DRAINAGE IMPROVEMENTS
FOR
ROSE GARDEN LANE

City Solicitation No. P-04-0057
City Engineering Project No. SS-0203

OUTFALL ALIGNMENT STUDY
AND
NUISANCE FLOW EVALUATION

September 2005

WP #042161.05

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1.0 INTRODUCTION

1.1 General Background

In June 2004 the City of Peoria and the Flood Control District of Maricopa County (FCDMC) contracted with Wood, Patel & Associates, Inc. (Wood/Patel) to provide a Concept Refinement Study for the Rose Garden Lane drainage improvements. The Rose Garden Lane drainage system is one of the three drainage projects for the Northwest Region recommended in the Glendale/Peoria ADMP Update. The Concept Refinement Study limits are approximately from the Agua Fria River to the west, Rose Garden Lane to the south, Williams Road alignment to the north, and 95th Avenue to the east. Rose Garden Lane channel is designed to convey surface runoff of the 100-year storm event from the study area into Agua Fria River to the west. See Plate 1.

In addition to the Concept Refinement Study, two added issues needed to be addressed:

- As part of the Rose Garden Lane drainage improvements, an outfall alignment study for the Rose Garden Lane channel wash was authorized. The alignments to be evaluated include routes in addition to that shown in the ADMP Update. The additional alignments include routing to the north either on the Sun State Rock property or ASLD property, routing further south and along Rose Garden Lane, routing south to Beardsley Road and then in the Beardsley Channel, and extending the ADMP route further west and into the Agua Fria River. One or more of these alignments may be combined so that lower flows are routed in one path and higher flows in another.

- The Rose Garden Lane crossing of the Agua Fria River is approximately at grade within the river bottom. The impact of the diverted flow on the Rose Garden Lane crossing near 115th Avenue in the Agua Fria River bottom was evaluated because that roadway serves as the only means of access to a number of properties west of the river.

1.2 Purpose

The purpose of this study is to evaluate and to make recommendations for an outfall alignment of the Rose Garden Lane channel. It estimates the amount of flows reaching the Rose Garden Lane crossing from upstream of the Agua Fria River watershed as well as from the project. It also evaluates the hydraulic impact of the additional flow from the project on the Rose Garden Lane crossing.

The Concept Refinement Study limits are approximately from the Agua Fria River to the west, Rose Garden Lane to the south, Williams Road alignment to the north, and 95th Avenue to the east. The project lies within the City of Peoria, as shown on Plate 1.

The area north of Pinnacle Peak Road is mainly characterized by steep hills draining into flat valleys. Some of the flood water from areas north of Pinnacle Peak near 91st Avenue flows south to Deer Valley Road on the west side of the 91st Avenue. This flow has some impact to the proposed drainage system improvements of the project. Storm water from areas east of 91st Avenue between Pinnacle Peak Road and Beardsley Road flows south and/or east and does not have significant impact to the project site. Under existing conditions, storm runoff flows south and west either as sheet flow or in natural washes or man made channels. A majority of the flow is intercepted by the Beardsley Road channel and conveyed to the Agua Fria River.

The Concept Refinement Study investigates alternatives for providing flood protection west of 95th Avenue along Rose Garden Lane corridor and 107th Avenue corridor between Rose Garden Lane and Williams Road and develops probable cost estimates for each of the alternatives. Conceptual design plans are prepared for the preferred alternatives.

Phase I in the overall project of the Rose Garden Lane drainage improvements is a channel which begins west of Lake Pleasant Road and discharges into the Agua Fria River. Design work is currently underway on the Rose Garden Lane channel as proposed in the ADMP Update.

2.3 Agua Fria Watercourse Master Plan

The Agua Fria River is characterized by large flood flows, high sediment transport, and a floodplain that can migrate radically from side-to-side during large events. The historic flow regime has been altered by Lake Pleasant, which greatly reduces flood peaks and sediment inflow from the upper watershed, and by disturbances to the river due to development, including large scale extraction of high quality aggregates. Development pressures along the Agua Fria corridor increase potential threats from both the floodplain and the hazard of lateral migration of the river.

In response to the changing river character and the increasing potential for flood damages to existing and new development, the Flood Control District of Maricopa County initiated the Agua Fria Watercourse Master Plan, resulting in a Final Recommended Plan, issued in November 2001. The Agua Fria Watercourse Master Plan encompasses an area of the greater Phoenix metropolitan area generally known as the "West Valley". The Agua Fria River is over 100 miles long, extending from central Arizona near the City of Prescott to the confluence with the Gila River near the City of Avondale. The Watercourse Master Plan encompasses the 35-mile reach from the New Waddell Dam to the Gila River. Between the New Waddell Dam and the Gila River, the Agua Fria River flows through the Cities and Towns of Peoria, Glendale, Surprise, El Mirage, Youngtown, Phoenix and Avondale. Land uses along the River vary from undeveloped desert canyons to urbanized areas to extensive gravel mines to agricultural fields. The purpose of the Watercourse Master Plan is to establish a long-term planning document for future development near the River. The goals of the master plan are flood control and public safety, conservation of habitat, and incorporation of multi-use recreational facilities.

Kimley-Horn and Associates (KHA) created supplemental hydrologic models as part of the master planning process. The models are intended for planning uses only and should not be used for regulatory purposes. The supplemental models were created to evaluate the effectiveness of the existing retention policies within the watershed and flood-wave attenuation in the river as it relates to encroachment of the floodplain.

The Agua Fria River watershed is approximately 2,250 square miles in size. The New Waddell Dam, constructed in 1991, cuts off the upper 1,459 square miles of the watershed. Although the dam does not have dedicated flood control space, the U.S. Army Corps of Engineers determined that for a 100-year flood the dam provides a greater degree of downstream flood protection. The greater degree of protection is reflected in the hydrologic modeling. The capacity of the dam at an elevation of 1,725 feet is 1,101,000 ac-ft, but the normal "pool" elevation is 1,694 feet. The primary function of New Waddell Dam is to supply and store waters from the Central Arizona Project Canal, and capture surface waters from the River. Flooding on the river through the West Valley is generally the result of runoff emanating from downstream of the dam; however, in very large flood events a significant discharge from the dam is possible.

The upper reach, New Waddell Dam to Bell Road, is generally undeveloped desert from the dam to Jomax Road. The area from Jomax Road to Bell Road has several large sand and gravel mines within the floodway and floodplain fringe. Residential development has occurred in the lower portion of this reach, primarily on the east overbank area.

The U.S. Army Corps of Engineers, Los Angeles District, established the regulatory hydrology for the River in July 1995. The hydrology is documented in the report "*Hydrologic Evaluation of New Waddell Dam on Downstream Peak Discharges in the Agua Fria River.*" The Corps' hydrology reflects the construction and accepted operation of the New Waddell Dam and is the basis for current regulatory discharges on the Agua Fria River. Another study, "*Hydrology for Evaluation of Flood Reduction by New Waddell Dam, Agua Fria River below New Waddell Dam to the New River Confluence*", 1988, describes the hydrologic design parameters of the River and New Waddell Dam.

2.4 Agua Fria Watercourse Master Plan Channelization Alternative

The Agua Fria Watercourse Master Plan Channelization Alternative serves as an addendum to the Agua Fria Watercourse Master Plan. This amendment addresses a master plan alternative – an approach that channelizes the river to a 1,200-foot wide river corridor to ensure flood control protection while accommodating a continuous recreational corridor and seamless public interaction with the river. Sand and gravel mining activity is a key component in establishing the channel, providing much of the channel excavation and rough grading. Once the channel is constructed mining activities will be primarily limited to lands outside of the corridor. The channelization will also eliminate flooding potential on lands outside of the channel, greatly reducing risks to public infrastructure and creating additional development opportunities on land previously designated as floodplain area.

The multi-stage channel alternative proposes to channelize the river to a 1,000-foot channel with 100-foot landscaped buffers on both banks. Rather than a conventional trapezoidal channel, the channel design for this alternative will be 'multi-staged', comprised of a 500-foot wide flood channel and a 500-foot wide vegetated midlevel terrace.

3.0 ROSE GARDEN LANE CHANNEL OUTFALL ALIGNMENT STUDY

3.1 Characteristics of Channel Outfall

The alignment for the outfall of the Rose Garden Lane channel into the Agua Fria River was originally established in the Glendale/Peoria ADMP and further refined in the Glendale/Peoria ADMP update. Immediately west of 111th Avenue the channel alignment deviates from a course parallel with Rose Garden Lane and veers off northwesterly to tie into an existing wash that outfalls into the Agua Fria River.

During the Concept Refinement Study for the Rose Garden Lane drainage improvements, Wood/Patel contacted the private property owner, Sun State Rock, and found that the owner plans to use the parcel over which the outfall wash crosses for mining purposes and is opposed to the proposed ADMP channel alignment because it would bisect their parcel, making mining the parcel difficult.

In light of this development, an alternative outfall alignment study for the Rose Garden Lane channel was authorized. The ADMP alignment has the benefit of being the most direct path to an outfall in the Agua Fria River and is aligned with the fall of the land to minimize cut. However, this alignment has a significant detrimental effect on the ability of Sun State Rock to perform mining operations on the remainder of the parcel. Therefore, in addition to the ADMP alignment, the alternative alignments to be studied included the following: 1) routing to the north on the Sun State Rock property to another existing wash; 2) routing to the north on ASLD property to the other existing wash; 3) extending the ADMP alignment north of and parallel with Rose Garden Lane; 4) an alignment south of and parallel with Rose Garden Lane; and 5) an alignment south to Beardsley Road and then into the Beardsley Channel. These alternative alignments are shown on Plate 2. One or more of these alignments may be combined so that lower flows are routed in one path and higher flows in another.

3.2 Channel Outfall Alternative 1

In this alternative, proposed by Sun State Rock, the outfall channel would transition from a westerly alignment to a northerly alignment along the east property line of and within the Sun State Rock parcel. The channel would tie into an existing wash located at the northeast corner of the property. This alignment has the benefit of reducing the

limitations to mining the parcel compared with the ADMP alignment. This alternative will also require approval to cross an electric transmission line corridor located near the eastern edge of the parcel for a greater length than with the ADMP alignment.

3.3 Channel Outfall Alternative 2

This alternative is similar to Alternative 1 except the channel would be located on an Arizona State Lane Department (ASLD) parcel immediately east of the Sun State Rock parcel. This alignment will require crossing the transmission line corridor with a length similar to Alternative 1, and crossing a small portion of the Sun State Rock parcel in order to tie into the existing wash. This alternative was discussed briefly with ASLD representative, Dempsey Helms, and his initial reaction is that ASLD would probably not be receptive to allowing the channel to proceed north on their parcel since it is not the historical flow route.

3.4 Channel Outfall Alternative 3

This alternative would have the storm water conveyance system continue to the west immediately north of and parallel with Rose Garden Lane. The benefit of this alternative is that it would not adversely affect the mining on the Sun State Rock parcel. The disadvantage is that there is only a small strip of land between Rose Garden Lane and the high voltage towers and the terrain falls off sharply west of the transmission corridor. Therefore, this alternative would need to be conveyed in a closed conduit for at least the portion until flatter grades are reached.

In addition, flow from this system would outfall immediately north of Rose Garden Lane. Since Rose Garden Lane is an at-grade crossing at the bottom of the Agua Fria River, it may be necessary to construct a culvert under Rose Garden Lane at this location.

3.5 Channel Outfall Alternative 4

This alternative is similar to Alternative 3, except that it would cross over to the south side of Rose Garden Lane Avenue in a closed conduit and would discharge into the Agua Fria River south (downstream) of the road crossing. Therefore, a culvert would not be required at the crossing. A significant portion of the system will still need to be conveyed in an expensive closed conduit.

3.6 Channel Outfall Alternative 5

This alternative would convey flows to the south along the 111th Avenue alignment to the Beardsley Channel and ultimately to the Agua Fria River. There are several options for conveying this flow to the south: 1) by taking advantage of the capacity of the existing storm drain channel along the west side of Ventana Lakes; 2) by constructing a new conveyance system within 111th Avenue.

There are significant concerns with both of these options. The existing channel lies within Ventana Lakes, Unit 9. The channel is located across privately owned lots that back up to 111th Avenue. Permission would be required from each of these property owners to incorporate this channel into a regional drainage solution. The Ventana Lakes channel also has limited capacity and cannot convey the entire Rose Garden Lane design flow. Therefore, a storm drain system to the Agua Fria River at or near the Rose Garden Lane alignment would still be required.

There is an existing 36-inch sanitary sewer line in the 111th Avenue alignment so there is not enough right-of-way to construct a new channel to convey the design flow. It might be feasible to construct a storm drain along this alignment but this closed conduit would be approximately ½ mile long and would be costly.

Another major concern with this alternative is that the Beardsley Channel receiving these flows has been designed and constructed based on the ADMP, and does not include flows from the Rose Garden Lane system. Unless the Beardsley Channel capacity was upsized as part of this project, the system can only accommodate a portion of the initial flow from the Rose Garden Lane system. Peak flows would still need to be conveyed to the Agua Fria River by the Rose Garden Lane system.

3.7 Summary and Conclusions

A Preliminary Opinion of Probable Cost was prepared for each of the alternatives described above and is included in Appendix 4.

A decision matrix was developed to evaluate each alternative using factors such as cost, constructability, public acceptance and agency acceptance (City of Peoria, FCDMC, and ASLD) as shown in Table 3.

Alternative 5 is the most problematic and costly solution. Alternatives 3 and 4 require a significant portion of the systems to be closed conduit, rendering them more cost prohibitive. Alternative 2 is not supported by ASLD and the ADMP alignment is not supported by Sun State Rock. Therefore, as shown in Table 3, Alternative 1 best fulfills the goals of the project and, with the exception of the ADMP alignment, has the lowest probable cost.

4.0 ROSE GARDEN LANE CHANNEL NUISANCE FLOW EVALUATION

4.1 Characteristics of Agua Fria River at Rose Garden Lane

As previously described, the Agua Fria River is characterized by large flood flows, high sediment transport, and a floodplain that can migrate radically from side-to-side during large events. The historic flow regime has been altered by New Waddell Dam and Lake Pleasant and greatly reduces flood peaks and sediment inflow from the upper watershed. The area near Rose Garden Lane has several large sand and gravel mines within the floodway and floodplain fringe. See Plate 3.

Rose Garden Lane crossing Agua Fria River is approximately at grade within the river bottom. The longitudinal profile varies up to 3 percent slopes (see HEC-RAS cross section 21.798). Storage upstream of the roadway is limited. Runoff from significant storms sometimes overtops the roadway.

4.2 Hydrology

The hydrologic HEC-1 model for Agua Fria River watershed was created using input data from the U.S. Army Corps of Engineers, Los Angeles District report entitled "Agua Fria River Study, New Waddell Dam to Gila River Confluence, Arizona" written in July of 1995 by Kimley-Horn and Associates, Inc. February 2001. The models for 10-year, 6-hour, and 2-year, 6-hour storm events were modified from the 100-year, 6-hr storm event model. The modeling results are summarized in Table 1. Since the Sub-basin 37 southern limit extends south of this project to Bell Road, the peak flows and volumes are estimated to be 75% of Sub-basin 37.

The hydrologic base model for Rose Garden Lane drainage improvements is the HEC-1 model of the Level III alternative analysis recommended by the Glendale/Peoria ADMP Update (LEVEL3.DAT). This model has been revised as part of the Concept Refinement Study for Rose Garden Lane Drainage Improvements by Wood/Patel (LEVEL 3R5.DAT). A partial output file for this model is included in Appendix A. The models for 10-year, 6-hour, and 2-year, 6-hour storm events were modified from the 100-year, 6-hr storm event model. The modeling results are summarized in Table 1.

4.3 Hydraulics

The HEC-RAS model for the entire Agua Fria River was obtained from the Flood Control District of Maricopa County. This model was converted from the original HEC-2 flood insurance study model with flows estimated by the Corps of Engineers (35,000 cfs for the 100-year storm event at Rose Garden Lane cross section). The original HEC-RAS model was shortened for the purpose of this study. The cross section near Rose Garden Lane alignment was modified according to a topographic map provided to Wood/Patel by the FCDMC. The representative cross section number is 21.798.

Since the contributing watershed for Rose Garden Lane channel is a small tributary to the Agua Fria River at Rose Garden Lane cross section and the total watershed is about 80 square miles, the less frequent storms from both systems (say, 100-year and 10-year storms) are likely to be correlated (coincidental). However, they may be independent for more frequent storms, such as 2-year or smaller storms. Therefore, the 100-year and 10-year storms both with and without the additional runoffs from Rose Garden Lane channel were modeled. For the 2-year storm, the runoff from Rose Garden Lane channel only was modeled to evaluate the impact of the nuisance flow on the Rose Garden Lane road crossing. The modeling results are summarized in Table 2.

4.4 Summary and Conclusions

Peak flow rates for the Agua Fria River were estimated for the 100-year, 6-hour storm event by using the HEC-1 model provided by the FCDMC. This model was modified to determine 10-year, 6-hour and 2-year, 6-hour flow rates and volumes. Similarly, 10-year, 6-hour and 2-year, 6-hour peak flow rates and volumes for the Rose Garden Lane drainage system were derived by modifying the 100-year, 6-hour Rose Garden Lane model.

This information was then incorporated into the HEC-RAS model for the Agua Fria River to determine the impact on the at-grade Rose Garden Lane crossing. As shown in Table 2, the impact of the proposed Rose Garden Lane Drainage Improvements is negligible.

For the coincidental flow events, 100-year, 6-hour and 10-year, 6-hour, the estimated increase in water surface evaluation is 0.16' and 0.01' respectively. For the 2-year, 6-

hour event, assumed to be non-coincidental with flows in the Agua Fria River, the flow depth across Rose Garden Lane is estimated to be 0.41' maximum.

Based on this analysis, it is Wood/Patel's opinion that the impact of the proposed Rose Garden Lane Drainage Improvements on the at-grade Rose Garden Lane roadway in the Agua Fria River is negligible and additional mitigation at this location as a result of this project is unwarranted.

5.0 REFERENCES

1. *Agua Fria River Study New Waddell Dam to Gila River Confluence, Arizona: Hydrologic Evaluation of Impacts of New Waddell Dam on Downstream Peak Discharges in the Agua Fria River*, U.S. Army Corps of Engineers, Los Angeles District, July 1995.

2. *Drainage Design Manual for Maricopa County, Volume I,* Flood Control District of Maricopa County, Arizona, January 1995.

3. *River Routing with HEC-1 and HEC-2, Training Document No. 30,* U.S. Army Corps of Engineers, September 1990.

4. *HEC-1 Flood Hydrograph Package, Version 4.1,* U.S. Army Corps of Engineers, July 1997.

5. *HEC-RAS River Analysis System, Version 2.2,* U.S. Army Corps of Engineers, September 1998.

6. *Glendale-Peoria ADMP,* CDM Inc. and Jim Montgomery, Inc., May 1987.

7. *Glendale-Peoria AMDP Update,* Entellus, May 2002.

8. *Concept Refinement Study Report for Rose Garden Lane Drainage Report (Draft),* Wood, Patel & Associates, Inc., June 2005

9. *Agua Fria Watercourse Master Plan,* Kimley-Horn and Associates, Inc., September 2001.

10. *Agua Fria Watercourse Master Plan Addendum, Channelization Alternative, Volume I,* EDAW, January 2005.

TABLE 1

Peak Flow Summary Table

Table 1 Peak Flow Summary for 6-Hour Storm Event

Model Name	Return Period (year)	Location	Hydrograph Name	Peak Flow (cfs)	Volume (Ac-Ft)	Watershed Area (mile²)
CE6HR.DAT	100	AFR@RGL	75%"37"	17900	5890	77
10YR6HR.DAT	10	AFR@RGL	75%"37"	8270	2700	77
2YR6HR.DAT	2	AFR@RGL	75%"37"	4280	1400	77
LEVEL3R5.DAT	100	RGL@AFR	"CA99V"	1126	153	4.5
L3R5_10.DAT	10	RGL@AFR	"CA99V"	135	34	4.5
L3R5_02.DAT	2	RGL@AFR	"CA99V"	8	4	4.5

TABLE 2

Hydraulic Modeling Results

Table 2 HEC-RAS Modeling Results at RGL Crossing (RS = 21.798)

Model Name	Return Period (year)	AFR Flow Only		AFR Flow + RGL Flow		WSEL Difference (ft)
		Flow (cfs)	WSEL (ft)	Flow (cfs)	WSEL (ft)	
100Year.PRJ	100	17900	1193.61	19026	1193.77	0.16
10_Year.PRJ	10	8270	1192.51	8405	1192.52	0.01
				RGL Flow Only		
				Flow (cfs)	Flow Depth (ft)	
2_Year.PRJ	2			8	0.41	

TABLE 3

Decision Matrix for Outfall Channel Alignment

Table 3

Decision Matrix for Outfall Channel Alignment

Option	Description	Cost Related	Construction Related			Public Related		Agency Related		Weighted Total Score	Ranking
		Estimated Capital Improvement Costs	Ease of Construction	Ease of ROW Acquisition	Design Schedule Impact	Anticipated Public Acceptance	Anticipated Partner Acceptance	Operation and Maintenance of System	Estimated Public Safety of System		
	Weighting Factor	*40%*	*5%*	*5%*	*10%*	*10%*	*10%*	*10%*	*10%*	*100%*	
ADMP Alignment	Trapezoidal earthen channel northwesterly through the Sun State Rock Parcel	10.0	10.0	3.0	4.0	1.0	2.0	9.0	8.0	7.05	2
Alternative 1	Trapezoidal earthen channel northerly along the east boundary of the Sun State Rock Parcel	9.0	8.0	8.0	9.0	9.0	9.0	9.0	8.0	8.80	1
Alternative 2	Concrete box culvert and trapezoidal earthen channel northerly along the west side of the State Land Parcel adjacent to the Sun State Rock Parcel	8.0	6.0	1.0	1.0	8.0	2.0	7.0	7.0	6.05	4
Alternative 3	Concrete box culvert and trapezoidal earthen channel along the north side of Rose Garden Lane	7.0	4.0	5.0	6.0	6.0	5.0	6.0	6.0	6.15	3
Alternative 4	Concrete box culvert and trapezoidal earthen channel along the south side of Rose Garden Lane	6.0	4.0	5.0	6.0	6.0	5.0	6.0	6.0	5.75	5
Alternative 5	Concrete box culvert south in 111th Avenue and west along Beardsley Road and trapezoidal earthen channel along the south side of Beardsley Road	1.0	2.0	5.0	5.0	3.0	3.0	5.0	4.0	2.75	6

Rating Point System

Best	9-10
Better	7-8
Average	5-6
Poor	3-4
Worst	1-2

APPENDIX A

HEC-1 Model Input and Output Files

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*************************************
*                                   *
 FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
           JUN   1998               *
        VERSION 4.1                 *
                                    *
RUN DATE   27MAY05  TIME  10:39:40  *
                                    *
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*************************************
*                                   *
*   U.S. ARMY CORPS OF ENGINEERS    *
*   HYDROLOGIC ENGINEERING CENTER   *
*         609 SECOND STREET         *
*      DAVIS, CALIFORNIA 95616      *
*          (916) 756-1104           *
*                                   *
*************************************
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX        XXX
```

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

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

HEC-1 INPUT PAGE 1

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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

              * ***********************************************************************
              *                                                                       *
              *                 Flood Control District of Maricopa County              *
              *                  Agua Fria River Watercourse Master Plan               *
              *             From the New Waddell Dam to the Gila River Confluence      *
              *                                FCD99-24                                *
              *                                                                       *
              *                              Retention Model                          *
              *                                                                       *
              *                         100 yr, 6 hr storm event                      *
              *                 Prepared by Kimley-Horn and Associates, Inc.          *
              *                            KHA Job No. 091131004                      *
              *                                                                       *
              *                              February 2001                            *
              *                                                                       *
              *   This model has been created using input data from the U.S. Army Corps of   *
              *   Engineers, Los Angeles District report entitled "Agua Fria River Study     *
              *   New Waddell Dam to Gila River Confluence, Arizona" written in July of 1995.*
              *   The intent of this model was to simulate the impact of the current and two *
              *   proposed retention policies to evaluate the impact of development on       *
              *   future flood peaks.                                                        *
              *   The loss rate values were obtained from Table 8, pg. 37 of the Corps of    *
              *   Engineers report.                                                          *
              *   These values correspond to the HEC Exponential Loss Rate variables.        *
              *   The subbasin areas were obtained from Table 7, pg 36 of the Corps of       *
              *   Engineers report. The Flood Control District of Maricopa County's software *
              *   package MCUHP2 was used to generate the PB, PC and UI records.  Input data *
              *   for this program was obtained from Tables 6 and 7, pages 34 and 35         *
              *   respectively, of the Corps of Engineers report.                            *
              *   The IT record (time specification) variable NMIN (integer number of minutes*
              *   in interval) was obtained from Section C on page 15 from the Corps report. *
              *                                                                       *
              * ***********************************************************************
              *
    1         ID   AGUA FRIA WATERCOURSE MASTER PLAN
              *DIAGRAM
    2         IT      15                    100
    3         IO       5
              * DDM   ***** Preserved *****

    4         KK    1036
    5         KM   BASIN 1036
    6         KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
```

```
 7          KM    L=     17.0  Lca=      8.0   S=   94.0  Kn= .035  LAG= 137.0
 8          KM    PHOENIX MOUNTAIN S-GRAPH WAS USED FOR THIS BASIN
 9          BA   69.00
10          KM   RAINFALL DEPTH OF 3.30 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
11          KM   AN AREAL REDUCTION COEFFICIENT OF  .846 WAS USED
12          PB   2.790
13          KM   THE FOLLOWING PC RECORD USED A 6-HOUR RAINFALL WITH PATTERN NO. 3.78
14          PC    .000    .020    .032    .046    .066    .082    .099    .117    .135    .151
15          PC    .170    .190    .220    .268    .351    .494    .661    .778    .847    .893
16          PC    .931    .948    .966    .983   1.000
17          LE     .33            2.00            5.00
18          UI   1696.   1696.   4848.   7787.  10629.  13049.  15021.  16062.  16189.  15259.
1                                       HEC-1 INPUT                                          PAGE  2

LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

19          UI  13309.  11041.   9097.   7523.   6263.   5058.   4195.   3443.   2917.   2521.
20          UI   1797.   1723.   1161.   1161.   1125.    413.    413.    413.    413.    413.
21          UI    413.    413.    413.      0.      0.      0.      0.      0.      0.      0.
22          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

23          KK   R1036
24          KM   Route the combined runoff hydrograph from SUB-BASIN 1036
25          RM       4     1.0      .2

26          KK    1037
27          KM   SUB-BASIN 37
28          KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
29          KM   L=     26.0  Lca=     10.3   S=   70.0  Kn= .035  LAG= 188.0
30          BA   102.3
31          LE    0.33       0     2.0       0       5
32          UI   1832.   1832.   2235.   5482.   7756.  10010.  12197.  13977.  15791.  16662.
33          UI  17558.  17558.  16911.  16102.  14191.  12413.  10689.   9347.   8210.   7063.
34          UI   6152.   5352.   4656.   4028.   3454.   3087.   2809.   2211.   1942.   1942.
35          UI   1275.   1254.   1254.   1254.    641.    446.    446.    446.    446.    446.
36          UI    446.    446.    446.    446.    446.    446.      0.      0.      0.      0.
37          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

38          KK  CP1037
            *  This point corresponds to the Bell Road crossing.
39          KM   Combine runoff hydrograph 37 with New Waddell Dam hydrograph.
40          HC       2

41          KK   R38-1
            *  All pertinent routing data is summarized in Table 9 of the Corps report.
42          KM   Route the combined hydrograph from CP1037 to CP1038
43          RM       2     0.5     0.2
            *  Within the Corps report is a concentration point at this location (CP1038),
            *  and it corresponds to the Grand Ave crossing.
            *  No additional runoff added at CP1038.

44          KK   R39-1
45          KM   Route the combined runoff hydrograph from CP 1038 to CP 1039
46          RM       8     1.8     0.2

47          KK      39
48          KM   SUB-BASIN 39
49          KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
50          KM   L=     13.8  Lca=      7.9   S=   22.0  Kn= .025  LAG= 119.0
51          KM   PHOENIX MOUNTAIN S-GRAPH WAS USED FOR THIS BASIN
52          BA   59.30
53          LE    0.33       0     2.0       0      13
54          UI   1678.   2229.   5861.   9231.  12190.  14648.  15820.  15909.  14748.  12148.
55          UI   9666.   7845.   6309.   4990.   4011.   3238.   2630.   2006.   1778.   1154.
56          UI   1149.    907.    408.    408.    408.    408.    408.    408.    408.      0.
57          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
58          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
1                                       HEC-1 INPUT                                          PAGE  3

LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

59          KK  CP1039
60          KM   Combine routed hydrograph from CP 1038 and runoff hydrograph 39
61          HC       2

62          KK   R40-1
63          KM   Route the combined runoff hydrograph from CP 1039 to CP 1040
64          RM       5     1.2     0.2

65          KK      40
```

```
KM   SUB-BASIN 40
KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
KM   L=     18.5  Lca=     10.5   S=   15.0  Kn= .020  LAG= 127.0
KM   PHOENIX MOUNTAIN S-GRAPH WAS USED FOR THIS BASIN
BA   81.60
LE    0.33       0     2.0       0      21
UI   2163.   2377.   7050.  10963.  14538.  18105.  19890.  20732.  19946.  17834.
UI  14518.  11810.   9613.   7875.   6323.   5130.   4188.   3453.   2753.   2293.
UI   1713.   1481.   1481.    651.    527.    527.    527.    527.    527.    527.
UI    527.      0.      0.      0.      0.      0.      0.      0.      0.      0.
UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

KK  CP1040
*  This concentration point corresponds to the Interstate 10 crossing.
KM   Combine routed hydrograph from CP1039 and runoff hydrograph 40
HC       2

KK   R42-1
KM   Route the combined runoff hydrograph from CP1040 to CP 1042
RM       2     0.6     0.2

KK      42
KM   SUB-BASIN 42
KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
KM   L=      6.9  Lca=      3.2   S=   12.0  Kn= .025  LAG=  72.8
KM   PHOENIX MOUNTAIN S-GRAPH WAS USED FOR THIS BASIN
BA   11.30
LE    0.33       0     2.0       0       5
UI    523.   1751.   3417.   4644.   4950.   4201.   2960.   2082.   1426.   1004.
UI    696.    481.    358.    187.    127.    127.    127.      0.      0.      0.
UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

KK  CP1042
KM   Combine routed hydrograph from CP1040 with runoff hydrograph 42
*  This concentration point corresponds to the Highway 80 crossing.
HC       2

KK   R43-1
KM   Route the combined runoff hydrograph from CP1042 to CP 1043
RM       4     1.1     0.2
*  Within the Corps report there is a conc. point at this location (CP1043).
*  This concentration point corresponds to the Agua Fria & Gila confluence.
*  Study terminated at Agua Fria River and Gila River confluence.
ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

NO.       (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

  4         1036
               V
               V
           R1036
               .
               .
               .          1037
               .            .
               .            .
 38      CP1037............
               V
               V
           R38-1
               V
               V
 44        R39-1
               .
               .
               .            39
               .             .
               .             .
         CP1039............
               V
               V
 62        R40-1
               .
               .
               .            40
               .             .
               .             .
 77      CP1040............
               V
               V
           R42-1
               .
               .
 82            .            42
               .             .
               .             .
 93      CP1042............
               V
               V
           R43-1
```

*** RUNOFF ALSO COMPUTED AT THIS LOCATION

```
*****************************************
*                                       *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *
*            JUN   1998                 *
*         VERSION 4.1                   *
*                                       *
*  RUN DATE   27MAY05  TIME  10:39:40   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

AGUA FRIA WATERCOURSE MASTER PLAN

```
3 IO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE

  IT          HYDROGRAPH TIME DATA
                     NMIN         15  MINUTES IN COMPUTATION INTERVAL
                    IDATE      1    0  STARTING DATE
                    ITIME       0000  STARTING TIME
                       NQ        100  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE      2    0  ENDING DATE
                   NDTIME       0045  ENDING TIME
                    ICENT         19  CENTURY MARK

              COMPUTATION INTERVAL     .25 HOURS
                   TOTAL TIME BASE   24.75 HOURS

     ENGLISH UNITS
          DRAINAGE AREA          SQUARE MILES
          PRECIPITATION DEPTH    INCHES
          LENGTH, ELEVATION      FEET
          FLOW                   CUBIC FEET PER SECOND
          STORAGE VOLUME         ACRE-FEET
          SURFACE AREA           ACRES
          TEMPERATURE            DEGREES FAHRENHEIT
```

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

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	1036	21183.	6.00	10205.	2665.	2584.	69.00		
ROUTED TO	R1036	19918.	7.00	10137.	2665.	2584.	69.00		
HYDROGRAPH AT	1037	23859.	6.75	14201.	3955.	3836.	102.30		
2 COMBINED AT	CP1037	43748.	6.75	24310.	6620.	6420.	171.30		
ROUTED TO	R38-1	42752.	7.25	24215.	6620.	6420.	171.30		
ROUTED TO	R39-1	39908.	9.00	23913.	6620.	6420.	171.30		
HYDROGRAPH AT	39	21290.	5.50	9467.	2474.	2399.	59.30		
2 COMBINED AT	CP1039	41642.	9.00	28967.	9094.	8818.	230.60		
ROUTED TO	R40-1	40098.	10.25	28636.	9094.	8818.	230.60		
HYDROGRAPH AT	40	29170.	5.75	13751.	3654.	3543.	81.60		
2 COMBINED AT									

+	CP1040	43271.	6.25	36717.	12748.	12361.	312.20
ROUTED TO	R42-1	41927.	6.75	36404.	12748.	12361.	312.20
HYDROGRAPH AT	42	5608.	5.00	1727.	435.	422.	11.30
+ 2 COMBINED AT	CP1042	42755.	6.75	36750.	13183.	12784.	323.50
ROUTED TO	R43-1	41027.	8.00	36334.	13183.	12784.	323.50

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

Partial Output File for: LEVEL3R5.OUT

```
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *              JUN   1998               *
 *            VERSION 4.1                *
 *                                       *
 *  RUN DATE   19MAY05  TIME  17:19:54   *
 *                                       *
 *****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X       XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.
THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
1                                          HEC-1 INPUT
PAGE  1

          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

            1           ID   ****************************************************************************
            2           ID   **                                                                        **
            3           ID   ** CONCEPT REFINEMENT STUDY FOR ROSE GARDEN LANE DRAINAGE IMPROVEMENTS     **
            4           ID   ** ORIGINAL HEC-1 FILE FROM GLENDAL/PEORIA ADMP UPDATE STUDY               **
            5           ID   ** MODIFIED HEC-1 MODEL: LEVEL3R5.DAT, Wood/Patel & CVL, May 2005          **
            6           ID   ** THIS IS THE PREFERRED ALTERNATIVE MODEL                                 **
            7           ID   **                                                                        **
            8           ID   ****************************************************************************
                        *
            9           ID   Project ID: GP - Major Basin: 01 - Return Period: 100 Years
           10           ID   ****************************************************************************
           11           ID   **                                                                        **
           12           ID   **                    Glendale/Peoria ADMP Update                         **
           13           ID   **                                                                        **
           14           ID   ****************************************************************************
           15           ID   ****************************************************************************
           16           ID   PROJECT:                Glendale Peoria ADMP Update
           17           ID   CLIENT:                 Flood Control District of Maricopa County
           18           ID   PREPARED BY:            Entellus, Inc.
           19           ID   PROJECT No:             FCD 99-44              Entellus 310.017
           20           ID   FILE NAME: LEVEL3.DAT            CREATED DATE: JUNE 6, 2001
           21           ID   STORM:                  100-year 6-hour Storm
           22           ID   DEVELOPMENT CONDITIONS: LEVEL 3 HYDROLOGY
           23           ID
           24           ID   DDM MCUHP1
                        *
                        * ***************************************************************************
           25           IT       2                    1000
           26           IO       5
                        *
                        *DIAGRAM
```

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

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE
+	HYDROGRAPH AT	N11P6	367.	4.10	20.	5.	4.	.20	
+	ROUTED TO	R11P6S	350.	4.17	20.	5.	4.	.20	

+	HYDROGRAPH AT	N11P5	81.	4.10	5.	1.	1.	.05
+	ROUTED TO	R11P5S	74.	4.20	5.	1.	1.	.05
+	HYDROGRAPH AT	N11P1	124.	4.10	7.	2.	1.	.07
+	DIVERSION TO	N11P1I	31.	4.10	2.	0.	0.	.07
+	HYDROGRAPH AT	DN11P1	93.	4.10	5.	1.	1.	.07
+	ROUTED TO	R11P1E	90.	4.20	5.	1.	1.	.07
+	HYDROGRAPH AT	N11P2	68.	4.20	6.	2.	1.	.06
+	4 COMBINED AT	CN11P2	575.	4.17	35.	9.	6.	.38
+	DIVERSION TO	CALLEI	575.	4.17	35.	9.	6.	.38
+	HYDROGRAPH AT	CALLE	0.	.00	0.	0.	0.	.38
+	DIVERSION TO	LEJOSI	0.	.00	0.	0.	0.	.38
+	HYDROGRAPH AT	LEJOS	0.	.00	0.	0.	0.	.38
+	ROUTED TO	RN11PS	0.	.00	0.	0.	0.	.38
+	HYDROGRAPH AT	N11L3	76.	4.13	8.	2.	1.	.06
+	2 COMBINED AT	CN11L3	76.	4.13	8.	2.	1.	.45
+	DIVERSION TO	N11L3I	50.	4.13	5.	1.	1.	.45
+	HYDROGRAPH AT	DN11L3	26.	4.13	3.	1.	0.	.45
+	ROUTED TO	R11L3W	23.	4.20	3.	1.	0.	.45
+	HYDROGRAPH AT	N11L2	9.	4.17	1.	0.	0.	.01
+	2 COMBINED AT	CN11L2	32.	4.20	4.	1.	1.	.46
+	ROUTED TO	RN11L2	31.	4.23	4.	1.	1.	.46
+	HYDROGRAPH AT	N11L5	52.	4.23	8.	2.	1.	.07
+	HYDROGRAPH AT	N11LPX	31.	4.10	2.	0.	0.	.07
+	ROUTED TO	RN11P1	28.	4.30	2.	0.	0.	.07
+	3 COMBINED AT	CN11L5	106.	4.27	13.	3.	2.	.53
+	ROUTED TO	RN11L5	105.	4.30	13.	3.	2.	.53
+	HYDROGRAPH AT	N11L1	65.	4.20	9.	2.	2.	.07
+	2 COMBINED AT	CN11L1	155.	4.30	21.	5.	4.	.61

+	DIVERSION TO	N11L1I	155.	4.30	21.	5.	4.	.61
+	HYDROGRAPH AT	DN11L1	0.	.00	0.	0.	0.	.61
+	HYDROGRAPH AT	N11L3X	50.	4.13	5.	1.	1.	.45
+	ROUTED TO	R11L3E	49.	4.17	5.	1.	1.	.45
+	HYDROGRAPH AT	N11L4	8.	4.27	1.	0.	0.	.01
+	2 COMBINED AT	CN11L4	56.	4.17	7.	2.	1.	.46
+	ROUTED TO	R11L4E	55.	4.20	7.	2.	1.	.46
+	HYDROGRAPH AT	N21I1	121.	4.17	12.	3.	2.	.11
+	2 COMBINED AT	CN21I1	166.	4.17	18.	4.	3.	.57
+	ROUTED TO	RN21I1	164.	4.20	17.	4.	3.	.57
+	HYDROGRAPH AT	N21I2	75.	4.17	10.	2.	2.	.06
+	2 COMBINED AT	CN21I2	227.	4.20	26.	7.	5.	.63
+	ROUTED TO	RN21I2	225.	4.20	26.	7.	5.	.63
+	HYDROGRAPH AT	N11P7	234.	4.07	13.	3.	2.	.10
+	DIVERSION TO	N11P7I	187.	4.07	10.	3.	2.	.10
+	HYDROGRAPH AT	DN11P7	47.	4.07	3.	1.	0.	.10
+	ROUTED TO	R11P7E	34.	4.27	3.	1.	0.	.10
+	HYDROGRAPH AT	DN11P7	187.	4.07	10.	3.	2.	.10
+	ROUTED TO	R11P7W	136.	4.27	10.	3.	2.	.10
+	HYDROGRAPH AT	N11P4	172.	4.20	13.	3.	2.	.12
+	3 COMBINED AT	CN11P4	333.	4.23	26.	6.	5.	.23
+	ROUTED TO	RN11P4	326.	4.27	26.	6.	5.	.23
+	HYDROGRAPH AT	N11P3	52.	4.20	4.	1.	1.	.04
+	2 COMBINED AT	CN11P3	371.	4.27	30.	7.	5.	.27
+	ROUTED TO	RN11P3	370.	4.30	30.	7.	5.	.27
+	HYDROGRAPH AT	N21J	565.	4.07	39.	10.	7.	.23
+	DIVERSION TO	N21JI	174.	4.07	12.	3.	2.	.23
	HYDROGRAPH AT							

+		DN21JO	390.	4.07	27.	7.	5.	.23
+	ROUTED TO	RN21JS	348.	4.23	27.	7.	5.	.23
+	HYDROGRAPH AT	N21Z	249.	4.10	22.	5.	4.	.11
+	DIVERSION TO	LN21ZD	191.	4.00	6.	2.	1.	.11
+	HYDROGRAPH AT	LN21Z	249.	4.10	15.	4.	3.	.11
+	2 COMBINED AT	CN21Z	546.	4.20	42.	11.	8.	.34
+	DIVERSION TO	N21ZI	42.	4.20	2.	0.	0.	.34
+	HYDROGRAPH AT	DN21ZO	504.	4.20	41.	10.	7.	.34
+	DIVERSION TO	N21ZI*	164.	4.20	5.	1.	1.	.34
+	HYDROGRAPH AT	DN21Z*	384.	4.07	35.	9.	6.	.34
+	ROUTED TO	RN21ZW	328.	4.37	35.	9.	6.	.34
+	HYDROGRAPH AT	N21I3	128.	4.17	13.	3.	2.	.12
+	4 COMBINED AT	CN21I	667.	4.33	80.	20.	14.	1.63
+	ROUTED TO	83RD	72.	5.20	67.	20.	14.	1.63
+	ROUTED TO	RN21I	72.	5.23	67.	20.	14.	1.63
+	HYDROGRAPH AT	N22B	455.	4.10	40.	10.	7.	.19
+	DIVERSION TO	N22BI	410.	4.10	36.	9.	6.	.19
+	HYDROGRAPH AT	DN22B	46.	4.10	4.	1.	1.	.19
+	ROUTED TO	RN22BE	24.	4.33	4.	1.	1.	.19
+	HYDROGRAPH AT	N21F	158.	4.23	28.	7.	5.	.10
+	3 COMBINED AT	CN21F	209.	4.33	95.	27.	19.	1.92
+	ROUTED TO	RN21F	208.	4.47	95.	27.	19.	1.92
+	HYDROGRAPH AT	N21G	121.	4.13	17.	4.	3.	.06
+	HYDROGRAPH AT	DR21Z*	164.	4.20	5.	1.	1.	.34
+	ROUTED TO	RN21ZS	102.	4.53	5.	1.	1.	.34
+	2 COMBINED AT	CN21G	150.	4.53	21.	5.	4.	.63
+	DIVERSION TO	N21GI	64.	4.53	3.	1.	1.	.63
+	HYDROGRAPH AT	DN21GO	88.	4.17	18.	5.	3.	.63

+	ROUTED TO	RN21GS	88.	4.53	18.	5.	3.	.63
+	HYDROGRAPH AT	N21E	93.	4.23	18.	4.	3.	.06
+	3 COMBINED AT	CN21E	361.	4.43	126.	35.	25.	1.98
+	ROUTED TO	RN21E	355.	4.63	126.	35.	25.	1.98
+	HYDROGRAPH AT	N21D	152.	4.07	13.	3.	2.	.05
+	DIVERSION TO	LN21DD	152.	4.07	10.	2.	2.	.05
+	HYDROGRAPH AT	LN21D	95.	4.20	4.	1.	1.	.05
+	HYDROGRAPH AT	N22BIX	410.	4.10	36.	9.	6.	.19
+	ROUTED TO	RN22BS	385.	4.27	36.	9.	6.	.19
+	HYDROGRAPH AT	N22A	368.	4.17	48.	12.	9.	.18
+	2 COMBINED AT	CN22A	728.	4.23	84.	21.	15.	.37
+	DIVERSION TO	N22AI	109.	4.23	13.	3.	2.	.37
+	HYDROGRAPH AT	DN22A	619.	4.23	71.	18.	13.	.37
+	ROUTED TO	RN22AE	568.	4.50	71.	18.	13.	.37
+	3 COMBINED AT	CN21D	786.	4.53	194.	52.	38.	2.21
+	DIVERSION TO	N21DI	118.	4.53	29.	8.	6.	2.21
+	HYDROGRAPH AT	DN21D	668.	4.53	165.	45.	32.	2.21
+	ROUTED TO	RN21DS	637.	5.00	163.	45.	32.	2.21
+	HYDROGRAPH AT	N21C	522.	4.30	95.	24.	17.	.39
+	DIVERSION TO	LN21CD	97.	3.80	6.	2.	1.	.39
+	HYDROGRAPH AT	LN21C	522.	4.30	90.	22.	16.	.39
+	2 COMBINED AT	CN21C	860.	4.93	241.	65.	47.	2.61
+	ROUTED TO	RN21C	860.	4.93	241.	65.	47.	2.61
+	HYDROGRAPH AT	N24Q	100.	4.07	7.	2.	1.	.04
+	ROUTED TO	RN24Q	66.	4.53	7.	2.	1.	.04
+	HYDROGRAPH AT	N24R	97.	4.07	7.	2.	1.	.03
+	ROUTED TO	RN24R	75.	4.47	7.	2.	1.	.03
+	HYDROGRAPH AT	N24O	374.	4.13	26.	6.	5.	.16

+	3 COMBINED AT	CN24O	401.	4.17	40.	10.	7.	.22
+	ROUTED TO	RN24O	380.	4.23	40.	10.	7.	.22
+	HYDROGRAPH AT	N24S	147.	4.07	10.	2.	2.	.05
+	ROUTED TO	RN24S	93.	4.60	10.	2.	2.	.05
+	HYDROGRAPH AT	N24T	50.	4.03	3.	1.	1.	.02
+	ROUTED TO	RN24T	37.	4.63	3.	1.	1.	.02
+	HYDROGRAPH AT	N24P	297.	4.13	21.	5.	4.	.12
+	4 COMBINED AT	CN24P	615.	4.17	73.	18.	13.	.41
+	ROUTED TO	RN24P	614.	4.20	73.	18.	13.	.41
+	HYDROGRAPH AT	N24U	333.	4.07	21.	5.	4.	.11
+	ROUTED TO	RN24U	293.	4.23	21.	5.	4.	.11
+	2 COMBINED AT	CN24U*	883.	4.23	93.	23.	17.	.52
+	ROUTED TO	RN24U*	849.	4.30	93.	23.	17.	.52
+	HYDROGRAPH AT	N24V	116.	4.07	7.	2.	1.	.05
+	ROUTED TO	RN24V	74.	4.50	7.	2.	1.	.05
+	2 COMBINED AT	CN24V*	848.	4.30	100.	25.	18.	.57
+	ROUTED TO	RN24V*	811.	4.40	100.	25.	18.	.57
+	HYDROGRAPH AT	N24M	504.	4.20	40.	10.	7.	.25
+	2 COMBINED AT	CN24M	996.	4.37	134.	33.	24.	.82
+	ROUTED TO	RN24M	976.	4.43	134.	33.	24.	.82
+	HYDROGRAPH AT	N24L	1077.	4.07	68.	17.	12.	.38
+	ROUTED TO	RN24L	999.	4.17	68.	17.	12.	.38
+	2 COMBINED AT	CN24I*	1211.	4.23	190.	48.	34.	1.20
+	ROUTED TO	RN24I*	1166.	4.60	190.	48.	34.	1.20
+	HYDROGRAPH AT	N24I	256.	4.50	41.	10.	7.	.30
+	HYDROGRAPH AT	N24H	641.	4.13	59.	15.	11.	.29
+	HYDROGRAPH AT	N24N	214.	4.20	19.	5.	3.	.13
	ROUTED TO							

+		RN24N	146.	4.67	19.	5.	3.	.13
	HYDROGRAPH AT							
+		N24J	101.	4.43	16.	4.	3.	.12
	2 COMBINED AT							
+		CN24J	227.	4.63	35.	9.	6.	.25
	ROUTED TO							
+		RN24J	225.	4.67	35.	9.	6.	.25
	HYDROGRAPH AT							
+		N24K	137.	4.60	29.	7.	5.	.21
	5 COMBINED AT							
+		CN24I	1517.	4.63	309.	78.	56.	2.25
	ROUTED TO							
+		RN24I	1512.	4.73	309.	78.	56.	2.25
	HYDROGRAPH AT							
+		DRN21J	174.	4.07	12.	3.	2.	.23
	ROUTED TO							
+		RN21JE	141.	4.43	12.	3.	2.	.23
	2 COMBINED AT							
+		CN24G*	1508.	4.73	311.	79.	57.	2.71
	ROUTED TO							
+		RN24G*	1496.	4.83	311.	79.	57.	2.71
	HYDROGRAPH AT							
+		N24G	503.	4.43	63.	16.	11.	.44
	DIVERSION TO							
+		LN24GD	43.	4.00	1.	0.	0.	.44
	HYDROGRAPH AT							
+		LN24G	503.	4.43	62.	15.	11.	.44
	2 COMBINED AT							
+		CN24G	1643.	4.80	348.	88.	63.	3.26
	HYDROGRAPH AT							
+		DRN21Z	42.	4.20	2.	0.	0.	.34
	ROUTED TO							
+		RN21ZE	10.	4.33	2.	0.	0.	.34
	2 COMBINED AT							
+		CN24G+	1643.	4.80	348.	88.	63.	3.26
	ROUTED TO							
+		RN24G	1636.	4.83	348.	88.	63.	3.26
	HYDROGRAPH AT							
+		N24F	194.	4.20	17.	4.	3.	.11
	2 COMBINED AT							
+		CN24F	1648.	4.83	359.	91.	65.	3.37
	HYDROGRAPH AT							
+		N24D	184.	4.10	17.	4.	3.	.09
	2 COMBINED AT							
+		CN24D	1656.	4.83	371.	94.	68.	3.45
	ROUTED TO							
+		LN24D	13.	9.00	12.	11.	9.	3.45
	HYDROGRAPH AT							
+		N21H	76.	4.07	6.	2.	1.	.03
	HYDROGRAPH AT							
+		DRN21G	64.	4.53	3.	1.	1.	.63
	ROUTED TO							
+		RN21GE	43.	4.80	3.	1.	1.	.63
	2 COMBINED AT							
+		CN21H	76.	4.07	10.	3.	2.	.03

+	ROUTED TO	RN21H	55.	5.00	10.	3.	2.	.03
+	HYDROGRAPH AT	N24E	24.	4.27	3.	1.	1.	.02
+	ROUTED TO	RN24E	22.	4.47	3.	1.	1.	.02
+	3 COMBINED AT	CN24D*	55.	4.90	19.	13.	11.	3.51
+	HYDROGRAPH AT	N27F	659.	4.10	48.	12.	9.	.28
+	ROUTED TO	RN27F	630.	4.17	48.	12.	9.	.28
+	HYDROGRAPH AT	N27G	498.	4.17	42.	11.	8.	.26
+	2 COMBINED AT	CN27G	1098.	4.17	89.	22.	16.	.55
+	ROUTED TO	RN27G	1024.	4.27	89.	22.	16.	.55
+	HYDROGRAPH AT	N27E	287.	4.27	26.	6.	5.	.19
+	ROUTED TO	RN27E	266.	4.40	26.	6.	5.	.19
+	HYDROGRAPH AT	N27H	451.	4.13	33.	8.	6.	.21
+	ROUTED TO	RN27H	394.	4.30	33.	8.	6.	.21
+	HYDROGRAPH AT	N27C	156.	4.17	12.	3.	2.	.09
+	4 COMBINED AT	CN27C	1412.	4.27	145.	36.	26.	1.03
+	ROUTED TO	RN27C	1375.	4.33	145.	36.	26.	1.03
+	HYDROGRAPH AT	N27I	411.	4.10	28.	7.	5.	.17
+	ROUTED TO	RN27I	344.	4.33	28.	7.	5.	.17
+	HYDROGRAPH AT	N27B	109.	4.23	11.	3.	2.	.08
+	HYDROGRAPH AT	N27J	501.	4.10	32.	8.	6.	.19
+	DIVERSION TO	N27JI	189.	4.10	9.	2.	2.	.19
+	HYDROGRAPH AT	DN27J	312.	4.10	23.	6.	4.	.19
+	ROUTED TO	RN27JW	270.	4.37	23.	6.	4.	.19
+	4 COMBINED AT	CN27B	1738.	4.33	193.	48.	35.	1.46
+	ROUTED TO	RN27B	1642.	4.47	193.	48.	35.	1.46
+	HYDROGRAPH AT	N27D	158.	4.10	17.	4.	3.	.09
+	DIVERSION TO	LN27DD	158.	4.10	13.	3.	2.	.09
+	HYDROGRAPH AT	LN27D	67.	4.43	4.	1.	1.	.09

+	HYDROGRAPH AT	DRN27J	189.	4.10	9.	2.	2.	.19
+	ROUTED TO	RN27JS	175.	4.17	9.	2.	2.	.19
+	2 COMBINED AT	CN27D	175.	4.17	13.	3.	2.	.28
+	DIVERSION TO	N27DI	86.	4.17	10.	2.	2.	.28
+	HYDROGRAPH AT	DN27DO	89.	4.17	3.	1.	1.	.28
+	ROUTED TO	RN27DW	41.	4.63	3.	1.	1.	.28
+	HYDROGRAPH AT	DRN27D	86.	4.17	10.	2.	2.	.28
+	ROUTED TO	RN27DS	67.	4.70	10.	2.	2.	.28
+	HYDROGRAPH AT	N27K	676.	4.57	105.	26.	19.	.63
+	ROUTED TO	RN27K	651.	4.77	105.	26.	19.	.63
+	HYDROGRAPH AT	N27L	721.	4.30	80.	20.	15.	.47
+	2 COMBINED AT	CN27L	843.	4.67	173.	43.	31.	1.09
+	ROUTED TO	RN27L	842.	4.70	173.	43.	31.	1.09
+	HYDROGRAPH AT	N25S	80.	4.07	7.	2.	1.	.03
+	ROUTED TO	RN25S	76.	4.10	7.	2.	1.	.03
+	2 COMBINED AT	CN25O*	847.	4.70	179.	45.	32.	1.12
+	ROUTED TO	RN25O*	843.	4.73	179.	45.	32.	1.12
+	HYDROGRAPH AT	N25O	267.	4.07	24.	6.	4.	.13
+	DIVERSION TO	LN25OD	267.	4.07	13.	3.	2.	.13
+	HYDROGRAPH AT	LN25O	229.	4.17	11.	3.	2.	.13
+	2 COMBINED AT	CN25O	854.	4.73	186.	47.	34.	1.25
+	ROUTED TO	RN25O	848.	4.87	186.	47.	34.	1.25
+	4 COMBINED AT	CN27*	1873.	4.50	347.	87.	63.	2.99
+	HYDROGRAPH AT	N27	243.	4.37	38.	10.	7.	.28
+	HYDROGRAPH AT	N27A	160.	4.27	17.	4.	3.	.11
+	HYDROGRAPH AT	N26B	317.	4.17	41.	10.	7.	.22
+	DIVERSION TO	LN26BD	317.	4.17	28.	7.	5.	.22
	HYDROGRAPH AT							

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+                    LN26B    164.   4.53     13.     3.     2.    .22
     4 COMBINED AT
+                    CN27    1998.   4.50    379.    96.    69.   3.62
     ROUTED TO
+                    RN27    1971.   4.63    379.    96.    69.   3.62
     HYDROGRAPH AT
+                    N26       79.   4.13      5.     1.     1.    .04
     HYDROGRAPH AT
+                    N26A     476.   4.17     57.    14.    10.    .35
     DIVERSION TO
+                    LN26AD   476.   4.17     27.     7.     5.    .35
     HYDROGRAPH AT
+                    LN26A    399.   4.33     30.     7.     5.    .35
     3 COMBINED AT
+                    CN26*   2065.   4.63    391.    99.    71.   4.01
     HYDROGRAPH AT
+                    N25R     290.   4.07     25.     6.     5.    .09
     ROUTED TO
+                    RN25R    277.   4.10     25.     6.     5.    .09
     HYDROGRAPH AT
+                    N25Q      88.   4.07      8.     2.     1.    .03
     ROUTED TO
+                    RN25Q     83.   4.13      8.     2.     1.    .03
     HYDROGRAPH AT
+                    N25P     498.   4.07     44.    11.     8.    .17
     ROUTED TO
+                    RN25P    470.   4.13     44.    11.     8.    .17
     HYDROGRAPH AT
+                    N25M     592.   4.07     55.    14.    10.    .24
     DIVERSION TO
+                    LN25MD   592.   4.07     35.     9.     6.    .24
     HYDROGRAPH AT
+                    LN25M    464.   4.17     21.     5.     4.    .24
     4 COMBINED AT
+                    CN25M   1230.   4.17     97.    24.    18.    .53
     DIVERSION TO
+                    N25MI   1053.   4.17     90.    23.    16.    .53
     HYDROGRAPH AT
+                    DN25M    178.   4.17      7.     2.     1.    .53
     ROUTED TO
+                    RN25MW   124.   4.33      7.     2.     1.    .53
     HYDROGRAPH AT
+                    N25N      49.   4.07      5.     1.     1.    .03
     DIVERSION TO
+                    LN25ND    49.   4.07      3.     1.     1.    .03
     HYDROGRAPH AT
+                    LN25N     32.   4.27      2.     0.     0.    .03
     ROUTED TO
+                    RN25N     27.   4.37      2.     0.     0.    .03
     2 COMBINED AT
+                    CX3      143.   4.37      8.     2.     2.    .55
     DIVERSION TO
+                    X3I       79.   4.37      5.     1.     1.    .55
     HYDROGRAPH AT
+                    DX3O      64.   4.37      4.     1.     1.    .55
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+	ROUTED TO	RX3W	39.	4.87	4.	1.	1.	.55
+	2 COMBINED AT	CN26	2051.	4.63	391.	99.	71.	4.56
+	ROUTED TO	RN26	1974.	4.73	384.	97.	70.	4.56
+	HYDROGRAPH AT	N25L	133.	4.13	10.	2.	2.	.06
+	DIVERSION TO	N25LI	72.	4.13	5.	1.	1.	.06
+	HYDROGRAPH AT	DN25L	61.	4.13	5.	1.	1.	.06
+	ROUTED TO	RN25LW	56.	4.37	5.	1.	1.	.06
+	HYDROGRAPH AT	N25K	216.	4.10	15.	4.	3.	.09
+	2 COMBINED AT	CN25K	219.	4.10	20.	5.	4.	.15
+	DIVERSION TO	N25KI	189.	4.10	14.	3.	3.	.15
+	HYDROGRAPH AT	DN25K	30.	3.90	6.	2.	1.	.15
+	ROUTED TO	RN25KW	30.	4.43	6.	2.	1.	.15
+	HYDROGRAPH AT	N25J	194.	4.17	13.	3.	2.	.10
+	3 COMBINED AT	CN25J	1988.	4.73	395.	100.	72.	4.81
+	ROUTED TO	RN25J	1912.	4.97	395.	100.	72.	4.81
+	HYDROGRAPH AT	N25G	115.	4.17	10.	2.	2.	.06
+	HYDROGRAPH AT	DRN25K	189.	4.10	14.	3.	3.	.15
+	ROUTED TO	RN25KS	139.	4.67	14.	3.	3.	.15
+	2 COMBINED AT	CN25G	160.	4.67	24.	6.	4.	.21
+	ROUTED TO	RN25G	128.	5.43	24.	6.	4.	.21
+	HYDROGRAPH AT	N25I	219.	4.20	17.	4.	3.	.12
+	3 COMBINED AT	CN25I	1913.	4.97	419.	106.	76.	4.99
+	ROUTED TO	RN25I	1864.	5.13	418.	106.	76.	4.99
+	HYDROGRAPH AT	N25E	303.	4.37	42.	11.	8.	.27
+	HYDROGRAPH AT	DRN25M	1053.	4.17	90.	23.	16.	.53
+	ROUTED TO	RN25MS	837.	4.37	90.	23.	16.	.53
+	HYDROGRAPH AT	DRX3	79.	4.37	5.	1.	1.	.55
+	ROUTED TO	RX3S	59.	4.67	5.	1.	1.	.55

+	3 COMBINED AT	CN25E	992.	4.37	131.	33.	24.	.82
+	DIVERSION TO	N25EI	496.	4.37	66.	16.	12.	.82
+	HYDROGRAPH AT	DN25E	496.	4.37	66.	16.	12.	.82
+	ROUTED TO	RN25EW	459.	4.60	66.	16.	12.	.82
+	HYDROGRAPH AT	N25D	580.	4.03	35.	9.	6.	.20
+	HYDROGRAPH AT	DRN25E	496.	4.37	66.	16.	12.	.82
+	ROUTED TO	RN25ES	434.	4.73	66.	16.	12.	.82
+	2 COMBINED AT	CN25D	580.	4.03	102.	26.	19.	1.03
+	DIVERSION TO	N25DI	143.	4.03	29.	7.	5.	1.03
+	HYDROGRAPH AT	DN25D	335.	4.03	68.	17.	12.	1.03
+	ROUTED TO	RN25DW	304.	4.13	68.	17.	12.	1.03
+	HYDROGRAPH AT	N25C	294.	4.23	28.	7.	5.	.17
+	3 COMBINED AT	CN25C	677.	4.63	155.	39.	28.	1.20
+	DIVERSION TO	N25CI	0.	4.63	0.	0.	0.	1.20
+	HYDROGRAPH AT	DN25C	677.	4.63	155.	39.	28.	1.20
+	ROUTED TO	RN25CW	677.	4.67	155.	39.	28.	1.20
+	HYDROGRAPH AT	N25F	195.	4.13	14.	3.	2.	.09
+	HYDROGRAPH AT	DRN25L	72.	4.13	5.	1.	1.	.06
+	ROUTED TO	RN25LS	46.	4.83	5.	1.	1.	.06
+	2 COMBINED AT	CN25F	195.	4.13	19.	5.	3.	.15
+	ROUTED TO	RN25F	160.	4.43	19.	5.	3.	.15
+	HYDROGRAPH AT	N25B	158.	4.27	19.	5.	3.	.11
+	3 COMBINED AT	CN25B	836.	4.53	184.	46.	33.	1.46
+	DIVERSION TO	N25BI	0.	4.47	0.	0.	0.	1.46
+	HYDROGRAPH AT	DN25B	836.	4.53	184.	46.	33.	1.46
+	ROUTED TO	RN25BW	832.	4.60	184.	46.	33.	1.46
+	HYDROGRAPH AT	N25A	163.	4.20	15.	4.	3.	.09
	2 COMBINED AT							

+	CN25A	881.	4.53	196.	49.	36.	1.55
DIVERSION TO							
+	N25AI	0.	4.47	0.	0.	0.	1.55
HYDROGRAPH AT							
+	DN25A	881.	4.53	196.	49.	36.	1.55
HYDROGRAPH AT							
+	N25	200.	4.47	30.	7.	5.	.24
HYDROGRAPH AT							
+	N25H	78.	4.27	10.	2.	2.	.07
4 COMBINED AT							
+	CN25	2199.	5.13	574.	146.	105.	6.85
ROUTED TO							
+	RN25	2095.	5.40	574.	146.	105.	6.85
HYDROGRAPH AT							
+	N24B	129.	4.13	12.	3.	2.	.07
HYDROGRAPH AT							
+	DRN25D	143.	4.03	29.	7.	5.	1.03
ROUTED TO							
+	RN25DS	122.	4.33	29.	7.	5.	1.03
2 COMBINED AT							
+	CN24B	238.	4.23	43.	11.	8.	.27
ROUTED TO							
+	RN24B	236.	4.33	43.	11.	8.	.27
HYDROGRAPH AT							
+	DRN25C	0.	4.63	0.	0.	0.	1.20
ROUTED TO							
+	RN25CS	0.	4.80	0.	0.	0.	1.20
2 COMBINED AT							
+	CN24B*	236.	4.33	43.	11.	8.	.64
DIVERSION TO							
+	N24BI	0.	4.30	0.	0.	0.	.64
HYDROGRAPH AT							
+	DN24B*	223.	4.33	42.	11.	8.	.64
ROUTED TO							
+	RN24BW	219.	4.40	42.	11.	8.	.64
HYDROGRAPH AT							
+	DRN25B	0.	4.47	0.	0.	0.	1.46
ROUTED TO							
+	RN25BS	0.	4.87	0.	0.	0.	1.46
2 COMBINED AT							
+	CN24C*	219.	4.40	42.	11.	8.	2.09
ROUTED TO							
+	RN24C*	162.	4.47	37.	9.	7.	2.09
HYDROGRAPH AT							
+	DRN25A	0.	4.47	0.	0.	0.	1.55
ROUTED TO							
+	RN25AS	0.	4.70	0.	0.	0.	1.55
HYDROGRAPH AT							
+	N24C	404.	4.10	38.	10.	7.	.19
3 COMBINED AT							
+	CN24C	298.	4.33	66.	17.	12.	3.73
ROUTED TO							
+	RN24C	295.	4.37	66.	17.	12.	3.73
HYDROGRAPH AT							
+	N24	153.	4.27	14.	4.	3.	.11

+	HYDROGRAPH AT	N24A	356.	4.20	53.	13.	10.	.24
+	DIVERSION TO	LN24AD	339.	4.13	18.	5.	3.	.24
+	HYDROGRAPH AT	LN24A	356.	4.20	35.	9.	6.	.24
+	HYDROGRAPH AT	DRN24B	0.	4.30	0.	0.	0.	.64
+	ROUTED TO	RN24BS	0.	4.43	0.	0.	0.	.64
+	DIVERSION TO	X30I	0.	4.43	0.	0.	0.	.64
+	HYDROGRAPH AT	DX30	0.	.00	0.	0.	0.	.64
+	ROUTED TO	RX30W	0.	.00	0.	0.	0.	.64
+	6 COMBINED AT	CN24	2021.	5.43	626.	167.	123.	10.60
+	ROUTED TO	RN24	1991.	5.63	625.	167.	123.	10.60
+	HYDROGRAPH AT	DRX30	0.	4.43	0.	0.	0.	.64
+	ROUTED TO	RX30S	0.	4.73	0.	0.	0.	.64
+	HYDROGRAPH AT	N23A	1012.	4.13	106.	27.	19.	.49
+	DIVERSION TO	LN23AD	728.	4.00	32.	8.	6.	.49
+	HYDROGRAPH AT	LN23A	1012.	4.13	74.	19.	13.	.49
+	2 COMBINED AT	CN23A	1013.	4.13	74.	19.	13.	.49
+	DIVERSION TO	N23AI	242.	4.13	18.	5.	3.	.49
+	HYDROGRAPH AT	DN23A	771.	4.13	56.	14.	10.	.49
+	ROUTED TO	RN23AW	703.	4.33	56.	14.	10.	.49
+	HYDROGRAPH AT	N23	390.	4.33	66.	17.	12.	.39
+	HYDROGRAPH AT	DRN21D	118.	4.53	29.	8.	6.	2.21
+	ROUTED TO	RN21DE	111.	5.13	29.	8.	6.	2.21
+	4 COMBINED AT	CN23	2009.	5.63	692.	185.	136.	13.79
+	ROUTED TO	RN23	1940.	5.97	691.	185.	136.	13.79
+	HYDROGRAPH AT	N21B	2824.	4.10	356.	89.	64.	1.66
+	DIVERSION TO	LN21BD	2824.	4.10	234.	58.	42.	1.66
+	HYDROGRAPH AT	LN21B	1879.	4.33	124.	31.	22.	1.66
+	ROUTED TO	RN21B	1300.	4.73	124.	31.	22.	1.66

HYDROGRAPH AT	DRN23A	242.	4.13	18.	5.	3.	.49
ROUTED TO	RN23AS	179.	4.77	18.	5.	3.	.49
HYDROGRAPH AT	N21A	964.	4.40	209.	53.	38.	.93
DIVERSION TO	LN21AD	964.	4.40	150.	37.	27.	.93
HYDROGRAPH AT	LN21A	431.	5.17	61.	15.	11.	.93
3 COMBINED AT	CN21A	1327.	4.77	180.	45.	32.	3.07
ROUTED TO	RN21A	1161.	4.87	172.	43.	31.	3.07
HYDROGRAPH AT	N21	626.	4.40	132.	33.	24.	.62
4 COMBINED AT	CN21	2629.	5.10	1045.	279.	203.	17.39
HYDROGRAPH AT	A09U	454.	4.10	31.	8.	6.	.17
DIVERSION TO	A09UI	91.	4.10	6.	2.	1.	.17
HYDROGRAPH AT	DA09U	364.	4.10	25.	6.	4.	.17
ROUTED TO	RA09US	309.	4.33	25.	6.	4.	.17
HYDROGRAPH AT	N11N	700.	4.03	42.	11.	8.	.26
DIVERSION TO	N11NI	661.	4.03	39.	10.	7.	.26
HYDROGRAPH AT	DN11N	39.	4.03	3.	1.	1.	.26
ROUTED TO	RN11NW	32.	4.57	3.	1.	1.	.26
HYDROGRAPH AT	N11O	119.	4.13	8.	2.	1.	.05
DIVERSION TO	N11OI	12.	4.13	1.	0.	0.	.05
HYDROGRAPH AT	DN11O	107.	4.13	7.	2.	1.	.05
ROUTED TO	RN11OS	85.	4.50	7.	2.	1.	.05
HYDROGRAPH AT	N11M	234.	4.13	14.	3.	2.	.10
4 COMBINED AT	CN11M	410.	4.27	48.	12.	9.	.33
DIVERSION TO	N11MI	102.	4.27	12.	3.	2.	.33
HYDROGRAPH AT	DN11M	307.	4.27	36.	9.	7.	.33
ROUTED TO	RN11MS	294.	4.53	36.	9.	7.	.33
HYDROGRAPH AT	N11J	492.	4.10	40.	10.	7.	.24
DIVERSION TO							

+		LN11JD	137.	3.87	5.	1.	1.	.24
	HYDROGRAPH AT							
+		LN11J	492.	4.10	36.	9.	6.	.24
	2 COMBINED AT							
+		CN11J	515.	4.13	71.	18.	13.	.57
	DIVERSION TO							
+		N11JI	257.	4.13	36.	9.	6.	.57
	HYDROGRAPH AT							
+		DN11J	257.	4.13	35.	9.	6.	.57
	ROUTED TO							
+		RN11JS	228.	4.67	35.	9.	6.	.57
	HYDROGRAPH AT							
+		N11G	716.	4.37	73.	18.	13.	.52
	HYDROGRAPH AT							
+		N11K	301.	4.17	31.	8.	6.	.19
	DIVERSION TO							
+		LN11KD	68.	3.87	3.	1.	0.	.19
	HYDROGRAPH AT							
+		LN11K	301.	4.17	29.	7.	5.	.19
	HYDROGRAPH AT							
+		DRN11N	661.	4.03	39.	10.	7.	.26
	ROUTED TO							
+		RN11NS	546.	4.23	39.	10.	7.	.26
	HYDROGRAPH AT							
+		DN11LI	155.	4.30	21.	5.	4.	.61
	ROUTED TO							
+		RN11L1	152.	4.30	21.	5.	4.	.61
	3 COMBINED AT							
+		CN11K	751.	4.23	77.	19.	14.	1.13
	DIVERSION TO							
+		LN11K1	209.	3.97	6.	2.	1.	1.13
	HYDROGRAPH AT							
+		LN11KX	751.	4.23	71.	18.	13.	1.13
	ROUTED TO							
+		RN11K	714.	4.43	71.	18.	13.	1.13
	DIVERSION TO							
+		X5I	558.	4.43	40.	10.	7.	1.13
	HYDROGRAPH AT							
+		DX5	156.	4.47	31.	8.	6.	1.13
	ROUTED TO							
+		RX5W	157.	4.63	31.	8.	6.	1.13
	HYDROGRAPH AT							
+		N11H	603.	4.37	64.	16.	11.	.44
	2 COMBINED AT							
+		CN11H	476.	4.60	84.	21.	15.	1.56
	ROUTED TO							
+		RN11H	437.	4.80	84.	21.	15.	1.56
	3 COMBINED AT							
+		CN11G	894.	4.57	168.	42.	30.	2.09
	DIVERSION TO							
+		N11GI	894.	4.57	168.	42.	30.	2.09
	HYDROGRAPH AT							
+		DN11G	0.	.00	0.	0.	0.	2.09
	ROUTED TO							
+		RN11GS	0.	.00	0.	0.	0.	2.09

+	ROUTED TO	RN11F	0.	.00	0.	0.	0.	2.09
+	HYDROGRAPH AT	N11C	398.	4.20	51.	13.	9.	.25
+	DIVERSION TO	LN11CD	398.	4.20	31.	8.	6.	.25
+	HYDROGRAPH AT	LN11C	277.	4.43	20.	5.	4.	.25
+	2 COMBINED AT	CN11C	163.	4.60	13.	3.	2.	2.34
+	DIVERSION TO	N11CWI	0.	4.43	0.	0.	0.	2.34
+	HYDROGRAPH AT	DN11CW	163.	4.60	13.	3.	2.	2.34
+	DIVERSION TO	N11CEI	12.	4.60	3.	1.	0.	2.34
+	HYDROGRAPH AT	DN11CE	151.	4.60	10.	3.	2.	2.34
+	HYDROGRAPH AT	DRN11C	0.	4.43	0.	0.	0.	2.34
+	ROUTED TO	LN11CW	0.	.00	0.	0.	0.	2.34
+	HYDROGRAPH AT	DR11C*	12.	4.60	3.	1.	0.	2.34
+	ROUTED TO	LN11CE	3.	6.43	2.	1.	0.	2.34
+	3 COMBINED AT	CN11C*	152.	4.60	13.	3.	2.	2.34
+	HYDROGRAPH AT	N11DA	404.	4.20	49.	12.	9.	.26
+	DIVERSION TO	LDAOUT	402.	4.17	20.	5.	4.	.26
+	HYDROGRAPH AT	LN11DA	381.	4.23	29.	7.	5.	.26
+	ROUTED TO	SN11DA	152.	4.67	29.	7.	5.	.26
+	DIVERSION TO	D11DAW	135.	4.67	25.	6.	5.	.26
+	HYDROGRAPH AT	N11DAS	17.	4.67	4.	1.	1.	.26
+	HYDROGRAPH AT	N11DB	404.	4.20	49.	12.	9.	.26
+	DIVERSION TO	LNBOUT	404.	4.20	36.	9.	7.	.26
+	HYDROGRAPH AT	LN11DB	197.	4.57	13.	3.	2.	.26
+	DIVERSION TO	N11DI	20.	4.57	1.	0.	0.	.26
+	HYDROGRAPH AT	DN11D	177.	4.57	12.	3.	2.	.26
+	3 COMBINED AT	CN11D	171.	4.60	21.	5.	4.	2.60
+	ROUTED TO	RWBW1	99.	5.33	21.	5.	4.	2.60
+	HYDROGRAPH AT	WBW	831.	4.77	214.	55.	39.	1.00

2 COMBINED AT	CWBW	702.	4.87	214.	55.	40.	3.60
ROUTED TO	RBWB	25.	5.30	25.	25.	22.	3.60
ROUTED TO	RWBW2	25.	9.10	25.	25.	21.	3.60
HYDROGRAPH AT	N11I	1112.	4.17	133.	33.	24.	.62
HYDROGRAPH AT	DRN22A	109.	4.23	13.	3.	2.	.37
ROUTED TO	RN22AW	100.	4.50	13.	3.	2.	.37
2 COMBINED AT	CN11I	1112.	4.20	144.	36.	26.	.98
DIVERSION TO	N11II	519.	4.20	71.	18.	13.	.98
HYDROGRAPH AT	DN11I	519.	4.20	71.	18.	13.	.98
ROUTED TO	RN11IS	506.	4.30	70.	18.	13.	.98
HYDROGRAPH AT	DRN11I	519.	4.20	71.	18.	13.	.98
ROUTED TO	RN11IW	505.	4.40	70.	18.	13.	.98
2 COMBINED AT	CX50	991.	4.37	141.	35.	25.	.98
ROUTED TO	LX50	867.	4.53	232.	166.	160.	.98
DIVERSION TO	DX50I	627.	4.53	198.	153.	149.	.98
HYDROGRAPH AT	DX50	240.	4.53	34.	13.	11.	.98
ROUTED TO	RX50E	234.	4.70	34.	13.	11.	.98
HYDROGRAPH AT	N22	579.	4.37	121.	31.	22.	.47
DIVERSION TO	LN22D	579.	4.37	76.	19.	14.	.47
HYDROGRAPH AT	LN22	397.	4.87	46.	12.	8.	.47
2 COMBINED AT	CN22	518.	4.97	76.	23.	18.	1.46
DIVERSION TO	N22I	500.	4.97	75.	23.	18.	1.46
HYDROGRAPH AT	DN22	48.	4.87	1.	0.	0.	1.46
ROUTED TO	RN22W	24.	5.10	1.	0.	0.	1.46
HYDROGRAPH AT	DRX50I	627.	4.53	198.	153.	149.	.98
ROUTED TO	RX50W	619.	4.67	198.	153.	148.	.98
HYDROGRAPH AT	N11E	762.	4.23	112.	28.	20.	.49
2 COMBINED AT							

+	CN11E1	1012.	4.53	300.	179.	166.	1.47
DIVERSION TO +	LN11ED	169.	3.43	79.	20.	14.	1.47
HYDROGRAPH AT +	LN11E	1012.	4.53	295.	178.	152.	1.47
HYDROGRAPH AT +	DRN11D	20.	4.57	1.	0.	0.	.26
ROUTED TO +	RN11DE	10.	5.10	1.	0.	0.	.26
HYDROGRAPH AT +	DRX5	558.	4.43	40.	10.	7.	1.13
ROUTED TO +	RX5S	387.	4.87	40.	10.	7.	1.13
2 COMBINED AT +	CX1	486.	4.87	48.	12.	9.	.70
DIVERSION TO +	X1I	45.	4.83	2.	1.	0.	.70
HYDROGRAPH AT +	DX1	441.	4.87	46.	11.	8.	.70
ROUTED TO +	RX1E	436.	4.90	46.	11.	8.	.70
3 COMBINED AT +	CN11E	1024.	4.87	331.	187.	159.	1.47
ROUTED TO +	R-WBE1	1022.	4.87	331.	187.	159.	1.47
HYDROGRAPH AT +	WB1	285.	4.20	32.	8.	6.	.12
2 COMBINED AT +	CPWB1	1126.	4.50	358.	193.	164.	1.59
ROUTED TO +	R-R3	1125.	4.50	351.	192.	161.	1.59
HYDROGRAPH AT +	WB2	156.	4.47	28.	7.	5.	.10
2 COMBINED AT +	CPWB2	1243.	4.50	374.	197.	166.	1.69
ROUTED TO +	R-4-5	1136.	4.70	304.	180.	150.	1.69
HYDROGRAPH AT +	WB3	35.	4.10	3.	1.	1.	.01
2 COMBINED AT +	CPWB3	1139.	4.70	304.	180.	151.	1.71
ROUTED TO +	R-6	1133.	4.87	303.	180.	150.	1.71
HYDROGRAPH AT +	DRN22	500.	4.97	75.	23.	18.	1.46
HYDROGRAPH AT +	WB4	161.	4.13	16.	4.	3.	.06
2 COMBINED AT +	CPWB4	511.	4.97	90.	27.	21.	1.52
ROUTED TO +	R-R1	526.	5.00	83.	27.	21.	1.52
HYDROGRAPH AT +	WB5	178.	4.17	20.	5.	4.	.08
2 COMBINED AT +	CPWB5	544.	5.00	99.	31.	24.	1.60

+	ROUTED TO	R-R2	208.	5.53	45.	27.	22.	1.60
+	2 COMBINED AT	CPR6	1124.	4.87	343.	205.	171.	2.33
+	ROUTED TO	RCR26	1057.	5.00	335.	203.	169.	2.33
+	HYDROGRAPH AT	WB7	97.	4.10	10.	2.	2.	.03
+	2 COMBINED AT	CR6W7	1059.	5.00	335.	203.	171.	2.36
+	ROUTED TO	R-R7	1059.	5.03	333.	203.	169.	2.36
+	HYDROGRAPH AT	WB6	178.	4.27	23.	6.	4.	.08
+	ROUTED TO	R-R8	21.	5.10	18.	6.	4.	.08
+	2 COMBINED AT	C7R8	1072.	5.03	349.	207.	173.	2.45
+	ROUTED TO	RC78	1069.	5.07	348.	207.	172.	2.45
+	HYDROGRAPH AT	WB8	103.	4.07	10.	3.	2.	.03
+	2 COMBINED AT	CP-678	1070.	5.07	348.	207.	174.	2.48
+	HYDROGRAPH AT	WB10	139.	4.17	14.	4.	3.	.06
+	ROUTED TO	R-R9	24.	4.63	14.	4.	3.	.06
+	2 COMBINED AT	WBEOT	1090.	5.07	357.	209.	176.	2.50
+	DIVERSION TO	TONRI	100.	4.73	76.	59.	50.	2.50
+	HYDROGRAPH AT	DVNR	990.	5.07	281.	151.	126.	2.50
+	DIVERSION TO	DCLUB	216.	5.07	48.	17.	13.	2.50
+	HYDROGRAPH AT	CCLUB	775.	5.07	234.	134.	114.	2.50
+	ROUTED TO	RR287	774.	5.07	234.	134.	113.	2.50
+	DIVERSION TO	DV87SI	225.	5.07	50.	17.	13.	2.50
+	HYDROGRAPH AT	DV87S	549.	5.07	184.	116.	100.	2.50
+	ROUTED TO	RR289	548.	5.10	184.	116.	100.	2.50
+	DIVERSION TO	DV89I	201.	5.10	33.	8.	6.	2.50
+	HYDROGRAPH AT	DS89	346.	5.10	151.	108.	94.	2.50
+	ROUTED TO	TODET	345.	5.17	151.	108.	93.	2.50
+	DIVERSION TO	DV91I	224.	5.17	47.	12.	8.	2.50
+	HYDROGRAPH AT	DV91	121.	5.23	104.	96.	85.	2.50

	HYDROGRAPH AT							
+		WB9	627.	4.10	71.	18.	13.	.28
	ROUTED TO							
+		R-R10	331.	4.37	23.	6.	4.	.28
	HYDROGRAPH AT							
+		DRX1I	45.	4.83	2.	1.	0.	.70
	ROUTED TO							
+		RX1S	22.	5.53	2.	1.	0.	.70
	4 COMBINED AT							
+		CN11B	365.	4.63	170.	138.	120.	4.79
	ROUTED TO							
+		RCP91	212.	4.67	160.	135.	117.	4.79
	HYDROGRAPH AT							
+		SB-G4a	142.	4.07	13.	3.	2.	.06
	HYDROGRAPH AT							
+		DR91	224.	5.17	47.	12.	8.	2.50
	ROUTED TO							
+		R2DET	224.	5.17	47.	12.	8.	2.50
	3 COMBINED AT							
+		CPDET	371.	5.23	203.	146.	126.	4.94
	ROUTED TO							
+		S-DET	267.	6.07	196.	145.	130.	4.94
	ROUTED TO							
+		RDET	267.	6.10	196.	145.	130.	4.94
	ROUTED TO							
+		RN11BS	266.	6.40	195.	145.	129.	4.94
	HYDROGRAPH AT							
+		N11	1231.	4.30	223.	56.	40.	.90
	HYDROGRAPH AT							
+		DRV87	225.	5.07	50.	17.	13.	2.50
	ROUTED TO							
+		RDV87S	224.	5.13	50.	17.	13.	2.50
	ROUTED TO							
+		R-G1	222.	5.20	50.	17.	13.	2.50
	DIVERSION TO							
+		DX55I	150.	5.00	44.	16.	12.	2.50
	HYDROGRAPH AT							
+		DX55	72.	5.20	6.	1.	1.	2.50
	DIVERSION TO							
+		DX56I	56.	5.20	4.	1.	1.	2.50
	HYDROGRAPH AT							
+		DX56	16.	5.17	1.	0.	0.	2.50
	ROUTED TO							
+		DX56W	8.	5.50	1.	0.	0.	2.50
	HYDROGRAPH AT							
+		DRV89	201.	5.10	33.	8.	6.	2.50
	ROUTED TO							
+		RDV89S	159.	5.47	33.	8.	6.	2.50
	ROUTED TO							
+		RDV89E	135.	5.80	33.	8.	6.	2.50
	4 COMBINED AT							
+		CN11	1231.	4.37	471.	217.	185.	5.69
	ROUTED TO							
+		RN11	989.	4.53	391.	197.	169.	5.69
	HYDROGRAPH AT							

+	N10	614.	4.30	115.	29.	21.	.49
HYDROGRAPH AT +	S10R	37.	4.23	8.	2.	1.	.03
DIVERSION TO +	S10RI	24.	4.23	4.	1.	1.	.03
HYDROGRAPH AT +	DS10RO	13.	4.23	3.	1.	1.	.03
ROUTED TO +	RS10RS	9.	4.70	3.	1.	1.	.03
3 COMBINED AT +	CN10	1382.	4.50	479.	219.	186.	6.22
DIVERSION TO +	N10I	632.	4.50	73.	19.	14.	6.22
HYDROGRAPH AT +	DN10	750.	4.27	406.	201.	173.	6.22
ROUTED TO +	RN10E	750.	4.53	406.	201.	172.	6.22
HYDROGRAPH AT +	DR56	56.	5.20	4.	1.	1.	2.50
ROUTED TO +	RDR56	20.	5.57	4.	1.	1.	2.50
HYDROGRAPH AT +	N09	1068.	4.23	170.	43.	31.	.65
3 COMBINED AT +	CN09*	1431.	4.30	540.	236.	199.	6.87
HYDROGRAPH AT +	CN21	2629.	5.10	1045.	279.	203.	17.39
ROUTED TO +	RN21	2548.	5.37	1041.	279.	203.	17.39
HYDROGRAPH AT +	DRTONR	100.	4.73	76.	59.	50.	2.50
HYDROGRAPH AT +	N20	472.	4.27	83.	21.	15.	.36
3 COMBINED AT +	CN20	2709.	5.37	1145.	346.	262.	17.74
ROUTED TO +	RN20	2654.	5.60	1144.	346.	261.	17.74
HYDROGRAPH AT +	N12	475.	4.50	123.	31.	23.	.51
DIVERSION TO +	LN12D	21.	3.37	6.	1.	1.	.51
HYDROGRAPH AT +	LN12	475.	4.50	120.	30.	22.	.51
HYDROGRAPH AT +	N13	184.	5.10	112.	34.	25.	.50
3 COMBINED AT +	CN12	2891.	5.60	1291.	393.	296.	18.75
ROUTED TO +	RN12	2825.	5.83	1290.	392.	295.	18.75
2 COMBINED AT +	CN09+	2976.	5.83	1635.	586.	464.	26.16
ROUTED TO +	RN09*	2954.	5.93	1634.	586.	462.	26.16
HYDROGRAPH AT +	N19E	726.	4.60	123.	31.	22.	.70

+	HYDROGRAPH AT	N19F	323.	4.63	58.	14.	10.	.37
+	2 COMBINED AT	CN19E	937.	4.63	169.	43.	31.	1.08
+	ROUTED TO	RN19E	853.	4.80	169.	43.	31.	1.08
+	HYDROGRAPH AT	N19D	575.	4.33	75.	19.	14.	.39
+	2 COMBINED AT	CN19D	1029.	4.70	230.	58.	42.	1.47
+	ROUTED TO	RN19D	1013.	4.97	230.	58.	42.	1.47
+	HYDROGRAPH AT	N19C	1498.	4.10	141.	35.	26.	.76
+	2 COMBINED AT	CN19C	1082.	4.13	344.	88.	63.	2.23
+	ROUTED TO	RN19C	1070.	4.30	344.	88.	63.	2.23
+	HYDROGRAPH AT	N19B	808.	4.07	61.	15.	11.	.32
+	2 COMBINED AT	CN19B	1321.	4.23	390.	100.	72.	2.54
+	ROUTED TO	RN19B	1244.	4.60	390.	100.	72.	2.54
+	HYDROGRAPH AT	N19A	1061.	4.07	97.	24.	17.	.47
+	2 COMBINED AT	CN19A	1382.	4.57	461.	119.	86.	3.02
+	ROUTED TO	397RR	1261.	4.70	460.	119.	86.	3.02
+	HYDROGRAPH AT	398AS	718.	4.20	60.	15.	11.	.30
+	ROUTED TO	398ARR	564.	4.27	39.	10.	7.	.30
+	HYDROGRAPH AT	398BS	618.	4.77	216.	56.	40.	.90
+	3 COMBINED AT	HC398	1881.	4.70	669.	174.	125.	4.22
+	ROUTED TO	398BR1	1610.	5.03	663.	174.	125.	4.22
+	ROUTED TO	398BR2	1219.	6.03	631.	174.	125.	4.22
+	ROUTED TO	398BR3	792.	7.30	533.	172.	125.	4.22
+	ROUTED TO	398BR4	708.	8.17	500.	172.	125.	4.22
+	ROUTED TO	RM399	705.	8.30	498.	172.	125.	4.22
+	HYDROGRAPH AT	N18	788.	4.20	103.	26.	19.	.50
+	2 COMBINED AT	CN18	704.	8.30	497.	191.	140.	4.73
+	ROUTED TO	RN18	693.	8.53	489.	189.	138.	4.73
+	HYDROGRAPH AT	N17	546.	4.23	85.	21.	15.	.41

2 COMBINED AT							
+	CN17	794.	4.43	489.	206.	151.	5.14
ROUTED TO							
+	RN17	760.	4.67	483.	204.	150.	5.14
HYDROGRAPH AT							
+	N16	1155.	4.30	201.	50.	36.	.92
2 COMBINED AT							
+	CN16	1415.	4.63	553.	244.	179.	6.06
ROUTED TO							
+	RN16	1405.	4.73	552.	244.	179.	6.06
HYDROGRAPH AT							
+	N15B	792.	4.37	161.	41.	29.	.75
ROUTED TO							
+	RN15B	753.	4.90	160.	41.	29.	.75
HYDROGRAPH AT							
+	N15A	948.	4.37	193.	49.	35.	.80
DIVERSION TO							
+	LN15AD	948.	4.37	151.	38.	27.	.80
HYDROGRAPH AT							
+	LN15A	333.	5.03	43.	11.	8.	.80
2 COMBINED AT							
+	CN15A	882.	5.27	192.	48.	35.	1.54
ROUTED TO							
+	RN15A	808.	5.47	191.	48.	35.	1.54
HYDROGRAPH AT							
+	N15	546.	4.40	121.	31.	22.	.54
3 COMBINED AT							
+	CN15	1990.	4.80	762.	301.	220.	8.14
ROUTED TO							
+	RN15	1978.	4.87	761.	301.	220.	8.14
HYDROGRAPH AT							
+	N14A	458.	4.40	102.	26.	19.	.44
ROUTED TO							
+	RN14A	454.	4.50	102.	26.	19.	.44
HYDROGRAPH AT							
+	N14	195.	4.07	24.	6.	4.	.08
3 COMBINED AT							
+	CN14	2265.	4.87	835.	326.	238.	8.66
ROUTED TO							
+	RN14	2112.	5.17	818.	325.	238.	8.66
HYDROGRAPH AT							
+	N08B	750.	4.40	165.	42.	30.	.70
DIVERSION TO							
+	LN08BD	750.	4.40	116.	29.	21.	.70
HYDROGRAPH AT							
+	LN08B	373.	4.97	51.	13.	9.	.70
ROUTED TO							
+	RN08B	260.	5.87	51.	13.	9.	.70
HYDROGRAPH AT							
+	N08A	702.	4.43	174.	44.	32.	.74
DIVERSION TO							
+	LN08AD	702.	4.43	109.	27.	20.	.74
HYDROGRAPH AT							
+	LN08A	432.	5.07	69.	17.	12.	.74
2 COMBINED AT							

+		CN08A	420.	5.07	109.	27.	20.	1.43
	ROUTED TO							
+		RN08A	334.	6.07	108.	27.	20.	1.43
	HYDROGRAPH AT							
+		N08	918.	4.30	183.	46.	33.	.79
	3 COMBINED AT							
+		CN08	2321.	5.17	946.	372.	272.	10.88
	ROUTED TO							
+		RN08	2317.	5.20	946.	372.	272.	10.88
	2 COMBINED AT							
+		CN09	3937.	5.87	2243.	856.	661.	37.04
	ROUTED TO							
+		RN09	3903.	6.00	2239.	856.	659.	37.04
	HYDROGRAPH AT							
+		DRN10	632.	4.50	73.	19.	14.	6.22
	ROUTED TO							
+		RN10S	625.	4.60	73.	19.	14.	6.22
	DIVERSION TO							
+		DX26I	590.	4.60	66.	17.	12.	6.22
	HYDROGRAPH AT							
+		DX26O	35.	4.33	7.	2.	1.	6.22
	ROUTED TO							
+		RX26S	35.	5.40	7.	2.	1.	6.22
	HYDROGRAPH AT							
+		DRX26	590.	4.60	66.	17.	12.	6.22
	HYDROGRAPH AT							
+		N07A	809.	4.13	81.	20.	15.	.36
	DIVERSION TO							
+		LN07AD	809.	4.13	56.	14.	10.	.36
	HYDROGRAPH AT							
+		LN07A	531.	4.30	26.	6.	5.	.36
	2 COMBINED AT							
+		CN07A	1456.	4.43	150.	38.	27.	.36
	HYDROGRAPH AT							
+		N07	962.	4.27	160.	40.	29.	.75
	4 COMBINED AT							
+		CN07	3926.	6.00	2329.	885.	681.	38.15
	ROUTED TO							
+		RN07	3907.	6.27	2324.	885.	676.	38.15
	HYDROGRAPH AT							
+		A11L	662.	4.20	62.	15.	11.	.25
	ROUTED TO							
+		RA11L	607.	4.37	62.	15.	11.	.25
	HYDROGRAPH AT							
+		A11M	722.	4.10	55.	14.	10.	.26
	ROUTED TO							
+		RA11M	670.	4.20	55.	14.	10.	.26
	HYDROGRAPH AT							
+		A11J	181.	4.17	16.	4.	3.	.08
	HYDROGRAPH AT							
+		A11N	210.	4.10	14.	4.	3.	.08
	ROUTED TO							
+		RA11N	200.	4.13	14.	4.	3.	.08
	HYDROGRAPH AT							
+		A11O	146.	4.07	10.	2.	2.	.06

	ROUTED TO							
+		RA11O	136.	4.17	10.	2.	2.	.06
	2 COMBINED AT							
+		CX21	334.	4.17	24.	6.	4.	.14
	ROUTED TO							
+		RX21	290.	4.33	24.	6.	4.	.14
	3 COMBINED AT							
+		CA11K*	1046.	4.23	95.	24.	17.	.47
	HYDROGRAPH AT							
+		A11K	777.	4.10	46.	12.	8.	.30
	HYDROGRAPH AT							
+		A11G	189.	4.03	13.	3.	2.	.07
	DIVERSION TO							
+		A11GI	0.	4.03	0.	0.	0.	.07
	HYDROGRAPH AT							
+		DA11G	189.	4.03	13.	3.	2.	.07
	ROUTED TO							
+		RA11GN	178.	4.10	13.	3.	2.	.07
	4 COMBINED AT							
+		CA11K	1803.	4.17	205.	51.	37.	1.09
	ROUTED TO							
+		RA11K	1735.	4.27	205.	51.	37.	1.09
	HYDROGRAPH AT							
+		DRA11G	0.	4.03	0.	0.	0.	.07
	ROUTED TO							
+		RA11GW	0.	4.20	0.	0.	0.	.07
	HYDROGRAPH AT							
+		A11I	884.	4.07	58.	14.	10.	.28
	4 COMBINED AT							
+		CA11I	3888.	6.27	2390.	923.	704.	39.52
	ROUTED TO							
+		RA11I	3862.	6.47	2389.	923.	701.	39.52
	HYDROGRAPH AT							
+		A11E	542.	4.20	44.	11.	8.	.30
	HYDROGRAPH AT							
+		A11F	898.	4.20	79.	20.	14.	.47
	DIVERSION TO							
+		A11FI	1.	4.20	0.	0.	0.	.47
	HYDROGRAPH AT							
+		DA11F	897.	4.20	79.	20.	14.	.47
	ROUTED TO							
+		RA11FN	866.	4.23	78.	20.	14.	.47
	3 COMBINED AT							
+		CA11E	3843.	6.47	2413.	933.	709.	40.28
	ROUTED TO							
+		RA11E	3837.	6.53	2413.	933.	708.	40.28
	HYDROGRAPH AT							
+		A11H	188.	4.07	10.	2.	2.	.07
	ROUTED TO							
+		RA11H	149.	4.37	10.	2.	2.	.07
	HYDROGRAPH AT							
+		DRA09U	91.	4.10	6.	2.	1.	.17
	ROUTED TO							
+		RA09UW	67.	4.33	6.	2.	1.	.17
	HYDROGRAPH AT							
+		A09T	348.	4.17	26.	7.	5.	.18

	2 COMBINED AT							
+		CA09T	407.	4.17	32.	8.	6.	.18
	DIVERSION TO							
+		A09TI	197.	4.17	8.	2.	1.	.18
	HYDROGRAPH AT							
+		DA09T	210.	4.03	24.	6.	4.	.18
	ROUTED TO							
+		RA09TW	210.	4.37	24.	6.	4.	.18
	HYDROGRAPH AT							
+		DRA11F	1.	4.20	0.	0.	0.	.47
	ROUTED TO							
+		RA11FS	0.	4.63	0.	0.	0.	.47
	2 COMBINED AT							
+		CX22	210.	4.37	25.	6.	4.	.18
	ROUTED TO							
+		RX22	210.	4.43	25.	6.	4.	.18
	3 COMBINED AT							
+		CX23	3831.	6.53	2423.	936.	710.	40.53
	ROUTED TO							
+		RX23	3828.	6.70	2420.	936.	706.	40.53
	HYDROGRAPH AT							
+		A99Z	333.	4.17	32.	8.	6.	.16
	ROUTED TO							
+		RA99Z	302.	4.43	32.	8.	6.	.16
	HYDROGRAPH AT							
+		A11D	313.	4.13	20.	5.	4.	.15
	2 COMBINED AT							
+		CA11D	397.	4.17	51.	13.	9.	.30
	ROUTED TO							
+		RA11D	357.	4.97	51.	13.	9.	.30
	HYDROGRAPH AT							
+		A11B	196.	4.23	21.	5.	4.	.15
	HYDROGRAPH AT							
+		A11A	659.	4.43	93.	23.	17.	.59
	4 COMBINED AT							
+		CA11A	3823.	6.70	2459.	949.	716.	41.58
	ROUTED TO							
+		RA11A	3820.	6.73	2458.	948.	715.	41.58
	HYDROGRAPH AT							
+		A11C	152.	4.33	16.	4.	3.	.12
	ROUTED TO							
+		RA11C	140.	4.60	16.	4.	3.	.12
	2 COMBINED AT							
+		CA11*	3817.	6.73	2460.	949.	716.	41.70
	ROUTED TO							
+		RA11*	3806.	6.80	2459.	949.	715.	41.70
	HYDROGRAPH AT							
+		A11	254.	4.30	22.	6.	4.	.16
	2 COMBINED AT							
+		CA11	3802.	6.80	2459.	950.	715.	41.86
	HYDROGRAPH AT							
+		DRN11O	12.	4.13	1.	0.	0.	.05
	ROUTED TO							
+		RN11OW	3.	4.40	1.	0.	0.	.05
	HYDROGRAPH AT							

+		DRA09T	197.	4.17	8.	2.	1.	.18
	ROUTED TO							
+		RA09TS	69.	5.23	8.	2.	1.	.18
	HYDROGRAPH AT							
+		A09R	173.	4.33	20.	5.	4.	.14
	3 COMBINED AT							
+		CA09R	176.	4.33	28.	7.	5.	.32
	DIVERSION TO							
+		A09RI	0.	4.33	0.	0.	0.	.32
	HYDROGRAPH AT							
+		DA09R	176.	4.33	28.	7.	5.	.32
	ROUTED TO							
+		RA09RS	161.	4.67	28.	7.	5.	.32
	HYDROGRAPH AT							
+		DRN11M	102.	4.27	12.	3.	2.	.33
	ROUTED TO							
+		RN11MW	93.	4.80	12.	3.	2.	.33
	HYDROGRAPH AT							
+		DRN11J	257.	4.13	36.	9.	6.	.57
	ROUTED TO							
+		RN11JW	234.	4.27	36.	9.	6.	.57
	2 COMBINED AT							
+		CX4	252.	4.63	48.	12.	9.	.57
	ROUTED TO							
+		RX4	250.	4.80	48.	12.	9.	.57
	HYDROGRAPH AT							
+		A09O	200.	4.43	29.	7.	5.	.19
	3 COMBINED AT							
+		CA09O	474.	4.67	92.	23.	17.	1.09
	DIVERSION TO							
+		A09OI	474.	4.67	92.	23.	17.	1.09
	HYDROGRAPH AT							
+		DA09O	0.	.00	0.	0.	0.	1.09
	ROUTED TO							
+		RA09OS	0.	.00	0.	0.	0.	1.09
	HYDROGRAPH AT							
+		A09K	524.	4.40	59.	15.	11.	.41
	DIVERSION TO							
+		A09KI	382.	4.40	43.	11.	8.	.41
	HYDROGRAPH AT							
+		DA09K	141.	4.40	16.	4.	3.	.41
	2 COMBINED AT							
+		CX7	142.	4.40	16.	4.	3.	.11
	ROUTED TO							
+		RX7S	131.	4.60	16.	4.	3.	.11
	HYDROGRAPH AT							
+		N11DAW	135.	4.67	25.	6.	5.	.26
	ROUTED TO							
+		RN11DA	132.	4.83	25.	6.	5.	.26
	HYDROGRAPH AT							
+		N11FB	196.	4.27	35.	9.	6.	.18
	DIVERSION TO							
+		LN1FBD	196.	4.27	27.	7.	5.	.18
	HYDROGRAPH AT							
+		LN11FB	85.	4.93	9.	2.	2.	.18

+	2 COMBINED AT	CN11FB	213.	4.93	34.	8.	6.	.44
+	HYDROGRAPH AT	DRN11G	894.	4.57	168.	42.	30.	2.09
+	ROUTED TO	RN11G	883.	4.67	168.	42.	30.	2.09
+	2 COMBINED AT	C98RGL	901.	4.77	186.	47.	34.	2.53
+	ROUTED TO	RN11FB	897.	4.83	186.	47.	34.	2.53
+	HYDROGRAPH AT	DRA09K	382.	4.40	43.	11.	8.	.41
+	ROUTED TO	RA09KS	368.	4.53	43.	11.	8.	.41
+	HYDROGRAPH AT	N11FA	157.	4.23	26.	7.	5.	.13
+	DIVERSION TO	LN1FAD	157.	4.23	19.	5.	3.	.13
+	HYDROGRAPH AT	LN11FA	71.	4.80	7.	2.	1.	.13
+	HYDROGRAPH AT	A09GA	280.	4.07	30.	7.	5.	.10
+	DIVERSION TO	L09GAD	259.	4.00	15.	4.	3.	.10
+	HYDROGRAPH AT	LA09GA	280.	4.07	15.	4.	3.	.10
+	4 COMBINED AT	CN11FA	1067.	4.77	228.	57.	41.	3.06
+	ROUTED TO	RN11FA	1064.	4.80	228.	57.	41.	3.06
+	HYDROGRAPH AT	A09GB	88.	4.13	10.	2.	2.	.05
+	DIVERSION TO	L09GBD	88.	4.13	7.	2.	1.	.05
+	HYDROGRAPH AT	LA09GB	45.	4.40	3.	1.	0.	.05
+	2 COMBINED AT	CA09G	1074.	4.80	229.	57.	41.	3.10
+	DIVERSION TO	A09GI	149.	4.83	41.	10.	7.	3.10
+	HYDROGRAPH AT	DA09G	924.	4.80	188.	47.	34.	3.10
+	ROUTED TO	RA09GW	921.	4.83	188.	47.	34.	3.10
+	2 COMBINED AT	CX8	981.	4.83	198.	50.	36.	3.21
+	ROUTED TO	RX8W	971.	4.97	198.	50.	36.	3.21
+	HYDROGRAPH AT	A09H	278.	4.23	44.	11.	8.	.21
+	DIVERSION TO	LA09HD	278.	4.23	32.	8.	6.	.21
+	HYDROGRAPH AT	LA09H	146.	4.70	13.	3.	2.	.21
+	2 COMBINED AT	CA09H1	1005.	5.03	202.	51.	37.	3.42

	HYDROGRAPH AT							
+		A09J	300.	4.27	35.	9.	6.	.17
	DIVERSION TO							
+		LA09JD	300.	4.27	19.	5.	3.	.17
	HYDROGRAPH AT							
+		LA09J	237.	4.40	16.	4.	3.	.17
	DIVERSION TO							
+		A09JI	0.	.00	0.	0.	0.	.17
	HYDROGRAPH AT							
+		DA09J	237.	4.40	16.	4.	3.	.17
	ROUTED TO							
+		RA09JS	173.	4.67	16.	4.	3.	.17
	2 COMBINED AT							
+		CA09H	1059.	5.00	210.	53.	38.	3.59
	ROUTED TO							
+		RA09H	1053.	5.03	210.	53.	38.	3.59
	HYDROGRAPH AT							
+		A09S	142.	4.17	11.	3.	2.	.07
	HYDROGRAPH AT							
+		DRA09R	0.	4.33	0.	0.	0.	.32
	ROUTED TO							
+		RA09RW	0.	5.60	0.	0.	0.	.32
	2 COMBINED AT							
+		CA09S	142.	4.17	11.	3.	2.	.07
	DIVERSION TO							
+		A09SI	1.	4.17	0.	0.	0.	.07
	HYDROGRAPH AT							
+		DA09S	142.	4.17	11.	3.	2.	.07
	ROUTED TO							
+		RA09SS	119.	4.53	11.	3.	2.	.07
	HYDROGRAPH AT							
+		A09Q	327.	4.30	32.	8.	6.	.22
	HYDROGRAPH AT							
+		A09P	189.	4.40	27.	7.	5.	.18
	HYDROGRAPH AT							
+		DRA09O	474.	4.67	92.	23.	17.	1.09
	ROUTED TO							
+		RA09OW	466.	4.73	92.	23.	17.	1.09
	2 COMBINED AT							
+		CA09P	563.	4.67	113.	28.	20.	1.27
	ROUTED TO							
+		RA09P	562.	4.70	113.	28.	20.	1.27
	3 COMBINED AT							
+		CA09Q	729.	4.60	145.	36.	26.	1.56
	DIVERSION TO							
+		A09QI	729.	4.60	145.	36.	26.	1.56
	HYDROGRAPH AT							
+		DA09Q	0.	.00	0.	0.	0.	1.56
	ROUTED TO							
+		RA09QS	0.	.00	0.	0.	0.	1.56
	HYDROGRAPH AT							
+		A09M	540.	4.10	42.	10.	8.	.25
	DIVERSION TO							
+		LA09MD	503.	4.03	17.	4.	3.	.25
	HYDROGRAPH AT							

+	LA09M	540.	4.10	24.	6.	4.	.25
2 COMBINED AT +	CA09M	540.	4.10	24.	6.	4.	.25
ROUTED TO +	RA09M	452.	4.20	24.	6.	4.	.25
HYDROGRAPH AT +	A09N	204.	4.47	30.	8.	5.	.15
2 COMBINED AT +	CA09N	551.	4.20	54.	14.	10.	.40
ROUTED TO +	LA09N	200.	4.70	52.	14.	10.	.40
ROUTED TO +	RA09N	200.	4.77	52.	14.	10.	.40
HYDROGRAPH AT +	DRA09J	0.	.00	0.	0.	0.	.17
ROUTED TO +	RA09JW	0.	.00	0.	0.	0.	.17
HYDROGRAPH AT +	A09L	127.	4.20	19.	5.	3.	.09
3 COMBINED AT +	CA09L	255.	4.67	69.	18.	13.	.49
ROUTED TO +	LA09L	232.	4.90	69.	18.	13.	.49
ROUTED TO +	RA09LS	231.	4.97	69.	18.	13.	.49
HYDROGRAPH AT +	A09IH	109.	4.60	20.	5.	4.	.10
2 COMBINED AT +	CA09IH	298.	4.93	87.	23.	17.	.59
ROUTED TO +	LA09IH	231.	5.27	85.	23.	17.	.59
HYDROGRAPH AT +	A09I	251.	4.13	27.	7.	5.	.13
DIVERSION TO +	LA09ID	251.	4.13	14.	3.	2.	.13
HYDROGRAPH AT +	LA09I	228.	4.23	14.	3.	3.	.13
3 COMBINED AT +	CX10	1147.	5.07	277.	71.	51.	4.31
ROUTED TO +	RX10	1128.	5.17	276.	71.	51.	4.31
HYDROGRAPH AT +	A99V	396.	4.23	35.	9.	6.	.21
2 COMBINED AT +	CA99V	1126.	5.17	298.	77.	56.	4.51
HYDROGRAPH AT +	DRA09G	149.	4.83	41.	10.	7.	3.10
ROUTED TO +	RA09GS	149.	5.30	40.	10.	7.	3.10
HYDROGRAPH AT +	A09F	577.	4.20	76.	19.	14.	.37
DIVERSION TO +	LA09FD	577.	4.20	34.	9.	6.	.37
HYDROGRAPH AT +	LA09F	542.	4.30	42.	11.	8.	.37

+	2 COMBINED AT	CA09F	492.	4.30	84.	21.	15.	.59
+	ROUTED TO	RA09FW	396.	4.53	84.	21.	15.	.59
+	HYDROGRAPH AT	A09E	159.	4.30	32.	8.	6.	.15
+	DIVERSION TO	LA09ED	159.	4.30	21.	5.	4.	.15
+	HYDROGRAPH AT	LA09E	101.	4.80	12.	3.	2.	.15
+	2 COMBINED AT	CA09E	378.	4.57	94.	24.	17.	.73
+	ROUTED TO	RA09E	345.	4.70	94.	24.	17.	.73
+	HYDROGRAPH AT	A09D	745.	4.07	62.	15.	11.	.25
+	DIVERSION TO	LA09DD	745.	4.07	39.	10.	7.	.25
+	HYDROGRAPH AT	LA09D	642.	4.13	23.	6.	4.	.25
+	2 COMBINED AT	CA09C*	388.	4.13	113.	28.	20.	.99
+	ROUTED TO	RA09C*	350.	4.73	112.	28.	20.	.99
+	HYDROGRAPH AT	A09C	120.	4.20	11.	3.	2.	.07
+	2 COMBINED AT	CA09C	419.	4.23	121.	31.	22.	1.06
+	ROUTED TO	RA09C	418.	4.27	121.	31.	22.	1.06
+	HYDROGRAPH AT	A09B	130.	4.00	10.	3.	2.	.04
+	ROUTED TO	RA09B	106.	4.43	10.	3.	2.	.04
+	HYDROGRAPH AT	A09A	80.	4.30	15.	4.	3.	.08
+	3 COMBINED AT	CA09A	527.	4.37	142.	36.	26.	1.19
+	DIVERSION TO	DA09I	158.	4.37	38.	9.	7.	1.19
+	HYDROGRAPH AT	DA09	370.	4.37	104.	27.	19.	1.19
+	ROUTED TO	RA09AW	279.	5.60	103.	27.	19.	1.19
+	HYDROGRAPH AT	A99T	73.	4.03	3.	1.	1.	.03
+	DIVERSION TO	LA99TD	68.	3.97	2.	0.	0.	.03
+	HYDROGRAPH AT	LA99T	73.	4.03	2.	0.	0.	.03
+	ROUTED TO	RA99T	42.	4.27	2.	0.	0.	.03
+	HYDROGRAPH AT	A09	339.	4.23	23.	6.	4.	.18
+	3 COMBINED AT	CA09	273.	5.60	117.	31.	23.	1.39

+	3 COMBINED AT	DUMMYZ	3897.	6.40	2561.	977.	736.	47.76
+	HYDROGRAPH AT	S30D	271.	4.17	33.	8.	6.	.13
+	ROUTED TO	RS30D	183.	4.40	32.	8.	6.	.13
+	HYDROGRAPH AT	S30C	591.	4.30	119.	30.	22.	.46
+	2 COMBINED AT	XX1	753.	4.33	151.	38.	28.	.59
+	HYDROGRAPH AT	S30B	373.	4.40	88.	22.	16.	.40
+	2 COMBINED AT	CS30B	1035.	4.37	232.	59.	43.	.98
+	DIVERSION TO	DS30BI	485.	4.37	49.	12.	9.	.98
+	HYDROGRAPH AT	DS30BO	550.	4.20	184.	47.	34.	.98
+	ROUTED TO	RS30BW	550.	4.43	184.	47.	34.	.98
+	HYDROGRAPH AT	S30A	637.	4.33	121.	30.	22.	.53
+	2 COMBINED AT	CS30A	1085.	4.40	298.	76.	55.	1.52
+	DIVERSION TO	DS30AI	535.	4.40	74.	19.	13.	1.52
+	HYDROGRAPH AT	DS30AO	550.	4.20	224.	57.	41.	1.52
+	ROUTED TO	RS30AW	550.	4.53	224.	57.	41.	1.52
+	HYDROGRAPH AT	S30	418.	4.23	65.	16.	12.	.32
+	2 COMBINED AT	CS30	857.	4.30	281.	72.	52.	1.84
+	ROUTED TO	RS30	857.	4.33	281.	72.	52.	1.84
+	HYDROGRAPH AT	A07G	685.	4.07	63.	16.	11.	.26
+	DIVERSION TO	LA07GD	685.	4.07	32.	8.	6.	.26
+	HYDROGRAPH AT	LA07G	643.	4.13	31.	8.	6.	.26
+	ROUTED TO	RA07G	625.	4.27	31.	8.	6.	.26
+	HYDROGRAPH AT	A07F	232.	4.33	50.	13.	9.	.23
+	ROUTED TO	RA07F	230.	4.43	50.	13.	9.	.23
+	HYDROGRAPH AT	A07E	524.	4.13	62.	15.	11.	.23
+	3 COMBINED AT	CA07E	1066.	4.27	139.	35.	25.	.72
+	ROUTED TO	RA07E	907.	4.43	139.	35.	25.	.72
	HYDROGRAPH AT							

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+                    A07C     298.   4.27      28.      7.      5.     .17
  2 COMBINED AT
+                    CA07C   1073.   4.40     163.     41.     30.     .89
  ROUTED TO
+                    RA07C   1071.   4.43     163.     41.     30.     .89
  HYDROGRAPH AT
+                    A07H     268.   4.03      19.      5.      3.     .09
  ROUTED TO
+                    RA07H    254.   4.17      19.      5.      3.     .09
  HYDROGRAPH AT
+                    DRA09A   158.   4.37      38.      9.      7.    1.19
  HYDROGRAPH AT
+                    A08B     149.   4.17      17.      4.      3.     .10
  2 COMBINED AT
+                    CA08B    245.   4.37      51.     13.      9.    1.29
  ROUTED TO
+                    RA08B    209.   4.63      51.     13.      9.    1.29
  HYDROGRAPH AT
+                    A07D     129.   4.60      40.     10.      7.     .23
  4 COMBINED AT
+                    CA07D   1151.   4.47     245.     63.     45.    2.50
  ROUTED TO
+                    RA07D   1081.   4.67     245.     63.     45.    2.50
  ROUTED TO
+                    LA07D   1082.   4.67     209.     53.     38.    2.50
  HYDROGRAPH AT
+                    A07B     936.   4.20     123.     31.     22.     .65
  DIVERSION TO
+                    LA07BD   921.   4.17      48.     12.      9.     .65
  HYDROGRAPH AT
+                    LA07B    863.   4.30      76.     19.     14.     .65
  3 COMBINED AT
+                    CA07B   2126.   4.53     515.    132.     95.    4.99
  ROUTED TO
+                    RA07B   2029.   4.63     515.    132.     95.    4.99
  HYDROGRAPH AT
+                    A06A     541.   4.13      54.     14.     10.     .28
  2 COMBINED AT
+                    CA06A   2130.   4.63     554.    142.    103.    5.27
  HYDROGRAPH AT
+                    A07A     103.   4.30      21.      5.      4.     .12
  ROUTED TO
+                    RA07A    103.   4.37      21.      5.      4.     .12
  HYDROGRAPH AT
+                    A07      319.   4.03      15.      4.      3.     .12
  2 COMBINED AT
+                    CA07     349.   4.03      36.      9.      7.     .24
  ROUTED TO
+                    RA07     260.   4.20      36.      9.      7.     .24
  HYDROGRAPH AT
+                    A06      605.   4.17      34.      9.      6.     .28
  3 COMBINED AT
+                    CA06    2201.   4.60     589.    152.    109.    5.79
  ROUTED TO
+                    RA06    2165.   4.77     589.    152.    109.    5.79
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+	HYDROGRAPH AT	A99Q	345.	4.00	15.	4.	3.	.12
+	2 COMBINED AT	CA99Q	2158.	4.77	596.	153.	110.	5.90
+	2 COMBINED AT	DUMMY1	4279.	6.27	2851.	1055.	796.	53.67
+	DIVERSION TO	DUMMYO	4279.	6.27	2851.	1055.	796.	53.67
+	HYDROGRAPH AT	DUMMY	0.	.00	0.	0.	0.	53.67
+	ROUTED TO	EMPTY	0.	.00	0.	0.	0.	53.67
+	HYDROGRAPH AT	S10V	303.	4.20	46.	12.	8.	.20
+	ROUTED TO	RS10V	289.	4.40	46.	12.	8.	.20
+	HYDROGRAPH AT	S10U	136.	4.20	21.	5.	4.	.11
+	2 COMBINED AT	CS10U	406.	4.37	67.	17.	12.	.30
+	ROUTED TO	RS10U	396.	4.50	67.	17.	12.	.30
+	HYDROGRAPH AT	S10T	470.	4.27	79.	20.	14.	.34
+	2 COMBINED AT	CS10T	762.	4.43	143.	36.	26.	.64
+	ROUTED TO	RS10T	754.	4.50	143.	36.	26.	.64
+	HYDROGRAPH AT	DS30BX	485.	4.37	49.	12.	9.	.98
+	ROUTED TO	RS30BS	466.	4.60	49.	12.	9.	.98
+	HYDROGRAPH AT	S10S	973.	4.20	136.	34.	25.	.49
+	2 COMBINED AT	XX2	884.	4.57	175.	44.	32.	1.47
+	2 COMBINED AT	CS10S	1429.	4.57	301.	76.	55.	2.11
+	ROUTED TO	RS10S	1390.	4.67	301.	76.	55.	2.11
+	HYDROGRAPH AT	S10Q	369.	4.27	69.	17.	13.	.25
+	2 COMBINED AT	CS10Q	1590.	4.63	363.	92.	66.	2.37
+	ROUTED TO	RS10Q	1568.	4.73	363.	92.	66.	2.37
+	HYDROGRAPH AT	DRS10R	24.	4.23	4.	1.	1.	.03
+	ROUTED TO	RS10RW	22.	4.87	4.	1.	1.	.03
+	HYDROGRAPH AT	S10O	1089.	4.27	179.	45.	32.	.79
+	3 COMBINED AT	CS10O	2169.	4.50	523.	132.	95.	3.19
+	HYDROGRAPH AT	S10J	163.	4.10	18.	4.	3.	.08

+	DIVERSION TO	S10JI	96.	4.10	10.	2.	2.	.08
+	HYDROGRAPH AT	DS10JO	68.	4.10	8.	2.	1.	.08
+	ROUTED TO	RS10JW	67.	4.13	8.	2.	1.	.08
+	2 COMBINED AT	CS10KN	2187.	4.50	528.	134.	96.	3.27
+	ROUTED TO	RS10KN	2181.	4.53	528.	134.	96.	3.27
+	HYDROGRAPH AT	S10JX	96.	4.10	10.	2.	2.	.08
+	ROUTED TO	RS10JS	93.	4.17	10.	2.	2.	.08
+	HYDROGRAPH AT	S10I	211.	4.17	30.	7.	5.	.13
+	2 COMBINED AT	CS10I	303.	4.17	40.	10.	7.	.21
+	DIVERSION TO	S10II	178.	4.17	23.	6.	4.	.21
+	HYDROGRAPH AT	DS10IO	126.	4.17	17.	4.	3.	.21
+	ROUTED TO	RS10IW	124.	4.20	17.	4.	3.	.21
+	2 COMBINED AT	CS10KM	2232.	4.53	541.	137.	99.	3.40
+	ROUTED TO	RS10KM	2211.	4.60	541.	137.	99.	3.40
+	HYDROGRAPH AT	S10IX	178.	4.17	23.	6.	4.	.21
+	ROUTED TO	RS10IS	173.	4.30	23.	6.	4.	.21
+	HYDROGRAPH AT	S10N	210.	4.20	32.	8.	6.	.14
+	2 COMBINED AT	CS10N	373.	4.27	55.	14.	10.	.34
+	DIVERSION TO	S10NI	187.	4.27	27.	7.	5.	.34
+	HYDROGRAPH AT	DS10NO	187.	4.27	27.	7.	5.	.34
+	ROUTED TO	RS10NW	187.	4.27	27.	7.	5.	.34
+	HYDROGRAPH AT	S10K	499.	4.27	87.	22.	16.	.34
+	3 COMBINED AT	CS10K	2583.	4.53	639.	162.	117.	3.87
+	ROUTED TO	RS10K	2559.	4.63	639.	162.	117.	3.87
+	HYDROGRAPH AT	S10NX	187.	4.27	27.	7.	5.	.34
+	ROUTED TO	RS10NS	180.	4.47	27.	7.	5.	.34
+	HYDROGRAPH AT	S10G	592.	4.17	68.	17.	12.	.28
	3 COMBINED AT							

+	CS10G	2836.	4.60	719.	182.	131.	4.16
+ ROUTED TO	RS10G	2819.	4.67	718.	182.	131.	4.16
+ DIVERSION TO	X40I	916.	4.70	279.	71.	51.	4.16
+ HYDROGRAPH AT	DX40	1903.	4.67	440.	111.	80.	4.16
+ ROUTED TO	RX40S	1887.	4.77	440.	111.	80.	4.16
+ HYDROGRAPH AT	S10D	550.	4.33	114.	29.	21.	.46
+ 2 COMBINED AT	CS10D	2189.	4.73	535.	135.	98.	4.61
+ HYDROGRAPH AT	DS30X	535.	4.40	74.	19.	13.	1.52
+ ROUTED TO	RS30AS	515.	4.73	74.	19.	13.	1.52
+ HYDROGRAPH AT	S10P	439.	4.27	78.	20.	14.	.33
+ 2 COMBINED AT	CS10P	739.	4.70	145.	36.	26.	1.84
+ ROUTED TO	RS10P	689.	5.03	145.	36.	26.	1.84
+ HYDROGRAPH AT	S10E	369.	4.77	141.	37.	27.	.63
+ 2 COMBINED AT	CS10E	985.	5.07	273.	71.	51.	2.47
+ ROUTED TO	RS10E	974.	5.13	273.	71.	51.	2.47
+ HYDROGRAPH AT	S10M	722.	4.17	95.	24.	17.	.35
+ ROUTED TO	RS10M	673.	4.40	95,	24.	17.	.35
+ 2 COMBINED AT	CS10E*	1160.	5.13	358.	93.	67.	2.83
+ ROUTED TO	RS10E*	1156.	5.17	358.	93.	67.	2.83
+ HYDROGRAPH AT	S10F	345.	4.37	76.	19.	14.	.33
+ ROUTED TO	RS10F	337.	4.63	76.	19.	14.	.33
+ 2 COMBINED AT	CS10F*	1335.	5.13	421.	109.	79.	3.16
+ ROUTED TO	RS10F*	1323.	5.23	421.	109.	79.	3.16
+ HYDROGRAPH AT	S10C	330.	4.57	106.	28.	20.	.37
+ 3 COMBINED AT	CS10C	3283.	4.77	976.	253.	182.	8.15
+ ROUTED TO	RS10C	3270.	4.83	975.	253.	182.	8.15
+ HYDROGRAPH AT	S10	149.	4.27	29.	7.	5.	.11
+ 2 COMBINED AT	XX3	3333.	4.83	999.	259.	187.	8.26

+	HYDROGRAPH AT	DRX40	916.	4.70	279.	71.	51.	4.16
+	ROUTED TO	RX40E	916.	4.77	279.	71.	51.	4.16
+	HYDROGRAPH AT	S10B	197.	4.23	35.	9.	6.	.14
+	2 COMBINED AT	CS10B	1103.	4.40	315.	80.	58.	.14
+	ROUTED TO	RS10B	1097.	4.47	315.	80.	58.	.14
+	HYDROGRAPH AT	S10A	46.	4.30	11.	3.	2.	.05
+	3 COMBINED AT	CS10	4333.	4.83	1304.	337.	243.	8.44
+	ROUTED TO	RS10	4331.	4.83	1304.	337.	243.	8.44
+	HYDROGRAPH AT	N06	952.	4.20	135.	34.	25.	.59
+	4 COMBINED AT	CN06	4611.	5.03	1818.	495.	359.	52.61
+	ROUTED TO	RN06	4562.	5.10	1817.	495.	359.	52.61
+	HYDROGRAPH AT	N05C	357.	4.27	60.	15.	11.	.28
+	2 COMBINED AT	CN05C	4622.	5.10	1848.	504.	366.	52.89
+	ROUTED TO	RN05C	4579.	5.17	1847.	504.	365.	52.89
+	HYDROGRAPH AT	N05B	221.	4.53	69.	18.	13.	.31
+	DIVERSION TO	DN05BI	199.	4.53	62.	16.	12.	.31
+	HYDROGRAPH AT	DN05B	22.	4.53	7.	2.	1.	.31
+	ROUTED TO	RN05BE	22.	4.67	7.	2.	1.	.31
+	HYDROGRAPH AT	N05A	330.	4.17	41.	10.	7.	.17
+	HYDROGRAPH AT	N05	393.	4.27	73.	18.	13.	.28
+	4 COMBINED AT	CN05	4681.	5.17	1916.	524.	380.	53.65
+	ROUTED TO	RN05	4672.	5.23	1915.	524.	380.	53.65
+	HYDROGRAPH AT	DN05BX	199.	4.53	62.	16.	12.	.31
+	ROUTED TO	RN05BS	198.	4.70	62.	16.	12.	.31
+	HYDROGRAPH AT	N04A	101.	4.17	17.	4.	3.	.07
+	3 COMBINED AT	CN04A	4777.	5.23	1963.	537.	389.	53.72
+	ROUTED TO	RN04A	4695.	5.37	1958.	537.	389.	53.72
+	HYDROGRAPH AT	N04	1090.	4.30	198.	50.	36.	.83

	DIVERSION TO							
+		LN04D	574.	4.03	37.	9.	7.	.83
	HYDROGRAPH AT							
+		LN04	1090.	4.30	162.	40.	29.	.83
	2 COMBINED AT							
+		CN04	4854.	5.33	2055.	561.	407.	54.54
	ROUTED TO							
+		RN04	4850.	5.33	2055.	561.	407.	54.54
	HYDROGRAPH AT							
+		S01G	469.	4.23	74.	18.	13.	.28
	ROUTED TO							
+		RS01G	446.	4.53	74.	18.	13.	.28
	HYDROGRAPH AT							
+		S01D	569.	4.43	138.	35.	25.	.63
	2 COMBINED AT							
+		CS01D	941.	4.53	207.	52.	38.	.91
	ROUTED TO							
+		RS01D	925.	4.70	207.	52.	38.	.91
	HYDROGRAPH AT							
+		S01H	329.	4.33	69.	17.	13.	.32
	ROUTED TO							
+		RS01H	323.	4.53	69.	17.	13.	.32
	HYDROGRAPH AT							
+		S01E	342.	4.20	49.	12.	9.	.23
	2 COMBINED AT							
+		CS01E	575.	4.40	117.	30.	21.	.55
	ROUTED TO							
+		RS01E	566.	4.53	117.	30.	21.	.55
	HYDROGRAPH AT							
+		S01C	526.	4.30	93.	23.	17.	.40
	3 COMBINED AT							
+		CS01C	1599.	4.67	390.	99.	72.	1.87
	ROUTED TO							
+		RS01C	1596.	4.70	390.	99.	72.	1.87
	HYDROGRAPH AT							
+		S01I	333.	4.23	54.	14.	10.	.23
	ROUTED TO							
+		RS01I	323.	4.37	54.	14.	10.	.23
	HYDROGRAPH AT							
+		S01F	184.	4.23	30.	7.	5.	.15
	2 COMBINED AT							
+		CS01F	494.	4.33	83.	21.	15.	.38
	ROUTED TO							
+		RS01F	483.	4.53	83.	21.	15.	.38
	HYDROGRAPH AT							
+		S01B	468.	4.23	73.	18.	13.	.31
	3 COMBINED AT							
+		CS01B	2085.	4.67	522.	133.	96.	2.56
	ROUTED TO							
+		RS01B	2077.	4.73	522.	133.	96.	2.56
	HYDROGRAPH AT							
+		S01A	342.	4.33	71.	18.	13.	.35
	2 COMBINED AT							
+		CS01A	2254.	4.73	578.	147.	106.	2.91
	ROUTED TO							

+		RS01A	2244.	4.77	578.	147.	106.	2.91
+	HYDROGRAPH AT	S01	221.	4.40	56.	14.	10.	.26
+	2 COMBINED AT	CS01	2374.	4.77	623.	159.	115.	3.16
+	ROUTED TO	RS01	2373.	4.77	623.	159.	115.	3.16
+	2 COMBINED AT	CN03*	5826.	5.27	2443.	667.	483.	57.71
+	ROUTED TO	RN03*	5812.	5.40	2443.	667.	483.	57.71
+	HYDROGRAPH AT	N03A	351.	4.40	82.	21.	15.	.39
+	ROUTED TO	RN03A	347.	4.50	82.	21.	15.	.39
+	HYDROGRAPH AT	N03B	723.	4.40	146.	37.	26.	.63
+	ROUTED TO	RN03B	720.	4.43	146.	37.	26.	.63
+	HYDROGRAPH AT	N03	464.	4.50	119.	30.	22.	.60
+	4 COMBINED AT	CN03	6186.	5.37	2632.	719.	520.	59.33
+	ROUTED TO	RN03	6183.	5.43	2632.	719.	520.	59.33
+	HYDROGRAPH AT	N02B	183.	4.27	30.	8.	6.	.15
+	DIVERSION TO	LN02BD	153.	4.13	7.	2.	1.	.15
+	HYDROGRAPH AT	LN02B	183.	4.27	24.	6.	4.	.15
+	2 COMBINED AT	CN02B	6196.	5.43	2640.	721.	522.	59.48
+	ROUTED TO	RN02B	6189.	5.50	2639.	721.	522.	59.48
+	HYDROGRAPH AT	N02	994.	4.47	150.	37.	27.	.76
+	HYDROGRAPH AT	N02A	361.	4.20	35.	9.	6.	.18
+	3 COMBINED AT	CN02	6266.	5.50	2721.	744.	539.	60.42
+	HYDROGRAPH AT	S20A	247.	4.23	44.	11.	8.	.16
+	ROUTED TO	RS20A	245.	4.30	44.	11.	8.	.16
+	HYDROGRAPH AT	S20	231.	4.20	38.	10.	7.	.14
+	2 COMBINED AT	CS20	466.	4.27	82.	21.	15.	.30
+	ROUTED TO	RS20	464.	4.30	82.	21.	15.	.30
+	HYDROGRAPH AT	A05A	260.	4.17	37.	9.	7.	.14
+	ROUTED TO	RA05A	249.	4.43	37.	9.	7.	.14

+	HYDROGRAPH AT	A99N	341.	4.13	41.	10.	7.	.16
+	3 COMBINED AT	CA99N	875.	4.37	159.	40.	29.	.60
+	HYDROGRAPH AT	DRA09S	1.	4.17	0.	0.	0.	.07
+	ROUTED TO	RA09SW	0.	4.77	0.	0.	0.	.07
+	HYDROGRAPH AT	A99Y	410.	4.37	45.	11.	8.	.32
+	2 COMBINED AT	CA99Y	410.	4.37	45.	11.	8.	.32
+	HYDROGRAPH AT	A10	551.	4.10	33.	8.	6.	.21
+	HYDROGRAPH AT	DRA09Q	729.	4.60	145.	36.	26.	1.56
+	ROUTED TO	RA09QW	727.	4.67	145.	36.	26.	1.56
+	HYDROGRAPH AT	A10A	423.	4.17	32.	8.	6.	.19
+	2 COMBINED AT	CA10A	1001.	4.53	207.	52.	37.	.19
+	ROUTED TO	RA10A	1000.	4.57	207.	52.	37.	.19
+	HYDROGRAPH AT	A99X	723.	4.07	58.	14.	10.	.26
+	2 COMBINED AT	CA99X	1030.	4.57	262.	66.	48.	.45
+	5 COMBINED AT	DUMMY2	6538.	5.43	2923.	802.	581.	62.01
+	HYDROGRAPH AT	A99W	312.	4.23	44.	11.	8.	.22
+	DIVERSION TO	LA99WD	312.	4.23	17.	4.	3.	.22
+	HYDROGRAPH AT	LA99W	305.	4.30	27.	7.	5.	.22
+	HYDROGRAPH AT	A99U	100.	4.20	9.	2.	2.	.07
+	HYDROGRAPH AT	A99S	66.	4.43	10.	2.	2.	.08
+	HYDROGRAPH AT	A08A	86.	4.43	22.	6.	4.	.14
+	ROUTED TO	RA08A	85.	4.60	22.	6.	4.	.14
+	HYDROGRAPH AT	A99R	88.	4.07	6.	1.	1.	.04
+	ROUTED TO	RA99R	73.	4.30	6.	1.	1.	.04
+	HYDROGRAPH AT	A08	218.	4.00	11.	3.	2.	.08
+	3 COMBINED AT	CA08	227.	4.00	38.	10.	7.	.25
+	6 COMBINED AT	DUMMY3	6549.	5.43	2933.	805.	583.	63.22
+	HYDROGRAPH AT	A99P	959.	4.17	123.	31.	22.	.57

	HYDROGRAPH AT							
+		A05	368.	4.03	23.	6.	4.	.13
	HYDROGRAPH AT							
+		A99O	299.	4.03	22.	5.	4.	.10
	HYDROGRAPH AT							
+		A99M	193.	4.00	17.	4.	3.	.06
	HYDROGRAPH AT							
+		A99L	255.	4.00	18.	4.	3.	.08
	6 COMBINED AT							
+		DUMMY4	6584.	5.43	3020.	832.	602.	64.17
	HYDROGRAPH AT							
+		A99K	240.	4.07	25.	6.	5.	.11
	HYDROGRAPH AT							
+		A99J	242.	4.13	33.	8.	6.	.14
	HYDROGRAPH AT							
+		A99I	319.	4.10	32.	8.	6.	.14
	HYDROGRAPH AT							
+		A04A	412.	4.17	51.	13.	9.	.22
	ROUTED TO							
+		RA04A	392.	4.30	51.	13.	9.	.22
	HYDROGRAPH AT							
+		A04	124.	4.20	9.	2.	2.	.08
	2 COMBINED AT							
+		CA04	499.	4.23	61.	15.	11.	.30
	ROUTED TO							
+		RA04	463.	4.53	60.	15.	11.	.30
	HYDROGRAPH AT							
+		A03D	96.	4.50	14.	3.	2.	.13
	2 COMBINED AT							
+		CA03D	557.	4.53	74.	19.	13.	.43
	ROUTED TO							
+		RA03D	520.	4.80	74.	19.	13.	.43
	HYDROGRAPH AT							
+		A03E	216.	4.17	29.	7.	5.	.15
	ROUTED TO							
+		RA03E	208.	4.30	29.	7.	5.	.15
	HYDROGRAPH AT							
+		A03B	153.	4.10	10.	2.	2.	.07
	2 COMBINED AT							
+		CA03B	304.	4.17	39.	10.	7.	.23
	ROUTED TO							
+		RA03B	267.	4.70	39.	10.	7.	.23
	HYDROGRAPH AT							
+		A03A	249.	4.20	19.	5.	3.	.14
	2 COMBINED AT							
+		CA03A	308.	4.57	58.	15.	11.	.37
	ROUTED TO							
+		RA03A	303.	4.73	58.	15.	11.	.37
	HYDROGRAPH AT							
+		A03	179.	4.67	32.	8.	6.	.28
	3 COMBINED AT							
+		CA03	824.	4.77	145.	37.	26.	1.07
	5 COMBINED AT							
+		DUMMY5	6726.	5.40	3105.	858.	620.	65.63
	HYDROGRAPH AT							

+	A99G	63.	4.00	3.	1.	0.	.02
DIVERSION TO +	LA99GD	62.	3.93	2.	0.	0.	.02
HYDROGRAPH AT +	LA99G	63.	4.00	1.	0.	0.	.02
HYDROGRAPH AT +	A99H	35.	4.90	10.	3.	2.	.10
DIVERSION TO +	LA99HD	35.	4.90	8.	2.	1.	.10
HYDROGRAPH AT +	LA99H	10.	6.60	2.	1.	0.	.10
ROUTED TO +	RA99H	5.	7.43	2.	1.	0.	.10
HYDROGRAPH AT +	A02D	154.	4.00	6.	2.	1.	.06
DIVERSION TO +	LA02DD	152.	3.97	5.	1.	1.	.06
HYDROGRAPH AT +	LA02D	146.	4.03	1.	0.	0.	.06
ROUTED TO +	RA02D	46.	4.20	1.	0.	0.	.06
HYDROGRAPH AT +	A99F	37.	5.03	12.	3.	2.	.11
3 COMBINED AT +	CA99F	48.	4.20	15.	4.	3.	.28
HYDROGRAPH AT +	A02	32.	4.10	2.	0.	0.	.02
HYDROGRAPH AT +	A01H	195.	4.00	9.	2.	2.	.07
DIVERSION TO +	LA01HD	193.	3.93	6.	2.	1.	.07
HYDROGRAPH AT +	LA01H	195.	4.00	2.	1.	0.	.07
HYDROGRAPH AT +	A99E	74.	4.00	4.	1.	1.	.02
DIVERSION TO +	LA99ED	74.	4.00	3.	1.	1.	.02
HYDROGRAPH AT +	LA99E	37.	4.07	0.	0.	0.	.02
6 COMBINED AT +	DUMMY6	6725.	5.40	3105.	858.	621.	66.03
HYDROGRAPH AT +	A99B	143.	4.03	7.	2.	1.	.05
HYDROGRAPH AT +	A99C	74.	4.00	3.	1.	1.	.03
DIVERSION TO +	LA99CD	74.	4.00	3.	1.	1.	.03
HYDROGRAPH AT +	LA99C	2.	4.10	0.	0.	0.	.03
HYDROGRAPH AT +	A99D	91.	4.00	4.	1.	1.	.03
DIVERSION TO +	LA99DD	91.	3.97	3.	1.	1.	.03
HYDROGRAPH AT +	LA99D	86.	4.03	1.	0.	0.	.03

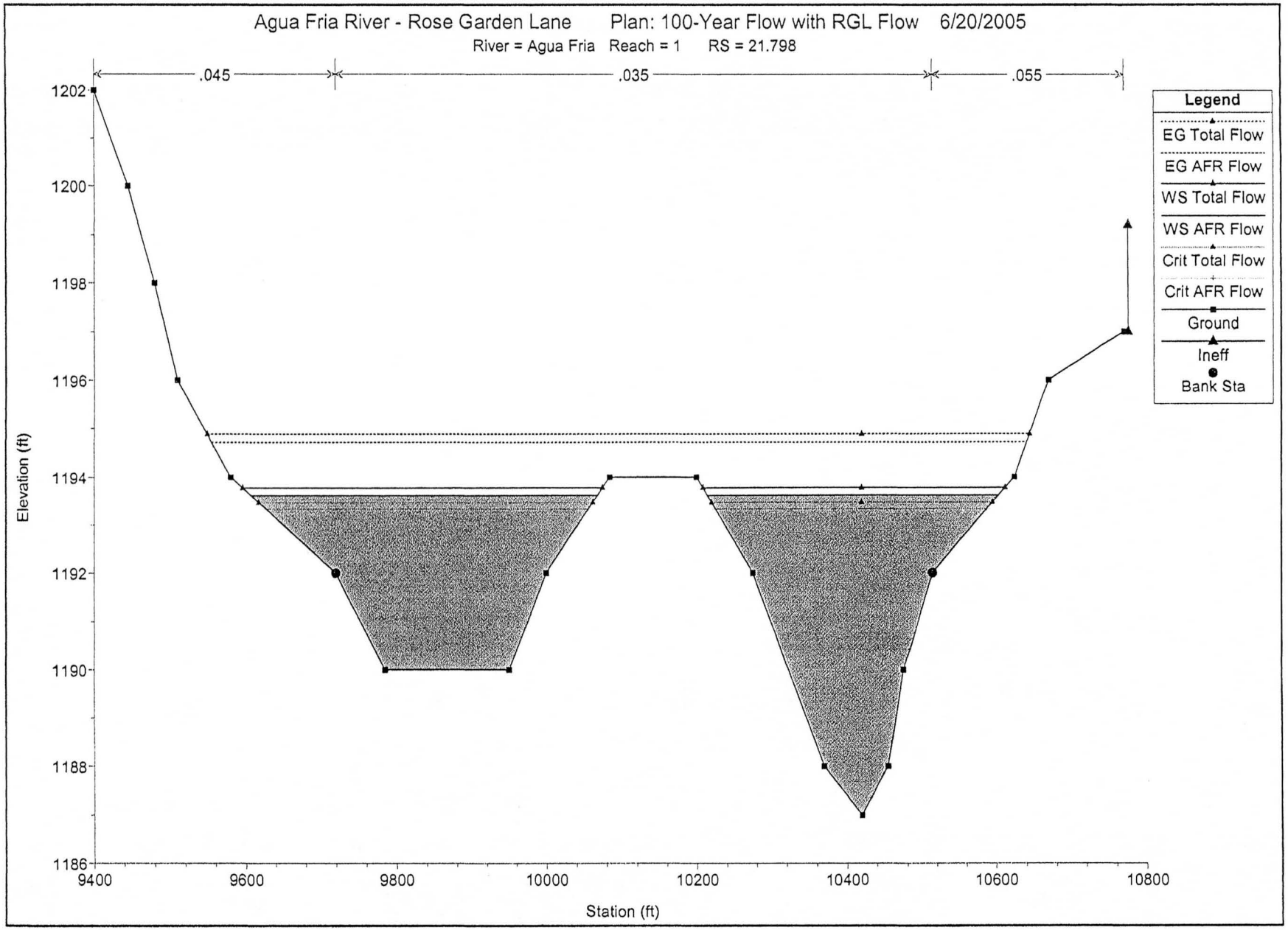
+	HYDROGRAPH AT	A01A	97.	4.13	7.	2.	1.	.05
+	ROUTED TO	RA01A	82.	4.40	7.	2.	1.	.05
+	HYDROGRAPH AT	A01	274.	4.27	27.	7.	5.	.20
+	2 COMBINED AT	CA01	337.	4.30	34.	9.	6.	.25
+	HYDROGRAPH AT	A99A	366.	4.07	25.	6.	5.	.13
+	DIVERSION TO	LA99AD	366.	4.07	18.	4.	3.	.13
+	HYDROGRAPH AT	LA99A	280.	4.13	8.	2.	1.	.13
+	HYDROGRAPH AT	A99	161.	4.27	16.	4.	3.	.14
+	7 COMBINED AT	DUMMY7	6710.	5.40	3104.	858.	621.	66.66
+	HYDROGRAPH AT	A01E	218.	4.07	21.	5.	4.	.08
+	DIVERSION TO	A01EI	131.	4.07	13.	3.	2.	.08
+	HYDROGRAPH AT	DA01E	87.	4.07	9.	2.	2.	.08
+	ROUTED TO	RA01ES	49.	5.13	9.	2.	2.	.08
+	HYDROGRAPH AT	N01A	570.	4.33	56.	14.	10.	.41
+	ROUTED TO	RN01A	534.	4.50	56.	14.	10.	.41
+	HYDROGRAPH AT	N01	951.	4.20	136.	34.	25.	.65
+	3 COMBINED AT	CN01	1019.	4.43	185.	47.	34.	1.14
+	HYDROGRAPH AT	A03C	529.	4.17	61.	15.	11.	.33
+	ROUTED TO	RA03C	501.	4.33	61.	15.	11.	.33
+	HYDROGRAPH AT	A02B	760.	4.03	51.	13.	9.	.27
+	ROUTED TO	RA02B	702.	4.10	51.	13.	9.	.27
+	2 COMBINED AT	CA02A*	941.	4.17	110.	28.	20.	.60
+	ROUTED TO	RA02A*	869.	4.30	110.	28.	20.	.60
+	HYDROGRAPH AT	A02A	530.	4.70	91.	23.	16.	.61
+	HYDROGRAPH AT	A01G	599.	4.00	35.	9.	6.	.19
+	DIVERSION TO	LA01GD	595.	3.93	26.	6.	5.	.19
+	HYDROGRAPH AT	LA01G	599.	4.00	9.	2.	2.	.19
+	3 COMBINED AT	CA01G	932.	4.50	187.	47.	34.	1.39

+	ROUTED TO	RA01G	901.	4.63	187.	47.	34.	1.39
+	HYDROGRAPH AT	A02C	462.	4.23	68.	17.	12.	.33
+	DIVERSION TO	LA02CD	462.	4.23	32.	8.	6.	.33
+	HYDROGRAPH AT	LA02C	418.	4.37	36.	9.	7.	.33
+	ROUTED TO	RA02C	284.	4.97	36.	9.	7.	.33
+	HYDROGRAPH AT	A01F	436.	4.17	57.	14.	10.	.28
+	DIVERSION TO	LA01FD	365.	4.07	17.	4.	3.	.28
+	HYDROGRAPH AT	LA01F	436.	4.17	40.	10.	7.	.28
+	2 COMBINED AT	CA01F	416.	4.17	74.	19.	13.	.61
+	ROUTED TO	RA01F	369.	4.40	74.	19.	13.	.61
+	HYDROGRAPH AT	A01D	520.	4.13	45.	11.	8.	.21
+	DIVERSION TO	LA01DD	520.	4.13	32.	8.	6.	.21
+	HYDROGRAPH AT	LA01D	275.	4.30	12.	3.	2.	.21
+	HYDROGRAPH AT	DRA01E	131.	4.07	13.	3.	2.	.08
+	ROUTED TO	RA01EW	124.	4.13	13.	3.	2.	.08
+	3 COMBINED AT	CA01D	521.	4.37	94.	24.	17.	.82
+	ROUTED TO	RA01D	442.	4.63	94.	24.	17.	.82
+	HYDROGRAPH AT	A01C	472.	4.13	56.	14.	10.	.22
+	DIVERSION TO	LA01CD	472.	4.13	39.	10.	7.	.22
+	HYDROGRAPH AT	LA01C	294.	4.33	17.	4.	3.	.22
+	HYDROGRAPH AT	A01B	357.	4.10	19.	5.	3.	.15
+	DIVERSION TO	LA01BD	357.	4.10	15.	4.	3.	.15
+	HYDROGRAPH AT	LA01B	190.	4.20	5.	1.	1.	.15
+	4 COMBINED AT	CA01B	1222.	4.70	260.	66.	47.	2.58

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

APPENDIX B

Supporting Hydraulic Calculations


Agua Fria River - Rose Garden Lane
Plan: 100-Year Flow with RGL Flow
6/20/2005
River = Agua Fria
Reach = 1
RS = 21.798
.045
.035
.055
Legend
EG Total Flow
EG AFR Flow
WS Total Flow
WS AFR Flow
Crit Total Flow
Crit AFR Flow
Ground
Ineff
Bank Sta
Elevation (ft)
1202
1200
1198
1196
1194
1192
1190
1188
1186
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

HEC-RAS Plan: 100-Year River: Agua Fria Reach: 1

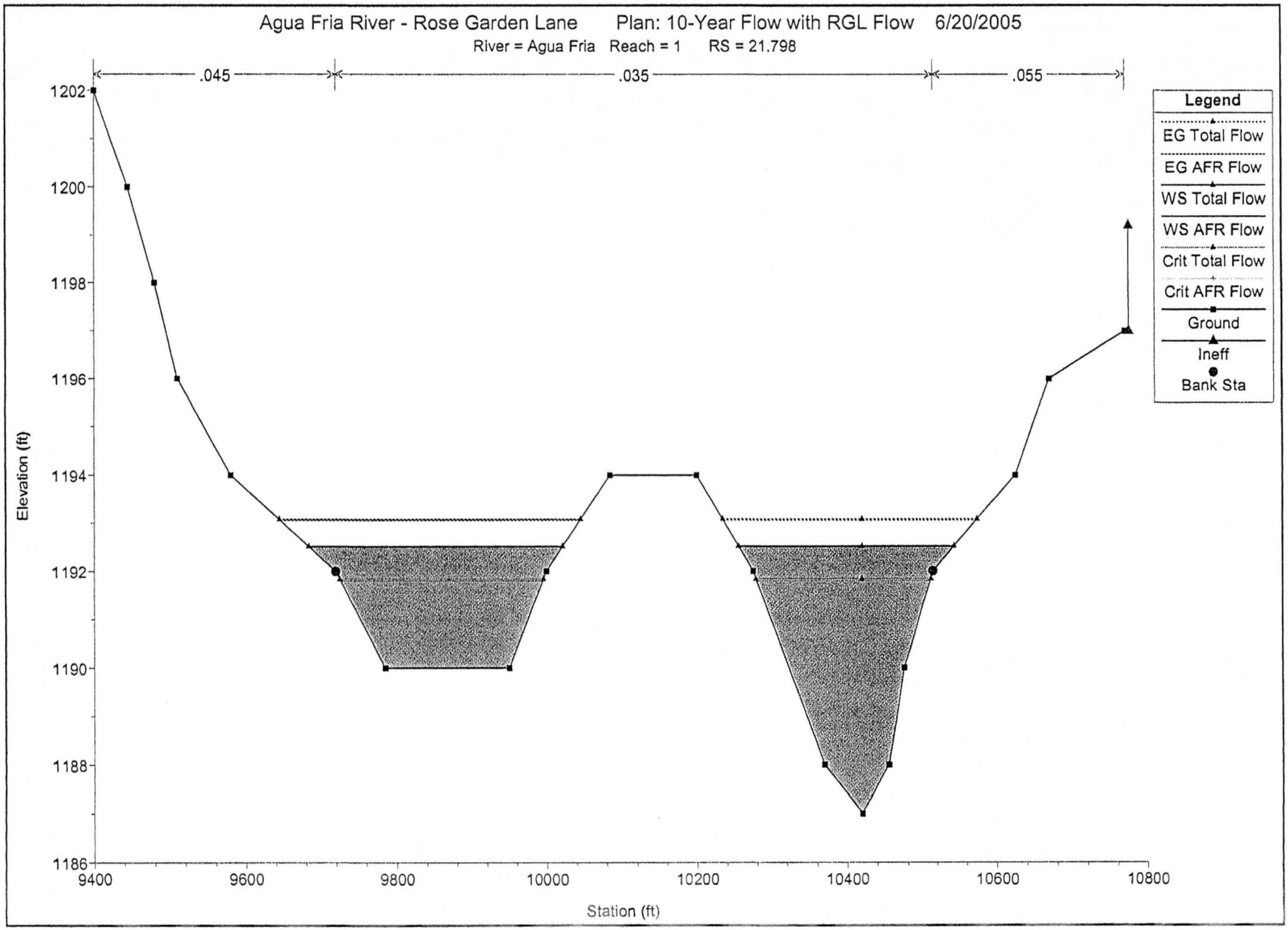
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	24.816	AFR Flow	17900.00	1241.80	1248.02		1248.19	0.003296	4.31	5697.47	3091.61	0.49
1	24.816	Total Flow	19026.00	1241.80	1248.11		1248.29	0.003375	4.39	5980.00	3338.49	0.50
1	24.721	AFR Flow	17900.00	1241.10	1246.37		1246.53	0.003527	3.77	5759.70	3446.84	0.49
1	24.721	Total Flow	19026.00	1241.10	1246.45		1246.62	0.003519	3.87	6031.93	3577.27	0.49
1	24.631	AFR Flow	17900.00	1239.80	1244.38		1244.62	0.004778	4.28	4692.09	2692.89	0.57
1	24.631	Total Flow	19026.00	1239.80	1244.47		1244.71	0.004736	4.39	4933.46	2842.38	0.57
1	24.543	AFR Flow	17900.00	1237.60	1242.57		1242.79	0.003351	4.46	4848.42	2497.86	0.50
1	24.543	Total Flow	19026.00	1237.60	1242.66		1242.89	0.003363	4.55	5081.44	2555.69	0.51
1	24.449	AFR Flow	17900.00	1235.00	1240.56		1240.88	0.004384	5.39	4464.41	2587.70	0.58
1	24.449	Total Flow	19026.00	1235.00	1240.63		1240.97	0.004435	5.52	4650.94	2618.55	0.59
1	24.353	AFR Flow	17900.00	1233.60	1239.06	1237.98	1239.24	0.002370	3.89	5778.81	2879.07	0.43
1	24.353	Total Flow	19026.00	1233.60	1239.19	1238.05	1239.37	0.002235	3.90	6147.68	2948.34	0.42
1	24.26	AFR Flow	17900.00	1231.70	1238.19	1236.54	1238.31	0.001471	3.34	6875.32	3188.59	0.34
1	24.26	Total Flow	19026.00	1231.70	1238.34	1236.62	1238.46	0.001489	3.42	7282.50	3383.69	0.35
1	24.212	AFR Flow	17900.00	1231.30	1237.71	1236.16	1237.88	0.001912	4.37	6121.25	3705.00	0.40
1	24.212	Total Flow	19026.00	1231.30	1237.83	1236.22	1238.01	0.002039	4.62	6458.55	3758.66	0.42
1	24.165	AFR Flow	17900.00	1231.40	1237.26	1235.35	1237.44	0.001616	4.23	6064.15	3784.73	0.38
1	24.165	Total Flow	19026.00	1231.40	1237.38	1235.44	1237.57	0.001576	4.26	6367.73	3787.96	0.37
1	24.067	AFR Flow	17900.00	1229.30	1236.36	1234.06	1236.51	0.002056	3.40	6052.69	3646.85	0.30
1	24.067	Total Flow	19026.00	1229.30	1236.49	1234.16	1236.65	0.002043	3.47	6302.68	3647.48	0.30
1	23.974	AFR Flow	17900.00	1227.50	1234.70	1233.36	1235.03	0.004580	5.49	4158.31	3235.06	0.45
1	23.974	Total Flow	19026.00	1227.50	1234.84	1233.62	1235.18	0.004553	5.56	4344.75	3257.45	0.45
1	23.881	AFR Flow	17900.00	1225.10	1232.79	1231.59	1233.27	0.002808	6.17	3937.33	3296.77	0.51
1	23.881	Total Flow	19026.00	1225.10	1232.91	1231.69	1233.41	0.002852	6.33	4107.67	3323.52	0.52
1	23.79	AFR Flow	17900.00	1224.20	1231.51	1229.85	1231.87	0.002929	5.69	4621.22	3112.65	0.51
1	23.79	Total Flow	19026.00	1224.20	1231.62	1230.30	1231.99	0.002947	5.82	4803.89	3118.50	0.51
1	23.692	AFR Flow	17900.00	1223.80	1229.19	1228.57	1229.84	0.005485	7.42	3339.54	3157.43	0.69
1	23.692	Total Flow	19026.00	1223.80	1229.30	1228.69	1229.96	0.005435	7.53	3510.96	3175.51	0.69
1	23.598	AFR Flow	17900.00	1221.40	1227.48	1226.00	1227.79	0.003042	5.31	4469.48	3056.50	0.51
1	23.598	Total Flow	19026.00	1221.40	1227.59	1226.07	1227.91	0.003062	5.43	4661.44	3101.94	0.51
1	23.504	AFR Flow	17900.00	1220.80	1226.07	1224.56	1226.28	0.002980	4.30	4905.42	3244.85	0.48
1	23.504	Total Flow	19026.00	1220.80	1226.17	1224.63	1226.39	0.002990	4.35	5098.92	3279.11	0.48
1	23.409	AFR Flow	17900.00	1218.80	1224.33	1223.02	1224.65	0.003622	5.70	4338.10	3190.31	0.55
1	23.409	Total Flow	19026.00	1218.80	1224.43	1223.18	1224.76	0.003643	5.82	4509.24	3218.74	0.55
1	23.314	AFR Flow	17900.00	1216.10	1221.98	1220.79	1222.44	0.005612	7.21	3757.27	3079.41	0.69
1	23.314	Total Flow	19026.00	1216.10	1222.09	1220.79	1222.56	0.005555	7.32	3949.45	3155.69	0.69
1	23.219	AFR Flow	17900.00	1214.70	1220.02	1218.69	1220.27	0.003291	4.82	4589.39	2651.48	0.51
1	23.219	Total Flow	19026.00	1214.70	1220.12	1218.76	1220.38	0.003341	4.88	4798.87	2790.73	0.51
1	23.124	AFR Flow	17900.00	1213.90	1218.29	1216.98	1218.52	0.003770	5.03	4793.43	2506.93	0.54
1	23.124	Total Flow	19026.00	1213.90	1218.38	1217.02	1218.62	0.003774	5.15	4985.35	2522.49	0.54
1	23.029	AFR Flow	17900.00	1211.80	1216.14	1215.26	1216.45	0.005052	5.53	4216.57	2240.40	0.62
1	23.029	Total Flow	19026.00	1211.80	1216.22	1215.37	1216.55	0.005067	5.66	4382.65	2275.85	0.62
1	22.935	AFR Flow	17900.00	1209.50	1214.67		1214.86	0.002361	3.83	5381.66	2313.33	0.42
1	22.935	Total Flow	19026.00	1209.50	1214.77		1214.97	0.002340	3.92	5620.28	2358.87	0.42
1	22.839	AFR Flow	17900.00	1208.70	1213.35		1213.60	0.003000	5.04	4837.73	2222.67	0.50
1	22.839	Total Flow	19026.00	1208.70	1213.48		1213.73	0.002937	5.11	5121.54	2337.61	0.49
1	22.745	AFR Flow	17900.00	1206.30	1211.75		1212.05	0.003660	5.47	4365.95	2024.61	0.55
1	22.745	Total Flow	19026.00	1206.30	1211.87		1212.18	0.003764	5.63	4625.86	2147.69	0.56
1	22.651	AFR Flow	17900.00	1204.90	1210.44		1210.65	0.002414	4.70	5128.15	2021.24	0.45
1	22.651	Total Flow	19026.00	1204.90	1210.55		1210.77	0.002405	4.80	5355.03	2071.21	0.45
1	22.558	AFR Flow	17900.00	1203.40	1207.90		1208.64	0.008345	8.15	2943.63	1543.59	0.82
1	22.558	Total Flow	19026.00	1203.40	1208.00		1208.75	0.008349	8.30	3089.25	1587.33	0.83
1	22.462	AFR Flow	17900.00	1200.30	1206.09		1206.31	0.002905	4.57	4853.28	1897.89	0.48

HEC-RAS Plan: 100-Year River: Agua Fria Reach: 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	22.462	Total Flow	19026.00	1200.30	1206.21		1206.44	0.002877	4.66	5073.64	1913.03	0.48
1	22.368	AFR Flow	17900.00	1198.50	1204.74		1205.00	0.002589	4.68	4788.69	1631.82	0.46
1	22.368	Total Flow	19026.00	1198.50	1204.88		1205.15	0.002526	4.74	5016.93	1642.30	0.46
1	22.273	AFR Flow	17900.00	1197.60	1202.92	1201.73	1203.48	0.003484	6.16	3097.48	1222.74	0.55
1	22.273	Total Flow	19026.00	1197.60	1203.04	1201.83	1203.63	0.003539	6.34	3207.96	1241.74	0.56
1	22.177	AFR Flow	17900.00	1196.00	1200.48	1199.82	1201.20	0.006061	7.29	2826.06	1386.43	0.71
1	22.177	Total Flow	19026.00	1196.00	1200.63	1199.95	1201.36	0.005903	7.36	2986.61	1413.35	0.70
1	22.082	AFR Flow	17900.00	1194.90	1200.00	1194.09	1200.10	0.000862	2.64	7224.41	2042.93	0.26
1	22.082	Total Flow	19026.00	1194.90	1200.15	1194.24	1200.26	0.000875	2.75	7511.51	2052.39	0.27
1	21.986	AFR Flow	17900.00	1191.80	1198.86	1197.59	1199.28	0.003623	6.50	3972.67	2680.58	0.57
1	21.986	Total Flow	19026.00	1191.80	1199.00	1197.70	1199.43	0.003566	6.59	4160.12	2689.88	0.57
1	21.893	AFR Flow	17900.00	1187.40	1196.97	1195.30	1197.52	0.003561	6.39	3304.32	1453.37	0.56
1	21.893	Total Flow	19026.00	1187.40	1197.10	1195.65	1197.67	0.003585	6.55	3441.79	1499.67	0.57
1	21.798	AFR Flow	17900.00	1187.00	1193.61	1193.33	1194.71	0.008579	8.49	2224.01	850.92	0.84
1	21.798	Total Flow	19026.00	1187.00	1193.77	1193.46	1194.88	0.008396	8.57	2358.29	882.68	0.83
1	21.716	AFR Flow	17900.00	1183.10	1191.62	1189.48	1192.11	0.004231	5.84	3301.44	798.30	0.45
1	21.716	Total Flow	19026.00	1183.10	1191.86	1189.61	1192.36	0.004040	5.88	3509.61	865.02	0.44
1	21.621	AFR Flow	17900.00	1182.50	1191.33	1185.28	1191.44	0.000500	2.82	6884.02	952.44	0.17
1	21.621	Total Flow	19026.00	1182.50	1191.58	1185.39	1191.70	0.000511	2.90	7105.35	955.47	0.17
1	21.524	AFR Flow	17900.00	1182.00	1190.75	1185.77	1190.98	0.001986	3.87	4625.58	1318.68	0.30
1	21.524	Total Flow	19026.00	1182.00	1190.99	1185.93	1191.23	0.001934	3.92	4850.02	1344.59	0.30
1	21.431	AFR Flow	17900.00	1181.00	1188.53	1185.80	1189.45	0.004936	7.67	2341.39	538.84	0.50
1	21.431	Total Flow	19026.00	1181.00	1188.71	1186.00	1189.69	0.005169	7.96	2402.24	548.58	0.52
1	21.337	AFR Flow	17900.00	1180.00	1188.73	1182.37	1188.80	0.000315	2.24	8444.60	1467.96	0.13
1	21.337	Total Flow	19026.00	1180.00	1188.92	1182.46	1189.00	0.000328	2.32	8665.77	1487.72	0.14
1	21.245	AFR Flow	17900.00	1184.00	1187.91	1186.35	1188.39	0.005370	5.09	3232.42	1996.97	0.47
1	21.245	Total Flow	19026.00	1184.00	1188.09	1186.48	1188.59	0.005327	5.18	3402.49	2078.08	0.47
1	21.157	AFR Flow	17900.00	1176.60	1186.81	1184.15	1187.01	0.001904	3.65	4952.45	1745.01	0.30
1	21.157	Total Flow	19026.00	1176.60	1187.01	1184.26	1187.22	0.001870	3.72	5166.17	1753.09	0.29
1	21.061	AFR Flow	17900.00	1176.50	1185.38	1182.76	1185.98	0.001984	6.25	2971.01	1380.68	0.45
1	21.061	Total Flow	19026.00	1176.50	1185.54	1182.94	1186.18	0.002052	6.46	3075.33	1423.21	0.46
1	20.958	AFR Flow	17900.00	1176.60	1184.24	1182.68	1184.75	0.002550	5.93	3466.95	1472.56	0.49
1	20.958	Total Flow	19026.00	1176.60	1184.41	1182.89	1184.92	0.002520	6.03	3651.58	1501.88	0.49
1	20.864	AFR Flow	17900.00	1176.00	1183.10	1181.34	1183.60	0.002163	6.02	3657.88	1290.68	0.46
1	20.864	Total Flow	19026.00	1176.00	1183.28	1181.46	1183.79	0.002152	6.13	3852.43	1324.56	0.46
1	20.769	AFR Flow	17900.00	1173.10	1182.19	1180.10	1182.62	0.001717	5.76	3971.78	1287.94	0.42
1	20.769	Total Flow	19026.00	1173.10	1182.38	1180.26	1182.82	0.001699	5.85	4187.49	1378.01	0.42
1	20.675	AFR Flow	17900.00	1171.30	1180.85	1178.81	1181.61	0.002315	7.39	3106.41	1184.68	0.50
1	20.675	Total Flow	19026.00	1171.30	1181.02	1179.00	1181.81	0.002346	7.56	3293.90	1242.62	0.50
1	20.579	AFR Flow	17900.00	1171.90	1179.38		1180.15	0.003744	7.24	2803.17	935.51	0.59
1	20.579	Total Flow	19026.00	1171.90	1179.55		1180.34	0.003718	7.38	2959.32	976.79	0.59
1	20.483	AFR Flow	17900.00	1169.80	1178.10		1178.62	0.002297	6.05	3398.50	927.92	0.47
1	20.483	Total Flow	19026.00	1169.80	1178.25		1178.79	0.002343	6.21	3542.18	981.55	0.48
1	20.435	AFR Flow	17900.00	1168.80	1177.18	1176.23	1177.90	0.003356	7.57	3110.10	1002.66	0.57
1	20.435	Total Flow	19026.00	1168.80	1177.31	1176.36	1178.06	0.003432	7.77	3237.51	1033.33	0.58
1	20.388	AFR Flow	17900.00	1168.90	1176.35	1175.45	1176.94	0.004048	7.21	3398.47	1396.76	0.61
1	20.388	Total Flow	19026.00	1168.90	1176.47	1175.56	1177.08	0.004076	7.36	3548.89	1463.50	0.61
1	20.343	AFR Flow	17900.00	1168.70	1175.64		1176.07	0.003257	6.51	4016.70	1646.63	0.55
1	20.343	Total Flow	19026.00	1168.70	1175.78		1176.21	0.003214	6.60	4245.77	1719.36	0.54
1	20.294	AFR Flow	17900.00	1166.70	1174.98		1175.37	0.002223	6.12	4271.25	1562.23	0.47
1	20.294	Total Flow	19026.00	1166.70	1175.11		1175.52	0.002225	6.23	4488.10	1586.30	0.47
1	20.207	AFR Flow	17900.00	1167.20	1173.80		1174.25	0.002782	6.32	3916.50	1376.19	0.51
1	20.207	Total Flow	19026.00	1167.20	1173.92		1174.39	0.002819	6.47	4086.88	1398.74	0.52

HEC-RAS Plan: 100-Year River: Agua Fria Reach: 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	20.111	AFR Flow	17900.00	1166.80	1172.59		1172.90	0.002486	5.43	4421.28	1708.10	0.47
1	20.111	Total Flow	19026.00	1166.80	1172.70		1173.03	0.002508	5.56	4615.52	1738.74	0.48
1	20.015	AFR Flow	17900.00	1166.10	1171.24	1169.78	1171.54	0.003000	5.52	4580.81	1869.10	0.51
1	20.015	Total Flow	19026.00	1166.10	1171.34	1169.78	1171.66	0.002998	5.62	4774.85	1875.55	0.51


Agua Fria River - Rose Garden Lane Plan: 10-Year Flow with RGL Flow 6/20/2005
River = Agua Fria Reach = 1 RS = 21.798
.045
.035
.055
Legend
EG Total Flow
EG AFR Flow
WS Total Flow
WS AFR Flow
Crit Total Flow
Crit AFR Flow
Ground
Ineff
Bank Sta
Elevation (ft)
1202
1200
1198
1196
1194
1192
1190
1188
1186
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

HEC-RAS Plan: 10-Year River: Agua Fria Reach: 1

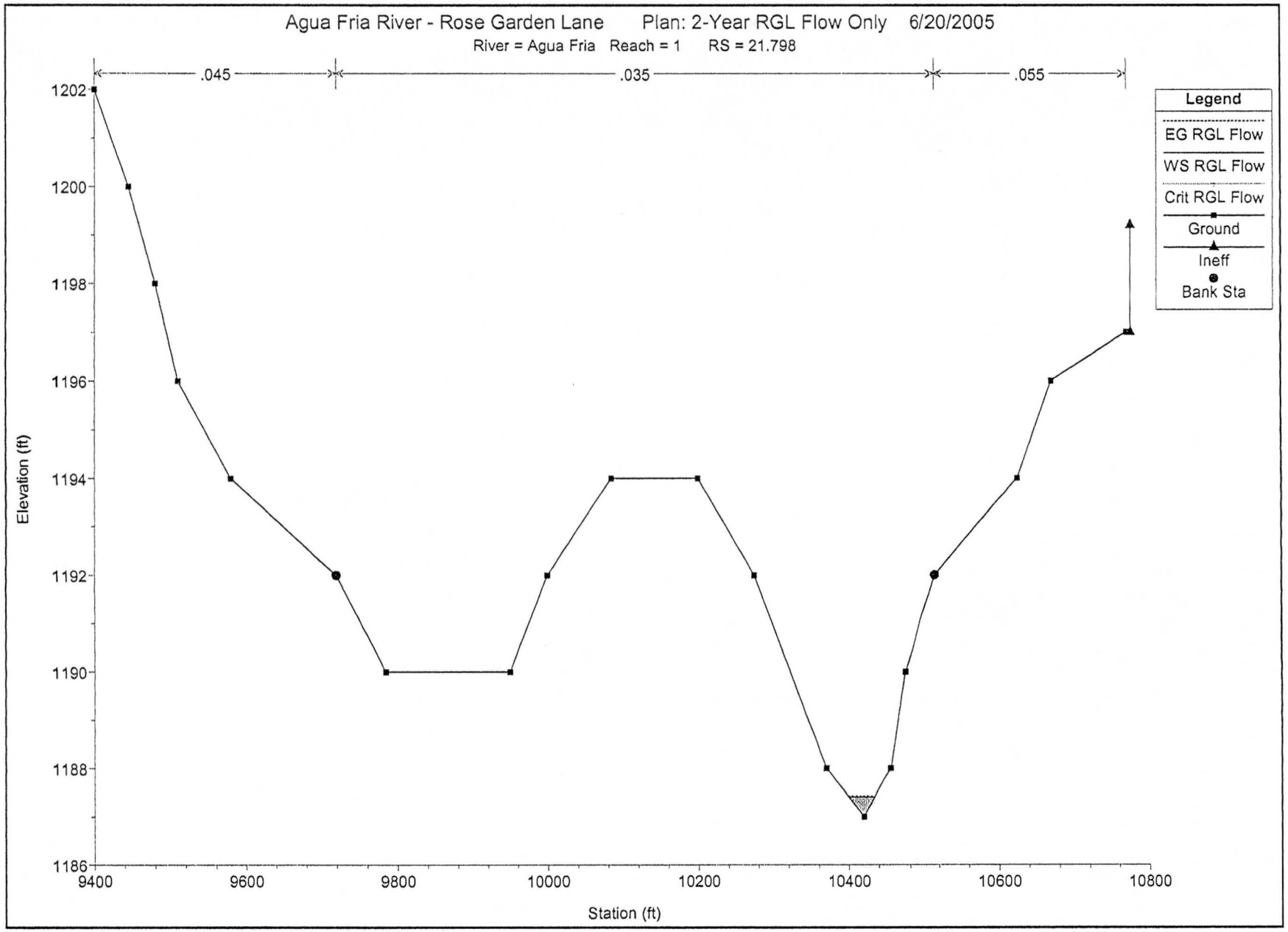
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	24.816	AFR Flow	8270.00	1241.80	1246.85		1246.97	0.002743	3.83	3084.66	1656.73	0.45
1	24.816	Total Flow	8405.00	1241.80	1246.87		1247.00	0.002751	3.85	3120.78	1668.14	0.45
1	24.721	AFR Flow	8270.00	1241.10	1245.30		1245.42	0.003810	3.26	2971.21	1904.30	0.49
1	24.721	Total Flow	8405.00	1241.10	1245.32		1245.44	0.003808	3.25	3008.54	1918.96	0.49
1	24.631	AFR Flow	8270.00	1239.80	1243.24		1243.42	0.004843	3.46	2459.51	1554.34	0.54
1	24.631	Total Flow	8405.00	1239.80	1243.26		1243.44	0.004842	3.48	2490.53	1563.65	0.54
1	24.543	AFR Flow	8270.00	1237.60	1241.46		1241.62	0.003209	3.40	2674.83	1542.69	0.46
1	24.543	Total Flow	8405.00	1237.60	1241.48		1241.64	0.003216	3.43	2703.35	1551.54	0.46
1	24.449	AFR Flow	8270.00	1235.00	1239.68		1239.88	0.003812	4.07	2464.47	1756.63	0.52
1	24.449	Total Flow	8405.00	1235.00	1239.70		1239.90	0.003776	4.07	2510.33	1787.35	0.51
1	24.353	AFR Flow	8270.00	1233.60	1238.08	1237.20	1238.20	0.002774	3.12	3142.73	2431.57	0.43
1	24.353	Total Flow	8405.00	1233.60	1238.11	1237.21	1238.23	0.002804	3.16	3200.87	2451.28	0.43
1	24.26	AFR Flow	8270.00	1231.70	1236.93	1236.10	1237.02	0.002062	2.83	3632.13	2539.19	0.37
1	24.26	Total Flow	8405.00	1231.70	1236.95	1236.09	1237.04	0.002051	2.84	3677.46	2553.29	0.37
1	24.212	AFR Flow	8270.00	1231.30	1236.31	1235.46	1236.44	0.002500	3.64	3059.53	2370.64	0.43
1	24.212	Total Flow	8405.00	1231.30	1236.33	1235.47	1236.47	0.002480	3.65	3100.78	2387.43	0.43
1	24.165	AFR Flow	8270.00	1231.40	1235.82	1234.60	1235.94	0.001643	3.14	3187.02	2400.54	0.35
1	24.165	Total Flow	8405.00	1231.40	1235.85	1234.64	1235.97	0.001637	3.16	3226.05	2422.58	0.35
1	24.067	AFR Flow	8270.00	1229.30	1234.90	1232.97	1235.00	0.002062	2.67	3507.85	3108.38	0.28
1	24.067	Total Flow	8405.00	1229.30	1234.93	1233.07	1235.03	0.002063	2.68	3549.49	3125.43	0.28
1	23.974	AFR Flow	8270.00	1227.50	1233.15	1231.89	1233.43	0.005412	4.79	2198.37	2908.08	0.47
1	23.974	Total Flow	8405.00	1227.50	1233.18	1231.92	1233.46	0.005401	4.80	2229.66	2918.99	0.47
1	23.881	AFR Flow	8270.00	1225.10	1231.38	1230.19	1231.68	0.002487	4.63	2221.60	2896.47	0.45
1	23.881	Total Flow	8405.00	1225.10	1231.41	1230.21	1231.71	0.002491	4.66	2248.38	2898.80	0.45
1	23.79	AFR Flow	8270.00	1224.20	1230.13	1228.73	1230.37	0.002984	4.51	2530.71	2663.33	0.48
1	23.79	Total Flow	8405.00	1224.20	1230.16	1228.77	1230.40	0.002985	4.54	2562.51	2674.28	0.48
1	23.692	AFR Flow	8270.00	1223.80	1227.91	1227.32	1228.32	0.005504	5.64	1746.52	2529.39	0.64
1	23.692	Total Flow	8405.00	1223.80	1227.93	1227.34	1228.35	0.005498	5.67	1766.99	2532.93	0.64
1	23.598	AFR Flow	8270.00	1221.40	1226.22	1224.74	1226.39	0.002792	3.78	2546.64	2490.60	0.45
1	23.598	Total Flow	8405.00	1221.40	1226.24	1224.77	1226.42	0.002802	3.81	2572.13	2496.15	0.45
1	23.504	AFR Flow	8270.00	1220.80	1224.79	1223.26	1224.94	0.003113	3.25	2728.91	2328.62	0.45
1	23.504	Total Flow	8405.00	1220.80	1224.81	1223.28	1224.96	0.003108	3.27	2760.36	2339.74	0.45
1	23.409	AFR Flow	8270.00	1218.80	1223.03	1221.67	1223.24	0.003795	4.33	2363.40	2411.95	0.52
1	23.409	Total Flow	8405.00	1218.80	1223.06	1221.69	1223.26	0.003789	4.36	2394.25	2434.98	0.52
1	23.314	AFR Flow	8270.00	1216.10	1220.73	1219.79	1221.04	0.005190	5.25	1882.74	2009.41	0.62
1	23.314	Total Flow	8405.00	1216.10	1220.75	1219.82	1221.07	0.005204	5.29	1906.39	2035.95	0.62
1	23.219	AFR Flow	8270.00	1214.70	1218.72	1217.80	1218.90	0.003490	3.90	2464.85	1853.56	0.49
1	23.219	Total Flow	8405.00	1214.70	1218.74	1217.80	1218.92	0.003487	3.92	2492.70	1857.14	0.49
1	23.124	AFR Flow	8270.00	1213.90	1217.10	1216.17	1217.26	0.003092	3.84	2732.53	1892.81	0.47
1	23.124	Total Flow	8405.00	1213.90	1217.12	1216.19	1217.28	0.003101	3.86	2759.63	1895.89	0.47
1	23.029	AFR Flow	8270.00	1211.80	1215.07	1214.49	1215.29	0.005912	4.18	2246.03	1912.86	0.61
1	23.029	Total Flow	8405.00	1211.80	1215.09	1214.50	1215.31	0.005891	4.21	2275.62	1922.16	0.61
1	22.935	AFR Flow	8270.00	1209.50	1213.38		1213.51	0.002621	2.87	2857.54	1665.98	0.41
1	22.935	Total Flow	8405.00	1209.50	1213.40		1213.54	0.002616	2.89	2894.67	1676.91	0.41
1	22.839	AFR Flow	8270.00	1208.70	1212.04		1212.21	0.002921	3.83	2552.21	1324.28	0.46
1	22.839	Total Flow	8405.00	1208.70	1212.06		1212.24	0.002917	3.85	2583.32	1330.07	0.46
1	22.745	AFR Flow	8270.00	1206.30	1210.45		1210.68	0.003595	4.53	2248.82	1159.48	0.52
1	22.745	Total Flow	8405.00	1206.30	1210.47		1210.70	0.003606	4.55	2274.29	1171.39	0.52
1	22.651	AFR Flow	8270.00	1204.90	1209.11		1209.24	0.002560	3.48	2835.53	1503.31	0.43
1	22.651	Total Flow	8405.00	1204.90	1209.13		1209.27	0.002552	3.50	2870.28	1508.69	0.43
1	22.558	AFR Flow	8270.00	1203.40	1206.84		1207.30	0.006976	6.11	1622.44	960.71	0.71
1	22.558	Total Flow	8405.00	1203.40	1206.86		1207.33	0.007026	6.15	1639.98	968.31	0.72
1	22.462	AFR Flow	8270.00	1200.30	1204.86		1205.01	0.003335	3.43	2758.95	1578.29	0.47

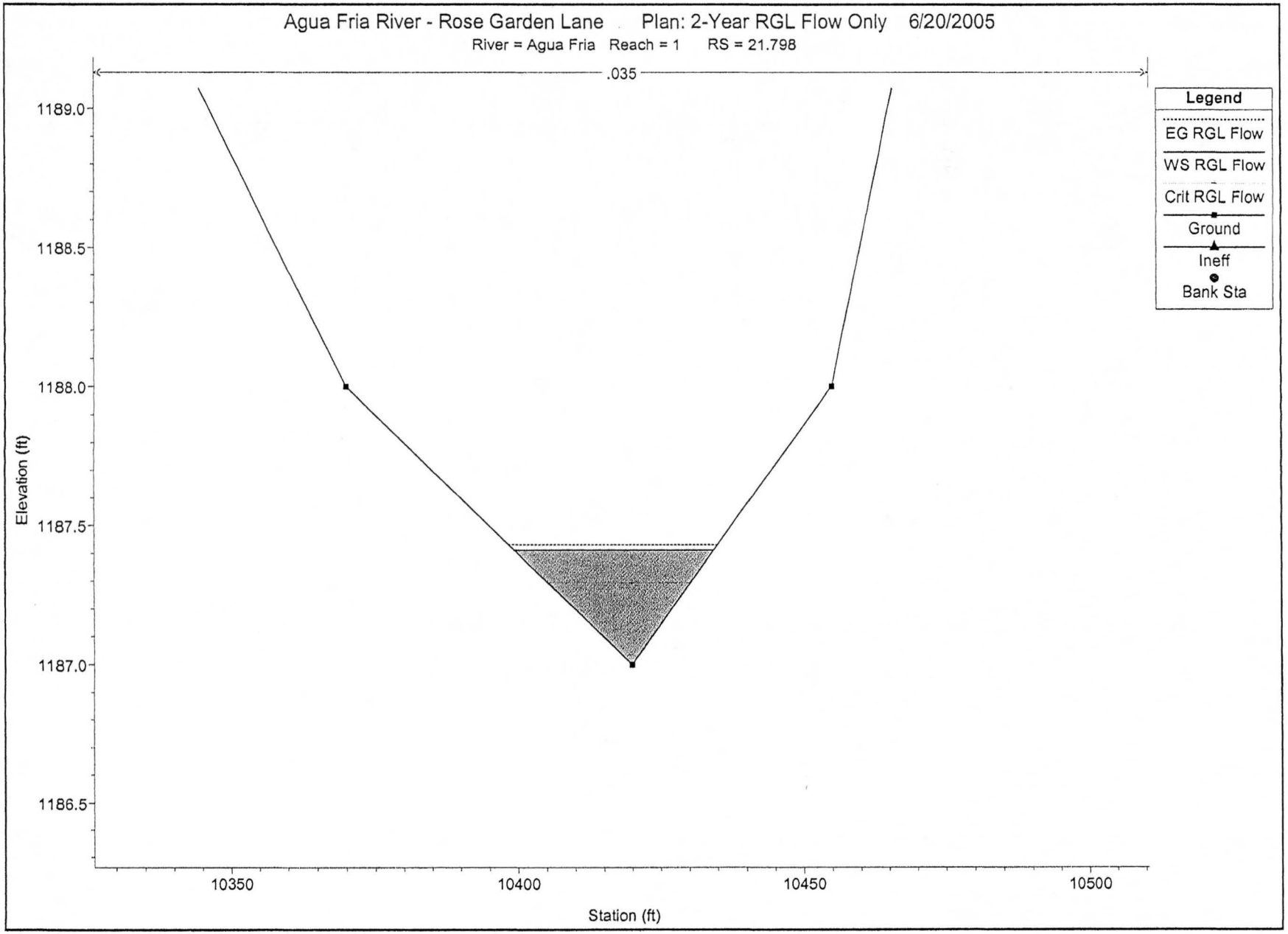
HEC-RAS Plan: 10-Year River: Agua Fria Reach: 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	22.462	Total Flow	8405.00	1200.30	1204.89		1205.03	0.003319	3.45	2791.34	1580.52	0.47
1	22.368	AFR Flow	8270.00	1198.50	1203.19		1203.44	0.003187	4.43	2482.98	1430.85	0.49
1	22.368	Total Flow	8405.00	1198.50	1203.21		1203.46	0.003165	4.44	2518.45	1431.85	0.49
1	22.273	AFR Flow	8270.00	1197.60	1201.76	1200.67	1202.02	0.002515	4.15	2093.56	1158.15	0.44
1	22.273	Total Flow	8405.00	1197.60	1201.78	1200.67	1202.04	0.002526	4.19	2112.67	1159.36	0.44
1	22.177	AFR Flow	8270.00	1196.00	1198.48	1198.48	1199.38	0.015832	7.93	1123.25	971.37	1.04
1	22.177	Total Flow	8405.00	1196.00	1198.51	1198.51	1199.41	0.015593	7.93	1142.63	976.93	1.03
1	22.082	AFR Flow	8270.00	1194.90	1198.11	1191.92	1198.17	0.000466	1.53	4480.32	1154.05	0.18
1	22.082	Total Flow	8405.00	1194.90	1198.15	1191.94	1198.20	0.000471	1.54	4518.24	1161.24	0.18
1	21.986	AFR Flow	8270.00	1191.80	1197.28	1196.15	1197.61	0.004112	5.49	2065.66	2302.46	0.57
1	21.986	Total Flow	8405.00	1191.80	1197.31	1196.18	1197.64	0.004132	5.51	2092.68	2313.30	0.57
1	21.893	AFR Flow	8270.00	1187.40	1195.26	1194.18	1195.60	0.004076	4.98	1835.30	1170.73	0.56
1	21.893	Total Flow	8405.00	1187.40	1195.29	1194.22	1195.63	0.004035	5.00	1860.67	1173.77	0.55
1	21.798	AFR Flow	8270.00	1187.00	1192.51	1191.80	1193.05	0.005816	5.93	1407.39	623.90	0.66
1	21.798	Total Flow	8405.00	1187.00	1192.52	1191.84	1193.08	0.005947	6.01	1412.88	625.70	0.67
1	21.716	AFR Flow	8270.00	1183.10	1188.51	1188.15	1189.19	0.017105	6.71	1262.25	572.36	0.78
1	21.716	Total Flow	8405.00	1183.10	1188.56	1188.18	1189.23	0.016349	6.66	1293.10	573.81	0.77
1	21.621	AFR Flow	8270.00	1182.50	1188.21	1184.16	1188.28	0.000496	2.09	4181.77	834.39	0.16
1	21.621	Total Flow	8405.00	1182.50	1188.26	1184.19	1188.33	0.000497	2.11	4221.44	835.24	0.16
1	21.524	AFR Flow	8270.00	1182.00	1187.71	1184.27	1187.88	0.001277	3.32	2488.64	498.45	0.25
1	21.524	Total Flow	8405.00	1182.00	1187.75	1184.28	1187.93	0.001283	3.35	2509.33	498.80	0.25
1	21.431	AFR Flow	8270.00	1181.00	1186.60	1183.89	1186.96	0.002842	4.83	1712.50	331.52	0.37
1	21.431	Total Flow	8405.00	1181.00	1186.63	1183.91	1187.00	0.002876	4.88	1723.42	336.77	0.37
1	21.337	AFR Flow	8270.00	1180.00	1186.60	1181.42	1186.63	0.000180	1.40	6116.84	1255.90	0.10
1	21.337	Total Flow	8405.00	1180.00	1186.64	1181.44	1186.67	0.000182	1.42	6156.22	1260.16	0.10
1	21.245	AFR Flow	8270.00	1184.00	1186.00	1183.16	1186.38	0.004147	2.98	1808.37	1629.26	0.38
1	21.245	Total Flow	8405.00	1184.00	1186.03	1183.21	1186.41	0.004183	3.02	1825.71	1634.14	0.38
1	21.157	AFR Flow	8270.00	1176.60	1184.67	1182.74	1184.82	0.002977	3.07	2711.87	1586.14	0.33
1	21.157	Total Flow	8405.00	1176.60	1184.71	1182.85	1184.86	0.002934	3.07	2750.92	1588.46	0.33
1	21.061	AFR Flow	8270.00	1176.50	1183.57	1181.19	1183.84	0.001319	4.14	2000.90	984.34	0.35
1	21.061	Total Flow	8405.00	1176.50	1183.60	1181.20	1183.87	0.001330	4.17	2016.88	989.34	0.35
1	20.958	AFR Flow	8270.00	1176.60	1182.45	1181.27	1182.81	0.002861	4.81	1764.27	1073.33	0.48
1	20.958	Total Flow	8405.00	1176.60	1182.48	1181.29	1182.85	0.002858	4.84	1786.62	1084.46	0.48
1	20.864	AFR Flow	8270.00	1176.00	1181.17	1179.82	1181.51	0.002445	4.78	1904.62	923.91	0.45
1	20.864	Total Flow	8405.00	1176.00	1181.20	1179.84	1181.54	0.002442	4.81	1929.56	929.64	0.45
1	20.769	AFR Flow	8270.00	1173.10	1179.93	1178.56	1180.29	0.002407	4.96	1868.40	816.78	0.46
1	20.769	Total Flow	8405.00	1173.10	1179.97	1178.58	1180.33	0.002388	4.97	1897.43	821.20	0.45
1	20.675	AFR Flow	8270.00	1171.30	1178.93	1176.72	1179.30	0.001656	5.03	1820.68	559.58	0.40
1	20.675	Total Flow	8405.00	1171.30	1178.97	1176.74	1179.35	0.001664	5.07	1840.47	562.06	0.40
1	20.579	AFR Flow	8270.00	1171.90	1177.59		1178.08	0.003822	5.65	1493.76	550.30	0.56
1	20.579	Total Flow	8405.00	1171.90	1177.62		1178.12	0.003824	5.68	1511.90	554.61	0.56
1	20.483	AFR Flow	8270.00	1169.80	1176.41		1176.70	0.001882	4.41	2025.02	747.81	0.40
1	20.483	Total Flow	8405.00	1169.80	1176.44		1176.73	0.001887	4.44	2048.70	749.98	0.40
1	20.435	AFR Flow	8270.00	1168.80	1175.74	1173.94	1176.14	0.002517	5.39	1850.33	756.61	0.47
1	20.435	Total Flow	8405.00	1168.80	1175.76	1173.99	1176.17	0.002542	5.44	1868.68	764.58	0.48
1	20.388	AFR Flow	8270.00	1168.90	1174.99	1174.50	1175.36	0.003833	5.52	1954.39	1054.26	0.56
1	20.388	Total Flow	8405.00	1168.90	1175.01	1174.50	1175.39	0.003838	5.55	1975.98	1056.66	0.56
1	20.343	AFR Flow	8270.00	1168.70	1174.12		1174.50	0.003746	5.74	2039.43	1066.49	0.56
1	20.343	Total Flow	8405.00	1168.70	1174.15		1174.52	0.003722	5.75	2068.64	1070.02	0.56
1	20.294	AFR Flow	8270.00	1166.70	1173.46		1173.75	0.002158	4.86	2336.18	1124.77	0.43
1	20.294	Total Flow	8405.00	1166.70	1173.49		1173.78	0.002159	4.89	2367.94	1127.51	0.44
1	20.207	AFR Flow	8270.00	1167.20	1172.35		1172.65	0.002715	4.92	2145.52	1049.81	0.48
1	20.207	Total Flow	8405.00	1167.20	1172.38		1172.68	0.002706	4.94	2177.26	1063.56	0.48

HEC-RAS Plan: 10-Year River: Agua Fria Reach: 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev.	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	20.111	AFR Flow	8270.00	1166.80	1171.16		1171.37	0.002340	4.11	2405.23	1112.81	0.43
1	20.111	Total Flow	8405.00	1166.80	1171.19		1171.40	0.002353	4.13	2437.61	1126.14	0.43
1	20.015	AFR Flow	8270.00	1166.10	1169.85	1168.53	1170.05	0.002998	4.03	2356.88	1210.82	0.47
1	20.015	Total Flow	8405.00	1166.10	1169.87	1168.54	1170.07	0.003004	4.05	2383.86	1217.13	0.47


Agua Fria River - Rose Garden Lane Plan: 2-Year RGL Flow Only 6/20/2005
River = Agua Fria Reach = 1 RS = 21.798
.045
.035
.055
Legend
EG RGL Flow
WS RGL Flow
Crit RGL Flow
Ground
Ineff
Bank Sta
Elevation (ft)
1202
1200
1198
1196
1194
1192
1190
1188
1186
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)


Agua Fria River - Rose Garden Lane Plan: 2-Year RGL Flow Only 6/20/2005
River = Agua Fria Reach = 1 RS = 21.798
.035
Legend
EG RGL Flow
WS RGL Flow
Crit RGL Flow
Ground
Ineff
Bank Sta
Elevation (ft)
1189.0
1188.5
1188.0
1187.5
1187.0
1186.5
10350
10400
10450
10500
Station (ft)

HEC-RAS Plan: 2-Year River: Agua Fria Reach: 1 Profile: RGL Flow

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	24.816	RGL Flow	8.00	1241.80	1241.97		1241.98	0.001918	0.36	15.35	80.34	0.22
1	24.721	RGL Flow	8.00	1241.10	1241.01		1241.02	0.002067		12.00	34.46	0.00
1	24.631	RGL Flow	8.00	1239.80	1238.50	1238.47	1238.53	0.034963		5.14	34.74	0.00
1	24.543	RGL Flow	8.00	1237.60	1236.58	1236.11	1236.59	0.001558		10.80	25.05	0.00
1	24.449	RGL Flow	8.00	1235.00	1235.49		1235.50	0.003222	0.94	8.53	35.13	0.34
1	24.353	RGL Flow	8.00	1233.60	1233.92	1233.81	1233.93	0.003023	0.68	11.85	76.10	0.30
1	24.26	RGL Flow	8.00	1231.70	1232.38	1232.26	1232.39	0.003206	0.71	11.21	69.14	0.31
1	24.212	RGL Flow	8.00	1231.30	1232.17	1231.69	1232.17	0.000396	0.45	17.89	46.21	0.13
1	24.165	RGL Flow	8.00	1231.40	1231.88	1231.77	1231.91	0.007197	1.39	5.76	24.02	0.50
1	24.067	RGL Flow	8.00	1229.30	1229.76	1229.55	1229.76	0.002729	0.58	13.80	60.45	0.21
1	23.974	RGL Flow	8.00	1227.50	1227.82	1227.70	1227.83	0.006079	0.71	11.23	447.41	0.30
1	23.881	RGL Flow	8.00	1225.10	1225.35	1225.26	1225.37	0.004574	0.93	8.59	569.61	0.38
1	23.79	RGL Flow	8.00	1224.20	1224.74	1224.45	1224.74	0.000600	0.43	18.44	936.52	0.15
1	23.692	RGL Flow	8.00	1223.80	1223.96	1223.91	1223.97	0.007959	0.82	9.79	1686.88	0.45
1	23.598	RGL Flow	8.00	1221.40	1220.94	1220.68	1220.96	0.004952		6.72	1094.05	0.00
1	23.504	RGL Flow	8.00	1220.80	1218.59	1218.38	1218.61	0.004649		7.99	477.67	0.00
1	23.409	RGL Flow	8.00	1218.80	1217.34	1217.04	1217.35	0.001629		12.78	39.67	0.00
1	23.314	RGL Flow	8.00	1216.10	1216.70	1216.42	1216.70	0.001085	0.62	12.82	213.88	0.20
1	23.219	RGL Flow	8.00	1214.70	1215.06	1215.06	1215.13	0.032993	2.46	4.11	103.64	1.02
1	23.124	RGL Flow	8.00	1213.90	1212.36	1212.11	1212.36	0.000914		20.07	99.72	0.00
1	23.029	RGL Flow	8.00	1211.80	1211.09	1211.07	1211.14	0.037389		4.56	231.39	0.00
1	22.935	RGL Flow	8.00	1209.50	1209.22	1209.08	1209.22	0.001571		19.07	105.46	0.00
1	22.839	RGL Flow	8.00	1208.70	1207.55	1207.50	1207.57	0.016295		6.91	48.08	0.00
1	22.745	RGL Flow	8.00	1206.30	1206.49	1206.25	1206.49	0.000977	0.27	21.21	101.73	0.16
1	22.651	RGL Flow	8.00	1204.90	1205.01	1205.01	1205.07	0.053660	1.42	4.26	38.44	1.07
1	22.558	RGL Flow	8.00	1203.40	1202.90		1202.91	0.001457		11.40	27.22	0.00
1	22.462	RGL Flow	8.00	1200.30	1200.77	1200.77	1200.88	0.028918	2.72	2.94	12.66	0.99
1	22.368	RGL Flow	8.00	1198.50	1198.91	1198.73	1198.92	0.000919	0.46	17.40	81.43	0.18
1	22.273	RGL Flow	8.00	1197.60	1198.22	1197.98	1198.23	0.002240	0.85	9.40	335.64	0.29
1	22.177	RGL Flow	8.00	1196.00	1194.84	1194.84	1194.96	0.080879		2.86	231.89	0.00
1	22.082	RGL Flow	8.00	1194.90	1192.25	1187.67	1192.25	0.000000		956.78	309.90	0.00
1	21.986	RGL Flow	8.00	1191.80	1192.16	1192.16	1192.24	0.040791	2.74	4.23	1367.66	1.13
1	21.893	RGL Flow	8.00	1187.40	1188.10	1187.68	1188.11	0.000554	0.64	12.47	409.14	0.16
1	21.798	RGL Flow	8.00	1187.00	1187.41	1187.30	1187.43	0.005638	1.11	7.20	34.99	0.43
1	21.716	RGL Flow	8.00	1183.10	1183.58	1183.49	1183.62	0.017504	1.43	5.59	25.36	0.54
1	21.621	RGL Flow	8.00	1182.50	1182.58	1182.53	1182.58	0.000732	0.15	53.54	653.08	0.09
1	21.524	RGL Flow	8.00	1182.00	1182.09	1182.02	1182.09	0.001389	0.22	37.00	428.83	0.13
1	21.431	RGL Flow	8.00	1181.00	1181.08	1181.03	1181.09	0.003303	0.33	24.60	296.10	0.20
1	21.337	RGL Flow	8.00	1180.00	1180.06	1180.02	1180.06	0.001425	0.17	48.44	857.75	0.12
1	21.245	RGL Flow	8.00	1184.00	1178.05	1178.05	1178.08	0.108988		6.39	523.82	0.00
1	21.157	RGL Flow	8.00	1176.60	1177.58	1176.91	1177.59	0.000168	0.28	28.25	178.17	0.06
1	21.061	RGL Flow	8.00	1176.50	1177.47	1176.89	1177.47	0.000334	0.43	18.59	211.52	0.12
1	20.958	RGL Flow	8.00	1176.60	1177.21	1176.90	1177.21	0.000726	0.52	15.48	201.93	0.17
1	20.864	RGL Flow	8.00	1176.00	1176.58	1176.37	1176.60	0.002554	0.97	8.25	27.10	0.31
1	20.769	RGL Flow	8.00	1173.10	1173.36	1173.36	1173.45	0.033464	2.37	3.37	19.92	1.02
1	20.675	RGL Flow	8.00	1171.30	1172.40	1171.65	1172.40	0.000076	0.26	31.35	54.74	0.06
1	20.579	RGL Flow	8.00	1171.90	1172.29		1172.30	0.002221	0.67	11.93	61.53	0.27
1	20.483	RGL Flow	8.00	1169.80	1170.05	1170.00	1170.07	0.012086	1.27	6.28	44.07	0.59
1	20.435	RGL Flow	8.00	1168.80	1169.52	1169.13	1169.52	0.000867	0.40	20.09	111.65	0.17
1	20.388	RGL Flow	8.00	1168.90	1169.34	1169.16	1169.34	0.000615	0.38	21.02	96.68	0.14
1	20.343	RGL Flow	8.00	1168.70	1168.83	1168.83	1168.88	0.048792	1.75	4.58	56.87	1.09
1	20.294	RGL Flow	8.00	1166.70	1167.68		1167.69	0.000229	0.40	20.00	40.64	0.10
1	20.207	RGL Flow	8.00	1167.20	1167.41	1167.33	1167.42	0.003694	0.74	10.77	69.74	0.33
1	20.111	RGL Flow	8.00	1166.80	1165.97		1165.98	0.002480		8.91	22.05	0.00
1	20.015	RGL Flow	8.00	1166.10	1164.69	1164.41	1164.70	0.003001		9.03	26.31	0.00

TYPICAL CHANNEL
ADMP ALIGNMENT

TRAPEZOIDAL CHANNEL ANALYSIS
NORMAL DEPTH COMPUTATION

September 9, 2005

PROGRAM INPUT DATA

DESCRIPTION	VALUE
Flow Rate (cfs)	1,126.0
Channel Bottom Slope (ft/ft)	0.0015
Manning's Roughness Coefficient (n-value)	0.03
Channel Left Side Slope (horizontal/vertical)	4.0
Channel Right Side Slope (horizontal/vertical)	4.0
Channel Bottom Width (ft)	30.0

COMPUTATION RESULTS

DESCRIPTION	VALUE
Normal Depth (ft)	5.04
Flow Velocity (fps)	4.45
Froude Number	0.414
Velocity Head (ft)	0.31
Energy Head (ft)	5.35
Cross-Sectional Area of Flow (sq ft)	253.03
Top Width of Flow (ft)	70.35

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TYPICAL CHANNEL
SUN STATE NORTH ALIGN.
ALTERNATIVE 1

TRAPEZOIDAL CHANNEL ANALYSIS
NORMAL DEPTH COMPUTATION

September 9, 2005

PROGRAM INPUT DATA

DESCRIPTION	VALUE
Flow Rate (cfs)	1,126.0
Channel Bottom Slope (ft/ft)	0.0026
Manning's Roughness Coefficient (n-value)	0.03
Channel Left Side Slope (horizontal/vertical)	4.0
Channel Right Side Slope (horizontal/vertical)	4.0
Channel Bottom Width (ft)	35.0

COMPUTATION RESULTS

DESCRIPTION	VALUE
Normal Depth (ft)	4.11
Flow Velocity (fps)	5.33
Froude Number	0.533
Velocity Head (ft)	0.44
Energy Head (ft)	4.55
Cross-Sectional Area of Flow (sq ft)	211.22
Top Width of Flow (ft)	67.86

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TYPICAL CHANNEL
STATE LAND ALIGN.
ALTERNATIVE 2

TRAPEZOIDAL CHANNEL ANALYSIS
NORMAL DEPTH COMPUTATION

September 9, 2005

PROGRAM INPUT DATA

DESCRIPTION	VALUE
Flow Rate (cfs)	1,126.0
Channel Bottom Slope (ft/ft)	0.0025
Manning's Roughness Coefficient (n-value)	0.03
Channel Left Side Slope (horizontal/vertical)	4.0
Channel Right Side Slope (horizontal/vertical)	4.0
Channel Bottom Width (ft)	35.0

COMPUTATION RESULTS

DESCRIPTION	VALUE
Normal Depth (ft)	4.15
Flow Velocity (fps)	5.26
Froude Number	0.523
Velocity Head (ft)	0.43
Energy Head (ft)	4.58
Cross-Sectional Area of Flow (sq ft)	214.16
Top Width of Flow (ft)	68.2

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BOX CULVERT
ALTERNATIVE 2

BOX CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

September 9, 2005

PROGRAM INPUT DATA

DESCRIPTION	VALUE
Culvert Span (ft)	10.0
Culvert Rise (ft)	6.0
FHWA Chart Number	8
FHWA Scale Number (Type of Culvert Entrance)	1
Manning's Roughness Coefficient (n-value)	0.012
Entrance Loss Coefficient of Culvert Opening	0.5
Culvert Length (ft)	320.0
Invert Elevation at Downstream end of Culvert (ft)	1,222.5
Invert Elevation at Upstream end of Culvert (ft)	1,224.0
Culvert Slope (ft/ft)	0.0047
Starting Flow Rate (cfs)	375.0
Incremental Flow Rate (cfs)	0.0
Ending Flow Rate (cfs)	375.0
Starting Tailwater Depth (ft)	5.0
Incremental Tailwater Depth (ft)	0.0
Ending Tailwater Depth (ft)	5.0

COMPUTATION RESULTS

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater (ft) Inlet Control	Headwater (ft) Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
375.0	5.0	5.67	0.0	2.94	3.52	2.94	12.78

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3 BARREL 10'x6' = 1126 cfs, 375 cfs/barrel

TYPICAL CHANNEL
ROSE GARDEN LN. ALIGN
ALTERNATIVES 3 & 4

TRAPEZOIDAL CHANNEL ANALYSIS
NORMAL DEPTH COMPUTATION

September 9, 2005

PROGRAM INPUT DATA

DESCRIPTION	VALUE
Flow Rate (cfs)	1,126.0
Channel Bottom Slope (ft/ft)	0.002
Manning's Roughness Coefficient (n-value)	0.03
Channel Left Side Slope (horizontal/vertical)	6.0
Channel Right Side Slope (horizontal/vertical)	4.0
Channel Bottom Width (ft)	8.0

COMPUTATION RESULTS

DESCRIPTION	VALUE
Normal Depth (ft)	6.02
Flow Velocity (fps)	4.91
Froude Number	0.472
Velocity Head (ft)	0.37
Energy Head (ft)	6.39
Cross-Sectional Area of Flow (sq ft)	229.26
Top Width of Flow (ft)	68.19

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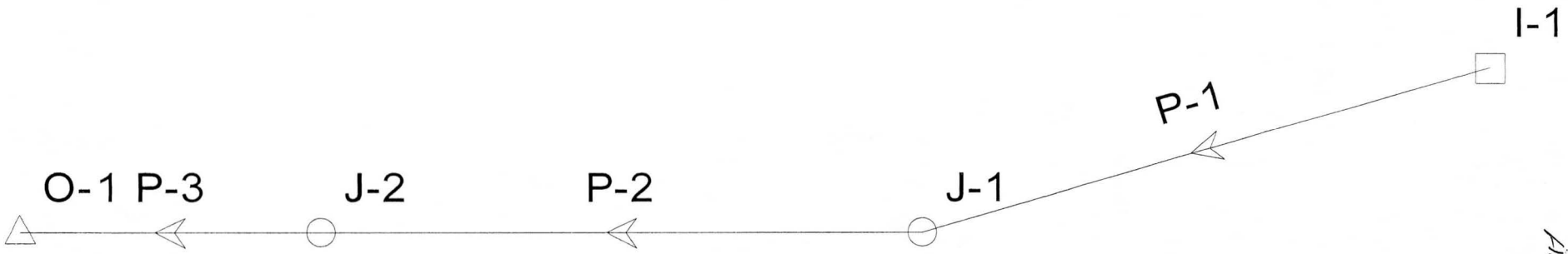
Scenario: Base



BOX CULVERT
ALTERNATIVES 3 & 4

Title: Alternative Alalysis
n:\...\hydro\stormcad\outfall alt.stm
09/09/05 11:36:58 AM

Wood Patel & Associates Inc
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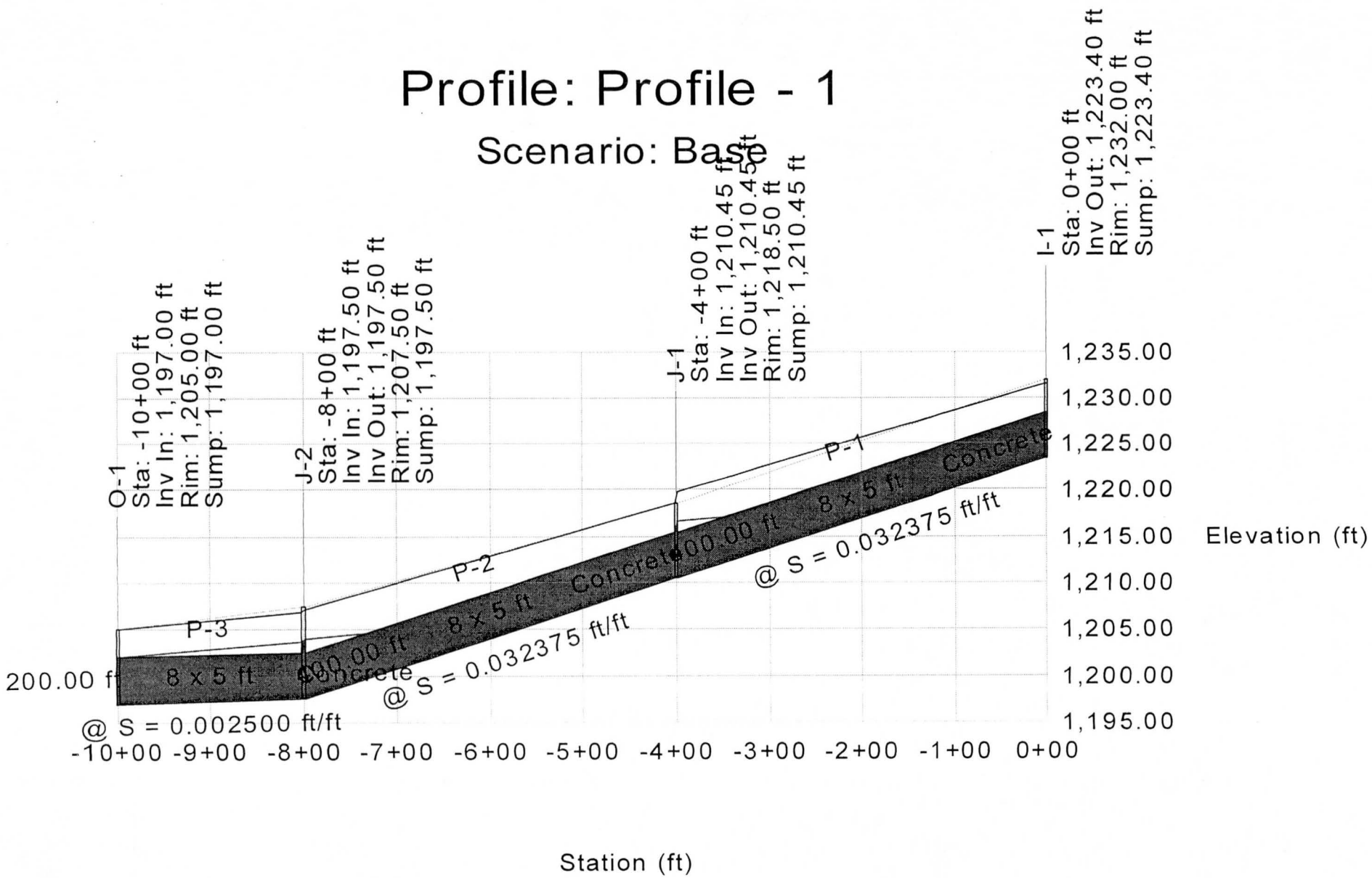
Project Engineer: Network Administrator
StormCAD v5.5 [5.5003]

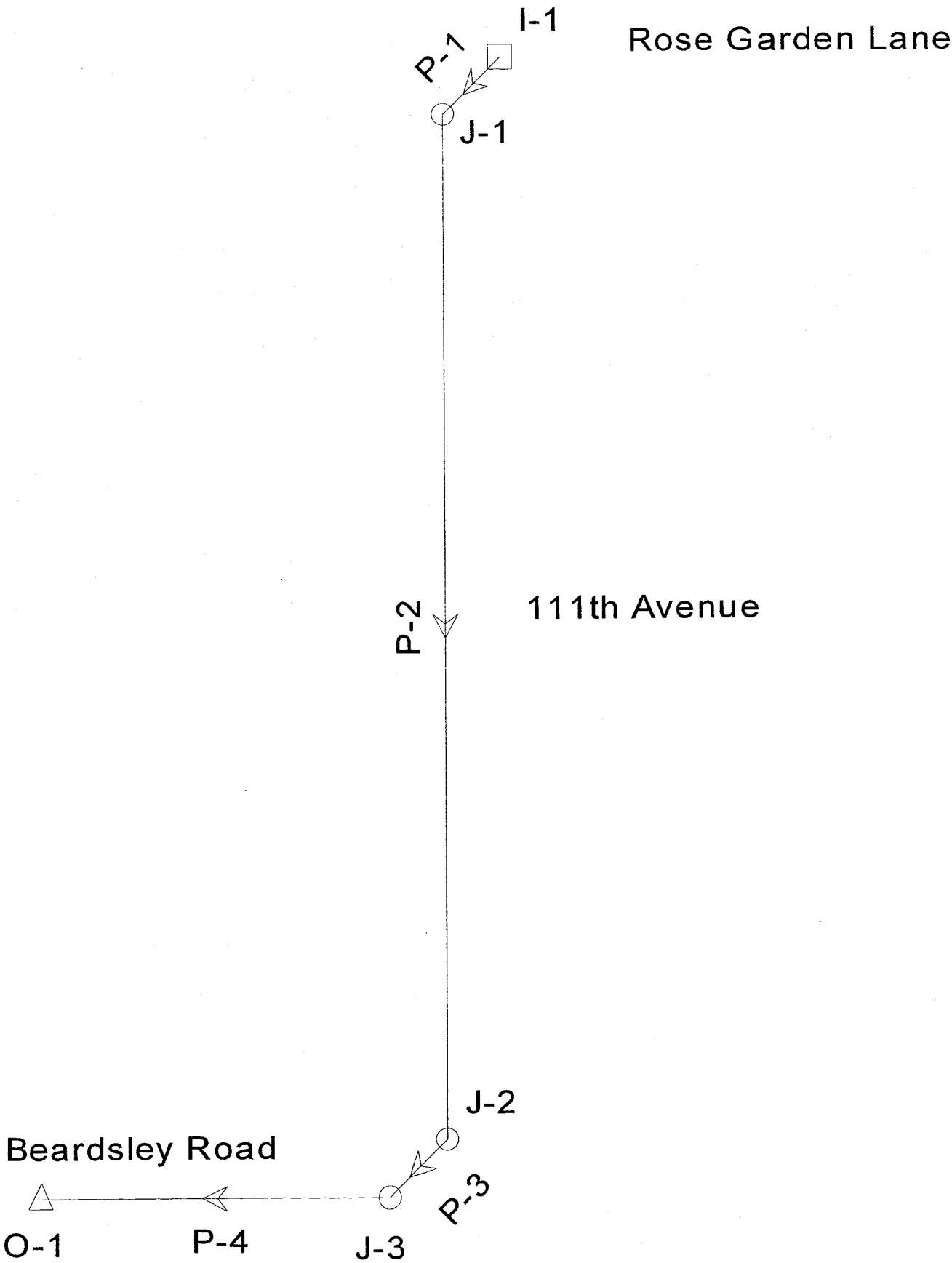

Profile: Profile - 1
Scenario: Base
O-1
Sta: -10+00 ft
Inv In: 1,197.00 ft
Rim: 1,205.00 ft
Sump: 1,197.00 ft
J-2
Sta: -8+00 ft
Inv In: 1,197.50 ft
Inv Out: 1,197.50 ft
Rim: 1,207.50 ft
Sump: 1,197.50 ft
J-1
Sta: -4+00 ft
Inv In: 1,210.45 ft
Inv Out: 1,210.45 ft
Rim: 1,218.50 ft
Sump: 1,210.45 ft
I-1
Sta: 0+00 ft
Inv Out: 1,223.40 ft
Rim: 1,232.00 ft
Sump: 1,223.40 ft
P-3
P-2
P-1
200.00 ft
8 x 5 ft
Concrete
@ S = 0.002500 ft/ft
@ S = 0.032375 ft/ft
1,235.00
1,230.00
1,225.00
1,220.00
1,215.00
1,210.00
1,205.00
1,200.00
1,195.00
Elevation (ft)
-10+00 -9+00 -8+00 -7+00 -6+00 -5+00 -4+00 -3+00 -2+00 -1+00 0+00
Station (ft)

Pipe Report

Label	Upstream Node	Downstream Node	Total System Flow (cfs)	Length (ft)	Constructed Slope (ft/ft)	Section Size	Mannings n	Full Capacity (cfs)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Downstream Ground Elevation (ft)	Upstream Cover (ft)	Downstream Cover (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
P-1	I-1	J-1	1,126.00	400.00	0.032375	8 x 5 ft	0.013	2,192.66	1,223.40	1,210.45	1,232.00	1,218.50	3.60	3.05	1,228.40	1,216.68
P-2	J-1	J-2	1,126.00	400.00	0.032375	8 x 5 ft	0.013	2,192.66	1,210.45	1,197.50	1,218.50	1,207.50	3.05	5.00	1,215.45	1,204.02
P-3	J-2	O-1	1,126.00	200.00	0.002500	8 x 5 ft	0.013	609.31	1,197.50	1,197.00	1,207.50	1,205.00	5.00	3.00	1,203.71	1,202.00

BOX CULVERT
ALTERNATIVE 5

Scenario: Base



Title: Alternative Alalysis
n:\...\outfall alt to beardsley channel.stm
09/09/05 09:46:21 AM © Haestad Methods, Inc.

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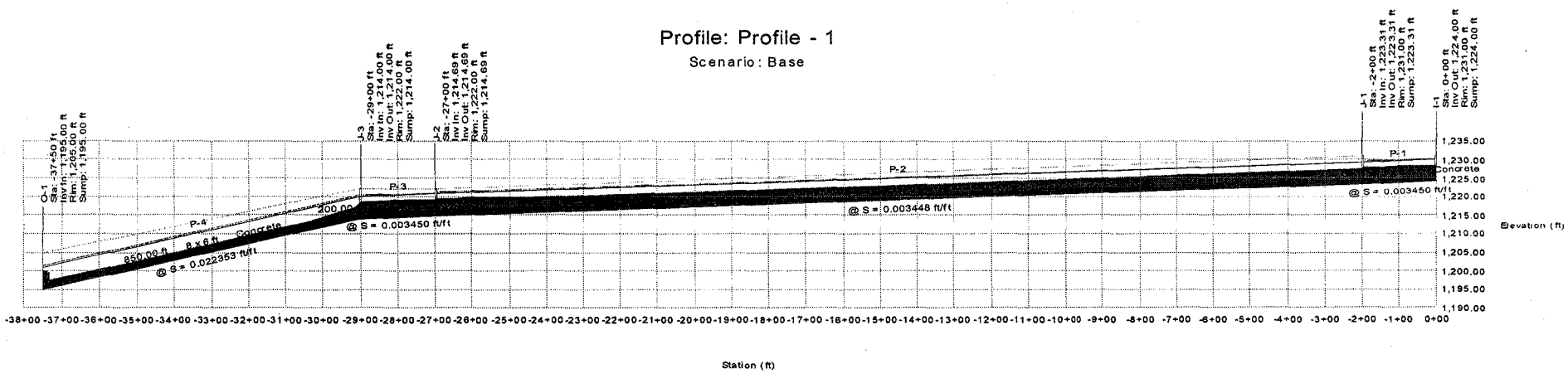
Project Engineer: Network Administrator
StormCAD v5.5 [5.5003]
Page 1 of 1

Profile
Scenario: Base



Scenario: Base

Pipe Report

Label	Upstream Node	Downstream Node	Total System Flow (cfs)	Length (ft)	Constructed Slope (ft/ft)	Section Size	Mannings n	Full Capacity (cfs)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Downstream Ground Elevation (ft)	Upstream Cover (ft)	Downstream Cover (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
P-1	I-1	J-1	1,126.00	200.00	0.003450	8 x 6 ft	0.013	1,384.78	1,224.00	1,223.31	1,231.00	1,231.00	1.00	1.69	1,228.47	1,228.17
P-2	J-1	J-2	1,126.00	2,500.00	0.003448	8 x 6 ft	0.013	1,384.37	1,223.31	1,214.69	1,231.00	1,222.00	1.69	1.31	1,227.61	1,219.61
P-3	J-2	J-3	1,126.00	200.00	0.003450	8 x 6 ft	0.013	1,384.78	1,214.69	1,214.00	1,222.00	1,222.00	1.31	2.00	1,219.07	1,218.70
P-4	J-3	O-1	1,126.00	850.00	0.022353	8 x 6 ft	0.013	3,524.82	1,214.00	1,195.00	1,222.00	1,205.00	2.00	4.00	1,218.09	1,200.20

BEARDSLEY CHANNEL
ALTERNATIVE 5

TRAPEZOIDAL CHANNEL ANALYSIS
NORMAL DEPTH COMPUTATION

September 9, 2005

PROGRAM INPUT DATA

DESCRIPTION	VALUE
Flow Rate (cfs)	1,126.0
Channel Bottom Slope (ft/ft)	0.0035
Manning's Roughness Coefficient (n-value)	0.03
Channel Left Side Slope (horizontal/vertical)	4.0
Channel Right Side Slope (horizontal/vertical)	6.0
Channel Bottom Width (ft)	10.0

COMPUTATION RESULTS

DESCRIPTION	VALUE
Normal Depth (ft)	5.19
Flow Velocity (fps)	6.04
Froude Number	0.614
Velocity Head (ft)	0.57
Energy Head (ft)	5.75
Cross-Sectional Area of Flow (sq ft)	186.33
Top Width of Flow (ft)	61.86

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APPENDIX C

Preliminary Opinion of Probable Cost

*Alternative Outfall Alignment Preliminary Opinion of Probable Cost**
City of Peoria

September 14, 2005
W/P # 031902

Rose Garden Lane Outfall Channel Alignments - 111th Avenue to Agua Fria River

ADMP Alignment

MAJOR OUTFALL ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Channel Excavation	$7	CY	17,778	$124,444
2	O&M Road (DG)	$0.50	SF	34,800	$17,400
3	Channel Erosion Protection	$50	CY	930	$46,500
4	Landscaping/Irrigation	$0.60	SF	147,900	$88,740
5	Outlet protection at AFR	$50	CY	400	$20,000
				SUBTOTAL MAJOR ELEMENTS	$297,084
		CONTINGENCIES:			
		Construction		25%	$74,271
		Design & Field Engineering		18%	$66,844
		Change Orders		7%	$25,995
				TOTAL MAJOR ELEMENTS	**$464,194**

1. Construction Contingencies @ 25% of the Total Construction Cost
2. Design and Field Engineering Costs @ 18% of the sum of Total Construction Cost and Construction Contingencies
3. Change Orders @ 7% of the sum of Total Construction Cost and Construction Contingencies
4. Miscellaneous utility relocations are not included in this estimate.

LAND ACQUISITION

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Sun State Rock(2)	$200,000	AC	2.53	$506,000
2	SRP Parcel	$200,000	AC	0.63	$125,344
3	Sun State Rock	$200,000	AC	3.01	$602,617
				SUBTOTAL LAND ACQUISITION	$1,233,961
		CONTINGENCIES:		15%	$185,094
				TOTAL LAND ACQUISITION	**$1,419,056**
				TOTAL	**$1,883,250**

* Costs provided without benefit of plan and specifications, thus subject to revisions

1. Land value and land contingency is based upon input from the City of Peoria.
2. This area includes the entire Triangular Sun State Parcel at the SE corner of their site.

Alternative Outfall Alignment Preliminary Opinion of Probable Cost*

City of Peoria

September 14, 2005
W/P # 031902

Rose Garden Lane Outfall Channel Alignments - 111th Avenue to Agua Fria River

Alternative 1 - North on Sun State Rock Parcel

MAJOR OUTFALL ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Channel Excavation	$7	CY	28,527	$199,692
2	Landscaping/Irrigation	$0.60	SF	176,400	$105,840
3	Channel Erosion Protection	$50	CY	1,220	$61,000
4	O&M Road (Stabilized DG)	$2	SF	28,000	$56,000
5	Outlet protection at AFR	$50	CY	400	$20,000
				SUBTOTAL MAJOR ELEMENTS	$442,532
		CONTINGENCIES:			
		Construction		25%	$110,633
		Design & Field Engineering		18%	$99,570
		Change Orders		7%	$38,722
				TOTAL MAJOR ELEMENTS	**$691,456**

1. Construction Contingencies @ 25% of the Total Construction Cost
2. Design and Field Engineering Costs @ 18% of the sum of Total Construction Cost and Construction Contingencies
3. Change Orders @ 7% of the sum of Total Construction Cost and Construction Contingencies
4. Miscellaneous utility relocations are not included in this estimate.

LAND ACQUISITION

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Sun State Rock[2]	$200,000	AC	2.53	$506,000
2	SRP Parcel	$200,000	AC	1.88	$375,390
3	Sun State Rock	$200,000	AC	1.98	$395,500
				SUBTOTAL LAND ACQUISITION	$1,276,891
		CONTINGENCIES:		15%	$191,534
				TOTAL LAND ACQUISITION	**$1,468,424**
				TOTAL	**$2,159,880**

* Costs provided without benefit of plan and specifications, thus subject to revisions

1. Land value and land contingency is based upon input from the City of Peoria.
2. This area includes the entire Triangular Sun State Parcel at the SE corner of their site.

Alternative Outfall Alignment Preliminary Opinion of Probable Cost*

City of Peoria

September 14, 2005

W/P # 031902

Rose Garden Lane Outfall Channel Alignments - 111th Avenue to Agua Fria River

Alternative 2 - North on Arizona State Land Department Parcel

MAJOR OUTFALL ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Channel & Culvert Excavation	$7	CY	26,585	$186,096
2	Box Culvert (3 - 10' x 6')	$1,629	LF	350	$570,150
3	Channel Erosion Protection	$50	CY	400	$20,000
4	Landscaping/Irrigation	$0.60	SF	128,000	$76,800
5	O&M Road (DG)	$0.50	SF	28,400	$14,200
6	Outlet protection at AFR	$50	CY	400	$20,000
			SUBTOTAL MAJOR ELEMENTS		$887,246
		CONTINGENCIES:			
		Construction		25%	$221,812
		Design & Field Engineering		18%	$199,630
		Change Orders		7%	$77,634
			TOTAL MAJOR ELEMENTS		**$1,386,322**

1. Construction Contingencies @ 25% of the Total Construction Cost
2. Design and Field Engineering Costs @ 18% of the sum of Total Construction Cost and Construction Contingencies
3. Change Orders @ 7% of the sum of Total Construction Cost and Construction Contingencies
4. Miscellaneous utility relocations are not included in this estimate.

LAND ACQUISITION

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	ASLD	$200,000	AC	2.77	$553,719
2	SRP Parcel	$200,000	AC	0.47	$93,664
3	Sun State Rock	$200,000	AC	0.19	$38,567
			SUBTOTAL LAND ACQUISITION		$685,950
		CONTINGENCIES:		15%	$102,893
			TOTAL LAND ACQUISITION		**$788,843**
				TOTAL	**$2,175,165**

* Costs provided without benefit of plan and specifications, thus subject to revisions

1. Land value and land contingency is based upon input from the City of Peoria.

*Alternative Outfall Alignment Preliminary Opinion of Probable Cost**
City of Peoria

September 14, 2005
W/P # 031902

Rose Garden Lane Outfall Channel Alignments - 111th Avenue to Agua Fria River

Alternative 3 - Rose Garden Lane (north side)

MAJOR OUTFALL ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Channel & Culvert Excavation	$7	CY	20,543	$143,798
2	Box Culvert (2 - 8' x 5')	$821	LF	850	$697,850
3	Landscaping/Irrigation	$0.60	SF	58,700	$35,220
4	O&M Road (DG)	$0.50	SF	23,000	$11,500
5	Outlet protection at AFR	$50	CY	400	$20,000
				SUBTOTAL MAJOR ELEMENTS	$908,368
		CONTINGENCIES:			
		Construction		25%	$227,092
		Design & Field Engineering		18%	$204,383
		Change Orders		7%	$79,482
				TOTAL MAJOR ELEMENTS	**$1,419,325**

1. Construction Contingencies @ 25% of the Total Construction Cost
2. Design and Field Engineering Costs @ 18% of the sum of Total Construction Cost and Construction Contingencies
3. Change Orders @ 7% of the sum of Total Construction Cost and Construction Contingencies
4. Miscellaneous utility relocations are not included in this estimate.

LAND ACQUISITION

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Sun State Rock	$200,000	AC	1.75	$349,403
2	SRP	$200,000	AC	0.32	$63,361
3	West of Sun State	$200,000	AC	1.52	$303,030
				SUBTOTAL LAND ACQUISITION	$715,794
		CONTINGENCIES:		15%	$107,369
				TOTAL LAND ACQUISITION	**$823,163**
				TOTAL	**$2,242,489**

* Costs provided without benefit of plan and specifications, thus subject to revisions

1. Land value and land contingency is based upon input from the City of Peoria.

*Alternative Outfall Alignment Preliminary Opinion of Probable Cost**
City of Peoria

September 14, 2005
W/P # 031902

Rose Garden Lane Outfall Channel Alignments - 111th Avenue to Agua Fria River

Alternative 4 - Rose Garden Lane (south side)

MAJOR OUTFALL ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Channel & Culvert Excavation	$7	CY	21,352	$149,466
2	Box Culvert (2 - 8' x 5')	$821	LF	870	$714,270
3	Landscaping/Irrigation	$0.60	SF	180,000	$108,000
4	Outlet protection at AFR	$50	CY	400	$20,000
				SUBTOTAL MAJOR ELEMENTS	$991,736
		CONTINGENCIES:			
		Construction		25%	$247,934
		Design & Field Engineering		18%	$223,141
		Change Orders		7%	$86,777
				TOTAL MAJOR ELEMENTS	**$1,549,587**

1. Construction Contingencies @ 25% of the Total Construction Cost
2. Design and Field Engineering Costs @ 18% of the sum of Total Construction Cost and Construction Contingencies
3. Change Orders @ 7% of the sum of Total Construction Cost and Construction Contingencies
4. Miscellaneous utility relocations are not included in this estimate.

LAND ACQUISITION

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Sun State Parcel	$200,000	AC	0.41	$82,645
2	South side of RGL	$200,000	AC	3.72	$743,802
				SUBTOTAL LAND ACQUISITION	$826,446
		CONTINGENCIES:		15%	$123,967
				TOTAL LAND ACQUISITION	**$950,413**
				TOTAL	**$2,500,000**

* Costs provided without benefit of plan and specifications, thus subject to revisions

1. The majority of culvert will be constructed in the south half of Rose Garden Lane Right-of-way.
2. Land value and land contingency is based upon input from the City of Peoria.

*Alternative Outfall Alignment Preliminary Opinion of Probable Cost**

City of Peoria

September 14, 2005
W/P # 031902

Rose Garden Lane Outfall Channel Alignments - 111th Avenue to Agua Fria River

Alternative 5 - South to Beardsley Channel

MAJOR OUTFALL ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Channel & Culvert Excavation	$7	CY	34,001	$238,008
2	Box Culvert (3 - 8' x 6')	$1,234	LF	3,750	$4,627,500
3	Channel Removal	$20	LF	850	$17,000
				SUBTOTAL MAJOR ELEMENTS	$4,882,508
		CONTINGENCIES:			
		Construction		25%	$1,220,627
		Design & Field Engineering		18%	$1,098,564
		Change Orders		7%	$427,219
				TOTAL MAJOR ELEMENTS	**$7,628,918**

1. Construction Contingencies @ 25% of the Total Construction Cost
2. Design and Field Engineering Costs @ 18% of the sum of Total Construction Cost and Construction Contingencies
3. Change Orders @ 7% of the sum of Total Construction Cost and Construction Contingencies
4. Miscellaneous utility relocations are not included in this estimate.

LAND ACQUISITION

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Beardsley Channel	$200,000	AC	1.8	$351,240
				SUBTOTAL LAND ACQUISITION	$351,240
		CONTINGENCIES:		15%	$52,686
				TOTAL LAND ACQUISITION	**$403,926**
				TOTAL	**$8,032,844**

* Costs provided without benefit of plan and specifications, thus subject to revisions

1. This alternative assumes that the culvert can be constructed within the existing 111th Avenue right-of-way.
2. Land value and land contingency is based upon input from the City of Peoria.

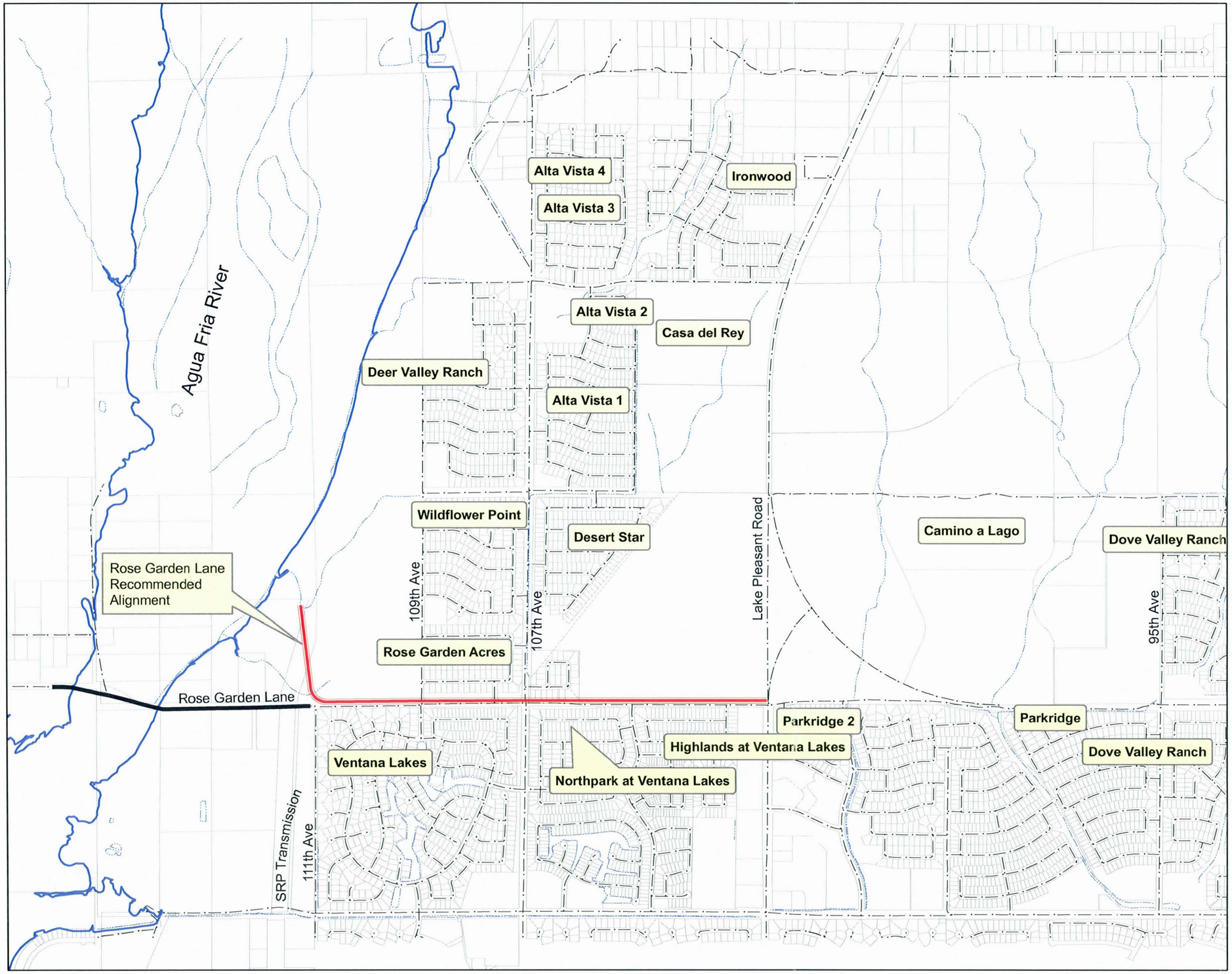
Alternative Outfall Alignment Summary
Preliminary Opinion of Probable Cost *

Rose Garden Lane Alignment	***Total***
ADMP Alignnment	**$1,883,250**
Alternative 1	**$2,159,880**
Alternative 2	**$2,175,165**
Alternative 3	**$2,242,489**
Alternative 4	**$2,500,000**
Alternative 5	**$8,032,844**

* Costs provided without benefit of plan and specifications, thus subject to revisions

PLATE 1

Project Location and Vicinity Map



Wood/Patel

Civil Engineers
Hydrologists
Land Surveyors
Construction Managers

0 600 1,200 Feet

Legend

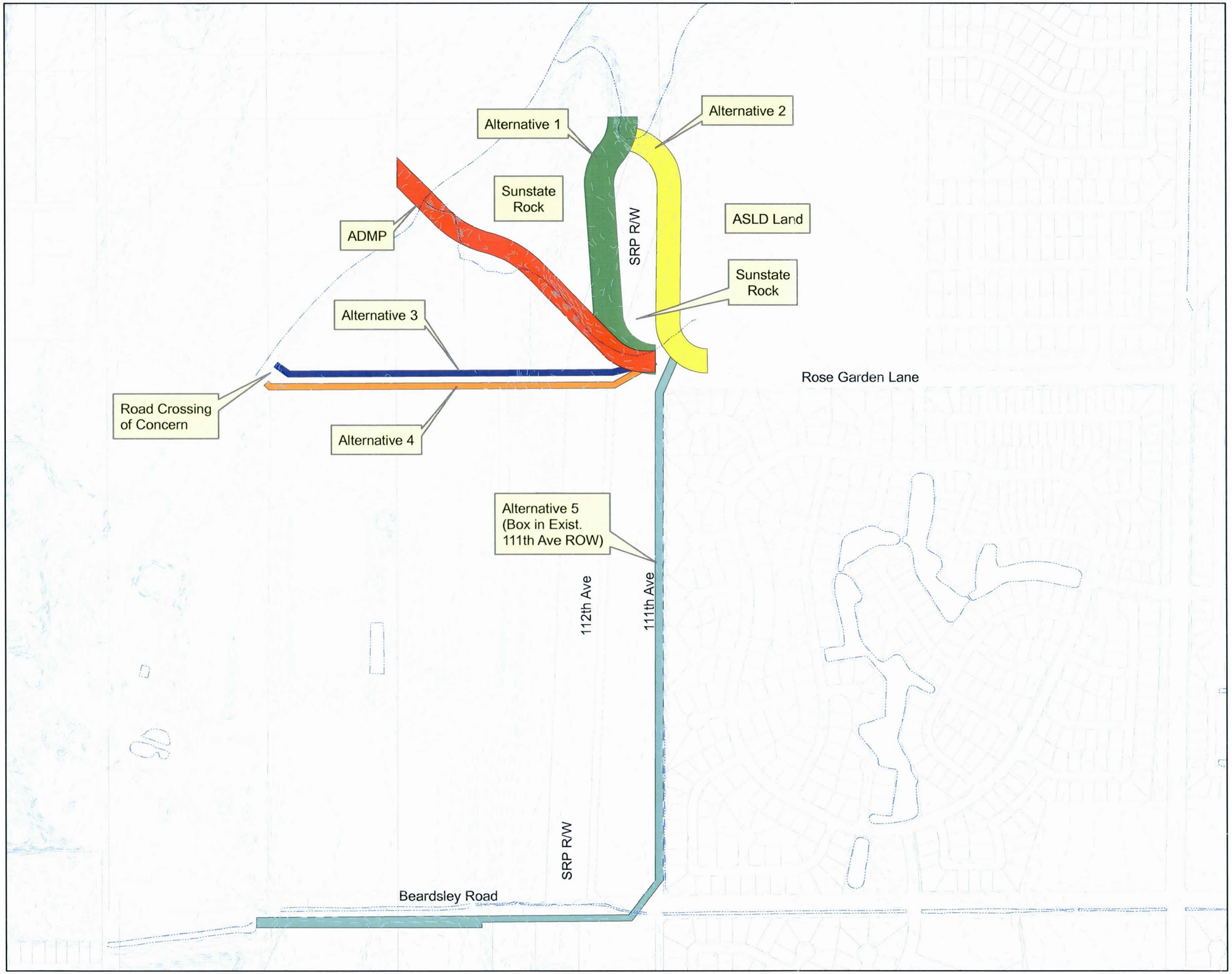
- Streets
- Rivers
- Washes
- Parcels
- Proposed route - Ph I
- FEMA Flood Plain
- Rose Garden Lane

City of Peoria
Rose Garden Lane Drainage Improvements
Outfall Alignment and Nuisance Flows Study.
Wood Patel & Associates
Job #042161.05

Plate 1
Project Location

PLATE 2

Alternative Outfall Alignments



Wood/Patel

Civil Engineers
Hydrologists
Land Surveyors
Construction Managers

0 500 1,000 Feet

Legend

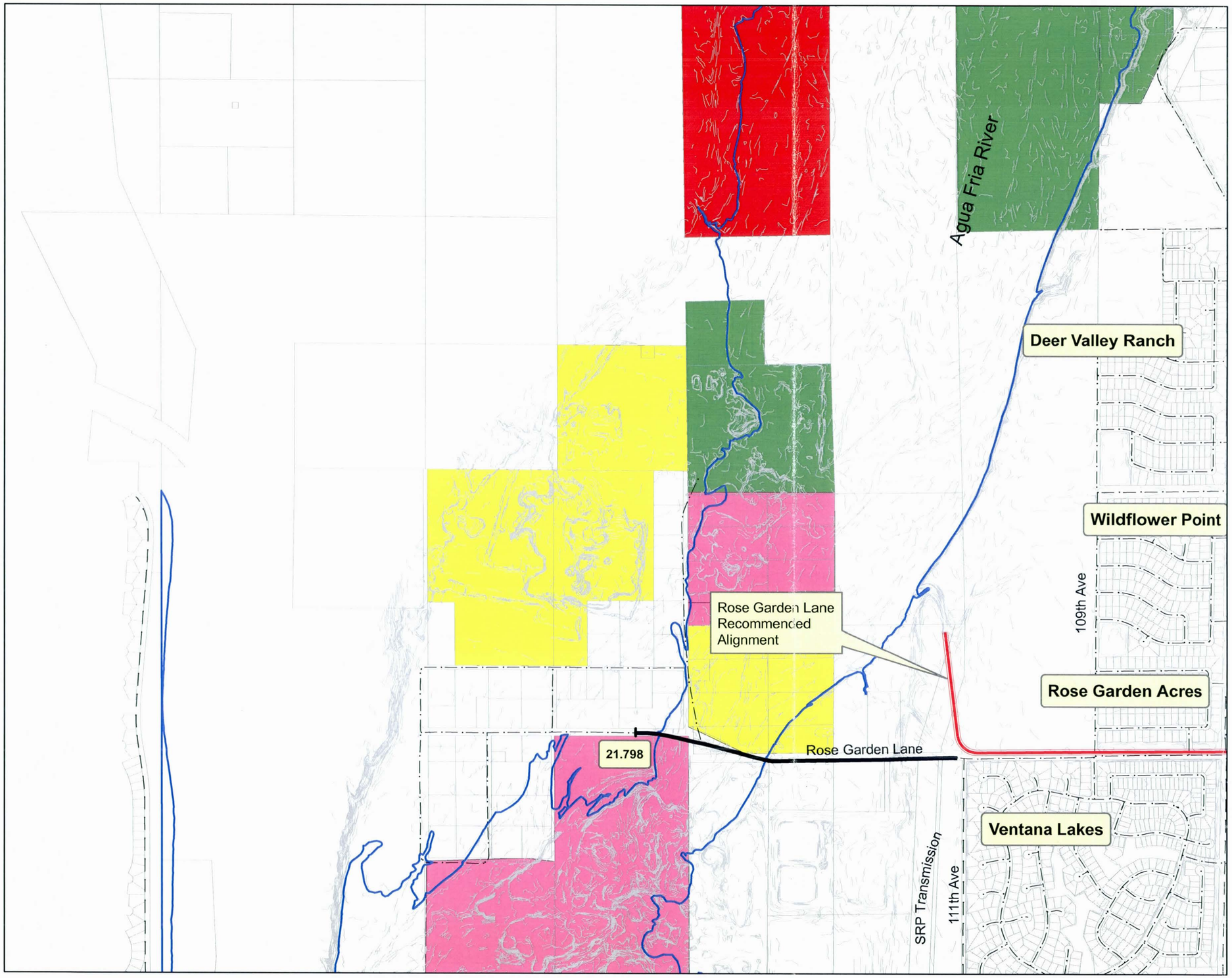
- Rivers
- Washes
- Parcels
- Contours
- Alternative ADMP ROW
- Alternative 1 Channel ROW
- Alternative 2 Channel ROW
- Alternative 3 Box/Channel ROW
- Alternative 4 Box/Channel ROW
- Alternative 5 Box/Channel ROW

City of Peoria
Rose Garden Lane Drainage Improvements
Outfall Alignment and Nuisance Flows Study.
Wood Patel & Associates
Job #042161.05

Plate 2
Alternative Outfall Alignments

PLATE 3

Agua Fria River at Rose Garden Lane



Wood/Patel

Civil Engineers
Hydrologists
Land Surveyors
Construction Managers

0 500 1,000 Feet

Legend

- Streets
- Parcels
- Proposed route - Ph I
- FEMA Flood Plain
- Rose Garden Lane
- Contours
- 21.798 HEC RAS Cross Section Number

Sand & Gravel Operation Permit Status

- APPROVED
- CLOSED
- NO FA
- PENDING

City of Peoria
Rose Garden Lane Drainage Improvements
Outfall Alignment and Nuisance Flows Study.
Wood Patel & Associates
Job #042161.05

Plate 3
Agua Fria River at Rose Garden Lane