132+30 Rt		137+00	Rt
1671+253 Rg	111+80.Rt	9	115+90 Rt	10		124+19 Ft	<u> </u>	128+30 Rt	12	132+30 Rt		137+00	Rt
10T+25 FB	111+80.Rt	9	115H90Rt			124+19 Rt		1284500 Rt	12	132+30 Rt		137+00	Rt
10T+25TB	111+80.Rt	9	115490Rt	<u>t0</u>		1214 19 Rt		128400 Rt	12	132+30 Rt		137+00	Rt
1971+255 Fig	111+80.Rt	9	115490Rt			120+19 Rt		128400 Rt	12	132+30 Rt		137+00	Rt
10T+235 Fig	111+80.Rt	9.	115490.Rt	<u>10</u>		124+19 Rt		128400 Rt	12	132+30 Rt		137+00	Rt
107+23 Fg	111+80.Rt	9.	115490Rt	<u>. 10</u>		1264 19 Rt		128400 Rt	12	132430 Rt		137+00	Rt
107+23 Fig	111+80.Rt	9.	115490Rt			1264 19 Rt		128400 Rt	12	132430 Rt		137+00	Rt
107+23 Rg	111+80.Rt	9	11540Rt			1264 19 Rt		128-100 Rt	12	132430 Rt		137+00	Rt
107+23 Fig	111+80.Rt		115490Rt			1264 19 Rt		126-100 Rt	12	132+30 Rt		137+00	Rt
107+23 Fig	111+80.Rt	9.	115490Rt			1264 19 Rt		128400 Rt	12	132+30 Rt		137+00	Rt
(07+425 Rg	111+80.Rt	9	115490Rt			1264 19 Rt		128400 Rt	12	132430 Rt		137+00	Rt

Storr Sewer Labulation

rage 1

Stat	ion	L.en	Drng	Area	Rnoff	Are	axC	Ŧ¢	:	Rain (I)	Total flow	Cap	Vei	Pi	pe	Invert	Elev	HGL	Elev	Gmd / R	im Elev	Line (D
Line	To Line		lner	Total	Coan	Incr	Total	Inlet	Syst	(1)	11044	1011		Size	Slope	Up	Dn	Up	Dn	Up	Dn	
_	Line	(ft)	(ac)	(ac)	(C)	_	<u> </u>	(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	50.0	0.62	8.72	0.95	0.59	8.29	5.0	173.5	0.7	6.03	0.00	3.03	72	0.00	1.00	1.00	1.88	1.64	0.00	0.00	D
2	1	370.0	0.02	8.10	0.95	0.33	7.70	5.0	164.6	0.7	5.85	0.00	0.21	72	0.00	1.00	1.00	7.00	7.00	0.00	0.00	Dummy Line
3	2	180.0	0.34	7.82	0.95	0.32	7.43	5.0	160.3	0.7	5.78	0.00	0.20	72	0.00	1.00	1.00	7.00	7.00	0.00	0.00	Dummy Line Dummy Line
4	3	219.0	0.63	7.48	0.95	0.60	7.11	5.0	154.9	0.8	5.69	0.00	0.20	72	0.00	1.00	1.00	7.00	7.00	0.00	0.00	Dummy Line
5	4	320.0	0.24	6.85	0.95	0.23	6.51	5.0	146.8	0.8	5.45	0.00	0.19	72	0.00	1.00	1.00	7.00	7.00	0.00	0.00	Dummy Line
5	5	131.0	0.39	6.61	0.95	0.23	6.28	5.0	143.4	0.8	5.36	0.00	0.19	72	0.00	1.00	1,00	7.00	7.00	0.00	0.00	Dummy Line
7			ì	6.22	0.95	0.74	5.91	5.0	133.6	0.9	5.34	0.00	0.19	72	0.00	1.00	1.00	7.00	7.00	0.00	0.00	-
	6	380.0	0.78	5.44	0.95	0.74	5.17	5.0	125.8	0.9	4.92	0.00	0.19	72	0.00	1.00	1.00	7.00	7.00	0.00	0.00	Dummy Line
8	7 8	278.0 472.0	0.79	4.65	0.95	0.75	4.42	5.0	111.6	1.0	4.63	0.00	0.17	72	0.00	1.00	1.00	7.00	7.00	0.00	0.00	Dummy Line Dummy Line
							1		ì]	4.62	0.00	0.16	72	0.00	1.00	1.00	7.00	7.00	0.00		•
10	9	668.9 484.2	1.48 0.77	3.95 2.47	0.95	0.73	3.76 2.35	5.0 5.0	91.1	1.2	3.56	0.00	0.10	72	0.00	1.00	1.00	7.00	7.00	0.00	0.00	Dummy Line Dummy Line
11		430.D	0.77	1.70	0.95	0.73	1.62	5.0	46.6	2.0	3.32	0.00	0.13	72	0.00	1.00	1.00	7.01	7.00	0.00	0.00	Dummy Line
12 13	11	-		0.89	0.95	0.77	0.85	5.0	5.0	6.1	5.33	0.00	0.12	72	0.00	1.00	1.00	7.01	7.01	0.00	0.00	Dummy Line
13	12	470.0	0.89	0.69	0.95	0.85	0.85	5.0	5.0	0.1	5.33	0.00	0.19	12	0.00	1.00	1.00	7.01	7.01	0.00	0.00	Duniny Line
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		<u> </u>	L	L	Chaun	<u> </u>	J		L	L	L	!	J	L	<u> </u>	<u> </u>	of lines;	<u> </u>		D	te: 03-22	0007

NOTES: Intensity = 64.98 / (Inlet time + 10.30) ^ 0.87; Return period = 10 Yrs

Inlet teport

Page 1

Line No	iniet ID	Q= CIA	Q	Q	Q byp	Junc type	Curb	Inlet	G	rate infe	et .				Gutter					Inlet		Вур
,40		(cfs)	(cfs)	(cfs)	(cfs)	Туре	Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	depth (ft)	spread (ft)	depth (ft)	spread (ft)	Dep (in)	line No
1	93+13 Rt	3.60	0.00	2.98	0.62	Curb	3.0	7.20	0.00	0.00	0.00	0.012	1.42	0.058	0.019	0.015	0.27	11.30	0.43	9.63	3.00	Off
2	96+70 Rt	1.63	0.00	1.63	0.00	Curb	3.0	12.80	0.00	0.00	0.00	0.008	1.42	0.058	0.031	0.015	0.24	6.51	0.40	4.87	3.00	1
3	98+50 Rt	1.97	0.00	1.97	0.00	Curb	3.0	9.60	0.00	0.00	0,00	0.010	1.42	0.058	0.029	0.015	0.25	7.20	0.41	5.38	3.00	2
4	100+73 Rt	3.66	0.00	3.66	0.00	Curb	3.0	16.00	0.00	0.00	0.00	Sag	1.42	0.058	0.022	0.000	0.23	8.10	0.43	8.10	3.00	Off
5	103+88 Rt	1.39	0.00	1.39	0.00	Curb	3.0	12.80	0.00	0.00	0.00	0.017	1.42	0.058	0.009	0.015	0.17	11.16	0.31	7.22	3.00	4
6	105+17 Rt	2.26	0.00	2.26	0.00	Curb	3.0	12.80	0.00	0.00	0.00	0.013	1.42	0.058	0.027	0.015	0.25	7.63	0.40	5.67	3.00	5
7	107+23 Rt	4.53	0.00	4.53	0.00	Curb	3.0	16.00	0.00	0.00	0.00	0.005	1.42	0.058	0.028	0.015	0.36	11.34	0.54	10.39	3,00	6
8	111+80 Rt	4.59	0.00	4.59	0.00	Curb	3.0	16.00	0.00	0.00	0.00	0.014	1.42	0.058	0.022	0.015	0.29	10.86	0.46	9.55	3.00	7
9	115+90 Rt	4.06	1.70	5.76	0.00	Curb	3.0	16.00	0.00	0.00	0.00	0.012	1.42	0.058	0.023	0.015	0.33	12.19	0.50	10.78	3,00	8
10	124+19 Rt	8.62	0.26	7.18	1.70	Curb	3.0	12.80	0.00	0.00	0.00	0.009	1.42	0.058	0.015	0.015	0.35	19.26	0.52	18.33	3.00	9
11	128+00 Rt	4.47	0.67	4.88	0.26	Curb	3.0	10.40	0.00	0.00	0.00	0.007	1.42	0.058	0.021	0.015	0.34	13.69	0.51	12.29	3.00	10
12	132+30 Rt	4.70	0.66	4.69	0.67	Curb	3.0	10.40	0.00	0.00	0.00	0.016	1.42	0.058	0.022	0.015	0.30	11.31	0.47	10.00	3.00	11
13	137+00 Rt	5.33*	0.00	4.67	0.66	Curb	3.0	10.40	0.00	0.00	0.00	0.016	1.42	0.058	0.022	0.015	0.30	11.31	0.47	9.95	3.00	12
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Project File: SurfaceCalcsEast_S_Chauncey.stm

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I-D-F File: ScottsdaleIDF.IDF

Number of lines: 13

Run Date: 03-22-2007

NOTES: Inlet N-Values = 0.016; Intensity = 64.98 / (Inlet time + 10.30) ^ 0.87; Return period = 10 Yrs.

10 Yrs.; *Indicates Known Q added

Hydraflow Storm Sewers 200;

Inle Report

Page 1

Line No	Inlet ID	Q = CIA	Q	Q capt	Q byp	Junc type	Curb	Inlet	G	rate inie	et				Gutter					Inlet		Вур
110		(cfs)	(cfs)	(cfs)	(cfs)	туре	Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	depth (ft)	spread (ft)	depth (ft)	spread (ft)	Dep (in)	line No
1 .	93+13 Rt	5.42	0.00	3.73	1.69	Curb	3.0	7.20	0.00	0.00	0.00	0.012	1.42	0.058	0.019	0.015	0.31	13.40	0.47	11.84	3.00	Off
2	96+70 Rt	2.45	0.00	2.45	0.00	Curb	3.0	12.80	0.00	0.00	0.00	0.008	1.42	0.058	0.031	0.015	0.28	7.80	0.45	6.32	3.00	1
3	98+50 Rt	2.97	0.00	2.97	0.00	Curb	3.0	9.60	0.00	0.00	0.00	0.010	1.42	0.058	0.029	0.015	0.28	8.24	0.45	6.90	3.00	2
4	100+73 Rt	5.51	0.00	5.51	0.00	Curb	3.0	16.00	0.00	0.00	0.00	Sag	1.42	0.058	0.022	0.000	0.29	10.65	0.48	10.65	3.00	Off
5	103+88 Rt	2.10	0.00	2.10	0.00	Curb	3.0	12.80	0.00	0.00	0.00	0.017	1.42	0.058	0.009	0.015	0.19	13.38	0.34	10.33	3.00	4
6	105+17 Rt	3.41	0.00	3.41	0.00	Curb	3.0	12.80	0.00	0.00	0.00	0.013	1.42	0.058	0.027	0.015	0.28	8.74	0.45	7.26	3.00	5
7	107+23 Rt	6.82	0.44	7.26	0.00	Curb	3.0	16.00	0.00	0.00	0.00	0.005	1.42	0.058	0.028	0.015	0.43	13.84	0.61	12.82	3.00	6
8	111+80 Rt	6.90	1.52	7.98	0.44	Curb	3.0	16.00	0.00	0.00	0.00	0.014	1.42	0.058	0.022	0.015	0.36	14.04	0.53	12.73	3.00	7
9	115+90 Rt	6.12	5.67	10.27	1.52	Curb	3.0	16.00	0.00	0.00	0.00	0.012	1.42	0.058	0.023	0.015	0.41	15.67	0.59	14.83	3.00	8
10	124+19 Rt	12.97	2.29	9.58	5.67	Curb	3.0	12.80	0.00	0.00	0.00	0.009	1.42	0.058	0.015	0.015	0.42	23.93	0.59	23.00	3.00	9
11	128+00 Rt	6.73	2.75	7.19	2.29	Curb	3.0	10.40	0.00	0.00	0.00	0.007	1.42	0.058	0.021	0.015	0.41	17.02	0.59	16.05	3.00	10
12	132+30 Rt	7.08	2.03	6.36	2.75	Curb	3.0	10.40	0.00	0.00	0.00	0.016	1.42	0.058	0.022	0.015	0.36	14.04	0.53	12.82	3.00	11
13	137+00 Rt	7.94⁺	0.00	5.90	2.03	Curb	3.0	10.40	0.00	0.00	0.00	0.016	1.42	0.058	0.022	0.015	0.34	13.13	0.51	12.05	3.00	12
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Project File: SurfaceCalcsEast_S_Chauncey.stm

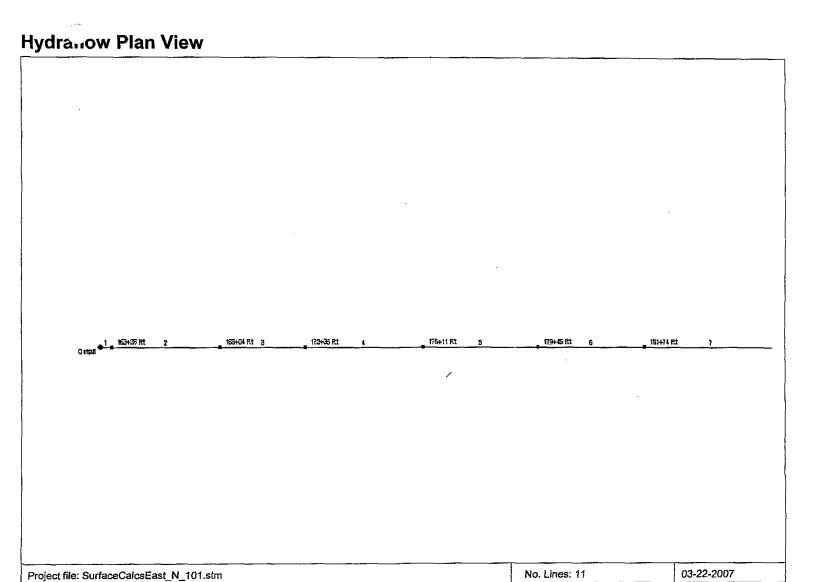
I-D-F File: ScottsdaleIDF.IDF

Number of lines: 13

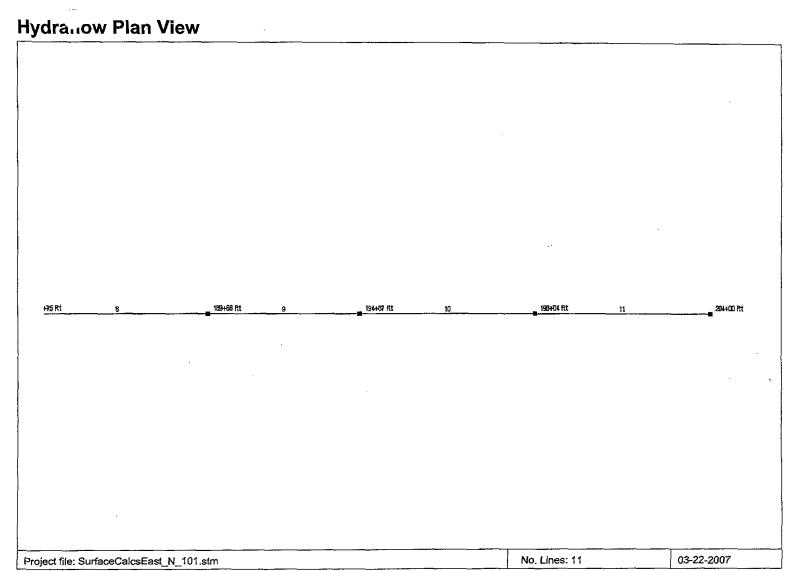
Run Date: 03-23-2007

NOTES: Inlet N-Values = 0.016; Intensity = 301.57 / (Inlet time + 18.30) ^ 1.11; Return period =

00 Yrs ; * Indicates Known Q added



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Storr Sewer Tabulation

Page 1

Stat	tion	Len	Drng	Area	Rnoff	Are	axC	To	:	Rain (i)	Total flow	Cap full	Vei	Pi	pe	Invert	Elev	HGL	Elev	Grnd / R	im Elev	Line ID
line	То]	Incr	Total	COEII	Incr	Total	Inlet	Syst	(")	110₩	, .u.,		Size	Slope	Up	Dn	Uр	Dn	Up	Dn	
	Line	(ft)	(ac)	(ac)	(c)		Ì '	(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	ţ
1	End	50.0	0.48	8.31	0.95	0.45	7.89	5.0	165.8	0.7	5.38	0.00	2.84	72	0.00	1.00	1.00	1.83	1.63	0,00	0.00	Dummy Line
2	1	476.0	0.67	7.83	0.95	0.64	7.44	5.0	153.7	0.7	5.44	0.00	0.19	72	0.00	1.00	1.00	7.00	7.00	0.00	0.00	Dummy Line
3	2	376.0		7.18	0.95	0.67	6.80	5.0	143.9	0.8	5.28	0.00	0.19	72	0.00	1.00	1.00	7.00	7.00	0.00	0.00	Dummy Line
4	3	520.0	0.59	6.45	0.95	0.56	6.13	5.0	129.8	0.9	5.22	0.00	0.18	72	0.00	1.00	1.00	7.00	7.00	0.00	0.00	Dummy Line
5	4	508.6	0.44	5.86	0.95	0.42	5.57	5.0	115.9	0.9	5.25	0.00	0.19	72	0.00	1,00	1.00	7.00	7.00	0.00	0.00	Dummy Line
6	5	469.3	0.49	5.42	0.95	0.47	5.15	5.0	103.1	1.0	5.39	0.00	0.19	72	0.00	1,00	1.00	7.00	7.00	0.00	0.00	Dummy Line
7	6	595.0	1.08	4.93	0.95	1.02	4.68	5.0	87.1	1.2	5.67	0.00	0.20	72	0.00	1.00	1.00	7.00	7.00	0,00	0.00	Dummy Line
8	7	510.0	0.84	3.85	0.95	0.79	3.66	5.0	71.4	1.4	5.24	0.00	0.19	72	0.00	1.00	1.00	7.01	7.00	0.00	0.00	Dummy Line
9	8	432.0	0.61	3.01	0.95	0.58	2.86	5.0	56.0	1.7	4.99	0.00	0.18	72	0.00	1.00	1.00	7.01	7.01	0.00	0.00	Dummy Line
10	9	500.0	1.12	2.40	0.95	1.06	2.28	5.0	36.4	2.4	5.49	0.00	0.19	72	0.00	1.00	1.00	7.01	7.01	0.00	0.00	Dummy Line
11	10	500.0	1.28	1.28	0.95	1.22	1,22	5.0	5.0	6.1	7.50	0.00	0.27	72	0.00	1.00	1.00	7.01	7.01	0.00	0.00	Dummy Line
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Pro	ject Fil	le: Surfa	ceCalc	East_N	_101.str	71										Number	of lines: 1	11		Run Da	te: 03-22	-2007

NOTES: Intensity = 129.35 / (Inlet time + 15.50) ^ 1.01; Return period = 10 Yrs.

Inle Report

Page 1

Line No	Inlet ID	Q = CIA	Q	Q	Q byp	June type	Curb	inlet .	G	rate inie	ŧ				Gutter				1	inlet	:	Вут
,,,		(cfs)	(cfs)	(cfs)	(cfs)	type	Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	depth (ft)	spread (ft)	depth (ft)	spread (ft)	Dep (in)	lin No
1	163+28 Rt	2.77	0.01	2.79	0.00	Curb	3.0	12.80	0.00	0.00	0.00	0.013	1.42	0.058	0.020	0.015	0.25	9.80	0.41	7.90	3.00	Of
2	168+04 Rt	3.94	0.23	4.15	0.01	Curb	3.0	12.80	0.00	0.00	0.00	0.017	1.42	0.058	0.020	0.015	0.27	10.80	0.43	9.20	3.00	1
3	172+35 Rt	4.10	0.05	3.92	0.23	Curb	3.0	9.60	0.00	0.00	0.00	0.013	1.42	0.056	0.025	0.015	0.30	10.13	0.46	8.52	3.00	2
4	176+11 Rt	3.46	0.08	3.50	0.05	Curb	3.0	9.60	0.00	0.00	0.00	0.012	1.42	0.058	0.026	0.015	0.29	9.41	0.45	7.81	3.00	3
5	179+45 Rt	2.59	0.38	2.89	80.0	Curb	3.0	9.60	0.00	0.00	0.00	0.020	1.42	0.058	0.019	0.015	0.24	9.72	0.39	7.47	3.00	4
6	181+74 Rt	2.87	1.86	4.35	0.38	Curb	3.0	9.60	0.00	0.00	0.00	0.011	1.42	0.058	0.024	0.015	0.31	10.91	0.48	9.75	3.00	5
7	184+75 Rt	6.29	1.90	6.33	1.86	Curb	3.0	9.60	0.00	0.00	0.00	0.006	1.42	0.058	0.020	0.015	0.40	17.30	0.57	16.10	3.00	6
8	189+68 Rt	4.88	1.56	4.54	1.90	Curb	3.0	9.60	0.00	0.00	0.00	0.017	1.42	0.058	0.014	0.015	0.29	16.25	0.45	14.43	3.00	7
9	194+87 Rt	3.56	3.02	5.03	1.56	Curb	3.0	9.60	0.00	0.00	0.00	0.015	1,42	0.058	0.021	0.015	0.32	12.74	0.49	11.52	3.00	8
10	198+04 Rt	6.53	2.51	6.02	3.02	Curb	3.0	9.60	0.00	0.00	0.00	0.015	1.42	0.058	0.022	0.015	0.36	14.04	0.53	12.95	3.00	9
11	204+00 Rt	7.50	0.00	4.98	2.51	Curb	3.0	9.60	0.00	0.00	0.00	0.025	1.42	0.058	0.020	0.015	0.31	12.80	0.47	11.20	3.00	10
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Project File: SurfaceCalcsEast_N_101.stm

I-D-F File: Scottsdale(DF.IDF

Number of lines: 11

Run Date: 03-22-2007

NOTES: Inlet N-Values = 0.016; Intensity = 129.35 / (Inlet time + 15.50) ^ 1.01; Return period = 10 Yrs

Yrs ; * Indicates Known Q added

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Hydraflow Storm Sewers 200:

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ne	Inlet ID	Q = Cia	Q	Q	Q byp	Junc type	Curb	Inlet	G	rate Inie	et _				Gutter					Inlet		Ву
		(cfs)	(cfs)	(cfs)	(cfs)	type	Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	No.
	163+28 Rt	4.15	3.59	5.96	1.78	Curb	3.0	12.80	0.00	0.00	0.00	0.013	1.42	0.058	0.020	0.015	0.34	14.25	0.51	13.25	3.0	Of
	168+04 Rt	5.89	4.43	6.74	3.59	Сить	3.0	12.80	0.00	0.00	0.00	0.017	1.42	0.058	0.020	0.015	0.36	15.10	0.53	14.20	3.0	1
	172+35 Rt	6.14	4.37	6.08	4.43	Curb	3.0	9.60	0.00	0.00	0.00	0.013	1.42	0.058	0.025	0.015	0.40	13.97	0.58	13.16	3.0	2
1	176+11 Rt	5.18	5.49	6.30	4.37	Curb	3.0	9.60	0.00	0.00	0.00	0.012	1.42	0.058	0.026	0.015	0.41	13.91	0.59	13.12	3.0	3
ĺ	179+45 Rt	3.87	6.82	5.20	5.49	Curb	3.0	9.60	0.00	0.00	0.00	0.020	1.42	0.058	0.019	0.015	0.35	15.35	0.52	14.37	3.0	4
	181+74 Rt	4.30	9.75	7.23	6.82	Curb	3.0	9.60	0.00	0.00	0.00	0.011	1.42	0.058	0.024	0.015	0.44	16.49	0.63	15.83	3.0	5
	184+75 Rt	9.41	9.18	8.85	9.75	Curb	3. 0	9.60	0.00	0.00	0.00	0.006	1.42	0.058	0.020	0.015	0.52	23.10	0.70	22.50	3.0	6
	189+68 Rt	7.31	7.58	5.70	9.18	Curb	3,0	9.60	0.00	0,00	0.00	0.017	1.42	0.058	0.014	0.015	0.37	21.75	0.54	20.86	3.0	7
	194+87 Rt	5.33	8.77	6.52	7.58	Curb	3.0	9.60	0.00	0.00	0.00	0.015	1.42	0.058	0.021	0.015	0.41	16.93	0.59	16.14	3.0	
. [198+04 Rt	9.77	6.03	7.02	8.77	Curb	3.0	9.60	0.00	0.00	0.00	0.015	1.42	0.058	0.022	0.015	0.43	17.18	0.61	16.45	3.0	9
ı	204+00 Rt	11.22	0.00	5.19	6.03	Curb	3.0	9.60	0.00	0.00	0.00	0.025	1.42	0.058	0.020	0.015	0.34	14.50	0.52	13.50	3.0	
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Project File: SurfaceCalcsEast_N_101.stm

Number of lines: 11

Run Date: 03-02-2009

NOTES: Inlet N-Values = 0.016; Intensity = 301.57 / (Inlet time + 18.30) ^ 1.11; Return period = 100 Yrs ; * Indicates Known Q added. All curb inlets are Horiz throat.

Hydraflow Storm Sewers Extension v6.06

Storr Sewer Labulation

Page 1

Sta	tion	Len	Drng	Area	Rnoff	Are	axC	To	:	Rain (I)	Total flow	Cap full	Vel	Pi	pe	invert	Elev	HGL	Elev	Gmd / R	im Elev	Line ID
ine	To Line		Incr	Total	coen	Incr	Total	Inlet	Syst	(1)	11OW	TUII		Size	Slope	Up	Dη	Ŭр	Dn	Up	Dπ	
	Line	(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	ł	1	0.00	0.90	0.00	0.00	0.86	0.0	5.3	6.0	5.14	4.67	2.91	18	0.20	46,31	46.00	48.17	47.79	50.10	0.00	Inserted Line
5	1	8.6	0.00	0.63	0.00	0.00	0.60	0.0	5.2	6.0	3.61	5.07	2.04	18	0.23	46.33	46.31	48.31	48.30	50.20	50.10	Inserted Line
3	2	28.3	0.63	0.63	0.95	0.60	0.60	5.0	5.0	6.1	3.66	4.42	2.07	18	0.18	46.38	46.33	48.40	48.36	50.60	50.20	Inserted Line
4	1	5.7	0.27	0.27	0.95	0.26	0.26	5.0	5.0	6.1	1.57	18.64	0.89	18	3.15	46.49	46.31	48.30	48.30	49.30	50,10	Inserted Line
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Pro	oject Fi	le: Princ	ess_Sto	mDrair	nda.r											Number	r of lines: 4	4		Run Da	te: 03-22-	2007

Tology no. 1 Anacos Common announ

NOTES: Intensity = 64.98 / (Inlet time + 10.30) ^ 0.87; Return period = 10 Yrs.

Hydraflow Storm Sewers 2003

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ine lo	Inlet ID	Q = CIA	Q	Q	Q byp	Junc type	Curb	Inlet	G	rate Inle	t	1			Gutter					inlet		Ву
40		(cfs)	(cfs)	(cfs)	(cfs)	туре	Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	depth (ft)	spread (ft)	depth (ft)	spread (ft)	Dep (in)	line No
l		0.00	0.00	0.00	0.00	None	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	Off
2		0.00	0.00	0.00	0.00	мн	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	Off
3	Princess	3.66	0.00	3.66	0.00	Curb	3.0	13.60	0.00	0.00	0.00	0.009	1.42	0.058	0.011	0.015	0.25	16.66	0.41	15.00	3.00	2
t	Princess conn	1.57	0.00	1.57	0.00	Curb	3.0	16.00	0.00	0.00	0.00	0.006	1.42	0.058	0.170	0.015	0.32	2.82	0.53	1.68	3.00	1
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Project File: Princess_StormDrain.stm

I-D-F File: ScottsdaleIDF.IDF

Number of lines: 4

Run Date: 03-22-2007

NOTES: Inlet N-Values = 0.016; Intensity = 64.98 / (Inlet time + 10.30) ^ 0.87; Return period = 10 Yrs.; * Indicates Known Q added

myar Tilic Grade Line Computations

Page 1

-ine	Size	Q			De	ownstre	am				Len				Upstr	eam				Che	ck	JL	Mino
	(in)	(cfs)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	(ft)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vei (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)	coeff (K)	loss (ft)
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1	18	5.14	46.00	47.79	1.50	1.77	2.91	0.13	47.92	0.240	157	46.31	48.17	1.50	1.77	2.91	0.13	48.30	0.239	0.239	0.376	1.00	0.13
5	18	3.61	46.31	48.30	1.50	1.77	2.04	0.06	48.36	0.118	8.6	46.33	48.31	1.50	1.77	2.04	0.06	48.37	0.118	0.118	0.010	0.85	0.06
3	18	3.66	46.33	48.36	1.50	1.77	2.07	0.07	48.43	0.121	28.3	46.38	48.40	1.50	1.77	2.07	0.07	48.46	0.121	0.121	0.034	0.50	0.03
4	18	1.57	46.31	48.30	1.50	1.77	0.89	0.01	48.31	0.022	5.7	46.49	48.30	1.50	1.77	0.89	0.01	48.31	0.022	0.022	0.001	0.50	0.01
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NOTES: * Normal depth assumed., ** Critical depth assumed.

Hydraflow Storm Sewers 200

WINEST FFI - JENNER PK.

HY-8 Culvert Analysis Report

Table 1 - Culvert Summary Table: 188+24.97

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Dapth (ft)	Outlet Velocity (ft/s)	Tallwater Velocity (ft/s)
100.00	100.00	1632.28	2.616	2.616	1-S2n	1.487	1.697	1.489	2.240	8.395	0.000
120.00	120.00	1632.66	2.997	2.997	1-S2n	1.680	1.916	1.685	2,240	8.903	0.000
140.00	140.00	1633.04	3.380	3.380	5-\$2n	1.868	2.123	1.872	2.240	9,347	0.000
160.00	160.00	1633.44	3.776	3.776	5-S2n	2.050	2.321	2.050	2,240	9.756	0.000
180.00	180.00	1633.85	4.194	4.194	5-S2n	2.225	2.511	2.230	2,240	10.092	0.000
200.00	200.00	1634.30	4.639	0.980	5-S2n	2.397	2.693	2.402	2.240	10.407	0.000
220.00	220.00	1634.78	5.118	0.980	5-S2n	2.563	2.870	2.569	2.240	10.705	0.000
224.00	224.00	1634.88	5.218	0.980	5-S2n	2.597	2.905	2.604	2,240	10.754	0.000
260.0D	235.97	1635.19	5.526	5.249	5-S2n	2.696	3.000	2.900	2.240	10.171	0,000
280.00	238.96	1635.27	5.605	5.339	5-S2n	3.000	3.000	3.000	2,240	9,957	0.000
300.00	241.55	1635.33	5.674	5.417	5-S2n	3.000	3.000	3.000	2,240	10.064	0.000

Inlet Elevation (invert): 1629.66 ft, Outlet Elevation (invert): 1628.40 ft

Culvert Length: 306.00 ft, Culvert Slope; 0.0041

Site Data - 188+24.97

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1629.66 ft Outlet Station: 306.00 ft Outlet Elevation: 1628.40 ft

Number of Barrels: 1

Culvert Data Summary - 188+24.97

Barrel Shape: Concrete Box

Barrel Span: 8.00 ft Barrel Rise: 3.00 ft

Barrel Material: Concrete Barrel Manning's n: 0.0120

Inlet Type: Conventional

Inlet Edge Condition: 1:1 Bevel (45° flare) Wingwall

Inlet Depression: None

Water Surface Profile Plot for Culvert: 188+24.97

Crossing - Scottsdale Road, Design Discharge - 224.0 cfs
Culvert - 188+24.97, Culvert Discharge - 224.0 cfs

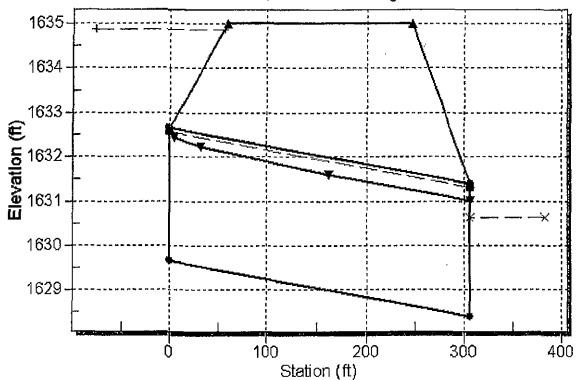


Table 2 - Downstream Channel Rating Curve (Crossing: Scottsdale Road)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
100.00	1630.64	2.24
120.00	1630.64	2.24
140.00	1630.64	2.24
160.00	1630.64	2.24
180.00	1630.64	2.24
200.00	1630.64	2.24
220.00	1630.64	2.24
224.00	1630.64	2.24
260.00	1630.64	2.24
280.00	1630.64	2.24
300.00	1630.64	2.24

Tailwater Channel Data - Scottsdale Road

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1630.64 ft

Roadway Data for Crossing: Scottsdale Road

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 1635.00 ft Roadway Surface: Paved

Roadway Top Width: 188.00 ft

DIBBLE & ASSOCIATES	Date	23-Mar-07
CONSULTING ENGINEERS	Job No.	10-0244
	Ву	JEP
	RCE	
Scottsdale Road	Chk'd	
Channel Design	Filepath:	J:\10-0244\EXCEL\DRAINAGE\CHANNDES.xis

CHANNEL DESIGN REFERENCES

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- 14. FHWA H.E.C. No. 11 "Design of Riprap Revetment," March 1989

HAPICAL SEC		NAMES E	TNSC													
Channel: INPUT DATA:		SCOTTSDA	LE ROAD	O - Offsite	Channel 1A										THE CHARLES OF SECTION	<u> </u>
Manning's n =		0.038														
T allow =		2.00 lb	/ft^2													
Sideslope Left	=	3.0 :1	i													
Sideslope Rig	ht =	3.0 :1	l													
Bottom stope	=	0.0 p	ercent													
													Topwid	ith		
Reach	Slope	BW (ft)								30.00				40		
Channel1A	0.0010	10.0	0.0	4.22	2.34	0.038	224.0	0.25	0.16	0.26	1.08	5,30	35.32	41.78	105.97	0.06
Channel1A	0.0020	10.0	0.0	3.58	3.02	0.038	224.0	0.35	0.28	0.45	1.00	4.58	31.45	37.45	94.36	0.09
Channel1A	0.0030	10.0	0.0	3.24	3.51	0.038	224.0	0.42	0.39	0.61	1.00	4.24	29.44	35.44	88.31	0.13
Channel1A	0.0040	10.0	0.0	3.02	3.90	0.038	224.0	0.48	0.49	0.75	1.00	4.02	28.11	34.11	84.32	0.16
Channel1A	0.0050	10.0	0.0	2.86	4.23	0.038	224.0	0.53	0.59	0.89	1.00	3.86	27.13	33.13	81.39	0.18
Channel1A	0.0060	10.0	0.0	2.73	4.52	0.038	224.0	0.58	0.68	1.02	1.00	3.73	26.37	32.37	79.10	0.21
Channel1A	0.0070	10.0	0.0	2.62	4.78	0.038	224.0	0.62	0.77	1.15	1.00	3.62	25.75	31.75	77.24	0.24
Channel1A	0800.0	10.0	0.0	2.54	5,01	0.038	224.0	0.66	0.86	1.27	1.00	3.54	25.22	31.22	75.67	0.26
Channel1A	0.0090	10.0	0.0	2.46	5.23	0.038	224.0	0.70	0.94	1.38	1.00	3,46	24.78	30,78	74.33	0.28
Channella				TIM2 20	25634F	10,000	E PER CONTRACTOR		### 3 N		12000	20	2320	2926	m69 59 m	
Channel1A	0.0010	12.0	0.0	4.01	2.33	0.038	224.0	0.25	0.16	0.25	1.02	5.03	36.05	42.19	108.16	0.06
Channel1A	0.0020	12.0	0.0	3.38	3,00	0.038	224.0	0.35	0.28	0.42	1.00	4.38	32.27	38.27	96.81	0.09
Channel1A	0.0030	12.0	0.0	3.05	3.47	0.038	224.0	0.42	0.39	0.57	1.00	4.05	30.31	36.31	90.92	0.12
Channel1A	0.0040	12.0	0.0	2.84	3.85	0.038	224.0	0.48	0.48	0.71	1.00	3.84	29.02	35.02	87.05	0.15
Channel1A	0.0050	12.0	0.0	2.68	4.17	0.038	224.0	0.53	0.58	0.84	1.00	3.68	28.07	34.07	84.22	0.18
Channei1A	0.0060	12.0	0.0	2.56	4.46	0.038	224.0	0.58	0.67	0.96	1.00	3.56	27.33	33,33	82.00	0.21
Channel1A	0.0070	12.0	0.0	2.46	4.71	0.038	224.0	0.62	0.75	1.07	1.00	3.46	26.73	32.73	80.20	0.23
Channel1A	0.0080	12.0	0.0	2,37	4.94	0.038	224.0	0.66	0.84	1.18	1.00	3.37	26.23	32.23	78.69	0.25
Channel1A	0.0090	12.0	0.0	2.30	5.15	0.038	224.0	0.70	0.92	1.29	1.00	3.30	25.80	31.80	77.40	0.27
Channel1A	0.0150	12.0	0.0	2.01	6.18	0.038	224.0	0.89	1.37	1.88	1.00	3.01	24.06	30.06	72.18	0.40
Channel1A	0.0010	14.0	0.0	3.82	2.31	0.038	224.0	0.25	0.16	0.24	1.00	4.82	36.90	42.90	110.70	0.06
Channel1A	0.0020	14.0	0.0	3.20	2.96	0.038	224.0	0.35	0.28	0.40	1.00	4.20	33,21	39.21	99.63	0.09
Channel1A	0.0030	14.0	0.0	2.88	3.43	0.038	224.0	0.42	0.38	0.54	1.00	3.88	31.30	37.30	93.90	0.12
Channel1A	0.0040	14.0	0.0	2.68	3.80	0.038	224.0	0.48	0.48	0.67	1.00	3.68	30.05	36.0 5	90.15	0.15
Channel1A	0.0050	14.0	0.0	2.52	4.12	0.038	224.0	0.53	0.57	0.79	1.00	3,52	29.14	35.14	87.41	0.18
Channel1A	0.0060	14.0	0.0	2.40	4.39	0.038	224.0	0.58	0.65	0.90	1.00	3.40	28.42	34.42	85.27	0.20
Channel1A	0.0070	14.0	0.0	2,31	4.64	0.038	224.0	0.62	0.74	1.01	1.00	3.31	27.85	33.85	83.54	0.22
Channel1A	0.0080	14.0	0.0	2.23	4.86	0.038	224.0	0.66	0.82	1.11	1.00	3.23	27.36	33.36	82.08	0.24
Channel1A	0.0090	14.0	0.0	2.16	5.07	0.038	224.0	0.70	0.90	1.21	1.00	3.16	26.95	32.95	80.84	0.27
Channel1A	0.0150	14.0	0.0	1.88	6.07	0.038	224.0	0.88	1.33	1.76	1.00	2,88	25.28	31.28	75.84	0.38

DIBBLE & ASSOCIATES CONSULTING ENGINEERS

23-Mar-07 10-0244 JEP

Scottsdale Road Channel Design

 Date
 23-Mar-07

 Job No.
 10-0244

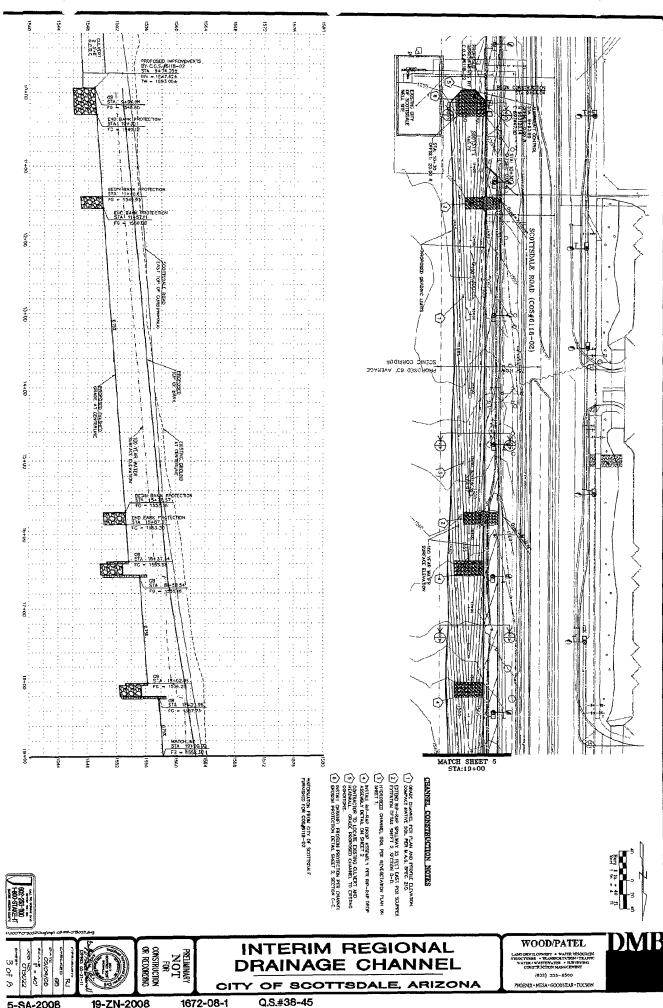
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Channel:		SCOTTSDA			Channel 1B		- danies and danies as	anientania sesse	1,000		<u> </u>				220217
NPUT DATA															
Manning's n =		0.038 F													
f altow =		2.00 1													
Sideslope Lef		3.0 :													
ideslope Rig		3.0 :													
Bottom slope	=	0.0 p	ercent								_				
				n manus en en en en en en en en en en en en en		Parties and Security	od dispose will know	naskaladala s	ridala and a feat and	Jane Land		Topwi			
Reach	Slope	BW (ft)													
hannel1B	0.0100	10.0	0.0	2,40	5.43	0.038	224.0	0.74	1.02	1.00	3.40	24.39	30.39	73.16	0.
hannel1B	0.0101	10.0	0.0	2.39	5.45	0.038	224.0	0.74	1.03	1.00	3.39	24.35	30.35	73.05	0.
hannel1B	0.0102	10.0	0.0	2.39	5.47	0.038	224.0	0.74	1.04	1.00	3.39	24.31	30.31	72.94	0.
hannel1B	0.0103	10.0	0.0	2.38	5.49	0.038	224.0	0.75	1.05	1.00	3.38	24.28	30.28	72.83	0.
hannel1B	0.0104	10.0	0.0	2.37	5.51	0.038	224.0	0.75	1.05	1.00	3.37	24.24	30,24 30,21	72.73	0.
hannel1B	0,0105 0,0106	10.0	0.0	2.37	5.53	0.038 0.038	224.0 224.0	0.75	1.06	1.00	3.37	24.21 24.17	30.21 30.17	72.62 72.52	0.
hannel1B		10.0	0.0	2.36 2.36	5.55 5.57	0.038	224.0	0.76 0.76	1.07 1.08	1.00 1.00	3.36 3.36	24.17	30.17	72.52 72.42	0.
hannel1B	0.0107	10.0					224.0		1.09	1.00	3.35	24.14	30.14	72.32	
hannel1B	0.0108	10.0	0.0	2.35	5.59	0.038		0.76					30.07	72.32 72.22	0.
hannel1B	0.0109	10.0	0.0	2.35	5.61	0.038	224.0	0.77	1.09	1.00	3.35	24.07			0.
hannel1B	0.0110	10.0	0.0	2.34	5.62	0.038	224.0	0.77	1.10	1.00	3.34		30.04	72.12	0.
hannel1B	0.0111	10.0	0.0	2.33	5.64	0.038	224.0	0.77	1.11	1.00	3.33	24.01	30.01	72.02	0.
hannel1B	0.0112	10.0	0.0	2.33	5.6 6	0.038	224.0	0.78	1.12	1.00	3.33	23.98	29.98	71.93	0.
hannel1B	0.0113	10.0	0.0	2.32	5.68	0.038	224.0	0.78	1.13	1.00	3.32	23.94	29.94	71.83	0.
hannel1B	0.0114	10.0	0.0	2.32	5.70	0.038	224.0	0.78	1.13	1.00	3,32	23.91	29.91	71.74	0
hannel1B	0.0115	10.0	0.0	2.31	5.72	0.038	224.0	0.79	1,14	1.00	3.31	23.88	29.88	71.64	0
hannel1B	0.0116	10.0	0.0	2.31	5.73	0.038	224.0	0.79	1,15	1.00	3.31	23.85	29.85	71.55	0
hannel1B	0.0117	10.0	0.0	2.30	5.75	0.038	224.0	0.79	1.16	1.00	3.30	23.82	29.82	71.46	0.
hanneitB	0.0118	10.0	0.0	2.30	5.77	0.038	224.0	0.80	1.17	1.00	3.30	23.79	29.79	71.37	0
hanneliB	0.0119	10.0	0.0	2.29	5.79	0.038	224.0	0.80	1.17	1.00	3.29	23.76	29.76	71.28	0.
hannel18	0.0120	10.0	0.0	2.29	5,80	0.038	224.0	0.80	1.18	1.00	3.29	23.73 23.70	29.73 29.70	71.19	0.
hannel1B	0.0121	10.0	0.0	2.28	5.82	0.038	224.0	0.81	1.19 1.20	1.00 1.00	3.28 3.28	23.70 23.67	29.70 29.67	71.10 71.02	0.
hannel1B	0.0122	10.0	0.0	2.28	5.84	0.038 0.038	224.0 224.0	0.81 0.81	1.20	1.00	3.28	23.67 23.64	29.64	70.93	0
hannel1B	0.0123	10.0	0.0	2.27	5.86 5.87	0.038	224.0	0.81	1.21	1.00	3.27	23.62	29.62	70.85	0
hannel1B	0.0124	10.0	0.0	2.27	5.87 5.89	0.038	224.0	0.81	1.22	1.00	3.26	23.52	29.59	70.00	0
hannel18	0.0125	10.0	0.0	2.26		0.038	224.0	0.82	1.22	1.00	3.26	23.56	29.56	70.78	0
hannel1B	0.0126	10.0	0.0	2.26	5.91		224.0	0.82	1,23	1.00	3,26 3,26	23.53	29.53	70.60	0
hannel1B	0.0127	10.0	0,0 62663	2.26	5.92	0.038	∠∠4.U BeenergyGing	0.82					23.33 25996	(49967669)	Transpool

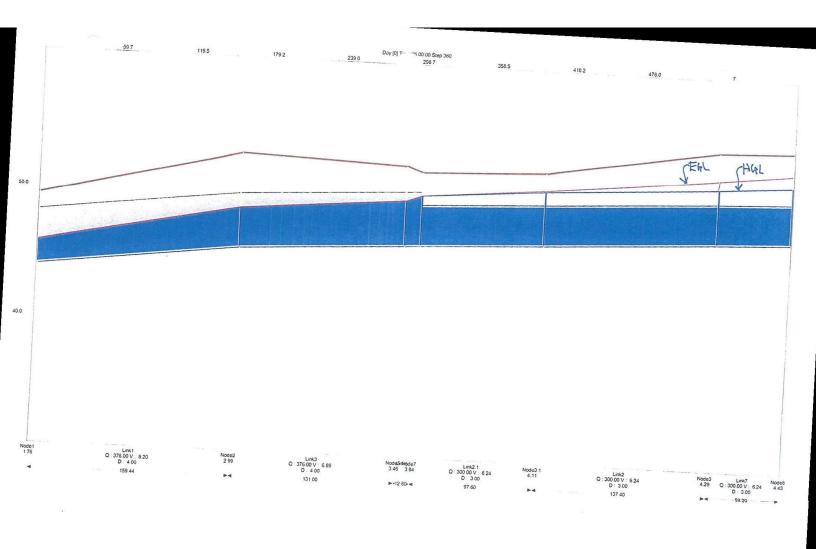


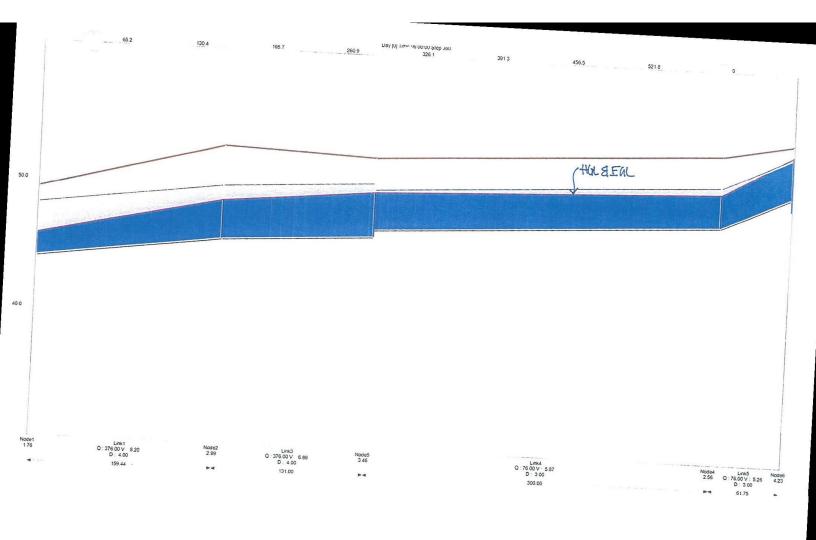
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WWERT #2 9#3 SUTSOAVE DO Node6 Node4 (2)30"PIK Node8 Node3 (2)8×3 CRC Node3.1 CHURRY # 2 (2)8x4 CBC FRINGESS DR. Node1

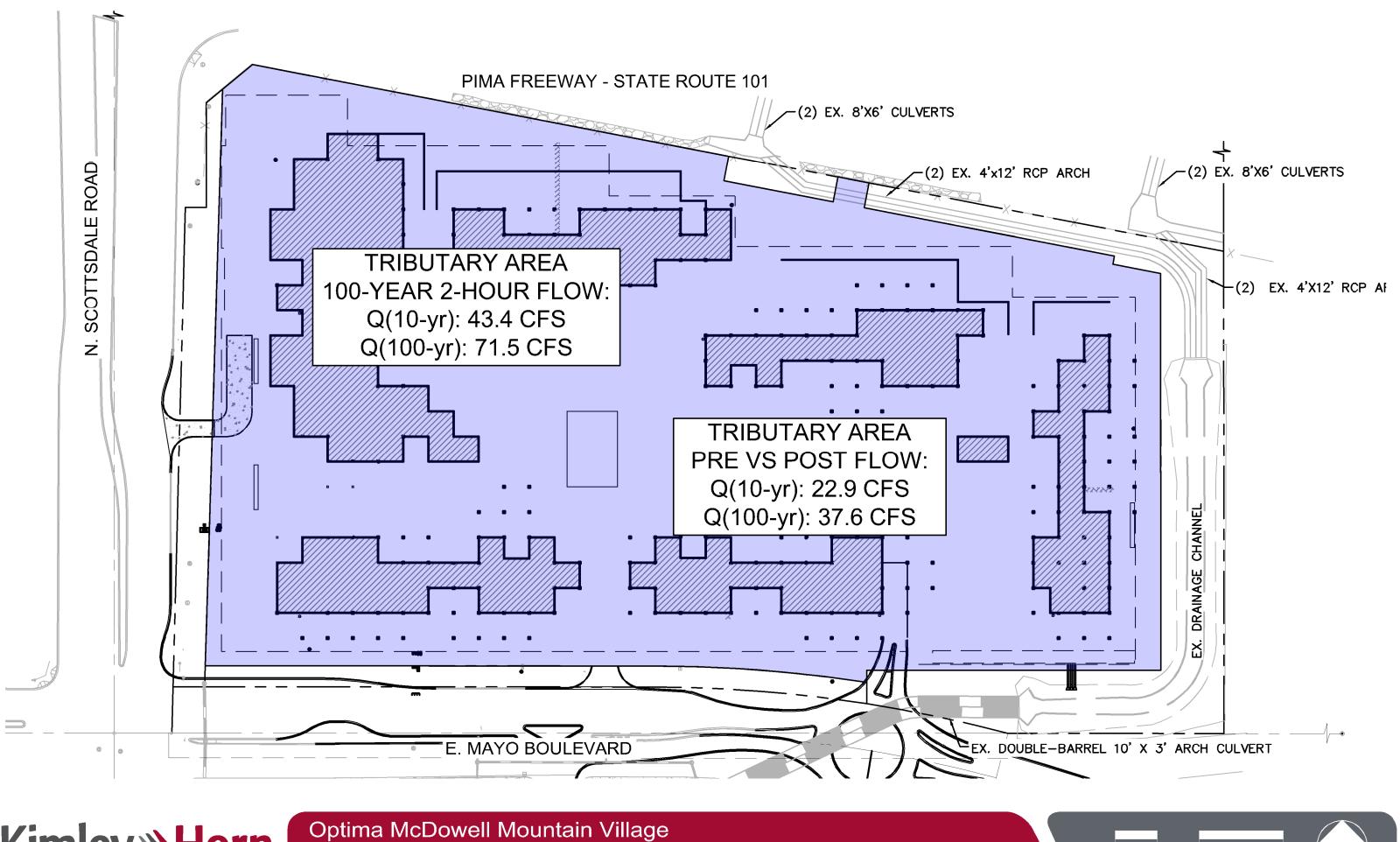






Appendix J

Watershed Delineation





Optima McDowell Mountain Village WATERSHED DELINEATION

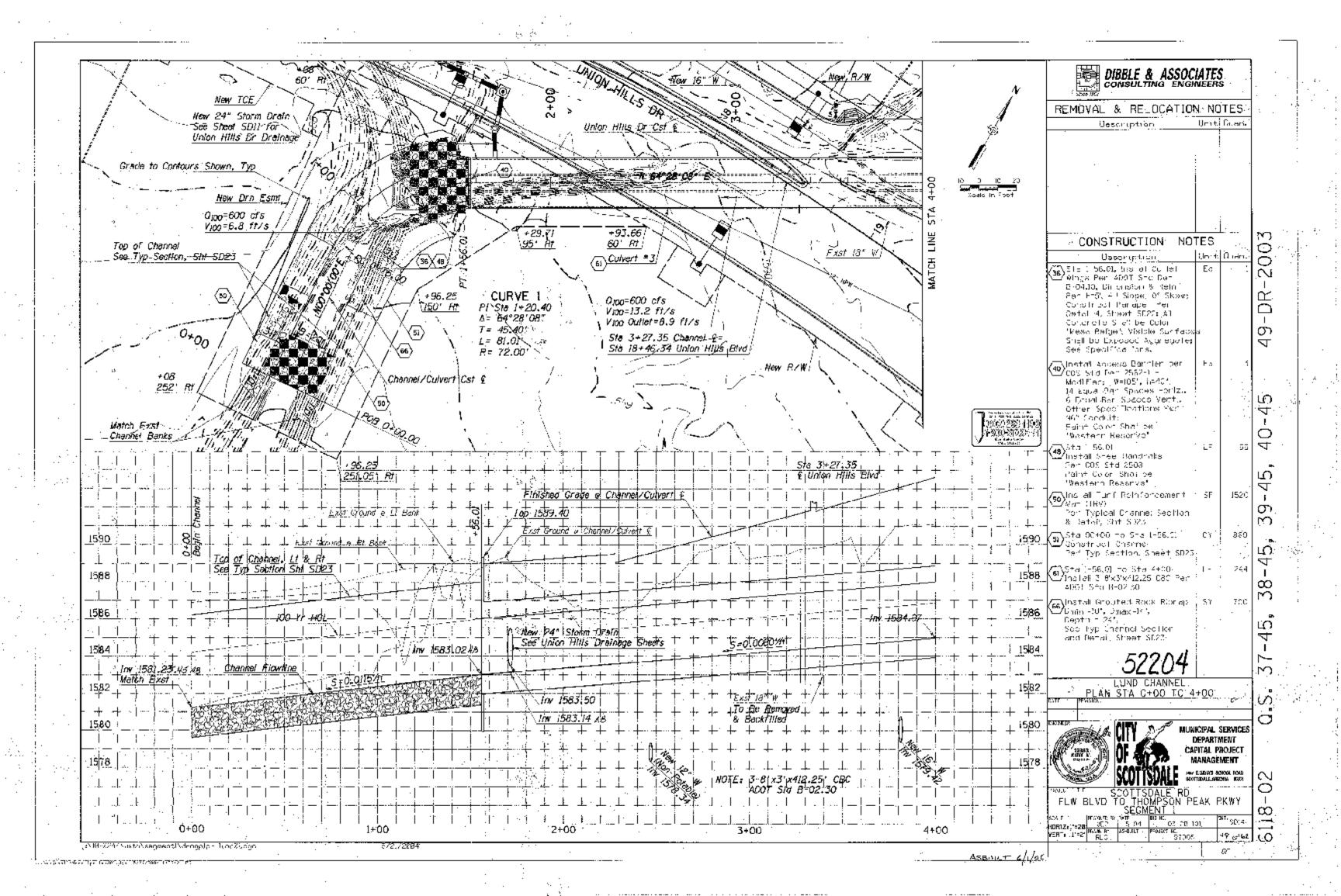
September 1, 2022

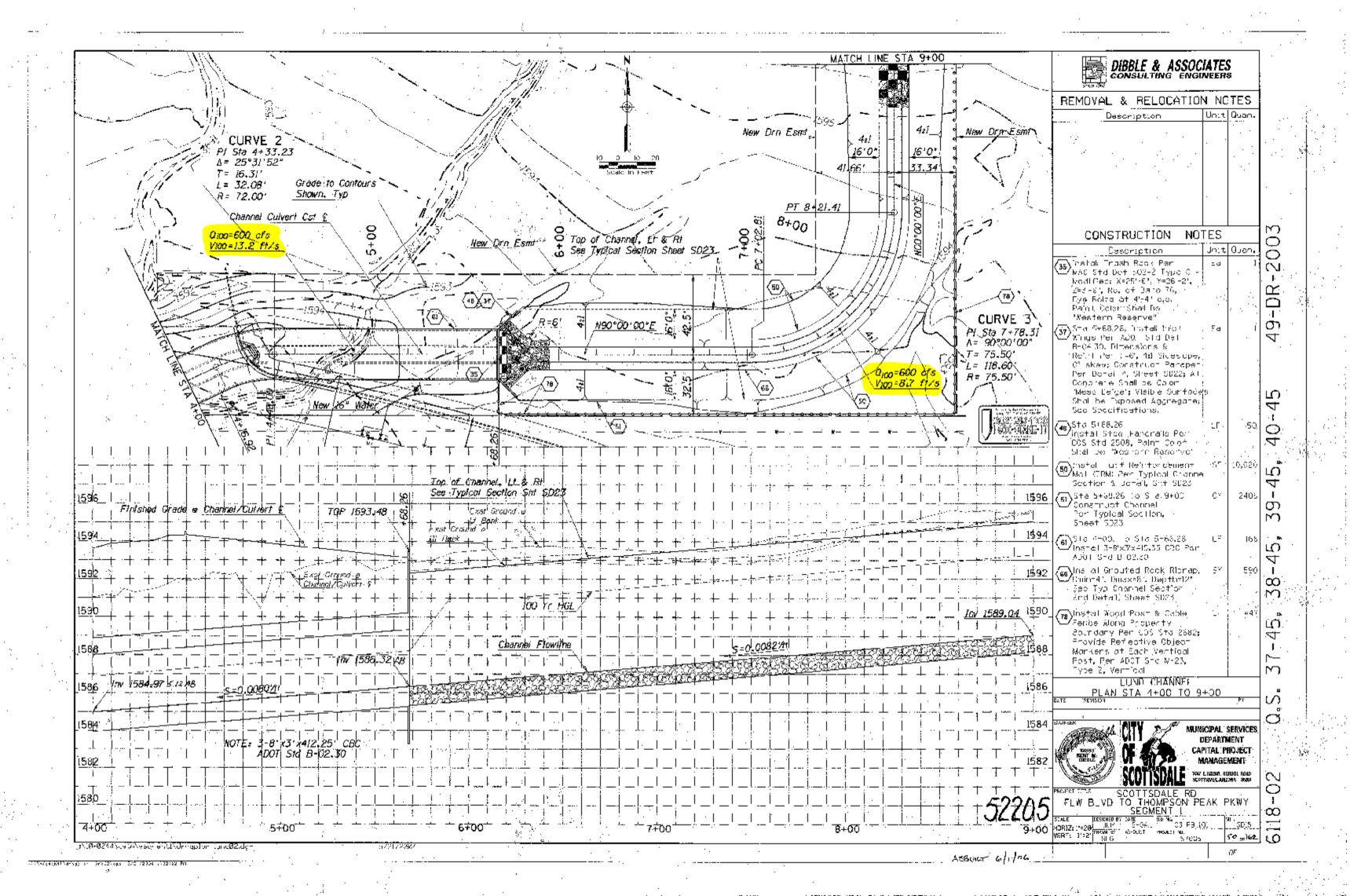


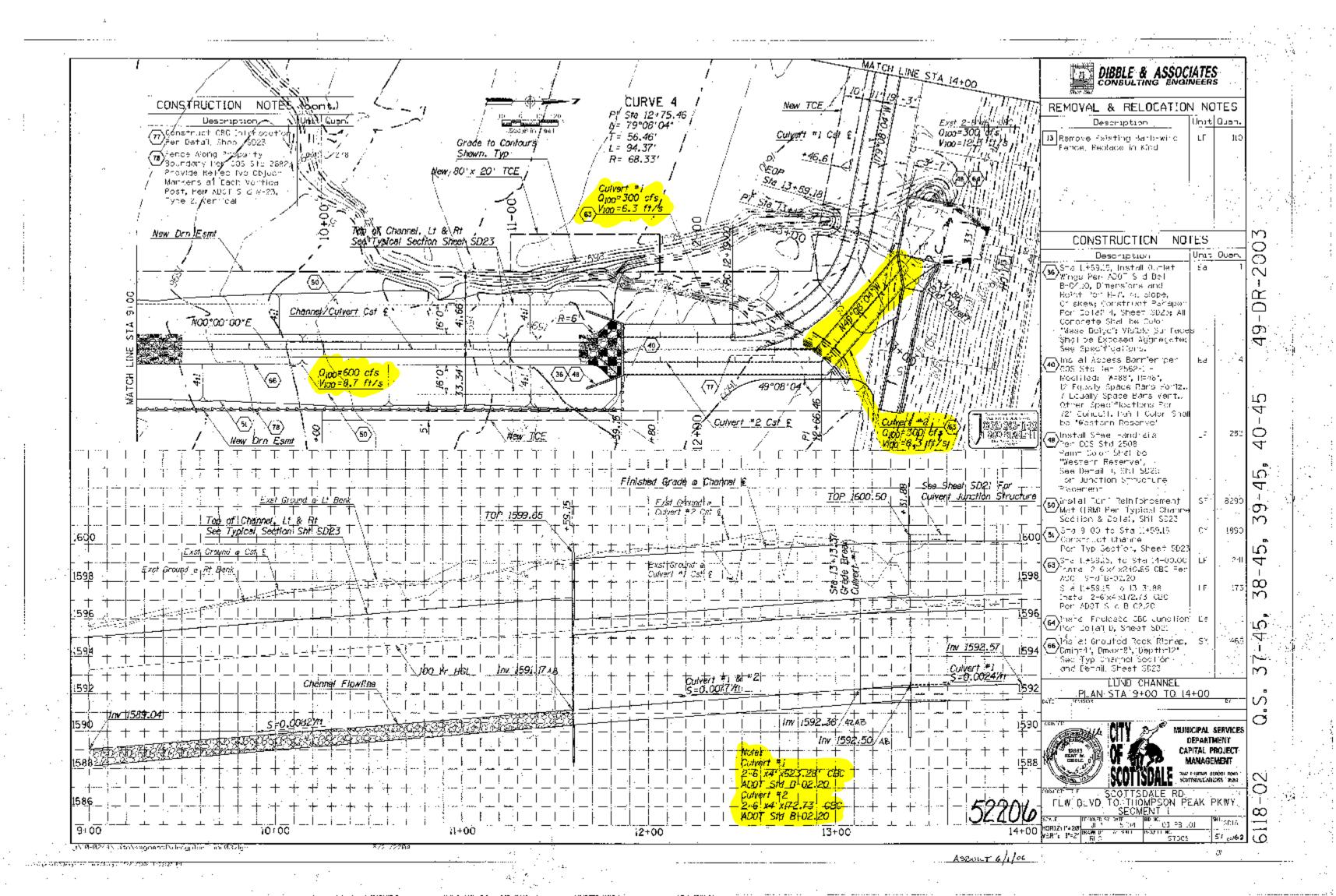


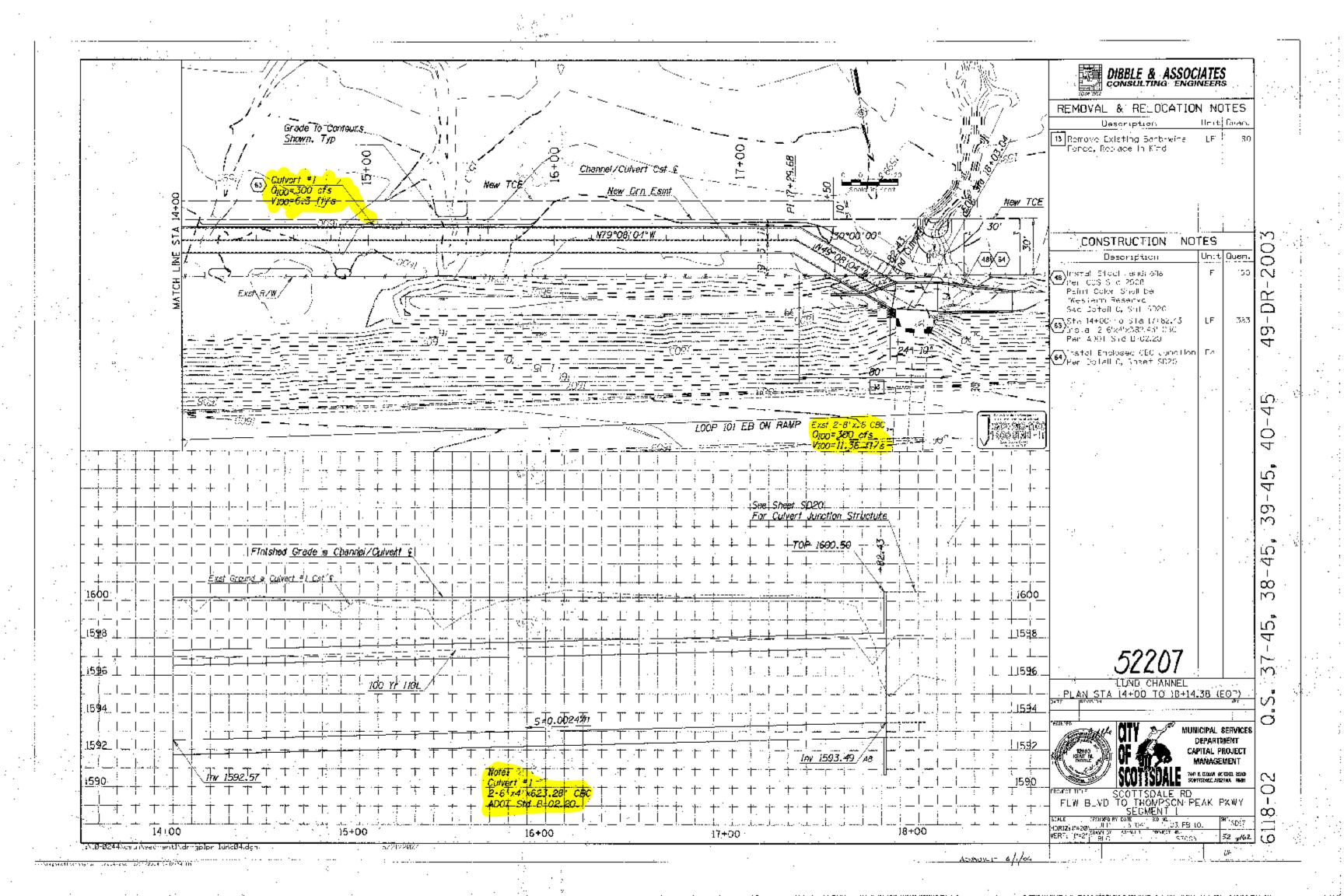
Appendix K

As-Builts for Lund Channel











Appendix L

As-Builts for One Scottsdale South Drainage Basin Improvement Plans

ENGINEERS NOTES

- MARICOPA ASSOCIATION OF GOVERNMENTS (M.A.G.) UNIFORM STANDARD SPECIFICATIONS AND DETAILS FOR PUBLIC WORKS CONSTRUCTION (LATEST EDITION INCLUDING LATEST REVISION AND CURRENT SUPPLEMENTALS THEREOF PER THE LOCAL TOWN OR CITY) ARE INCORPORATED INTO THIS PLAN IN THEIR ENTIRETY.
- ALL WORK REQUIRED TO COMPLETE THE CONSTRUCTION COVERED BY THIS PLAN SHALL BE IN ACCORDANCE WITH THE M.A.G. STANDARD SPECIFICATIONS AND DETAILS AND CURRENT SUPPLEMENTS THEREOF PER THE LOCAL CITY OR TOWN UNLESS SPECIFIED OTHERWISE IN THESE PLANS OR ELSEWHERE IN THE CONTRACT DOCUMENTS. CONTRACTORS SHALL FAMILIARIZE THEMSELVES WITH ALL REQUIRED STANDARD SPECIFICATIONS, DETAILS AND SUPPLEMENTS PRIOR TO BIDDING THE WORK FOR THE CONSTRUCTION COVERED BY THIS PLAN.
- THE CONTRACTOR IS RESPONSIBLE FOR ALL METHODS, SEQUENCING, AND SAFETY CONCERNS ASSOCIATED WITH THIS PROJECT DURING CONSTRUCTION, UNLESS SPECIFICALLY ADDRESSED OTHERWISE IN THIS PLAN OR ELSEWHERE IN THE CONTRACT.
- THE CONTRACTOR IS TO COMPLY WITH ALL LOCAL, STATE, AND FEDERAL LAWS AND REGULATIONS APPLICABLE TO THE CONSTRUCTION COVERED BY THIS PLAN.
- THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND COMPLYING WITH ALL PERMITS REQUIRED TO COMPLETE ALL WORK COVERED BY THIS PLAN.
- THE QUANTITIES AND SITE CONDITIONS DEPICTED IN THESE PLANS ARE FOR INFORMATIONAL PURPOSES ONLY AND ARE SUBJECT TO ERROR AND OMISSION. CONTRACTORS SHALL SATISFY THEMSELVES AS TO ACTUAL QUANTITIES AND SITE CONDITIONS PRIOR TO BIDDING THE WORK FOR THE CONSTRUCTION COVERED BY THIS PLAN.
- A REASONABLE EFFORT HAS BEEN MADE TO SHOW THE LOCATIONS OF EXISTING UNDERGROUND FACILITIES AND UTILITIES IN THE CONSTRUCTION AREA. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO UTILITIES AND/OR FACILITIES CAUSED DURING THEIR CONSTRUCTION OPERATIONS, THE CONTRACTOR SHALL CALL 48 HOURS IN ADVANCE FOR BLUE STAKE (1-800-STAKE-IT) PRIOR TO ANY EXCAVATION.
- B. THE CONTRACTOR IS RESPONSIBLE FOR ALL COORDINATION OF CONSTRUCTION AFFECTING UTILITIES AND THE COORDINATION OF ANY NECESSARY UTILITY RELOCATION WORK.
- 9. ALL PAYING, GRADING, EXCAVATION, TRENCHING, PIPE BEDDING, CUT FILL AND BACKFILL SHALL COMPLY WITH THE RECOMMENDATIONS SET FORTH IN THE SOILS (GEOTECHNICAL) REPORT FOR THIS PROJECT IN ADDITION TO THE REFERENCED REQUIRED SPECIFICATIONS AND DÉTAILS. THE CONTRACTOR SHALL BE AWARE THAT CERTAIN UTILITIES. REQUIRE PROPER ATTENTION AND CAREFUL PLANNING DURING SITE CONSTRUCTION, PLEASE NOTE THAT UTILITIES ON THESE PLANS MAY NOT EXHIBIT THE FULL PROTECTIVE COVER REQUIRED DURING THE SUBGRADE PREPARATION PHASE OF THE PONSTRUCTION. IN SUCH INSTANCES, THE CONTRACTOR SHALL PROVIDE ADDITIONAL PROTECTION. (SUCH AS RAMPING) OR INCREASED PIPE STRENGTH TO PROVIDE THE NECESSARY PROTECTION REQUIRED TO PREVENT DAMAGE DURING THE CONSTRUCTION OF THIS PROJECT, THE CONTRACTOR SHALL HOLD THE ENGINEER. HARMLESS IN ALL CAGES FOR DAMAGES TO UTILITIES WHERE INADEQUATE PROTECTIVE MEASURES OCCUR.
- 10. THE CONTRACTOR IS TO VERIFY THE LOCATION AND THE ELEVATIONS OF ALL EXISTING UTILITIES AT POINTS OF TIE-IN PRIOR TO COMMENCING ANY NEW CONSTRUCTION. SHOULD ANY LOCATION OR ELEVATION DIFFER FROM THAT SHOWN ON THESE PLANS, THE CONTRACTOR SHALL CONTACT THE OWNER'S AGENT.
- 11. CONTRACTOR TO VERIFY AND COORDINATE ALL DIMENSIONS AND SITE LAYOUT WITH ARCHITECT'S FINAL SITE PLAN AND FINAL BUILDING DIMENSIONS BEFORE STARTING WORK, REPORT DISCREPANCIES TO OWNER'S AGENT.
- 12. COORDINATION BETWEEN ALL PARTIES IS ESSENTIAL PART OF CONTRACT.
- 13. CONTRACTOR IS RESPONSIBLE FOR PROJECT AND SITE CONDITIONS, AND TO WORK WITH WEATHER CONDITIONS AS THE PROJECT SITE MAY BE LOCATED IN A FLOOD PRONE AREA AND SUBJECT TO FLOODING AND ITS HAZARDS.
- 14. THE CONTRACTOR IS TO VERIFY THE LOCATION, ELEVATION, CONDITION, AND PAVEMENT CROSS-SLOPE OF ALL EXISTING SURFACES AT POINTS OF TIE-IN AND MATCHING, PRIOR TO COMMENCEMENT OF GRADING, PAVING, CURB AND GUTTER, OR OTHER SURFACE CONSTRUCTION, SHOULD EXISTING LOCATIONS, ELEVATIONS, CONDITION, OR PAYEMENT CROSS-SLOPE DIFFER FROM THAT SHOWN ON THESE PLANS, RESULTING IN THE DESIGN INTENT REFLECTED ON THESE PLANS NOT ABLE TO BE CONSTRUCTED, THE CONTRACTOR SHALL NOTIFY THE OWNER'S AGENT IMMEDIATELY FOR DIRECTION ON HOW TO PROCEED PRIOR TO COMMENCEMENT OF CONSTRUCTION. THE CONTRACTOR ACCEPTS RESPONSIBILITY FOR ALL COSTS ASSOCIATED WITH CORRECTIVE ACTION IF THESE PROCEDURES ARE NOT FOLLOWED.
- 15. CONTRACTOR IS RESPONSIBLE TO COORDINATE UTILITY CROSSINGS AT CULVERT CROSSINGS BEFORE STARTING WORK ON CULVERT, COORDINATE WITH DWNER REPRESENTATIVE, VERIFY UTILITY LINES AND/OR CONDUITS ARE IN PLACE BEFORE STARTING CULVERT WORK.
- 16. CONSTRUCT RETENTION BASIN AS SHOWN, CONTRACTOR TO SCARIFY BOTTOM OF BASIN TWO FEET DEEP AND NOT ALLOW COMPACTION OVER BUX.
- 17. THIS PROJECT REQUIRES A REGULAR ONGOING MAINTENANCE PROGRAM FOR THE DESIGNED DRAINAGE SYSTEM(S) TO PRESERVE THE DESIGN INTEGRITY AND THE ABILITY TO PERFORM ITS OPERATIONAL INTENT. FAILURE TO PROVIDE MAINTENANCE WILL JEOPARDIZE THE DRAINAGE SYSTEM(S)' PERFORMANCE AND MAY LEAD TO IT'S INABILITY TO PERFORM PROPERLY AND/OR CAUSE DAMAGE ELSEWHERE IN THE PROJECT.
- 18. SEMER LINES DESIGNED IN PROFILE AND PUBLIC WATER LINES ARE REQUIRED TO BE ASSUILT AND THE INSTALLATION AND TESTING WITNESSED BY A PROFESSIONAL ENGINEER IN ACCORDANCE WITH ARIZONAL ADMINISTRATIVE CODES R18-9-E301 "4.01 GENERAL PERMIT: SEWAGE COLLECTIONS SYSTEMS" AND R18-4-507 AND 508 "APPROVAL OF CONSTRUCTION" AND "RECORD DRAWINGS", RESPECTIVELY, IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY OWNER 72 HOURS IN ADVANCE WHEN THOSE SYSTEMS ARE READY TO BE WITNESSED
- 19. THE WORK PRODUCT PRESENTED IS BELIEVED TO BE COMPLIAN! WITH THE INTENT OF THE CURRENT AMERICANS. DISABILITIES ACT (ADA) REQUIREMENTS AS INTERPRETED BY THE REVIEWING AGENCY(S), IF CONSTRUCTION OF THE PROJECT IS DELAYED, THIS WORK PRODUCT SHOULD BE UPDATED TO ACCOUNT FOR ANY RELEVANT ADA UPDATES. BEFORE CONSTRUCTION BEGINS.

<u>UTILITY_NOTES</u>

- THESE PLANS HAVE BEEN SUBMITTED TO THE FOLLOWING UTILITY COMPANIES AND THE WORK CONTAINED IN THESE PLANS HAS BEEN APPROVED BY THESE COMPANIES. WITHIN THEIR AREA OF INTEREST. THE SIZE AND LOCATIONS, AS SHOWN, OF THE GAS, TELEPHONE AND POWER LINES, AND CONNECTIONS AGREE WITH THE INFORMATION CONTAINED IN THE UTILITY COMPANY RECORDS. WHERE THE WORK TO BE DONE CONFLICTS WITH ANY OF THESE UTILITIES, THE CONFLICTS SHALL BE RESOLVED AS SPECIFIED. CONFLICTS ARISING DURING THE COURSE OF CONSTRUCTION FROM UNFORESEEN CIRCUMSTANCES SHALL BE REPORTED TO THE INTERESTED UTILITY COMPANY AND BE RESOLVED BY THEM AND THE DESIGN ENGINEER AND APPROVED BY THE COS.
- 2. THE CITY WILL NOT PARTICIPATE IN THE COST OF CONSTRUCTION OR UTILITY RELOCATION.
- 3. IN ACCORDANCE WITH AAC RIB-4-119, ALL MATERIALS ADDED AFTER JANUARY 1, 1993 WHICH MAY COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM 10 NATIONAL SANITATION FOUNDATION STANDARDS 60 AND 61.

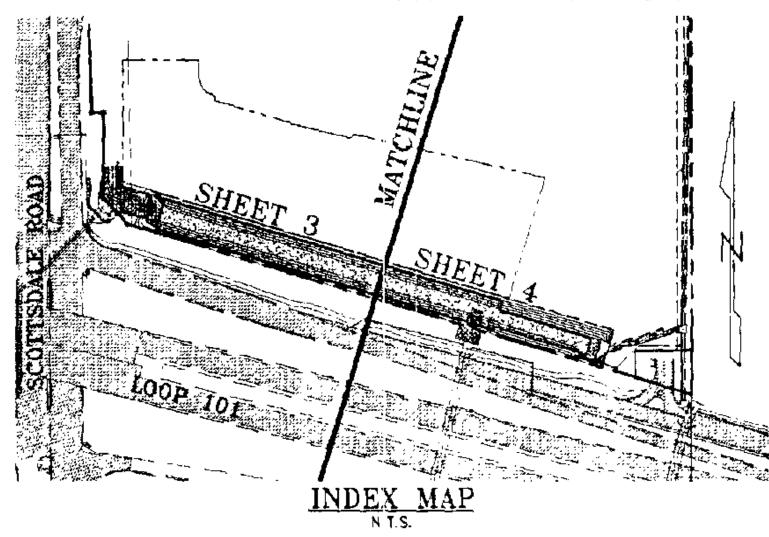
HAUL ROUTE

HAUL ROUTE PERMITS ARE REQUIRED FOR ANY HAUL OPERATION WHICH UTILIZES CITY RIGHT-OF-WAY WITH A VOLUME EXCEEDING 5,000 C.Y.

ONE SCOTTSDALE SOUTH DRAINAGE BASIN IMPROVEMENTS SCOTTSDALE, ARIZONA

SHEET INDEX

- COVER SHEET NOTES/SECTIONS/LEGAL DESCRIPTION
- PLAN SHEETS
- DETAIL SHEET
- STORM TRAP UNDERGROUND DETENTION PLAN



GENERAL NOTES

CITY OF SCOTTSDALE GENERAL CONSTRUCTION NOTES FOR PUBLIC WORKS CONSTRUCTION

- ALL CONSTRUCTION IN THE PUBLIC RIGHT-OF-WAY OR IN EASEMENTS GRANTED FOR PUBLIC USE MUST CONFORM TO THE LATEST MARICOPA ASSOCIATION OF GOVERNMENTS (MAG) UNIFORM STANDARD SPECIFICATIONS AND UNIFORM STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION AS AMENDED BY THE LATEST VERSION OF THE CITY OF SCOTTSDALE (COS SUPPLEMENTAL STANDARD SPECIFICATIONS AND SUPPLEMENTAL STANDARD DETAILS. IF THERE IS A CONFLICT, THE LATTER SHALL GOVERN.
- THE ENGINEERING DESIGNS ON THESE PLANS ARE ONLY APPROVED BY THE CITY IN SCOPE AND NOT IN DETAIL. IF CONSTRUCTION QUANTITIES ARE SHOWN ON THESE PLANS, THEY ARE NOT VERIFIED BY THE CITY.
- APPROVAL OF PLANS IS VALID FOR SIX (6) MONTHS. IF AN ENCROACHMENT PERMIT FOR THE CONSTRUCTION HAS NOT BEEN ISSUED WITHIN SIX MONTHS. THE PLANS SHALL BE RESUBMITTED TO THE CITY FOR RE-APPROVAL.
- 4. A PUBLIC WORKS INSPECTOR WILL INSPECT ALL WORKS WITHIN THE CITY OF SCOTTSDALE RIGHT-OF-WAY AND IN EASEMENTS. NOTIFY INSPECTION SERVICES 24 HOURS PRIOR TO STARTING OF CONSTRUCTION (TELEPHONE
- WHENEVER EXCAVATION IS TO BE DONE, CALL THE "BLUE STAKE CENTER", 263-1100. TWO WORKING DAYS BEFORE EXCAVATION IS TO BEGIN. THE CENTER WILL SEE THAT THE LOCATION OF THE UNDERGROUND UTILITY LINES IS IDENTIFIED FOR THE PROJECT, CALL "COLLECT" IF NECESSARY.
- ENCROACHMENT PERMITS ARE REQUIRED FOR ALL WORK IN PUBLIC RIGHTS-OF-WAY AND EASEMENTS GRANTED FOR PUBLIC PURPOSES, AN ENCROACHMENT PERMIT WILL BE ISSUED BY THE CITY UPON RECEIPT OF PAYMENT OF A BASE FEE PLUS A FEE FOR INSPECTION SERVICES. TO BE PROVIDED BY THE CITY. COPIES OF ALL PERMITS SHALL BE RETAINED. ONSITE AND SHALL BE AVAILABLE FOR INSPECTION AT ALL TIMES. FAILURE TO PRODUCE THE REQUIRED PERMITS WILL RESULT IN IMMEDIATE WORK STOPPAGE UNTIL THE PROPER PERMIT DOCUMENTATION IS OBTAINED.
- ALL EXCAVATION AND GRADING WHICH IS NOT IN THE PUBLIC RIGHTS-OF-WAY OR NOT IN EASEMENTS GRANTED FOR PUBLIC USE MUST CONFORM TO CHAPTER 70, EXCAVATION AND GRADING, OF THE LATEST EDITION OF THE UNIFORM BUILDING CODE PREPARED BY THE INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS. A PERMIT FOR THIS GRADING MUST BE SECURED FROM THE CITY FOR A FEE ESTABLISHED BY THE UNIFORM BUILDING CODE.
- 8. ALL CONCRETE SHALL BE SAN DIEGO BUFF.

INDEMNITY:

- CITY OF SCOTTSDALE WILL NOT BE RESPONSIBLE FOR REMOVAL, REPAIR, OR REPLACEMENT OF SIDEWALKS, LANDSCAPING OR ANY OTHER IMPROVEMENTS LOCATED WITHIN CITY EASEMENT(S) AS A RESULT OF ACCESS TO MAINTENANCE OF, OR REPAIRS TO THE WATERLINE SHOWN ON THESE PLANS.
- 2. CITY OF SCOTTSDALE WILL NOT BE RESPONSIBLE FOR REMOVAL, REPAIR, OR REPLACEMENT OF THE RETAINING WALLS OR OTHER IMPROVEMENTS WITHIN CITY EASEMENT(S) AS A RESULT OF ACCESS TO, MAINTENANCE OF, OR REPAIRS TO THE RETAINING WALLS SURROUNDING THE DETENTION BASINS SHOWN ON THESE PLANS.

"THE ENGINEER OF RECORD ON THESE PLANS HAS RECEIVED A COPY OF THE APPROVED STIPULATIONS FOR THIS PROJECT AND HAS DESIGNED THESE PLANS IN CONFORMANCE WITH THE APPROVED STIPULATIONS."

ENGINEER: LISA L CRANE, P.E.

LAND SURVEY DATA

E/W STREET BEARDSLEY ROAD

N/S STREET SCOTTSDALE ROAD ALIGN

MC BC HH, N. BOUND LANE, DOWN D.B' DESCRIPTION

RANGE UPDATED NA

NORTHING (f) 15,283,524 EASTING (f) 27,356,033

BENCHMARK AND TOPO SOURCE

ALL TOPOGRAPHY WAS OBTAINED FROM AERIAL MAPPING COMPANY. INC., PROJECT NUMBER 04134, FLIGHT DATE JUNE 26, 2004

I HEREBY CERTIFY THAT ALL ELEVATIONS REPRESENTED ON THIS PLAN ARE BASED ON THE ELEVATION DATUM FOR THE CITY OF SCOTTSDALE BENCHMARK PROVIDED ABOVE.

REVIEW & RECOMMENDED APPROVAL BY:

FIRE DEPT	NIA	GRADING de DRAINAGE	10-24-07
PLANNING	AD 10/26/08	WATER SEWER	N /A
TRAFFIC	MIA	PAVING	NIA
TRUCTURAL	079 8, Held	RET.	aging & Addle

SECTION 28 T. 4 N., R. 4 B. SITE S.A.

VICINITY MAP 4.TS.

IUN ON HULLS DRIVE (ALIONMENT) MAÑO BOUJÊVĀRD

OWNER / DEVELOPER ONE SCOTTSDALE HOLDINGS LLC. 7600 E. DOUBLETREE RANCH RD. SUITE 300 SCOTTSDALE, AZ 85258 CONTACT: MR. ART NEHF TEL: (480) 367-7000

ENGINEER

FAX (480) 367-7558

WOOD, PATEL & ASSOCIATES INC. 2051 WEST NORTHERN, SUITE 100 PHOENIX, ARIZONA 85021 CONTACT: MS. USA L. CRANE, P.E. (602) 335-8500 (FAX) 335-8580

EARTHWORK QUANTITIES

QUANTITIES ARE IN PLACE ESTIMATES. VOLUME OF CUT FOR UNDERGROUND STORAGE IS INCLUDED. NO SHRINK OR SWELL IS ASSUMED. DESCRIPTION

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YIH MAUS? 17,800 C.Y.

DETENTION CALCULATIONS

THIS PLAN SHOULD BE REVIEWED WITH THE MASTER DRAINAGE REPORT DATED 09-26-06 PREPARED BY WOOD, PATEL & ASSOCIATES.

NO CONFLICT SIGNATURE BLOCK UTILITY COMPANY DATE SENT UTUTY NAME OF COMPANY REPRESENTATIVE NUMBER CITY OF SCOTTSDALE WATER CITY OF SCOTTSDALE | N/A NVA SANITARY SEWER | CITY OF SCOTTSDALE CITY OF SCOTTSDALE JIN/A N\A 602-371-6688 ELECTRIC A.P.S. 02-13-07 BARBARA HEIMER CONFLICT LIAISON DEPT | 602-630-0496 TELEPHONE QWEST COMM. 02-1**3-**-07 602-749-8550 NATURAL GAS SOUTHWEST GAS CORP. POM JINTASAWANG 02-13-07 CABLE TY COX CABLE THANH DOAN 823-322-7086 02-13-07 OTHER OTHER

ENGINEER'S CERTIFICATION:

CIGNATURE

nia.

I. LISA L. CRANE . BEING THE PERSON RESPONSIBLE FOR DESIGNING THE FACILITIES NECESSARY TO SERVE THIS DEVELOPMENT, HEREBY CERTIFY THAT ALL OF THE UTILITY COMPANIES LISTED BEING THE PERSON RESPONSIBLE FOR DESIGNING THE FACILITIES ABOVE, HAVE REVIEWED THIS PROJECT PROPOSAL AND ALL CONFLICTS HAVE BEEN RESOLVED AT THIS POINT. "NO CONFLICTS" FORMS HAVE BEEN OBTAINED FROM EACH UTILITY COMPANY AND ARE INCLUDED ! IN THIS SUBMITTAL, I ALSO CERTIFY THAT ALL ONSITE TRANSFORMERS, CABLE BOXES AND ANY OTHER PUBLIC/PRIVATE UTILITY APPURTENANCES ARE PLACED SUCH THAT THEY DO NOT NEGATIVELY IMPACT THE USE OR INTENDED USE OF ANY DEDICATED EASEMENTS OR FACILITIES DEVELOPED WITH THIS PROJECT INCLUDING BUT NOT LIMITED TO STORMWATER STORAGE BASINS, SIGHT DISTANCE EASEMENTS AND NAOS OR OTHER OPEN SPACE EASEMENTS.

FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

COMMUNITY NUMBER	PANEL NUMBER	SUFFIX	DATE	OF FIRM	FIRM ZONE	BASE FLOOD ELEVATION (IN AC ZONE, USE DEPTH)
045012	1245	G	SEPT.	30, 2005	AD	1.





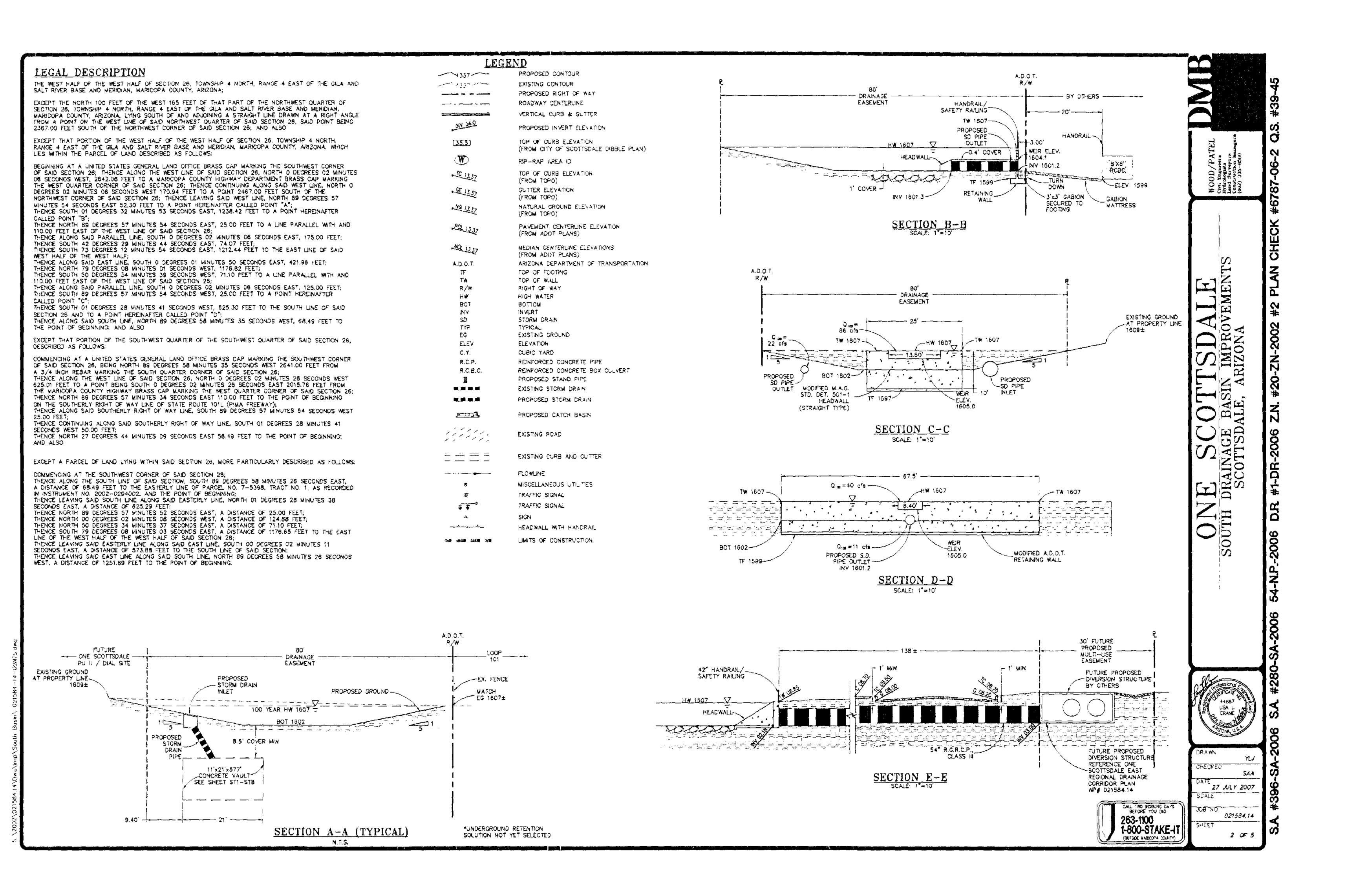
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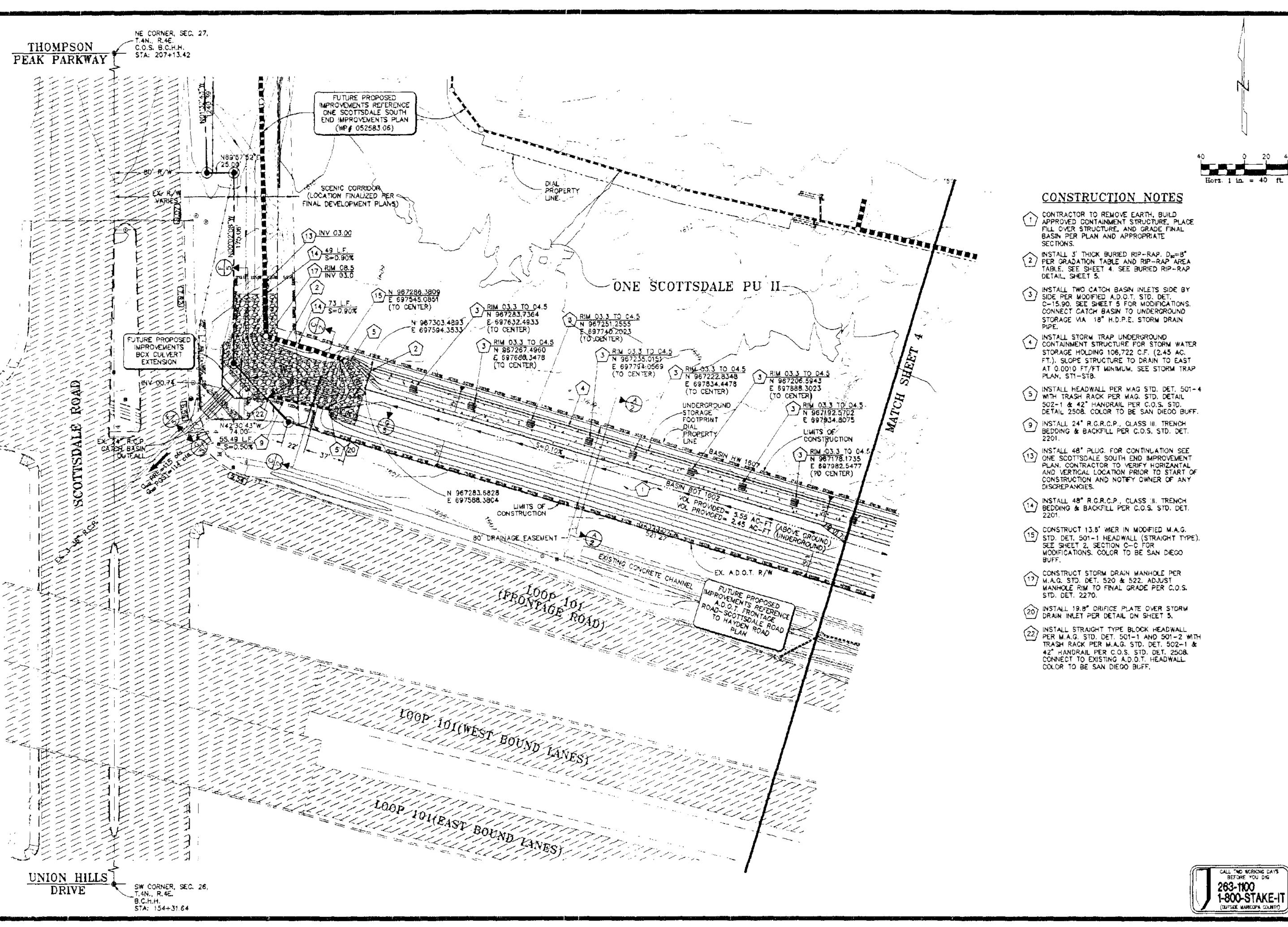
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27 JULY 2007

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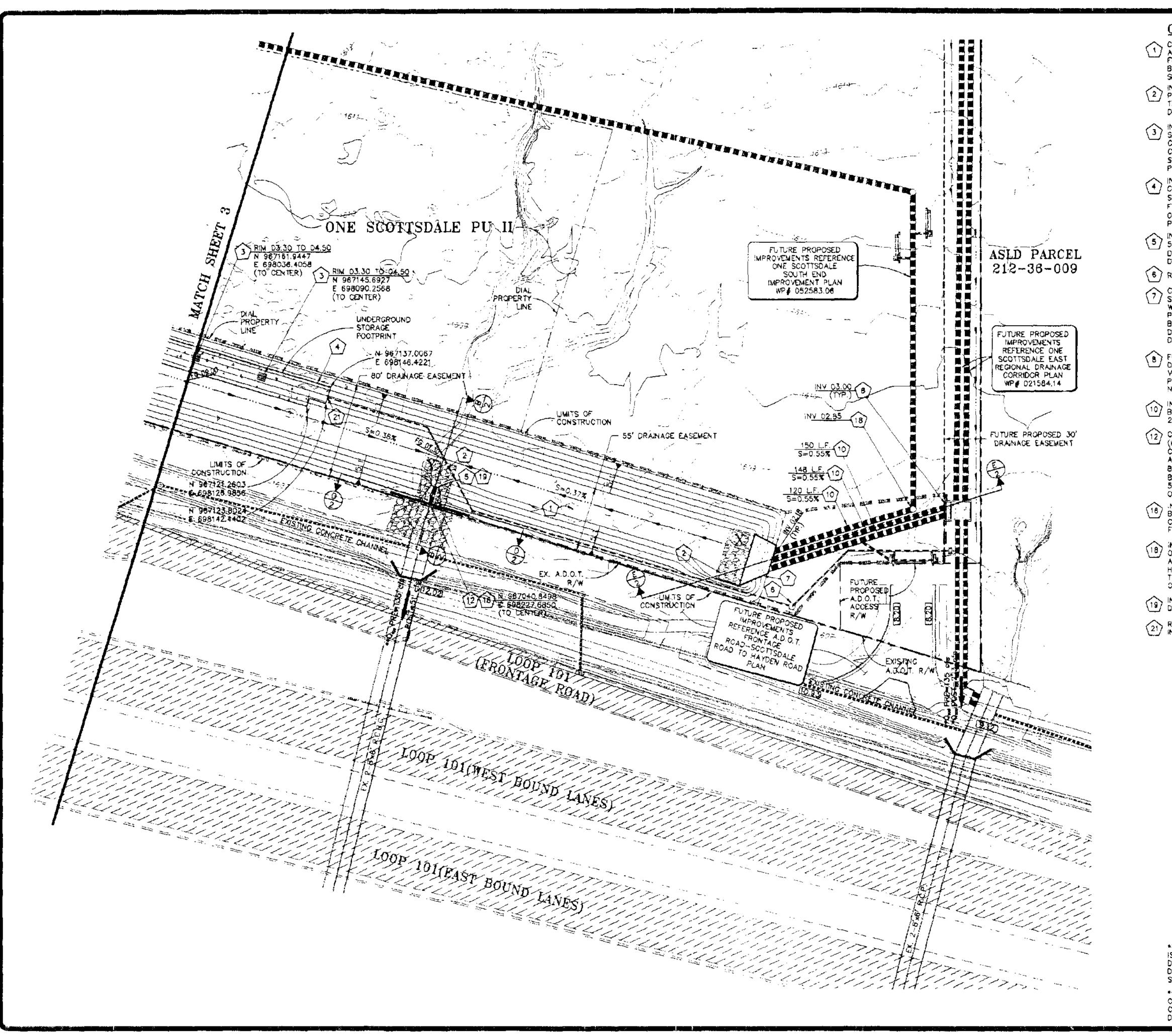




CHECKED SAA

27 JULY 2007 1"= 40" 021584.14

SHEET 3 OF 5



CONSTRUCTION NOTES

- , CONTRACTOR TO REMOVE EARTH, BUILD APPROVED CONTAINMENT STRUCTURE, PLACE FILL OVER STRUCTURE, AND GRADE FINAL BASIN PER PLAN AND APPROPRIATE SECTIONS.
- INSTALL 3' THICK BURIED RIP-RAP. D==8" PER GRADATION TABLE AND RIP-RAP AREA TABLE, SEE SHEET 4. SEE BURIED RIP--RAP DETAIL, SHEET 5.
- 3 SIDE PER MODIFIED A.D.O.T. STD. DET. C-15.90. SEE SHEET 5 FOR MODIFICATIONS. CONNECT CATCH BASIN TO UNDERGROUND STORAGE VIA 18" H.D.P.E. STORM DRAIN
- INSTALL STORM TRAP UNDERGROUND CONTAINMENT STRUCTURE FOR STORM WATER STORAGE HOLDING 470,448 C.F. (10.8 AC. FT.). SLOPE STRUCTURE TO DRAIN TO EAST 0.0010 FT/FT MINIMUM, SEE STORM TRAP PLAN, ST1-ST8.
- , INSTALL HEADWALL PER M.A.G. STD. DET. 5 501-4 WITH TRASH RACK PER M.A.G. STD. DET. 502-1 & 42" HANDRAIL PER C.O.S. STD. DET. 2508. COLOR TO BE SAN DIEGO BUFF.
- (6) REFERENCE WOOD/PATEL LIFT STATION PLAN.
- CONSTRUCT MULTIPLE PIPE OUTLET PER ADOT / STD. DET. 811.14 WETH 30" SKEW ANGLE & 4:1 WING WALLS. EXTEND SOUTH WING WALL PER PLAN AND DETAIL A OF A.D.O.T. STD. DET. B-11.12, INSTALL TRASH RACK PER MAG. STD. DETAIL 502-1 & HANDRAIL PER C.O.S. STD. DETAIL 2508, COLOR TO BE SAN DIEGO BUFF
- 8 FOR CONTINUATION SEE EAST REGIONAL DRAINAGE CORRIDOR PLAN. CONTRACTOR TO VERIFY HORIZONTAL AND VERTICAL LOCATION PRIOR TO START OF CONSTRUCTION AND NOTIFY OWNER OF ANY DISCREPANCIES.
- 10 BEDDING AND BACKFILL PER C.O.S. STD. DET.
- (12) CONSTRUCT A.D.O.T. RETAINING WALL (MODIFIED) WITH 8.4' WIDE WEIR OPENING. CONTRACTOR TO SELECT WALL TYPE, EITHER A.D.O.T. STD. DET. B-18.10 OR B-18.50. FOR 8-18.10 USE H=8' AND W=5'-0". FOR 8-18.50 USE H=8' AND W=5'-6". SEE SHEE" 5 FOR DETAILS, SEE SECTION B-B AND D-D ON SHEET 2. COLOR TO BE SAN DIEGO BUFF
- INSTALL THREE 3'x3' GABIONS CENTERED 18 BENEATH WER OPENING IN RETAINING WALL CONTRACTOR TO SECURE GABIONS TO FOOTING, SEE SECTION B-B ON SHEET 2.
- 18 ONE SCOTTSDALE PLANNING UNIT II GRADING AND DRAINAGE PLAN. CONTRACTOR TO VERIFY HORIZANTAL AND VERTICAL LOCATION PRIOR TO START OF CONSTRUCTION AND NOTIFY OWNER OF ANY DISCREPANCIES.
- INSTALL 13.6" ORIFICE PLATE OVER STORM DRAIN INVERT PER DETAIL ON SHEET 5.
- 21) REFERENCE STORM TRAP PLAN FOR SUMP INVERT.

GRADATION TABLE•

PERCENT	SIZE	Doo	CLASS,	INC	HES
PASSING	STAR	4	6	8	12
100 10 90	2.0 Dso	В	12	16	24
85 TO 70	1.5 Dsc	6	9	12	18
50 TO 30	1.0 D _∞	4	6	8	12
15 TO 5	0.67 Dao	3	4	5	8
5 TO 0	0.33 D	1	2	3	4

*MOIGENOUS/NATIVE STONE

RIP-RAP TABLE

AREA ID	AREA SIZE
W	40'x150'
X	20'x40'
Ŷ	25'x35'
Z	25'x55'

*THE 100 YEAR POST DEVELOPMENT DISCHARGE IS DESIGNED TO EXCEED THE 100 YEAR PRE DEVELOPMENT DISCHARGE DUE TO A DOWNSTREAM REGIONAL FLOOD CONTROL SOLUTION.

**FLOWS FROM THE EXISTING A.D.O.T. BOX CULVERTS MERGE SOUTH OF THE LOOP 101. THE COMBINED 100 YEAR PRE DEVELOPMENT DISCHARGE IS APPROXIMATED AT 135 CFS.





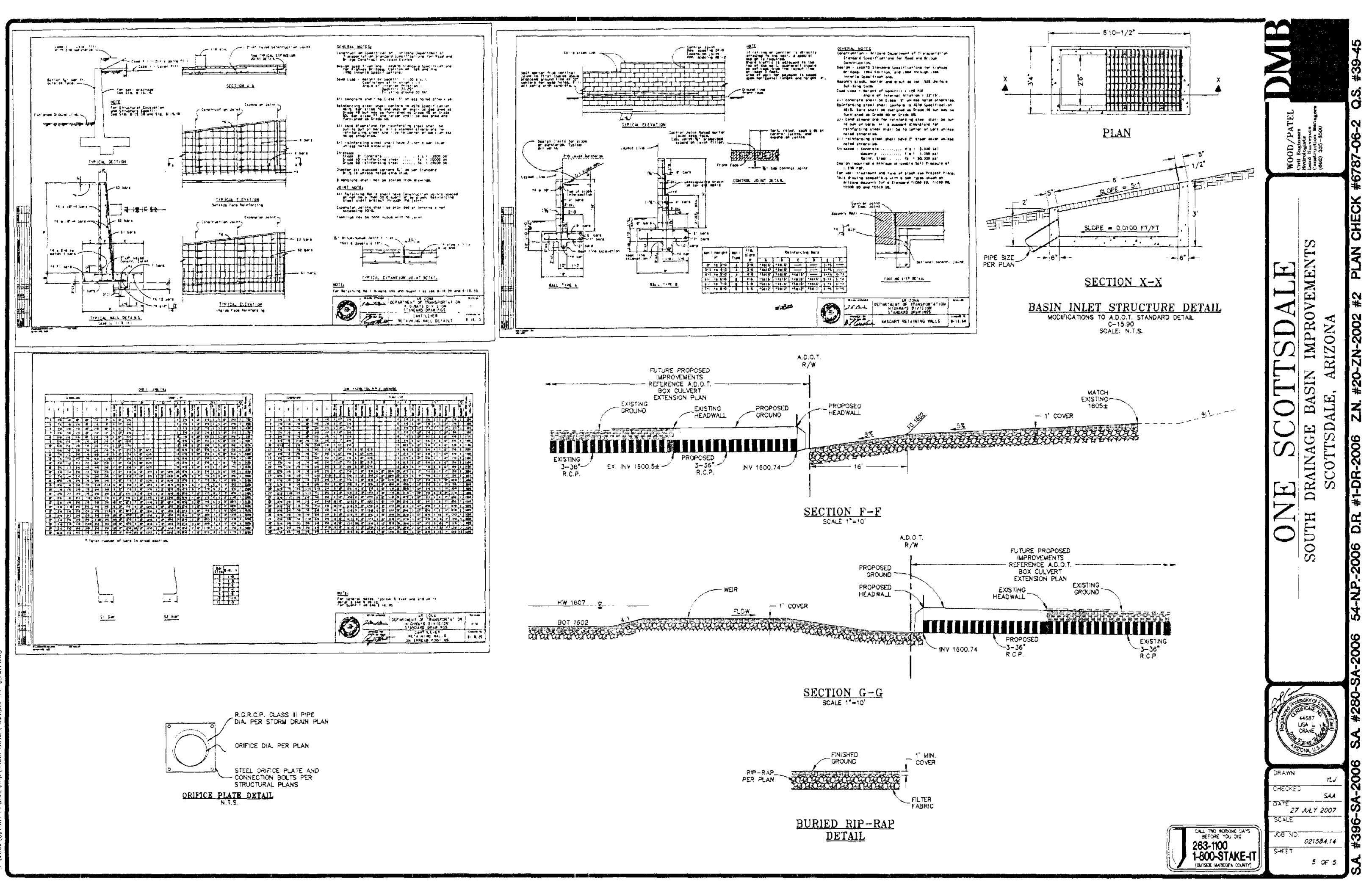
E SC SC

44687 LISA L. CRANE DRAWN

SAA 27 JULY 2007 1"=40

021584.14

4 OF 5





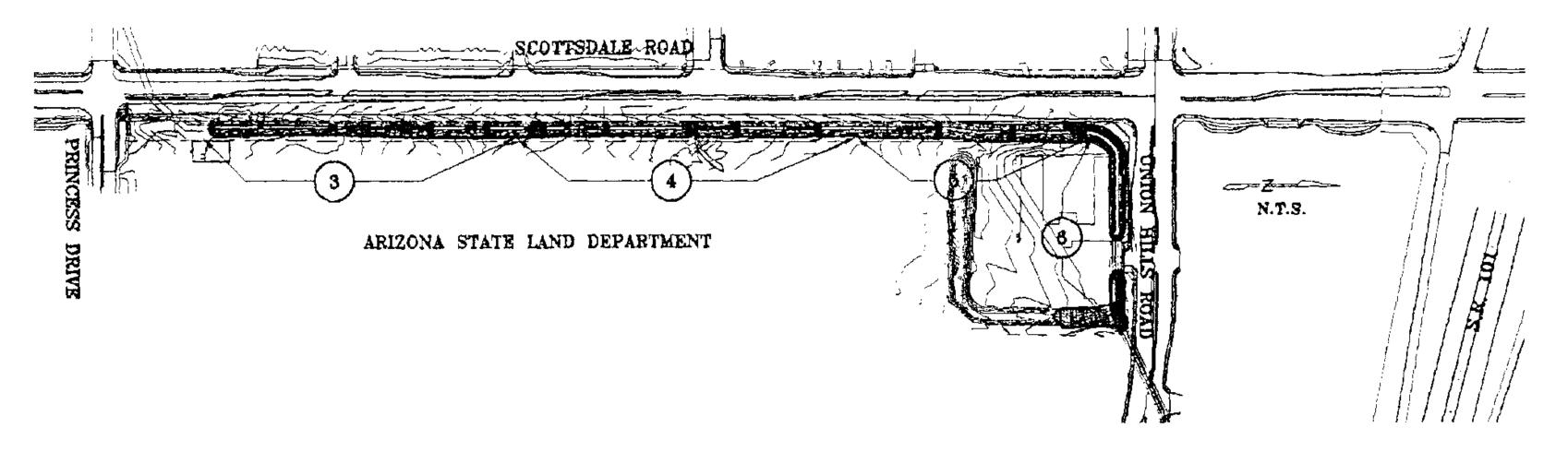
Appendix M

As-Builts for Scottsdale Road Intrim Drainage Channel

MARICOPA COUNTY, ARIZONA

ENGINEERS NOTES

- MARICOPA ASSOCIATION OF GOVERNMENTS (M.A.C.) UNIFORM STANDARD SPECIFICATIONS AND DETAILS FOR PUBLIC WORKS CONSTRUCTION (LATEST EDITION INCLUDING LATEST REVISION AND CURRENT SUPPLEMENTALS THEREOF PER THE LOCAL TOWN OR CITY) ARE INCORPORATED INTO THIS PLAN IN THEIR ENTIRETY.
- ALL WORK REQUIRED TO COMPLETE THE CONSTRUCTION COVERED BY THIS PLAN SHALL BE IN ACCORDANCE WITH THE M.A.G. STANDARD SPECIFICATIONS AND DETAILS AND CURRENT SUPPLEMENTS THEREOF PER THE LOCAL CITY OR TOWN UNLESS SPECIFIED OTHERWISE IN THESE PLANS OR ELSEWHERE IN THE CONTRACT DOCUMENTS, CONTRACTORS SHALL FAMILIARIZE THEMSELVES WITH ALL REQUIRED STANDARD SPECIFICATIONS, DETAILS AND SUPPLEMENTS PRIOR TO BIDDING THE WORK FOR THE CONSTRUCTION COVERED BY THIS PLAN.
- THE CONTRACTOR IS RESPONSIBLE FOR ALL METHODS, SEQUENCING, AND SAFETY CONCERNS ASSOCIATED WITH THIS PROJECT DURING CONSTRUCTION, UNLESS SPECIFICALLY ADDRESSED OTHERWISE IN THIS PLAN OR ELSEWHERE IN THE CONTRACT.
- THE CONTRACTOR IS TO COMPLY WITH ALL LOCAL STATE, AND FEDERAL LAWS AND REGULATIONS APPLICABLE TO THE CONSTRUCTION COVERED BY
- 5. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND COMPLYING WITH ALL PERMITS REQUIRED TO COMPLETE ALL WORK COVERED BY THIS PLAN.
- THE QUANTITIES AND SITE CONDITIONS DEPICTED IN THESE PLANS ARE FOR INFORMATIONAL PURPOSES ONLY AND ARE SUBJECT TO ERROR AND CHISSION, CONTRACTORS SHALL SATISFY THEMSELVES AS TO ACTUAL QUANTITIES AND SITE CONDITIONS PRIOR TO BIDDING THE WORK FOR THE CONSTRUCTION COVERED BY THIS PLAN.
- A REASONABLE EFFORT HAS BEEN MADE TO SHOW THE LOCATIONS OF EXISTING UNDERGROUND FACILITIES AND UTILITIES IN THE CONSTRUCTION AREA. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO UTILITIES AND/OR FACILITIES CAUSED DURING THEIR CONSTRUCTION OPERATIONS. THE CONTRACTOR SHALL CALL 48 HOURS IN ADVANCE FOR BLUE STAKE (1-800-STAKE-IT) PRICE TO ANY EXCAVATION.
- 8. THE CONTRACTOR IS RESPONSIBLE FOR ALL COORDINATION OF CONSTRUCTION AFFECTING UTILITIES AND THE COCRDINATION OF ANY NECESSARY UTILITY RELOCATION WORK.
- ALL PAYING, GRADING, EXCAVATION, TRENCHING, PIPE SEDDING, OUT FILL AND BACKFILL SHALL COMPLY WITH THE RECOMMENDATIONS SET FORTH IN THE SOILS (GEOTECHNICAL) REPORT FOR THIS PROJECT IN ADDITION TO THE REFERENCED REQUIRED SPECIFICATIONS AND DETAILS.
- 10. THE CONTRACTOR IS TO VERIFY THE LOCATION AND THE ELEVATIONS OF ALL EXISTING UTILITIES AT POINTS OF TIE-IN PRIOR TO COMMENCING ANY NEW CONSTRUCTION. SHOULD ANY LOCATION OR ELEVATION DIFFER FROM THAT SHOWN ON THESE PLANS, THE CONTRACTOR SHALL CONTACT THE OWNER'S
- 11. CONTRACTOR TO VERIFY AND COORDINATE ALL DIMENSIONS AND SITE LAYOUT WITH ARCHITECTURE'S FINAL SITE PLAN AND FINAL BUILDING DIMENSIONS BEFORE STARTING WORK, REPORT DISCREPANCIES TO OWNER'S
- 12. COORDINATION BETWEEN ALL PARTIES IS ESSENTIAL PART OF CONTRACT.
- 13. CONTRACTOR IS RESPONSIBLE FOR PROJECT AND SITE CONDITIONS, AND TO WORK WITH WEATHER CONDITIONS AS THE PROJECT SITE IS LOCATED IN A FLOOD PROME AREA AND SUBJECT TO FLOODING AND ITS HAZARDS.
- 14. THE CONTRACTOR IS TO YERIFY THE LOCATION, ELEVATION, CONDITION, AND PAYEMENT CROSS-SLOPE OF ALL EXISTING SURFACES AT POINTS OF THE-IN AND MATCHING, PRIOR TO COMMENCEMENT OF GRADING, PAVING, CURB AND GUTTER, OR OTHER SURFACE CONSTRUCTION, SHOULD EXISTING LOCATIONS, ELEVATIONS, CONDITION, OR PAVEMENT CROSS-SLOPE DIFFER FROM THAT SHOWN ON THESE PLANS, RESULTING IN THE DESIGN INTENT REFLECTED ON THESE PLANS NOT ABLE TO BE CONSTRUCTED, THE CONTRACTOR SHALL NOTIFY THE OWNER'S AGENT IMMEDIATELY FOR DIRECTION ON HOW TO PROCEED PRICE TO COMMENCEMENT OF CONSTRUCTION. THE CONTRACTOR ACCEPTS RESPONSIBILITY FOR ALL COSTS ASSOCIATED WITH CORRECTIVE ACTION IF THESE PROCEDURES ARE NOT FOLLOWED.
- 15. CONTRACTOR IS RESPONSIBLE TO COORDINATE UTILITY CROSSINGS AT CULVERT CROSSINGS BEFORE STARTING WORK ON CULVERT, COORDINATE WITH OWNER REPRESENTATIVE, VERIFY UTILITY LINES AND/OR CONDUITS ARE IN PLACE BEFORE STARTING CULVERT WORK
- 18. THIS PROJECT REQUIRES A RECULAR ONGOING MAINTENANCE PROGRAM. FOR THE DESIGNED DRAINAGE SYSTEM(S) TO PRESERVE THE DESIGN INTEGRITY AND THE ABILITY TO PERFORM ITS OPERATIONAL INTENT. FAILURE TO PROVIDE MAINTENANCE WILL LEGRARDIZE THE DRAINAGE SYSTEM(S) PERFORMANCE AND MAY LEAD TO IT'S INABILITY TO PERFORM PROPERLY AND/OR CAUSE DAMAGE. ELSEWHERE IN THE PROJECT.
- 17. CONTRACTOR TO NOTIFY WOOD/PATEL, IF ENGAGED, 72 HOURS PRICE TO BEGINAING CONSTRUCTION FOR THE PURPOSE OF WITNESSING THE INSTALLATION OF ALL UNDERGROUND WET UTILITIES DIRECTED BY THIS PLAN. CONTRACTOR IS ALSO RESPONSIBLE FOR PROVIDING TO WOOD/PATEL, IF ENGAGED, A SET OF REPRODUCIBLE AS-BUILTS OF SAID UTILITIES (5 DAY REVIEW THE REQUIRED). CONTRACTOR TO NOTHY WOOD/PATEL IF ENGAGED, 72 HOURS PRIOR TO ANY TESTING OF WET UTILITIES AND TO PROVIDE A COPY OF TEST RESULTS AFTER COMPLETION.
- 18. THOSE SEWER LINES DESIGNED IN PROFILE ARE REQUIRED TO BE ASSUILT AND THE INSTALLATION AND TESTING WITNESSED BY A PROFESSIONAL ENGINEER IN ACCORDANCE WITH ARIZONA ADMINISTRATIVE CODE R18-9-E301 "4.01 GENERAL PERMIT: SEWAGE COLLECTION SYSTEMS". IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE CHINER WHEN THOSE SERVICES ARE READY TO BE WITNESSED.
- 19. THE PUBLIC WATER LINE INSTALLATION AND TESTING MAY BE REQUIRED TO BE MINESSED BY A PROFESSIONAL ENGINEER IN ACCORDANCE WITH ARIZONA ADMINISTRATIVE CODES R18-4-507 AND 508 TAPPPROVAL OF CONSTRUCTION. AND "RECORD DRAWINGS", RESPECTIVELY, IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE CHINER WHEN THOSE SERVICES ARE READY TO BE WITNESSED.
- 20. LOWEST FLOOR (LF) REFERS TO EITHER FLOOR/SLAB ELEVATION OR TOP OF BASEMENT SLAB. IF ELEVATIONS ON THE GRADING AND DRAINAGE PLANS FOR RESIDENTIAL UNITS REFLECT SLAB ON GRADE CONDITIONS AND CANNOT BE LOWERED WITHOUT AGENCY APPROVAL IN LOCATIONS WHERE 'SPECIAL FLOOD HAZARD AREAS' EXIST. IN NON-FLOOD HAZARD LOCATIONS, TO ENSURE THAT ADEQUATE RESIDENTIAL LOT DRAINAGE CAN BE ACHIEVED, A PROFESSIONAL ENGINEER SHOULD BE CONSULTED IF THE LF FOR THE SLAB IS PROPOSED TO BE LOWERED, OR IF A BASEMENT IS TO BE CONSTRUCTED.



GENERAL NOTES

CITY OF SCOTTSDALE GENERAL CONSTRUCTION NOTES FOR PUBLIC WORKS CONSTRUCTION

- 1. ALL CONSTRUCTION IN THE PUBLIC RIGHT-OF-WAY OR IN EASEMENTS GRANTED FOR PUBLIC USE MUST CONFORM TO THE LATEST MARICOPA association of governments (mag) uniform standard specifications: AND UNIFORM STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION AS AMENDED BY THE LATEST VERSION OF THE CITY OF SCOTTSDALE (CCS) SUPPLEMENTAL STANDARD SPECIFICATIONS AND SUPPLEMENTAL STANDARD DETAILS. IF THERE IS A CONFLICT, THE LATTER SHALL COVERN.
- THE ENGINEERING DESIGNS ON THESE PLANS ARE ONLY APPROVED BY THE CITY IN SCOPE AND NOT IN DETAIL. IF CONSTRUCTION QUANTITIES ARE SHOWN ON THESE PLANS, THEY ARE NOT VERIFIED BY THE CITY.
- APPROVAL OF PLANS IS VALID FOR SIX (6) MONTHS, IF AN ENCROACHMENT PERMIT FOR THE CONSTRUCTION HAS NOT BEEN ISSUED WITHIN SIX MONTHS, THE PLANS SHALL BE RESUBMITTED TO THE CITY FOR RE-APPROVAL
- 4. A PUBLIC WORKS INSPECTOR WILL INSPECT ALL WORKS WITHIN THE CITY OF SCOTTSDALE RIGHT-OF-WAY AND IN EASEMENTS. NOTIFY INSPECTION SERVICES 24 HOURS PRIOR TO STARTING OF CONSTRUCTION (TELEPHONE 480-312-5750).
- WHENEVER EXCAVATION IS TO BE DONE, CALL THE "BLUE STAKE CENTER" 263-1100, TWO WORKING DAYS BEFORE EXCAVATION IS TO BEGIN. THE CENTER WILL SEE THAT THE LOCATION OF THE UNDERGROUND UTILITY LINES I SIDENTIFIED FOR THE PROJECT, CALL "COLLECT" IF
- 6. ENCROACHMENT PERMITS ARE REQUIRED FOR ALL WORK IN PUBLIC RIGHTS-OF-WAY AND EASEMENTS GRANTED FOR PUBLIC PURPOSES. AN ENCROACHMENT PERMIT WILL BE ISSUED BY THE CITY UPON RECEIPT OF PAYMENT OF A BASE FEE PLUS A FEE FOR INSPECTION SERVICES TO BE PROVIDED BY THE CITY. COPIES OF ALL PERMITS SHALL BE RETAINED ONSITÉ AND SHALL BÉ AVAILABLE FOR INSPECTION AT ALL TIMES. FAILURE TO PRODUCE THE REQUIRED PERMITS WILL RESULT IN IMMEDIATE WORK STOPPAGE UNTIL THE PROPER PERMIT DOCUMENTATION IS OBTAINED.
- ALL EXCAVATION AND GRADING WHICH IS NOT IN THE PUBLIC RIGHTS-OF-WAY OR NOT IN EASEMENTS GRANTED FOR PUBLIC USE MUST CONFORM TO CHAPTER 70, EXCAVATION AND GRADING, OF THE LATEST EDITION OF THE UNIFORM BUILDING CODE PREPARED BY THE INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS. A PERMIT FOR THIS GRADING MUST BE SECURED FROM THE CITY FOR A FEE ESTABLISHED BY THE UNIFORM BUILDING CODE.

CHETY

TELEPHONE CHEST COMMUNICATIONS IAN HOLMES (480) 758-4588 4/20 NATURAL GAS SOUTHWEST GASC/O AR UTIL HOWARD WARREN (480) 730-3843 4/18 CABLE TV COX COMMUNICATIONS ARTURO BAYLON (623) 328-3625 4/20 DTHER N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A					
NATURAL GAS SOUTHWEST GASC/O AR UTIL HOWARD WARREN (480) 730—3843 4/16 CABLE TV COX COMMUNICATIONS ARTURO BAYLON (623) 328—3625 4/2 DTHER N/A N/A N/A N/A N/A N/A N/A OTHER N/A N/A N/A N/A N/A N/A N/A EVIGURER'S CERTIFICATION L. CALLEGY C. SCOMMEN, BEING THE PERSON RESPONSIBLE FOR DESIGNING FACILITIES RECESSARY TO SERVE THIS DEVELOPMENT, HEREBY CERTIFY THAT ALL THE UTILITY COMPANIES LISTED ABOVE, HAVE REVIEWED THIS PROJECT PROPOSAL ALL CONFLICTS HAVE BEEN RESCLIED AT THIS POINT. NO CONFLICT FORMS HAV BEEN CONFLICTS HAVE BEEN RESCLIED AT THIS POINT. NO CONFLICT FORMS HAV BEEN CONFLICTS THAT ALL ONSITE TRANSFORMERS, CABLE BOXES AND ANY OTHER PUBLIC/PRIVATE UTILITY APPURTENANCES ARE PLACED SUCH THAT THEY DO NOT NECATIVELY IMPACT THE USE OR INTENDED USE OF ANY DEDICATED EASEMENTS OF FACILITIES DEVELOPED WITH THIS PROJECT INCLUDING BUT NOT LIMITED TO STORMWATER STORAGE BASINS, SITE DISTANCE EASEMENTS AND NAOS OR OTHER OPEN SPACE FASTIFINTS.	SECTION C	ARIZONA PUBLIC SERVICE	MAP RECEIVED	7	4/21/0
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NAME OF COMPANY TELEPHONE NUMBER

RELATED PROJECTS

SCOTISDALE ROAD PUBLIC IMPROVEMENTS COS#6118-02

15 Bours

STIPULATION CONFORMANCE STATEMENT

THE ENGINEER OF RECORD ON THESE PLANS HAS RECEIVED A COPY OF THE APPROVED STIPULATIONS FOR THIS PROJECT AND HAS DESIGNED THESE PLANS IN CONFORMANCE WITH THE APPROVED STIPULATIONS.

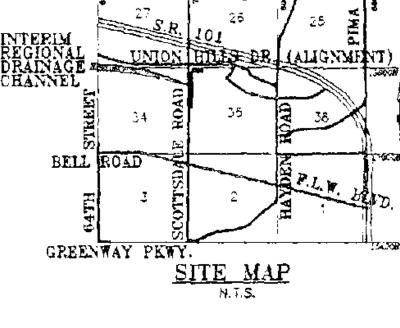
NATURAL OPEN SPACE & LIMITS OF CONSTRUCTION PROTECTION PLAN

- 1. NO BUILDING, GRADING, OR CONSTRUCTION ACTIVITY SHALL ENCROACH INTO AREAS DESIGNATED AS NOS.
- 2 ALL NOS AND LOC AREAS SHALL BE PROTECTED FROM DAMAGE PRIOR TO AND DURING CONSTRUCTION BY THE FOLLOWING METHODS: *A REGISTERED LAND SURVEYOR SHALL STAKE ALL NOS AND LOC AREAS BASED ON THIS EXHIBIT. *±THREE (3) FOOT TALL STEEL REBAR SHALL BE SET ALONG THE NOS AND
- LOC LINE AND CONNECTED WITH GOLD ROPING BY THE CONTRACTOR PRICR TO ANY CLEARING OR GRADING. *THE STAKING AND ROPING SHALL BE MAINTAINED INTACT BY THE CONTRACTOR DURING THE DURATION OF THE CONSTRUCTION ACTIVITY.
- 3. THE CONTRACTOR SHALL REMOVE STAKING AND ROPING AFTER RECEIPT OF THE CERTIFICATE OF OCCUPANCY FROM THE CITY OF SCOTTSDALE FOR THE ADJACENT HOME OR CONSTRUCTION WORK.

UTILITY NOTES

- 1. COMPANIES AND THE WORK CONTAINED IN THESE PLANS HAS BEEN APPROVED BY THESE COMPANIES WITHIN THEIR AREA OF INTEREST. THE SIZE WID LOCATIONS. AS SHOWN, OF THE CAS, TELEPHONE AND POWER LINES, AND CONNECTIONS AGREE WITH THE INFORMATION CONTAINED IN THE UTILITY COMPANY RECORDS. WHERE THE WORK TO BE DONE CONFLICTS WITH ANY OF THESE UTILITIES, THE CONFLICTS SHALL BE RESOLVED AS SPECIFIED. CONFLICTS ARISING DURING THE COURSE OF CONSTRUCTION FROM UNFORESEEN CIRCUMSTANCES SHALL BE REPORTED TO THE INTERESTED UTILITY COMPANY AND BE RESOLVED BY THEM AND THE DESIGN ENGINEER AND APPROVED BY CLO.S.
- 2. THE CITY MILE NOT PARTICIPATE IN THE COST OF CONSTRUCTION OR UTILITY RELOCATION.
- 3. "IN ACCORDANCE WITH MAG RIS-4-119, ALL MATERIALS ADDED AFTER JANUARY 1, 1993 WHICH MAY COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM TO NATIONAL SANETATION FOUNDATION STANDARDS 80 AND 61."

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LAND OWNER

ARIZONA STATE LAND DEPARTMENT 1616 WEST ADAMS STREET PHOENIX, ARIZONA 85007 TEL: (602) \$42-2648

<u>DEVELOPER</u>

ONE SCOTTSDALE HOLDINGS, LLC C/O DMB ASSOCIATES, INC. 7600 EAST DOUBLETREE RANCH ROAD SULTE 300 SCOTTSDALE, ARIZONA 85258 CONTACT: ART NEHF TEL: (480) 367-7000

ENGINEER

SHEET NUMBER WOOD, PATEL & ASSOCIATES INC. 2051 WEST NORTHERN, SUITE 100 PHOENIX, ARIZONA B5021 SHEET INDEX CONTACT: MR. DARREL WOOD P.E. R.L.S., MR. GEOFF BROWNELL P.E., CFM TEL: (602) 335-8500 DETAILS AND SECTIONS 3~6 PLAN AND PROFILE

PLAN & PROFILE

COVER

REVEGETATION PLAN

TREE SALVAGE PLAN

<u>BENCHMARK</u>

CITY OF SCOTTSDALE BRASS CAP FLUSH IN CONCRETE MEDIAN. NORTHING 967396.89 EASTING 697368.18 ELEVATION - 1609.79 CITY OF SCOTTSDALE NAVO 88 DATUM

APN#

NOTE

CONCRETE SHALL BE COLORED "SAN DIEGO BUFF"

ESTIMATED QUANTITIES

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THE QUANTITIES AND SITE CONDITIONS DEPICTED IN THESE PLANS ARE FOR INFORMATIONAL PURPOSES ONLY AND ARE SUBJECT TO ERROR AND CHISSION. CONTRACTORS SHALL SATISFY THEMSELVES AS TO ACTUAL QUANTITIES AND SITE CONDITIONS PRIOR TO BIDDING THE WORK FOR THE CONSTRUCTION COVERED BY THESE PLANS.

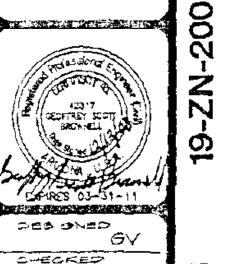
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AREST ATTEMORIES

SECTION A-A

*CHANNEL BOTTOM VARIES FROM A

CHANNEL (SECTION NAN) BETWEEN EACH GRADE CONTROL LOCATION.

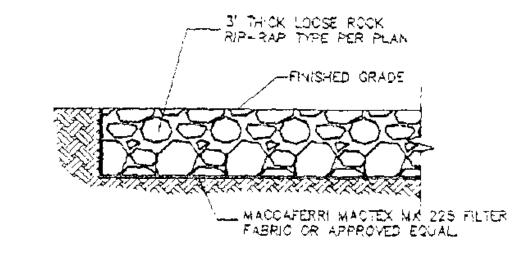
V BOTTOM CHANNEL (SECTION

M-M) to a 10' FLAT BOTTOM

EXISTING DRY

UTILITY BANKS

COMPACT NATIVE SOIL : PER MAG SPEC 215

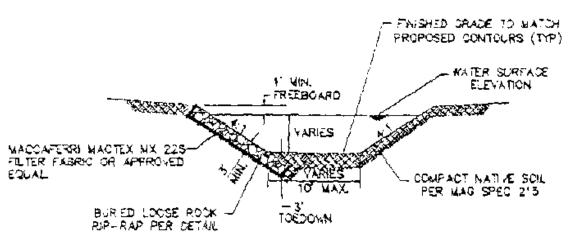


LOOSE ROCK RIP-RAP DETAIL NOTE: R'P-RAP TO BE ANGULAR STONE OR APPROVED EQUAL

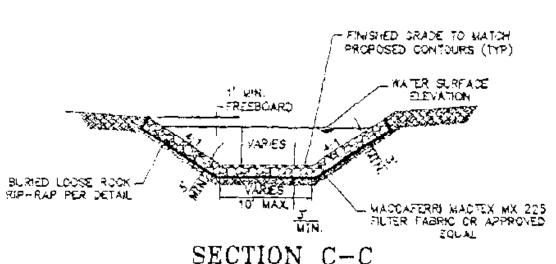
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1. IF ADDITIONAL BURIED ROCK PROTECTION IS AVAILABLE, CONTRACTOR MAY INSTALL BURIED LOOSE ROCK ON SIDE SLOPES IN ADDITION TO REQUIRED MINIMUM LOCATIONS SHOWN ON PLANS, PROVIDED THAT FLIFER FABRIC IS INSTALLED BENEATH THE ROCK.

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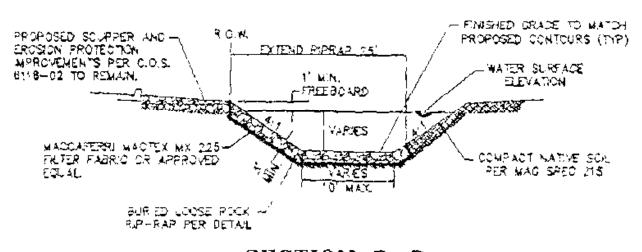


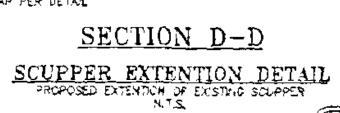
SECTION B-B BANK EROSION PROTECTION DETAIL



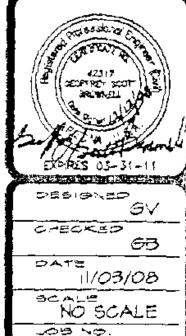
CHANNEL EROSION PROTECTION DETAIL

PROPOSED WASH AT BANK
PROTECTION ON BOTH SIDES
N.T.S.





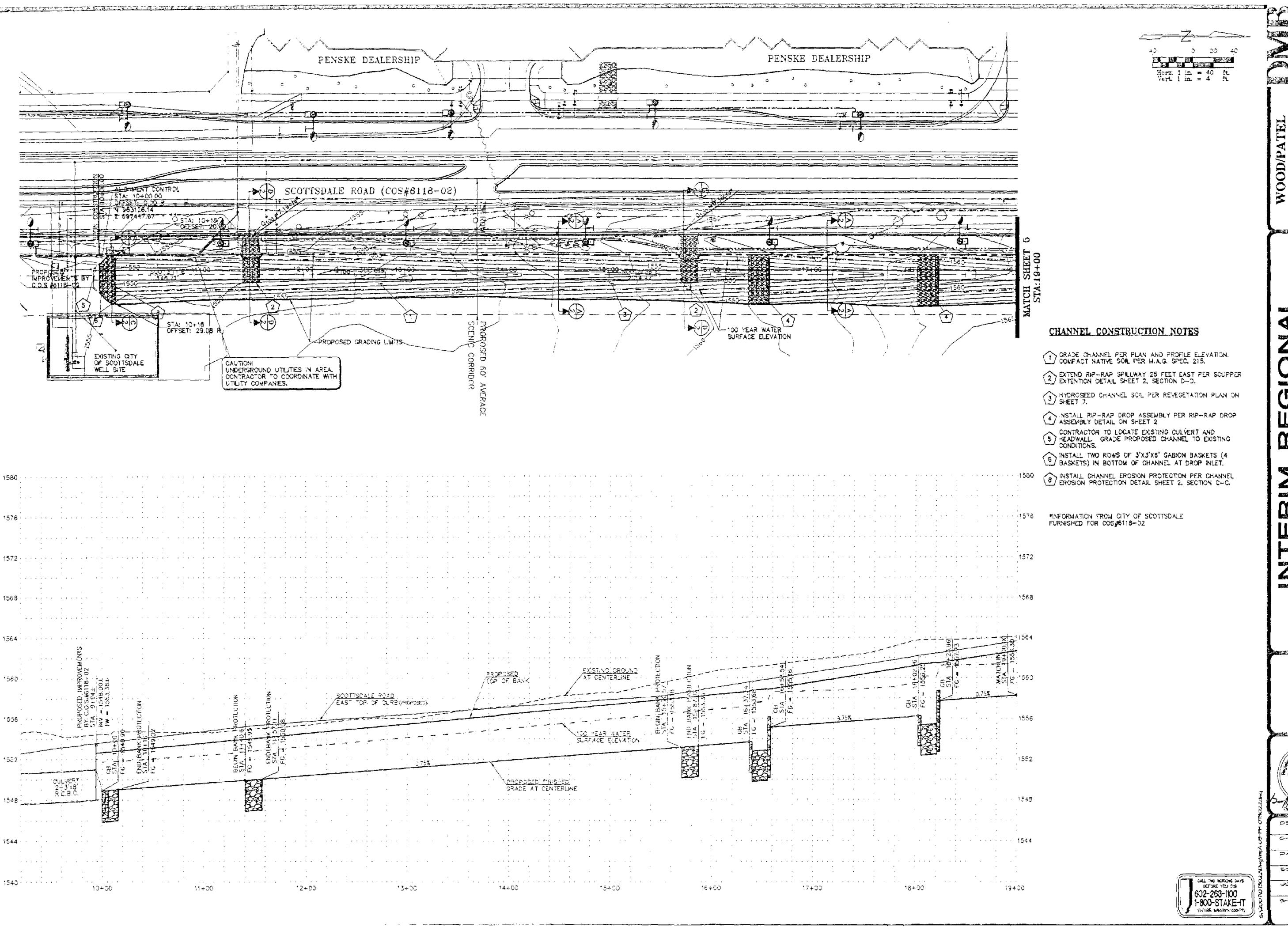




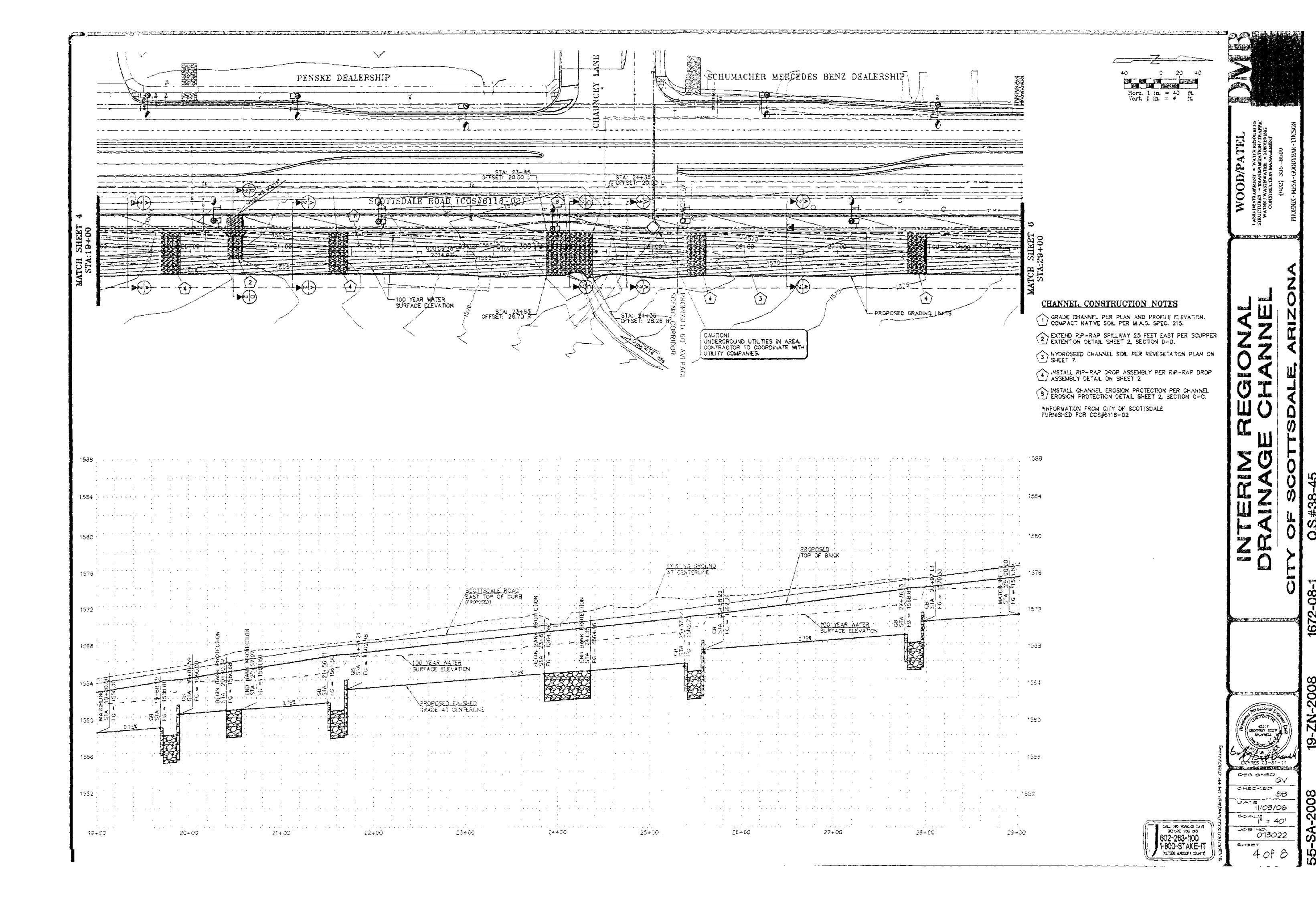
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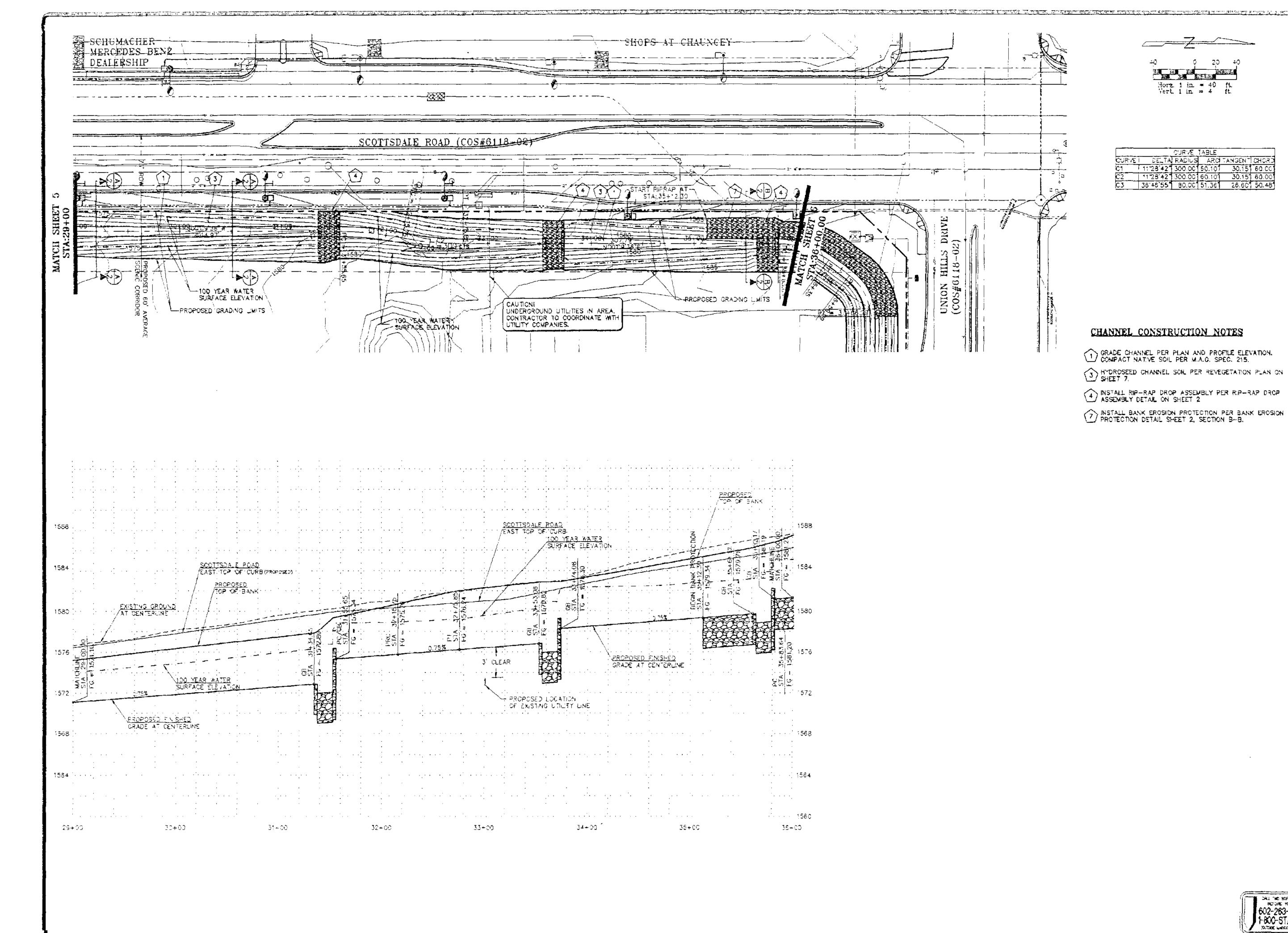
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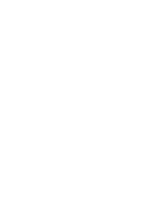
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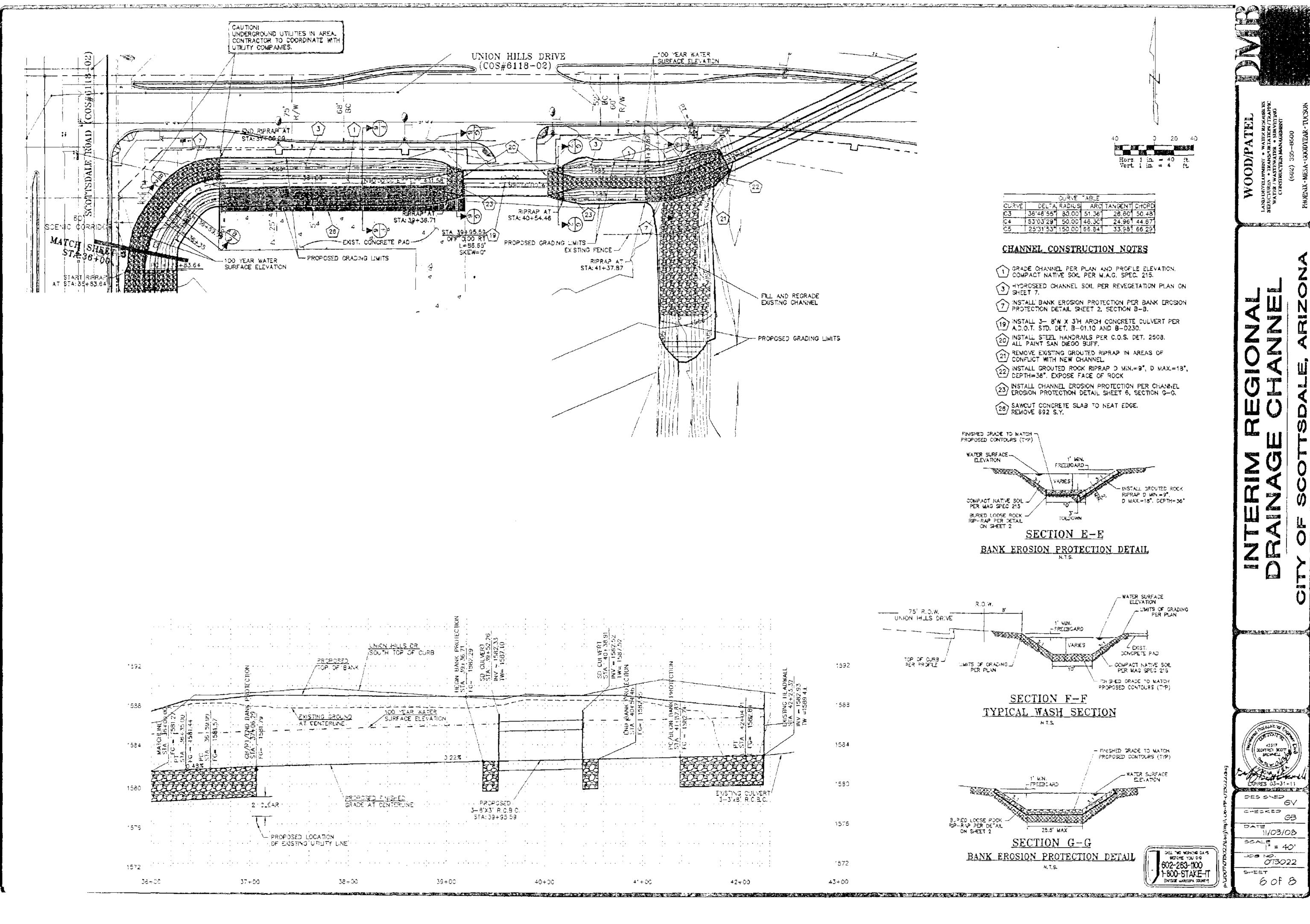
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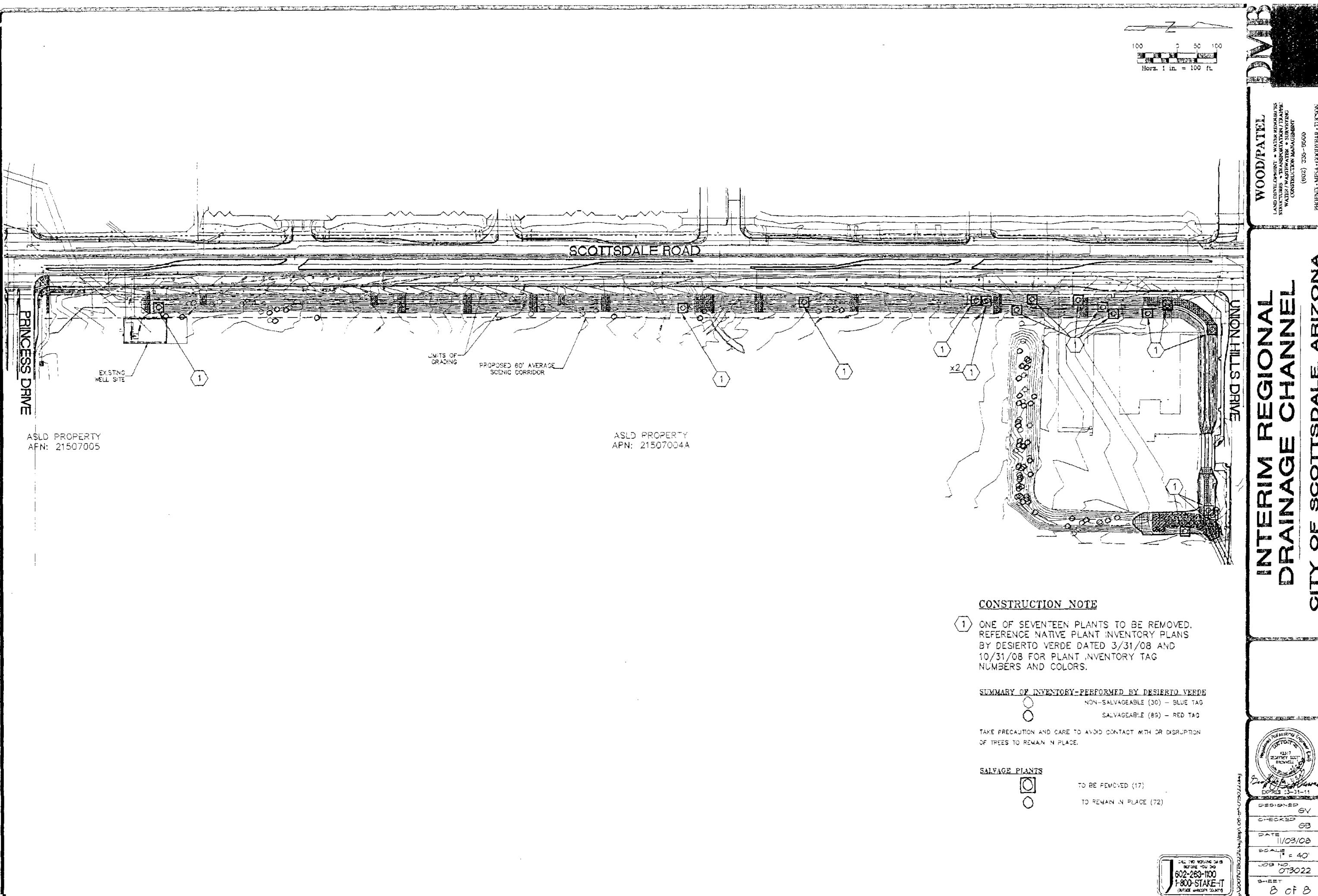
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UCTURES - TRANSPORTATION / TRAFFING PATER / WASTEWNERD - SCRUBLING CONSTRUCTION MANAGEMENT



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Appendix N

As-Builts for Interim Drainage Channel Report

FINAL DRAINAGE REPORT FOR

INTERIM REGIONAL DRAINAGE CHANNEL

October 1, 2008 WP# 073022

Prepared for:

One Scottsdale Holdings, LLC

c/o DMB Associates, Inc.

7600 East Doubletree Ranch Road

Suite 300

Scottsdale, Arizona 85258 Phone: (480) 367-7000 Fax: (480) 367-7558

Submitted to:

City of Scottsdale

7447 East Indian School Road

Suite 300

Scottsdale, Arizona 85251 Phone: (480) 312-2352 Fax: (480) 312-2672

Prepared by:

Wood, Patel & Associates, Inc.

2051 West Northern Avenue

Suite 100

Phoenix, Arizona 85021 Phone: (602) 335-8500 Fax: (602) 335-8580

Website: www.woodpatel.com

expires 3/31/11

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2.0	GENERAL BACKGROUND	. 2
3.0	DESIGN CONCEPT	. 3
4.0	HYDROLOGY	
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7.0	REFERENCES	9

APPENDICES

Appendix A Hydrology

Appendix B Hydraulic Calculations

Appendix C Erosion Protection

EXHIBITS

Exhibit 1 Vicinity Map Exhibit 2 FEMA Map Exhibit 3 Conceptual Grading and Drainage Plan HEC-RAS Schematic

Exhibit 4

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1.0 EXECUTIVE SUMMARY

- The Interim Regional Drainage Channel is a proposed 3,200-linear foot open channel along Union Hills Road and Scottsdale Road within the City of Scottsdale.
- The channel is intended to provide increased flood protection in a known floodplain, as well as
 protection for future improvements of Scottsdale Road.
- The Interim Regional Drainage Channel completes the downstream reach of City of Scottsdalc initiated regional drainage improvements.
- The channel will convey flow from an existing culvert under Union Hills Drive. It will run east adjacent to Union Hills Drive, turn south and flow adjacent to the Scottsdale Road right-of-way within a future scenic corridor easement to a proposed box culvert under Scottsdale Road. Storm water will ultimately be retained in the Reach 11 Recreation Area of the Central Arizona Project canal.
- The maximum channel width is proposed to be 40 feet.
- The box culvert conveying flows under Scottsdale Road is currently under design by the City of Scottsdale.
- Grade control structures are incorporated in the design to maintain the 100-year flow velocities in the channel within permissible velocities appropriate for an unlined native channel.
- Riprap crosion protection will be incorporated into each grade control structure, as well as at horizontal turns in the channel alignment and inlet/outlet of culverts.
- The design flow for the Interim Regional Drainage Channel is 300 cubic feet per second.

2.0 GENERAL BACKGROUND

The Interim Regional Drainage Channel presents the opportunity for implementation of flood protection in the City of Scottsdale. It completes the downstream reach of drainage improvements initiated by the City of Scottsdale. In addition, it provides protection to proposed improvements to Scottsdale Road. It will be located within a scenic corridor casement and add aesthetic open space along a major arterial roadway. The solution is anticipated to prevent redundancies in the drainage system that could occur if development occurred in a disjointed manner.

The proposed Interim Regional Drainage Channel is located within the northwest quarter of Section 35, Township 4 North, Range 4 East, of the Gila and Salt River Base and Meridian. More specifically, the channel is located along the east side of the Scottsdale Road right-of-way between Union Hills Drive and Princess Drive. A map of the area can be seen on Exhibit 1 – Vicinity Map.

The project site lies in a Federal Emergency Management Agency (FEMA) designated Zone "AO" Special Flood Hazard Area, with depths of one foot and velocities of three feet per second, per the Flood Insurance Rate Map (FIRM) panel number 04013C1245H, effective date September 30, 2005 (see Exhibit 2 – FEMA Map).

Currently, drainage from the north passes south under the Loop 101 Freeway through existing box culverts. Flow is conveyed past Union Hills Drive via existing drainage improvements, then flows in an existing wash in a westerly and southerly direction across the Arizona State Land Department (ASLD) property. There is current planning for concrete box culverts that would convey this flow west under Scottsdale Road. An existing channel running west on the north side of Princess Drive would not be disturbed by the Interim Regional Drainage Channel and would continue to operate independently.

3.0 DESIGN CONCEPT

The alignment for the Interim Regional Drainage Channel was chosen with input from the Arizona State Land Department (ASLD) and the City of Scottsdale. The proposed alignment maintains connection with the existing drainage improvements south of Union Hills Drive. The proposed channel begins at the outlet of an existing culvert on the south side of Union Hills Drive. The channel will flow east adjacent to Union Hills Drive for approximately 550 feet where it turns south and flows for approximately 2,650 feet within a future scenic corridor easement adjacent to the Scottsdale Road right-of-way. The planned access to the ASLD parcel is a driveway off Union Hills Drive. The proposed channel will be conveyed through three (3) 3-foot by 8-foot concrete box culverts at the proposed driveway location. The proposed regional channel ultimately outfalls into proposed culverts that are currently under design by Dibble & Associates, Inc. The storm water then flows west under Scottsdale Road and into the Central Arizona Project Reach 11 Recreation Area retention. The proposed channel alignment is shown on Exhibit 3 -- Conceptual Grading and Drainage Plan.

The Interim Regional Drainage Channel is proposed to be an unlined earthen channel. Grade control structures are incorporated into the vertical design of the channel in order to maintain the 100-year flow velocities within appropriate ranges. A variable bottom width is employed in the channel in order to maintain a constant channel slope adjacent to a variable sloped roadway. A 10-foot wide bottom occurs at the upstream end of each grade control structure. The drop is created by extending the sideslopes down to make a triangular channel at the downstream end of the structure. The channel transitions back to the flat bottom at the upstream end of the next grade control structure.

Erosion protection was incorporated into the channel design. Riprap crosion protection was integrated as part of each grade control structure. This protection will be of sufficient length to include the hydraulic jump associated with each structure. Riprap crosion protection is also proposed at the bends in the channel alignment to reduce the possibility of breakout and lateral migration. Revegetation and hydrosced will be used along the length of the channel for aesthetic purposes and increased crosion control.

Typical cross sections for the Interim Regional Drainage Channel were selected to provide adequate conveyance for the 100-year storm. A minimum of one foot of freeboard is provided within the channel, and the top width of the channel, including freeboard, is limited to 40 feet. The channel side slopes are limited to 4:1 along Scottsdale Road, and 3:1 along Union Hills Drive.

4.0 HYDROLOGY

The 100-year design flow for the Interim Regional Drainage Channel is 300 cfs. This is based on a 100-year, 6-hour design storm utilizing HEC-1 hydrology modeling software (Ref. 3). Results of this model are included in Appendix A - Hydrology. These results are compared to those published in Drainage Study Core North/Core South by Robert L. Ward (Ref. 4).

The included HEC-1 model is an expansion of the hydrology model completed for the *One Scottsdale Master Drainage Plan*, by Wood, Patel & Associates, Inc. (Ref. 5). The One Scottsdale development lies upstream of the project site to the north of the Loop 101 Freeway. The model was revised to expand to the south to include the proposed improvements. Flow at the Loop 101 Freeway culverts (identifier 33E.1) is now routed through the Interim Regional Drainage Channel (identifier R33E.1). The runoff from the adjacent State Land parcel (identifier ASLD) joins at the outfall culvert under Scottsdale Road near Princess Road (identifier CPPRIN). This downstream flow of 300 cfs was used as the design flow for the entire channel. The ASLD sub-basin was determined to be a 35-acre area with a curve number of 77, chosen to represent desert shrub with poor hydrologic conditions. The other revision to the *One Scottsdale Master Drainage Plan* hydrology model is modification to the storage routing to account for the changes in storm water storage requirements due to channel improvements proposed here. This resulted in increased runoff under the Loop 101 Freeway.

These results are compared to existing conditions and proposed conditions models published in *Core North/Core South* (Ref. 4). Both of these models also use a curve number of 77 for the State Land subbasin. The flows published in that model are lower than those proposed here, which is considered conservative. In a separate hydraulies section of that report, the culvert design flows for the Loop 101 Freeway culverts are listed as 300 cfs, including large offsite impacts. The report proposes that offsite impacts would not affect these culverts, and revises the design flow to 65 cfs. This further establishes that the design flow for the Interim Regional Drainage Channel of 300 cfs is conservative.

		Interim F	Regional	Core No	rth/South	Core North/South Plan			
		Drainage	Channel	Existing C	Conditions	1 Proposed	l Conditions		
		HEC-1 CP	Q100 (cfs)	HEC-1 CP	Q100 (cfs)	HEC-1 CP	Q100 (cfs)		
-	Loop 101 Culvert	33E.1	256	SCNA1	129	N61.3	173		
ĺ	State Land	ASLD	90	3B	98	N63	98		
	Proposed Channel	R22E.1	252	3B.1	125	N63.1	169		
	Outfall Culvert	CPPRIN	300	3B.2	178	N63.2	256		

An existing wash traverses the ASLD parcel in a southwesterly direction. This wash is a Section 404 jurisdictional wash. In the existing conditions, it is blocked on the upstream side from receiving flow by the existing retention basin near Station 36+00. It collects only local flow and discharges into the proposed channel near Station 24+00. This local flow is estimated as 14 cfs by a Rational Method calculation which is included in Appendix A – *Hydrology*.

5.0 HYDRAULICS

Final design and analysis of the Interim Regional Drainage Channel was completed using HEC-RAS (Ref. 6) hydraulic modeling software. Grade control structures are specified to manage the longitudinal slope and maintain velocity within the design range. The results of the hydraulic model are the basis for analysis of erosion potential. Grade control structures are used in lieu of bank crosion protection along the entire channel reach.

Cross sections were cut upstream, downstream, and at each grade control structure, horizontal channel bends, changes in channel lining, and along the channel length. Roughness coefficients for the channel were selected to reflect graded earth with expected landscaping and vegetation. The downstream boundary condition was set as the calculated headwater required for the proposed culvert, currently under design by Dibble & Associates, Inc. This culvert is assumed to be a reinforced concrete box culvert with two (2) 8- foot wide by 3-foot tall barrels. Culvert headwater calculations were completed with Bentley CulvertMaster (Ref. 7). The culvert inlet loss coefficient was set as 0.7 to reflect a drop inlet with possible skew. The upstream boundary condition was set as critical depth to reflect flow exiting the existing culverts under Union Hills Drive. Hydraulic models of the 2-year and 10-year storms were also run to analyze hydraulic conditions. Flows for these storms were approximated as 10% and 35% of the 100-year discharge, respectively, per the Drainage Design Manual (Ref. 8). Input hydraulic data and results are located in Appendix B - Hydraulic Calculations.

Velocities within the channel for the 100-year storm were found to range from 3.5 to 7 feet per second. Supercritical flow was not found to occur. The highest velocities occur as the flow exits the proposed stilling basins and slows as it approaches normal depth through the length of the open channel. The lowest velocities occur within the proposed stilling basins and where under the influence of the backwater caused by rock check dams. Provided freeboard ranges from 0.25 feet to 3 feet within the 40-foot channel corridor. Less than one foot of freeboard occurs where flow is under the influence of backwater from the rock check dams. At each location with less than one foot of provided freeboard, additional freeboard will be provided outside of the easement in the grading to existing. In order to mitigate any flooding hazard low amounts of provided freeboard might create, it is reminded that according to City of Scottsdale requirements for development within FEMA flood Zone "AO" (1 foot, 3 feet per second), all adjacent buildings must have a lowest floor a minimum of 12 inches above the water surface elevation.

Flow velocities for the 10-year storm range from 2 to 5.6 feet per second. This is within the recommended range to prevent sedimentation aggradation, as well as channel erosion. At least 1.3 feet of freeboard is provided in all locations. The flow velocities for the 2-year storm range from 1 to 4.5 feet per second. At least 2 feet of freeboard is provided in all locations.

Brosion potential was analyzed using the results of the hydraulic modeling. These analyses are included in Appendix C – Erosion Protection. An ADWR Level 1 scour analysis found the estimated scour depth to be 3 feet. A minimum crosion protection thickness of 3 feet is therefore specified. Bend scour around the outside bank of the horizontal turns in the channel was also analyzed. A minimum length of bank protection downstream of the bends is specified as 70 feet. Riprap was selected for use as erosion protection. A fiftieth percentile diameter of 9 inches was chosen for these locations. Gradation per the Drainage Design Manual (Ref. 1) is specified.

Scour erosion is not expected on the upstream side of the check dams. The purpose of the check dams is to slow the rate of flow. This would more likely result in aggradation. The flow velocity for each of these check dams in the 100-year storm is approximately 3.6 feet per second, with an energy grade slope of approximately 0.26%. Since the channel slope is 0.75%, this shows that the check dams effectively produce a backwater effect and scour is not anticipated. Additionally, these dams are constructed of rock-filled gabion baskets, and are keyed into the sides and bottom of the channel to reduce the possibility of overturning. The flow will become supercritical as it pours over the dams; so erosion protection is proposed on the downstream side. For a graphical and tabular representation, please see the HEC-RAS profiles and results included in Appendix B – Hydraulics.

6.0 MAINTENANCE

Ongoing maintenance of the designed or recommended drainage systems is required to preserve the design integrity and purpose of the drainage system. Failure to provide maintenance can prevent the drainage system from performing to its intended design purpose and can result in reduced performance. Maintenance within the public right-of-way is the responsibility of the governing municipality. However, it is the responsibility of private developers, homeowners associations, etc. for facilities on private property within drainage easements, and includes private streets. A regular maintenance program is required to have drainage systems perform to the level of protection or service as presented in this report and related construction documents and specifications.

7.0 REFERENCES

- Drainage Design Manual for Maricopa County, Arizona, Hydraulics (Draft), Flood Control District of Maricopa County, September 2003.
- 2. Design Standards & Policies Manual, Chapter 4 Grading and Drainage, City of Scottsdale, August 2007.
- 3. Flood Hydrograph Package (HEC-1), Version 4.1, U.S. Army Corps of Engineers, June 1998.
- 4. Drainage Study Core North/Core South Scottsdale, Arizona, Robert L. Ward, Consulting Engineer, September 25, 2001.
- 5. One Scottsdale Master Drainage Plan, Wood, Patel & Associates, Inc., September 26, 2006.
- 6. River Analysis System (HEC-RAS), Version 3.1.3, U.S. Army Corps of Engineers, May 2005.
- 7. Bentley CulvertMaster, Version 3.1, Service Pack 1, Bentley Systems, Inc., copyright 2005.
- 8. Drainage Design Manual for Maricopa County, Arizona, Hydrology (Draft), Flood Control District of Maricopa County, September 2003.

APPENDIX A

Hydrology

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U.S. ARBY CORPS OF ENGINEERS HYDROLOGIC CHOINERING CIMPER 609 SECOND STREET 19475, CALIFORNIA 95676 (916) 756-1104

PAGE 1

THIS PROGRAM REPLACES AND PREVIOUS VERSIONS OF HEC-1 KNOWN AS RECT (JAN 77), HEC2GS, HEC1DR, AND NEC1KR

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                       SCHEMATIC DIAGRAM OF STREAM NETWORK
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                (V) ROUTING
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 ***) SUBORY ALSO COMPUTED AT THIS LOCATION
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    FLOOD RYDRAGRAPH PACKAGE (HEC-1)
                                                                                                                 S ARMY CORPS OF ENGINEERS
                                                                                                              HYDROLOGIC ENGIPEERING CENTER
609 SECOND STREET
DAVIS, CALIFORNIA 93616
              JUN 1998
VEHAION 1.1
  RUN DATE 04FC068 TIME 15 17 69
                                                                                                                     (916) 756-1104
                                                                                                         ............
                                OND SCOTTABALE (STACKLE 105) POST DEVELOPMENT COMPLTION 100-YM 6-HM STORM OFFSITE MYDROLOGY 6 ONSITE HYDROLOGY FOR AREA GOVERNED BY DRE-HOLT CRITCHIA OFFICE A - ASEO CHARMS.

FILE 1007F-POED DAT OFFSIGN DATE OF ASED PARCES
                                 BASED ON MODELS PREPARED BY: ROBERT L WARD, P. E. CONSULTING REGINGER
                                                     PROMETOR 61
C1 61 (CYNTER ORIVI: PROJECT)
SIGEKIOG 61 (STACKED 40S VXISTING CONDITION)
                                all conve beging addisted to 6-equi values on august 11, 2002 100-year, 6-equi utfotheticae syons
                                AREAL RAINEALL REDUCTIES IS BASED ON A 13 SQUARE MILE STORM
                  OUTPUT CONTROL VARIABLES

IPRNT 5 PRINT CONTROL

IPLOT 0 PLOT CONTROL

GREAT 0 REPRESENTE PLOT 5CALE
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TOTAL TIME BASE 21 93 POURS
                    COMPUTATION INTERVAL
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PRECIPITATION DEPIM
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                                         ACRE-FEET
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                    33A3
319 KK
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                  RADECCEADE COMPINATION S MADRICE OF MADROGUNDED TO COMPINE
352 1/0
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HYPROGRAPH AT STATION 23A3 SUM OF 2 HYDROGRAPHS

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O 1410 MOLEVATE AN HAMBORITH E SU RUS

1COME 3 MINURES OF HYDROGRAPHES TO COMBINE 503 HC HYDROGRAPH COMBINES

COMPINE SITE S' 20D 37D' 240EL TO 240CA 170MC 184D TONGLION ELENCIONES
15FOL 0 LAVAL CONLEGE
15FOL 1 SETEL CONLEGE
237 ED 00140L CONLEGE SETEL CONLEGE

PSO DE CLIS O COMBINE

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1	0115	15 17	υ U	:	i	0730	92	6 .	ì	1350	167	o.		i	2005	243	Ü
1	0125	15	o o		ì	0710	93	٠.	í.	1355	161	0		i	2010	243	0
1	0130	15	ō		i	0745	94	٠.	i	1400	169	0	,	1	2015	244	0
i	9135	26	Ü		ì	0/50	95	u. ·	ı	1405	170	0		1	2020	2.15	0
i	0140	21	ů		ì	0755	96	0.	1	1410	171	0	•	1	2025	246	9
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í	0150	23	0		1	0305	9.9	0 .)	1120	173	α.	•	1	2015	340	9
1	0155	24	c		t	0810	29	0 '	1	1425	1.74	٥.	•	1	7540	2:9	0
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1	0225	30	0	•	1	0810	105	0	1	1455 1500	180	0		1	7115	256	0
1	0530	33	0	•	1	0315	106	0 .	1 1	1505	182	0		1	2120	257	ő
1	0735	32	Q.	•	1 1	9840	107	v	ì	1510	183	ŏ		i	2135	2 3	0
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1	0255	35	0		î	0910	111	o. ·)	1525	185	0		1	2140	261	0
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ī	0305)3	237		ī	0220	113	٥. •	1	1535	100	0.	•	1	2150	263	0
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1	0120	4.1	0	•	2	0935	116	0 •	1	1550	198	0	•	1	220	366	Ú
2	0325	4 >	٥	•	1	0740	117	0 .	ı	1555	192	0		1	3310	267	0
1	0310	4.3	0.	•	1	0915	110	0 .	ı	1600	193	0.	•	1	2215	268	9
1	0335	74	0	•	1	0240	133	٥. ١	ŗ	1605	194	0	•	1	2220	269	0
1	0340	45	c	•	1	0955	170	0 .	1	1610	195	9		1	3225 2230	270	0
1	0345	15	٥	•	2	1000	121	•	ì ì	1615	196	ò		1	2735	272	Ů
ι.	0350	4.7	D	•	1	1005	122		í	1625	197	Ď		i	2210	271	ō
1	0155	118	0	:	1	1010	121	o. •	i	1630	199	Ö		ì	2245	274	o
1	0.100	19	Q Q	:	3	1015	124	9 .	i	1635	200	ō		i	2250	275	o.
ī	0405	50	0 5		1	1025	126	,	i	1640	307	å		i	2255	2 /6	o o
1	0410	51 52	9		ì	1023	137	ő ·	ì	1645	505	0		1	2300	277	o o
1	0413	53	o o		ì	1030	128	,	ī	1650	20)	0		1	2305	215	0
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1	0+30	55	0		1	1045	110	0		2	1700	205	Ú		3	2315	280	ð
1	0435	56	ō		1	1050	131	0		ì	1705	206	ŋ	•	Ł	2320	281	O
1	0110	57	0	,	1	1053	132	0		3	1710	207	ŋ		Ł	2325	382	0
1	0445	Se	ō.		1	1100	133	ŋ.		1	1715	208	9		1	2330	283	õ
ì	0450	59	0		ī	1105	134	Ď.		•	1720	209	O	•	1	2335	784	۵
1	0455	60	ŏ.	٠	1	1110	135	0.		ì	1725	210	9	•	3	2340	285	0
ī	0500	61	0		ī	1115	136	0		1	1730	211	٥	•	ì	2315	286	ò
i	0505	62	ů.		í	1120	137	á.		1	1735	212	0	•	1	2350	287	٥
î	0510	63	o.		ī	1125	138	0.		2	1740	213	0		1	2355	388	0
i	0515	6-3	ŏ		i	1130	139	o .		ī	1745	214	n	•	,	0000	289	٥
ī	0520	55	ō		,	1135	140	Ü		1	1750	215	0		2	0005	290	٥.
î	0525	66	ő		ī	1140	141	ű		i	1755	216	ò		,	0010	221	٥.
;	0510	67	0		÷	1115	112	a.		i	1800	217	0		7	0015	292	0.
i	0535	68	o.		•	1150	143	0		ī	1805	218	0		2	0020	593	٥
î	9549	69	o.			1155	114	Õ		i	1810	219	ð.		2	0025	291	0.
•	0545	70	ò			1700	115	n		í	1315	220	٥		2	90)0	295	0
;	0550	71	a.			1205	146	٥		•	1870	231	ΰ		2	0035	296	Ď
- 1	0555	72	0.	·		1210	147	Ü		•	1825	222	Ü		2	0010	297	ō
	0500		-					0		•	1830	227	o.		2	0015	398	ò
		73	0	•	1	1215	148	-	i			2.24	ō		3	0050	299	ŏ
1	0605	74	0	٠	1	1330	149	Ð			2805		0		2	0055	300	٥
1	0610	75	0	•	ı	1225	150	0.	•	1	1040	225	0		~	0055	100	ū
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PRAK FLOW FIRE 6-IR MAXIMUM AVERAGE FLOW 77-UR 7

HYDROGRAPH AT STATION - U_SURP

OA :	ном нат	Olto	1,110%	•	DA MON	наян	QiiD	51.0%	DA 2	той внемя	om	FLOV	- Da 1	ON HAND	ORD	81.00
ı	0000	1	0	:	1	0615	75	ů ·	ı	1230	151	0	, 1	18:5	226	0
1	0005		ō		ì	0620	77	0 4	. 1	1735	152	ຄ	. 1	10,2	557	9
3	0010	3	0	٠	1	0625	19	0	. 1	13-0	153	u	, 1	1055	>58	0
)	3015		0		1	0610	19	ŋ	1	1245	154	y	- 1	1000	533	0
1	0030	5	0	•	1	0615	80	0.	· L	1250	155	O	, ,	1905	230	δ.
1	6025	6	0	٠	ι	0610	Pλ	0	ı	1355	156	-	יו	1910	531	0
ı	0030	7	0		1	3615	87	0	, ,	1000	12.7	3	•)	1915	232	3
	0031		0	•	1	06.0	9.3	0.	1	1305	158	n	- 1	1339	733	Ů.
1	0040	. 9	٥.	•	ι	0655	8 ;	0	. 1	1310	159	ō	1	1935	234	0
3	6015		0	•	;	0700	3.5	c ·	. 1	1015	100	Ú	- 1	1910	235	0
1	0050		0	•	1	0/05	8.6	0	1	1350	151	t) 0	. 1	1915	236	0
1	0059		O	•	1	0710	87	0 '	1	1335	103	9	· 1	1940	237 238	0
1	0100		c	•	1	2735	5.5	0 -	1	1110	160		. ,	1950	239	0
1.	0105		٥	•	1	0 / 2 0	89	n	1	1335	163	0	. 1	1955	240	ů.
1	0110	-	0	•	1	2725	90	0	1	1340	165 166		• 1	1993	243	o
1	0115		٥	•	1	3710	91	0	1	1720	167	Ď	, 1	2005	242	v
2	0130		0	•	1	97.15	92	0 -	1	1355	168	ŭ	. ;	2010	21)	0
1	0125		٥	•	1	0/10	93 91	ο.	3	1100	169	ő	. (2015	214	ň
1	0130		0	•	1	0745	95	0	,	1105	170	ŏ	. ;	3020	245	ŏ
1	0140		0.	- :	1	0755	96	, ,	· 1	1410	171	ō	, ;	2035	246	D
- 1	0145		0.		ì	0800	21	ő,	. 1	1.15	172	ò	· i	2010	247	0.
i	0150		0	- 1	1	0000	28	ő .		1120	1.73	0.	· ï	2035	248	0
3	0155		0			0910	22	ο,	í	1425	171	o o	4 1	2010	249	0
í	0.200		0		i	0815	100	ŏ.	1	1030	175	0	. 1	2015	250	0
•	0205		0		î	0010	101	ŏ.	. ,	1435	176	ø	- 1	2050	251	0
i	0210		ĝ.		ì	0025	102	ŏ,	1	1410	177	v		2055	252	0.
- 1	3215		ò	,	i	2830	100	o ·		1445	178	0	1	2100	253	Q.
1	0220		Ö		i	0005	104	0 -	. 1	1150	179	o	. 1	2105	254	å
1	0229		ù		1	0849	105	0	1	1455	100	ú	• 1	2110	255	0
1	0230		0		1	2811	106	c ·	,	1 700	161	0	. 1	2115	255	Q
i	0235		ō.		1	0050	107	n ·	1	1505	182	a	١ ١	2120	257	D
3	0240		Ö	•	1	0055	108	0	1	1510	163	n		2125	358	D
1	0245		0	- 1	1	0900	109	o '	1	1515	154	0	. !	2130	159	Ò
3	0250	3.5	0	•	1	0505	110	0	1	1520	105	۵	. 1	21.05	760	0
ı	0755		0	•	1	0910	123	2	1	1575	196	ŋ	. }	3140	563	σ
1	0)00	3.2	0		2	9915	11?	0	1	1530	197	0	. 1	2115	362	٥.
1	0305	. ja	126	•	1	0330	113	()	1	1535	100	9	. 1	2150	563	0
ı	0319	39	309	•	1	0725	123	0	1	1500	198	0	, ,	21.55	264	Ü
2	0015	10	132.	•	1	0030	115	0	1	1545	150	0	. :	2200	355	0
1	0320		131	•	1	0935	116	0	. 1	1550	191	9		2204	266	9
1	0325	1.2	101	•	1	0940	117	0	· L	1555	192	0	. 1	2210	267	0
1	0130		0.3	٠	L	0945	116	a.	1	1600	193	n	1	2715	266	0
3	0177		60	•	1	0950	119	0		1602	194	Q.	1	2220	269	0
ι	0340		38.	•	3	0955	170	0		1610	195	0	1	2225	270	0
1	0145		3.1	•	1	1000	121	0	•	1615	196	0	1	2210	271 272	0
1	9350		10	•	1	1002	3 2 3	0	•	1620	197		-	3312		
1	0365		3	•	1	1010	153	0	. 1	1625	198	ð	1	2240	2/3	0
1	0500		Q.	•	ž	1015	174	~	• 1	1630	199	D	.)	2245	274	0
ı	0405		٥.	•	1	1020	125			1635	200	0	. 1	2250	275	0
1	0110		o		3	1025	126	0	1	1610	201	0		2255	276	0
3	0115		Ü	•	ł	1030	127	0	. 1	1642	303	9	. 1	2300 2305	277 278	0
1	0120		Ü	•	1	1035	128	0 '	. 1	1650	203	0	,	2300	279	0.
ì.	0425		0	•	L	1040	129	9	, 1	1655	204	p	. t	2015	280	0.
ι	0+10		0	•	1	1045	130	0	. 1	1700	205					0.
ì	0439		0	•	1	1050	131	0	. 1	1705	206	0		2320 2125	281 282	٥.
2	0140		0	•	1	1055	132	0 '	' 1	1710	707	•	. 1			
1	0145		0	•	1	1100	131	0	1	1715	300	n O	. 1	2335 2335	261 284	0. 0
1	0450		9	•	1	1105	134	0	. 1	1720	202	0	. 1	7340	205	0
1	0155		٥	•	l	1110	1.15	0.		7.172	310	0	. 1		286	0
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l	0530	67	G	•	1	1115	112	0.	•	ı	1800	217	0.	٠	2	0015	292	0
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HAXINUM AVERAGE FLOW 24-HR 72-HR PEAK FLOW TIME 24.92-88 · (CFS) (100) (CF3) 7. .172 5. 3 33 51 (INCHES) 170

CURULATIVE AREA =

336.1 658 KK

COMBINE

653 KQ

OUTPUT CONTROL VARIABLES

IPRUT 1 PRINT CONTROL

IPLOT 0 PLOT CONTROL

OSCAL 0. HYDROGRAPH PLOT SCALE

CONSINED DISCURRE AT ADOT CULVERT 5 AND 6

.51 SQ NI

GGA BC

HYDROGRAPH COMBINATION 2 NUMBER OF HYDROGRAPHS TO COMBINE

HYDROGRAPH AT STATION DI SUM OF Z HYDROGRAPHS

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í		0010	i	0.		1	0625	78	56.	•	1	1210	153	5.	•	1	1855	228	1
ì		0015	,	0.		1	0630	79	53.	•	1	1215	154	S.	•	7	1900	225	1
ī		0020	Š	o.		1	0635	80	51.	•	1	1250	155	5.	•	2	1905	530	1
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3 UIBLAND RANGER OF DX INLERANTS
CHALCON RIVERS
CHARGE RIVERS
CONTRIBUTIONS
CONTRIBUTIONS MUNICIPALIN 00 S tte: 9∧я∓ 00 SILAPE CA CHYRART BONGINGES COSELICITYAL TROBE n EDWINST TERRORS KINESVALG BYAS SAUGVE SOLLING INDROGINARI ROUTING DATA PERMIE CHPRE FIRED CHPURER B: 010 NE-1765 ? DENTITES BOOLE P-4000 ' SPYE ERCLION NE-16. S-2' LEGEX-35. ERON FLOATEDHIE BOYD BOOLH LO DEINGESE DEINE ESON SCOLEDNEY MOYD COURSE TO BETHCREE BATKE

SULIDA 2 - HOUGOERG CHARREZ FORLIN OF FRIND CAULTING LO SCOLLEDTE BOYD

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1 213 (Inches) 53 E (6.10) (mi)(53.2) 34 35-48 411-77. 28 17 NH - 3 MYXIMIN PASHVOR EPON ZRIJ. ROTA RYSIA 69 7012 7012 7012 611 611 5171 6121 44 11 5550 0550 16 56 07 588 147 5181 941 97. 69 0950 617 818 818 612 612 612 5111 59 60 60 16 62 99 59 99 \$1.50 161 ٠,٥ 5017 6071 0541 0.550 313 313 315 316 3512 3320 SPAT 31 E 73 N 66 701 () () 0 F 6 T \$0\$0 0050 066.1 5261 0661 1100 0 : \$500 5660 300 300 300 500 500 SEEC 202 6 7 9 8 25 55 0501 5166 9115 507.7 007. t 559 t et t 5:01 971 0°01 750 50.0 61.2 27.5 27.5 87.5 3700 5372 201 15 05 529T \$130 521 521 520 L 01:0 50:0 661 861 STOR 6.4 00:0 07.7 SEDI 5.13 01:20 100 100 100 100 3.13 3.13 1615 500 E 000 f 5560 9 t 5 t 5 F C O τετ +01 7550 5.10 0091 b.V SEED 0160 14 14 52 52 18 \$122 SSST OSST SEST OEST SCST 911 911 911 761 761 01-6 532 25.00 21.00 21.00 956 576 5700 0110 192 SSTE 69T 691 3 0 201 68 (11) 48 98 58 18 29T 98T 98T 98T 98T 98T 3 05 5060 8060 5112 7250 11 11 10 10 501 £9 5720 60 t 7.0 ٤ť 0::0 U 6 1 6 505T 557 5511 07 5+00 101 5880 0220 SOTE 7.50 7.50 0 4 0£110 5200 6 t 27 22 22 22 241 241 441 441 152 540£ 01-1-1 5 (6 T 0 E 9 T 5190 51 51 51 51 51 tat 5510 50 SZVI ĢЬ () () 5110 6 0141 5011 5008 731 56 66 . 12 557.0 1.2 01. 61 0.002 0.61 014.0 ٥τ SETO

COMPUTED KINEHATIC PARAMETERS VARIABLE TIME STEP (DT SHOWN IS A MINIMUM)

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CONTINUITY SUPPARY (ACTIT) - INFLOR: 5700E+02 EXCESS: 0000E+00 OUTFLOR: 5203E+02 BASIN STORAGE: 24.09E-01 PERCENT BRIGG: 1

DETERPOLATED TO SPECIFIED COMPUTATION DETERMAL

Mattl 98 [43], 00 251 70 200 60 2 92

HYDROGRAPH AT STATION ROBE 1

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PROT CONTROL

UNDREGRAPH PAGE SCALE
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(OF SHOWN IS A MINIBUM)
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CONTINUETY SUMMARY (AC-FF) - INCLOS: 00094-00 EFCESS: 3491E+01 OUTFLOW: 1478E+01 MASEN STORAGES BOOTE-01 PERCENT ERRORS
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OUTPUT CONTROL VARIABLES

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COMBINE MOUTED ANOT 5 AND 5 WITH ASLD PARCUL

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PRECIPITATION DATA

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60 INSTEAL ABSTRACTION 17 00 CURVE NUMBER 89 00 PERCENT SUBSEAVED STPTL CPVBBR

PTIME

KINESATIC WAVE

691 08 OVERLAND FLOW ELEMENT NO

100.0 PROCEST OF SUBBRICES

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KINEMATIC MANE NATH CHARGO.

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4 50 BOITOS WIDTH OF DIAMETER
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COYSIS HO ROUTE OPSTREAM BYDROGRAPH 201570

COMPUTED KINEMATIC PARAMETERS VARIABLE TIME STEP (OT 58600 IS A MINIMUM)

Colliniar ALPRA DT. 5% CRUERITY am [11314] (CFS) (R) M, (FPS) 10 04 184 61 3 00 PEARET 200 00 12.50

CONTINUITY SERBARY (MC-FF) + (NESCH. 0000E+00 EXCESS 1000E+01 OUTCHOR) 1008E+01 PARTS STORAGE 4154E+05 PERCEPT LERGIE.

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

6 3: 1 37 5 00 31 67 357 30

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32, TOTAL EXCESS : 3 00 MAXIMUM AVERAGE FLOW 21-DR 72-BR PEAK FLOW TIME 24 92-RR 6 - HR

(CES) HIR) (CF_{2}) 3.08 0. .1 513 1 31. (THChes) (AC-Fr)

> CUMULATIVE APEA : .01 SQ 81

130 2 . 693 KK COMBING

694 KO OBTPUT CONTROL VARIABLES

CONDINED DISCHARGE AT SCOTTSDALD ROAD CULVERT

HEBROGRAPH COMBINATION 2 NUMBER OF HYDROGRAPHS TO COMBINE 695 NC

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SUB-OF 2 PADROGRAPHS

A SIDS	HP80	OHD	FLOW		DA MON	0280	OHD	FLOW	. 1	DA MON	ROBBI	ORD	FLOW	:	DA NON	10998	030	PLOW
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		MHE. OE.	RESERVOIR W.S. ELEV	REP 30	SYORAGE AC+FT	ontplow CFS	OVER TOP BOURS	MAX GUTFLOU HOURS	HOURS		
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etan	1			ThTJ.(VI)	VALUE	SPILEMAY CRI	(5t 16t)	OF DAM			
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yLAn	;		SOLITIVO STORAGE SULTANION		90 ספ אאועאל	501L0WAY CRI 2 No 0 22	rsir for (0F DAM 2 50 V 22.			
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!·[.A	1		ELEVATION STORAGE OUTFLOW	INITIAL	00 00 0. 0.	SPILEWAY CRI 2.50 0 32	St ror	OF DAR 2 50 0 22	
		ottak Yo Sivi	MAXIMUM RESERVOIR WAY CLEV	MAXIDUM DEPOI OVER DAM	MAKTBUM ETORAGE AG-PT	HAXIMUH OUTFION CEN	DURATION OVER TOP NOURS	TIME OF MANY OUTFLOW MODES	TIME OF FAILURY HOURS
1		1.09	2.87 SUMMARY (PEAKS SROWN	.37 OF DAM OVER ARE FOR INT	o. Haydhiyadi Hit Jaksa	35. QIACH APALYSIS STEP USED E	33 FOR STATI URING DREA	D.11) ON DETINS OR FORMATION)	.00
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plan	·		ELEVATION STOPAGE OUTFLOW	[8[758]	0 0 00 A7UME	50 3.60 0 14	uor ro	OS DAR 3 60 0 14	
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हा,उप	ι		ELEVATION STORAGE OUTFLOW	INTECAL	O O O O	99 114 MAY CRES	er gov	OF 9AM 3 60 1	
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			9AT10 OF PH1	# 2 SPEA BEREKAGIS WAXIMON	MAX IMUM DEPTH OVER DAK	MAKIMUM SINEAGE AC- FT	CES ON LAPOR RVX LHOR	HOURS OVER JOP PRUON	PO BHIT Réjistro Mai Reijon	TIME OF FAILURE HOURS
t			1 00				DI BACH ANALYSIS STEP USED D			03
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			ratio Of PNF	MUNIKAN RIOVRAZER VEJS 2.K	MAX DOM DEPTH OVER DAS	NACIDAM STORAGE AC-FT	NANTIMES OUTSTOW CES	DURATION OVER TOP HOURS	TIME OF EAX OUTFLOW SAUON	TIME OF FAILURE ROURS
			1.00	2 95	00	1	4	00) 50	00

1	WA, IN	1		ELEVATION STURAGE HOLISTUO	INTYLE.	VALUE 00 0. 0			OF DAM 3 00 2 1	
			93710 97 1981	MAXIMUM RESERVOIR W.S. ELEV	МАХІМИ ИГЧЭО МАСІ МЭЧО	HAXIMUI STORACE AC-FT	MAXIMUM OUTSLOG CFS	DURATION OVER TOP	HOURS AND WAR	TIME OF FAILUIGE HOURS
			1 00	7 81 SUMBARY OPEACS SHOWN	GO OF DAM OVER ARE FOR 1877	TOPPING/SE	1. REACH ASALY GEOUGED GETE C	00 SIC FOR STATE TAURING DRIVA	ON DETERT CH LOBBYLOW)	Qυ
r	и.ду	j		STORAGE STORAGE STORAGE	INITIAL	VALUE 000 0			מגק מאק 3 00 2. 10	
			20010 OF IMP	MAXIMUM RESPRYOIR W.S. ELEV	MAKIMOM DEPIH OVER DAM	BAXIMUM SYORAGE AC: FT	MARCINUM OUTPLOW CER	DURATION OVER TOP HOURS	TIME OF MAX OUTSLOW HORNER	WIME OF FAILURE HOURS
			1 00					67 DURING STATE DURING SAEA		00
1*	сан	1		ELEVATION STORAGE	IN PTIAS	0 0 4 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7) YANGGI 93	90 L	OF DAM 3 00 2 13	
			DATIO OF PMF	N S EFFA BECESAGIS ACXIMOS	OAER DAR DEELM BYXIKON	MUHI XAN HDAROTE TE-DA	MAXIBUTI OUTFLION CYS	DORATION OVER TOP HOURS	HOURS MAX OUTFLOW TIME OF	TIME OF PAILURE HOURS
			1 09	(SCAFU Shown immerki 5 We	00 233VO MAG 3O 2381 805 38A	1. COPPINGUER COMPINGUER	12 SEACH ANALYS SEEP USED	00 TIS YOK SPAYII DURING BUSA	3.47 ON DELIC CH FORMARIONS	00
p.	LAN	į		SESVATION SOCIETATION	minim	VAI,UE 00 0 0	SPILLINAY C	10	0F DAM: 1 00 1	
			RAT 10 OF PHF	MARINUM REGERVOIR V 5 ELEV	EAX LOUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FY	BAXTHON OUTFLOW CAS	DURATION OVER TOP HOORS	HOURS OF THE OF	TIME OF PATEURS HOURS
			1 00					DO HTATE ROT EES MERG DNISUG		0.0
,,	LAN	1		ELEVATION STORAGE OUTFLOW	in talvi	VALUE 00 0 U.	9P1)L#AY (0	0; DAM 3 00 5 52	
			PATIO OF OT	MAXIMUM RESURVOIR M S CLEY	OAUS DYF: DES-LII WYX IMDN	MAXIMUM STORAGE AC-FT	SANTONA SANTONA SANTONA	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW ROURS	TIME OF FAILURE HOURS
			1 09					00 515 FOR STATIO DURING BEEAG		00
PI	I.AN	1		ROLLWANTER SEVENCES MOTELOO		9860E 0 0 0	SPISERAY C	:	OF DAM 1 00 5 13	
			RATTO OP PRF	MAKIMOM RESERVOIK W.S.EUDV	MARKEDH PETERO MAG REVO	MAK THUM STORAGE AC-FF	HANGEUM OUTFLON CFT	OURATION OVER TOP HOURS	ROURS HOURS	COME OF PATIBLE HOURS
			1 20	7 57 SURRARY IPEAKS SHOWN				00 HS FOR STATE DUNING BREAC		00
ŗ;	LAN	1		ELEVATION STORAGE OUTFLOW		VALUE: 00 0 0	SPILLWAY C 3 C 5	b .	05 DAM 3 00 5. 30	
			01749 40 979	A S EPEA SESTINGUE WYXIBIN	MENTIKAN LEPTA LUC REVO	MAX IMUM STORAGE TT - DA	MAXIMUM OUTPIADA CAD	SURATION OVER TOP HOURS	TIME OF MAX OUTFLOW MOURS	TIME OF FAILURE BOURS

2.77 .00 3 18. 00 3.75 .00
SUBMARY OF DAH OVERTOPPING/BREACH ANALYSIS FOR STATION DETTH
CHERKS SHOWN ARE FOR INTERNAL TIME SIEP USED DURING BREACH FORMATION

PEAN 1 ... INCITAL VALUE SPILEMAY CREST TOP OF DAY.

SUBVATION 00 3 00 3 00

STORAGE 0 3. 3

OUTFLOS 0 20. 30

Patio	HARIMUM	OVER DAM	MAX IKUM	CPS	DURATION	TIME OF	TIME OF
Of	RESERVOIR		SORAGE	OUTFION	OVER TOP	MAX OUTFLOW	SHULLIAS
PMF	R.S. ELEV		T3 - OA	CPS	HOURS	HOURS	ERCON
1 00	3 70	70	4	49	.83	3 42	0.0

*** NORMAL END OF HEC-1 ***

RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Interim Regional Drainage Chan

Project Description:

Drainage Point: 404 Wash

Location:

Channel Station 24-+00

Drainage Basin Data

Water Course Length:

820.00 ft

Basin Area:

3.220 acres

High Elevation:

1581.00 ft

Low Elevation:

1570.00 ft

Average Slope:

0.0134 ft/ft

Roughness, Kb: 0.0368 (A)

10-Year Runoff Coefficient:

0.400

10-Year 6 Hour Rainfall Depth:

2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	
Q (cfs)	4	6	7	9	12	14	
С	0.400	0.400	0.400	().44()	0.480	0.500	
Tc (min)	8 3	7.3	6.8	6.3	6.0	5.7	
i (in/hr)	3.2	4.4	5.3	6.6	7.6	8.8	

Computed by JMO, Wood, Parel & Associates Thursday, May 08, 2008-10,08-51 a

Thie S \2007\07302.\Project SupportVlydro\RationalRDC rat

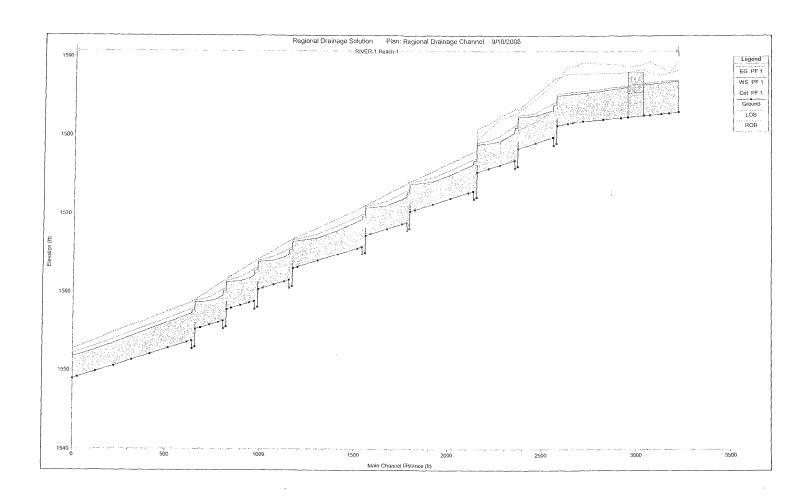
Author, Frank M. Koo, P.E. Email gultank@engsoftwarecenter com URL http://www.engsoftwarecenter.com/rational.html

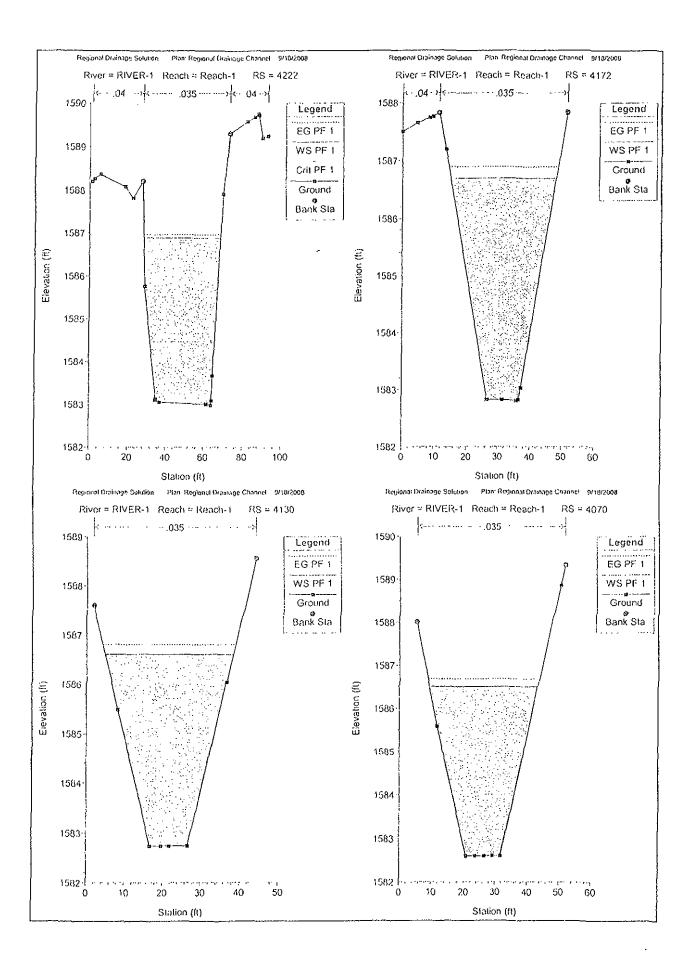
APPENDIX B

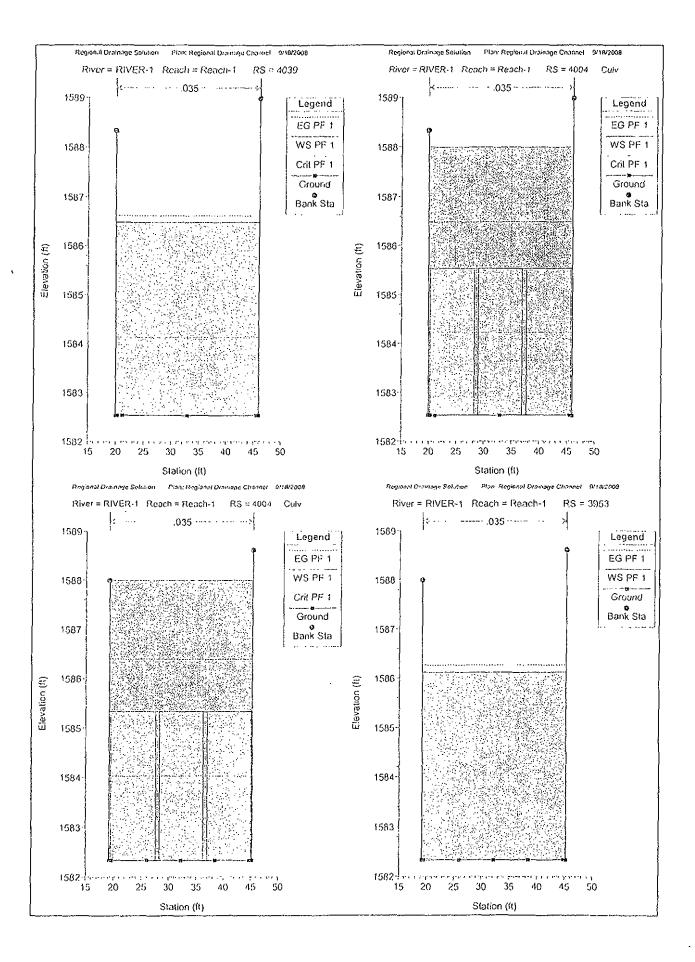
Hydraulic Calculations

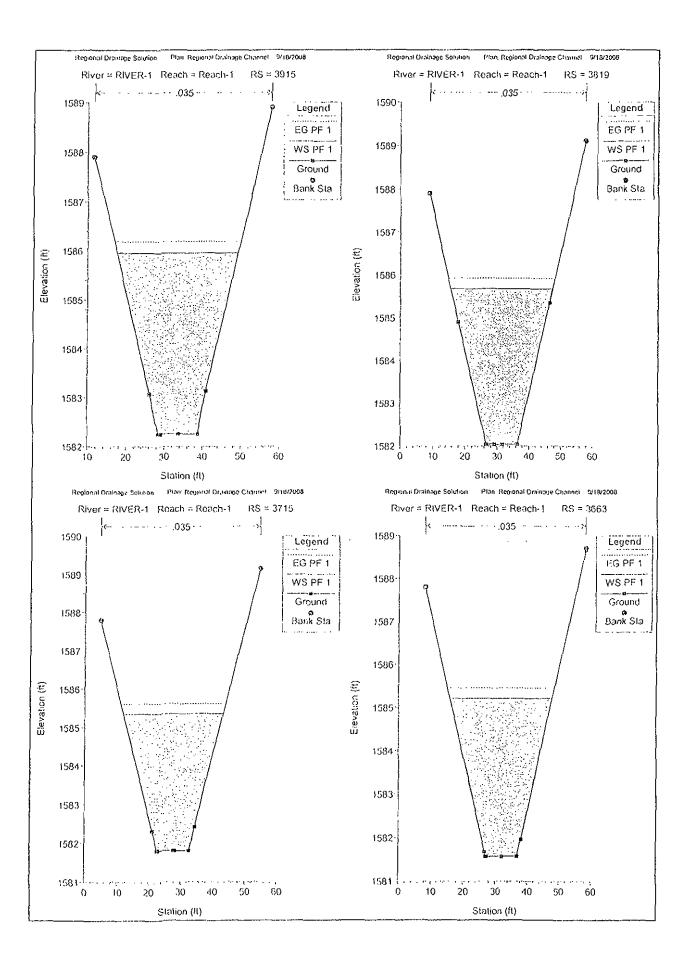
HEC-RAS Plan; RDC 100 River; RIVER-1 Reach Reach-1 Profile, PF 1

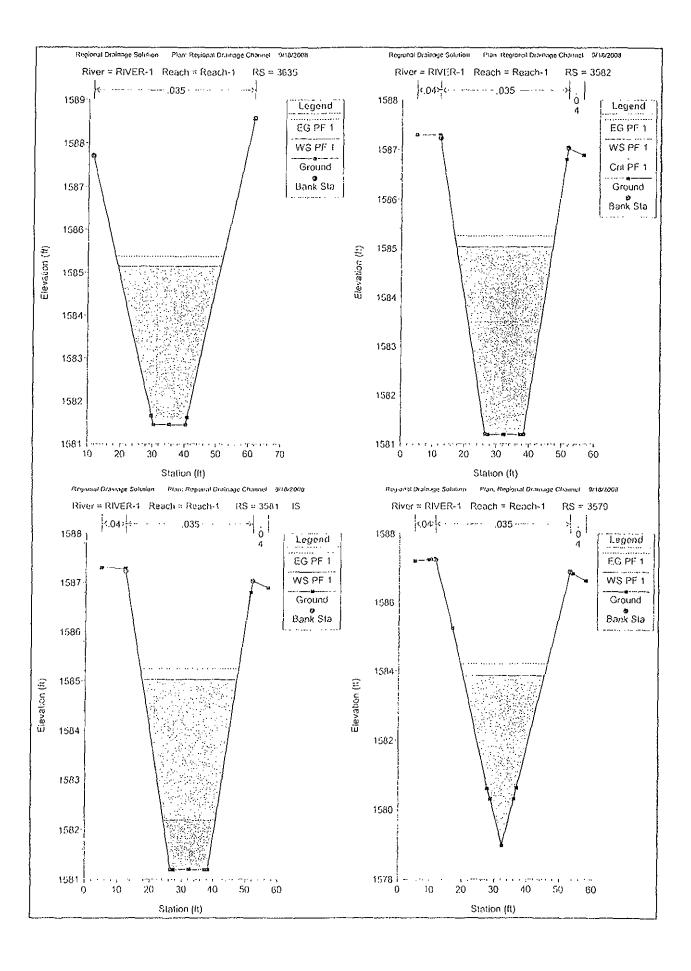
HEĞ-KVS	Elan: RDQ	2,100 Rive	r: RIVER-1	Reach Re		olile, PF 1	,		Coming W	Ţ		innersit.) ett det lær	ריים בממבונים
River Sta	Q Total	Min Ch El	WS Elev	E G Elev	E G Slope	Vel Chol	Flow Area	Top Width	Froude # Chl	LOB Elev	ROB Elev	Flow Depth	i Req	Freeboard Prov
	(cis)	(#)	(11)	(ft)	(#//(1)	(IVs)	(sq (t)	(0)		(ft)	(0)	(h)	(35)	(11)
1222	300	1532.97	1506.08	1586 96	0.000577 0.002174	2 20	136.44	40 32	0.21	1588.20	1509 30	3.91	1 02	1.32
4172	300	1582 80	1586.70 1586.61	1586.89 1586.80	0.002174	3.58 3.56	83 81 84 36	33.20 33.53	0.40	1587 82 1587.60	1587 84 1588 56	3.90 3.98	1.07	1.12 0.99
4070	300	1582 59	1586.50	1586 G8	0 00 1859	3.38	BB 72	34.04	0.37	1588.00	1589 33	3.91	1 07	1.50
4070 4039 4004	300	1582 53	1586 49	1586 62	0 00 1065	2 91	103 17	26.10	0.26	1588 33	1588 98	3 96	1.06	1.84
3953	Culverl 300] _1582.33	1506 12	1586 26	0 001218	304] 	26.07	0 28 "	1587.99	1588 61	j 379	1.02	1.87
3915	300	1582.25	1585.96	1586 19	0 002674	3.87	77.54	31 91	0.44	1587 00	1588 90	371	1 04	1 94
3819	300	1582.01	1565.68	1595.92	0.002809	3 93	76.32	31.8/	0.45	1587 90	1589.11	361	1 03	2.22
3715 3663	300	1581 80 1581 57	1585 36 1585 22	1595 G2 1585.46	0.003119	4 09	73.44 76.60	31.32 31.99	0.47 0.45	1587 80 1587 80	1589 14	3 55	1.02	2.44
3635	300 300	1581 44	1585.15	1585.38	0.002787	3 92	78.43	32.32	0.43	1587 70	1588.70 1586.57	3.65 3.71	1.03	2 58 2 55
3582	300	1581.19	1585.03	1585.25	0 002239	3.75	79.99	29 78	0.40	1587 23	1587.03	3 04	107	2.00
3531	Int Struct							-27:54"	::			:::::		1
3579 3564	300	1570.96 1578.70	1583 86 1583 90	1584.21 1584.13	G 004005 G 002489	3 84	63.31 78.11	25 18 30.25	0.53 0.42	1597 24 1597 02	1586 88 1 1586 40	4.90 5.20	1 40	3 02 2 50
3561	300	1579 71	1583.16	1584 05	0.016160	7 55	39 76	23.04	1 01	1586 89	1586 40	3.15	131	3 24
3467	300	1579.00	1582 50	1582 81	0.004580	4.51	66,59	33.05	0.55	1585 10	1584.55	3 50	1.03	2.05
3374 3373	300 Inl Struct	1578 30	1502.30	1582 51	0 002052	3.70	81.10	28 57	0.39	1583.20	1582 91	4.00	1.11	0.61
3371	300	1576.07	1500 88	1581 38	0 006206	5 66	52.99	22.05	0.61	1583 36	1582 90	4.81	1,45	2 02
3355	300	1575.82	1581 00	1531 24	0.002647	3.91	76 65	30.23	0.43	1583 42	1582.70	5.18	1.41	1 70
3353 3276	300 300	1576 82 1576.24	1580 29 1579 23	1581 1 <u>6</u> 1579 86	0.015790	7.48 6.38	40.09 47.00	23 11 27 66	<u>1</u> .05 0.85	1583.22 1582 40	1582.64 1582.03	3.47 2.99	1.30 1.06	2.35
3216	300	1575 79	1578 94	1579.31	0.005728	4.87	61 57	32.20	0.62	1581 40	1500 73	3 15	100	1 79
3155	300	1575 34 (1578.04	1579 04	0 002516	3,56	84 27	30 12	0.42	15B0 80	1579 34	3 50	1 00	0.50
3155 3152	iol Struct	1572,09	1576 77	1577 04	0.003261	4 13	72.56	31.02	0.48	1578 10	1578.13	468	1 30	1.33
3138	300	1571 86	1576.76	1576 98	0.002556	3 77	79.48	32.42	0.42	1577 91	1577 91 [4 90	1 34	1 15
3135	300	1572 85	1576 31	157G 93	0 011152	6 29	47 70	27 67	0.84	1577 86	1577 90	3.45	1.17	1.55
3110	300	1572.67 1571.95	1576 04 1 1575 00	1576 65 1575 61	0.010850	6.25 6.25	47.99 47.99	27.72 27.94	0.84 0.84	1577 58 1576.51	1577 58 { 1576 51	3.05	1.15 1.07	1.51
2918	300	1571 20	1574 18	1574.67	0.008218	5 59	53.71	30 00	0.74	1575 43	1575.43	2.58	1.00	1 25
2822	300	1570 50	1573 89		0 003230	3.92	76.54	35 19	0 47	1574 36	1574 36	3.39	1 00	0.47
2797 2796	300 Ini Struct	1570 30	1573.84	1574 04	0.002621	3.63	82 62	37 37	0.43	1574.17	1574 17]	3.54	1 00	0.33
2794	300	1568 08	1572.74	15/3 01	0.003367	4 19	71 66	30 83	0.48	15/4 12	1574.12	4.66	1 30	1 38
2779	300	1567 85	1572.72	1572 95	0.002625	3.81	78.66	32 24 26 93	0.43	1573.90	15/3.90	4 87	1 33	1 10
2776 2751	300 	1568 85 1560 66	1572 20		0 013016 0 013511	6.65 6.79	45.11 44.21	26.63	0.91 0.93	1573 05 1573 52	1573.85 1 1573.52	3 35 3 18	1.18	1.68
2668	300	1568.04	15/1 02	1571 57	0 000000	5.97	50 23	23 66	080	1572 43	1572 43	2 98	1 02	1 41
2586	300	1567 40	15/0.78	1571 03	0.003459	4.03	74 45	35.48	0 49	1571 35	1571.35	3 38	100	0.7
2561 2559	300 Ini Struct	1567 20	1570 74	1570.94.	0 002633	3.64	82.46	37 34	0.43	1571 07.	. 1571 10	3.54	1.00	0 33
2559 2557	300	1564 90	1569.66	1569.93		4.14	72.51	31.01	0.48	1571 00	1571.02	4 60	1 30	1 34
2543	300	1564 80	1569 65		0.002573	3.78	/9.42	32.59 27.91	.0.43	1570.80	1570 80	4.85	1.32	1.15
2540 2516	300	1565.75 1565.56	1569 23 1568 96	1569.82 1569.55	0.010714	618	48.52 48.63	27.91	0.83 0.62	1570 75 1570 47	1570.75 1570.47	3.48	1 17	1.52
2108	300	1564 76	1567.84	1568 43	0 0 10001	6.18	48 55	28.14	0.03	1569.32	1569 32	3 08	107	1.48
2302	300	1563.97	1566 87 1566 52		0.008824	5 73	52.37	29 71 36 17	0 76	1568 16 1567 00	1568 16	2 90 3 35	1.00	1.29
2196 2171	300 300	1563.17 1562.98	1506 52		0.003297	3.54	76 09 81 71	37 25	0.48	1566.72	1567 00 1566 02	3.10	1 00	0 18 0 25
2170	Int Struct						:: · · · · · · · · · · · · · · · · · ·							į.
2168 2153	300	1560.72	1565 38		0.003387	4 10	71 69 70 23	30 74	0 48 0 43	1566 69	1506.77	4 06	1 30	1.31
2150	300	1560 50 1561 19	1565 36 1564 78		0.002555 0.014412	3.83 6.53	43 32	26.32	0 95	1566.50 1566.49	1566 50 1566 49	4 86 3 29	1 20	. 1.14}
2125	300	1561 30	1554 40	1565.16	0 011646	7.00	42.84	26 16	0 96	1566 13	1566 10	3 10	1 16	170
2071	300	1560.90	1563 98		0.003655	5.59	52 59 72 78	29 33 34 92	0.75	1565 33 1564 49	1555 33	3.08	02	35
2015 1990	300 300	1560 49	1563.85 1563.82		0.003551	1 12 3 50	83 30	37 49	0.50 0.43	1564 13	1564.49 1564.13	3 36 3 53	1 00 1 00	0.31
1969	Int Struct			i i		·}		- 1				t		- 1
1906	300 300	1558.04	1562.70 1562.69		0 003360 0 002601	3 80	71 94 . 70 85	30.82	0.48	1564 10	1564 08 1563 85	4 56 4.08	1 30	1.17
1959	300	1558 81	1562.04		0 002601	7 19	41 71	25 88	1 00	1563 81	1563 81	3 23	1 21	… 器 】
1944	300	1558 60	1561.69	1562 45 [0 014631	5.90	12 89	26 22	0.96	1563 43	1563.40	3 09	1 15	1.71
1049	300	1558.27	1561 37 { 1561 27 }	1561 86 1561 54	0.008189 0.003791	5.61	53 49 71 68	29.55	073	1562.69	1562.69 1562.60	3.1 <u>0</u> 3.35	1.02	11.32
1824	300	1557 70	1561 24		0 002625	<u>4.19</u> }	82.56	37 35	0 43	1561 57	1561 60	3.53	1 00	0.69
1822	Ini Struct	1	j	ł	}		1	1		ł	ĺ	[ļ	
1821	300 300	1555.48 1555.25	1560 14 1		0.002643	4.18 3.82	71 70 78 61	30.83	0.48	1561 52 1561 30	1561.30	4 66 4 87	1 30	1 39
1803	300	1556 30	1550 51		0.015062	7.05	42.56	26 10	0 27	1561 20	1561 25	3 21		1.69
1778	200	1556.06	1559 11	1559 90	0.015490	7 15	41 96	25,97	0.03	1560.86	1560 90	3.05	1 16	175
1731	300	1555.70	1558.80		0 008204	-561	53.44	29.53	0.74	1550.13	1560 13	3.10	1.02	1 33
1683	300	1555 35 1565 16	1558 70 1558 66		0.003783	4 18 3 67	7172 8166	34 54	0.51	1559 39 1559 00	1559 40	3.35 3.50	1 00	0.69
1657	In Struct			<u>I</u>	. i		" [l						
1655	300	1552 91	1557 63		0 003131	4.07	73.68	31 12	0.47	1550 95	1558 95	4 /2	131	1 32
1610	300 300	1552.69 1553.68	1557 61 1557 24		0 009394	3 73 5 91	80 39 50 80	32.63 28.45	0.42	1558 73 1558 60	1558 70	4.93 3.56	1,16	1.09
1612	300	1553 49	1557 00	1557 55	0 009394	5.92	50 69	28 53	0 73	1558.40	1550 44	3 51	1.15	1.10
1514	300_	1552.76	1556.09		0.009303	5 90	50.87	28 61	0.78	1.557.50	1557.51	3 33 3 19	1 10	2.41
1319	300 ·	1552.00 1551.28	1555 19 1554 30		0 009139	5 85 5 82	51.29 51.55	28 85 29 16	0.77	1555.58 1555.65	1556 58 1555 70	3 19	1 03	1 39
1221	000	1550.00	1553.43	1553 94	0.008964	5.76	52.05	29.60	0.77	1.554 85	1554 /0	2.93 2.76	1.00	1.27
1123	300				0.008680	5 66	52.97	30 24	0.75	1553 79	1553.80	2.76	1 00	1.21
1025	300 300	1549.08 1548.89	1551.87 1551.73	1552.29 1	0.007044	5.21 4.95	57 60 60 59	31 90 32 77	0.64	1552 67 1552 63	1552 67 1552 63	2 79 2 84	1 00	1 GO 0 SO
3 155%. (.				. 7 20 114 11	i				.: I			-= ".∴ . I.		

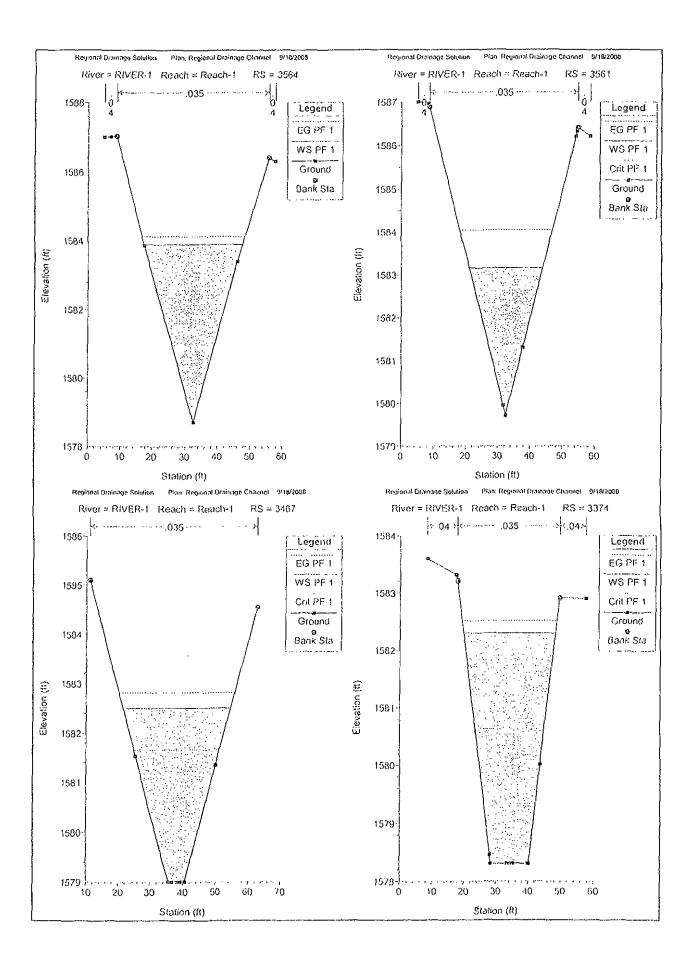


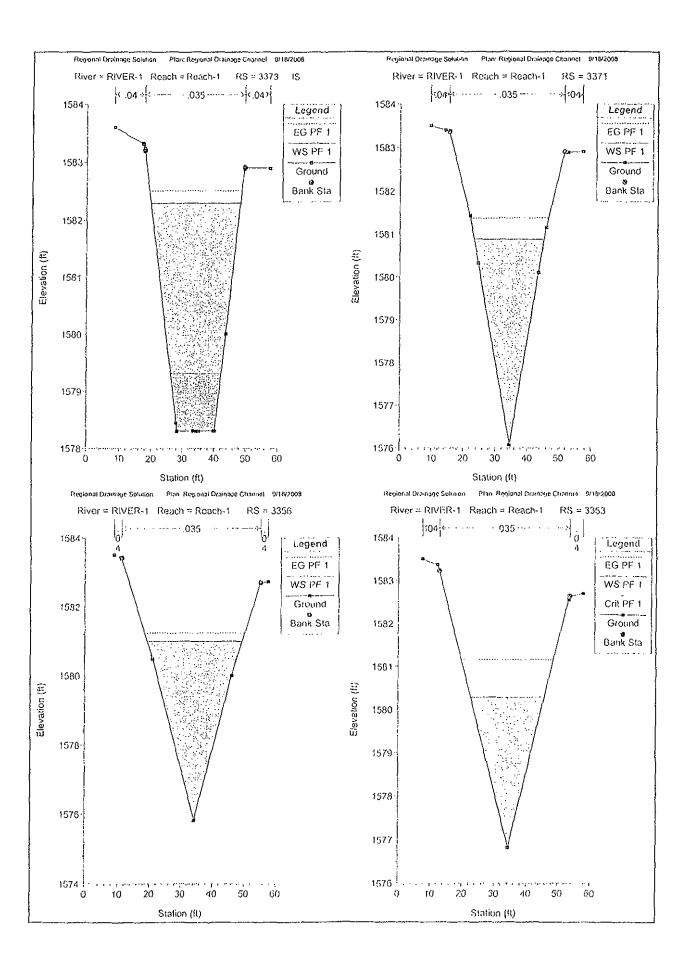


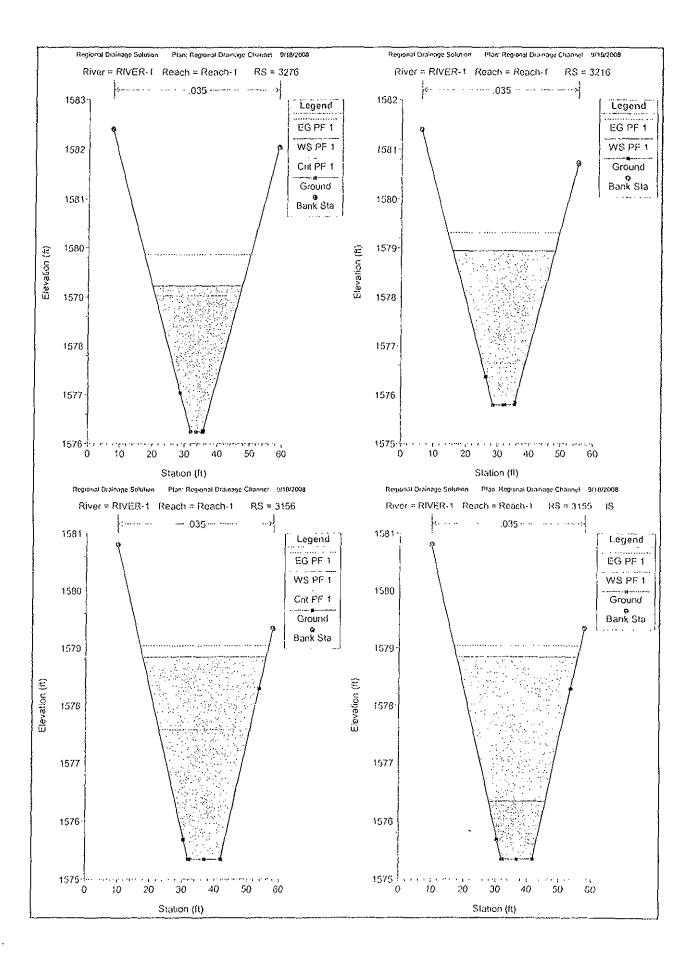


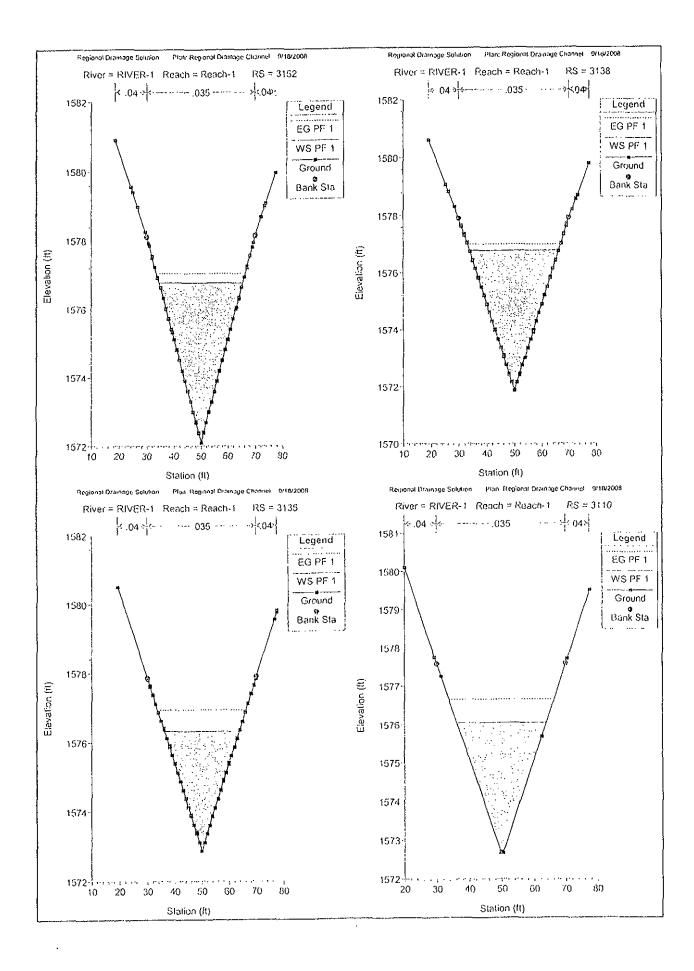


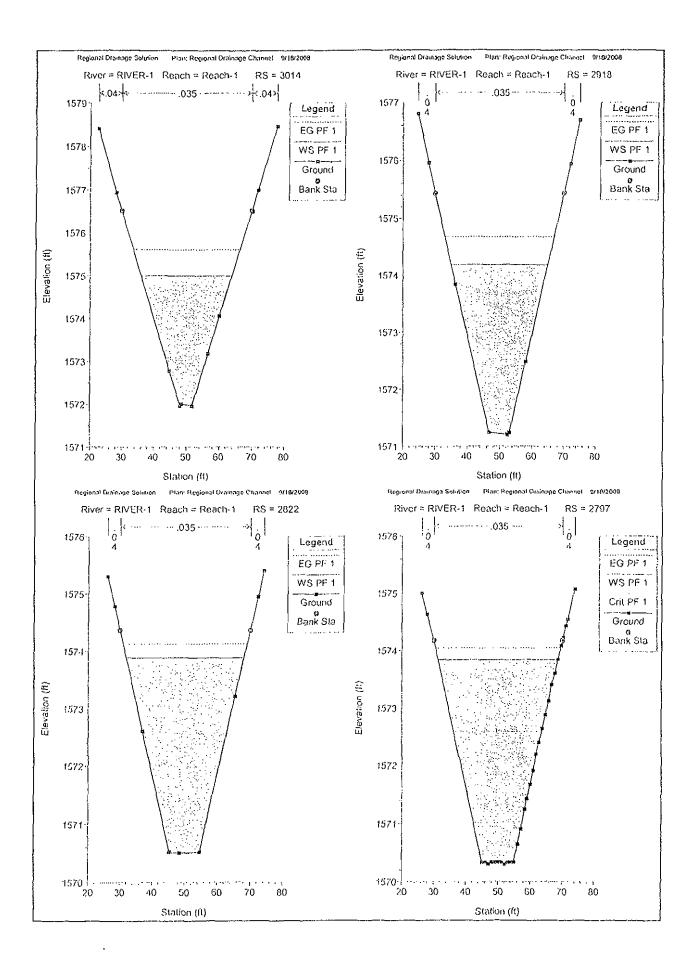


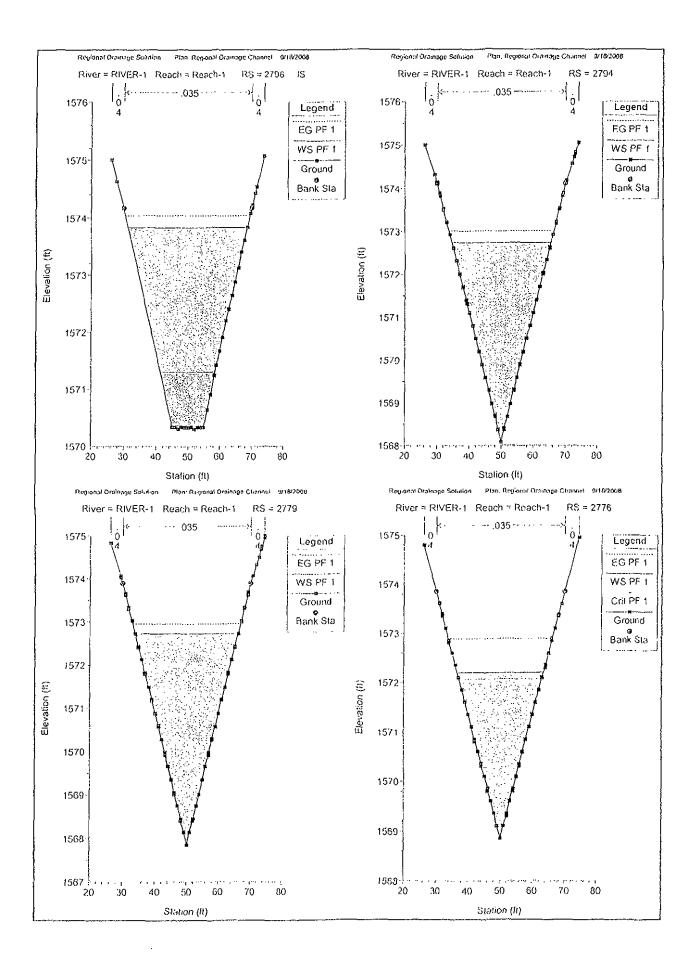


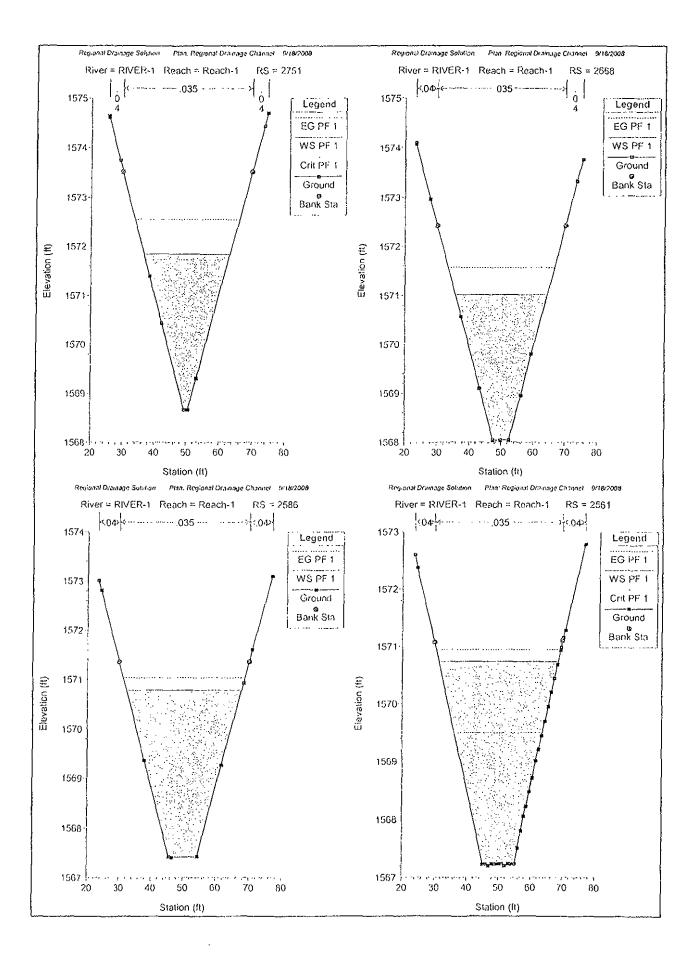


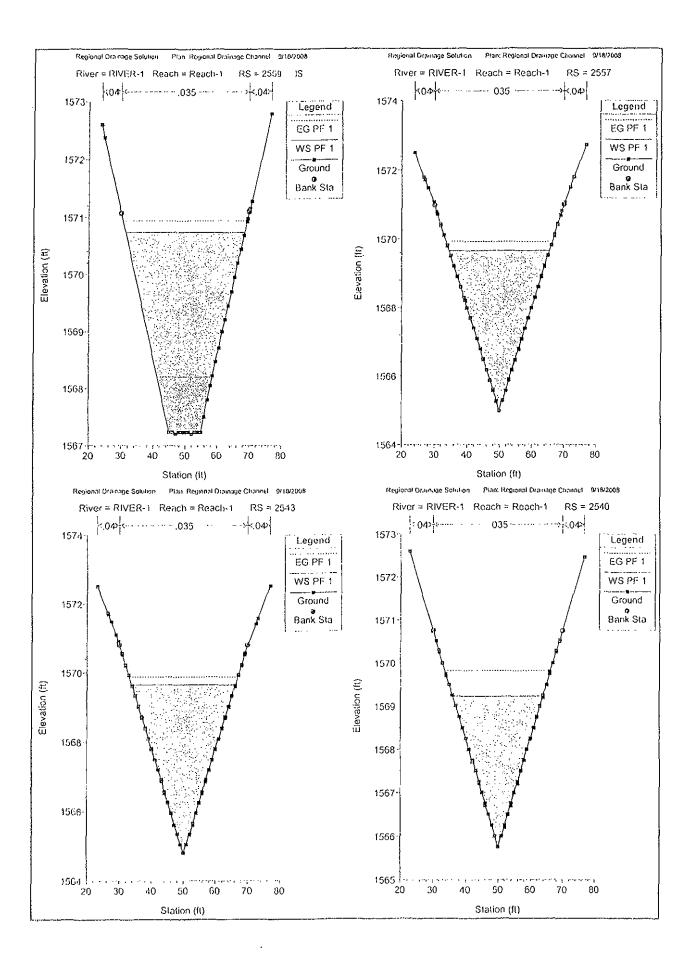


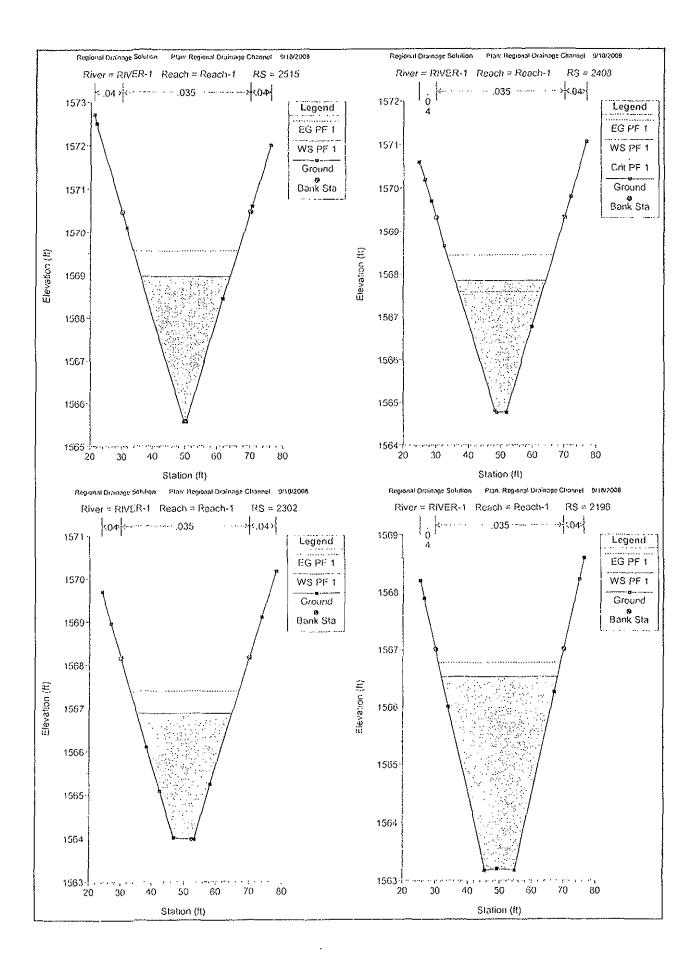


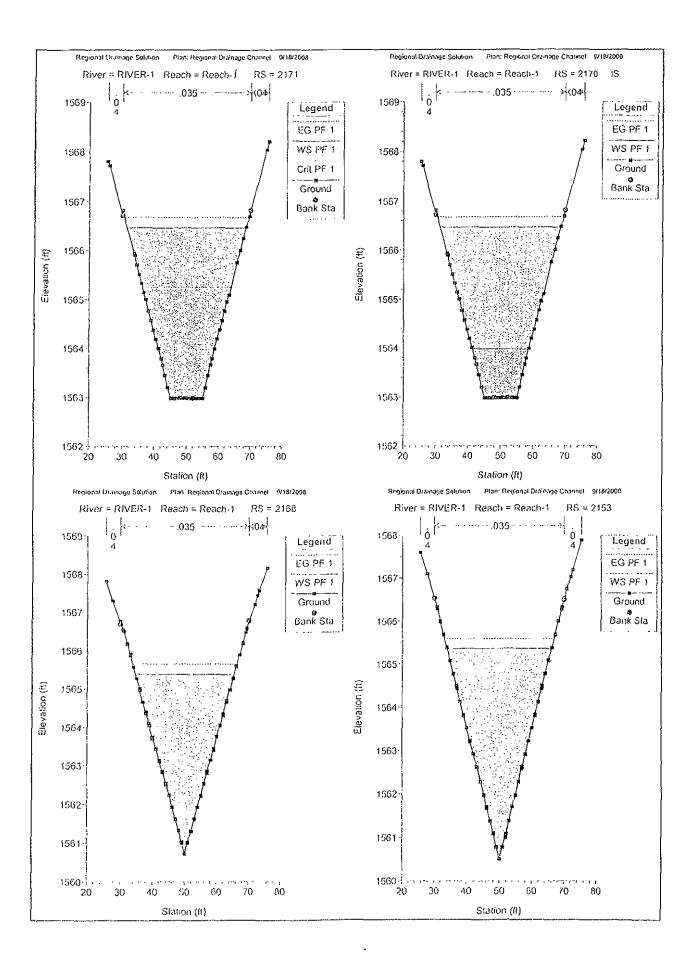


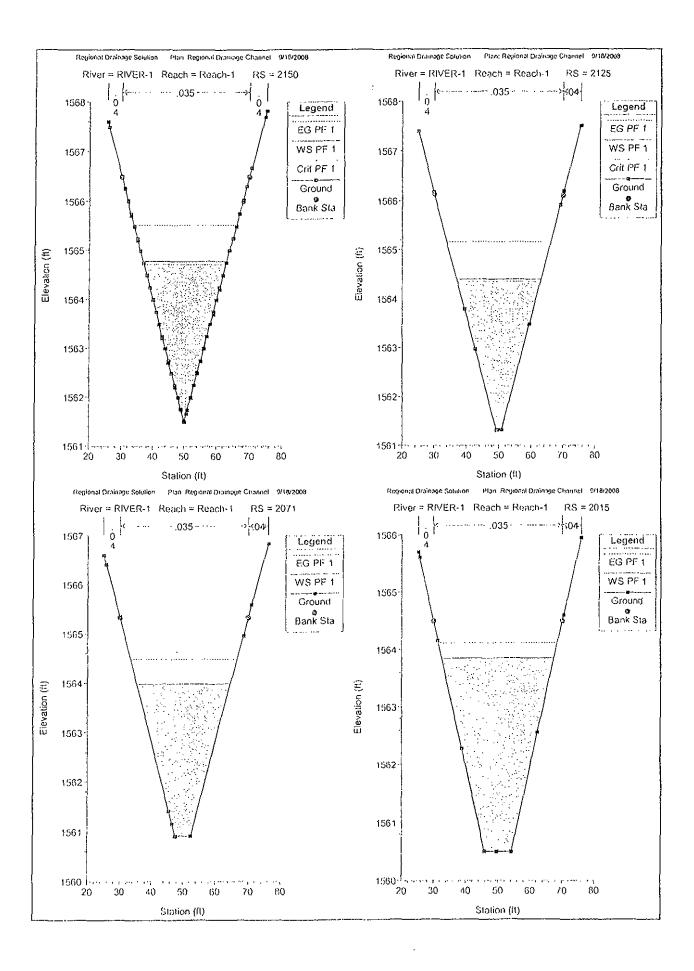


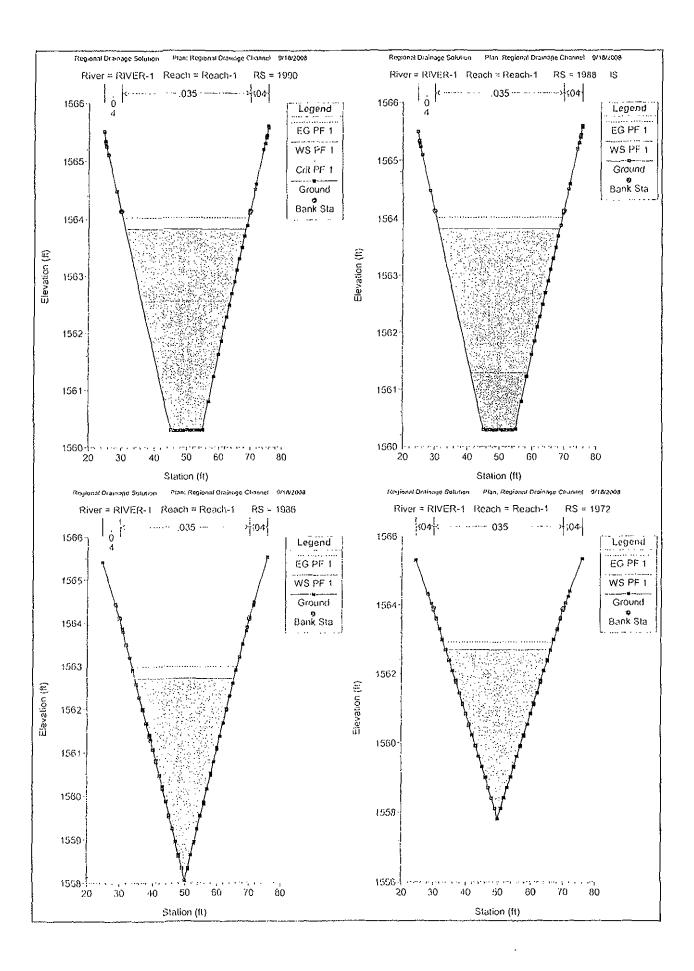


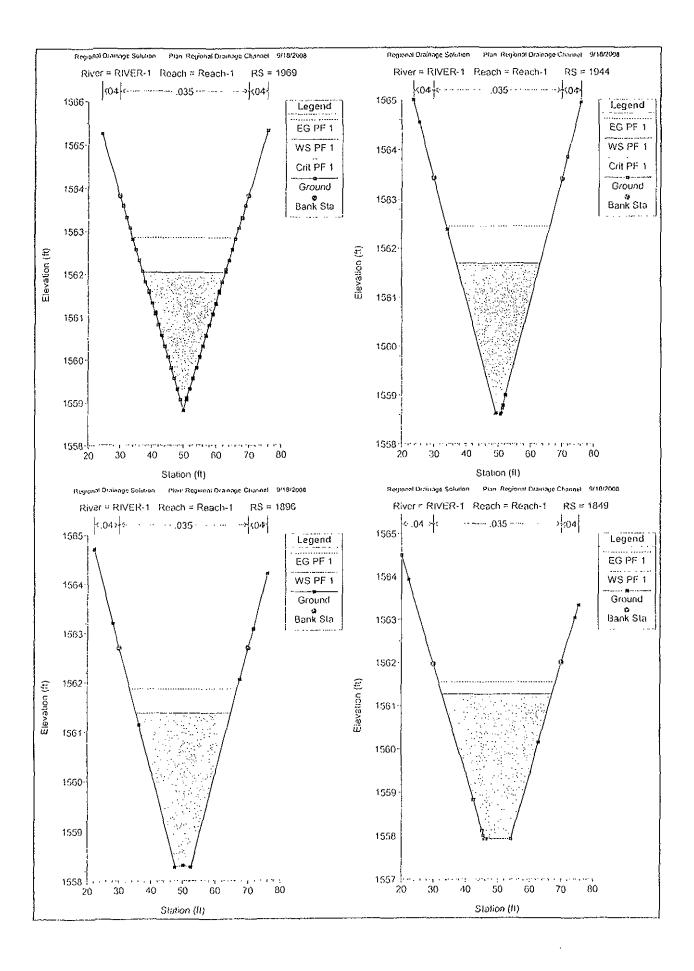


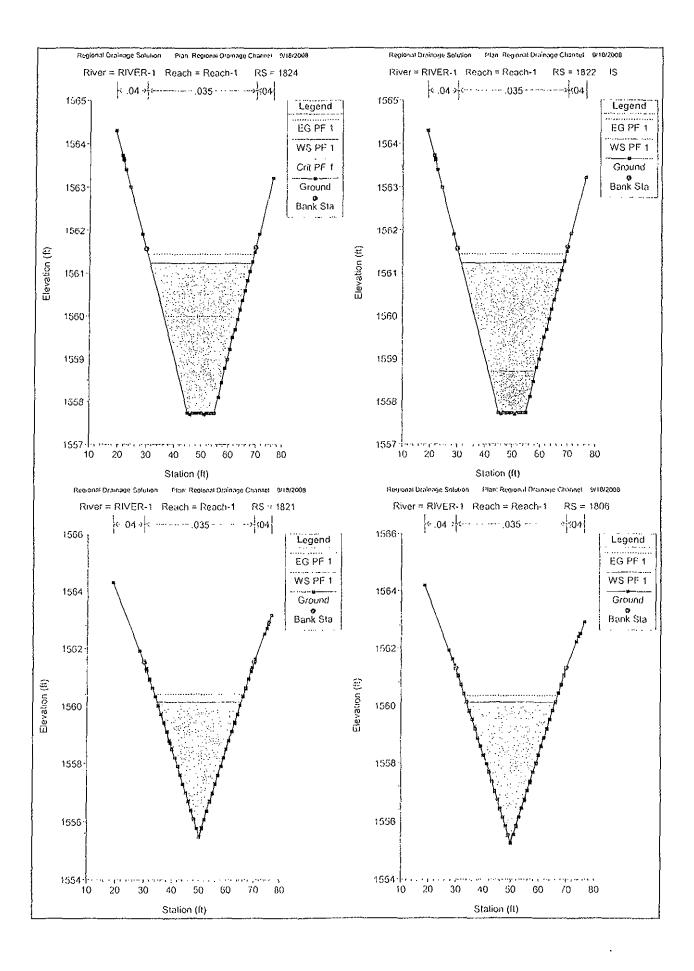


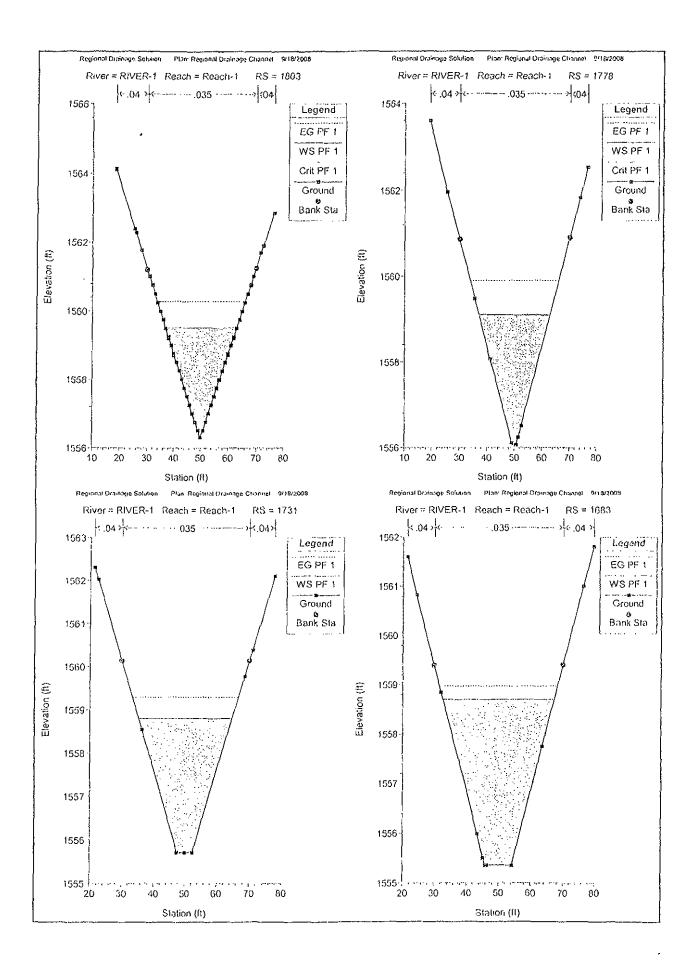


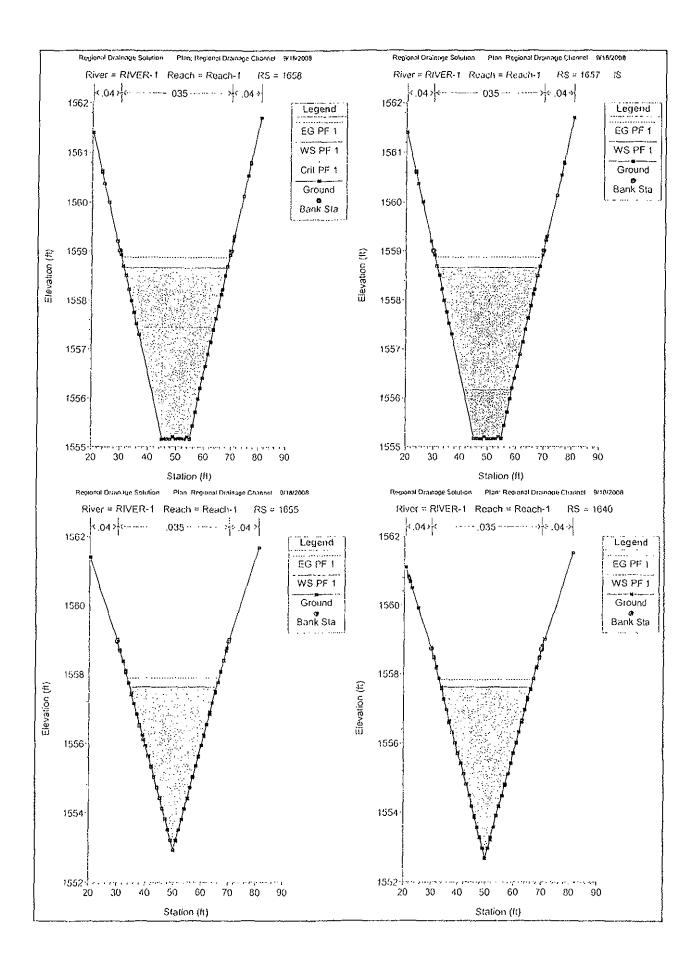


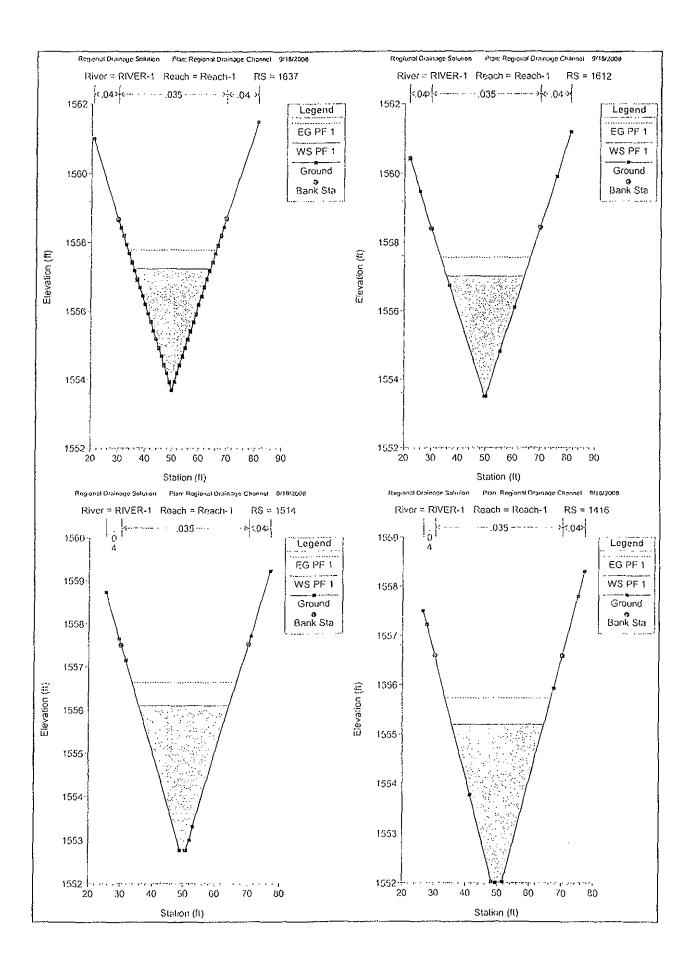


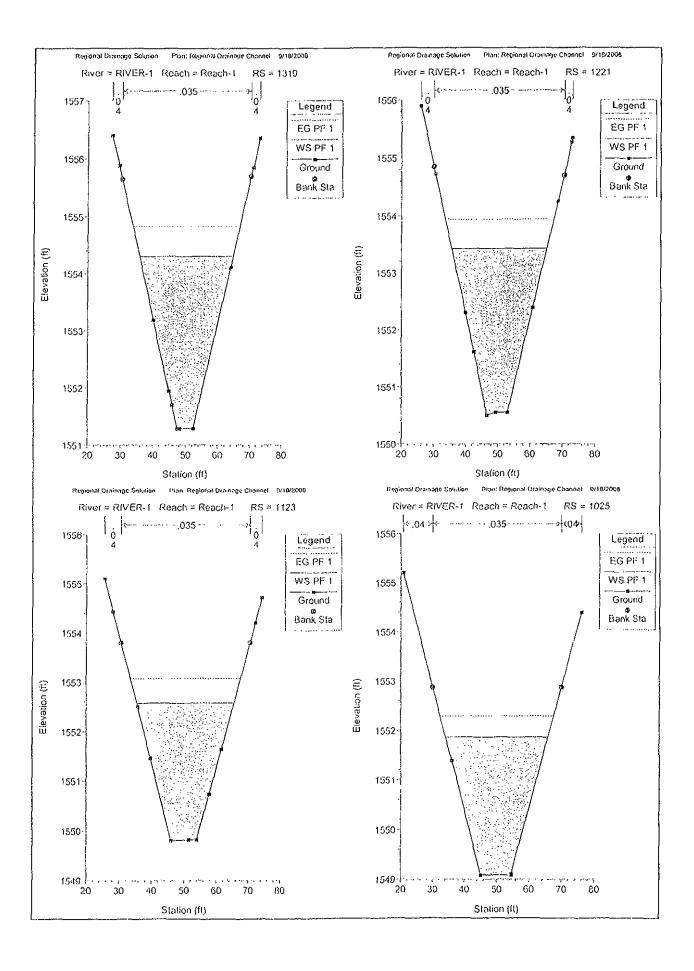


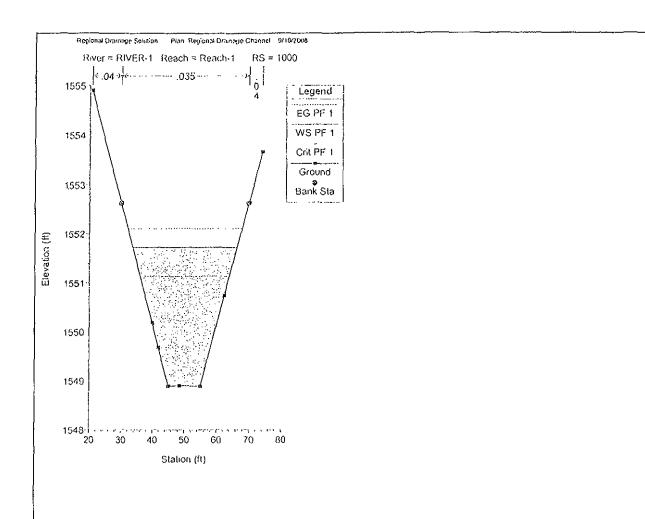












THAT RUG TODY PAYER-1	2000 tul 2000 tul 2000	Prome: PF 1
and the second section of the second section is a second section of the second section	there is a first of large at the transport of the figure of a grant and	
E.G. Elev (ft)	1585.25 Q Gates (cfs)	1
(M, W- MICE (11)	190 AAV (Q QBIGS (OS)	4

E;G: Elev (ft)	1585.25	Q Gates (cfs)	
W.S. Elev (ft)	1585.03	Q Gate Group (cfs)	0.00
Q Total (cfs)	300.00	Gate Open Flt (ft)	1583.36
Q Weir (cfs)	300.00	Gate #Open	
Wair Flow Area (sq ft)	72.37	Gate Area (sq ft)	1.00
Weir Sta Lft (fl)	16.98	Gate Submerg	0.00
Wair Sta Rgf (ft)	47.77	Gate Invert (ft)	0.00
Weir Max Depth (ft)	3.06	Gate Weir Coef	8.000
Weir Avg Depth (ft)	2.35		
Weir Coef	2.600	Q Breach (cfs)	
Weir Submerg	0.44	Breach Avg Velocity (IVs)	
Min El Weir Flow (ft)	1582.20	Breach Flow Area (sq ft)	
Wr Top Wilth (ft)	30.79		

Plan: RDC 100yr RIVER-1 Reach-1 RS: 3373 Int Struct: Profile: PF 1

E.G. Elev (It)	1582.51	Q Gates (cfs)	
W.S. Elev (ft)	1982.30	Q Gate Group (cfs)	0.00
Q Total (cfs)	300.00	Gate Open Ht (ft)	1580.88
Q Weir (cfs)	300.00	Gate #Open	
Weir Flow Area (sq ft)	73.03	Gate Area (sq.ft)	1.00
Weir Sta Lft (ft)	19.30	Gate Submerg	0.00
Weir Sta Rgt (ft)	48.75	Gate Invert (ft)	0.00
Weir Max Depth (ft)	3.20	Gate Weir Coef	0.000
Weir Avg Depth (ft)	2,48		
Weir Coef	2.500	Q Breach (cfs)	
Weir Submerg	0.40	Breach Avg Velocity (ft/s)	
Min El Wair Flow (ft)	1579.32	8reach Flow Arca (sq (t)	
Wr Yop Wdth (ft).	29.44		[]

Errors Warnings and Notes

Warning: The inline structure solution failed to converge. The program used the solution with the least curon

Plan: RDC 100vr RIVER-1 Reach-1 RS: 3155 Inf Struct: Profile: PF 1

TIGHT (1120) 16031 (117C)	1 Roughing	TOP DIGG IN SHEEL I TOME	
E.G. Elev (ft)	1579.04	Q Gates (cfs)	}
W.S. Elev (ft)	1578.84	☐ Gate Group (cfs)	0.00
Q Total (cls).	300.00	Gate Open Ht (ft)	1576.77
Q Weir (cls)	300,00	Gate #Open	
Weir Flow Area (sq.ft)	77.91	Gate Area (sq ft)	1.00
Weir Sta Lft (ft)	16,94	Gale Submerg	0.00
Weir Sta Rgt (ft)	56.53	Gate Invert (II)	0.00
Weir Max Depth (ft)	2.70	Gate Weir Coef	0.000
Weir Avg Depth (It)	1.96		
Weir Coef	2.500	Q Breach (cfs)	
Weir Submerg	0.11	Breach Avg Velocity (fVs)	}
Min El Weir Flow (ff)	1576.35	Breach Flow Area (sq ft)	
Wr Top Wdth (ft)	39.70	the same of the same state of	
rates, and the second of the s		and the second of the contract of the second	

Plan: RDC 100yr RIVER-1 Reach-1 RS: 2796 Inl Struct: Profile: PF 1

E.G. Elev (ft)	1574.04	O Gales (cfs)	
W.S Elov (ft)	1573,B4	Q Gate Group (cfs)	0.00
Q Total (cfs)	300.00	Gale Open Ht (ft)	1572.74
Q Weir (cfs)	300.00	Gate IlOpen	

Plan: RDC 100yr RIVER-1 Reach-1 RS: 2796 Inf Struct Profile: PF 1 (Continued)

Weir Flow Area (sq ft)	77.07	Cala Area log (IV	1.00
. Well Flow Alea (Sq II)	17.07	Gate Area (sq ft)	1.00
Weir Sta Lft (ft)	30.50	Gate Submerg	0.00
Weir Sta Rgt (ft)	69,49	Gate Invert (ft)	0.00
Weir Max Depth (ft)	2.74	Gate Weir Coef	0.000
Weir Avg Depth (ft)	1.98		
Weir Coef	2.600	Q Breach (cfs)	
Weir Submerg	0.42	Breach Avg Volocity (ft/s)	
Min El Weir Flow (ft)	1571.31	Breach Flow Area (sq ft)	
Wr Top Wath (ft)	38.99		

Plan: RDC 100yr RIVER-1 Reach-1 RS: 2559 Inl Struct: Profile: PF 1

E.G. Elev (ft)	1570.94	Q Gates (cfs)	
W,S, Elev (ft)	1570.74	Q Gate Group (cfs)	0.00
Q Total (cfs)	300.00	Gate Open Ht (ft)	1569.66
Q Weir (cfs)	300.00	Gate #Open	
Weir Flow Area (sq ft)	77.03	Gate Area (sq ft)	1.00
Weir Sta Lft (ft)	30.51	Gate Submerg	0.00
Weir Sta Rgt (ft)	69.46	Gate Invert (ft)	0.00
Welr Max Depth (ft)	2.74	Gate Weir Coef	0.000
Weir Avg Depth (ft)	1.98		
Weir Coef	2.600	Q Breach (cfs)	
Weir Submerg	0.43	Breach Avg Velocity (ft/s):	
Min El Weir Flow (ft)	1568.21	Breach Flow Area (sq ft)	
Wr Top Wath (ft)	38.96)

Plan: RDC 100yr RIVER-1 Reach-1 RS: 2170 Inl Struct: Profile: PF 1

E.G. Elev (ft)	1566.68	Q Gates (cfs)	
W.S. Elev (ft)	1566.47	Q Gate Group (cfs)	0.00
Q Total (cfs)	300.00	Gate Open Ht (ft)	1565.38
Q Weir (cfs)	300.00	Gate #Open	
Weir Flow Area (sq ft)	76.16	Gate Area (sq ft)	1.00
Weir Sta Lft (ft)	30.56	Gate Submerg	0.00
Weir Sta Rgt (ft)	69.57	Gate Invert (ft)	0.00
Weir Max Depth (ft)	2.70	Gate Weir Coef	0.000
.Weir Avg Depth (ft)	1.95		
Weir Coef	2.600	Q Breach (cfs)	
Weir Submerg	0.45	Breach Avg Velocity (fl/s)	
Min El Weir Flow (ft)	1563.99	Breach Flow Area (sq ft)	
Wr Top Wdth (ft)	39.00		

Plan: RDC 100yr RIVER-1 Reach-1 RS: 1988 Inl Struct Profile PF 1

E.C. Elev (ft)	1564.02	Q Gates (cfs)	
W.S. Elev (ft)	1563.82	Q Gate Group (cfs)	0.00
Q Total (cfs)	300.00	Gate Open Ht (ft)	1562.70
Q Weir (cfs)	300.00	Gate #Open	
Weir Flow Area (sq ft)	77.23	Gate Area (sq ft)	1.00
Weir Sta Lft (ft)	30.44	Gate Submerg	0.00
Weir Sta Rgt (ft)	69.44	Gate Invert (ft)	0.00
Weir Max Depth (ft)	2.73	Gate Weir Coef	0.000
Weir Avg Depth (ft)	1.98		
Weir Coef	2.600	Q Breach (cfs)	
Weir Submerg	0.41	Breach Avg Velocity (ft/s)	
Min El Weir Flow (ft)	1561.30	Breach Flow Area (sq ft)	

Plan: RDC 100yr RIVER-1 Reach-1 RS: 1988 Ini Struct: Profile: PF 1 (Continued)
Wr.Top Wdth (ft) 39.01

Plan: RDC 100yr RIVER-1	Reach-1	RS: 1822 Inl Struct: Profile: F	F 1
E.G. Elev (ft)	1561.44	Q Gates (cfs)	
W.S. Elev (ft)	1561.24	Q Gate Group (cfs)	0.00
Q Total (cfs)	300.00	Gate Open Ht (ft)	1560,14
Q Welr (cfs)	300.00	Gate #Open	
Weir Flow Area (sq.ft)	77.05	Gate Area (sq ft)	1.00
Weir Sta Lft (ft)	30.50	Gate Submerg	0.00
Weir Sta Rgt (ft)	69.47	Gate Invert (ft)	0.00
Weir Max Depth (ft)	2.74	Gate Weir Coef	0.000
Weir Avg Depth (ft)	1.98		
Weir Coef	2.600	Q Breach (cfs)	
Weir Submerg	0.42	Breach Avg Velocity (ft/s)	
Min El Weir Flow (ft)	1558.71	Breach Flow Area (sq ft)	
Wr Top Wdth (ft)	38.97		

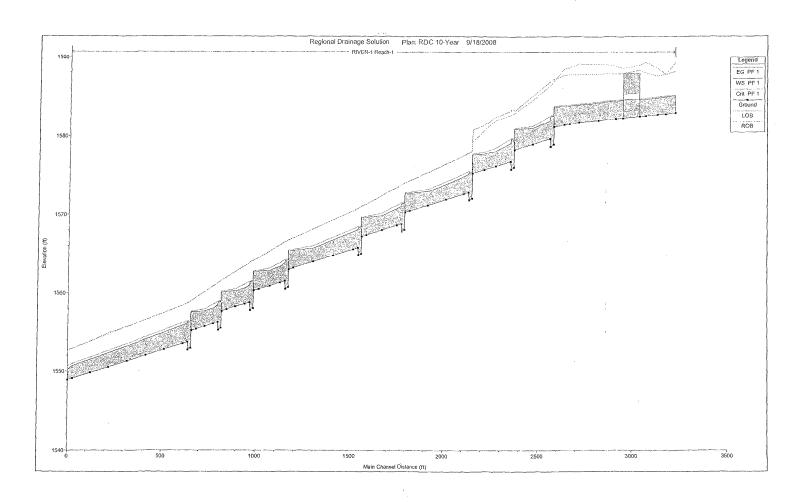
Plan: RDC 100yr RIVER-1	Reach-1	RS: 1657 Inl Struct: Profile:	PF 1
E.G. Elev (ft)	1558.87	Q Gates (cfs)	
W.S. Elev (ft)	1558.66	Q Gate Group (cfs)	0.00
Q Total (cfs)	300.00	Gate Open Ht (ft)	1557.63
Q Weir (cfs)	300.00	Gate #Open	
Weir Flow Area (sq ft)	76.02	Gate Area (sq ft)	1.00
Weir Sta Lft (ft)	30.54	Gate Submerg	0.00
Weir Sta Rgt (ft)	69.46	Gate Invert (ft)	0.00
Weir Max Depth (ft)	2.71	Gate Welr Coef	0 000
Welr Avg Depth (ft)	1.95		
Weir Coet	2.600	Q Breach (cfs)	
Weir Submerg	0.47	Breach Avg Velocity (ft/s)	
Min: El Weir Flow (ft)	1556.17	Breach Flow Area (sq ft)	
Wr Top Wdth (ft)	38.91		

Culvert Calculator Report RDC Outfall 100yr

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	1,552.00	ſt	Headwater Depth/Heig	ht 137	
Computed Headwater Elev	i 1,551.73	fŧ	Discharge	300.00	cfs
Inlet Control HW Elev.	1,551.51	ft	Tailwater Elevation	0.00	ft
Outlet Control HW Elev	1,551.73	ft	Control Type	Entrance Control	
Grades					
Upstream Invert	1,547.62	fl	Downstream Inveit	1,545.80	ft
Length	375.00	fl	Constructed Slope	0.0048\$3	ft/ft
Hydraulic Profile					
Profile	S2		Depth, Downstream	1.96	ſt
Slope Type	Steep		Normal Depth	1.96	ft
	Supercritical		Critical Depth	2.22	fl
Velocity Downstream	9.56	fl/s	Critical Slope	0.003401	ft/ft
Section					
Section Shape	Вох		Mannings Coefficient	0 013	
Section Material	Concrete		Span	8.00	ft
Section Size	8 x 3 ft		Rise	3.00	ft
Number Sections	2				
Outlet Control Properties					
Outlet Control HW Elev.	1,551.73	ft	Upstream Velocity Hea	d 1.11	ft
Ke	0 70		Entrance Loss	0 78	fl
Inlet Control Properties					
Inlet Control HW Elev.	1,551.51	ſţ	Flow Control	Transition	
Inlet Type 0° win	ngwall flares		Area Full 🗓	48.0	ſt₹
K	0.06100		FIDS 5 Chart	8	
M	0.75000		HDS 5 Scale	3	
С	0.04230		Equation Form	1	
Y	0.82000				

HEC RAS	Plan: RD	C 10yr Rive	c RIVER-1	Reach: 8	each-1 Pi	rofile; PF 1	T	· · · · · · · · · · · · · · · · · · ·		Ţ- <i>-</i>	T	y	Τ	
River Sta		1	T	ì	EG		Flow Area	Top Width	Froude #	LOS Elev	ROB Elev	Flow		Freeboord
rsiver Sta	Q Total (c/s)	(ft)	W.S. Elev	E G. Elev	Slope (IVII)	Vei Chnl (IVs)	(sq fl)	(ft)	1	(II)	(II)	(fl)	Req (ft)	Prov (ft)
4222	105.00	1582.97	1585 13	1585.17	0.000576	1 53	68.79	36 28	0.20	1588 20	1589 30	2.16	1.00	3.07
4172	105	1582.80	1584.97	1585 10 1584 98	0.002851	2.97	35.35	22.87	0.42	1587.82 1587.60	1587.84	2.17	1.00	2.85
4070	105	1582.59	1584.84 1584.67	1584 80	0.003072	3 04 2.93	34.50 35.78	22.78	0.42	1588.00	1588.56 1589.33	2.11	1.00	2.76 3.33
4039	105	1582 53	1584.6B	1584 73	0 000866	1.88	55 86	26,06	0.23	1586 33	1588 98	2.15	1 00	3.65
4004	Culveri		1804.63	160462	0.000304	 	60.00		0 20	1587.99	1588 61	2 30	1,00	
3953 3915	105	1582 33 1582.25	1584 63 1584 50	1584 67	0.002423	1.76 2.81	59 80 37.38	26.06	0 39	1587.90	1588.90	2 25	1.00	3.36
3819	105	1582 04	1584.26	1584.35	0.002524	2.84	36.96	23.33	0.40	1587.90	1589 11	2.22	1.00	3 64
3715	105	1581 80	1583.98	1584 11	0.002715	2.92	35.99	23.06	0.41	1587.80 1587.80	1589.14	2.18	1.00	3 82
3663 3635	105	1581.57 1581.44	1583.07 1583.01	1583.98 1583.92	0.002203	2.70	38.84 40.64	23.84	0.37	1507.70	1588.70 1589.57	2.30 2.37	1.00	3.93
3582	105	1581.19	1583.75	1583.83	0.001308	2 30	45 62	23.80	0.29	1587.23	1587.03	2.56	1.00	3.28
3501	In Struct	1570 OC	37.00.00	1502.63	0.000001			18.55	~~~~~	1507.24	1606.00		4.00	
3579 3564	105	1578.96	1582.52 1582.52	1582.67 1582.62	0.002612	3.10 2.49	33 <u>89</u> 42.23	22.09	0.40	1587.02	1586.88 1586.40	3.56 3.62	1 00	4.36 3.88
3561	105	1579.71	1581 98	1502.56	0 018555	6 1 1	17 18	15.14	1.01	1586 89	1586.40	2.27	1.00	4.42
3467	105	1579.00	1581 01 1580.89	1581.26 1580.98	0.001296	- 3.99 2.33	26 31 45.07	21.11	0.63	1585.10 1583.20	1584 55 1582 91	2.01 2.59	1.00	3.54 2.02
3373	Ini Struct	13/0.30	1300.09	1300 90	0.001290	2.33	45.07	2.10	0.2.3	1,003,20	1302 31-		1.00	2.04
3371	105	1576 07	1579.59	1579.80	0.004030	3.70	28 34	16,12	0.49	1583 38	1502.90	3.52	1.00	3.31
3356 3353	105	1575.82 1576.82	1579.63 1579.12	1579.73 1579.67	0 001645	2 55 5 96	41,25 17 G2	21.67 15.32	0.33 0.98	1583.42	1582.70 1582.64	3,81 2,30	1.00	3.07 3.52
3353	105	1576.82	1579.12	1579.67	0.012316	5.01	20 97	18.69	0.83	1582.40	1582.03	1.87	1.00	3.52
3216	105	1575.79	1577 82	1570.01	0 004652	3 43	30.57	23 21	0.53	1581.40	1580 73	2.03	1 00	2.91
3156 3155	fol Struct	1575 34	1577 75	1577.83	0.001469	2.21	47 48	29 38	031	1580.80	1579 34	2.41	1 00	1.59
3152	105	1572 09	1575.51	1575 63	0.002130	2,71	38 71	22.68	0.37	1578.10	1578.13	3,42	1.00	2.59
3138	105	1571.86	1575 50	1575 59	0 001522	2.39	43 91	24,10	0.31	1577.91	1577.91	3.64	1.00	2.41
3135 3110	105 105	1572.86	1575.19 1574 92	1575.55 1575.28	0 011170	4.84	21.70 21.91	18.59	0.79	1577.86	1577.58	2.33	1.00	2.67 2.66
3014	105	1571.95	1573 91	1574.25	0.010566	4.73	22.21	19.20	077	1576.51	1576 51	1.96	1 00	2.60
2918	105	1571 20	1573 00	1573.30	0.009150	4,42	23.76	20.49	0.72	1575.43	1575.43	1.80	100	2.43
2022	105	1570 50 1570 30	1572 76 1572 73	1572 86 1572 81	0.002187	2.57	40.84 46.08	27 16 28 60	0 37	1574.36 1574.17	1574.36 1574.17	2 25	1.00	1,60
2796	Ini Struct	131000			0.50.123									
2794	105	1568 08	1571.47	1571.59	0.002228	276	38.07	22.48	0.37	1574 12	1574.12	3.39	1 00	2.65
2779 2775	105	1567 85 1568 85	1571.47	1571.56 1571.52	0.001577	2.42 5.09	43.32 20.62	23.90 18.12	0.32	1573.90	1573.90 [2.26	1,00	2 43 2 74
2751	105	1568.66	1570.78	1571 19	0 013134	5.16	20 34	10 08	0.86	1573.52	1573.52	313	1.00	2.74
2668	105	1568.04	1569 85	1570.20	0 010667	4.73	22 21	19.39	0.78	1572.43	1572 43	1.81	1.00	2.58
2505 2561	105	1567.40 1567.20	1569 66 1569 63	1569 77 1569 71	0.002339	2.65 2.28	39.68 46.03	26.50 28.60	0.38	1571.35	1571 35 1571.10	2.43	100	1.69
2559	Inl Struct	}												
2557	105	1564 98	1568.40	1568.51	0 002147	2.72	30 60	22.63	0.37	1571.00	1571.02	3 42	1.00	2.60
2543 2540	105	1564 80 1565.75	1568.39 1568.00	1568 48 1568.44	0.001526	2.40 4.76	43.80 22.08	24.01 18.76	0.77	1570.80	1570.80 1570.75	3.59 2.34	1.00	2.41
2515	105	1565,56	1567 83	1568.18	0.010577	4.76	22.06	10 81	0.77	1570.47	1570 47	2.27	1 00	2.64
2408	105 105	1563.97	1566 76	1567.09	0.000827	4.60	22.84 22.84	19 44 20 25	0.75 0.76	1569.32 1569.16	1569.32	3 00	1 00	2.56 2.47
2302 2196	105	1563.17	1565 69 1565 42	1566.02 1565.52	0.010257	4.60 2.55	41.11	27.34	0.76	1567.00	1560 16 1567,00	2.25	1.00	1.58
2196 2171	105	1562.98	1565.39		0.001567	2 55 2 27	46 23	28 80	0 32	1566.72	1566.82	2 41	1.00	1.33
2170 2168	Ini Siruct 105	1560,72	1564 11	1564.23	0 002236	2 76	30 10	22 46	0.37	1566 69	1566.77	3.39	1 00	2.58
2153	105	1560.72	1564 10		0 001615	2.44	42 95	23.88	0.32	1566 53	1566.50	3.60	1.00	2.30
2150	105	1561 49	1563.72		0 014208	5.29	19 86	17 90	0.88	1566.49	1566.49	2 23	100	277
2125	105 105	1561 30 1560.90	1563.32 1562.85	1593.78 1563.13	0 015240	5.47 4.29	19.21	17.54 20.31	0.69	1566.13 1565.33	1565.33	1.95	1.00	2.78 2.48
2015	105	1560.49	1562 73		0 002487	271	38.70	26 11	0.39		1564.49	2 24	1.00	1.76
1990	105	1550 29	1562 71		0 001522	2 25	46 61	20 76	0.31	1564 13	1564.13	2.12	1 00	1.42
1988 1986	Inl Struct	1558 04	1561 43	1561 55	0 002241	2 75	38.07	22.34	0.37	1564.10	1564 00	3 39	1.00	2.65
1972	105	1557.81	1561 42	1561.51	0 001587	2.43	13.20	23.89	0.32	1563.90	1563 86	3.61	1.00	2.44
1969	105	1558 81	1560 99		0.015562	5 50	19.08	17.41	0.93		1563.81	2.18	1.00	2.82
1944 1896	105 105	1558 GD 1558 27	1560.60 1560.24		0 015615 0 007636	5 51 4,17	19.06 25.17	17.52 20.61	0.67		1563.40 1562.69	200	100	2.80
1849	105	1557.92	1560 15	1560 27	0.002592	2 7G	30.04	25 81	0.40	1561.96	1562.00	2.23	1 00	1.01
1824	105	1557.70	1560.13	1560 21	0 001571	2 28	46.04	23 56	0.32	1061.57	1561 60	2 43	1 00	1 44
1822 1821	Int Struct	1555.48	1558.88	1558.99	0 002224	2 76	38 09	22.49	0.37	1561.52	1561 52	3.40	1.00	2.64
1866	105	1555.25	1558.87	1558.96	0 001595	2 43	43 26	23 91	0.32	1561.30	1561 30	3.62	1 00	2.43
1803	105	1556 30	1558.46		0 014548	5 36	19.59	17 75	0.90		1561.25	2.16	1.00	2.74
1778 1731	105 105	1556.06 1555.70	1558.03 1557.69	1558.52	0 00166151	<u>5.63</u> 4.11	18 65 25.52	17.40 20.73	0.96 0.65		1560.90 (1560.13	<u>1 97</u>	1.00	2.83
1683	105	1555.35	1557 60	1557 72	0.002481	2 72	38.65	25 98	0.39	1559.39	1559 40	2 25	1.00	1.79
1658	105	1555.16	1557.58	1557 G6	0.001362	2.28	46.14	28.59	0.32	1559 60	1559 00	2.42	1.00	1.12
1657 1655	Int Struct 105	1552.91	1556.36	1556.47	0 002036	2 66	39 42	22 88	0.36	1550.95	1558.95	3.45	1.00	2.59
1640	105	1552.68	1556.35	1556.44	0.001473	2 36	44.45	24.27	0.31	1550.73	1558.70	3 67	1.00	2.35
1637	105	1553.GB	1556 08	1556.40	0.009380	4.53	23 19	19 30			1558.70	2 40	1.00	2.60
1612	105 105	1553 49	1555 85 1554 94		0.009400	4.53	23.05 23.20	19.23			1558.44 1557 51	2.36	1.00	2.55 2.56
1416	105	1552 00	1354.05		0.009013	1 16	23.54	19.71		1556.58	1556.58	2.05	1.00	2.53
1319	105	1551 28	1553.18	1553 48	0 008959	4.42	23 76	20.13	0.72	1555.65	1555.70	1.90	1.00	2.47
1221 1123	105	1549.80	1552.31 1551.48		0.008793	4.25	24.13	20.68			1554,70 1553,80	1.68	1.00	2.30
1025	105	1549.08	1550 69		0 003034	4 11	25.56	22.38			1552.87	1 61	1.00	2 18
1000	105	15-18 69	1550 16		0.010070	5.55	1393	20.11			1552.63	1.27	1.00	2 47

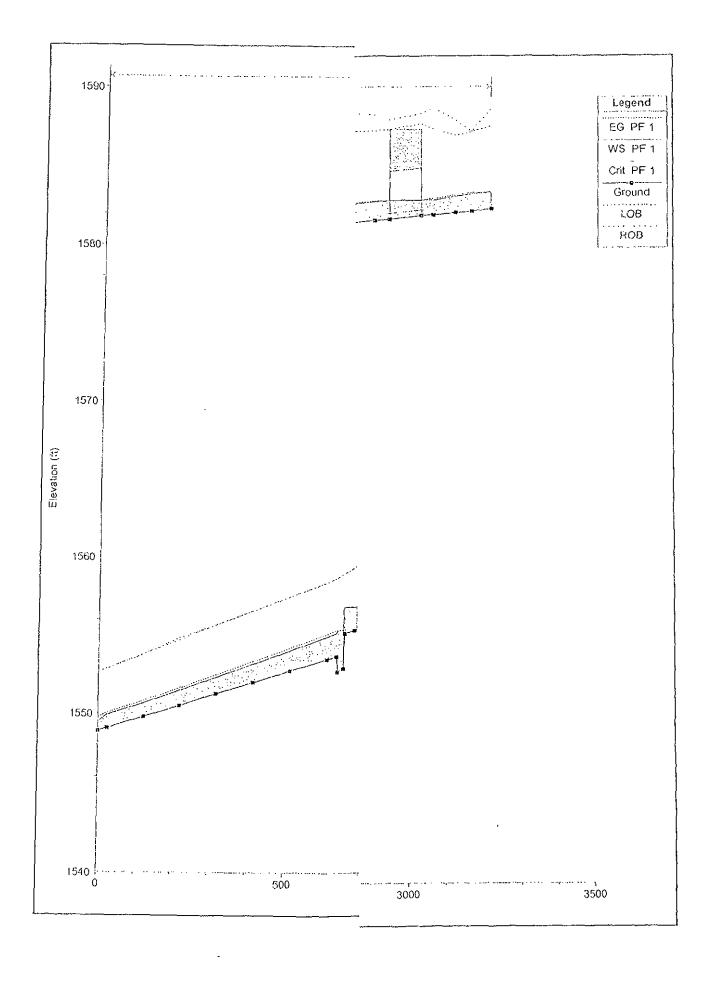


Culvert Calculator Report RDC Outfall 10yr

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	1,552 00	ft	Fleadwater Depth/Fleigl	nt 0.68	
Computed Headwater Elev	1,549.66	ft	Discharge	105.00	cfs
Inlet Control HW Elev.	1,549.48	ft	Tailwater Elevation	0.00	ft
Outlet Confroi HW Elev.	1,549 66	fŧ	Control Type F	Entrance Control	
Grades					
Upstream Invert	1,547.62	ft	Downstream Invert	1,545.80	ſŧ
Length	375.00	ft	Constructed Slope	0.004853	ft/ft
Hydrautic Profile					
Profile	\$2		Depth, Downstream	0.97	ft
Slope Type	Steep		Normal Depth	0.97	ft
Flow Regime	Supercritical		Critical Depth	1.10	ft
Velocity Downstream	6.76	fVs	Critical Slope	0.003298	ft/ft
Section					
Section Shape	Box		Mannings Coefficient	0 013	
Section Material	Concrete		Span	8.00	ft
Section Size	8 × 3 ft		Rise	3.00	ft
Number Sections	2				
Oullot Control Properties					
Outlet Control HW Elev.	1,549.66	ft	Upstream Velocity Head		
Ке	0.70		Entrance Loss	0.39	ft
Inlet Controt Properties					
Inlet Control HW Elev	1,549.48	ft	Flow Control	Unsubmerged	
Inlet Type 0° wi	ngwall flares		Area Full	48.0	ſţ²
K	0.06100		HDS 5 Chart	8	
M	0.75000		HDS 5 Scale	3	
C	0.04230		Equation Form	1	
Υ	0.82000				

River Staj	Q Total	Min Ch El	W S. Elev	EG Elov			Flow Area		Cin		ROB Elev		Req	Pro
	(cfs)	(11)	((1)	<u>(ft)</u>	(11/11)	(IVs)	(sq It)	(II)	<u></u>	(/1)	(f)	(0)	(ft)	((
4222	30	1582.97	1504 03	1534 04	0.000583	0.98	30.71	32 42	0.18	1588 20	1509.30	1 06	100	4
4172	30	1582.80	1503 91	1583.98	0.002872	2 0G	14 57	16.56	0.39	1587.82	1597.84	. 111	1.00	3 1
4130	30	1502.73	1583.77	1583 85	0.003454	2.19	13 70	16 32	0.42	1587 60	1588 56	1,04	100	3
4070	30	1502.59	1583.54	1583 62	0.004075	2.28	13.15	16.72	0.45	1588.00	1589.33	0.95	1.00	4
4039	30	1582 53	1583 53	1583 56	0 000303	1 15	26.13	26.03	0.20	1588 33	1588 98	3,00	1.00	4.
4004	Culvert				ì				l				ļ	
3953	30	1532 33	1583.51	1583,53	0.000470	0 97	30.84	26.05	0 16	1507 99	1588 61	1.18	1.00	4
3915	30	1582.25	1583 44	1583 49	0 002122	1.86	16 11	_16.91	0.34	1587.90	1588 90	1 19	100	4
3819	30	1582 04	1583 24	1583 29	0.002089	1 84	16 28	17 19	0.33	1587 90	1589,11	1,20	1.00	4
3715	30	1501.80	1583.04	1583 09	0 (01858	1 77	16 95	17.41	0.32	1587.00	1589 14 [1 24	1.00	4
3663	30	1581 57	1582 97	1583.01	0 00 1170	1 50	19.94	18,45	0.26	1587 80	1598 70	1.40	1.00	
3635	30	1581 44	1582.95	1582.98	0 000699	1 37	21.87	19 05	0.23	1587.70	1588 57	1.51	1.00	4
3582	30	1581 19	1582 92	1582 94	0 000446	1 09	27.59	19,97	0.16	1507 23	1567.03	1.73	100	_ 4
3581	Int Struct				j. "		i		-					İ
3579	30	1578.96	1501 15	1531.50	0.001388	1 78	16.88	13.27	0.28	1587 24	1596 88	2 49	1.00	5
3564	30	1578 70	1581 45	1581.48	0 000744	1 30	21.78	15.00	0.21	1587.02	1585 40	2 75	100	4
3561	30	1579 71	1581 09	1591 44	0.021934	176	6.30	9 17	1.01	1586 89	1586 40	1.38	100	5.
3/167	30	1579,00	1580 08	1580.21	0.007703	3.00	10 01	13.62	0.62	1585 10	1584.55	1.08	1.00	4 :
3374	30	1578 30	1580 05	1580 07	0 000440	1 10	27.40	19 29	0.16	1583 20	1582.91	1.75	1.00	2 (
3373	Int Struct				[] i								[
3371	30	1576 07	1578.56	1578.63	0 002092	2 12	14 15	11,40	0.33	1583 36	1502.90	2.49	100	4.3
3356	30	1575 82	1578 57	1578 60	0.000770	1 10	21 44	15.62	0 21	1583 42	1592 70	2.75	1.00	4
3353	30	1576 82	1578 32	1578 57	0.013852	4.01	7 19	9 99	0.82	1583 22	1582 64	1.50	1.00	43
3276	30	1576.24	1577 25	1577.47	0.014457	3.83	7 83	11 60	0.03	1582.40	1582.03	1.01	100	4.7
3216	30	1575.79	1577 04	1577 11	0.002727	201	14 91	16.91	0.38	1581 40	1535.73	1 25	1.00	3.6
3156	30	1575 34	1577 01	1577 03	0 000516	1 07	27 97	23 44	0 17	1580.80	1579 34	1 67	1.00	2.3
	Int Struct													
3152	30	1572 09	1574.51	1574 55	0.001006	1 55	19 39	16 01	0.25	1578 10	1578 13	2.42	1.00	3.5
3138	30	1571.86	1574,51		0 0000375	1 29	23 23	17 4G	0.20	1577 91	1577.91	2 65	100	3 /
3135	30	1572 86	1574.32	15/4 51	0 01 1228	3 54	8.47	11.69	0.73	1577.86	1577 90	146	100	3.5
3110	30	1572.67	1574 03	15/4 23	0.011444	3.58	8 37	11.60	074	1577.5B	1577 58	1 35	100	3 !
3014	30	1571.95	1573 11	1573 27	0 008627	3 17	9 47	12 87	0.65	1576 51	1576.51	1 16	1 00	<u></u> 3,4
2916	30	1571.20	15/2 [1	1572.29	8001100	3.45	8.69	13 36	0.75	1575 43	1575 13	0.91	1 00	3
7822	30	1570 50	1572 00	1572 03	0.000924	1 33	22 51	21.08	0.23	1574 36	1574 36	150	1.00	2.3
2797	30	1570 30	1571.99	1572 01	0.000550	1.11	2/ 11	22 70	0 18	1574.17	1574 17	1 69	1 00	2.1
	Int Struct			1,72.7.0	0.011,742,01	. 17.1	·=		: [}			
2794	30	1568 08	1570 18	1570 52	0 001158	1.58	19.02	15.88	0.25	1574 12	1571.12	2.40	1 00	3,€
2794 2779	30	1567 85	1570.49	1570 50	0 000696	7.31	72 93	17 29	0.20	15/3.90	1573 90	2 63	1.00	3
2776	30(1568 05	1570 25	1570 48	0.01299?	3 72	8,07	11 51	0.78	1573 85	1573.85	141	1 00	3.5
2751	30.	1568 66	1569.98	1570.17	0 01 1024	3 53	8 49	770	0.73	1573 52	1573 52	1 32 "	1 00	3.5
2668	30	1568.04	1568.98	1569 18	0013121	3.63	8 27	12 62	0.79	1572 13	15/2 43	094	100	31
2586	<u>3</u> 6	1567 40	1568 90	1558 93	0.000995	1.38	21 80	20 55	0.24	1571 35	1571 35	1 50	100	2
2561	30						27 02	22 64		1571 07	1571 10	1 69	1 00	?
	In Struct	1557 20	1268 00	1558 91	0 000554	_1.11.			0.18	2.77.37	_:*'.:.'\	: ***	iXX- · }	" !
2557	30	1564,98	1567 40	1567 44	0.001101	1 55	19 39	16 03	0.25	1571 00	1571 02	2.42	1 00	ΞĒ
2543	· 30 · ·	155180	1567 40	1567 43	0 0000377	7.29	23 24	17.54	0.20	1570.00	1570 80	2.60	7 00	. 34
2540	30	1505 75	1567 22	1567 40	0.010545	3.43	8 75	12 01	071	1570 /5	1570.75	1 47	1.00	35
2515	30	1565 56	156\$ 90	1567 11	0.012611	3 72	3.73	11 40	0.78	15/0/17	1570.73	34	1 00	35
2103	36			1566 13	0.006811	2 91	10.31	13 31	0.58	1569 32	1569 32	1 24	100	33
		1564 76	1506,00				7 63	12.86	0.30 - {	1568 16	1568.10	0.80	100	33
2302	30	1563 97	1564.77	1565.01	0 017535 [3 93	72.89	21 35				1 50	1 000	
2196	30	15G3 17	1564.67	1564 70	0.0008891	1 31			622	1567 00	1567 00 1			2.3
2171	30	154:5 88	1564.66	1564.68	0 000536	1 09	27 41	22.69	0.10	1566 72	1566 82	; eg : j	1 00	5.0
	Int Struct				11					- John no	11.50 35	2.76		
2166	30	1550 72	1563.12		0.001150	1.57	19 09	15 94	0.25	1565 69	1566 77	2 40	100	3.5
2153	30	1560 50	1563,12	1563 14		1.33	72 62	17.38	0.20	1566.53	1566 50	. 262	1.60	33
2150	30	1561 49		1563 12		3.79	7 91	11.24	0.80	1566 49	1.66.49	. 1.40	1 00	36
2125	30		1562.48			4 12 j	7.28	10.87	0 89	1566 13		1.18	1.00	3.0
2071	30	1560 90	1562.04		0.000503	2.82	10.62	13.63	0.57	1565.33	1555.33	1 14	1 00	3 2
2015	30 30	1560,49	1561 9B		0.001053	1.41	21 28	20.18	0 24	1564 49	1564 49	1 49	1.00	2 5
1990		1560.29	1561 97	1561 99	0.000524	1 09	27.56	22.82	9.17	1564.13	1564 13	168	1 00	2 i
	In Shuct	l				ا ا		إيي				ا ي . ي ا		
1986	30 .]	1550 01	1530 44	1550 18	0.001137	1 57	19 12	15.75	0 25	1564 10	1564 08	2 40	1 000	35
1972	30	1557,81	1550 43		0 000718	1.32	22 78	17.47	0.20	1533.90	1563 86	2 62	100	3.4
1969	30	1558.81	1560.20		0014411	3 90	7.70	11 13	0.83	1563 81	1563 81	1 39	100 ∫	3.6
1944	30	1558 60	1559 76		0.017505	4 19	7 15	10.01	0.91	1563 13	1553 40	1 16	. 100	3 6
1896	30	1558 27	1559 45		0 (X)5 (199	2 05	11 31	14 33	0.53	1562 69	1552.69	1.18	1 00 l	32
18-19	30	1557 92	1559 40		0.001095	143	20.93	19 93	0.25	1561.96	1562.00	1 49	100	2.5
1824	30	1557 70	1559 39	1559 41	0.000541	1 10	27 22	22.65	0.18	1561 57	1561 60	1 69	1.00	2 1
	Int Struct			1			ł		i i			i	i	
1821	30	1555 48	1557 89		0.001132	1.96	19 19	15.94	0.25	1561 52	1561 52	241	100	36
1806	30	1555 25	1957 89		962000 0	1 30	23 03	17 36	0.20	1561 00	1551 30	2.64	1 00	3 4
1803	30	1556,30	1557 67	1557 🕸	0.012/97	373	0.04	11.41	0.78	1561 20	1581.25	1.37	100	. 35
1778	30	1556 06	1557 19	1557 49	0.019991	4 40	5.82	10 61	0.97	1560.86	1560 90	1 13	100	36
1731_	30	1555 70	1556,90		0 005023	2 57	11 67	14 19	0.50	1560.13	1560 13	1 20	100	3.2
1683	30	1555 70 1555 35	1555.86		0.001013	2 57 1 39	21 52	20 15	0.24	1559 39	1559 40	151	1.00	2.5
1658	30	1555.16	1556.85		0 000529		27 49	22 60	0.18	1559 00	1559.00	1.69	1.00	2 1
	In Struct											1	·i	
1655		1552 91	1555 35	1555 39	0.001048	1 52	19.77	16 24	0.24	1558 95	1558 95	2 44	1.00	3 €
1640	30 30	1552.68	1555 35		0.000362	1 28	23 46	17.65	0.20	1558.73	1558.70	2.67	100	3.3
	30		1555 18		0 000335	331	9.07	12 03	0.20	1558 58	1558.70	-550	1.00	3.3 3.5
1637		1553 68	-1233.30.					12 00	0.68	1558.40	1558.44	1 46	100	3.4
1612	30 30	1553.40	1554.95		0.000333	3.33	9 02	12 23		1557 50	1557,51	1 29		
1514	30	1552 76	1554.05		0 009165	3 29			0.67				100	3.4
	30 [.	1552.00	1553,18		0.0087001	3 19	9 41	12.74	0.65	1556 58	1656 58	1.18	1 00	3.4
1416	20)	1551 28	1552 32		0 008019	3 15	9.53	13 33	0.66	1555.65	1555.70	104	1 00	33
1319									0.64	14 CA OC	1.64 10	100		2.0
1319	30 30	1550.50	1551 50		0.008351	3.03	9.91	14 12	0.64	1554.85	1554 70	100	100	
1319	30 30 30	1550.50 1549.60 1549.08	1551 50 1550 68 1549 94	1550 82	0.008351 0.003631 0.005972	2 99	10.04	15 02 16 36	0.58	1553.79 1552.87	1553 80 1552 87	0.88 0.86	100	3 20 3 1 2 9:



Culvert Calculator Report RDC Outfall 2yr

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	1,552.00	ft	Headwater Depth/Heigh	nt 0.29	
Computed Headwater Elev	7.548.50	ft	Discharge	30.00	cfs
Inlet Control HW Elev.	1,548.42	ft	Tailwater Elevation	0.00	fţ
Outlet Control HW Elev.	1,548.50	ít	Control Type 6	Entrance Control	
Grades					
Upstream Invert	1,547.62	ft	Downstream Invert	1,545 80	ft ft
Length	375.00	ft	Constructed Slope	0 004853	ft/ft
Hydraulic Profile					
Profile	S2		Depth, Downstream	0.44	lt
Slope Type	Steep		Normal Depth	0 44	ft
Flow Regime	Supercritical		Critical Depth	0.48	ſŧ
Velocity Downstream	4.28	ft/s	Critical Slope	0 003661	tVII
Section					
Section Shape	Вох		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3 00	ſţ
Section Size	8 x 3 ft		Rise	3.00	ſţ
Number Sections	2.			· · · · · · · · · · · · · · · · · · ·	<u></u>
Outlet Control Properties					
Outlet Control HW Elev	1,548 50	fŧ	Upstream Velocity Head	0.24	ft.
Ke	0.70		Entrance Loss	0.17	ft
Inlet Control Properties					
Inlet Control HW Flev	1,548.42	ſŧ	Flow Control	Unsubmerged	
Inlet Type 0° w)	ngwall flares		Area Full	48.0	ft²
К	0.06100		HDS 5 Chart	8	
М	0.75000		HOS 5 Scale	3	
C	0.04230		Equation Form	1	
Υ	0.82000				

APPENDIX C

Erosion Protection

Level | Scour

Site: Interim Regional Drainage Channel

Location: Scottsdale, Arizona

Description: Rip Rap Design Calculations

Date: 9/16/2008

Level 1 Analysis of Stream Degradation

Reference: ADWR, Flood Warning and Dam Safety Section, 1996. State Standard 5-96: "Watercourse System Sediment Balance - Guideline 2:

Channel Degradation Estimation for Alluvial Channels in Arizona"

Assumptions: Channel reaches without major disturbances, such as dams and bridges.

Equations: Ds = Dgs + Dlts

where:

Ds ≈ total scour depth, in feet;

Dgs = general degradation, in feet;

Dlts = long term degradation, in feet;

For straight channel reaches:

Dgs ~ 0.157*Q100^0.4

For channel reaches with ourvature:

Dgs = 0.219*Q100^0.4

Long term degradation:

 $Dlts = 0.02*Q100^0.6$

Project Name: Regional Drainage Solution Location: Scottsdale

Input Data:

Q100 = 300 cfs

Ds ≈ 2.15 ft for straight channel

Ds = 2.76 ft otherwise

Recommended Scour Depth: 3.0 ft

Note: the minimum total scour depth, Ds, shall be 3 feet.

Bend Scour Calculation

Site: Interim Regional Drainage Channel

Location: Scottsdale, Arizona

Description: Bend Scour Design Calculations

Date: 9/16/2008

Bend Scour Calculation Sheet

Reference: ADWR, Design Manual for Engineering Analysis of Fluvial Systems, 1985 p5 105-5,110

Project Name, Regional Drainage Solution

Wood/Patel # 073022

Scour Depth Equation:

Zbs = $(0.0685^{\circ}Y^{\circ}V^{\circ}0.8)[2.1^{\circ}(\sin^{2}(a/2)/\cos(a))^{\circ}0.2^{-1}]/(Yh^{\circ}0.4^{\circ}Se^{\circ}0.3)$

there Zbs = bend scour component of total scour depth (ff)

V = mean velocity of upstream flow (fps)

Y = maximum depth of upstream flow (ft)

Yh = hydraulic depth of upstream flow (ft)

Se = upstream energy slope (bed slope for uniform flow conditions, (VII)

a = angle formed by the projection of the channel centerline from the point of curvature to a point which meets a fine tangent to the outer bank of the channel (degrees)

Scour Length Equation

 $X = 2.3*(C/g^{0.5})*Y$

Scour Depth:

Where X = distance from the end of channel curvature (point of rangency P T) to the downstream point at which secondary currents have dissipated (ft)

C = Chezy coefficient = 1 486*R*(1/6)/n

g = gravitational acceleration (32.2 ft/s²)

Y = depth of flow (to be conservative, use maximum depth of flow, exclusive of scour, within the bend) (ft)

Input Data

V =	4.1	(It/s)	n =	0.035	
Υ≃	3.56	(fl)	A≈	73,54	(fl^2)
Yh ∺	2 3 5	(ft)	P≈	33	(ft)
Se =	0.003104		R ≈	2 23	(ft)
a =	40	(degree)	C ≈	48.52	
		Stable bank sid	de slope =	3	(H:V)

Computed Scour Values

Zbs =	1.34 (8)	X =	70 (ft)	W =	4.0 (11)

Scour Width:

Scour Length:

Rip Rap Design

Site: Interim Regional Drainage Channel

Location: Scottsdale, Arizona

Description: Rip Rap Design Calculations

Date: 9/15/2008

Riprap Design Spreadsheet

References: Department of the Army, U.S. Army Corps of Engineers,

Engineering and Design Hydraulic Design of Flood Control Channels. No. 1110-2-1601, Dated 30 June 1994, Chapter 3 (Riprap Protection)

US DOT, FHWA, Highways in the River Environment Hydraulic and Environmental Design Considerations May 1975, pVI-24, (Suggested gradation for riprap).

$$D_{30} = S_f C_S C_{\nu} C_{\tau} d \left[\left(\frac{\gamma_w}{\gamma_S - \lambda_w} \right)^{1/2} \frac{V}{\sqrt{K_1 g d}} \right]^{2.5}$$

Project Name: Interim Regional Drainage Channel

Location: Inlet Driveway Culvert

Inlet Riprap Size

Safety Factor, S _f	1.3
Stability Coefficient, C _s	0,375 (Assume rounded rock)
Vertical Velocity Dist., C√	. : 1.00
Thickness Coefficient, C _T	1.00
Local Depth, d	3.94 ft
Unit Weight of Water, γ _w	62.4 lbs/ft ³
Unit Weight of Stones, γ _s	165 lbs/ft ³
Local Velocity, V	3.6 ft/sec
Bank Angle With Horizontal, θ	18.43 °
Rip Rap Angle of Repose (Fig 6-8), Ф	37 °
Bank Angle Correction Factor, K ₁	0.8509
Computed Riprap Size, D ₃₀	0.9 inches
Computed Riprap Size, N ₅₀	1.3 inches
Computed Riprap Size, D ₁₅	0.6 inches
Computed Riprap Size, D ₈₅	2.0 inches

Design Riprap Size, D₅₀ 9 inches TYPE I

Rip Rap Design

Site: Interim Regional Drainage Channel

Location: Scottsdale, Arizona

Description: Rip Rap Design Calculations

Date: 9/15/2008

Riprap Design Spreadsheet

References: Department of the Army, U.S. Army Corps of Engineers,

Engineering and Design Hydraulic Design of Flood Control Channels. No. 1110-2-1601, Dated 30 June 1994, Chapter 3 (Riprap Protection)

US DOT, FHWA, Highways in the River Environment Hydraulic and Environmental Design Considerations May 1975, pVI-24, (Suggested gradation for riprap).

$$D_{30} = S_f C_S C_{\nu} C_T d \left[\left(\frac{\gamma_w}{\gamma_S - \lambda_w} \right)^{1/2} \frac{\nu}{\sqrt{K_1 g d}} \right]^{2.5}$$

Project Name: Interim Regional Drainage Channel

Location: Channel Bend

Inlet Riprap Size

Safety Factor, S _f	1.3	
Stability Coefficient, Cs	0.375 (Assume ro	unded rock)
Vertical Velocity Dist., C _v	1.15	
Thickness Coefficient, C _T	1.00	
Local Depth, d	3.56 ft	
Unit Weight of Water, γ _w	62.4 lbs/ft ³	
Unit Weight of Stones, γ _s	: 165 lbs/ft³	
Local Velocity, V	4.1 ft/sec	
Bank Angle With Horizontal, θ	18.43 °	
Rip Rap Angle of Repose (Fig 6-8), Ф	39 °	
Bank Angle Correction Factor, K₁	0.8647	
Computed Riprap Size, D ₃₀	1.4 inches	
Computed Riprap Size, D ₅₀	2.1 inches	
Computed Riprap Size, D ₁₅	0,9 inches	
Computed Riprap Size, D ₈₅	3.1 inches	
Design Riprap Size, D ₅₀	9 inches	TYPEI

Rip Rap Design

Site: Interim Regional Drainage Channel

Location: Scottsdale, Arizona

Description: Rip Rap Design Calculations

Date: 9/15/2008

Riprap Design Spreadsheet

References: Department of the Army, U.S. Army Corps of Engineers,

Engineering and Design Hydraulic Design of Flood Control Channels. No. 1110-2-1601, Dated 30 June 1994, Chapter 3 (Riprap Protection)

US DOT, FHWA, Highways in the River Environment Hydraulic and Environmental Design Considerations May 1975, pVI-24, (Suggested gradation for riprap).

$$D_{30} = S_f C_S C_V C_T d \left[\left(\frac{\gamma_w}{\gamma_S - \lambda_w} \right)^{1/2} \frac{V}{\sqrt{K_1 g d}} \right]^{2.5}$$

Project Name: Interim Regional Drainage Channel Location: Culvert Under Scottdale Road

Inlet Riprap Size

Design Riprap Size, D₅₀

Safety Factor, S _f Stability Coefficient, C _s Vertical Velocity Dist., C _v Thickness Coefficient, C _f Local Depth, d Unit Weight of Water, γ _w Unit Weight of Stones, γ _s Local Velocity, V Bank Angle With Horizontal, θ Rip Rap Angle of Repose (Fig 6-8), Φ Bank Angle Correction Factor, K ₁ Computed Riprap Size, D ₃₀ Computed Riprap Size, D ₅₀	1.3 0.375 (Assume rounded rock) 1.00 1.00 2.84 ft 62.4 lbs/ft ³ 165 lbs/ft ³ 5.0 ft/sec 14.1 ° 37 ° 0.9144 1.9 inches 2.9 inches
Computed Riprap Size, D ₅₀ Computed Riprap Size, D ₁₅ Computed Riprap Size, D ₈₅	2.9 inches 1.3 inches 4.4 inches

TYPE I

9 inches

Rip Rap Design

Site

Interim Regional Drainage Channel

Location:

Scottsdale, Arizona

Description: Rip Rap Design Calculations

Date:

9/15/2008

Riprap Design Spreadsheet

References: US DOT, FIIWA, Highways in the River Environment

Hydraulic and Environmental Design Considerations

May 1975, pVI-24.

US DOT, FHWA, Hydraulic Design of Energy Dissipaters

for Culverts and Channel. Sept. 1983, pl1-5-11-9.

FCDMC, Drainage Design Manual for Maricopa County Arizona, Vol. II - Hydraulics. January 1996, p5.75-5.77.

Project Name: Project #:	Interim Regional Dramage Chantel 073022	Structure ID: Culvert Size:	Union Hills Outlet 3- 8'x3' CBC
1. Riprap Size	c D50		
	Max, flow width Wo =	24.00 ft	
	Max, culvert flow depth h =	3.00 ft	
	Tailwater depth TW :=	3.00 ft	
	Exit Velocity Ve =	4.16 fps	
	Tailwater velocity Vd ≈	2.20 fps	normal
	Wash bottom width =	25.00 ft	
	Computed Riprap Size D50 :=	1.2 in	
	Design Riprap Size D50 =	9 in	
	Sieve Size =	ТҮРЕТ	
2. Riprap Size	es D15 and D85		
	Design Riprap Size D15 =	4 in	
	Design Riprap Size D85 ≈	14 in	
3. Riprap Apa	ron Length		
	Riprap Apron Length =	14 (t	
4. Riprap Apt	on Width		
	Min. Riprap Apron Width =	30 ft	
	Max. Riprap Apron Width =	31 ft	
5. Riprap Thi	ckness		
	Riprap Thickness =	36 in	
6. Total Ripra	p Yolume		
	Riprap Rock Volume =	46 CY	
Please note field	ds highlighted are input values from the	: Culvert Modeling Summ	arv

Rip Rap Design

Site:

Interim Regional Drainage Channel

Location:

Scottsdale, Arizona

Description: Rip Rap Design Calculations

Date:

9/15/2008

Riprap Design Spreadsheet

References: US DOT, FIWA, Highways in the River Environment

Hydraulic and Environmental Design Considerations

May 1975, pYI-24.

Max, flow width, Wo =-

US DOT, FIIWA, Hydraulic Design of Energy Dissipaters

for Culverts and Channel. Sept. 1983, pll-5-II-9.

FCDMC, Drainage Design Manual for Maricopa County Arizona, Vol. II - Hydraulics. Junuary 1996, p5.75-5.77.

Structure ID: Driveway Outlet Project Name: Interim Regional Drainage Channel Culvert Size: 3-8'x3' CBC Project#: 073022

24.00 ft

normal

I. Riprap Size D50

	Max, culvert flow depth h =	3,00	U
	Tailwater depth TW =	3.00	
	Exit Velocity Ve =	4.17	fps
	Tailwater velocity Vd =	3.05	fps
	Wash bottom width =	25.00	ſt
	Computed Riprap Size D50 =	12	in
	Design Riprap Size D50 =	9	in
	Sieve Size =	TYPE I	
Riprap Size	s D15 and D85		
	Design Riprap Size D15 =	4	in
	Design Riprap Size D85 :=	[4	in

Design Riprap Size D85 =

2.

3. Riprap Apron Length 8 ft

Riprap Apron Length -4. Riprap Apron Width

> Min. Riprap Apron Width = 30 ft 31 ft Max. Riprap Apron Width =

5. Riprap Thickness

Riprap Thickness = 36 in

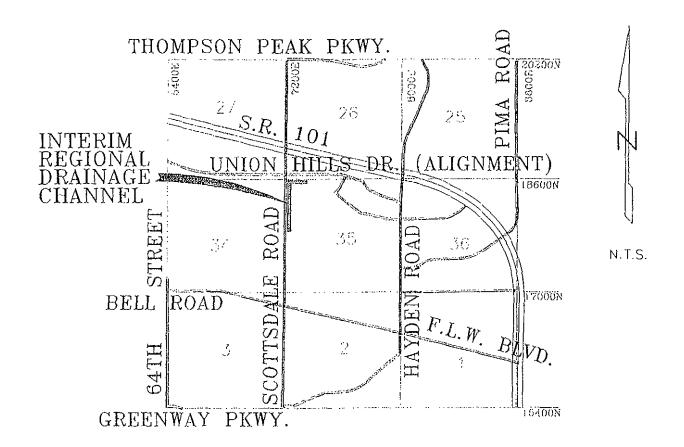
6. Total Riprap Volume

Riprap Rock Volume = 26 CY

Please note fields highlighted are input values from the Culvert Modeling Summary

EXHIBIT I

Vicinity Map



INTERIM REGIONAL DRAINAGE CHANNEL

Exhibit 1 Vicinity Map WOOD/PATEL,

NUD DE VELOINEET * WATER RESOURCE

TRANSPORTATION FRANCE

WATER PARTIE WATER * SURVEYING

CONSTRUCTION BANAGE YELD

(002) 335-8500



Appendix O

As-Builts for Interim Regional Channel Design Report

FINAL DRAINAGE REPORT FOR

INTERIM REGIONAL DRAINAGE CHANNEL

October 1, 2008 WP# 073022

Prepared for:

One Scottsdale Holdings, LLC

c/o DMB Associates, Inc.

7600 East Doubletree Ranch Road

Suite 300

Scottsdale, Arizona 85258 Phone: (480) 367-7000 Fax: (480) 367-7558

Submitted to:

City of Scottsdale

7447 East Indian School Road

Suite 300

Scottsdale, Arizona 85251 Phone: (480) 312-2352 Fax: (480) 312-2672

Prepared by:

Wood, Patel & Associates, Inc.

2051 West Northern Avenue

Suite 100

Phoenix, Arizona 85021 Phone: (602) 335-8500 Fax: (602) 335-8580

Website: www.woodpatel.com

expires 3/31/11

TABLE OF CONTENTS

1.0	EXECUTIVE SUMMARY	. 1
2.0	GENERAL BACKGROUND	. 2
3.0	DESIGN CONCEPT	3
4.0	HYDROLOGY	4
5.0	HYDRAULICS	6
6.0	MAINTENANCE	8
7.0	REFERENCES	9

APPENDICES

Appendix A Hydrology

Appendix B Hydraulic Calculations

Appendix C Erosion Protection

EXHIBITS

Exhibit 1 Vicinity Map Exhibit 2 FEMA Map

Exhibit 3 Conceptual Grading and Drainage Plan

Exhibit 4 HEC-RAS Schematic

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GEOFFREY SCO

1.0 EXECUTIVE SUMMARY

- The Interim Regional Drainage Channel is a proposed 3,200-linear foot open channel along Union Hills Road and Scottsdale Road within the City of Scottsdale.
- The channel is intended to provide increased flood protection in a known floodplain, as well as protection for future improvements of Scottsdale Road.
- The Interim Regional Drainage Channel completes the downstream reach of City of Scottsdalc initiated regional drainage improvements.
- The channel will convey flow from an existing culvert under Union Hills Drive. It will run east adjacent to Union Hills Drive, turn south and flow adjacent to the Scottsdale Road right-of-way within a future scenic corridor easement to a proposed box culvert under Scottsdale Road. Storm water will ultimately be retained in the Reach 11 Recreation Area of the Central Arizona Project canal.
- The maximum channel width is proposed to be 40 feet.
- The box culvert conveying flows under Scottsdale Road is currently under design by the City of Scottsdale.
- Grade control structures are incorporated in the design to maintain the 100-year flow velocities in the channel within permissible velocities appropriate for an unlined native channel.
- Riprap crosion protection will be incorporated into each grade control structure, as well as at horizontal turns in the channel alignment and inlet/outlet of culverts.
- The design flow for the Interim Regional Drainage Channel is 300 cubic feet per second.

2.0 GENERAL BACKGROUND

The Interim Regional Drainage Channel presents the opportunity for implementation of flood protection in the City of Scottsdale. It completes the downstream reach of drainage improvements initiated by the City of Scottsdale. In addition, it provides protection to proposed improvements to Scottsdale Road. It will be located within a scenic corridor casement and add aesthetic open space along a major arterial roadway. The solution is anticipated to prevent redundancies in the drainage system that could occur if development occurred in a disjointed manner.

The proposed Interim Regional Drainage Channel is located within the northwest quarter of Section 35, Township 4 North, Range 4 East, of the Gila and Salt River Base and Meridian. More specifically, the channel is located along the east side of the Scottsdale Road right-of-way between Union Hills Drive and Princess Drive. A map of the area can be seen on Exhibit 1 – Vicinity Map.

The project site lies in a Federal Emergency Management Agency (FEMA) designated Zone "AO" Special Flood Hazard Area, with depths of one foot and velocities of three feet per second, per the Flood Insurance Rate Map (FIRM) panel number 04013C1245H, effective date September 30, 2005 (see Exhibit 2 – FEMA Map).

Currently, drainage from the north passes south under the Loop 101 Freeway through existing box culverts. Flow is conveyed past Union Hills Drive via existing drainage improvements, then flows in an existing wash in a westerly and southerly direction across the Arizona State Land Department (ASLD) property. There is current planning for concrete box culverts that would convey this flow west under Scottsdale Road. An existing channel running west on the north side of Princess Drive would not be disturbed by the Interim Regional Drainage Channel and would continue to operate independently.

3.0 DESIGN CONCEPT

The alignment for the Interim Regional Drainage Channel was chosen with input from the Arizona State Land Department (ASLD) and the City of Scottsdale. The proposed alignment maintains connection with the existing drainage improvements south of Union Hills Drive. The proposed channel begins at the outlet of an existing culvert on the south side of Union Hills Drive. The channel will flow east adjacent to Union Hills Drive for approximately 550 feet where it turns south and flows for approximately 2,650 feet within a future scenic corridor easement adjacent to the Scottsdale Road right-of-way. The planned access to the ASLD parcel is a driveway off Union Hills Drive. The proposed channel will be conveyed through three (3) 3-foot by 8-foot concrete box culverts at the proposed driveway location. The proposed regional channel ultimately outfalls into proposed culverts that are currently under design by Dibble & Associates, Inc. The storm water then flows west under Scottsdale Road and into the Central Arizona Project Reach 11 Recreation Area retention. The proposed channel alignment is shown on Exhibit 3 -- Conceptual Grading and Drainage Plan.

The Interim Regional Drainage Channel is proposed to be an unlined earthen channel. Grade control structures are incorporated into the vertical design of the channel in order to maintain the 100-year flow velocities within appropriate ranges. A variable bottom width is employed in the channel in order to maintain a constant channel slope adjacent to a variable sloped roadway. A 10-foot wide bottom occurs at the upstream end of each grade control structure. The drop is created by extending the sideslopes down to make a triangular channel at the downstream end of the structure. The channel transitions back to the flat bottom at the upstream end of the next grade control structure.

Erosion protection was incorporated into the channel design. Riprap crosion protection was integrated as part of each grade control structure. This protection will be of sufficient length to include the hydraulic jump associated with each structure. Riprap crosion protection is also proposed at the bends in the channel alignment to reduce the possibility of breakout and lateral migration. Revegetation and hydrosced will be used along the length of the channel for aesthetic purposes and increased crosion control.

Typical cross sections for the Interim Regional Drainage Channel were selected to provide adequate conveyance for the 100-year storm. A minimum of one foot of freeboard is provided within the channel, and the top width of the channel, including freeboard, is limited to 40 feet. The channel side slopes are limited to 4:1 along Scottsdale Road, and 3:1 along Union Hills Drive.

4.0 HYDROLOGY

The 100-year design flow for the Interim Regional Drainage Channel is 300 cfs. This is based on a 100-year, 6-hour design storm utilizing HEC-1 hydrology modeling software (Ref. 3). Results of this model are included in Appendix A - Hydrology. These results are compared to those published in Drainage Study Core North/Core South by Robert L. Ward (Ref. 4).

The included HEC-1 model is an expansion of the hydrology model completed for the *One Scottsdale Master Drainage Plan*, by Wood, Patel & Associates, Inc. (Ref. 5). The One Scottsdale development lies upstream of the project site to the north of the Loop 101 Freeway. The model was revised to expand to the south to include the proposed improvements. Flow at the Loop 101 Freeway culverts (identifier 33E.1) is now routed through the Interim Regional Drainage Channel (identifier R33E.1). The runoff from the adjacent State Land parcel (identifier ASLD) joins at the outfall culvert under Scottsdale Road near Princess Road (identifier CPPRIN). This downstream flow of 300 cfs was used as the design flow for the entire channel. The ASLD sub-basin was determined to be a 35-acre area with a curve number of 77, chosen to represent desert shrub with poor hydrologic conditions. The other revision to the *One Scottsdale Master Drainage Plan* hydrology model is modification to the storage routing to account for the changes in storm water storage requirements due to channel improvements proposed here. This resulted in increased runoff under the Loop 101 Freeway.

These results are compared to existing conditions and proposed conditions models published in *Core North/Core South* (Ref. 4). Both of these models also use a curve number of 77 for the State Land subbasin. The flows published in that model are lower than those proposed here, which is considered conservative. In a separate hydraulies section of that report, the culvert design flows for the Loop 101 Freeway culverts are listed as 300 cfs, including large offsite impacts. The report proposes that offsite impacts would not affect these culverts, and revises the design flow to 65 cfs. This further establishes that the design flow for the Interim Regional Drainage Channel of 300 cfs is conservative.

		Interim F	Regional	Core No	rth/South	Core North/South Plan			
		Drainage	Channel	Existing C	Conditions	1 Proposed	l Conditions		
		HEC-1 CP	Q100 (cfs)	HEC-1 CP	Q100 (cfs)	HEC-1 CP	Q100 (cfs)		
-	Loop 101 Culvert	33E.1	256	SCNA1	129	N61.3	173		
ĺ	State Land	ASLD	90	3B	98	N63	98		
	Proposed Channel	R22E.1	252	3B.1	125	N63.1	169		
	Outfall Culvert	CPPRIN	300	3B.2	178	N63.2	256		

An existing wash traverses the ASLD parcel in a southwesterly direction. This wash is a Section 404 jurisdictional wash. In the existing conditions, it is blocked on the upstream side from receiving flow by the existing retention basin near Station 36+00. It collects only local flow and discharges into the proposed channel near Station 24+00. This local flow is estimated as 14 cfs by a Rational Method calculation which is included in Appendix A – Hydrology.

5.0 HYDRAULICS

Final design and analysis of the Interim Regional Drainage Channel was completed using HEC-RAS (Ref. 6) hydraulic modeling software. Grade control structures are specified to manage the longitudinal slope and maintain velocity within the design range. The results of the hydraulic model are the basis for analysis of erosion potential. Grade control structures are used in lieu of bank crosion protection along the entire channel reach.

Cross sections were cut upstream, downstream, and at each grade control structure, horizontal channel bends, changes in channel lining, and along the channel length. Roughness coefficients for the channel were selected to reflect graded earth with expected landscaping and vegetation. The downstream boundary condition was set as the calculated headwater required for the proposed culvert, currently under design by Dibble & Associates, Inc. This culvert is assumed to be a reinforced concrete box culvert with two (2) 8- foot wide by 3-foot tall barrels. Culvert headwater calculations were completed with Bentley CulvertMaster (Ref. 7). The culvert inlet loss coefficient was set as 0.7 to reflect a drop inlet with possible skew. The upstream boundary condition was set as critical depth to reflect flow exiting the existing culverts under Union Hills Drive. Hydraulic models of the 2-year and 10-year storms were also run to analyze hydraulic conditions. Flows for these storms were approximated as 10% and 35% of the 100-year discharge, respectively, per the Drainage Design Manual (Ref. 8). Input hydraulic data and results are located in Appendix B - Hydraulic Calculations.

Velocities within the channel for the 100-year storm were found to range from 3.5 to 7 feet per second. Supercritical flow was not found to occur. The highest velocities occur as the flow exits the proposed stilling basins and slows as it approaches normal depth through the length of the open channel. The lowest velocities occur within the proposed stilling basins and where under the influence of the backwater caused by rock check dams. Provided freeboard ranges from 0.25 feet to 3 feet within the 40-foot channel corridor. Less than one foot of freeboard occurs where flow is under the influence of backwater from the rock check dams. At each location with less than one foot of provided freeboard, additional freeboard will be provided outside of the easement in the grading to existing. In order to mitigate any flooding hazard low amounts of provided freeboard might create, it is reminded that according to City of Scottsdale requirements for development within FEMA flood Zone "AO" (1 foot, 3 feet per second), all adjacent buildings must have a lowest floor a minimum of 12 inches above the water surface elevation.

Flow velocities for the 10-year storm range from 2 to 5.6 feet per second. This is within the recommended range to prevent sedimentation aggradation, as well as channel erosion. At least 1.3 feet of freeboard is provided in all locations. The flow velocities for the 2-year storm range from 1 to 4.5 feet per second. At least 2 feet of freeboard is provided in all locations.

Brosion potential was analyzed using the results of the hydraulic modeling. These analyses are included in Appendix C – Erosion Protection. An ADWR Level 1 scour analysis found the estimated scour depth to be 3 feet. A minimum crosion protection thickness of 3 feet is therefore specified. Bend scour around the outside bank of the horizontal turns in the channel was also analyzed. A minimum length of bank protection downstream of the bends is specified as 70 feet. Riprap was selected for use as erosion protection. A fiftieth percentile diameter of 9 inches was chosen for these locations. Gradation per the Drainage Design Manual (Ref. 1) is specified.

Scour erosion is not expected on the upstream side of the check dams. The purpose of the check dams is to slow the rate of flow. This would more likely result in aggradation. The flow velocity for each of these check dams in the 100-year storm is approximately 3.6 feet per second, with an energy grade slope of approximately 0.26%. Since the channel slope is 0.75%, this shows that the check dams effectively produce a backwater effect and scour is not anticipated. Additionally, these dams are constructed of rock-filled gabion baskets, and are keyed into the sides and bottom of the channel to reduce the possibility of overturning. The flow will become supercritical as it pours over the dams; so erosion protection is proposed on the downstream side. For a graphical and tabular representation, please see the HEC-RAS profiles and results included in Appendix B – Hydraulics.

6.0 MAINTENANCE

Ongoing maintenance of the designed or recommended drainage systems is required to preserve the design integrity and purpose of the drainage system. Failure to provide maintenance can prevent the drainage system from performing to its intended design purpose and can result in reduced performance. Maintenance within the public right-of-way is the responsibility of the governing municipality. However, it is the responsibility of private developers, homeowners associations, etc. for facilities on private property within drainage easements, and includes private streets. A regular maintenance program is required to have drainage systems perform to the level of protection or service as presented in this report and related construction documents and specifications.

7.0 REFERENCES

- 1. Drainage Design Manual for Maricopa County, Arizona, Hydraulics (Draft), Flood Control District of Maricopa County, September 2003.
- 2. Design Standards & Policies Manual, Chapter 4 Grading and Drainage, City of Scottsdale, August 2007.
- 3. Flood Hydrograph Package (HEC-1), Version 4.1, U.S. Army Corps of Engineers, June 1998.
- 4. Drainage Study Core North/Core South Scottsdale, Arizona, Robert L. Ward, Consulting Engineer, September 25, 2001.
- 5. One Scottsdale Master Drainage Plan, Wood, Patel & Associates, Inc., September 26, 2006.
- 6. River Analysis System (HEC-RAS), Version 3.1.3, U.S. Army Corps of Engineers, May 2005.
- 7. Bentley CulvertMaster, Version 3.1, Service Pack 1, Bentley Systems, Inc., copyright 2005.
- 8. Drainage Design Manual for Maricopa County, Arizona, Hydrology (Draft), Flood Control District of Maricopa County, September 2003.

APPENDIX A

Hydrology

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U.S. ARBY CORPS OF ENGINEERS HYDROLOGIC CHOINERING CIMPER 609 SECOND STREET 19475, CALIFORNIA 95676 (916) 756-1104

PAGE 1

THIS PROGRAM REPLACES AND PREVIOUS VERSIONS OF HEC-1 KNOWN AS RECT (JAN 71), HEC2GS, HEC1DR, AND NEC1KR

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                       ROUTE DIVERTED FLOW THROUGH OPPLINE BASIN CONCEPT NAK H =5.9 ASSUMED 1000 X 80° DASIN WITH 5:1 SIDS SLOPES A 26° DUTLET 24° BLEED-OFF PIPE PLUS 20° WIDE SPILLWAY AT 1 8°
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OPTION 5 - PROPOSED CHARMED SOUTH OF LUND CADILLAC TO SCOTTSDALE ROAD
FROM SCOTTSDALE ROAD SOUTH TO PRINCESS DRIVE
ROUTE L=4600', TRAY SECTION BH-10' 2-5, THMAKH39'
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    FLOOD RYDRAGRAPH PACKAGE (HEC-1)
                                                                                                                S ARMY CORPS OF ENGINEERS
                                                                                                              HYDROLOGIC ENGINEERING CENTER
609 SECOND STREET
DAVIS, CALIFORNIA 93616
              JUN 1998
VEHAION 1.1
  RUN DATE 04FC068 TIME 15 17 69
                                                                                                                     (916) 756-1104
                                                                                                        ............
                                OND SCOTTABALE (STACKLE 105) POST DEVELOPMENT COMPLTION 100-YM 6-HM STORM OFFSITE MYDROLOGY 6 ONSITE HYDROLOGY FOR AREA GOVERNED BY DRE-HOLT CRITCHIA OFFICE A - ASEO CHARMS.

FILE 1007F-PCER DAT OFFSIGN PARCES
                                BASED ON MODELS PREPARED BY: ROBERT L WARD, P. E. CONSULTING REGINGER
                                                     PROMETOR 61
C1 61 (CYNTER ORIVI: PROJECT)
SIGEKIOG 61 (STACKED 40S VXISTING CONDITION)
                                all convex agreement addingted to 6-edge values on august 11, 2002 100-year, 6-edge expossestical syons
                                AREAL RAINEALL REDUCTIES IS BASED ON A 13 SQUARE MILE STORM
                  OUTPUT CONTROL VACIABLES

IPANT 5 PRINT CONTROL

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                                         ACRE-FEET
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HYPROGRAPH AT STATION 23A3 SUM OF 2 HYDROGRAPHS

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1	0.100	19	Q Q	:	3	1015	124	9 .	i	1635	200	ō		i	2250	275	o.
ī	0405	50	0 5		1	1025	126	,	i	1640	307	å		i	2255	2 /6	o o
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1	0415	53	ů.		ì	1030	128	,	ī	1650	20)	0		1	2305	215	0
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1	0+30	55	0		1	1045	110	0		2	1700	205	Ú		3	2315	280	ð
1	0435	56	ō		1	1050	131	0		ì	1705	206	ŋ	•	Ł	2320	281	O
1	0110	57	0	,	1	1053	132	0		3	1710	207	ŋ		Ł	2325	382	0
1	0445	Se	ō.		1	1100	133	ŋ.		1	1715	208	9		1	2330	283	õ
ì	0450	59	0		ī	1105	134	ô.		•	1720	209	O	•	1	2335	784	۵
1	0455	60	ŏ.	٠	1	1110	135	0.		ì	1725	210	9	•	3	2340	285	0
ī	0500	61	0		ī	1115	136	0		1	1730	211	٥	•	ì	2315	286	ò
i	0505	62	ů.		í	1120	137	á.		1	1735	212	0	•	1	2350	287	٥
î	0510	63	o.		ī	1125	138	0.		2	1740	213	0		1	2355	388	0
i	0515	6-3	ŏ		i	1130	139	o .		ī	1745	214	n	•	,	0000	289	٥
ī	0520	55	ō		,	1135	140	Ü		1	1750	215	0		2	0005	290	٥.
î	0525	66	ő		ī	1140	141	ű		i	1755	216	ò			0010	221	٥.
;	0510	67	0		÷	1115	112	a.		i	1800	217	0		7	0015	292	0.
i	0535	68	o.		•	1150	143	0		ī	1805	218	0		2	0020	593	٥
î	9549	69	o.			1155	114	Õ		i	1810	219	ð.		2	0025	291	0.
•	0545	70	ò			1700	115	n		í	1315	220	٥		2	90)0	295	0
;	0550	71	a.			1205	146	٥		•	1870	231	ΰ		2	0035	296	Ď
- 1	0555	72	0.	·		1210	147	Ü		•	1825	222	Ü		2	0010	297	ō
	0500		-					0		•	1830	227	o.		2	0015	398	ò
		73	0	•	1	1215	148	-	i			2.24	ō		3	0050	299	ŏ
1	0605	74	0	٠	1	1330	149	Ð			2805		0		2	0055	300	٥
1	0610	75	0	•	ı	1225	150	0.	•	1	1040	225	0		~	0055	100	ū
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PRAK FLOW FIRE 6-IR MAXIMUM AVERAGE FLOW 77-UR 7

HYDROGRAPH AT STATION - U_SURP

OA :	ном нат	Olto	1,110%	•	DA MON	наян	QiiD	51.0%	DA 2	той внемя	om	FLOV	- Da 1	ON HAND	ORD	81.00
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1	0030	5	0	•	1	0615	80	0.	· L	1250	155	O	, ,	1905	230	δ.
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1.	0105		٥	•	1	0 / 2 0	89	n	1	1335	163	0	. 1	1955	240	ů.
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- 1	0145		0.		ì	0800	21	ő,	. 1	1.15	172	ò	· i	2010	247	0.
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i	0235		ō.		1	0050	107	n ·	1	1505	182	a	١ ١	2120	257	D
3	0240		o	•	1	0055	108	0	1	1510	163	n		2125	358	D
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3	0250	3.5	0	•	1	0505	110	0	1	1520	105	۵	. 1	21.05	760	0
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ı	0319	39	309	•	1	0725	123	0	1	150	198	0	, ,	21.55	264	Ü
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1	0320		131	•	1	0935	116	0	. 1	1550	191	9		2204	266	9
1	0325	1.2	101	•	1	0940	117	0	· L	1555	192	0	. 1	2210	267	0
1	0130		0.3	٠	L	0945	116	a.	1	1600	193	n	1	2715	266	0
3	0177		60	•	1	0950	119	0		1602	194	Q.	1	2220	269	0
ι	0340		38.	•	3	0955	170	0		1610	195	0	1	2225	270	0
1	0145		3.1	•	1	1000	121	0	•	1615	196	0	1	2210	271 272	0
1	9350		10	•	1	1002	3 2 3	0	•	1620	197		-	3312		
1	0365		3	•	1	1010	153	0	. 1	1625	198	ð	1	2240	2/3	0
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ı	0405		٥.	•	1	1020	125			1635	200	0	. 1	2250	275	0
1	0110		o		3	1025	126	0	1	1610	201	0		2255	276	0
3	0115		Ü	•	ł	1030	127	0	. 1	1642	303	9	. 1	2300 2305	277 278	0
1	0120		Ü	•	1	1035	128	0 '	. 1	1650	203	0	. ,	2300	279	0.
ì.	0425		0	•	L	1040	129	9	, 1	1655	204	p	. t	2015	280	0.
ι	0+10		0	•	1	1045	130	0	. 1	1700	205					0.
ì	0439		0	•	1	1050	131	0	. 1	1705	206	0		2320 2125	281 282	٥.
2	0140		0	•	1	1055	132	0 '	' 1	1710	707	•	. 1			
1	0145		0	•	1	1100	131	0	1	1715	300	n O	. 1	2335 2335	261 284	0. 0
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1	0155		٥	•	l	1110	1.15	0.		7.172	310	0	. 1		286	0
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1	0505	62	0		1	1120	137	ŋ	1	1715	312	0	•	ı	2350	207	0
1	0510	63	٥		ī	1125	1.38	ο.	1	1710	213	0	-	1	2 1 5 5	283	0.
ī	0515	64	ò		i	1130	119	0	,	1745	214	O		2	0000	269	0
i	0520	65	ō		ì	1135		ò	1	1750	215	0		2	0005	290	0.
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,	0530	67	ō			1115		ú	1	1609	217	D	•	?	0015	292	Ð
í	0535	68	ñ	,	Ţ	1150		Ď	1	1805	218	0		2.	0020	293	ņ
î	0510	69	o		i	1155		Ď	1	1810	219	ò		2	0023	294	n
i	0515	70	o.	,	,	1200		Ď	i	1815	230	o		2.	0000	295	O
i	0550	71	0		i	13105		ō	3	1820	321	O		2.	0035	296	О.
î	2555	72	ö.		i	1210		ň	1	1825	222	O	-	2	6040	297	0
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.	0605	71	ŏ		•	1270		ŏ	i		721	Ď.	•	2	0050	299	n
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	0510	7.5			,	177.5	150	ν.	•	10.0		٠.			*****		•
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	SEAK FLOW	11700			BAXINOR AVE	UNGE FLOW	
	(C75)	(ICR)		6 - 713t	34 - 1116	72 HR	24 92-KR
•	(0:57	(NA)	(CFS)				
	109	3 17		15	3	-)	1
			(INCRES)	.271	271	271	271
			(AC-FT)	7	7	1	"

CONDUCATIVE AREA - .51 50 HT

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C5403 .
633 KK
                           COSTISE
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634 KO

| OUTPUT CONTROL VARIABLES | 1184T | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CONTROL | 1 PRIPT CON

COMBINE PIPE FLOW, DIVERETH SURFACE FLOW AND REMAINING SURFACE FLOW

636 HC

HYDROGRAPH COMBINATION 1 BUMBER OF HYDROGRAPHS TO COMBINE

HYDREGRAPS AT STATION CS46H SUM OF 1 RYDROGRAPHS

RON Ad	103481	ORD	FLOW	•	DA RON	Biette	ORD	FLOR	٠	UCK AGI	ium:	OAD	FLOR	•	DA BON	P11598	OND	YLUW
1	0000	1	٥	:	ı	0615	76	3	:	ı	1230	151	0		1	1815	226	· ·
1	0000	· 2 ·	0.		ì	0620	7.7	ź		i	1235	152	ě		i	1850	327	ò
,	0010	ź	3.		ì	3525	78	ؠٛ	,		1740	153	Ď		i	1055	7 / 0	ō
,	0015	4	a.		ì	0630	79	ï		i	1245	154	Ó		ì	1200	2.29	0
-	0020	3	i		,	0635	60	i		1	1250	155	ò		1	1905	230	0
1	0075	5	i		1	0040	61	1		1	1255	156	o		1	1910	231	0
i	0030	7	â		ì	0645	0.2	i		1	1100	157	0		1	1915	7.13	٥
i	0031	ū			í	0650	E 3	ì		1	1305	1.58	O		ı	1920	233	0
1	0040	9	ì		1	0655	04	ï		ì	1310	159	0		1	1935	234	0.
î	9943	10	1		î	0700	85	n			1315	160	0		1	1930	205	0
,	0050	11	1		ì	0705	86	9		1	1320	161	υ	•	J	1905	7.16	0
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ī	0110	15	5		ì	0725	20	0		1	1310	165	0		1	1955	240	0
ì	0115	16	5		1	0730	91	Ó	•	1	1345	165	0		1	3000	742	٥
Ţ.	0220	17			1	0735	92	0		1	1350	167	e		1	2005	212	0
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1	0130	19	ű.		i	0715	24	0		1	1400	149	ο.		1	2015	241	٥
i	0135	20	6		ī	0750	93	o		1	1105	170	Q		ι	2020	245	0
1	0140	21	s		i	0755	96	0		1	1410	171	0	•	ì.	7025	216	0
1	0145	22	2		i	0800	97	٥	•	1	1415	172	0	•	1	2010	247	0
1	0150	23	7		1	9805	98	0.		l	\$430	173	e e	•	ì	2035	248	0
1	0155	24	7		1	0810	99	0		1	1425	174	0.	•	ì	1040	249	0
ī	0200	25	8	,	1	0815	100	0		1	1430	175	0	•	1	2045	250	0
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i	9215	26	10		i	9839	103	ō		1	1145	176	0		1	3100	253	0
ì	0220	29	10		í	0835	101	ò	•	1	1159	179	n	•	ı	2105	254	U
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ì	0230	31	13		i	0815	106	o	٠	1	1500	181	9	•	1	2115	256	0
ì	0235	32	19.		i	0850	107	ō		1	1505	102	O	٠	1	2120	257	0
i	0240	33	28		i	บกรร	108	0		1	1510	303	0	•	ì	2125	258	0
i	0245	31	39		í	0200	109	ō		1	1515	184	O.		1	2130	259	0
ì	0250	35	śź		1	0905	110	ņ		1	1520	185	0		1	2135	260	0
ì	0255	36	73		í	0910	411	ü		1	1525	186	i)		ι	2140	263	0
î	0300	37	99		í	0915	112	ō		1	1510	187	o	•	ı	2115	262	Ü
ì	0305	38	156		i	0520	113	ŏ		1	1515	160	٥	•	ŧ	2150	263	ė.
1	0310)9	339		,	9925		ŏ		ì	1510	189	ŏ		i	2155	261	0

	0335 4 0335 4 0335 4 0350 4 0350 4 0355 4 0400 5 0410 5 0420 5 0420 5 0430 6 0435 6 0500 6 0500 6 0500 6 0515 6 0500 6 0515 6 0500 6 0515 6 0500 6 0515 6 0500 6 0515 6 0500 6 0515 6 0500 7 0515 7 0610 7	1 161. 131. 131. 131. 14. 90. 56. 68. 67. 40. 68. 67. 40. 68. 13. 20. 20. 20. 20. 20. 20. 20. 20. 20. 20	- 1	0910 115 0915 116 0915 116 0915 116 0950 119 0955 120 1000 121 1000 122 1001 127 1001 127 1001 127 1015 126 1010 127 1025 126 1010 127 1025 126 1010 127 1025 127 1025 128 1031 129 1040 129 1045 130 1155 131 1110 135 1110 135 1110 135 1111 130 1120 137 1121 138 1135 140 1145 142 1155 144 1200 145 1200 146 1210 17 1225 136			1550 1550 1600 1605 1610 1625 1630 1630 1630 1645 1650 1705 1710 1720 1720 1725 1730 1735 1735 1735 1735 1735 1735 1735 1735	190 191 197 193 194 199 199 199 199 199 199 200 200 200 200 200 200 200 200 200 2		. 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0030 0035 0040 0045 0050 0055	285 206 207 286 209 290 291 292 293 294 295 296 297 290 200	
PEAK F	LGW TIM	В	6-118	юж 1мрк 24 - пр	AVERAGE FLOW	21	92 - HR						
· (CYS)	9 (10)) (GFS)	U-11X	1.4 - 114	7.6 11.		,						
• 339	3 1	7 (180086)	30 .540	.511	1 544) 514						
		(AC 7T)	15 VE AREA n	.51 50	15		15						
637 XX	·	49BAS			,, ,,, ,,, ,,				,		.,, ,,		
		ASSUME	1 0. OETREVIG E 1000'X	PRINT CONTR PLOT CONTRO NAMED AND A NAMED TO BE SEEN BASIN WI	I.	alorus	r 70- oat:	-\$ 9 LET					
		TPREET OSCAL ROUTE ASSUME 21* BL	1 0 0. DIVERTED D 1000'X EED-OFF P	PRINT CONTR PLOT CONTRO NAMED AND A NAMED TO BE SEEN BASIN WI	e Plot Scale Offline Basi Th 5 1 Schi S	alorus	r 70- oat:	-5 g LET					
642 RS		TPROF QSCAL ROUTE ASSUME 21° RL	DIVERTED DIVERTED DIOCYX EED-OFF P C DATA 1 STOR 1.00	PRINT CONTR PRINT CONTR PLUS 20: HUNDER OF STYPE OF INI INITIAL CON INITIAL CONTR PLUS 20: HUNDER OF STYPE OF INITIAL CONTR PLUS 20: HUNDER	D PLOT SCALE OFFLINE BASI TH 5 1 SIDE 5 WIDE SPILLWA UDREACHES TIAL CONDITIO	aloris AY AT 3	r 70- oat:	:5 9 LET					
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1	0005	2	υ.		i	0620	77	0.		1	1235	152	ο.	•	1	1850	227	9.
1	0010	3	0.	•	1	0625	78	'n		1	1240	153	o	•	1	1055	228	0.
1	0015	1	0.		1	0630	72	6	٠	1	1245	154	٥.	•	1	1990	229	2.
)	0020	5	٥.		ì	0635	80	\$.	٠	ı	1250	155	0.	•	1	1905	2)0	0
1	0025	4	0	٠	1	0640	81	5		1	1255	156	0	•	ı	1910	231	0.
ı	0030	7	0	•	1	0645	62	4	4	1	1300	157	Ο.	•	1	1915	232	0.
1	0035	8	0	•	1	8650	8 J	4.	4	1	1305	258	0.	•	Ł	1920	2)3	0
1	0040	9	0	٠	ı	0655	84	1.		1	1310	159	0	•	ı	L925	234	0
3	0045	20	0.	•	1	0700	85	3	٠	1	1315	160	ο.	•	ı	1930	235	0.
ì	0050))	٥.	•	1	0765	86	2.	•	ı	1720	161	0.	•	1	1935	579	9.
ı	0055	12	0.		1	0710	87	2	•	1	1325	162	0.	٠	ì	1940	237	9.
ì	0100	13	O.	•	1	0715	88	7.	٠	1	1330	16)	٥.	•	1	1945	2)0	9.
1	0105	14	1.	•	ı	0720	6.9	2.	•	1	1335	164	0	٠	ı	1950	239	9.
1	0110	15	2.		1	0725	90	ı	•	2	2340	265	D	٠	2	1955	210	٥.
1	0115	16	١.		1	0730	91	1.	•	1	1345	166	0.	•	1	2000	241	9.
1	0150	17	2.	•	1	0715	92	ı	•	1	1350	167	0	•	1	2005	242	າ.
ı	0125	3.1	2.	٠	1	0740	93	1.		1	1355	168	0	٠	1	20)0	243	0
ì	0130	19	2.	•	2	0745	94	1.	4	1	1400	169	0	•	ì	2015	244	0.
ı	0135	20	3.		1	0750	95	1.	٠	1	1405	170	σ.	•	1	2020	245	Ο.
1	0140	21	3.		1	0755	26	1.		1	2 4 2 0	271	0.	•	1	2025	745	p
1	0245	22	3.		1	0800	97	2.	٠	2	1115	177	٥.	•	1	2030	247	٥.
ī	0150	2)	,		ī	9005	98	1.	•	ì	1420	1.73	0.	,	l	2035	218	0.
i	0155	24	3.	•	1	OBTO	99	o.	•	1	1425	2.74	0.	•	1	2040	249	9.
ì	0200	25	3	•	ì	0815	100	0	•	ı	1430	175	٥.	4	1	2045	250	9.
1	0205	26	4	•	ì	0820	101	0.	•	1	1435	176	0.	•	1	2050	251	Đ.

80'18	ദ്ദേറ	киян нок	va	:	LPOH	asso	NEARL	иои ча		KO.13	aso	misn w	on AG	•	E1:03	aso	NHHII	RON AG
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0	222 226	050T 520E	ī	:	. 0	ISI	1530	ì		i	26	5190	ī		. 0	۲	0000	τ
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0	550	1900	ì	•	.0	v≤t EST	2221	ì	•	٠.٤	87	5090	i		٠.٥	٤	0100	τ
.0	017	\$06t	τ	•			7245	ì	•	į	64	0(90	Ϋ́	· ·	.0	,	5100	i
.0	533	1070	τ	•	.0	95T 54T	7322 7320	τ	•	٠٤.	OÜ	5(90	Ť	;	·ŏ	ś	0000	ί
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0	533	0261	ι	•	. 0	851	5011	Ţ	•	۲.	28	5590	Ť		.0	i	0000	·τ
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. 0	240	SSGT	τ	٠	.0	591	0)[]	t	•	τ.		0270	ì	:	٠,	74	5010	ť
. 0	243	5000	Y	-	0	991	5+(1	ī	•		06	5270	ĭ	:	, ,	ST	0770	ť
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. 0	523	2700	1	•	0	941	5471	ι	•	0	COL	0600	,	•	٠.٢	5.8	STZO	
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'0	457	0277	٤	•	. 0	185	505 L	τ	•	.0	101	0580	γ	•	٤	75	5550	1
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Hadbograph at Station #33E.1

3H 03 15

FRRA DMITARDING

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0 292 SP12 T . 0 L9T GEST T . 0 ETT S160 T . 151 LE DOCO T 0 192 DPTZ T . 10 597 SZST T . 0 TTT D160 T . 171 SE SSZO T 0 092 SF12 T . 0 S81 DZST T . 0 TTT D160 T . 171 SE SSZO T 0 652 DCTX T . 0 P8T STST T . 0 DOT D600 T . 171 SE DSZO T 10 852 SZTZ T . 10 TRT DTST T . 10 S07 SSRO T . 18 CC DF20 T 10 852 SZTZ T . 10 TRT DTST T . 10 S07 SSRO T . 18 CC DF20 T 10 852 SZTZ T . 10 TRT DTST T . 10 S07 SSRO T . 18 CC DF20 T 10 SSZ STZ T . 10 TRT DUST T . 10 S07 SSRO T . 19 CC DC20 T 10 SSZ STZ T . 0 D07 SSPT T . 10 S07 SSRO T . 19 CC DC20 T 10 SSZ STZ T . 0 D07 SSPT T . 10 S07 SSRO T . 19 CC DC20 T 10 SSZ STZ T . 0 D07 SSPT T . 10 S07 SSRO T . 19 CC DC20 T 10 SSZ DTZ T . 0 D07 SSPT T . 10 S07 SSRO T . 15 DT DC20 T 10 SSZ DTZ T . 0 D07 SSPT T . 10 S07 SSRO T . 15 DT DC20 T 10 SSZ DTZ T . 0 D07 SSPT T . 10 S07 SSRO T . 15 DT DC20 T 10 SSZ DTZ T . 0 D07 SSPT T . 10 S07 SSRO T . 15 DT DC20 T	_				•									τ		Ll	81	9000	τ	
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0 092 5012 1 . 0 500 0757 7 . 0 001 5060 1 . 17 50 0500 1 0 652 013 7 . 0 001 7051 1 . 0 007 0500 7 . 0 007 0500 7 0 852 5012 1 . 0 001 7051 1 . 0 007 0500 7 . 0 007 0500 7 0 852 5012 1 . 0 001 5001 7 . 0 001 5000 7 . 0 001 0500 7 0 952 5012 1 . 0 001 5007 7 . 0 001 5000 7 . 0 001 0500 7 0 552 0132 7 . 0 001 5007 7 . 0 001 5000 7 . 0 001 0500 7 0 552 0132 7 . 0 001 5007 7 . 0 001 5000 7 . 0 001 0500 7 0 552 0132 7 . 0 001 5007 7 . 0 001 0507 7 . 0 001 0500 7 . 0 001									τ		0	171	0110	Ţ		.(1	20	5520	τ	
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0 852 5216						0		STST	ι		. 0				•	-				
0 952 STLT 1 . 0 101 0051 T . 0 901 5500 T . 19 1C 0C70 T . 0 952 STLT 1 . 0 001 5557 L . 0 901 5500 T . 19 1C 0C70 T . 0 952 OT70 T . 0 953 STLT 1 . 0 953				τ		. 0	រខារ		τ	4										
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O CSE OUTE T . O DAT SHOT T . O EOT OTEO T BE STED T					•	-				•										
0 152 0012 1 7 0 071 3441 1 7 0 7 7 7					•					•	-				-					
10 252 5500 (- 10 221 0771 (- 0 201 520 (-) 10 0100					•					•				-	:					
	. 0	252	5502	τ	•	. 0	221	0771	·	•	•	CUI	,	•	•	•		,,.,	-	

	0716		5.		1	0200	109	c.		1	1515	104	٥.		ı	2130	259	0.
1	0245 0250	34 35	5.		1	0905	110	0.		1	1520	185	Ü.		i	2135	260	٥.
1	0255	36		į	ì	0910	111	0.		î	1525	136	0		1	2140	261	0.
1		37	6 7.		,	0515	112	0.		1	1530	187	0.		1	2145	262	()
1	0300	-			,	0920	11)	0.		î	1535	189	0.		ï	2150	261	0.
1	0305	38	0 .	i.	ì	0925	111	0.		ī	1540	189	o.		ì	2155	264	٥.
j	0310	39	22.	:	-		115	0.		1	1545	190	o.		1	2200	265	0.
1	0315	40	45.	:	1	0930		0.		î	1550	191	Ď.	٠	1	₹205	266	0.
1	0320	41	51		-	0132	116	0.		i	1555	192	0		,	2210	267	0.
1	0325	42	19	•	ı	0940	117	0.		1	1600	193	ŏ.		1	2215	268	o.
1	0330	43	35.	٠	1	0945	110	_			1605	194	0.	,	ī	2220	269	o.
1	0335	91	11	•	1	0950	119	n.	i	1	1620	195	0.		ī	2225	270	ŏ
7	0340	15	35.	•	1	0985	120	0	•	1		196	0.		1	2230	271	Ö,
1	0345	16	30	•	λ	1000	12!	0.	•	1	3615		Ů.		i	2235	277	0.
1	0350	47	25.	•	1	1005	122	٥.	•	1	1620	197			1	2210	273	0.
1	0355	18	20.	•	1	1010	133	0.	•	1	1625	198	0.	;	ì	2215	279	
1	0400	19	17.	٠	1	1015	124	0	•	1	1630	199	0.		_			٥.
1	0105	50	15	•	1	1020	125	0.	•	1	1635	2.00	٥.	;	ì	2250	275	0.
ı	0110	51	7.7	•	1	1025	126	0.	•	ı	1640	201	0.		,	2255	276	0.
1	0415	52	11	•	λ	7030	127	0.	•	1	1645	202	٥.	•	1	2300	277	0.
1	0120	5)	10	•	1	1072	128	0.	٠	1	1650	203	٥.	•	1	2305	276	٥.
1	0425	54	У.	٠	1	1040	129	Q .	•	1	1655	204	0.	•	1	2310	279	٥.
l	0.130	55	6.	•	ì	10-15	130	0	•	ı	1700	205	0.	٠	7	2315	280	٥.
1	0135	56	C.		ì	1050	131	٥.	•	ı	1705	206	٥.	•	7	2330	261	0
ı	0110	57	0.	•	1	1055	132	٥.	•	1	1710	207	٥.	٠	ı	2325	202	Ü.
1	0115	58	в.	•	7	1100	133	0.	•),	1715	208	٥.	•	1	2330	287	٥.
ı	0.150	59	e.	•	1	1105	134	0.	٠	1	1,720	209	0.	•	ı	2335	261	0.
1	0155	60	8	•	Ł	1110	135	0	•	3	1775	310	0	•	1	2310	285	٥.
1	0500	61	n.	•	1	1115	136	0.	•	1	1730	211	0	•	1	2345	286	O.
1	0505	62	7	•	1	1120	137	0.	•)	1735	212	0	•	1	2350	247	٥.
l l	0510	63	7.	•	1	1125	138	0.	•	1	1740	213	Q.	•	1	2355	288	0.
1	0515	64	7.	•)	1130	139	ŋ	•	1	1745	214	٥.	٠	5	0000	209	0
l.	0520	65	7.	•	1),135	140	٥.	•	1	1750	215	٥.	•	2	0005	220	0
1	0525	66	7.	•	1	1140	111	0.	•	1	1755	336	٥.	٠	2	0010	291	٥.
l	0530	67	G	•	1	1115	112	0.	•	ı	1800	217	0.	٠	2	0015	292	0
3	0535	GE	6.	•	1	1150	143	٥.	•	1	1805	238	0.	•	2	0020	293	0.
ì	0510	69	6.	•	λ	,155	144	٥.	•	ı	1810	510	Ο.	٠	λ	0025	294	0
ı	0545	70	. آ	•	ı	1500	145	0.	•	1	1815	220	٥.	٠	2	0030	295	0
1	0550	72	G.	٠	1	1205	116	0.	•	1	1820	221	۵.	•	2	0035	296	٥.
7	0555	72	5.		1	1210	147	D.	•	1	1025	222	٥.	٠	,	0040	201	0.
ì	0600	73	5.	•	ì	1215	148	0.	٠	1	1830	223	0.	•	2	0045	228	0
ī	9605	74	Š	٠	1	1220	149	0	٠	1	1835	224	0.	٠	,	0050	299	0
ı	9610	.75	5	٠	1	1225	150	٥.	٠	λ	1840	225	0	٠	2	0055	300	υ.
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HAXINUM AVERAGE FLOW 24-HR 72-HR PEAK FLOW TIME 24.92-88 · (CFS) (100) (CF3) 7. .172 5. 3 33 51 (INCHES) 170

CURULATIVE AREA =

336.1 658 KK

COMBINE

653 KQ

OUTPUT CONTROL VARIABLES

1PRINT 1 PRINT CONTROL

1PLOT 0 PLOT CONTROL

OSCAL 0. HYDROGRAPH PLOT SCALE

CONSINED DISCURRE AT ADOT CULVERT 5 AND 6

.51 SQ NI

GGA BC

HYDROGRAPH COMBINATION 2 NUMBER OF HYDROGRAPHS TO COMBINE

HYDROGRAPH AT STATION DI SUM OF Z HYDROGRAPHS

					•					•					•				
A I	1011	IRHN	OKD	F.POX	:	DΛ	исян иом	ORD	FLOH	:	DA H	ION HRMN	ORD	LFON	:	DV ROS	пани	ORD	FLOR
1		0000	1	0.		1	0615	76	62.	•	ì	1230	251	5.	٠	1	1845	336	1.
ī		0005	2	٥.	•	1	0620	77	59.	٠	1	1235	152	5.	•	1	1850	227	1.
í		0010	i	0.		1	0625	78	56.	•	1	1210	153	5.	•	1	1855	228	1
ì		0015	,	0.		1	0630	79	53.	•	1	1215	154	S .	•	7	1900	225	1
ī		0020	Š	o.		1	0635	80	51.	•	1	1250	155	5.	•	2	1905	530	1
î		0025	6	1	•	1	0640	01	48.	•	1	1255	156	5.	•	1	1910	201	1.
ī		0030	7	1.		1	0645	82	46.		L	1300	157	\$.	•	ı	1915	232	7
í		0035	8	2		1	0650	BĴ	44.	•	1	1305	158	S.	•	1	1920	233	1
ī		0040	9	3.	٠	ı	0655	Вя	42.		1	1310	159	1.	•	1	1975	234	1
1		0015	10	4.	-	1	0700	85	40.	•	1	1325	160	· ·	•	1	1930	235	1
1		3050	23	5		ı	0705	06	39.	•	1	1320	161	4.	•	1	1935	2)6	1
ı	(0055	12	6.	•	1	0710	87	37	•	1	1325	162	٩.	•	1	1940	237	7
1	(0100	13	7		ı	0715	9.8	36 .	•	Ł	1330	163	1.	•	1	1945	238	i
1		0105	1.4	7	•	ı	0720	89	34.	•	Ł	1335	164	4.	•	1	1950	239	λ
1		0110	15	€.		1	0725	90	3.3	•	1	1740	165	4.	•	λ	1955	240	1
1		1115	16	9		1	0730	91	32.	•	1	1345	156	4.	•	1	2000	241	1
ı		0120	17	9		1	0735	92	31.		2	1350	167	٤.	•	1	2005	242	1.

3 UIBLAND RANGER OF DX INLERANTS
CHALCON RIVERS
CHARGET RIVER
CONTRIBUTIONS
CONTRIBUTIONS MUNICIPALIN 00 S tte: 9∧я∓ 00 01 SUATE CA CHYRART BONGINGES COSELICITYAL TROBE n EDWINST TERRORS KINESVALG BYAS SAUGVE SOLLING INDROGINARI ROUTING DATA PERMIE CHPRE FIRED CHPURER B: 010 NE-1765 ? DENTITES BOOLE P-4000 ' SPYE ERCLION NE-16. S-2' LEGEX-35. ERON ROOLEDVIE BOND ROULH LO DETHICESS DELLE ESON SCOLEDNEY MOYD COURSE TO BETHCREE BRIGE
SULDAY - HOUGORD CHANNER? POLITU OF FRUIT CAULTYC LO SCOLLEDTE BOYD
SULDAY - BURNEGENAR FOOL COURSE
O BARNGORWIN BIOL SCYPTC
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O BARNGORWIN BIOL SCYPTC
O BARNGORWIN BIOL SCYPTC
A FICE COURSE?
A BRIAL COMINGE OECAL TOURI OBLIGA CORRESP AVIEWEDE плоок 1.3008 12 05 Cv COMBUNIAN PREV 4 GA: 5V3

28 690

0X 159

88 E99

1 213 (Inches) 53 E (6.10) (mi)(53.2) 34 35-48 411-77. 28 17 NH - 3 MYXIMIN PASHVOR EPON ZRIJ. ROTA RYSIA 69 7012 7012 7012 611 611 5171 6121 44 11 5550 0550 56 56 07 588 147 5181 941 97. 69 0950 617 818 818 612 612 612 5111 59 60 60 16 62 99 59 99 \$1.50 161 ٠,٥ 5010 6000 0541 0.550 313 313 315 316 3512 3320 SPAT 31 E 73 N 66 701 () () 0 F 6 T 0050 066.1 5261 0861 1100 0 : \$500 5660 300 300 300 500 500 SEEC 202 6 7 8 8 25 55 0501 5166 9115 507.7 007. t 559 t et t 5:01 971 0°01 750 50.0 61.2 27.5 27.5 87.5 3700 5372 201 15 05 529T \$130 521 521 520 L 01:0 50:0 661 861 STOR 6.4 00:0 07.7 SEDI 5.13 01:20 100 100 100 100 3.13 3.13 1615 500 E 000 f 5560 9 t 5 t 5 F C O τετ +01 7550 5.10 0091 b.V SEED 0160 14 14 52 52 18 \$122 6551 6451 6451 911 911 911 761 761 01-6 532 25.00 21.00 21.00 956 576 5700 0110 192 SSTE 69T 691 3 0 201 68 (11) 48 98 58 18 29T 98T 98T 98T 98T 98T 3 05 5060 8060 5112 7250 11 11 10 10 501 £9 5720 60 t 7.0 ٤ť 0::0 U 6 1 6 505T 557 5511 07 5+00 101 5880 0220 SOTE 7.50 7.50 0 4 0£110 5200 6 t 27 22 22 22 241 241 441 441 152 540£ 01-1-1 5 (6 T 0 E 9 T 5190 51 51 51 51 51 tat 5510 50 SZVI ĢЬ () () 5110 6 0141 5011 5008 731 56 66 . 12 557.0 1.2 01. 61 0.002 0.61 014.0 ٥τ SETO

COMPUTED KINEHATIC PARAMETERS VARIABLE TIME STEP (DT SHOWN IS A MINIMUM)

EVEREAL	АБРЯА	rs	p.t	DΧ	PEAK	TIME TO	AOPINAN:	HAN THAM
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CONTINUITY SUPPARY (ACTIT) - INFLOR: 5700E+02 EXCESS: 0000E+00 OUTFLOR: 5203E+02 BASIN STORAGE: 24.09E-01 PERCENT BRIGG: 1

DETERPOLATED TO SPECIFIED COMPUTATION DETERMAL

Mattl 98 [43], 00 251 70 200 60 2 92

HYDROGRAPH AT STATION ROBE 1

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PROT CONTROL

UNDREGRAPH PAGE SCALE
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                       ASLD PARCEL BAST OF SCOTTSDALE ROAD
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(OF SHOWN IS A MINIBUM)
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CONTINUETY SUMMARY (AC-FF) - INCLOS: 00094-00 EFCESS: 3491E+01 OUTFLOW: 1478E+01 WASIN STORAGES BOOTE-01 PERCENT ERRORS
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CPURIN 677 KK COMBINE

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OUTPUT CONTROL VARIABLES

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COMBINE MOUTED ANOT 5 AND 5 WITH ASLD PARCUL

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CURVERT, TAXES ECOTES RD HALF ST AND SCENIC CORRIDOR

SUBBASIN DOROSE DATA

689 BA

SUBDASID CHARACTERISTICS TARPA 01 SUBDASID OREA

PRECIPITATION DATA

24 191 DEPTRS FOR OFFERCERT BYPOTHETICAL STORM

HYDRO-15 5-BIN 15-BIN 60-BIN 76 1 50 2 51 2 HR 3-HN 6-HR 2 Bl 7-99 3 33 17:308 00

STORM AREA : 14 00

690 68 SCS BOSS RATE

60 INSTEAL ABSTRACTION 17 00 CURVE NUMBER 89 00 PERCENT SUBSEAVED STPTL CPVBBR

PTIME

KINESATIC WAVE

691 08 OVERLAND FLOW ELEMENT NO

100.0 PROCEST OF SUBBRICES

100.0 PROCESS CONFFICIENT

100.0 PROCEST OF SUBBRICES

3 HISTORY OF SUBBRICES 72

DYSTR

KINEMATIC MANE NATH CHARGO.

692 RE

500 CHANNEL LEEGTH
0100 SLOPE
011 CHANNEL ROWGENISS COFFFICIENT
011 COMPRINCTING AREA
CIRC CHANNEL SPADE)1

ÇA SHAPE

МĐ

4 50 BOITOS WIDTH OF DIAMETER
00 SIDS SLOPE
2 HISINUS BURBER OF DX INTERVALS

COYSIS HO ROUTE OPSTREAM BYDROGRAPH 201570

COMPUTED KINEMATIC PARAMETERS VARIABLE TIME STEP (OT 58600 IS A MINIMUM)

Colliniar ALPRA DT. 5% CRUERITY am [11314] (CFS) (R) M, (FPS) 10 04 184 61 3 00 PEARET 200 00 12.50

CONTINUITY SERBARY (MC-FF) + (NESCH. 0000E+00 EXCESS 1000E+01 OUTCHOR) 1008E+01 PARTS STORAGE 4154E+05 PERCEPT LERGIE.

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

6 3: 1 37 5 00 31 67 357 30

RYDROGRAPH AT STATION SCOUT

DA E	מינאוו ווכ	ORO	RATH	1.085	SACESS	COMP. Q	•	DA HO	a Bewa	OAD	RAIN	U055	UCCESS	COUR. O
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1	0075	C _i	01	0.0	01	o		1	1255	156	ΟÚ	ů o	0.0	9
1	0010	7	01	0.0	0.1	0		1	1300	157	00	0.0	00	o
1	0015	8	01	0.0	91	O	1	1	1005	158	90	0.0	00	0
1	0040	*1	01	0.0	01	9	1	1	1310	159	0.0	ņο	20	a
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2	9100	13	0.3	01)	0.5	0		1	1310	163	00	0.0	0.0	0
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1	0110	15	01	0.0	0.3	υ.	•	1	1310	165	90	00	00	9
1	0115	16	0.1	0.0	01	0.	•	3	1315	166	00	00	0.0	0
1	0120	17	61	0.0	01	ı		3	1350	167	:)0	0.0	00	0
ì	0152	18	01	υð	G 1	ı		1	1455	158	00	0.0	90	C)
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1	01:0	21	5:	90	01	1		1	1410	171	00	90	20	ง
1	0145	2.7	0.3	00	٩ı	1	•	1	1415	172	00	0.0	0.0	0
ı	0150	2.3	37	6.0	ગ ા	;		ι	1420	17)	00	90	99	ti
1	0155	24	0.5	0.0	67	1	•	1	1425	3.34	.00	00	0.0	0
1	0200	25	0.2	0.0	0.5	1	•	١	1630	175	00	00	00	0
3	0205	36	03	0.0	02	1	•	1	1435	176	00	OU	00	Ü
1	0210	27	27	90	02	1	•	1	1400	177	00	00	្តព	٥
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1	0220	2.9	0.5	90	0.2	1	•	1	1:50) 79	OO.	CO	0.0	Ú
1	0225	30	10	0.0	6.5	1	•	ı	1155	:80	Qû	.00	00	o
1	9530	3.1	01	00	6.1	l l	•	ı	1500	1 10 1	Ofi	00	an	U
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1	0310	10	28	.01	26	13.	•	1	1540	189	00	00	00	9.
1	0015	10	. 15	01	15	7	•	1	1545	130	06	.00	.00	٥.
Ţ	0320	4.3	. t <i>1</i>	.១០	10	S .	•	2	1550	191	. 00	00	00	¢
1	0325	12	0.2	.00	09	->	•	ī	1555	132	00	.00	60	0.
1	0330	43	. 08	00	0.6	4.	•)	1600	193	00 00	00	.00 00	o o
1	0335	11	03	00	03	5	•	1	1605 1610	194	00	00	60	0
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l l	0355	48	0.7	00	02	í	,	ĩ	1630	:97	.00	00	40	ō
i	0405	50	02	00	02	ī		1	1635	200	00	0.0	90	ú
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i	0415	52	0.2	0.0	02	1	•	1	1515	202	oo	0.0	90	c
١	0420	53	.03	0.0	62	1.	•	1	1650	203	00	.00	90	0.
2	0175	54	. 02	.00	0.1	3		3	1655	304	.00	00	0.0	ø.
)	0450	55	0.1	90	01	Ł	•	1	1700	205	90	00	00	0
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3	0505	62	01	00	0.1	ì		1	1235	23.2	0 u	00	ถอ	0
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1	0515	6.4	0.7	00	. 0 1	0	•	1	1755	314	00	00	0.0	0
1	0520	55	0.7	00	01	0	•	1	1750	215	30	00	00	0
1	0525	66	91	00	0.1	0	,	1	1755	216	60 60	00 00	00 00	0
1	0530	67	91	00	0)	Û	•	1	1800 1800	217 218	00	00	00	0
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1	0550	71	01	co	03	ŏ	,	ì	1030	231	90	90	90	0
,	9555	72	01	.00	01	ŏ		1	1025	222	90	0.0	00	0
i	6600	71	91	.00	0)	ō		1	1830	2.7.3	90	.00	00	vì.
ĭ	0605	24	0.0	00	0.0	υ	•	ι	1035	2.24	. 90	00	00	0
ì	0610	75	on	uo	00	ō		1	1840	252	0.0	00	0.0	0
)	0615	76	0.0	60	0.0	٥		1	1845	226	96	00	00	0
į	0670	77	00	00	6.0	٥	•	1	10:0	227	0.0	00	00	0
ì	9675	7.0	60	60	30	o	•	1	1 A S S 1 9 O O	728 239	00 00	00	00 00	0 0
ı.	0530	79	00	50	00	ņ	•	1	1905	230	00	00	00	٥
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÷	0655	64	6p	00	. 30	ō		1	1925	2.34	.00	. 50	00	0
1	0700	0.S	ÚÐ	0.0	00	0	•	1	1930	235	00	00	(rf)	D
1	0705	26	00	C.P	90	o	•	,	1035	536	aa	00	00	0
1	0710	0.7	60	0.0	00	0	•	1	1940	7.37	00	00	00 00	0
1	0715	Кū	00	0.0	00	0	•	1	1915	238	00 00	00	00	o o
1	0.450	0.9	00	00	00	ņ	•	l 1	1950 1955	210	90	0.5	00	0
1	0775	20	00	60 00	00	s o	·	1	2000	211	00	00	00	٥.
l l	0730 0735	93	00 00	20	00 00	0		ì	2005	342	20	00	00	D
î	0735	93	90	00	ψū	ŏ	,	Ĺ	2010	343	00	o o	0.0	U
i	0745	24	90	00	30	ō		ì	2015	244	0.0	0.3	0.0	ç
1	0.150	25	90	26	o o	0		1	2030	245	00	00	00	φ.
1	0.755	96	0.0	D G	0.0	ŋ		1	2025	216	00	() ()	.00	O
ì	0800	97	ρo	90	90	0	•	1	1030	247	:) ป	0.5	V O	0
1	0905	78	00	00	00	0		1	2015	248	00	.00	00	0.
λ	0810	99	90	0.0	00	0		1	2040 2045	249 250	00 00	00 00	.00	0
1	0915	700	00	60	00	ę ú	•	1 1	2050	250	93	90	00	0
1	0820	101 J02	. 00 . 00	0 U	33	۵		ì	2055	25.7	60	00	0.0	ņ.
,	0825 QB30	103	00	60	90	Ď		ì	3100	253	00	0.0	.00	Ü
í	0835	101	00	00	00	0		1	3105	254	00	0.0	0.0	0
ì	0010	105	80	00	90	0		1	2110	255	00	00	a c	Ų
	0845	106	00	9.0	00	0	•	1	2115	356	60	.00	0.0	9.
1	0850	107	0.0	00	40	0	•	1	2120	257	00	60	60	0
1	0055	108	0.0	00	0.0	0	:	1	2125 7130	356 359	00 00	60 60	.00	0
1	0200	109	00	00	00	0		1	2139	266	00	00	00	Ď
ı,	0935	110	<i>03</i>	0.0 0.0	47 60	<i>ti</i> 0	;	; ;	2149	261	00	00	u Q	0
l l	0910	111	00 00	0 C	00 00	0	·,	1	2165	363	00	90	. 00	ŏ
i	0920	113	0.0	00	0.0	ŭ		ì	2150	262	00	00	υσ	o
;	0925	114	00	50	00	0		ī	7155	764	00	0.0	00	0
j	0930	115	0.0	0.0	8.0	9	•	:	2260	265	0.0	. 90	00	Q
1	0935	116	30	0.0	0.0	0		2	2205	500	.00	0.0	0.0	0.
1	9310	117	.50	0.0	00	Ç	•	3	2310	26.1	ue	90	0.0	Ů
l.	0945	116	vo	ao	აა	a	•	2	2216	169	00	60	0 D	0
7	0950	119	00	0.0	20	0	•	1	2225 2225	262 270	00 00	00	00	0
1	0955	120	60	90	00	0))	2233	271	0.0	60	00	0
1	1000	121	90 90	GO GO	0 U	0	:	1	2235	272	00	00	00	o
ì	1005	122	00	00	çç	Ü	•	ì	2210	273	00	uо	00	0
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ì	1030	127	00	00	00	ō	•	1	2300	277	00	00	30	O
į	1035	122	DO	90	0.0	n	•	1	2305	776	00	20	0.0	0
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1	1100	133	.00	G U	00	9		1	2335	284	00	00	90	٠,
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l 1	1110 1115	135	.00 00	00	00	8		i	23.5	206	0.0	00	00	ŏ
1	1120	117	00	90	00	ŏ		3	2350	287	.00	0.0	00	ō
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1	3130	139	. 90	0.0	.00	0		3	0000	289	0.0	.00	.00	0
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1	1140	141	50	0.0	.00	0		2	0010	291	OO	00	.00	0
ì	1145	142	90	00	.00	0.		,	0015	393	. 00	Q O	.06	0.
Ţ	1150	143	.90	.00	00	0		2	0020	293	00	00	00	0
ı	1155	140	90	00	. 00	0		2	0025	294	. 00	0.0	0.0	٥.
1	1700	115	90	.00	0.0	0		3	0036	295	00	0.0	0.0	0
ī	1205		.90	.00	00	0		2.	0035	296	00	0.0	00	0
i	1210	147	90	no	00	0		2	0040	297	Đΰ	.00	00	٥
ı.	1215	148	90	0.0	.00	0		2	0915	290	0.0	.00	0.0	0
1	1220	112	.00	UO	00	0		2	0050	299	00	00	0.0	o
ì	1725		. 90	00	00	ō		2	0055	100	00	00	.00	0
-			. 50											

32, TOTAL EXCESS : 3 00 MAXIMUM AVERAGE FLOW 21-DR 72-BR PEAK FLOW TIME 24 92-RR 6 - HB

(CES) HIR) (CF_{2}) 3.08 0. .1 513 1 31. (THChes) (AC-Fr)

> CUMULATIVE APEA : .01 SQ 81

130 2 . 693 KK COMBING

694 KO OBTPUT CONTROL VARIABLES

CONDINED DISCHARGE AT SCOTTSDALD ROAD CULVERT

HEBROGRAPH COMBINATION 2 NUMBER OF HYDROGRAPHS TO COMBINE 695 NC

......

SUB-OF 2 PADROGRAPHS

A SIDS	HP80	OHD	FLOW		DA MON	0280	OHD	FLOW	. 1	DA MON	ROBBI	ORD	FLOW	:	DA NON	10998	030	PLOW
1	0000	1	U	,	1	0625	15	9		1	1230	151	٥		1	1045	336	D.
1	0005	5	0		ì	0620	7	Ą		1	12)5	152	U	•	1	1850	227	0.
1	0010	J	D	,	ì	0525	78	7	•	1	1270	153	(I	•	1	1055	228	٥.
:	0215	4	0		ì	0630	79	6	•	1	1245	154	G	•	1	1900	275	0
1	0020	5	0		j	0635	30	5.		1	1250	155	0	•	1	1904	230	0
2	0035	L	0	•	:	0540	6.3	S	•	1	1255	156	Ο.	•	1	1910	231	Q
1	0010	7	o	•	1	0645	8.2	-}	•	1	1300	15	0	•	1	1915	232	٥
1	0015	8	0		ì	0650	8)	1	•	1	1305	158	0	•	1	1920	231	0
1	0040	9	0		1	0655	8-3	1	•	1	1310	159	0.	•	1	1925	334	0
1	0045	17	J		ı	0700	85	3	•	1	1315	160	0	•	١	1930	235	0
1	0050	13	0		1	0705	ВG	2	•	1	1320	161	0	•	1	1935	236	0
1	0055	12	9	•	ı	0710	87	2	•	1	1325	162	0	•	1	1940	237	0
1	0100	13	3		1	0/15	5.8	5	•	1	1330	163	0	•	1	1945	2.18	0
1	0105	ι:	ı	•	ì	0720	82	₹.	•)	11112	164	0	•	1	1950	519	O
1	0110	15	2.	٠	£	6725	20	1	•	ì	1340	16.	Ų	•	1	1955	2.10	0
1	0115	l 6	2	٠	1	0730	91	1	•	1	1315	166	ō	•	:	2000	742	0
1	0120	17	2	•	ì	07)5	97	1	•	1	1350	167	o	•	7	2005	217	0
1	0125	18	3	•	1	0710	93	1	•	:	1355	168	υ.	•	1	2010	21)	0
1	0130	19	3	•	١	0715	21	1		1	1400	163	0	•	1	2015	244	0
ι	0135	2.0	3	•	1	0750	98	1	•	2	1405	170	υ	•	,	2010	245	0
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yLAn	;		SOLITIVO STORAGE SULTANION		90 ספ אאויעק	501L0WAY CRI 2 No 0 22	rsir for (0F DAM 2 50 V 22.			
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	11.A2	1		elevation Storage Outflow	INITINI	00 0. 0.	SPILEWAY CRI 2.50 0 22	ST FOR	OF DAM 2 50 0 22	
			ojtak Ye Sivs	MAXIBUM RESERVOIR R S CLEV	MAXIDUM DEPOJI OVER DAM	MAKTBUM ETORAGE AG-PT	HAXIMUH OUTFION CEN	DURATION OVER TOP MOUNS	TIME OF MANY OUTFLOW MODES	TIME OF FAILURY HOURS
1			1.00	2.87 SUMMARY (PEARS SROWN	.37 OF DAM OVER ARE FOR INT	o. Haydhiyadi Hit Jaksa	35. QIACH APALYSIS STEP USED - E	33 FOR STATI URING DREA	D.11) ON DETINS OR FORMATION)	.00
1	H,AH	ì		ELEVATION SYDRAGE OUTFLOW	1817141.	9ALDE 00 0	SPILLMAY CRE 2 50 1 34	\$T 107	OF DAPS 2 50 1. 34	
			RATIO OF PEF	HAXINUH BESERVOLR W S.ELEV	AUWINDA DELIN ON BURD	HAN INUM STORAGE AC+FT	HUMI XAR FOLISTUO CES	DURATION OVER TOP HOURS	TIME OF	TIME OF FAILURE HOURS
1			1 00				51 REACH AMAGYSIS STEP USED D			9ô
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ì			1 00	2 65 SUMMARY (PEAKS SHOWN	15 OF DAM OVER ARE FOR INT	o TOPPIROZOR ERMAN TIME	14 CACH ANALYSIS STEP USED D	17 VOR STATE URING HPEAS	CH LOBHWAIGN) OA DAGATWA J 33	.00
F	1.AN	1 .		ELEVATION STORAGE OUT TO W	perend.	VALUE 90 0	SPILLWAY CRE 2 50 1 11	907 ТЗ	OF DAM 2.50 1 11.	
			RATIO OF PMF	HARIBUM RESERVOIR HARIBUM	MAXIMUM DEPTH MUNIKA	BAKIHUM STORAGE AC FT	MAXIAUA OUTELOH CPR	PURATION OVER TOP HOURS	TIME OF ROLITED MAN SEROR	TIME OF FATIME ROUSES
;			1 90				66 CACH ABALYSIS SYEP USED D			60
r	4.49	ı		EUEVATION STORAGE OUTFLOW	mirta).	9AUDE 09 0	SPILLWAY CHE 3 60 7. 14.	st rov	OF DAM 3 60 3	
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2			1 00	4 86 SUMMARY OPEARS SHOWS	1 26 OF PAM OVER: ARE EGS (RIT	2 ARVDHINGYER BRIT HANKE	73 EACH ANALYSIS SIEP USED DI	1 33 FOR STATIC JEING BREAC	02 E AKDIBU KU (KOITANKO? KI	. 00
،	r.av	! .	·	ELEVATION STOPAGE OUTFLOW	[8[758]	0 0 04 A7UME	50 14	uor ro	OS DAR 3 60 0 14	
			87110 64 87410	MAXIBUM GESERVOIR DES ELSV	NAXIKUS DEPUT DANIKAN OVER DAN	BAX 100B S FORAGE T T - DA	HAXIBUM OUTFLOX CFS	DURATION OWER TOP HOURS	Time of May outfloa Mound	Time OF FAILURE HOURS
ı			: 00				93 EACH ANALYSIS STEP USED DI			00
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			RATTO OF PMF	BAXIBUR REGERVOID W.S.ELEV	OAEB DVR OTLAH PVXIMAW	MAX IMUR STORAGE STORAGE	HADITAUN OUTFLOW CPS	DURATION OVER TOU HOURS	TIME OF NAX OUTTLOW HOURS	TIME OF TAILURE BOURS
			1 00	5 02	1 47 OF DAY DVSRI	ı	90	2 92	3 SO 3 SD1C2C	.00

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			RATIO OF PHE	HAXIMUM RESURVOIR W S ELEV	MYQ YBAO HEARD MYX HABA	MUST FAN STORAGE STORAGE	CES OUTFLOW OUTFLOW	DURATION OVER TOP HOURS	TIME OF HAX OUTFLOW HOURS	TIME OF FAILURE MOURS
1			1 00				92. REACH ANALYSIS STEP USED - D			00
	MA.14	1	•	ROLTAVEUE SEARCE WOLLYTUO	ՍԱՐՋԴՈԼ	VALUE: 00 0	SPILDMAY CRE J 50 1 150.	est top	OF DAM 1 50 1 150.	
			PATIO OF PMF	MAXIMUM RESERVOIR R S.ELEV	OVER DAR OVER DAR OVER DAR	RAX HAURI S PGRAGE AC - FT	HAXIMUM OUTPLOY CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW BOURS	TIME OF FAILURE ROURS
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	илли	1 .		ELEVATION STORAGS OUTFLOW	TRITTAL	VALUE 00 0	SUILLMAY CRE 3 00 4 13	sr 300	OF DAM 3 00 4 13.	
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			9AT10 OF PH1	# 2 SPEA BEREKAGIS WAXIMON	MAX IMUM DEPTH OVER DAK	MAKIMUM SINEAGE AC- FT	CES ON LAPOR RVX LHOR	HOURS OVER JOP PRUON	PO BHIT Réjistro Mai Reijon	TIME OF FAILURE HOURS
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r	и.ду	j		ELEVATION STORAGE STORAGE	INITIAL	VALUE 00 0			מגק 27 3 00 2. 10	
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			RAT 10 OF PHF	MARINUM REGERVOIR V 5 ELEV	EAX LOUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FY	RAX LUGO OUTFLOW CAS	DURATION OVER TOP HOURS	HOURS OF THE OF	TIME OF PATEURS HOURS
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			PATIO OF OT	MAXIMUM RESURVOIR M S CLEY	OAUS DYF: DES-LII WYX IMDN	MAXIMUM STORAGE AC-FT	SAN TOUR	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW ROURS	TIME OF FAILURE HOURS
			1 09					00 515 FOR STATE DURING BREAM		00
PI	I.AN	1		ROLLWANTER SEVENCES MOTELOO		9860E 0 0 0	SPISERAY C	:	OF DAM 1 00 5 13	
			RATTO OP PRF	MAKIMOM RESERVOIK W.S.EUDV	MARKEDH PETERO MAG REVO	MAK THUM STORAGE AC-FF	HANGERUM OUTFLON CFF	OURATION OVER 13 VO HOURS	ROURS HOURS	COME OF PATIBLE HOURS
			1 20	7 57 SURRARY IPEAKS SHOWN				00 HE FOR STATE OWNER DRINUG		00
ŗ;	LAN	1		ELEVATION STORAGE OUTFLOW		VALUE: 00 0 0	SPILLWAY C 3 C 5 20	b .	05 DAM 3 00 5. 30	
			RATIO QF PMP	A S EPEA SESTINGUE WYXIBIN	MENTIKAN LEPTA LUIG REVO	MAX IMUM STORAGE TT - DA	MAXIMUM OUTPIASK CAR	BURATION OVER TOP HOURS	TIME OF MAX OUTFLOW MOURS	TIME OF FAILURE BOURS

2.77 .00 3 18. 00 3.75 .00
SUBMARY OF DAH OVERTOPPING/BREACH ANALYSIS FOR STATION DETTH
CHERKS SHOWN ARE FOR INTERNAL TIME SIEP USED DURING BREACH FORMATION

PEAN 1 ... INCITAL VALUE SPILEMAY CREST TOP OF DAY.

SUBVATION 00 3 00 3 00

STORAGE 0 3. 3

OUTFLOS 0 20. 30

Patio	HARIMUM	OVER DAM	MAX LHUM	CPS	DURATION	TIME OF	TIME OF
Of	RESERVOIR		STORAGE	OUTFION	OVER TOP	MAX OUTFLOW	SHULLIAS
PMF	R.S. ELEV		AC - FT	MAXIMUM	HOURS	HOURS	ERUQUI
1 00	3 70	70	4	49	.83	3 42	00

*** NORMAL END OF HEC-1 ***

RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Interim Regional Drainage Chan

Project Description:

Drainage Point: 404 Wash

Location:

Channel Station 24-+00

Drainage Basin Data

Water Course Length:

820.00 ft

Basin Area:

3.220 acres

High Elevation:

1581.00 ft

Low Elevation:

1570.00 ft

Average Slope:

0.0134 ft/ft

Roughness, Kb: 0.0368 (A)

10-Year Runoff Coefficient:

0.400

10-Year 6 Hour Rainfall Depth:

2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	
Q (efs)	4	6	7	9	12	14	
С	0.400	0.400	0.400	().44()	0.480	0.500	
Te (min)	8 3	7.3	6.8	6.3	6.0	5.7	
i (in/hr)	3.2	4.4	5.3	6.6	7.6	8.8	

Computed by JMO, Wood, Parel & Associates Thursday, May 08, 2008-10,08-51 a

Thie S \2007\07302.\Project SupportVlydro\RationalRDC rat

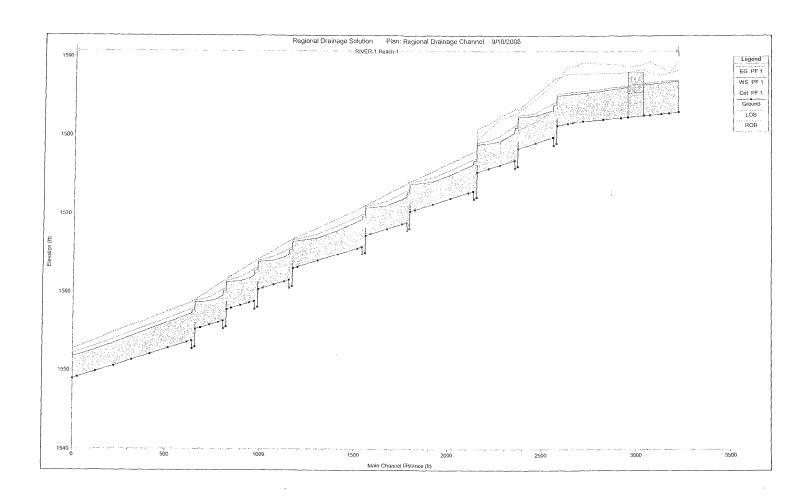
Author, Frank M. Koo, P.E. Email gultank@engsoftwarecenter com URL http://www.engsoftwarecenter.com/rational.html

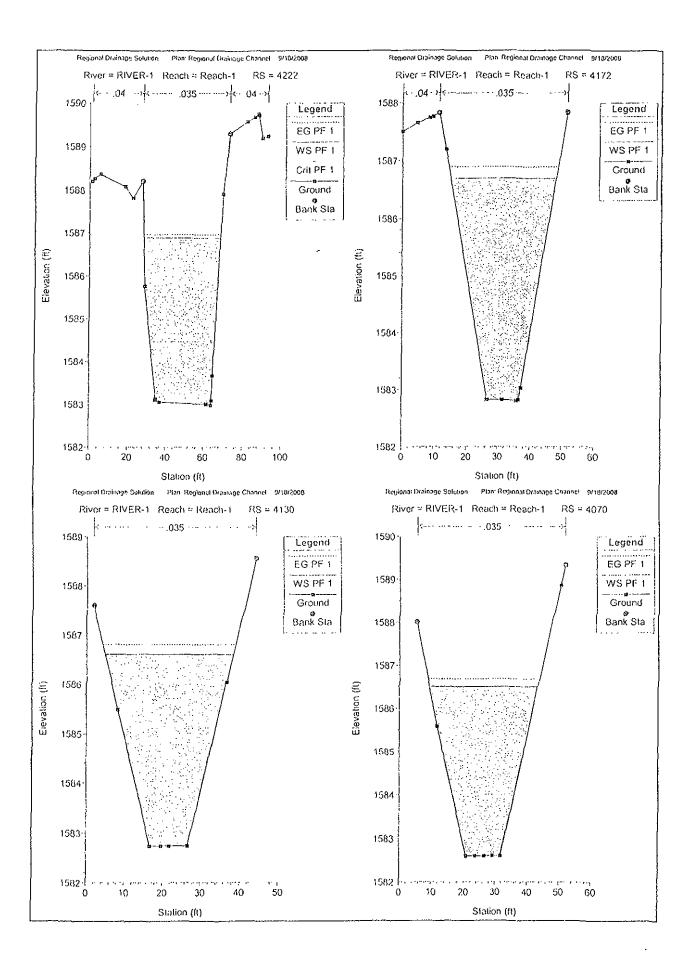
APPENDIX B

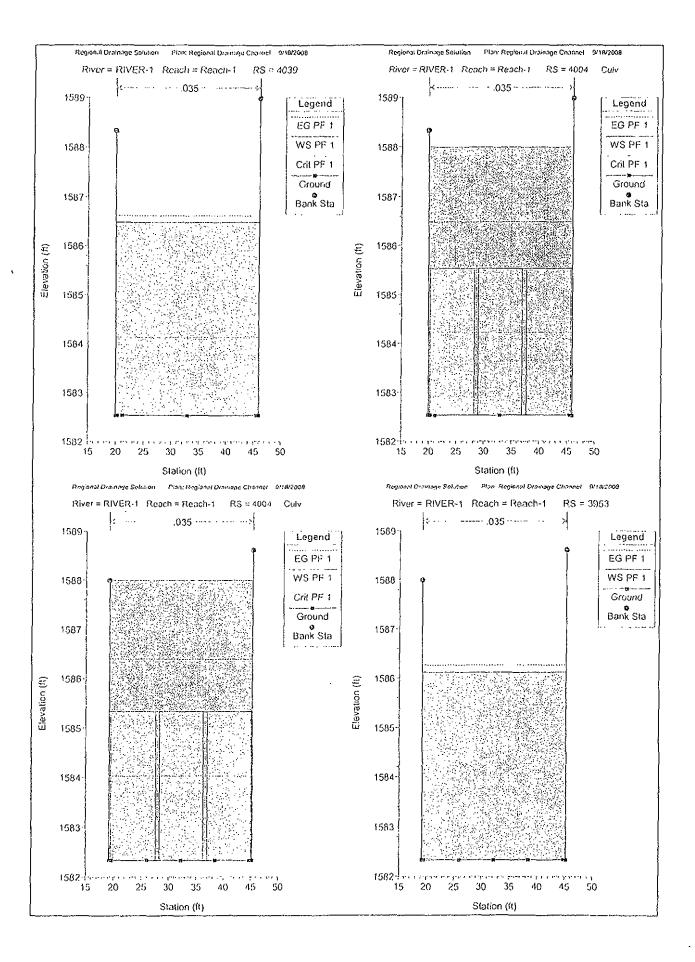
Hydraulic Calculations

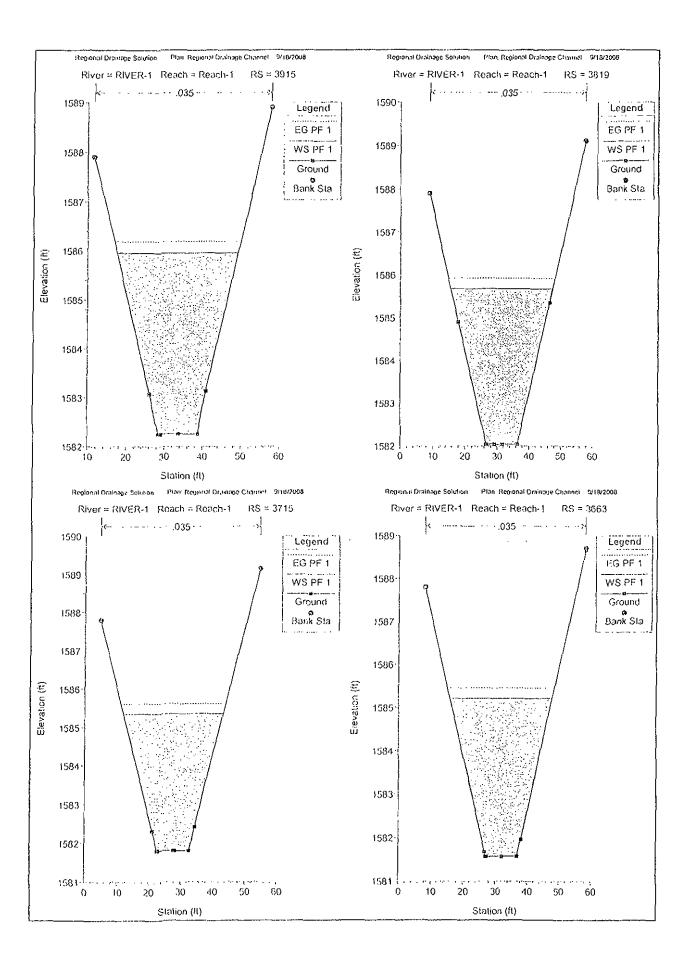
HEC-RAS Plan; RDC 100 River; RIVER-1 Reach Reach-1 Profile, PF 1

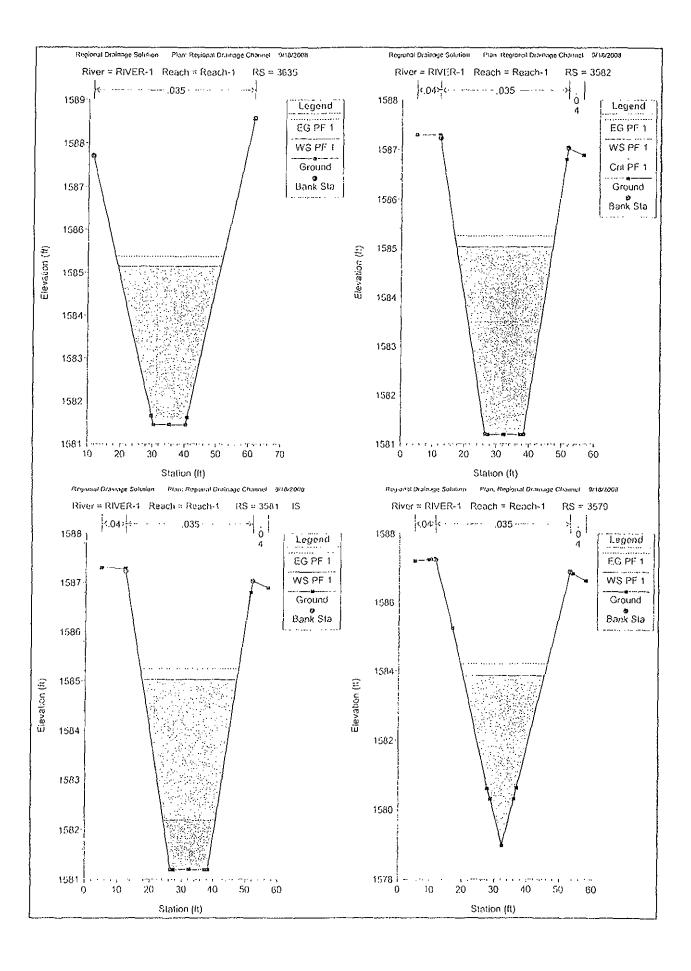
HEĞ-KVS	Elan: RDQ	100 Rive	r: RIVER-1	Reach Re		olile, PF 1	,		Coming W	Ţ		onews.	r ett det litte	רוערט מעמים אור
River Sta	Q Total	Min Ch El	WS Elev	E G Elev	E G Slope	Vel Chol	Flow Area	Top Width	Froude # Chl	LOB Elev	ROB Elev	Flow Depth	Freebourd Req	Freeboard Prov
	(cis)	(#)	(11)	(ft)	(#//(1)	(IVs)	(sq (t)	(0)		(ft)	(0)	(h)	(35)	(11)
1222	300	1582.97	1506.08	1586 96	0.000577 0.002174	2 20	136.44	40 32	0.21	1588.20	1509 30	3.91	1 02	1.32
4172	300	1582 80	1586.70 1586.61	1586.89 1586.80	0.002174	3.58 3.55	83 81 84 36	33.20 33.53	0.40	1587 82 1587.60	1587 84 1588 56	3.90 3.98	1.07	1.12 0.99
4070	300	1582 59	1586.50	1586 68	0 00 1859	3.38	BB 72	34.04	0.37	1588.00	1589 33	3.91	1 07	1.50
4070 4039 4004	300	1582 53	1586 49	1586 62	0 00 1065	2 91	103 17	26.10	0.26	1598 33	1588 98	3 96	1.06	1.84
3953	Culvert	1 41:82.27	1606 15	1600.00	0 001218	304		26.07	0 28 "	1587.99	1588 61		1	
3915	300	1582.33	1585.96	1586 26 1586 19	0 007674	3.87	98.73 77.54	31 91	0.44	1587 00	1588 90	3.79 3.71	1.02	1.87 1.94
3819	300	1582.01	1565.68	1595.92	0.002809	3 93	76.32	31.87	0.45	1587 90	1589.11	361	1 03	2.22
3715	300	1581 80	1595 36	1595 G 2	0.003119	4 09	73 44	31.32	0.47	1587.80	1589 14	3 55	1.02	2.44
3663 3635	300 300	1581 57	1585.22 1585.15	1585.46 1685.38	0.002787	3 92	76.60 78.43	31.99 32.32	0.45 0.43	1587 80 1587 70	1588.70 1588.57	3.65 3.71	1.03	2 58 2 55
3582	300	1581.19	1585.03	1585.25	0.002239	3.83 3.75	79.99	29 78	0.40	1587 23	1587.03	3.64	1.04 1.07	2.00
3531	Int Struct													1
3579	300	1570.96	1583 86	1584.21	0 004005	474	63.31	25 18	0.53	1597 24	1586 88	4.90	1 40	3 02 2 50
3564 3561	300 300	1578.70 1579.71	1583 90 1583.16	1584.13 1584.05	0.002489 0.016160	3.84 7.55	78 11 39 76	30.25 23.04	0.42	1587.02 1586.89	1586 40 1586 40	5 20 3.45	1 41	2 50 3 24
3467	300	1579.00	1582 50	1582 81	0.004580	4.51	66.59	33.05	0.58	1585 10	1584.55	3 50	1.03	2.05
3374	300	1578 30	1502 30	1532 51	0 002052	3.70	81.10	28 57	0.39	1583 20	1582 91	4.00	1.11	0.61
3373	Ini Siruct		46.00.00	Talestone .	A 000000					1600.00				
3371 3355	300 300	1576.07 1575.82	1580 88 1581 00	1581 30	0 006206 0 002647	5.66 3.91	52.99 76.65	22.05 30.23	0.61	1583 36 1583 42	1582 90 1582 70	4.81 5.18	1.45 1.41	2 02 1 70
3353	300	1576 82	1580 29	1581 16	0.015790	7.48	40.09	23 11	1 00	1583.22	1582.64	3.47	1.30	2 35
3276	300	1576.24	1579 23	1579 86	0.011545	6 38	47 00	27 66	0.85	1582 40	1582.03	2.99	1.06	2 35 2.00
3216	300 300	1575 79	1578 94	1579.31	0.005728	4.87	61.57	32.20	0 62	1581 40	1580 73	3 15	1 00	1.79
3155	In Struct	1575 34 (1578.04	1579 04	0 002516	3,56	84 27	30 12	0.42	1580 80	1579 34	3 50	1.00	0.50
3152	300	1572.09	1576 77	1577 04	0.003261	4 13	72.56	31.02	0.48	1578 10	1578.13	4 68	1 30	1.33
3138	300	1571 86	1576.76	1576 98	0.002556	3 77	79.48	32.42	0.42	1577 91	1577 91	4 90	1 34	1 15
3135	300	1572.67 1572.67	1576 31 1576 04	157G 93 157G 65	0 011152	6.29 6.25	47 70 47 99	27 G7 27.72	0.B4 0.B4	1577 86 1577 58	1577 90 1577 58	3.45 3.37	1.17 1.15	1.55 1.51
3014	300	1571 95	1575 00	15/5 61	0.010923	6.25	17 99	27 9 1	0.84	1576.51	1576 51	3.05	1.07	1 51
2918	300	1571 20	1574 18	1574.67	0.008218	5 59	53.71	30,00	0.74	15/5 43	1575.43	2.98	1.00	1 25
2822 2797	300	1570 50 1570 30	1573.89 1573.84	1574.12 1574.04	0 003236	3.92	76.54 82.62	35 19 37 37	0.47	1574 35 1574 17	1574.36 1574.17	3.39 3.54	1 00	0 47 0 33
2796	Ini Struct	1.77	. 137 9.94		7 502021	3.03	02 02	3: 5:	. V.13	13/11/1			. ! 0,0	i
2794	300	1568 06	1572.74	15/3 01	0.003367	4 19	71 66	30 63	0.48	15/4 12	1574.12	4.66	1 30	1 38
2779	300	1567 85	1572.72	1572 95	0.002625	3.81	78.66	32 24 26 93	0.43	1573.90	1573.90	4 87	1 33	1 10
2776 2751	300 	1568 85 1560 66	1572 20		0.013511	6.65 6.79	45.11 44.21	26.63	0.93	1573 05 1573 52	1573.85 1 1573.52	3 35 3 18	1.18	1.68
2668	300	1558.04	15/1 02	1571 57	0 000000	5.97	50 23	23 66	080	1572 43	1572 13	2.98	1 02	1 41
2586	300	1567 40	15/0.78	1571 03	0.003459	1.03	74 45	35.48	0 49	1571 35	1571.35	3 38	100	0.57
256 t	300 Ini Struct	1567 20	1570 74	1570,94.	0 002633	3 64	82.16	37 34	0.13	1571 07	1571 10	3.54	1.00	0.33
2559 2557	300	''i564 90	1569.66	1569.93	0 000263	4.14	72.51	31.01	0.48	1571 00	1571.02	460	1 30	1 34
2543	300	1564 80	1569 65	1569 87	0.002573	3.78	79.42	32.59	0.43	1570.80	1570 80	4.85	1 32	1.15
2540	300	1565.75	1569 23	1569.82	0.010714	618	48.52	27.91	0.83	1570 75	1570.75	3.48	1.17	1.52
2515 2408	300	1565 56 1564 76	1568 96 1		0 010483	6.18	48 63	27 92 28.14	0 02	1570 47 1569.32	1570 47	3 40	1 15 1 07	1.51
2302	300	1563 97	156C 87		0 008824	5 73	52.37		0 76	1368 16	1568 16	2 90	100	1.29
2190	300	1563.17	1566 52		0 003297	3.94	76 09	29 71 36 17	0.48	1567 00	1567 00	3 35	1 00	0 18
2171	300 Int Struct	1562.98	1566 47	1566.68	0.002687	3 56	81 91	37 25	0.44	1566.72	. 1566 82 /	3.10	1 00	0.25
2168	300	1560.72	i565 38	1565 65	0.003387	4 10	71 69	30.74	0.48	1566 69	1596,77	4 66	1 30	131
2153	300	1560 50	1565 36	1565 59	0.002655	3 83	79 23	32 12	0 43	1566.5J	1555 50	4 36	1 33	1.14
2150	300	1561.49			0.014412	6.93	43 32	26.32	0.95	1566 49	1566 49	3 29	1 20	171
2125	300	1561 30	1554 40 1553 98		0 014646 0 000524	7.50 5.59	42.84 52.59	26 16 29 33	0.96	1566 13 1565 33	1566 10 1 1565 30	3 10	1 16	1 70
2015	300	1560 19	1563.85		0.003655	4 12	72 78	34 92	0.50	1564 19	1564.49	3.36	1 00	0 64
1950	300	1560 20	1563 82		0.002561	3 60	ย3 30	37 49	0 13	1564 13	1564.13	3 53	1 00	0.31
1969	Int Struct 300		1669.70	1552 97	ö 003360	ا ج. ا.	71 94	 30.82 }	0.48	1503.10	1564 (10	4 56		1 38
1906	300	1558.04	1562.69		0.002601	3 80	70 85	32.25	0.43	1564 10	1564 08	4.86	1 30	1.17
1959	300	1558 81	1562.04	1562.84	0 0 159 15	7 19	41 71	25 NB	1 00	1563 81	1563 81	3 23	1 21	1.77
1944	300	1558 60	1561.69	1562 45 [5.90	12 89	26 22	0.96	1563 43	1563.40	3 09	1 15	1.71
1049	300	1558.27	1561 37 { 1561 27 }	1561 86 1561 54	0.008109	561	53 49 71 68	29.55	073	1562.69	1562.69 1562.60	3.1 <u>0</u> 3.35	1 02	0 69
1824	300	1557 70	1561 24		0 002625	363	82.56	37 35	0 43	1561 57	1561 60	354	1 00	033
1822	Int Struct	1	j	ł	}		1	1		ł	ĺ	[1	-
1831	300	1555 48	1560 14		0.003364	4.18	71 70	30.83	0.48	1561.52	1561 52	4 66	1 30	1 30
1806	300	1555.25 1556.30	1560 12 1559 51		0.002643	3.82 7.05	78.51 42.56	32,23 26 10	0.43	1561 30 1561 20	1561.30 	4 87 3 21	1 19	1.69
1778	200	1556.06	1559 11		0.015490	7 15	4196	25.93	0.99	1560.86	1560 90	3.05	1 16	175
1/31	300	1555.70	1558.80	1559 29	0 008204	561	53.44	29.53	0.74	1960.13	1560 13	3.10	1 02	1.33
1683	300	1555 35	1559 70		0.003783	4 18	7172	34.51	0.51	1559 39	1559 40	3.35	1 00	0 69
1657	300 Ini Struct	1555 16	1558 66	1558 87	0.002707}	3 67	8) 66	3/ 1/	0.00	1559 00	1559 00	3.50	1.00	0.34
1655	300	1552 91	1557 63	1557 88	0 003131 .	4 07	73.68	31 12	0.47	1550 95	1558 95	1.72	1.31	1 32
1640	300	1552.69	1557 61	1557.83	0.002403	3 73	80 39	32.63	0.42	1550 73	1558 70	4.93	1 34	1.09
163/	300	1553.68	1557 24		0 009394	5 91	50 00	28.45	0.78	1558 60	1558 /0	3.56	1.16	1 44
1612	300		1557 00 1556 09		0 009394	5 92 5 90	50 69 50 87	28 53 28 61	0.78	1558.40 1557.50	1550 44	3 51	1.15	1.10
1416	300	1552.00	1555 19		0 009139	5 85	51.29	28 86	0.77	1555.58	1556 58	3 33 3 19	1 03	1 39
1319	300	1551 28	1554 30	1554 83	0.009067	5.82	51 55	29 16	0.77	1555 65	1555 70	3 02	1 02	1 35
1221	200		1553.43		0.008967	5.76	52.05	29.60	0.77	1554 85	1554 /0	2.93 2.76	1.00	1.27
1123	300		1552.58 1551.87		0.008680 0.007044	5.66 5.21	52 97 57 60	30 24 31 90	0.7 <u>5</u> 0.68	1553 79 1552 87	1553.80 1552.87	2 79	1 00	1 <u>.21</u>
1000	300	1548 89	1551 73	1552 11	0.000105	4.95	60.59	32 77	0.64	1552 63	1552 63	284	00	0.50
					• •	• • • • • • • • • • • • • • • • • • • •								

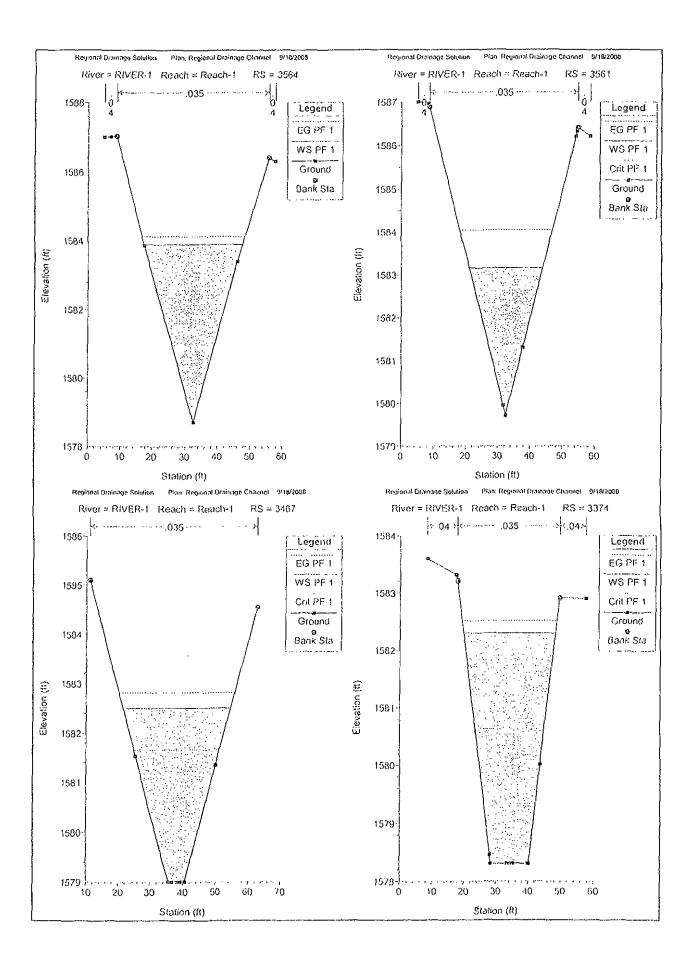


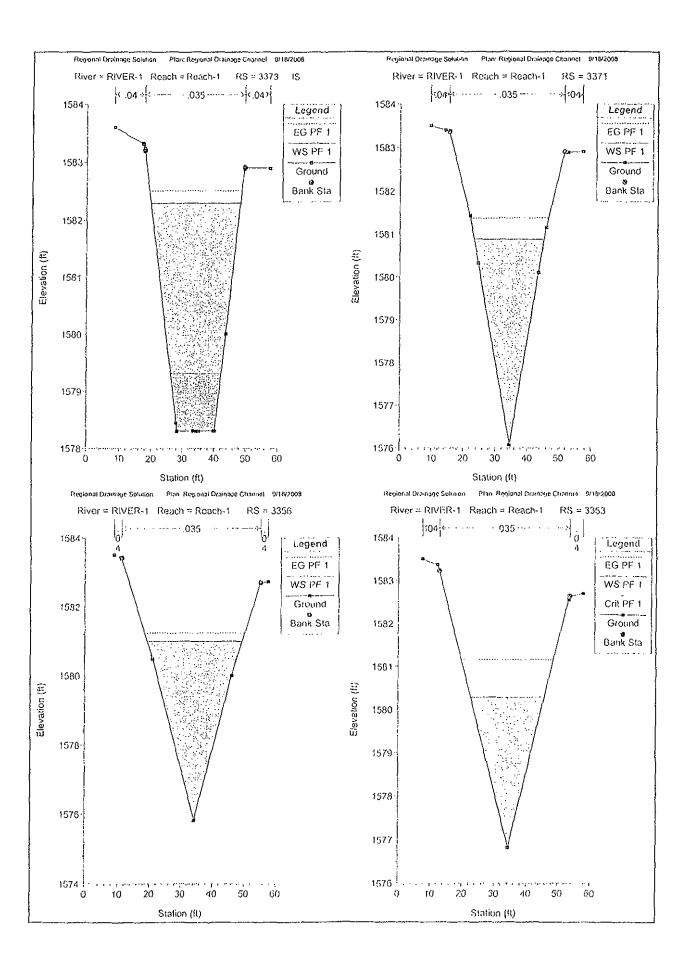


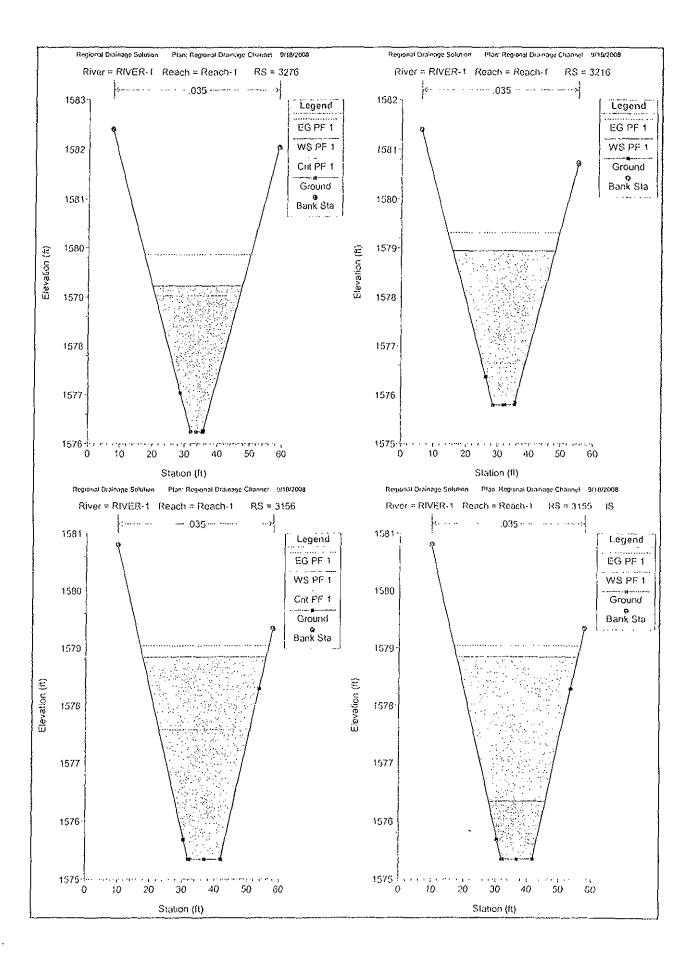


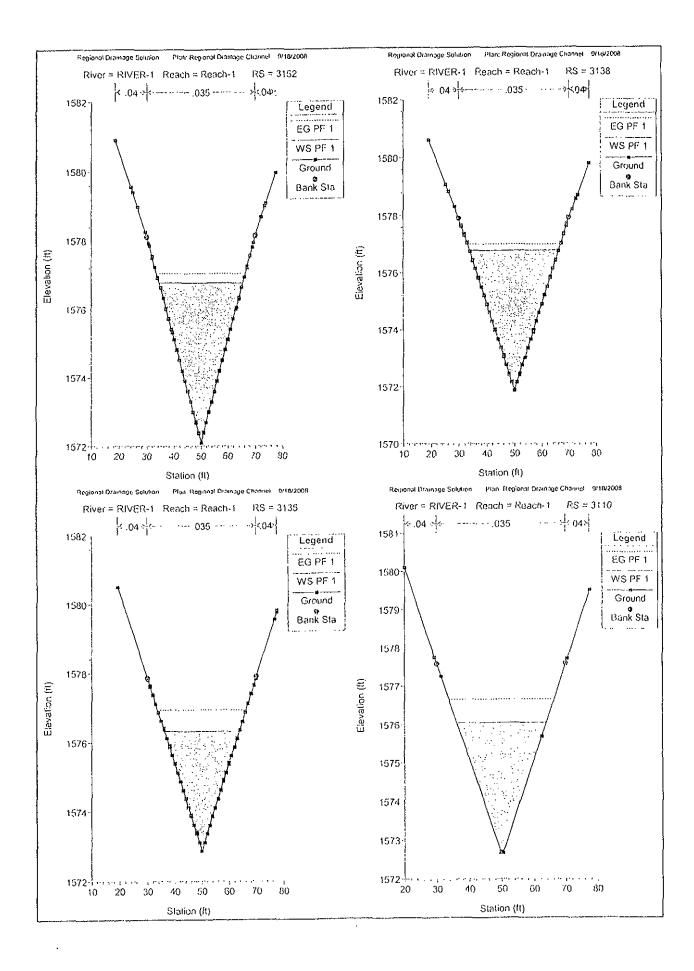


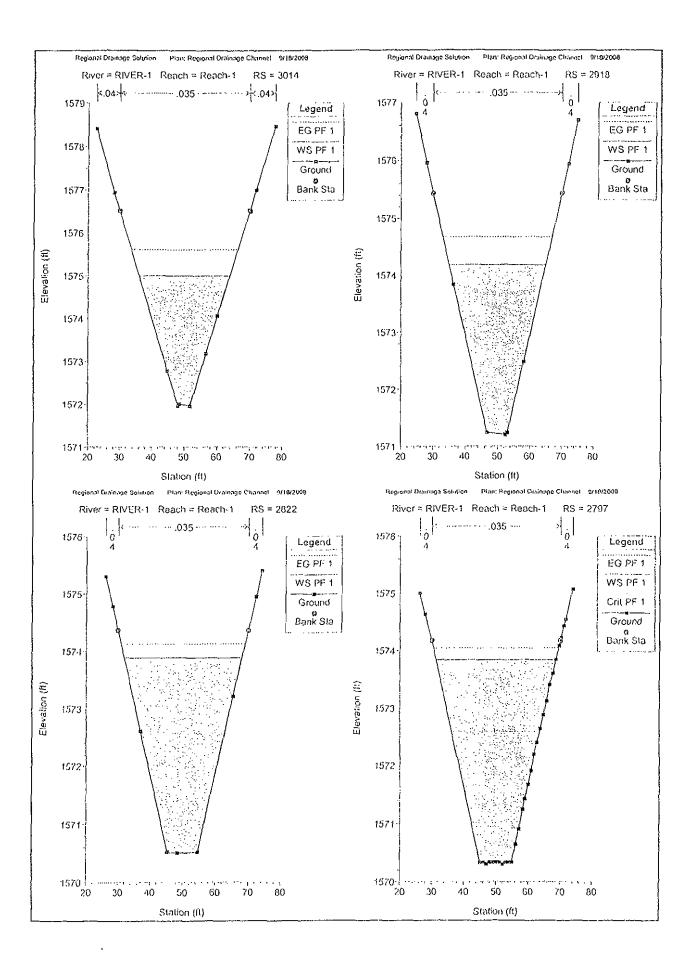


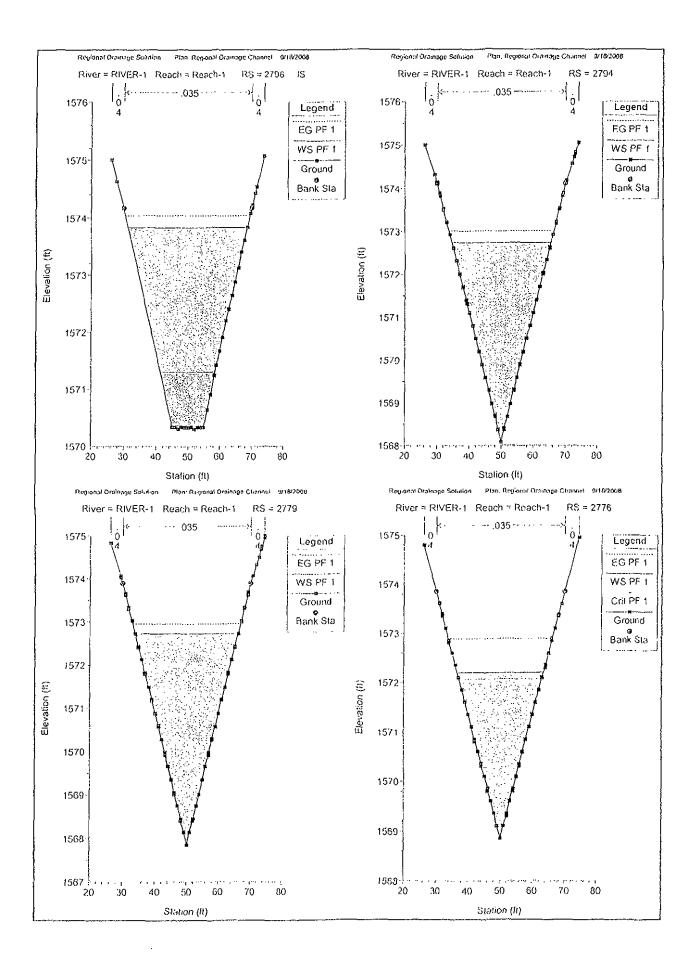


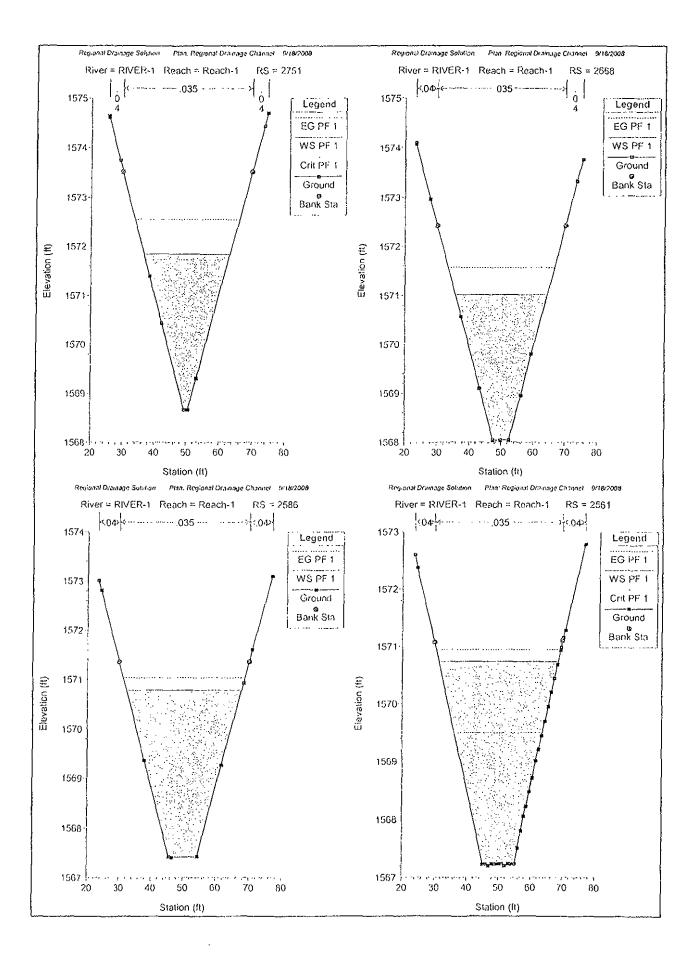


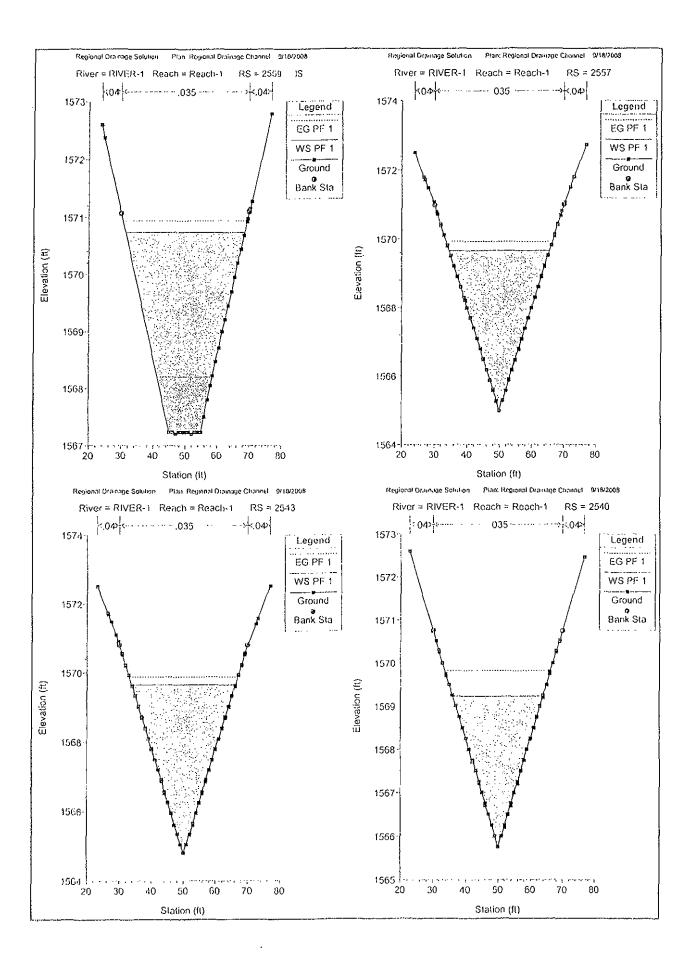


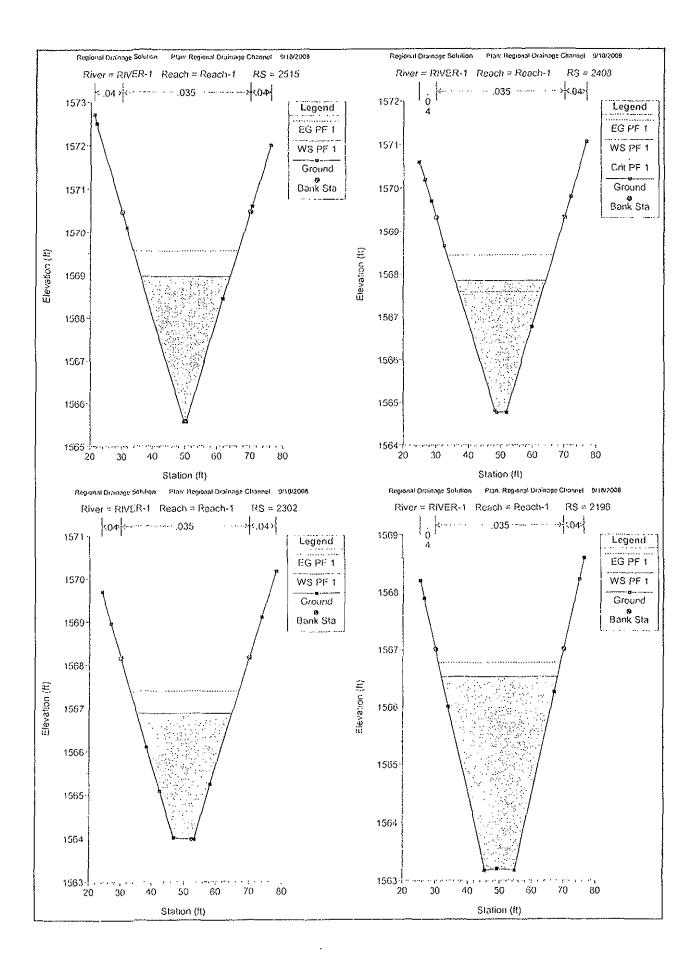


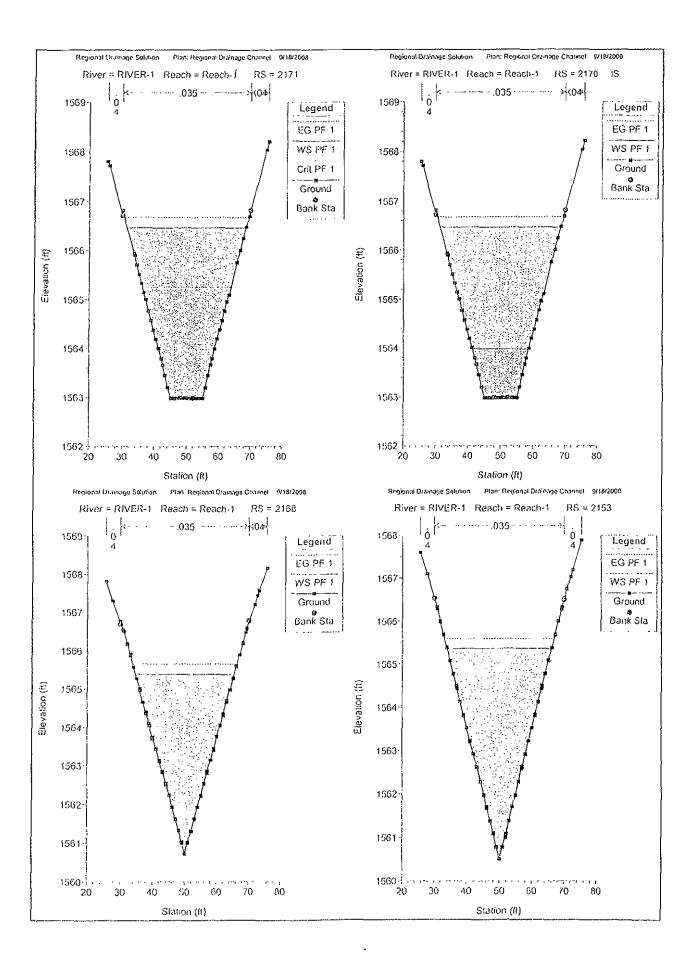


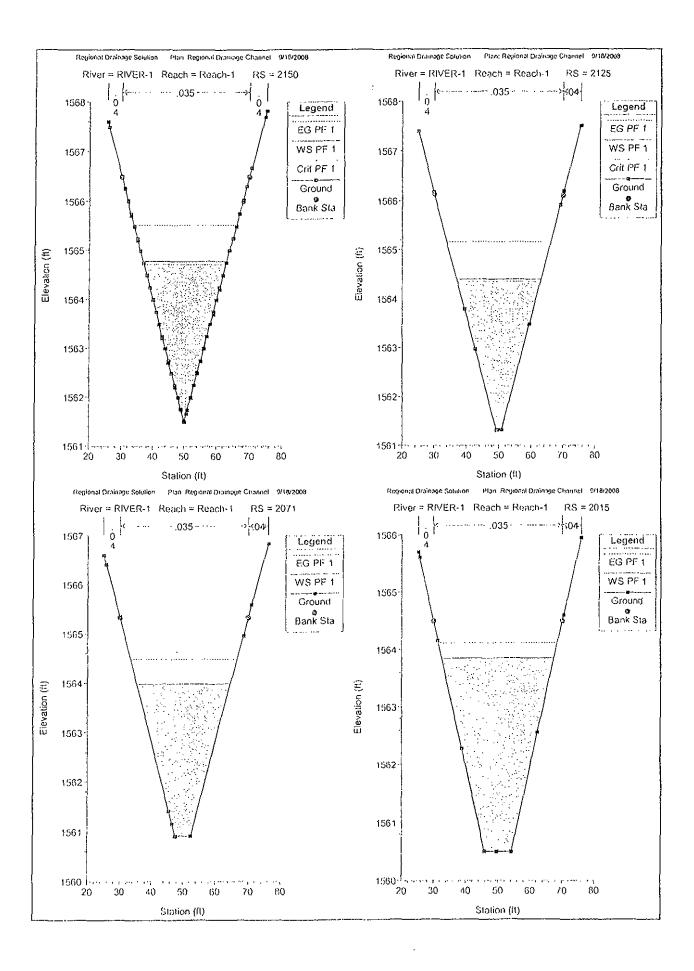


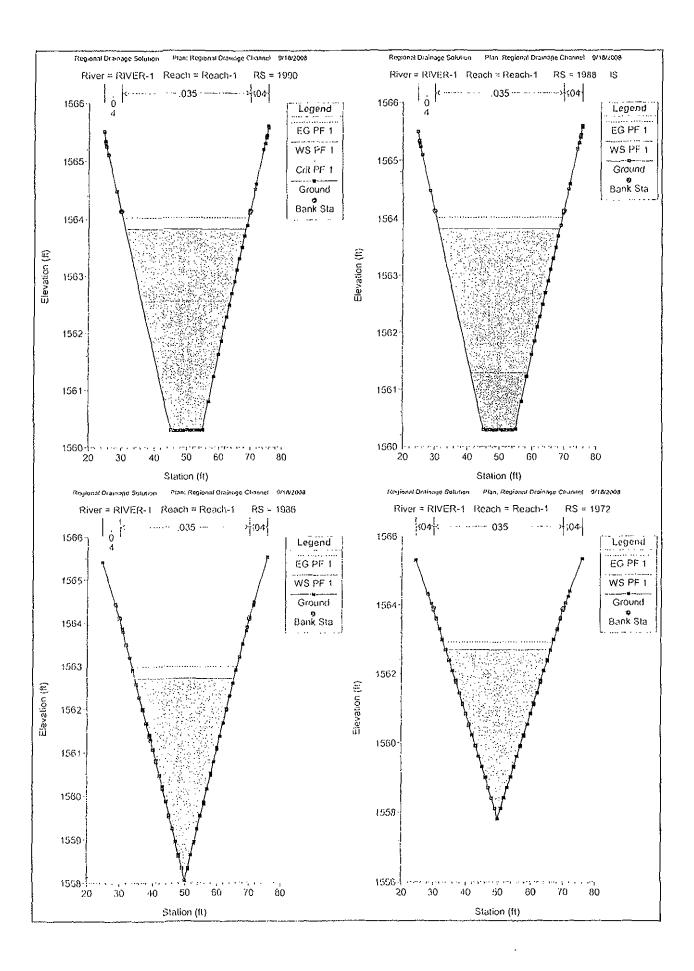


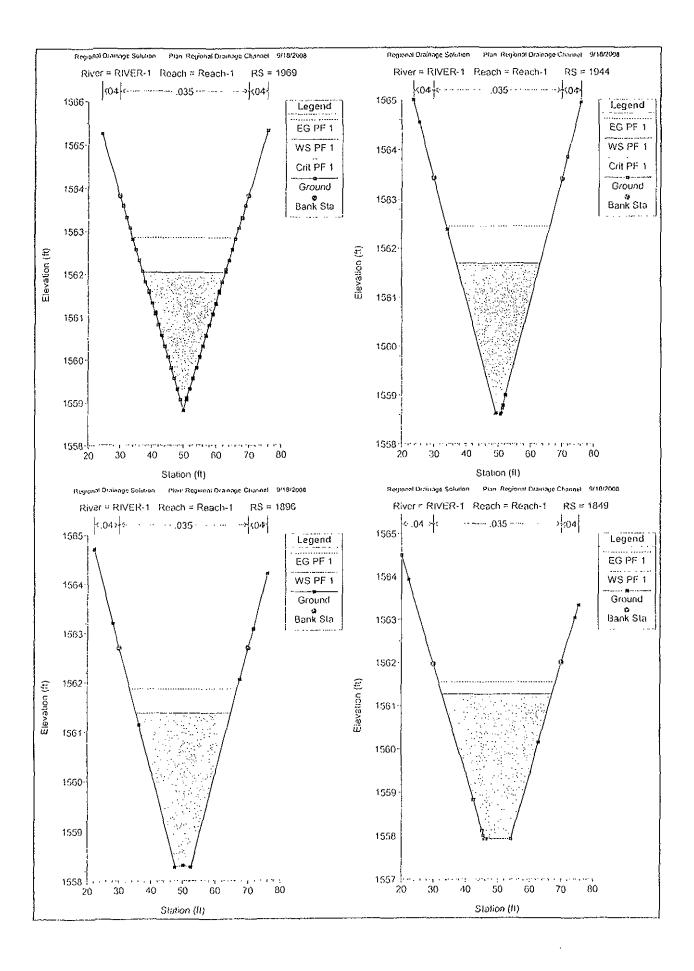


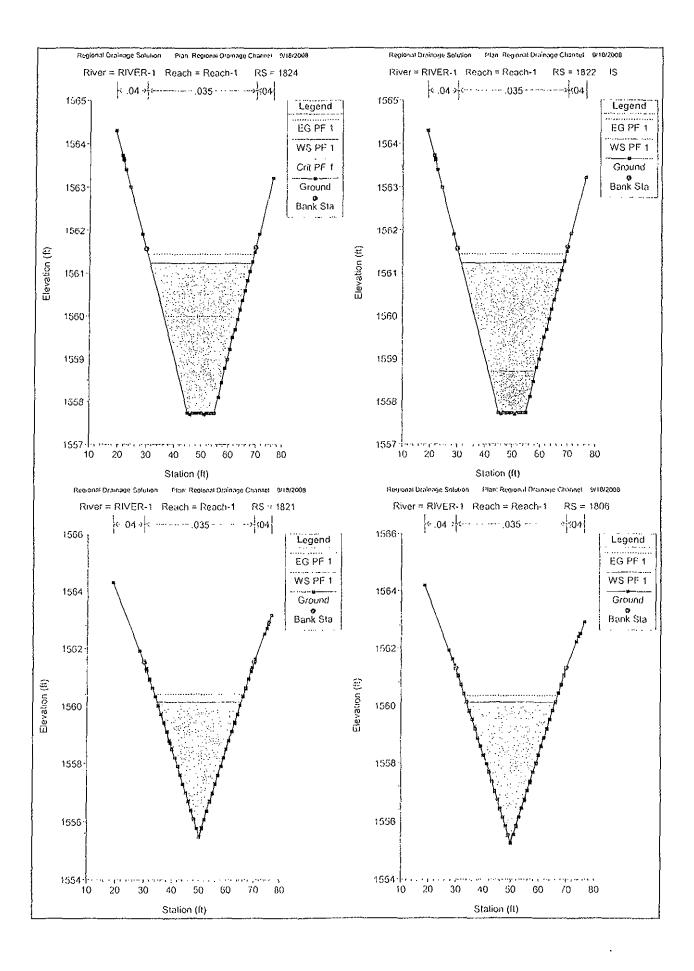


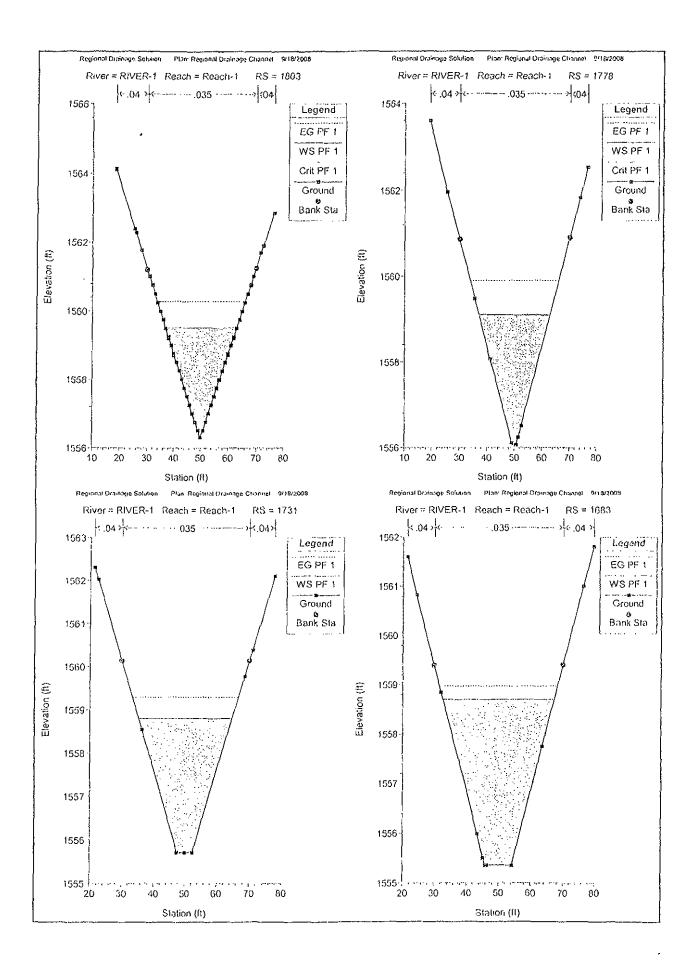


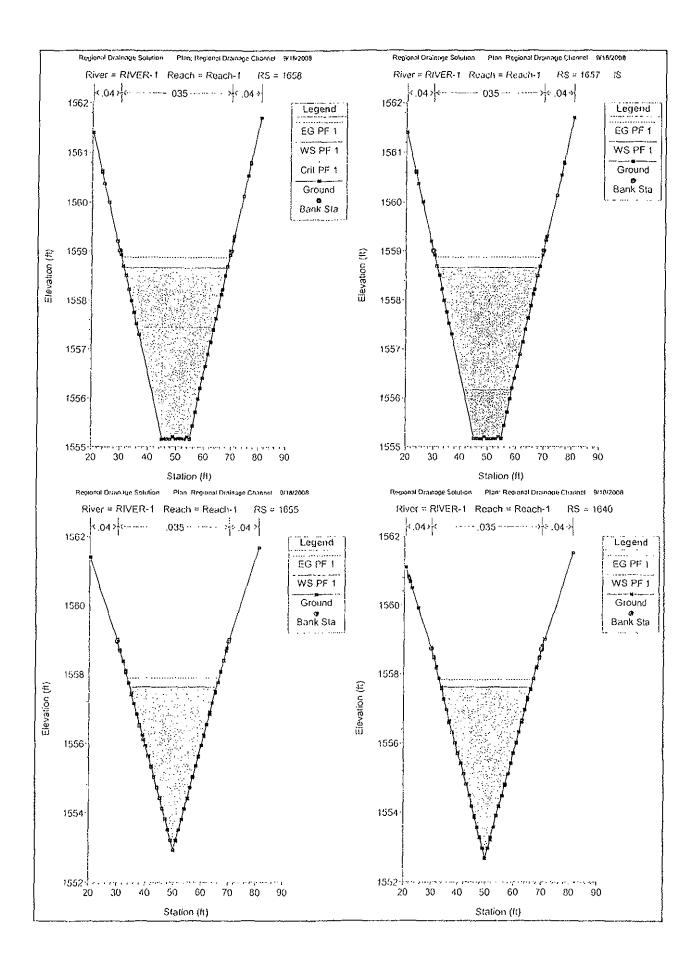


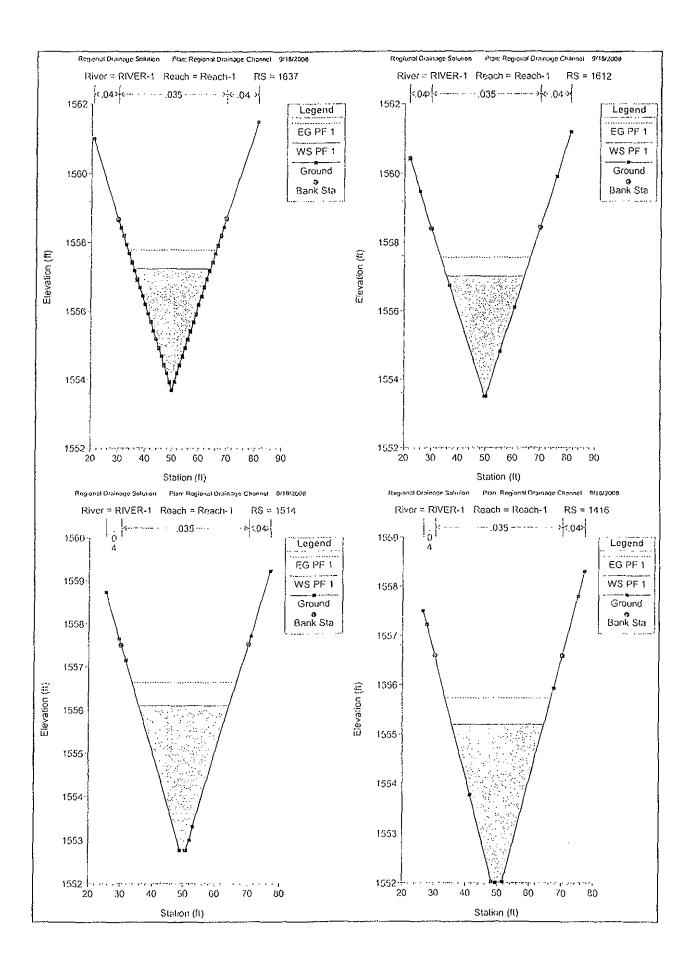


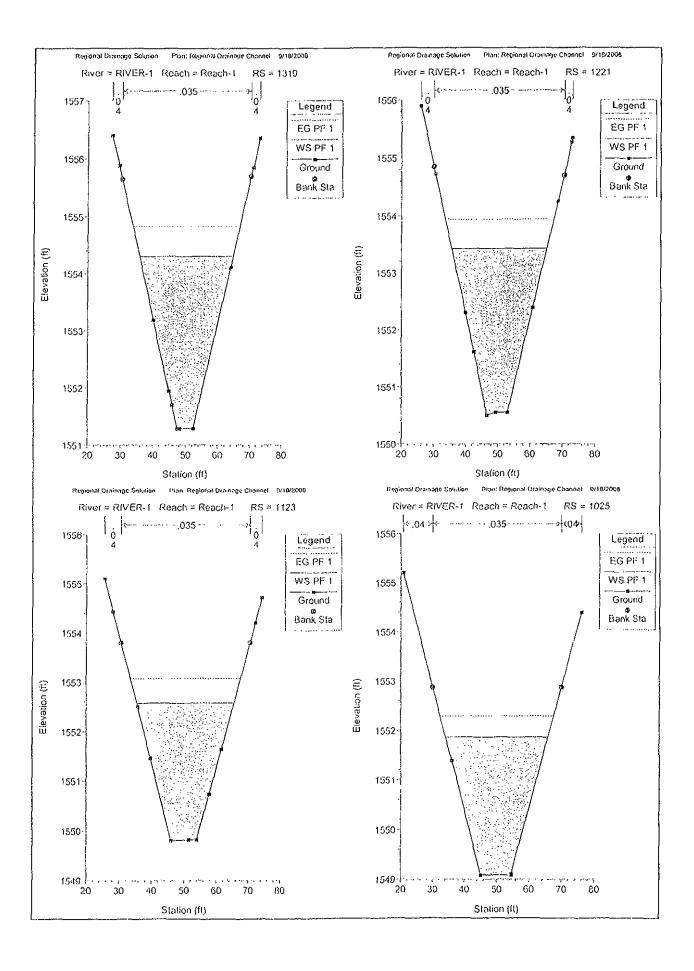


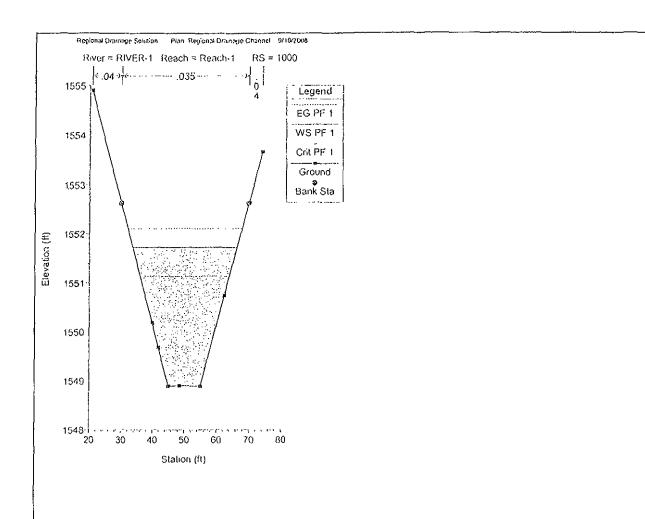












THAT RUG TODY PAYER-1	2000 tul 2000 tul 2000	Prome: PF 1
and the contract of the contra	there is a first of large at the transport of the figure of a grant and	
E.G. Elev (ft)	1585.25 Q Gates (cfs)	1
(M, W- MICE (11)	190 AAV (Q QBIGS (OS)	4

E;G: Elev (ft)	1585.25	Q Gates (cfs)	
W.S. Elev (ft)	1585.03	Q Gate Group (cfs)	0.00
Q Total (cfs)	300.00	Gate Open Flt (ft)	1583.36
Q Weir (cfs)	300.00	Gate #Open	
Wair Flow Area (sq ft)	72.37	Gate Area (sq ft)	1.00
Weir Sta Lft (fl)	16.98	Gate Submerg	0.00
Wair Sta Rgf (ft)	47.77	Gate Invert (ft)	0.00
Weir Max Depth (ft)	3.06	Gate Weir Coef	8.000
Weir Avg Depth (ft)	2.35		
Weir Coef	2.600	Q Breach (cfs)	
Weir Submerg	0.44	Breach Avg Velocity (IVs)	
Min El Weir Flow (ft)	1582.20	Breach Flow Area (sq ft)	
Wr Top Wilth (ft)	30.79		

Plan: RDC 100yr RIVER-1 Reach-1 RS: 3373 Int Struct: Profile: PF 1

E.G. Elev (It)	1582.51	Q Gates (cfs)	
W.S. Elev (ft)	1982.30	Q Gate Group (cfs)	0.00
Q Total (cfs)	300.00	Gate Open Ht (ft)	1580.88
Q Weir (cfs)	300.00	Gate #Open	
Weir Flow Area (sq ft)	73.03	Gate Area (sq.ft)	1.00
Weir Sta Lft (ft)	19.30	Gate Submerg	0.00
Weir Sta Rgt (ft)	48.75	Gate Invert (ft)	0.00
Weir Max Depth (ft)	3.20	Gate Weir Coef	0.000
Weir Avg Depth (ft)	2,48		
Weir Coef	2.500	Q Breach (cfs)	
Weir Submerg	0.40	Breach Avg Velocity (ft/s)	
Min El Wair Flow (ft)	1579.32	8reach Flow Arca (sq (t)	
Wr Yop Wdth (ft).	29.44		[]

Errors Warnings and Notes

Warning: The inline structure solution failed to converge. The program used the solution with the least curon

Plan: RDC 100vr RIVER-1 Reach-1 RS: 3155 Inf Struct: Profile: PF 1

TIGHT (1120) 16031 (117C)	1 Roughing	TOP DIGO IN DIRECT FORCE	
E.G. Elev (ft)	1579.04	Q Gates (cfs)	}
W.S. Elev (ft)	1578.84	☐ Gate Group (cfs)	0.00
Q Total (cls).	300.00	Gate Open Ht (ft)	1576.77
Q Weir (cls)	300,00	Gate #Open	
Weir Flow Area (sq.ft)	77.91	Gate Area (sq ft)	1.00
Weir Sta Lft (ft)	16,94	Gale Submerg	0.00
Weir Sta Rgt (ft)	56.53	Gate Invert (II)	0.00
Weir Max Depth (ft)	2.70	Gate Weir Coef	0.000
Weir Avg Depth (It)	1.96		
Weir Coef	2.500	Q Breach (cfs)	
Weir Submerg	0.11	Breach Avg Velocity (fVs)	}
Min El Weir Flow (ff)	1576.35	Breach Flow Area (sq ft)	
Wr Top Wdth (ft)	39.70	the same of the same state of	
rates, and the second of the s		and the second of the contract of the second	

Plan: RDC 100yr RIVER-1 Reach-1 RS: 2796 Inl Struct: Profile: PF 1

E.G. Elev (ft)	1574.04	O Gales (cfs)	
W.S Elov (ft)	1573,B4	Q Gate Group (cfs)	0.00
Q Total (cfs)	300.00	Gale Open Ht (ft)	1572.74
Q Weir (cfs)	300.00	Gate IlOpen	

Plan: RDC 100yr RIVER-1 Reach-1 RS: 2796 Inf Struct Profile: PF 1 (Continued)

Weir Flow Area (sq ft)	77.07	Cala Area log (IV	1.00
. Well Flow Alea (Sq II)	17.07	Gate Area (sq ft)	1.00
Weir Sta Lft (ft)	30.50	Gate Submerg	0.00
Weir Sta Rgt (ft)	69,49	Gate Invert (ft)	0.00
Weir Max Depth (ft)	2.74	Gate Weir Coef	0.000
Weir Avg Depth (ft)	1.98		
Weir Coef	2.600	Q Breach (cfs)	
Weir Submerg	0.42	Breach Avg Volocity (ft/s)	
Min El Weir Flow (ft)	1571.31	Breach Flow Area (sq ft)	
Wr Top Wath (ft)	38.99		

Plan: RDC 100yr RIVER-1 Reach-1 RS: 2559 Inl Struct: Profile: PF 1

E.G. Elev (ft)	1570.94	Q Gates (cfs)	
W,S, Elev (ft)	1570.74	Q Gate Group (cfs)	0.00
Q Total (cfs)	300.00	Gate Open Ht (ft)	1569.66
Q Weir (cfs)	300.00	Gate #Open	
Weir Flow Area (sq ft)	77.03	Gate Area (sq ft)	1.00
Weir Sta Lft (ft)	30.51	Gate Submerg	0.00
Weir Sta Rgt (ft)	69.46	Gate Invert (ft)	0.00
Welr Max Depth (ft)	2.74	Gate Weir Coef	0.000
Weir Avg Depth (ft)	1.98		
Weir Coef	2.600	Q Breach (cfs)	
Weir Submerg	0.43	Breach Avg Velocity (ft/s):	
Min El Weir Flow (ft)	1568.21	Breach Flow Area (sq ft)	
Wr Top Wath (ft)	38.96)

Plan: RDC 100yr RIVER-1 Reach-1 RS: 2170 Inl Struct: Profile: PF 1

E.G. Elev (ft)	1566.68	Q Gates (cfs)	
W.S. Elev (ft)	1566.47	Q Gate Group (cfs)	0.00
Q Total (cfs)	300.00	Gate Open Ht (ft)	1565.38
Q Weir (cfs)	300.00	Gate #Open	
Weir Flow Area (sq ft)	76.16	Gate Area (sq ft)	1.00
Weir Sta Lft (ft)	30.56	Gate Submerg	0.00
Weir Sta Rgt (ft)	69.57	Gate Invert (ft)	0.00
Weir Max Depth (ft)	2.70	Gate Weir Coef	0.000
.Weir Avg Depth (ft)	1.95		
Weir Coef	2.600	Q Breach (cfs)	
Weir Submerg	0.45	Breach Avg Velocity (fl/s)	
Min El Weir Flow (ft)	1563.99	Breach Flow Area (sq ft)	
Wr Top Wdth (ft)	39.00		

Plan: RDC 100yr RIVER-1 Reach-1 RS: 1988 Inl Struct Profile PF 1

E.C. Elev (ft)	1564.02	Q Gates (cfs)	
W.S. Elev (ft)	1563.82	Q Gate Group (cfs)	0.00
Q Total (cfs)	300.00	Gate Open Ht (ft)	1562.70
Q Weir (cfs)	300.00	Gate #Open	
Weir Flow Area (sq ft)	77.23	Gate Area (sq ft)	1.00
Weir Sta Lft (ft)	30.44	Gate Submerg	0.00
Weir Sta Rgt (ft)	69.44	Gate Invert (ft)	0.00
Weir Max Depth (ft)	2.73	Gate Weir Coef	0.000
Weir Avg Depth (ft)	1.98		
Weir Coef	2.600	Q Breach (cfs)	
Weir Submerg	0.41	Breach Avg Velocity (ft/s)	
Min El Weir Flow (ft)	1561.30	Breach Flow Area (sq ft)	

Plan: RDC 100yr RIVER-1 Reach-1 RS: 1988 Ini Struct: Profile: PF 1 (Continued)
Wr.Top Wdth (ft) 39.01

Plan: RDC 100yr RIVER-1	Reach-1	RS: 1822 Inl Struct: Profile: F	F 1
E.G. Elev (ft)	1561.44	Q Gates (cfs)	
W.S. Elev (ft)	1561.24	Q Gate Group (cfs)	0.00
Q Total (cfs)	300.00	Gate Open Ht (ft)	1560,14
Q Welr (cfs)	300.00	Gate #Open	
Weir Flow Area (sq.ft)	77.05	Gate Area (sq ft)	1.00
Weir Sta Lft (ft)	30.50	Gate Submerg	0.00
Weir Sta Rgt (ft)	69.47	Gate Invert (ft)	0.00
Weir Max Depth (ft)	2.74	Gate Weir Coef	0.000
Weir Avg Depth (ft)	1.98		
Weir Coef	2.600	Q Breach (cfs)	
Weir Submerg	0.42	Breach Avg Velocity (ft/s)	
Min El Weir Flow (ft)	1558.71	Breach Flow Area (sq ft)	
Wr Top Wdth (ft)	38.97		

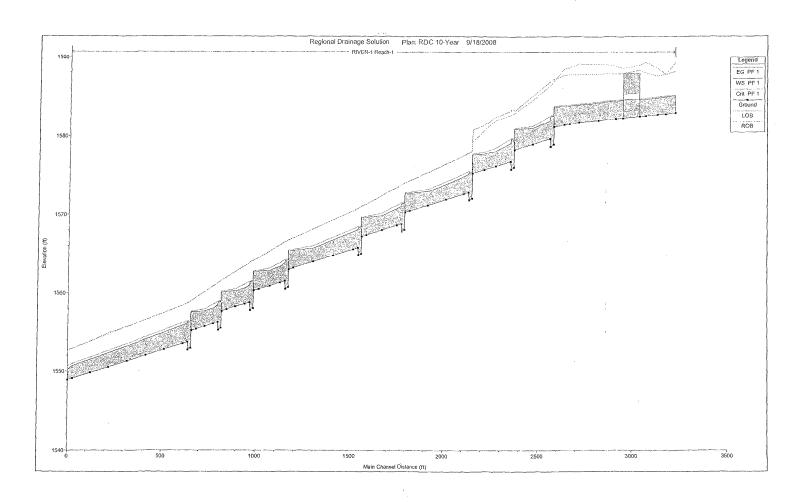
Plan: RDC 100yr RIVER-1	Reach-1	RS: 1657 Inl Struct: Profile:	PF 1
E.G. Elev (ft)	1558.87	Q Gates (cfs)	
W.S. Elev (ft)	1558.66	Q Gate Group (cfs)	0.00
Q Total (cfs)	300.00	Gate Open Ht (ft)	1557.63
Q Weir (cfs)	300.00	Gate #Open	
Weir Flow Area (sq ft)	76.02	Gate Area (sq ft)	1.00
Weir Sta Lft (ft)	30.54	Gate Submerg	0.00
Weir Sta Rgt (ft)	69.46	Gate Invert (ft)	0.00
Weir Max Depth (ft)	2.71	Gate Welr Coef	0 000
Welr Avg Depth (ft)	1.95		
Weir Coet	2.600	Q Breach (cfs)	
Weir Submerg	0.47	Breach Avg Velocity (ft/s)	
Min: El Weir Flow (ft)	1556.17	Breach Flow Area (sq ft)	
Wr Top Wdth (ft)	38.91		

Culvert Calculator Report RDC Outfall 100yr

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	1,552.00	ſt	Headwater Depth/Heig	ht 137	
Computed Headwater Elev	i 1,551.73	fŧ	Discharge	300.00	cfs
Inlet Control HW Elev.	1,551.51	ft	Tailwater Elevation	0.00	ft
Outlet Control HW Elev	1,551.73	ft	Control Type	Entrance Control	
Grades					
Upstream Invert	1,547.62	fl	Downstream Inveit	1,545.80	ft
Length	375.00	fl	Constructed Slope	0.0048\$3	ft/ft
Hydraulic Profile					
Profile	S2		Depth, Downstream	1.96	ſt
Slope Type	Steep		Normal Depth	1.96	ft
	Supercritical		Critical Depth	2.22	fl
Velocity Downstream	9.56	ft/s	Critical Slope	0.003401	ft/ft
Section					
Section Shape	Вох		Mannings Coefficient	0 013	
Section Material	Concrete		Span	8.00	ft
Section Size	8 x 3 ft		Rise	3.00	ft
Number Sections	2				
Outlet Control Properties					
Outlet Control HW Elev.	1,551.73	ft	Upstream Velocity Hea	d 1.11	ft
Ke	0 70		Entrance Loss	0 78	fl
Inlet Control Properties					
Inlet Control HW Elev.	1,551.51	ſţ	Flow Control	Transition	
Inlet Type 0° win	ngwall flares		Area Full 🗓	48.0	ſt₹
K	0.06100		FIDS 5 Chart	8	
M	0.75000		HDS 5 Scale	3	
С	0.04230		Equation Form	1	
Y	0.82000				

HEC RAS	Plan: RD	C 10yr Rive	c RIVER-1	Reach: 8	each-1 Pi	rofile; PF 1	T	· · · · · · · · · · · · · · · · · · ·		Ţ- <i>-</i>	T	y	Τ	
River Sta		1	T	ì	EG		Flow Area	Top Width	Froude #	LOS Elev	ROB Elev	Flow		Freeboord
rsiver Sta	Q Total (c/s)	(ft)	W.S. Elev	E G. Elev	Slope (IVII)	Vei Chnl (IVs)	(sq fl)	(ft)	1	(II)	(II)	(fl)	Req (ft)	Prov (ft)
4222	105.00	1582.97	1585 13	1585.17	0.000576	1 53	68.79	36 28	0.20	1588 20	1589 30	2.16	1.00	3.07
4172	105	1582.80	1584.97	1585 10 1584 98	0.002851	2.97	35.35	22.87	0.42	1587.82 1587.60	1587.84	2.17	1.00	2.85
4070	105	1582.59	1584.84 1584.67	1584 80	0.003072	3 04 2.93	34.50 35.78	22.78	0.42	1588.00	1588.56 1589.33	2.11	1.00	2.76 3.33
4039	105	1582 53	1584.6B	1584 73	0 000866	1.88	55 86	26,06	0.23	1586 33	1588 98	2.15	1 00	3.65
4004	Culveri		1804.63	160462	0.000304	 	60.00		0 20	1587.99	1588 61	2 30	1,00	
3953 3915	105	1582 33 1582.25	1584 63 1584 50	1584 67	0.002423	1.76 2.81	59 80 37.38	26.06	0 39	1587.90	1588.90	2 25	1.00	3.36
3819	105	1582 04	1584.28	1584.35	0.002524	2.84	36.96	23.33	0.40	1587.90	1589 11	2.22	1.00	3 64
3715	105	1581 80	1583.98	1584 11	0.002715	2.92	35.99	23.06	0.41	1587.80 1587.80	1589.14	2.18	1.00	3 82
3663 3635	105	1581.57 1581.44	1583.07 1583.01	1583.98 1583.92	0.002203	2.70	38.84 40.64	23.84	0.37	1507.70	1588.70 1589.57	2.30 2.37	1.00	3.93
3582	105	1581.19	1583.75	1583.83	0.001308	2 30	45 62	23.80	0.29	1587.23	1587.03	2.56	1.00	3.28
3501	In Struct	1570 OC	37.00.00	1502.63	0.000001			18.55	~~~~~	1507.24	1606.00		4.00	
3579 3564	105	1578.96	1582.52 1582.52	1582.67 1582.62	0.002612	3.10 2.49	33 <u>89</u> 42.23	22.09	0.40	1587.02	1586.88 1586.40	3.56 3.62	1 00	4.36 3.88
3561	105	1579.71	1581 98	1502.56	0 018555	6 1 1	17 18	15.14	1.01	1586 89	1586.40	2.27	1.00	4.42
3467	105	1579.00	1581 01 1580.89	1581.26 1580.98	0.001296	- 3.99 2.33	26 31 45.07	21.11	0.63	1585.10 1583.20	1584 55 1582 91	2.01 2.59	1.00	3.54 2.02
3373	Ini Struct	13/0.30	1300.09	1300 90	0.001290	2.33	45.07	2.10	0.2.3	1,003,20	1302 31-		1.00	2.04
3371	105	1576 07	1579.59	1579.80	0.004030	3.70	28 34	16,12	0.49	1583 38	1502.90	3.52	1.00	3.31
3356 3353	105	1575.82 1576.82	1579.63 1579.12	1579.73 1579.67	0 001645	2 55 5 96	41,25 17 G2	21.67 15.32	0.33 0.98	1583.42	1582.70 1582.64	3,81 2,30	1.00	3.07 3.52
3353	105	1576.82	1579.12	1579.67	0.012316	5.01	20 97	18.69	0.83	1582.40	1582.03	1.87	1.00	3.52
3216	105	1575.79	1577 82	1570.01	0 004652	3 43	30.57	23 21	0.53	1581.40	1580 73	2.03	1 00	2.91
3156 3155	fol Struct	1575 34	1577 75	1577.83	0.001469	2.21	47 48	29 38	031	1580.80	1579 34	2.41	1 00	1.59
3152	105	1572 09	1575.51	1575 63	0.002130	2,71	38 71	22.68	0.37	1578.10	1578.13	3,42	1.00	2.59
3138	105	1571.86	1575 50	1575 59	0 001522	2.39	43 91	24,10	0.31	1577.91	1577.91	3.64	1.00	2.41
3135 3110	105 105	1572.86	1575.19 1574 92	1575.55 1575.28	0 011170	4.84	21.70 21.91	18.59	0.79	1577.86	1577.58	2.33	1.00	2.67 2.66
3014	105	1571.95	1573 91	1574.25	0.010566	4.73	22.21	19.20	077	1576.51	1576 51	1.96	1 00	2.60
2918	105	1571 20	1573 00	1573.30	0.009150	4,42	23.76	20.49	0.72	1575.43	1575.43	1.80	100	2.43
2022	105	1570 50 1570 30	1572 76 1572 73	1572 86 1572 81	0.002187	2.57	40.84 46.08	27 16 28 60	0 37	1574.36 1574.17	1574.36 1574.17	2 25	1.00	1,60
2796	Ini Struct	131000			0.50.123									
2794	105	1568 08	1571.47	1571.59	0.002228	276	38.07	22.48	0.37	1574 12	1574.12	3.39	1 00	2.65
2779 2775	105	1567 85 1568 85	1571.47	1571.56 1571.52	0.001577	2.42 5.09	43.32 20.62	23.90 18.12	0.32	1573.90	1573.90 [2.26	1,00	2 43 2 74
2751	105	1568.66	1570.78	1571 19	0 013134	5.16	20 34	10 08	0.86	1573.52	1573.52	313	1.00	2.74
2668	105	1568.04	1569 85	1570.20	0 010667	4.73	22 21	19.39	0.78	1572.43	1572 43	1.81	1.00	2.58
2505 2561	105	1567.40 1567.20	1569 66 1569 63	1569 77 1569 71	0.002339	2.65 2.28	39.68 46.03	26.50 28.60	0.38	1571.35	1571 35 1571.10	2.43	100	1.69
2559	Inl Struct	}												
2557	105	1564 98	1568.40	1568.51	0 002147	2.72	30 60	22.63	0.37	1571.00	1571.02	3 42	1.00	2.60
2543 2540	105	1564 80 1565.75	1568.39 1568.00	1568 48 1568.44	0.001526	2.40 4.76	43.80 22.08	24.01	0.77	1570.80	1570.80 1570.75	3.59 2.34	1.00	2.41
2515	105	1565,56	1567 83	1568.18	0.010577	4.76	22.06	10 81	0.77	1570.47	1570 47	2.27	1 00	2.64
2408	105 105	1563.97	1566 76	1567.09	0.000827	4.60	22.84 22.84	19 44 20 25	0.75 0.76	1569.32 1569.16	1569.32	3 00	1 00	2.56 2.47
2302 2196	105	1563.17	1565 69 1565 42	1566.02 1565.52	0.010257	4.60 2.55	41.11	27.34	0.76	1567.00	1560 16 1567,00	2.25	1.00	1.58
2196 2171	105	1562.98	1565.39		0.001567	2 55 2 27	46 23	28 80	0 32	1566.72	1566.82	2 41	1.00	1.33
2170 2168	Ini Siruct 105	1560,72	1564 11	1564.23	0 002236	2 76	30 10	22 46	0.37	1566 69	1566.77	3.39	1 00	2.58
2153	105	1560.72	1564 10		0 001615	2.44	42 95	23.88	0.32	1566 53	1566.50	3.60	1.00	2.30
2150	105	1561 49	1563.72		0 014208	5.29	19 86	17 90	0.88	1566.49	1566.49	2 23	100	277
2125	105 105	1561 30 1560.90	1563.32 1562.85	1593.78 1563.13	0 015240	5.47 4.29	19.21	17.54 20.31	0.69	1566.13 1565.33	1565.33	1.95	1.00	2.78 2.48
2015	105	1560.49	1562 73		0 002487	271	38.70	26 11	0.39		1564.49	2 24	1.00	1.76
1990	105	1550 29	1562 71		0 001522	2 25	46 61	20 76	0.31	1564 13	1564.13	2.12	1 00	1.42
1988 1986	Inl Struct	1558 04	1561 43	1561 55	0 002241	2 75	38.07	22.34	0.37	1564.10	1564 00	3 39	1.00	2.65
1972	105	1557.81	1561 42	1561.51	0 001587	2.43	13.20	23.89	0.32	1563.90	1563 86	3.61	1.00	2.44
1969	105	1558 81	1560 99		0.015562	5 50	19.08	17.41	0.93		1563.81	2.18	1.00	2.82
1944 1896	105 105	1558 GD 1558 27	1560.60 1560.24		0 015615 0 007636	5 51 4,17	19.06 25.17	17.52 20.61	0.67		1563.40 1562.69	200	100	2.80
1849	105	1557.92	1560 15	1560 27	0.002592	276	30.04	25 81	0.40	1561.96	1562.00	2.23	1 00	1.01
1824	105	1557.70	1560.13	1560 21	0 001571	2 28	46.04	23 56	0.32	1061.57	1561 60	2 43	1 00	1 44
1822 1821	Int Struct	1555.48	1558.88	1558.99	0 002224	2 76	38 09	22.49	0.37	1561.52	1561 52	3.40	1.00	2.64
1866	105	1555.25	1558.87	1558.96	0 001595	2 43	43 26	23 91	0.32	1561.30	1561 30	3.62	1 00	2.43
1803	105	1556 30	1558.46		0 014548	5 36	19.59	17 75	0.90		1561.25	2.16	1.00	2.74
1778 1731	105 105	1556.06 1555.70	1558.03 1557.69	1558.52	0 00166151	<u>5.63</u> 4.11	18 65 25.52	17.40 20.73	0.96 0.65		1560.90 (1560.13	<u>1 97</u>	1.00	2.83
1683	105	1555.35	1557 60	1557 72	0.002481	2 72	38.65	25 98	0.39	1559.39	1559 40	2 25	1.00	1.79
1658	105	1555.16	1557.58	1557 G6	0.001362	2.28	46.14	28.59	0.32	1559 60	1559 00	2.42	1.00	1.12
1657 1655	Int Struct 105	1552.91	1556.36	1556.47	0 002036	2 66	39 42	22 88	0.36	1550.95	1558.95	3.45	1.00	2.59
1640	105	1552.68	1556.35	1556.44	0.001473	2 36	44.45	24.27	0.31	1550.73	1558.70	3 67	1.00	2.35
1637	105	1553.GB	1556 08	1556.40	0.009380	4.53	23 19	19 30			1558.70	2 40	1.00	2.60
1612	105 105	1553 49	1555 85 1554 94		0.009400	4.53	23.05 23.20	19.23			1558.44 1557 51	2.36	1.00	2.55 2.56
1416	105	1552 00	1354.05		0.009013	1 16	23.54	19.71		1556.58	1556.58	2.05	1.00	2.53
1319	105	1551 28	1553.18	1553 48	0 008959	4.42	23 76	20.13	0.72	1555.65	1555.70	1.90	1.00	2.47
1221 1123	105	1549.80	1552.31 1551.48		0.008793	4.25	24.13	20.68			1554,70 1553,80	1.68	1.00	2.30
1025	105	1549.08	1550 69		0 003034	4 11	25.56	22.38			1552.87	1 61	1.00	2 18
1000	105	15-18 69	1550 16		0.010070	5.55	1393	20.11			1552.63	1.27	1.00	2 47

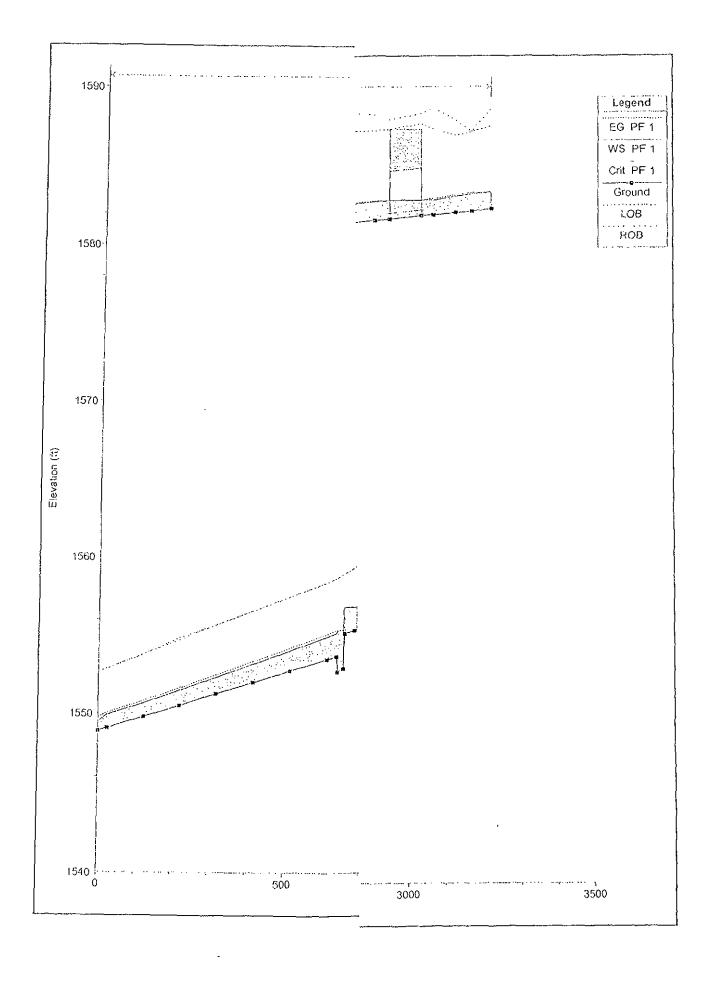


Culvert Calculator Report RDC Outfall 10yr

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	1,552 00	ft	Fleadwater Depth/Fleigl	nt 0.68	
Computed Headwater Elev	1,549.66	ft	Discharge	105.00	cfs
Inlet Control HW Elev.	1,549.48	ft	Tailwater Elevation	0.00	ft
Outlet Confroi HW Elev.	1,549 66	fŧ	Control Type F	Entrance Control	
Grades					
Upstream Invert	1,547.62	ft	Downstream Invert	1,545.80	ſŧ
Length	375.00	ft	Constructed Slope	0.004853	ft/ft
Hydrautic Profile					
Profile	\$2		Depth, Downstream	0.97	ft
Slope Type	Steep		Normal Depth	0.97	ft
Flow Regime	Supercritical		Critical Depth	1.10	ft
Velocity Downstream	6.76	fVs	Critical Slope	0.003298	ft/ft
Section					
Section Shape	Box		Mannings Coefficient	0 013	
Section Material	Concrete		Span	8.00	ft
Section Size	8 × 3 ft		Rise	3.00	ft
Number Sections	2				
Oullot Control Properties					
Outlet Control HW Elev.	1,549.66	ft	Upstream Velocity Head		
Ке	0.70		Entrance Loss	0.39	ft
Inlet Controt Properties					
Inlet Control HW Elev	1,549.48	ft	Flow Control	Unsubmerged	
Inlet Type 0° wi	ngwall flares		Area Full	48.0	ſţ²
K	0.06100		HDS 5 Chart	8	
M	0.75000		HDS 5 Scale	3	
C	0.04230		Equation Form	1	
Υ	0.82000				

Durac Com	0.750	AND CHICK	INC FA	E C 15	E'G.	Marchael	Charles and	Too Mush	Frodige #		المحاورة ا	Flow	Freeboard	Pro
River Sta			W S. Elev		Siope		Flow Area		Chi	LOB Elev	ROB Elev	Depth (ft)	Req	(ft)
4222	(cfs) 30	((1)	(ft)	(ft)	(11/(1)	(IVs)	(sq /t) 30.71	(II) 32 42	0.18	(ft) 1588 20	1509,30	1 06	(ft) 1 00	4.1
4222	30	1532.97	1504 03		0 000583	0.98		16 56	0.39	1587.82	1597.84	1 11	1.00	3 9
4172		1582.80	1:03 91	1583.98	0.002872	2.06	14 57							
4130	30	1502.73	1583.77	1583.85	0 003454	2.19	13.70	16 32	0.12	1587 60	1588 56	1,04	100	3.8
4070	30	1502.59	1503.54	1593 62	0.004075	2.28	13.15	16.72	0.45	1588.00	1589.33	0.95	1.00	14
4039	30	1582 53	1583 53	1583 56	0.000303	1 15	26.13	26.03	0.20	1588 33	1588 98	3,00	1.00	4.8
4004	Culvert						l		L			· 		
3953	30	1532 33	1583.51	1583.53	0 000470	0.97	30.84	26.05	0.16	1587 99	1588 61	1.18	1 00	4.4
3915	30	1532.25	1583 44	1583 49	0 002122	1.86	16 11	16 91	0.34	1587.90	1588 90	1 19	1 00	4 4
3819	30	1582 04	1583 24	1583 29	0.002089	1 84	16 28	17 19	0.33	1587 90	1509,11	1.20	1.00	46
3715	30	1501.80	1503.01	1583 09	0 (01858	1 77	16 95	17.41	0.32	1587.00	1589 14	124	1.00	47
2663	30	1581 57	1582 97	1503.01	0 00 1170	1 50	19.94	18,45	0.26	1587 80	1598 70	1.40	1.00	18
	30	1581 44	1582.95				21.87	19 05	0.23	1587.70	1588 57	1.51	1.00	47
3635	30		1502.95	1582.98	0.000699			10 02						
3582		1581 19	1582 92	1582 94	0.000446	1.09	27.59	19,97	0.16	1507 23	1567.03	1.73	1,00	. 41
3581	Int Struct	Lagrance (ا رسمتیر سا						~~ ~~~	: 225 To 50	- : -:::::			
3579	30	1578.96	1501 45	1531.50	0.001388	1.78	16.88	13.27	0.28	1587 24	1596 88	2 19	1.00	5 4
3564	30	1578 70	1581 45	1581.48	0 000744	1 30	21.70	15.06	0.21	1587.02	1585 40	2 75	100	4.9
3961	30 .	1579 71	1581 09	159 ; 44	0.021934	176	6.30	9 17	1.01	1586 89	1586 40	1.38	100	5.3
3/167	30	1579.00	1560 U8	1580.21	0.007703	3.00	10 01	13.62	0.62	1585 10	1584.55	1.08	1.00	্ৰ্
2374	30	1578 30	1580 05	1580 07	0 000440	1 10	27.40	19 29	0.16	1583 20	1582.91	1.75	1.00	28
3373	Inf Struct			· · · · · · · · · · · · · · · · · · ·	/		ii						[
3371	30	1576 07	1578.55	1578.63	0.002092	2 2	14 15	11,40	0.33	1583 36	1502.90	2.49	100	4.3
3356	30	1575 82	1578 57	1578 60		1 10	21 44	15.62	0.21	1083 42	1592 70	2.75	1.00	4 1
3353	30	1576 82	1578 32	1578 57	0.013852	4.01	7 19	9 99	0.82	1583 22	1582 64	1.50	7.00	13
3276	30	1576.24	1577 25	1577 47	0.014457	3.83	7 83	11 80	003	1582.40	1582.03	1.01	100	47
3216	30	1575.79	1577 04	1577 11	0 002727	3.03 2.01	11 91	16.94	0.38	1581 40	1530.73	1 25	1.00	3.6
3156	30			1577 03		1 07	27 97	23 14	0 17	1580.80	1579 34	1 67	1.00	2.3
		1575 34	1577 01	130,03	0 000516	1.21	21,31	52 27	۲ '.′	. 1200.00			ļ <u>1.</u>	
3155	Int Struct		إسرته رنوي :	[. ـ ـ	ا مدم تاتان نم:		1	16.0		1620 16	-11,70 40	7.30		
3152	30	1572 09	1574.51	1574 55	0.001000	1.55	19 39	16 01	0.25	1578 10	1578 13	2.42	1.00	3.5
3138	30	1571.86	1574,51	1574 53		1 29	23 23	17 46	0.20	1577 91	1577.91	2 65	100	34
3135	30	15/2 (6	1574.32	15/4 51		3 54	8.47	11.69	0.73	1577.86	1577 90	1.46	1 00	3.5
31.10	30	1572.67	1574 03		0 01 1444	3.58	6 37	11.60	0.74	1577.5B	1577 58	1 35	1.00	35
3014	30	1571.95	1573 11	1573 27	0 008627	3 17	9 47	12 87	0.65	1576 51	1576.51	1.16	1 00	3.4
2916	30	1571.20	15/2 [1	1572.29	0 01 1998	3.45	8.69	13.36	0.75	1575 13	1575 43	0.91	1 00	33
7822	30	1570 50	1572 00	1572 03	0.000924	1 33	22 51	21.08	0.23	1574 36	1574 36	150	1.00	2.3
2797	30	1570 30	1571.99	1572 01	0.000550	1.11	27 11	22 70	0 18	1574.17	1574 17	1 69	1.00	2.1
2796	Int Struct			1,777.	***	i		· · · · · · · · · · · · · · · · · · ·	: {		}		ii	
2794	30	1568 08	1570 18	1570 52	0 001158	1.58	19.02	15.88	0 25	1574 12	1574.12	2.40	100	3.6
2779	30	1567 85	1570.49		0 000696	7.31	22 93	17 29	0.20	15/3.90	1573 90	2 63	1.00	3 43
2776	30	1568 05	157U 25	1570 48		3 72	8.07	11 51	0.78	1573 85	1573.85	1 41	1 00	3.5
2751	30	1568 66	1569.98	1570.17		3 53	8 49	1170	0.73	1573 52	1573 52	1 32 "	100	3.5
-2631							8 27	12 62	079	1572 13	15/2 43	094	1 00	3 45
2668	30	1568.04	1568.98		0.013124	3 63								
2585	30	156/ 40	1568 90		0.000995	1.38	21 80	20 55	0.24	1571 35	1571 35	1 50	1 00	2.1
2551	30	1557 20	15681 89	1558 91	0 000554	_1.11_ {	27 02	22 64	0.18	1571 97	1571 10	1 69	100	3 18
2559	Inf Struct					., . <u></u> i						!	i	
2557	30	1564,98	1567 40		0.001101	1.55	19 39	16 03	0.25	1571 00	1571 02	2.42 2.60	1 00	3.60
2543	30	1551.80	1567 40		0 0000377	1.20	23 24	17.54	0.20	1570.00	1570 80	2.60	100	3 40
2540	30	1505 75	1567 22		0.010545	3.43	8.75	12 01	071	1570 /5	1570.75	1 47	1.00	3 5
2515	30	1565 5G	1566 90	1567 11	0 012611	3 72	B 07	11_40	0.78	15/0 17	1570 17	134	100	3.5
2403	30	1564 76	1536,00	1566 13	0.006811	2.91	10.31	13 31	0.58	1569 32	1569 32	1 24	100	3 3;
2302	30	1563 97	1564.77	1/365.01	0 017535	3 93	7 63	12.86	0.00	1568 16	1558.16	0.80	100	3 3
2196	30	1563 17	1564.67		0.0008891	1 31	22.89	21 35	0.22	1567 00	1567 00 1	1 50	3 00	2.3
2171	30	15xi2 98	1564 66		0 000535	109	27 41	22.89	0 ល	1566 72	1566 82	1 60	1 00	200
2170	In Struct	: • •		100,100										
	30	1560 72	1802.13	1462 16	naniisa)	1 57	19 09	15 94	0.25	1565 69	1566 77	2 40	100	3.5
2166	30		1563.12	1563 16			72 62	17.38	0.20	1566.53	1566 50	2.62	1.60	3.30
_2153[1563,12	1563 14		1.33		11.24	0.20	1566 49		1.40	1 00	
2150		1561 49				3.79	791				1566.10			3 60
2125	30	1561 30	1562.48	1562 74	0 016579	4 12	7.28	10.87	089	1566 13	1565.10	1.18	1.00	3.6
2071	30	1560 90	1562.04	1562 16	0.000503	2.82	10.62	13.83	0 57	1565.33	1555.33	114	1 00	3 2
2015	30 30	1560,49	1561 9B		0.001053	1.41.	21 28	20.18	0.24	1564 49	1564 49	1 49	1.00	25
1990		1560 29	1561 97	1561 99	0.000524	1 09	27.56	22.82	0.17	1564.13	1564 13	. 168	1.00	. 2, 10
	In Sinici	[!					ايوپ	<u></u>		_	
1986	30	1558 04	1530 44		0.001137	157 (19 12	15.75	0.25	1564 10	1564 08	2 10	1 00	35
1972	30	1557.81	1560 43		0 000718	1 32	22 78	17 47	0 20	1583.90	1563 86	2 62	1 00	3 43
1969	35	1558.81	1560.20		0014411	3 90	7 70	11 13	0.83	1563 81	1563 81	1 39	`i ∞	36
1944	30	1558 60	1559 76		0.017505	7 19	7 15	10.81	0.51	1563 43	1553 40	1 16	1 00	3.64
1896	30	1558 27	1559 45		0 (X)5 (199	2 65	11 31	14 33	0.53	1562 69	1562.69	1 18	100	32
18-19	· 35 · \	1557 92	1559 40		0 001095	143	20.93	19 93	0.25	1561.96	1562.00	1 49	100	250
1824	30	1557 70	1559 39		0.000541	1 10	27 22	22.65	0.18	1561 57	1561 60	1 69	100	2 18
	In Sinici				- : *:****	·····								
1821	30	1555 48	1557 89	1557 53	0 001132	156	19 19	15.91	0 25	1561 52	1561 52	241	100	3 60
1806		1555 25			0.000596	1 30	23 03	17 36	0.20	1561 30	1551 30	2.64	1 00	34
	30		1557 89								1581.25	1.37		
1803	30	1556,30	1557 67	1557 (2)	0.012/97	3.73	0.04	11.41	0.70	1561 20		; ;;;}		3 5
1778	30	1556 06	1557 19		0.019991	4 40	5.82	10 61	0.97	1560.86	1560 90	1 13	1 00	3 67
1731	30	1555 70	1556,90	1557 00	0 005023	2 57	11 67	14.19	0.50	1560.13	1560 13	1 20	1 00	3.2
1683	30	1555 35	1555.86	1556 69	0.001013	1 39	21 52	20 15	0.21	1559 39	1559 40	151	1.00	2.53 2.15
1658	30	1555.16	1556,85	1556 87	0 000529	1 00	27 49	22 BO	0.18	1559 00	1559.00	1.69	1.00	. 215
	In Struct							í					ľ	
1655	30	1552 91	1555 35	1555 39	0.001018	1 52	19.77	16 24	0.24	1558 95	1558 95	2 44	1.00	3 80
1640	30	1552.68	1555 35		0 000362	1 28	23 46	16 24 17.G5	0.20	1558.73	1558,70	2.67	100	3.3
		1553 68			ö 000000 Ö 00000	337	9.07	12 03	0.20	1558 58	1558.70	7 50	1.00	3.50
1537	30 30		1555 18								1558.44			
1612		1553.49	1554.95		0.000333	3.33	9 02	12 00	0.68	1558.40		1.46	1.00	3 <u>45</u>
1514	30	1552 76	1554.05		0.009165	3 29	9.12	12.23	0.67	1557 50	1557,51	1 29	100	3,45
1416	30 [1552.00	1553,18		0 0087001	3 19	941	12.74	0 65	1556 58	1556 58	1.18	1 00	3.40
1319	30	1551 28	1552 32		0 008819	3 15	9.53	13 33	0.66	1555.65	1555.70	104	100	3 3
	30	1550.50	1551 50		0.008351	3.03	9.91	14 12	0.64	1554 85	1554 70	100	100	3 20
1.441		1549.60	1550 68		0.003631	2 99	10.04	15 02	0.64	1553.79	1553 80	0.88	100	311
1221	30 1													
1123	30 30 30	1549.08	1549 94		0 005972	2 71	11 08	16 36	0.58	1552 87	1552.87	0.86	100	2 93



Culvert Calculator Report RDC Outfall 2yr

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	1,552.00	ft	Headwater Depth/Heigh	nt 0.29	
Computed Headwater Elev	7.548.50	ft	Discharge	30.00	cfs
Inlet Control HW Elev.	1,548.42	ft	Tailwater Elevation	0.00	fţ
Outlet Control HW Elev.	1,548.50	ít	Control Type 6	Entrance Control	
Grades					
Upstream Invert	1,547.62	ft	Downstream Invert	1,545 80	ft ft
Length	375.00	ft	Constructed Slope	0 004853	ft/ft
Hydraulic Profile					
Profile	S2		Depth, Downstream	0.44	lt
Slope Type	Steep		Normal Depth	0 44	ft
Flow Regime	Supercritical		Critical Depth	0.48	ſŧ
Velocity Downstream	4.28	ft/s	Critical Slope	0 003661	tVII
Section					
Section Shape	Вох		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3 00	ſţ
Section Size	8 x 3 ft		Rise	3.00	ſţ
Number Sections	2.			· · · · · · · · · · · · · · · · · · ·	<u></u>
Outlet Control Properties					
Outlet Control HW Elev	1,548 50	fŧ	Upstream Velocity Head	0.24	ft.
Ke	0.70		Entrance Loss	0.17	ft
Inlet Control Properties					
Inlet Control HW Flev	1,548.42	ſŧ	Flow Control	Unsubmerged	
Inlet Type 0° w)	ngwall flares		Area Full	48.0	ft²
К	0.06100		HDS 5 Chart	8	
М	0.75000		HOS 5 Scale	3	
C	0.04230		Equation Form	1	
Υ	0.82000				

APPENDIX C

Erosion Protection

Level | Scour

Site: Interim Regional Drainage Channel

Location: Scottsdale, Arizona

Description: Rip Rap Design Calculations

Date: 9/16/2008

Level 1 Analysis of Stream Degradation

Reference: ADWR, Flood Warning and Dam Safety Section, 1996. State Standard 5-96: "Watercourse System Sediment Balance - Guideline 2:

Channel Degradation Estimation for Alluvial Channels in Arizona"

Assumptions: Channel reaches without major disturbances, such as dams and bridges.

Equations: Ds = Dgs + Dlts

where:

Ds ≈ total scour depth, in feet;

Dgs = general degradation, in feet;

Dlts = long term degradation, in feet;

For straight channel reaches:

Dgs ~ 0.157*Q100^0.4

For channel reaches with ourvature:

Dgs = 0.219*Q100^0.4

Long term degradation:

 $Dlts = 0.02*Q100^0.6$

Project Name: Regional Drainage Solution Location: Scottsdale

Input Data:

Q100 = 300 cfs

Ds ≈ 2.15 ft for straight channel

Ds = 2.76 ft otherwise

Recommended Scour Depth: 3.0 ft

Note: the minimum total scour depth, Ds, shall be 3 feet.

Bend Scour Calculation

Site: Interim Regional Drainage Channel

Location: Scottsdale, Arizona

Description: Bend Scour Design Calculations

Date: 9/16/2008

Bend Scour Calculation Sheet

Reference: ADWR, Design Manual for Engineering Analysis of Fluvial Systems, 1985 p5 105-5,110

Project Name, Regional Drainage Solution

Wood/Patel # 073022

Scour Depth Equation:

Zbs = $(0.0685^{\circ}Y^{\circ}V^{\circ}0.8)[2.1^{\circ}(\sin^{2}(a/2)/\cos(a))^{\circ}0.2^{-1}]/(Yh^{\circ}0.4^{\circ}Se^{\circ}0.3)$

there Zbs = bend scour component of total scour depth (ff)

V = mean velocity of upstream flow (fps)

Y = maximum depth of upstream flow (ft)

Yh = hydraulic depth of upstream flow (ft)

Se = upstream energy slope (bed slope for uniform flow conditions, (VII)

a = angle formed by the projection of the channel centerline from the point of curvature to a point which meets a fine tangent to the outer bank of the channel (degrees)

Scour Length Equation

 $X = 2.3*(C/g^{0.5})*Y$

Scour Depth:

Where X = distance from the end of channel curvature (point of rangency P T) to the downstream point at which secondary currents have dissipated (ft)

C = Chezy coefficient = 1 486*R*(1/6)/n

g = gravitational acceleration (32.2 ft/s²)

Y = depth of flow (to be conservative, use maximum depth of flow, exclusive of scour, within the bend) (ft)

Input Data

V =	4.1	(It/s)	n =	0.035	
Υ≃	3.56	(fl)	A≈	73,54	(fl^2)
Yh ∺	2 3 5	(ft)	P≈	33	(ft)
Se =	0.003104		R ≈	2 23	(ft)
a =	40	(degree)	C ≈	48.52	
		Stable bank sid	de slope =	3	(H:V)

Computed Scour Values

Zbs =	1.34 (8)	X =	70 (ft)	W =	4.0 (11)

Scour Width:

Scour Length:

Rip Rap Design

Site: Interim Regional Drainage Channel

Location: Scottsdale, Arizona

Description: Rip Rap Design Calculations

Date: 9/15/2008

Riprap Design Spreadsheet

References: Department of the Army, U.S. Army Corps of Engineers,

Engineering and Design Hydraulic Design of Flood Control Channels. No. 1110-2-1601, Dated 30 June 1994, Chapter 3 (Riprap Protection)

US DOT, FHWA, Highways in the River Environment Hydraulic and Environmental Design Considerations May 1975, pVI-24, (Suggested gradation for riprap).

$$D_{30} = S_f C_S C_{\nu} C_{\tau} d \left[\left(\frac{\gamma_w}{\gamma_S - \lambda_w} \right)^{1/2} \frac{V}{\sqrt{K_1 g d}} \right]^{2.5}$$

Project Name: Interim Regional Drainage Channel

Location: Inlet Driveway Culvert

Inlet Riprap Size

Safety Factor, S _f	1.3
Stability Coefficient, C _s	0,375 (Assume rounded rock)
Vertical Velocity Dist., C√	. : 1.00
Thickness Coefficient, C _T	1.00
Local Depth, d	3.94 ft
Unit Weight of Water, γ _w	62.4 lbs/ft ³
Unit Weight of Stones, γ _s	165 lbs/ft ³
Local Velocity, V	3.6 ft/sec
Bank Angle With Horizontal, θ	18.43 °
Rip Rap Angle of Repose (Fig 6-8), Ф	37 °
Bank Angle Correction Factor, K ₁	0.8509
Computed Riprap Size, D ₃₀	0.9 inches
Computed Riprap Size, N ₅₀	1.3 inches
Computed Riprap Size, D ₁₅	0.6 inches
Computed Riprap Size, D ₈₅	2.0 inches

Design Riprap Size, D₅₀ 9 inches TYPE I

Rip Rap Design

Site: Interim Regional Drainage Channel

Location: Scottsdale, Arizona

Description: Rip Rap Design Calculations

Date: 9/15/2008

Riprap Design Spreadsheet

References: Department of the Army, U.S. Army Corps of Engineers,

Engineering and Design Hydraulic Design of Flood Control Channels. No. 1110-2-1601, Dated 30 June 1994, Chapter 3 (Riprap Protection)

US DOT, FHWA, Highways in the River Environment Hydraulic and Environmental Design Considerations May 1975, pVI-24, (Suggested gradation for riprap).

$$D_{30} = S_f C_S C_{\nu} C_T d \left[\left(\frac{\gamma_w}{\gamma_S - \lambda_w} \right)^{1/2} \frac{\nu}{\sqrt{K_1 g d}} \right]^{2.5}$$

Project Name: Interim Regional Drainage Channel

Location: Channel Bend

Inlet Riprap Size

Safety Factor, S _f	1.3	
Stability Coefficient, Cs	0.375 (Assume ro	unded rock)
Vertical Velocity Dist., C _v	1.15	
Thickness Coefficient, C _T	1.00	
Local Depth, d	3.56 ft	
Unit Weight of Water, γ _w	62.4 lbs/ft ³	
Unit Weight of Stones, γ _s	: 165 lbs/ft³	
Local Velocity, V	4.1 ft/sec	
Bank Angle With Horizontal, θ	18.43 °	
Rip Rap Angle of Repose (Fig 6-8), Ф	39 °	
Bank Angle Correction Factor, K₁	0.8647	
Computed Riprap Size, D ₃₀	1.4 inches	
Computed Riprap Size, D ₅₀	2.1 inches	
Computed Riprap Size, D ₁₅	0,9 inches	
Computed Riprap Size, D ₈₅	3.1 inches	
Design Riprap Size, D ₅₀	9 inches	TYPEI

Rip Rap Design

Site: Interim Regional Drainage Channel

Location: Scottsdale, Arizona

Description: Rip Rap Design Calculations

Date: 9/15/2008

Riprap Design Spreadsheet

References: Department of the Army, U.S. Army Corps of Engineers,

Engineering and Design Hydraulic Design of Flood Control Channels. No. 1110-2-1601, Dated 30 June 1994, Chapter 3 (Riprap Protection)

US DOT, FHWA, Highways in the River Environment Hydraulic and Environmental Design Considerations May 1975, pVI-24, (Suggested gradation for riprap).

$$D_{30} = S_f C_S C_V C_T d \left[\left(\frac{\gamma_w}{\gamma_S - \lambda_w} \right)^{1/2} \frac{V}{\sqrt{K_1 g d}} \right]^{2.5}$$

Project Name: Interim Regional Drainage Channel Location: Culvert Under Scottdale Road

Inlet Riprap Size

Design Riprap Size, D₅₀

Safety Factor, S _f Stability Coefficient, C _s Vertical Velocity Dist., C _v Thickness Coefficient, C _f Local Depth, d Unit Weight of Water, γ _w Unit Weight of Stones, γ _s Local Velocity, V Bank Angle With Horizontal, θ Rip Rap Angle of Repose (Fig 6-8), Φ Bank Angle Correction Factor, K ₁ Computed Riprap Size, D ₃₀ Computed Riprap Size, D ₅₀	1.3 0.375 (Assume rounded rock) 1.00 1.00 2.84 ft 62.4 lbs/ft ³ 165 lbs/ft ³ 5.0 ft/sec 14.1 ° 37 ° 0.9144 1.9 inches 2.9 inches
Computed Riprap Size, D ₅₀ Computed Riprap Size, D ₁₅ Computed Riprap Size, D ₈₅	2.9 inches 1.3 inches 4.4 inches

TYPE I

9 inches

Rip Rap Design

Site

Interim Regional Drainage Channel

Location:

Scottsdale, Arizona

Description: Rip Rap Design Calculations

Date:

9/15/2008

Riprap Design Spreadsheet

References: US DOT, FIIWA, Highways in the River Environment

Hydraulic and Environmental Design Considerations

May 1975, pVI-24.

US DOT, FHWA, Hydraulic Design of Energy Dissipaters

for Culverts and Channel. Sept. 1983, pl1-5-11-9.

FCDMC, Drainage Design Manual for Maricopa County Arizona, Vol. II - Hydraulics. January 1996, p5.75-5.77.

Project Name: Project #:	Interim Regional Dramage Chantel 073022	Structure ID: Culvert Size:	Union Hills Outlet 3- 8'x3' CBC
1. Riprap Size	c D50		
	Max, flow width Wo =	24.00 ft	
	Max, culvert flow depth h =	3.00 ft	
	Tailwater depth TW :=	3.00 ft	
	Exit Velocity Ve =	4.16 fps	
	Tailwater velocity Vd ≈	2.20 fps	normal
	Wash bottom width =	25.00 ft	
	Computed Riprap Size D50 :=	1.2 in	
	Design Riprap Size D50 =	9 in	
	Sieve Size =	ТҮРЕТ	
2. Riprap Size	es D15 and D85		
	Design Riprap Size D15 =	4 in	
	Design Riprap Size D85 ≈	14 in	
3. Riprap Apa	ron Length		
	Riprap Apron Length =	14 (t	
4. Riprap Apt	on Width		
	Min. Riprap Apron Width =	30 ft	
	Max. Riprap Apron Width =	31 ft	
5. Riprap Thi	ckness		
	Riprap Thickness =	36 in	
6. Total Ripra	p Yolume		
	Riprap Rock Volume =	46 CY	
Please note field	ds highlighted are input values from the	: Culvert Modeling Summ	arv

Rip Rap Design

Site:

Interim Regional Drainage Channel

Location:

Scottsdale, Arizona

Description: Rip Rap Design Calculations

Date:

9/15/2008

Riprap Design Spreadsheet

References: US DOT, FIWA, Highways in the River Environment

Hydraulic and Environmental Design Considerations

May 1975, pYI-24.

Max, flow width, Wo =-

US DOT, FIIWA, Hydraulic Design of Energy Dissipaters

for Culverts and Channel. Sept. 1983, pll-5-II-9.

FCDMC, Drainage Design Manual for Maricopa County Arizona, Vol. II - Hydraulics. Junuary 1996, p5.75-5.77.

Structure ID: Driveway Outlet Project Name: Interim Regional Drainage Channel Culvert Size: 3-8'x3' CBC Project#: 073022

24.00 ft

normal

I. Riprap Size D50

	Max, culvert flow depth h =	3,00	U
	Tailwater depth TW =	3.00	
	Exit Velocity Ve =	4.17	fps
	Tailwater velocity Vd =	3.05	fps
	Wash bottom width =	25.00	ſt
	Computed Riprap Size D50 =	12	in
	Design Riprap Size D50 =	9	in
	Sieve Size =	TYPE I	
Riprap Size	s D15 and D85		
	Design Riprap Size D15 =	4	in
	Design Riprap Size D85 :=	[4	in

Design Riprap Size D85 =

2.

3. Riprap Apron Length 8 ft

Riprap Apron Length -4. Riprap Apron Width

> Min. Riprap Apron Width = 30 ft 31 ft Max. Riprap Apron Width =

5. Riprap Thickness

Riprap Thickness = 36 in

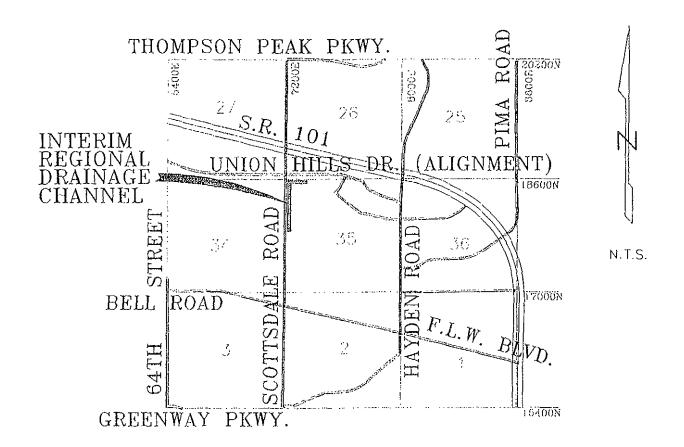
6. Total Riprap Volume

Riprap Rock Volume = 26 CY

Please note fields highlighted are input values from the Culvert Modeling Summary

EXHIBIT I

Vicinity Map



INTERIM REGIONAL DRAINAGE CHANNEL

Exhibit 1 Vicinity Map WOOD/PATEL,

AND DEVILORMENT * WATER RESOURCE

TRANSPORTATION, TRANSPORT

WANTED PARTITIONED AND SERVICE CONSTRUCTION MANAGEMENT

(002) 335-8500

EXHIBIT 2

FEMA Map

