



MEMO

November 12, 2014

To: Mark Patterson, P.E.

From: Tom B. Beck, P.E. *Tom B. Beck, P.E.*
Elie J. Alkhoury, P.E. *Elie J. Alkhoury, P.E.*

Subject: Harris County
CSJ: 0912-00-144
SH 249: From FM 1774/FM 149 in Pinehurst to FM 1774 in Todd Mission
Approval of Hydrologic and Hydraulic Analysis

We have reviewed the Hydrologic and Hydraulic Analysis prepared by Jacobs for the Texas Department of Transportation on the above referenced project. We concur with the Hydrologic and Hydraulic Analysis Report.

Please contact Tom Beck at extension 5654 or Elie Alkhoury at extension 5508 should you have any questions concerning this matter.

JCJ:ht

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Texas Department of Transportation

HYDROLOGIC AND HYDRAULIC ANALYSIS

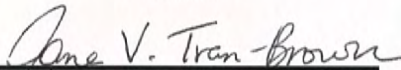
For

**State Highway 249 Extension
From FM 1774/ FM 149 in Pinehurst to FM 1774 in
Todd Mission**

CSJ: 0912-00-144

MONTGOMERY/GRIMES COUNTY, TEXAS





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Prepared For:
TEXAS DEPARTMENT OF TRANSPORTATION

October 28, 2014

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1.0 EXECUTIVE SUMMARY

This report updates the State Highway 249 Extension Drainage Report prepared by Carter & Burgess (Jacobs), dated September 2006 for the Texas Department of Transportation (TxDOT). This study includes hydrologic analyses of the proposed 17 miles SH 249 extension in Montgomery/Grimes County, Texas from FM 149 in Pinehurst to FM 1774 in Todd Mission. The purpose of this study is to present the hydrologic impacts within the Mill Creek Watershed associated with the proposed SH 249 extension. This report is prepared for TxDOT under Contract No. 12-245P5002 (CSJ: 0912-00-144).

The project site is located in northwest Montgomery County and Southeast Grimes County from FM 149 in Pinehurst to FM 1774 in Todd Mission. The proposed project will be constructed as a four-main lane controlled access highway facility consisting of two main lanes in each direction within a 400 ft. wide right-of-way (ROW) to allow for the inclusion of auxiliary lanes between on-ramps and off-ramps where appropriate. Also, note that this will be utilized as an evacuation route. The drainage area for this project is part of the Mill Creek watershed and crosses Mill Creek and its tributaries at various locations. Montgomery County participates in the National flood Insurance Program (NFIP) and has a published Flood Insurance Study (FIS) for the entire county. The portion of the project in Grimes County, also a NFIP participant, has no flood information available for Mill Creek.

In 2014, Jacobs Engineering Group under contract with TxDOT prepared an alignment for the proposed SH 249 extension that altered approximately six miles of the previously studied proposed roadway alignment. The revised alignment caused the previously delineated drainage areas to be modified, three drainage areas (14A, 14B, 14C) added, and four drainage areas (9A, 13, 15, 17A) removed from the impact analysis study. The profile was also adjusted to better match the new data.

The Preliminary Drainage Report prepared by Carter & Burgess (Jacobs) on September 2006 used the Rural Regional Regression Equations for drainage areas greater than 200 acres, however, in this detention analysis the regression equations produced excessively large flows compared to the Effective Flood Insurance Study. The TxDOT Hydraulic Design Manual, Revised May 2014, was used to calculate peak flows. The manual employs the Rational Method for drainage areas up to 200 acres for calculating peak flows. For areas greater than 200 acres, the peak flows are calculated using the Clark Unit Hydrograph (Tc&R, HEC-HMS) method.

Storm water detention is required to mitigate the increase in runoff rate due to the increase in impervious cover from the proposed roadway and improved drainage. The approximate detention volume was calculated using Malcolm Method to mitigate peak flows under proposed conditions for each ROW drainage area. The 100-year storm event peak flow was used to estimate the required detention volume.

In order to reduce the number of detention ponds, a total of 39 ponds would be required if placed at every stream crossing; this analysis will present 3 alternatives to mitigate increased runoff from the proposed SH 249 alignment:

1. 2 detention ponds, total 21 acres required that includes 20% contingency to account for the 15-foot maintenance berm and the imperviousness of the detention basin
2. 3 detention ponds, total 24 acres required that includes 20% contingency to account for the 15-foot maintenance berm and the imperviousness of the detention basin
3. 4 detention ponds, total 26 acres required that includes 20% contingency to account for the 15-foot maintenance berm and the imperviousness of the detention basin

The required storage volume increases as additional ponds are modeled because downstream ponds can often cause the flow to have a flat peak for longer, which makes peaks match, and require a higher detention rate.

Hydraulic model requests were made to the City of Conroe, Montgomery County Floodplain Administrator, and the Montgomery County Engineer's Office. These agencies were not able to provide models at the time of this study. The models received from FEMA in 2006 were partial models in a PDF file and were not usable in this study. Therefore, HEC-RAS models for Mill Creek and Tributaries 1, 2, 4 and 5 were created, using HEC Geo-RAS in ArcMap v.10.1, by generating cross sections using USGS topographic information. Water surface elevations for the 50- and 100-year storm events were compared for existing and proposed conditions.

Bridges were proposed along SH 249 Extension at several channel crossings. Bridges were modeled in HEC-RAS to ensure that 1) there was no adverse impact to nearby structures induced by the bridge under proposed conditions for the 1% AEP storm event, and 2) bridge low chords were set at a minimum of 2-foot above the 1% AEP WSE.

The 2006 Carter & Burgess (Jacobs) report used the TxDOT Culvert program, THYSYS, to analyze pipe/box culvert crossings for headwater elevations. This was accomplished by identifying approximate upstream and downstream flow lines at these locations from the digital terrain model. Tailwater was determined assuming normal depth at downstream cross section for various frequencies.

Since the 2014 updated analysis utilizes different peak flow calculation methods than previously used, the culvert analysis was verified using the Federal Highway Administration software, HY-8 version 7.3.

Once the preferred number of detention ponds is determined, an additional detailed analysis would be required to refine the pond locations. This report analysis was based on minimizing the number of ponds (ROW, construction, and maintenance cost) to meet preliminary mitigation requirements. The listed pond locations were based on the environmental constraints and current assumptions of available area. The report did not model the various possible pond location scenarios (if DET 405 & 405D available only, etc.), an additional detailed analysis would be required to determine the final size and location of the ponds of the various scenarios.

At this point, it is recommended to minimize construction and future maintenance cost on the project by implementing the 2, 3 or 4 detention pond options, in that order of preference, to mitigate increased impervious area as a result of project development.

2.0 GENERAL INFORMATION

2.1 Project Description

This report updates the State Highway 249 Extension Drainage Report prepared by Carter & Burgess (Jacobs), dated September 2006 for the Texas Department of Transportation (TxDOT) (**Appendix F**). This study includes hydrologic analyses of the proposed 17 miles SH 249 extension in Montgomery/Grimes County, Texas from FM 149 in Pinehurst to FM 1774 in Todd Mission. The purpose of this study is to present the hydrologic impacts within the Mill Creek Watershed associated with the proposed SH 249 extension. This report is prepared for TxDOT under Contract No. 12-245P5002 (CSJ: 0912-00-144). The objectives of the impact analysis, during the schematic development are:

- Determine the existing 100-year water surface elevations at water crossings along the project
- Determine the associated runoff rate and volume impacts associated with the increased impervious area from the proposed roadway extension
- Evaluate and determine if detention basins are required
- Identify potential detention pond locations, detention area, and mitigation volume that does not entail detailed detention routing
- Update the existing interim drainage report with the recommendations from the conceptual impact analysis

2.2 Project Location

The project site is located in northwest Montgomery County and Southeast Grimes County from FM 149 in Pinehurst to FM 1774 in Todd Mission. A vicinity map for the roadway extension is shown in **Exhibit 1**. The proposed project will be constructed as a four-main lane controlled access highway facility consisting of two main lanes in each direction within a 400 ft. wide right-of-way (ROW) to allow for the inclusion of auxiliary lanes between on-ramps and off-ramps where appropriate. Also, note that this will be utilized as an evacuation route and will require to clear 100-year water surface elevation. The drainage area for this project is part of the Mill Creek watershed and crosses Mill Creek and its tributaries at various locations. Montgomery County participates in the National flood Insurance Program (NFIP) and has a published Flood Insurance Study (FIS) for the entire county. The portion of the project in Grimes County, also an NFIP participant, has no flood information available for Mill Creek. A revised drainage area map is provided in **Exhibit 2**.

2.3 Drainage Design Criteria

The 50-year frequency flood event was utilized in determining the preliminary drainage design for the structures. This design frequency selection is consistent with guidance from the TxDOT Hydraulic Design Manual, dated May 2014, for this roadway classification. The 100-year frequency storm was also evaluated to ensure that new structures would not cause any additional backwater above the existing water surface elevations. In addition headwaters elevations were analyzed for the 10- and 25-years frequencies at these cross structure locations to establish tailwater boundary conditions for designing road side ditches.

2.4 FEMA Mapping

The drainage study area is located in the regulatory floodplain designated as Zone AE and Zone X, as shown in **Exhibit 3**. The proposed roadway alignment crosses through FIRM Panels 48339C0495F, 48339C0480F, 48339C0490F, 48339C0478F, 48339C0460F, 48339C0340F,

48339C0320F (Dated December 19, 1996), and 48185C0500C (dated April 3, 2012). **Table 1** indicates all FIRM panels that contain the watershed boundaries of Mill Creek along the proposed alignment.

Table 1: FIRM Panels

FIRM Panel No.	Effective Date	County
48339C0495F	12/19/1996	Montgomery
48339C0480F	12/19/1996	Montgomery
48339C0490F	12/19/1996	Montgomery
48339C0478F	12/19/1996	Montgomery
48339C0460F	12/19/1996	Montgomery
48339C0320F	12/19/1996	Montgomery
48339C0340F	12/19/1996	Montgomery
48185C0500C	4/3/2012	Grimes

Areas designated as Zone X are areas with minimal flood hazard, usually above the 500-year flood level. Zone AE indicates that the area is subject to inundation by the 1-percent-annual-chance flood event and mapped using detailed methods. The models developed for this study served as the basis for evaluating existing and proposed hydrologic and hydraulic conditions at the proposed bridge and culvert crossings located along the SH 249 extension proposed alignment. These models were not developed to become the new effective models for FEMA.

Local Floodplain Administrator notification will be needed upon approval of this report and completion of the final plans, specifications, and estimates (PS&E) package.

3.0 HYDROLOGY

3.1 Drainage Area

Drainage area boundaries for various creek crossings were derived from the U.S. Geological Survey (USGS) topographic maps for the “Keenan, Texas”, “Stoneham, Texas”, “Plantersville, Texas”, “Magnolia East, Texas” and “Magnolia West, Texas” 7.5 minute quadrangles, survey data, and field visits by Carter & Burgess (Jacobs) in March/April 2006. Existing HEC-1/ HEC-2/ WSP2 data for Mill Creek and its tributaries were requested by Carter & Burgess (Jacobs) in 2006 and partial printouts of the models in PDF format were received from Federal Emergency Management Agency (FEMA). In addition, TxDOT Montgomery County Area Office was contacted to verify project specific hydrologic data. Drainage basins were computed based on land use including woods, pasture, residential and industry utilizing current aerial imagery. These drainage areas, based on land use, were used to compute weighted run-off coefficient factors for each basin.

In 2014, Jacobs Engineering Group under contract with TxDOT prepared an alignment for the proposed SH 249 extension that altered approximately six miles of the previously studied proposed roadway alignment. The revised alignment caused the previously delineated drainage areas to be modified, three drainage areas (14A, 14B, 14C) added, and four drainage areas (9A, 13, 15, 17A) removed from the impact analysis study, shown on **Exhibit 2**. The profile was also adjusted to better match the new data.

3.2 Hydrology Method – Peak Flow

The Preliminary Drainage Report prepared by Carter & Burgess (Jacobs) on September 2006 used the Rural Regional Regression Equations for drainage areas greater than 200 acres, however, in this detention analysis the regression equations produced excessively large flows compared to the Effective Flood Insurance Study (FIS). The FIS flows were not used in this study because the values in the Montgomery County and Harris County FIS for Mill Creek did not match and could not be verified with an Effective model. The TxDOT Hydraulic Design Manual, Revised May 2014, was used to calculate peak flows. The manual employs the Rational Method for drainage areas up to 200 acres for calculating peak flows. For areas greater than 200 acres, the peak flows are calculated using the Clark Unit Hydrograph (Tc&R, HEC-HMS) method.

The Rational Method was used to estimate peak flows where the contributing drainage area was less than or equal to 200 acres. The utilization of the Rational Method follows the guidelines described in *Chapter 4, Section 12* of the *Texas Department of Transportation (TxDOT) Hydraulic Design Manual* (May 2014). The Rational Method equation is expressed as

$$Q = CIA,$$

Where:

Q = maximum rate of runoff (cfs),

C = runoff coefficient,

I = average rainfall intensity (in/hr), and

A = drainage area (ac).

A runoff coefficient (C) was assigned to each land-use type in this study. A composite C -value was then calculated for each drainage area using weighted C -values of various land-uses within the drainage area. For the details on the determination of area-weighted Composite C -values, please refer to *Section 3.2.2, Land-Use*.

The rainfall intensity was determined using the equation

$$I = \frac{b}{(t_c + d)^e},$$

Where:

I = rainfall intensity (in/hr), and

t_c = time of concentration (min).

b , d , e = coefficients for specific frequencies listed by county in the rainfall Intensity-Duration-Frequency coefficients provided by Montgomery County Drainage Manual which matches TxDOT b , d , e values.

Table 2 presents the b , d , and e values used in this study for Montgomery County provided by the Montgomery County Drainage Manual

Table 2: Intensity-Duration-Frequency Coefficients for Montgomery County

Annual Exceedance Probability	10%			4%			2%			1%		
Return Period	10-Year			25-Year			50-Year			100-Year		
	e	b	d	e	b	d	e	b	d	e	b	d
Montgomery	0.757	81	7.7	0.728	82	7.7	0.736	92	7.7	0.712	92	7.9

Once runoff coefficient (C), average rainfall intensity (I) and drainage area acreage (A) were determined, they were substituted into the Rational Method equation to calculate peak flows. The flows calculated using the TC&R Method were used in the hydraulic modeling discussed in Section 4 of this report.

For areas greater than 200 acres, the peak flows are calculated using the Clark Unit Hydrograph (T_c and R) method. The Montgomery County Drainage Criteria Manual, November 1989, was used to determine the T_c and R parameters. Exponential Loss Rate Function method was utilized for loss method, and the Clark Unit Hydrograph method for transform method, which used the T_c and R . The initial loss of 0.2 inches, moisture deficit of 0.25, suction of 2.0 inches, and conductivity of 0.55 inches/hour was used, as indicated in the manual. The hydrologic analysis parameters and results are included in **Appendix A**.

Details of the peak flow calculations can be found in **Appendix A**. The flows calculated in this section were used in the existing and proposed condition HEC-RAS models for Tributary No. 1, 2, 4, and 5 to Mill Creek to obtain the water surface elevation at the proposed bridge structures. The following table is a summary of the Drainage Area ID, Runoff calculation method, and associated stream.

DRAINAGE AREA ID	RUNOFF METHOD	STREAM
1	RATIONAL	MILL CREEK
2	RATIONAL	MILL CREEK
3	RATIONAL	MILL CREEK
4	RATIONAL	MILL CREEK
5	RATIONAL	MILL CREEK
6	RATIONAL	MILL CREEK
7	RATIONAL	MILL CREEK
8	RATIONAL	MILL CREEK
9	RATIONAL	MILL CREEK
10	TC&R	TRIB NO. 1
11	RATIONAL	TRIB NO. 2
12	TC&R	TRIB NO. 2
14	TC&R	TRIB NO. 4
14A	TC&R	TRIB NO. 4

DRAINAGE AREA ID	RUNOFF METHOD	STREAM
14B	RATIONAL	TRIB NO. 4
14C	TC&R	TRIB NO. 4
16	RATIONAL	TRIB NO. 5
17	TC&R	TRIB NO. 5
17B	RATIONAL	TRIB NO. 5
17C	RATIONAL	TRIB NO. 5
18	TC&R	TRIB NO. 5
19	RATIONAL	TRIB NO. 5
20	RATIONAL	TRIB NO. 5
21	RATIONAL	TRIB NO. 5
22	TC&R	TRIB NO. 5
23	RATIONAL	TRIB NO. 5
24	RATIONAL	TRIB NO. 5
25	TC&R	TRIB NO. 5
26	RATIONAL	MILL CREEK
27	RATIONAL	MILL CREEK
28	RATIONAL	MILL CREEK
29	RATIONAL	MILL CREEK
29A	RATIONAL	MILL CREEK
30	RATIONAL	MILL CREEK
30A	RATIONAL	MILL CREEK
31	RATIONAL	MILL CREEK
32	RATIONAL	MILL CREEK
33	RATIONAL	MILL CREEK
34	RATIONAL	MILL CREEK
35	TC&R	MILL CREEK

3.2.1 Time of Concentration

The t_c is required in the Rational Method for estimating the design average rainfall intensity. The time of concentration calculated in the previous study (see **Appendix F**) for each cross structure used the following average velocity for overland flow (from 0.30 to 0.90 feet per second (fps)) and average velocity over the shallow/channel length through the watershed (from 0.50 to 1.50 fps). The total t_c for a drainage area was determined as the sum of travel times for the runoff to overland sheet flow, shallow concentrated flow, and open channel flow along the entire flow path within the drainage area.

For the peak flow calculation for drainage areas and initial detention sizing for the preliminary mitigation analysis, a travel-based t_c was computed for each drainage area. For the preliminary mitigation analysis, the travel-based t_c was computed for the development of hydrographs.

For the subareas that were larger than 640 acres, the following equations were used to calculate time of concentration and the storage coefficient as specified in the *Montgomery County Drainage Criteria Manual*:

$$TC + R = \frac{(128(L/\text{SQRT}(S))^{0.57}(N)^{0.8})}{((\text{So})^{0.11} * (10)^I)} \quad \text{Equation 2.10, page 29}$$

$$TC = (TC+R)*0.38*(\log \text{So}) \quad \text{Equation 2.11, page 29}$$

$$R = (TC+R)-TC \quad \text{Equation 2.12, page 29}$$

In which:

TC = Clark's time of concentration

R = Clark's Storage coefficient

L = Length of longest watercourse in the subarea, mi

S = channel slope, ft/mi

N = Weighted roughness coefficient

So = Average Basin Slope, ft/mi

I = Effective Impervious Ratio, determined by $I = \frac{(\sum(CD))}{A_t} \times 10^{-2}$

In which:

At = total drainage area

C = Average percent of impervious cover of developed area, %

D = Area that is developed

The basic adjustment factor (RM) for the storage coefficient is calculated using $RM = X P^Y$

Where,

P = ponded area, %

X, Y = values in the Montgomery County Manual Table 2.15, Page 31

The modified adjustment factor, R_p is calculated with the following equation:

$$R_p = [RM - 1 * AP / 100] + 1$$

Where,

AP = area affected by ponding, %

Finally, the adjusted Clark Storage Coefficient is calculated $R_A = R \times R_p$

The hydrology parameters can be found in **Appendix A**.

3.2.2 Land-Use

Peak flow estimations were calculated using a runoff coefficient (C) which is a function of land-use. Land-use was determined using a combination of aerial photography and the 2008 Land Cover Data Set from the HGAC, which is the latest data set available. **Table 3** presents C-values for various land-use types in the study.

Table 3: Runoff Coefficient (C) Values for Various Land Use Types

Land Use Type	C-Value	Percent Impervious Cover
Woods	0.32	0%
Pasture	0.35	0%
Residential	0.40	65%
Industry	0.90	72%
Pavement	0.85	100%

The existing and proposed land-use data was intersected with developed drainage areas to allow computation of the area weighted C for each drainage area. The intersected land-uses and associated areas for each drainage area were identified. Using the following equation, an area weighted C-value was calculated for each drainage area.

$$\bar{C} = \frac{\sum_{i=1}^n A_i C_i}{\sum_{i=1}^n A_i}$$

Where:

C_i = Land-use C-values for drainage area,

A_i = Area associated with land-use for drainage area, and

\bar{C} = Area weighted C for the drainage area.

The area weighted C-values for each drainage area were used to calculate existing and proposed peak flow estimates for the Rational Method, the preliminary mitigation estimate, and the percentage of impervious cover.

3.3 Detention Pond Mitigation Volume Estimation

Storm water detention is required to mitigate the increase in runoff rate due to the increase in impervious cover from the proposed roadway alignment. The detention volume was quantified for each ROW drainage area. The approximate detention volume was calculated to mitigate peak flows under proposed conditions. The 100-year storm event peak flow was used to estimate the required detention volume. The estimated detention storage volume was quantified based on the inflow hydrograph, along with the maximum allowable flow from the detention facility. Here, the inflow hydrograph is derived from the proposed 100-year peak flow. The maximum allowable outflow is equal to the existing 1% peak flow, since detention is required to provide sufficient storage volume such that peak outflows are limited to a rate that is “equal to” or “less than” the existing peak flow.

The Malcolm Small Watershed Method was employed to generate the 100-year proposed hydrograph for initial pond sizing. The method calculates the flow rate at a given time (t) based on the step function:

for $0 < t \leq 1.25t_p$,

$$Q = 0.5Q_p \left[1 - \cos\left(\frac{\pi t}{t_p}\right) \right],$$

and for $t > 1.25t_p$,

$$Q = 4.34Q_p e^{-1.3\left(\frac{t}{t_p}\right)},$$

Where:

Q = flow rate at time t (cfs),

Q_p = peak flow rate (cfs),

t = given time during hydrograph (minute), and

t_p = time to peak (minute), given as $t_p = V/(1.39Q_p)$,

Where:

V = runoff volume (ft^3).

The runoff volume V was calculated from the proposed percent impervious cover, according to the Montgomery County Drainage Manual, Table 2-4 (November 1989) and shown in **Table 4**.

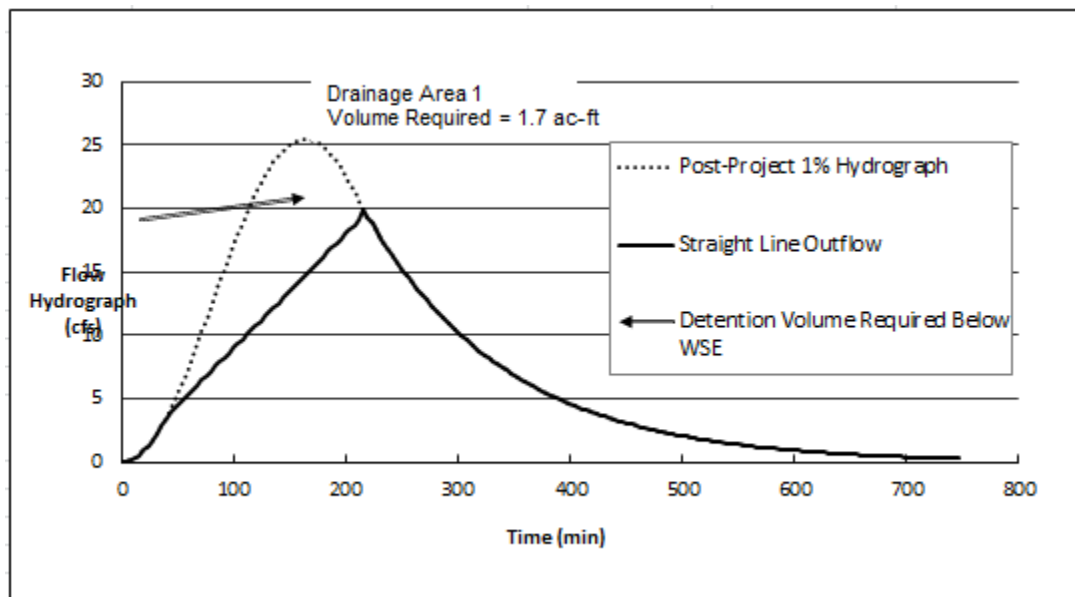
Table 4: Montgomery County 100-year Runoff Volume

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in)*	4.84	6.59	8.09	9.43	10.55	12.17

After the inflow hydrograph and the outflow limitation had been determined, the approximate detention volume was calculated by using the straight line method.

The estimated inflow hydrograph was plotted at a suitable scale. The point of maximum outflow rate was located on the receding limb of the hydrograph. A straight line was constructed by connecting the origin and the point of outflow limit on the receding limb. The area between the inflow hydrograph and the straight line was the required storage volume as shown for example below.

Storm Event For Volume Calculations (yr)	100				
Post-Project Composite Percent Impervious**	18.9	**See Table 2-14 from Montgomery County Drainage Manual			
Post-Project Excess Runoff (in)	6.5				
	Pre-Project	Post-Project			
Selected Storm Peak Flow (cfs)	19.4	25.5			
Small Hydrograph Method Time to Peak (min)	N/A	164.08			



The approximate detention volume required is summarized in **Table 5**. A 20% contingency was added to the detention volume obtained from the Malcolm Method calculations to account for the imperviousness of the detention basin. The Malcolm Method detention volume calculation can be found in **Appendix B**. The mitigation drainage areas are shown on **Exhibit 6**.

Table 5: Malcolm Method Approximate Detention Volume Summary

DA	REQ DET	REQ DET
NO	VOL	VOL+20%
	AC-FT	AC-FT
1	1.70	2.04
2	1.14	1.36
3	1.59	1.90
4	1.18	1.41
5	4.25	5.10
6	1.87	2.25
7	1.24	1.48
8	1.24	1.49
9	2.42	2.90
10	1.82	2.19
11	1.01	1.21
12	3.85	4.63
14	5.26	6.31
14A	3.05	3.66
14B	1.33	1.60
14C	3.45	4.14
16	4.72	5.67
17	11.83	14.20
17B	3.49	4.19
17C	0.91	1.09
18	7.88	9.46
19	0.54	0.65
20	0.71	0.85
21	0.23	0.27
22	0.53	0.64
23	0.34	0.41
24	0.54	0.64
25	6.52	7.83
26	0.84	1.01
27	1.22	1.47
28	1.67	2.01
29	2.66	3.20
29A	1.49	1.79
30	1.26	1.51
30A	1.49	1.79
31	0.71	0.86
32	0.48	0.57
33	0.68	0.82
34	4.19	5.02
35	14.85	17.82
Total	106.21	127.45

In order to reduce the number of detention ponds, this analysis will present 3 alternatives to mitigate increased runoff from the proposed SH 249 alignment:

1. 2 detention ponds
2. 3 detention ponds
3. 4 detention ponds

Since the Harris County Flood Control District (HCFCD) HEC-HMS v. 3.3.0 model for the Spring Creek Watershed (J100-00-00) includes the Mill Creek Watershed this was utilized as the existing condition/ base model. This Spring Creek hydrology model was downloaded January 2014 from HCFCD Model & Map Management (M3) System. The HCFCD Mill Creek model, existing condition model (**Figure 1**), was revised to produce a reach with more detail than the Spring Creek model included, as shown in **Figure 2** (highlighted yellow). Proposed condition basin models were created for the proposed condition without detention, 2 pond alternative, 3 pond alternative, and 4 pond alternative with increased percent impervious for the proposed roadway and applicable ponds and diversions for the 10-, 50-, and 100-year storm frequencies. Figures for the respective proposed conditions hydrology model are shown below.

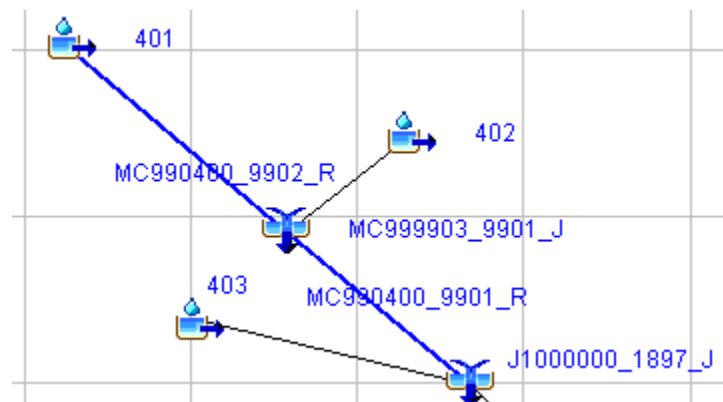


Figure 1. Existing HCFCD Mill Creek hydrology model layout in the Spring Creek HEC-HMS model

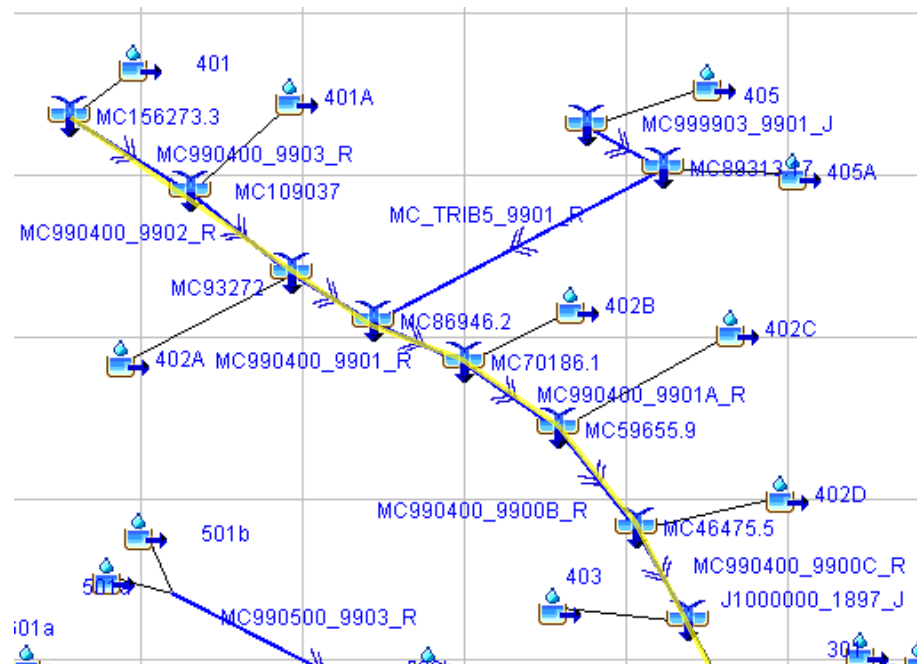


Figure 2. Revised Existing and Proposed Condition Mill Creek hydrology model layout in the Spring Creek HEC-HMS model

The detention ponds with diversions were added to the proposed condition model to reduce the impacts of the increased impervious cover. The diversions are designed to redirect flow from Mill Creek to the detention ponds. Due to the length of the proposed roadway it would be inefficient and impractical to collect flow from the proposed roadway and route to individual ponds. By consolidating the number of detention ponds to two, three, or four the construction and maintenance costs are greatly reduced compared to constructing a pond for each individual drainage sub-basin. The amount of ROW necessary for the ponds is also reduced. The HEC-HMS model output for the Revised Existing (**Figure 2**), Proposed (**Figure 2**), Proposed 2 pond (**Figure 3**), Proposed 3 pond (**Figure 4**), and Proposed 4 pond (**Figure 5**) 100-year runs are included in **Appendix C**.

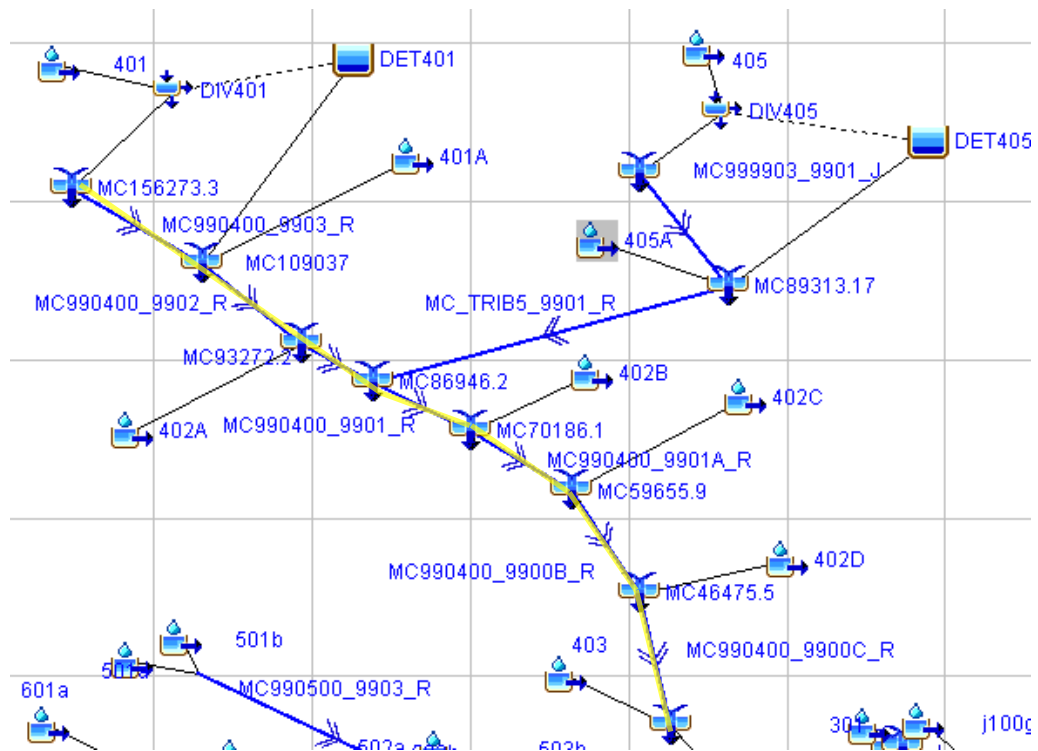


Figure 3. Proposed Condition 2 detention ponds Mill Creek hydrology model layout in the Spring Creek HEC-HMS model

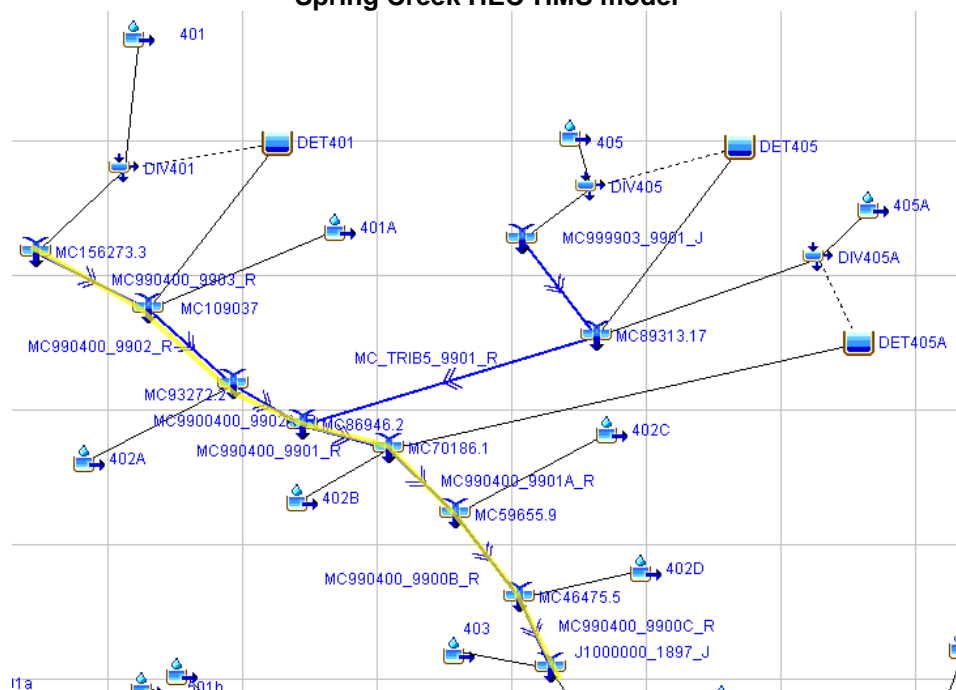


Figure 4. Proposed Condition 3 detention ponds Mill Creek hydrology model layout in the Spring Creek HEC-HMS model

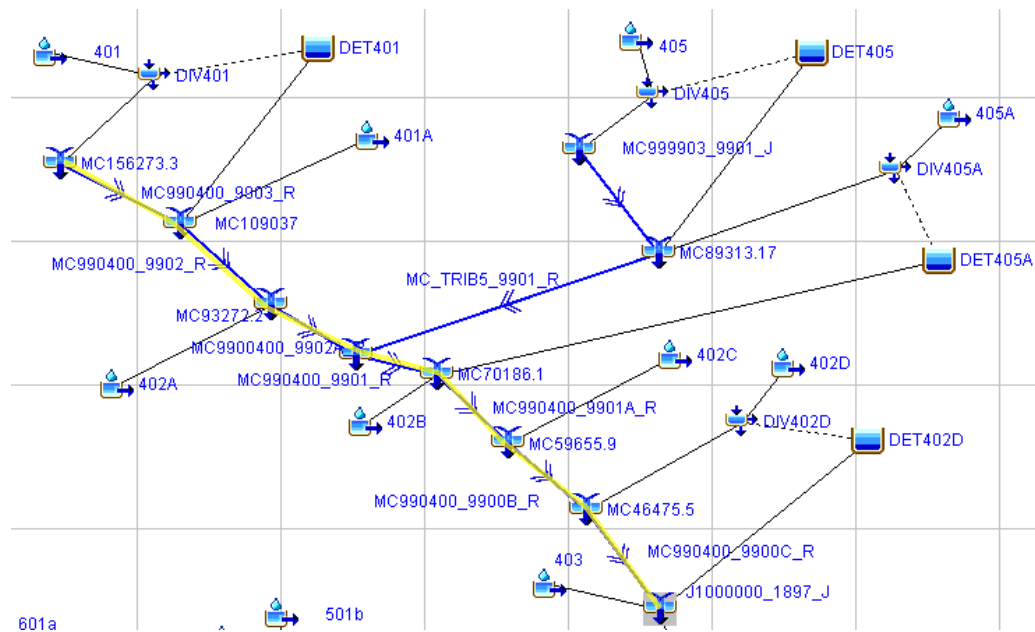
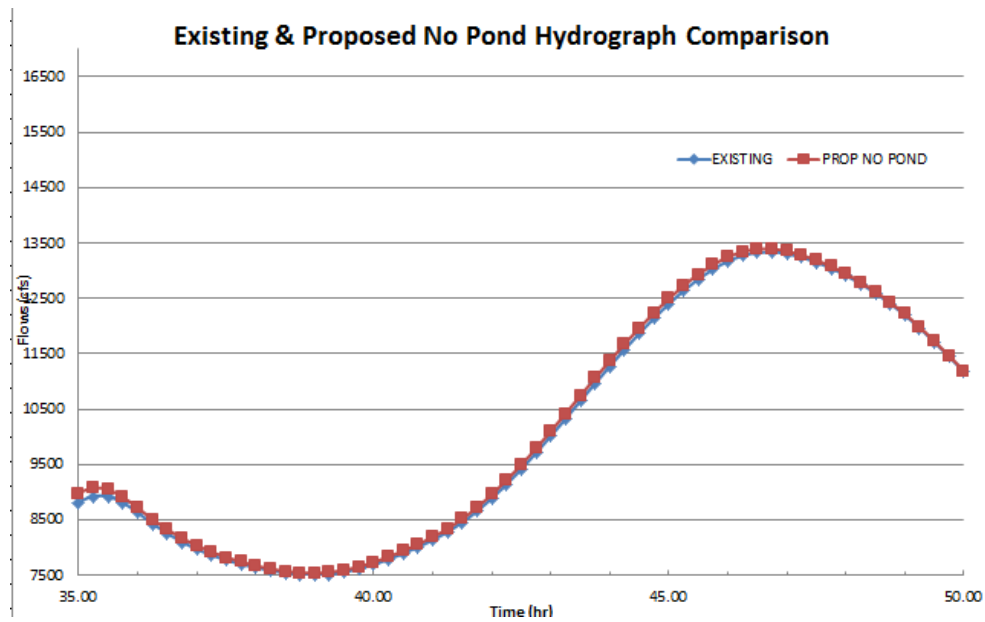


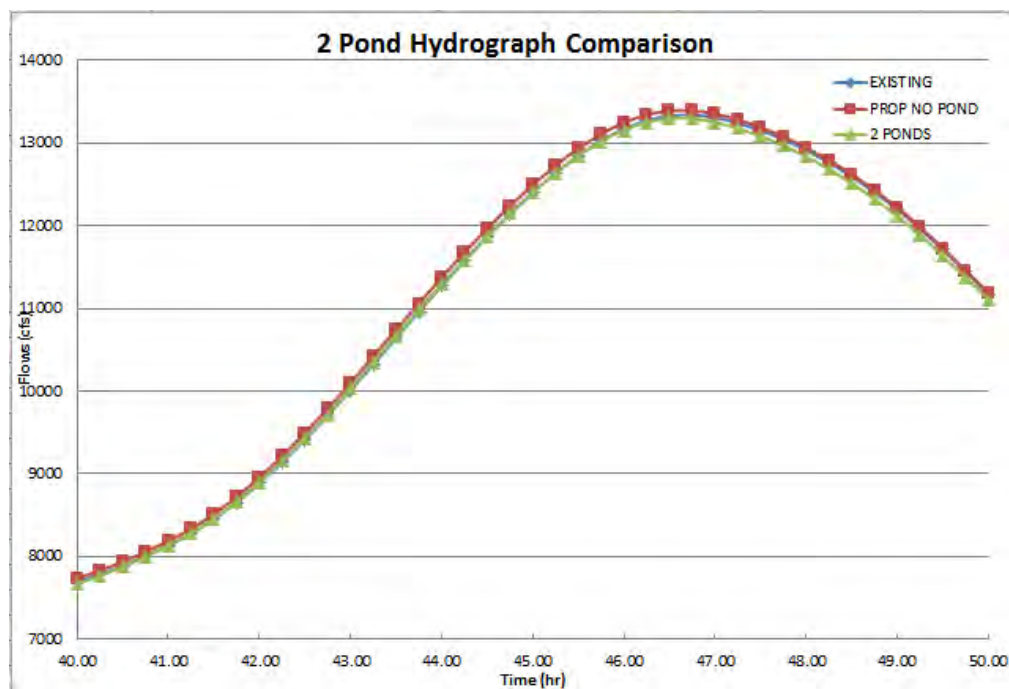
Figure 5. Proposed Condition 4 detention ponds Mill Creek hydrology model layout in the Spring Creek HEC-HMS model

The first detention pond, DET 401, is located near the southeast intersection of Mill Creek and the proposed SH249 roadway. The second pond, DET 405, is located near the northeast intersection of FM 1486 and the proposed SH 249 near Tributary No. 5 of Mill Creek. The third pond, DET 405A, is located between Mill Creek and Tributary No. 5, north of FM 1488. The fourth pond, DET 402D, is west of the intersection of SH 149 and Mill Creek. **Exhibit 4** shows the proposed locations for all four detention ponds.

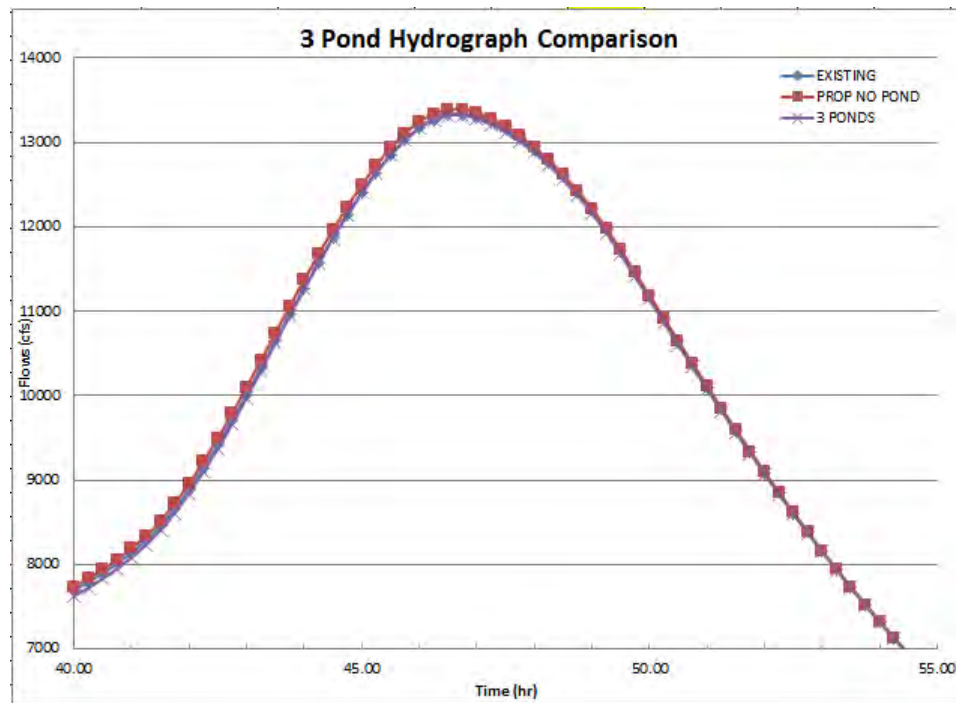
The following hydrographs are at the downstream point, hydrologic element J1000000_1897_J, of Mill Creek from the HCFCD Spring Creek HEC-HMS models previously discussed.



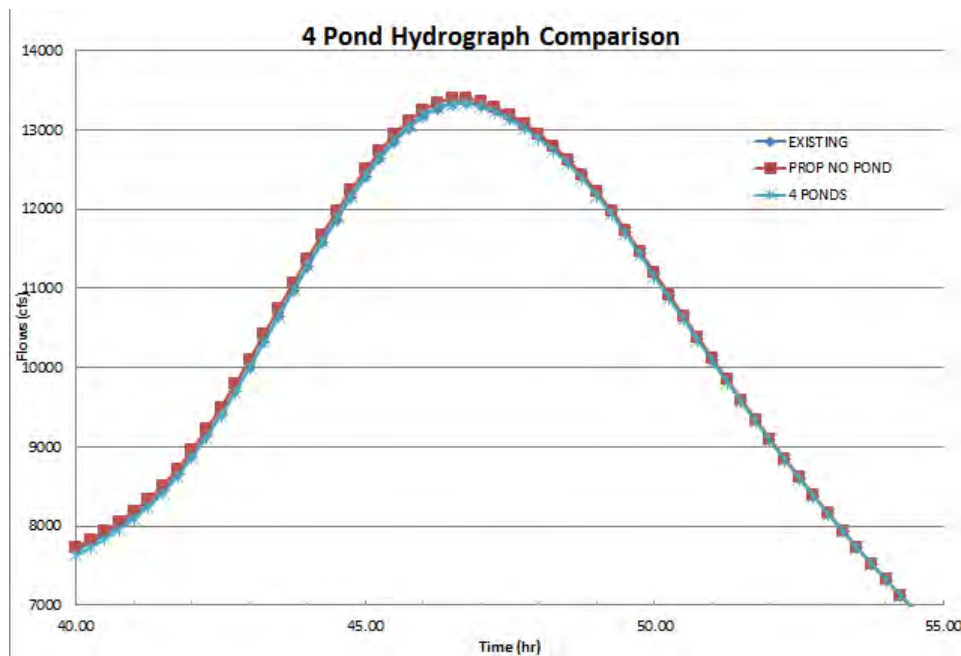
The existing condition hydrograph compared with the proposed condition hydrograph with no mitigation show that the proposed flows are higher than existing due to the increase in impervious area from the proposed roadway alignment.



The proposed 2 pond alternative hydrograph comparison show that the proposed flows are reduced to slightly lower than the existing condition at the downstream most point of Mill Creek due to the detention ponds.



The proposed 3 pond alternative hydrograph comparison show that the proposed flows are reduced to lower than the existing condition at the downstream most point of Mill Creek due to the detention ponds.



The proposed 4 pond alternative hydrograph comparison show that the proposed flows are reduced to lower than the existing condition at the downstream most point of Mill Creek due to the detention ponds.

The detention volume calculated using the Malcolm Small Watershed Method is the theoretical storage to offset the hydraulic impact imposed by the construction within the proposed ROW. The actual detention volume should be analyzed with a detailed routing model with the Effective Mill Creek HEC-HMS model for Montgomery County. A summary of the detention volume estimation from the HCFCD Spring Creek HEC-HMS model is summarized in **Table 6**.

Table 6: HEC-HMS Mill Creek Detention Volume Summary

Alternative	Detention Pond ID	Volume Required (ac-ft)	Depth Provided (ft)	Area Req (ac)	Area Req + 20% (ac)	Detention Pond Area Totals (ac)
2 Ponds	DET 401	82.1	7	11.7	14.1	21
	DET 405	57.5	10	5.8	6.9	
3 Ponds	DET 401	59.8	7	8.5	10.3	24
	DET 405	52	10	5.2	6.2	
	DET 405A	62.8	10	6.3	7.5	
4 Ponds	DET 401	64.9	7	9.3	11.1	26
	DET 405	47.3	10	4.7	5.7	
	DET 405A	48.5	10	4.9	5.8	
	DET 402D	30.3	10	3.0	3.6	

The required storage volume increases as additional ponds are modeled because downstream ponds can often cause the flow to have a flat peak for longer, which makes peaks match, and require a higher detention rate.

Table 7 shows the difference from the existing and proposed condition peak discharges for Mill Creek. The detention ponds and diversion alternatives reduce the increased runoff impacts downstream of the proposed alignment, see J100000_1897_J in **Figure 4**. There is no adverse impact resulting from the proposed project. The flows from the HCFCD Spring Creek HEC-HMS existing and proposed conditions models for Mill Creek and Tributary No. 5 to Mill Creek were entered into the HEC-RAS models to determine the 50- year and 100-year water surface elevations at the proposed structures to ensure no adverse impact to nearby structures. **Appendix C** shows the existing and proposed condition flows for each pond scenario from HEC-HMS.

Table 7. Peak Discharge Comparison Proposed – Existing Condition

HEC-HMS ID	PROP NO POND – EXIST Change in CFS			PROP 2 POND – EXIST Change in CFS			PROP 3 POND – EXIST Change in CFS			PROP 4 POND – EXIST Change in CFS		
	10 YR	50 YR	100 YR	10 YR	50 YR	100 YR	10 YR	50 YR	100 YR	10 YR	50 YR	100 YR
MC156273.3	10	14	15	-48	-58	-93	-34	-30	-33	-24	-34	-35
MC109037	15	16	16	-45	-58	-94	-31	-29	-34	-21	-34	-35
MC93272.17	32	42	45	-27	-38	-63	-21	-11	-12	-7	-11	-12
MC86946.23	43	55	61	-25	-29	-36	-43	-20	-7	-26	-20	-14
MC70186.1	44	54	56	-24	-30	-40	-41	-21	-12	-25	-21	-20
MC59655.91	43	55	57	-24	-28	-39	-42	-20	-10	-26	-19	-18
MC46475.52	41	49	49	-27	-35	-46	-45	-26	-19	-20	-13	-11
J1000000_1897_J	42	50	53	-25	-33	-41	-45	-26	-15	-20	-12	-7

4.0 Hydraulics

4.1 Project Datum

The horizontal datum control for the project is NAD 83 (1993 Adj.) and elevations are based on NAVD 88 established by GPS static survey from NGS control monument designation A 1281 (TSARP RM 100195 Elev. 231.72 feet). Survey data was extracted from a digital terrain model, created for the project site, provided by Martinez Corporation. The FEMA Flood Insurance Study, stamped Preliminary dated September 23, 2008 is on the same vertical datum as the project and no adjustment is necessary to compare the 100-year water surface elevations at the various cross structures along the project.

4.2 Water Surface Elevations

Since Proposed Roadway is an evacuation route in accordance with the TxDOT Hydraulic Design Manual the cross structures are designed for a 100-year storm and will have a minimum freeboard of 2 ft. for freeway main lanes. The proposed roadway does not have any frontage roads. Counter-erosive measures including riprap, energy dissipater blocks etc. may be provided where the average through-bridge/culvert velocity exceeds 6 feet per second (fps). The water surface elevations upstream of proposed bridge/culverts locations should not exceed existing water surface elevations (**Table 8 and 9**).

Hydraulic model requests were made to the City of Conroe, Montgomery County Floodplain Administrator, and the Montgomery County Engineer's Office. These agencies were not able to provide these models at the time of this study. In the discussion in Section 3.1 Drainage Areas, the models received from FEMA were partial models in a PDF file and were not usable in this study. Therefore, HEC-RAS models for Mill Creek and Tributaries 1, 2, 4 and 5 were created using HEC Geo-RAS in ArcMap v.10.1 by generating cross sections using USGS topographic information. Water surface elevations for the 50- and 100-year storm events were compared for existing and proposed conditions. All of the hydraulic models created from HEC Geo-RAS for Mill Creek and its Tributaries will be referred to as "existing condition" or "proposed condition" models.

Following are the drainage areas that correlate to the Tributaries of Mill Creek:

1. Drainage Area no. 10 (Tributary no. 1 to Mill Creek)
2. Drainage Area no. 12 (Tributary no. 2 to Mill Creek)
3. Drainage Area no. 14 (Tributary no. 4 to Mill Creek)
4. Drainage Area no. 18 (Tributary no. 5 to Mill Creek)
5. Drainage Area no. 25 (Tributary no. 5 to Mill Creek)

The flows used in the hydraulic models for Tributary No. 1, 2, and 4 are the flows calculated using the Rational or TC&R Methods discussed in Section 3 of this report. The flows used in the hydraulic models for Mill Creek and Tributary No. 5 are the flows calculated in the revised existing HCFCD Spring Creek HEC-HMS model (**Figure 2**).

Headwater elevations for each of these crossings were computed using Hydrologic Engineering Center River Analysis Systems (HEC-RAS) (version 4.0.0, March 2008) or Federal Highway Administration HY-8 (version 7.30, January 16, 2013). Manning's "n" values for main channel and overbanks were extracted from the Flood Insurance Study (FIS) for Montgomery County, dated September 23, 2008. For Tributary No. 1 an average value of 0.11 and 0.14 was used for main

channel and overbanks respectively. For Tributary No. 2 an average value of 0.08 and 0.10 was used for main channel and overbanks respectively. For Tributary No. 4 an average value of 0.075 and 0.095 was used for main channel and overbanks respectively. For the Mill Creek crossing an average value of 0.08 and 0.11 was used for main channel and overbanks respectively. For Tributary No. 5 an average value of 0.095 and 0.10 was used for main channel and overbanks respectively.

Hydraulic results are included in **Appendix D and E** for HEC-RAS and Culvert runs respectively.

The proposed condition 10-, 50-, and 100-year WSEL have increased upstream of the structures from the existing condition for Mill Creek, Tributary No. 1, 2, 4, 5, and its unnamed tributaries ranging from 0.03 to 0.35-feet. Some of the increases could be resolved with adding more cross sections in the models and/or using the existing hydraulic model for Mill Creek and its Tributaries. Another way to reduce the increases in WSEL is to use the Revised Existing hydrology model for Mill Creek and its Tributaries (**Figure 2**) with detailed modeling and using Modified Puls routing method instead of the HCFCD Spring Creek HEC-HMS model (**Figure 1**) that uses the Lag method to reduce flows with appropriate stage-storage reach routing method.

A total of 40 cross structures including pipe culverts, box culverts and bridge openings were identified from USGS topographic maps, a digital terrain model for the project corridor, and field visits. These structures are classified as bridge class culverts (total structure width > 20 ft) and non-bridge class culverts (total structure width < 20 ft). Out of these 40 locations 11 are estimated to be bridge-class and the remainder to be non-bridge class structures.

4.3 Cross Structures

In the previous analysis, computer programs HEC-RAS (version 3.1.2 April 2004) and TxDOT THYSYS Culvert (version 1.1, 1998) programs were utilized to run hydraulics to preliminarily size the cross structures

In this 2014 update, HEC-RAS (version 4.1.0, Jan 2010) was used to analyze bridge sections while the Federal Highway Administration HY-8 (version 7.30, January 16, 2013) was used to analyze pipe and box culverts. The preliminary culvert sizes were checked with HY-8 and the sizes adjusted where appropriate. The culvert crossing analysis is discussed in Section 4.3.2 and a summary table of culverts is presented in that section.

4.3.1 Bridge Crossing Analysis using HEC-RAS

Following are the locations where HEC-RAS was used to analyze bridge hydraulics:

1. Drainage Area no. 5 (Unnamed Tributary to Mill Creek)
2. Drainage Area no. 10 (Tributary no. 1 to Mill Creek)
3. Drainage Area no. 12 (Tributary no. 2 to Mill Creek)
4. Drainage Area no. 14 (Tributary no. 4 to Mill Creek)
5. Drainage Area no. 14A (Unnamed Tributary to Tributary 4)
6. Drainage Area no. 14C (Unnamed Tributary to Tributary 4)
7. Drainage Area no. 17 (Mill Creek)
8. Drainage Area no. 18 (Tributary no. 5 to Mill Creek)
9. Drainage Area no. 25 (Tributary no. 5 to Mill Creek)
10. Drainage Area no. 30 (Unnamed Tributary to Mill Creek)
11. Drainage Area no. 35 (Mill Creek)

The boundary conditions included either slope of the channel (normal depth) for computations or known water surface elevations at locations where backwater effects from Mill Creek are propagated into tributaries.

Bridges were proposed along SH 249 Extension at several channel crossings. Bridges were modeled in HEC-RAS to ensure that 1) there was no adverse impact to nearby structures induced by the bridge under proposed conditions for the 1% AEP storm event, and 2) bridge low chords were set at a minimum of 2-foot above the 1% AEP WSE.

Both existing and proposed geometry files were created in HEC-RAS based on the USGS topographic information. Though a Flood Insurance Study (FIS) for Mill Creek exists, the hydraulic model used for that study could not be obtained. For Mill Creek the entire length of the creek was not modeled. There are two proposed crossings of Mill Creek with the proposed roadway alignment and each of those locations were analyzed. Cross sections were generated from the USGS data approximately one half mile both upstream and downstream of the crossings.

Peak flows for the bridge HEC-RAS models were computed using the Rational Method or the Clark Unit Hydrograph (TC&R) Method depending on drainage area size based on the TxDOT Hydraulic Design Manual for Tributaries No. 1, 2, and 4. The peak flows for the bridge HEC-RAS models for Mill Creek and Tributary No. 5 were computed using the Revised Existing Spring Creek HEC-HMS model (**Figure 2**). As discussed in Section 3.2, the Rural Regional Regression Equations were previously used to calculate peak flows and produced significantly greater flows than the flows in the FIS for each frequency storm event for Mill Creek and its Tributaries. And since the Montgomery County and Harris County FIS flows did not match and could not be verified with an Effective model, the calculated peak flows were used in this analysis. **Table 8** compares the existing and proposed 50- and 100-year WSEL and summarizes the 50- and 100-year freeboard for the proposed bridge structures along Mill Creek and its tributaries for the existing and proposed alternatives. The detailed HEC-RAS model output can be found in **Appendix D**.

Table 8. Comparison of 50- & 100-year Water Surface Elevation for Existing and Proposed Condition

DRAINAGE AREA ID	APPROX. ROADWAY STATION	WATER SURFACE ELEVATIONS				PROP vs EXIST 100- YR WSEL (FT)	MIN. LOW CHORD ELEV (FT)	50-YR FREEBOARD (FT)	100-YR FREEBOARD (FT)	COMMENTS
		(FT)								
		EXIST		PROP						
		50-YR	100-YR	50-YR	100-YR					
5	1252+00	181.63	181.74	181.83	181.97	0.23	202.03	20.2	20.06	Unnamed Trib to Mill Creek
10	1320+00	189.04	189.21	189.13	189.29	0.08	197.61	8.48	8.32	TRIBUTARY NO. 1, RS 1318.937
12	1351+50	199.4	199.53	199.49	199.63	0.1	203.11	3.62	3.48	TRIBUTARY NO. 2, RS 5932.8
14	1457+00	219.39	219.54	219.78	219.89	0.35	242.96	23.18	23.07	TRIBUTARY NO. 4, RS 11687.26
14A	1427+50	206.55	206.71	206.56	206.72	0.01	213.12	6.56	6.4	Unnamed Trib to Trib No.4
14C	1400+00	208.87	209.08	208.9	209.11	0.03	220.07	11.17	10.96	Unnamed Trib to Trib No.4
30	1814+00	284.29	284.44	284.33	284.44	0	301.77	17.44	17.33	Unnamed Trib to Mill Creek
2 DETENTION PONDS										
17	1536+50	214.37	215.38	214.36	215.37	-0.01	218.13	3.77	2.76	MILL CREEK, RS 92980.49
18	1554+00	215.71	216.17	215.51	216.18	0.01	218.26	2.75	2.08	TRIBUTARY NO. 5, RS 6366.862
25	1633+50	232.36	232.73	232.31	232.67	-0.06	237.46	5.15	4.79	TRIBUTARY NO. 5, RS 16144.15
35	1921+00	281.34	282.12	281.25	281.89	-0.23	287.06	5.81	5.17	MILL CREEK, RS 157091.2
3 DETENTION PONDS										
17	1536+50	214.37	215.38	214.38	215.39	0.01	218.13	3.75	2.74	MILL CREEK, RS 92980.49
18	1554+00	215.71	216.17	215.47	216.14	-0.03	218.26	2.79	2.12	TRIBUTARY NO. 5, RS 6366.862
25	1633+50	232.36	232.73	232.32	232.68	-0.05	237.46	5.14	4.78	TRIBUTARY NO. 5, RS 16144.15
35	1921+00	281.34	282.12	281.27	281.92	-0.2	287.06	5.79	5.14	MILL CREEK, RS 157091.2
4 DETENTION PONDS										
17	1536+50	214.37	215.38	214.38	215.39	0.01	218.13	3.75	2.74	MILL CREEK, RS 92980.49
18	1554+00	215.71	216.17	215.48	216.16	-0.01	218.66	3.18	2.5	TRIBUTARY NO. 5, RS 6366.862
25	1633+50	232.36	232.73	232.33	232.69	-0.04	237.46	5.13	4.77	TRIBUTARY NO. 5, RS 16144.15
35	1921+00	281.34	282.12	281.26	281.92	-0.2	287.06	5.8	5.14	MILL CREEK, RS 157091.2

The increase in 100-year WSEL from existing to proposed condition for Tributaries No. 1, 2, and 4 range from 0.03-ft to 0.35-ft. The flows used in these hydraulic models are the calculated peak flows using the Rational Method or Clark Unit Hydrograph (Tc&R, HEC-HMS) methods depending on the drainage area size. In these tributaries, all flows are contained within the channel and the bridge structures are not overtopped and can pass the 1% AEP. There is also no adverse impact on any nearby structures. The increase attenuates 1,000-feet or less upstream of the bridge structure. As discussed in Section 4.2, some of the increases could be resolved with adding more cross sections in the models, developing a detailed hydrology model, and acquiring the Effective HEC-HMS model to determine the flows with appropriate stage-storage reach routing methods. The HEC-RAS bridge analysis output for Tributaries No. 1, 2, and 4 to Mill Creek can be found in **Appendix D**.

For the 2 detention pond alternative, the Tributary No. 5 to Mill Creek hydraulic model shows a 0.01-foot increase at a proposed bridge. This increase is contained in the channel and attenuates 1,000-feet or less upstream of the bridge structure. There is no adverse impact on any nearby structures. There is no increase in WSEL in the Mill Creek model at the proposed bridges.

For the 3 detention pond alternative, the Mill Creek hydraulic model shows a 0.01-foot increase in 100-year WSEL at a proposed bridge. This increase is contained in the channel and attenuates 1,000-feet or less upstream of the bridge structure. There is no adverse impact on any nearby structures. The model for Tributary No. 5 to Mill Creek does not show an increase in WSEL at proposed bridges.

For the 4 detention pond alternative, the Mill Creek hydraulic model shows a 0.01-foot increase in 100-year WSEL at a proposed bridge. This increase is contained in the channel and attenuates 1,000-feet or less upstream of the bridge structure. There is no adverse impact on any nearby structures. The model for Tributary No. 5 to Mill Creek does not show an increase in WSEL at proposed bridges.

Table 8 shows that both the 50 & 100-year WSEL for all bridges provides at least 2-feet of freeboard from the low chord of the bridge structure.

4.3.2 Pipe/Box Culvert Crossing Analysis

Since the 2014 updated analysis utilizes different peak flow calculation methods than previously used, the culvert analysis (preliminary culvert sizing) was verified using the Federal Highway Administration software, HY-8 version 7.3, January 16, 2013. **Table 9** presents a summary of the culvert analysis using HY-8. This table also lists profile grade line (PGL) elevation comparison to the 50 & 100-year headwater elevations at these culvert crossings. Velocities for 50- and 100-yr storm frequencies are included in this table while detailed outputs for HY-8 culvert runs are included in **Appendix E** of the report. The culvert analysis showed that velocities through some of the cross structures are higher than 6 fps; therefore, the downstream culvert ends would require measures including riprap, energy dissipater blocks, or other velocity control devices/structures designed to reduce erosion.

Table 9. Culvert Analysis Hydraulic Computation

STRUCTURE ID	STATION (LT)	STATION (RT)	STRUCTURE TYPE	LENGTH (FT)	FLOWLINE		PROP. GRADELINE ELEVATION (FT)	SIDE SLOPE		50-YR HEADWATER (FT)	50-YR VELOCITY (FT/S)	100-YR HEADWATER (FT)	100-YR VELOCITY (FT/S)	SKEW ANGLE (DEG)	OUTFALL TREATMENT (V>6FT/S)	COMMENTS
					U/S (FT)	D/S (FT)		LT	RT							
1	1199+34.00	1199+34.00	N/A	N/A	226.47	225.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Drainage facilitated by existing road side ditch
2	1207+90.05	1209+79.34	2-36" RCP	300	230.67	227.9	237.38	6:1	6:1	233.27	4.29	233.50	4.90	30°	RIPRAP	Safety End Treatment
3	1223+12.36	1222+81.64	2-4'X2' MCB	280	233.49	230.34	240.82	6:1	6:1	235.80	4.44	236.08	10.13	0°	RIPRAP	Safety End Treatment
4	1237+34.44	1243+29.86	36" RCP	560	203.9	188.91	214.52	6:1	6:1	206.85	14.67	207.23	15.30	60°	RIPRAP	Safety End Treatment
6	1269+81.36	1270+89.02	2-36" RCP	380	203.51	188.96	213.86	6:1	6:1	206.69	17.19	207.09	17.90	15°	RIPRAP	Headwall Treatment (Pavement in Super)
7	1275+04.78	1274+02.37	36" RCP	380	198.75	187.38	205.06	6:1	6:1	202.20	16.15	202.63	16.66	15°	RIPRAP	Headwall Treatment
8	1284+83.02	1285+63.20	6'X3' RBC	300	183.44	177	199.56	6:1	6:1	187.41	15.93	187.98	16.64	15°	RIPRAP	Safety End Treatment
9	1294+68.20	1295+07.85	2-48" RCP	325	186.45	183.28	194.54	6:1	6:1	190.87	7.03	191.35	7.96	15°	RIPRAP	Safety End Treatment
11	1337+48.37	1338+67.97	36" RCP	340	208.26	198.68	216.51	6:1	6:1	212.62	16.39	213.46	17.45	15°	RIPRAP	Safety End Treatment
14B	1414+28.33	1413+47.89	36" RCP	340	209	204.17	223.86	6:1	6:1	213.74	13.14	214.75	13.53	15°	RIPRAP	Safety End Treatment
16	1502+57.06	1505+63.07	6'X4' RBC	415	221.87	216.93	229.76	6:1	6:1	226.07	5.54	226.66	14.40	30°	RIPRAP	Safety End Treatment
17B	1750+25.70	1749+92.29	2-36" RCP	320	288	274.71	293.47	6:1	6:1	290.14	15.10	290.35	15.77	0°	RIPRAP	Safety End Treatment
17C	1762+55.36	1766+60.44	2-24" RCP	450	298.69	284.89	304.4	6:1	6:1	300.80	12.30	301.04	12.72	45°	RIPRAP	Safety End Treatment
19	1562+02.86	1568+36.60	2-36" RCP	560	222.94	214.79	230.72	6:1	6:1	225.62	4.52	225.91	5.27	60°	RIPRAP	Safety End Treatment
20	1585+23.89	1582+75.55	2-36" RCP	425	239.59	232.8	246.98	6:1	6:1	243.38	13.09	243.97	13.54	45°	RIPRAP	Safety End Treatment (Pavement in Super)
21	1591+45.46	1593+31.96	2-5'X5' MBC	350	230.58	228.47	243.77	6:1	6:1	235.79	6.10	236.87	7.80	15°	RIPRAP	Safety End Treatment
22	1600+29.78	1600+10.91	7'X5' RBC	350	231.94	229.93	244.74	6:1	6:1	238.27	7.86	239.29	9.29	15°	RIPRAP	Safety End Treatment
23	1607+79.11	1609+32.21	6'X3' RCB	328	242.52	237.51	247.74	6:1	6:1	245.39	4.22	245.68	13.29	0°	RIPRAP	Safety End Treatment
24	1617+83.64	1617+61.17	2-42" RCP	360	240.6	236.53	250.64	6:1	6:1	243.93	5.37	244.34	6.31	15°	RIPRAP	Safety End Treatment
26	1652+46.47	1652+91.46	2-30" RCP	400	256.08	251.63	276.56	6:1	6:1	259.53	10.36	259.92	10.57	15°	RIPRAP	Headwall Treatment
27	1662+08.59	1662+21.87	2-36" RCP	400	244.73	243.05	277.11	6:1	6:1	250.06	7.00	251.11	8.14	15°	RIPRAP	Headwall Treatment
28	1670+74.62	1674+61.81	2-36" RCP	426	255.43	249.52	261.77	6:1	6:1	258.91	12.12	259.37	12.52	45°	RIPRAP	Safety End Treatment
29	1686+86.46	1689+05.73	2-4'X4' MBC	360	251	245.78	257.34	6:1	6:1	254.49	4.25	254.85	4.91	30°	RIPRAP	Safety End Treatment
29A	1714+98.90	1715+01.10	2-36" RCP	320	287.76	280.72	293.79	6:1	6:1	290.37	12.96	290.57	13.39	0°	RIPRAP	Safety End Treatment
30A	1840+31.29	1838+71.25	4'X4' RCB	340	306.2	302.93	316.78	6:1	6:1	309.80	4.44	310.25	5.25	30°	-	Safety End Treatment
31	1868+76.70	1866+17.66	2-48" RCP	360	297.11	287.83	306.5	6:1	6:1	300.32	15.89	300.58	15.99	30°	RIPRAP	Safety End Treatment
32	1868+76.70	1870+37.20	5'X4' RBC	360	290.86	287.83	305.54	6:1	6:1	295.58	6.45	296.15	7.40	15°	RIPRAP	Safety End Treatment
33	1892+94.49	1893+09.19	5'X4' RBC	340	296.92	294.15	308.97	6:1	6:1	301.64	6.45	302.24	7.45	15°	RIPRAP	Safety End Treatment
34	1909+49.88	1910+38.96	4'X4' RBC	360	294.94	285.79	303.18	6:1	6:1	299.26	16.93	299.69	17.40	0°	RIPRAP	Safety End Treatment

5.0 CONCLUSIONS

This report presents a revised/updated drainage impact analysis and a preliminary detention/mitigation impact analysis of the State Highway 249 Extension Project from FM 149 in Pinehurst to FM 1774 in Todd Mission. Procedures presented in the TxDOT Hydraulic Design Manual and the Montgomery County Drainage Criteria Manual were followed to perform hydrology and hydraulics for various crossings. This analysis identified cross culvert (including bridge and non-bridge class structures) locations, sizing and 50- and 100-year headwater elevations. Conclusions and recommendations are summarized below based on the analysis in the report:

- A total of 40 bridges and culverts crossings were identified in this drainage assessment using the USGS topographic maps, a digital terrain model of the project corridor and field visits. Drainage area maps for these basins are included in **Exhibit 2** of this report.
- Rational Method or Clark Unit Hydrograph Method were used, where applicable, to compute flows for 10-, 25-, 50- and 100-year storm frequencies.
- The Malcolm Small Watershed Method was used to estimate the detention mitigation volume for each drainage area. The mitigation drainage areas are shown on **Exhibit 6**. Since the length of the proposed roadway is approximately 17 miles, it would be inefficient and impractical to collect flow from the proposed roadway and have individual ponds for each drainage area. Therefore, several detention pond alternatives were developed using the HCFCD Spring Creek HEC-HMS model for the client to select the preferred alternative.

Alternative	Detention Pond ID	Volume Required (ac-ft)	Depth Provided (ft)	Area Req (ac)	Area Req + 20% (ac)	Detention Pond Area Totals (ac)
2 Ponds	DET 401	82.1	7	11.7	14.1	21
	DET 405	57.5	10	5.8	6.9	
3 Ponds	DET 401	59.8	7	8.5	10.3	24
	DET 405	52	10	5.2	6.2	
	DET 405A	62.8	10	6.3	7.5	
4 Ponds	DET 401	64.9	7	9.3	11.1	26
	DET 405	47.3	10	4.7	5.7	
	DET 405A	48.5	10	4.9	5.8	
	DET 402D	30.3	10	3.0	3.6	

The required storage volume increases as additional ponds are modeled because downstream ponds can often cause the flow to have a flat peak for longer, which makes peaks match, and require a higher detention rate.

- At this point, it is recommended to minimize construction and future maintenance cost on the project by implementing the 2, 3 or 4 detention pond options, in that order of preference, to mitigate increased impervious area as a result of project development. **Exhibit 4** shows the proposed pond locations along the proposed alignment.
- Once the preferred number of detention ponds is selected, an additional detailed analysis would be required to determine the suitable locations. This report analysis was based on minimizing the number of ponds (ROW, construction, and maintenance cost) to meet preliminary mitigation requirements. The listed pond locations were based on the environmental constraints and current

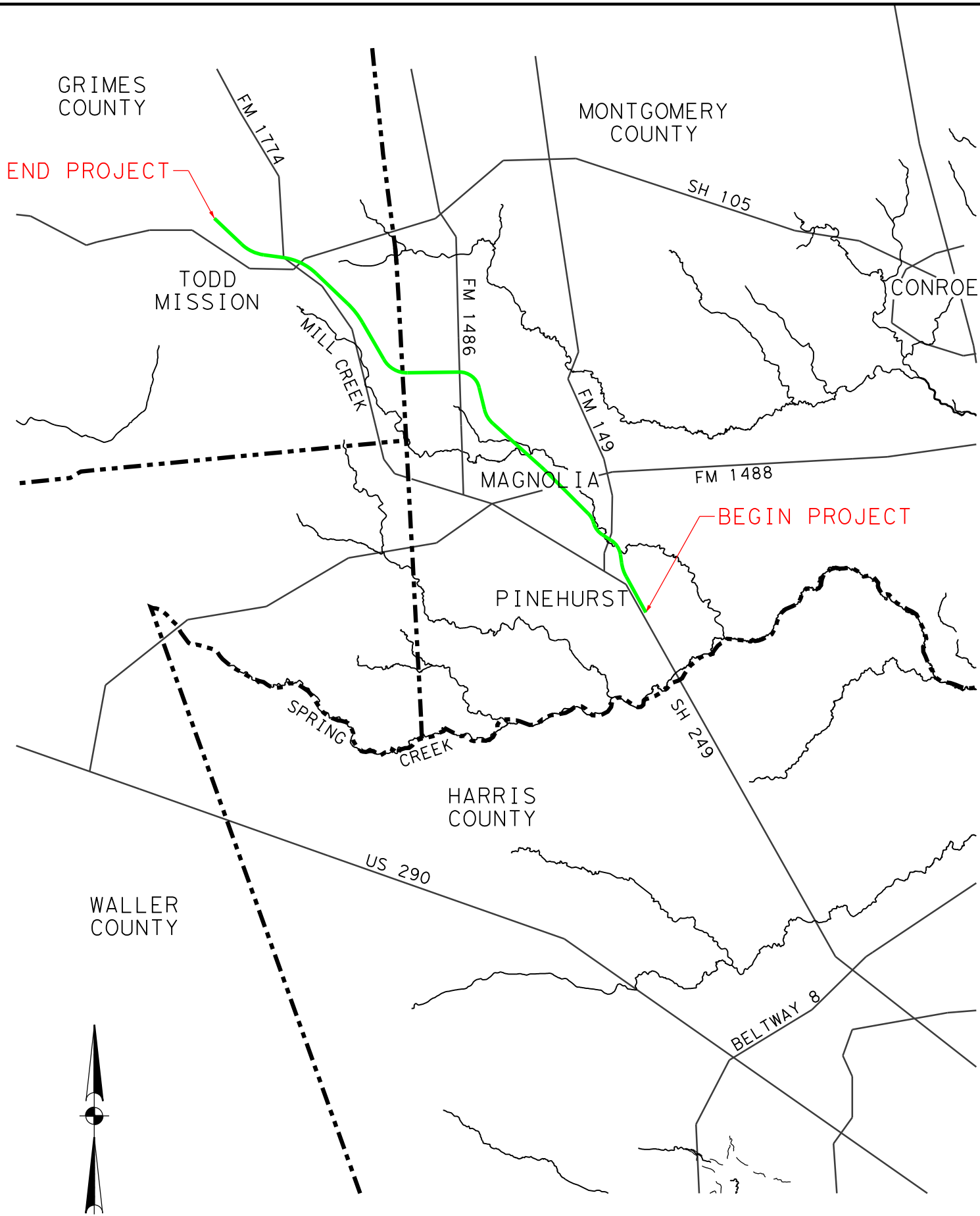
assumptions of available area. The report did not model the various possible pond location scenarios (if DET 405 & 405D available only, etc.) an additional detailed analysis would be required to determine the final size and location of the ponds of the various scenarios.

- Hydraulic models for Mill Creek and Tributaries 1, 2, 4, and 5 were created using HEC GeoRAS in ArcMap 10.1 by generating cross sections using USGS topographic information to determine the impacts to the water surface elevation from the proposed bridge crossings. Results are presented in **Table 8** of this report. HEC-RAS output are included in **Appendix D** of this report.

Following are the drainage areas that correlate to the Tributaries of Mill Creek:

- Drainage Area no. 10 (Tributary no. 1 to Mill Creek)
 - Drainage Area no. 12 (Tributary no. 2 to Mill Creek)
 - Drainage Area no. 14 (Tributary no. 4 to Mill Creek)
 - Drainage Area no. 18 (Tributary no. 5 to Mill Creek)
 - Drainage Area no. 25 (Tributary no. 5 to Mill Creek)
- For the hydraulic analysis of Tributaries 1, 2, 4, and 5 of Mill Creek, the known water surface elevation boundary condition was used. The HEC-RAS models showed the flood profiles for Tributaries 2 and 5 were impacted by backwater effects from Mill Creek. Tributary 2 had 8 cross sections impacted by the backwater effects and no structure crossing effected. Tributary 5 had 3 cross sections impacted by the backwater effects and no structure crossings effected.
 - THYSYS Culvert Program was used to analyze and size the pipe/box culvert crossings in the 2006 Carter & Burgess (Jacobs) report. For the 2014 Jacobs update, HY-8 was used to verify and update the pipe/box culvert crossing analysis. Hydraulic analysis showed that velocities through some structures are higher than 6 fps and, therefore, downstream ends would require measures including riprap, energy dissipater blocks etc. to accommodate these high velocities. **Table 9** has the updated culvert sizes and a summary of velocities for the 50-year design frequency. Detailed run outputs from Culvert program are included in **Appendix E**.
 - Culvert lengths were based on a usual 6:1 front slope with a maximum 3:1 slope where ROW was limited. Safety End Treatments (SET) was assumed for end treatment.
 - The upstream reach of Mill Creek that contains crossing no. 35 which is beyond the FEMA limit of detailed study. The existing model run under this analysis forms the basis to establishing 100-year water surface elevations for the proposed bridge crossing.
 - The 100-year water surface elevations for the proposed cross drainage structures are plotted against roadway profile as shown in **Exhibit 5**.

Exhibit 1 – Vicinity Map



SCALE: NTS



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Jacobs Engineering Group Inc. F-2966

**EXHIBIT 1
VICINITY MAP**

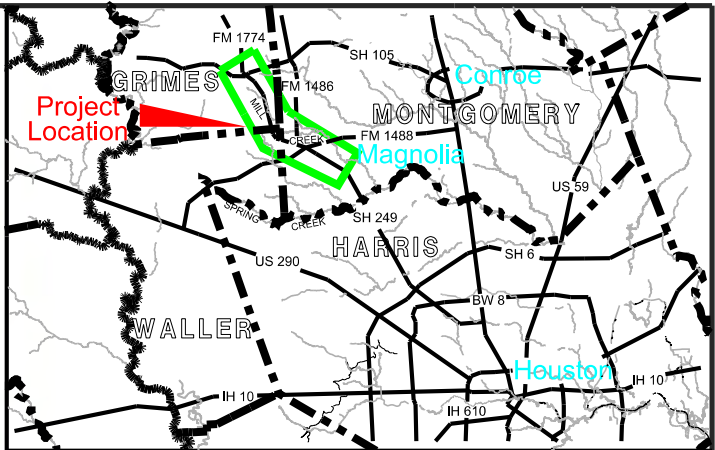
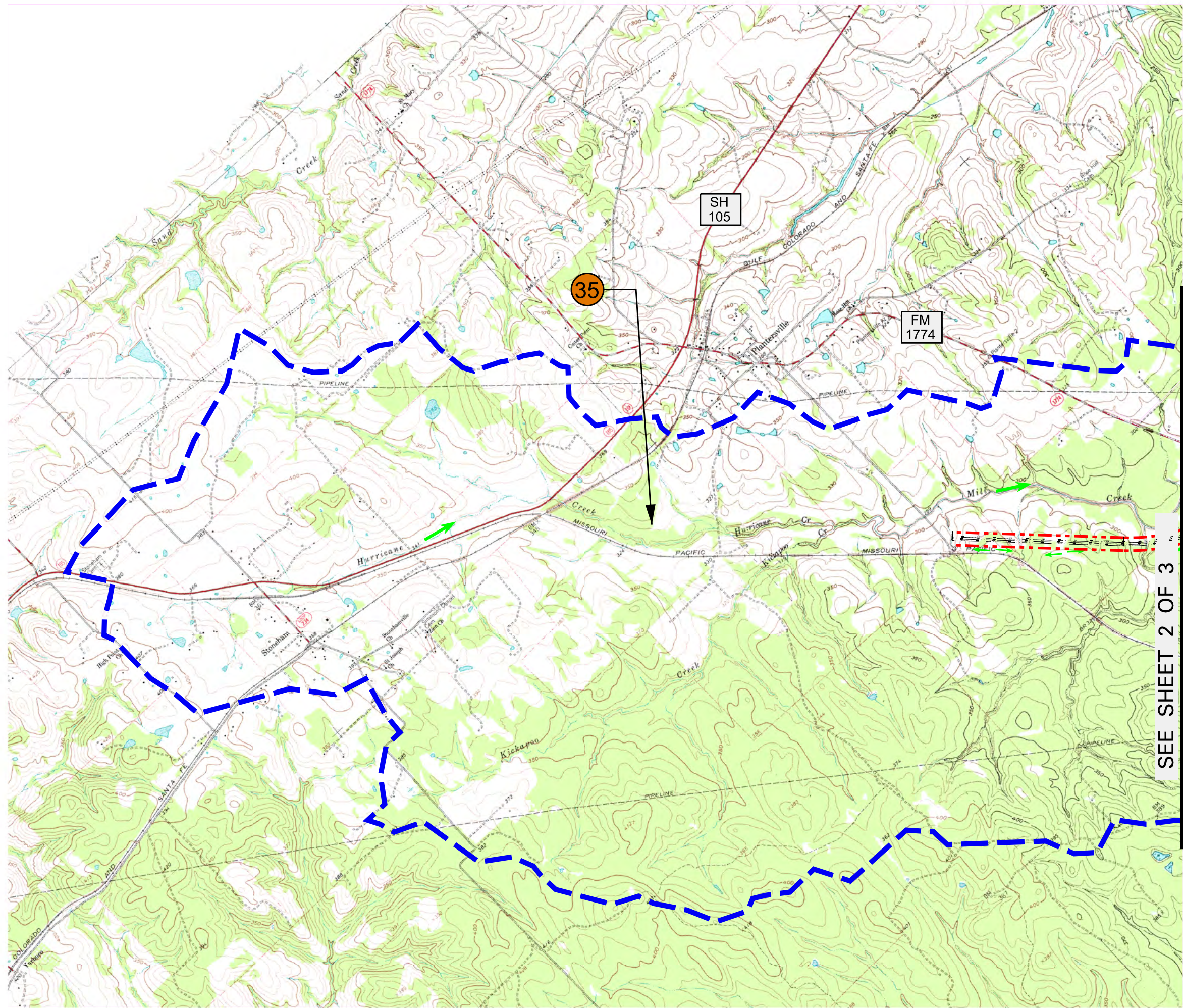
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CK:	6	TEXAS				SH 249
DRN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
CK:	HOU	MONTGOMERY	0912	00	144	

7/2/2014 2:48:26 PM
8351_Vicinity Map.dgn

8351_Vicinity Map.dgn

Exhibit 2 – Revised Drainage Area Map

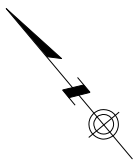


VICINITY MAP

USGS QUADRANGLE MAPS

DACUS
ANDERSON
STONEHAM
PLANTERSVILLE

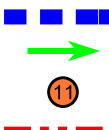
MAGNOLIA EAST
MAGNOLIA WEST
KEENAN



0 1500 3000
SCALE: 1"=3000'

LEGEND

DRAINAGE AREA BOUNDARY
FLOW DIRECTION
DRAINAGE AREA ID
PROPOSED ROW



REV. NO.	DATE	DESCRIPTION	BY
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UNIT	JOB NO.	DESIGN FILE
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835+da002.dgn

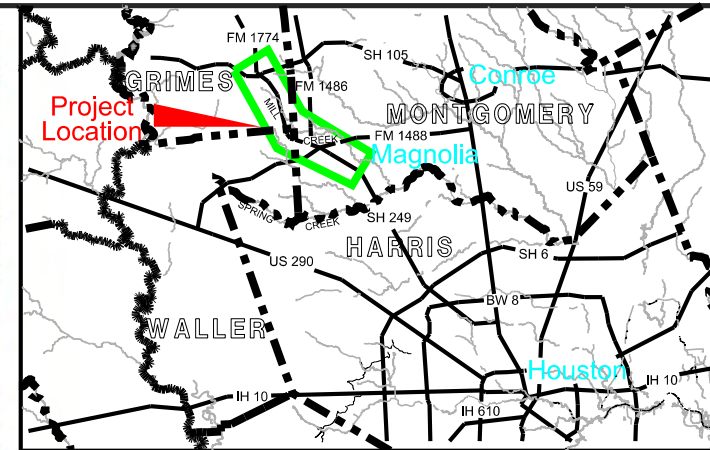
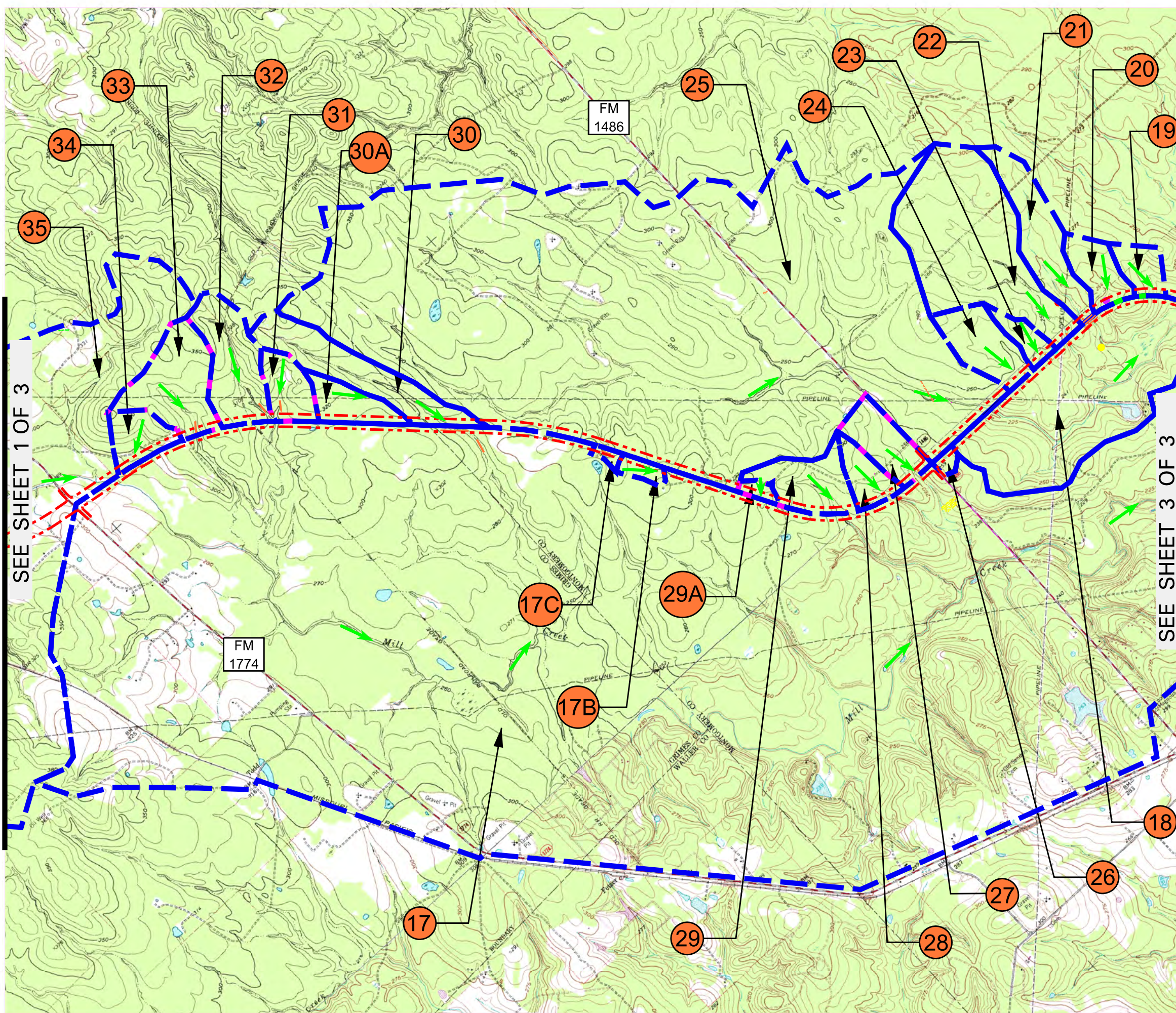


SH 249

REVISED DRAINAGE AREA MAP
EXHIBIT 2

SHEET 1 OF 3

DSN:	FED.RD. DIV.NO.	STATE	PROJECT NO.			HIGHWAY NO.
CK:	6	TEXAS				SH 249
DRN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
CK:	HOU	MONTGOMERY	0912	00	144	

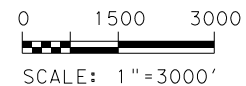
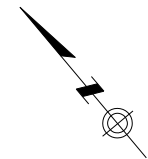


VICINITY MAP

USGS QUADRANGLE MAPS

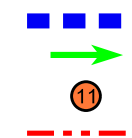
DACUS
ANDERSON
STONEHAM
PLANTERSVILLE

MAGNOLIA EAST
MAGNOLIA WEST
KEENAN



LEGEND

DRAINAGE AREA BOUNDARY
FLOW DIRECTION
DRAINAGE AREA ID
PROPOSED ROW



REV. NO.	DATE	DESCRIPTION	BY
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UNIT	JOB NO.	DESIGN FILE
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835+da003.dgn



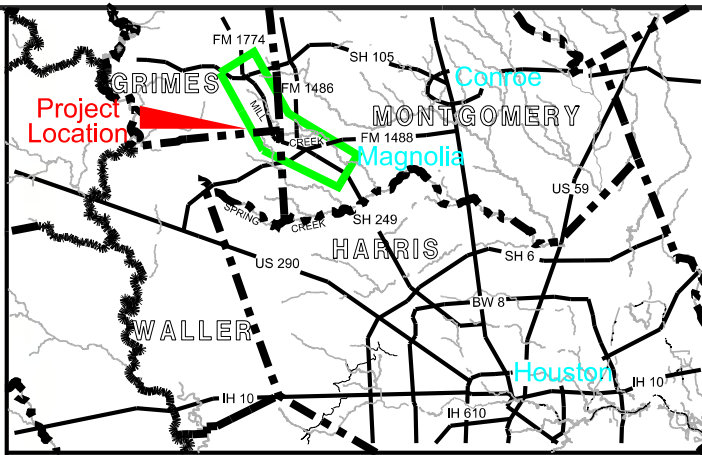
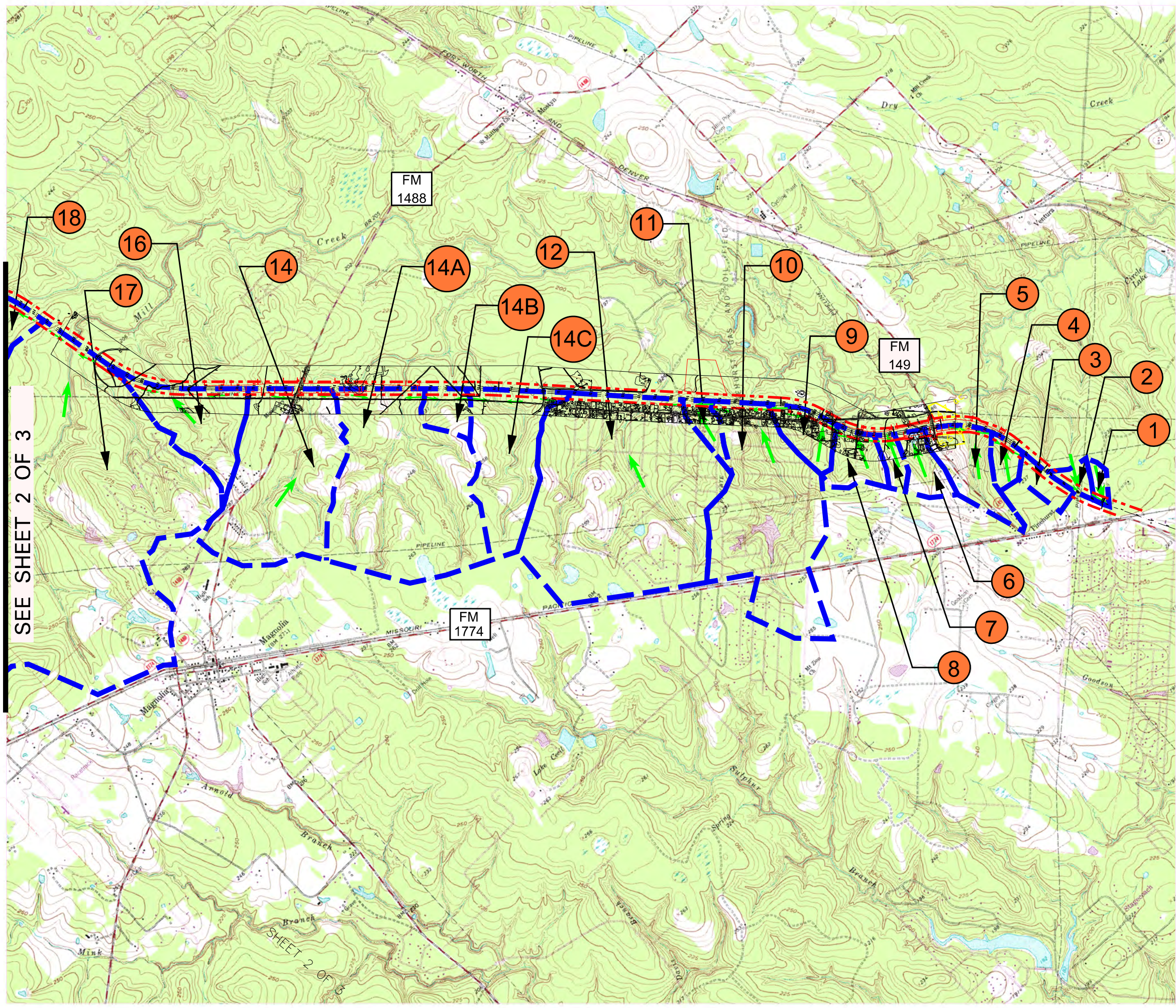
SH 249

REVISED DRAINAGE AREA MAP

EXHIBIT 2

SHEET 2 OF 3

DSN:	FED.RD. DIV.NO.	STATE	PROJECT NO.			HIGHWAY NO.
CK:	6	TEXAS				SH 249
DRN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
CK:	HOU	MONTGOMERY	0912	00	144	

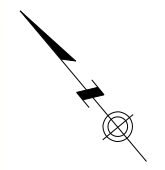


VICINITY MAP

USGS QUADRANGLE MAPS

DACUS
ANDERSON
STONEHAM
PLANTERSVILLE

MAGNOLIA EAST
MAGNOLIA WEST
KEENAN



0 1500 3000
SCALE: 1" = 3000'

LEGEND

- DRAINAGE AREA BOUNDARY
- FLOW DIRECTION
- DRAINAGE AREA ID
- PROPOSED ROW

REV. NO.	DATE	DESCRIPTION	BY
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UNIT	JOB NO.	DESIGN FILE
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SH 249

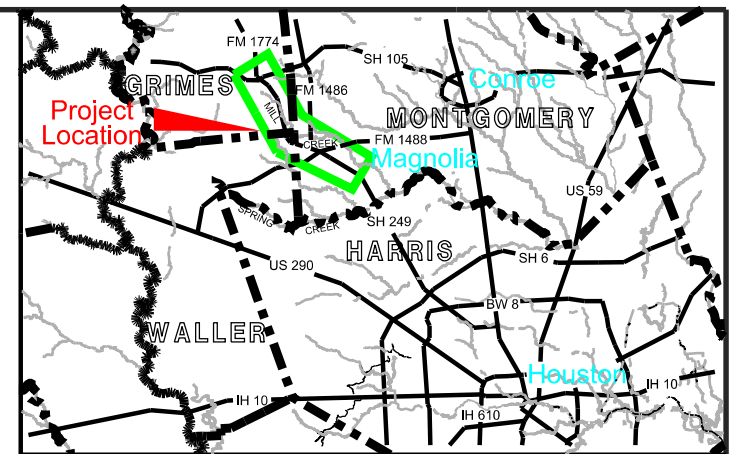
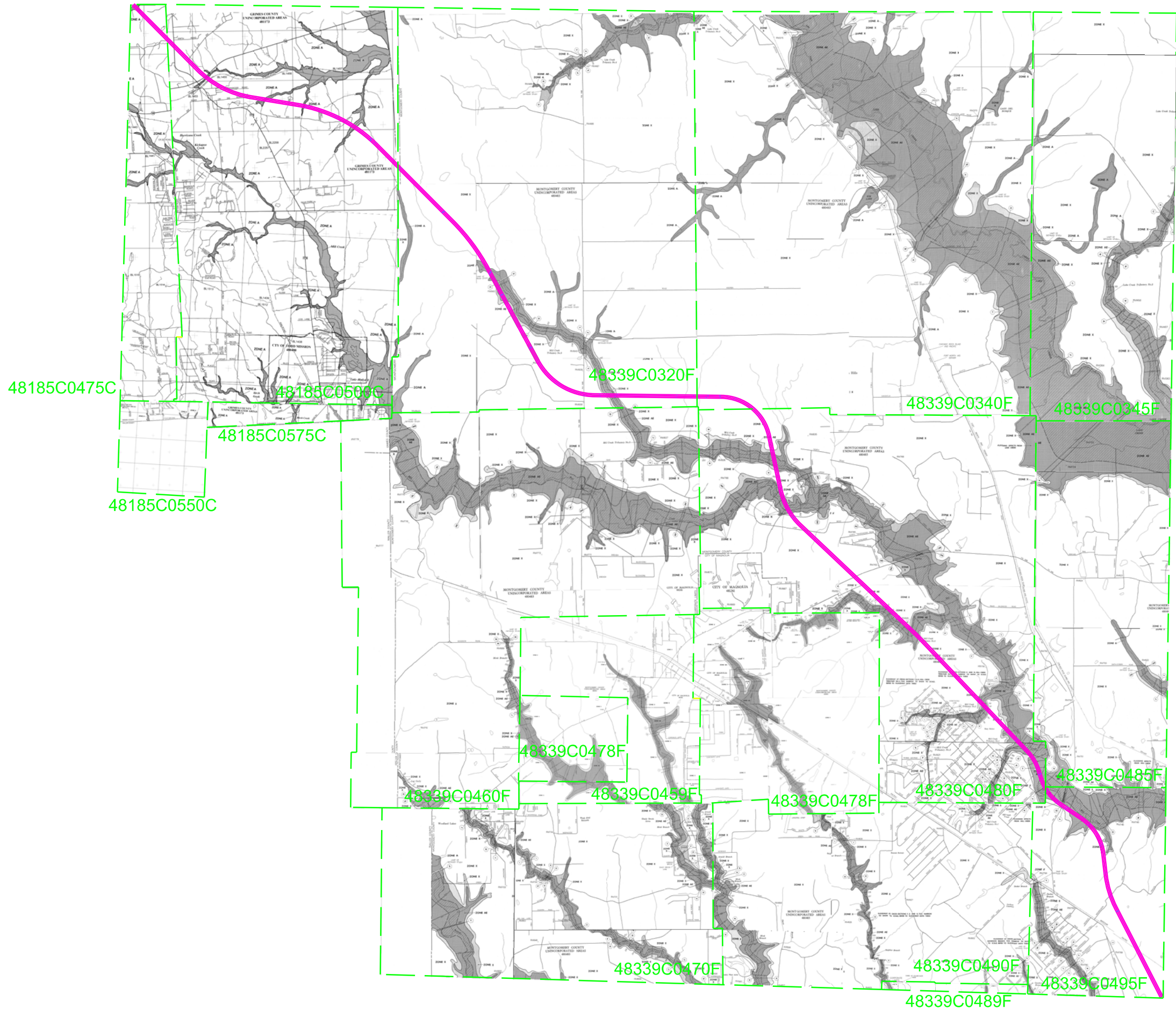
REVISED DRAINAGE AREA MAP

EXHIBIT 2

SHEET 3 OF 3

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CK:	6	TEXAS				SH 249
DRN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
CK:	HOU	MONTGOMERY	0912	00	144	

Exhibit 3 – FEMA Flood Insurance Rate Map

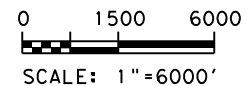


VICINITY MAP

USGS QUADRANGLE MAPS

DACUS
ANDERSON
STONEHAM
PLANTERSVILLE

MAGNOLIA EAST
MAGNOLIA WEST
KEENAN



LEGEND

- DRAINAGE AREA BOUNDARY
- FLOW DIRECTION
- DRAINAGE AREA ID
- FLOOD PLAIN (100 YEAR)
- PROPOSED ROW

REV. NO.	DATE	DESCRIPTION	BY
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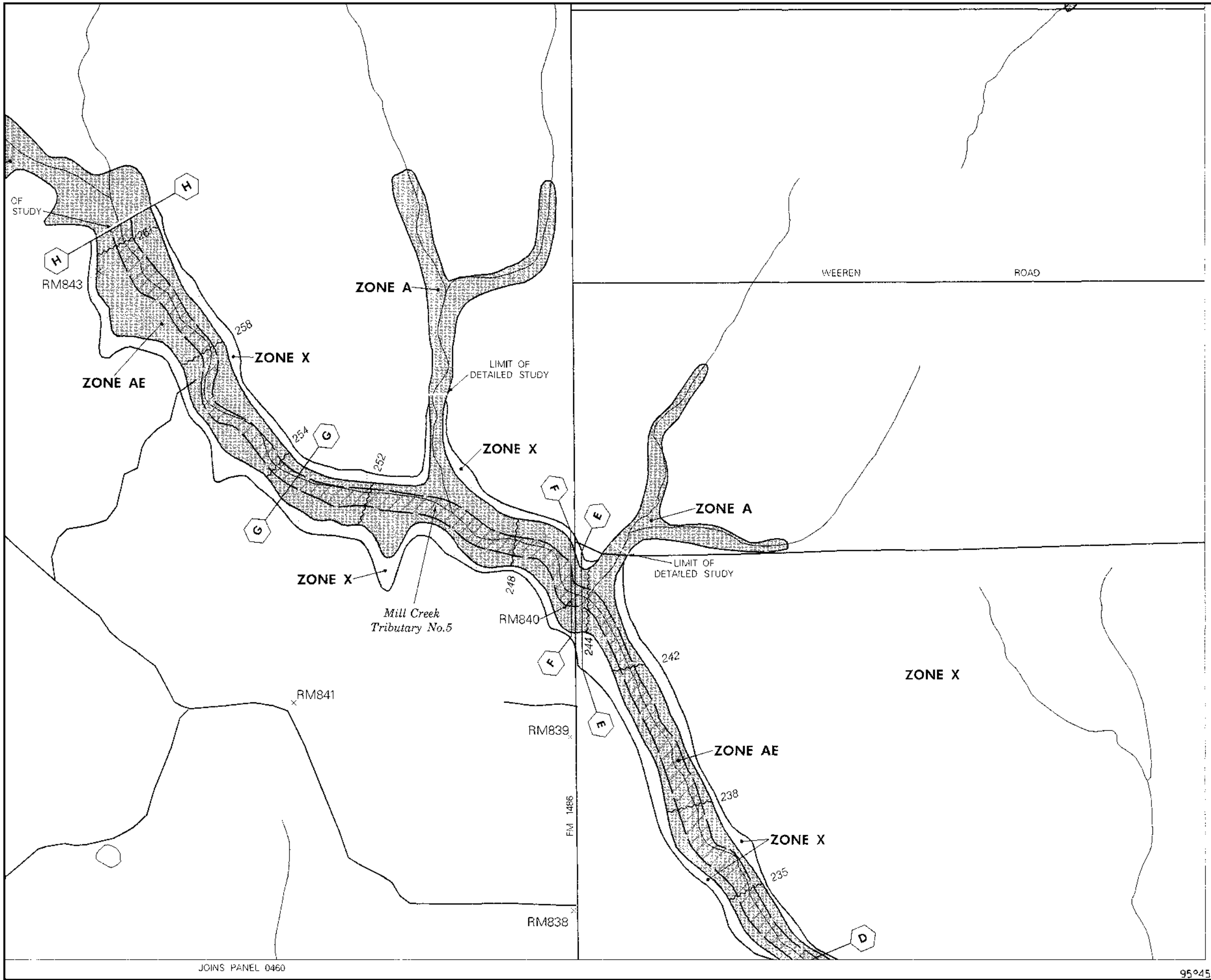
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SH 249

EXHIBIT 3

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DRN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
CK:	HOU	MONTGOMERY	0912	00	144	



APPROXIMATE SCALE IN FEET
1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP
MONTGOMERY COUNTY,
TEXAS AND
INCORPORATED AREAS

PANEL 320 OF 750
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS	NUMBER	PANEL	SUFFIX
COMMUNITY			
MONTGOMERY COUNTY	483483	0320	F
UNINCORPORATED AREAS			

MAP NUMBER
48339C0320 F

EFFECTIVE DATE:
DECEMBER 19, 1996

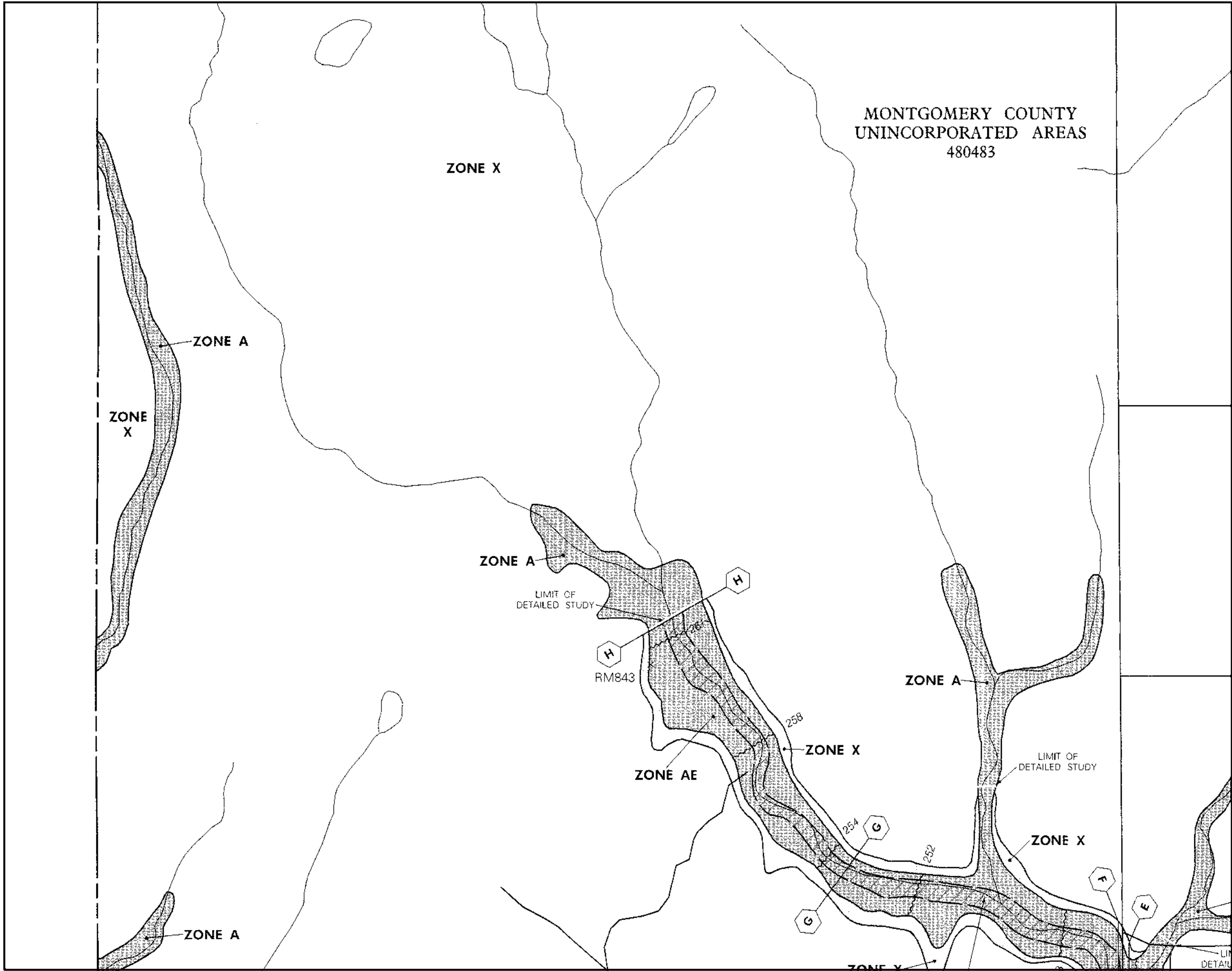


Federal Emergency Management Agency

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JOINS PANEL 0460

30°15'
95°45'00"



APPROXIMATE SCALE IN FEET
1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

**FIRM
FLOOD INSURANCE RATE MAP**

**MONTGOMERY COUNTY,
TEXAS AND
INCORPORATED AREAS**

PANEL 320 OF 750
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS COMMUNITY	NUMBER	PANEL	SUFFIX
MONTGOMERY COUNTY UNINCORPORATED AREAS	480483	0320	F

**MAP NUMBER
48339C0320 F**


**EFFECTIVE DATE:
DECEMBER 19, 1996**



Federal Emergency Management Agency

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APPROXIMATE SCALE IN FEET

1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP


MONTGOMERY COUNTY, TEXAS AND INCORPORATED AREAS

PANEL 340 OF 750
(SEE MAP INDEX FOR PANELS NOT PRINTED)

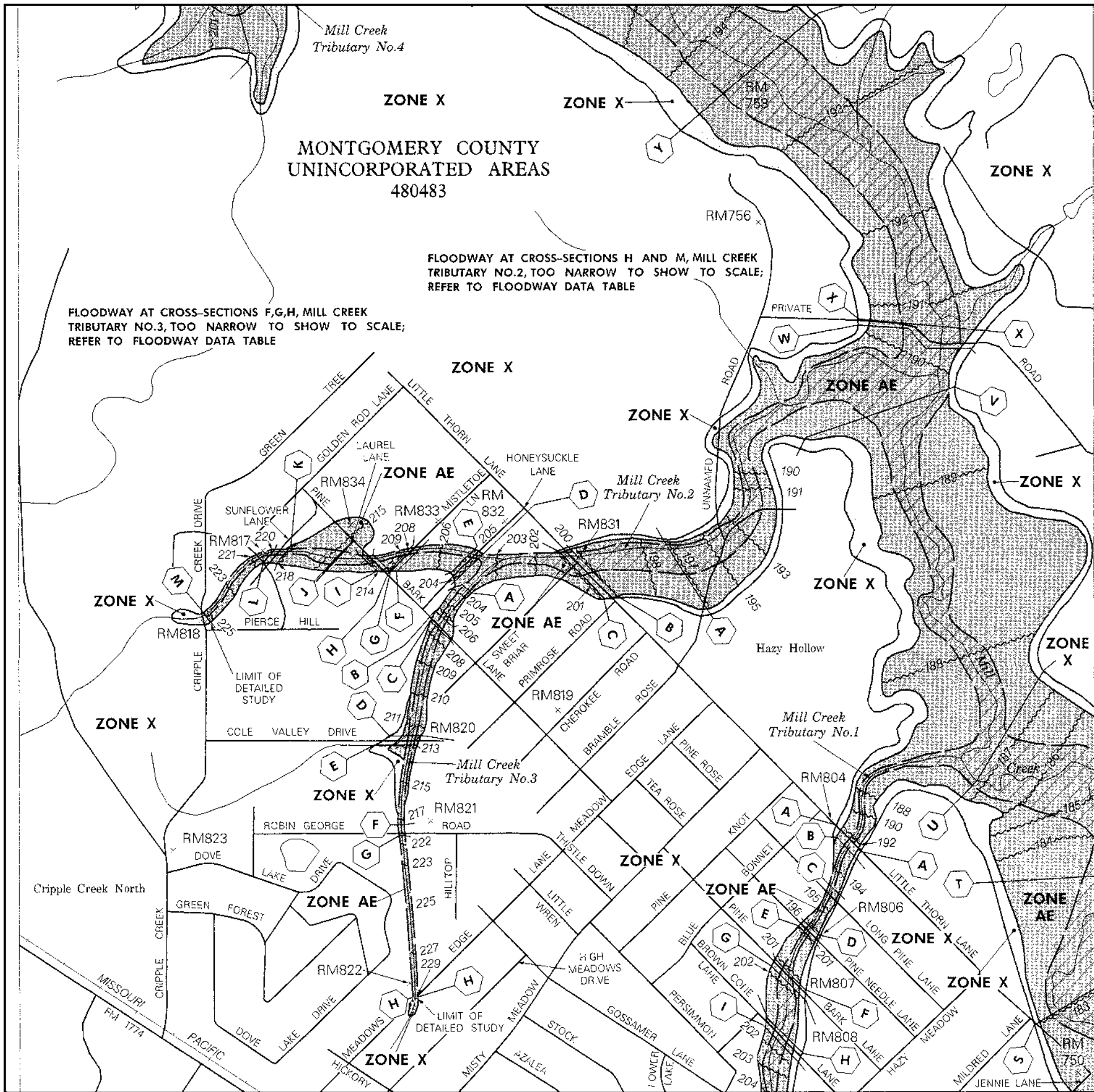
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MONTGOMERY COUNTY UNINCORPORATED AREAS	483483	0340	F

MAP NUMBER
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EFFECTIVE DATE:
DECEMBER 19, 1996


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COUNTYWIDE FLOOD INSURANCE MAP

DECEMBER 1996

EFFECTIVE DATE(S) OF REVISION: NONE

Refer to the FLOOD INSURANCE RATE MAP on this map to determine when actual zones where elevations or depths have changed.

To determine if flood insurance is available, call the National Flood Insurance Program.

APPROXIMATE SCALE IN FEET

1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

MONTGOMERY COUNTY, TEXAS AND INCORPORATED AREAS

PANEL 480 OF 750
(SEE MAP INDEX FOR PANELS NOT PRINTED)

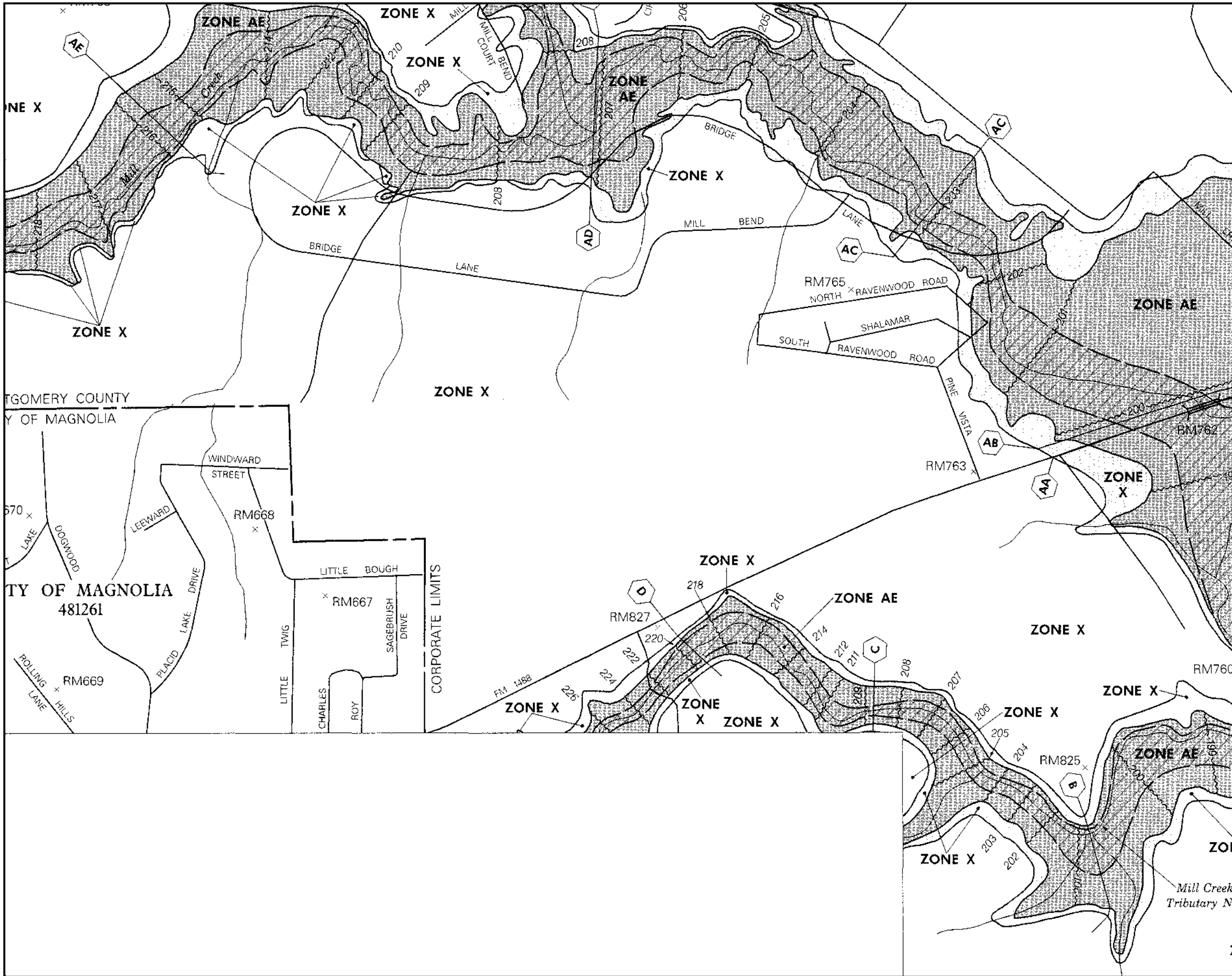
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MAGNOLIA CITY OF MONTGOMERY COUNTY UNINCORPORATED AREAS	480285	0480	F	
MAGNOLIA CITY OF MONTGOMERY COUNTY UNINCORPORATED AREAS	480483	0480	F	

MAP NUMBER
48339C0480 F

EFFECTIVE DATE:
DECEMBER 19, 1996

Federal Emergency Management Agency

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APPROXIMATE SCALE IN FEET
1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MONTGOMERY COUNTY, TEXAS AND INCORPORATED AREAS

PANEL 480 OF 750
(SEE MAP INDEX FOR PANELS NOT PRINTED)

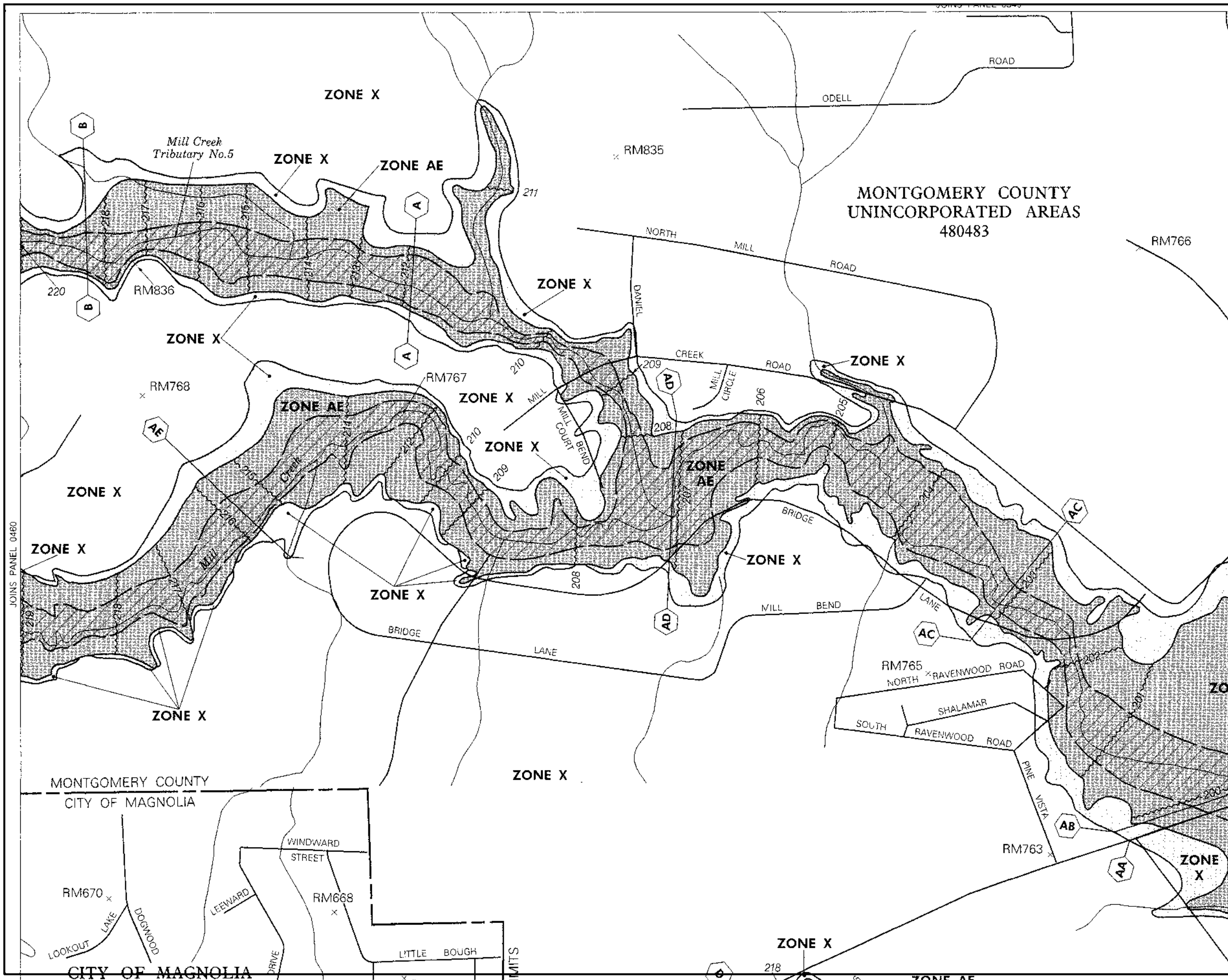
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MONTGOMERY COUNTY	481261	0480	F	
UNINCORPORATED AREAS	480483	0480	F	

MAP NUMBER
48339C0480 F

EFFECTIVE DATE:
DECEMBER 19, 1996

Federal Emergency Management Agency

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APPROXIMATE SCALE IN FEET

1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

MONTGOMERY COUNTY, TEXAS AND INCORPORATED AREAS

PANEL 480 OF 750

(SEE MAP INDEX FOR PANELS NOT PRINTED)

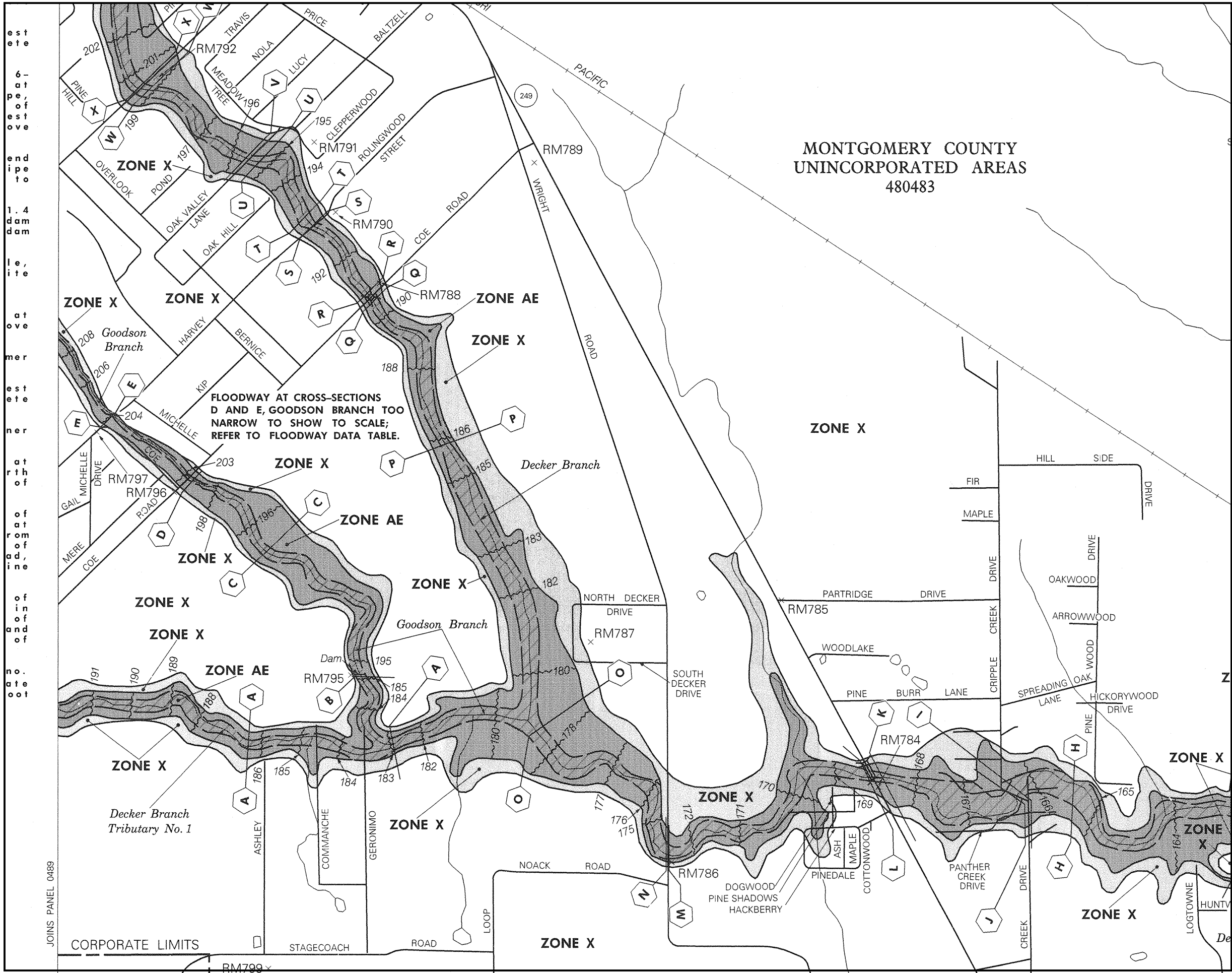
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MONTGOMERY COUNTY, TEXAS	480251	0340	F
MONTGOMERY COUNTY, TEXAS UNINCORPORATED AREAS	480483	0360	F

MAP NUMBER
48339C0480 F

EFFECTIVE DATE:
DECEMBER 19, 1996

Federal Emergency Management Agency

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APPROXIMATE SCALE IN FEET

1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

MONTGOMERY COUNTY, TEXAS AND INCORPORATED AREAS

PANEL 495 OF 750
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:	NUMBER	PANEL	SUFFIX
COMMUNITY			
MONTGOMERY COUNTY, UNINCORPORATED AREAS	480483	0495	F
STAGECOACH, TOWN OF	481296	0495	F

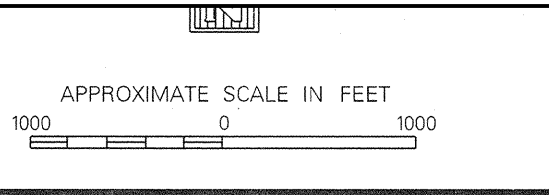
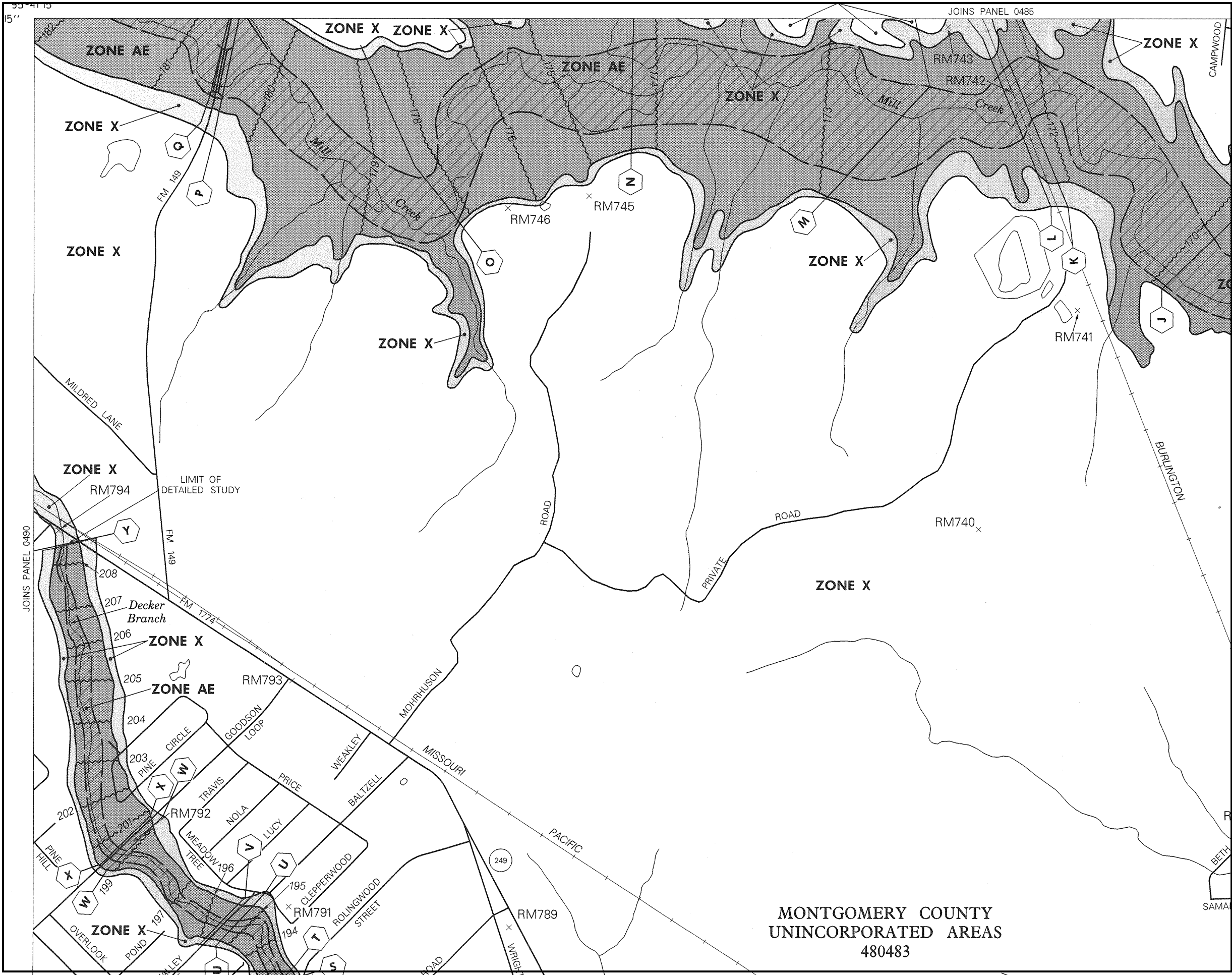
MAP NUMBER 48339C0495 F

EFFECTIVE DATE: DECEMBER 19, 1996

Federal Emergency Management Agency

EXHIBIT 3B

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



NATIONAL FLOOD INSURANCE PROGRAM

**FIRM
FLOOD INSURANCE RATE MAP**

**MONTGOMERY COUNTY,
TEXAS AND
INCORPORATED AREAS**

PANEL 495 OF 750
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
MONTGOMERY COUNTY, UNINCORPORATED AREAS	480483	0495	F
STAGECOACH, TOWN OF	481296	0495	F

**MAP NUMBER
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**EFFECTIVE DATE:
DECEMBER 19, 1996**



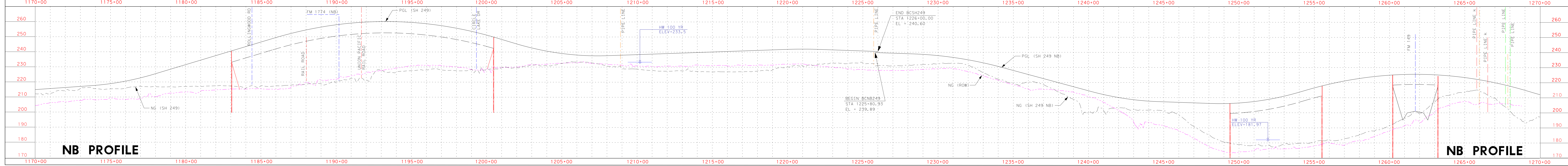
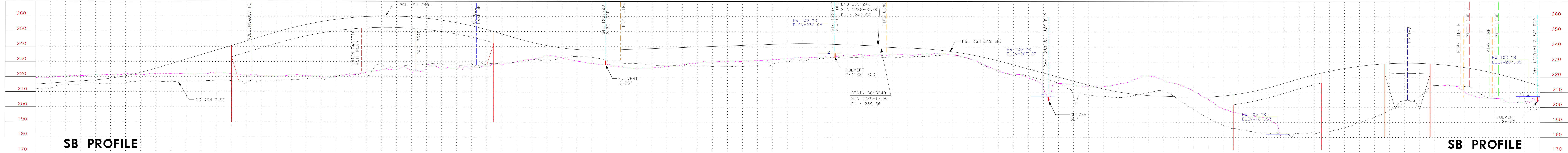
Federal Emergency Management Agency

EXHIBIT 3C

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Exhibit 4 – Proposed Detention Pond Locations

Exhibit 5 – Proposed Cross Drainage Structures
& 100-year WSEL Profile



LEGEND

- EXIST NG @ PGL
- 100 YEAR WSEL
- NG @ PROP ROW
- PROP PGL
- PROP FRONTAGE ROAD PROFILE
- PROP DRAINAGE STRUCTURE

PRELIMINARY

0 200 400
GRAPHIC SCALE IN FEET

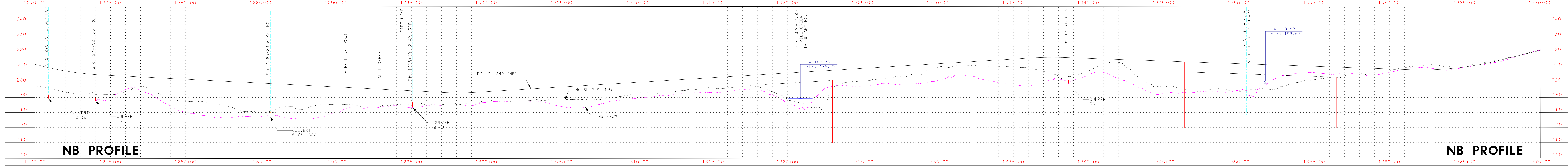
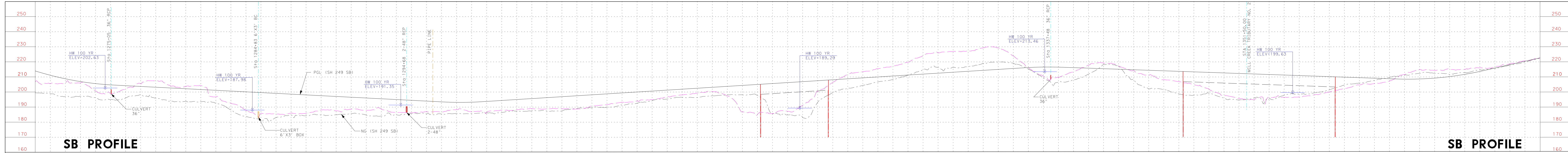
SHEET 1 OF 8

TEXAS DEPARTMENT OF TRANSPORTATION

STATE HIGHWAY 249
PROPOSED CROSS DRAINAGE
STRUCTURES AND 100-YEAR
WATER SURFACE PROFILE

FM 149 TO FM 1774
MONTGOMERY & GRIMES COUNTIES, TEXAS

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LEGEND

- EXIST NG @ PGL
- 100 YEAR WSEL
- NG @ PROP ROW
- PROP PGL
- PROP FRONTAGE ROAD PROFILE
- PROP DRAINAGE STRUCTURE

PRELIMINARY

0 200 400
GRAPHIC SCALE IN FEET

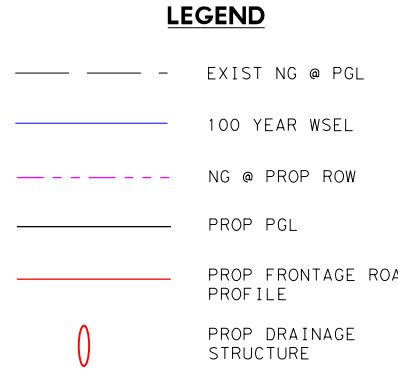
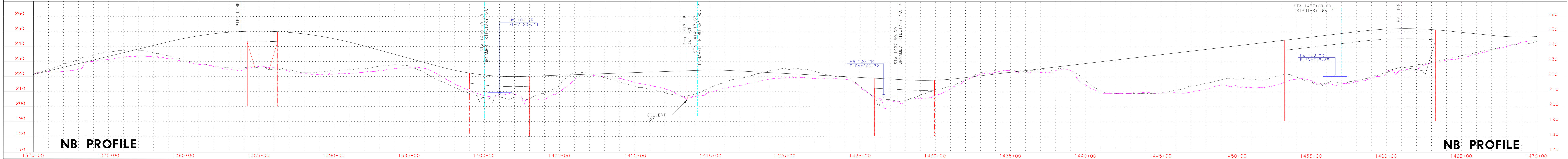
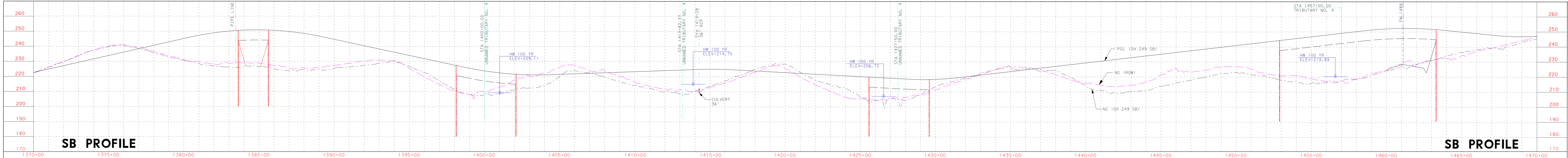
SHEET 2 OF 8

TEXAS DEPARTMENT OF TRANSPORTATION

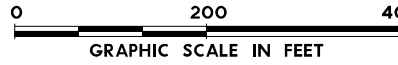
STATE HIGHWAY 249
PROPOSED CROSS DRAINAGE
STRUCTURES AND 100-YEAR
WATER SURFACE PROFILE

FM 149 TO FM 1774
MONTGOMERY & GRIMES COUNTIES, TEXAS

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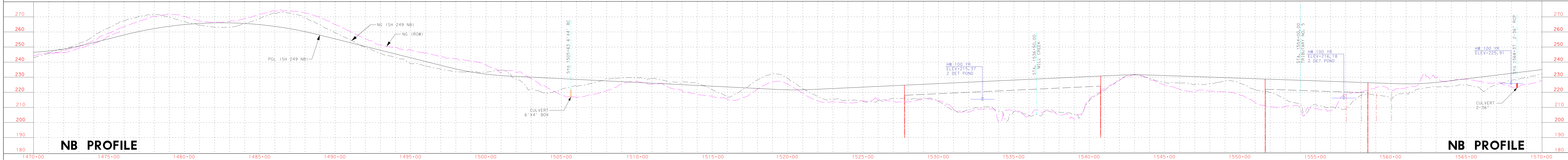
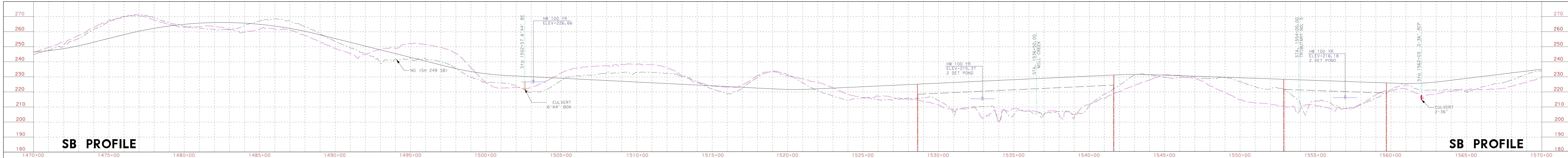
PRELIMINARY



SHEET 3 OF 8



STATE HIGHWAY 249
PROPOSED CROSS DRAINAGE
STRUCTURES AND 100-YEAR
WATER SURFACE PROFILE
FM 149 TO FM 1774
MONTGOMERY & GRIMES COUNTIES, TEXAS



LEGEND

- EXIST NG @ PGL
- 100 YEAR WSEL
- NG @ PROP ROW
- PROP PGL
- PROP FRONTAGE ROAD PROFILE
- PROP DRAINAGE STRUCTURE

PRELIMINARY

0 200 400
GRAPHIC SCALE IN FEET

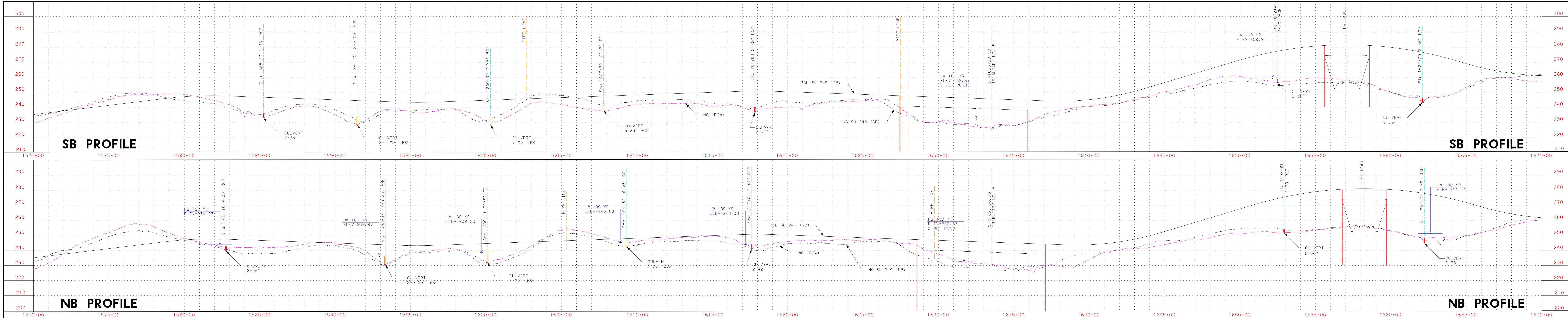
SHEET 4 OF 8

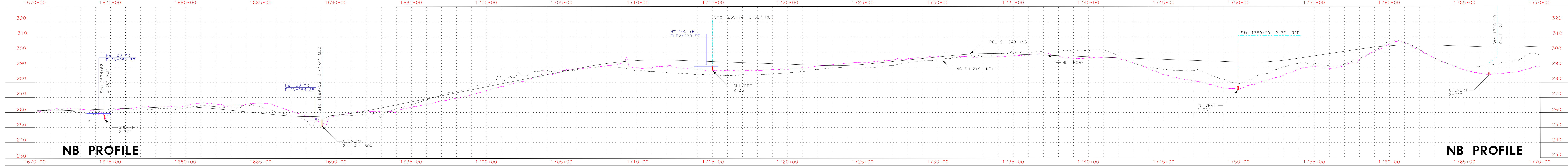
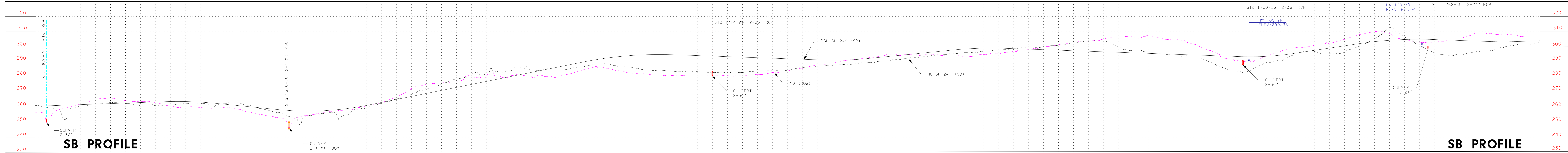
Texas Department of Transportation

STATE HIGHWAY 249
PROPOSED CROSS DRAINAGE
STRUCTURES AND 100-YEAR
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FM 149 TO FM 1774
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LEGEND

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- 100 YEAR WSEL
- NG @ PROP ROW
- PROP PGL
- PROP FRONTAGE ROAD PROFILE
- PROP DRAINAGE STRUCTURE

PRELIMINARY

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GRAPHIC SCALE IN FEET

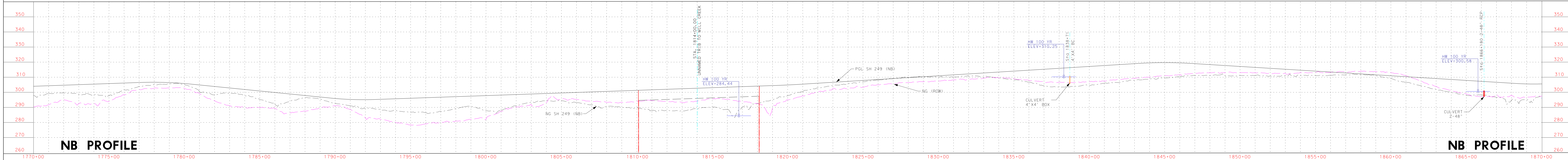
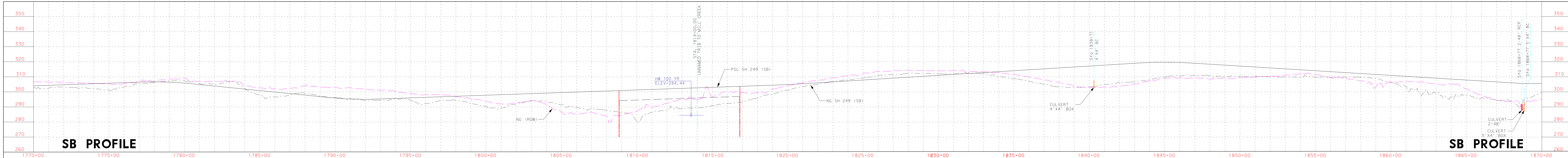
SHEET 6 OF 8

TEXAS Department of Transportation

STATE HIGHWAY 249
PROPOSED CROSS DRAINAGE
STRUCTURES AND 100-YEAR
WATER SURFACE PROFILE

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LEGEND

- EXIST NG @ PGL
- 100 YEAR WSEL
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- PROP PGL
- PROP FRONTAGE ROAD PROFILE
- PROP DRAINAGE STRUCTURE

EXHIBIT 5

PRELIMINARY

0 200 400
GRAPHIC SCALE IN FEET

SHEET 7 OF 8

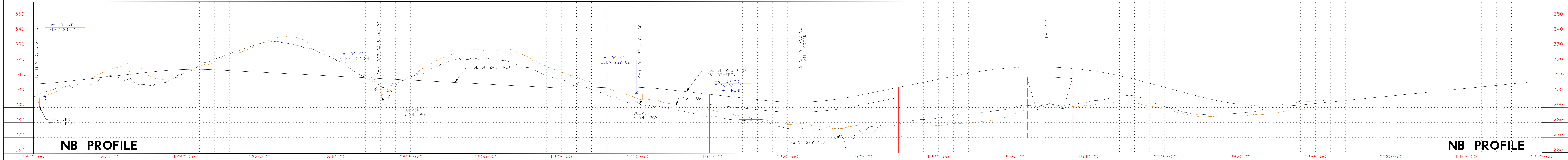
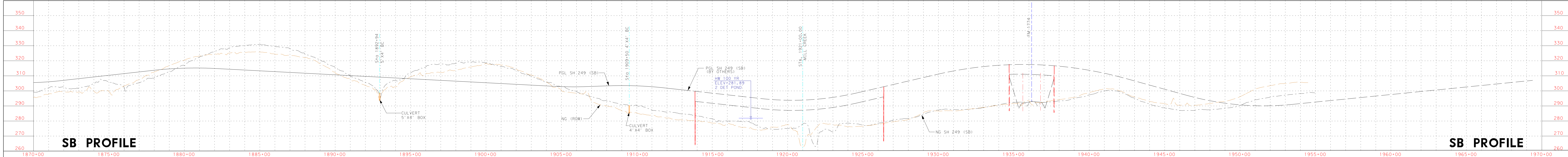
STATE HIGHWAY 249

PROPOSED CROSS DRAINAGE STRUCTURES AND 100-YEAR WATER SURFACE PROFILE

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LEGEND

- EXIST NG @ PGL
- 100 YEAR WSEL
- NG @ PROP ROW
- PROP PGL
- PROP FRONTAGE ROAD PROFILE
- PROP DRAINAGE STRUCTURE

**EXHIBIT 5
PRELIMINARY**

0 200 400
GRAPHIC SCALE IN FEET

SHEET 8 OF 8

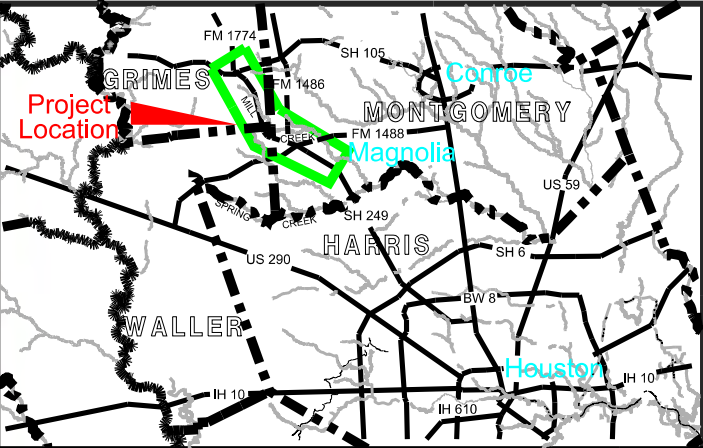
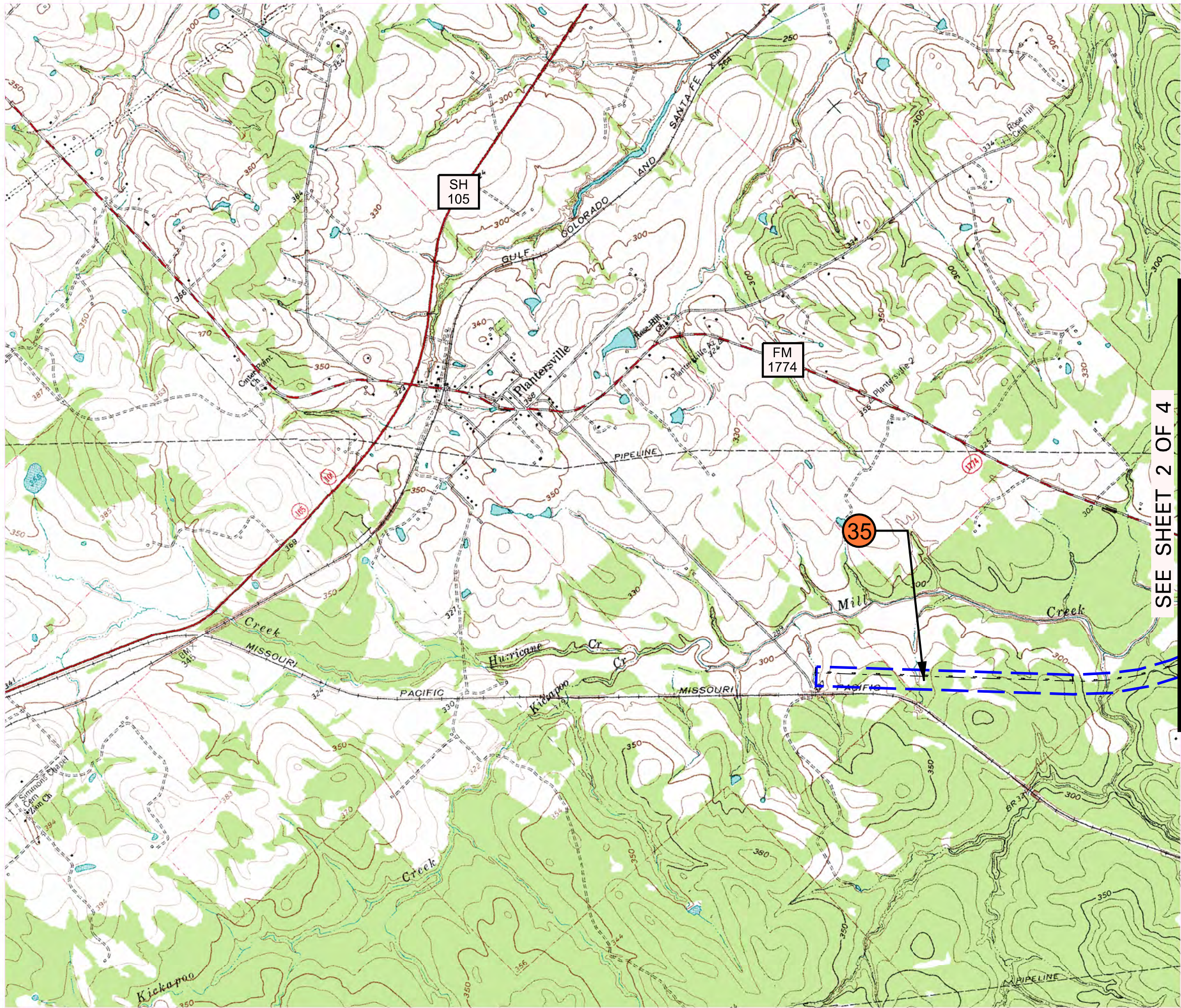
Texas Department of Transportation

STATE HIGHWAY 249
PROPOSED CROSS DRAINAGE
STRUCTURES AND 100-YEAR
WATER SURFACE PROFILE

FM 149 TO FM 1774
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Exhibit 6 – Mitigation Drainage Area Map

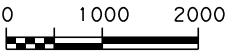
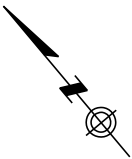


VICINITY MAP

USGS QUADRANGLE MAPS

DACUS
ANDERSON
STONEHAM
PLANTERSVILLE

MAGNOLIA EAST
MAGNOLIA WEST
KEENAN



SCALE: 1" = 2000'

LEGEND

MITIGATION DRAINAGE AREA



MITIGATION DRAINAGE AREA ID



REV. NO.	DATE	DESCRIPTION	BY
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UNIT	JOB NO.	DESIGN FILE
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835+0DrainageMitigationMap01.dgn



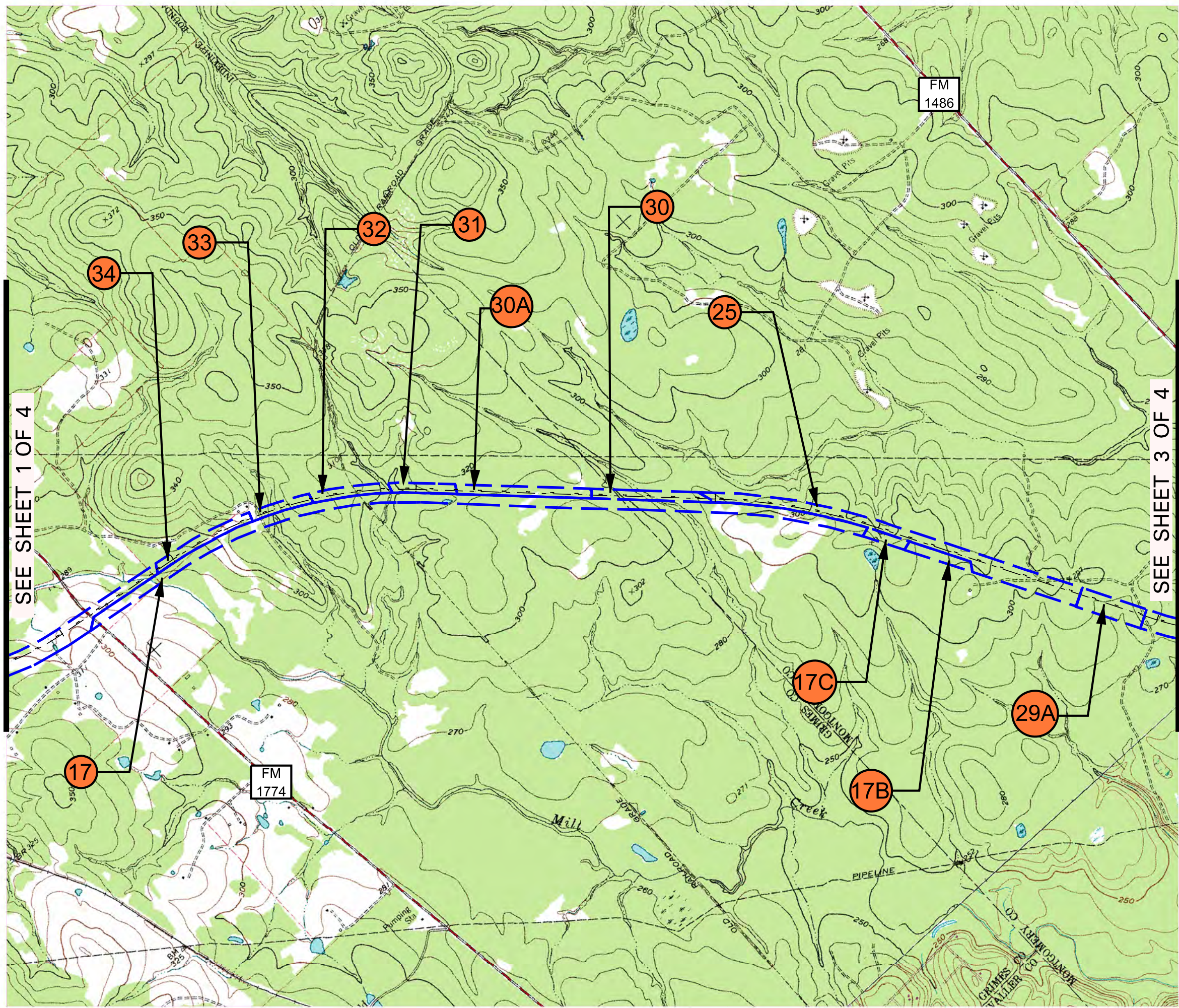
SH 249

MITIGATION DRAINAGE AREA MAP

EXHIBIT 6

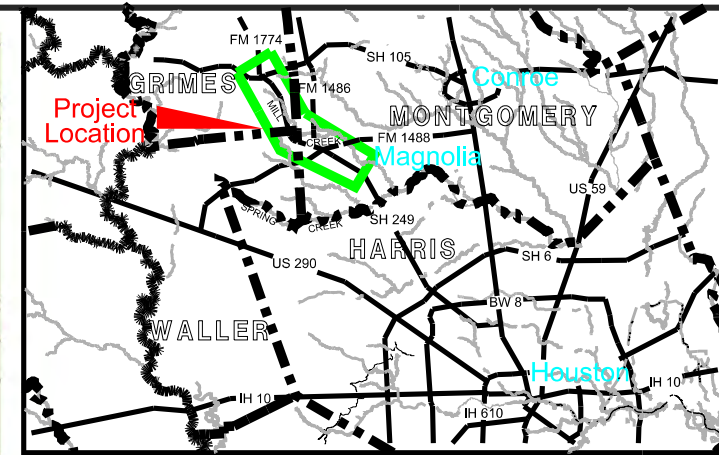
SHEET 1 OF 4

DSN:	NK	FED.RD. DIV.NO.	6	STATE	TEXAS	PROJECT NO.		HIGHWAY NO.	SH 249
CK:	ODH	STATE DISTRICT		COUNTY	MONTGOMERY	CONTROL NO.	0912	SECTION NO.	00
DRN:	CRR	HOU				JOB NO.	144	SHEET NO.	
CK:	WTT								



SEE SHEET 1 OF 4

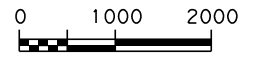
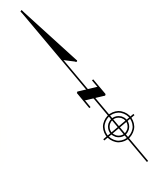
SEE SHEET 3 OF 4



VICINITY MAP

USGS QUADRANGLE MAPS

DACUS	MAGNOLIA EAST
ANDERSON	MAGNOLIA WEST
STONEHAM	KEENAN
PLANTERSVILLE	

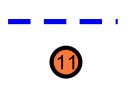


SCALE: 1" = 2000'

LEGEND

MITIGATION DRAINAGE AREA

MITIGATION DRAINAGE AREA ID



REV. NO.	DATE	DESCRIPTION	BY
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UNIT	JOB NO.	DESIGN FILE
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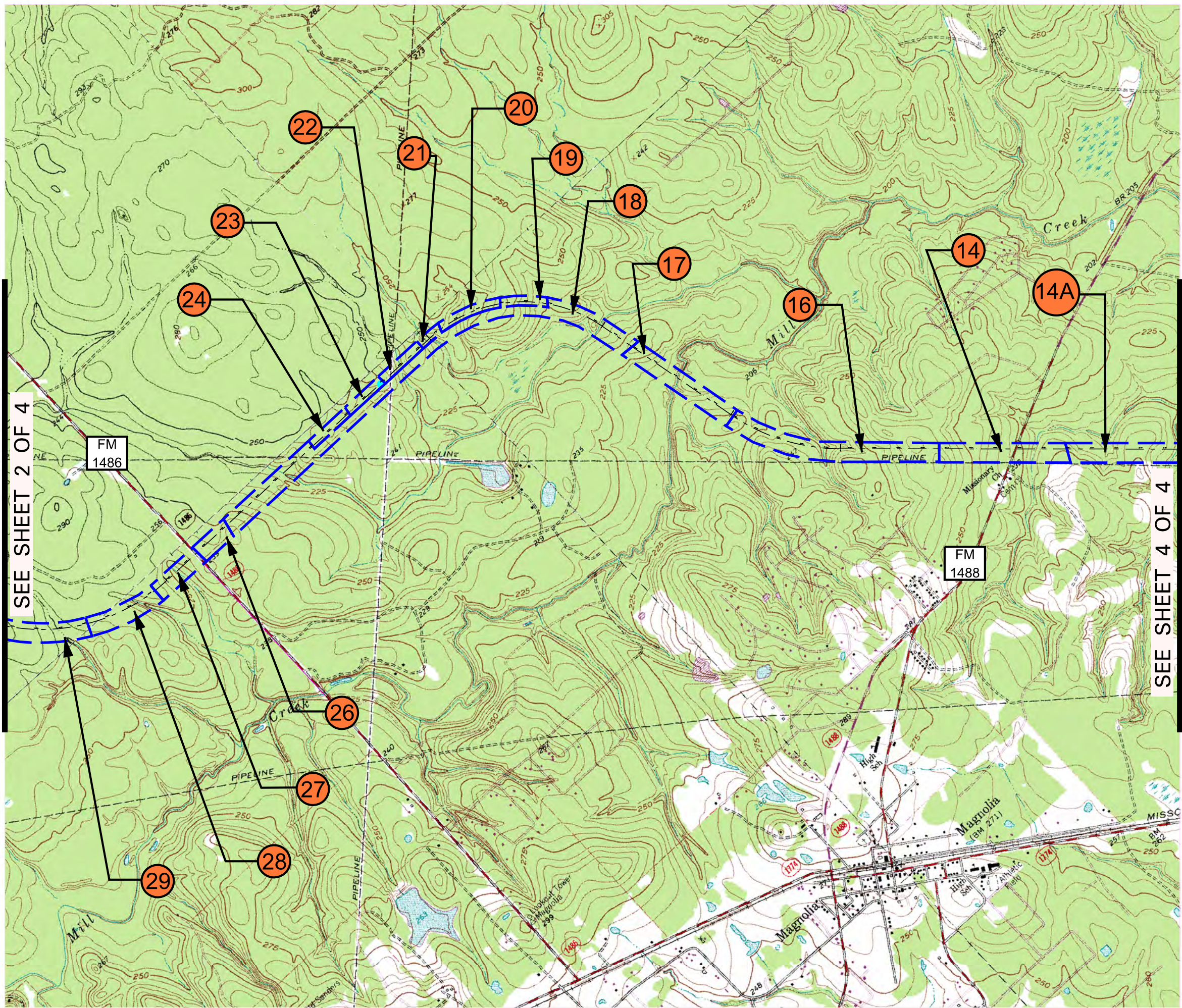
SH 249

MITIGATION DRAINAGE AREA MAP

EXHIBIT 6

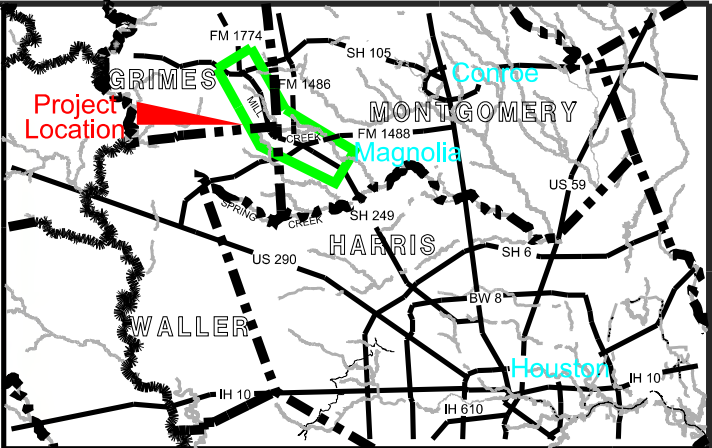
SHEET 2 OF 4

DSN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CK:	6	TEXAS				SH 249
DRN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
CK:	HOU	MONTGOMERY	0912	00	144	



SEE SHEET 2 OF 4

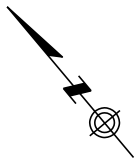
SEE SHEET 4 OF 4



VICINITY MAP

USGS QUADRANGLE MAPS

- | | |
|---------------|---------------|
| DACUS | MAGNOLIA EAST |
| ANDERSON | MAGNOLIA WEST |
| STONEHAM | KEENAN |
| PLANTERSVILLE | |



0 1000 2000
SCALE: 1" = 2000'

LEGEND

- | | |
|-----------------------------|--|
| MITIGATION DRAINAGE AREA | |
| MITIGATION DRAINAGE AREA ID | |

REV. NO.	DATE	DESCRIPTION	BY
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UNIT	JOB NO.	DESIGN FILE
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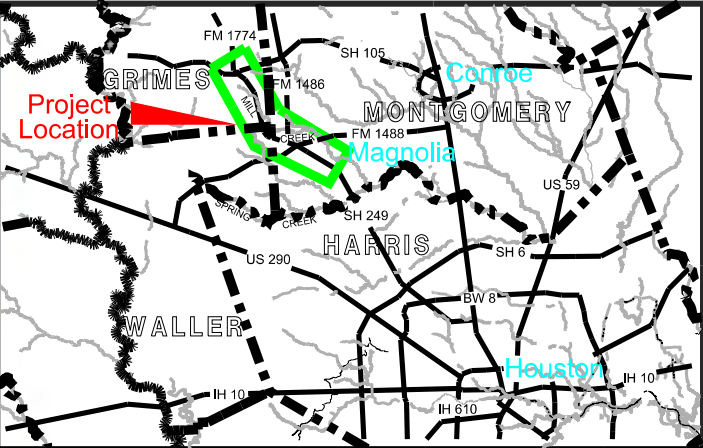
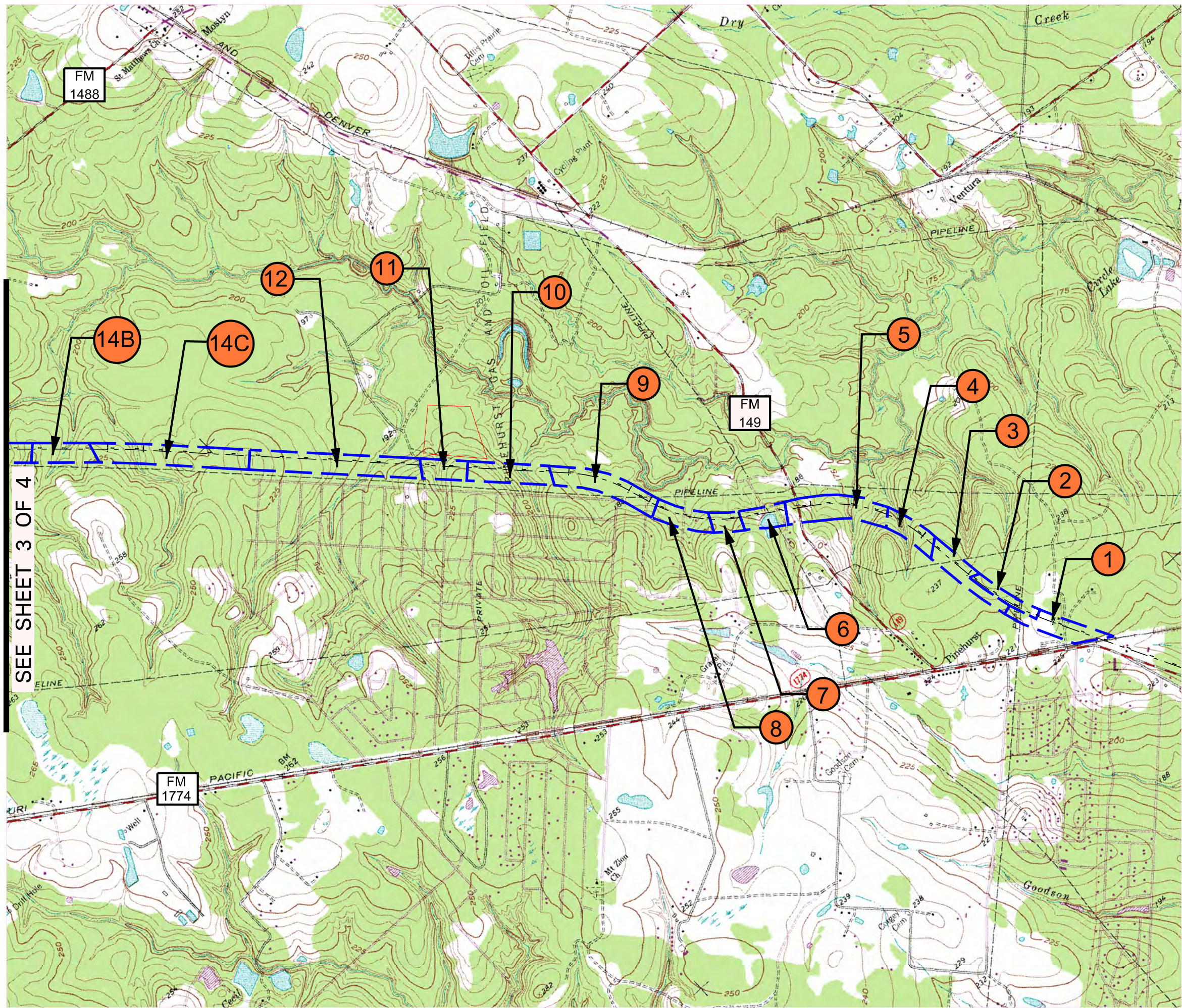


SH 249

MITIGATION DRAINAGE AREA MAP
EXHIBIT 6

SHEET 3 OF 4

DSN:	FED.RD. DIV.NO.	STATE	PROJECT NO.			HIGHWAY NO.
CK:	6	TEXAS				SH 249
DRN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
CK:	HOU	MONTGOMERY	0912	00	144	

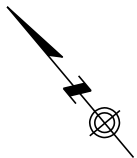


VICINITY MAP

USGS QUADRANGLE MAPS

DACUS
ANDERSON
STONEHAM
PLANTERSVILLE

MAGNOLIA EAST
MAGNOLIA WEST
KEENAN



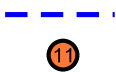
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SCALE: 1" = 2000'

LEGEND

MITIGATION DRAINAGE AREA

MITIGATION DRAINAGE AREA ID



REV. NO.	DATE	DESCRIPTION	BY
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UNIT	JOB NO.	DESIGN FILE
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835+Drainage+Mitigation+Map+04.dgn



SH 249

MITIGATION DRAINAGE AREA MAP

EXHIBIT 6

SHEET 4 OF 4

DSN:	FED.RD. DIV.NO.	STATE	PROJECT NO.			HIGHWAY NO.
CK:	6	TEXAS				SH 249
DRN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
CK:	HOU	MONTGOMERY	0912	00	144	

Appendix A – Hydrologic Peak Flow Computation Data

HYDROLOGIC COMPUTATIONS (RATIONAL METHOD, RUNOFF CURVE, OR TC&R (CLARK UNIT HYDROGRAPH)) EXISTING CONDITIONS

DRAINAGE AREA ID	DA (ACRES)	DA (SQ. MILES)	PEAK Q METHOD	RUNOFF COEFFICIENT*	TIME OF CONCENTRATION (MIN)	INTENSITY (IN/HR)				BASIN SHAPE FACTOR	CHANNEL SLOPE (FT/MILE)	FLOW (CFS)			
						10-YR	25-YR	50-YR	100-YR			10-YR	25-YR	50-YR	100-YR
1	14.5	0.02	RATIONAL	0.35	57	3.45	3.94	4.28	4.71			17	22	26	30
2	19.5	0.03	RATIONAL	0.32	36	4.64	5.24	5.71	6.23			29	36	43	49
3	30.8	0.05	RATIONAL	0.37	68	3.06	3.51	3.81	4.22			35	44	52	60
4	28.2	0.04	RATIONAL	0.42	148	1.77	2.08	2.24	2.53			21	27	31	37
5	99.3	0.16	RATIONAL	0.33	138	1.87	2.18	2.35	2.65			62	80	94	110
6	52.3	0.08	RATIONAL	0.32	73	2.92	3.35	3.63	4.03			49	62	73	84
7	25.0	0.04	RATIONAL	0.32	62	3.26	3.73	4.05	4.47			26	33	39	45
8	63.9	0.10	RATIONAL	0.33	56	3.49	3.98	4.32	4.77			73	92	109	125
9	59.6	0.09	RATIONAL	0.39	32	4.99	5.62	6.12	6.67			116	144	171	194
10	436.9	0.68	TC&R	0.41	340	0.97	1.16	1.24	1.43	2.44	40.30	376	463	544	628
11	32.0	0.05	RATIONAL	0.38	81	2.73	3.14	3.40	3.78			33	42	50	57
12	779.5	1.22	TC&R	0.38	259	1.18	1.40	1.51	1.72	1.03	47.32	773	956	1121	1294
14	406.8	0.64	TC&R	0.33	280	1.11	1.33	1.42	1.63	2.49	68.57	212	267	318	375
14A	536.0	0.84	TC&R	0.33	282	1.11	1.32	1.42	1.62	1.78	46.50	281	353	422	498
14B	44.9	0.07	RATIONAL	0.32	91	2.50	2.89	3.13	3.49			36	46	54	63
14C	222.6	0.35	TC&R	0.32	273	1.14	1.35	1.45	1.66	4.12	51.42	70	89	107	127
16	153.8	0.24	RATIONAL	0.40	228	1.30	1.54	1.65	1.88			79	103	120	143
17	10243.9	16.01	TC&R	0.37	625	0.61	0.75	0.80	0.93	7.09	22.52	1549	1944	2307	2739
17B	19.1	0.03	RATIONAL	0.32	52	3.66	4.17	4.53	4.98			22	28	33	38
17C	8.2	0.01	RATIONAL	0.32	29	5.27	5.93	6.46	7.02			14	17	20	23
18	558.5	0.87	TC&R	0.34	290	1.09	1.30	1.39	1.59	3.11	69.76	170	213	255	302
19	45.7	0.07	RATIONAL	0.32	91	2.50	2.89	3.13	3.49			37	47	55	64
20	66.7	0.10	RATIONAL	0.32	80	2.74	3.16	3.42	3.80			58	74	87	101
21	140.1	0.22	RATIONAL	0.35	339	0.97	1.16	1.24	1.43	3.87	52.47	131	235	305	390
22	415.7	0.65	TC&R	0.32	283	1.10	1.32	1.41	1.62	0.74	64.34	182	230	275	325
23	33.4	0.05	RATIONAL	0.32	41	4.27	4.84	5.27	5.76			46	57	68	77
24	98.2	0.15	RATIONAL	0.32	129	1.96	2.29	2.47	2.77			62	79	93	109
25	3342.3	5.22	TC&R	0.34	309	1.04	1.24	1.33	1.53	3.29	21.74	936	1181	1411	1674
26	9.7	0.02	RATIONAL	0.37	12	8.34	9.21	10.09	10.77			30	36	44	48
27	83.7	0.13	RATIONAL	0.33	104	2.28	2.64	2.85	3.19			62	79	93	109
28	51.9	0.08	RATIONAL	0.32	68	3.05	3.50	3.79	4.20			51	64	76	87
29	101.9	0.16	RATIONAL	0.32	90	2.53	2.92	3.16	3.52			82	105	124	143
29A	13.1	0.02	RATIONAL	0.32	23	6.01	6.73	7.34	7.94			25	31	37	42
30	166.4	0.26	RATIONAL	0.34	310	1.03	1.24	1.32	1.52			58	77	90	107
30A	64.1	0.10	RATIONAL	0.32	132	1.92	2.25	2.42	2.72			39	51	60	70
31	64.9	0.10	RATIONAL	0.33	75	2.82	3.25	3.58	3.90			60	77	92	104
32	143.8	0.22	RATIONAL	0.33	163	1.63	1.90	2.09	2.31			78	99	120	138
33	153.4	0.24	RATIONAL	0.33	168	1.59	1.86	2.05	2.26			81	104	125	144
34	61.3	0.10	RATIONAL	0.32	81	2.66	3.07	3.39	3.69			52	66	80	90
35	11111.5	17.36	TC&R	0.34	768	0.52	0.62	0.68	0.78	2.57	20.72	1879	2380	2856	3406

* Runoff Coefficients for 25-, 50-, and 100-year storm frequency include multiple factors of 1.1 , 1.2 & 1.25 respectively as indicated in the TxDOT Hydraulic Design Manual.

** DA 13 and 15 previously included in the study, have been removed in the update due to the shift in alignment

RUN OFF COMPUTATION FOR SH249 EXTENSION PROJECT - EXISTING CONDITION
 CSJ: 0912-00-144

BRIDGE/CULVERT STATION	DA NO	PEAK Q METHOD	AREA	AREA	AREA	Land Use				RUNOFF* COEFFICIENT	LENGTH			VELOCITY		CHANNEL	TIME	SCS*** LAG	%IMPERVIOUS					%IMP	10-YR INT	25-YR INT	50-YR INT	100-YR INT	HW AT CHANNEL	HW AT SITE	BSF	SLOPE	SLOPE	RATIONAL				TC&R																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
						Woods	Pasture	Resid- ential	Industry		OVERLAND	SHALLOW/ CHANNEL	CHANNEL	OVERLAND	SHALLOW/ CHANNEL				CHANNEL	TIME	SCS*** LAG	Woods	Pasture											Resid- ential	Industry	%IMP	10-YR INT	25-YR INT	50-YR INT	100-YR INT	HW AT CHANNEL	HW AT SITE	BSF	SLOPE	SLOPE	Q10	Q25	Q50	Q100	Q10	Q25	Q50	Q100	CFS	CFS	CFS	CFS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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(Based on SH249 Chain)			SF	(AC)	(SQ. MI)	0.32	0.35	0.40	0.90		(FT)	(FT)	(FT)	(FPS)	(FPS)	(FPS)	(MIN)	(MIN)	0.00	0.00	20.00	72.00		(IN/HR)	(IN/HR)	(IN/HR)	(IN/HR)	(FT)	(FT)		(FT/FT)	(FT/MILE)	CFS	CFS	CFS	CFS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										

SH 249

APPENDIX A - EXISTING TC&R PARAMETERS

DA ID	AREA AC	AREA (SQMI)	% IMP	L (MI)	N	CHANN SLOPE (FT/MI)	So (FT/MI)	I	DLU%	DPP%	TC+R	TC	Ra			
													10-YR ADJ R	25-YR ADJ R	50-YR ADJ R	100-YR ADJ R
10	436.9	0.68	20%	1.675	0.08	13.46	58.51	0.1813	91%	20	4.57	3.07	1.90	1.83	1.78	1.74
12	779.50	1.22	15%	1.331	0.08	33.59	48.83	0.1147	76%	20	3.67	2.36	1.66	1.60	1.57	1.53
14	406.8	0.64	1%	1.458	0.08	13.49	44.57	0.0013	13%	20	6.58	4.12	3.11	2.99	2.92	2.85
14A	536.0	0.84	1%	1.452	0.08	13.78	44.77	0.0010	10%	20	6.53	4.09	3.08	2.96	2.89	2.82
14C	222.6	0.35	1%	1.410	0.08	9.00	7.80	0.0005	5%	20	8.79	2.98	7.35	7.07	6.91	6.74
17	10243.90	16.01	11%	10.656	0.08	7.74	15.48	0.0622	57%	20	23.39	10.58	16.21	15.60	15.24	14.86
18	558.5	0.87	4%	1.648	0.08	3.09	29.72	0.0077	19%	20	11.07	6.20	6.16	5.93	5.79	5.65
22	415.7	0.65	1%	1.243	0.08	7.76	28.95	0.0002	2%	20	7.40	4.11	4.16	4.00	3.91	3.81
25	3342.30	5.22	4%	4.37	0.08	20.59	20.59	0.0085	21%	20	11.68	5.83	7.40	7.12	6.95	6.78
35	11111.50	17.36	1%	7.965	0.08	16.32	16.32	0.0004	4%	20	18.36	8.46	12.52	12.05	11.77	11.48

EXISTING Tc&R PARAMETERS - DETAILED HEC-HMS POND ROUTING														RM				Rp				Ra						
HMS NODE	AREA AC	AREA (SQMI)	%IMP	L (MI)	N	CHANN SLOPE (FT/MI)	So (FT/MI)	I	DLU%	DPP%	TC+R	TC	R	10-YR	25-YR	50-YR	100-YR	10-YR	25-YR	50-YR	100-YR	10-YR ADJ R	25-YR ADJ R	50-YR ADJ R	100-YR ADJ R			STREAM
401	11112	17.36	0.89%	7.20	0.08	18.04	18.04	0.0004	0.04	20	16.67	7.96	8.71	2.32	2.09	1.95	1.80	1.26	1.22	1.19	1.16	11.02	10.60	10.36	10.10	DIV401	DET401	MILL
401A	914	1.43	1.47%	6.94	0.08	72.02	72.017	0.00102	0.07	20	9.43	6.66	2.77	2.32	2.09	1.95	1.80	1.26	1.22	1.19	1.16	3.51	3.38	3.30	3.22			MILL
405	3342	5.22	4.24%	4.24	0.08	21.20	21.20	0.009	0.21	20	11.34	5.72	5.62	2.32	2.09	1.95	1.80	1.26	1.22	1.19	1.16	7.11	6.85	6.69	6.52	DIV405	DET405	TRIB NO. 5
405A	1512	2.36	2.72%	7.48	0.08	53.47	53.47	0.00232	0.09	20	11.04	7.25	3.79	2.32	2.09	1.95	1.80	1.26	1.22	1.19	1.16	4.79	4.61	4.51	4.39	DIV405A	DET405A	TRIB NO. 5
402A	10271	16.05	11.42%	8.56	0.08	17.51	17.51	0.06439	0.56	20	16.06	7.59	8.47	2.32	2.09	1.95	1.80	1.26	1.22	1.19	1.16	10.72	10.31	10.07	9.82	DIV402A	DET402A	TRIB NO. 5/ MILL
402B	1210	1.89	0.00%	1.18	0.08	54.96	54.96	0	0.21	20	3.84	2.54	1.30	2.32	2.09	1.95	1.80	1.26	1.22	1.19	1.16	1.64	1.58	1.55	1.51			TRIB NO. 4
402C	811	1.27	15.28%	1.79	0.08	55.98	55.98	0.11675	0.76	20	3.68	2.45	1.24	2.32	2.09	1.95	1.80	1.26	1.22	1.19	1.16	1.56	1.50	1.47	1.43			TRIB NO. 2
402D	830	1.30	13.03%	5.88	0.08	56.99	56.99	0.07845	0.60	20	7.87	5.25	2.62	2.32	2.09	1.95	1.80	1.26	1.22	1.19	1.16	3.31	3.19	3.12	3.04	DIV402D	DET402D	MILL

HYDROLOGIC COMPUTATIONS (RATIONAL METHOD, RUNOFF CURVES, OR TC&R (CLARK UNIT HYDROGRAPH)) PROPOSED CONDITIONS

DRAINAGE AREA ID	DA (ACRES)	DA (SQ. MILES)	PEAK Q METHOD	RUNOFF COEFFICIENT*	TIME OF CONCENTRATION (MIN)	INTENSITY (IN/HR)				BASIN SHAPE FACTOR	CHANNEL SLOPE (FT/MILE)	FLOW (CFS)			
						10-YR	25-YR	50-YR	100-YR			10-YR	25-YR	50-YR	100-YR
1	14.5	0.02	RATIONAL	0.40	57	3.45	3.94	4.28	4.71			20	25	29	34
2	19.5	0.03	RATIONAL	0.43	36	4.64	5.24	5.71	6.23			39	48	57	65
3	30.8	0.05	RATIONAL	0.51	68	3.06	3.51	3.81	4.22			48	60	71	82
4	28.2	0.04	RATIONAL	0.47	148	1.77	2.08	2.24	2.53			23	30	35	41
5	99.3	0.16	RATIONAL	0.36	138	1.87	2.18	2.35	2.65			67	86	101	119
6	52.3	0.08	RATIONAL	0.34	73	2.92	3.35	3.63	4.03			52	66	78	90
7	25.0	0.04	RATIONAL	0.35	62	3.26	3.73	4.05	4.47			29	36	43	49
8	63.9	0.10	RATIONAL	0.35	56	3.49	3.98	4.32	4.77			78	98	116	134
9	59.6	0.09	RATIONAL	0.38	32	4.99	5.62	6.12	6.67			113	140	166	188
10	436.9	0.68	TC&R	0.41	340	0.97	1.16	1.24	1.43	2.44	40.30	377	465	545	631
11	32.0	0.05	RATIONAL	0.42	81	2.73	3.14	3.40	3.78			37	47	55	64
12	779.5	1.22	TC&R	0.39	259	1.18	1.40	1.51	1.72	1.03	47.32	792	979	1151	1327
14	406.8	0.64	TC&R	0.35	280	1.11	1.33	1.42	1.63	2.49	68.57	218	273	325	383
14A	536.0	0.84	TC&R	0.34	282	1.11	1.32	1.42	1.62	1.78	46.50	286	363	428	504
14B	44.9	0.07	RATIONAL	0.35	91	2.50	2.89	3.13	3.49			39	50	59	69
14C	222.6	0.35	TC&R	0.35	273	1.14	1.35	1.45	1.66	4.12	51.42	72	91	109	130
16	153.8	0.24	RATIONAL	0.44	228	1.30	1.54	1.65	1.88			87	114	133	158
17	10243.9	16.01	TC&R	0.37	625	0.61	0.75	0.80	0.93	7.09	22.52	1590	1994	2366	2807
17B	19.1	0.03	RATIONAL	0.42	52	3.66	4.17	4.53	4.98			29	36	43	50
17C	8.2	0.01	RATIONAL	0.44	29	5.27	5.93	6.46	7.02			19	24	28	32
18	558.5	0.87	TC&R	0.36	290	1.09	1.30	1.39	1.59	3.11	69.76	177	222	264	312
19	45.7	0.07	RATIONAL	0.35	91	2.50	2.89	3.13	3.49			40	51	60	70
20	66.7	0.10	RATIONAL	0.35	80	2.74	3.16	3.42	3.80			63	80	95	110
21	140.1	0.22	RATIONAL	0.35	339	0.97	1.16	1.24	1.43	3.87	52.47	131	235	305	390
22	415.7	0.65	TC&R	0.33	283	1.10	1.32	1.41	1.62	0.74	64.34	182	230	275	325
23	33.4	0.05	RATIONAL	0.36	41	4.27	4.84	5.27	5.76			52	64	76	87
24	98.2	0.15	RATIONAL	0.34	129	1.96	2.29	2.47	2.77			64	83	97	114
25	3342.3	5.22	TC&R	0.34	309	1.04	1.24	1.33	1.53	3.29	21.74	952	1199	1431	1697
26	9.7	0.02	RATIONAL	0.55	12	8.34	9.21	10.09	10.77			45	55	66	73
27	83.7	0.13	RATIONAL	0.34	104	2.28	2.64	2.85	3.19			66	84	99	115
28	51.9	0.08	RATIONAL	0.36	68	3.05	3.50	3.79	4.20			58	73	86	99
29	101.9	0.16	RATIONAL	0.35	90	2.53	2.92	3.16	3.52			90	115	136	157
29A	13.1	0.02	RATIONAL	0.50	23	6.01	6.73	7.34	7.94			40	49	58	65
30	166.4	0.26	RATIONAL	0.36	310	1.03	1.24	1.32	1.52			62	82	95	114
30A	64.1	0.10	RATIONAL	0.38	132	1.92	2.25	2.42	2.72			47	61	71	84
31	64.9	0.10	RATIONAL	0.38	75	2.82	3.25	3.58	3.90			69	87	105	119
32	143.8	0.22	RATIONAL	0.36	163	1.63	1.90	2.09	2.31			84	107	129	148
33	153.4	0.24	RATIONAL	0.34	168	1.59	1.86	2.05	2.26			84	107	129	149
34	61.3	0.10	RATIONAL	0.37	81	2.66	3.07	3.39	3.69			61	77	93	105
35	11111.5	17.36	TC&R	0.34	768	0.53	0.65	0.69	0.81	2.57	20.72	1879	2380	2856	3408

* Runoff Coefficients for 25-, 50-, and 100-year storm frequency include multiple factors of 1.1 , 1.2 & 1.25 respectively as indicated in the TxDOT Hydraulic Design Manual.

** DA 13 and 15 previously included in the study, have been removed in the update due to the shift in alignment

RUN OFF COMPUTATION FOR SH249 EXTENSION PROJECT - PROPOSED CONDITION
 CSJ: 0912-00-144

BRIDGE/CULVERT STATION	DA NO	PEAK Q METHOD	AREA	AREA	AREA	Land Use				RUNOFF* COEFFICIENT	LENGTH			VELOCITY			TIME	SCS*** LAG	%IMPERVIOUS				%IMP	10-YR INT	25-YR INT	50-YR INT	100-YR INT	HW AT CHANNEL	HW AT SITE	BSF	SLOPE	SLOPE	RATIONAL				TC&R																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
						Woods	Pasture	Resid- ential	Industry		OVERLAND	SHALLOW/ CHANNEL	CHANNEL	OVERLAND	SHALLOW/ CHANNEL	CHANNEL			Woods	Pasture	Resid- ential	Industry											Q10	Q25	Q50	Q100	Qc				S	So	Op																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												

SH 249

APPENDIX A - PROPOSED TC&R PARAMETERS

DA ID	AREA AC	AREA (SQMI)	% IMP	L (MI)	N	CHANN SLOPE (FT/MI)	So (FT/MI)	I	DLU%	DPP%	TC+R	TC	Ra			
													10-YR ADJ R	25-YR ADJ R	50-YR ADJ R	100-YR ADJ R
10	436.9	0.68	20%	1.675	0.08	13.46	58.51	0.18310098	92%	20	4.55	3.06	1.89	1.82	1.78	1.73
12	779.50	1.22	16%	1.331	0.08	33.59	48.83	0.124838999	78%	20	3.59	2.30	1.63	1.57	1.53	1.49
14	406.8	0.64	3%	1.458	0.08	13.49	44.57	0.005029478	17%	20	6.53	4.09	3.08	2.97	2.90	2.82
14A	536.0	0.84	2%	1.452	0.08	13.78	44.77	0.00216417	11%	20	6.51	4.08	3.07	2.95	2.88	2.81
14C	222.6	0.35	4%	1.410	0.08	9.00	7.80	0.003953796	10%	20	8.72	2.96	7.29	7.02	6.85	6.68
17	10243.90	16.01	12%	10.656	0.08	7.74	15.48	0.068634016	57%	20	23.05	10.42	15.97	15.37	15.01	14.64
18	558.5	0.87	7%	1.648	0.08	3.09	29.72	0.016607369	24%	20	10.84	6.07	6.04	5.81	5.68	5.53
22	415.7	0.65	1%	1.243	0.08	7.76	28.95	0.000279	3%	20	7.39	4.11	4.16	4.00	3.91	3.81
25	3342.30	5.22	5%	4.37	0.08	20.59	20.59	0.011019358	22%	20	11.61	5.80	7.35	7.08	6.91	6.74
35	11111.50	17.36	1%	7.965	0.08	16.32	16.32	0.000508752	5%	20	18.36	8.46	12.52	12.05	11.77	11.47

PROPOSED Tc&R PARAMETERS - DETAILED HEC-HMS POND ROUTING														RM				Rp				Ra						
HMS NODE	AREA AC	AREA (SQMI)	%IMP	L (MI)	N	CHANN SLOPE (FT/MI)	So (FT/MI)	I	DLU%	DPP%	TC+R	TC	R	10-YR	25-YR	50-YR	100-YR	10-YR	25-YR	50-YR	100-YR	10-YR ADJ R	25-YR ADJ R	50-YR ADJ R	100-YR ADJ R			STREAM
401	11112	17.36	1.34%	7.20	0.08	18.04	18.04	0.00068	0.05	20	16.66	7.95	8.70	2.32	2.09	1.95	1.80	1.26	1.22	1.19	1.16	11.01	10.60	10.35	10.09	DIV401	DET401	MILL
401A	914	1.43	5.21%	6.94	0.08	72.02	72.017	0.00618	0.12	20	9.32	6.58	2.74	2.32	2.09	1.95	1.80	1.26	1.22	1.19	1.16	3.47	3.34	3.26	3.18			MILL
405	3342	5.22	4.84%	4.24	0.08	21.20	21.20	0.01066	0.22	20	11.30	5.69	5.60	2.32	2.09	1.95	1.80	1.26	1.22	1.19	1.16	7.09	6.82	6.66	6.50	DIV405	DET405	TRIB NO. 5
405A	1512	2.36	5.16%	7.48	0.08	53.47	53.47	0.00622	0.12	20	10.94	7.18	3.76	2.32	2.09	1.95	1.80	1.26	1.22	1.19	1.16	4.75	4.57	4.47	4.35	DIV405A	DET405A	TRIB NO. 5
402A	10271	16.05	11.92%	8.56	0.08	17.51	17.51	0.06798	0.57	20	15.93	7.53	8.40	2.32	2.09	1.95	1.80	1.26	1.22	1.19	1.16	10.63	10.23	9.99	9.74			MILL
402B	1210	1.89	2.28%	1.18	0.08	54.96	54.96	0.0053	0.23	20	3.79	2.51	1.28	2.32	2.09	1.95	1.80	1.26	1.22	1.19	1.16	1.62	1.56	1.53	1.49			TRIB NO. 4
402C	811	1.27	16.57%	1.79	0.08	55.98	55.98	0.12954	0.78	20	3.58	2.37	1.20	2.32	2.09	1.95	1.80	1.26	1.22	1.19	1.16	1.52	1.46	1.43	1.39			TRIB NO. 2
402D	830	1.30	15.76%	5.88	0.08	56.99	56.99	0.09948	0.63	20	7.50	5.00	2.50	2.32	2.09	1.95	1.80	1.26	1.22	1.19	1.16	3.16	3.04	2.97	2.89	DIV402D	DET402D	MILL

Appendix B – Malcolm Method Detention Volume Calculation

				ROW to ROW or ROW to RD CL	ROW to ROW or ROW to RD CL	PAVE	PAVE	PAVE	EXISTING Land Use				EXISTING	PROPOSED Land Use				PROPOSED	LENGTH
BRIDGE/CULVERT	DA	REQ DET	REQ DET	AREA	AREA	AREA 1	AREA 2	TOTAL AREA	Woods	Pasture	Resid- ential	Road	RUNOFF*	Woods	Pasture	Resid- ential	Road	RUNOFF*	SHALLOW/ CHANNEL
STATION	NO	VOL	VOL+20%										COEFFICIENT					COEFFICIENT	
(Based on SH249 Chain)		AC-FT	AC-FT	SF	(AC)	SF	SF	AC	0.32	0.35	0.40	0.85		0.32	0.35	0.40	0.85		(FT)
1199+80	1	1.70	2.04	643850	14.8	97280	23484	2.8	14.8				0.32	12.0			2.8	0.42	1280
1211+22	2	1.14	1.36	299147	6.9	38722	46816	2.0	6.9				0.32	4.9			2.0	0.47	1635
1224+20	3	1.59	1.90	605939	13.9	38722	73644	2.6	13.9				0.32	11.3			2.6	0.42	1988
1241+40	4	1.18	1.41	454913	10.4	86108		2.0	10.4				0.32	8.5			2.0	0.42	1133
1254+00	5	4.25	5.10	1005399	23.1	319200		7.3	23.1				0.32	15.8			7.3	0.49	2100
1271+66	6	1.87	2.25	405828	9.3	141816		3.3	9.3				0.32	6.1			3.3	0.51	933
1275+20	7	1.24	1.48	255045	5.9	97280		2.2	5.9				0.32	3.6			2.2	0.52	640
1285+85	8	1.24	1.49	478598	11.0	91200		2.1	11.0				0.32	8.9			2.1	0.42	1200
1296+03	9	2.42	2.90	911117	20.9	174040		4.0	20.9				0.32	16.9			4.0	0.42	2290
1320+80	10	1.82	2.19	690423	15.8	133760		3.1	15.8				0.32	12.8			3.1	0.42	1760
1335+49	11	1.01	1.21	386147	8.9	72200		1.7	8.9				0.32	7.2			1.7	0.42	950
1347+00	12	3.85	4.63	1454327	33.4	269800		6.2	33.4				0.32	27.2			6.2	0.42	3550
1422+08	14	5.26	6.31	1063815	24.4	402800		9.2	24.4				0.32	15.2			9.2	0.52	2650
1427+50	14A	3.05	3.66	1152189	26.5	215080		4.9	26.5				0.32	21.5			4.9	0.42	2830
1414+28	14B	1.33	1.60	517255	11.9	97280		2.2	11.9				0.32	9.6			2.2	0.42	1280
1400+00	14C	3.45	4.14	1305248	30.0	243200		5.6	30.0				0.32	24.4			5.6	0.42	3200
1511+03	16	4.72	5.67	1763940	40.5	336300		7.7	40.5				0.32	32.8			7.7	0.42	4425
1538+08	17	11.83	14.20	4406620	101.2	627000	190000	18.8	101.2				0.32	82.4			18.8	0.42	16500
1753+00	17B	3.49	4.19	291852	6.7	101840		6.7	6.7				0.32	0.0			6.7	0.85	1340
1766+70	17C	0.91	1.09	180193	4.1	68400		1.6	4.1				0.32	2.6			1.6	0.52	900
1558+03	18	7.88	9.46	2915462	66.9	328016	228000	12.8	66.9				0.32	54.2			12.8	0.42	10316
1568+48	19	0.54	0.65	194607	4.5	37810		0.9	4.5				0.32	3.6			0.9	0.42	995
1587+50	20	0.71	0.85	271505	6.2	50236		1.2	6.2				0.32	5.1			1.2	0.42	1322
1595+50	21	0.23	0.27	107576	2.5	19418		0.4	2.5				0.32	2.0			0.4	0.42	511
1603+15	22	0.53	0.64	220490	5.1	40280		0.9	5.1				0.32	4.1			0.9	0.42	1060
1611+75	23	0.34	0.41	195954	4.5	37240		0.9	4.5				0.32	3.6			0.9	0.42	980
1619+57	24	0.54	0.64	203619	4.7	38532		0.9	4.7				0.32	3.8			0.9	0.42	1014
1635+27	25	6.52	7.83	2072132	47.6	179360	290320	10.8	47.6				0.32	36.8			10.8	0.44	10000
1656+03	26	0.84	1.01	331893	7.6	62548		1.4	7.6				0.32	6.2			1.4	0.42	823
1665+09	27	1.22	1.47	466688	10.7	90060		2.1	10.7				0.32	8.6			2.1	0.42	1185
1675+11	28	1.67	2.01	642235	14.7	120308		2.8	14.7				0.32	12.0			2.8	0.42	1583
1691+74	29	2.66	3.20	1007949	23.1	190000		4.4	23.1				0.32	18.8			4.4	0.42	2500
1719+50	29A	1.49	1.79	578894	13.3	106400		2.4	13.3				0.32	10.8			2.4	0.42	1400
1806+82	30	1.26	1.51	470674	10.8	93328		2.1	10.8				0.32	8.7			2.1	0.43	2456
1841+40	30A	1.49	1.79	561384	12.9	106058		2.4	12.9				0.32	10.5			2.4	0.42	2791
1871+75	31	0.71	0.86	276175	6.3	50768		1.2	6.3				0.32	5.2			1.2	0.42	1336
1876+29	32	0.48	0.57	335611	7.7	30210		0.7	7.7				0.32	7.0			0.7	0.37	795
1897+98	33	0.68	0.82	259492	6.0	49894		1.1	6.0				0.32	4.8			1.1	0.42	1313
1924+50	34	4.19	5.02	441121	10.1	341544		7.8	10.1				0.32	2.3			7.8	0.73	2247
1927+35	35	14.85	17.82	4145828	95.2	684076	380000	24.4	95.2				0.32	70.7			24.4	0.46	11501
Total	Total	106.21	127.45																

Enter Values in highlighted areas only!

Drainage Area: 1
 Calculations Prepared By: JTB
 Calculations Checked By:
 Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	71
Drainage Area (acres)	15

Landuse Acreage									
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	2.06	2.52	2.97	3.41	3.70	4.10
Pre-Project Q (cfs)	10	12	14	16	18	19

Post-Project	
Time-of-Concentration (min)	71
Drainage Area (acres)	15

Landuse Acreage									
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch
0.42	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	2.06	2.52	2.97	3.41	3.70	4.10
Post-Project Q (cfs)	13	16	18	21	23	25

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
 Montgomery County
 ebdikup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in")	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	18.9
Post-Project Excess Runoff (in)	6.5

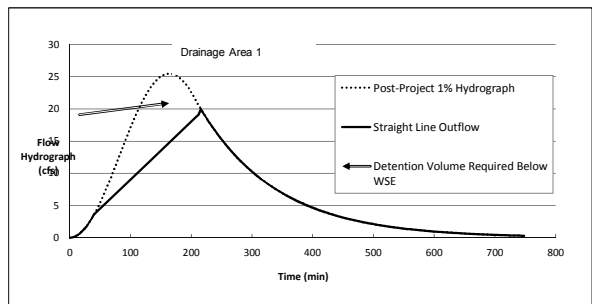
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	19.4	25.5
Small Hydrograph Method Time to Peak (min)	N/A	164.08

Approximate Volume Required
 (ac-ft)

1.70

Note: Requirement shown does not include a contingency volume



Time (min)	Time (hour)	Post-Project (cfs)	Straight Line Outflow (cfs)	Volume (acft)
0	0.00	0.0	0.00	
4	0.07	0.0	0.04	0.00
8	0.13	0.1	0.15	0.00
12	0.20	0.3	0.33	0.00
16	0.27	0.6	0.59	0.00
20	0.33	0.9	0.92	0.00
24	0.40	1.3	1.32	0.00
28	0.47	1.8	1.79	0.00
32	0.53	2.3	2.32	0.00
36	0.60	2.9	2.91	0.00
40	0.67	3.6	3.56	0.00
44	0.73	4.3	3.96	0.00
48	0.80	5.0	4.32	0.00
52	0.87	5.8	4.68	0.01

Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	25.5
Time Prop Max Q (min)	164
Row Prop Max Q (cfs)	111
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	125
Prop Q Just > Max Exist Q (cfs)	19.99
Prop Q Just < Max Exist Q (cfs)	19.37
Time Prop Q Just > Max Exist Q (min)	212
Time Prop = Max Exist Outflow (min)	215.71

Discharge slope (Q/T)

0.0900

Enter Values in highlighted areas only!

Drainage Area: 2
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	55
Drainage Area (acres)	7

Landuse Acreage									
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	2.49	3.02	3.55	4.05	4.40	4.85
Pre-Project Q (cfs)	5	7	8	9	10	11

Post-Project	
Time-of-Concentration (min)	55
Drainage Area (acres)	7

Landuse Acreage									
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch
0.47	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	2.49	3.02	3.55	4.05	4.40	4.85
Post-Project Q (cfs)	8	10	12	13	14	16

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
 Montgomery County
 ebdlkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in)*	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	29.0
Post-Project Excess Runoff (in)	7.3

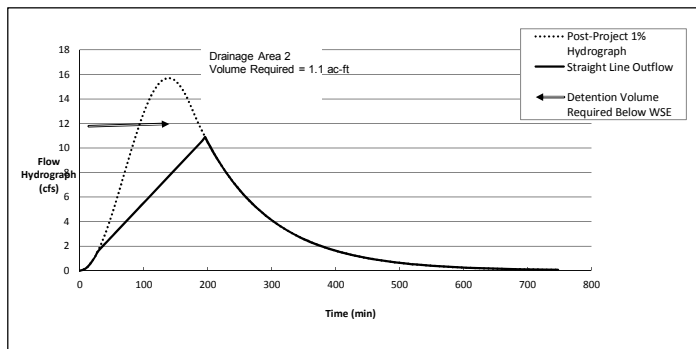
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	10.7	15.7
Small Hydrograph Method Time to Peak (min)	N/A	138.95

Approximate Volume Required
 (ac-ft)

1.1

Note: Requirement shown does not include a contingency volume



Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	15.7
Time Prop Max Q (min)	140
Row Prop Max Q (cfs)	105
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	120
Prop Q Just > Max Exist Q (cfs)	10.89
Prop Q Just < Max Exist Q (cfs)	10.49
Time Prop Q Just > Max Exist Q (min)	192
Time Prop = Max Exist Outflow (min)	193.84

Discharge slope (Q/T)

0.0552

Enter Values in highlighted areas only!

Drainage Area: 3
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	66
Drainage Area (acres)	14

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	2.17	2.64	3.12	3.57	3.87	4.29
Pre-Project Q (cfs)	10	12	14	16	17	19

Post-Project	
Time-of-Concentration (min)	66
Drainage Area (acres)	14

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.42	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	2.17	2.64	3.12	3.57	3.87	4.29
Post-Project Q (cfs)	13	15	18	21	23	25

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
 Montgomery County
 ebdikup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in)*	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	18.7
Post-Project Excess Runoff (in)	6.5

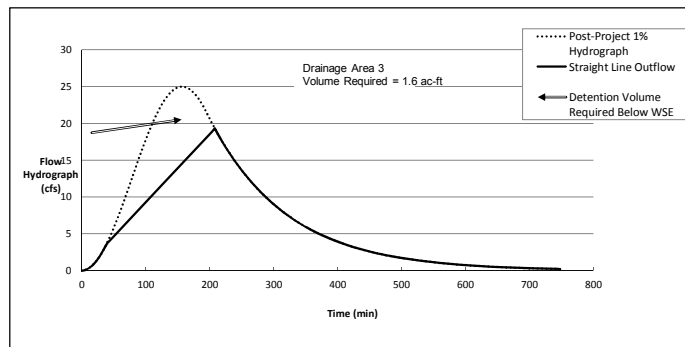
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	19.1	25.0
Small Hydrograph Method Time to Peak (min)	N/A	156.74

Approximate Volume Required (ac-ft)

1.6

Note: Requirement shown does not include a contingency volume



Time (min)	Time (hour)	Post-Project (cfs)	Straight Line Outflow (cfs)	Volume (acft)
0	0.00	0.0	0.00	
4	0.07	0.0	0.04	0.00
8	0.13	0.2	0.16	0.00
12	0.20	0.4	0.36	0.00
16	0.27	0.6	0.64	0.00
20	0.33	1.0	0.99	0.00
24	0.40	1.4	1.42	0.00
28	0.47	1.9	1.92	0.00
32	0.53	2.5	2.48	0.00
36	0.60	3.1	3.11	0.00
40	0.67	3.8	3.71	0.00
44	0.73	4.5	4.08	0.00
48	0.80	5.3	4.45	0.01
52	0.87	6.2	4.82	0.01

Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	25.0
Time Prop Max Q (min)	156
Row Prop Max Q (cfs)	109
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	123
Prop Q Just > Max Exist Q (cfs)	19.33
Prop Q Just < Max Exist Q (cfs)	18.70
Time Prop Q Just > Max Exist Q (min)	204
Time Prop = Max Exist Outflow (min)	205.64

Discharge slope (Q/T)

0.0927

Enter Values in highlighted areas only!

Drainage Area: 4
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	38
Drainage Area (acres)	10

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	3.20	3.85	4.50	5.09	5.54	6.06
Pre-Project Q (cfs)	11	13	15	17	18	20

Post-Project	
Time-of-Concentration (min)	38
Drainage Area (acres)	10

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.42	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	3.20	3.85	4.50	5.09	5.54	6.06
Post-Project Q (cfs)	14	17	20	22	24	26

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
Montgomery County
ebdkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in)*	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	19.2
Post-Project Excess Runoff (in)	6.5

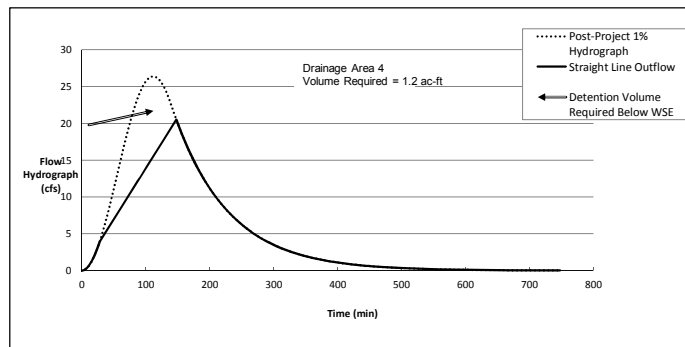
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	20.2	26.4
Small Hydrograph Method Time to Peak (min)	N/A	111.84

Approximate Volume Required (ac-ft)

1.2

Note: Requirement shown does not include a contingency volume



Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	26.4
Time Prop Max Q (min)	112
Row Prop Max Q (cfs)	98
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	108
Prop Q Just > Max Exist Q (cfs)	20.51
Prop Q Just < Max Exist Q (cfs)	19.58
Time Prop Q Just > Max Exist Q (min)	144
Time Prop = Max Exist Outflow (min)	145.54

Discharge slope (Q/T)

0.1385

Enter Values in highlighted areas only!

Drainage Area: 5
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	70
Drainage Area (acres)	23

Landuse Acreage									
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	2.09	2.55	3.00	3.45	3.74	4.14
Pre-Project Q (cfs)	15	19	22	25	28	31

Post-Project	
Time-of-Concentration (min)	70
Drainage Area (acres)	23

Landuse Acreage									
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch
0.49	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	2.09	2.55	3.00	3.45	3.74	4.14
Post-Project Q (cfs)	24	29	34	39	42	47

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
e	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
Montgomery County
ebdkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in")	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	31.6
Post-Project Excess Runoff (in)	7.5

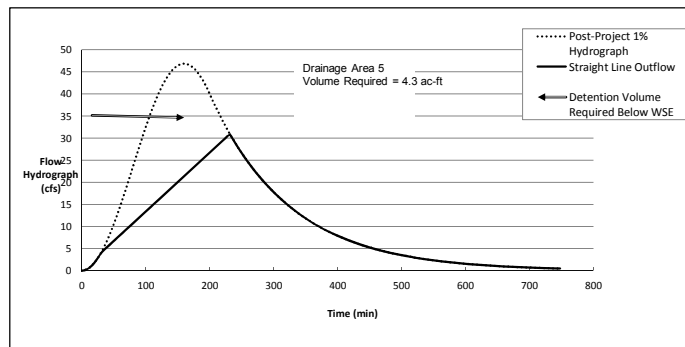
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	30.6	46.9
Small Hydrograph Method Time to Peak (min)	N/A	159.93

Approximate Volume Required (ac-ft)

4.3

Note: Requirement shown does not include a contingency volume



Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	46.9
Time Prop Max Q (min)	160
Row Prop Max Q (cfs)	110
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	129
Prop Q Just > Max Exist Q (cfs)	30.88
Prop Q Just < Max Exist Q (cfs)	29.89
Time Prop Q Just > Max Exist Q (min)	228
Time Prop = Max Exist Outflow (min)	229.11

Discharge slope (Q/T)

0.1336

Enter Values in highlighted areas only!

Drainage Area: 6
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	31
Drainage Area (acres)	9

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	3.63	4.35	5.08	5.72	6.23	6.78
Pre-Project Q (cfs)	11	13	15	17	19	20

Post-Project	
Time-of-Concentration (min)	31
Drainage Area (acres)	9

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.51	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	3.63	4.35	5.08	5.72	6.23	6.78
Post-Project Q (cfs)	17	21	24	27	30	32

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
e	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
 Montgomery County
 ebdkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in")	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	35.5
Post-Project Excess Runoff (in)	7.8

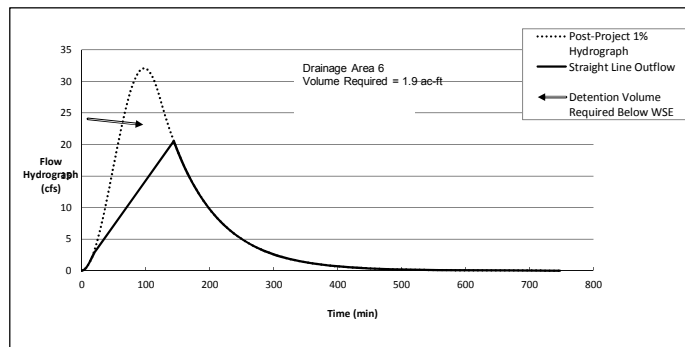
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	20.2	32.1
Small Hydrograph Method Time to Peak (min)	N/A	97.74

Approximate Volume Required (ac-ft)

1.9

Note: Requirement shown does not include a contingency volume



Time (min)	Time (hour)	Post-Project (cfs)	Straight Line Outflow (cfs)	Volume (acft)
0	0.00	0.0	0.00	
4	0.07	0.1	0.13	0.00
8	0.13	0.5	0.53	0.00
12	0.20	1.2	1.18	0.00
16	0.27	2.1	2.07	0.00
20	0.33	3.2	2.85	0.00
24	0.40	4.5	3.42	0.00
28	0.47	6.1	3.99	0.01
32	0.53	7.8	4.57	0.03
36	0.60	9.6	5.14	0.05
40	0.67	11.5	5.71	0.08
44	0.73	13.5	6.28	0.11
48	0.80	15.6	6.85	0.16
52	0.87	17.6	7.42	0.21

Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	32.1
Time Prop Max Q (min)	96
Row Prop Max Q (cfs)	94
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	107
Prop Q Just > Max Exist Q (cfs)	20.52
Prop Q Just < Max Exist Q (cfs)	19.46
Time Prop Q Just > Max Exist Q (min)	140
Time Prop = Max Exist Outflow (min)	141.35

Discharge slope (Q/T)

0.1427

Enter Values in highlighted areas only!

Drainage Area: 7
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	21
Drainage Area (acres)	6

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	4.57	5.44	6.33	7.06	7.71	8.32
Pre-Project Q (cfs)	9	10	12	13	15	16

Post-Project	
Time-of-Concentration (min)	21
Drainage Area (acres)	6

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.52	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	4.57	5.44	6.33	7.06	7.71	8.32
Post-Project Q (cfs)	14	17	19	22	24	26

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
Montgomery County
ebdkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in)*	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	37.3
Post-Project Excess Runoff (in)	7.9

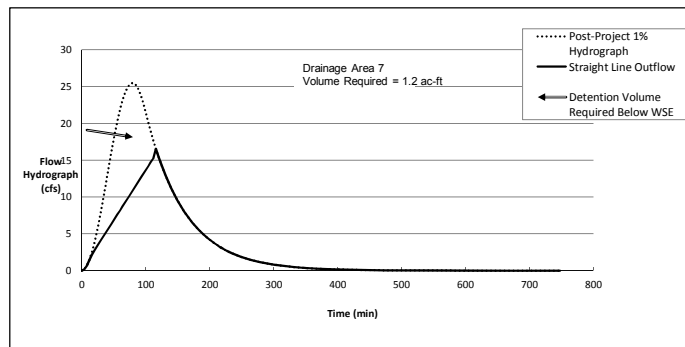
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	15.7	25.5
Small Hydrograph Method Time to Peak (min)	N/A	79.42

Approximate Volume Required (ac-ft)

1.2

Note: Requirement shown does not include a contingency volume



Time (min)	Time (hour)	Post-Project (cfs)	Straight Line Outflow (cfs)	Volume (acft)
0	0.00	0.0	0.00	
4	0.07	0.2	0.16	0.00
8	0.13	0.6	0.63	0.00
12	0.20	1.4	1.41	0.00
16	0.27	2.5	2.18	0.00
20	0.33	3.8	2.72	0.00
24	0.40	5.3	3.27	0.01
28	0.47	7.0	3.81	0.03
32	0.53	8.9	4.36	0.05
36	0.60	10.9	4.90	0.08
40	0.67	12.9	5.45	0.11
44	0.73	14.9	5.99	0.16
48	0.80	16.8	6.54	0.21
52	0.87	18.7	7.08	0.27

Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	25.5
Time Prop Max Q (min)	80
Row Prop Max Q (cfs)	90
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	100
Prop Q Just > Max Exist Q (cfs)	16.57
Prop Q Just < Max Exist Q (cfs)	15.52
Time Prop Q Just > Max Exist Q (min)	112
Time Prop = Max Exist Outflow (min)	115.30

Discharge slope (Q/T)

0.1362

Enter Values in highlighted areas only!

Drainage Area: 8
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	40
Drainage Area (acres)	11

Landuse Acreage									
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	3.08	3.71	4.34	4.92	5.35	5.85
Pre-Project Q (cfs)	11	13	15	17	19	21

Post-Project	
Time-of-Concentration (min)	40
Drainage Area (acres)	11

Landuse Acreage									
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch
0.42	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	3.08	3.71	4.34	4.92	5.35	5.85
Post-Project Q (cfs)	14	17	20	23	25	27

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
 Montgomery County
 ebdikup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in")	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	19.1
Post-Project Excess Runoff (in)	6.5

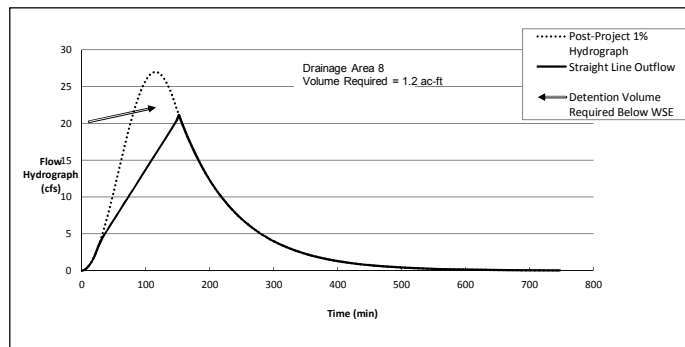
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	20.6	27.0
Small Hydrograph Method Time to Peak (min)	N/A	115.45

Approximate Volume Required (ac-ft)

1.2

Note: Requirement shown does not include a contingency volume



Time (min)	Time (hour)	Post-Project (cfs)	Straight Line Outflow (cfs)	Volume (acft)
0	0.00	0.0	0.00	
4	0.07	0.1	0.08	0.00
8	0.13	0.3	0.32	0.00
12	0.20	0.7	0.71	0.00
16	0.27	1.3	1.26	0.00
20	0.33	1.9	1.95	0.00
24	0.40	2.8	2.78	0.00
28	0.47	3.7	3.73	0.00
32	0.53	4.8	4.38	0.00
36	0.60	6.0	4.93	0.01
40	0.67	7.2	5.48	0.01
44	0.73	8.6	6.03	0.02
48	0.80	10.0	6.58	0.04
52	0.87	11.4	7.12	0.06

Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	27.0
Time Prop Max Q (min)	116
Row Prop Max Q (cfs)	99
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	109
Prop Q Just > Max Exist Q (cfs)	21.16
Prop Q Just < Max Exist Q (cfs)	20.23
Time Prop Q Just > Max Exist Q (min)	148
Time Prop = Max Exist Outflow (min)	150.39

Discharge slope (Q/T)

0.1370

Enter Values in highlighted areas only!

Drainage Area: 9

Calculations Prepared By: JTB

Calculations Checked By:

Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	76
Drainage Area (acres)	21

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	1.96	2.40	2.83	3.26	3.53	3.92
Pre-Project Q (cfs)	13	16	19	22	24	26

Post-Project	
Time-of-Concentration (min)	76
Drainage Area (acres)	21

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.42	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	1.96	2.40	2.83	3.26	3.53	3.92
Post-Project Q (cfs)	17	21	25	29	31	34

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
Montgomery County
ebdkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in")	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	19.1
Post-Project Excess Runoff (in)	6.5

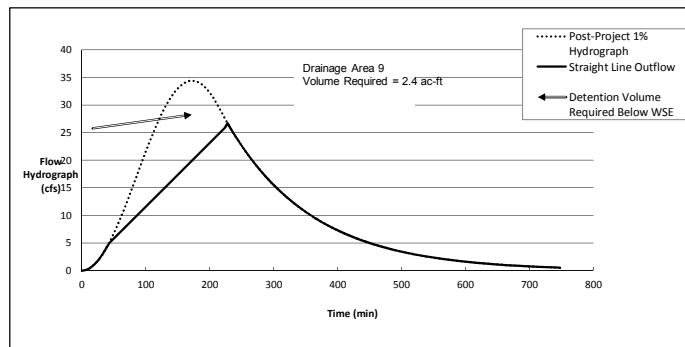
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	26.2	34.4
Small Hydrograph Method Time to Peak (min)	N/A	172.27

Approximate Volume Required (ac-ft)

2.4

Note: Requirement shown does not include a contingency volume



Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	34.4
Time Prop Max Q (min)	172
Row Prop Max Q (cfs)	113
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	128
Prop Q Just > Max Exist Q (cfs)	26.72
Prop Q Just < Max Exist Q (cfs)	25.93
Time Prop Q Just > Max Exist Q (min)	224
Time Prop = Max Exist Outflow (min)	226.66

Discharge slope (Q/T)

0.1156

Enter Values in highlighted areas only!

Drainage Area: 10
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	59
Drainage Area (acres)	16

Landuse Acreage									
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	2.37	2.87	3.38	3.87	4.20	4.63
Pre-Project Q (cfs)	12	15	17	20	21	23

Post-Project	
Time-of-Concentration (min)	59
Drainage Area (acres)	16

Landuse Acreage									
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch
0.42	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	2.37	2.87	3.38	3.87	4.20	4.63
Post-Project Q (cfs)	16	19	22	26	28	31

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
e	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
Montgomery County
ebdkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in)*	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	19.6
Post-Project Excess Runoff (in)	6.6

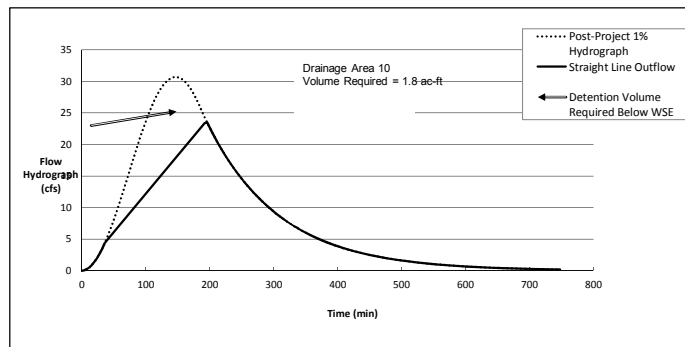
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	23.4	30.7
Small Hydrograph Method Time to Peak (min)	N/A	146.88

Approximate Volume Required (ac-ft)

1.8

Note: Requirement shown does not include a contingency volume



Time (min)	Time (hour)	Post-Project (cfs)	Straight Line Outflow (cfs)	Volume (acft)
0	0.00	0.0	0.00	
4	0.07	0.1	0.06	0.00
8	0.13	0.2	0.22	0.00
12	0.20	0.5	0.50	0.00
16	0.27	0.9	0.89	0.00
20	0.33	1.4	1.38	0.00
24	0.40	2.0	1.98	0.00
28	0.47	2.7	2.67	0.00
32	0.53	3.5	3.45	0.00
36	0.60	4.3	4.33	0.00
40	0.67	5.3	4.87	0.00
44	0.73	6.3	5.35	0.00
48	0.80	7.4	5.84	0.01
52	0.87	8.5	6.32	0.02

Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	30.7
Time Prop Max Q (min)	148
Row Prop Max Q (cfs)	107
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	368
Row Prop < Max Exist Outflow (cfs)	120
Prop Q Just > Max Exist Q (cfs)	23.51
Prop Q Just < Max Exist Q (cfs)	22.69
Time Prop Q Just > Max Exist Q (min)	192
Time Prop = Max Exist Outflow (min)	192.47

Discharge slope (Q/T)

0.1216

Enter Values in highlighted areas only!

Drainage Area: 11
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	32
Drainage Area (acres)	9

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	3.59	4.30	5.02	5.66	6.16	6.71
Pre-Project Q (cfs)	10	12	14	16	18	19

Post-Project	
Time-of-Concentration (min)	32
Drainage Area (acres)	9

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.42	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	3.59	4.30	5.02	5.66	6.16	6.71
Post-Project Q (cfs)	13	16	19	21	23	25

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
 Montgomery County
 ebdikup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in)*	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	19.1
Post-Project Excess Runoff (in)	6.5

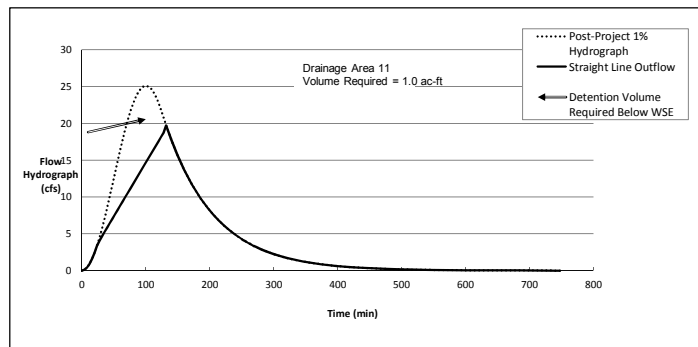
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	19.1	25.1
Small Hydrograph Method Time to Peak (min)	N/A	100.49

Approximate Volume Required (ac-ft)

1.0

Note: Requirement shown does not include a contingency volume



Time (min)	Time (hour)	Post-Project (cfs)	Straight Line Outflow (cfs)	Volume (acft)
0	0.00	0.0	0.00	
4	0.07	0.1	0.10	0.00
8	0.13	0.4	0.39	0.00
12	0.20	0.9	0.87	0.00
16	0.27	1.5	1.54	0.00
20	0.33	2.4	2.37	0.00
24	0.40	3.4	3.37	0.00
28	0.47	4.5	4.09	0.00
32	0.53	5.8	4.68	0.01
36	0.60	7.1	5.26	0.01
40	0.67	8.6	5.85	0.03
44	0.73	10.1	6.43	0.04
48	0.80	11.7	7.02	0.07
52	0.87	13.2	7.60	0.09

Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	25.1
Time Prop Max Q (min)	100
Row Prop Max Q (cfs)	95
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	104
Prop Q Just > Max Exist Q (cfs)	19.75
Prop Q Just < Max Exist Q (cfs)	18.75
Time Prop Q Just > Max Exist Q (min)	128
Time Prop = Max Exist Outflow (min)	130.61

Discharge slope (Q/T)

0.1462

Enter Values in highlighted areas only!

Drainage Area: 1.2

Calculations Prepared By: JTB

Calculations Checked By:

Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	118
Drainage Area (acres)	33

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	1.42	1.75	2.08	2.43	2.62	2.94
Pre-Project Q (cfs)	15	19	22	26	28	31

Post-Project	
Time-of-Concentration (min)	118
Drainage Area (acres)	33

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.42	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	1.42	1.75	2.08	2.43	2.62	2.94
Post-Project Q (cfs)	20	25	29	34	37	41

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
Montgomery County
ebdlkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in)*	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	18.6
Post-Project Excess Runoff (in)	6.5

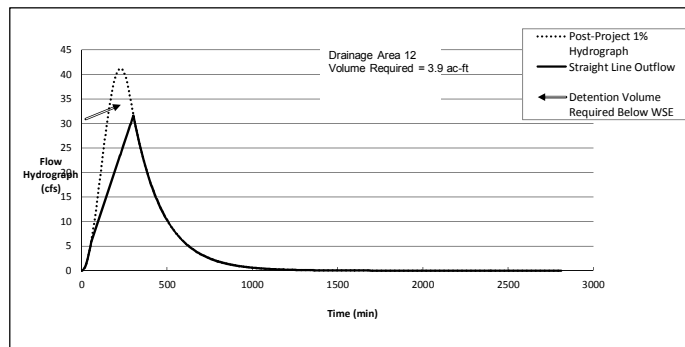
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	31.4	41.2
Small Hydrograph Method Time to Peak (min)	N/A	228.09

Approximate Volume Required
(ac-ft)

3.9

Note: Requirement shown does not include a contingency volume



Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	41.2
Time Prop Max Q (min)	228
Row Prop Max Q (cfs)	127
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	147
Prop Q Just > Max Exist Q (cfs)	31.62
Prop Q Just < Max Exist Q (cfs)	30.90
Time Prop Q Just > Max Exist Q (min)	300
Time Prop = Max Exist Outflow (min)	301.29

Discharge slope (Q/T)

0.1042

Time (min)	Time (hour)	Post-Project (cfs)	Straight Line Outflow (cfs)	Volume (acft)
0	0.00	0.0	0.00	
4	0.07	0.0	0.03	0.00
8	0.13	0.1	0.12	0.00
12	0.20	0.3	0.28	0.00
16	0.27	0.5	0.50	0.00
20	0.33	0.8	0.78	0.00
24	0.40	1.1	1.11	0.00
28	0.47	1.5	1.51	0.00
32	0.53	2.0	1.97	0.00
36	0.60	2.5	2.48	0.00
40	0.67	3.0	3.05	0.00
44	0.73	3.7	3.66	0.00
48	0.80	4.3	4.34	0.00
52	0.87	5.1	5.06	0.00

Enter Values in highlighted areas only!

Drainage Area: 1.4

Calculations Prepared By: JTB

Calculations Checked By:

Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	88
Drainage Area (acres)	24

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	1.76	2.16	2.56	2.96	3.20	3.56
Pre-Project Q (cfs)	14	17	20	23	25	28

Post-Project	
Time-of-Concentration (min)	88
Drainage Area (acres)	24

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.52	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	1.76	2.16	2.56	2.96	3.20	3.56
Post-Project Q (cfs)	22	27	32	37	41	45

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
e	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM Montgomery County ebdikup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in")	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	37.7
Post-Project Excess Runoff (in)	7.9

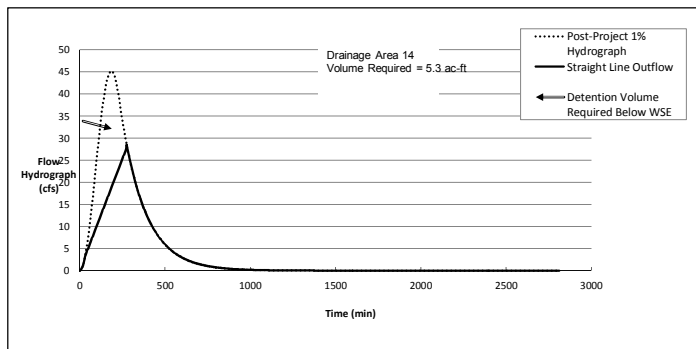
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	27.8	45.2
Small Hydrograph Method Time to Peak (min)	N/A	186.04

Approximate Volume Required (ac-ft)

5.3

Note: Requirement shown does not include a contingency volume



Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	45.2
Time Prop Max Q (min)	188
Row Prop Max Q (cfs)	117
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	140
Prop Q Just > Max Exist Q (cfs)	28.51
Prop Q Just < Max Exist Q (cfs)	27.73
Time Prop Q Just > Max Exist Q (min)	272
Time Prop = Max Exist Outflow (min)	275.57

Discharge slope (Q/T)

0.1009

Enter Values in highlighted areas only!

Drainage Area: 1.4A
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	94
Drainage Area (acres)	27

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	1.68	2.06	2.44	2.83	3.06	3.41
Pre-Project Q (cfs)	14	17	21	24	26	29

Post-Project	
Time-of-Concentration (min)	94
Drainage Area (acres)	27

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.42	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	1.68	2.06	2.44	2.83	3.06	3.41
Post-Project Q (cfs)	19	23	27	31	34	38

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
 Montgomery County
 ebdikup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in")	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	18.5
Post-Project Excess Runoff (in)	6.5

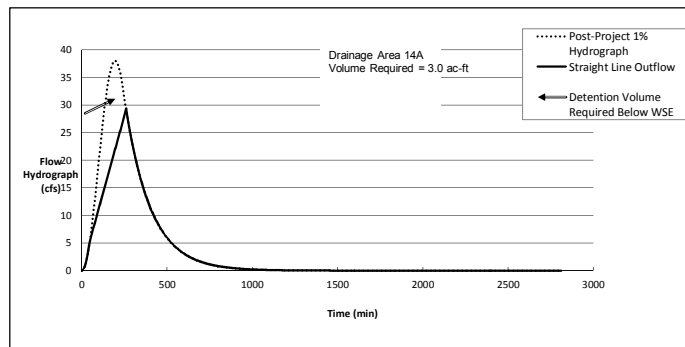
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	28.9	38.0
Small Hydrograph Method Time to Peak (min)	N/A	196.02

Approximate Volume Required
 (ac-ft)

3.0

Note: Requirement shown does not include a contingency volume



Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	38.0
Time Prop Max Q (min)	196
Row Prop Max Q (cfs)	119
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	136
Prop Q Just > Max Exist Q (cfs)	29.40
Prop Q Just < Max Exist Q (cfs)	28.63
Time Prop Q Just > Max Exist Q (min)	256
Time Prop = Max Exist Outflow (min)	258.46

Discharge slope (Q/T)

0.1119

Enter Values in highlighted areas only!

Drainage Area: 1.4B
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	43
Drainage Area (acres)	12

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	2.95	3.56	4.17	4.73	5.14	5.63
Pre-Project Q (cfs)	11	14	16	18	20	21

Post-Project	
Time-of-Concentration (min)	43
Drainage Area (acres)	12

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.42	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	2.95	3.56	4.17	4.73	5.14	5.63
Post-Project Q (cfs)	15	18	21	24	26	28

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
Montgomery County
ebdkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in)*	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	18.5
Post-Project Excess Runoff (in)	6.5

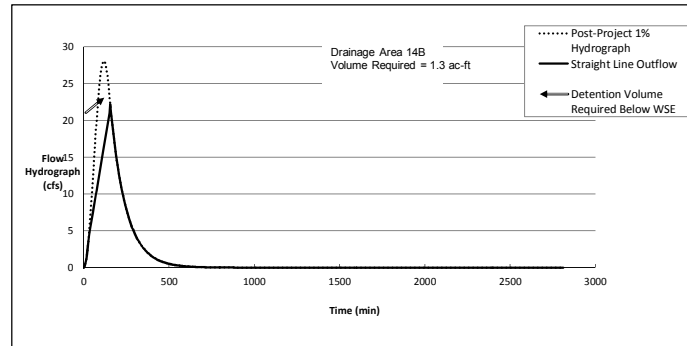
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	21.4	28.1
Small Hydrograph Method Time to Peak (min)	N/A	119.03

Approximate Volume Required (ac-ft)

1.3

Note: Requirement shown does not include a contingency volume



Time (min)	Time (hour)	Post-Project (cfs)	Straight Line Outflow (cfs)	Volume (acft)
0	0.00	0.0	0.00	
4	0.07	0.1	0.08	0.00
8	0.13	0.3	0.31	0.00
12	0.20	0.7	0.70	0.00
16	0.27	1.2	1.23	0.00
20	0.33	1.9	1.91	0.00
24	0.40	2.7	2.72	0.00
28	0.47	3.7	3.66	0.00
32	0.53	4.7	4.42	0.00
36	0.60	5.9	4.98	0.00
40	0.67	7.1	5.53	0.01
44	0.73	8.4	6.08	0.02
48	0.80	9.8	6.63	0.04
52	0.87	11.3	7.19	0.06

Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	28.1
Time Prop Max Q (min)	120
Row Prop Max Q (cfs)	100
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	110
Prop Q Just > Max Exist Q (cfs)	22.20
Prop Q Just < Max Exist Q (cfs)	21.25
Time Prop Q Just > Max Exist Q (min)	152
Time Prop = Max Exist Outflow (min)	155.16

Discharge slope (Q/T)

0.1382

Enter Values in highlighted areas only!

Drainage Area: 14C
 Calculations Prepared By: JTB
 Calculations Checked By:
 Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	107
Drainage Area (acres)	30

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	1.53	1.89	2.24	2.60	2.81	3.15
Pre-Project Q (cfs)	15	18	22	25	27	30

Post-Project	
Time-of-Concentration (min)	107
Drainage Area (acres)	30

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.42	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	1.53	1.89	2.24	2.60	2.81	3.15
Post-Project Q (cfs)	19	24	28	33	35	40

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
e	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
 Montgomery County
 ebdkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in)*	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	18.7
Post-Project Excess Runoff (in)	6.5

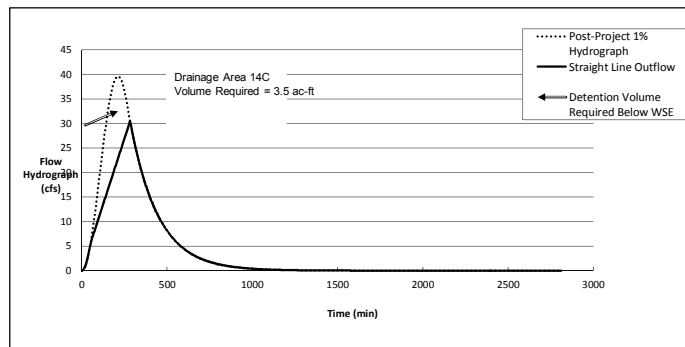
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	30.2	39.6
Small Hydrograph Method Time to Peak (min)	N/A	213.45

Approximate Volume Required (ac-ft)

3.5

Note: Requirement shown does not include a contingency volume



Time (min)	Time (hour)	Post-Project (cfs)	Straight Line Outflow (cfs)	Volume (acft)
0	0.00	0.0	0.00	
4	0.07	0.0	0.03	0.00
8	0.13	0.1	0.14	0.00
12	0.20	0.3	0.31	0.00
16	0.27	0.5	0.55	0.00
20	0.33	0.9	0.85	0.00
24	0.40	1.2	1.22	0.00
28	0.47	1.7	1.66	0.00
32	0.53	2.2	2.15	0.00
36	0.60	2.7	2.71	0.00
40	0.67	3.3	3.33	0.00
44	0.73	4.0	4.00	0.00
48	0.80	4.7	4.73	0.00
52	0.87	5.5	5.52	0.00

Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	39.6
Time Prop Max Q (min)	212
Row Prop Max Q (cfs)	123
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	142
Prop Q Just > Max Exist Q (cfs)	30.48
Prop Q Just < Max Exist Q (cfs)	29.74
Time Prop Q Just > Max Exist Q (min)	280
Time Prop = Max Exist Outflow (min)	281.55

Discharge slope (Q/T)

0.1072

Enter Values in highlighted areas only!

Drainage Area: 1.6
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	148
Drainage Area (acres)	41

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	1.20	1.49	1.78	2.08	2.25	2.53
Pre-Project Q (cfs)	16	19	23	27	29	33

Post-Project	
Time-of-Concentration (min)	148
Drainage Area (acres)	41

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.42	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	1.20	1.49	1.78	2.08	2.25	2.53
Post-Project Q (cfs)	20	25	30	35	38	43

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100	
e	0.800	0.771	0.757	0.728	0.736	0.712	Select values from TxDOT HDM
b	68	73	81	82	92	92	Montgomery County
d	7.9	7.7	7.7	7.7	7.7	7.9	ebdlkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in)*	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

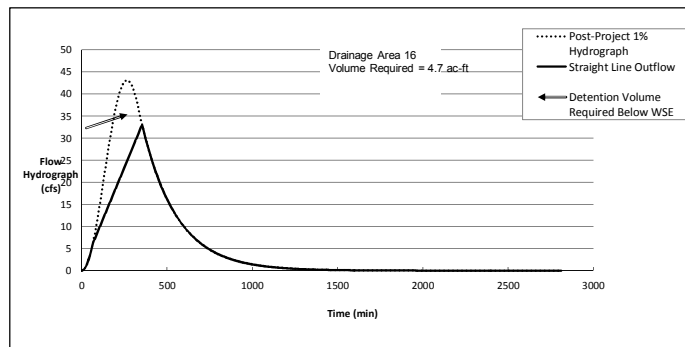
Storm Event For Volume Calculations (yr)	100	
Post-Project Composite Percent Impervious**	19.0	**See Table 2-14 from Montgomery County Drainage Manual
Post-Project Excess Runoff (in)	6.5	

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	32.8	43.1
Small Hydrograph Method Time to Peak (min)	N/A	265.99

Approximate Volume Required (ac-ft)

4.7

Note: Requirement shown does not include a contingency volume



Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	43.1
Time Prop Max Q (min)	268
Row Prop Max Q (cfs)	137
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	160
Prop Q Just > Max Exist Q (cfs)	32.84
Prop Q Just < Max Exist Q (cfs)	32.20
Time Prop Q Just > Max Exist Q (min)	352
Time Prop = Max Exist Outflow (min)	352.12

Discharge slope (Q/T)

0.0932

Enter Values in highlighted areas only!

Drainage Area: 1.7
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	550
Drainage Area (acres)	101

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	0.43	0.56	0.68	0.82	0.88	1.02
Pre-Project Q (cfs)	14	18	22	27	28	33

Post-Project	
Time-of-Concentration (min)	550
Drainage Area (acres)	101

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.42	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	0.43	0.56	0.68	0.82	0.88	1.02
Post-Project Q (cfs)	18	24	29	35	37	43

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
e	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
Montgomery County
ebdkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in")	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	18.6
Post-Project Excess Runoff (in)	6.5

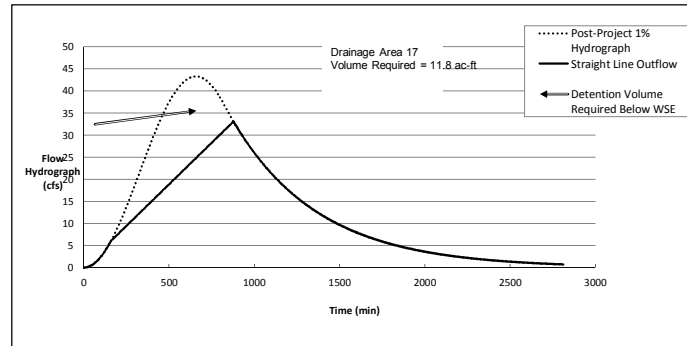
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	33	43
Small Hydrograph Method Time to Peak (min)	N/A	657.71

Approximate Volume Required
(ac-ft)

11.8

Note: Requirement shown does not include a contingency volume



Time (min)	Time (hour)	Post-Project (cfs)	Straight Line Outflow (cfs)	Volume (acft)
0	0.00	0.0	0.00	
4	0.07	0.0	0.00	0.00
8	0.13	0.0	0.02	0.00
12	0.20	0.0	0.04	0.00
16	0.27	0.1	0.06	0.00
20	0.33	0.1	0.10	0.00
24	0.40	0.1	0.14	0.00
28	0.47	0.2	0.19	0.00
32	0.53	0.3	0.25	0.00
36	0.60	0.3	0.32	0.00
40	0.67	0.4	0.39	0.00
44	0.73	0.5	0.48	0.00
48	0.80	0.6	0.57	0.00
52	0.87	0.7	0.66	0.00

Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	43
Time Prop Max Q (min)	660
Row Prop Max Q (cfs)	235
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	2233
Row Prop < Max Exist Outflow (cfs)	291
Prop Q Just > Max Exist Q (cfs)	33.01
Prop Q Just < Max Exist Q (cfs)	32.75
Time Prop Q Just > Max Exist Q (min)	876
Time Prop = Max Exist Outflow (min)	876.01

Discharge slope (Q/T)

0.0377

Enter Values in highlighted areas only!

Drainage Area: 17B
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	45
Drainage Area (acres)	7

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	2.86	3.45	4.05	4.60	5.00	5.48
Pre-Project Q (cfs)	6	7	9	10	11	12

Post-Project	
Time-of-Concentration (min)	45
Drainage Area (acres)	7

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.85	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	2.86	3.45	4.05	4.60	5.00	5.48
Post-Project Q (cfs)	16	20	23	26	28	31

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
 Montgomery County
 ebdkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in)*	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	100.0
Post-Project Excess Runoff (in)	11.7

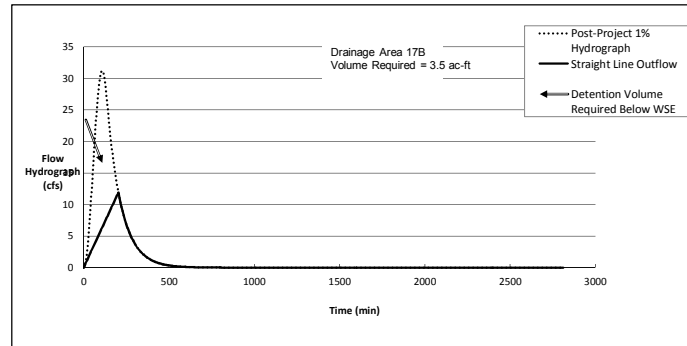
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	11.7	31.2
Small Hydrograph Method Time to Peak (min)	N/A	109.08

Approximate Volume Required (ac-ft)

3.5

Note: Requirement shown does not include a contingency volume



Time (min)	Time (hour)	Post-Project (cfs)	Straight Line Outflow (cfs)	Volume (acft)
0	0.00	0.0	0.00	
4	0.07	0.1	0.10	0.00
8	0.13	0.4	0.41	0.00
12	0.20	0.9	0.70	0.00
16	0.27	1.6	0.93	0.00
20	0.33	2.5	1.17	0.01
24	0.40	3.6	1.40	0.02
28	0.47	4.8	1.63	0.03
32	0.53	6.2	1.87	0.05
36	0.60	7.7	2.10	0.08
40	0.67	9.2	2.34	0.12
44	0.73	10.9	2.57	0.16
48	0.80	12.7	2.80	0.21
52	0.87	14.4	3.04	0.27

Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	31.2
Time Prop Max Q (min)	108
Row Prop Max Q (cfs)	97
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	122
Prop Q Just > Max Exist Q (cfs)	11.91
Prop Q Just < Max Exist Q (cfs)	11.35
Time Prop Q Just > Max Exist Q (min)	200
Time Prop = Max Exist Outflow (min)	201.16

Discharge slope (Q/T)

0.0584

Enter Values in highlighted areas only!

Drainage Area: 17C
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	30
Drainage Area (acres)	4

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	3.71	4.45	5.19	5.84	6.36	6.92
Pre-Project Q (cfs)	5	6	7	8	8	9

Post-Project	
Time-of-Concentration (min)	30
Drainage Area (acres)	4

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.53	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	3.71	4.45	5.19	5.84	6.36	6.92
Post-Project Q (cfs)	8	10	11	13	14	15

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
 Montgomery County
 ebdikup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in)*	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	39.0
Post-Project Excess Runoff (in)	8.0

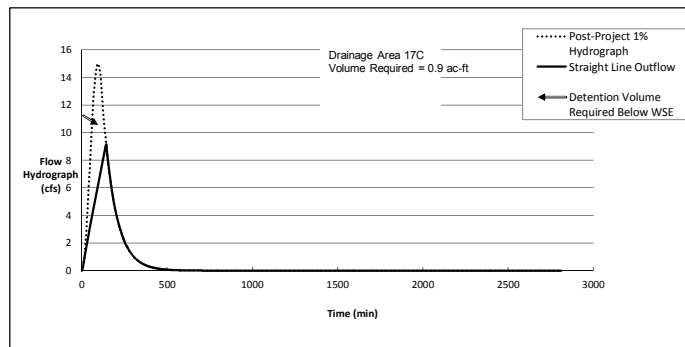
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	9.1	15.0
Small Hydrograph Method Time to Peak (min)	N/A	95.38

Approximate Volume Required
 (ac-ft)

0.9

Note: Requirement shown does not include a contingency volume



Time (min)	Time (hour)	Post-Project (cfs)	Straight Line Outflow (cfs)	Volume (acft)
0	0.00	0.0	0.00	
4	0.07	0.1	0.06	0.00
8	0.13	0.3	0.26	0.00
12	0.20	0.6	0.58	0.00
16	0.27	1.0	1.02	0.00
20	0.33	1.6	1.29	0.00
24	0.40	2.2	1.55	0.00
28	0.47	3.0	1.81	0.01
32	0.53	3.8	2.06	0.02
36	0.60	4.7	2.32	0.03
40	0.67	5.6	2.58	0.04
44	0.73	6.6	2.84	0.06
48	0.80	7.6	3.10	0.08
52	0.87	8.6	3.36	0.11

Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	15.0
Time Prop Max Q (min)	96
Row Prop Max Q (cfs)	94
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	107
Prop Q Just > Max Exist Q (cfs)	9.14
Prop Q Just < Max Exist Q (cfs)	8.66
Time Prop Q Just > Max Exist Q (min)	140
Time Prop = Max Exist Outflow (min)	140.59

Discharge slope (Q/T)

0.0645

Enter Values in highlighted areas only!

Drainage Area: 18
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	344
Drainage Area (acres)	67

Landuse Acreage									
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	0.62	0.79	0.96	1.15	1.23	1.42
Pre-Project Q (cfs)	13	17	20	25	26	30

Post-Project	
Time-of-Concentration (min)	344
Drainage Area (acres)	67

Landuse Acreage									
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch
0.42	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	0.62	0.79	0.96	1.15	1.23	1.42
Post-Project Q (cfs)	18	22	27	32	35	40

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
Montgomery County
ebdlkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in)*	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	19.1
Post-Project Excess Runoff (in)	6.5

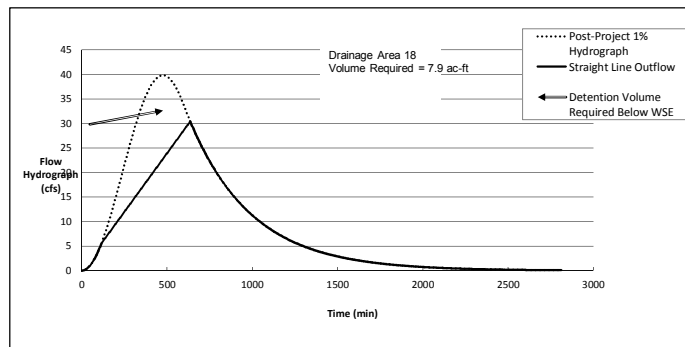
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	30.3	39.8
Small Hydrograph Method Time to Peak (min)	N/A	476.59

Approximate Volume Required (ac-ft)

7.9

Note: Requirement shown does not include a contingency volume



Time (min)	Time (hour)	Post-Project (cfs)	Straight Line Outflow (cfs)	Volume (acft)
0	0.00	0.0	0.00	
4	0.07	0.0	0.01	0.00
8	0.13	0.0	0.03	0.00
12	0.20	0.1	0.06	0.00
16	0.27	0.1	0.11	0.00
20	0.33	0.2	0.17	0.00
24	0.40	0.2	0.25	0.00
28	0.47	0.3	0.34	0.00
32	0.53	0.4	0.44	0.00
36	0.60	0.6	0.56	0.00
40	0.67	0.7	0.69	0.00
44	0.73	0.8	0.83	0.00
48	0.80	1.0	0.99	0.00
52	0.87	1.2	1.16	0.00

Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	39.8
Time Prop Max Q (min)	476
Row Prop Max Q (cfs)	189
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	230
Prop Q Just > Max Exist Q (cfs)	30.47
Prop Q Just < Max Exist Q (cfs)	30.14
Time Prop Q Just > Max Exist Q (min)	632
Time Prop = Max Exist Outflow (min)	634.15

Discharge slope (Q/T)

0.0478

Enter Values in highlighted areas only!

Drainage Area: 19
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	33
Drainage Area (acres)	5

Landuse Acreage									
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	3.48	4.18	4.88	5.50	6.00	6.53
Pre-Project Q (cfs)	5	6	7	8	9	9

Post-Project	
Time-of-Concentration (min)	33
Drainage Area (acres)	5

Landuse Acreage									
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch
0.43	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	3.48	4.18	4.88	5.50	6.00	6.53
Post-Project Q (cfs)	7	8	9	11	12	13

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
 Montgomery County
 ebdkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in")	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	20.0
Post-Project Excess Runoff (in)	6.6

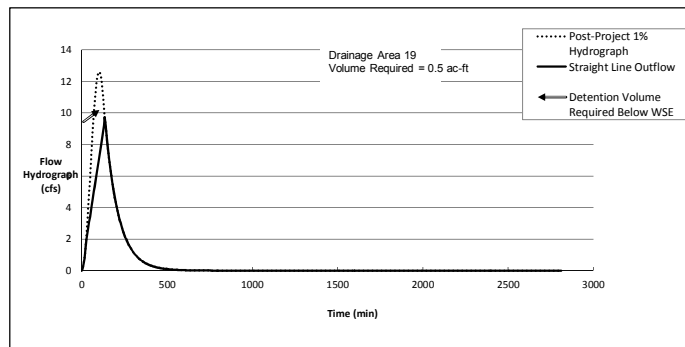
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	9.4	12.6
Small Hydrograph Method Time to Peak (min)	N/A	102.44

Approximate Volume Required
 (ac-ft)

0.5

Note: Requirement shown does not include a contingency volume



Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	12.6
Time Prop Max Q (min)	104
Row Prop Max Q (cfs)	96
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	105
Prop Q Just > Max Exist Q (cfs)	9.73
Prop Q Just < Max Exist Q (cfs)	9.25
Time Prop Q Just > Max Exist Q (min)	132
Time Prop = Max Exist Outflow (min)	134.74

Discharge slope (Q/T)

0.0698

Enter Values in highlighted areas only!

Drainage Area: 20
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	44
Drainage Area (acres)	6

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	2.88	3.48	4.08	4.63	5.04	5.52
Pre-Project Q (cfs)	6	7	8	9	10	11

Post-Project	
Time-of-Concentration (min)	44
Drainage Area (acres)	6

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.42	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	2.88	3.48	4.08	4.63	5.04	5.52
Post-Project Q (cfs)	8	9	11	12	13	14

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
Montgomery County
ebdkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in)*	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	19.4
Post-Project Excess Runoff (in)	6.5

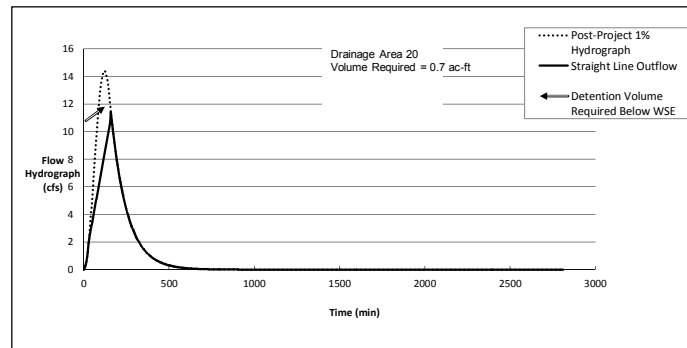
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	11.0	14.4
Small Hydrograph Method Time to Peak (min)	N/A	122.44

Approximate Volume Required (ac-ft)

0.7

Note: Requirement shown does not include a contingency volume



Time (min)	Time (hour)	Post-Project (cfs)	Straight Line Outflow (cfs)	Volume (acft)
0	0.00	0.0	0.00	
4	0.07	0.0	0.04	0.00
8	0.13	0.2	0.15	0.00
12	0.20	0.3	0.34	0.00
16	0.27	0.6	0.60	0.00
20	0.33	0.9	0.93	0.00
24	0.40	1.3	1.32	0.00
28	0.47	1.8	1.78	0.00
32	0.53	2.3	2.19	0.00
36	0.60	2.9	2.47	0.00
40	0.67	3.5	2.74	0.00
44	0.73	4.1	3.01	0.01
48	0.80	4.8	3.29	0.02
52	0.87	5.5	3.56	0.03

Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	14.4
Time Prop Max Q (min)	124
Row Prop Max Q (cfs)	101
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	111
Prop Q Just > Max Exist Q (cfs)	11.43
Prop Q Just < Max Exist Q (cfs)	10.96
Time Prop Q Just > Max Exist Q (min)	156
Time Prop = Max Exist Outflow (min)	159.98

Discharge slope (Q/T)

0.0685

Enter Values in highlighted areas only!

Drainage Area: 21
 Calculations Prepared By: JTB
 Calculations Checked By:
 Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	17
Drainage Area (acres)	3

Landuse Acreage									
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	5.19	6.15	7.14	7.93	8.68	9.32
Pre-Project Q (cfs)	4	5	6	6	7	7

Post-Project	
Time-of-Concentration (min)	17
Drainage Area (acres)	3

Landuse Acreage									
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch
0.4	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	5.19	6.15	7.14	7.93	8.68	9.32
Post-Project Q (cfs)	5	6	7	8	9	9

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
 Montgomery County
 ebdlkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in)*	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	16.0
Post-Project Excess Runoff (in)	6.2

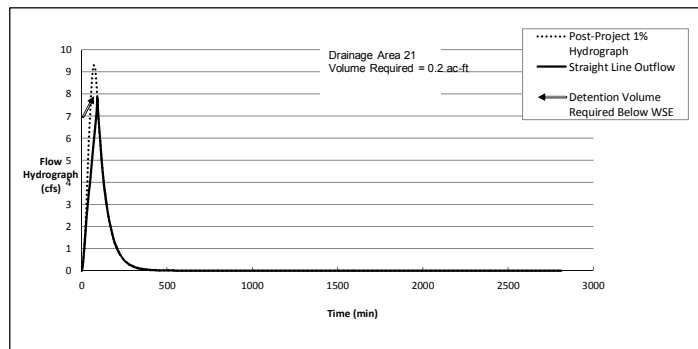
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	7.5	9.3
Small Hydrograph Method Time to Peak (min)	N/A	73.01

Approximate Volume Required (ac-ft)

0.2

Note: Requirement shown does not include a contingency volume



Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	9.3
Time Prop Max Q (min)	72
Row Prop Max Q (cfs)	88
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	94
Prop Q Just > Max Exist Q (cfs)	7.84
Prop Q Just < Max Exist Q (cfs)	7.30
Time Prop Q Just > Max Exist Q (min)	88
Time Prop = Max Exist Outflow (min)	90.89

Discharge slope (Q/T)

0.0820

Enter Values in highlighted areas only!

Drainage Area: 2.2
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	35
Drainage Area (acres)	5

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	3.34	4.01	4.70	5.30	5.77	6.30
Pre-Project Q (cfs)	5	7	8	9	9	10

Post-Project	
Time-of-Concentration (min)	35
Drainage Area (acres)	5

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.41	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	3.34	4.01	4.70	5.30	5.77	6.30
Post-Project Q (cfs)	7	8	10	11	12	13

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
Montgomery County
ebdlkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in)*	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	17.6
Post-Project Excess Runoff (in)	6.4

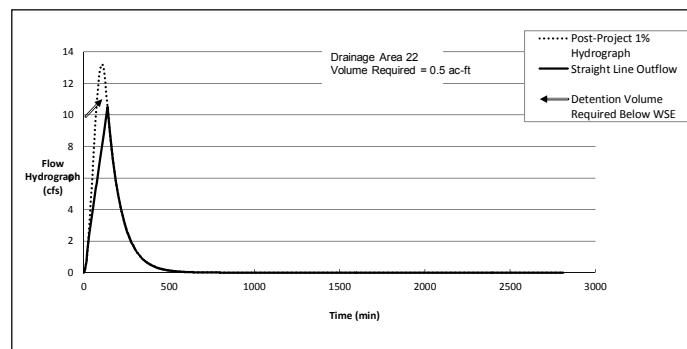
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	10.3	13.2
Small Hydrograph Method Time to Peak (min)	N/A	107.36

Approximate Volume Required (ac-ft)

0.5

Note: Requirement shown does not include a contingency volume



Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	13.2
Time Prop Max Q (min)	108
Row Prop Max Q (cfs)	97
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	106
Prop Q Just > Max Exist Q (cfs)	10.52
Prop Q Just < Max Exist Q (cfs)	10.02
Time Prop Q Just > Max Exist Q (min)	136
Time Prop = Max Exist Outflow (min)	137.93

Discharge slope (Q/T)

0.0745

Enter Values in highlighted areas only!

Drainage Area: 2.3
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	32
Drainage Area (acres)	4

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	3.57	4.28	5.00	5.63	6.14	6.68
Pre-Project Q (cfs)	5	5	6	7	8	9

Post-Project	
Time-of-Concentration (min)	32
Drainage Area (acres)	4

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.44	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	3.57	4.28	5.00	5.63	6.14	6.68
Post-Project Q (cfs)	6	8	9	10	11	12

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100	
a	0.800	0.771	0.757	0.728	0.736	0.712	Select values from TxDOT HDM
b	68	73	81	82	92	92	Montgomery County
d	7.9	7.7	7.7	7.7	7.7	7.9	ebdlkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in")	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	32.7
Post-Project Excess Runoff (in)	4.5

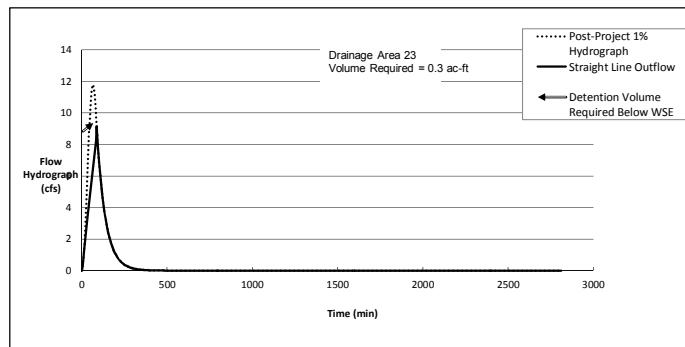
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	8.5	11.8
Small Hydrograph Method Time to Peak (min)	N/A	66.39

Approximate Volume Required (ac-ft)

0.3

Note: Requirement shown does not include a contingency volume



Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	11.8
Time Prop Max Q (min)	68
Row Prop Max Q (cfs)	87
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	93
Prop Q Just > Max Exist Q (cfs)	9.14
Prop Q Just < Max Exist Q (cfs)	8.45
Time Prop Q Just > Max Exist Q (min)	84
Time Prop = Max Exist Outflow (min)	87.45

Discharge slope (Q/T)

0.0977

Enter Values in highlighted areas only!

Drainage Area: 2.4
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	34
Drainage Area (acres)	5

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	3.44	4.13	4.83	5.44	5.93	6.46
Pre-Project Q (cfs)	5	6	7	8	9	10

Post-Project	
Time-of-Concentration (min)	34
Drainage Area (acres)	5

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.42	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	3.44	4.13	4.83	5.44	5.93	6.46
Post-Project Q (cfs)	7	8	10	11	12	13

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
Montgomery County
ebdlkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in)*	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	19.1
Post-Project Excess Runoff (in)	6.5

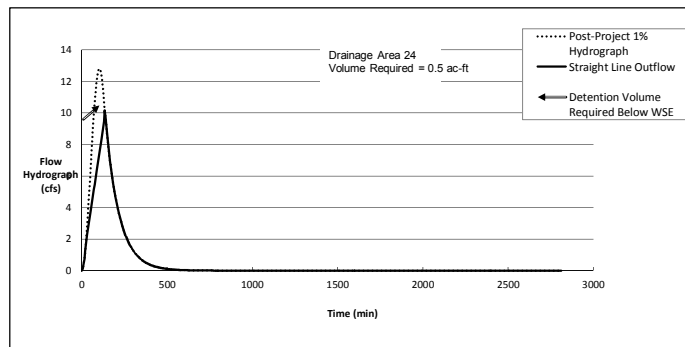
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	9.7	12.8
Small Hydrograph Method Time to Peak (min)	N/A	104.13

Approximate Volume Required (ac-ft)

0.5

Note: Requirement shown does not include a contingency volume



Time (min)	Time (hour)	Post-Project (cfs)	Straight Line Outflow (cfs)	Volume (acft)
0	0.00	0.0	0.00	
4	0.07	0.0	0.05	0.00
8	0.13	0.2	0.19	0.00
12	0.20	0.4	0.41	0.00
16	0.27	0.7	0.73	0.00
20	0.33	1.1	1.13	0.00
24	0.40	1.6	1.60	0.00
28	0.47	2.1	2.01	0.00
32	0.53	2.8	2.29	0.00
36	0.60	3.4	2.58	0.01
40	0.67	4.1	2.86	0.01
44	0.73	4.9	3.15	0.02
48	0.80	5.6	3.44	0.03
52	0.87	6.4	3.72	0.04

Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	12.8
Time Prop Max Q (min)	104
Row Prop Max Q (cfs)	96
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	105
Prop Q Just > Max Exist Q (cfs)	10.17
Prop Q Just < Max Exist Q (cfs)	9.67
Time Prop Q Just > Max Exist Q (min)	132
Time Prop = Max Exist Outflow (min)	135.66

Discharge slope (Q/T)

0.0716

Enter Values in highlighted areas only!

Drainage Area: 25
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	333
Drainage Area (acres)	48

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	0.64	0.81	0.98	1.18	1.26	1.45
Pre-Project Q (cfs)	10	12	15	18	19	22

Post-Project	
Time-of-Concentration (min)	333
Drainage Area (acres)	48

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.44	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	0.64	0.81	0.98	1.18	1.26	1.45
Post-Project Q (cfs)	13	17	21	25	26	30

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
Montgomery County
ebdlkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in)*	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	22.7
Post-Project Excess Runoff (in)	6.8

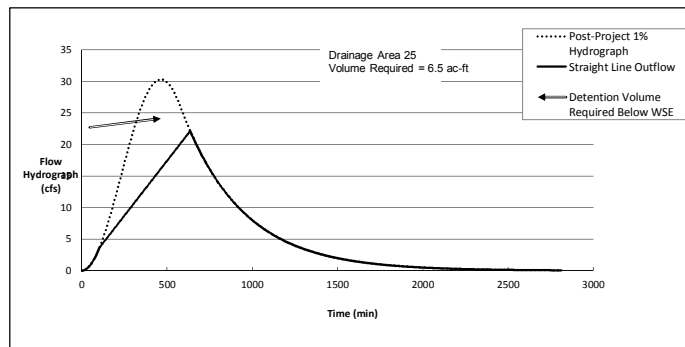
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	22.0	30.3
Small Hydrograph Method Time to Peak (min)	N/A	464.39

Approximate Volume Required (ac-ft)

6.5

Note: Requirement shown does not include a contingency volume



Time (min)	Time (hour)	Post-Project (cfs)	Straight Line Outflow (cfs)	Volume (acft)
0	0.00	0.0	0.00	
4	0.07	0.0	0.01	0.00
8	0.13	0.0	0.02	0.00
12	0.20	0.0	0.05	0.00
16	0.27	0.1	0.09	0.00
20	0.33	0.1	0.14	0.00
24	0.40	0.2	0.20	0.00
28	0.47	0.3	0.27	0.00
32	0.53	0.4	0.35	0.00
36	0.60	0.4	0.45	0.00
40	0.67	0.6	0.55	0.00
44	0.73	0.7	0.67	0.00
48	0.80	0.8	0.79	0.00
52	0.87	0.9	0.93	0.00

Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	30.3
Time Prop Max Q (min)	464
Row Prop Max Q (cfs)	186
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	230
Prop Q Just > Max Exist Q (cfs)	22.17
Prop Q Just < Max Exist Q (cfs)	21.92
Time Prop Q Just > Max Exist Q (min)	632
Time Prop = Max Exist Outflow (min)	633.98

Discharge slope (Q/T)

0.0348

Enter Values in highlighted areas only!

Drainage Area: 26
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	27
Drainage Area (acres)	8

Landuse Acreage									
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	3.93	4.69	5.48	6.15	6.70	7.27
Pre-Project Q (cfs)	10	11	13	15	16	18

Post-Project	
Time-of-Concentration (min)	27
Drainage Area (acres)	8

Landuse Acreage									
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch
0.42	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	3.93	4.69	5.48	6.15	6.70	7.27
Post-Project Q (cfs)	13	15	17	20	21	23

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
e	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
Montgomery County
ebdlkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in")	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	18.4
Post-Project Excess Runoff (in)	6.5

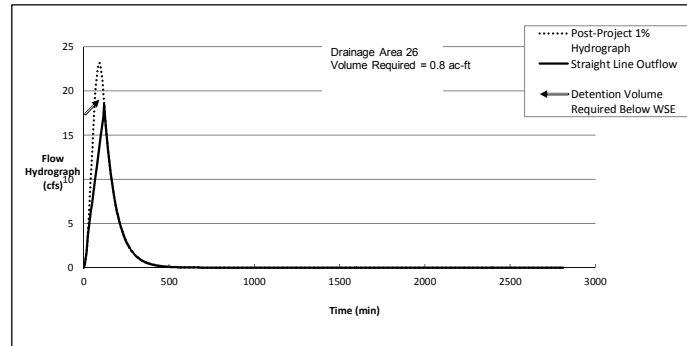
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	17.7	23.2
Small Hydrograph Method Time to Peak (min)	N/A	91.99

Approximate Volume Required (ac-ft)

0.8

Note: Requirement shown does not include a contingency volume



Time (min)	Time (hour)	Post-Project (cfs)	Straight Line Outflow (cfs)	Volume (acft)
0	0.00	0.0	0.00	
4	0.07	0.1	0.11	0.00
8	0.13	0.4	0.43	0.00
12	0.20	1.0	0.96	0.00
16	0.27	1.7	1.69	0.00
20	0.33	2.6	2.60	0.00
24	0.40	3.7	3.56	0.00
28	0.47	4.9	4.16	0.00
32	0.53	6.3	4.75	0.01
36	0.60	7.7	5.34	0.02
40	0.67	9.2	5.94	0.04
44	0.73	10.8	6.53	0.06
48	0.80	12.4	7.12	0.08
52	0.87	14.0	7.72	0.11

Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	23.2
Time Prop Max Q (min)	92
Row Prop Max Q (cfs)	93
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	101
Prop Q Just > Max Exist Q (cfs)	18.47
Prop Q Just < Max Exist Q (cfs)	17.46
Time Prop Q Just > Max Exist Q (min)	116
Time Prop = Max Exist Outflow (min)	119.12

Discharge slope (Q/T)

0.1484

Enter Values in highlighted areas only!

Drainage Area: 27
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	40
Drainage Area (acres)	11

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	3.10	3.74	4.38	4.96	5.39	5.90
Pre-Project Q (cfs)	11	13	15	17	18	20

Post-Project	
Time-of-Concentration (min)	40
Drainage Area (acres)	11

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.42	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	3.10	3.74	4.38	4.96	5.39	5.90
Post-Project Q (cfs)	14	17	20	22	24	27

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
 Montgomery County
 ebdlkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in)*	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	19.6
Post-Project Excess Runoff (in)	6.6

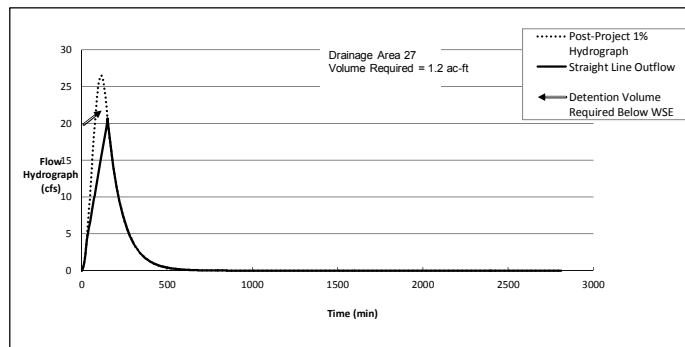
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	20.2	26.5
Small Hydrograph Method Time to Peak (min)	N/A	115.24

Approximate Volume Required (ac-ft)

1.2

Note: Requirement shown does not include a contingency volume



Time (min)	Time (hour)	Post-Project (cfs)	Straight Line Outflow (cfs)	Volume (acft)
0	0.00	0.0	0.00	
4	0.07	0.1	0.08	0.00
8	0.13	0.3	0.31	0.00
12	0.20	0.7	0.70	0.00
16	0.27	1.2	1.24	0.00
20	0.33	1.9	1.92	0.00
24	0.40	2.7	2.73	0.00
28	0.47	3.7	3.67	0.00
32	0.53	4.7	4.30	0.00
36	0.60	5.9	4.84	0.01
40	0.67	7.1	5.38	0.01
44	0.73	8.4	5.91	0.02
48	0.80	9.8	6.45	0.04
52	0.87	11.2	6.99	0.06

Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	26.5
Time Prop Max Q (min)	116
Row Prop Max Q (cfs)	99
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	109
Prop Q Just > Max Exist Q (cfs)	20.70
Prop Q Just < Max Exist Q (cfs)	19.79
Time Prop Q Just > Max Exist Q (min)	148
Time Prop = Max Exist Outflow (min)	150.25

Discharge slope (Q/T)

0.1344

Enter Values in highlighted areas only!

Drainage Area: 28
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	53
Drainage Area (acres)	15

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	2.55	3.09	3.63	4.14	4.49	4.95
Pre-Project Q (cfs)	12	15	17	19	21	23

Post-Project	
Time-of-Concentration (min)	53
Drainage Area (acres)	15

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.42	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	2.55	3.09	3.63	4.14	4.49	4.95
Post-Project Q (cfs)	16	19	22	26	28	31

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
e	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
 Montgomery County
 ebdkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in)*	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	19.0
Post-Project Excess Runoff (in)	6.5

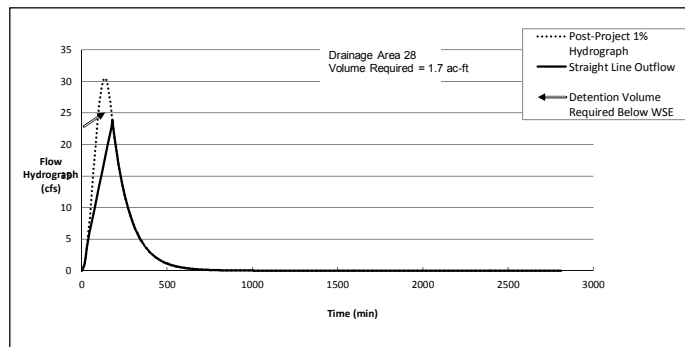
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	23.3	30.5
Small Hydrograph Method Time to Peak (min)	N/A	136.49

Approximate Volume Required
 (ac-ft)

1.7

Note: Requirement shown does not include a contingency volume



Time (min)	Time (hour)	Post-Project (cfs)	Straight Line Outflow (cfs)	Volume (acft)
0	0.00	0.0	0.00	
4	0.07	0.1	0.06	0.00
8	0.13	0.3	0.26	0.00
12	0.20	0.6	0.58	0.00
16	0.27	1.0	1.02	0.00
20	0.33	1.6	1.59	0.00
24	0.40	2.3	2.27	0.00
28	0.47	3.1	3.06	0.00
32	0.53	3.9	3.95	0.00
36	0.60	4.9	4.69	0.00
40	0.67	6.0	5.21	0.00
44	0.73	7.2	5.73	0.01
48	0.80	8.4	6.26	0.02
52	0.87	9.7	6.78	0.03

Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	30.5
Time Prop Max Q (min)	136
Row Prop Max Q (cfs)	104
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	116
Prop Q Just > Max Exist Q (cfs)	23.84
Prop Q Just < Max Exist Q (cfs)	22.95
Time Prop Q Just > Max Exist Q (min)	176
Time Prop = Max Exist Outflow (min)	178.55

Discharge slope (Q/T)

0.1303

Enter Values in highlighted areas only!

Drainage Area: 29
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	83
Drainage Area (acres)	23

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	
		23								

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	1.84	2.25	2.66	3.07	3.33	3.70
Pre-Project Q (cfs)	14	17	20	23	25	27

Post-Project	
Time-of-Concentration (min)	83
Drainage Area (acres)	23

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.42	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	
		18.7						4.4		

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	1.84	2.25	2.66	3.07	3.33	3.70
Post-Project Q (cfs)	18	22	26	30	32	36

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
e	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
Montgomery County
ebdtkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in")	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	19.0
Post-Project Excess Runoff (in)	6.5

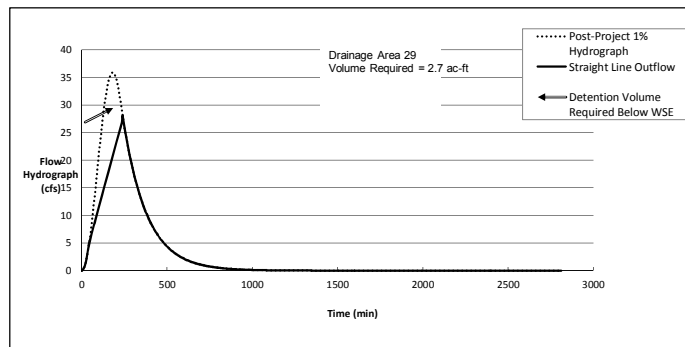
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	27.3	35.9
Small Hydrograph Method Time to Peak (min)	N/A	182.23

Approximate Volume Required (ac-ft)

2.7

Note: Requirement shown does not include a contingency volume



Time (min)	Time (hour)	Post-Project (cfs)	Straight Line Outflow (cfs)	Volume (acft)
0	0.00	0.0	0.00	
4	0.07	0.0	0.04	0.00
8	0.13	0.2	0.17	0.00
12	0.20	0.4	0.38	0.00
16	0.27	0.7	0.68	0.00
20	0.33	1.1	1.06	0.00
24	0.40	1.5	1.51	0.00
28	0.47	2.0	2.05	0.00
32	0.53	2.7	2.66	0.00
36	0.60	3.3	3.34	0.00
40	0.67	4.1	4.10	0.00
44	0.73	4.9	4.92	0.00
48	0.80	5.8	5.47	0.00
52	0.87	6.7	5.93	0.00

Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	35.9
Time Prop Max Q (min)	184
Row Prop Max Q (cfs)	116
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	131
Prop Q Just > Max Exist Q (cfs)	28.12
Prop Q Just < Max Exist Q (cfs)	27.33
Time Prop Q Just > Max Exist Q (min)	236
Time Prop = Max Exist Outflow (min)	239.90

Discharge slope (Q/T)

0.1140

Enter Values in highlighted areas only!

Drainage Area: 29A
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	47
Drainage Area (acres)	13

Landuse Acreage									
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	2.77	3.35	3.93	4.47	4.86	5.33
Pre-Project Q (cfs)	12	14	17	19	21	23

Post-Project	
Time-of-Concentration (min)	47
Drainage Area (acres)	13

Landuse Acreage									
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch
0.42	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	2.77	3.35	3.93	4.47	4.86	5.33
Post-Project Q (cfs)	15	19	22	25	27	30

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
Montgomery County
ebdkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in)*	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	18.0
Post-Project Excess Runoff (in)	6.4

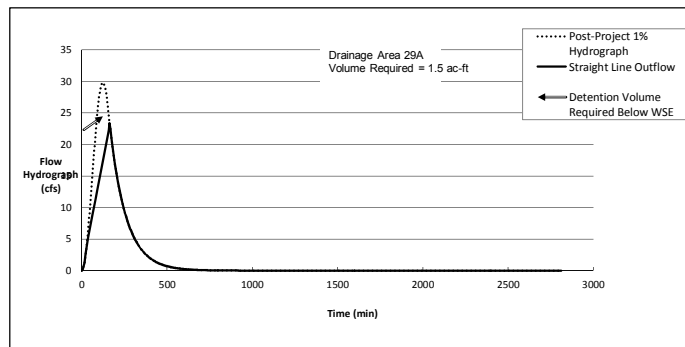
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	22.7	29.8
Small Hydrograph Method Time to Peak (min)	N/A	124.69

Approximate Volume Required (ac-ft)

1.5

Note: Requirement shown does not include a contingency volume



Time (min)	Time (hour)	Post-Project (cfs)	Straight Line Outflow (cfs)	Volume (acft)
0	0.00	0.0	0.00	
4	0.07	0.1	0.08	0.00
8	0.13	0.3	0.30	0.00
12	0.20	0.7	0.68	0.00
16	0.27	1.2	1.19	0.00
20	0.33	1.9	1.85	0.00
24	0.40	2.6	2.64	0.00
28	0.47	3.6	3.55	0.00
32	0.53	4.6	4.46	0.00
36	0.60	5.7	5.02	0.00
40	0.67	6.9	5.57	0.01
44	0.73	8.2	6.13	0.02
48	0.80	9.6	6.69	0.03
52	0.87	11.1	7.25	0.05

Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	29.8
Time Prop Max Q (min)	124
Row Prop Max Q (cfs)	101
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	112
Prop Q Just > Max Exist Q (cfs)	23.40
Prop Q Just < Max Exist Q (cfs)	22.44
Time Prop Q Just > Max Exist Q (min)	160
Time Prop = Max Exist Outflow (min)	162.90

Discharge slope (Q/T)

0.1394

Enter Values in highlighted areas only!

Drainage Area: 30
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	82
Drainage Area (acres)	11

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	1.86	2.28	2.70	3.11	3.37	3.74
Pre-Project Q (cfs)	6	8	9	11	12	13

Post-Project	
Time-of-Concentration (min)	82
Drainage Area (acres)	11

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.42	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	1.86	2.28	2.70	3.11	3.37	3.74
Post-Project Q (cfs)	8	10	12	14	15	17

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
Montgomery County
ebdlkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in)*	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	19.4
Post-Project Excess Runoff (in)	6.5

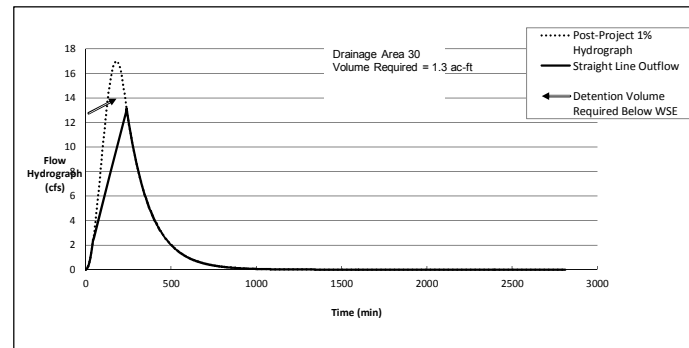
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	12.9	17.0
Small Hydrograph Method Time to Peak (min)	N/A	180.88

Approximate Volume Required (ac-ft)

1.3

Note: Requirement shown does not include a contingency volume



Time (min)	Time (hour)	Post-Project (cfs)	Straight Line Outflow (cfs)	Volume (acft)
0	0.00	0.0	0.00	
4	0.07	0.0	0.02	0.00
8	0.13	0.1	0.08	0.00
12	0.20	0.2	0.18	0.00
16	0.27	0.3	0.33	0.00
20	0.33	0.5	0.51	0.00
24	0.40	0.7	0.73	0.00
28	0.47	1.0	0.98	0.00
32	0.53	1.3	1.28	0.00
36	0.60	1.6	1.61	0.00
40	0.67	2.0	1.97	0.00
44	0.73	2.4	2.36	0.00
48	0.80	2.8	2.61	0.00
52	0.87	3.2	2.82	0.00

Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	17.0
Time Prop Max Q (min)	180
Row Prop Max Q (cfs)	115
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	131
Prop Q Just > Max Exist Q (cfs)	13.15
Prop Q Just < Max Exist Q (cfs)	12.77
Time Prop Q Just > Max Exist Q (min)	236
Time Prop = Max Exist Outflow (min)	238.28

Discharge slope (Q/T)

0.0543

Enter Values in highlighted areas only!

Drainage Area: 30A
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	93
Drainage Area (acres)	13

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	1.70	2.08	2.47	2.85	3.09	3.44
Pre-Project Q (cfs)	7	9	10	12	13	14

Post-Project	
Time-of-Concentration (min)	93
Drainage Area (acres)	13

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.42	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	1.70	2.08	2.47	2.85	3.09	3.44
Post-Project Q (cfs)	9	11	13	15	17	19

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
Montgomery County
ebdkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in")	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	18.6
Post-Project Excess Runoff (in)	6.5

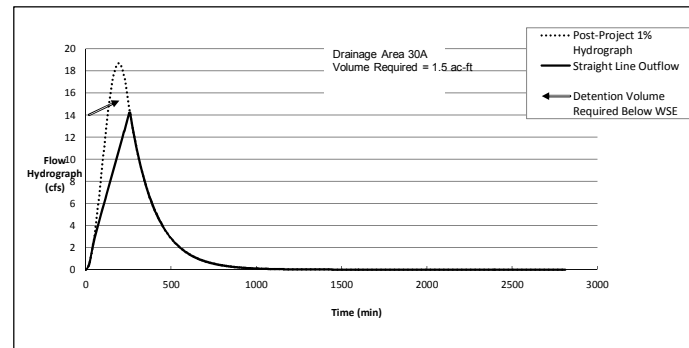
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	14.2	18.7
Small Hydrograph Method Time to Peak (min)	N/A	194.20

Approximate Volume Required
(ac-ft)

1.5

Note: Requirement shown does not include a contingency volume



Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	18.7
Time Prop Max Q (min)	196
Row Prop Max Q (cfs)	119
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	136
Prop Q Just > Max Exist Q (cfs)	14.24
Prop Q Just < Max Exist Q (cfs)	13.86
Time Prop Q Just > Max Exist Q (min)	256
Time Prop = Max Exist Outflow (min)	256.28

Discharge slope (Q/T)

0.0555

Enter Values in highlighted areas only!

Drainage Area: 31
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	45
Drainage Area (acres)	6

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	2.86	3.46	4.06	4.60	5.00	5.49
Pre-Project Q (cfs)	6	7	8	9	10	11

Post-Project	
Time-of-Concentration (min)	45
Drainage Area (acres)	6

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.42	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	2.86	3.46	4.06	4.60	5.00	5.49
Post-Project Q (cfs)	8	9	11	12	13	15

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
Montgomery County
ebdlkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in)*	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	19.0
Post-Project Excess Runoff (in)	6.5

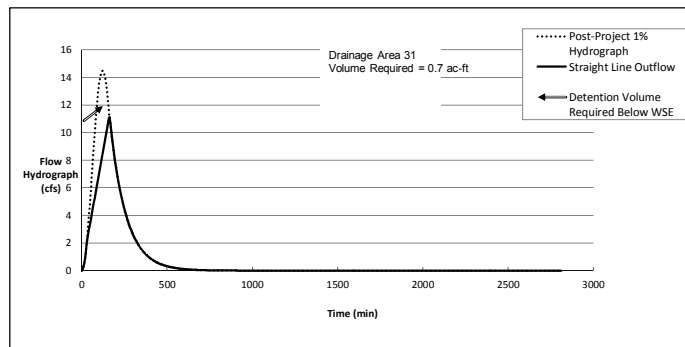
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	11.1	14.5
Small Hydrograph Method Time to Peak (min)	N/A	123.05

Approximate Volume Required (ac-ft)

0.7

Note: Requirement shown does not include a contingency volume



Time (min)	Time (hour)	Post-Project (cfs)	Straight Line Outflow (cfs)	Volume (acft)
0	0.00	0.0	0.00	
4	0.07	0.0	0.04	0.00
8	0.13	0.2	0.15	0.00
12	0.20	0.3	0.34	0.00
16	0.27	0.6	0.60	0.00
20	0.33	0.9	0.92	0.00
24	0.40	1.3	1.32	0.00
28	0.47	1.8	1.77	0.00
32	0.53	2.3	2.21	0.00
36	0.60	2.9	2.48	0.00
40	0.67	3.5	2.76	0.00
44	0.73	4.1	3.03	0.01
48	0.80	4.8	3.31	0.02
52	0.87	5.5	3.58	0.03

Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	14.5
Time Prop Max Q (min)	124
Row Prop Max Q (cfs)	101
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	112
Prop Q Just > Max Exist Q (cfs)	11.13
Prop Q Just < Max Exist Q (cfs)	10.67
Time Prop Q Just > Max Exist Q (min)	160
Time Prop = Max Exist Outflow (min)	160.54

Discharge slope (Q/T)

0.0689

Enter Values in highlighted areas only!

Drainage Area: 3.2
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	27
Drainage Area (acres)	8

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	4.01	4.79	5.59	6.27	6.84	7.41
Pre-Project Q (cfs)	10	12	14	15	17	18

Post-Project	
Time-of-Concentration (min)	27
Drainage Area (acres)	8

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.37	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	4.01	4.79	5.59	6.27	6.84	7.41
Post-Project Q (cfs)	11	14	16	18	19	21

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
 Montgomery County
 ebdlkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in")	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	9.1
Post-Project Excess Runoff (in)	5.6

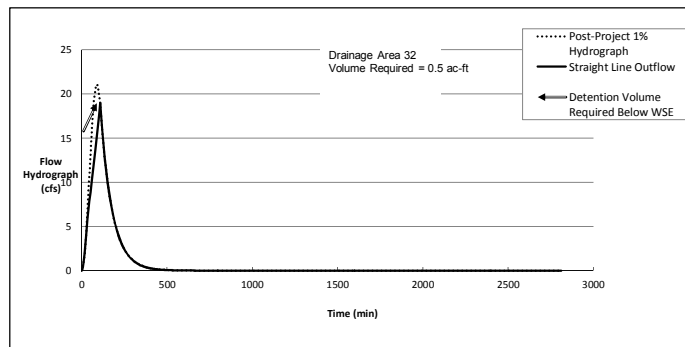
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	18.3	21.1
Small Hydrograph Method Time to Peak (min)	N/A	89.51

Approximate Volume Required
 (ac-ft)

0.5

Note: Requirement shown does not include a contingency volume



Time (min)	Time (hour)	Post-Project (cfs)	Straight Line Outflow (cfs)	Volume (acft)
0	0.00	0.0	0.00	
4	0.07	0.1	0.10	0.00
8	0.13	0.4	0.41	0.00
12	0.20	0.9	0.92	0.00
16	0.27	1.6	1.62	0.00
20	0.33	2.5	2.49	0.00
24	0.40	3.5	3.52	0.00
28	0.47	4.7	4.69	0.00
32	0.53	6.0	5.46	0.00
36	0.60	7.4	6.14	0.01
40	0.67	8.8	6.83	0.01
44	0.73	10.3	7.51	0.03
48	0.80	11.7	8.19	0.05
52	0.87	13.2	8.88	0.07

Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	21.1
Time Prop Max Q (min)	88
Row Prop Max Q (cfs)	92
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	98
Prop Q Just > Max Exist Q (cfs)	18.97
Prop Q Just < Max Exist Q (cfs)	18.00
Time Prop Q Just > Max Exist Q (min)	104
Time Prop = Max Exist Outflow (min)	106.95

Discharge slope (Q/T)

0.1707

Enter Values in highlighted areas only!

Drainage Area: 33
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	44
Drainage Area (acres)	6

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	2.90	3.50	4.10	4.65	5.06	5.55
Pre-Project Q (cfs)	6	7	8	9	10	11

Post-Project	
Time-of-Concentration (min)	44
Drainage Area (acres)	6

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.42	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	2.90	3.50	4.10	4.65	5.06	5.55
Post-Project Q (cfs)	7	9	10	12	13	14

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
Montgomery County
ebdlkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in)*	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	18.3
Post-Project Excess Runoff (in)	6.4

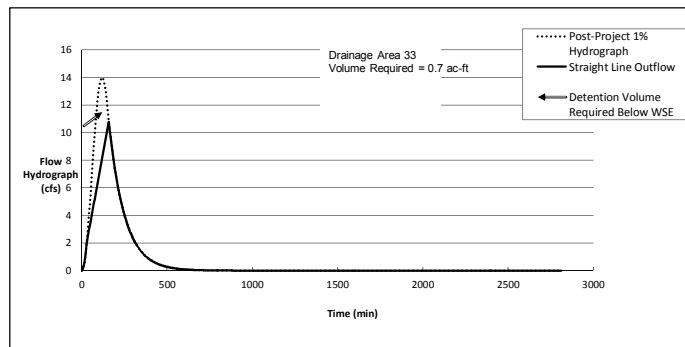
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	10.6	14.0
Small Hydrograph Method Time to Peak (min)	N/A	120.21

Approximate Volume Required (ac-ft)

0.7

Note: Requirement shown does not include a contingency volume



Time (min)	Time (hour)	Post-Project (cfs)	Straight Line Outflow (cfs)	Volume (acft)
0	0.00	0.0	0.00	
4	0.07	0.0	0.04	0.00
8	0.13	0.2	0.15	0.00
12	0.20	0.3	0.34	0.00
16	0.27	0.6	0.60	0.00
20	0.33	0.9	0.93	0.00
24	0.40	1.3	1.33	0.00
28	0.47	1.8	1.79	0.00
32	0.53	2.3	2.17	0.00
36	0.60	2.9	2.44	0.00
40	0.67	3.5	2.71	0.01
44	0.73	4.1	2.98	0.01
48	0.80	4.8	3.25	0.02
52	0.87	5.5	3.53	0.03

Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	14.0
Time Prop Max Q (min)	120
Row Prop Max Q (cfs)	100
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	111
Prop Q Just > Max Exist Q (cfs)	10.77
Prop Q Just < Max Exist Q (cfs)	10.31
Time Prop Q Just > Max Exist Q (min)	156
Time Prop = Max Exist Outflow (min)	157.05

Discharge slope (Q/T)

0.0678

Enter Values in highlighted areas only!

Drainage Area: 3.4
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	75
Drainage Area (acres)	10

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	1.99	2.43	2.87	3.30	3.57	3.96
Pre-Project Q (cfs)	6	8	9	11	12	13

Post-Project	
Time-of-Concentration (min)	75
Drainage Area (acres)	10

Landuse Acreage										
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch	
0.73	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95	

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	1.99	2.43	2.87	3.30	3.57	3.96
Post-Project Q (cfs)	15	18	21	24	26	29

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
Montgomery County
ebdkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in)*	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	77.2
Post-Project Excess Runoff (in)	10.4

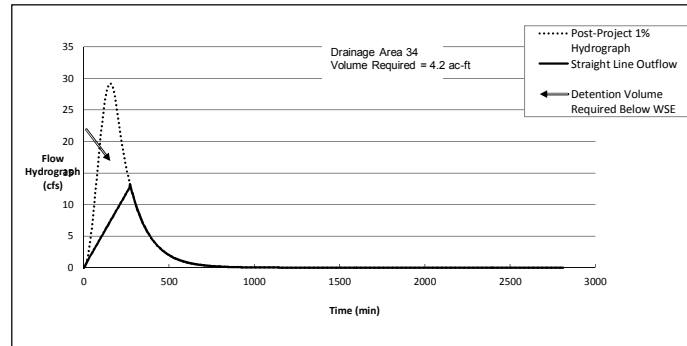
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	12.8	29.2
Small Hydrograph Method Time to Peak (min)	N/A	156.49

Approximate Volume Required (ac-ft)

4.2

Note: Requirement shown does not include a contingency volume



Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	29.2
Time Prop Max Q (min)	156
Row Prop Max Q (cfs)	109
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	139
Prop Q Just > Max Exist Q (cfs)	13.23
Prop Q Just < Max Exist Q (cfs)	12.80
Time Prop Q Just > Max Exist Q (min)	268
Time Prop = Max Exist Outflow (min)	271.87

Discharge slope (Q/T)

0.0471

Enter Values in highlighted areas only!

Drainage Area: 35
Calculations Prepared By: JTB
Calculations Checked By:
Date: 8-Oct-14

Comments:

Pre-Project	
Time-of-Concentration (min)	383
Drainage Area (acres)	95

Landuse Acreage									
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch
0.32	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	0.57	0.73	0.88	1.06	1.14	1.31
Pre-Project Q (cfs)	17	22	27	32	35	40

Post-Project	
Time-of-Concentration (min)	383
Drainage Area (acres)	95

Landuse Acreage									
Composite C-value	Unimproved Agricultural	Unimproved Woodland	Grass-Covered ROW, Residential Rural	Residential Single Family, Residential Large Lot	Residential Multi Family	Light Industrial/Business	Heavy Industrial/Business	Pavement	Water Feature/Ditch
0.46	0.2	0.32	0.35	0.4	0.6	0.65	0.8	0.85	0.95

Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
Rainfall Intensity (in/hr)	0.57	0.73	0.88	1.06	1.14	1.31
Post-Project Q (cfs)	25	32	39	47	50	57

County EBD Values by Annual Recurrence Interval (1:X Years)	2	5	10	25	50	100
a	0.800	0.771	0.757	0.728	0.736	0.712
b	68	73	81	82	92	92
d	7.9	7.7	7.7	7.7	7.7	7.9

Select values from TxDOT HDM
Montgomery County
ebdkup.xls

Percent Impervious Cover	0	20	40	60	80	100
100-yr Runoff Volume (in)*	4.84	6.59	8.09	9.43	10.55	12.17

*See Table 2-4 from Montgomery County Drainage Manual

Storm Event For Volume Calculations (yr)	100
Post-Project Composite Percent Impervious**	25.6
Post-Project Excess Runoff (in)	7.0

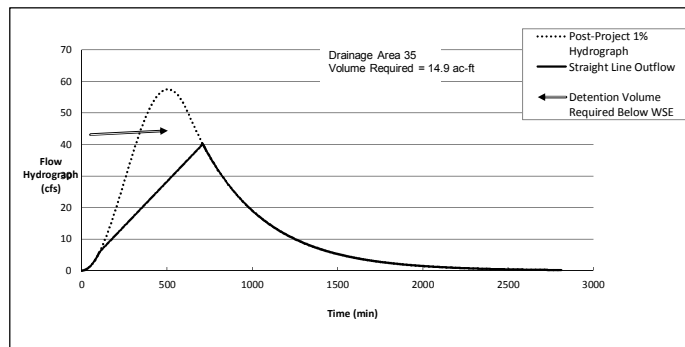
**See Table 2-14 from Montgomery County Drainage Manual

	Pre-Project	Post-Project
Selected Storm Peak Flow (cfs)	40.0	57.5
Small Hydrograph Method Time to Peak (min)	N/A	505.32

Approximate Volume Required (ac-ft)

14.9

Note: Requirement shown does not include a contingency volume



Time (min)	Time (hour)	Post-Project (cfs)	Straight Line Outflow (cfs)	Volume (acft)
0	0.00	0.0	0.00	
4	0.07	0.0	0.01	0.00
8	0.13	0.0	0.04	0.00
12	0.20	0.1	0.08	0.00
16	0.27	0.1	0.14	0.00
20	0.33	0.2	0.22	0.00
24	0.40	0.3	0.32	0.00
28	0.47	0.4	0.43	0.00
32	0.53	0.6	0.57	0.00
36	0.60	0.7	0.72	0.00
40	0.67	0.9	0.88	0.00
44	0.73	1.1	1.07	0.00
48	0.80	1.3	1.27	0.00
52	0.87	1.5	1.49	0.00

Time Interval (min)	4
Post-Project Max Q (From Hydrograph) (cfs)	57.5
Time Prop Max Q (min)	504
Row Prop Max Q (cfs)	196
First Hydrograph Row (Row ID)	70
Last Hydrograph Row (Row ID)	257
Row Prop < Max Exist Outflow (cfs)	248
Prop Q Just > Max Exist Q (cfs)	40.38
Prop Q Just < Max Exist Q (cfs)	39.96
Time Prop Q Just > Max Exist Q (min)	704
Time Prop = Max Exist Outflow (min)	707.96

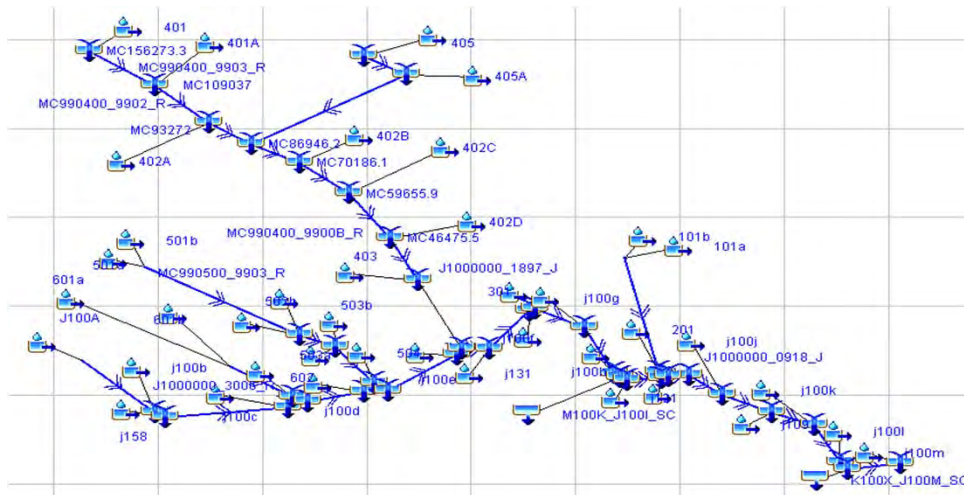
Discharge slope (Q/T)

0.0565

Appendix C – HEC-HMS Mill Creek Watershed Output

rev 10/23/14 jtb																	
MILL CREEK			HCFCD HEC-HMS REVISED EXISTING			PROPOSED NO PONDS			PROPOSED 2 PONDS			PROPOSED 3 PONDS			PROPOSED 4 PONDS		
HEC-HMS ID	10 YR	50 YR	100 YR	10 YR	50 YR	100 YR	10 YR	50 YR	100 YR	10 YR	50 YR	100 YR	10 YR	50 YR	100 YR		
	CFS	CFS	CFS	CFS	CFS	CFS	CFS	CFS	CFS	CFS	CFS	CFS	CFS	CFS	CFS		
MC156273.3	2328	4276	5384	2338.1	4290.3	5399.3	2280	4219	5291.4	2294.3	4246.3	5350.8	2303.8	4241.6	5349.3		
MC109037	2562	4701	5916	2576.6	4716.9	5932.3	2517	4643	5822	2531	4671	5882	2541	4667	5881		
MC93272.17	4740	8618	10823	4771.9	8660.2	10868	4713	8581	10760	4719.1	8607.3	10811.7	4732.6	8607.6	10811.7		
MC86946.23	5402	9777	12264	5444.7	9831.6	12324.4	5376	9748	12228	5359	9757	12257	5375	9757	12249		
MC70186.1	5398	9774	12263	5442.6	9827.3	12318.7	5375	9744	12223	5357	9752	12251	5373	9753	12244		
MC59655.91	5399	9773	12262	5442.3	9828.1	12319.8	5375	9745	12224	5358	9753	12252	5374	9754	12245		
MC46475.52	5433	9826	12325	5473.9	9874.5	12374.6	5406	9791	12279	5388	9799	12307	5413	9813	12314		
J1000000_1897_J	5891	10637	13339	5933	10686.2	13392.1	5866	10604	13298	5846	10611	13324	5871	10625	13332		
						PROP NO POND - EXIST			PROP 2 POND - EXIST			PROP 3 POND - EXIST			PROP 4 POND - EXIST		
HEC-HMS ID	10 YR	50 YR	100 YR	10 YR	50 YR	100 YR	10 YR	50 YR	100 YR	10 YR	50 YR	100 YR	10 YR	50 YR	100 YR		
	CFS	CFS	CFS	CFS	CFS	CFS	CFS	CFS	CFS	CFS	CFS	CFS	CFS	CFS	CFS		
MC156273.3	10	14	15	-48	-58	-93	-34	-30	-33	-24	-34	-35					
MC109037	15	16	16	-45	-58	-94	-31	-29	-34	-21	-34	-35					
MC93272.17	32	42	45	-27	-38	-63	-21	-11	-12	-7	-11	-12					
MC86946.23	43	55	61	-25	-29	-36	-43	-20	-7	-26	-20	-14					
MC70186.1	44	54	56	-24	-30	-40	-41	-21	-12	-25	-21	-20					
MC59655.91	43	55	57	-24	-28	-39	-42	-20	-10	-26	-19	-18					
MC46475.52	41	49	49	-27	-35	-46	-45	-26	-19	-20	-13	-11					
J1000000_1897_J	42	50	53	-25	-33	-41	-45	-26	-15	-20	-12	-7					
TRIB 5			HCFCD HEC-HMS REVISED EXISTING			PROPOSED NO PONDS			PROPOSED 2 PONDS			PROPOSED 3 PONDS			PROPOSED 4 PONDS		
HEC-HMS ID	10 YR	50 YR	100 YR	10 YR	50 YR	100 YR	10 YR	50 YR	100 YR	10 YR	50 YR	100 YR	10 YR	50 YR	100 YR		
	CFS	CFS	CFS	CFS	CFS	CFS	CFS	CFS	CFS	CFS	CFS	CFS	CFS	CFS	CFS		
MC999903_9901_J	1056	1887	2347	1062.8	1897.8	2358.3	1025	1846	2301.8	1034.6	1855.1	2309.7	1034.9	1866.5	2320.5		
MC89313.17	1592	2848	3543	1613	2877.7	3575.6	1576	2825	3519	1552	2788	3472	1550	2801	3486		

J100_SH249 EXISTING



EXISTING 10-YEAR

Global Summary Results for Run "J100_10%_SH249EX"

Project: J100-00-00REV Simulation Run: J100_10%_SH249EX

Start of Run: 01Jun2007, 00:00 Basin Model: J100_10PCT_SH249EX
End of Run: 05Jun2007, 00:00 Meteorologic Model: 10%_24HR
Compute Time: 17Apr2014, 12:54:49 Control Specifications: CONTROL15

Volume Units: ☐ IN ☒ AC-FT

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
401	17.3600	2327.5	01Jun2007, 23:30	2997.9
401A	1.5000	418.6	01Jun2007, 21:30	260.6
402A	16.0100	2395.6	01Jun2007, 23:15	3109.7
402B	1.8600	1151.4	01Jun2007, 18:15	334.1
402C	1.2700	823.7	01Jun2007, 18:15	256.6
402D	1.4500	489.4	01Jun2007, 20:30	284.6
403	28.2730	3948.5	02Jun2007, 03:15	5292.6
405	5.2200	1056.1	01Jun2007, 21:30	937.1
405A	2.3300	543.1	01Jun2007, 22:15	411.3
501a	21.2050	4939.3	01Jun2007, 22:30	3675.3
501b	14.5880	3538.3	01Jun2007, 20:00	2522.5
502a	14.5080	3230.6	01Jun2007, 19:45	2621.1
502b	10.5080	2489.7	01Jun2007, 20:30	1898.5
503a	3.9541	2003.2	01Jun2007, 17:45	726.5
503b	6.9582	2888.3	01Jun2007, 19:00	1392.0
504	3.7717	1786.4	01Jun2007, 19:45	716.8
601a	28.4720	4073.1	02Jun2007, 02:30	4975.5
601b	15.1800	2297.7	02Jun2007, 01:00	2600.1
602	6.2554	1668.3	01Jun2007, 20:15	1107.2
J1000000_0030_J	760.8811	28106.6	04Jun2007, 03:00	130550.9
J1000000_0030_R	757.0591	28106.6	04Jun2007, 03:00	129822.2
J1000000_0164_J	757.0591	28166.0	04Jun2007, 00:30	131908.7
J1000000_0175_J	437.5891	20238.6	04Jun2007, 01:45	75928.2
J1000000_0175_R	432.8364	20238.6	04Jun2007, 01:45	75113.2
J1000000_0364_J	432.8364	20351.6	03Jun2007, 20:30	76770.2
J1000000_0364_R	423.4378	20351.4	03Jun2007, 20:30	75078.0
J1000000_0498_J	423.4378	20391.9	03Jun2007, 18:00	75944.4
J1000000_0498_R	421.0193	20391.9	03Jun2007, 18:00	75404.4
J1000000_0687_J	421.0193	20454.1	03Jun2007, 15:15	76288.0
J1000000_0687_R	404.7713	20328.9	03Jun2007, 15:15	72520.6
J1000000_0828_J	404.7713	20402.7	03Jun2007, 12:30	73182.3
J1000000_0828_R	404.7713	20402.7	03Jun2007, 12:30	73182.3
J1000000_0918_J	404.7713	20472.2	03Jun2007, 10:15	73696.4
J1000000_0930_J	37.2917	8206.7	02Jun2007, 01:15	8360.5
J1000000_0930_R	364.0798	20330.6	03Jun2007, 10:30	64709.2
J1000000_0945_J	367.4796	20336.5	03Jun2007, 10:15	65335.9
J1000000_1061_J	362.2974	20385.2	03Jun2007, 08:00	64728.4
J1000000_1070_J	364.0798	20385.2	03Jun2007, 08:00	65091.9
J1000000_1106_J	306.7274	19151.9	03Jun2007, 06:15	54637.3
J1000000_1106_R	303.3938	19151.8	03Jun2007, 06:15	53957.5
J1000000_1129_J	362.2974	20684.3	03Jun2007, 05:15	65188.3

EXISTING 50-YEAR

Global Summary Results for Run "J100_2%_SH249EX"

Project: J100-00-00REV Simulation Run: J100_2%_SH249EX

Start of Run: 01Jun2007, 00:00 Basin Model: J100_2PCT_SH249EX
End of Run: 05Jun2007, 00:00 Meteorologic Model: 2%_24HR
Compute Time: 17Apr2014, 13:24:39 Control Specifications: CONTROL15

Volume Units: ☐ IN ☒ AC-FT

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
401	17.3600	4276.3	01Jun2007, 23:30	5415.8
401A	1.5000	740.5	01Jun2007, 21:30	469.9
402A	16.0100	4274.7	01Jun2007, 23:15	5426.8
402B	1.8600	1860.2	01Jun2007, 18:15	596.4
402C	1.2700	1309.0	01Jun2007, 18:15	442.9
402D	1.4500	835.8	01Jun2007, 20:30	495.2
403	28.2730	6902.6	02Jun2007, 03:15	9334.2
405	5.2200	1886.7	01Jun2007, 21:30	1673.2
405A	2.3300	969.6	01Jun2007, 22:15	738.1
501a	21.2050	8617.1	01Jun2007, 22:30	6632.2
501b	14.5880	6005.3	01Jun2007, 20:00	4555.1
502a	14.5080	5440.7	01Jun2007, 19:45	4671.1
502b	10.5080	4220.7	01Jun2007, 20:30	3383.2
503a	3.9541	3161.5	01Jun2007, 17:45	1288.2
503b	6.9582	4658.5	01Jun2007, 19:15	2409.3
504	3.7717	2932.4	01Jun2007, 19:45	1258.7
601a	28.4720	7230.7	02Jun2007, 02:30	8956.0
601b	15.1800	4073.6	02Jun2007, 01:00	4708.9
602	6.2554	2822.2	01Jun2007, 20:15	1985.2
J1000000_0030_J	760.8811	46335.0	03Jun2007, 19:30	162273.7
J1000000_0030_R	757.0591	46335.0	03Jun2007, 19:30	160995.3
J1000000_0164_J	757.0591	46427.8	03Jun2007, 17:30	163699.8
J1000000_0175_J	437.5891	37936.8	03Jun2007, 17:30	127719.3
J1000000_0175_R	432.8364	37936.5	03Jun2007, 17:30	126243.8
J1000000_0364_J	432.8364	38247.0	03Jun2007, 12:45	128587.1
J1000000_0364_R	423.4378	38208.6	03Jun2007, 12:45	125568.3
J1000000_0498_J	423.4378	38358.2	03Jun2007, 10:15	126720.0
J1000000_0498_R	421.0193	38358.2	03Jun2007, 10:15	125812.1
J1000000_0687_J	421.0193	38619.8	03Jun2007, 06:45	126974.5
J1000000_0687_R	404.7713	38225.6	03Jun2007, 07:00	120700.7
J1000000_0828_J	404.7713	38360.5	03Jun2007, 04:45	121604.6
J1000000_0828_R	404.7713	38360.5	03Jun2007, 04:45	121604.6
J1000000_0918_J	404.7713	38480.7	03Jun2007, 03:15	122333.1
J1000000_0930_J	37.2917	13342.4	02Jun2007, 01:15	14040.6
J1000000_0930_R	364.0798	37975.8	03Jun2007, 03:30	107182.2
J1000000_0945_J	367.4796	38002.3	03Jun2007, 03:30	108292.5
J1000000_1061_J	362.2974	38092.5	03Jun2007, 01:45	107133.1
J1000000_1070_J	364.0798	38092.5	03Jun2007, 01:45	107758.9
J1000000_1106_J	306.7274	36409.2	02Jun2007, 23:15	97308.4
J1000000_1106_R	303.3938	36392.5	02Jun2007, 23:15	96137.9
J1000000_1129_J	362.2974	38932.9	02Jun2007, 23:00	107859.3

EXISTING 100-YEAR

Global Summary Results for Run "J100_1%_SH249EX"

Project: J100-00-00REV Simulation Run: J100_1%_SH249EX

Start of Run: 01Jun2007, 00:00 Basin Model: J100_1PCT_SH249EX
End of Run: 05Jun2007, 00:00 Meteorologic Model: 1%_24HR
Compute Time: 17Apr2014, 13:30:12 Control Specifications: CONTROL15

Volume Units: ☐ IN ☒ AC-FT

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
401	17.3600	5384.4	01Jun2007, 23:30	6807.1
401A	1.5000	914.8	01Jun2007, 21:30	590.2
402A	16.0100	5332.6	01Jun2007, 23:15	6737.0
402B	1.8600	2206.1	01Jun2007, 18:15	746.5
402C	1.2700	1546.9	01Jun2007, 18:15	547.6
402D	1.4500	1021.9	01Jun2007, 20:30	614.1
403	28.2730	8551.9	02Jun2007, 03:15	11632.3
405	5.2200	2347.1	01Jun2007, 21:30	2094.3
405A	2.3300	1204.6	01Jun2007, 22:15	925.5
501a	21.2050	10613.3	01Jun2007, 22:30	8332.6
501b	14.5880	7308.7	01Jun2007, 20:00	5724.5
502a	14.5080	6608.9	01Jun2007, 19:45	5842.9
502b	10.5080	5139.5	01Jun2007, 20:30	4231.9
503a	3.9541	3719.3	01Jun2007, 17:45	1608.6
503b	6.9582	5567.9	01Jun2007, 19:15	2981.9
504	3.7717	3520.5	01Jun2007, 19:45	1566.1
601a	28.4720	8997.2	02Jun2007, 02:30	11242.4
601b	15.1800	5060.0	02Jun2007, 01:00	5923.8
602	6.2554	3431.1	01Jun2007, 20:15	2400.7
J1000000_0030_J	760.8811	56734.3	03Jun2007, 16:15	211951.5
J1000000_0030_R	757.0591	56734.3	03Jun2007, 16:15	210361.3
J1000000_0164_J	757.0591	56882.5	03Jun2007, 14:15	213405.9
J1000000_0175_J	437.5891	48558.8	03Jun2007, 14:00	157425.4
J1000000_0175_R	432.8364	48546.1	03Jun2007, 14:15	155569.4
J1000000_0364_J	432.8364	48922.7	03Jun2007, 10:00	158271.5
J1000000_0364_R	423.4378	48924.4	03Jun2007, 10:00	154949.0
J1000000_0498_J	423.4378	49184.9	03Jun2007, 07:30	155775.6
J1000000_0498_R	421.0193	49184.9	03Jun2007, 07:30	154664.3
J1000000_0687_J	421.0193	49568.6	03Jun2007, 04:30	155930.5
J1000000_0687_R	404.7713	48993.4	03Jun2007, 04:30	148279.2
J1000000_0828_J	404.7713	49185.3	03Jun2007, 02:45	149298.9
J1000000_0828_R	404.7713	49185.3	03Jun2007, 02:45	149298.9
J1000000_0918_J	404.7713	49361.5	03Jun2007, 01:30	150109.3
J1000000_0930_J	37.2917	16060.9	02Jun2007, 01:15	17179.8
J1000000_0930_R	364.0798	48519.5	03Jun2007, 01:30	131543.6
J1000000_0945_J	367.4796	48562.6	03Jun2007, 01:30	132929.5
J1000000_1061_J	362.2974	48722.6	02Jun2007, 23:45	131420.9
J1000000_1070_J	364.0798	48722.6	02Jun2007, 23:45	132193.9
J1000000_1106_J	306.7274	47370.7	02Jun2007, 21:30	121708.2
J1000000_1106_R	303.3938	47340.5	02Jun2007, 21:30	120262.4
J1000000_1129_J	362.2974	50122.5	02Jun2007, 21:30	132529.1

J1000000_1338_J	303.3938	19303.6	03Jun2007, 02:15	54590.7
J1000000_1338_R	295.5216	19181.4	03Jun2007, 02:15	53107.5
J1000000_1550_J	278.7726	19364.2	02Jun2007, 22:15	50249.5
J1000000_1560_J	295.5216	19364.2	02Jun2007, 22:15	53408.8
J1000000_1577_R	271.0253	19276.7	02Jun2007, 22:15	48851.4
J1000000_1793_J	271.0253	19529.2	02Jun2007, 18:15	48968.8
J1000000_1817_R	266.3098	19528.4	02Jun2007, 18:15	47955.3
J1000000_1888_J	266.3098	19909.0	02Jun2007, 17:15	47989.0
J1000000_1897_J	75.2730	7037.6	02Jun2007, 23:45	13856.2
J1000000_1908_J	191.0368	16919.0	02Jun2007, 15:45	34132.8
J1000000_1908_R	180.7678	16548.5	02Jun2007, 15:45	32122.5
J1000000_2251_J	180.7678	17193.7	02Jun2007, 09:30	32140.9
J1000000_2297_J	75.4930	11209.3	02Jun2007, 04:15	13552.6
J1000000_2307_J	105.2748	11510.0	02Jun2007, 11:00	18588.3
J1000000_2307_R	96.9314	11110.8	02Jun2007, 11:00	16987.3
J1000000_2546_J	96.9314	11360.3	02Jun2007, 06:45	16987.5
J1000000_2580_J	49.9074	6536.6	02Jun2007, 06:30	8682.8
J1000000_2605_J	47.0240	4949.3	02Jun2007, 09:45	8304.7
J1000000_2605_R	34.2750	3594.3	02Jun2007, 10:30	6032.6
J1000000_2970_J	34.2750	3652.1	02Jun2007, 04:15	6032.6
J1000000_3006_J	23.4260	2891.5	02Jun2007, 05:30	4041.6
J1000000_3006_R	11.1870	1781.0	02Jun2007, 06:30	1925.3
MC_TRIBS_9900_R	5.2200	1056.1	01Jun2007, 22:00	937.1
MC_TRIBS_9901_R	7.5500	1597.2	01Jun2007, 22:30	1348.4
MC109037	18.8600	2612.0	01Jun2007, 23:45	3258.5
MC156273.3	17.3600	2327.5	01Jun2007, 23:30	2997.9
MC46475.5	47.0000	6631.4	02Jun2007, 01:15	8591.9
MC59655.9	45.5500	6469.4	02Jun2007, 00:45	8307.3
MC70186.1	44.2800	6435.6	02Jun2007, 00:30	8050.7
MC86946.2	42.4200	6399.2	01Jun2007, 23:45	7716.6
MC89313.17	7.5500	1597.2	01Jun2007, 22:30	1348.4
MC93272.2	34.8700	4967.9	01Jun2007, 23:30	6368.2
MC9900400_9902A_R	34.8700	4967.9	02Jun2007, 00:00	6368.2
MC990100_9901_R	25.6527	6196.2	02Jun2007, 01:15	5647.5
MC990400_9900B_R	45.5500	6469.4	02Jun2007, 01:15	8307.3
MC990400_9900C_R	47.0000	6631.4	02Jun2007, 23:45	8563.6
MC990400_9901_R	42.4200	6399.2	02Jun2007, 00:45	7716.6
MC990400_9901A_R	44.2800	6435.6	02Jun2007, 00:45	8050.7
MC990400_9902_R	18.8600	2612.0	02Jun2007, 00:15	3258.5
MC990400_9903_R	17.3600	2327.5	02Jun2007, 00:00	2997.9
MC990500_9901_R	71.7213	11198.8	02Jun2007, 04:15	12835.8
MC990500_9902_R	60.8090	10654.8	02Jun2007, 02:15	10717.4
MC990500_9903_R	35.7930	7619.8	02Jun2007, 01:30	6197.8
MC990600_9901_R	43.6520	6283.8	02Jun2007, 06:45	7575.6
MC999901_9901_J	60.8090	10656.7	02Jun2007, 00:15	10717.4
MC999902_9901_J	71.7213	11198.8	02Jun2007, 02:00	12835.8
MC999903_9901_J	5.2200	1056.1	01Jun2007, 21:30	937.1

J1000000_1338_J	303.3938	36797.4	02Jun2007, 20:00	97209.2
J1000000_1338_R	295.5216	36408.6	02Jun2007, 20:00	94598.2
J1000000_1550_J	278.7726	36749.3	02Jun2007, 16:45	89551.0
J1000000_1560_J	295.5216	36749.3	02Jun2007, 16:45	95110.6
J1000000_1577_R	271.0253	36433.6	02Jun2007, 17:00	87058.6
J1000000_1793_J	271.0253	36847.4	02Jun2007, 13:30	87253.1
J1000000_1817_R	266.3098	36812.5	02Jun2007, 13:30	85532.3
J1000000_1888_J	266.3098	37143.8	02Jun2007, 12:30	85586.6
J1000000_1897_J	75.2730	12674.8	02Jun2007, 23:45	24567.7
J1000000_1908_J	191.0368	34150.6	02Jun2007, 12:45	61018.9
J1000000_1908_R	180.7678	33232.8	02Jun2007, 12:45	57518.4
J1000000_2251_J	180.7678	34001.2	02Jun2007, 07:45	57552.0
J1000000_2297_J	75.4930	19722.3	02Jun2007, 04:15	24197.8
J1000000_2307_J	105.2748	20900.4	02Jun2007, 10:15	33354.2
J1000000_2307_R	96.9314	20137.0	02Jun2007, 10:15	30550.6
J1000000_2546_J	96.9314	20364.8	02Jun2007, 06:45	30551.0
J1000000_2580_J	49.9074	11621.5	02Jun2007, 06:30	15650.1
J1000000_2605_J	47.0240	9030.4	02Jun2007, 09:30	14900.9
J1000000_2605_R	34.2750	6596.3	02Jun2007, 09:45	10835.2
J1000000_2970_J	34.2750	6791.7	02Jun2007, 04:15	10835.2
J1000000_3006_J	23.4260	5352.9	02Jun2007, 04:45	7303.4
J1000000_3006_R	11.1870	3181.6	02Jun2007, 05:30	3481.7
MC_TRIBS_9900_R	5.2200	1886.7	01Jun2007, 22:00	1673.2
MC_TRIBS_9901_R	7.5500	2854.6	01Jun2007, 22:30	2411.3
MC109037	18.8600	4788.6	01Jun2007, 23:45	5885.7
MC156273.3	17.3600	4276.3	01Jun2007, 23:30	5415.8
MC46475.5	47.0000	11954.9	02Jun2007, 01:15	15258.4
MC59655.9	45.5500	11676.8	02Jun2007, 00:45	14763.2
MC70186.1	44.2800	11626.1	02Jun2007, 00:45	14320.3
MC86946.2	42.4200	11567.4	01Jun2007, 23:45	13723.9
MC89313.17	7.5500	2854.6	01Jun2007, 22:00	2411.3
MC93272.2	34.8700	8990.2	01Jun2007, 23:30	11312.6
MC9900400_9902A_R	34.8700	8990.2	02Jun2007, 00:00	11312.6
MC990100_9901_R	25.6527	9990.9	02Jun2007, 01:30	9528.5
MC990400_9900B_R	45.5500	11676.8	02Jun2007, 01:15	14763.2
MC990400_9900C_R	47.0000	11954.9	02Jun2007, 23:45	15233.5
MC990400_9901_R	42.4200	11567.4	02Jun2007, 00:45	13723.9
MC990400_9901A_R	44.2800	11626.1	02Jun2007, 01:00	14320.3
MC990400_9902_R	18.8600	4788.6	02Jun2007, 00:15	5885.7
MC990400_9903_R	17.3600	4276.3	02Jun2007, 00:00	5415.8
MC990500_9901_R	71.7213	19704.1	02Jun2007, 04:15	22939.1
MC990500_9902_R	60.8090	18759.1	02Jun2007, 02:15	19241.6
MC990500_9903_R	35.7930	13420.7	02Jun2007, 01:30	11187.3
MC990600_9901_R	43.6520	11163.5	02Jun2007, 06:45	13664.9
MC999901_9901_J	60.8090	18766.3	02Jun2007, 00:30	19241.6
MC999902_9901_J	71.7213	19704.1	02Jun2007, 02:00	22939.1
MC999903_9901_J	5.2200	1886.7	01Jun2007, 21:30	1673.2

J1000000_1338_J	303.3938	48074.5	02Jun2007, 18:15	121559.9
J1000000_1338_R	295.5216	47501.2	02Jun2007, 18:15	118308.2
J1000000_1550_J	278.7726	48009.5	02Jun2007, 15:15	112016.0
J1000000_1560_J	295.5216	48009.5	02Jun2007, 15:15	118938.9
J1000000_1577_R	271.0253	47525.4	02Jun2007, 15:30	108898.0
J1000000_1793_J	271.0253	48129.2	02Jun2007, 12:15	109135.2
J1000000_1817_R	266.3098	48068.0	02Jun2007, 12:15	107021.0
J1000000_1888_J	266.3098	48604.4	02Jun2007, 11:00	107068.2
J1000000_1897_J	75.2730	15873.9	02Jun2007, 23:45	30675.0
J1000000_1908_J	191.0368	44313.2	02Jun2007, 11:15	76411.1
J1000000_1908_R	180.7678	42966.7	02Jun2007, 11:30	72069.0
J1000000_2251_J	180.7678	43780.1	02Jun2007, 07:30	72111.7
J1000000_2297_J	75.4930	24476.6	02Jun2007, 04:15	30288.6
J1000000_2307_J	105.2748	26162.1	02Jun2007, 10:15	41623.1
J1000000_2307_R	96.9314	25220.3	02Jun2007, 10:30	38338.3
J1000000_2546_J	96.9314	25461.6	02Jun2007, 06:45	38338.9
J1000000_2580_J	49.9074	14468.4	02Jun2007, 06:30	19654.9
J1000000_2605_J	47.0240	11503.3	02Jun2007, 09:30	18684.0
J1000000_2605_R	34.2750	8454.9	02Jun2007, 09:45	13591.1
J1000000_2970_J	34.2750	8754.2	02Jun2007, 03:45	13591.1
J1000000_3006_J	23.4260	6803.9	02Jun2007, 04:30	9180.5
J1000000_3006_R	11.1870	3999.2	02Jun2007, 05:15	4377.8
MC_TRIBS_9900_R	5.2200	2347.1	01Jun2007, 22:00	2094.3
MC_TRIBS_9901_R	7.5500	3550.3	01Jun2007, 22:30	3019.9
MC109037	18.8600	6024.4	01Jun2007, 23:45	7397.4
MC156273.3	17.3600	5384.4	01Jun2007, 23:30	6807.1
MC46475.5	47.0000	14971.7	02Jun2007, 01:15	19062.4
MC59655.9	45.5500	14625.6	02Jun2007, 00:45	18448.3
MC70186.1	44.2800	14565.3	02Jun2007, 00:45	17900.7
MC86946.2	42.4200	14486.2	01Jun2007, 23:45	17154.2
MC89313.17	7.5500	3550.3	01Jun2007, 22:00	3019.9
MC93272.2	34.8700	11266.7	01Jun2007, 23:45	14134.3
MC9900400_9902A_R	34.8700	11266.7	02Jun2007, 00:15	14134.3
MC990100_9901_R	25.6527	11990.4	02Jun2007, 01:30	11679.9
MC990400_9900B_R	45.5500	14625.6	02Jun2007, 01:15	18448.3
MC990400_9900C_R	47.0000	14971.7	02Jun2007, 23:45	19042.8
MC990400_9901_R	42.4200	14486.2	02Jun2007, 00:45	17154.2
MC990400_9901A_R	44.2800	14565.3	02Jun2007, 01:00	17900.7
MC990400_9902_R	18.8600	6024.4	02Jun2007, 00:15	7397.4
MC990400_9903_R	17.3600	5384.4	02Jun2007, 00:00	6807.1
MC990500_9901_R	71.7213	24450.5	02Jun2007, 04:15	28722.4
MC990500_9902_R	60.8090	23299.0	02Jun2007, 02:30	24132.0
MC990500_9903_R	35.7930	16587.4	02Jun2007, 01:30	14057.2
MC990600_9901_R	43.6520	13889.7	02Jun2007, 06:45	17166.2
MC999901_9901_J	60.8090	23270.3	02Jun2007, 00:30	24132.0
MC999902_9901_J	71.7213	24450.5	02Jun2007, 02:00	28722.4
MC999903_9901_J	5.2200	2347.1	01Jun2007, 21:30	2094.3

PROPOSED 10-YEAR NO POND				
Global Summary Results for Run "J100_10%_SH249PROP"				
Project: J100-00-00REV Simulation Run: J100_10%_SH249PROP				
Start of Run: 01Jun2007, 00:00 Basin Model: J100_10PCT_SH249PROP				
End of Run: 05Jun2007, 00:00 Meteorologic Model: 10%_24HR				
Compute Time: 17Apr2014, 13:34:29 Control Specifications: CONTROL15				
Volume Units: <input type="radio"/> IN <input checked="" type="radio"/> AC-FT				
Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
401	17.3600	2338.1	01Jun2007, 23:30	3013.8
401A	1.5000	431.5	01Jun2007, 21:30	271.6
402A	16.0100	2421.3	01Jun2007, 23:15	3124.7
402B	1.8600	1163.9	01Jun2007, 18:15	339.0
402C	1.2700	846.9	01Jun2007, 18:00	259.9
402D	1.4500	515.5	01Jun2007, 20:30	292.2
403	28.2730	3948.5	02Jun2007, 03:15	5292.6
405	5.2200	1062.8	01Jun2007, 21:30	943.5
405A	2.3300	556.4	01Jun2007, 22:15	423.0
501a	21.2050	4939.3	01Jun2007, 22:30	3675.3
501b	14.5880	3538.3	01Jun2007, 20:00	2522.5
502a	14.5080	3230.6	01Jun2007, 19:45	2621.1
502b	10.5080	2489.7	01Jun2007, 20:30	1898.5
503a	3.9541	2003.2	01Jun2007, 17:45	726.5
503b	6.9582	2888.3	01Jun2007, 19:00	1392.0
504	3.7717	1786.4	01Jun2007, 19:45	716.8
601a	28.4720	4073.1	02Jun2007, 02:30	4975.5
601b	15.1800	2297.7	02Jun2007, 01:00	2690.1
602	6.2554	1668.3	01Jun2007, 20:15	1107.2
J1000000_0030_J	760.8811	28153.6	04Jun2007, 03:15	130631.5
J1000000_0030_R	757.0591	28153.6	04Jun2007, 03:15	129902.8
J1000000_0164_J	757.0591	28213.4	04Jun2007, 00:30	131990.0
J1000000_0175_J	437.5891	20291.8	04Jun2007, 01:45	76009.5
J1000000_0175_R	432.8364	20291.8	04Jun2007, 01:45	75194.4
J1000000_0364_J	432.8364	20405.2	03Jun2007, 20:30	76851.9
J1000000_0364_R	423.4378	20405.1	03Jun2007, 20:30	75159.6
J1000000_0498_J	423.4378	20446.3	03Jun2007, 18:15	76026.0
J1000000_0498_R	421.0193	20446.3	03Jun2007, 18:15	75486.0
J1000000_0687_J	421.0193	20509.6	03Jun2007, 15:15	76369.5
J1000000_0687_R	404.7713	20384.3	03Jun2007, 15:15	72602.0
J1000000_0828_J	404.7713	20459.2	03Jun2007, 12:30	73263.5
J1000000_0828_R	404.7713	20459.2	03Jun2007, 12:30	73263.5
J1000000_0918_J	404.7713	20529.2	03Jun2007, 10:15	73777.2
J1000000_0930_J	37.2917	8206.7	02Jun2007, 01:15	8360.5
J1000000_0930_R	364.0798	20388.9	03Jun2007, 10:30	64790.0
J1000000_0945_J	367.4796	20394.7	03Jun2007, 10:30	65416.7
J1000000_1061_R	362.2974	20443.1	03Jun2007, 08:00	64809.0
J1000000_1070_J	364.0798	20443.1	03Jun2007, 08:00	65172.4
J1000000_1106_J	306.7274	19220.1	03Jun2007, 06:15	54717.3
J1000000_1106_R	303.3938	19220.0	03Jun2007, 06:15	54037.5
J1000000_1129_J	362.2974	20748.5	03Jun2007, 05:15	65268.3

PROPOSED 50-YEAR NO POND				
Global Summary Results for Run "J100_2%_SH249PROP"				
Project: J100-00-00REV Simulation Run: J100_2%_SH249PROP				
Start of Run: 01Jun2007, 00:00 Basin Model: J100_2PCT_SH249PROP				
End of Run: 05Jun2007, 00:00 Meteorologic Model: 2%_24HR				
Compute Time: 17Apr2014, 13:38:24 Control Specifications: CONTROL15				
Volume Units: <input type="radio"/> IN <input checked="" type="radio"/> AC-FT				
Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
401	17.3600	4290.3	01Jun2007, 23:30	5435.8
401A	1.5000	756.4	01Jun2007, 21:30	483.6
402A	16.0100	4313.4	01Jun2007, 23:15	5445.7
402B	1.8600	1871.5	01Jun2007, 18:15	602.6
402C	1.2700	1343.6	01Jun2007, 18:00	447.1
402D	1.4500	871.7	01Jun2007, 20:15	504.7
403	28.2730	6902.6	02Jun2007, 03:15	9334.2
405	5.2200	1897.8	01Jun2007, 21:30	1681.2
405A	2.3300	985.8	01Jun2007, 22:15	752.8
501a	21.2050	8617.1	01Jun2007, 22:30	6632.2
501b	14.5880	6005.3	01Jun2007, 20:00	4555.1
502a	14.5080	5440.7	01Jun2007, 19:45	4671.1
502b	10.5080	4220.7	01Jun2007, 20:30	3383.2
503a	3.9541	3161.5	01Jun2007, 17:45	1288.2
503b	6.9582	4658.5	01Jun2007, 19:15	2409.3
504	3.7717	2932.4	01Jun2007, 19:45	1258.7
601a	28.4720	7230.7	02Jun2007, 02:30	8956.0
601b	15.1800	4073.6	02Jun2007, 01:00	4708.9
602	6.2554	2822.2	01Jun2007, 20:15	1985.2
J1000000_0030_J	760.8811	46398.7	03Jun2007, 19:30	182383.5
J1000000_0030_R	757.0591	46398.7	03Jun2007, 19:30	181105.1
J1000000_0164_J	757.0591	46489.8	03Jun2007, 17:30	183809.0
J1000000_0175_J	437.5891	37998.8	03Jun2007, 17:30	127828.5
J1000000_0175_R	432.8364	37998.6	03Jun2007, 17:30	126353.0
J1000000_0364_J	432.8364	38305.4	03Jun2007, 12:45	128694.7
J1000000_0364_R	423.4378	38267.0	03Jun2007, 12:45	125675.9
J1000000_0498_J	423.4378	38415.2	03Jun2007, 10:15	126826.7
J1000000_0498_R	421.0193	38415.2	03Jun2007, 10:15	125918.8
J1000000_0687_J	421.0193	38670.6	03Jun2007, 06:45	127080.4
J1000000_0687_R	404.7713	38279.4	03Jun2007, 07:00	120806.6
J1000000_0828_J	404.7713	38411.8	03Jun2007, 05:00	121709.6
J1000000_0828_R	404.7713	38411.8	03Jun2007, 05:00	121709.6
J1000000_0918_J	404.7713	38528.2	03Jun2007, 03:15	122437.3
J1000000_0930_J	37.2917	13342.4	02Jun2007, 01:15	14040.6
J1000000_0930_R	364.0798	38026.5	03Jun2007, 03:30	107286.5
J1000000_0945_J	367.4796	38052.9	03Jun2007, 03:30	108396.8
J1000000_1061_R	362.2974	38142.0	03Jun2007, 01:45	107236.7
J1000000_1070_J	364.0798	38142.0	03Jun2007, 01:45	107862.5
J1000000_1106_J	306.7274	36449.8	02Jun2007, 23:15	97411.0
J1000000_1106_R	303.3938	36433.1	02Jun2007, 23:15	96240.5
J1000000_1129_J	362.2974	38971.0	02Jun2007, 23:00	107961.9

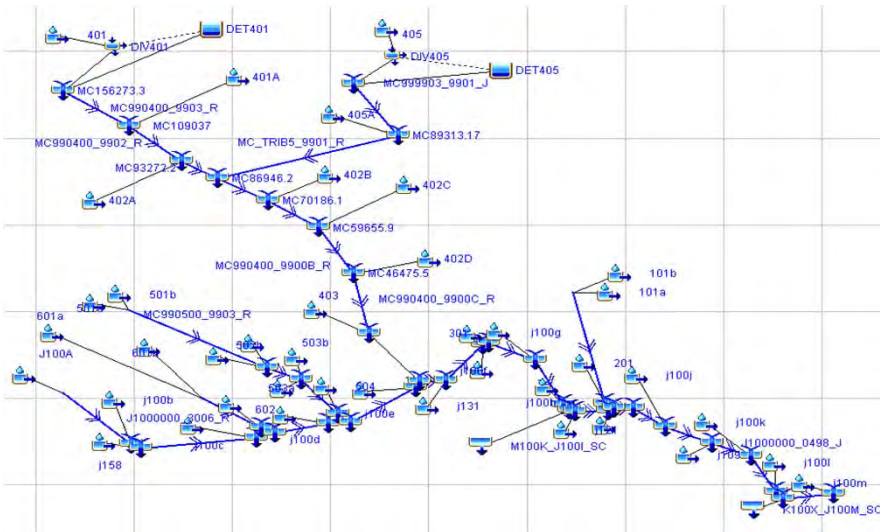
PROPOSED 100-YEAR NO POND				
Global Summary Results for Run "J100_1%_SH249PROP"				
Project: J100-00-00REV Simulation Run: J100_1%_SH249PROP				
Start of Run: 01Jun2007, 00:00 Basin Model: J100_1PCT_SH249PROP				
End of Run: 05Jun2007, 00:00 Meteorologic Model: 1%_24HR				
Compute Time: 17Apr2014, 13:40:35 Control Specifications: CONTROL15				
Volume Units: <input type="radio"/> IN <input checked="" type="radio"/> AC-FT				
Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
401	17.3600	5399.3	01Jun2007, 23:30	6828.3
401A	1.5000	932.0	01Jun2007, 21:30	604.8
402A	16.0100	5378.6	01Jun2007, 23:15	6757.0
402B	1.8600	2218.3	01Jun2007, 18:15	753.1
402C	1.2700	1584.7	01Jun2007, 18:00	552.1
402D	1.4500	1063.4	01Jun2007, 20:15	624.2
403	28.2730	8551.9	02Jun2007, 03:15	11632.3
405	5.2200	2358.3	01Jun2007, 21:30	2102.8
405A	2.3300	1223.8	01Jun2007, 22:00	941.2
501a	21.2050	10613.3	01Jun2007, 22:30	8332.6
501b	14.5880	7308.7	01Jun2007, 20:00	5724.5
502a	14.5080	6608.9	01Jun2007, 19:45	5842.9
502b	10.5080	5139.5	01Jun2007, 20:30	4231.9
503a	3.9541	3719.3	01Jun2007, 17:45	1608.6
503b	6.9582	5567.9	01Jun2007, 19:15	2981.9
504	3.7717	3520.5	01Jun2007, 19:45	1566.1
601a	28.4720	8997.2	02Jun2007, 02:30	11242.4
601b	15.1800	5060.0	02Jun2007, 01:00	5923.8
602	6.2554	3431.1	01Jun2007, 20:15	2488.7
J1000000_0030_J	760.8811	56788.8	03Jun2007, 16:15	212072.3
J1000000_0030_R	757.0591	56788.8	03Jun2007, 16:15	210482.2
J1000000_0164_J	757.0591	56935.3	03Jun2007, 14:15	213525.4
J1000000_0175_J	437.5891	48611.3	03Jun2007, 14:15	157544.9
J1000000_0175_R	432.8364	48598.9	03Jun2007, 14:15	155688.9
J1000000_0364_J	432.8364	49041.3	03Jun2007, 10:00	158387.9
J1000000_0364_R	423.4378	48973.1	03Jun2007, 10:00	154610.4
J1000000_0498_J	423.4378	49231.0	03Jun2007, 07:30	155890.6
J1000000_0498_R	421.0193	49231.0	03Jun2007, 07:30	154779.3
J1000000_0687_J	421.0193	49610.9	03Jun2007, 04:30	156044.2
J1000000_0687_R	404.7713	49035.7	03Jun2007, 04:30	148392.8
J1000000_0828_J	404.7713	49226.1	03Jun2007, 02:45	149411.2
J1000000_0828_R	404.7713	49226.1	03Jun2007, 02:45	149411.2
J1000000_0918_J	404.7713	49401.7	03Jun2007, 01:30	150220.6
J1000000_0930_J	37.2917	16060.9	02Jun2007, 01:15	17179.8
J1000000_0930_R	364.0798	48559.7	03Jun2007, 01:30	131654.9
J1000000_0945_J	367.4796	48602.9	03Jun2007, 01:30	133040.8
J1000000_1061_R	362.2974	48761.2	02Jun2007, 23:45	131531.4
J1000000_1070_J	364.0798	48761.2	02Jun2007, 23:45	132304.4
J1000000_1106_J	306.7274	47406.0	02Jun2007, 21:30	121817.4
J1000000_1106_R	303.3938	47375.7	02Jun2007, 21:30	120371.6
J1000000_1129_J	362.2974	50157.8	02Jun2007, 21:30	132368.4

J1000000_1338_J	303.3938	19374.7	03Jun2007, 02:15	54669.7
J1000000_1338_R	295.5216	19252.6	03Jun2007, 02:15	53186.4
J1000000_1550_J	278.7726	19439.5	02Jun2007, 22:15	50327.6
J1000000_1560_J	295.5216	19439.5	02Jun2007, 22:15	53486.9
J1000000_1577_R	271.0253	19352.0	02Jun2007, 22:15	48929.5
J1000000_1793_J	271.0253	19611.9	02Jun2007, 18:15	49046.3
J1000000_1817_R	266.3098	19611.0	02Jun2007, 18:15	48032.8
J1000000_1888_J	266.3098	20011.2	02Jun2007, 17:00	48066.3
J1000000_1897_J	75.2730	7096.1	02Jun2007, 23:30	13933.5
J1000000_1908_J	191.0368	16919.0	02Jun2007, 15:45	34132.8
J1000000_1908_R	180.7678	16548.5	02Jun2007, 15:45	32122.5
J1000000_2251_J	180.7678	17193.7	02Jun2007, 09:30	32140.9
J1000000_2297_J	75.4930	11209.3	02Jun2007, 04:15	13552.6
J1000000_2307_J	105.2748	11510.0	02Jun2007, 11:00	18588.3
J1000000_2307_R	96.9314	11110.8	02Jun2007, 11:00	16987.3
J1000000_2546_J	96.9314	11360.3	02Jun2007, 06:45	16987.5
J1000000_2580_J	49.9074	6536.6	02Jun2007, 06:30	8682.8
J1000000_2605_J	47.0240	4949.3	02Jun2007, 09:45	8304.7
J1000000_2605_R	34.2750	3594.3	02Jun2007, 10:30	6032.6
J1000000_2970_J	34.2750	3652.1	02Jun2007, 04:15	6032.6
J1000000_3006_J	23.4260	2891.5	02Jun2007, 05:30	4041.6
J1000000_3006_R	11.1870	1781.0	02Jun2007, 06:30	1925.3
MC_TRI85_9900_R	5.2200	1062.8	01Jun2007, 22:00	943.5
MC_TRI85_9901_R	7.5500	1618.0	01Jun2007, 22:30	1366.6
MC109037	18.8600	2626.9	01Jun2007, 23:45	3285.4
MC156273.3	17.3600	2338.1	01Jun2007, 23:30	3013.8
MC46475.5	47.0000	6685.3	02Jun2007, 01:15	8667.8
MC59655.9	45.5500	6530.5	02Jun2007, 00:45	8375.6
MC70186.1	44.2800	6497.7	02Jun2007, 00:30	8115.7
MC86946.2	42.4200	6456.7	01Jun2007, 23:30	7776.7
MC89313.17	7.5500	1618.0	01Jun2007, 22:00	1366.6
MC93272.2	34.8700	5006.1	01Jun2007, 23:30	6410.1
MC9900400_9902A_R	34.8700	5006.1	02Jun2007, 00:00	6410.1
MC990100_9901_R	25.6527	6196.2	02Jun2007, 01:15	5647.5
MC990400_9900B_R	45.5500	6530.5	02Jun2007, 01:15	8375.6
MC990400_9900C_R	47.0000	6685.3	02Jun2007, 23:45	8640.9
MC990400_9901_R	42.4200	6456.7	02Jun2007, 00:30	7776.7
MC990400_9901A_R	44.2800	6497.7	02Jun2007, 00:45	8115.7
MC990400_9902_R	18.8600	2626.9	02Jun2007, 00:15	3285.4
MC990400_9903_R	17.3600	2338.1	02Jun2007, 00:00	3013.8
MC990500_9901_R	71.7213	11198.8	02Jun2007, 04:15	12835.8
MC990500_9902_R	60.8090	10654.8	02Jun2007, 02:15	10717.4
MC990500_9903_R	35.7930	7619.8	02Jun2007, 01:30	6197.8
MC990600_9901_R	43.6520	6283.8	02Jun2007, 06:45	7575.6
MC999901_9901_J	60.8090	10656.7	02Jun2007, 00:15	10717.4
MC999902_9901_J	71.7213	11198.8	02Jun2007, 02:00	12835.8
MC999903_9901_J	5.2200	1062.8	01Jun2007, 21:30	943.5

J1000000_1338_J	303.3938	36834.9	02Jun2007, 20:00	97309.6
J1000000_1338_R	295.5216	36446.1	02Jun2007, 20:00	94698.6
J1000000_1550_J	278.7726	36782.8	02Jun2007, 16:45	89649.7
J1000000_1560_J	295.5216	36782.8	02Jun2007, 16:45	95209.3
J1000000_1577_R	271.0253	36468.9	02Jun2007, 17:00	87157.3
J1000000_1793_J	271.0253	36879.8	02Jun2007, 13:30	87350.7
J1000000_1817_R	266.3098	36844.9	02Jun2007, 13:30	85630.0
J1000000_1888_J	266.3098	37175.7	02Jun2007, 12:30	85683.9
J1000000_1897_J	75.2730	12747.3	02Jun2007, 23:30	24664.9
J1000000_1908_J	191.0368	34150.6	02Jun2007, 12:45	61018.9
J1000000_1908_R	180.7678	33232.8	02Jun2007, 12:45	57518.4
J1000000_2251_J	180.7678	34001.2	02Jun2007, 07:45	57552.0
J1000000_2297_J	75.4930	19722.3	02Jun2007, 04:15	24197.8
J1000000_2307_J	105.2748	20900.4	02Jun2007, 10:15	33354.2
J1000000_2307_R	96.9314	20137.0	02Jun2007, 10:15	30550.0
J1000000_2546_J	96.9314	20364.8	02Jun2007, 06:45	30551.0
J1000000_2580_J	49.9074	11621.5	02Jun2007, 06:30	15650.1
J1000000_2605_J	47.0240	9030.4	02Jun2007, 09:30	14900.9
J1000000_2605_R	34.2750	6596.3	02Jun2007, 09:45	10835.2
J1000000_2970_J	34.2750	6791.7	02Jun2007, 04:15	10835.2
J1000000_3006_J	23.4260	5352.9	02Jun2007, 04:45	7303.4
J1000000_3006_R	11.1870	3181.6	02Jun2007, 05:30	3481.7
MC_TRI85_9900_R	5.2200	1897.8	01Jun2007, 22:00	1681.2
MC_TRI85_9901_R	7.5500	2883.2	01Jun2007, 22:30	2434.0
MC109037	18.8600	4805.8	01Jun2007, 23:30	5919.4
MC156273.3	17.3600	4290.3	01Jun2007, 23:30	5435.8
MC46475.5	47.0000	12022.6	02Jun2007, 01:15	15353.5
MC59655.9	45.5500	11760.2	02Jun2007, 00:45	14848.8
MC70186.1	44.2800	11708.7	02Jun2007, 00:30	14401.7
MC86946.2	42.4200	11640.8	01Jun2007, 23:45	13799.1
MC89313.17	7.5500	2883.2	01Jun2007, 22:00	2434.0
MC93272.2	34.8700	9042.4	01Jun2007, 23:30	11365.1
MC9900400_9902...	34.8700	9042.4	02Jun2007, 00:00	11365.1
MC990100_9901_R	25.6527	9990.9	02Jun2007, 01:30	9528.5
MC990400_9900B_R	45.5500	11760.2	02Jun2007, 01:15	14848.8
MC990400_9900C_R	47.0000	12022.6	02Jun2007, 23:45	15330.7
MC990400_9901_R	42.4200	11640.8	02Jun2007, 00:45	13799.1
MC990400_9901A_R	44.2800	11708.7	02Jun2007, 00:45	14401.7
MC990400_9902_R	18.8600	4805.2	02Jun2007, 00:15	5919.4
MC990400_9903_R	17.3600	4290.3	02Jun2007, 00:00	5435.8
MC990500_9901_R	71.7213	19704.1	02Jun2007, 04:15	22939.1
MC990500_9902_R	60.8090	18759.1	02Jun2007, 02:15	19241.6
MC990500_9903_R	35.7930	13420.7	02Jun2007, 01:30	11187.3
MC990600_9901_R	43.6520	11163.5	02Jun2007, 06:45	13664.9
MC999901_9901_J	60.8090	18766.3	02Jun2007, 00:30	19241.6
MC999902_9901_J	71.7213	19704.1	02Jun2007, 02:00	22939.1
MC999903_9901_J	5.2200	1897.8	01Jun2007, 21:30	1681.2

J1000000_1338_J	303.3938	48108.2	02Jun2007, 18:15	121666.0
J1000000_1338_R	295.5216	47534.9	02Jun2007, 18:15	118414.3
J1000000_1550_J	278.7726	48041.5	02Jun2007, 15:15	112119.8
J1000000_1560_J	295.5216	48041.5	02Jun2007, 15:15	119042.7
J1000000_1577_R	271.0253	47558.5	02Jun2007, 15:30	109001.8
J1000000_1793_J	271.0253	48161.2	02Jun2007, 12:15	109237.7
J1000000_1817_R	266.3098	48100.0	02Jun2007, 12:15	107123.4
J1000000_1888_J	266.3098	48635.5	02Jun2007, 11:00	107188.1
J1000000_1897_J	75.2730	15950.8	02Jun2007, 23:30	30777.0
J1000000_1908_J	191.0368	44313.2	02Jun2007, 11:15	76411.1
J1000000_1908_R	180.7678	42966.7	02Jun2007, 11:30	72069.0
J1000000_2251_J	180.7678	43780.1	02Jun2007, 07:30	72111.7
J1000000_2297_J	75.4930	24476.6	02Jun2007, 04:15	30288.6
J1000000_2307_J	105.2748	26167.1	02Jun2007, 10:15	41823.1
J1000000_2307_R	96.9314	25220.3	02Jun2007, 10:30	38338.3
J1000000_2546_J	96.9314	25461.6	02Jun2007, 06:45	38338.9
J1000000_2580_J	49.9074	14468.4	02Jun2007, 06:30	19654.9
J1000000_2605_J	47.0240	11503.3	02Jun2007, 09:30	18684.0
J1000000_2605_R	34.2750	8454.9	02Jun2007, 09:45	13591.1
J1000000_2970_J	34.2750	8754.2	02Jun2007, 03:45	13591.1
J1000000_3006_J	23.4260	6803.9	02Jun2007, 04:30	9180.5
J1000000_3006_R	11.1870	3999.2	02Jun2007, 05:15	4377.8
MC_TRI85_9900_R	5.2200	2358.3	01Jun2007, 22:00	2102.8
MC_TRI85_9901_R	7.5500	3582.1	01Jun2007, 22:30	3044.0
MC109037	18.8600	6040.7	01Jun2007, 23:30	7433.2
MC156273.3	17.3600	5399.3	01Jun2007, 23:30	6828.3
MC46475.5	47.0000	15042.7	02Jun2007, 01:15	19163.5
MC59655.9	45.5500	14717.4	02Jun2007, 00:45	18539.3
MC70186.1	44.2800	14653.9	02Jun2007, 00:30	17987.2
MC86946.2	42.4200	14568.4	01Jun2007, 23:45	17234.2
MC89313.17	7.5500	3582.1	01Jun2007, 22:00	3044.0
MC93272.2	34.8700	11325.3	01Jun2007, 23:30	14190.2
MC9900400_9902...	34.8700	11325.3	02Jun2007, 00:00	14190.2
MC990100_9901_R	25.6527	11990.4	02Jun2007, 01:30	11679.9
MC990400_9900B_R	45.5500	14717.4	02Jun2007, 01:15	18539.3
MC990400_9900C_R	47.0000	15042.7	02Jun2007, 23:45	19144.7
MC990400_9901_R	42.4200	14568.4	02Jun2007, 00:45	17234.2
MC990400_9901A_R	44.2800	14653.9	02Jun2007, 00:45	17987.2
MC990400_9902_R	18.8600	6040.7	02Jun2007, 00:15	7433.2
MC990400_9903_R	17.3600	5399.3	02Jun2007, 00:00	6828.3
MC990500_9901_R	71.7213	24450.5	02Jun2007, 04:15	28722.4
MC990500_9902_R	60.8090	23259.0	02Jun2007, 02:30	24132.0
MC990500_9903_R	35.7930	16587.4	02Jun2007, 01:30	14057.2
MC990600_9901_R	43.6520	13889.7	02Jun2007, 06:45	17166.2
MC999901_9901_J	60.8090	23270.3	02Jun2007, 00:30	24132.0
MC999902_9901_J	71.7213	24450.5	02Jun2007, 02:00	28722.4
MC999903_9901_J	5.2200	2358.3	01Jun2007, 21:30	2102.8

PROPOSED 2 PONDS



PROPOSED 10-YEAR 2 PONDS

Global Summary Results for Run "J100_10%_SH249PROP2"

Project: J100_rev102214 Simulation Run: J100_10%_SH249PROP2

Start of Run: 01Jun2007, 00:00 Basin Model: J100_10PCT_SH249PROP2
End of Run: 05Jun2007, 00:00 Meteorologic Model: 10%_24HR
Compute Time: 28Oct2014, 08:20:27 Control Specifications: CONTROL15

Volume Units: ☒ IN ☐ AC-FT

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
101a	16.7190	3313.4	01Jun2007, 19:00	4.17
101b	8.9337	2884.2	01Jun2007, 19:00	4.05
201	11.6390	2972.3	01Jun2007, 21:45	4.37
301	16.7490	8422.4	01Jun2007, 19:30	3.54
401	17.3600	2338.1	01Jun2007, 23:30	3.26
401A	1.4300	411.8	01Jun2007, 21:30	3.40
402A	16.0500	2425.4	01Jun2007, 23:15	3.66
402B	1.8900	1169.5	01Jun2007, 18:15	3.36
402C	1.2700	846.9	01Jun2007, 18:00	3.84
402D	1.3000	465.0	01Jun2007, 20:15	3.81
403	28.2730	3948.5	02Jun2007, 03:15	3.51
405	5.2200	1062.8	01Jun2007, 21:30	3.39
405A	2.3600	564.2	01Jun2007, 22:15	3.42
501a	21.2050	4939.3	01Jun2007, 22:30	3.25
501b	14.5880	3538.2	01Jun2007, 20:00	3.24
502a	14.5080	3230.6	01Jun2007, 19:45	3.39
502b	10.5080	2489.7	01Jun2007, 20:30	3.39
503a	3.9541	2003.2	01Jun2007, 17:45	3.44
503b	6.9582	2888.3	01Jun2007, 19:00	3.75
504	3.7717	1766.4	01Jun2007, 19:45	3.56
601a	28.4720	4073.1	02Jun2007, 02:30	3.28
601b	15.1800	2297.7	02Jun2007, 01:00	3.21
602	6.2554	1668.3	01Jun2007, 20:15	3.32
DET401	0.0000	34.4	02Jun2007, 08:00	
DET405	0.0000	64.8	02Jun2007, 10:30	
DIV401	17.3600	2268.1	01Jun2007, 23:30	3.16
DIV405	5.2200	992.1	01Jun2007, 21:30	2.87
J1000000_0030_J	760.7611	29142.9	04Jun2007, 02:15	3.22
J1000000_0030_R	756.9391	29142.9	04Jun2007, 02:15	3.22
J1000000_0164_J	756.9391	29230.0	03Jun2007, 23:30	3.27
J1000000_0175_J	437.4691	21155.7	04Jun2007, 00:15	3.26
J1000000_0175_R	432.7164	21155.7	04Jun2007, 00:15	3.26
J1000000_0364_J	432.7164	21299.3	03Jun2007, 19:15	3.33
J1000000_0364_R	423.3178	21299.3	03Jun2007, 19:15	3.33

PROPOSED 50-YEAR 2 PONDS

Global Summary Results for Run "J100_2%_SH249PROP2"

Project: J100_rev102214 Simulation Run: J100_2%_SH249PROP2

Start of Run: 01Jun2007, 00:00 Basin Model: J100_2PCT_SH249PROP2
End of Run: 05Jun2007, 00:00 Meteorologic Model: 2%_24HR
Compute Time: 27Oct2014, 14:12:59 Control Specifications: CONTROL15

Volume Units: ☒ IN ☐ AC-FT

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
101a	16.7190	5364.4	01Jun2007, 19:15	7.01
101b	8.9337	4632.2	01Jun2007, 19:15	6.87
201	11.6390	4850.6	01Jun2007, 22:00	7.27
301	16.7490	13676.1	01Jun2007, 19:30	6.22
401	17.3600	4290.3	01Jun2007, 23:30	5.87
401A	1.4300	721.6	01Jun2007, 21:30	6.06
402A	16.0500	4323.3	01Jun2007, 23:15	6.38
402B	1.8900	1889.7	01Jun2007, 18:15	6.01
402C	1.2700	1343.6	01Jun2007, 18:00	6.60
402D	1.3000	786.5	01Jun2007, 20:15	6.56
403	28.2730	6902.6	02Jun2007, 03:15	6.19
405	5.2200	1897.8	01Jun2007, 21:30	6.04
405A	2.3600	999.0	01Jun2007, 22:15	6.07
501a	21.2050	8617.1	01Jun2007, 22:30	5.86
501b	14.5880	6005.3	01Jun2007, 20:00	5.85
502a	14.5080	5440.7	01Jun2007, 19:45	6.04
502b	10.5080	4220.7	01Jun2007, 20:30	6.04
503a	3.9541	3161.5	01Jun2007, 17:45	6.11
503b	6.9582	4658.5	01Jun2007, 19:15	6.49
504	3.7717	2932.4	01Jun2007, 19:45	6.26
601a	28.4720	7230.7	02Jun2007, 02:30	5.90
601b	15.1800	4073.6	02Jun2007, 01:00	5.82
602	6.2554	2822.2	01Jun2007, 20:15	5.95
DET401	0.0000	60.0	02Jun2007, 08:15	
DET405	0.0000	69.3	02Jun2007, 13:30	
DIV401	17.3600	4190.3	01Jun2007, 23:30	5.71
DIV405	5.2200	1796.0	01Jun2007, 21:30	5.40
J1000000_0030_J	760.7611	48682.7	03Jun2007, 19:00	4.50
J1000000_0030_R	756.9391	48682.7	03Jun2007, 19:00	4.49
J1000000_0164_J	756.9391	48805.2	03Jun2007, 17:15	4.56
J1000000_0175_J	437.4691	40318.2	03Jun2007, 17:00	5.49
J1000000_0175_R	432.7164	40317.6	03Jun2007, 17:00	5.48
J1000000_0364_J	432.7164	40766.5	03Jun2007, 12:30	5.58
J1000000_0364_R	423.3178	40766.5	03Jun2007, 12:30	5.57

PROPOSED 100-YEAR 2 PONDS

Global Summary Results for Run "J100_1%_SH249PROP2"

Project: J100_rev102214 Simulation Run: J100_1%_SH249PROP2

Start of Run: 01Jun2007, 00:00 Basin Model: J100_1PCT_SH249PROP2
End of Run: 05Jun2007, 00:00 Meteorologic Model: 1%_24HR
Compute Time: 27Oct2014, 14:11:00 Control Specifications: CONTROL15

Volume Units: ☒ IN ☐ AC-FT

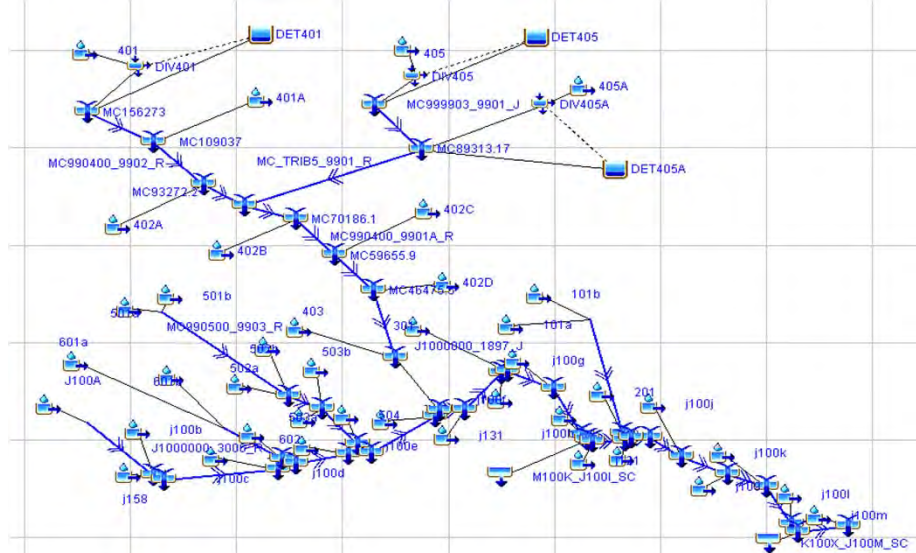
Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
101a	16.7190	6453.9	01Jun2007, 19:30	8.59
101b	8.9337	5546.7	01Jun2007, 19:15	8.44
201	11.6390	5854.6	01Jun2007, 22:00	8.86
301	16.7490	16337.0	01Jun2007, 19:30	7.75
401	17.3600	5399.3	01Jun2007, 23:30	7.38
401A	1.4300	889.0	01Jun2007, 21:30	7.57
402A	16.0500	5390.9	01Jun2007, 23:15	7.91
402B	1.8900	2241.3	01Jun2007, 18:15	7.52
402C	1.2700	1584.7	01Jun2007, 18:00	8.15
402D	1.3000	958.1	01Jun2007, 20:15	8.11
403	28.2730	8551.9	02Jun2007, 03:15	7.71
405	5.2200	2358.3	01Jun2007, 21:30	7.55
405A	2.3600	1238.5	01Jun2007, 22:00	7.59
501a	21.2050	10613.3	01Jun2007, 22:30	7.37
501b	14.5880	7308.7	01Jun2007, 20:00	7.36
502a	14.5080	6608.9	01Jun2007, 19:45	7.55
502b	10.5080	5139.5	01Jun2007, 20:30	7.55
503a	3.9541	3719.3	01Jun2007, 17:45	7.63
503b	6.9582	5567.9	01Jun2007, 19:15	8.04
504	3.7717	3520.5	01Jun2007, 19:45	7.79
601a	28.4720	8997.2	02Jun2007, 02:30	7.40
601b	15.1800	5060.0	02Jun2007, 01:00	7.32
602	6.2554	3431.1	01Jun2007, 20:15	7.46
DET401	0.0000	71.6	02Jun2007, 08:30	
DET405	0.0000	73.7	02Jun2007, 03:15	
DIV401	17.3600	5249.3	01Jun2007, 23:30	7.17
DIV405	5.2200	2244.4	01Jun2007, 21:30	6.85
J1000000_0030_J	760.7611	59787.7	03Jun2007, 16:15	5.24
J1000000_0030_R	756.9391	59787.7	03Jun2007, 16:15	5.22
J1000000_0164_J	756.9391	59967.7	03Jun2007, 14:15	5.30
J1000000_0175_J	437.4691	51643.7	03Jun2007, 14:15	6.76
J1000000_0175_R	432.7164	51631.3	03Jun2007, 14:15	6.76
J1000000_0364_J	432.7164	52184.2	03Jun2007, 10:00	6.87
J1000000_0364_R	423.3178	52184.2	03Jun2007, 10:00	6.87

J1000000_0498_J	423.3178	21362.9	03Jun2007, 16:30	3.37
J1000000_0498_R	423.3178	21362.9	03Jun2007, 16:30	3.36
J1000000_0687_J	420.8993	21502.6	03Jun2007, 13:00	3.40
J1000000_0687_R	404.6513	21354.2	03Jun2007, 13:00	3.37
J1000000_0828_J	404.6513	21466.8	03Jun2007, 10:30	3.40
J1000000_0828_R	404.6513	21466.8	03Jun2007, 10:30	3.40
J1000000_0918_J	404.6513	21572.9	03Jun2007, 08:15	3.42
J1000000_0930_J	37.2917	8206.7	02Jun2007, 01:15	4.20
J1000000_0930_R	363.9598	21401.4	03Jun2007, 08:30	3.34
J1000000_0945_J	367.3596	21409.1	03Jun2007, 08:30	3.34
J1000000_1061_R	362.1774	21468.8	03Jun2007, 06:30	3.35
J1000000_1070_J	363.9598	21468.8	03Jun2007, 06:30	3.36
J1000000_1106_J	306.6074	19993.4	03Jun2007, 04:30	3.34
J1000000_1106_R	303.2738	19993.2	03Jun2007, 04:30	3.34
J1000000_1129_J	362.1774	21822.0	03Jun2007, 03:30	3.38
J1000000_1338_J	303.2738	20115.3	03Jun2007, 00:30	3.38
J1000000_1338_R	295.4016	19973.5	03Jun2007, 00:45	3.37
J1000000_1550_J	278.6526	20087.6	02Jun2007, 21:00	3.38
J1000000_1560_J	295.4016	20087.6	02Jun2007, 21:00	3.39
J1000000_1577_R	270.9053	19984.8	02Jun2007, 21:00	3.38
J1000000_1793_J	270.9053	20104.5	02Jun2007, 17:15	3.39
J1000000_1817_R	266.1898	20103.1	02Jun2007, 17:15	3.38
J1000000_1888_J	266.1898	20229.0	02Jun2007, 16:00	3.38
J1000000_1897_J	75.1530	5866.2	02Jun2007, 22:30	3.47
J1000000_1908_J	191.0368	16919.0	02Jun2007, 15:45	3.35
J1000000_1908_R	180.7678	16548.5	02Jun2007, 15:45	3.33
J1000000_2251_J	180.7678	17193.7	02Jun2007, 09:30	3.33
J1000000_2297_J	75.4930	11209.3	02Jun2007, 04:15	3.37
J1000000_2307_J	105.2748	11510.0	02Jun2007, 11:00	3.31
J1000000_2307_R	96.9314	11110.8	02Jun2007, 11:00	3.29
J1000000_2546_J	96.9314	11360.3	02Jun2007, 06:45	3.29
J1000000_2580_J	49.9074	6536.6	02Jun2007, 06:30	3.26
J1000000_2605_J	47.0240	4949.3	02Jun2007, 09:45	3.31
J1000000_2605_R	34.2750	3594.3	02Jun2007, 10:30	3.30
J1000000_2970_J	34.2750	3652.1	02Jun2007, 04:15	3.30
J1000000_3006_J	23.4260	2891.5	02Jun2007, 05:30	3.23
J1000000_3006_R	11.1870	1781.0	02Jun2007, 06:30	3.23
J100A	11.1870	2136.4	01Jun2007, 21:15	3.23
J100b	12.2390	1622.2	02Jun2007, 01:15	3.24
J100c	12.7490	1384.0	02Jun2007, 08:15	3.34
J100d	8.3434	1418.6	01Jun2007, 22:45	3.60
J100e	10.2690	1547.6	02Jun2007, 02:00	3.67
J100f	7.7473	1255.4	02Jun2007, 00:30	3.38
J100g	7.8722	1015.0	02Jun2007, 02:30	3.53
J100h	3.3336	773.5	01Jun2007, 22:45	3.82
J100i	3.3998	658.6	01Jun2007, 21:30	3.46
J100j	16.2480	2414.6	01Jun2007, 22:30	4.35
J100k	9.3986	1380.5	02Jun2007, 02:00	3.38
J100l	4.7527	824.2	01Jun2007, 22:15	3.22
J100m	3.8220	905.1	01Jun2007, 22:30	3.57
J109	2.4185	1691.2	01Jun2007, 16:45	4.19
J121	1.7824	1049.7	01Jun2007, 17:15	3.82
J131	4.7155	1859.7	01Jun2007, 17:45	4.03
J158	10.8490	2564.9	01Jun2007, 21:00	3.44
K100X_J100M_SC	319.4700	15049.0	02Jun2007, 04:45	3.29
M100K_J100I_SC	55.5700	4979.4	02Jun2007, 00:00	3.56
MC_TR1B5_9900_R	5.2200	1025.3	01Jun2007, 21:30	3.37
MC_TR1B5_9901_R	7.5800	1575.5	01Jun2007, 21:30	3.39
MC109037	18.7900	2517.2	02Jun2007, 00:15	3.26
MC156273.3	17.3600	2279.7	03Jun2007, 23:30	3.25
MC46475.5	46.8800	5406.0	02Jun2007, 06:00	3.45
MC59655.9	45.5800	5375.0	02Jun2007, 05:45	3.44
MC70186.1	44.3100	5374.6	02Jun2007, 05:30	3.43
MC86946.2	42.4200	5376.4	02Jun2007, 03:45	3.43
MC89313.17	7.5800	1575.5	01Jun2007, 21:30	3.39
MC93272.2	34.8400	4713.4	02Jun2007, 00:15	3.44
MC990400_9902...	34.8400	4713.4	02Jun2007, 04:15	3.44
MC990100_9901_R	25.6527	6196.2	02Jun2007, 01:15	4.13
MC990400_9900B_R	45.5800	5373.1	02Jun2007, 06:00	3.44
MC990400_9900C_R	46.8800	5404.7	02Jun2007, 22:45	3.44
MC990400_9901_R	42.4200	5374.2	02Jun2007, 05:30	3.43
MC990400_9901A_R	44.3100	5374.2	02Jun2007, 05:45	3.43
MC990400_9902_R	18.7900	2517.2	02Jun2007, 01:30	3.26
MC990400_9903_R	17.3600	2279.1	02Jun2007, 00:30	3.25
MC990500_9901_R	71.7213	11198.8	02Jun2007, 04:15	3.36
MC990500_9902_R	60.8090	10654.8	02Jun2007, 02:15	3.30
MC990500_9903_R	35.7930	7619.8	02Jun2007, 01:30	3.25
MC990600_9901_R	43.6520	6283.8	02Jun2007, 06:45	3.25
MC999901_9901_J	60.8090	10656.7	02Jun2007, 00:15	3.30
MC999902_9901_J	71.7213	11198.8	02Jun2007, 02:00	3.36
MC999903_9901_J	5.2200	1025.3	01Jun2007, 21:30	3.37

J1000000_0498_J	423.3178	40947.2	03Jun2007, 10:00	5.62
J1000000_0498_R	420.8993	40947.2	03Jun2007, 10:00	5.61
J1000000_0687_J	420.8993	41328.5	03Jun2007, 06:45	5.66
J1000000_0687_R	404.6513	40931.6	03Jun2007, 06:45	5.60
J1000000_0828_J	404.6513	41137.1	03Jun2007, 04:45	5.64
J1000000_0828_R	404.6513	41137.1	03Jun2007, 04:45	5.64
J1000000_0918_J	404.6513	41317.9	03Jun2007, 03:15	5.67
J1000000_0930_J	37.2917	13342.4	02Jun2007, 01:15	7.06
J1000000_0930_R	363.9598	40800.8	03Jun2007, 03:15	5.53
J1000000_0945_J	367.3596	40828.2	03Jun2007, 03:15	5.53
J1000000_1061_R	362.1774	40986.1	03Jun2007, 01:30	5.55
J1000000_1070_J	363.9598	40986.1	03Jun2007, 01:30	5.56
J1000000_1106_J	306.6074	39633.2	02Jun2007, 23:15	5.96
J1000000_1106_R	303.2738	39616.5	02Jun2007, 23:15	5.95
J1000000_1129_J	362.1774	42152.9	02Jun2007, 23:15	5.59
J1000000_1338_J	303.2738	40184.9	02Jun2007, 20:00	6.01
J1000000_1338_R	295.4016	39796.1	02Jun2007, 20:00	6.01
J1000000_1550_J	278.6526	40252.2	02Jun2007, 16:45	6.03
J1000000_1560_J	295.4016	40252.2	02Jun2007, 16:45	6.04
J1000000_1577_R	270.9053	39933.6	02Jun2007, 16:45	6.03
J1000000_1793_J	270.9053	40441.8	02Jun2007, 13:30	6.04
J1000000_1817_R	266.1898	40406.9	02Jun2007, 13:30	6.03
J1000000_1888_J	266.1898	40892.0	02Jun2007, 12:00	6.03
J1000000_1897_J	75.1530	10603.5	02Jun2007, 22:30	6.14
J1000000_1908_J	191.0368	34150.6	02Jun2007, 12:45	5.99
J1000000_1908_R	180.7678	33232.8	02Jun2007, 12:45	5.97
J1000000_2251_J	180.7678	34001.2	02Jun2007, 07:45	5.97
J1000000_2297_J	75.4930	19722.3	02Jun2007, 04:15	6.01
J1000000_2307_J	105.2748	20900.4	02Jun2007, 10:15	5.94
J1000000_2307_R	96.9314	20137.0	02Jun2007, 10:15	5.91
J1000000_2546_J	96.9314	20364.8	02Jun2007, 06:45	5.91
J1000000_2580_J	49.9074	11621.5	02Jun2007, 06:30	5.88
J1000000_2605_J	47.0240	9030.4	02Jun2007, 09:30	5.94
J1000000_2605_R	34.2750	6596.3	02Jun2007, 09:45	5.93
J1000000_2970_J	34.2750	6791.7	02Jun2007, 04:15	5.93
J1000000_3006_J	23.4260	5352.9	02Jun2007, 04:45	5.85
J1000000_3006_R	11.1870	3181.6	02Jun2007, 05:30	5.84
J100A	11.1870	3697.6	01Jun2007, 21:30	5.84
J100b	12.2390	2873.7	02Jun2007, 01:15	5.85
J100c	12.7490	2467.6	02Jun2007, 08:15	5.98
J100d	8.3434	2427.6	01Jun2007, 22:45	6.30
J100e	10.2690	2667.2	02Jun2007, 02:00	6.39
J100f	7.7473	2195.3	02Jun2007, 00:30	6.03
J100g	7.8722	1767.4	02Jun2007, 02:30	6.22
J100h	3.3336	1304.3	01Jun2007, 22:45	6.58
J100i	3.3998	1126.4	01Jun2007, 21:30	6.12
J100j	16.2480	3971.1	01Jun2007, 22:45	7.24
J100k	9.3986	2428.6	02Jun2007, 02:00	6.02
J100l	4.7527	1439.9	01Jun2007, 22:15	5.82
J100m	3.8220	1544.6	01Jun2007, 22:30	6.27
J109	2.4185	2536.1	01Jun2007, 16:45	7.04
J121	1.7824	1613.1	01Jun2007, 17:15	6.58
J131	4.7155	2914.9	01Jun2007, 17:45	6.84
J158	10.8490	4358.4	01Jun2007, 21:00	6.10
K100X_J100M_SC	319.4700	15049.0	02Jun2007, 04:45	3.29
M100K_J100I_SC	55.5700	4979.4	02Jun2007, 00:00	3.56
MC_TR1B5_9900_R	5.2200	1845.5	01Jun2007, 21:30	6.02
MC_TR1B5_9901_R	7.5800	2825.4	01Jun2007, 21:30	6.04
MC109037	18.7900	4642.9	02Jun2007, 00:15	5.88
MC156273.3	17.3600	4218.5	03Jun2007, 23:30	5.86
MC46475.5	46.8800	9791.3	02Jun2007, 06:00	6.12
MC59655.9	45.5800	9744.8	02Jun2007, 05:45	6.10
MC70186.1	44.3100	9744.0	02Jun2007, 05:30	6.09
MC86946.2	42.4200	9748.2	02Jun2007, 03:45	6.09
MC89313.17	7.5800	2825.4	01Jun2007, 21:30	6.04
MC93272.2	34.8400	8580.6	02Jun2007, 00:15	6.11
MC990400_9902...	34.8400	8580.6	02Jun2007, 04:15	6.11
MC990100_9901_R	25.6527	9990.9	02Jun2007, 01:30	6.96
MC990400_9900B_R	45.5800	9740.8	02Jun2007, 06:00	6.10
MC990400_9900C_R	46.8800	9790.3	02Jun2007, 22:45	6.11
MC990400_9901_R	42.4200	9743.4	02Jun2007, 05:30	6.09
MC990400_9901A_R	44.3100	9743.8	02Jun2007, 05:45	6.09
MC990400_9902_R	18.7900	4642.9	02Jun2007, 01:30	5.88
MC990400_9903_R	17.3600	4217.4	02Jun2007, 00:30	5.86
MC990500_9901_R	71.7213	19704.1	02Jun2007, 04:15	6.00
MC990500_9902_R	60.8090	18759.1	02Jun2007, 02:15	5.93
MC990500_9903_R	35.7930	13420.7	02Jun2007, 01:30	5.86
MC990600_9901_R	43.6520	11163.5	02Jun2007, 06:45	5.87
MC999901_9901_J	60.8090	18766.3	02Jun2007, 00:30	5.93
MC999902_9901_J	71.7213	19704.1	02Jun2007, 02:00	6.00
MC999903_9901_J	5.2200	1845.5	01Jun2007, 21:30	6.02

J1000000_0498_J	423.3178	52444.6	03Jun2007, 07:30	6.91
J1000000_0498_R	420.8993	52444.6	03Jun2007, 07:30	6.90
J1000000_0687_J	420.8993	52877.2	03Jun2007, 04:45	6.95
J1000000_0687_R	404.6513	52312.7	03Jun2007, 04:45	6.88
J1000000_0828_J	404.6513	52545.8	03Jun2007, 03:00	6.92
J1000000_0828_R	404.6513	52545.8	03Jun2007, 03:00	6.92
J1000000_0918_J	404.6513	52766.9	03Jun2007, 01:45	6.96
J1000000_0930_J	37.2917	16060.9	02Jun2007, 01:15	8.64
J1000000_0930_R	363.9598	51953.4	03Jun2007, 02:00	6.78
J1000000_0945_J	367.3596	51993.9	03Jun2007, 02:00	6.79
J1000000_1061_R	362.1774	52205.1	03Jun2007, 00:15	6.81
J1000000_1070_J	363.9598	52205.1	03Jun2007, 00:15	6.82
J1000000_1106_J	300.2738	51116.9	02Jun2007, 22:00	7.45
J1000000_1106_R	303.2738	51116.5	02Jun2007, 22:00	7.44
J1000000_1129_J	362.1774	51857.3	02Jun2007, 21:45	6.85
J1000000_1338_J	303.2738	52009.4	02Jun2007, 18:30	7.52
J1000000_1338_R	295.4016	51449.5	02Jun2007, 18:30	7.51
J1000000_1550_J	278.6526	52094.9	02Jun2007, 15:45	7.54
J1000000_1560_J	295.4016	52094.9	02Jun2007, 15:45	7.55
J1000000_1577_R	270.9053	51638.7	02Jun2007, 15:45	7.54
J1000000_1793_J	270.9053	52440.7	02Jun2007, 12:30	7.56
J1000000_1817_R	266.1898	52383.6	02Jun2007, 12:30	7.54
J1000000_1888_J	266.1898	53325.7	02Jun2007, 11:15	7.55
J1000000_1897_J	75.1530	13298.3	02Jun2007, 22:30	7.66
J1000000_1908_J	191.0368	44313.2	02Jun2007, 11:15	7.50
J1000000_1908_R	180.7678	42966.7	02Jun2007, 11:30	7.48
J1000000_2251_J	180.7678	43780.1	02Jun2007, 07:30	7.48
J1000000_2297_J	75.4930	24476.6	02Jun2007, 04:15	7.52
J1000000_2307_J	105.2748	26167.1	02Jun2007, 10:15	7.45
J1000000_2307_R	96.9314	25220.3	02Jun2007, 10:30	7.42
J1000000_2546_J	96.9314	25461.0	02Jun2007, 06:45	7.42
J1000000_2580_J	49.9074	14468.4	02Jun2007, 06:30	7.38
J1000000_2605_J	47.0240	11503.3	02Jun2007, 09:30	7.45
J1000000_2605_R	34.2750	8454.9	02Jun2007, 09:45	7.43
J1000000_2970_J	33.4250	8782.2	02Jun2007, 03:45	7.35
J1000000_3006_J	32.4260	6893.9	02Jun2007, 04:30	7.35
J1000000_3006_R	11.1870	3999.2	02Jun2007, 05:15	7.34
J100A	11.1870	4542.0	01Jun2007, 21:30	7.34
J100b	12.2390	3570.0	02Jun2007, 01:15	7.36
J100c	12.7490	3083.3	02Jun2007, 08:15	7.49
J100d	8.3434	2976.0	01Jun2007, 22:45	7.83
J100e	10.2690	3287.0	02Jun2007, 02:00	7.93
J100f	7.7473	2714.2	02Jun2007, 00:30	7.55
J100g	7.8722	2185.8	02Jun2007, 02:30	7.74
J100h	3.3336	1591.5	01Jun2007, 22:45	8.13
J100i	3.3998	1377.9	01Jun2007, 21:30	7.64
J100j	16.2480	4810.6	01Jun2007, 22:45	8.83
J100k	9.3986	3012.4	02Jun2007, 02:00	7.54
J100l	4.7527	1774.5	01Jun2007, 22:15	7.32
J100m	3.8220	1890.1	02Jun2007, 22:30	7.80
J109	2.4185	2920.6	01Jun2007, 16:45	8.62
J121	1.7824	1874.6	01Jun2007, 17:15	8.13
J131	4.7155	3440.5	01Jun2007, 18:00	8.41
J158	10.8490	5314.4	01Jun2007, 21:00	7.62
K100X_3100M_SC	319.4700	15049.0	02Jun2007, 04:45	3.29
M100X_3100L_SC	55.5700	4974.4	02Jun2007, 00:00	3.56
MC_TR185_9901_R	5.2200	2301.8	01Jun2007, 21:30	7.54
MC_TR185_9901_R	7.5800	3519.1	01Jun2007, 21:30	7.55
MC10937	18.7900	5821.9	02Jun2007, 00:15	7.38
MC156273.3	17.3600	5291.4	01Jun2007, 23:30	7.36
MC46475.5	46.8800	12279.0	02Jun2007, 00:00	7.64
MC59655.9	45.5800	12223.6	02Jun2007, 05:45	7.62
MC70186.1	44.3100	12222.8	02Jun2007, 05:30	7.61
MC86946.2	42.4200	12227.6	02Jun2007, 03:45	7.61
MC89313.7	7.5800	3519.1	01Jun2007, 21:30	7.55
MC93272.2	34.8400	10760.3	02Jun2007, 00:15	7.63
MC990400_9902A_R	34.8400	10760.3	02Jun2007, 04:15	7.63
MC990100_9901_R	25.6527	11990.4	02Jun2007, 01:30	8.54
MC990400_9900B_R	45.5800	12218.8	02Jun2007, 06:00	7.62
MC990400_9900C_R	46.8800	12277.6	02Jun2007, 22:45	7.63
MC990400_9901_R	42.4200	12221.8	02Jun2007, 05:30	7.61
MC990400_9901A_R	44.3100	12222.5	02Jun2007, 05:45	7.61
MC990400_9902_R	18.7900	5821.9	02Jun2007, 01:30	7.38
MC990400_9903_R	17.3600	5290.0	02Jun2007, 00:30	7.36
MC990500_9901_R	71.7213	24450.5	02Jun2007, 04:15	7.51
MC990500_9902_R	60.8090	23259.0	02Jun2007, 02:30	7.44
MC990500_9903_R	35.7930	16587.4	02Jun2007, 01:30	7.38
MC990600_9901_R	43.6520	13889.7	02Jun2007, 06:45	7.37
MC999901_9901_J	60.8090	2322.3	02Jun2007, 02:30	7.44
MC999902_9901_J	71.7213	24450.5	02Jun2007, 02:00	7.51
MC999903_9901_J	5.2200	2301.8	01Jun2007, 21:30	7.54

PROPOSED 3 PONDS



PROPOSED 10-YEAR 3 PONDS

Global Summary Results for Run "J100_10%_SH249PROP3"

Project: J100_rev102214 Simulation Run: J100_10%_SH249PROP3

Start of Run: 01Jun2007, 00:00 Basin Model: J100_10PCT_SH249PROP3
End of Run: 05Jun2007, 00:00 Meteorologic Model: 10%_24HR
Compute Time: 27Oct2014, 14:09:03 Control Specifications: CONTROL15

Volume Units: ☒ IN ☐ AC-FT

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
101a	16.7190	3313.4	01Jun2007, 19:00	4.17
101b	8.9337	2884.2	01Jun2007, 19:00	4.05
201	11.6390	2972.3	01Jun2007, 21:45	4.37
301	16.7490	8422.4	01Jun2007, 19:30	3.54
401	17.3600	2338.1	01Jun2007, 23:30	3.26
401A	1.4300	411.8	01Jun2007, 21:30	3.40
402A	16.0500	2425.4	01Jun2007, 23:15	3.66
402B	1.8900	1169.5	01Jun2007, 18:15	3.36
402C	1.2700	846.9	01Jun2007, 18:00	3.84
402D	1.3000	465.0	01Jun2007, 20:15	3.81
403	28.2730	3948.5	02Jun2007, 03:15	3.51
405	5.2200	1062.8	01Jun2007, 21:30	3.39
405A	2.3600	564.2	01Jun2007, 22:15	3.42
501a	21.2050	4939.3	01Jun2007, 22:30	3.25
501b	14.5880	3538.3	01Jun2007, 20:00	3.24
502a	14.5080	3230.6	01Jun2007, 19:45	3.39
502b	10.5080	2489.7	01Jun2007, 20:30	3.39
503a	3.9541	2003.2	01Jun2007, 17:45	3.44
503b	6.9582	2888.3	01Jun2007, 19:00	3.75
504	3.7717	1786.4	01Jun2007, 19:45	3.56
601a	28.4720	4073.1	02Jun2007, 02:30	3.28
601b	15.1800	2297.7	02Jun2007, 01:00	3.21
602	6.2554	1668.3	01Jun2007, 20:15	3.32
DET401	0.0000	55.2	02Jun2007, 10:30	
DET405	0.0000	67.2	02Jun2007, 10:15	
DET405A	0.0000	19.1	02Jun2007, 07:45	
DIV401	17.3600	2268.1	01Jun2007, 23:30	3.11
DIV405	5.2200	992.1	01Jun2007, 21:30	2.87
DIV405A	2.3600	524.2	01Jun2007, 22:15	3.00
J1000000_0030_J	760.7611	29120.0	04Jun2007, 02:15	3.22
J1000000_0030_R	756.9391	29120.0	04Jun2007, 02:15	3.22
J1000000_0164_J	756.9391	29206.6	03Jun2007, 23:30	3.27
J1000000_0175_J	437.4691	21133.2	03Jun2007, 00:15	3.76

PROPOSED 50-YEAR 3 PONDS

Global Summary Results for Run "J100_2%_SH249PROP3"

Project: J100_rev102214 Simulation Run: J100_2%_SH249PROP3

Start of Run: 01Jun2007, 00:00 Basin Model: J100_2PCT_SH249PROP3
End of Run: 05Jun2007, 00:00 Meteorologic Model: 2%_24HR
Compute Time: 27Oct2014, 14:05:37 Control Specifications: CONTROL15

Volume Units: ☒ IN ☐ AC-FT

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
101a	16.7190	5364.4	01Jun2007, 19:15	7.01
101b	8.9337	4632.2	01Jun2007, 19:15	6.87
201	11.6390	4850.6	01Jun2007, 22:00	7.27
301	16.7490	13676.1	01Jun2007, 19:30	6.22
401	17.3600	4290.3	01Jun2007, 23:30	5.87
401A	1.4300	721.6	01Jun2007, 21:30	6.06
402A	16.0500	4323.3	01Jun2007, 23:15	6.38
402B	1.8900	1889.7	01Jun2007, 18:15	6.01
402C	1.2700	1343.6	01Jun2007, 18:00	6.60
402D	1.3000	786.5	01Jun2007, 20:15	6.56
403	28.2730	6902.6	02Jun2007, 03:15	6.19
405	5.2200	1897.8	01Jun2007, 21:30	6.04
405A	2.3600	999.0	01Jun2007, 22:15	6.07
501a	21.2050	8617.1	01Jun2007, 22:30	5.86
501b	14.5880	6005.3	01Jun2007, 20:00	5.85
502a	14.5080	5440.7	01Jun2007, 19:45	6.04
502b	10.5080	4220.7	01Jun2007, 20:30	6.04
503a	3.9541	3161.5	01Jun2007, 17:45	6.11
503b	6.9582	4658.5	01Jun2007, 19:15	6.49
504	3.7717	2932.4	01Jun2007, 19:45	6.26
601a	28.4720	7230.7	02Jun2007, 02:30	5.90
601b	15.1800	4073.6	02Jun2007, 01:00	5.82
602	6.2554	2822.2	01Jun2007, 20:15	5.95
DET401	0.0000	62.8	02Jun2007, 12:15	
DET405	0.0000	71.2	02Jun2007, 02:15	
DET405A	0.0000	22.7	02Jun2007, 09:15	
DIV401	17.3600	4210.3	01Jun2007, 23:30	5.68
DIV405	5.2200	1796.0	01Jun2007, 21:30	5.40
DIV405A	2.3600	939.0	01Jun2007, 22:15	5.51
J1000000_0030_J	760.7611	48656.1	03Jun2007, 19:00	4.50
J1000000_0030_R	756.9391	48656.1	03Jun2007, 19:00	4.49
J1000000_0164_J	756.9391	48778.1	03Jun2007, 17:15	4.56
J1000000_0175_J	437.4691	40292.0	03Jun2007, 17:00	5.40

PROPOSED 100-YEAR 3 PONDS

Global Summary Results for Run "J100_1%_SH249PROP3"

Project: J100_rev102214 Simulation Run: J100_1%_SH249PROP3

Start of Run: 01Jun2007, 00:00 Basin Model: J100_1PCT_SH249PROP3
End of Run: 05Jun2007, 00:00 Meteorologic Model: 1%_24HR
Compute Time: 27Oct2014, 14:03:56 Control Specifications: CONTROL15

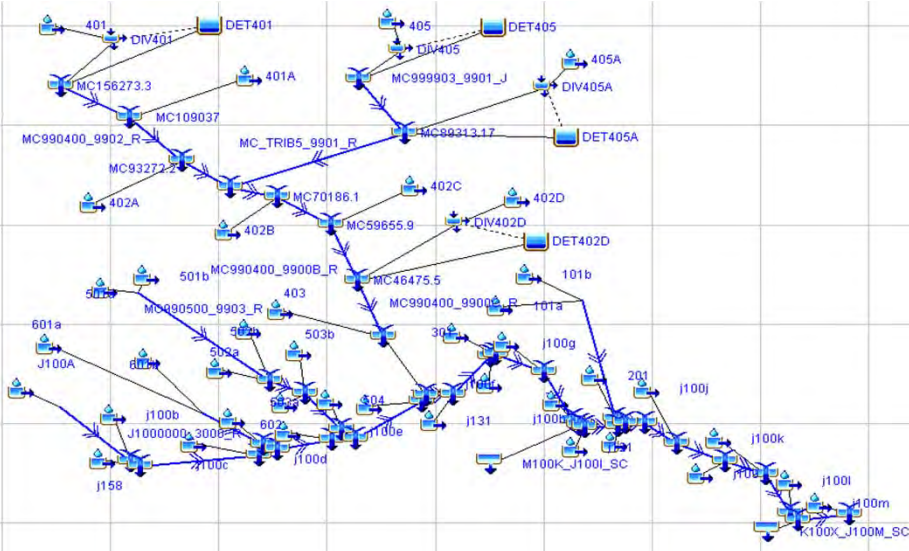
Volume Units: ☒ IN ☐ AC-FT

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
101a	16.7190	6453.9	01Jun2007, 19:30	8.59
101b	8.9337	5546.7	01Jun2007, 19:15	8.44
201	11.6390	5854.6	01Jun2007, 22:00	8.86
301	16.7490	16337.0	01Jun2007, 19:30	7.75
401	17.3600	5399.3	01Jun2007, 23:30	7.38
401A	1.4300	889.0	01Jun2007, 21:30	7.57
402A	16.0500	5390.9	01Jun2007, 23:15	7.91
402B	1.8900	2241.3	01Jun2007, 18:15	7.52
402C	1.2700	1584.7	01Jun2007, 18:00	8.15
402D	1.3000	958.1	01Jun2007, 20:15	8.11
403	28.2730	8551.9	02Jun2007, 03:15	7.71
405	5.2200	2358.3	01Jun2007, 21:30	7.55
405A	2.3600	1238.5	01Jun2007, 22:00	7.59
501a	21.2050	10613.3	01Jun2007, 22:30	7.37
501b	14.5880	7308.7	01Jun2007, 20:00	7.36
502a	14.5080	6608.9	01Jun2007, 19:45	7.55
502b	10.5080	5139.5	01Jun2007, 20:30	7.55
503a	3.9541	3719.3	01Jun2007, 17:45	7.63
503b	6.9582	5567.9	01Jun2007, 19:15	8.04
504	3.7717	3520.5	01Jun2007, 19:45	7.79
601a	28.4720	8997.2	02Jun2007, 02:30	7.40
601b	15.1800	5060.0	02Jun2007, 01:00	7.32
602	6.2554	3431.1	01Jun2007, 20:15	7.46
DET401	0.0000	66.1	02Jun2007, 11:45	
DET405	0.0000	79.1	02Jun2007, 02:30	
DET405A	0.0000	24.6	02Jun2007, 09:45	
DIV401	17.3600	5309.3	01Jun2007, 23:30	7.16
DIV405	5.2200	2244.4	01Jun2007, 21:30	6.85
DIV405A	2.3600	1168.5	01Jun2007, 22:00	6.95
J1000000_0030_J	760.7611	59761.6	03Jun2007, 16:15	5.24
J1000000_0030_R	756.9391	59761.6	03Jun2007, 16:15	5.22
J1000000_0164_J	756.9391	59942.3	03Jun2007, 14:15	5.30
J1000000_0175_J	437.4691	51618.2	03Jun2007, 14:15	6.76

J1000000_0175_J	752.7091	21133.2	04Jun2007, 00:15	3.26
J1000000_0175_R	432.7164	21133.2	04Jun2007, 00:15	3.26
J1000000_0364_J	432.7164	21276.1	03Jun2007, 19:15	3.33
J1000000_0364_R	423.3178	21276.1	03Jun2007, 19:15	3.33
J1000000_0498_J	423.3178	21339.1	03Jun2007, 16:45	3.37
J1000000_0498_R	420.8993	21339.1	03Jun2007, 16:45	3.36
J1000000_0687_J	420.8993	21474.0	03Jun2007, 13:00	3.40
J1000000_0687_R	404.6513	21326.0	03Jun2007, 13:15	3.36
J1000000_0828_J	404.6513	21439.9	03Jun2007, 10:30	3.39
J1000000_0828_R	404.6513	21439.9	03Jun2007, 10:30	3.39
J1000000_0918_J	404.6513	21545.8	03Jun2007, 08:15	3.42
J1000000_0930_J	37.2917	8206.7	02Jun2007, 01:15	4.20
J1000000_0930_R	363.9598	21374.5	03Jun2007, 08:15	3.34
J1000000_0945_J	367.3596	21382.3	03Jun2007, 08:30	3.34
J1000000_1061_J	362.1774	21442.6	03Jun2007, 06:30	3.35
J1000000_1070_J	363.9598	21442.6	03Jun2007, 06:30	3.36
J1000000_1106_J	306.6074	19967.0	03Jun2007, 04:30	3.34
J1000000_1106_R	303.2738	19966.8	03Jun2007, 04:30	3.34
J1000000_1129_J	362.1774	21796.7	03Jun2007, 03:30	3.38
J1000000_1338_J	303.2738	20088.9	03Jun2007, 00:30	3.38
J1000000_1338_R	295.4016	19947.1	03Jun2007, 00:45	3.37
J1000000_1550_J	278.6526	20061.7	02Jun2007, 21:00	3.38
J1000000_1560_J	295.4016	20061.7	02Jun2007, 21:00	3.39
J1000000_1577_J	270.9053	19958.9	02Jun2007, 21:00	3.38
J1000000_1793_J	270.9053	20078.9	02Jun2007, 17:15	3.39
J1000000_1817_J	266.1898	20077.6	02Jun2007, 17:15	3.38
J1000000_1888_J	266.1898	20203.7	02Jun2007, 16:00	3.39
J1000000_1897_J	75.1530	5846.1	02Jun2007, 22:30	3.47
J1000000_1908_J	191.0368	16919.0	02Jun2007, 15:45	3.35
J1000000_1908_R	180.7678	16548.5	02Jun2007, 15:45	3.33
J1000000_2251_J	180.7678	17193.7	02Jun2007, 09:30	3.33
J1000000_2297_J	75.4930	11209.3	02Jun2007, 04:15	3.37
J1000000_2307_J	105.2748	11510.0	02Jun2007, 11:00	3.31
J1000000_2307_R	96.9314	11110.8	02Jun2007, 11:00	3.29
J1000000_2546_J	96.9314	11360.3	02Jun2007, 06:45	3.29
J1000000_2580_J	49.9074	6536.6	02Jun2007, 06:30	3.26
J1000000_2605_J	47.0240	4949.3	02Jun2007, 09:45	3.31
J1000000_2605_R	34.2750	3594.3	02Jun2007, 10:30	3.30
J1000000_2970_J	34.2750	3652.1	02Jun2007, 04:15	3.30
J1000000_3006_J	23.4260	2891.5	02Jun2007, 05:30	3.23
J1000000_3006_R	11.1870	1781.0	02Jun2007, 06:30	3.23
J100A	11.1870	2136.4	01Jun2007, 21:15	3.23
J100b	12.2390	1622.2	02Jun2007, 01:15	3.24
J100c	12.7490	1384.0	02Jun2007, 08:15	3.34
J100d	8.3434	1418.6	01Jun2007, 22:45	3.60
J100e	10.2690	1547.6	02Jun2007, 02:00	3.67
J100f	7.7473	1255.4	02Jun2007, 00:30	3.38
J100g	7.8722	1015.0	02Jun2007, 02:30	3.53
J100h	3.3336	773.5	01Jun2007, 22:45	3.82
J100i	3.3998	658.6	01Jun2007, 21:30	3.46
J100j	16.2480	2414.6	01Jun2007, 22:30	4.35
J100k	9.3986	1380.5	02Jun2007, 02:00	3.38
J100l	4.7527	824.2	01Jun2007, 22:15	3.22
J100m	3.8220	905.1	01Jun2007, 22:30	3.57
J109	2.4185	1691.2	01Jun2007, 16:45	4.19
J121	1.7824	1049.7	01Jun2007, 17:15	3.82
J131	4.7155	1859.7	01Jun2007, 17:45	4.03
J158	10.8490	2564.9	01Jun2007, 21:00	3.44
K100K_100M_SC	319.4700	15049.0	02Jun2007, 04:45	3.29
M100K_100L_SC	55.5700	4979.4	02Jun2007, 00:00	3.56
MC_TRIB5_9900_R	5.2200	1034.6	01Jun2007, 21:30	3.38
MC_TRIB5_9901_R	7.5800	1551.9	01Jun2007, 21:30	3.38
MC109037	18.7900	2531.0	02Jun2007, 00:15	3.26
MC156273.3	17.3600	2294.3	01Jun2007, 23:30	3.25
MC46475.5	46.8800	5388.1	02Jun2007, 06:00	3.45
MC59655.9	45.5800	5357.5	02Jun2007, 05:45	3.44
MC70186.1	44.3100	5356.9	02Jun2007, 05:30	3.43
MC86946.2	42.4200	5359.2	02Jun2007, 03:45	3.43
MC89313.17	7.5800	1551.9	01Jun2007, 21:30	3.38
MC93272.2	34.8400	4719.1	02Jun2007, 00:15	3.44
MC9900400_9902...	34.8400	4719.1	02Jun2007, 04:15	3.44
MC990100_9901_R	25.6527	6196.2	02Jun2007, 01:15	4.13
MC990400_9900B_R	45.5800	5355.2	02Jun2007, 06:00	3.44
MC990400_9900C...	46.8800	5387.3	02Jun2007, 22:45	3.44
MC990400_9901_R	42.4200	5356.5	02Jun2007, 05:30	3.43
MC990400_9901A...	44.3100	5356.7	02Jun2007, 05:45	3.43
MC990400_9902_R	18.7900	2531.0	02Jun2007, 01:30	3.26
MC990400_9903_R	17.3600	2293.6	02Jun2007, 00:30	3.25
MC990500_9901_R	71.7213	11198.8	02Jun2007, 04:15	3.36
MC990500_9902_R	60.8090	10654.8	02Jun2007, 02:15	3.30
MC990500_9903_R	35.7930	7619.8	02Jun2007, 01:30	3.25
MC990600_9901_R	43.6520	6283.8	02Jun2007, 06:45	3.25
MC999901_9901_J	60.8090	10656.7	02Jun2007, 00:15	3.30
MC999902_9901_J	71.7213	11198.8	02Jun2007, 02:00	3.36
MC999903_9901_J	5.2200	1034.6	01Jun2007, 21:30	3.38

J1000000_0175_R	752.7091	204291.4	03Jun2007, 17:00	5.48
J1000000_0175_R	432.7164	40291.4	03Jun2007, 17:00	5.48
J1000000_0364_J	432.7164	40740.2	03Jun2007, 12:30	5.58
J1000000_0364_R	423.3178	40700.5	03Jun2007, 12:30	5.57
J1000000_0498_J	423.3178	40921.1	03Jun2007, 10:00	5.62
J1000000_0498_R	420.8993	40921.1	03Jun2007, 10:00	5.61
J1000000_0687_J	420.8993	41303.1	03Jun2007, 06:45	5.66
J1000000_0687_R	404.6513	40906.2	03Jun2007, 06:45	5.60
J1000000_0828_J	404.6513	41111.9	03Jun2007, 04:45	5.64
J1000000_0828_R	404.6513	41111.9	03Jun2007, 04:45	5.64
J1000000_0918_J	404.6513	41292.9	03Jun2007, 03:15	5.67
J1000000_0930_J	37.2917	13342.4	02Jun2007, 01:15	7.06
J1000000_0930_R	363.9598	40775.8	03Jun2007, 03:15	5.53
J1000000_0945_J	367.3596	40803.1	03Jun2007, 03:15	5.53
J1000000_1061_R	362.1774	40961.0	03Jun2007, 01:30	5.55
J1000000_1070_J	363.9598	40961.0	03Jun2007, 01:30	5.56
J1000000_1106_J	306.6074	39607.4	02Jun2007, 23:15	5.95
J1000000_1106_R	303.2738	39590.7	02Jun2007, 23:15	5.95
J1000000_1129_J	362.1774	42127.7	02Jun2007, 23:00	5.59
J1000000_1338_J	303.2738	40158.3	02Jun2007, 20:00	6.01
J1000000_1338_R	295.4016	39769.5	02Jun2007, 20:00	6.01
J1000000_1550_J	278.6526	40225.9	02Jun2007, 16:45	6.03
J1000000_1560_J	295.4016	40225.9	02Jun2007, 16:45	6.04
J1000000_1577_R	270.9053	39907.3	02Jun2007, 16:45	6.03
J1000000_1793_J	270.9053	40412.8	02Jun2007, 13:30	6.04
J1000000_1817_R	266.1898	40377.9	02Jun2007, 13:30	6.03
J1000000_1888_J	266.1898	40862.5	02Jun2007, 12:00	6.03
J1000000_1897_J	75.1530	10611.0	02Jun2007, 22:45	6.14
J1000000_1908_J	191.0368	34150.6	02Jun2007, 12:45	5.99
J1000000_1908_R	180.7678	33232.8	02Jun2007, 12:45	5.97
J1000000_2251_J	180.7678	34001.2	02Jun2007, 07:45	5.97
J1000000_2297_J	75.4930	19722.3	02Jun2007, 04:15	6.01
J1000000_2307_J	105.2748	20900.4	02Jun2007, 10:15	5.94
J1000000_2307_R	96.9314	20137.0	02Jun2007, 10:15	5.91
J1000000_2546_J	96.9314	20364.8	02Jun2007, 06:45	5.91
J1000000_2580_J	49.9074	11621.5	02Jun2007, 06:30	5.88
J1000000_2605_J	47.0240	9030.4	02Jun2007, 09:30	5.94
J1000000_2605_R	34.2750	6596.3	02Jun2007, 09:45	5.93
J1000000_2970_J	34.2750	6791.7	02Jun2007, 04:15	5.93
J1000000_3006_J	23.4260	5352.9	02Jun2007, 04:45	5.85
J1000000_3006_R	11.1870	3181.6	02Jun2007, 05:30	5.84
J100A	11.1870	3697.6	01Jun2007, 21:30	5.84
J100b	12.2390	2873.7	02Jun2007, 01:15	5.85
J100c	12.7490	2467.6	02Jun2007, 08:15	5.98
J100d	8.3434	2427.6	01Jun2007, 22:45	6.30
J100e	10.2690	2667.2	02Jun2007, 02:00	6.39
J100f	7.7473	2195.3	02Jun2007, 00:30	6.03
J100g	7.8722	1767.4	02Jun2007, 02:30	6.22
J100h	3.3336	1304.3	01Jun2007, 22:45	6.58
J100i	3.3998	1126.4	01Jun2007, 21:30	6.12
J100j	16.2480	3971.1	01Jun2007, 22:45	7.24
J100k	9.3986	2428.6	02Jun2007, 02:00	6.02
J100l	4.7527	1439.9	01Jun2007, 22:15	5.82
J100m	3.8220	1544.6	01Jun2007, 22:30	6.27
J109	2.4185	2536.1	01Jun2007, 16:45	7.04
J121	1.7824	1613.1	01Jun2007, 17:15	6.58
J131	4.7155	2914.9	01Jun2007, 17:45	6.84
J158	10.8490	4358.4	01Jun2007, 21:00	6.10
K100K_100M_SC	319.4700	15049.0	02Jun2007, 04:45	3.29
M100K_100L_SC	55.5700	4979.4	02Jun2007, 00:00	3.56
MC_TRIB5_9900_R	5.2200	1855.1	01Jun2007, 21:30	6.03
MC_TRIB5_9901_R	7.5800	2787.5	01Jun2007, 21:30	6.03
MC109037	18.7900	4671.3	02Jun2007, 00:15	5.88
MC156273.3	17.3600	4246.3	01Jun2007, 23:30	5.86
MC46475.5	46.8800	9799.4	02Jun2007, 06:00	6.12
MC59655.9	45.5800	9753.1	02Jun2007, 05:45	6.10
MC70186.1	44.3100	9752.3	02Jun2007, 05:30	6.09
MC86946.2	42.4200	9756.8	02Jun2007, 03:45	6.09
MC89313.17	7.5800	2787.5	01Jun2007, 21:30	6.03
MC93272.2	34.8400	8607.3	02Jun2007, 00:15	6.11
MC9900400_9902...	34.8400	8607.3	02Jun2007, 04:15	6.11
MC990100_9901_R	25.6527	9990.9	02Jun2007, 01:30	6.96
MC990400_9900B_R	45.5800	9749.5	02Jun2007, 06:15	6.10
MC990400_9900C_R	46.8800	9798.7	02Jun2007, 22:45	6.11
MC990400_9901_R	42.4200	9751.6	02Jun2007, 05:30	6.09
MC990400_9901A_R	44.3100	9752.1	02Jun2007, 05:45	6.09
MC990400_9902_R	18.7900	4671.3	02Jun2007, 01:30	5.88
MC990400_9903_R	17.3600	4245.3	02Jun2007, 00:30	5.86
MC990500_9901_R	71.7213	19704.1	02Jun2007, 04:15	6.00
MC990500_9902_R	60.8090	18759.1	02Jun2007, 02:15	5.93
MC990500_9903_R	35.7930	13420.7	02Jun2007, 01:30	5.86
MC990600_9901_R	43.6520	11163.5	02Jun2007, 06:45	5.87
MC999901_9901_J	60.8090	18766.3	02Jun2007, 00:30	5.93
MC999902_9901_J	71.7213	19704.1	02Jun2007, 02:00	6.00
MC999903_9901_J	5.2200	1855.1	01Jun2007, 21:30	6.03

PROPOSED 4 PONDS



PROPOSED 10-YEAR 4 PONDS

Global Summary Results for Run "J100_10%_SH249PROP4"

Project: J100_rev102214 Simulation Run: J100_10%_SH249PROP4

Start of Run: 01Jun2007, 00:00 Basin Model: J100_10PCT_SH249PROP4
End of Run: 05Jun2007, 00:00 Meteorologic Model: 10%_24HR
Compute Time: 27Oct2014, 14:01:58 Control Specifications: CONTROL15

Volume Units: ☒ IN ☐ AC-FT

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
101a	16.7190	3313.4	01Jun2007, 19:00	4.17
101b	8.9337	2884.2	01Jun2007, 19:00	4.05
201	11.6390	2972.3	01Jun2007, 21:45	4.37
301	16.7490	8422.4	01Jun2007, 19:30	3.54
401	17.3600	2338.1	01Jun2007, 23:30	3.26
401A	1.4300	411.8	01Jun2007, 21:30	3.40
402A	16.0500	2425.4	01Jun2007, 23:15	3.66
402B	1.8900	1169.5	01Jun2007, 18:15	3.36
402C	1.2700	846.9	01Jun2007, 18:00	3.84
402D	1.3000	465.0	01Jun2007, 20:15	3.81
403	28.2730	3948.5	02Jun2007, 03:15	3.51
405	5.2200	1062.8	01Jun2007, 21:30	3.39
405A	2.3600	564.2	01Jun2007, 22:15	3.42
501a	21.2050	4939.3	01Jun2007, 22:30	3.25
501b	14.5880	3538.3	01Jun2007, 20:00	3.24
502a	14.5080	3230.6	01Jun2007, 19:45	3.39
502b	10.5080	2499.7	01Jun2007, 20:30	3.39
503a	3.9541	2003.2	01Jun2007, 17:45	3.44
503b	6.9582	2888.3	01Jun2007, 19:00	3.75
504	3.7717	1786.4	01Jun2007, 19:45	3.56
601a	28.4720	4073.1	02Jun2007, 02:30	3.28
601b	15.1800	2297.7	02Jun2007, 01:00	3.21
602	6.2554	1668.3	01Jun2007, 20:15	3.32
DET401	0.0000	33.8	02Jun2007, 13:15	
DET402D	0.0000	17.6	02Jun2007, 01:15	
DET405	0.0000	41.1	02Jun2007, 11:15	
DET405A	0.0000	37.0	02Jun2007, 05:30	
DIV401	17.3600	2291.1	01Jun2007, 23:30	3.14
DIV402D	1.3000	425.0	01Jun2007, 20:15	3.41
DIV405	5.2200	1012.8	01Jun2007, 21:30	3.02
DIV405A	2.3600	509.2	01Jun2007, 22:15	2.87
J1000000_0030_J	760.7611	29108.2	04Jun2007, 02:15	3.22
J1000000_0030_R	756.9391	29108.2	04Jun2007, 02:15	3.22
J1000000_0164_J	756.9391	29194.1	03Jun2007, 23:30	3.27
J1000000_0175_J	437.4691	21123.8	04Jun2007, 00:15	3.26
J1000000_0175_R	432.7164	21123.8	04Jun2007, 00:15	3.26
J1000000_0364_J	432.7164	21266.0	03Jun2007, 19:15	3.33
J1000000_0364_R	423.3178	21265.6	03Jun2007, 19:15	3.33
J1000000_0498_J	423.3178	21328.8	03Jun2007, 16:45	3.37
J1000000_0498_R	420.8993	21328.8	03Jun2007, 16:45	3.36
J1000000_0687_J	420.8993	21459.6	03Jun2007, 13:15	3.40
J1000000_0687_R	404.6513	21313.9	03Jun2007, 13:15	3.36
J1000000_0687_1	404.6513	21426.2	03Jun2007, 13:30	3.36

PROPOSED 50-YEAR 4 PONDS

Global Summary Results for Run "J100_2%_SH249PROP4"

Project: J100_rev102214 Simulation Run: J100_2%_SH249PROP4

Start of Run: 01Jun2007, 00:00 Basin Model: J100_2PCT_SH249PROP4
End of Run: 05Jun2007, 00:00 Meteorologic Model: 2%_24HR
Compute Time: 27Oct2014, 13:59:55 Control Specifications: CONTROL15

Volume Units: ☒ IN ☐ AC-FT

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
101a	16.7190	5364.4	01Jun2007, 19:15	7.01
101b	8.9337	4632.2	01Jun2007, 19:15	6.87
201	11.6390	4850.6	01Jun2007, 22:00	7.27
301	16.7490	13676.1	01Jun2007, 19:30	6.22
401	17.3600	4290.3	01Jun2007, 23:30	5.87
401A	1.4300	721.6	01Jun2007, 21:30	6.06
402A	16.0500	4323.3	01Jun2007, 23:15	6.38
402B	1.8900	1889.7	01Jun2007, 18:15	6.01
402C	1.2700	1343.6	01Jun2007, 18:00	6.60
402D	1.3000	786.5	01Jun2007, 20:15	6.56
403	28.2730	6902.6	02Jun2007, 03:15	6.19
405	5.2200	1897.8	01Jun2007, 21:30	6.04
405A	2.3600	999.0	01Jun2007, 22:15	6.07
501a	21.2050	8617.1	01Jun2007, 22:30	5.86
501b	14.5880	6005.3	01Jun2007, 20:00	5.85
502a	14.5080	5440.7	01Jun2007, 19:45	6.04
502b	10.5080	4220.7	01Jun2007, 20:30	6.04
503a	3.9541	3161.5	01Jun2007, 17:45	6.11
503b	6.9582	4658.5	01Jun2007, 19:15	6.49
504	3.7717	2932.4	01Jun2007, 19:45	6.26
601a	28.4720	7230.7	02Jun2007, 02:30	5.90
601b	15.1800	4073.6	02Jun2007, 01:00	5.82
602	6.2554	2822.2	01Jun2007, 20:15	5.95
DET401	0.0000	39.7	02Jun2007, 17:15	
DET402D	0.0000	27.4	02Jun2007, 01:15	
DET405	0.0000	43.9	02Jun2007, 14:15	
DET405A	0.0000	43.3	02Jun2007, 07:15	
DIV401	17.3600	4220.3	01Jun2007, 23:30	5.72
DIV402D	1.3000	736.5	01Jun2007, 20:15	5.99
DIV405	5.2200	1837.8	01Jun2007, 21:30	5.60
DIV405A	2.3600	924.0	01Jun2007, 22:15	5.36
J1000000_0030_J	760.7611	48640.7	03Jun2007, 19:00	4.50
J1000000_0030_R	756.9391	48640.7	03Jun2007, 19:00	4.49
J1000000_0164_J	756.9391	48762.8	03Jun2007, 17:15	4.56
J1000000_0175_J	437.4691	40275.8	03Jun2007, 17:00	5.49
J1000000_0175_R	432.7164	40275.2	03Jun2007, 17:00	5.48
J1000000_0364_J	432.7164	40722.7	03Jun2007, 12:30	5.58
J1000000_0364_R	423.3178	40683.1	03Jun2007, 12:30	5.57
J1000000_0498_J	423.3178	40902.8	03Jun2007, 10:00	5.62
J1000000_0498_R	420.8993	40902.8	03Jun2007, 10:00	5.61
J1000000_0687_J	420.8993	41283.0	03Jun2007, 06:45	5.66
J1000000_0687_R	404.6513	40886.0	03Jun2007, 06:45	5.60

PROPOSED 100-YEAR 4 PONDS

Global Summary Results for Run "J100_1%_SH249PROP4"

Project: J100_rev102214 Simulation Run: J100_1%_SH249PROP4

Start of Run: 01Jun2007, 00:00 Basin Model: J100_1PCT_SH249PROP4
End of Run: 05Jun2007, 00:00 Meteorologic Model: 1%_24HR
Compute Time: 27Oct2014, 13:57:29 Control Specifications: CONTROL15

Volume Units: ☒ IN ☐ AC-FT

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
101a	16.7190	6453.9	01Jun2007, 19:30	8.59
101b	8.9337	5546.7	01Jun2007, 19:15	8.44
201	11.6390	5854.6	01Jun2007, 22:00	8.86
301	16.7490	16337.0	01Jun2007, 19:30	7.75
401	17.3600	5399.3	01Jun2007, 23:30	7.38
401A	1.4300	889.0	01Jun2007, 21:30	7.57
402A	16.0500	5390.9	01Jun2007, 23:15	7.91
402B	1.8900	2241.3	01Jun2007, 18:15	7.52
402C	1.2700	1584.7	01Jun2007, 18:00	8.15
402D	1.3000	958.1	01Jun2007, 20:15	8.11
403	28.2730	8551.9	02Jun2007, 03:15	7.71
405	5.2200	2358.3	01Jun2007, 21:30	7.55
405A	2.3600	1238.5	01Jun2007, 22:00	7.59
501a	21.2050	10613.3	01Jun2007, 22:30	7.37
501b	14.5880	7308.7	01Jun2007, 20:00	7.36
502a	14.5080	6608.9	01Jun2007, 19:45	7.55
502b	10.5080	5139.5	01Jun2007, 20:30	7.55
503a	3.9541	3719.3	01Jun2007, 17:45	7.63
503b	6.9582	5567.9	01Jun2007, 19:15	8.04
504	3.7717	3520.5	01Jun2007, 19:45	7.79
601a	28.4720	8997.2	02Jun2007, 02:30	7.40
601b	15.1800	5060.0	02Jun2007, 01:00	7.32
602	6.2554	3431.1	01Jun2007, 20:15	7.46
DET401	0.0000	42.4	02Jun2007, 18:45	
DET402D	0.0000	32.6	02Jun2007, 00:45	
DET405	0.0000	45.5	02Jun2007, 15:15	
DET405A	0.0000	46.3	02Jun2007, 07:45	
DIV401	17.3600	5324.3	01Jun2007, 23:30	7.21
DIV402D	1.3000	898.1	01Jun2007, 20:15	7.45
DIV405	5.2200	2288.3	01Jun2007, 21:30	7.08
DIV405A	2.3600	1153.5	01Jun2007, 22:00	6.78
J1000000_0030_J	760.7611	59741.8	03Jun2007, 16:15	5.24
J1000000_0030_R	756.9391	59741.8	03Jun2007, 16:15	5.22
J1000000_0164_J	756.9391	59921.8	03Jun2007, 14:15	5.30
J1000000_0175_J	437.4691	51597.8	03Jun2007, 14:15	6.76
J1000000_0175_R	432.7164	51585.4	03Jun2007, 14:15	6.76
J1000000_0364_J	432.7164	52136.2	03Jun2007, 10:00	6.87
J1000000_0364_R	423.3178	52067.9	03Jun2007, 10:00	6.85
J1000000_0498_J	423.3178	52396.2	03Jun2007, 07:30	6.91
J1000000_0498_R	420.8993	52396.2	03Jun2007, 07:30	6.90
J1000000_0687_J	420.8993	52628.8	03Jun2007, 04:45	6.95
J1000000_0687_R	404.6513	52264.3	03Jun2007, 04:45	6.88
J1000000_0687_1	404.6513	52407.0	03Jun2007, 04:30	6.87

Appendix C
Existing and Proposed
Conditions

HEC-HMS Output
Mill Creek
Watershed

Hydrologic and Hydraulic Analysis

J1000000_0828_J	767.6913	21426.2	03Jun2007, 10:30	3.39
J1000000_0828_R	404.6513	21426.2	03Jun2007, 10:30	3.39
J1000000_0918_J	404.6513	21531.0	03Jun2007, 08:30	3.42
J1000000_0930_J	37.2917	8206.7	02Jun2007, 01:15	4.20
J1000000_0930_R	363.9598	21360.5	03Jun2007, 08:30	3.34
J1000000_0945_J	367.3596	21368.2	03Jun2007, 08:30	3.34
J1000000_1061_R	362.1774	21428.6	03Jun2007, 06:30	3.35
J1000000_1070_J	363.9598	21428.6	03Jun2007, 06:30	3.36
J1000000_1106_J	306.6074	19954.7	03Jun2007, 04:30	3.34
J1000000_1106_R	303.2738	19954.4	03Jun2007, 04:30	3.34
J1000000_1129_J	362.1774	21779.9	03Jun2007, 03:30	3.38
J1000000_1338_J	303.2738	20075.4	03Jun2007, 00:45	3.38
J1000000_1338_R	295.4016	19934.7	03Jun2007, 00:45	3.37
J1000000_1550_J	278.6526	20048.9	02Jun2007, 21:00	3.38
J1000000_1560_J	295.4016	20048.9	02Jun2007, 21:00	3.39
J1000000_1577_R	270.9053	19946.1	02Jun2007, 21:00	3.38
J1000000_1793_J	270.9053	20065.2	02Jun2007, 17:15	3.39
J1000000_1817_R	266.1898	20063.8	02Jun2007, 17:15	3.38
J1000000_1888_J	266.1898	20190.2	02Jun2007, 16:00	3.38
J1000000_1897_J	75.1530	5870.9	02Jun2007, 22:30	3.46
J1000000_1908_J	191.0368	16919.0	02Jun2007, 15:45	3.35
J1000000_1908_R	180.7678	16548.5	02Jun2007, 15:45	3.33
J1000000_2251_J	180.7678	17193.7	02Jun2007, 09:30	3.33
J1000000_2297_J	75.4930	11209.3	02Jun2007, 04:15	3.37
J1000000_2307_J	105.2748	11510.0	02Jun2007, 11:00	3.31
J1000000_2307_R	96.9314	11110.8	02Jun2007, 11:00	3.29
J1000000_2546_J	96.9314	11360.3	02Jun2007, 06:45	3.29
J1000000_2580_J	49.9074	6536.6	02Jun2007, 06:30	3.26
J1000000_2605_J	47.0240	4949.3	02Jun2007, 09:45	3.31
J1000000_2605_R	34.2750	3594.3	02Jun2007, 10:30	3.30
J1000000_2970_J	34.2750	3652.1	02Jun2007, 04:15	3.30
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J100e	10.2690	1547.6	02Jun2007, 02:00	3.67
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J100i	3.3998	658.6	01Jun2007, 21:30	3.46
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MC156273.3	17.3600	2303.8	01Jun2007, 23:30	3.25
MC46475.5	46.8800	5413.0	02Jun2007, 06:00	3.45
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MC70186.1	44.3100	9752.9	02Jun2007, 05:30	6.09
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MC990400_9900C_R	46.8800	9812.2	02Jun2007, 22:45	6.10
MC990400_9901_R	42.4200	9752.2	02Jun2007, 05:30	6.09
MC990400_9901A_R	44.3100	9752.6	02Jun2007, 05:45	6.09
MC990400_9902_R	18.7900	4667.0	02Jun2007, 01:30	5.88
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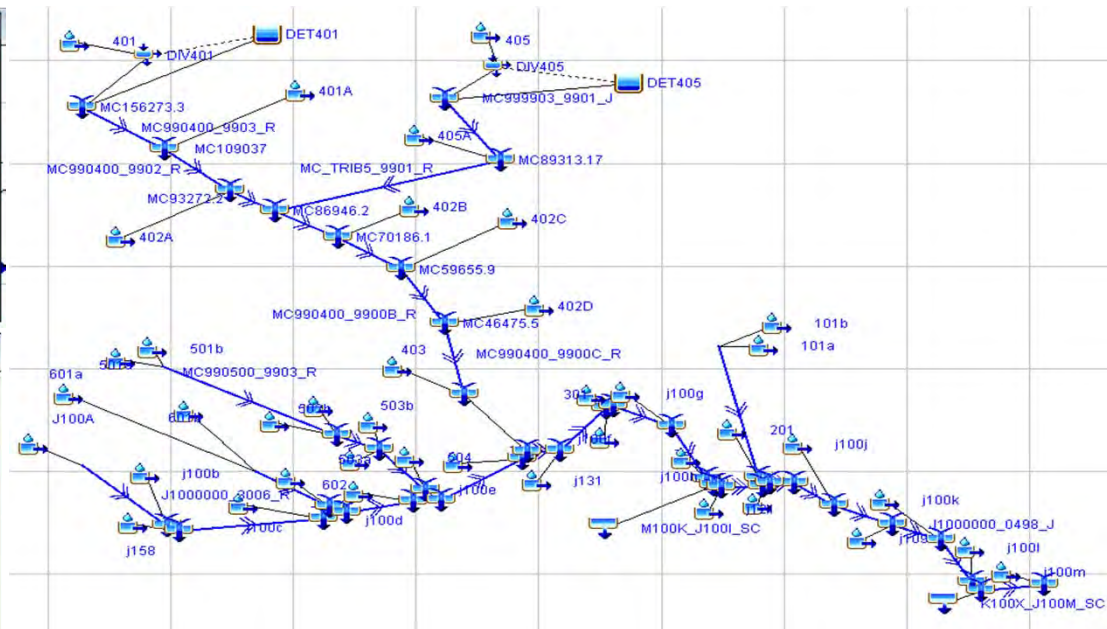
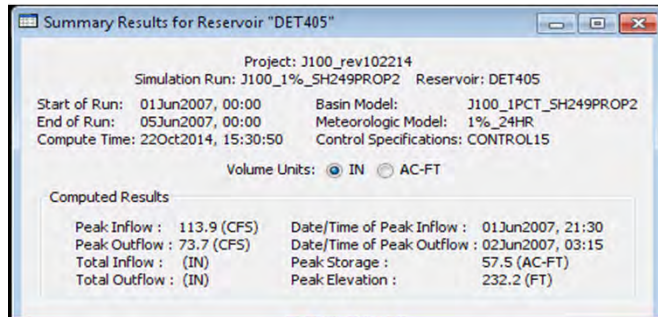
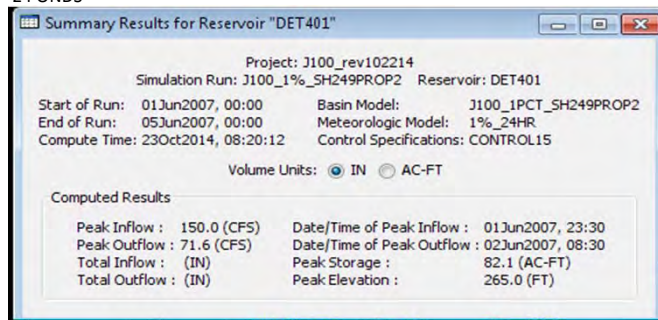
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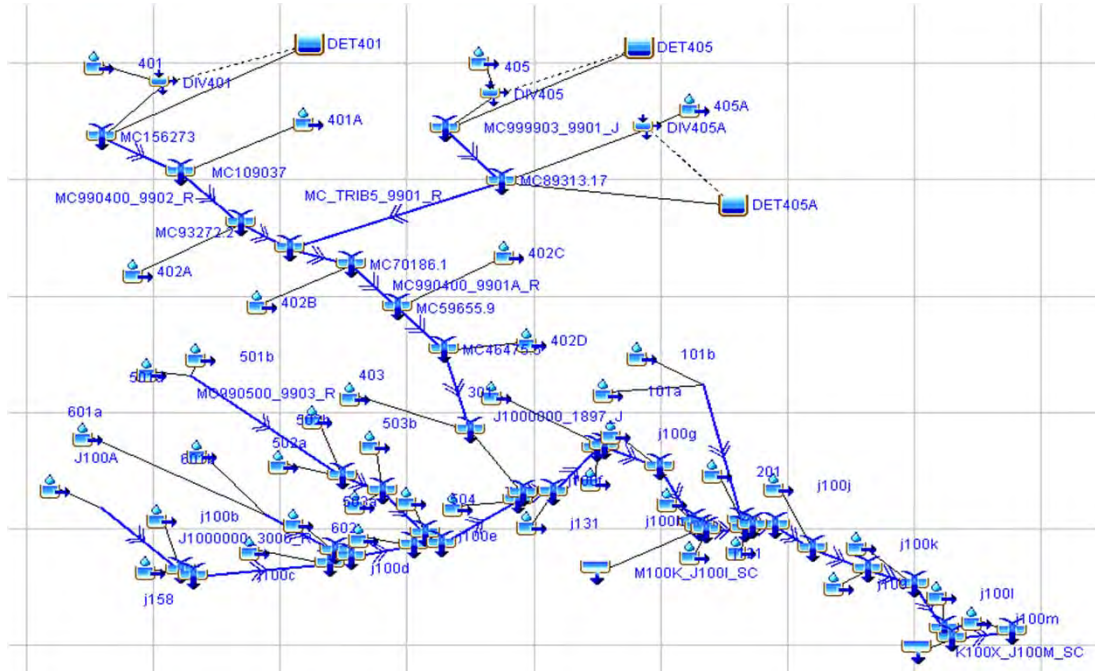
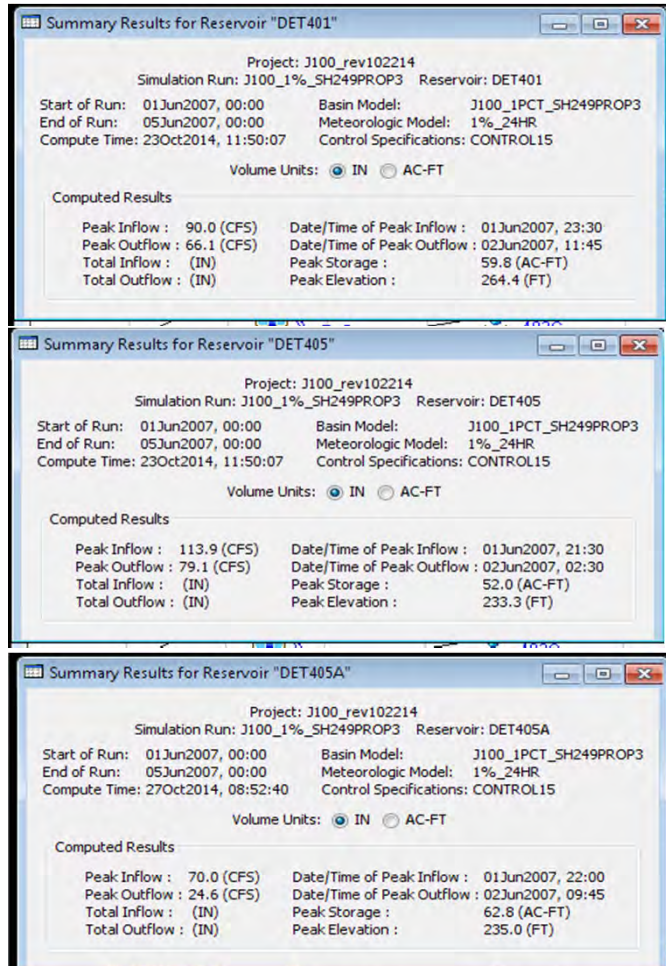
HEC-HMS Detention Volume Summary

Alternative	Detention Pond ID	Volume Required (ac-ft)	Depth Provided (ft)	Area Req (ac)	Area Req + 20% (ac)	Detention Pond Area Totals (ac)
2 Ponds	DET 401	82.1	7	11.7	14.1	21
	DET 405	57.5	10	5.8	6.9	
3 Ponds	DET 401	59.8	7	8.5	10.3	24
	DET 405	52	10	5.2	6.2	
	DET 405A	62.8	10	6.3	7.5	
4 Ponds	DET 401	64.9	7	9.3	11.1	26
	DET 405	47.3	10	4.7	5.7	
	DET 405A	48.5	10	4.9	5.8	
	DET 402D	30.3	10	3.0	3.6	

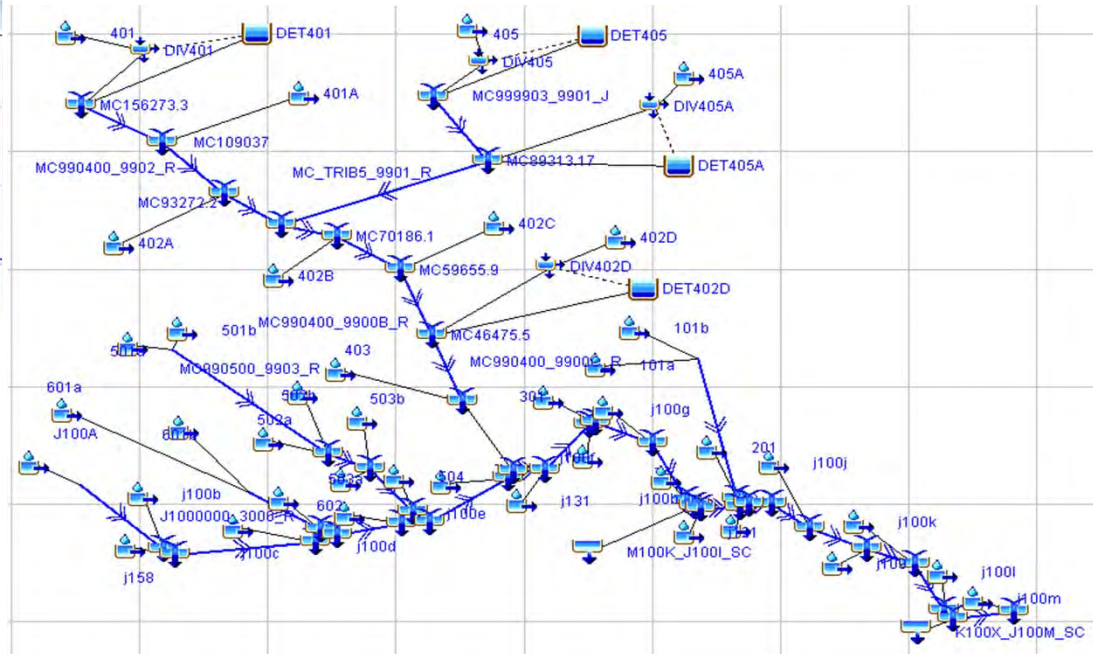
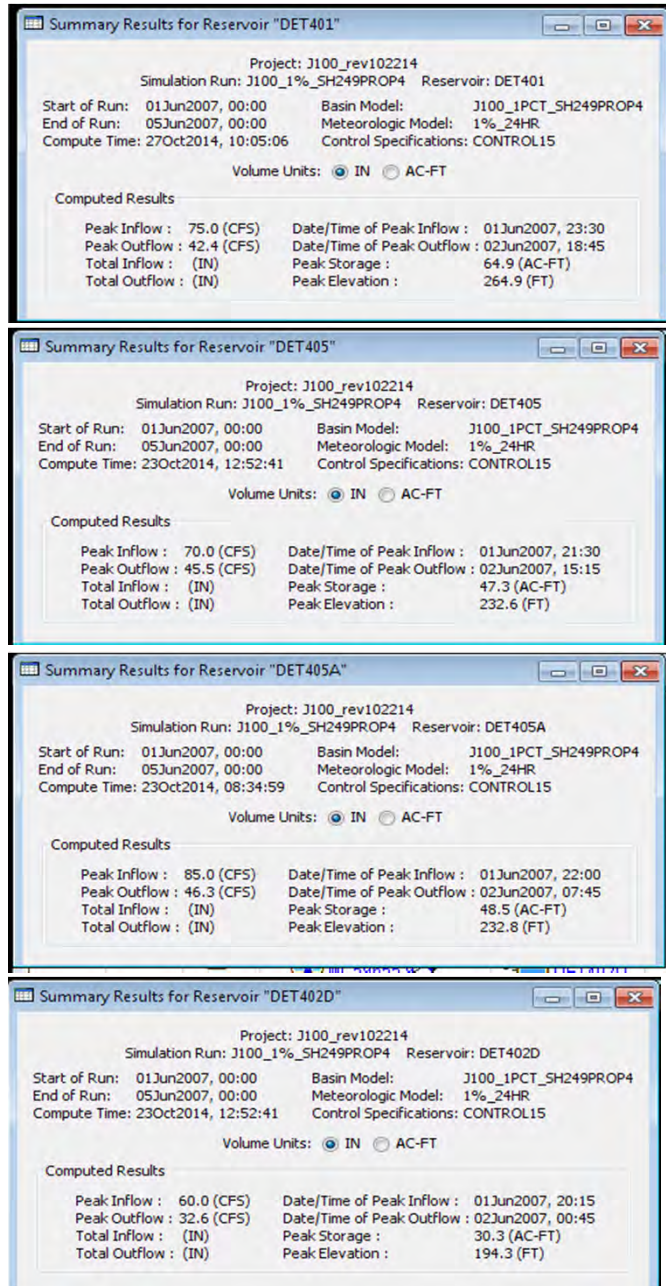
2 PONDS

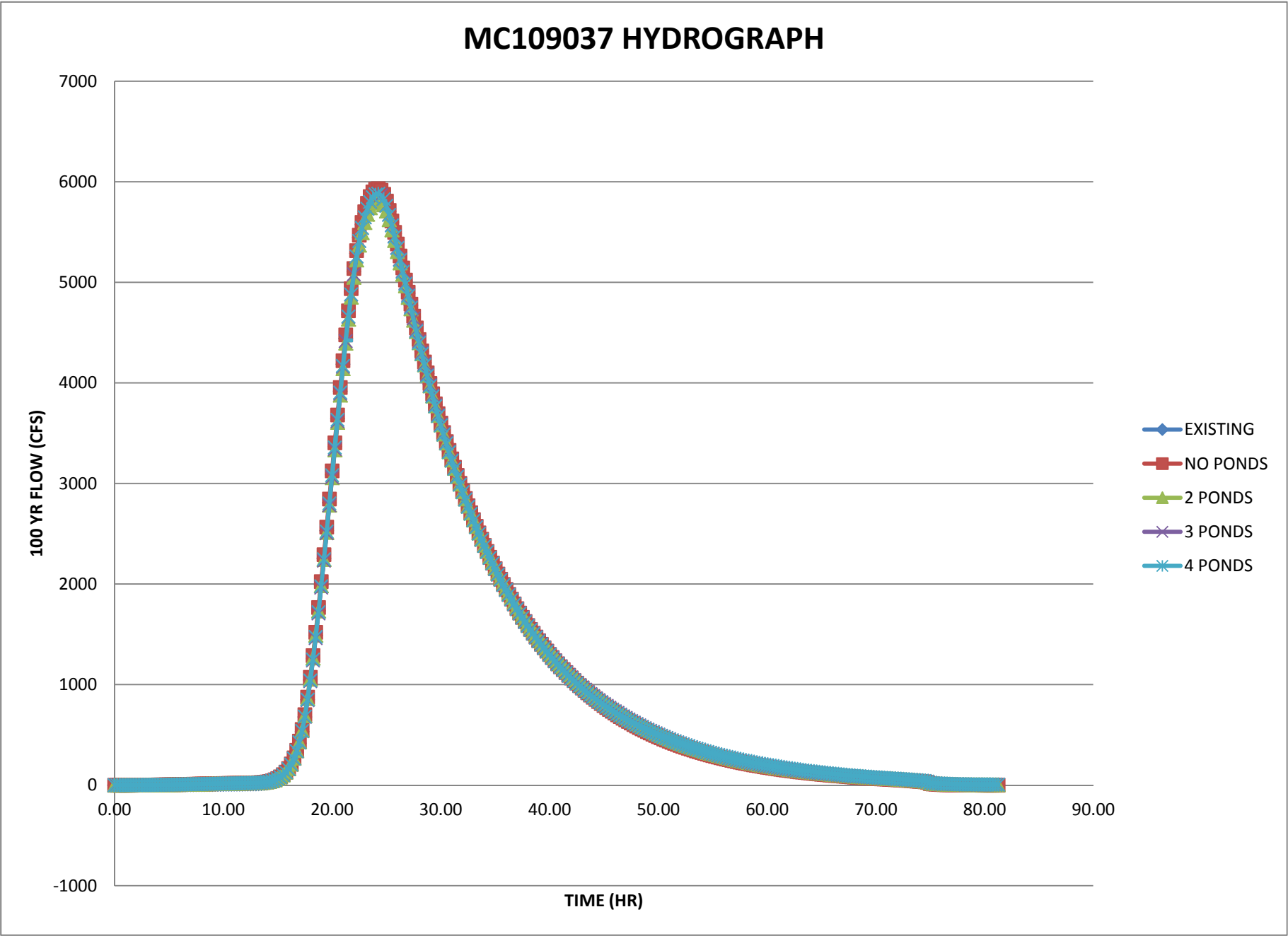


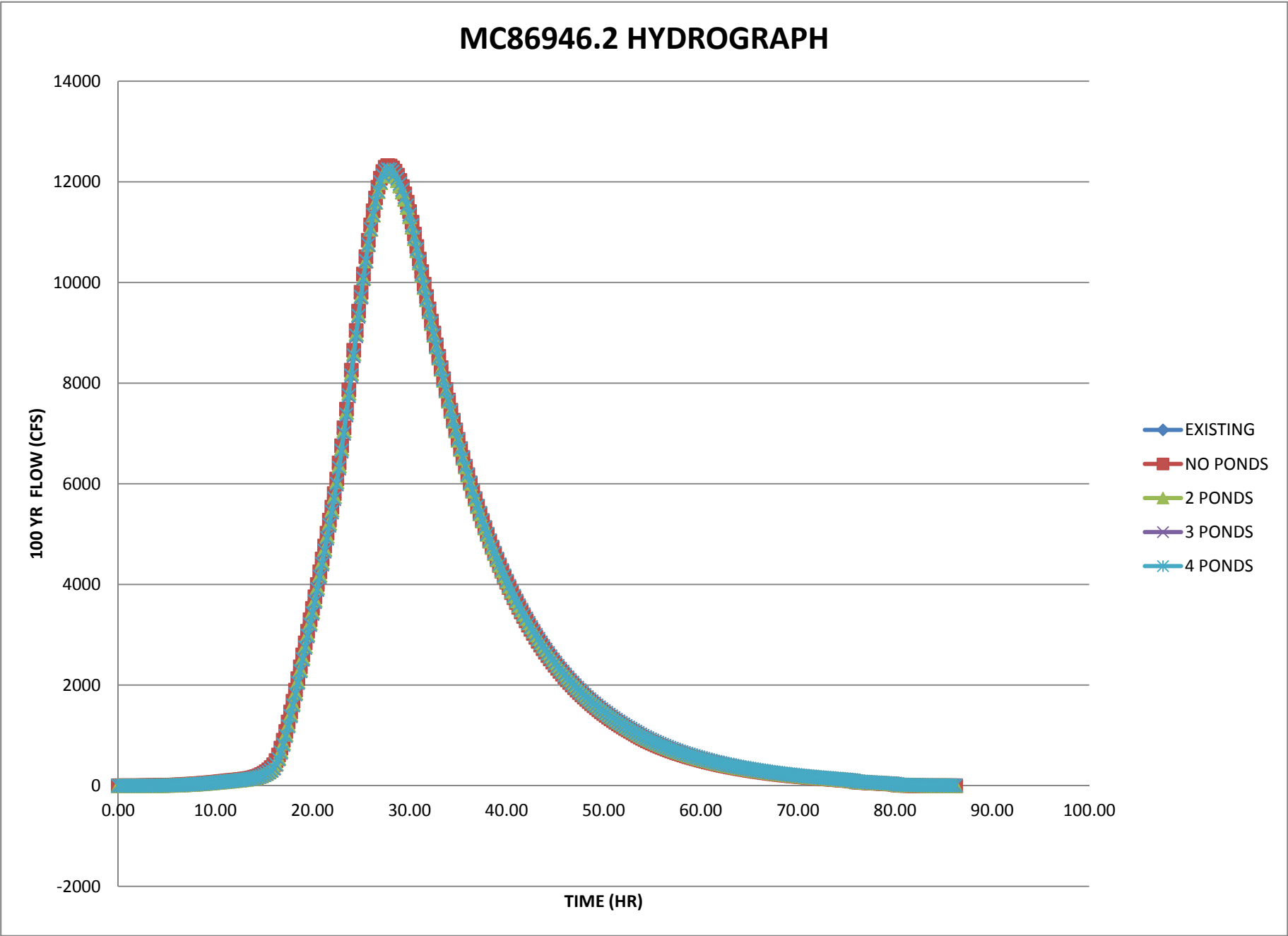
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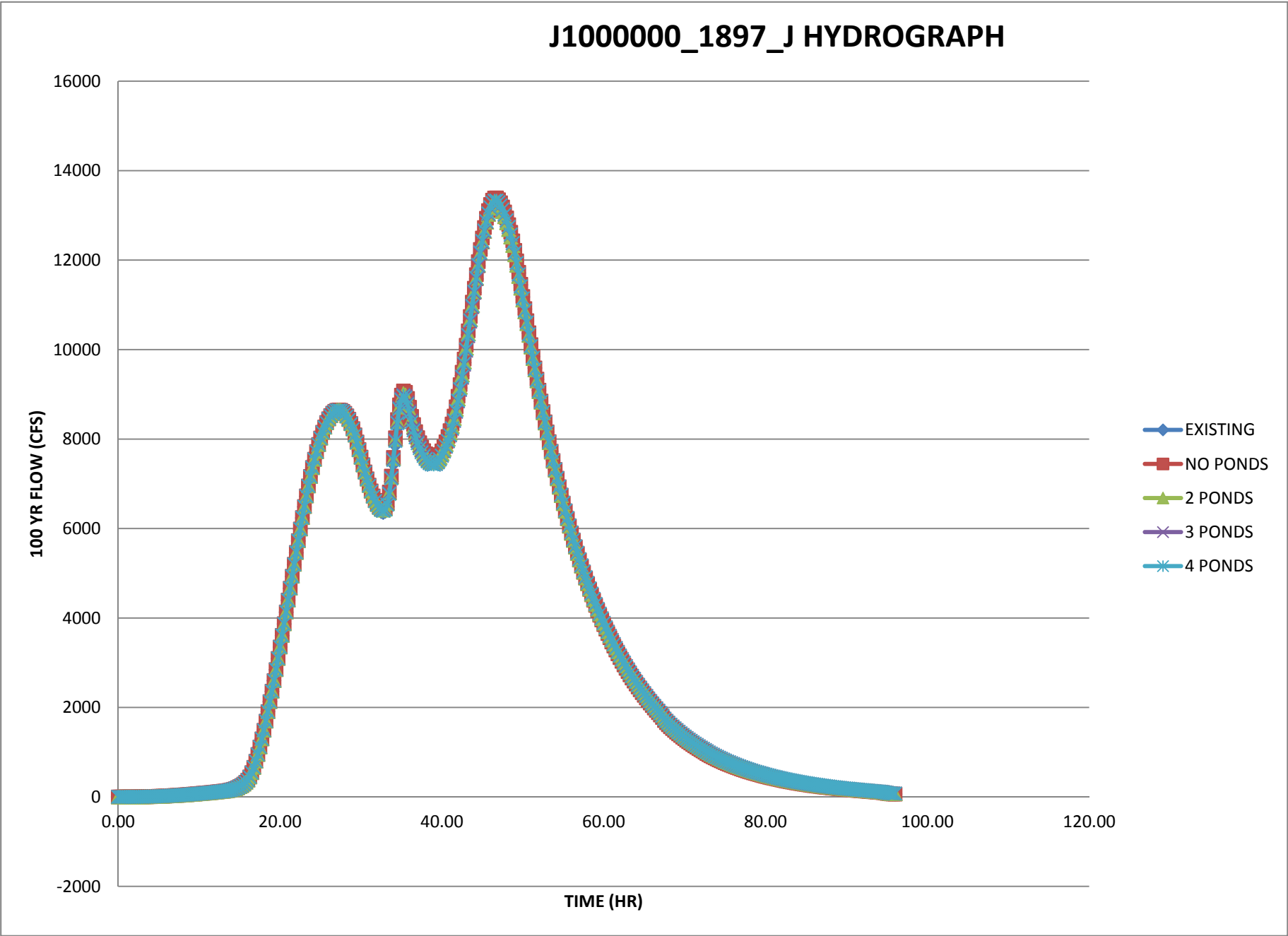


4 PONDS









Appendix D – HEC-RAS Data Output

APPENDIX D
HEC-RAS DATA OUTPUT
MILL CREEK

HEC-RAS PLAN: EXISTING			RIVER: MILL CREEK			REACH: 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)	
Reach 1	174507	10 yr	2328	296	307.51	302.34	307.64	0.002037	3.24	987.72	555.47	0.2
Reach 1	174507	50 yr	4276	296	308.93	304.48	309.07	0.002219	3.78	2219.1	789.86	0.22
Reach 1	174507	100 yr	5384	296	309.55	305.78	309.7	0.002309	4.03	2740.27	881.13	0.23
Reach 1	173479.3	10 yr	2328	296	305.55	301.17	305.63	0.001836	2.72	1465.77	755.75	0.19
Reach 1	173479.3	50 yr	4276	296	306.78	302.87	306.88	0.002022	3.21	2483.72	867.86	0.2
Reach 1	173479.3	100 yr	5384	296	307.38	303.61	307.48	0.002013	3.36	3003.22	891.93	0.21
Reach 1	172871.7	10 yr	2328	296	303.69	300.81	303.85	0.005349	3.51	819.07	355.09	0.3
Reach 1	172871.7	50 yr	4276	296	305.46	302.78	305.54	0.002424	2.96	2688.06	1047.61	0.21
Reach 1	172871.7	100 yr	5384	296	306.23	303.61	306.29	0.001859	2.81	3508.27	1084.32	0.19
Reach 1	171232.7	10 yr	2328	290	301.74	293.94	301.79	0.000535	2.09	2030.96	625.74	0.11
Reach 1	171232.7	50 yr	4276	290	303.78	295.28	303.83	0.00057	2.42	3342.6	655.42	0.12
Reach 1	171232.7	100 yr	5384	290	304.54	295.9	304.6	0.000654	2.69	3856.83	717.79	0.13
Reach 1	170298.1	10 yr	2328	290	300.66	295.83	300.82	0.002654	3.71	1109.12	552.83	0.23
Reach 1	170298.1	50 yr	4276	290	302.9	298.48	303	0.001566	3.35	2682.42	771.32	0.18
Reach 1	170298.1	100 yr	5384	290	303.62	299.09	303.7	0.001506	3.44	3232.27	776.37	0.18
Reach 1	169304.9	10 yr	2328	286	298.37		298.5	0.002068	2.89	805.02	122.66	0.2
Reach 1	169304.9	50 yr	4276	286	300.72		300.91	0.002932	3.5	1469.66	677.83	0.24
Reach 1	169304.9	100 yr	5384	286	301.56		301.74	0.002664	3.61	2167.84	1014.42	0.23
Reach 1	168301.8	10 yr	2328	286	296.6	291.73	296.7	0.001559	2.81	1241.77	478.29	0.18
Reach 1	168301.8	50 yr	4276	286	298.64	293.76	298.76	0.001615	3.35	1945.23	532.25	0.19
Reach 1	168301.8	100 yr	5384	286	299.47	294.49	299.61	0.001726	3.66	2242.14	569.6	0.2
Reach 1	167268.9	10 yr	2328	284	294.59		294.74	0.002362	3.04	803.25	258.84	0.21
Reach 1	167268.9	50 yr	4276	284	296.62		296.79	0.002273	3.59	1758.26	588.66	0.22
Reach 1	167268.9	100 yr	5384	284	297.49		297.65	0.002086	3.67	2276.2	599.9	0.21
Reach 1	166274.1	10 yr	2328	282.69	293.47	286.21	293.53	0.000714	1.85	1258.02	352.1	0.12
Reach 1	166274.1	50 yr	4276	282.69	295.52	287.47	295.58	0.000726	2.15	2663.95	561.37	0.13
Reach 1	166274.1	100 yr	5384	282.69	296.36	288.1	296.43	0.000774	2.36	3161.91	599.52	0.13
Reach 1	165453.1	10 yr	2328	280	292.63	286.61	292.72	0.001431	2.44	1191.57	392.55	0.17
Reach 1	165453.1	50 yr	4276	280	294.63	288.72	294.74	0.001512	2.99	2078.49	524.63	0.18
Reach 1	165453.1	100 yr	5384	280	295.41	289.7	295.54	0.001634	3.3	2536.74	647.48	0.19
Reach 1	164294.3	10 yr	2328	276	290.95	283.33	291.04	0.001459	2.66	1250.92	486.19	0.17
Reach 1	164294.3	50 yr	4276	276	293.08	285.75	293.17	0.001216	2.86	2523.29	644.41	0.16
Reach 1	164294.3	100 yr	5384	276	293.74	286.77	293.84	0.001304	3.1	2952.54	649.19	0.17
Reach 1	163291.2	10 yr	2328	276	289.32	282.05	289.45	0.001724	2.97	917.45	212.62	0.19
Reach 1	163291.2	50 yr	4276	276	291.52	284.38	291.68	0.001825	3.6	2143.59	918.33	0.2
Reach 1	163291.2	100 yr	5384	276	292.09	285.57	292.25	0.001938	3.85	2673.81	1034.46	0.21
Reach 1	162285	10 yr	2328	274	287.31	279.63	287.45	0.00232	2.98	781.25	159.94	0.21
Reach 1	162285	50 yr	4276	274	289.24	281.93	289.41	0.002865	3.53	1894.52	1230.3	0.24
Reach 1	162285	100 yr	5384	274	289.88	282.95	290.03	0.002533	3.52	2714.25	1320.46	0.23
Reach 1	161278.1	10 yr	2328	270	285.43		285.55	0.001554	2.87	1126.78	561.31	0.18
Reach 1	161278.1	50 yr	4276	270	287.19		287.31	0.001571	3.29	2283.99	689.18	0.18
Reach 1	161278.1	100 yr	5384	270	287.9		288.03	0.001587	3.46	2780.44	699.62	0.19
Reach 1	160286	10 yr	2328	270	284.2	276.25	284.28	0.001059	2.48	1488.23	740.88	0.15
Reach 1	160286	50 yr	4276	270	285.98	278.67	286.05	0.001028	2.77	3037.52	996.43	0.15
Reach 1	160286	100 yr	5384	270	286.73	279.8	286.8	0.000969	2.81	3805.58	1026.37	0.15
Reach 1	159266.2	10 yr	2328	270	282.74	276.32	282.83	0.002004	2.42	1000.58	420.5	0.19
Reach 1	159266.2	50 yr	4276	270	284.69	279.58	284.77	0.001566	2.59	2487.5	956.49	0.18

Reach 1	159266.2	100 yr	5384	270	285.61	280.22	285.68	0.00126	2.53	3414.85	1055.61	0.16
Reach 1	158273.3	10 yr	2328	266	280.07	273.08	280.22	0.003588	3.08	755.68	172.48	0.25
Reach 1	158273.3	50 yr	4276	266	282.12	275.72	282.36	0.004221	3.9	1096	281.71	0.28
Reach 1	158273.3	100 yr	5384	266	283.08	276.71	283.35	0.005727	4.13	1303	430.67	0.32
Reach 1	157283.5	10 yr	2328	266	279.6		279.61	0.000225	1.05	2290.83	435.14	0.07
Reach 1	157283.5	50 yr	4276	266	281.46		281.49	0.000333	1.48	3216.61	518.73	0.09
Reach 1	157283.5	100 yr	5384	266	282.27		282.31	0.000388	1.69	3648.67	579.46	0.09
Reach 1	157091.2	10 yr	2328	266	279.51		279.55	0.000505	1.59	1598.25	410.62	0.1
Reach 1	157091.2	50 yr	4276	266	281.34		281.4	0.000698	2.16	2472.93	503.35	0.12
Reach 1	157091.2	100 yr	5384	266	282.12		282.2	0.000796	2.44	2884.17	574.37	0.13
Reach 1	156834.3	10 yr	2328	266	279.18	272.38	279.3	0.002169	2.78	835.92	405.6	0.2
Reach 1	156834.3	50 yr	4276	266	280.79	275.23	281.03	0.003887	3.97	1077.81	828.21	0.27
Reach 1	156834.3	100 yr	5384	266	281.44	276.16	281.76	0.005033	4.53	1189.6	874.83	0.31
Reach 1	156735.2	10 yr	2328	266	279.08	272.37	279.14	0.001095	2.11	1528.59	542.63	0.15
Reach 1	156735.2	50 yr	4276	266	280.7	274.45	280.78	0.001216	2.58	2532.28	759.21	0.16
Reach 1	156735.2	100 yr	5384	266	281.38	275.34	281.47	0.00129	2.81	2980.83	893.35	0.17
Reach 1	155914.3	10 yr	2328	264	278.24	270.76	278.29	0.000959	2.22	1732.88	679.75	0.14
Reach 1	155914.3	50 yr	4276	264	279.7	272.91	279.78	0.001212	2.8	2746.79	954.72	0.16
Reach 1	155914.3	100 yr	5384	264	280.31	273.91	280.4	0.001312	3.04	3224.88	1014.89	0.17
Reach 1	155053.7	10 yr	2328	264	277.44	269.29	277.49	0.0009	2.25	1523.38	770.86	0.13
Reach 1	155053.7	50 yr	4276	264	278.66	271.88	278.71	0.001247	2.46	3342.58	1368.02	0.16
Reach 1	155053.7	100 yr	5384	264	279.25	273	279.31	0.001207	2.55	4168.53	1421.95	0.16
Reach 1	154269	10 yr	2328	264	276.59	269.44	276.67	0.001236	2.41	1253.95	1058.43	0.16
Reach 1	154269	50 yr	4276	264	277.79	271.61	277.84	0.001002	2.4	3442.34	1106.29	0.15
Reach 1	154269	100 yr	5384	264	278.37	273.07	278.43	0.001042	2.56	4101.46	1155.85	0.15
Reach 1	153259.5	10 yr	2328	264	275.46	270.21	275.49	0.001092	1.51	2106.39	766.63	0.13
Reach 1	153259.5	50 yr	4276	264	276.68	273.9	276.71	0.001244	1.93	3085.83	821.96	0.15
Reach 1	153259.5	100 yr	5384	264	277.2	274.29	277.25	0.001329	2.12	3517.47	827.66	0.16
Reach 1	152248.4	10 yr	2328	260	274.2	266.44	274.25	0.001381	2.03	1967.68	1278.1	0.16
Reach 1	152248.4	50 yr	4276	260	275.43	268.57	275.47	0.001218	2.2	3830.35	1696.25	0.15
Reach 1	152248.4	100 yr	5384	260	275.98	269.6	276.02	0.001103	2.21	4788.99	1758.64	0.15
Reach 1	151251.5	10 yr	2328	260	272.82	268.69	272.84	0.00143	1.43	2382.06	1069.56	0.15
Reach 1	151251.5	50 yr	4276	260	274.31	272	274.33	0.001067	1.62	4101.27	1376.28	0.13
Reach 1	151251.5	100 yr	5384	260	274.97	272	274.99	0.000963	1.68	5082.19	1542.96	0.13
Reach 1	150269.6	10 yr	2328	260	269.88	265.06	270.16	0.006902	4.28	543.97	577.65	0.35
Reach 1	150269.6	50 yr	4276	260	271.28	267.19	271.83	0.011064	5.96	717.35	1088.55	0.45
Reach 1	150269.6	100 yr	5384	260	271.9	268.53	272.6	0.012574	6.73	813.89	1486.69	0.48
Reach 1	149285.9	10 yr	2328	260	269.07	265.27	269.08	0.000392	1.15	3623.34	1122.43	0.08
Reach 1	149285.9	50 yr	4276	260	269.89	265.94	269.91	0.000707	1.69	4619.2	1296.38	0.12
Reach 1	149285.9	100 yr	5384	260	270.33	266	270.35	0.000824	1.91	5195.9	1427.07	0.13
Reach 1	148288.1	10 yr	2328	260	268.57	265.57	268.58	0.000673	1.07	3164.2	1621.16	0.1
Reach 1	148288.1	50 yr	4276	260	268.92	266.22	268.94	0.001417	1.66	4072.47	2148.44	0.15
Reach 1	148288.1	100 yr	5384	260	269.24	266.58	269.26	0.001534	1.82	4747.59	2148.44	0.16
Reach 1	147249.2	10 yr	2328	260	268.34	264.14	268.34	0.000112	0.59	5973.32	1841.91	0.05
Reach 1	147249.2	50 yr	4276	260	268.18	264.63	268.19	0.000436	1.13	5684.67	1837.65	0.09
Reach 1	147249.2	100 yr	5384	260	268.26	264.89	268.28	0.00064	1.39	5838.21	1839.92	0.11
Reach 1	146260.1	10 yr	2328	260	268.27	263.48	268.27	0.000047	0.43	8153.36	1657.94	0.03
Reach 1	146260.1	50 yr	4276	260	267.9	263.49	267.9	0.000205	0.86	7542.96	1646.04	0.06
Reach 1	146260.1	100 yr	5384	260	267.82	264.09	267.83	0.000345	1.11	7406.85	1645.48	0.08

Reach 1	145874.1	10 yr	2328	260.75	268.24	266.36	268.24	0.00012	0.46	6027.64	1508.36	0.04
Reach 1	145874.1	50 yr	4276	260.75	267.77	267.28	267.78	0.000607	0.95	5316.44	1499.04	0.1
Reach 1	145874.1	100 yr	5384	260.75	267.59	267.43	267.6	0.001142	1.25	5043.36	1495.25	0.13
Reach 1	145588.1	10 yr	2328	260.73	266.25	266.25	267.95	0.063426	10.45	222.81	1368.71	1
Reach 1	145588.1	50 yr	4276	260.73	267.61	266.97	267.62	0.000479	1.06	5789.02	1578.97	0.09
Reach 1	145588.1	100 yr	5384	260.73	267.27	267.05	267.29	0.001034	1.47	5252.63	1572.85	0.13
Reach 1	145309.5	10 yr	2328	260	266.05		266.06	0.000478	1.23	4062.6	1712.28	0.09
Reach 1	145309.5	50 yr	4276	260	267.5		267.51	0.000354	1.24	6554.7	1718.48	0.08
Reach 1	145309.5	100 yr	5384	260	267.01		267.03	0.000874	1.85	5710.13	1716.51	0.13
Reach 1	145209.5	10 yr	2328	260.26	264.72	264.72	265.79	0.072783	8.29	280.78	1229.57	1
Reach 1	145209.5	50 yr	4276	260.26	265.92	265.92	267.25	0.067307	9.28	461	1579.99	1
Reach 1	145209.5	100 yr	5384	260.26	266.22	266.22	266.72	0.032993	6.62	1084.73	1655.09	0.7
Reach 1	144909.5	10 yr	2328	259.6	264.67	262.73	264.67	0.000299	0.64	4311.39	1965.27	0.07
Reach 1	144909.5	50 yr	4276	259.6	264.87	263.45	264.88	0.000834	1.1	4587.15	1990.11	0.11
Reach 1	144909.5	100 yr	5384	259.6	264.93	263.78	264.95	0.000743	1.05	6360.78	1997.71	0.11
Reach 1	144593.5	10 yr	2328	259.41	264.57	264.57	264.58	0.000308	0.67	4134.78	1759.08	0.07
Reach 1	144593.5	50 yr	4276	259.41	264.57	264.57	264.59	0.001039	1.24	4134.74	1759.08	0.13
Reach 1	144593.5	100 yr	5384	259.41	264.58	264.58	264.61	0.001634	1.55	4146.44	1762.24	0.16
Reach 1	144307.8	10 yr	2328	260	263.4	261.6	263.4	0.000183	0.48	6100.01	2062.52	0.05
Reach 1	144307.8	50 yr	4276	260	263.33	261.59	263.36	0.002542	1.78	3075.18	2050.45	0.19
Reach 1	144307.8	100 yr	5384	260	263.72	261.59	263.73	0.000717	0.87	6780.84	2123.78	0.1
Reach 1	143302.5	10 yr	2328	256	263.09	262	263.1	0.000171	0.7	5480.41	1816.66	0.05
Reach 1	143302.5	50 yr	4276	256	262.55	262	262.57	0.000965	1.55	4663.87	1782.38	0.13
Reach 1	143302.5	100 yr	5384	256	262.81	262.01	262.83	0.001182	1.78	5054.55	1798.88	0.14
Reach 1	142295.6	10 yr	2328	254	260.43	260.14	262.29	0.051999	10.95	212.65	1483.19	0.92
Reach 1	142295.6	50 yr	4276	254	261.96	261.96	261.97	0.000392	0.75	6020.56	1575.56	0.08
Reach 1	142295.6	100 yr	5384	254	261.96	261.96	261.98	0.00062	0.94	6025.31	1575.81	0.1
Reach 1	140841.3	10 yr	2328	254	260.75	258.54	260.75	0.000189	0.55	5105.31	1592.7	0.05
Reach 1	140841.3	50 yr	4276	254	260.44	259.03	260.45	0.00088	1.11	4610.33	1587.53	0.12
Reach 1	140841.3	100 yr	5384	254	260.9	259.26	260.92	0.000867	1.22	5351.38	1594.98	0.12
Reach 1	139478.8	10 yr	2328	250	257.68	257.68	259.64	0.062429	11.22	207.55	960.8	1
Reach 1	139478.8	50 yr	4276	250	258.87	258	258.9	0.00157	2.1	3660.07	1473.96	0.17
Reach 1	139478.8	100 yr	5384	250	259.39	258.01	259.41	0.001483	2.18	4435.96	1568.99	0.16
Reach 1	137957	10 yr	2328	250	256.61		256.62	0.000416	0.83	3689.45	1341.32	0.08
Reach 1	137957	50 yr	4276	250	257.63		257.64	0.000506	1.09	5056.72	1346.19	0.09
Reach 1	137957	100 yr	5384	250	258.11		258.13	0.000543	1.22	5707.33	1354.34	0.1
Reach 1	136943.4	10 yr	2328	250	255.76		255.79	0.002302	2.64	2290.46	1461.21	0.2
Reach 1	136943.4	50 yr	4276	250	256.73		256.76	0.001809	2.62	3725.91	1471.66	0.19
Reach 1	136943.4	100 yr	5384	250	257.21		257.24	0.001675	2.65	4422.7	1473.88	0.18
Reach 1	135924.9	10 yr	2328	248	254.64	254	254.65	0.00066	1.2	3631.96	1564.87	0.1
Reach 1	135924.9	50 yr	4276	248	255.67	254	255.68	0.000698	1.43	5285.08	1631.81	0.11
Reach 1	135924.9	100 yr	5384	248	256.17	254.01	256.19	0.000696	1.52	6114.13	1644.76	0.11
Reach 1	134950.8	10 yr	2328	248	253.55	251.35	253.58	0.00216	1.95	1849.03	726.24	0.19
Reach 1	134950.8	50 yr	4276	248	254.41	251.78	254.47	0.00286	2.6	2483.71	746.11	0.22
Reach 1	134950.8	100 yr	5384	248	254.9	251.78	254.96	0.002936	2.83	2849.1	756.82	0.23
Reach 1	134000.7	10 yr	2328	248	252.99	252	253	0.000281	0.75	4566.3	1448.89	0.07
Reach 1	134000.7	50 yr	4276	248	252.83	252	252.84	0.001118	1.45	4328.01	1443.86	0.13
Reach 1	134000.7	100 yr	5384	248	253.29	252	253.31	0.001133	1.58	4999.85	1458	0.14

Reach 1	132978.5	10 yr	2328	244	251.51	249.45	252.05	0.015032	5.88	395.66	1632.1	0.5
Reach 1	132978.5	50 yr	4276	244	251.89	251.28	251.9	0.000779	1.28	4885.25	1662.93	0.11
Reach 1	132978.5	100 yr	5384	244	252.38	251.88	252.39	0.000726	1.3	6036.21	1701	0.11
Reach 1	131987.2	10 yr	2328	244	250.12		250.13	0.000645	1.33	3708.31	1740.53	0.11
Reach 1	131987.2	50 yr	4276	244	251.21		251.22	0.000598	1.47	5604.25	1750.38	0.11
Reach 1	131987.2	100 yr	5384	244	251.73		251.75	0.000587	1.54	6520.67	1760.26	0.11
Reach 1	130964.6	10 yr	2328	244	249.15	247.68	249.17	0.001546	1.55	2366.36	1107.65	0.16
Reach 1	130964.6	50 yr	4276	244	250.33	247.96	250.36	0.00132	1.78	3725.09	1183.72	0.15
Reach 1	130964.6	100 yr	5384	244	250.88	247.96	250.91	0.001243	1.87	4382	1187.62	0.15
Reach 1	129697	10 yr	2328	240	247.8	246	247.81	0.000782	1.68	2983.45	1240.08	0.12
Reach 1	129697	50 yr	4276	240	249.17	246.15	249.19	0.00067	1.79	4712.18	1276.8	0.12
Reach 1	129697	100 yr	5384	240	249.75	246.15	249.77	0.00068	1.89	5449.9	1291.24	0.12
Reach 1	128641.7	10 yr	2328	240	246.86	245.77	246.88	0.001	1.52	2431.08	800.05	0.13
Reach 1	128641.7	50 yr	4276	240	248.24	246	248.26	0.00117	1.98	3672.7	1020.38	0.15
Reach 1	128641.7	100 yr	5384	240	248.81	246	248.84	0.001158	2.11	4255.88	1025.95	0.15
Reach 1	127244	10 yr	2328	238	245.14	243.31	245.18	0.001524	2.17	2042.66	800.89	0.17
Reach 1	127244	50 yr	4276	238	246.27	243.89	246.32	0.001681	2.59	2954.56	813.54	0.18
Reach 1	127244	100 yr	5384	238	246.84	244.15	246.89	0.001712	2.77	3415.05	824.48	0.19
Reach 1	126289.9	10 yr	2328	238	243.71	241.52	243.74	0.001512	1.96	2389.84	1148.91	0.16
Reach 1	126289.9	50 yr	4276	238	244.95	242.1	244.97	0.001212	2.06	3827.57	1169.63	0.15
Reach 1	126289.9	100 yr	5384	238	245.55	242.1	245.58	0.001131	2.12	4539.5	1181.28	0.15
Reach 1	124780.6	10 yr	2328	234	242.02		242.04	0.000867	1.83	2523.37	871.37	0.13
Reach 1	124780.6	50 yr	4276	234	243.36		243.39	0.000914	2.14	3707.59	889.18	0.14
Reach 1	124780.6	100 yr	5384	234	244		244.03	0.000934	2.29	4275.67	897.43	0.14
Reach 1	123738.1	10 yr	2328	234	241.08		241.09	0.000956	1.68	2677.03	966.48	0.13
Reach 1	123738.1	50 yr	4276	234	242.39		242.41	0.000951	1.95	3972.42	1013.16	0.14
Reach 1	123738.1	100 yr	5384	234	243.01		243.04	0.000969	2.09	4611.31	1051.19	0.14
Reach 1	122650.8	10 yr	2328	234	240.18		240.2	0.000714	1.44	2675.53	1046.68	0.11
Reach 1	122650.8	50 yr	4276	234	241.49		241.52	0.000721	1.7	4058.08	1055.88	0.12
Reach 1	122650.8	100 yr	5384	234	242.09		242.12	0.000743	1.83	4688.51	1067.59	0.12
Reach 1	121693	10 yr	2328	234	239.46	236.57	239.47	0.000807	1.36	2943.49	1186.61	0.12
Reach 1	121693	50 yr	4276	234	240.83	237.25	240.84	0.000687	1.52	4602.41	1236.05	0.11
Reach 1	121693	100 yr	5384	234	241.41	237.58	241.43	0.000685	1.62	5333.99	1253.48	0.12
Reach 1	120667.8	10 yr	2328	230.54	238.61	235.03	238.63	0.000827	1.71	2300.86	760.24	0.13
Reach 1	120667.8	50 yr	4276	230.54	239.96	236.09	240	0.001008	2.17	3399.24	874.6	0.14
Reach 1	120667.8	100 yr	5384	230.54	240.52	236.47	240.57	0.001071	2.35	3897.06	882.11	0.15
Reach 1	119080	10 yr	2328	230	235.98	234.31	236.08	0.00435	3.39	1193.83	678.68	0.28
Reach 1	119080	50 yr	4276	230	237.3	235.16	237.38	0.003127	3.4	2533.11	960.61	0.25
Reach 1	119080	100 yr	5384	230	238	235.55	238.07	0.002489	3.27	3214.93	986.75	0.22
Reach 1	118001.1	10 yr	2328	228	234.8	232	234.81	0.000521	1.33	3480.47	1276.91	0.1
Reach 1	118001.1	50 yr	4276	228	236.34	232.58	236.35	0.000442	1.44	5467.69	1327.12	0.1
Reach 1	118001.1	100 yr	5384	228	237.13	232.85	237.14	0.000422	1.51	6548.34	1426.79	0.09
Reach 1	116862.3	10 yr	2328	228	233.93	230.72	233.96	0.001146	1.64	1812.19	635.46	0.14
Reach 1	116862.3	50 yr	4276	228	235.58	231.68	235.63	0.001003	1.91	2926.66	687.31	0.14
Reach 1	116862.3	100 yr	5384	228	236.39	231.77	236.44	0.000983	2.06	3494.57	731.11	0.14
Reach 1	115784.5	10 yr	2328	228	232.96	229.71	232.98	0.00073	1.3	1986.46	534.42	0.11
Reach 1	115784.5	50 yr	4276	228	234.66	230.34	234.7	0.000736	1.64	2917.93	555.6	0.12
Reach 1	115784.5	100 yr	5384	228	235.47	230.62	235.51	0.000752	1.8	3368.48	572.2	0.12
Reach 1	114617.3	10 yr	2328	224	232.29	228.11	232.3	0.000474	1.39	2775.97	618.25	0.09

Reach 1	114617.3	50 yr	4276	224	233.9	228.11	233.92	0.000605	1.81	3810.44	665.31	0.11
Reach 1	114617.3	100 yr	5384	224	234.67	228.11	234.7	0.000645	1.98	4325.64	674.11	0.12
Reach 1	112591.1	10 yr	2328	220	230.42	227.51	230.49	0.002221	2.82	1617.89	754.97	0.2
Reach 1	112591.1	50 yr	4276	220	231.92	229.51	231.98	0.001724	2.88	2754.04	762.43	0.19
Reach 1	112591.1	100 yr	5384	220	232.67	229.83	232.73	0.001606	2.96	3334.09	796.13	0.18
Reach 1	111434.1	10 yr	2328	220	229.28	225.83	229.29	0.000583	1.43	3307.02	1212.03	0.1
Reach 1	111434.1	50 yr	4276	220	231.13	225.83	231.14	0.000388	1.4	5577.76	1238.37	0.09
Reach 1	111434.1	100 yr	5384	220	231.92	227.26	231.94	0.000366	1.45	6565.86	1245.11	0.09
Reach 1	110204.6	10 yr	2328	218	228.77	225.55	228.78	0.000318	1.2	4056.88	1287.23	0.08
Reach 1	110204.6	50 yr	4276	218	230.77	226.7	230.78	0.000231	1.21	6695.22	1337.38	0.07
Reach 1	110204.6	100 yr	5384	218	231.58	227.06	231.58	0.000228	1.27	7778.73	1343.62	0.07
Reach 1	109036.8	10 yr	2562	218	227.93	223.59	228.02	0.001627	3.15	1436.51	460.33	0.19
Reach 1	109036.8	50 yr	4701	218	230.05	225.1	230.16	0.001727	3.75	2771.81	788.25	0.2
Reach 1	109036.8	100 yr	5916	218	230.89	225.64	230.99	0.001585	3.77	3467.07	860.31	0.19
Reach 1	108031.1	10 yr	2562	214	226.51	220.39	226.6	0.001243	2.88	1496.85	442.34	0.16
Reach 1	108031.1	50 yr	4701	214	228.34	222.19	228.47	0.001632	3.7	2368.26	574.07	0.19
Reach 1	108031.1	100 yr	5916	214	229.06	223.5	229.22	0.001945	4.21	2853.32	765.71	0.21
Reach 1	107075.8	10 yr	2562	214	225.6	220.46	225.64	0.000804	2.03	2394.09	745	0.13
Reach 1	107075.8	50 yr	4701	214	227.14	223.03	227.19	0.001091	2.66	3837.54	1185.74	0.15
Reach 1	107075.8	100 yr	5916	214	227.76	224.07	227.81	0.001121	2.82	4611.37	1304.84	0.16
Reach 1	105740.9	10 yr	2562	210	224.11	218.68	224.2	0.001513	2.75	1862.16	967.46	0.17
Reach 1	105740.9	50 yr	4701	210	225.35	221.02	225.43	0.00161	3.13	3066.37	979.98	0.18
Reach 1	105740.9	100 yr	5916	210	225.97	222.47	226.05	0.001579	3.24	3672.67	986.09	0.18
Reach 1	105073.7	10 yr	2562	210	223.37	217.4	223.42	0.000903	2.43	2190.48	855.39	0.14
Reach 1	105073.7	50 yr	4701	210	224.3	220.18	224.39	0.001527	3.36	3075.88	999.31	0.18
Reach 1	105073.7	100 yr	5916	210	224.94	220.71	225.03	0.00149	3.45	3721.01	1003.32	0.18
Reach 1	104400.4	10 yr	2562	210	221.82	217.09	222.1	0.006582	4.26	605.52	864.92	0.34
Reach 1	104400.4	50 yr	4701	210	223.34	220.11	223.38	0.001397	2.35	3461.56	1039.85	0.16
Reach 1	104400.4	100 yr	5916	210	224.03	220.97	224.08	0.001285	2.41	4198.16	1077.99	0.16
Reach 1	104005.1	10 yr	2562	210	221.3	217.31	221.33	0.001019	2.27	2222.05	727.61	0.14
Reach 1	104005.1	50 yr	4701	210	222.82	219.1	222.87	0.001201	2.77	3533.12	904.53	0.16
Reach 1	104005.1	100 yr	5916	210	223.53	219.5	223.58	0.001207	2.92	4200.03	968.28	0.16
Reach 1	103025.1	10 yr	2562	210	220.5	218.21	220.51	0.000694	1.73	3101.9	1054.64	0.11
Reach 1	103025.1	50 yr	4701	210	221.99	218.72	222.01	0.000661	1.92	4680.38	1064.12	0.12
Reach 1	103025.1	100 yr	5916	210	222.68	218.93	222.71	0.000681	2.05	5433.6	1105.54	0.12
Reach 1	101979.6	10 yr	2562	208	219.55	213.55	219.6	0.001121	2.06	2021.35	832	0.15
Reach 1	101979.6	50 yr	4701	208	221.08	215.46	221.14	0.001073	2.34	3456.49	963.92	0.15
Reach 1	101979.6	100 yr	5916	208	221.78	216.47	221.83	0.00104	2.44	4128.59	968.41	0.15
Reach 1	100998.5	10 yr	2562	208	218.61	214.35	218.63	0.000872	1.12	2749.02	919.24	0.11
Reach 1	100998.5	50 yr	4701	208	220.21	216	220.23	0.00078	1.42	4308.48	1014.73	0.12
Reach 1	100998.5	100 yr	5916	208	220.94	216.01	220.97	0.000743	1.52	5051.64	1021.06	0.12
Reach 1	100268.9	10 yr	2562	204	217.87	212.69	217.9	0.001122	1.8	2198.62	789.14	0.14
Reach 1	100268.9	50 yr	4701	204	219.55	214.7	219.59	0.000982	2.04	3688.73	947.33	0.14
Reach 1	100268.9	100 yr	5916	204	220.32	216.17	220.36	0.000926	2.13	4427.4	977.39	0.14
Reach 1	98606.43	10 yr	2562	204	216.31	211.28	216.34	0.000792	1.94	2506.88	821.29	0.12
Reach 1	98606.43	50 yr	4701	204	218.13	214.47	218.16	0.000758	2.19	4331.52	1150.86	0.13
Reach 1	98606.43	100 yr	5916	204	219.01	214.81	219.04	0.000678	2.2	5376.17	1217.56	0.12
Reach 1	97734.7	10 yr	2562	205.01	215.62		215.66	0.000776	2.04	2446.63	917.85	0.13
Reach 1	97734.7	50 yr	4701	205.01	217.52		217.55	0.000651	2.15	4334.9	1058.12	0.12

Reach 1	97734.7	100 yr	5916	205.01	218.46		218.5	0.000588	2.17	5363.03	1114.87	0.12
Reach 1	96250.23	10 yr	2562	202	214.27	208.74	214.32	0.001056	2.3	1894.43	556.95	0.15
Reach 1	96250.23	50 yr	4701	202	216.29	211.16	216.35	0.001041	2.66	3039.12	614.16	0.15
Reach 1	96250.23	100 yr	5916	202	217.28	212.01	217.34	0.001064	2.87	3707.17	726.86	0.15
Reach 1	95264.73	10 yr	2562	202	213.39	207.46	213.43	0.000784	1.87	2176.26	632.73	0.12
Reach 1	95264.73	50 yr	4701	202	215.47	210.05	215.51	0.000695	2.09	3603.79	701.28	0.12
Reach 1	95264.73	100 yr	5916	202	216.47	210.65	216.51	0.000681	2.22	4319.09	769.19	0.12
Reach 1	94258.65	10 yr	2562	202	212.86		212.88	0.000391	1.52	3239.89	733.66	0.09
Reach 1	94258.65	50 yr	4701	202	214.97		214.99	0.000393	1.75	4865.42	825.46	0.09
Reach 1	94258.65	100 yr	5916	202	215.98		216	0.000385	1.84	5724.26	878.98	0.09
Reach 1	93272.17	10 yr	4740	202	212.45	208.11	212.46	0.000438	1.33	5439.99	1251.89	0.09
Reach 1	93272.17	50 yr	8618	202	214.55	208.51	214.57	0.000442	1.61	8157.08	1317.74	0.1
Reach 1	93272.17	100 yr	10823	202	215.57	208.78	215.59	0.000434	1.72	9494.19	1324.51	0.1
Reach 1	92980.49	10 yr	4740	202	212.27	208.21	212.3	0.000694	1.86	4201.9	937.8	0.12
Reach 1	92980.49	50 yr	8618	202	214.37	208.93	214.4	0.000741	2.26	6258.43	1020.31	0.13
Reach 1	92980.49	100 yr	10823	202	215.38	209.26	215.42	0.000728	2.4	7295.58	1027.18	0.13
Reach 1	92734.37	10 yr	4740	202	212.01	208.66	212.06	0.001399	2.48	3011.49	902.19	0.17
Reach 1	92734.37	50 yr	8618	202	214.15	209.39	214.2	0.000955	2.45	5752.63	972.98	0.14
Reach 1	92734.37	100 yr	10823	202	215.17	209.74	215.22	0.00092	2.59	6773.42	1029.72	0.14
Reach 1	92504.4	10 yr	4740	202	211.79	208.01	211.82	0.0008	1.86	4073.02	891.06	0.13
Reach 1	92504.4	50 yr	8618	202	213.96	208.57	214	0.000797	2.24	6076.83	961.72	0.13
Reach 1	92504.4	100 yr	10823	202	214.98	208.91	215.02	0.000787	2.39	7105.15	1055.34	0.13
Reach 1	91303.04	10 yr	4740	198	211.14		211.17	0.000384	1.69	4433.89	936.45	0.09
Reach 1	91303.04	50 yr	8618	198	213.2		213.25	0.000493	2.17	6437.35	1017.22	0.11
Reach 1	91303.04	100 yr	10823	198	214.21		214.26	0.000517	2.34	7462.61	1024.64	0.11
Reach 1	90295.13	10 yr	4740	198	210.35	206.75	210.44	0.001841	3.15	2771.62	793.59	0.2
Reach 1	90295.13	50 yr	8618	198	212.31	207.67	212.41	0.001723	3.52	4345.26	827.56	0.2
Reach 1	90295.13	100 yr	10823	198	213.29	208	213.39	0.001703	3.73	5189.36	893.43	0.2
Reach 1	89313.17	10 yr	4740	198	208.67	204.97	208.74	0.001608	2.62	2745.36	813.16	0.18
Reach 1	89313.17	50 yr	8618	198	210.81	206.21	210.89	0.001376	2.92	4554.44	867.19	0.17
Reach 1	89313.17	100 yr	10823	198	211.86	206.68	211.95	0.001275	3.03	5474.62	879.61	0.17
Reach 1	88360.79	10 yr	4740	195.92	207.72	202.54	207.76	0.000697	2.12	4055.16	1004.53	0.12
Reach 1	88360.79	50 yr	8618	195.92	209.94	203.96	209.98	0.00068	2.42	6407.93	1112.46	0.13
Reach 1	88360.79	100 yr	10823	195.92	211.05	204.44	211.1	0.000637	2.49	7656.36	1126.54	0.12
Reach 1	86946.23	10 yr	5402	194	207.03	203.03	207.04	0.0004	1.64	6981.76	1682.95	0.09
Reach 1	86946.23	50 yr	9777	194	209.31	203.74	209.32	0.000345	1.75	10942.71	1769.13	0.09
Reach 1	86946.23	100 yr	12264	194	210.47	204.11	210.49	0.000316	1.79	13016.45	1787.94	0.09
Reach 1	85763.68	10 yr	5402	194	206.26	202.79	206.31	0.001065	2.67	3933.92	860.43	0.15
Reach 1	85763.68	50 yr	9777	194	208.62	203.77	208.68	0.000986	2.98	6152.52	960.08	0.15
Reach 1	85763.68	100 yr	12264	194	209.84	204.13	209.89	0.000909	3.05	7325.76	970.6	0.15
Reach 1	84304.58	10 yr	5402	192	205.16	200.63	205.19	0.000571	1.85	5005.83	1058.48	0.11
Reach 1	84304.58	50 yr	9777	192	207.57	201.62	207.61	0.000559	2.15	7609.66	1120.09	0.11
Reach 1	84304.58	100 yr	12264	192	208.76	202.08	208.8	0.000626	2.44	9090.82	1365.49	0.12
Reach 1	83700.74	10 yr	5402	192	204.79	199.13	204.83	0.00062	1.99	3853.88	817.57	0.12
Reach 1	83700.74	50 yr	9777	192	207.19	200.67	207.24	0.00065	2.38	6416.89	1016.45	0.12
Reach 1	83700.74	100 yr	12264	192	208.35	201.11	208.41	0.000653	2.55	7642.14	1100.7	0.13
Reach 1	82541.44	10 yr	5402	192	203.92	198.85	203.97	0.000901	2.16	3828.53	998.4	0.14
Reach 1	82541.44	50 yr	9777	192	206.38	200.34	206.44	0.000755	2.38	6335.85	1060.18	0.13
Reach 1	82541.44	100 yr	12264	192	207.56	200.79	207.62	0.000715	2.49	7623.74	1116.54	0.13

Reach 1	81753.13	10 yr	5402	192	203.3	197.59	203.33	0.000718	2.22	4301.55	827.01	0.13
Reach 1	81753.13	50 yr	9777	192	205.8	199.08	205.85	0.000712	2.58	6551.01	1004.06	0.13
Reach 1	81753.13	100 yr	12264	192	206.95	199.56	207.01	0.00084	2.97	7759.59	1108.02	0.14
Reach 1	80430.07	10 yr	5402	188	202.07	196	202.15	0.001137	2.87	3280.74	669.79	0.16
Reach 1	80430.07	50 yr	9777	188	204.57	198.74	204.66	0.00117	3.38	5117.81	788.21	0.17
Reach 1	80430.07	100 yr	12264	188	205.58	199.22	205.68	0.0012	3.6	5923.9	795.88	0.17
Reach 1	79347.86	10 yr	5402	188	201.07	195.93	201.12	0.000797	2.17	3941.66	983.95	0.13
Reach 1	79347.86	50 yr	9777	188	203.61	197.7	203.65	0.000732	2.48	7513.12	1522.24	0.13
Reach 1	79347.86	100 yr	12264	188	204.68	198	204.73	0.000653	2.49	9162.29	1532.28	0.13
Reach 1	78173.07	10 yr	5402	188	200.42	194.71	200.45	0.000425	1.63	5799.43	1307.59	0.1
Reach 1	78173.07	50 yr	9777	188	203.04	196.21	203.07	0.000359	1.78	9326.91	1394.12	0.09
Reach 1	78173.07	100 yr	12264	188	204.15	197.09	204.18	0.000354	1.88	10869.34	1394.12	0.09
Reach 1	77126.59	10 yr	5402	188	199.69	194.18	199.76	0.00109	2.85	2896.93	450.54	0.16
Reach 1	77126.59	50 yr	9777	188	202.25	195.38	202.39	0.001449	3.82	4248.5	757.64	0.19
Reach 1	77126.59	100 yr	12264	188	203.34	195.81	203.49	0.001511	4.12	5157.96	893.36	0.2
Reach 1	75906.48	10 yr	5402	184	197.47	193.3	197.65	0.00315	4.89	2141.68	463.91	0.26
Reach 1	75906.48	50 yr	9777	184	199.63	195.5	199.85	0.003246	5.62	3329.11	727.52	0.28
Reach 1	75906.48	100 yr	12264	184	200.67	195.97	200.9	0.003218	5.9	4269.46	962.42	0.28
Reach 1	74771.55	10 yr	5402	184	196.34	192	196.37	0.000548	1.98	5626.92	1378.1	0.11
Reach 1	74771.55	50 yr	9777	184	198.62	192.62	198.65	0.000485	2.14	8828.38	1423.14	0.11
Reach 1	74771.55	100 yr	12264	184	199.7	193.07	199.72	0.000469	2.22	10362.38	1433.94	0.11
Reach 1	73882.51	10 yr	5402	184	195.8	190.76	195.83	0.000676	1.56	4587.24	966.64	0.11
Reach 1	73882.51	50 yr	9777	184	198.12	191.88	198.15	0.000639	1.9	6835.18	974.63	0.12
Reach 1	73882.51	100 yr	12264	184	199.2	192.1	199.24	0.000638	2.06	7888.71	978.36	0.12
Reach 1	72505.33	10 yr	5402	182	195.12	189.49	195.14	0.000382	1.6	6519.4	1481.85	0.09
Reach 1	72505.33	50 yr	9777	182	197.51	191.62	197.53	0.000336	1.75	10073.74	1498.52	0.09
Reach 1	72505.33	100 yr	12264	182	198.59	191.74	198.62	0.00033	1.84	11707.99	1504.49	0.09
Reach 1	71346.87	10 yr	5402	182	194.25	188.54	194.32	0.001688	2.77	2698.46	452.89	0.18
Reach 1	71346.87	50 yr	9777	182	196.64	189.86	196.75	0.001911	3.33	3791.73	468.23	0.2
Reach 1	71346.87	100 yr	12264	182	197.7	190	197.83	0.002008	3.69	4296.05	483.73	0.21
Reach 1	70186.09	10 yr	5398	182	192.66	188.26	192.72	0.001151	2.81	3584.79	767.63	0.16
Reach 1	70186.09	50 yr	9774	182	194.96	189.27	195.03	0.001166	3.27	5484.85	852.93	0.17
Reach 1	70186.09	100 yr	12263	182	196	189.82	196.08	0.001162	3.45	6374.02	860.07	0.17
Reach 1	69207.5	10 yr	5398	178	191.76		191.81	0.000767	2.14	3913.73	944.15	0.13
Reach 1	69207.5	50 yr	9774	178	194.05		194.11	0.000772	2.51	6225.27	1046.25	0.13
Reach 1	69207.5	100 yr	12263	178	195.1		195.17	0.000764	2.66	7324.73	1052.33	0.14
Reach 1	67710.94	10 yr	5398	178	190.33	185.45	190.4	0.001191	2.62	3332.3	774.18	0.16
Reach 1	67710.94	50 yr	9774	178	192.62	187.55	192.71	0.001166	3.04	5435.57	1017.47	0.16
Reach 1	67710.94	100 yr	12263	178	193.71	188.27	193.8	0.001106	3.16	6566.9	1059.61	0.16
Reach 1	66841.3	10 yr	5398	178	189.69	184.47	189.72	0.000534	1.66	5001.72	1178.13	0.11
Reach 1	66841.3	50 yr	9774	178	192.02	185.78	192.05	0.000509	1.94	7875.46	1272.04	0.11
Reach 1	66841.3	100 yr	12263	178	193.13	186.2	193.17	0.000491	2.04	9309.04	1295.92	0.11
Reach 1	65899.21	10 yr	5398	178	189.21	183.45	189.24	0.000473	1.58	4666.83	917.38	0.1
Reach 1	65899.21	50 yr	9774	178	191.52	184.63	191.56	0.000528	1.98	6837.33	978.09	0.11
Reach 1	65899.21	100 yr	12263	178	192.62	185.18	192.68	0.000558	2.19	7948.84	1041.92	0.12
Reach 1	64371.68	10 yr	5398	176	188.17	183.31	188.23	0.000999	2.35	3370.7	683.48	0.15
Reach 1	64371.68	50 yr	9774	176	190.32	184.47	190.41	0.001148	2.95	4871.58	723.66	0.16
Reach 1	64371.68	100 yr	12263	176	191.35	184.96	191.46	0.001227	3.25	5646.25	777.76	0.17

Reach 1	63293.49	10 yr	5398	174	187.03	182.82	187.09	0.001108	2.48	3754.23	966.31	0.15
Reach 1	63293.49	50 yr	9774	174	189.15	184.09	189.21	0.001061	2.83	5926.24	1050.24	0.16
Reach 1	63293.49	100 yr	12263	174	190.16	184.61	190.23	0.001028	2.97	6999.35	1065.32	0.16
Reach 1	62734.52	10 yr	5398	174	186.55	181.8	186.58	0.000741	2.27	4144.31	701.35	0.13
Reach 1	62734.52	50 yr	9774	174	188.6	183.14	188.66	0.00094	2.91	5587.8	706.87	0.15
Reach 1	62734.52	100 yr	12263	174	189.6	183.47	189.67	0.001011	3.18	6295.08	710.14	0.16
Reach 1	61445.96	10 yr	5398	174	184.96		185.06	0.00215	3.29	2956.55	906.65	0.21
Reach 1	61445.96	50 yr	9774	174	186.83		186.94	0.00199	3.67	4683.48	948.67	0.21
Reach 1	61445.96	100 yr	12263	174	187.81		187.92	0.001882	3.81	5629.02	990.74	0.21
Reach 1	60665.99	10 yr	5398	174	183.78		183.83	0.001178	2.53	4209.57	1324.53	0.16
Reach 1	60665.99	50 yr	9774	174	185.88		185.93	0.000894	2.58	7052.86	1366.33	0.14
Reach 1	60665.99	100 yr	12263	174	186.92		186.97	0.000829	2.65	8506.18	1426.61	0.14
Reach 1	59655.91	10 yr	5399	172	183.38	180	183.39	0.000219	1.06	8155.6	1461.95	0.07
Reach 1	59655.91	50 yr	9773	172	185.47	180.01	185.48	0.000256	1.34	11225.75	1476.08	0.08
Reach 1	59655.91	100 yr	12262	172	186.51	180.03	186.52	0.000269	1.47	12766.23	1495.28	0.08
Reach 1	58792.02	10 yr	5399	172	183.08	179.09	183.1	0.000567	1.56	5941.74	1819.77	0.11
Reach 1	58792.02	50 yr	9773	172	185.17	180	185.19	0.000444	1.65	9875.88	1892.86	0.1
Reach 1	58792.02	100 yr	12262	172	186.22	180.22	186.24	0.000399	1.69	11861.01	1900.1	0.1
Reach 1	57476.03	10 yr	5399	172	182.28	178.33	182.31	0.00063	1.83	5376.42	1288.8	0.12
Reach 1	57476.03	50 yr	9773	172	184.51	179.85	184.54	0.000555	2.03	8318.83	1344.21	0.11
Reach 1	57476.03	100 yr	12262	172	185.61	179.85	185.64	0.000521	2.11	9798.34	1349.49	0.11
Reach 1	56111.01	10 yr	5399	171.61	181.39	176.08	181.43	0.000664	1.99	4567.44	1014.68	0.12
Reach 1	56111.01	50 yr	9773	171.61	183.68	177.38	183.73	0.000638	2.29	6902.46	1020.61	0.12
Reach 1	56111.01	100 yr	12262	171.61	184.81	178.25	184.86	0.000624	2.42	8057.8	1095.05	0.12
Reach 1	54998.39	10 yr	5399	168	180.7	175.9	180.72	0.000615	2.18	4675.76	806	0.12
Reach 1	54998.39	50 yr	9773	168	182.95	176.72	182.99	0.000704	2.65	6500.4	811.22	0.13
Reach 1	54998.39	100 yr	12262	168	184.08	177.13	184.13	0.000725	2.84	7416.69	831.9	0.13
Reach 1	53922.78	10 yr	5399	168	179.97	175.25	180	0.000729	2.12	4485.28	960.3	0.13
Reach 1	53922.78	50 yr	9773	168	182.17	175.54	182.21	0.000749	2.49	6657.47	1012.37	0.13
Reach 1	53922.78	100 yr	12262	168	183.29	177.18	183.34	0.000731	2.63	7814.04	1039.16	0.13
Reach 1	52312.84	10 yr	5399	168	179.04	174.16	179.06	0.000477	1.53	6073.49	1617.21	0.1
Reach 1	52312.84	50 yr	9773	168	181.35	175.61	181.37	0.000384	1.65	9849.39	1675.25	0.09
Reach 1	52312.84	100 yr	12262	168	182.53	176.04	182.55	0.000348	1.69	11860.28	1716.58	0.09
Reach 1	51397.14	10 yr	5399	168	178.5	173.68	178.54	0.000698	2.13	4399.25	936.12	0.12
Reach 1	51397.14	50 yr	9773	168	180.87	175.35	180.91	0.000656	2.41	6882.77	963.33	0.13
Reach 1	51397.14	100 yr	12262	168	182.08	176	182.13	0.000642	2.55	8050.16	980.98	0.13
Reach 1	49873.99	10 yr	5399	168	177.59	171.99	177.62	0.000519	1.83	4779.57	817.08	0.11
Reach 1	49873.99	50 yr	9773	168	179.91	171.99	179.95	0.000607	2.3	6709.87	910.7	0.12
Reach 1	49873.99	100 yr	12262	168	181.03	171.99	181.08	0.000733	2.69	7880.92	1065.26	0.13
Reach 1	48863.91	10 yr	5399	166	177.21	172	177.23	0.000303	1.42	6590.25	1362.09	0.08
Reach 1	48863.91	50 yr	9773	166	179.48	172.01	179.5	0.000329	1.71	9889.91	1492.62	0.09
Reach 1	48863.91	100 yr	12262	166	180.56	172.15	180.58	0.000342	1.85	11521.22	1540.86	0.09
Reach 1	47468.78	10 yr	5399	166	176.61	171.35	176.64	0.000614	1.85	5108.17	1374.13	0.11
Reach 1	47468.78	50 yr	9773	166	178.9	173.08	178.93	0.000514	2	8395.8	1462.75	0.11
Reach 1	47468.78	100 yr	12262	166	179.99	173.67	180.02	0.000481	2.06	9987.44	1467.36	0.11
Reach 1	46475.52	10 yr	5433	162	176.09	168.73	176.13	0.000442	1.9	5023.37	1173.58	0.1
Reach 1	46475.52	50 yr	9826	162	178.41	170.57	178.45	0.000466	2.22	7748.76	1181.19	0.11
Reach 1	46475.52	100 yr	12325	162	179.5	171.2	179.55	0.000471	2.35	9046.4	1184.8	0.11
Reach 1	45311.81	10 yr	5433	162	175.64	168.98	175.66	0.000359	1.44	6284.35	1418.13	0.09

Reach 1	45311.81	50 yr	9826	162	177.95	170.86	177.98	0.000346	1.67	9661.58	1507.64	0.09
Reach 1	45311.81	100 yr	12325	162	179.06	172.26	179.08	0.000337	1.76	11329.37	1516.69	0.09
Reach 1	44122.59	10 yr	5433	162	174.8	170.65	174.9	0.001406	3.04	2684.31	516.31	0.17
Reach 1	44122.59	50 yr	9826	162	177.07	171.8	177.2	0.001578	3.72	4298.58	780.77	0.19
Reach 1	44122.59	100 yr	12325	162	178.19	172.29	178.32	0.001547	3.92	5169.08	780.77	0.19
Reach 1	43305.32	10 yr	5433	162	173.69	169.61	173.77	0.001362	2.86	2823.99	502.45	0.17
Reach 1	43305.32	50 yr	9826	162	175.71	170.58	175.85	0.001765	3.74	3863.2	531.56	0.2
Reach 1	43305.32	100 yr	12325	162	176.78	171.03	176.94	0.001879	4.12	4438.52	600.74	0.21
Reach 1	42249.08	10 yr	5433	162	172.78	168.63	172.8	0.000647	1.34	5512.95	1599.12	0.11
Reach 1	42249.08	50 yr	9826	162	174.92	170.08	174.95	0.000478	1.47	8979.85	1629.07	0.1
Reach 1	42249.08	100 yr	12325	162	176.07	170.3	176.1	0.000414	1.52	10853.72	1637.5	0.09
Reach 1	40966.61	10 yr	5433	162	171.94	167.11	171.96	0.000667	1.59	5692.33	1426.76	0.11
Reach 1	40966.61	50 yr	9826	162	174.31	168.26	174.33	0.000489	1.7	9091.54	1435.94	0.1
Reach 1	40966.61	100 yr	12325	162	175.53	168.82	175.55	0.000433	1.75	10848.12	1435.94	0.1
Reach 1	39658.88	10 yr	5433	162	171.03	167.09	171.06	0.000708	1.93	5225.03	1336.05	0.12
Reach 1	39658.88	50 yr	9826	162	173.66	168.19	173.69	0.000487	1.95	8879.13	1437.63	0.11
Reach 1	39658.88	100 yr	12325	162	174.97	168.69	174.99	0.000423	1.96	10770.53	1460.33	0.1
Reach 1	38757.5	10 yr	5433	158	170.53	165.62	170.55	0.000469	1.94	6303.99	1468.5	0.1
Reach 1	38757.5	50 yr	9826	158	173.31	165.83	173.33	0.000335	1.91	10521.95	1557.65	0.09
Reach 1	38757.5	100 yr	12325	158	174.66	165.84	174.67	0.000299	1.92	12640.96	1587.61	0.09
Reach 1	38200.74	10 yr	5433	158	170.2	165.63	170.23	0.000693	2.14	4407.56	795.7	0.12
Reach 1	38200.74	50 yr	9826	158	173.03	166.76	173.07	0.000657	2.48	7061.56	993.59	0.13
Reach 1	38200.74	100 yr	12325	158	174.4	167.1	174.44	0.0006	2.55	8437.56	1011.58	0.12
Reach 1	37492.84	10 yr	5433	158	169.87	164.1	169.89	0.000352	1.29	5500.07	960.61	0.09
Reach 1	37492.84	50 yr	9826	158	172.71	164.74	172.74	0.000344	1.59	8666.62	1209.25	0.09
Reach 1	37492.84	100 yr	12325	158	174.11	165.05	174.14	0.000316	1.67	10374.5	1228.66	0.09
Reach 1	36580.05	10 yr	5433	161.01	169.47	164.01	169.49	0.000551	1.68	5236.86	971	0.11
Reach 1	36580.05	50 yr	9826	161.01	172.36	164.69	172.38	0.00045	1.89	8042.24	971	0.1
Reach 1	36580.05	100 yr	12325	161.01	173.78	165.08	173.81	0.000422	1.99	9422	971	0.1
Reach 1	35507.14	10 yr	5433	158	169.03	162.06	169.05	0.000314	1.54	6272.7	969.83	0.08
Reach 1	35507.14	50 yr	9826	158	171.96	163.18	171.98	0.000322	1.84	9196.74	1047.82	0.09
Reach 1	35507.14	100 yr	12325	158	173.39	163.73	173.41	0.000325	1.98	10736.61	1102.24	0.09
Reach 1	34849.13	10 yr	5433	158	168.79	161.91	168.82	0.000381	1.5	4927.43	945.74	0.09
Reach 1	34849.13	50 yr	9826	158	171.72	163.09	171.75	0.000346	1.74	7752.1	987.73	0.09
Reach 1	34849.13	100 yr	12325	158	173.15	163.66	173.19	0.000331	1.84	9184.95	1011.12	0.09
Reach 1	33370.94	10 yr	5433	156	168.44	162.89	168.45	0.00017	0.99	7468.95	1113.89	0.06
Reach 1	33370.94	50 yr	9826	156	171.37	164	171.38	0.000184	1.26	10784.51	1166.81	0.07
Reach 1	33370.94	100 yr	12325	156	172.8	164	172.82	0.000187	1.38	12494.61	1215.01	0.07
Reach 1	32021.58	10 yr	5433	156	168.02	162	168.06	0.000595	2.19	4259.17	659.1	0.12
Reach 1	32021.58	50 yr	9826	156	170.92	163.64	170.97	0.000608	2.59	6193.88	697.44	0.12
Reach 1	32021.58	100 yr	12325	156	172.35	164	172.4	0.000602	2.75	7281.19	813.87	0.12
Reach 1	31212.27	10 yr	5433	156	167.4	161.7	167.45	0.000963	2.72	4137.06	1004.54	0.15
Reach 1	31212.27	50 yr	9826	156	170.43	163.11	170.47	0.000613	2.57	7223.07	1034.94	0.12
Reach 1	31212.27	100 yr	12325	156	171.89	163.72	171.94	0.00054	2.59	8763.32	1066.99	0.12
Reach 1	29931.87	10 yr	5433	152	166.5	160	166.53	0.000558	1.96	4473.23	762.81	0.11
Reach 1	29931.87	50 yr	9826	152	169.75	160.66	169.79	0.000472	2.19	7039	800.43	0.11
Reach 1	29931.87	100 yr	12325	152	171.25	161.16	171.29	0.000476	2.37	8271.58	853.93	0.11
Reach 1	28687.16	10 yr	5433	152	166.18	158.07	166.19	0.000155	1.18	7398.61	950.28	0.06
Reach 1	28687.16	50 yr	9826	152	169.43	159.07	169.45	0.00017	1.45	10580.88	992.3	0.07

Reach 1	28687.16	100 yr	12325	152	170.92	159.49	170.94	0.000181	1.6	12070.66	1023.72	0.07
Reach 1	27568.89	10 yr	5433	152	165.89		165.92	0.000419	1.83	4267.2	549.14	0.1
Reach 1	27568.89	50 yr	9826	152	169.1		169.15	0.000472	2.31	6148.67	608.15	0.11
Reach 1	27568.89	100 yr	12325	152	170.56		170.62	0.000502	2.55	7048.09	644.09	0.11
Reach 1	26738.66	10 yr	5433	152	165.69		165.71	0.000166	1.24	7224.36	944.17	0.06
Reach 1	26738.66	50 yr	9826	152	168.89		168.9	0.00019	1.55	10434.74	1049.65	0.07
Reach 1	26738.66	100 yr	12325	152	170.33		170.35	0.000205	1.72	11974.35	1095.55	0.07
Reach 1	25956.46	10 yr	5433	152	165.53		165.55	0.000248	1.46	5598.27	679.35	0.08
Reach 1	25956.46	50 yr	9826	152	168.68		168.71	0.000316	1.94	7948.21	800.21	0.09
Reach 1	25956.46	100 yr	12325	152	170.12		170.15	0.000326	2.1	9101.01	809.75	0.09
Reach 1	25307.43	10 yr	5433	152	165.28		165.32	0.000547	2.26	4179.58	633.13	0.11
Reach 1	25307.43	50 yr	9826	152	168.38		168.43	0.000635	2.83	6579.8	883.74	0.13
Reach 1	25307.43	100 yr	12325	152	169.82		169.87	0.000594	2.91	7858.47	894.02	0.13
Reach 1	24484.37	10 yr	5433	148	164.99	156	165.01	0.000265	1.63	5921.79	951.46	0.08
Reach 1	24484.37	50 yr	9826	148	168.06	156	168.09	0.000284	1.95	8958.38	1018.01	0.09
Reach 1	24484.37	100 yr	12325	148	169.51	156	169.54	0.000282	2.06	10437.12	1024.22	0.09
Reach 1	23186.49	10 yr	5433	148	164.48		164.52	0.000604	1.69	4103.69	920.82	0.11
Reach 1	23186.49	50 yr	9826	148	167.61		167.65	0.000423	1.8	7335.87	1066.6	0.1
Reach 1	23186.49	100 yr	12325	148	169.08		169.12	0.000379	1.86	8906.65	1066.6	0.1
Reach 1	22034.16	10 yr	5433	148	163.66	155.26	163.74	0.000873	2.53	2705.13	353.86	0.14
Reach 1	22034.16	50 yr	9826	148	166.84	157.51	166.95	0.001091	3.07	3906.9	455.43	0.16
Reach 1	22034.16	100 yr	12325	148	168.34	158.51	168.47	0.001075	3.31	4768.44	701.26	0.16
Reach 1	20846.64	10 yr	5433	146	162.86	153.75	162.91	0.000558	1.93	3690.4	780.72	0.11
Reach 1	20846.64	50 yr	9826	146	166.04	155.73	166.09	0.000495	2.21	6316.31	868.37	0.11
Reach 1	20846.64	100 yr	12325	146	167.57	156.89	167.63	0.000477	2.34	7721.16	962.95	0.11
Reach 1	19733.75	10 yr	5433	146	161.56		161.82	0.002055	4.12	1409.36	161.7	0.22
Reach 1	19733.75	50 yr	9826	146	164.46		164.95	0.002922	5.74	1922.85	194.08	0.27
Reach 1	19733.75	100 yr	12325	146	165.77		166.44	0.003535	6.7	2190.8	376.04	0.3
Reach 1	18610.39	10 yr	5891	146	160.43	153.86	160.49	0.00073	2.26	3946.41	761.5	0.13
Reach 1	18610.39	50 yr	10637	146	163.42	156.21	163.49	0.00066	2.57	6318.75	811.38	0.13
Reach 1	18610.39	100 yr	13339	146	164.78	156.21	164.86	0.000654	2.74	7441.36	843.04	0.13
Reach 1	17427.55	10 yr	5891	146	159.32		159.41	0.001175	2.55	2724.9	465.09	0.16
Reach 1	17427.55	50 yr	10637	146	162.37		162.49	0.001116	3.07	4186.1	495.59	0.16
Reach 1	17427.55	100 yr	13339	146	163.71		163.86	0.001132	3.34	4856.02	500.85	0.17
Reach 1	16506.49	10 yr	5891	146	158.82	153.58	158.84	0.00036	1.47	5614.64	858.46	0.09
Reach 1	16506.49	50 yr	10637	146	161.85	154	161.88	0.000409	1.91	8419.31	999.23	0.1
Reach 1	16506.49	100 yr	13339	146	163.21	154	163.24	0.000402	2.04	9783.88	1006.26	0.1
Reach 1	15082.54	10 yr	5891	146	158.11		158.17	0.000637	2.08	3564.25	760.42	0.12
Reach 1	15082.54	50 yr	10637	146	161.08		161.16	0.000628	2.48	5909.91	873.49	0.12
Reach 1	15082.54	100 yr	13339	146	162.45		162.53	0.000618	2.64	7164.11	938.47	0.13
Reach 1	14205	10 yr	5891	146	157.34	150.09	157.42	0.001208	2.98	3223.89	562.08	0.17
Reach 1	14205	50 yr	10637	146	160.33	153.3	160.43	0.001153	3.47	5022.28	636.54	0.17
Reach 1	14205	100 yr	13339	146	161.7	153.89	161.81	0.001134	3.68	5931.35	679.08	0.17
Reach 1	13144.96	10 yr	5891	146	156.36	150.22	156.42	0.000741	2.26	3485.4	502.25	0.13
Reach 1	13144.96	50 yr	10637	146	159.32	151.6	159.41	0.00081	2.83	4979.23	509.02	0.14
Reach 1	13144.96	100 yr	13339	146	160.65	152.16	160.76	0.000874	3.15	5695.81	616.1	0.15
Reach 1	11937.65	10 yr	5891	146	155.48	150.8	155.52	0.000757	1.93	4613.13	1026.02	0.13
Reach 1	11937.65	50 yr	10637	146	158.6	152.04	158.64	0.000508	2	7922.26	1086.04	0.11
Reach 1	11937.65	100 yr	13339	146	159.95	152.41	159.99	0.000473	2.09	9392.05	1090.75	0.11

Reach 1	11143.64	10 yr	5891	146	155.03	149.71	155.06	0.000455	1.59	5241.02	911.93	0.1
Reach 1	11143.64	50 yr	10637	146	158.26	150.07	158.29	0.000374	1.8	8182.26	911.93	0.09
Reach 1	11143.64	100 yr	13339	146	159.62	150.07	159.66	0.000376	1.95	9421.44	911.93	0.1
Reach 1	10738.33	10 yr	5891	146	154.9	148.52	154.92	0.000259	1.18	5883.72	971.04	0.07
Reach 1	10738.33	50 yr	10637	146	158.15	149.3	158.17	0.000228	1.4	9139.3	1019.34	0.07
Reach 1	10738.33	100 yr	13339	146	159.51	149.68	159.54	0.000232	1.52	10523.49	1019.34	0.08
Reach 1	9866.886	10 yr	5891	146	154.6		154.63	0.000444	1.5	4199.23	651.62	0.1
Reach 1	9866.886	50 yr	10637	146	157.86		157.91	0.000408	1.83	6509.09	778.69	0.1
Reach 1	9866.886	100 yr	13339	146	159.21		159.27	0.000418	2	7586.92	815.42	0.1
Reach 1	9171.781	10 yr	5891	146	154.23	148.56	154.26	0.000665	1.77	4267.63	621.2	0.12
Reach 1	9171.781	50 yr	10637	146	157.53	149.33	157.57	0.000594	2.16	6324.08	625.77	0.12
Reach 1	9171.781	100 yr	13339	146	158.86	149.68	158.92	0.000621	2.39	7163.15	633.52	0.12
Reach 1	8187.326	10 yr	5891	146	153.42	148.75	153.48	0.000964	1.83	3225.04	637.49	0.14
Reach 1	8187.326	50 yr	10637	146	156.97	149.58	157.02	0.000535	1.88	6401.53	943.51	0.11
Reach 1	8187.326	100 yr	13339	146	158.31	149.99	158.37	0.000503	2	7690.98	969.21	0.11
Reach 1	7303.347	10 yr	5891	146	152.76		152.8	0.000616	1.54	4064.12	903.16	0.11
Reach 1	7303.347	50 yr	10637	146	156.62		156.65	0.000322	1.54	8021.08	1068.48	0.09
Reach 1	7303.347	100 yr	13339	146	157.98		158.02	0.00031	1.65	9477.98	1068.48	0.09
Reach 1	6470.493	10 yr	5891	142	152.4	146.04	152.41	0.000348	1.4	6234.58	954	0.09
Reach 1	6470.493	50 yr	10637	142	156.4	147.39	156.42	0.000247	1.54	10134.95	1010.16	0.08
Reach 1	6470.493	100 yr	13339	142	157.76	147.69	157.78	0.000265	1.71	11534.79	1053.41	0.08
Reach 1	5530.472	10 yr	5891	142	152.02	146.51	152.05	0.000436	1.45	5290.34	983.88	0.09
Reach 1	5530.472	50 yr	10637	142	156.15	147.59	156.18	0.00026	1.51	9590.88	1199.8	0.08
Reach 1	5530.472	100 yr	13339	142	157.5	148.2	157.53	0.000271	1.66	11317.91	1367.4	0.08
Reach 1	4587.731	10 yr	5891	142	151.6		151.62	0.000472	1.67	5352.53	941.75	0.1
Reach 1	4587.731	50 yr	10637	142	155.91		155.93	0.000257	1.62	9648.01	1069.88	0.08
Reach 1	4587.731	100 yr	13339	142	157.24		157.27	0.000268	1.77	11133.87	1158.82	0.08
Reach 1	3812.865	10 yr	5891	142	151.22		151.25	0.000505	1.79	5730.23	1066.71	0.11
Reach 1	3812.865	50 yr	10637	142	155.72		155.74	0.000248	1.65	11002.08	1436.95	0.08
Reach 1	3812.865	100 yr	13339	142	157.05		157.07	0.000254	1.78	13064.28	1573.57	0.08
Reach 1	2830.46	10 yr	5891	142	150.8		150.82	0.000378	1.53	5688.46	959.93	0.09
Reach 1	2830.46	50 yr	10637	142	155.49		155.51	0.00021	1.52	10421.08	1106.14	0.07
Reach 1	2830.46	100 yr	13339	142	156.81		156.83	0.000225	1.67	11935.56	1161.16	0.08
Reach 1	1704.934	10 yr	5891	142	150.45	143.86	150.47	0.000259	1.1	5353.02	1361.43	0.07
Reach 1	1704.934	50 yr	10637	142	155.34	144.59	155.35	0.000099	0.94	13252.53	1630.58	0.05
Reach 1	1704.934	100 yr	13339	142	156.65	144.96	156.66	0.000105	1.04	15109.12	1732.45	0.05
Reach 1	699.9124	10 yr	5891	128	150.4	133.72	150.4	0.000026	0.66	15420.79	1404.65	0.03
Reach 1	699.9124	50 yr	10637	128	155.3	134.86	155.3	0.000028	0.79	22303.58	1404.65	0.03
Reach 1	699.9124	100 yr	13339	128	156.6	134.86	156.61	0.000034	0.91	24129.63	1404.65	0.03
HEC-RAS PLAN: PROPOSED NO PONDS RIVER: MILL CREEK REACH: REACH 1												
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach 1	174507	10 yr	2338.1	296	307.52	302.36	307.65	0.002042	3.25	990.32	556.97	0.2
Reach 1	174507	50 yr	4290.3	296	308.94	304.5	309.08	0.002221	3.79	2225.88	790.98	0.22
Reach 1	174507	100 yr	5399.3	296	309.56	305.78	309.71	0.00231	4.03	2747.59	882.35	0.23
Reach 1	173479.3	10 yr	2338.1	296	305.56	301.18	305.64	0.001834	2.72	1473.3	757.16	0.19
Reach 1	173479.3	50 yr	4290.3	296	306.79	302.88	306.89	0.002023	3.21	2490.47	868.34	0.2
Reach 1	173479.3	100 yr	5399.3	296	307.38	303.64	307.48	0.002013	3.36	3010.3	892.58	0.21
Reach 1	172871.7	10 yr	2338.1	296	303.71	300.82	303.86	0.005336	3.51	822.22	355.62	0.3

Reach 1	172871.7	50 yr	4290.3	296	305.47	302.79	305.55	0.002415	2.96	2698.77	1048.2	0.21
Reach 1	172871.7	100 yr	5399.3	296	306.24	303.61	306.3	0.001854	2.81	3518.86	1084.44	0.19
Reach 1	171232.7	10 yr	2338.1	290	301.76	293.95	301.81	0.000534	2.09	2041.31	626.2	0.11
Reach 1	171232.7	50 yr	4290.3	290	303.79	295.3	303.84	0.000571	2.42	3349.4	655.59	0.12
Reach 1	171232.7	100 yr	5399.3	290	304.54	295.9	304.61	0.000655	2.7	3863.69	718.83	0.13
Reach 1	170298.1	10 yr	2338.1	290	300.68	295.86	300.84	0.002637	3.71	1120.38	555.81	0.23
Reach 1	170298.1	50 yr	4290.3	290	302.91	298.49	303.01	0.001565	3.36	2690.12	771.4	0.18
Reach 1	170298.1	100 yr	5399.3	290	303.62	299.09	303.71	0.001506	3.44	3239.09	776.43	0.18
Reach 1	169304.9	10 yr	2338.1	286	298.39		298.52	0.002081	2.9	807.31	123.34	0.2
Reach 1	169304.9	50 yr	4290.3	286	300.74		300.92	0.002929	3.5	1477.65	679.92	0.24
Reach 1	169304.9	100 yr	5399.3	286	301.57		301.76	0.00266	3.61	2178.37	1016.93	0.23
Reach 1	168301.8	10 yr	2338.1	286	296.62	291.75	296.71	0.001557	2.81	1246.93	478.47	0.18
Reach 1	168301.8	50 yr	4290.3	286	298.65	293.78	298.77	0.001617	3.35	1949.33	532.68	0.19
Reach 1	168301.8	100 yr	5399.3	286	299.48	294.48	299.62	0.001728	3.66	2245.97	570.12	0.2
Reach 1	167268.9	10 yr	2338.1	284	294.61		294.75	0.00236	3.04	807.7	262.77	0.21
Reach 1	167268.9	50 yr	4290.3	284	296.63		296.8	0.00227	3.59	1765.6	588.84	0.22
Reach 1	167268.9	100 yr	5399.3	284	297.5		297.66	0.002085	3.68	2282.66	600.01	0.21
Reach 1	166274.1	10 yr	2338.1	282.69	293.49	286.22	293.54	0.000716	1.85	1260.66	352.89	0.12
Reach 1	166274.1	50 yr	4290.3	282.69	295.53	287.48	295.59	0.000727	2.15	2670.76	562.26	0.13
Reach 1	166274.1	100 yr	5399.3	282.69	296.38	288.09	296.45	0.000775	2.36	3168.21	599.65	0.13
Reach 1	165453.1	10 yr	2338.1	280	292.65	286.63	292.73	0.00143	2.45	1196.4	393.22	0.17
Reach 1	165453.1	50 yr	4290.3	280	294.64	288.74	294.75	0.001514	3	2084.28	526.44	0.18
Reach 1	165453.1	100 yr	5399.3	280	295.42	289.7	295.55	0.001635	3.3	2543.05	648.86	0.19
Reach 1	164294.3	10 yr	2338.1	276	290.97	283.34	291.06	0.001453	2.66	1259.85	488.56	0.17
Reach 1	164294.3	50 yr	4290.3	276	293.09	285.78	293.18	0.001217	2.87	2529.36	644.48	0.16
Reach 1	164294.3	100 yr	5399.3	276	293.75	286.8	293.85	0.001305	3.1	2957.93	649.24	0.17
Reach 1	163291.2	10 yr	2338.1	276	289.35	282.07	289.48	0.001718	2.97	922.46	213.7	0.19
Reach 1	163291.2	50 yr	4290.3	276	291.53	284.41	291.69	0.001827	3.6	2151.1	918.83	0.2
Reach 1	163291.2	100 yr	5399.3	276	292.09	285.58	292.26	0.00194	3.85	2680.49	1041.46	0.21
Reach 1	162285	10 yr	2338.1	274	287.33	279.65	287.47	0.002338	2.98	783.69	161.02	0.21
Reach 1	162285	50 yr	4290.3	274	289.25	281.94	289.42	0.002862	3.53	1904.81	1231.53	0.24
Reach 1	162285	100 yr	5399.3	274	289.89	282.97	290.03	0.002531	3.52	2723.72	1321.22	0.23
Reach 1	161278.1	10 yr	2338.1	270	285.45		285.56	0.001554	2.87	1134.13	563.83	0.18
Reach 1	161278.1	50 yr	4290.3	270	287.19		287.32	0.001575	3.29	2288.39	689.26	0.18
Reach 1	161278.1	100 yr	5399.3	270	287.91		288.03	0.001592	3.47	2782.85	699.68	0.19
Reach 1	160286	10 yr	2338.1	270	284.21	276.25	284.29	0.001058	2.48	1498.65	743.1	0.15
Reach 1	160286	50 yr	4290.3	270	285.98	278.7	286.06	0.001034	2.78	3038.58	996.55	0.15
Reach 1	160286	100 yr	5399.3	270	286.72	279.81	286.8	0.00098	2.83	3795.87	1026.06	0.15
Reach 1	159266.2	10 yr	2338.1	270	282.76	276.33	282.85	0.002001	2.42	1005.42	424.86	0.19
Reach 1	159266.2	50 yr	4290.3	270	284.67	279.58	284.76	0.001595	2.61	2473.42	954.75	0.18
Reach 1	159266.2	100 yr	5399.3	270	285.57	280.24	285.65	0.001298	2.56	3379.37	1052.39	0.16
Reach 1	158273.3	10 yr	2338.1	266	280.11	273.1	280.25	0.003537	3.07	761.31	179.47	0.25
Reach 1	158273.3	50 yr	4290.3	266	282.07	275.74	282.31	0.004262	3.95	1085.97	273.3	0.28
Reach 1	158273.3	100 yr	5399.3	266	282.97	276.73	283.25	0.005864	4.23	1275.83	411.49	0.33
Reach 1	157283.5	10 yr	2338.1	266	279.64		279.65	0.000222	1.05	2308.91	439.51	0.07
Reach 1	157283.5	50 yr	4290.3	266	281.38		281.42	0.000346	1.5	3175.88	517.35	0.09
Reach 1	157283.5	100 yr	5399.3	266	282.12		282.16	0.000412	1.73	3561.21	555.14	0.1
Reach 1	157091.2	10 yr	2338.1	266	279.55	270.51	279.59	0.0005	1.59	1613.9	416	0.1
Reach 1	157091.2	50 yr	4290.3	266	281.24	272.21	281.31	0.000733	2.2	2426.95	502.11	0.13

Reach 1	157091.2	100 yr	5399.3	266	281.95	273.03	282.04	0.000843	2.48	2789.46	542.18	0.14
Reach 1	156934.3		Bridge									
Reach 1	156834.3	10 yr	2338.1	266	279.21	272.4	279.29	0.001525	2.34	1321.74	408.87	0.17
Reach 1	156834.3	50 yr	4290.3	266	280.86	275.25	280.95	0.001874	2.76	2304.33	832.48	0.19
Reach 1	156834.3	100 yr	5399.3	266	281.55	276.2	281.63	0.001941	2.79	2896.48	886.48	0.19
Reach 1	156735.2	10 yr	2338.1	266	279.09	272.39	279.15	0.001093	2.11	1536.35	544.21	0.15
Reach 1	156735.2	50 yr	4290.3	266	280.71	274.46	280.79	0.001217	2.58	2538.45	760.7	0.16
Reach 1	156735.2	100 yr	5399.3	266	281.39	275.36	281.48	0.001292	2.81	2986.65	895.09	0.17
Reach 1	155914.3	10 yr	2338.1	264	278.25	270.76	278.31	0.000956	2.22	1743.08	683.15	0.14
Reach 1	155914.3	50 yr	4290.3	264	279.71	272.92	279.79	0.001214	2.8	2753.29	956.22	0.16
Reach 1	155914.3	100 yr	5399.3	264	280.32	273.93	280.41	0.001313	3.04	3231.07	1015.12	0.17
Reach 1	155053.7	10 yr	2338.1	264	277.45	269.3	277.51	0.000907	2.24	1528.02	773.16	0.13
Reach 1	155053.7	50 yr	4290.3	264	278.67	271.91	278.72	0.001247	2.47	3353.48	1368.76	0.16
Reach 1	155053.7	100 yr	5399.3	264	279.26	273.02	279.31	0.001206	2.55	4179.42	1422.65	0.16
Reach 1	154269	10 yr	2338.1	264	276.6	269.45	276.68	0.001239	2.42	1257.02	1058.76	0.16
Reach 1	154269	50 yr	4290.3	264	277.79	271.62	277.85	0.001003	2.41	3451.26	1106.69	0.15
Reach 1	154269	100 yr	5399.3	264	278.38	273.09	278.43	0.001043	2.56	4110.25	1156.69	0.15
Reach 1	153259.5	10 yr	2338.1	264	275.47	270.22	275.49	0.001093	1.51	2112.27	767.31	0.13
Reach 1	153259.5	50 yr	4290.3	264	276.68	273.91	276.72	0.001245	1.93	3091.88	822.04	0.15
Reach 1	153259.5	100 yr	5399.3	264	277.21	274.29	277.25	0.00133	2.13	3523.13	827.74	0.16
Reach 1	152248.4	10 yr	2338.1	260	274.2	266.46	274.25	0.001381	2.03	1976.42	1278.97	0.16
Reach 1	152248.4	50 yr	4290.3	260	275.44	268.59	275.48	0.001214	2.19	3845.27	1697.14	0.15
Reach 1	152248.4	100 yr	5399.3	260	275.99	269.6	276.03	0.001102	2.21	4801.5	1759.56	0.15
Reach 1	151251.5	10 yr	2338.1	260	272.83	268.7	272.84	0.001424	1.43	2391.99	1070.27	0.15
Reach 1	151251.5	50 yr	4290.3	260	274.32	272	274.34	0.001066	1.62	4115.88	1382.7	0.13
Reach 1	151251.5	100 yr	5399.3	260	274.97	272	275	0.000962	1.68	5094.72	1544.05	0.13
Reach 1	150269.6	10 yr	2338.1	260	269.89	265.08	270.17	0.006926	4.29	545.22	579.58	0.35
Reach 1	150269.6	50 yr	4290.3	260	271.29	267.21	271.85	0.011086	5.97	718.48	1093.37	0.45
Reach 1	150269.6	100 yr	5399.3	260	271.91	268.55	272.61	0.0126	6.74	815.22	1491.19	0.48
Reach 1	149285.9	10 yr	2338.1	260	269.08	265.28	269.09	0.000392	1.16	3636.68	1124.94	0.08
Reach 1	149285.9	50 yr	4290.3	260	269.9	265.93	269.92	0.000708	1.7	4628.58	1297.91	0.12
Reach 1	149285.9	100 yr	5399.3	260	270.34	266	270.36	0.000825	1.91	5203.55	1428.96	0.13
Reach 1	148288.1	10 yr	2338.1	260	268.58	265.58	268.59	0.000668	1.07	3182.89	1633.01	0.1
Reach 1	148288.1	50 yr	4290.3	260	268.93	266.22	268.95	0.001413	1.66	4088.4	2148.44	0.15
Reach 1	148288.1	100 yr	5399.3	260	269.24	266.58	269.27	0.001533	1.82	4759.52	2148.44	0.16
Reach 1	147249.2	10 yr	2338.1	260	268.35	264.14	268.35	0.000111	0.59	6001.26	1842.32	0.05
Reach 1	147249.2	50 yr	4290.3	260	268.19	264.63	268.2	0.000436	1.13	5701.28	1837.9	0.09
Reach 1	147249.2	100 yr	5399.3	260	268.27	264.9	268.29	0.00064	1.39	5848.71	1840.07	0.11
Reach 1	146260.1	10 yr	2338.1	260	268.28	263.48	268.29	0.000047	0.43	8178.81	1658.58	0.03
Reach 1	146260.1	50 yr	4290.3	260	267.91	263.49	267.91	0.000205	0.86	7558.08	1646.1	0.06
Reach 1	146260.1	100 yr	5399.3	260	267.82	264.09	267.83	0.000345	1.11	7415.23	1645.52	0.08
Reach 1	145874.1	10 yr	2338.1	260.75	268.26	266.36	268.26	0.000119	0.47	6050.88	1508.66	0.04
Reach 1	145874.1	50 yr	4290.3	260.75	267.78	267.28	267.79	0.000606	0.95	5330.35	1499.23	0.1
Reach 1	145874.1	100 yr	5399.3	260.75	267.59	267.43	267.61	0.001143	1.25	5050.34	1495.34	0.13
Reach 1	145588.1	10 yr	2338.1	260.73	266.26	266.26	267.96	0.063805	10.48	223.05	1369.43	1
Reach 1	145588.1	50 yr	4290.3	260.73	267.62	266.97	267.63	0.000478	1.06	5804.1	1579.14	0.09
Reach 1	145588.1	100 yr	5399.3	260.73	267.28	267.05	267.3	0.001036	1.48	5259.3	1572.93	0.13
Reach 1	145309.5	10 yr	2338.1	260	266.06		266.06	0.000477	1.23	4077.38	1712.32	0.09

Reach 1	145309.5	50 yr	4290.3	260	267.51		267.52	0.000354	1.24	6571.43	1718.51	0.08
Reach 1	145309.5	100 yr	5399.3	260	267.01		267.03	0.000876	1.85	5716.57	1716.52	0.13
Reach 1	145209.5	10 yr	2338.1	260.26	264.73	264.73	265.8	0.072378	8.28	282.22	1234.71	1
Reach 1	145209.5	50 yr	4290.3	260.26	265.92	265.92	267.26	0.067766	9.31	460.98	1579.97	1
Reach 1	145209.5	100 yr	5399.3	260.26	266.22	266.22	266.72	0.03318	6.64	1084.73	1655.09	0.7
Reach 1	144909.5	10 yr	2338.1	259.6	264.67	262.73	264.67	0.000302	0.64	4312.48	1965.35	0.07
Reach 1	144909.5	50 yr	4290.3	259.6	264.87	263.47	264.88	0.000838	1.1	4589.57	1990.35	0.11
Reach 1	144909.5	100 yr	5399.3	259.6	264.94	263.79	264.95	0.000746	1.05	6364.19	1997.78	0.11
Reach 1	144593.5	10 yr	2338.1	259.41	264.57	264.57	264.58	0.000311	0.68	4134.78	1759.08	0.07
Reach 1	144593.5	50 yr	4290.3	259.41	264.57	264.57	264.59	0.001046	1.24	4134.74	1759.08	0.13
Reach 1	144593.5	100 yr	5399.3	259.41	264.58	264.58	264.61	0.001643	1.56	4146.44	1762.24	0.16
Reach 1	144307.8	10 yr	2338.1	260	263.41	261.6	263.41	0.000183	0.48	6128.48	2065.17	0.05
Reach 1	144307.8	50 yr	4290.3	260	263.34	261.59	263.37	0.002539	1.78	3082.54	2051.65	0.19
Reach 1	144307.8	100 yr	5399.3	260	263.73	261.59	263.74	0.000717	0.86	6794.2	2124.95	0.1
Reach 1	143302.5	10 yr	2338.1	256	263.11	262	263.11	0.00017	0.7	5501.25	1817.53	0.05
Reach 1	143302.5	50 yr	4290.3	256	262.56	262	262.57	0.000969	1.55	4668.73	1782.59	0.13
Reach 1	143302.5	100 yr	5399.3	256	262.82	262.01	262.84	0.001181	1.78	5064.74	1799.31	0.14
Reach 1	142295.6	10 yr	2338.1	254	260.42	260.16	262.3	0.052886	11.03	212.01	1482.88	0.93
Reach 1	142295.6	50 yr	4290.3	254	261.96	261.96	261.97	0.000394	0.75	6020.56	1575.56	0.08
Reach 1	142295.6	100 yr	5399.3	254	261.97	261.96	261.98	0.00062	0.94	6035.66	1576.35	0.1
Reach 1	140841.3	10 yr	2338.1	254	260.76	258.54	260.77	0.000188	0.55	5125.87	1592.89	0.05
Reach 1	140841.3	50 yr	4290.3	254	260.45	259.03	260.46	0.00088	1.11	4620.41	1587.63	0.12
Reach 1	140841.3	100 yr	5399.3	254	260.91	259.27	260.93	0.000867	1.22	5361.22	1595.07	0.12
Reach 1	139478.8	10 yr	2338.1	250	257.7	257.7	259.66	0.062075	11.21	208.61	964	1
Reach 1	139478.8	50 yr	4290.3	250	258.88	258	258.91	0.001568	2.1	3670.37	1475.14	0.16
Reach 1	139478.8	100 yr	5399.3	250	259.39	258.01	259.42	0.001482	2.18	4446.5	1570.61	0.16
Reach 1	137957	10 yr	2338.1	250	256.62		256.63	0.000417	0.83	3697.76	1341.34	0.08
Reach 1	137957	50 yr	4290.3	250	257.64		257.65	0.000507	1.09	5065.51	1346.27	0.09
Reach 1	137957	100 yr	5399.3	250	258.12		258.14	0.000543	1.22	5715.97	1354.56	0.1
Reach 1	136943.4	10 yr	2338.1	250	255.76		255.8	0.002296	2.64	2299.33	1461.38	0.2
Reach 1	136943.4	50 yr	4290.3	250	256.74		256.77	0.001807	2.62	3735.39	1471.69	0.19
Reach 1	136943.4	100 yr	5399.3	250	257.21		257.24	0.001674	2.65	4431.83	1473.91	0.18
Reach 1	135924.9	10 yr	2338.1	248	254.65	254	254.66	0.00066	1.2	3643.45	1566.12	0.1
Reach 1	135924.9	50 yr	4290.3	248	255.67	254	255.68	0.000698	1.44	5296.36	1632.06	0.11
Reach 1	135924.9	100 yr	5399.3	248	256.18	254.01	256.19	0.000696	1.53	6124.97	1644.78	0.11
Reach 1	134950.8	10 yr	2338.1	248	253.56	251.36	253.59	0.002156	1.95	1855.28	726.47	0.19
Reach 1	134950.8	50 yr	4290.3	248	254.42	251.78	254.47	0.002861	2.61	2488.63	746.26	0.22
Reach 1	134950.8	100 yr	5399.3	248	254.91	251.78	254.97	0.002937	2.84	2853.92	756.96	0.23
Reach 1	134000.7	10 yr	2338.1	248	253	252	253.01	0.000281	0.75	4579.41	1449.17	0.07
Reach 1	134000.7	50 yr	4290.3	248	252.83	252	252.85	0.001118	1.45	4338.03	1444.08	0.13
Reach 1	134000.7	100 yr	5399.3	248	253.3	252	253.32	0.001132	1.59	5009.4	1458.2	0.14
Reach 1	132978.5	10 yr	2338.1	244	251.52	249.45	252.06	0.015112	5.9	396.12	1632.34	0.51
Reach 1	132978.5	50 yr	4290.3	244	251.89	251.29	251.91	0.000779	1.28	4895.47	1663.53	0.11
Reach 1	132978.5	100 yr	5399.3	244	252.39	251.88	252.4	0.000726	1.31	6047.79	1701.51	0.11
Reach 1	131987.2	10 yr	2338.1	244	250.13		250.14	0.000645	1.33	3719.28	1740.59	0.11
Reach 1	131987.2	50 yr	4290.3	244	251.22		251.23	0.000598	1.47	5616.51	1750.42	0.11
Reach 1	131987.2	100 yr	5399.3	244	251.74		251.75	0.000587	1.54	6532.95	1760.48	0.11
Reach 1	130964.6	10 yr	2338.1	244	249.16	247.69	249.18	0.001544	1.55	2373.88	1108.19	0.16
Reach 1	130964.6	50 yr	4290.3	244	250.34	247.96	250.36	0.001319	1.78	3733.95	1183.77	0.15

Reach 1	130964.6	100 yr	5399.3	244	250.89	247.96	250.92	0.001242	1.87	4390.7	1187.67	0.15
Reach 1	129697	10 yr	2338.1	240	247.81	246	247.82	0.000781	1.68	2993.78	1240.24	0.12
Reach 1	129697	50 yr	4290.3	240	249.18	246.15	249.2	0.000671	1.79	4722.11	1276.99	0.12
Reach 1	129697	100 yr	5399.3	240	249.75	246.15	249.77	0.00068	1.89	5459.69	1291.43	0.12
Reach 1	128641.7	10 yr	2338.1	240	246.87	245.79	246.89	0.001001	1.52	2437.76	801.25	0.13
Reach 1	128641.7	50 yr	4290.3	240	248.24	246	248.27	0.00117	1.99	3680.57	1020.46	0.15
Reach 1	128641.7	100 yr	5399.3	240	248.81	246	248.84	0.001157	2.11	4263.62	1026.02	0.15
Reach 1	127244	10 yr	2338.1	238	245.15	243.32	245.18	0.001534	2.18	2044.45	800.92	0.17
Reach 1	127244	50 yr	4290.3	238	246.28	243.89	246.33	0.001682	2.6	2960.67	813.67	0.18
Reach 1	127244	100 yr	5399.3	238	246.84	244.16	246.89	0.001712	2.77	3421.23	824.71	0.19
Reach 1	126289.9	10 yr	2338.1	238	243.72	242.01	243.74	0.001509	1.96	2398.22	1149.26	0.16
Reach 1	126289.9	50 yr	4290.3	238	244.96	242.1	244.98	0.00121	2.06	3837.1	1169.76	0.15
Reach 1	126289.9	100 yr	5399.3	238	245.56	242.1	245.59	0.00113	2.13	4548.88	1181.32	0.15
Reach 1	124780.6	10 yr	2338.1	234	242.03		242.05	0.000867	1.84	2530.97	871.49	0.13
Reach 1	124780.6	50 yr	4290.3	234	243.37		243.4	0.000914	2.15	3715.36	889.3	0.14
Reach 1	124780.6	100 yr	5399.3	234	244.01		244.04	0.000934	2.29	4283.24	897.48	0.14
Reach 1	123738.1	10 yr	2338.1	234	241.09		241.1	0.000953	1.68	2687.1	966.64	0.13
Reach 1	123738.1	50 yr	4290.3	234	242.4		242.42	0.000951	1.95	3981	1013.68	0.14
Reach 1	123738.1	100 yr	5399.3	234	243.02		243.04	0.000969	2.1	4620.11	1051.7	0.14
Reach 1	122650.8	10 yr	2338.1	234	240.19		240.21	0.000708	1.44	2692.19	1046.82	0.11
Reach 1	122650.8	50 yr	4290.3	234	241.5		241.53	0.000721	1.7	4066.79	1055.94	0.12
Reach 1	122650.8	100 yr	5399.3	234	242.1		242.13	0.000744	1.83	4696.98	1068.34	0.12
Reach 1	121693	10 yr	2338.1	234	239.49	236.58	239.5	0.000788	1.35	2976.37	1187.81	0.12
Reach 1	121693	50 yr	4290.3	234	240.83	237.26	240.85	0.000687	1.52	4612.69	1236.32	0.11
Reach 1	121693	100 yr	5399.3	234	241.42	237.59	241.44	0.000685	1.63	5343.61	1253.64	0.12
Reach 1	120667.8	10 yr	2338.1	230.54	238.66	235.03	238.69	0.000796	1.68	2342.03	764.02	0.12
Reach 1	120667.8	50 yr	4290.3	230.54	239.97	236.09	240	0.001009	2.17	3406.17	875.23	0.14
Reach 1	120667.8	100 yr	5399.3	230.54	240.53	236.48	240.58	0.001072	2.36	3903.49	882.17	0.15
Reach 1	119080	10 yr	2338.1	230	236.01	234.32	236.12	0.00482	3.58	1211.52	688.04	0.29
Reach 1	119080	50 yr	4290.3	230	237.31	235.17	237.39	0.003117	3.4	2541.95	960.95	0.25
Reach 1	119080	100 yr	5399.3	230	238.01	235.55	238.08	0.002482	3.26	3224.16	987.03	0.22
Reach 1	118001.1	10 yr	2338.1	228	234.81	232	234.82	0.000521	1.33	3492.49	1276.98	0.1
Reach 1	118001.1	50 yr	4290.3	228	236.35	232.58	236.36	0.000442	1.44	5481.38	1328.35	0.1
Reach 1	118001.1	100 yr	5399.3	228	237.14	232.85	237.15	0.000422	1.51	6563.15	1428.11	0.09
Reach 1	116862.3	10 yr	2338.1	228	233.94	230.74	233.97	0.001146	1.64	1818.73	637.91	0.14
Reach 1	116862.3	50 yr	4290.3	228	235.59	231.77	235.64	0.001003	1.92	2934.01	687.52	0.14
Reach 1	116862.3	100 yr	5399.3	228	236.4	231.77	236.45	0.000982	2.07	3502.33	731.85	0.14
Reach 1	115784.5	10 yr	2338.1	228	232.97	229.71	232.99	0.00073	1.3	1992.03	534.57	0.11
Reach 1	115784.5	50 yr	4290.3	228	234.68	230.34	234.71	0.000736	1.64	2923.98	555.71	0.12
Reach 1	115784.5	100 yr	5399.3	228	235.48	230.62	235.52	0.000752	1.8	3374.49	572.57	0.12
Reach 1	114617.3	10 yr	2338.1	224	232.3	228.11	232.31	0.000475	1.39	2782.01	618.54	0.09
Reach 1	114617.3	50 yr	4290.3	224	233.91	228.11	233.93	0.000605	1.81	3817.32	665.61	0.11
Reach 1	114617.3	100 yr	5399.3	224	234.68	228.11	234.71	0.000646	1.98	4332.39	674.23	0.12
Reach 1	112591.1	10 yr	2338.1	220	230.43	227.53	230.5	0.002219	2.82	1623.83	755	0.2
Reach 1	112591.1	50 yr	4290.3	220	231.93	229.51	231.99	0.001721	2.88	2761.66	762.49	0.19
Reach 1	112591.1	100 yr	5399.3	220	232.68	229.83	232.74	0.001605	2.96	3341.61	796.68	0.18
Reach 1	111434.1	10 yr	2338.1	220	229.29	225.83	229.3	0.000582	1.43	3318.88	1212.31	0.1
Reach 1	111434.1	50 yr	4290.3	220	231.14	225.83	231.15	0.000387	1.4	5591.31	1238.43	0.09
Reach 1	111434.1	100 yr	5399.3	220	231.93	227.27	231.95	0.000366	1.45	6577.89	1245.22	0.09

Reach 1	110204.6	10 yr	2338.1	218	228.78	225.57	228.79	0.000317	1.2	4070.63	1287.61	0.08
Reach 1	110204.6	50 yr	4290.3	218	230.78	226.7	230.79	0.000231	1.21	6710.18	1337.5	0.07
Reach 1	110204.6	100 yr	5399.3	218	231.59	227.07	231.59	0.000228	1.27	7791.65	1343.68	0.07
Reach 1	109036.8	10 yr	2576.6	218	227.93	223.6	228.03	0.001638	3.16	1440.41	461.98	0.19
Reach 1	109036.8	50 yr	4716.9	218	230.06	225.11	230.17	0.001725	3.75	2781.08	790.09	0.2
Reach 1	109036.8	100 yr	5932.3	218	230.9	225.65	231	0.001584	3.77	3475.28	860.75	0.19
Reach 1	108031.1	10 yr	2576.6	214	226.5	220.42	226.59	0.001264	2.9	1492.51	442.08	0.16
Reach 1	108031.1	50 yr	4716.9	214	228.35	222.19	228.48	0.001637	3.71	2373.46	576.41	0.19
Reach 1	108031.1	100 yr	5932.3	214	229.07	223.51	229.23	0.001948	4.22	2860.07	768.03	0.21
Reach 1	107075.8	10 yr	2576.6	214	225.56	220.48	225.6	0.000842	2.07	2362.77	744.66	0.13
Reach 1	107075.8	50 yr	4716.9	214	227.14	223.03	227.2	0.001092	2.67	3847.95	1187.53	0.15
Reach 1	107075.8	100 yr	5932.3	214	227.76	224.09	227.82	0.001121	2.82	4621.63	1306.3	0.16
Reach 1	105740.9	10 yr	2576.6	210	223.87	218.7	223.97	0.001905	3.02	1629.85	880.03	0.19
Reach 1	105740.9	50 yr	4716.9	210	225.36	221.03	225.44	0.00161	3.13	3074.73	980.06	0.18
Reach 1	105740.9	100 yr	5932.3	210	225.97	222.48	226.06	0.001579	3.24	3680.46	986.17	0.18
Reach 1	105073.7	10 yr	2576.6	210	222.85	217.42	222.93	0.001286	2.79	1812	671.58	0.16
Reach 1	105073.7	50 yr	4716.9	210	224.31	220.18	224.39	0.001527	3.36	3084.66	999.37	0.18
Reach 1	105073.7	100 yr	5932.3	210	224.95	220.72	225.04	0.001489	3.46	3729.3	1003.37	0.18
Reach 1	104400.4	10 yr	2576.6	210	221.84	217.12	221.89	0.001826	2.25	1718.16	879.22	0.18
Reach 1	104400.4	50 yr	4716.9	210	223.35	220.11	223.39	0.001396	2.35	3471.4	1040.39	0.16
Reach 1	104400.4	100 yr	5932.3	210	224.04	220.98	224.09	0.001283	2.41	4207.91	1078.05	0.16
Reach 1	104005.1	10 yr	2576.6	210	221.31	217.31	221.35	0.001021	2.28	2230.44	729.43	0.14
Reach 1	104005.1	50 yr	4716.9	210	222.83	219.11	222.88	0.001201	2.78	3541.82	905.39	0.16
Reach 1	104005.1	100 yr	5932.3	210	223.54	219.51	223.59	0.001207	2.92	4209.12	969.12	0.16
Reach 1	103025.1	10 yr	2576.6	210	220.51	218.21	220.53	0.000693	1.73	3115.04	1054.72	0.11
Reach 1	103025.1	50 yr	4716.9	210	222	218.72	222.02	0.000661	1.92	4690.48	1064.18	0.12
Reach 1	103025.1	100 yr	5932.3	210	222.69	218.94	222.72	0.000681	2.05	5444.05	1106.11	0.12
Reach 1	101979.6	10 yr	2576.6	208	219.57	213.56	219.61	0.001121	2.07	2031.96	834.62	0.15
Reach 1	101979.6	50 yr	4716.9	208	221.09	215.47	221.15	0.001073	2.34	3466.01	963.99	0.15
Reach 1	101979.6	100 yr	5932.3	208	221.79	216.48	221.84	0.001039	2.44	4138.18	968.48	0.15
Reach 1	100998.5	10 yr	2576.6	208	218.62	214.36	218.64	0.000871	1.13	2760.89	920.26	0.11
Reach 1	100998.5	50 yr	4716.9	208	220.23	216	220.25	0.000779	1.42	4319.37	1014.82	0.12
Reach 1	100998.5	100 yr	5932.3	208	220.96	216.01	220.98	0.000742	1.53	5062.9	1021.16	0.12
Reach 1	100268.9	10 yr	2576.6	204	217.88	212.7	217.91	0.001121	1.8	2209.37	790.61	0.14
Reach 1	100268.9	50 yr	4716.9	204	219.57	214.71	219.61	0.000981	2.04	3699.71	948.05	0.14
Reach 1	100268.9	100 yr	5932.3	204	220.33	216.18	220.37	0.000924	2.13	4439.49	977.47	0.14
Reach 1	98606.43	10 yr	2576.6	204	216.33	211.3	216.36	0.000793	1.94	2517.7	823.27	0.13
Reach 1	98606.43	50 yr	4716.9	204	218.15	214.47	218.18	0.000755	2.19	4349.5	1152.09	0.13
Reach 1	98606.43	100 yr	5932.3	204	219.03	214.82	219.06	0.000674	2.2	5397.21	1218.83	0.12
Reach 1	97734.7	10 yr	2576.6	205.01	215.63		215.67	0.000777	2.04	2458.05	919.29	0.13
Reach 1	97734.7	50 yr	4716.9	205.01	217.54		217.57	0.000648	2.15	4354.35	1059.36	0.12
Reach 1	97734.7	100 yr	5932.3	205.01	218.48		218.52	0.000584	2.17	5385.68	1115.79	0.12
Reach 1	96250.23	10 yr	2576.6	202	214.28	208.77	214.33	0.001062	2.31	1899.26	557	0.15
Reach 1	96250.23	50 yr	4716.9	202	216.31	211.17	216.37	0.001038	2.66	3053.52	617.06	0.15
Reach 1	96250.23	100 yr	5932.3	202	217.3	212.01	217.37	0.001058	2.86	3726.89	730.13	0.15
Reach 1	95264.73	10 yr	2576.6	202	213.39	207.48	213.43	0.000792	1.88	2177.33	632.89	0.13
Reach 1	95264.73	50 yr	4716.9	202	215.5	210.06	215.54	0.000688	2.09	3624.14	701.51	0.12
Reach 1	95264.73	100 yr	5932.3	202	216.5	210.66	216.54	0.000676	2.22	4344.47	773.7	0.12

Reach 1	94258.65	10 yr	2576.6	202	212.86		212.87	0.000397	1.53	3236.06	733.53	0.09
Reach 1	94258.65	50 yr	4716.9	202	215.01		215.02	0.000389	1.75	4893.55	827.13	0.09
Reach 1	94258.65	100 yr	5932.3	202	216.02		216.04	0.000381	1.83	5757.44	881.14	0.09
Reach 1	93272.17	10 yr	4771.9	202	212.44	208.11	212.45	0.000448	1.34	5423.05	1251.34	0.09
Reach 1	93272.17	50 yr	8660.2	202	214.59	208.51	214.61	0.000437	1.61	8207.14	1317.99	0.1
Reach 1	93272.17	100 yr	10868	202	215.61	208.78	215.63	0.00043	1.72	9549.58	1324.79	0.1
Reach 1	92980.49	10 yr	4771.9	202	212.25	207.91	212.28	0.000713	1.88	4183.08	937.06	0.12
Reach 1	92980.49	50 yr	8660.2	202	214.4	208.96	214.44	0.000735	2.26	6295.46	1020.56	0.13
Reach 1	92980.49	100 yr	10868	202	215.42	209.29	215.46	0.000721	2.39	7336.5	1027.45	0.13
Reach 1	92829.37		Bridge									
Reach 1	92734.37	10 yr	4771.9	202	212.02	208.68	212.05	0.001052	2.15	3748.98	902.36	0.14
Reach 1	92734.37	50 yr	8660.2	202	214.18	209.4	214.22	0.000953	2.45	5773.48	974.29	0.14
Reach 1	92734.37	100 yr	10868	202	215.2	209.71	215.24	0.000919	2.59	6764.1	1031.73	0.14
Reach 1	92504.4	10 yr	4771.9	202	211.81	208.01	211.84	0.0008	1.87	4091.63	891.25	0.13
Reach 1	92504.4	50 yr	8660.2	202	213.98	208.58	214.02	0.000797	2.24	6097.15	962.79	0.13
Reach 1	92504.4	100 yr	10868	202	215	208.91	215.05	0.000786	2.39	7128.91	1057.51	0.13
Reach 1	91303.04	10 yr	4771.9	198	211.16		211.19	0.000385	1.69	4452.53	936.58	0.09
Reach 1	91303.04	50 yr	8660.2	198	213.22		213.27	0.000493	2.17	6458.46	1017.29	0.11
Reach 1	91303.04	100 yr	10868	198	214.23		214.28	0.000519	2.35	7484.61	1027.75	0.11
Reach 1	90295.13	10 yr	4771.9	198	210.37	206.75	210.45	0.00184	3.15	2786.57	793.89	0.2
Reach 1	90295.13	50 yr	8660.2	198	212.33	207.67	212.43	0.001722	3.53	4362.16	828.89	0.2
Reach 1	90295.13	100 yr	10868	198	213.31	208	213.41	0.001702	3.73	5207.18	894.9	0.2
Reach 1	89313.17	10 yr	4771.9	198	208.69	204.99	208.77	0.001603	2.62	2763.69	813.83	0.18
Reach 1	89313.17	50 yr	8660.2	198	210.83	206.21	210.91	0.001372	2.92	4574.24	867.56	0.17
Reach 1	89313.17	100 yr	10868	198	211.88	206.68	211.97	0.001272	3.03	5493.99	879.82	0.17
Reach 1	88360.79	10 yr	4771.9	195.92	207.75	202.56	207.79	0.000696	2.12	4080.35	1006.32	0.12
Reach 1	88360.79	50 yr	8660.2	195.92	209.96	203.97	210.01	0.000679	2.42	6435.56	1113.53	0.13
Reach 1	88360.79	100 yr	10868	195.92	211.07	204.44	211.12	0.000636	2.5	7683.16	1126.89	0.12
Reach 1	86946.23	10 yr	5444.7	194	207.05	203.04	207.07	0.000399	1.64	7027.26	1684.46	0.09
Reach 1	86946.23	50 yr	9831.6	194	209.33	203.75	209.35	0.000345	1.75	10988.79	1769.78	0.09
Reach 1	86946.23	100 yr	12324.4	194	210.5	204.11	210.51	0.000316	1.79	13060.54	1788.02	0.09
Reach 1	85763.68	10 yr	5444.7	194	206.29	202.8	206.33	0.001065	2.68	3958.01	863.87	0.15
Reach 1	85763.68	50 yr	9831.6	194	208.65	203.77	208.7	0.000984	2.98	6178.56	960.31	0.15
Reach 1	85763.68	100 yr	12324.4	194	209.86	204.14	209.92	0.000908	3.05	7350.06	970.81	0.15
Reach 1	84304.58	10 yr	5444.7	192	205.19	200.65	205.22	0.00057	1.85	5036.57	1058.67	0.11
Reach 1	84304.58	50 yr	9831.6	192	207.6	201.63	207.63	0.000561	2.16	7638.64	1123.67	0.11
Reach 1	84304.58	100 yr	12324.4	192	208.78	202.09	208.82	0.000627	2.44	9124.83	1368.73	0.12
Reach 1	83700.74	10 yr	5444.7	192	204.82	199.14	204.86	0.000621	1.99	3871.36	817.91	0.12
Reach 1	83700.74	50 yr	9831.6	192	207.22	200.69	207.27	0.00065	2.39	6442.41	1017.63	0.12
Reach 1	83700.74	100 yr	12324.4	192	208.38	201.11	208.44	0.000653	2.55	7669.2	1102.05	0.13
Reach 1	82541.44	10 yr	5444.7	192	203.95	198.87	204	0.000898	2.16	3857.79	1001.17	0.14
Reach 1	82541.44	50 yr	9831.6	192	206.4	200.35	206.46	0.000755	2.38	6362.25	1061.43	0.13
Reach 1	82541.44	100 yr	12324.4	192	207.59	200.79	207.65	0.000715	2.49	7650.96	1117.63	0.13
Reach 1	81753.13	10 yr	5444.7	192	203.33	197.61	203.36	0.000718	2.22	4326.55	827.99	0.13
Reach 1	81753.13	50 yr	9831.6	192	205.83	199.1	205.88	0.000712	2.58	6575.86	1006.46	0.13
Reach 1	81753.13	100 yr	12324.4	192	206.97	199.57	207.03	0.00084	2.98	7786.23	1110.27	0.14
Reach 1	80430.07	10 yr	5444.7	188	202.11	196	202.18	0.001137	2.88	3301.31	671.17	0.16
Reach 1	80430.07	50 yr	9831.6	188	204.59	198.75	204.68	0.001171	3.38	5136.56	788.48	0.17
Reach 1	80430.07	100 yr	12324.4	188	205.61	199.22	205.71	0.001201	3.61	5941.86	796.04	0.17

Reach 1	79347.86	10 yr	5444.7	188	201.1	195.96	201.15	0.000799	2.18	3970.3	991.34	0.13
Reach 1	79347.86	50 yr	9831.6	188	203.63	197.72	203.68	0.00073	2.48	7551.65	1523.23	0.13
Reach 1	79347.86	100 yr	12324.4	188	204.71	198	204.75	0.000652	2.49	9197.9	1532.35	0.13
Reach 1	78173.07	10 yr	5444.7	188	200.45	194.74	200.47	0.000424	1.63	5837.7	1307.83	0.1
Reach 1	78173.07	50 yr	9831.6	188	203.07	196.21	203.09	0.000358	1.78	9363.34	1394.12	0.09
Reach 1	78173.07	100 yr	12324.4	188	204.17	197.25	204.2	0.000354	1.88	10901.9	1394.12	0.09
Reach 1	77126.59	10 yr	5444.7	188	199.72	194.19	199.79	0.001093	2.86	2910.08	451.23	0.16
Reach 1	77126.59	50 yr	9831.6	188	202.28	195.39	202.41	0.001452	3.83	4267.94	761.85	0.19
Reach 1	77126.59	100 yr	12324.4	188	203.37	195.81	203.51	0.001513	4.13	5178.09	895.54	0.2
Reach 1	75906.48	10 yr	5444.7	184	197.5	193.32	197.68	0.003152	4.9	2153.25	464.13	0.27
Reach 1	75906.48	50 yr	9831.6	184	199.66	195.53	199.87	0.003245	5.63	3346.42	733.01	0.28
Reach 1	75906.48	100 yr	12324.4	184	200.69	195.97	200.92	0.003211	5.9	4292.36	962.99	0.28
Reach 1	74771.55	10 yr	5444.7	184	196.37	192	196.39	0.000547	1.98	5662.69	1379.46	0.11
Reach 1	74771.55	50 yr	9831.6	184	198.65	192.64	198.67	0.000485	2.14	8863.49	1423.39	0.11
Reach 1	74771.55	100 yr	12324.4	184	199.72	193.07	199.75	0.000468	2.22	10397.98	1434.19	0.11
Reach 1	73882.51	10 yr	5444.7	184	195.83	190.78	195.85	0.000675	1.57	4612.85	966.73	0.11
Reach 1	73882.51	50 yr	9831.6	184	198.14	191.88	198.18	0.000639	1.9	6859.35	974.72	0.12
Reach 1	73882.51	100 yr	12324.4	184	199.22	192.11	199.26	0.000638	2.06	7913.07	978.45	0.12
Reach 1	72505.33	10 yr	5444.7	182	195.15	189.5	195.17	0.000381	1.6	6561.18	1481.94	0.09
Reach 1	72505.33	50 yr	9831.6	182	197.53	191.63	197.55	0.000335	1.75	10111.18	1498.72	0.09
Reach 1	72505.33	100 yr	12324.4	182	198.62	191.74	198.64	0.00033	1.84	11745.71	1504.57	0.09
Reach 1	71346.87	10 yr	5444.7	182	194.28	188.56	194.35	0.001689	2.78	2711.79	452.99	0.18
Reach 1	71346.87	50 yr	9831.6	182	196.66	189.88	196.77	0.001914	3.34	3803.09	468.59	0.2
Reach 1	71346.87	100 yr	12324.4	182	197.72	190	197.86	0.002011	3.7	4307.86	484.09	0.21
Reach 1	70186.09	10 yr	5442.6	182	192.69	188.28	192.75	0.001152	2.82	3606.88	769.47	0.16
Reach 1	70186.09	50 yr	9827.3	182	194.99	189.29	195.06	0.001166	3.27	5505.1	853.09	0.17
Reach 1	70186.09	100 yr	12318.7	182	196.03	189.82	196.1	0.001163	3.45	6393.56	861.58	0.17
Reach 1	69207.5	10 yr	5442.6	178	191.79		191.84	0.000766	2.14	3940.75	945.59	0.13
Reach 1	69207.5	50 yr	9827.3	178	194.08		194.14	0.000773	2.52	6250.13	1046.95	0.13
Reach 1	69207.5	100 yr	12318.7	178	195.12		195.19	0.000764	2.66	7348.4	1052.41	0.14
Reach 1	67710.94	10 yr	5442.6	178	190.35	185.46	190.42	0.001193	2.62	3353.67	777.81	0.16
Reach 1	67710.94	50 yr	9827.3	178	192.65	187.57	192.73	0.001164	3.05	5460.45	1018.41	0.16
Reach 1	67710.94	100 yr	12318.7	178	193.74	188.28	193.82	0.001105	3.17	6591.55	1060.79	0.16
Reach 1	66841.3	10 yr	5442.6	178	189.72	184.49	189.74	0.000533	1.66	5034.45	1178.51	0.11
Reach 1	66841.3	50 yr	9827.3	178	192.04	185.78	192.08	0.000509	1.94	7907.41	1272.57	0.11
Reach 1	66841.3	100 yr	12318.7	178	193.16	186.2	193.19	0.000491	2.04	9339.78	1296.43	0.11
Reach 1	65899.21	10 yr	5442.6	178	189.24	183.46	189.27	0.000473	1.58	4692.17	917.71	0.1
Reach 1	65899.21	50 yr	9827.3	178	191.54	184.64	191.59	0.000529	1.99	6861.86	978.88	0.11
Reach 1	65899.21	100 yr	12318.7	178	192.65	185.18	192.7	0.000558	2.19	7973.38	1043.43	0.12
Reach 1	64371.68	10 yr	5442.6	176	188.19	183.32	188.25	0.001	2.36	3388.58	683.71	0.15
Reach 1	64371.68	50 yr	9827.3	176	190.35	184.47	190.44	0.00115	2.96	4888.46	725.16	0.16
Reach 1	64371.68	100 yr	12318.7	176	191.37	184.97	191.48	0.001228	3.26	5663.51	778.67	0.17
Reach 1	63293.49	10 yr	5442.6	174	187.06	182.84	187.11	0.001109	2.49	3778.67	968.44	0.15
Reach 1	63293.49	50 yr	9827.3	174	189.17	184.1	189.24	0.00106	2.84	5950.19	1050.47	0.16
Reach 1	63293.49	100 yr	12318.7	174	190.19	184.63	190.26	0.001028	2.97	7022.8	1066.17	0.16
Reach 1	62734.52	10 yr	5442.6	174	186.57	181.8	186.61	0.000743	2.28	4161.25	701.41	0.13
Reach 1	62734.52	50 yr	9827.3	174	188.62	183.15	188.68	0.000942	2.91	5603.61	706.94	0.15
Reach 1	62734.52	100 yr	12318.7	174	189.62	183.48	189.69	0.001013	3.19	6310.38	710.21	0.16

Reach 1	61445.96	10 yr	5442.6	174	184.98		185.08	0.002148	3.29	2976.06	906.78	0.21
Reach 1	61445.96	50 yr	9827.3	174	186.86		186.97	0.001988	3.67	4703.68	949.58	0.21
Reach 1	61445.96	100 yr	12318.7	174	187.83		187.95	0.001879	3.81	5650.41	991.64	0.21
Reach 1	60665.99	10 yr	5442.6	174	183.8		183.86	0.001175	2.53	4241.49	1326.72	0.16
Reach 1	60665.99	50 yr	9827.3	174	185.9		185.95	0.000891	2.58	7084.82	1366.5	0.14
Reach 1	60665.99	100 yr	12318.7	174	186.95		187	0.000827	2.65	8539.33	1428.04	0.14
Reach 1	59655.91	10 yr	5442.3	172	183.4	180	183.41	0.00022	1.06	8190.04	1462.11	0.07
Reach 1	59655.91	50 yr	9828.1	172	185.49	180.01	185.5	0.000256	1.34	11260.32	1476.15	0.08
Reach 1	59655.91	100 yr	12319.8	172	186.53	180.03	186.54	0.000269	1.47	12800.9	1496.08	0.08
Reach 1	58792.02	10 yr	5442.3	172	183.1	179.13	183.12	0.000565	1.56	5984.41	1821.96	0.11
Reach 1	58792.02	50 yr	9828.1	172	185.19	180.01	185.22	0.000442	1.65	9920.48	1892.97	0.1
Reach 1	58792.02	100 yr	12319.8	172	186.24	180.22	186.26	0.000399	1.69	11905.26	1900.45	0.1
Reach 1	57476.03	10 yr	5442.3	172	182.31	178.36	182.33	0.000629	1.83	5408.74	1289.61	0.12
Reach 1	57476.03	50 yr	9828.1	172	184.53	179.85	184.56	0.000554	2.03	8352.08	1344.29	0.11
Reach 1	57476.03	100 yr	12319.8	172	185.63	179.85	185.66	0.000521	2.11	9831.01	1349.63	0.11
Reach 1	56111.01	10 yr	5442.3	171.61	181.42	176.1	181.45	0.000663	1.99	4593.92	1014.76	0.12
Reach 1	56111.01	50 yr	9828.1	171.61	183.71	177.4	183.75	0.000638	2.29	6928.25	1020.68	0.12
Reach 1	56111.01	100 yr	12319.8	171.61	184.84	178.26	184.89	0.000624	2.42	8083.07	1097.28	0.12
Reach 1	54998.39	10 yr	5442.3	168	180.72	175.9	180.75	0.000616	2.18	4696.31	806.06	0.12
Reach 1	54998.39	50 yr	9828.1	168	182.98	176.74	183.02	0.000705	2.65	6520.53	811.28	0.13
Reach 1	54998.39	100 yr	12319.8	168	184.1	177.14	184.15	0.000725	2.85	7437.14	837.57	0.13
Reach 1	53922.78	10 yr	5442.3	168	179.99	175.28	180.03	0.000729	2.13	4508.87	960.42	0.13
Reach 1	53922.78	50 yr	9828.1	168	182.19	175.54	182.24	0.000749	2.5	6681.98	1012.98	0.13
Reach 1	53922.78	100 yr	12319.8	168	183.32	177.18	183.37	0.000731	2.63	7839.37	1039.69	0.13
Reach 1	52312.84	10 yr	5442.3	168	179.07	174.19	179.09	0.000475	1.53	6115.96	1617.44	0.1
Reach 1	52312.84	50 yr	9828.1	168	181.37	175.62	181.39	0.000384	1.65	9890.73	1676.28	0.09
Reach 1	52312.84	100 yr	12319.8	168	182.56	176.05	182.58	0.000348	1.69	11903.69	1717.32	0.09
Reach 1	51397.14	10 yr	5442.3	168	178.53	173.69	178.57	0.000698	2.13	4423.16	936.44	0.12
Reach 1	51397.14	50 yr	9828.1	168	180.89	175.37	180.94	0.000657	2.41	6906.61	963.42	0.13
Reach 1	51397.14	100 yr	12319.8	168	182.1	176	182.15	0.000644	2.55	8074.41	985.35	0.13
Reach 1	49873.99	10 yr	5442.3	168	177.62	171.99	177.65	0.00052	1.84	4801.3	817.35	0.11
Reach 1	49873.99	50 yr	9828.1	168	179.93	171.99	179.97	0.000609	2.31	6731.18	914.55	0.12
Reach 1	49873.99	100 yr	12319.8	168	181.05	171.99	181.1	0.000733	2.7	7904.66	1065.67	0.13
Reach 1	48863.91	10 yr	5442.3	166	177.24	172	177.25	0.000304	1.42	6625.29	1365	0.08
Reach 1	48863.91	50 yr	9828.1	166	179.5	172.01	179.52	0.00033	1.71	9923.73	1492.87	0.09
Reach 1	48863.91	100 yr	12319.8	166	180.58	172.15	180.61	0.000342	1.85	11554.79	1542.03	0.09
Reach 1	47468.78	10 yr	5442.3	166	176.63	171.36	176.67	0.000613	1.85	5142.99	1375.2	0.11
Reach 1	47468.78	50 yr	9828.1	166	178.92	173.1	178.96	0.000514	2	8428.45	1462.84	0.11
Reach 1	47468.78	100 yr	12319.8	166	180.01	173.68	180.04	0.000481	2.07	10018.48	1468.49	0.11
Reach 1	46475.52	10 yr	5473.9	162	176.12	168.74	176.15	0.000442	1.9	5053.21	1173.66	0.1
Reach 1	46475.52	50 yr	9874.5	162	178.43	170.58	178.47	0.000466	2.22	7775.09	1181.26	0.11
Reach 1	46475.52	100 yr	12374.6	162	179.52	171.21	179.57	0.000471	2.35	9071.27	1184.87	0.11
Reach 1	45311.81	10 yr	5473.9	162	175.67	168.99	175.68	0.000359	1.45	6320.6	1418.66	0.09
Reach 1	45311.81	50 yr	9874.5	162	177.98	170.88	178	0.000346	1.67	9695.18	1508.53	0.09
Reach 1	45311.81	100 yr	12374.6	162	179.08	172.26	179.1	0.000337	1.76	11361.44	1516.83	0.09
Reach 1	44122.59	10 yr	5473.9	162	174.83	170.65	174.92	0.00141	3.05	2695.39	520.14	0.18
Reach 1	44122.59	50 yr	9874.5	162	177.1	171.8	177.22	0.001578	3.73	4315.9	780.77	0.19
Reach 1	44122.59	100 yr	12374.6	162	178.21	172.3	178.35	0.001546	3.92	5185.87	780.77	0.19
Reach 1	43305.32	10 yr	5473.9	162	173.71	169.64	173.79	0.001368	2.87	2834.48	502.97	0.17

Reach 1	43305.32	50 yr	9874.5	162	175.73	170.59	175.87	0.001767	3.75	3874.11	531.94	0.2
Reach 1	43305.32	100 yr	12374.6	162	176.8	171.05	176.96	0.00188	4.12	4450.63	602.62	0.21
Reach 1	42249.08	10 yr	5473.9	162	172.8	168.64	172.82	0.000645	1.34	5547.51	1599.55	0.11
Reach 1	42249.08	50 yr	9874.5	162	174.95	170.08	174.97	0.000476	1.47	9016.6	1629.3	0.1
Reach 1	42249.08	100 yr	12374.6	162	176.09	170.3	176.12	0.000413	1.52	10891.01	1637.89	0.09
Reach 1	40966.61	10 yr	5473.9	162	171.96	167.13	171.98	0.000666	1.6	5726.51	1430.35	0.11
Reach 1	40966.61	50 yr	9874.5	162	174.33	168.28	174.35	0.000488	1.7	9126.31	1435.94	0.1
Reach 1	40966.61	100 yr	12374.6	162	175.55	168.82	175.58	0.000432	1.75	10882.78	1435.94	0.1
Reach 1	39658.88	10 yr	5473.9	162	171.06	167.09	171.09	0.000705	1.93	5261.21	1337.21	0.12
Reach 1	39658.88	50 yr	9874.5	162	173.69	168.2	173.72	0.000486	1.95	8916.41	1438.47	0.11
Reach 1	39658.88	100 yr	12374.6	162	174.99	168.69	175.02	0.000422	1.96	10807.92	1460.64	0.1
Reach 1	38757.5	10 yr	5473.9	158	170.56	165.65	170.57	0.000467	1.94	6347.36	1469.42	0.1
Reach 1	38757.5	50 yr	9874.5	158	173.34	165.83	173.36	0.000334	1.91	10563.72	1558.41	0.09
Reach 1	38757.5	100 yr	12374.6	158	174.68	165.84	174.7	0.000298	1.92	12682.9	1588.04	0.09
Reach 1	38200.74	10 yr	5473.9	158	170.23	165.63	170.26	0.000695	2.14	4431.29	798.75	0.12
Reach 1	38200.74	50 yr	9874.5	158	173.06	166.77	173.1	0.000656	2.49	7088.65	994.26	0.13
Reach 1	38200.74	100 yr	12374.6	158	174.43	167.1	174.47	0.000598	2.55	8464.78	1011.68	0.12
Reach 1	37492.84	10 yr	5473.9	158	169.9	164.11	169.92	0.000352	1.29	5528.45	961.78	0.09
Reach 1	37492.84	50 yr	9874.5	158	172.74	164.74	172.77	0.000343	1.6	8700.19	1209.88	0.09
Reach 1	37492.84	100 yr	12374.6	158	174.14	165.05	174.17	0.000315	1.67	10408.3	1228.66	0.09
Reach 1	36580.05	10 yr	5473.9	161.01	169.5	164.01	169.52	0.00055	1.69	5266.13	971	0.11
Reach 1	36580.05	50 yr	9874.5	161.01	172.38	164.7	172.41	0.000449	1.89	8069.68	971	0.1
Reach 1	36580.05	100 yr	12374.6	161.01	173.81	165.09	173.83	0.000422	1.99	9449.23	971	0.1
Reach 1	35507.14	10 yr	5473.9	158	169.07	162.08	169.08	0.000314	1.54	6302.42	970.24	0.08
Reach 1	35507.14	50 yr	9874.5	158	171.98	163.19	172	0.000322	1.84	9226.5	1048.92	0.09
Reach 1	35507.14	100 yr	12374.6	158	173.41	163.73	173.44	0.000325	1.98	10767.9	1103.25	0.09
Reach 1	34849.13	10 yr	5473.9	158	168.82	161.93	168.85	0.000381	1.5	4956.48	946.14	0.09
Reach 1	34849.13	50 yr	9874.5	158	171.75	163.1	171.78	0.000345	1.74	7780.14	988.22	0.09
Reach 1	34849.13	100 yr	12374.6	158	173.18	163.66	173.22	0.000331	1.85	9213.81	1011.58	0.09
Reach 1	33370.94	10 yr	5473.9	156	168.47	162.9	168.48	0.00017	1	7503.01	1114.08	0.06
Reach 1	33370.94	50 yr	9874.5	156	171.4	164	171.41	0.000184	1.26	10817.6	1167.6	0.07
Reach 1	33370.94	100 yr	12374.6	156	172.83	164	172.85	0.000187	1.38	12529.66	1215.41	0.07
Reach 1	32021.58	10 yr	5473.9	156	168.05	162	168.09	0.000595	2.19	4278.99	659.23	0.12
Reach 1	32021.58	50 yr	9874.5	156	170.95	163.65	171	0.000608	2.59	6213.44	700.04	0.12
Reach 1	32021.58	100 yr	12374.6	156	172.37	164	172.43	0.000602	2.75	7304.86	815.22	0.12
Reach 1	31212.27	10 yr	5473.9	156	167.43	161.71	167.48	0.000957	2.71	4169.31	1004.94	0.15
Reach 1	31212.27	50 yr	9874.5	156	170.46	163.12	170.5	0.000612	2.57	7252.62	1035.64	0.12
Reach 1	31212.27	100 yr	12374.6	156	171.92	163.73	171.97	0.000538	2.59	8795.4	1067.62	0.12
Reach 1	29931.87	10 yr	5473.9	152	166.53	160	166.57	0.000556	1.96	4500.45	763.61	0.11
Reach 1	29931.87	50 yr	9874.5	152	169.78	160.66	169.82	0.000472	2.19	7062.57	800.53	0.11
Reach 1	29931.87	100 yr	12374.6	152	171.28	161.17	171.32	0.000476	2.37	8298.17	855.24	0.11
Reach 1	28687.16	10 yr	5473.9	152	166.22	158.08	166.23	0.000155	1.18	7432.48	951.01	0.06
Reach 1	28687.16	50 yr	9874.5	152	169.46	159.08	169.48	0.00017	1.46	10609.94	992.39	0.07
Reach 1	28687.16	100 yr	12374.6	152	170.95	159.49	170.97	0.000181	1.6	12102.53	1024.72	0.07
Reach 1	27568.89	10 yr	5473.9	152	165.92		165.95	0.00042	1.83	4286.49	549.74	0.1
Reach 1	27568.89	50 yr	9874.5	152	169.13		169.18	0.000473	2.32	6166.16	608.26	0.11
Reach 1	27568.89	100 yr	12374.6	152	170.59		170.65	0.000503	2.55	7067.94	645.89	0.11
Reach 1	26738.66	10 yr	5473.9	152	165.73		165.74	0.000167	1.25	7257.28	944.89	0.06
Reach 1	26738.66	50 yr	9874.5	152	168.91		168.93	0.00019	1.56	10464.73	1049.87	0.07

Reach 1	26738.66	100 yr	12374.6	152	170.36		170.38	0.000205	1.72	12007.93	1097.15	0.07
Reach 1	25956.46	10 yr	5473.9	152	165.56		165.58	0.000249	1.46	5621.69	680.05	0.08
Reach 1	25956.46	50 yr	9874.5	152	168.71		168.74	0.000316	1.94	7970.86	800.39	0.09
Reach 1	25956.46	100 yr	12374.6	152	170.15		170.18	0.000326	2.1	9125.71	810.05	0.09
Reach 1	25307.43	10 yr	5473.9	152	165.31		165.35	0.000549	2.27	4200.95	636.11	0.11
Reach 1	25307.43	50 yr	9874.5	152	168.41		168.46	0.000634	2.84	6604.84	883.94	0.13
Reach 1	25307.43	100 yr	12374.6	152	169.85		169.9	0.000593	2.91	7886.13	894.24	0.13
Reach 1	24484.37	10 yr	5473.9	148	165.02	156	165.04	0.000265	1.64	5953.28	952.34	0.08
Reach 1	24484.37	50 yr	9874.5	148	168.09	156	168.12	0.000284	1.95	8987.33	1018.13	0.09
Reach 1	24484.37	100 yr	12374.6	148	169.54	156	169.57	0.000282	2.06	10469.38	1024.36	0.09
Reach 1	23186.49	10 yr	5473.9	148	164.51		164.55	0.000601	1.69	4134.65	923.95	0.11
Reach 1	23186.49	50 yr	9874.5	148	167.64		167.68	0.000422	1.8	7366.61	1066.6	0.1
Reach 1	23186.49	100 yr	12374.6	148	169.12		169.16	0.000378	1.86	8941.32	1066.6	0.1
Reach 1	22034.16	10 yr	5473.9	148	163.7	155.28	163.78	0.000876	2.53	2717.19	354.07	0.14
Reach 1	22034.16	50 yr	9874.5	148	166.86	157.53	166.98	0.001091	3.07	3920.21	459.13	0.16
Reach 1	22034.16	100 yr	12374.6	148	168.37	158.53	168.51	0.001072	3.31	4792.63	701.37	0.16
Reach 1	20846.64	10 yr	5473.9	146	162.9	153.75	162.95	0.000558	1.93	3715.07	781.22	0.11
Reach 1	20846.64	50 yr	9874.5	146	166.07	155.74	166.12	0.000495	2.21	6341.56	870.45	0.11
Reach 1	20846.64	100 yr	12374.6	146	167.61	156.92	167.67	0.000476	2.34	7756.62	965.69	0.11
Reach 1	19733.75	10 yr	5473.9	146	161.59		161.85	0.002066	4.14	1414.24	161.95	0.22
Reach 1	19733.75	50 yr	9874.5	146	164.49		164.97	0.002932	5.75	1927.73	194.39	0.27
Reach 1	19733.75	100 yr	12374.6	146	165.79		166.47	0.003584	6.75	2199.07	447.49	0.3
Reach 1	18610.39	10 yr	5933	146	160.46	153.88	160.52	0.000729	2.26	3968.94	762.29	0.13
Reach 1	18610.39	50 yr	10686.2	146	163.45	156.21	163.51	0.00066	2.57	6339.3	811.84	0.13
Reach 1	18610.39	100 yr	13392.1	146	164.81	156.21	164.88	0.000655	2.74	7461.02	843.76	0.13
Reach 1	17427.55	10 yr	5933	146	159.35		159.44	0.001175	2.55	2738.72	465.19	0.16
Reach 1	17427.55	50 yr	10686.2	146	162.39		162.52	0.001117	3.08	4198.34	495.66	0.16
Reach 1	17427.55	100 yr	13392.1	146	163.73		163.88	0.001133	3.35	4867.12	500.95	0.17
Reach 1	16506.49	10 yr	5933	146	158.85	153.61	158.87	0.00036	1.47	5640.04	858.66	0.09
Reach 1	16506.49	50 yr	10686.2	146	161.87	154	161.9	0.000409	1.91	8443.91	999.71	0.1
Reach 1	16506.49	100 yr	13392.1	146	163.23	154	163.26	0.000403	2.04	9805.85	1006.34	0.1
Reach 1	15082.54	10 yr	5933	146	158.14		158.2	0.000637	2.08	3586.28	760.61	0.12
Reach 1	15082.54	50 yr	10686.2	146	161.1		161.18	0.000629	2.48	5930.81	875.81	0.12
Reach 1	15082.54	100 yr	13392.1	146	162.47		162.55	0.000619	2.64	7184	938.61	0.13
Reach 1	14205	10 yr	5933	146	157.37	150.09	157.44	0.001209	2.99	3239.69	563.44	0.17
Reach 1	14205	50 yr	10686.2	146	160.35	153.3	160.45	0.001156	3.48	5036.58	638.06	0.17
Reach 1	14205	100 yr	13392.1	146	161.72	153.9	161.83	0.001136	3.68	5945.18	679.58	0.17
Reach 1	13144.96	10 yr	5933	146	156.39	150.23	156.45	0.000743	2.26	3498.32	502.3	0.13
Reach 1	13144.96	50 yr	10686.2	146	159.34	151.61	159.43	0.000812	2.84	4989.2	509.06	0.14
Reach 1	13144.96	100 yr	13392.1	146	160.67	152.17	160.78	0.000877	3.15	5706.94	617.14	0.15
Reach 1	11937.65	10 yr	5933	146	155.51	150.81	155.55	0.000755	1.93	4639.08	1026.83	0.13
Reach 1	11937.65	50 yr	10686.2	146	158.62	152.04	158.65	0.000509	2	7941.92	1086.1	0.11
Reach 1	11937.65	100 yr	13392.1	146	159.97	152.42	160.01	0.000474	2.09	9410.11	1090.81	0.11
Reach 1	11143.64	10 yr	5933	146	155.06	149.72	155.09	0.000456	1.59	5264.13	911.93	0.1
Reach 1	11143.64	50 yr	10686.2	146	158.28	150.07	158.31	0.000375	1.8	8197.97	911.93	0.09
Reach 1	11143.64	100 yr	13392.1	146	159.63	150.07	159.67	0.000377	1.95	9435.75	911.93	0.1
Reach 1	10738.33	10 yr	5933	146	154.93	148.53	154.95	0.000259	1.19	5908.13	971.74	0.07
Reach 1	10738.33	50 yr	10686.2	146	158.17	149.29	158.19	0.000229	1.4	9156.49	1019.34	0.07
Reach 1	10738.33	100 yr	13392.1	146	159.52	149.68	159.55	0.000233	1.53	10539.12	1019.34	0.08

Reach 1	9866.886	10 yr	5933	146	154.62		154.66	0.000445	1.5	4215.05	652.29	0.1
Reach 1	9866.886	50 yr	10686.2	146	157.88		157.93	0.00041	1.84	6521.33	779.56	0.1
Reach 1	9866.886	100 yr	13392.1	146	159.23		159.28	0.000419	2.01	7598.56	815.56	0.1
Reach 1	9171.781	10 yr	5933	146	154.25	148.57	154.28	0.000667	1.77	4282	621.23	0.12
Reach 1	9171.781	50 yr	10686.2	146	157.54	149.33	157.59	0.000597	2.16	6332.98	625.8	0.12
Reach 1	9171.781	100 yr	13392.1	146	158.87	149.69	158.93	0.000624	2.4	7171.3	633.62	0.12
Reach 1	8187.326	10 yr	5933	146	153.45	148.75	153.5	0.000966	1.83	3236.97	638.07	0.14
Reach 1	8187.326	50 yr	10686.2	146	156.98	149.59	157.03	0.000538	1.89	6412.6	943.78	0.11
Reach 1	8187.326	100 yr	13392.1	146	158.33	150	158.38	0.000505	2	7701.26	969.28	0.11
Reach 1	7303.347	10 yr	5933	146	152.78		152.82	0.000618	1.54	4081.47	904.77	0.11
Reach 1	7303.347	50 yr	10686.2	146	156.63		156.66	0.000324	1.55	8031.76	1068.48	0.09
Reach 1	7303.347	100 yr	13392.1	146	157.99		158.03	0.000311	1.65	9487.68	1068.48	0.09
Reach 1	6470.493	10 yr	5933	142	152.42	146.05	152.43	0.00035	1.41	6251.37	954.06	0.09
Reach 1	6470.493	50 yr	10686.2	142	156.41	147.4	156.42	0.000248	1.54	10143.66	1010.39	0.08
Reach 1	6470.493	100 yr	13392.1	142	157.76	147.7	157.79	0.000266	1.72	11543.04	1053.69	0.08
Reach 1	5530.472	10 yr	5933	142	152.04	146.52	152.07	0.000439	1.46	5305.59	983.93	0.1
Reach 1	5530.472	50 yr	10686.2	142	156.16	147.61	156.18	0.000262	1.52	9599.21	1200.6	0.08
Reach 1	5530.472	100 yr	13392.1	142	157.5	148.21	157.53	0.000273	1.67	11326.51	1368.11	0.08
Reach 1	4587.731	10 yr	5933	142	151.61		151.64	0.000475	1.68	5364.54	942.58	0.1
Reach 1	4587.731	50 yr	10686.2	142	155.92		155.94	0.000259	1.63	9653.55	1070.11	0.08
Reach 1	4587.731	100 yr	13392.1	142	157.25		157.28	0.000269	1.77	11139.29	1159.14	0.08
Reach 1	3812.865	10 yr	5933	142	151.23		151.26	0.000509	1.8	5740.6	1067.05	0.11
Reach 1	3812.865	50 yr	10686.2	142	155.72		155.74	0.00025	1.65	11007.39	1437.45	0.08
Reach 1	3812.865	100 yr	13392.1	142	157.05		157.07	0.000256	1.78	13069.59	1573.57	0.08
Reach 1	2830.46	10 yr	5933	142	150.8		150.82	0.000383	1.54	5693.47	960.09	0.09
Reach 1	2830.46	50 yr	10686.2	142	155.49		155.52	0.000212	1.52	10423.02	1106.33	0.07
Reach 1	2830.46	100 yr	13392.1	142	156.81		156.84	0.000227	1.68	11937.47	1161.16	0.08
Reach 1	1704.934	10 yr	5933	142	150.45	143.87	150.47	0.000263	1.11	5353.55	1361.47	0.07
Reach 1	1704.934	50 yr	10686.2	142	155.34	144.6	155.36	0.0001	0.94	13253.08	1630.59	0.05
Reach 1	1704.934	100 yr	13392.1	142	156.65	144.97	156.66	0.000106	1.04	15109.73	1732.49	0.05
Reach 1	699.9124	10 yr	5933	128	150.4	133.72	150.4	0.000027	0.66	15420.79	1404.65	0.03
Reach 1	699.9124	50 yr	10686.2	128	155.3	134.86	155.3	0.000028	0.8	22303.58	1404.65	0.03
Reach 1	699.9124	100 yr	13392.1	128	156.6	134.86	156.61	0.000035	0.91	24129.63	1404.65	0.03
HEC-RAS PLAN: PROPOSED 2 PONDS RIVER: MILL CREEK REACH: REACH 1												
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach 1	174507	10 yr	2280	296	307.45	302.27	307.59	0.002019	3.21	974.28	547.66	0.2
Reach 1	174507	50 yr	4219	296	308.9	304.41	309.04	0.002212	3.77	2191.69	784.26	0.22
Reach 1	174507	100 yr	5291.4	296	309.5	305.71	309.65	0.002306	4.01	2696.03	873.77	0.23
Reach 1	173479.3	10 yr	2280	296	305.5	301.13	305.59	0.001843	2.71	1429.88	749.05	0.19
Reach 1	173479.3	50 yr	4219	296	306.75	302.82	306.85	0.002021	3.2	2456.71	865.94	0.2
Reach 1	173479.3	100 yr	5291.4	296	307.33	303.57	307.43	0.002009	3.34	2961.33	888.12	0.21
Reach 1	172871.7	10 yr	2280	296	303.63	300.74	303.79	0.005409	3.5	804.03	352.57	0.3
Reach 1	172871.7	50 yr	4219	296	305.42	302.74	305.5	0.002462	2.97	2645.2	1045.27	0.21
Reach 1	172871.7	100 yr	5291.4	296	306.17	303.4	306.23	0.001894	2.82	3444	1083.6	0.19
Reach 1	171232.7	10 yr	2280	290	301.66	293.91	301.71	0.00054	2.09	1980.86	623.5	0.11
Reach 1	171232.7	50 yr	4219	290	303.74	295.24	303.79	0.000567	2.41	3315.41	654.75	0.12
Reach 1	171232.7	100 yr	5291.4	290	304.48	295.84	304.54	0.000647	2.67	3815.16	711.38	0.13
Reach 1	170298.1	10 yr	2280	290	300.56	295.78	300.73	0.002731	3.74	1055.52	536.11	0.23

Reach 1	170298.1	50 yr	4219	290	302.86	298.45	302.96	0.001571	3.35	2651.52	771.04	0.18
Reach 1	170298.1	100 yr	5291.4	290	303.56	299.09	303.65	0.001508	3.43	3190.6	775.99	0.18
Reach 1	169304.9	10 yr	2280	286	298.28		298.41	0.002005	2.87	794.11	119.39	0.2
Reach 1	169304.9	50 yr	4219	286	300.68		300.86	0.002945	3.49	1437.83	669.45	0.24
Reach 1	169304.9	100 yr	5291.4	286	301.5		301.68	0.002692	3.61	2104.33	999.2	0.23
Reach 1	168301.8	10 yr	2280	286	296.53	291.69	296.62	0.001571	2.81	1216.97	477.4	0.18
Reach 1	168301.8	50 yr	4219	286	298.59	293.7	298.71	0.00161	3.33	1928.76	530.52	0.19
Reach 1	168301.8	100 yr	5291.4	286	299.41	294.5	299.54	0.001717	3.63	2218.84	566.47	0.2
Reach 1	167268.9	10 yr	2280	284	294.51		294.65	0.002374	3.02	782.85	239.98	0.21
Reach 1	167268.9	50 yr	4219	284	296.57		296.74	0.002287	3.59	1728.84	587.93	0.22
Reach 1	167268.9	100 yr	5291.4	284	297.42		297.59	0.002097	3.67	2236.75	599.27	0.21
Reach 1	166274.1	10 yr	2280	282.69	293.4	286.19	293.45	0.000704	1.83	1245.4	348.16	0.12
Reach 1	166274.1	50 yr	4219	282.69	295.47	287.44	295.53	0.000723	2.14	2636.74	557.84	0.13
Reach 1	166274.1	100 yr	5291.4	282.69	296.3	288.03	296.37	0.000771	2.34	3123.54	598.75	0.13
Reach 1	165453.1	10 yr	2280	280	292.57	286.57	292.65	0.001436	2.43	1168.5	389.37	0.17
Reach 1	165453.1	50 yr	4219	280	294.58	288.66	294.7	0.001503	2.97	2055.5	517.36	0.18
Reach 1	165453.1	100 yr	5291.4	280	295.35	289.62	295.48	0.001626	3.27	2498.61	639.08	0.19
Reach 1	164294.3	10 yr	2280	276	290.86	283.25	290.96	0.001486	2.66	1208.52	474.75	0.17
Reach 1	164294.3	50 yr	4219	276	293.04	285.68	293.13	0.001212	2.85	2498.97	644.13	0.16
Reach 1	164294.3	100 yr	5291.4	276	293.69	286.71	293.79	0.001296	3.08	2919.72	648.85	0.17
Reach 1	163291.2	10 yr	2280	276	289.21	282	289.34	0.001752	2.97	893.38	207.52	0.19
Reach 1	163291.2	50 yr	4219	276	291.49	284.3	291.65	0.001819	3.59	2113.52	916.32	0.2
Reach 1	163291.2	100 yr	5291.4	276	292.04	285.47	292.21	0.00193	3.83	2633.32	991.91	0.21
Reach 1	162285	10 yr	2280	274	287.22	279.56	287.35	0.002234	2.96	769.68	154.72	0.21
Reach 1	162285	50 yr	4219	274	289.2	281.87	289.37	0.002879	3.52	1851.4	1225.16	0.24
Reach 1	162285	100 yr	5291.4	274	289.83	282.87	289.98	0.002561	3.52	2647.57	1315.1	0.23
Reach 1	161278.1	10 yr	2280	270	285.37		285.49	0.00155	2.85	1092.88	549.51	0.18
Reach 1	161278.1	50 yr	4219	270	287.15		287.27	0.001573	3.28	2254.6	688.63	0.18
Reach 1	161278.1	100 yr	5291.4	270	287.84		287.97	0.001591	3.45	2736.83	698.54	0.19
Reach 1	160286	10 yr	2280	270	284.13	276.16	284.22	0.001063	2.47	1442.28	730.83	0.15
Reach 1	160286	50 yr	4219	270	285.93	278.63	286.01	0.001033	2.77	2990.82	990.83	0.15
Reach 1	160286	100 yr	5291.4	270	286.65	279.7	286.73	0.000986	2.82	3724.9	1024.8	0.15
Reach 1	159266.2	10 yr	2280	270	282.68	276.26	282.77	0.002003	2.4	981.74	403.19	0.19
Reach 1	159266.2	50 yr	4219	270	284.62	279.53	284.71	0.001604	2.61	2425.06	948.37	0.18
Reach 1	159266.2	100 yr	5291.4	270	285.49	280.19	285.57	0.001321	2.57	3293.04	1044.78	0.16
Reach 1	158273.3	10 yr	2280	266	280.02	272.99	280.17	0.003558	3.05	747.6	162.45	0.25
Reach 1	158273.3	50 yr	4219	266	282.04	275.65	282.28	0.004138	3.9	1081.4	269.79	0.28
Reach 1	158273.3	100 yr	5291.4	266	282.89	276.63	283.16	0.005698	4.22	1255.28	396.44	0.32
Reach 1	157283.5	10 yr	2280	266	279.55		279.57	0.00022	1.03	2272.7	430.7	0.07
Reach 1	157283.5	50 yr	4219	266	281.38		281.41	0.000335	1.48	3174.16	517.29	0.09
Reach 1	157283.5	100 yr	5291.4	266	282.05		282.09	0.000405	1.7	3524.1	542.91	0.1
Reach 1	157091.2	10 yr	2280	266	279.46	270.45	279.5	0.000495	1.57	1580.24	404.35	0.1
Reach 1	157091.2	50 yr	4219	266	281.25	272.16	281.31	0.000709	2.17	2427.59	502.13	0.13
Reach 1	157091.2	100 yr	5291.4	266	281.89	272.96	281.97	0.000834	2.46	2754.38	530.82	0.14
Reach 1	156934.3		Bridge									
Reach 1	156834.3	10 yr	2280	266	279.13	272.31	279.2	0.001522	2.33	1288.59	399.67	0.17
Reach 1	156834.3	50 yr	4219	266	280.87	275.16	280.96	0.001791	2.7	2318.84	833.53	0.19
Reach 1	156834.3	100 yr	5291.4	266	281.48	276.12	281.57	0.001928	2.79	2839.92	878.88	0.19

Reach 1	156735.2	10 yr	2280	266	279.01	272.3	279.07	0.001103	2.1	1491.74	535.08	0.15
Reach 1	156735.2	50 yr	4219	266	280.74	274.4	280.81	0.001158	2.53	2554.14	764.51	0.16
Reach 1	156735.2	100 yr	5291.4	266	281.33	275.28	281.41	0.001284	2.79	2945.38	882.49	0.17
Reach 1	155914.3	10 yr	2280	264	278.16	270.69	278.22	0.000974	2.23	1684.28	663.41	0.14
Reach 1	155914.3	50 yr	4219	264	279.81	272.86	279.88	0.001108	2.69	2825.61	972.73	0.15
Reach 1	155914.3	100 yr	5291.4	264	280.26	273.83	280.35	0.001306	3.02	3187.23	1013.8	0.17
Reach 1	155053.7	10 yr	2280	264	277.37	269.22	277.43	0.000868	2.25	1501.35	759.94	0.13
Reach 1	155053.7	50 yr	4219	264	278.95	271.83	278.99	0.000952	2.21	3736.18	1394	0.14
Reach 1	155053.7	100 yr	5291.4	264	279.21	272.92	279.26	0.00121	2.54	4102.23	1417.7	0.16
Reach 1	154269	10 yr	2280	264	276.54	269.36	276.62	0.001219	2.39	1239.31	1056.88	0.16
Reach 1	154269	50 yr	4219	264	277.74	271.56	277.9	0.002148	3.51	1631.99	1104.1	0.21
Reach 1	154269	100 yr	5291.4	264	278.32	272.97	278.38	0.001039	2.55	4048.1	1150.77	0.15
Reach 1	153259.5	10 yr	2280	264	275.42	270.13	275.45	0.001086	1.49	2078.28	763.36	0.13
Reach 1	153259.5	50 yr	4219	264	276.65	272.63	276.68	0.00124	1.91	3061.6	821.64	0.15
Reach 1	153259.5	100 yr	5291.4	264	277.16	274.29	277.2	0.001322	2.11	3483.18	827.21	0.16
Reach 1	152248.4	10 yr	2280	260	274.16	266.38	274.21	0.001378	2.02	1926.16	1273.96	0.16
Reach 1	152248.4	50 yr	4219	260	275.39	268.53	275.44	0.001232	2.2	3770.06	1692.62	0.15
Reach 1	152248.4	100 yr	5291.4	260	275.94	269.5	275.98	0.001109	2.21	4714.35	1753.12	0.15
Reach 1	151251.5	10 yr	2280	260	272.78	268.62	272.79	0.001449	1.42	2338.89	1066.08	0.15
Reach 1	151251.5	50 yr	4219	260	274.26	272	274.29	0.00107	1.61	4042.98	1350.35	0.13
Reach 1	151251.5	100 yr	5291.4	260	274.92	272	274.94	0.00097	1.68	5006.4	1536.6	0.13
Reach 1	150269.6	10 yr	2280	260	269.83	265.01	270.1	0.006781	4.24	538.08	568.56	0.34
Reach 1	150269.6	50 yr	4219	260	271.25	267.13	271.79	0.010973	5.92	712.79	1069.27	0.45
Reach 1	150269.6	100 yr	5291.4	260	271.86	268.38	272.55	0.012416	6.66	805.94	1459.32	0.48
Reach 1	149285.9	10 yr	2280	260	269.01	265.25	269.02	0.000393	1.15	3562.58	1110.94	0.08
Reach 1	149285.9	50 yr	4219	260	269.86	265.92	269.88	0.000703	1.68	4580.05	1289.98	0.12
Reach 1	149285.9	100 yr	5291.4	260	270.29	266	270.32	0.000819	1.9	5149.32	1415.52	0.13
Reach 1	148288.1	10 yr	2280	260	268.5	265.55	268.51	0.000695	1.07	3081.17	1566.4	0.1
Reach 1	148288.1	50 yr	4219	260	268.89	266.2	268.91	0.001426	1.65	4008.84	2106.47	0.15
Reach 1	148288.1	100 yr	5291.4	260	269.2	266.57	269.23	0.001542	1.81	4674.88	2148.44	0.16
Reach 1	147249.2	10 yr	2280	260	268.27	264.13	268.27	0.000114	0.59	5848.43	1840.07	0.05
Reach 1	147249.2	50 yr	4219	260	268.15	264.63	268.16	0.000439	1.13	5621.71	1836.73	0.09
Reach 1	147249.2	100 yr	5291.4	260	268.23	264.87	268.25	0.000638	1.38	5774.49	1838.98	0.11
Reach 1	146260.1	10 yr	2280	260	268.2	263.48	268.2	0.000048	0.43	8039.92	1655.08	0.03
Reach 1	146260.1	50 yr	4219	260	267.86	263.49	267.87	0.000204	0.86	7486.2	1645.81	0.06
Reach 1	146260.1	100 yr	5291.4	260	267.79	264.08	267.79	0.00034	1.1	7356.08	1645.27	0.08
Reach 1	145874.1	10 yr	2280	260.75	268.17	266.31	268.17	0.000122	0.46	5924.07	1507.01	0.04
Reach 1	145874.1	50 yr	4219	260.75	267.73	267.28	267.74	0.00061	0.94	5264.76	1498.32	0.1
Reach 1	145874.1	100 yr	5291.4	260.75	267.56	267.41	267.57	0.001133	1.24	5000.97	1494.66	0.13
Reach 1	145588.1	10 yr	2280	260.73	266.18	266.18	267.88	0.064033	10.45	218.15	1355.03	1
Reach 1	145588.1	50 yr	4219	260.73	267.58	266.94	267.59	0.000481	1.06	5733.52	1578.35	0.09
Reach 1	145588.1	100 yr	5291.4	260.73	267.25	267.05	267.27	0.001024	1.46	5212.36	1572.36	0.13
Reach 1	145309.5	10 yr	2280	260	266		266.01	0.000485	1.23	3988.82	1712.09	0.09
Reach 1	145309.5	50 yr	4219	260	267.46		267.47	0.000355	1.24	6493.55	1718.37	0.08
Reach 1	145309.5	100 yr	5291.4	260	266.99		267	0.000863	1.83	5671.47	1716.41	0.13
Reach 1	145209.5	10 yr	2280	260.26	264.69	264.69	265.74	0.072928	8.25	276.41	1215.19	1
Reach 1	145209.5	50 yr	4219	260.26	265.88	265.88	267.22	0.067663	9.27	455.2	1574.53	1
Reach 1	145209.5	100 yr	5291.4	260.26	266.22	266.22	266.7	0.031867	6.51	1084.73	1655.09	0.69
Reach 1	144909.5	10 yr	2280	259.6	264.66	262.71	264.67	0.000288	0.63	4305.82	1964.88	0.07

Reach 1	144909.5	50 yr	4219	259.6	264.86	263.45	264.87	0.000817	1.09	4577.49	1989.13	0.11
Reach 1	144909.5	100 yr	5291.4	259.6	264.92	263.75	264.93	0.000725	1.03	6340.36	1997.27	0.11
Reach 1	144593.5	10 yr	2280	259.41	264.57	264.57	264.58	0.000295	0.66	4134.78	1759.08	0.07
Reach 1	144593.5	50 yr	4219	259.41	264.57	264.57	264.59	0.001012	1.22	4134.74	1759.08	0.12
Reach 1	144593.5	100 yr	5291.4	259.41	264.58	264.58	264.61	0.001578	1.53	4146.44	1762.24	0.15
Reach 1	144307.8	10 yr	2280	260	263.33	261.6	263.34	0.000722	0.95	3076.28	2050.63	0.1
Reach 1	144307.8	50 yr	4219	260	263.3	261.59	263.33	0.00256	1.78	3043.56	2045.31	0.19
Reach 1	144307.8	100 yr	5291.4	260	263.69	261.59	263.7	0.000713	0.88	6714.95	2118.03	0.1
Reach 1	143302.5	10 yr	2280	256	263.02	262	263.02	0.000174	0.7	5372.05	1812.15	0.06
Reach 1	143302.5	50 yr	4219	256	262.54	262	262.55	0.000952	1.53	4644.53	1781.53	0.13
Reach 1	143302.5	100 yr	5291.4	256	262.79	262.01	262.81	0.001168	1.76	5019.42	1797.41	0.14
Reach 1	142295.6	10 yr	2280	254	260.44	260.09	262.22	0.049584	10.7	213.1	1483.4	0.9
Reach 1	142295.6	50 yr	4219	254	261.96	261.96	261.97	0.000381	0.74	6020.56	1575.56	0.08
Reach 1	142295.6	100 yr	5291.4	254	261.96	261.96	261.97	0.0006	0.92	6020.56	1575.56	0.09
Reach 1	140841.3	10 yr	2280	254	260.69	258.53	260.69	0.000193	0.55	5004	1591.71	0.05
Reach 1	140841.3	50 yr	4219	254	260.41	259.01	260.43	0.000881	1.11	4571.14	1587.11	0.12
Reach 1	140841.3	100 yr	5291.4	254	260.87	259.25	260.88	0.000868	1.21	5291.96	1594.43	0.12
Reach 1	139478.8	10 yr	2280	250	257.62	257.62	259.56	0.062469	11.16	204.24	957.64	1
Reach 1	139478.8	50 yr	4219	250	258.85	258	258.88	0.001567	2.09	3625.88	1470.05	0.16
Reach 1	139478.8	100 yr	5291.4	250	259.34	258.01	259.37	0.001489	2.17	4372.19	1559.18	0.16
Reach 1	137957	10 yr	2280	250	256.58		256.59	0.000413	0.82	3649.54	1341.22	0.08
Reach 1	137957	50 yr	4219	250	257.63		257.64	0.000493	1.08	5055.85	1346.19	0.09
Reach 1	137957	100 yr	5291.4	250	258.07		258.09	0.00054	1.21	5655.07	1353.05	0.1
Reach 1	136943.4	10 yr	2280	250	255.73		255.76	0.002326	2.64	2248.2	1460.38	0.21
Reach 1	136943.4	50 yr	4219	250	256.77		256.8	0.001676	2.54	3786.05	1471.85	0.18
Reach 1	136943.4	100 yr	5291.4	250	257.17		257.2	0.001684	2.65	4367.29	1473.7	0.18
Reach 1	135924.9	10 yr	2280	248	254.61	254	254.61	0.000662	1.2	3577.29	1558.88	0.1
Reach 1	135924.9	50 yr	4219	248	255.87	254	255.88	0.000561	1.32	5618.43	1639.36	0.1
Reach 1	135924.9	100 yr	5291.4	248	256.13	254.01	256.15	0.000697	1.52	6048.28	1644.62	0.11
Reach 1	134950.8	10 yr	2280	248	253.51	251.35	253.54	0.002181	1.94	1819.15	725.15	0.19
Reach 1	134950.8	50 yr	4219	248	254.96	251.78	255	0.001713	2.18	2895.74	758.17	0.17
Reach 1	134950.8	100 yr	5291.4	248	254.86	251.78	254.92	0.00293	2.82	2819.8	755.96	0.23
Reach 1	134000.7	10 yr	2280	248	252.95	252	252.95	0.000281	0.74	4503.58	1447.57	0.07
Reach 1	134000.7	50 yr	4219	248	254.45	252	254.46	0.000273	0.92	6712.29	1479.49	0.07
Reach 1	134000.7	100 yr	5291.4	248	253.25	252	253.27	0.001135	1.57	4941.92	1456.79	0.14
Reach 1	132978.5	10 yr	2280	244	251.49	249.39	252.01	0.014655	5.8	393.42	1630.96	0.5
Reach 1	132978.5	50 yr	4219	244	251.85	251.23	253.35	0.045244	9.82	429.85	1660.22	0.87
Reach 1	132978.5	100 yr	5291.4	244	252.34	251.88	252.35	0.000727	1.3	5965.98	1697.93	0.11
Reach 1	131987.2	10 yr	2280	244	250.09		250.1	0.000646	1.33	3656.02	1740.24	0.11
Reach 1	131987.2	50 yr	4219	244	251.18		251.19	0.000599	1.47	5554.89	1750.21	0.11
Reach 1	131987.2	100 yr	5291.4	244	251.69		251.7	0.000588	1.53	6446.19	1758.88	0.11
Reach 1	130964.6	10 yr	2280	244	249.12	247.68	249.14	0.001552	1.54	2330.57	1105.06	0.16
Reach 1	130964.6	50 yr	4219	244	250.3	247.96	250.32	0.001326	1.77	3688.93	1183.51	0.15
Reach 1	130964.6	100 yr	5291.4	244	250.84	247.96	250.87	0.001248	1.86	4329.17	1187.3	0.15
Reach 1	129697	10 yr	2280	240	247.76	246	247.77	0.000788	1.68	2933.34	1239.28	0.12
Reach 1	129697	50 yr	4219	240	249.14	246.15	249.16	0.000671	1.78	4669.72	1275.96	0.12
Reach 1	129697	100 yr	5291.4	240	249.7	246.15	249.72	0.000679	1.88	5390.44	1290.08	0.12
Reach 1	128641.7	10 yr	2280	240	246.82	245.7	246.84	0.000994	1.51	2398.21	793.89	0.13
Reach 1	128641.7	50 yr	4219	240	248.2	246	248.23	0.001167	1.97	3639.31	1016.27	0.15

Reach 1	128641.7	100 yr	5291.4	240	248.76	246	248.79	0.001159	2.1	4208.84	1025.53	0.15
Reach 1	127244	10 yr	2280	238	245.11	242	245.14	0.001518	2.16	2016.98	800.42	0.17
Reach 1	127244	50 yr	4219	238	246.24	243.88	246.29	0.001679	2.58	2930.15	813.06	0.18
Reach 1	127244	100 yr	5291.4	238	246.79	244.14	246.84	0.00171	2.76	3377.38	823.06	0.18
Reach 1	126289.9	10 yr	2280	238	243.68	241.52	243.7	0.001525	1.96	2348.97	1147.16	0.16
Reach 1	126289.9	50 yr	4219	238	244.91	242.1	244.94	0.001217	2.06	3789.44	1169.11	0.15
Reach 1	126289.9	100 yr	5291.4	238	245.5	242.1	245.53	0.001137	2.12	4482.08	1181.06	0.15
Reach 1	124780.6	10 yr	2280	234	241.98		242	0.000862	1.82	2491.77	870.12	0.13
Reach 1	124780.6	50 yr	4219	234	243.33		243.36	0.000913	2.14	3676.48	888.73	0.14
Reach 1	124780.6	100 yr	5291.4	234	243.95		243.98	0.000933	2.28	4229.02	896.76	0.14
Reach 1	123738.1	10 yr	2280	234	241.05		241.06	0.000949	1.66	2648.29	966.03	0.13
Reach 1	123738.1	50 yr	4219	234	242.36		242.38	0.00095	1.94	3938.04	1011.07	0.14
Reach 1	123738.1	100 yr	5291.4	234	242.96		242.98	0.00097	2.08	4556.9	1048	0.14
Reach 1	122650.8	10 yr	2280	234	240.17		240.19	0.000695	1.42	2661.94	1046.57	0.11
Reach 1	122650.8	50 yr	4219	234	241.46		241.49	0.00072	1.69	4023.09	1055.67	0.12
Reach 1	122650.8	100 yr	5291.4	234	242.04		242.07	0.00074	1.82	4635.37	1062.88	0.12
Reach 1	121693	10 yr	2280	234	239.48	236.56	239.49	0.000757	1.33	2966.04	1187.43	0.11
Reach 1	121693	50 yr	4219	234	240.79	237.23	240.81	0.000688	1.52	4561.18	1234.86	0.11
Reach 1	121693	100 yr	5291.4	234	241.36	237.55	241.38	0.000686	1.62	5272.2	1252.43	0.12
Reach 1	120667.8	10 yr	2280	230.54	238.71	235	238.73	0.00073	1.62	2374.58	767	0.12
Reach 1	120667.8	50 yr	4219	230.54	239.93	236.09	239.96	0.001003	2.16	3371.48	872.05	0.14
Reach 1	120667.8	100 yr	5291.4	230.54	240.47	236.45	240.52	0.001069	2.34	3853.43	881.71	0.15
Reach 1	119080	10 yr	2280	230	235.94	234.29	236.11	0.006425	4.09	792.39	668.11	0.34
Reach 1	119080	50 yr	4219	230	237.27	235.13	237.35	0.003168	3.41	2497.82	959.24	0.25
Reach 1	119080	100 yr	5291.4	230	237.95	235.52	238.02	0.002531	3.27	3158.9	984.65	0.22
Reach 1	118001.1	10 yr	2280	228	234.75	232	234.76	0.000526	1.33	3423.35	1276.59	0.1
Reach 1	118001.1	50 yr	4219	228	236.3	232.56	236.31	0.000443	1.43	5413.03	1322.18	0.1
Reach 1	118001.1	100 yr	5291.4	228	237.06	232.8	237.08	0.000424	1.5	6458.66	1418.79	0.09
Reach 1	116862.3	10 yr	2280	228	233.88	230.68	233.91	0.001143	1.63	1782.22	623.17	0.14
Reach 1	116862.3	50 yr	4219	228	235.54	231.65	235.58	0.001006	1.91	2897.32	686.47	0.14
Reach 1	116862.3	100 yr	5291.4	228	236.32	231.77	236.37	0.000984	2.05	3447.59	726.64	0.14
Reach 1	115784.5	10 yr	2280	228	232.91	229.69	232.93	0.000731	1.29	1959.79	533.67	0.11
Reach 1	115784.5	50 yr	4219	228	234.62	230.32	234.66	0.000735	1.63	2893.82	555.2	0.12
Reach 1	115784.5	100 yr	5291.4	228	235.4	230.6	235.45	0.00075	1.79	3332.17	569.99	0.12
Reach 1	114617.3	10 yr	2280	224	232.24	228.11	232.26	0.00047	1.37	2747.08	616.89	0.09
Reach 1	114617.3	50 yr	4219	224	233.86	228.11	233.88	0.000602	1.8	3783.06	664.11	0.11
Reach 1	114617.3	100 yr	5291.4	224	234.61	228.11	234.64	0.000642	1.96	4284.84	673.44	0.12
Reach 1	112591.1	10 yr	2280	220	230.38	227.45	230.46	0.002228	2.81	1589.58	754.78	0.2
Reach 1	112591.1	50 yr	4219	220	231.88	229.48	231.94	0.001733	2.88	2724.19	762.21	0.19
Reach 1	112591.1	100 yr	5291.4	220	232.61	229.8	232.67	0.00161	2.95	3289.4	792.97	0.18
Reach 1	111434.1	10 yr	2280	220	229.23	225.83	229.25	0.00059	1.43	3250.02	1210.68	0.1
Reach 1	111434.1	50 yr	4219	220	231.09	225.83	231.1	0.000389	1.39	5525.5	1238.13	0.09
Reach 1	111434.1	100 yr	5291.4	220	231.87	227.24	231.88	0.000366	1.44	6495.21	1244.45	0.09
Reach 1	110204.6	10 yr	2280	218	228.72	225.47	228.72	0.00032	1.2	3990.44	1285.38	0.08
Reach 1	110204.6	50 yr	4219	218	230.72	226.67	230.73	0.000231	1.2	6638.05	1336.94	0.07
Reach 1	110204.6	100 yr	5291.4	218	231.52	227.03	231.53	0.000227	1.26	7703.44	1343.27	0.07
Reach 1	109036.8	10 yr	2517	218	227.87	223.54	227.97	0.001619	3.13	1411.98	449.87	0.19
Reach 1	109036.8	50 yr	4643	218	230.01	225.08	230.12	0.001738	3.75	2736.41	781.67	0.2
Reach 1	109036.8	100 yr	5822	218	230.83	225.61	230.94	0.001594	3.77	3419.45	857.78	0.19

Reach 1	108031.1	10 yr	2517	214	226.46	220.34	226.55	0.001232	2.86	1477.56	441.2	0.16
Reach 1	108031.1	50 yr	4643	214	228.3	222.19	228.43	0.001614	3.67	2346.22	564.03	0.19
Reach 1	108031.1	100 yr	5822	214	229.01	223.43	229.17	0.001926	4.18	2814.82	752.39	0.21
Reach 1	107075.8	10 yr	2517	214	225.56	220.39	225.6	0.000802	2.02	2364.84	744.68	0.13
Reach 1	107075.8	50 yr	4643	214	227.1	223.03	227.16	0.001089	2.65	3799.49	1179.15	0.15
Reach 1	107075.8	100 yr	5822	214	227.71	224.05	227.77	0.001119	2.81	4553.5	1296.52	0.16
Reach 1	105740.9	10 yr	2517	210	224.07	218.63	224.15	0.001535	2.76	1815.96	966.56	0.17
Reach 1	105740.9	50 yr	4643	210	225.32	220.97	225.4	0.001612	3.13	3035.84	979.67	0.18
Reach 1	105740.9	100 yr	5822	210	225.92	222.42	226.01	0.001579	3.23	3630.17	985.66	0.18
Reach 1	105073.7	10 yr	2517	210	223.31	217.34	223.37	0.000906	2.42	2146.47	809.91	0.14
Reach 1	105073.7	50 yr	4643	210	224.26	220.15	224.35	0.001528	3.35	3043.88	999.11	0.18
Reach 1	105073.7	100 yr	5822	210	224.89	220.67	224.98	0.001492	3.45	3673.74	1003.03	0.18
Reach 1	104400.4	10 yr	2517	210	221.77	217.04	222.05	0.006561	4.23	599.51	837.04	0.34
Reach 1	104400.4	50 yr	4643	210	223.3	220.06	223.35	0.001403	2.35	3426.01	1037.88	0.16
Reach 1	104400.4	100 yr	5822	210	223.98	220.9	224.03	0.001292	2.41	4143.62	1076.79	0.16
Reach 1	104005.1	10 yr	2517	210	221.26	217.31	221.29	0.001015	2.26	2196.04	721.95	0.14
Reach 1	104005.1	50 yr	4643	210	222.79	219.09	222.83	0.001199	2.77	3501.83	901.43	0.16
Reach 1	104005.1	100 yr	5822	210	223.48	219.48	223.53	0.001207	2.91	4150.01	963.64	0.16
Reach 1	103025.1	10 yr	2517	210	220.46	218.19	220.48	0.000696	1.73	3061.11	1054.39	0.11
Reach 1	103025.1	50 yr	4643	210	221.95	218.7	221.97	0.000661	1.91	4644.5	1063.9	0.12
Reach 1	103025.1	100 yr	5822	210	222.63	218.92	222.66	0.00068	2.04	5377.98	1102.48	0.12
Reach 1	101979.6	10 yr	2517	208	219.51	213.49	219.56	0.001118	2.05	1988.52	823.82	0.15
Reach 1	101979.6	50 yr	4643	208	221.05	215.41	221.1	0.001074	2.34	3423.66	963.7	0.15
Reach 1	101979.6	100 yr	5822	208	221.73	216.38	221.78	0.001041	2.43	4080.47	968.09	0.15
Reach 1	100998.5	10 yr	2517	208	218.57	214.28	218.58	0.000875	1.11	2711.83	916.02	0.11
Reach 1	100998.5	50 yr	4643	208	220.18	216	220.2	0.000782	1.41	4272.72	1014.42	0.12
Reach 1	100998.5	100 yr	5822	208	220.89	216.01	220.92	0.000744	1.52	5000.17	1020.63	0.12
Reach 1	100268.9	10 yr	2517	204	217.82	212.64	217.86	0.001127	1.79	2164.5	784.45	0.14
Reach 1	100268.9	50 yr	4643	204	219.52	214.65	219.56	0.000982	2.04	3654.77	945.08	0.14
Reach 1	100268.9	100 yr	5822	204	220.27	216.15	220.31	0.000928	2.12	4377.34	977.04	0.14
Reach 1	98606.43	10 yr	2517	204	216.27	211.21	216.3	0.000791	1.93	2470.23	809.79	0.12
Reach 1	98606.43	50 yr	4643	204	218.09	214.44	218.13	0.000758	2.18	4289.26	1147.97	0.13
Reach 1	98606.43	100 yr	5822	204	218.96	214.79	218.99	0.000677	2.19	5313.23	1213.77	0.12
Reach 1	97734.7	10 yr	2517	205.01	215.58		215.61	0.000779	2.04	2404.74	912.57	0.13
Reach 1	97734.7	50 yr	4643	205.01	217.48		217.52	0.00065	2.14	4296.52	1055.69	0.12
Reach 1	97734.7	100 yr	5822	205.01	218.41		218.44	0.000586	2.16	5306.68	1112.6	0.12
Reach 1	96250.23	10 yr	2517	202	214.22	208.69	214.27	0.001057	2.29	1867.76	556.63	0.15
Reach 1	96250.23	50 yr	4643	202	216.26	211.12	216.32	0.001028	2.64	3022.36	610.76	0.15
Reach 1	96250.23	100 yr	5822	202	217.24	212	217.3	0.001049	2.84	3678.06	722.54	0.15
Reach 1	95264.73	10 yr	2517	202	213.34	207.41	213.38	0.000783	1.86	2146.3	629.15	0.12
Reach 1	95264.73	50 yr	4643	202	215.46	210.03	215.5	0.000683	2.08	3593.02	701.16	0.12
Reach 1	95264.73	100 yr	5822	202	216.44	210.6	216.48	0.000667	2.2	4299.82	765.74	0.12
Reach 1	94258.65	10 yr	2517	202	212.82		212.83	0.000389	1.51	3206.32	732.49	0.09
Reach 1	94258.65	50 yr	4643	202	214.97		214.98	0.000384	1.73	4860.79	825.19	0.09
Reach 1	94258.65	100 yr	5822	202	215.96		215.98	0.000375	1.81	5712.45	878.45	0.09
Reach 1	93272.17	10 yr	4713	202	212.4	208.1	212.41	0.000448	1.34	5375.5	1249.82	0.09
Reach 1	93272.17	50 yr	8581	202	214.55	208.5	214.57	0.000438	1.6	8156.52	1317.73	0.1
Reach 1	93272.17	100 yr	10760	202	215.56	208.77	215.58	0.00043	1.71	9483.62	1324.45	0.1

Reach 1	92980.49	10 yr	4713	202	212.21	207.91	212.24	0.000712	1.87	4147.6	935.67	0.12
Reach 1	92980.49	50 yr	8581	202	214.36	208.95	214.4	0.000735	2.25	6256.21	1020.29	0.13
Reach 1	92980.49	100 yr	10760	202	215.37	209.27	215.41	0.000723	2.39	7285.15	1027.12	0.13
Reach 1	92829.37		Bridge									
Reach 1	92734.37	10 yr	4713	202	211.98	208.67	212.01	0.001055	2.14	3714.62	901.38	0.14
Reach 1	92734.37	50 yr	8581	202	214.14	209.39	214.18	0.000955	2.45	5736.19	972.01	0.14
Reach 1	92734.37	100 yr	10760	202	215.15	209.7	215.19	0.000922	2.58	6714.91	1027.4	0.14
Reach 1	92504.4	10 yr	4713	202	211.77	208.01	211.8	0.0008	1.86	4057.38	890.9	0.13
Reach 1	92504.4	50 yr	8581	202	213.94	208.56	213.98	0.000796	2.23	6059.95	960.82	0.13
Reach 1	92504.4	100 yr	10760	202	214.95	208.91	215	0.000787	2.39	7075.3	1052.6	0.13
Reach 1	91303.04	10 yr	4713	198	211.12		211.15	0.000383	1.69	4418.36	936.35	0.09
Reach 1	91303.04	50 yr	8581	198	213.19		213.23	0.000492	2.16	6420.21	1017.17	0.11
Reach 1	91303.04	100 yr	10760	198	214.18		214.24	0.000514	2.33	7436.11	1020.89	0.11
Reach 1	90295.13	10 yr	4713	198	210.33	206.73	210.42	0.001842	3.14	2759.36	793.34	0.2
Reach 1	90295.13	50 yr	8581	198	212.29	207.66	212.39	0.001721	3.52	4332.16	826.52	0.2
Reach 1	90295.13	100 yr	10760	198	213.27	208	213.37	0.0017	3.72	5169.51	891.79	0.2
Reach 1	89313.17	10 yr	4713	198	208.65	204.96	208.73	0.001609	2.62	2731.89	812.66	0.18
Reach 1	89313.17	50 yr	8581	198	210.79	206.2	210.88	0.001375	2.92	4541.47	866.95	0.17
Reach 1	89313.17	100 yr	10760	198	211.84	206.66	211.93	0.001271	3.02	5457.98	879.42	0.17
Reach 1	88360.79	10 yr	4713	195.92	207.71	202.55	207.75	0.000696	2.12	4039	1003.39	0.12
Reach 1	88360.79	50 yr	8581	195.92	209.92	203.95	209.97	0.000679	2.42	6392.75	1111.87	0.13
Reach 1	88360.79	100 yr	10760	195.92	211.03	204.44	211.08	0.000634	2.49	7638.62	1126.3	0.12
Reach 1	86946.23	10 yr	5376	194	207.01	203.03	207.02	0.000401	1.64	6954.11	1682.03	0.09
Reach 1	86946.23	50 yr	9748	194	209.3	203.73	209.31	0.000345	1.75	10919.09	1768.8	0.09
Reach 1	86946.23	100 yr	12228	194	210.46	204.1	210.47	0.000316	1.78	12990.1	1787.89	0.09
Reach 1	85763.68	10 yr	5376	194	206.24	202.76	206.29	0.001064	2.67	3919.34	858.34	0.15
Reach 1	85763.68	50 yr	9748	194	208.61	203.76	208.66	0.000986	2.98	6139.34	959.96	0.15
Reach 1	85763.68	100 yr	12228	194	209.82	204.13	209.88	0.000909	3.05	7311.23	970.47	0.15
Reach 1	84304.58	10 yr	5376	192	205.15	200.63	205.17	0.000572	1.85	4987.29	1058.36	0.11
Reach 1	84304.58	50 yr	9748	192	207.56	201.61	207.6	0.000558	2.15	7594.48	1119.17	0.11
Reach 1	84304.58	100 yr	12228	192	208.74	202.07	208.78	0.000626	2.44	9070.52	1363.56	0.12
Reach 1	83700.74	10 yr	5376	192	204.77	199.12	204.81	0.000619	1.98	3843.35	817.36	0.12
Reach 1	83700.74	50 yr	9748	192	207.18	200.67	207.23	0.00065	2.38	6403.33	1015.82	0.12
Reach 1	83700.74	100 yr	12228	192	208.34	201.1	208.4	0.000653	2.55	7625.97	1099.89	0.13
Reach 1	82541.44	10 yr	5376	192	203.9	198.85	203.95	0.000902	2.16	3811.12	996.75	0.14
Reach 1	82541.44	50 yr	9748	192	206.37	200.33	206.42	0.000755	2.38	6321.8	1059.51	0.13
Reach 1	82541.44	100 yr	12228	192	207.55	200.79	207.61	0.000715	2.49	7607.47	1115.88	0.13
Reach 1	81753.13	10 yr	5376	192	203.28	197.58	203.31	0.000718	2.21	4286.81	826.43	0.13
Reach 1	81753.13	50 yr	9748	192	205.79	199.07	205.84	0.000712	2.57	6537.79	1002.78	0.13
Reach 1	81753.13	100 yr	12228	192	206.94	199.55	206.99	0.000839	2.97	7743.69	1106.68	0.14
Reach 1	80430.07	10 yr	5376	188	202.06	196	202.13	0.001137	2.87	3269.02	669.01	0.16
Reach 1	80430.07	50 yr	9748	188	204.55	198.73	204.64	0.00117	3.37	5107.83	788.06	0.17
Reach 1	80430.07	100 yr	12228	188	205.57	199.21	205.67	0.001199	3.6	5913.15	795.78	0.17
Reach 1	79347.86	10 yr	5376	188	201.05	195.9	201.1	0.000796	2.17	3924.89	979.19	0.13
Reach 1	79347.86	50 yr	9748	188	203.59	197.69	203.64	0.000733	2.48	7492.59	1521.71	0.13
Reach 1	79347.86	100 yr	12228	188	204.67	198	204.72	0.000653	2.49	9140.94	1532.23	0.13
Reach 1	78173.07	10 yr	5376	188	200.4	194.7	200.43	0.000426	1.63	5776.11	1307.44	0.1
Reach 1	78173.07	50 yr	9748	188	203.03	196.21	203.05	0.000359	1.78	9307.46	1394.12	0.09
Reach 1	78173.07	100 yr	12228	188	204.13	197.08	204.16	0.000354	1.88	10849.81	1394.12	0.09

Reach 1	77126.59	10 yr	5376	188	199.67	194.18	199.74	0.001088	2.84	2888.92	450.11	0.16
Reach 1	77126.59	50 yr	9748	188	202.24	195.37	202.37	0.001448	3.82	4238.15	755.38	0.19
Reach 1	77126.59	100 yr	12228	188	203.33	195.81	203.47	0.00151	4.12	5145.88	892.14	0.2
Reach 1	75906.48	10 yr	5376	184	197.46	193.27	197.64	0.003148	4.89	2134.69	463.78	0.26
Reach 1	75906.48	50 yr	9748	184	199.62	195.49	199.84	0.003247	5.62	3319.88	724.58	0.28
Reach 1	75906.48	100 yr	12228	184	200.65	195.97	200.88	0.003224	5.9	4255.41	962.07	0.28
Reach 1	74771.55	10 yr	5376	184	196.33	192	196.35	0.000548	1.98	5605.8	1377.3	0.11
Reach 1	74771.55	50 yr	9748	184	198.61	192.62	198.63	0.000486	2.13	8809.4	1423.01	0.11
Reach 1	74771.55	100 yr	12228	184	199.68	193.07	199.71	0.000469	2.22	10340.19	1433.79	0.11
Reach 1	73882.51	10 yr	5376	184	195.79	190.75	195.81	0.000676	1.56	4572.32	966.59	0.11
Reach 1	73882.51	50 yr	9748	184	198.1	191.88	198.14	0.000639	1.9	6822.05	974.59	0.12
Reach 1	73882.51	100 yr	12228	184	199.18	192.1	199.22	0.000639	2.06	7873.39	978.31	0.12
Reach 1	72505.33	10 yr	5376	182	195.1	189.47	195.12	0.000383	1.6	6495.66	1481.8	0.09
Reach 1	72505.33	50 yr	9748	182	197.49	191.61	197.51	0.000336	1.75	10053.26	1498.4	0.09
Reach 1	72505.33	100 yr	12228	182	198.58	191.73	198.6	0.000331	1.84	11683.94	1504.44	0.09
Reach 1	71346.87	10 yr	5376	182	194.23	188.53	194.31	0.001687	2.77	2691.2	452.84	0.18
Reach 1	71346.87	50 yr	9748	182	196.62	189.86	196.74	0.00191	3.33	3785.43	468.03	0.2
Reach 1	71346.87	100 yr	12228	182	197.68	190.01	197.82	0.002008	3.69	4288.33	483.5	0.21
Reach 1	70186.09	10 yr	5375	182	192.65	188.25	192.7	0.001151	2.81	3573.38	766.68	0.16
Reach 1	70186.09	50 yr	9744	182	194.95	189.27	195.02	0.001166	3.27	5473.45	852.84	0.17
Reach 1	70186.09	100 yr	12223	182	195.99	189.75	196.06	0.001162	3.45	6360.21	859.83	0.17
Reach 1	69207.5	10 yr	5375	178	191.74		191.79	0.000767	2.14	3899.74	943.41	0.13
Reach 1	69207.5	50 yr	9744	178	194.04		194.1	0.000772	2.51	6211.27	1045.86	0.13
Reach 1	69207.5	100 yr	12223	178	195.08		195.15	0.000765	2.66	7307.71	1052.27	0.14
Reach 1	67710.94	10 yr	5375	178	190.31	185.43	190.38	0.00119	2.61	3321.25	772.3	0.16
Reach 1	67710.94	50 yr	9744	178	192.61	187.55	192.69	0.001166	3.04	5421.57	1016.94	0.16
Reach 1	67710.94	100 yr	12223	178	193.7	188.26	193.78	0.001107	3.16	6549.23	1058.76	0.16
Reach 1	66841.3	10 yr	5375	178	189.67	184.47	189.7	0.000534	1.66	4984.77	1177.94	0.11
Reach 1	66841.3	50 yr	9744	178	192	185.77	192.04	0.00051	1.93	7857.49	1271.73	0.11
Reach 1	66841.3	100 yr	12223	178	193.12	186.2	193.15	0.000491	2.04	9287.04	1295.56	0.11
Reach 1	65899.21	10 yr	5375	178	189.2	183.44	189.23	0.000473	1.58	4653.7	917.21	0.1
Reach 1	65899.21	50 yr	9744	178	191.5	184.62	191.55	0.000528	1.98	6823.56	977.65	0.11
Reach 1	65899.21	100 yr	12223	178	192.61	185.18	192.66	0.000557	2.18	7931.31	1040.83	0.12
Reach 1	64371.68	10 yr	5375	176	188.15	183.3	188.21	0.000998	2.35	3361.43	683.37	0.15
Reach 1	64371.68	50 yr	9744	176	190.31	184.46	190.4	0.001146	2.95	4862.15	722.82	0.16
Reach 1	64371.68	100 yr	12223	176	191.34	184.96	191.44	0.001227	3.25	5633.96	777.1	0.17
Reach 1	63293.49	10 yr	5375	174	187.02	182.82	187.07	0.001108	2.48	3741.54	965.2	0.15
Reach 1	63293.49	50 yr	9744	174	189.14	184.08	189.2	0.001061	2.83	5912.91	1050.11	0.16
Reach 1	63293.49	100 yr	12223	174	190.15	184.6	190.22	0.001028	2.97	6982.76	1064.71	0.16
Reach 1	62734.52	10 yr	5375	174	186.53	181.8	186.57	0.000739	2.27	4135.49	701.32	0.13
Reach 1	62734.52	50 yr	9744	174	188.58	183.14	188.64	0.000939	2.9	5579.03	706.83	0.15
Reach 1	62734.52	100 yr	12223	174	189.58	183.46	189.65	0.00101	3.18	6284.29	710.09	0.16
Reach 1	61445.96	10 yr	5375	174	184.94		185.05	0.002151	3.29	2946.28	906.59	0.21
Reach 1	61445.96	50 yr	9744	174	186.82		186.93	0.00199	3.67	4672.61	948.18	0.21
Reach 1	61445.96	100 yr	12223	174	187.79		187.91	0.001883	3.81	5614.29	990.12	0.21
Reach 1	60665.99	10 yr	5375	174	183.77		183.82	0.001181	2.53	4191.98	1323.4	0.16
Reach 1	60665.99	50 yr	9744	174	185.87		185.92	0.000895	2.58	7036.23	1366.24	0.14
Reach 1	60665.99	100 yr	12223	174	186.91		186.96	0.00083	2.65	8483.77	1425.64	0.14

Reach 1	59655.91	10 yr	5375	172	183.36	180	183.37	0.000219	1.05	8136.41	1461.85	0.07
Reach 1	59655.91	50 yr	9745	172	185.45	180.01	185.47	0.000256	1.34	11207.84	1476.04	0.08
Reach 1	59655.91	100 yr	12224	172	186.49	180.02	186.51	0.000269	1.47	12742.85	1494.73	0.08
Reach 1	58792.02	10 yr	5375	172	183.06	179.06	183.08	0.000568	1.56	5917.95	1818.56	0.11
Reach 1	58792.02	50 yr	9745	172	185.16	180	185.18	0.000444	1.65	9852.72	1892.8	0.1
Reach 1	58792.02	100 yr	12224	172	186.2	180.22	186.22	0.0004	1.69	11831.07	1899.87	0.1
Reach 1	57476.03	10 yr	5375	172	182.27	178.32	182.29	0.000631	1.83	5358.35	1288.35	0.12
Reach 1	57476.03	50 yr	9745	172	184.5	179.85	184.52	0.000555	2.03	8301.45	1344.17	0.11
Reach 1	57476.03	100 yr	12224	172	185.59	179.85	185.62	0.000522	2.1	9776.07	1349.4	0.11
Reach 1	56111.01	10 yr	5375	171.61	181.37	176.07	181.41	0.000664	1.99	4552.57	1014.65	0.12
Reach 1	56111.01	50 yr	9745	171.61	183.67	177.38	183.72	0.000638	2.29	6888.82	1020.57	0.12
Reach 1	56111.01	100 yr	12224	171.61	184.8	178.24	184.85	0.000624	2.41	8040.32	1093.5	0.12
Reach 1	54998.39	10 yr	5375	168	180.68	175.9	180.71	0.000615	2.18	4664.15	805.96	0.12
Reach 1	54998.39	50 yr	9745	168	182.94	176.71	182.98	0.000703	2.65	6489.59	811.19	0.13
Reach 1	54998.39	100 yr	12224	168	184.06	177.12	184.11	0.000725	2.84	7402.41	827.92	0.13
Reach 1	53922.78	10 yr	5375	168	179.95	175.24	179.99	0.000729	2.12	4471.81	960.23	0.13
Reach 1	53922.78	50 yr	9745	168	182.15	175.54	182.2	0.000749	2.49	6644.02	1012.04	0.13
Reach 1	53922.78	100 yr	12224	168	183.27	177.18	183.33	0.000732	2.63	7795.84	1038.77	0.13
Reach 1	52312.84	10 yr	5375	168	179.03	174.16	179.05	0.000478	1.53	6048.72	1617.07	0.1
Reach 1	52312.84	50 yr	9745	168	181.33	175.6	181.35	0.000385	1.65	9825.87	1674.66	0.09
Reach 1	52312.84	100 yr	12224	168	182.51	176.03	182.53	0.000349	1.69	11828.15	1716.04	0.09
Reach 1	51397.14	10 yr	5375	168	178.49	173.67	178.52	0.000698	2.13	4385.1	935.93	0.12
Reach 1	51397.14	50 yr	9745	168	180.86	175.34	180.9	0.000657	2.41	6868.86	963.29	0.13
Reach 1	51397.14	100 yr	12224	168	182.06	176	182.11	0.00064	2.54	8031.95	977.68	0.13
Reach 1	49873.99	10 yr	5375	168	177.58	171.99	177.6	0.000519	1.83	4766.11	816.92	0.11
Reach 1	49873.99	50 yr	9745	168	179.89	171.99	179.94	0.000607	2.3	6696.59	908.29	0.12
Reach 1	49873.99	100 yr	12224	168	181.01	171.99	181.06	0.000734	2.69	7861.81	1064.93	0.13
Reach 1	48863.91	10 yr	5375	166	177.19	172	177.21	0.000302	1.41	6568.26	1357.91	0.08
Reach 1	48863.91	50 yr	9745	166	179.47	172.01	179.49	0.000329	1.71	9867.81	1492.48	0.09
Reach 1	48863.91	100 yr	12224	166	180.54	172.15	180.57	0.000342	1.85	11493.07	1539.87	0.09
Reach 1	47468.78	10 yr	5375	166	176.59	171.34	176.62	0.000616	1.85	5085.6	1373.43	0.11
Reach 1	47468.78	50 yr	9745	166	178.89	173.08	178.92	0.000516	2	8372.81	1462.68	0.11
Reach 1	47468.78	100 yr	12224	166	179.97	173.67	180	0.000482	2.07	9959.48	1467.28	0.11
Reach 1	46475.52	10 yr	5406	162	176.07	168.72	176.11	0.000442	1.89	5003.62	1173.52	0.1
Reach 1	46475.52	50 yr	9791	162	178.39	170.56	178.43	0.000466	2.21	7729.71	1181.14	0.11
Reach 1	46475.52	100 yr	12279	162	179.48	171.19	179.53	0.000471	2.35	9023.29	1184.74	0.11
Reach 1	45311.81	10 yr	5406	162	175.62	168.97	175.64	0.00036	1.44	6260.35	1417.77	0.09
Reach 1	45311.81	50 yr	9791	162	177.94	170.85	177.96	0.000346	1.67	9637.29	1506.99	0.09
Reach 1	45311.81	100 yr	12279	162	179.04	172.26	179.06	0.000337	1.75	11299.58	1516.55	0.09
Reach 1	44122.59	10 yr	5406	162	174.79	170.62	174.88	0.001403	3.04	2676.98	513.78	0.17
Reach 1	44122.59	50 yr	9791	162	177.06	171.79	177.19	0.001578	3.72	4286.06	780.77	0.19
Reach 1	44122.59	100 yr	12279	162	178.17	172.28	178.3	0.001548	3.92	5153.51	780.77	0.19
Reach 1	43305.32	10 yr	5406	162	173.67	169.6	173.75	0.001358	2.85	2817.05	502.1	0.17
Reach 1	43305.32	50 yr	9791	162	175.7	170.57	175.83	0.001763	3.74	3855.34	531.28	0.2
Reach 1	43305.32	100 yr	12279	162	176.76	171.02	176.92	0.001878	4.11	4427.31	598.99	0.21
Reach 1	42249.08	10 yr	5406	162	172.77	168.52	172.79	0.000649	1.34	5490.14	1598.84	0.11
Reach 1	42249.08	50 yr	9791	162	174.91	170.08	174.93	0.000479	1.47	8953.36	1628.91	0.1
Reach 1	42249.08	100 yr	12279	162	176.05	170.3	176.07	0.000415	1.52	10819.17	1637.14	0.09
Reach 1	40966.61	10 yr	5406	162	171.92	167.11	171.94	0.000668	1.59	5669.79	1424.39	0.11

Reach 1	40966.61	50 yr	9791	162	174.29	168.25	174.31	0.00049	1.69	9066.45	1435.94	0.1
Reach 1	40966.61	100 yr	12279	162	175.51	168.8	175.53	0.000434	1.74	10816	1435.94	0.1
Reach 1	39658.88	10 yr	5406	162	171.02	167.08	171.04	0.000711	1.93	5201.13	1335.28	0.12
Reach 1	39658.88	50 yr	9791	162	173.65	168.18	173.67	0.000488	1.95	8852.28	1437.02	0.11
Reach 1	39658.88	100 yr	12279	162	174.94	168.69	174.97	0.000424	1.96	10735.88	1460.04	0.1
Reach 1	38757.5	10 yr	5406	158	170.51	165.62	170.53	0.000471	1.94	6275.29	1467.9	0.1
Reach 1	38757.5	50 yr	9791	158	173.29	165.83	173.31	0.000336	1.91	10491.87	1557.13	0.09
Reach 1	38757.5	100 yr	12279	158	174.63	165.84	174.65	0.0003	1.92	12602.11	1587.22	0.09
Reach 1	38200.74	10 yr	5406	158	170.18	165.63	170.21	0.000692	2.13	4391.91	793.68	0.12
Reach 1	38200.74	50 yr	9791	158	173.01	166.76	173.05	0.000658	2.48	7042.05	993.11	0.13
Reach 1	38200.74	100 yr	12279	158	174.38	167.09	174.42	0.000601	2.55	8412.34	1011.49	0.12
Reach 1	37492.84	10 yr	5406	158	169.85	164.1	169.87	0.000352	1.29	5481.32	959.83	0.09
Reach 1	37492.84	50 yr	9791	158	172.69	164.73	172.72	0.000344	1.59	8642.43	1208.81	0.09
Reach 1	37492.84	100 yr	12279	158	174.09	165.05	174.11	0.000316	1.67	10343.19	1228.66	0.09
Reach 1	36580.05	10 yr	5406	161.01	169.45	164.01	169.47	0.000552	1.68	5217.51	971	0.11
Reach 1	36580.05	50 yr	9791	161.01	172.34	164.68	172.36	0.00045	1.88	8022.5	971	0.1
Reach 1	36580.05	100 yr	12279	161.01	173.75	165.07	173.78	0.000423	1.99	9396.77	971	0.1
Reach 1	35507.14	10 yr	5406	158	169.01	162.04	169.03	0.000314	1.53	6253.08	969.55	0.08
Reach 1	35507.14	50 yr	9791	158	171.94	163.17	171.95	0.000322	1.84	9175.34	1047.04	0.09
Reach 1	35507.14	100 yr	12279	158	173.36	163.72	173.38	0.000326	1.98	10707.64	1101.3	0.09
Reach 1	34849.13	10 yr	5406	158	168.77	161.9	168.8	0.000381	1.5	4908.25	945.47	0.09
Reach 1	34849.13	50 yr	9791	158	171.7	163.08	171.73	0.000346	1.74	7731.92	987.38	0.09
Reach 1	34849.13	100 yr	12279	158	173.13	163.65	173.16	0.000332	1.84	9158.22	1010.7	0.09
Reach 1	33370.94	10 yr	5406	156	168.42	162.87	168.43	0.000169	0.99	7446.48	1113.76	0.06
Reach 1	33370.94	50 yr	9791	156	171.35	164	171.36	0.000183	1.26	10760.73	1166.24	0.07
Reach 1	33370.94	100 yr	12279	156	172.78	164	172.79	0.000187	1.38	12462.17	1214.64	0.07
Reach 1	32021.58	10 yr	5406	156	168	162	168.04	0.000594	2.18	4246.12	659.02	0.12
Reach 1	32021.58	50 yr	9791	156	170.9	163.63	170.95	0.000607	2.58	6179.88	695.57	0.12
Reach 1	32021.58	100 yr	12279	156	172.32	163.99	172.37	0.000603	2.75	7259.32	812.62	0.12
Reach 1	31212.27	10 yr	5406	156	167.38	161.69	167.43	0.000967	2.72	4115.83	1004.28	0.15
Reach 1	31212.27	50 yr	9791	156	170.41	163.1	170.45	0.000614	2.57	7201.86	1034.43	0.12
Reach 1	31212.27	100 yr	12279	156	171.87	163.71	171.91	0.000542	2.59	8733.67	1066.41	0.12
Reach 1	29931.87	10 yr	5406	152	166.47	160	166.51	0.000558	1.96	4455.35	762.28	0.11
Reach 1	29931.87	50 yr	9791	152	169.73	160.65	169.77	0.000473	2.19	7022.14	800.35	0.11
Reach 1	29931.87	100 yr	12279	152	171.22	161.14	171.26	0.000476	2.37	8247.05	852.72	0.11
Reach 1	28687.16	10 yr	5406	152	166.16	158.06	166.17	0.000155	1.18	7376.35	949.8	0.06
Reach 1	28687.16	50 yr	9791	152	169.41	159.06	169.43	0.00017	1.45	10560.11	992.22	0.07
Reach 1	28687.16	100 yr	12279	152	170.89	159.49	170.91	0.00018	1.59	12041.26	1022.8	0.07
Reach 1	27568.89	10 yr	5406	152	165.86		165.9	0.000419	1.82	4254.54	548.74	0.1
Reach 1	27568.89	50 yr	9791	152	169.08		169.13	0.000472	2.31	6136.18	608.07	0.11
Reach 1	27568.89	100 yr	12279	152	170.53		170.59	0.000502	2.54	7029.81	642.42	0.11
Reach 1	26738.66	10 yr	5406	152	165.67		165.68	0.000166	1.24	7202.77	943.69	0.06
Reach 1	26738.66	50 yr	9791	152	168.87		168.88	0.000189	1.55	10413.34	1049.49	0.07
Reach 1	26738.66	100 yr	12279	152	170.3		170.32	0.000205	1.71	11943.4	1094.07	0.07
Reach 1	25956.46	10 yr	5406	152	165.51		165.53	0.000248	1.45	5582.93	678.82	0.08
Reach 1	25956.46	50 yr	9791	152	168.66		168.69	0.000316	1.94	7932.05	800.09	0.09
Reach 1	25956.46	100 yr	12279	152	170.09		170.12	0.000327	2.1	9078.23	809.48	0.09
Reach 1	25307.43	10 yr	5406	152	165.26		165.3	0.000546	2.26	4165.65	631.17	0.11
Reach 1	25307.43	50 yr	9791	152	168.36		168.41	0.000635	2.83	6561.97	883.59	0.13

Reach 1	25307.43	100 yr	12279	152	169.79		169.84	0.000596	2.91	7832.98	893.82	0.13
Reach 1	24484.37	10 yr	5406	148	164.97	156	164.99	0.000264	1.63	5901.24	950.88	0.08
Reach 1	24484.37	50 yr	9791	148	168.04	156	168.07	0.000284	1.95	8937.81	1017.93	0.09
Reach 1	24484.37	100 yr	12279	148	169.48	156	169.51	0.000282	2.06	10407.4	1024.09	0.09
Reach 1	23186.49	10 yr	5406	148	164.46		164.5	0.000606	1.69	4083.59	918.79	0.11
Reach 1	23186.49	50 yr	9791	148	167.59		167.63	0.000424	1.8	7314.09	1066.6	0.1
Reach 1	23186.49	100 yr	12279	148	169.05		169.09	0.000381	1.86	8874.74	1066.6	0.1
Reach 1	22034.16	10 yr	5406	148	163.64	155.24	163.72	0.000872	2.52	2697.34	353.73	0.14
Reach 1	22034.16	50 yr	9791	148	166.81	157.49	166.93	0.00109	3.06	3897.57	453.65	0.16
Reach 1	22034.16	100 yr	12279	148	168.31	158.49	168.44	0.001078	3.3	4746.21	701.15	0.16
Reach 1	20846.64	10 yr	5406	146	162.84	153.72	162.89	0.000559	1.93	3674.67	780.41	0.11
Reach 1	20846.64	50 yr	9791	146	166.02	155.72	166.07	0.000495	2.2	6298.67	866.91	0.11
Reach 1	20846.64	100 yr	12279	146	167.54	156.88	167.6	0.000478	2.34	7688.7	960.43	0.11
Reach 1	19733.75	10 yr	5406	146	161.54		161.8	0.002047	4.11	1406.35	161.54	0.22
Reach 1	19733.75	50 yr	9791	146	164.44		164.93	0.002914	5.72	1919.55	193.87	0.27
Reach 1	19733.75	100 yr	12279	146	165.75		166.41	0.003481	6.64	2185.53	322.38	0.3
Reach 1	18610.39	10 yr	5866	146	160.42	153.85	160.47	0.00073	2.26	3932.6	760.93	0.13
Reach 1	18610.39	50 yr	10604	146	163.41	156.21	163.47	0.00066	2.57	6304.96	811.07	0.13
Reach 1	18610.39	100 yr	13298	146	164.77	156.21	164.84	0.000654	2.74	7426.16	842.49	0.13
Reach 1	17427.55	10 yr	5866	146	159.3		159.39	0.001176	2.54	2716.26	465.02	0.16
Reach 1	17427.55	50 yr	10604	146	162.35		162.47	0.001116	3.07	4177.88	495.54	0.16
Reach 1	17427.55	100 yr	13298	146	163.69		163.84	0.001131	3.34	4847.45	500.77	0.17
Reach 1	16506.49	10 yr	5866	146	158.8	153.58	158.82	0.00036	1.46	5598.55	858.33	0.09
Reach 1	16506.49	50 yr	10604	146	161.83	154	161.86	0.000409	1.91	8402.79	998.91	0.1
Reach 1	16506.49	100 yr	13298	146	163.19	154	163.22	0.000402	2.04	9766.89	1006.21	0.1
Reach 1	15082.54	10 yr	5866	146	158.09		158.15	0.000637	2.07	3549.95	760.3	0.12
Reach 1	15082.54	50 yr	10604	146	161.06		161.14	0.000627	2.48	5895.89	871.92	0.12
Reach 1	15082.54	100 yr	13298	146	162.43		162.52	0.000618	2.64	7148.73	938.36	0.13
Reach 1	14205	10 yr	5866	146	157.32	150.09	157.4	0.001207	2.98	3214.47	561.27	0.17
Reach 1	14205	50 yr	10604	146	160.31	153.29	160.41	0.001151	3.46	5012.7	635.53	0.17
Reach 1	14205	100 yr	13298	146	161.69	153.87	161.8	0.001133	3.67	5920.65	678.69	0.17
Reach 1	13144.96	10 yr	5866	146	156.35	150.21	156.41	0.00074	2.25	3477.69	502.22	0.13
Reach 1	13144.96	50 yr	10604	146	159.31	151.59	159.4	0.000808	2.82	4972.53	508.99	0.14
Reach 1	13144.96	100 yr	13298	146	160.64	152.15	160.75	0.000872	3.14	5687.19	615.29	0.15
Reach 1	11937.65	10 yr	5866	146	155.47	150.78	155.51	0.000757	1.92	4597.66	1025.53	0.13
Reach 1	11937.65	50 yr	10604	146	158.59	152.03	158.62	0.000507	1.99	7909.07	1085.99	0.11
Reach 1	11937.65	100 yr	13298	146	159.94	152.4	159.98	0.000473	2.09	9378.07	1090.71	0.11
Reach 1	11143.64	10 yr	5866	146	155.02	149.7	155.05	0.000455	1.58	5227.24	911.93	0.1
Reach 1	11143.64	50 yr	10604	146	158.25	150.07	158.28	0.000373	1.8	8171.73	911.93	0.09
Reach 1	11143.64	100 yr	13298	146	159.61	150.07	159.64	0.000375	1.94	9410.38	911.93	0.1
Reach 1	10738.33	10 yr	5866	146	154.89	148.52	154.91	0.000258	1.18	5869.17	970.62	0.07
Reach 1	10738.33	50 yr	10604	146	158.14	149.29	158.16	0.000227	1.4	9127.78	1019.34	0.07
Reach 1	10738.33	100 yr	13298	146	159.49	149.67	159.52	0.000232	1.52	10511.42	1019.34	0.08
Reach 1	9866.886	10 yr	5866	146	154.58		154.62	0.000443	1.5	4189.8	651.22	0.1
Reach 1	9866.886	50 yr	10604	146	157.85		157.9	0.000407	1.83	6500.88	778.11	0.1
Reach 1	9866.886	100 yr	13298	146	159.2		159.26	0.000416	2	7577.94	815.31	0.1
Reach 1	9171.781	10 yr	5866	146	154.21	148.56	154.24	0.000663	1.76	4259.07	621.19	0.12
Reach 1	9171.781	50 yr	10604	146	157.52	149.32	157.56	0.000592	2.15	6318.11	625.76	0.12
Reach 1	9171.781	100 yr	13298	146	158.85	149.66	158.91	0.000619	2.38	7156.86	633.44	0.12

Reach 1	8187.326	10 yr	5866	146	153.41	148.74	153.46	0.000963	1.82	3217.93	637.15	0.14
Reach 1	8187.326	50 yr	10604	146	156.96	149.57	157.01	0.000534	1.88	6394.12	943.32	0.11
Reach 1	8187.326	100 yr	13298	146	158.31	149.98	158.36	0.000502	1.99	7683.07	969.15	0.11
Reach 1	7303.347	10 yr	5866	146	152.75		152.79	0.000615	1.53	4053.79	902.2	0.11
Reach 1	7303.347	50 yr	10604	146	156.61		156.65	0.000321	1.54	8013.94	1068.48	0.09
Reach 1	7303.347	100 yr	13298	146	157.98		158.01	0.000309	1.64	9470.51	1068.48	0.09
Reach 1	6470.493	10 yr	5866	142	152.39	146.05	152.4	0.000347	1.4	6224.58	953.96	0.09
Reach 1	6470.493	50 yr	10604	142	156.39	147.39	156.41	0.000245	1.53	10129.12	1010.01	0.08
Reach 1	6470.493	100 yr	13298	142	157.75	147.68	157.77	0.000264	1.71	11528.44	1053.2	0.08
Reach 1	5530.472	10 yr	5866	142	152.02	146.5	152.04	0.000435	1.45	5281.26	983.85	0.09
Reach 1	5530.472	50 yr	10604	142	156.15	147.59	156.17	0.000259	1.51	9585.32	1199.27	0.08
Reach 1	5530.472	100 yr	13298	142	157.49	148.2	157.52	0.00027	1.66	11311.32	1366.86	0.08
Reach 1	4587.731	10 yr	5866	142	151.59		151.62	0.00047	1.66	5345.39	941.25	0.1
Reach 1	4587.731	50 yr	10604	142	155.91		155.93	0.000255	1.62	9644.32	1069.73	0.08
Reach 1	4587.731	100 yr	13298	142	157.24		157.27	0.000266	1.76	11129.71	1158.58	0.08
Reach 1	3812.865	10 yr	5866	142	151.22		151.24	0.000502	1.79	5724.06	1066.51	0.11
Reach 1	3812.865	50 yr	10604	142	155.72		155.74	0.000247	1.64	10998.55	1436.78	0.08
Reach 1	3812.865	100 yr	13298	142	157.05		157.07	0.000253	1.77	13060.22	1573.57	0.08
Reach 1	2830.46	10 yr	5866	142	150.79		150.82	0.000376	1.52	5685.49	959.83	0.09
Reach 1	2830.46	50 yr	10604	142	155.49		155.51	0.000209	1.51	10419.78	1106.01	0.07
Reach 1	2830.46	100 yr	13298	142	156.81		156.83	0.000224	1.67	11934.11	1161.16	0.08
Reach 1	1704.934	10 yr	5866	142	150.45	143.86	150.47	0.000257	1.1	5352.69	1361.41	0.07
Reach 1	1704.934	50 yr	10604	142	155.34	144.58	155.35	0.000099	0.93	13252.14	1630.56	0.05
Reach 1	1704.934	100 yr	13298	142	156.65	144.95	156.66	0.000105	1.03	15108.68	1732.42	0.05
Reach 1	699.9124	10 yr	5866	128	150.4	133.72	150.4	0.000026	0.66	15420.79	1404.65	0.03
Reach 1	699.9124	50 yr	10604	128	155.3	134.86	155.3	0.000028	0.79	22303.58	1404.65	0.03
Reach 1	699.9124	100 yr	13298	128	156.6	134.86	156.61	0.000034	0.91	24129.63	1404.65	0.03
HEC-RAS PLAN: PROPOSED 3 PONDS RIVER: MILL CREEK REACH: 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)	
Reach 1	174507	10 yr	2294.3	296	307.47	302.29	307.61	0.002021	3.22	978.99	550.4	0.2
Reach 1	174507	50 yr	4246.3	296	308.91	304.45	309.05	0.002216	3.77	2204.87	787.16	0.22
Reach 1	174507	100 yr	5350.8	296	309.54	305.75	309.69	0.002308	4.02	2724.59	878.53	0.23
Reach 1	173479.3	10 yr	2294.3	296	305.51	301.14	305.6	0.001841	2.71	1440.57	751.02	0.19
Reach 1	173479.3	50 yr	4246.3	296	306.77	302.84	306.87	0.002022	3.2	2469.64	866.86	0.2
Reach 1	173479.3	100 yr	5350.8	296	307.36	303.62	307.46	0.002009	3.35	2989.75	890.71	0.21
Reach 1	172871.7	10 yr	2294.3	296	303.65	300.77	303.81	0.005391	3.5	808.52	353.32	0.3
Reach 1	172871.7	50 yr	4246.3	296	305.44	302.75	305.52	0.002443	2.96	2665.75	1046.4	0.21
Reach 1	172871.7	100 yr	5350.8	296	306.21	303.61	306.27	0.001872	2.81	3485.18	1084.06	0.19
Reach 1	171232.7	10 yr	2294.3	290	301.69	293.91	301.74	0.000538	2.09	1995.77	624.17	0.11
Reach 1	171232.7	50 yr	4246.3	290	303.76	295.26	303.81	0.000568	2.42	3328.46	655.07	0.12
Reach 1	171232.7	100 yr	5350.8	290	304.51	295.88	304.58	0.000651	2.69	3841.92	715.5	0.13
Reach 1	170298.1	10 yr	2294.3	290	300.59	295.78	300.76	0.002709	3.73	1071.13	541.78	0.23
Reach 1	170298.1	50 yr	4246.3	290	302.88	298.45	302.97	0.001569	3.35	2666.37	771.18	0.18
Reach 1	170298.1	100 yr	5350.8	290	303.6	299.1	303.68	0.001507	3.43	3217.39	776.23	0.18
Reach 1	169304.9	10 yr	2294.3	286	298.31		298.43	0.002024	2.88	797.36	120.37	0.2
Reach 1	169304.9	50 yr	4246.3	286	300.7		300.88	0.002939	3.49	1453.08	673.48	0.24
Reach 1	169304.9	100 yr	5350.8	286	301.54		301.72	0.002674	3.61	2145.02	1008.98	0.23
Reach 1	168301.8	10 yr	2294.3	286	296.55	291.7	296.65	0.001568	2.81	1224.4	477.67	0.18

Reach 1	168301.8	50 yr	4246.3	286	298.61	293.73	298.73	0.001613	3.34	1936.67	531.35	0.19
Reach 1	168301.8	100 yr	5350.8	286	299.45	294.49	299.58	0.001723	3.65	2233.8	568.48	0.2
Reach 1	167268.9	10 yr	2294.3	284	294.54		294.68	0.002371	3.03	788.8	245.63	0.21
Reach 1	167268.9	50 yr	4246.3	284	296.59		296.76	0.00228	3.59	1742.96	588.28	0.22
Reach 1	167268.9	100 yr	5350.8	284	297.46		297.63	0.00209	3.67	2262.1	599.68	0.21
Reach 1	166274.1	10 yr	2294.3	282.69	293.42	286.19	293.47	0.000707	1.84	1249.16	349.38	0.12
Reach 1	166274.1	50 yr	4246.3	282.69	295.49	287.46	295.55	0.000724	2.14	2649.79	559.54	0.13
Reach 1	166274.1	100 yr	5350.8	282.69	296.34	288.08	296.41	0.000773	2.35	3148.21	599.24	0.13
Reach 1	165453.1	10 yr	2294.3	280	292.59	286.59	292.67	0.001434	2.44	1175.35	390.32	0.17
Reach 1	165453.1	50 yr	4246.3	280	294.61	288.68	294.72	0.001507	2.98	2066.51	520.85	0.18
Reach 1	165453.1	100 yr	5350.8	280	295.39	289.67	295.52	0.001631	3.29	2523.08	644.48	0.19
Reach 1	164294.3	10 yr	2294.3	276	290.89	283.26	290.98	0.001478	2.66	1220.91	478.12	0.17
Reach 1	164294.3	50 yr	4246.3	276	293.06	285.72	293.15	0.001214	2.86	2510.66	644.27	0.16
Reach 1	164294.3	100 yr	5350.8	276	293.73	286.75	293.82	0.001301	3.09	2940.82	649.07	0.17
Reach 1	163291.2	10 yr	2294.3	276	289.24	282.01	289.37	0.001744	2.97	900.31	208.9	0.19
Reach 1	163291.2	50 yr	4246.3	276	291.5	284.34	291.66	0.001822	3.59	2127.96	917.29	0.2
Reach 1	163291.2	100 yr	5350.8	276	292.07	285.53	292.24	0.001935	3.84	2659.35	1019.26	0.21
Reach 1	162285	10 yr	2294.3	274	287.25	279.57	287.38	0.00226	2.97	773.14	156.3	0.21
Reach 1	162285	50 yr	4246.3	274	289.22	281.88	289.39	0.002873	3.53	1871.94	1227.61	0.24
Reach 1	162285	100 yr	5350.8	274	289.86	282.93	290.01	0.002545	3.52	2689.56	1318.48	0.23
Reach 1	161278.1	10 yr	2294.3	270	285.39		285.51	0.001551	2.86	1103.04	553.07	0.18
Reach 1	161278.1	50 yr	4246.3	270	287.17		287.29	0.001573	3.28	2268.05	688.88	0.18
Reach 1	161278.1	100 yr	5350.8	270	287.88		288	0.001592	3.46	2762.25	699.17	0.19
Reach 1	160286	10 yr	2294.3	270	284.15	276.2	284.24	0.001062	2.47	1456.16	734	0.15
Reach 1	160286	50 yr	4246.3	270	285.95	278.65	286.03	0.001032	2.77	3010.89	993.24	0.15
Reach 1	160286	100 yr	5350.8	270	286.69	279.75	286.77	0.000983	2.83	3764.13	1025.5	0.15
Reach 1	159266.2	10 yr	2294.3	270	282.7	276.27	282.79	0.002003	2.4	987.52	408.55	0.19
Reach 1	159266.2	50 yr	4246.3	270	284.64	279.56	284.73	0.001594	2.61	2448.69	951.68	0.18
Reach 1	159266.2	100 yr	5350.8	270	285.54	280.22	285.61	0.001308	2.57	3340.96	1049.01	0.16
Reach 1	158273.3	10 yr	2294.3	266	280.04	273.03	280.19	0.003553	3.06	750.97	166.64	0.25
Reach 1	158273.3	50 yr	4246.3	266	282.07	275.68	282.3	0.004176	3.91	1085.67	273.08	0.28
Reach 1	158273.3	100 yr	5350.8	266	282.93	276.68	283.21	0.005791	4.22	1266.59	404.79	0.32
Reach 1	157283.5	10 yr	2294.3	266	279.57		279.59	0.00022	1.04	2281.54	432.87	0.07
Reach 1	157283.5	50 yr	4246.3	266	281.4		281.43	0.000337	1.49	3184.59	517.64	0.09
Reach 1	157283.5	100 yr	5350.8	266	282.09		282.13	0.000409	1.72	3544.51	550.45	0.1
Reach 1	157091.2	10 yr	2294.3	266	279.49	270.47	279.52	0.000496	1.58	1588.43	407.21	0.1
Reach 1	157091.2	50 yr	4246.3	266	281.27	272.18	281.33	0.000711	2.17	2437.42	502.39	0.13
Reach 1	157091.2	100 yr	5350.8	266	281.92	273	282.01	0.000839	2.47	2773.67	537.1	0.14
Reach 1	156934.3		Bridge									
Reach 1	156834.3	10 yr	2294.3	266	279.15	272.34	279.22	0.001523	2.33	1296.66	401.93	0.17
Reach 1	156834.3	50 yr	4246.3	266	280.89	275.2	280.98	0.001789	2.7	2335.36	834.73	0.19
Reach 1	156834.3	100 yr	5350.8	266	281.52	276.17	281.6	0.001936	2.79	2871.1	883.08	0.19
Reach 1	156735.2	10 yr	2294.3	266	279.03	272.32	279.09	0.001101	2.1	1502.62	537.32	0.15
Reach 1	156735.2	50 yr	4246.3	266	280.76	274.43	280.83	0.001159	2.53	2566.97	767.62	0.16
Reach 1	156735.2	100 yr	5350.8	266	281.36	275.34	281.45	0.001288	2.8	2968.16	889.52	0.17
Reach 1	155914.3	10 yr	2294.3	264	278.18	270.7	278.24	0.00097	2.23	1698.55	668.22	0.14
Reach 1	155914.3	50 yr	4246.3	264	279.83	272.89	279.9	0.001109	2.7	2840.4	976.08	0.15
Reach 1	155914.3	100 yr	5350.8	264	280.29	273.88	280.38	0.00131	3.03	3211.42	1014.41	0.17

Reach 1	155053.7	10 yr	2294.3	264	277.39	269.24	277.45	0.000877	2.25	1507.82	763.1	0.13
Reach 1	155053.7	50 yr	4246.3	264	278.97	271.86	279.01	0.000948	2.21	3765.21	1395.9	0.14
Reach 1	155053.7	100 yr	5350.8	264	279.24	272.98	279.29	0.001208	2.54	4144.8	1420.43	0.16
Reach 1	154269	10 yr	2294.3	264	276.56	269.38	276.64	0.001224	2.4	1243.69	1057.33	0.16
Reach 1	154269	50 yr	4246.3	264	277.76	271.57	277.92	0.002151	3.52	1639.66	1105.21	0.21
Reach 1	154269	100 yr	5350.8	264	278.35	273.03	278.41	0.001041	2.56	4082.32	1154.03	0.15
Reach 1	153259.5	10 yr	2294.3	264	275.44	270.14	275.46	0.001088	1.5	2086.68	764.33	0.13
Reach 1	153259.5	50 yr	4246.3	264	276.66	273.84	276.7	0.001242	1.92	3073.24	821.79	0.15
Reach 1	153259.5	100 yr	5350.8	264	277.18	274.29	277.23	0.001327	2.12	3505.17	827.5	0.16
Reach 1	152248.4	10 yr	2294.3	260	274.17	266.4	274.22	0.001379	2.02	1938.57	1275.2	0.16
Reach 1	152248.4	50 yr	4246.3	260	275.41	268.55	275.45	0.001225	2.2	3799.05	1694.37	0.15
Reach 1	152248.4	100 yr	5350.8	260	275.97	269.56	276.01	0.001105	2.21	4762.01	1756.65	0.15
Reach 1	151251.5	10 yr	2294.3	260	272.79	268.64	272.81	0.001442	1.42	2352.33	1067.16	0.15
Reach 1	151251.5	50 yr	4246.3	260	274.28	272	274.31	0.001069	1.61	4070.88	1362.83	0.13
Reach 1	151251.5	100 yr	5350.8	260	274.95	272	274.97	0.000965	1.68	5055.09	1540.6	0.13
Reach 1	150269.6	10 yr	2294.3	260	269.84	265.02	270.12	0.006816	4.25	539.85	571.3	0.34
Reach 1	150269.6	50 yr	4246.3	260	271.26	267.16	271.81	0.011017	5.94	714.98	1078.53	0.45
Reach 1	150269.6	100 yr	5350.8	260	271.89	268.48	272.58	0.012517	6.7	811.02	1476.91	0.48
Reach 1	149285.9	10 yr	2294.3	260	269.03	265.26	269.04	0.000393	1.15	3581.02	1114.44	0.08
Reach 1	149285.9	50 yr	4246.3	260	269.88	265.92	269.89	0.000705	1.69	4598.57	1293.01	0.12
Reach 1	149285.9	100 yr	5350.8	260	270.32	266	270.34	0.000822	1.9	5179.26	1422.94	0.13
Reach 1	148288.1	10 yr	2294.3	260	268.52	265.56	268.53	0.000688	1.07	3106.55	1583.22	0.1
Reach 1	148288.1	50 yr	4246.3	260	268.91	266.21	268.93	0.001422	1.66	4038.9	2128.85	0.15
Reach 1	148288.1	100 yr	5350.8	260	269.22	266.58	269.25	0.001537	1.82	4721.56	2148.44	0.16
Reach 1	147249.2	10 yr	2294.3	260	268.29	264.13	268.29	0.000113	0.59	5887.12	1840.64	0.05
Reach 1	147249.2	50 yr	4246.3	260	268.16	264.63	268.17	0.000438	1.13	5651.82	1837.17	0.09
Reach 1	147249.2	100 yr	5350.8	260	268.25	264.88	268.27	0.000639	1.39	5815.41	1839.58	0.11
Reach 1	146260.1	10 yr	2294.3	260	268.22	263.48	268.22	0.000047	0.43	8075.13	1655.97	0.03
Reach 1	146260.1	50 yr	4246.3	260	267.88	263.49	267.89	0.000205	0.86	7513.32	1645.92	0.06
Reach 1	146260.1	100 yr	5350.8	260	267.81	264.08	267.81	0.000343	1.1	7388.67	1645.41	0.08
Reach 1	145874.1	10 yr	2294.3	260.75	268.19	266.31	268.2	0.000121	0.46	5956.26	1507.43	0.04
Reach 1	145874.1	50 yr	4246.3	260.75	267.75	267.28	267.76	0.000609	0.95	5289.45	1498.67	0.1
Reach 1	145874.1	100 yr	5350.8	260.75	267.57	267.42	267.59	0.001139	1.24	5028.16	1495.04	0.13
Reach 1	145588.1	10 yr	2294.3	260.73	266.19	266.19	267.9	0.064217	10.48	219.02	1357.6	1
Reach 1	145588.1	50 yr	4246.3	260.73	267.6	266.96	267.6	0.00048	1.06	5760.06	1578.64	0.09
Reach 1	145588.1	100 yr	5350.8	260.73	267.26	267.05	267.28	0.00103	1.47	5238.18	1572.67	0.13
Reach 1	145309.5	10 yr	2294.3	260	266.02		266.03	0.000483	1.23	4010.81	1712.15	0.09
Reach 1	145309.5	50 yr	4246.3	260	267.48		267.49	0.000355	1.24	6522.76	1718.42	0.08
Reach 1	145309.5	100 yr	5350.8	260	267		267.02	0.00087	1.84	5696.24	1716.47	0.13
Reach 1	145209.5	10 yr	2294.3	260.26	264.7	264.7	265.75	0.072847	8.26	277.76	1219.65	1
Reach 1	145209.5	50 yr	4246.3	260.26	265.9	265.9	267.23	0.067436	9.27	458.13	1577.29	1
Reach 1	145209.5	100 yr	5350.8	260.26	266.22	266.22	266.71	0.032587	6.58	1084.73	1655.09	0.7
Reach 1	144909.5	10 yr	2294.3	259.6	264.67	262.71	264.67	0.000292	0.63	4307.37	1964.99	0.07
Reach 1	144909.5	50 yr	4246.3	259.6	264.86	263.46	264.88	0.000825	1.09	4582.11	1989.6	0.11
Reach 1	144909.5	100 yr	5350.8	259.6	264.93	263.77	264.94	0.000737	1.04	6353.46	1997.55	0.11
Reach 1	144593.5	10 yr	2294.3	259.41	264.57	264.57	264.58	0.000299	0.67	4134.78	1759.08	0.07
Reach 1	144593.5	50 yr	4246.3	259.41	264.57	264.57	264.59	0.001025	1.23	4134.74	1759.08	0.12
Reach 1	144593.5	100 yr	5350.8	259.41	264.58	264.58	264.61	0.001614	1.55	4146.44	1762.24	0.16
Reach 1	144307.8	10 yr	2294.3	260	263.35	261.6	263.36	0.000715	0.95	3096.74	2053.96	0.1

Reach 1	144307.8	50 yr	4246.3	260	263.32	261.59	263.35	0.002552	1.78	3058.65	2047.76	0.19
Reach 1	144307.8	100 yr	5350.8	260	263.71	261.59	263.72	0.000716	0.87	6756.42	2121.65	0.1
Reach 1	143302.5	10 yr	2294.3	256	263.04	262	263.05	0.000173	0.7	5404.02	1813.48	0.05
Reach 1	143302.5	50 yr	4246.3	256	262.55	262	262.56	0.000959	1.54	4653.79	1781.94	0.13
Reach 1	143302.5	100 yr	5350.8	256	262.8	262.01	262.82	0.001178	1.77	5040.58	1798.3	0.14
Reach 1	142295.6	10 yr	2294.3	254	260.44	260.09	262.24	0.05029	10.77	212.97	1483.34	0.9
Reach 1	142295.6	50 yr	4246.3	254	261.96	261.96	261.97	0.000386	0.74	6020.56	1575.56	0.08
Reach 1	142295.6	100 yr	5350.8	254	261.96	261.96	261.97	0.000613	0.93	6020.56	1575.56	0.1
Reach 1	140841.3	10 yr	2294.3	254	260.71	258.54	260.71	0.000191	0.55	5035	1592.04	0.05
Reach 1	140841.3	50 yr	4246.3	254	260.43	259.02	260.44	0.000881	1.11	4589.35	1587.3	0.12
Reach 1	140841.3	100 yr	5350.8	254	260.89	259.26	260.91	0.000868	1.22	5330.16	1594.78	0.12
Reach 1	139478.8	10 yr	2294.3	250	257.63	257.63	259.58	0.06279	11.2	204.85	957.82	1
Reach 1	139478.8	50 yr	4246.3	250	258.86	258	258.89	0.001572	2.1	3638.63	1471.51	0.17
Reach 1	139478.8	100 yr	5350.8	250	259.37	258.01	259.4	0.001485	2.18	4413.1	1565.48	0.16
Reach 1	137957	10 yr	2294.3	250	256.59		256.6	0.000414	0.82	3661.45	1341.25	0.08
Reach 1	137957	50 yr	4246.3	250	257.62		257.63	0.000505	1.09	5038.4	1346.03	0.09
Reach 1	137957	100 yr	5350.8	250	258.1		258.12	0.000542	1.21	5688.61	1353.88	0.1
Reach 1	136943.4	10 yr	2294.3	250	255.74		255.77	0.002319	2.64	2260.83	1460.63	0.2
Reach 1	136943.4	50 yr	4246.3	250	256.72		256.75	0.001814	2.62	3706.24	1471.6	0.19
Reach 1	136943.4	100 yr	5350.8	250	257.19		257.22	0.001678	2.65	4402.86	1473.81	0.18
Reach 1	135924.9	10 yr	2294.3	248	254.62	254	254.62	0.000662	1.2	3593.59	1560.67	0.1
Reach 1	135924.9	50 yr	4246.3	248	255.65	254	255.66	0.000698	1.43	5261.55	1631.27	0.11
Reach 1	135924.9	100 yr	5350.8	248	256.16	254.01	256.17	0.000696	1.52	6090.59	1644.71	0.11
Reach 1	134950.8	10 yr	2294.3	248	253.52	251.34	253.55	0.002175	1.94	1828.07	725.47	0.19
Reach 1	134950.8	50 yr	4246.3	248	254.4	251.78	254.45	0.002858	2.6	2473.48	745.81	0.22
Reach 1	134950.8	100 yr	5350.8	248	254.89	251.77	254.95	0.002934	2.83	2838.62	756.51	0.23
Reach 1	134000.7	10 yr	2294.3	248	252.96	252	252.97	0.000281	0.75	4522.34	1447.97	0.07
Reach 1	134000.7	50 yr	4246.3	248	252.81	252	252.83	0.001119	1.45	4307.13	1443.42	0.13
Reach 1	134000.7	100 yr	5350.8	248	253.28	252	253.3	0.001133	1.58	4979.12	1457.56	0.14
Reach 1	132978.5	10 yr	2294.3	244	251.5	249.41	252.02	0.014767	5.82	394.09	1631.3	0.5
Reach 1	132978.5	50 yr	4246.3	244	251.87	251.25	251.88	0.000779	1.29	4864.07	1661.69	0.11
Reach 1	132978.5	100 yr	5350.8	244	252.37	251.88	252.38	0.000727	1.3	6011.07	1699.9	0.11
Reach 1	131987.2	10 yr	2294.3	244	250.1		250.11	0.000646	1.33	3671.63	1740.33	0.11
Reach 1	131987.2	50 yr	4246.3	244	251.2		251.21	0.000598	1.47	5578.85	1750.29	0.11
Reach 1	131987.2	100 yr	5350.8	244	251.72		251.73	0.000587	1.54	6494.01	1759.76	0.11
Reach 1	130964.6	10 yr	2294.3	244	249.13	247.68	249.15	0.00155	1.55	2341.25	1105.83	0.16
Reach 1	130964.6	50 yr	4246.3	244	250.32	247.96	250.34	0.001323	1.77	3706.81	1183.61	0.15
Reach 1	130964.6	100 yr	5350.8	244	250.87	247.96	250.9	0.001245	1.87	4363.1	1187.5	0.15
Reach 1	129697	10 yr	2294.3	240	247.77	246	247.79	0.000786	1.68	2948.34	1239.52	0.12
Reach 1	129697	50 yr	4246.3	240	249.16	246.15	249.17	0.00067	1.78	4692.13	1276.4	0.12
Reach 1	129697	100 yr	5350.8	240	249.73	246.15	249.75	0.000679	1.89	5428.62	1290.82	0.12
Reach 1	128641.7	10 yr	2294.3	240	246.83	245.72	246.85	0.000996	1.51	2408.01	795.75	0.13
Reach 1	128641.7	50 yr	4246.3	240	248.22	246	248.25	0.001169	1.98	3657.52	1020.23	0.15
Reach 1	128641.7	100 yr	5350.8	240	248.79	246	248.82	0.001158	2.1	4239.06	1025.8	0.15
Reach 1	127244	10 yr	2294.3	238	245.12	242	245.15	0.00152	2.16	2024.65	800.56	0.17
Reach 1	127244	50 yr	4246.3	238	246.26	243.88	246.3	0.00168	2.59	2941.85	813.29	0.18
Reach 1	127244	100 yr	5350.8	238	246.82	244.15	246.87	0.001711	2.76	3401.58	823.97	0.19
Reach 1	126289.9	10 yr	2294.3	238	243.69	241.52	243.71	0.001521	1.96	2361.14	1147.68	0.16
Reach 1	126289.9	50 yr	4246.3	238	244.93	242.1	244.96	0.001215	2.06	3807.7	1169.36	0.15

Reach 1	126289.9	100 yr	5350.8	238	245.54	242.1	245.56	0.001133	2.12	4519.01	1181.2	0.15
Reach 1	124780.6	10 yr	2294.3	234	241.99		242.01	0.000865	1.83	2499.73	870.6	0.13
Reach 1	124780.6	50 yr	4246.3	234	243.34		243.37	0.000914	2.14	3691.4	888.95	0.14
Reach 1	124780.6	100 yr	5350.8	234	243.98		244.01	0.000933	2.28	4259.13	897.19	0.14
Reach 1	123738.1	10 yr	2294.3	234	241.05		241.06	0.000957	1.67	2651.46	966.08	0.13
Reach 1	123738.1	50 yr	4246.3	234	242.38		242.4	0.00095	1.95	3954.51	1012.07	0.14
Reach 1	123738.1	100 yr	5350.8	234	242.99		243.02	0.000969	2.09	4592.16	1050.07	0.14
Reach 1	122650.8	10 yr	2294.3	234	240.15		240.17	0.000714	1.44	2647.46	1046.45	0.11
Reach 1	122650.8	50 yr	4246.3	234	241.48		241.5	0.000721	1.69	4039.86	1055.77	0.12
Reach 1	122650.8	100 yr	5350.8	234	242.07		242.1	0.000742	1.82	4670.11	1065.96	0.12
Reach 1	121693	10 yr	2294.3	234	239.43	236.56	239.44	0.000812	1.36	2908.87	1185.34	0.12
Reach 1	121693	50 yr	4246.3	234	240.81	237.25	240.83	0.000688	1.52	4580.96	1235.44	0.11
Reach 1	121693	100 yr	5350.8	234	241.4	237.57	241.42	0.000685	1.62	5313.08	1253.12	0.12
Reach 1	120667.8	10 yr	2294.3	230.54	238.58	235.01	238.6	0.000825	1.7	2277.61	758.1	0.13
Reach 1	120667.8	50 yr	4246.3	230.54	239.94	236.09	239.98	0.001006	2.16	3384.77	873.27	0.14
Reach 1	120667.8	100 yr	5350.8	230.54	240.51	236.47	240.55	0.001069	2.35	3883.02	881.98	0.15
Reach 1	119080	10 yr	2294.3	230	235.95	234.29	236.05	0.004349	3.38	1178.63	671.88	0.28
Reach 1	119080	50 yr	4246.3	230	237.29	235.14	237.36	0.003148	3.4	2514.73	959.9	0.25
Reach 1	119080	100 yr	5350.8	230	237.98	235.54	238.05	0.002504	3.27	3194.86	986.02	0.22
Reach 1	118001.1	10 yr	2294.3	228	234.77	232	234.78	0.000524	1.33	3440.94	1276.69	0.1
Reach 1	118001.1	50 yr	4246.3	228	236.32	232.57	236.33	0.000443	1.44	5439.22	1324.55	0.1
Reach 1	118001.1	100 yr	5350.8	228	237.11	232.84	237.12	0.000423	1.51	6516.2	1423.93	0.09
Reach 1	116862.3	10 yr	2294.3	228	233.89	230.7	233.93	0.001145	1.63	1791.31	627.56	0.14
Reach 1	116862.3	50 yr	4246.3	228	235.56	231.66	235.6	0.001005	1.91	2911.4	686.88	0.14
Reach 1	116862.3	100 yr	5350.8	228	236.36	231.77	236.41	0.000983	2.06	3477.73	729.51	0.14
Reach 1	115784.5	10 yr	2294.3	228	232.92	229.7	232.95	0.000731	1.29	1967.77	533.9	0.11
Reach 1	115784.5	50 yr	4246.3	228	234.64	230.33	234.68	0.000735	1.63	2905.39	555.39	0.12
Reach 1	115784.5	100 yr	5350.8	228	235.44	230.61	235.49	0.000751	1.8	3355.47	571.41	0.12
Reach 1	114617.3	10 yr	2294.3	224	232.26	228.11	232.27	0.000471	1.38	2755.71	617.3	0.09
Reach 1	114617.3	50 yr	4246.3	224	233.88	228.11	233.9	0.000603	1.8	3796.19	664.68	0.11
Reach 1	114617.3	100 yr	5350.8	224	234.65	228.11	234.68	0.000644	1.97	4311.01	673.87	0.12
Reach 1	112591.1	10 yr	2294.3	220	230.4	227.47	230.47	0.002226	2.81	1598.04	754.84	0.2
Reach 1	112591.1	50 yr	4246.3	220	231.9	229.49	231.96	0.001728	2.88	2738.52	762.32	0.19
Reach 1	112591.1	100 yr	5350.8	220	232.65	229.82	232.71	0.001607	2.96	3318.03	794.97	0.18
Reach 1	111434.1	10 yr	2294.3	220	229.25	225.83	229.26	0.000588	1.43	3267.42	1211.09	0.1
Reach 1	111434.1	50 yr	4246.3	220	231.11	225.83	231.12	0.000389	1.39	5550.65	1238.24	0.09
Reach 1	111434.1	100 yr	5350.8	220	231.9	227.24	231.92	0.000366	1.45	6540.45	1244.87	0.09
Reach 1	110204.6	10 yr	2294.3	218	228.73	225.5	228.74	0.000319	1.2	4011.02	1285.95	0.08
Reach 1	110204.6	50 yr	4246.3	218	230.75	226.68	230.75	0.000231	1.2	6665.59	1337.16	0.07
Reach 1	110204.6	100 yr	5350.8	218	231.56	227.05	231.56	0.000227	1.26	7751.61	1343.49	0.07
Reach 1	109036.8	10 yr	2531	218	227.89	223.56	227.99	0.001621	3.14	1419.58	453.14	0.19
Reach 1	109036.8	50 yr	4671	218	230.03	225.09	230.14	0.001733	3.75	2753.43	784.63	0.2
Reach 1	109036.8	100 yr	5882	218	230.87	225.63	230.97	0.001589	3.77	3449.89	859.4	0.19
Reach 1	108031.1	10 yr	2531	214	226.48	220.36	226.57	0.001235	2.86	1483.57	441.55	0.16
Reach 1	108031.1	50 yr	4671	214	228.32	222.19	228.45	0.001622	3.69	2356.85	568.89	0.19
Reach 1	108031.1	100 yr	5882	214	229.05	223.46	229.2	0.001938	4.2	2839.28	760.88	0.21
Reach 1	107075.8	10 yr	2531	214	225.58	220.42	225.61	0.000803	2.02	2373.94	744.78	0.13
Reach 1	107075.8	50 yr	4671	214	227.12	223.03	227.17	0.00109	2.66	3817.87	1182.34	0.15
Reach 1	107075.8	100 yr	5882	214	227.74	224.07	227.79	0.001121	2.81	4590.01	1301.77	0.16

Reach 1	105740.9	10 yr	2531	210	224.08	218.64	224.16	0.001528	2.76	1830.15	966.83	0.17
Reach 1	105740.9	50 yr	4671	210	225.33	221.01	225.42	0.001611	3.13	3050.61	979.82	0.18
Reach 1	105740.9	100 yr	5882	210	225.95	222.44	226.03	0.00158	3.24	3656.57	985.93	0.18
Reach 1	105073.7	10 yr	2531	210	223.33	217.35	223.38	0.000905	2.42	2159.55	823.68	0.14
Reach 1	105073.7	50 yr	4671	210	224.28	220.17	224.37	0.001527	3.36	3059.37	999.21	0.18
Reach 1	105073.7	100 yr	5882	210	224.92	220.69	225.01	0.001491	3.45	3704.09	1003.22	0.18
Reach 1	104400.4	10 yr	2531	210	221.78	217.06	222.06	0.006567	4.24	601.38	845.75	0.34
Reach 1	104400.4	50 yr	4671	210	223.32	220.08	223.37	0.0014	2.35	3443.23	1038.84	0.16
Reach 1	104400.4	100 yr	5882	210	224.02	220.95	224.06	0.001288	2.41	4178.64	1077.88	0.16
Reach 1	104005.1	10 yr	2531	210	221.27	217.31	221.31	0.001016	2.26	2204.14	723.72	0.14
Reach 1	104005.1	50 yr	4671	210	222.8	219.1	222.85	0.0012	2.77	3516.99	902.93	0.16
Reach 1	104005.1	100 yr	5882	210	223.52	219.49	223.57	0.001207	2.92	4182.13	966.62	0.16
Reach 1	103025.1	10 yr	2531	210	220.47	218.19	220.49	0.000696	1.73	3073.84	1054.47	0.11
Reach 1	103025.1	50 yr	4671	210	221.97	218.72	221.99	0.000661	1.92	4661.93	1064	0.12
Reach 1	103025.1	100 yr	5882	210	222.66	218.93	222.69	0.000681	2.05	5413.86	1104.45	0.12
Reach 1	101979.6	10 yr	2531	208	219.53	213.51	219.57	0.001119	2.05	1998.72	826.36	0.15
Reach 1	101979.6	50 yr	4671	208	221.07	215.44	221.12	0.001074	2.34	3439.7	963.81	0.15
Reach 1	101979.6	100 yr	5882	208	221.76	216.44	221.82	0.00104	2.44	4111.75	968.3	0.15
Reach 1	100998.5	10 yr	2531	208	218.58	214.3	218.6	0.000874	1.12	2723.37	917.02	0.11
Reach 1	100998.5	50 yr	4671	208	220.2	216	220.22	0.000781	1.41	4290.36	1014.58	0.12
Reach 1	100998.5	100 yr	5882	208	220.93	216.01	220.95	0.000743	1.52	5034.05	1020.91	0.12
Reach 1	100268.9	10 yr	2531	204	217.84	212.65	217.87	0.001126	1.8	2175.04	785.9	0.14
Reach 1	100268.9	50 yr	4671	204	219.54	214.67	219.58	0.000982	2.04	3671.71	946.2	0.14
Reach 1	100268.9	100 yr	5882	204	220.3	216.16	220.34	0.000926	2.13	4410.75	977.27	0.14
Reach 1	98606.43	10 yr	2531	204	216.28	211.23	216.31	0.000792	1.93	2481.12	813.37	0.12
Reach 1	98606.43	50 yr	4671	204	218.11	214.45	218.15	0.000757	2.19	4311.67	1149.51	0.13
Reach 1	98606.43	100 yr	5882	204	219	214.81	219.03	0.000676	2.2	5357.66	1216.45	0.12
Reach 1	97734.7	10 yr	2531	205.01	215.59		215.63	0.000779	2.04	2416.77	914.09	0.13
Reach 1	97734.7	50 yr	4671	205.01	217.5		217.54	0.000649	2.15	4317.84	1057.04	0.12
Reach 1	97734.7	100 yr	5882	205.01	218.45		218.48	0.000585	2.17	5348.05	1114.27	0.12
Reach 1	96250.23	10 yr	2531	202	214.23	208.7	214.28	0.001059	2.29	1874.25	556.71	0.15
Reach 1	96250.23	50 yr	4671	202	216.28	211.14	216.34	0.001032	2.65	3033.48	613.02	0.15
Reach 1	96250.23	100 yr	5882	202	217.27	212.01	217.34	0.001055	2.85	3702.9	726.15	0.15
Reach 1	95264.73	10 yr	2531	202	213.35	207.43	213.39	0.000787	1.87	2151.51	629.67	0.12
Reach 1	95264.73	50 yr	4671	202	215.47	210.03	215.51	0.000686	2.08	3603.63	701.28	0.12
Reach 1	95264.73	100 yr	5882	202	216.47	210.64	216.51	0.000672	2.21	4321.64	769.64	0.12
Reach 1	94258.65	10 yr	2531	202	212.82		212.84	0.000392	1.51	3209.77	732.61	0.09
Reach 1	94258.65	50 yr	4671	202	214.98		215	0.000386	1.74	4871.35	825.82	0.09
Reach 1	94258.65	100 yr	5882	202	215.99		216.01	0.000379	1.83	5733.56	879.4	0.09
Reach 1	93272.17	10 yr	4719.1	202	212.4	208.11	212.42	0.000448	1.34	5380.04	1249.96	0.09
Reach 1	93272.17	50 yr	8607.3	202	214.56	208.51	214.59	0.000438	1.61	8172.43	1317.81	0.1
Reach 1	93272.17	100 yr	10811.7	202	215.58	208.77	215.6	0.00043	1.72	9514.08	1324.61	0.1
Reach 1	92980.49	10 yr	4719.1	202	212.22	207.91	212.25	0.000712	1.87	4150.96	935.8	0.12
Reach 1	92980.49	50 yr	8607.3	202	214.38	208.96	214.41	0.000735	2.25	6268.47	1020.38	0.13
Reach 1	92980.49	100 yr	10811.7	202	215.39	209.28	215.43	0.000722	2.39	7308.8	1027.27	0.13
Reach 1	92829.37		Bridge									
Reach 1	92734.37	10 yr	4719.1	202	211.98	208.67	212.02	0.001055	2.14	3717.81	901.45	0.14
Reach 1	92734.37	50 yr	8607.3	202	214.15	209.4	214.19	0.000954	2.45	5747.77	972.72	0.14

Reach 1	92734.37	100 yr	10811.7	202	215.17	209.71	215.22	0.000921	2.59	6737.48	1029.38	0.14
Reach 1	92504.4	10 yr	4719.1	202	211.78	208.01	211.8	0.000801	1.86	4060.51	890.93	0.13
Reach 1	92504.4	50 yr	8607.3	202	213.95	208.57	213.99	0.000797	2.24	6071.42	961.43	0.13
Reach 1	92504.4	100 yr	10811.7	202	214.98	208.91	215.02	0.000787	2.39	7099.77	1054.84	0.13
Reach 1	91303.04	10 yr	4719.1	198	211.12		211.16	0.000384	1.69	4421.23	936.37	0.09
Reach 1	91303.04	50 yr	8607.3	198	213.2		213.24	0.000493	2.17	6431.59	1017.21	0.11
Reach 1	91303.04	100 yr	10811.7	198	214.2		214.26	0.000517	2.34	7457.81	1023.97	0.11
Reach 1	90295.13	10 yr	4719.1	198	210.34	206.74	210.42	0.001844	3.15	2761.22	793.38	0.2
Reach 1	90295.13	50 yr	8607.3	198	212.3	207.67	212.4	0.001723	3.52	4340.49	827.18	0.2
Reach 1	90295.13	100 yr	10811.7	198	213.29	208	213.39	0.001703	3.73	5185.75	893.13	0.2
Reach 1	89313.17	10 yr	4719.1	198	208.65	204.96	208.72	0.001616	2.62	2730.31	812.61	0.18
Reach 1	89313.17	50 yr	8607.3	198	210.8	206.21	210.88	0.001378	2.92	4548.16	867.07	0.17
Reach 1	89313.17	100 yr	10811.7	198	211.86	206.68	211.94	0.001274	3.03	5471.52	879.57	0.17
Reach 1	88360.79	10 yr	4719.1	195.92	207.7	202.55	207.74	0.000701	2.13	4031.09	1002.82	0.12
Reach 1	88360.79	50 yr	8607.3	195.92	209.93	203.95	209.97	0.000681	2.42	6398.36	1112.09	0.13
Reach 1	88360.79	100 yr	10811.7	195.92	211.05	204.44	211.09	0.000636	2.49	7652.96	1126.49	0.12
Reach 1	86946.23	10 yr	5359	194	207	203.02	207.01	0.000401	1.64	6935.99	1681.43	0.09
Reach 1	86946.23	50 yr	9757	194	209.3	203.74	209.32	0.000345	1.75	10926.32	1768.9	0.09
Reach 1	86946.23	100 yr	12257	194	210.47	204.11	210.49	0.000316	1.79	13011.32	1787.93	0.09
Reach 1	85763.68	10 yr	5359	194	206.23	202.76	206.28	0.001064	2.67	3909.8	856.97	0.15
Reach 1	85763.68	50 yr	9757	194	208.61	203.76	208.67	0.000986	2.98	6143.35	959.99	0.15
Reach 1	85763.68	100 yr	12257	194	209.84	204.14	209.89	0.000909	3.05	7322.93	970.57	0.15
Reach 1	84304.58	10 yr	5359	192	205.13	200.63	205.16	0.000572	1.84	4975.11	1058.28	0.11
Reach 1	84304.58	50 yr	9757	192	207.56	201.61	207.6	0.000559	2.15	7599.16	1119.34	0.11
Reach 1	84304.58	100 yr	12257	192	208.75	202.08	208.8	0.000626	2.44	9086.86	1365.12	0.12
Reach 1	83700.74	10 yr	5359	192	204.76	199.11	204.8	0.000618	1.98	3836.45	817.23	0.12
Reach 1	83700.74	50 yr	9757	192	207.18	200.67	207.24	0.00065	2.38	6407.53	1016.02	0.12
Reach 1	83700.74	100 yr	12257	192	208.35	201.11	208.41	0.000653	2.55	7638.98	1100.54	0.13
Reach 1	82541.44	10 yr	5359	192	203.89	198.84	203.94	0.000903	2.16	3799.72	995.66	0.14
Reach 1	82541.44	50 yr	9757	192	206.37	200.34	206.43	0.000755	2.38	6326.15	1059.72	0.13
Reach 1	82541.44	100 yr	12257	192	207.56	200.79	207.62	0.000715	2.49	7620.57	1116.41	0.13
Reach 1	81753.13	10 yr	5359	192	203.27	197.58	203.3	0.000718	2.21	4277.15	826.05	0.13
Reach 1	81753.13	50 yr	9757	192	205.8	199.07	205.84	0.000712	2.58	6541.88	1003.18	0.13
Reach 1	81753.13	100 yr	12257	192	206.95	199.55	207	0.000839	2.97	7756.48	1107.76	0.14
Reach 1	80430.07	10 yr	5359	188	202.05	196	202.12	0.001136	2.86	3261.33	668.49	0.16
Reach 1	80430.07	50 yr	9757	188	204.56	198.73	204.65	0.00117	3.37	5110.92	788.1	0.17
Reach 1	80430.07	100 yr	12257	188	205.58	199.21	205.68	0.0012	3.6	5921.78	795.86	0.17
Reach 1	79347.86	10 yr	5359	188	201.04	195.88	201.09	0.000796	2.17	3913.85	976.05	0.13
Reach 1	79347.86	50 yr	9757	188	203.6	197.69	203.64	0.000733	2.48	7498.93	1521.88	0.13
Reach 1	79347.86	100 yr	12257	188	204.68	198	204.73	0.000653	2.49	9158.06	1532.27	0.13
Reach 1	78173.07	10 yr	5359	188	200.39	194.7	200.42	0.000427	1.63	5760.81	1307.34	0.1
Reach 1	78173.07	50 yr	9757	188	203.03	196.21	203.06	0.000359	1.78	9313.46	1394.12	0.09
Reach 1	78173.07	100 yr	12257	188	204.15	197.08	204.17	0.000354	1.88	10865.46	1394.12	0.09
Reach 1	77126.59	10 yr	5359	188	199.66	194.17	199.73	0.001086	2.84	2883.66	449.84	0.16
Reach 1	77126.59	50 yr	9757	188	202.25	195.38	202.38	0.001449	3.82	4241.33	756.08	0.19
Reach 1	77126.59	100 yr	12257	188	203.34	195.81	203.49	0.001511	4.12	5155.53	893.1	0.2
Reach 1	75906.48	10 yr	5359	184	197.45	193.27	197.63	0.003147	4.88	2130.06	463.7	0.26
Reach 1	75906.48	50 yr	9757	184	199.62	195.5	199.84	0.003247	5.62	3322.66	725.47	0.28
Reach 1	75906.48	100 yr	12257	184	200.66	195.97	200.89	0.00322	5.9	4266.35	962.35	0.28

Reach 1	74771.55	10 yr	5359	184	196.32	192	196.34	0.000548	1.98	5591.49	1376.75	0.11
Reach 1	74771.55	50 yr	9757	184	198.61	192.62	198.64	0.000485	2.14	8815.04	1423.05	0.11
Reach 1	74771.55	100 yr	12257	184	199.69	193.07	199.72	0.000469	2.22	10357.15	1433.91	0.11
Reach 1	73882.51	10 yr	5359	184	195.77	190.74	195.8	0.000676	1.56	4562.04	966.55	0.11
Reach 1	73882.51	50 yr	9757	184	198.11	191.88	198.14	0.000639	1.9	6825.91	974.6	0.12
Reach 1	73882.51	100 yr	12257	184	199.19	192.1	199.24	0.000639	2.06	7884.96	978.35	0.12
Reach 1	72505.33	10 yr	5359	182	195.09	189.46	195.11	0.000383	1.6	6478.83	1481.76	0.09
Reach 1	72505.33	50 yr	9757	182	197.5	191.61	197.52	0.000336	1.75	10059.16	1498.44	0.09
Reach 1	72505.33	100 yr	12257	182	198.59	191.74	198.61	0.000331	1.84	11701.8	1504.48	0.09
Reach 1	71346.87	10 yr	5359	182	194.22	188.52	194.29	0.001686	2.77	2685.81	452.8	0.18
Reach 1	71346.87	50 yr	9757	182	196.63	189.85	196.74	0.001911	3.33	3787.18	468.09	0.2
Reach 1	71346.87	100 yr	12257	182	197.69	190	197.83	0.002009	3.69	4293.88	483.67	0.21
Reach 1	70186.09	10 yr	5357	182	192.64	188.25	192.69	0.00115	2.81	3564.43	765.93	0.16
Reach 1	70186.09	50 yr	9752	182	194.95	189.27	195.02	0.001166	3.27	5476.49	852.87	0.17
Reach 1	70186.09	100 yr	12251	182	196	189.76	196.08	0.001162	3.45	6369.86	859.9	0.17
Reach 1	69207.5	10 yr	5357	178	191.73		191.78	0.000767	2.13	3888.79	942.82	0.13
Reach 1	69207.5	50 yr	9752	178	194.04		194.1	0.000772	2.51	6215.02	1045.96	0.13
Reach 1	69207.5	100 yr	12251	178	195.09		195.16	0.000764	2.66	7319.64	1052.31	0.14
Reach 1	67710.94	10 yr	5357	178	190.3	185.43	190.37	0.001189	2.61	3312.64	770.82	0.16
Reach 1	67710.94	50 yr	9752	178	192.61	187.56	192.7	0.001166	3.04	5425.32	1017.08	0.16
Reach 1	67710.94	100 yr	12251	178	193.71	188.27	193.8	0.001106	3.16	6561.63	1059.36	0.16
Reach 1	66841.3	10 yr	5357	178	189.66	184.45	189.69	0.000534	1.66	4971.51	1177.79	0.11
Reach 1	66841.3	50 yr	9752	178	192.01	185.76	192.04	0.00051	1.93	7862.32	1271.82	0.11
Reach 1	66841.3	100 yr	12251	178	193.13	186.2	193.17	0.000491	2.04	9302.48	1295.82	0.11
Reach 1	65899.21	10 yr	5357	178	189.19	183.44	189.22	0.000472	1.57	4643.42	917.07	0.1
Reach 1	65899.21	50 yr	9752	178	191.51	184.62	191.55	0.000528	1.98	6827.26	977.77	0.11
Reach 1	65899.21	100 yr	12251	178	192.62	185.18	192.67	0.000557	2.18	7943.63	1041.59	0.12
Reach 1	64371.68	10 yr	5357	176	188.14	183.29	188.2	0.000998	2.34	3354.19	683.28	0.15
Reach 1	64371.68	50 yr	9752	176	190.31	184.46	190.4	0.001147	2.95	4864.68	723.05	0.16
Reach 1	64371.68	100 yr	12251	176	191.35	184.97	191.45	0.001227	3.25	5642.61	777.56	0.17
Reach 1	63293.49	10 yr	5357	174	187.01	182.81	187.06	0.001108	2.48	3731.66	964.34	0.15
Reach 1	63293.49	50 yr	9752	174	189.14	184.09	189.2	0.001061	2.83	5916.5	1050.15	0.16
Reach 1	63293.49	100 yr	12251	174	190.16	184.61	190.23	0.001028	2.97	6994.47	1065.14	0.16
Reach 1	62734.52	10 yr	5357	174	186.52	181.8	186.56	0.000738	2.26	4128.63	701.3	0.13
Reach 1	62734.52	50 yr	9752	174	188.59	183.14	188.65	0.00094	2.9	5581.4	706.84	0.15
Reach 1	62734.52	100 yr	12251	174	189.59	183.47	189.66	0.001011	3.18	6291.92	710.12	0.16
Reach 1	61445.96	10 yr	5357	174	184.94		185.04	0.002152	3.28	2938.45	906.54	0.21
Reach 1	61445.96	50 yr	9752	174	186.83		186.94	0.00199	3.67	4675.6	948.31	0.21
Reach 1	61445.96	100 yr	12251	174	187.81		187.92	0.001882	3.81	5624.85	990.57	0.21
Reach 1	60665.99	10 yr	5357	174	183.76		183.81	0.001182	2.53	4179.34	1322.63	0.16
Reach 1	60665.99	50 yr	9752	174	185.87		185.92	0.000894	2.58	7040.92	1366.27	0.14
Reach 1	60665.99	100 yr	12251	174	186.92		186.97	0.000829	2.65	8500	1426.34	0.14
Reach 1	59655.91	10 yr	5358	172	183.35	180	183.36	0.000219	1.05	8122.78	1461.79	0.07
Reach 1	59655.91	50 yr	9753	172	185.46	180.01	185.47	0.000256	1.34	11212.91	1476.05	0.08
Reach 1	59655.91	100 yr	12252	172	186.5	180.02	186.52	0.000269	1.47	12759.8	1495.13	0.08
Reach 1	58792.02	10 yr	5358	172	183.05	179.06	183.07	0.000568	1.56	5901.08	1817.69	0.11
Reach 1	58792.02	50 yr	9753	172	185.16	180	185.18	0.000444	1.65	9859.24	1892.82	0.1
Reach 1	58792.02	100 yr	12252	172	186.21	180.22	186.24	0.0004	1.69	11852.75	1900.04	0.1

Reach 1	57476.03	10 yr	5358	172	182.26	178.31	182.28	0.000632	1.83	5345.53	1288.04	0.12
Reach 1	57476.03	50 yr	9753	172	184.5	179.85	184.53	0.000555	2.03	8306.34	1344.18	0.11
Reach 1	57476.03	100 yr	12252	172	185.6	179.85	185.63	0.000521	2.11	9792.13	1349.47	0.11
Reach 1	56111.01	10 yr	5358	171.61	181.36	176.07	181.4	0.000664	1.99	4542.01	1014.62	0.12
Reach 1	56111.01	50 yr	9753	171.61	183.67	177.38	183.72	0.000638	2.29	6892.62	1020.58	0.12
Reach 1	56111.01	100 yr	12252	171.61	184.81	178.24	184.86	0.000624	2.42	8052.82	1094.61	0.12
Reach 1	54998.39	10 yr	5358	168	180.67	175.9	180.7	0.000614	2.17	4655.89	805.94	0.12
Reach 1	54998.39	50 yr	9753	168	182.94	176.72	182.98	0.000703	2.65	6492.58	811.2	0.13
Reach 1	54998.39	100 yr	12252	168	184.07	177.13	184.12	0.000725	2.84	7412.52	830.74	0.13
Reach 1	53922.78	10 yr	5358	168	179.94	175.23	179.98	0.000729	2.12	4462.23	960.17	0.13
Reach 1	53922.78	50 yr	9753	168	182.16	175.54	182.2	0.000749	2.49	6647.68	1012.13	0.13
Reach 1	53922.78	100 yr	12252	168	183.29	177.18	183.34	0.000732	2.63	7808.57	1039.04	0.13
Reach 1	52312.84	10 yr	5358	168	179.02	174.15	179.04	0.000479	1.53	6031.1	1616.97	0.1
Reach 1	52312.84	50 yr	9753	168	181.34	175.61	181.36	0.000385	1.65	9832.11	1674.81	0.09
Reach 1	52312.84	100 yr	12252	168	182.53	176.04	182.55	0.000349	1.69	11850.22	1716.41	0.09
Reach 1	51397.14	10 yr	5358	168	178.47	173.66	178.51	0.000699	2.12	4375.02	935.79	0.12
Reach 1	51397.14	50 yr	9753	168	180.86	175.34	180.9	0.000657	2.41	6872.49	963.3	0.13
Reach 1	51397.14	100 yr	12252	168	182.07	176	182.12	0.000641	2.54	8044.31	979.92	0.13
Reach 1	49873.99	10 yr	5358	168	177.57	171.99	177.59	0.000519	1.83	4756.5	816.8	0.11
Reach 1	49873.99	50 yr	9753	168	179.9	171.99	179.94	0.000607	2.3	6699.9	908.89	0.12
Reach 1	49873.99	100 yr	12252	168	181.02	171.99	181.07	0.000734	2.69	7874.27	1065.15	0.13
Reach 1	48863.91	10 yr	5358	166	177.18	172	177.2	0.000302	1.41	6552.92	1352.56	0.08
Reach 1	48863.91	50 yr	9753	166	179.47	172.01	179.49	0.000329	1.71	9873.19	1492.5	0.09
Reach 1	48863.91	100 yr	12252	166	180.55	172.15	180.58	0.000342	1.85	11511	1540.5	0.09
Reach 1	47468.78	10 yr	5358	166	176.58	171.33	176.61	0.000617	1.85	5070.42	1372.96	0.11
Reach 1	47468.78	50 yr	9753	166	178.89	173.09	178.92	0.000515	2	8378.17	1462.69	0.11
Reach 1	47468.78	100 yr	12252	166	179.98	173.67	180.01	0.000481	2.07	9976.7	1467.33	0.11
Reach 1	46475.52	10 yr	5388	162	176.06	168.71	176.1	0.000441	1.89	4990.42	1173.49	0.1
Reach 1	46475.52	50 yr	9799	162	178.39	170.56	178.44	0.000466	2.21	7734.07	1181.15	0.11
Reach 1	46475.52	100 yr	12307	162	179.49	171.19	179.54	0.000471	2.35	9037.36	1184.78	0.11
Reach 1	45311.81	10 yr	5388	162	175.61	168.95	175.63	0.00036	1.44	6244.32	1417.53	0.09
Reach 1	45311.81	50 yr	9799	162	177.94	170.85	177.97	0.000346	1.67	9642.84	1507.13	0.09
Reach 1	45311.81	100 yr	12307	162	179.05	172.26	179.08	0.000337	1.76	11317.73	1516.63	0.09
Reach 1	44122.59	10 yr	5388	162	174.78	170.62	174.87	0.001401	3.03	2672.08	512.09	0.17
Reach 1	44122.59	50 yr	9799	162	177.06	171.79	177.19	0.001578	3.72	4288.92	780.77	0.19
Reach 1	44122.59	100 yr	12307	162	178.18	172.28	178.32	0.001547	3.92	5163.01	780.77	0.19
Reach 1	43305.32	10 yr	5388	162	173.67	169.59	173.74	0.001355	2.85	2812.41	501.87	0.17
Reach 1	43305.32	50 yr	9799	162	175.7	170.58	175.83	0.001763	3.74	3857.13	531.35	0.2
Reach 1	43305.32	100 yr	12307	162	176.77	171.04	176.93	0.001878	4.11	4434.14	600.05	0.21
Reach 1	42249.08	10 yr	5388	162	172.76	168.51	172.78	0.00065	1.34	5474.89	1598.66	0.11
Reach 1	42249.08	50 yr	9799	162	174.91	170.08	174.93	0.000479	1.47	8959.4	1628.95	0.1
Reach 1	42249.08	100 yr	12307	162	176.06	170.3	176.09	0.000415	1.52	10840.26	1637.36	0.09
Reach 1	40966.61	10 yr	5388	162	171.91	167.1	171.93	0.000668	1.59	5654.76	1422.81	0.11
Reach 1	40966.61	50 yr	9799	162	174.29	168.26	174.31	0.000489	1.69	9072.17	1435.94	0.1
Reach 1	40966.61	100 yr	12307	162	175.52	168.81	175.54	0.000433	1.74	10835.63	1435.94	0.1
Reach 1	39658.88	10 yr	5388	162	171	167.08	171.03	0.000712	1.93	5185.13	1334.77	0.12
Reach 1	39658.88	50 yr	9799	162	173.65	168.19	173.68	0.000488	1.95	8858.38	1437.16	0.11
Reach 1	39658.88	100 yr	12307	162	174.96	168.69	174.98	0.000423	1.96	10757.07	1460.22	0.1
Reach 1	38757.5	10 yr	5388	158	170.49	165.6	170.51	0.000472	1.94	6256.08	1467.49	0.1

Reach 1	38757.5	50 yr	9799	158	173.3	165.83	173.31	0.000335	1.91	10498.69	1557.25	0.09
Reach 1	38757.5	100 yr	12307	158	174.65	165.84	174.67	0.000299	1.92	12625.87	1587.46	0.09
Reach 1	38200.74	10 yr	5388	158	170.16	165.62	170.2	0.000691	2.13	4381.44	792.33	0.12
Reach 1	38200.74	50 yr	9799	158	173.02	166.76	173.06	0.000658	2.48	7046.48	993.22	0.13
Reach 1	38200.74	100 yr	12307	158	174.39	167.1	174.43	0.0006	2.55	8427.78	1011.55	0.12
Reach 1	37492.84	10 yr	5388	158	169.83	164.09	169.85	0.000352	1.29	5468.76	959.31	0.09
Reach 1	37492.84	50 yr	9799	158	172.7	164.72	172.73	0.000344	1.59	8647.93	1208.91	0.09
Reach 1	37492.84	100 yr	12307	158	174.1	165.05	174.13	0.000316	1.67	10362.37	1228.66	0.09
Reach 1	36580.05	10 yr	5388	161.01	169.43	164.01	169.45	0.000553	1.68	5204.51	971	0.11
Reach 1	36580.05	50 yr	9799	161.01	172.34	164.68	172.37	0.00045	1.88	8026.98	971	0.1
Reach 1	36580.05	100 yr	12307	161.01	173.77	165.08	173.8	0.000423	1.99	9412.23	971	0.1
Reach 1	35507.14	10 yr	5388	158	169	162.05	169.01	0.000314	1.53	6239.88	969.37	0.08
Reach 1	35507.14	50 yr	9799	158	171.94	163.17	171.96	0.000322	1.84	9180.22	1047.22	0.09
Reach 1	35507.14	100 yr	12307	158	173.38	163.72	173.4	0.000325	1.98	10725.41	1101.88	0.09
Reach 1	34849.13	10 yr	5388	158	168.76	161.9	168.78	0.000381	1.5	4895.35	945.31	0.09
Reach 1	34849.13	50 yr	9799	158	171.7	163.08	171.74	0.000346	1.74	7736.52	987.46	0.09
Reach 1	34849.13	100 yr	12307	158	173.14	163.65	173.18	0.000331	1.84	9174.63	1010.96	0.09
Reach 1	33370.94	10 yr	5388	156	168.41	162.87	168.42	0.000169	0.99	7431.36	1113.68	0.06
Reach 1	33370.94	50 yr	9799	156	171.35	164	171.37	0.000183	1.26	10766.14	1166.37	0.07
Reach 1	33370.94	100 yr	12307	156	172.79	164	172.81	0.000187	1.38	12482.12	1214.87	0.07
Reach 1	32021.58	10 yr	5388	156	167.99	162	168.03	0.000594	2.18	4237.32	658.98	0.12
Reach 1	32021.58	50 yr	9799	156	170.9	163.63	170.95	0.000608	2.58	6183.06	696	0.12
Reach 1	32021.58	100 yr	12307	156	172.33	164	172.39	0.000603	2.75	7272.78	813.39	0.12
Reach 1	31212.27	10 yr	5388	156	167.36	161.69	167.42	0.00097	2.72	4101.47	1004.11	0.15
Reach 1	31212.27	50 yr	9799	156	170.41	163.1	170.46	0.000614	2.57	7206.7	1034.55	0.12
Reach 1	31212.27	100 yr	12307	156	171.88	163.71	171.93	0.000541	2.59	8751.94	1066.77	0.12
Reach 1	29931.87	10 yr	5388	152	166.46	160	166.49	0.000559	1.96	4443.18	761.92	0.11
Reach 1	29931.87	50 yr	9799	152	169.73	160.65	169.77	0.000473	2.19	7025.97	800.37	0.11
Reach 1	29931.87	100 yr	12307	152	171.23	161.16	171.28	0.000476	2.37	8262.2	853.47	0.11
Reach 1	28687.16	10 yr	5388	152	166.14	158.06	166.15	0.000155	1.17	7361.2	949.48	0.06
Reach 1	28687.16	50 yr	9799	152	169.42	159.06	169.43	0.00017	1.45	10564.84	992.24	0.07
Reach 1	28687.16	100 yr	12307	152	170.91	159.49	170.93	0.00018	1.6	12059.45	1023.37	0.07
Reach 1	27568.89	10 yr	5388	152	165.85		165.88	0.000418	1.82	4245.9	548.47	0.1
Reach 1	27568.89	50 yr	9799	152	169.08		169.13	0.000472	2.31	6139.02	608.09	0.11
Reach 1	27568.89	100 yr	12307	152	170.55		170.61	0.000502	2.55	7041.13	643.45	0.11
Reach 1	26738.66	10 yr	5388	152	165.66		165.67	0.000166	1.24	7188.01	943.37	0.06
Reach 1	26738.66	50 yr	9799	152	168.87		168.89	0.00019	1.55	10418.2	1049.52	0.07
Reach 1	26738.66	100 yr	12307	152	170.32		170.34	0.000205	1.72	11962.6	1094.99	0.07
Reach 1	25956.46	10 yr	5388	152	165.49		165.51	0.000247	1.45	5572.44	678.45	0.08
Reach 1	25956.46	50 yr	9799	152	168.67		168.7	0.000316	1.94	7935.7	800.11	0.09
Reach 1	25956.46	100 yr	12307	152	170.11		170.14	0.000326	2.1	9092.39	809.65	0.09
Reach 1	25307.43	10 yr	5388	152	165.24		165.28	0.000545	2.25	4156.12	629.83	0.11
Reach 1	25307.43	50 yr	9799	152	168.36		168.42	0.000635	2.83	6565.99	883.63	0.13
Reach 1	25307.43	100 yr	12307	152	169.81		169.86	0.000595	2.91	7848.84	893.95	0.13
Reach 1	24484.37	10 yr	5388	148	164.95	156	164.97	0.000264	1.63	5887.11	950.49	0.08
Reach 1	24484.37	50 yr	9799	148	168.05	156	168.07	0.000284	1.95	8942.44	1017.95	0.09
Reach 1	24484.37	100 yr	12307	148	169.5	156	169.53	0.000282	2.06	10425.94	1024.17	0.09
Reach 1	23186.49	10 yr	5388	148	164.44		164.48	0.000607	1.69	4069.7	917.38	0.11
Reach 1	23186.49	50 yr	9799	148	167.59		167.63	0.000424	1.8	7318.98	1066.6	0.1

Reach 1	23186.49	100 yr	12307	148	169.07		169.11	0.00038	1.86	8894.69	1066.6	0.1
Reach 1	22034.16	10 yr	5388	148	163.62	155.25	163.7	0.000871	2.52	2691.87	353.64	0.14
Reach 1	22034.16	50 yr	9799	148	166.82	157.51	166.93	0.00109	3.06	3899.64	454.04	0.16
Reach 1	22034.16	100 yr	12307	148	168.33	158.5	168.46	0.001076	3.31	4760.17	701.22	0.16
Reach 1	20846.64	10 yr	5388	146	162.83	153.72	162.88	0.000559	1.92	3663.34	780.18	0.11
Reach 1	20846.64	50 yr	9799	146	166.02	155.71	166.08	0.000495	2.2	6302.57	867.24	0.11
Reach 1	20846.64	100 yr	12307	146	167.56	156.9	167.62	0.000478	2.34	7709.21	962.02	0.11
Reach 1	19733.75	10 yr	5388	146	161.53		161.78	0.002042	4.1	1404.04	161.42	0.22
Reach 1	19733.75	50 yr	9799	146	164.45		164.93	0.002916	5.73	1920.26	193.92	0.27
Reach 1	19733.75	100 yr	12307	146	165.76		166.43	0.003516	6.68	2188.7	355.64	0.3
Reach 1	18610.39	10 yr	5846	146	160.4	153.84	160.46	0.00073	2.26	3921.8	760.48	0.13
Reach 1	18610.39	50 yr	10611	146	163.41	156.21	163.47	0.00066	2.57	6307.9	811.14	0.13
Reach 1	18610.39	100 yr	13324	146	164.78	156.21	164.85	0.000654	2.74	7435.8	842.84	0.13
Reach 1	17427.55	10 yr	5846	146	159.29		159.38	0.001176	2.54	2709.64	464.97	0.16
Reach 1	17427.55	50 yr	10611	146	162.35		162.48	0.001116	3.07	4179.63	495.55	0.16
Reach 1	17427.55	100 yr	13324	146	163.71		163.85	0.001131	3.34	4852.89	500.82	0.17
Reach 1	16506.49	10 yr	5846	146	158.79	153.57	158.81	0.00036	1.46	5586.39	858.24	0.09
Reach 1	16506.49	50 yr	10611	146	161.83	154	161.86	0.000409	1.91	8406.29	998.98	0.1
Reach 1	16506.49	100 yr	13324	146	163.2	154	163.23	0.000402	2.04	9777.67	1006.24	0.1
Reach 1	15082.54	10 yr	5846	146	158.07		158.13	0.000637	2.07	3539.41	760.21	0.12
Reach 1	15082.54	50 yr	10611	146	161.07		161.15	0.000628	2.48	5898.86	872.25	0.12
Reach 1	15082.54	100 yr	13324	146	162.44		162.53	0.000618	2.64	7158.48	938.43	0.13
Reach 1	14205	10 yr	5846	146	157.31	150.09	157.39	0.001206	2.97	3206.93	560.62	0.17
Reach 1	14205	50 yr	10611	146	160.32	153.28	160.41	0.001151	3.46	5014.73	635.74	0.17
Reach 1	14205	100 yr	13324	146	161.7	153.89	161.81	0.001134	3.68	5927.44	678.94	0.17
Reach 1	13144.96	10 yr	5846	146	156.34	150.2	156.4	0.000738	2.25	3471.5	502.19	0.13
Reach 1	13144.96	50 yr	10611	146	159.31	151.59	159.4	0.000809	2.82	4973.95	509	0.14
Reach 1	13144.96	100 yr	13324	146	160.65	152.16	160.76	0.000873	3.14	5692.65	615.8	0.15
Reach 1	11937.65	10 yr	5846	146	155.46	150.77	155.49	0.000758	1.92	4585.25	1025.15	0.13
Reach 1	11937.65	50 yr	10611	146	158.59	152.03	158.63	0.000507	1.99	7911.87	1086	0.11
Reach 1	11937.65	100 yr	13324	146	159.94	152.41	159.98	0.000473	2.09	9386.92	1090.74	0.11
Reach 1	11143.64	10 yr	5846	146	155.01	149.69	155.03	0.000455	1.58	5216.19	911.93	0.1
Reach 1	11143.64	50 yr	10611	146	158.25	150.07	158.28	0.000373	1.8	8173.95	911.93	0.09
Reach 1	11143.64	100 yr	13324	146	159.61	150.07	159.65	0.000376	1.95	9417.39	911.93	0.1
Reach 1	10738.33	10 yr	5846	146	154.88	148.51	154.89	0.000258	1.18	5857.52	970.28	0.07
Reach 1	10738.33	50 yr	10611	146	158.14	149.29	158.16	0.000227	1.4	9130.22	1019.34	0.07
Reach 1	10738.33	100 yr	13324	146	159.5	149.68	159.53	0.000232	1.52	10519.07	1019.34	0.08
Reach 1	9866.886	10 yr	5846	146	154.57		154.6	0.000442	1.49	4182.25	650.9	0.1
Reach 1	9866.886	50 yr	10611	146	157.85		157.9	0.000408	1.83	6502.62	778.23	0.1
Reach 1	9866.886	100 yr	13324	146	159.21		159.26	0.000417	2	7583.63	815.38	0.1
Reach 1	9171.781	10 yr	5846	146	154.2	148.56	154.23	0.000662	1.76	4252.2	621.18	0.12
Reach 1	9171.781	50 yr	10611	146	157.52	149.32	157.57	0.000592	2.15	6319.38	625.76	0.12
Reach 1	9171.781	100 yr	13324	146	158.86	149.67	158.92	0.000621	2.39	7160.85	633.49	0.12
Reach 1	8187.326	10 yr	5846	146	153.4	148.74	153.45	0.000962	1.82	3212.23	636.87	0.14
Reach 1	8187.326	50 yr	10611	146	156.96	149.58	157.01	0.000534	1.88	6395.7	943.36	0.11
Reach 1	8187.326	100 yr	13324	146	158.31	149.99	158.37	0.000503	2	7688.09	969.19	0.11
Reach 1	7303.347	10 yr	5846	146	152.74		152.78	0.000614	1.53	4045.53	901.44	0.11
Reach 1	7303.347	50 yr	10611	146	156.62		156.65	0.000321	1.54	8015.47	1068.48	0.09
Reach 1	7303.347	100 yr	13324	146	157.98		158.02	0.000309	1.65	9475.25	1068.48	0.09

Reach 1	6470.493	10 yr	5846	142	152.38	146.05	152.4	0.000346	1.39	6216.59	953.93	0.09
Reach 1	6470.493	50 yr	10611	142	156.39	147.39	156.41	0.000246	1.53	10130.37	1010.04	0.08
Reach 1	6470.493	100 yr	13324	142	157.75	147.69	157.78	0.000264	1.71	11532.48	1053.33	0.08
Reach 1	5530.472	10 yr	5846	142	152.01	146.5	152.03	0.000434	1.44	5274.01	983.83	0.09
Reach 1	5530.472	50 yr	10611	142	156.15	147.59	156.17	0.000259	1.51	9586.52	1199.38	0.08
Reach 1	5530.472	100 yr	13324	142	157.49	148.2	157.53	0.00027	1.66	11315.51	1367.21	0.08
Reach 1	4587.731	10 yr	5846	142	151.58		151.61	0.000468	1.66	5339.69	940.85	0.1
Reach 1	4587.731	50 yr	10611	142	155.91		155.93	0.000256	1.62	9645.12	1069.76	0.08
Reach 1	4587.731	100 yr	13324	142	157.24		157.27	0.000267	1.77	11132.34	1158.73	0.08
Reach 1	3812.865	10 yr	5846	142	151.21		151.24	0.0005	1.78	5719.14	1066.35	0.11
Reach 1	3812.865	50 yr	10611	142	155.72		155.74	0.000247	1.64	10999.32	1436.82	0.08
Reach 1	3812.865	100 yr	13324	142	157.05		157.07	0.000254	1.77	13062.79	1573.57	0.08
Reach 1	2830.46	10 yr	5846	142	150.79		150.81	0.000374	1.52	5683.11	959.75	0.09
Reach 1	2830.46	50 yr	10611	142	155.49		155.51	0.000209	1.51	10420.07	1106.04	0.07
Reach 1	2830.46	100 yr	13324	142	156.81		156.83	0.000225	1.67	11935.03	1161.16	0.08
Reach 1	1704.934	10 yr	5846	142	150.45	143.85	150.47	0.000255	1.09	5352.44	1361.39	0.07
Reach 1	1704.934	50 yr	10611	142	155.34	144.59	155.35	0.000099	0.93	13252.23	1630.57	0.05
Reach 1	1704.934	100 yr	13324	142	156.65	144.95	156.66	0.000105	1.04	15108.97	1732.44	0.05
Reach 1	699.9124	10 yr	5846	128	150.4	133.72	150.4	0.000026	0.66	15420.79	1404.65	0.03
Reach 1	699.9124	50 yr	10611	128	155.3	134.86	155.3	0.000028	0.79	22303.58	1404.65	0.03
Reach 1	699.9124	100 yr	13324	128	156.6	134.86	156.61	0.000034	0.91	24129.63	1404.65	0.03
HEC-RAS PLAN: PROPOSED 4 PONDS RIVER: MILL CREEK REACH: 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)	
Reach 1	174507	10 yr	2303.8	296	307.48	302.31	307.62	0.002026	3.23	981.46	551.83	0.2
Reach 1	174507	50 yr	4241.6	296	308.91	304.43	309.05	0.002215	3.77	2202.59	786.66	0.22
Reach 1	174507	100 yr	5349.3	296	309.54	305.75	309.68	0.002308	4.02	2723.84	878.41	0.23
Reach 1	173479.3	10 yr	2303.8	296	305.52	301.15	305.61	0.001839	2.71	1447.68	752.36	0.19
Reach 1	173479.3	50 yr	4241.6	296	306.77	302.85	306.86	0.002021	3.2	2467.42	866.7	0.2
Reach 1	173479.3	100 yr	5349.3	296	307.36	303.61	307.46	0.002009	3.35	2989.05	890.64	0.21
Reach 1	172871.7	10 yr	2303.8	296	303.66	300.78	303.82	0.005379	3.5	811.5	353.83	0.3
Reach 1	172871.7	50 yr	4241.6	296	305.44	302.76	305.51	0.002447	2.96	2662.21	1046.2	0.21
Reach 1	172871.7	100 yr	5349.3	296	306.2	303.61	306.27	0.001872	2.81	3484.15	1084.05	0.19
Reach 1	171232.7	10 yr	2303.8	290	301.7	293.93	301.75	0.000538	2.09	2005.83	624.62	0.11
Reach 1	171232.7	50 yr	4241.6	290	303.75	295.26	303.81	0.000568	2.41	3326.22	655.02	0.12
Reach 1	171232.7	100 yr	5349.3	290	304.51	295.88	304.58	0.000651	2.69	3841.24	715.4	0.13
Reach 1	170298.1	10 yr	2303.8	290	300.61	295.81	300.78	0.002694	3.73	1081.95	545.56	0.23
Reach 1	170298.1	50 yr	4241.6	290	302.88	298.46	302.97	0.001569	3.35	2663.83	771.15	0.18
Reach 1	170298.1	100 yr	5349.3	290	303.6	299.09	303.68	0.001507	3.43	3216.73	776.22	0.18
Reach 1	169304.9	10 yr	2303.8	286	298.32		298.45	0.002036	2.88	799.52	121.02	0.2
Reach 1	169304.9	50 yr	4241.6	286	300.7		300.88	0.00294	3.49	1450.45	672.78	0.24
Reach 1	169304.9	100 yr	5349.3	286	301.54		301.72	0.002675	3.61	2144	1008.74	0.23
Reach 1	168301.8	10 yr	2303.8	286	296.57	291.71	296.66	0.001565	2.81	1229.32	477.84	0.18
Reach 1	168301.8	50 yr	4241.6	286	298.61	293.72	298.73	0.001612	3.34	1935.31	531.21	0.19
Reach 1	168301.8	100 yr	5349.3	286	299.45	294.49	299.58	0.001723	3.65	2233.43	568.43	0.2
Reach 1	167268.9	10 yr	2303.8	284	294.55		294.69	0.002368	3.03	792.82	249.38	0.21
Reach 1	167268.9	50 yr	4241.6	284	296.59		296.76	0.002281	3.59	1740.54	588.22	0.22
Reach 1	167268.9	100 yr	5349.3	284	297.46		297.63	0.00209	3.67	2261.46	599.67	0.21
Reach 1	166274.1	10 yr	2303.8	282.69	293.44	286.18	293.49	0.000709	1.84	1251.68	350.2	0.12

Reach 1	166274.1	50 yr	4241.6	282.69	295.49	287.45	295.55	0.000724	2.14	2647.55	559.24	0.13
Reach 1	166274.1	100 yr	5349.3	282.69	296.34	288.08	296.41	0.000773	2.35	3147.57	599.23	0.13
Reach 1	165453.1	10 yr	2303.8	280	292.6	286.6	292.68	0.001433	2.44	1179.98	390.96	0.17
Reach 1	165453.1	50 yr	4241.6	280	294.6	288.67	294.71	0.001507	2.98	2064.62	520.25	0.18
Reach 1	165453.1	100 yr	5349.3	280	295.39	289.67	295.52	0.001631	3.29	2522.45	644.34	0.19
Reach 1	164294.3	10 yr	2303.8	276	290.9	283.29	291	0.001472	2.66	1229.65	480.49	0.17
Reach 1	164294.3	50 yr	4241.6	276	293.06	285.72	293.14	0.001214	2.86	2508.66	644.24	0.16
Reach 1	164294.3	100 yr	5349.3	276	293.72	286.75	293.82	0.001301	3.09	2940.28	649.06	0.17
Reach 1	163291.2	10 yr	2303.8	276	289.27	282.02	289.4	0.001737	2.97	905.51	210.04	0.19
Reach 1	163291.2	50 yr	4241.6	276	291.5	284.34	291.66	0.001821	3.59	2125.49	917.12	0.2
Reach 1	163291.2	100 yr	5349.3	276	292.07	285.54	292.24	0.001935	3.84	2658.71	1018.59	0.21
Reach 1	162285	10 yr	2303.8	274	287.26	279.6	287.4	0.002277	2.97	775.44	157.34	0.21
Reach 1	162285	50 yr	4241.6	274	289.22	281.89	289.39	0.002874	3.53	1868.46	1227.2	0.24
Reach 1	162285	100 yr	5349.3	274	289.86	282.93	290.01	0.002545	3.52	2688.48	1318.4	0.23
Reach 1	161278.1	10 yr	2303.8	270	285.4		285.52	0.001552	2.86	1109.78	555.42	0.18
Reach 1	161278.1	50 yr	4241.6	270	287.16		287.28	0.001573	3.28	2265.76	688.84	0.18
Reach 1	161278.1	100 yr	5349.3	270	287.88		288	0.001592	3.46	2761.59	699.15	0.19
Reach 1	160286	10 yr	2303.8	270	284.17	276.2	284.25	0.001061	2.48	1465.36	735.98	0.15
Reach 1	160286	50 yr	4241.6	270	285.95	278.65	286.02	0.001033	2.77	3007.47	992.82	0.15
Reach 1	160286	100 yr	5349.3	270	286.69	279.76	286.76	0.000983	2.83	3763.13	1025.48	0.15
Reach 1	159266.2	10 yr	2303.8	270	282.71	276.29	282.8	0.002002	2.41	991.38	412.1	0.19
Reach 1	159266.2	50 yr	4241.6	270	284.64	279.56	284.73	0.001596	2.61	2444.71	951.18	0.18
Reach 1	159266.2	100 yr	5349.3	270	285.53	280.23	285.61	0.001308	2.57	3339.71	1048.9	0.16
Reach 1	158273.3	10 yr	2303.8	266	280.06	273.03	280.2	0.003549	3.06	753.22	169.44	0.25
Reach 1	158273.3	50 yr	4241.6	266	282.06	275.67	282.3	0.00417	3.91	1084.97	272.54	0.28
Reach 1	158273.3	100 yr	5349.3	266	282.93	276.69	283.21	0.005788	4.22	1266.3	404.57	0.32
Reach 1	157283.5	10 yr	2303.8	266	279.59		279.6	0.000221	1.04	2287.48	434.32	0.07
Reach 1	157283.5	50 yr	4241.6	266	281.4		281.43	0.000336	1.48	3182.93	517.59	0.09
Reach 1	157283.5	100 yr	5349.3	266	282.08		282.13	0.000409	1.72	3543.97	550.3	0.1
Reach 1	157091.2	10 yr	2303.8	266	279.5	270.47	279.54	0.000497	1.58	1593.95	409.13	0.1
Reach 1	157091.2	50 yr	4241.6	266	281.26	272.17	281.33	0.000711	2.17	2435.87	502.35	0.13
Reach 1	157091.2	100 yr	5349.3	266	281.92	272.99	282.01	0.000839	2.47	2773.16	536.93	0.14
Reach 1	156934.3		Bridge									
Reach 1	156834.3	10 yr	2303.8	266	279.16	272.35	279.24	0.001523	2.33	1302.1	403.44	0.17
Reach 1	156834.3	50 yr	4241.6	266	280.89	275.19	280.98	0.001789	2.7	2332.84	834.54	0.18
Reach 1	156834.3	100 yr	5349.3	266	281.52	276.17	281.6	0.001935	2.79	2870.29	882.97	0.19
Reach 1	156735.2	10 yr	2303.8	266	279.04	272.35	279.1	0.001099	2.11	1509.96	538.83	0.15
Reach 1	156735.2	50 yr	4241.6	266	280.75	274.43	280.83	0.001158	2.53	2565.02	767.15	0.16
Reach 1	156735.2	100 yr	5349.3	266	281.36	275.32	281.45	0.001288	2.8	2967.58	889.34	0.17
Reach 1	155914.3	10 yr	2303.8	264	278.2	270.72	278.26	0.000967	2.22	1708.28	671.5	0.14
Reach 1	155914.3	50 yr	4241.6	264	279.82	272.88	279.9	0.001109	2.7	2838.41	975.63	0.15
Reach 1	155914.3	100 yr	5349.3	264	280.29	273.87	280.38	0.00131	3.03	3210.81	1014.38	0.17
Reach 1	155053.7	10 yr	2303.8	264	277.4	269.26	277.46	0.000884	2.25	1512.22	765.3	0.13
Reach 1	155053.7	50 yr	4241.6	264	278.96	271.85	279.01	0.000948	2.2	3762.32	1395.71	0.14
Reach 1	155053.7	100 yr	5349.3	264	279.24	272.98	279.29	0.001208	2.54	4143.72	1420.36	0.16
Reach 1	154269	10 yr	2303.8	264	276.57	269.41	276.65	0.001227	2.4	1246.58	1057.64	0.16
Reach 1	154269	50 yr	4241.6	264	277.76	271.58	277.92	0.002151	3.51	1638.35	1105.02	0.21
Reach 1	154269	100 yr	5349.3	264	278.35	273.03	278.41	0.001041	2.56	4081.48	1153.95	0.15

Reach 1	153259.5	10 yr	2303.8	264	275.44	270.16	275.47	0.001089	1.5	2092.25	764.98	0.13
Reach 1	153259.5	50 yr	4241.6	264	276.66	273.85	276.7	0.001241	1.92	3071.23	821.77	0.15
Reach 1	153259.5	100 yr	5349.3	264	277.18	274.29	277.23	0.001326	2.12	3504.61	827.5	0.16
Reach 1	152248.4	10 yr	2303.8	260	274.18	266.41	274.23	0.00138	2.02	1946.79	1276.02	0.16
Reach 1	152248.4	50 yr	4241.6	260	275.41	268.54	275.45	0.001226	2.2	3794.09	1694.07	0.15
Reach 1	152248.4	100 yr	5349.3	260	275.97	269.57	276.01	0.001105	2.21	4760.83	1756.56	0.15
Reach 1	151251.5	10 yr	2303.8	260	272.8	268.63	272.82	0.001438	1.42	2361.26	1067.88	0.15
Reach 1	151251.5	50 yr	4241.6	260	274.28	272	274.3	0.001069	1.61	4066.06	1360.68	0.13
Reach 1	151251.5	100 yr	5349.3	260	274.95	272	274.97	0.000966	1.68	5053.87	1540.5	0.13
Reach 1	150269.6	10 yr	2303.8	260	269.85	265.04	270.13	0.006841	4.26	540.99	573.06	0.34
Reach 1	150269.6	50 yr	4241.6	260	271.26	267.16	271.81	0.011009	5.94	714.6	1076.93	0.45
Reach 1	150269.6	100 yr	5349.3	260	271.88	268.47	272.58	0.012515	6.7	810.89	1476.47	0.48
Reach 1	149285.9	10 yr	2303.8	260	269.04	265.26	269.05	0.000393	1.15	3592.39	1116.59	0.08
Reach 1	149285.9	50 yr	4241.6	260	269.87	265.72	269.89	0.000705	1.69	4595.34	1292.49	0.12
Reach 1	149285.9	100 yr	5349.3	260	270.32	266	270.34	0.000822	1.9	5178.49	1422.75	0.13
Reach 1	148288.1	10 yr	2303.8	260	268.53	265.56	268.54	0.000685	1.07	3121.6	1593.19	0.1
Reach 1	148288.1	50 yr	4241.6	260	268.9	266.21	268.93	0.001423	1.66	4033.51	2124.86	0.15
Reach 1	148288.1	100 yr	5349.3	260	269.22	266.58	269.25	0.001537	1.82	4720.38	2148.44	0.16
Reach 1	147249.2	10 yr	2303.8	260	268.3	264.13	268.31	0.000113	0.59	5909.54	1840.97	0.05
Reach 1	147249.2	50 yr	4241.6	260	268.16	264.63	268.17	0.000438	1.13	5646.27	1837.09	0.09
Reach 1	147249.2	100 yr	5349.3	260	268.25	264.88	268.27	0.000639	1.39	5814.34	1839.57	0.11
Reach 1	146260.1	10 yr	2303.8	260	268.23	263.48	268.24	0.000047	0.43	8095.4	1656.48	0.03
Reach 1	146260.1	50 yr	4241.6	260	267.88	263.49	267.88	0.000205	0.86	7508.25	1645.9	0.06
Reach 1	146260.1	100 yr	5349.3	260	267.81	264.08	267.81	0.000343	1.1	7387.87	1645.4	0.08
Reach 1	145874.1	10 yr	2303.8	260.75	268.21	266.33	268.21	0.000121	0.46	5974.71	1507.67	0.04
Reach 1	145874.1	50 yr	4241.6	260.75	267.75	267.28	267.76	0.000609	0.95	5284.79	1498.6	0.1
Reach 1	145874.1	100 yr	5349.3	260.75	267.57	267.42	267.59	0.001139	1.24	5027.48	1495.03	0.13
Reach 1	145588.1	10 yr	2303.8	260.73	266.22	266.22	267.91	0.063451	10.43	220.86	1363.03	1
Reach 1	145588.1	50 yr	4241.6	260.73	267.59	266.96	267.6	0.00048	1.06	5755	1578.59	0.09
Reach 1	145588.1	100 yr	5349.3	260.73	267.26	267.05	267.28	0.00103	1.47	5237.55	1572.67	0.13
Reach 1	145309.5	10 yr	2303.8	260	266.03		266.03	0.000481	1.23	4025.5	1712.19	0.09
Reach 1	145309.5	50 yr	4241.6	260	267.48		267.49	0.000355	1.24	6517.15	1718.41	0.08
Reach 1	145309.5	100 yr	5349.3	260	267		267.02	0.00087	1.84	5695.62	1716.47	0.13
Reach 1	145209.5	10 yr	2303.8	260.26	264.7	264.7	265.76	0.072858	8.27	278.57	1222.32	1
Reach 1	145209.5	50 yr	4241.6	260.26	265.9	265.9	267.23	0.067242	9.26	458.25	1577.41	1
Reach 1	145209.5	100 yr	5349.3	260.26	266.22	266.22	266.71	0.032569	6.58	1084.73	1655.09	0.7
Reach 1	144909.5	10 yr	2303.8	259.6	264.67	262.71	264.67	0.000294	0.63	4308.38	1965.06	0.07
Reach 1	144909.5	50 yr	4241.6	259.6	264.86	263.45	264.88	0.000824	1.09	4581.3	1989.52	0.11
Reach 1	144909.5	100 yr	5349.3	259.6	264.93	263.77	264.94	0.000737	1.04	6353.1	1997.54	0.11
Reach 1	144593.5	10 yr	2303.8	259.41	264.57	264.57	264.58	0.000302	0.67	4134.78	1759.08	0.07
Reach 1	144593.5	50 yr	4241.6	259.41	264.57	264.57	264.59	0.001023	1.23	4134.74	1759.08	0.12
Reach 1	144593.5	100 yr	5349.3	259.41	264.58	264.58	264.61	0.001613	1.54	4146.44	1762.24	0.16
Reach 1	144307.8	10 yr	2303.8	260	263.36	261.6	263.37	0.000711	0.95	3110.43	2056.19	0.1
Reach 1	144307.8	50 yr	4241.6	260	263.31	261.59	263.34	0.002553	1.78	3056.09	2047.35	0.19
Reach 1	144307.8	100 yr	5349.3	260	263.71	261.59	263.72	0.000716	0.87	6755.38	2121.56	0.1
Reach 1	143302.5	10 yr	2303.8	256	263.06	262	263.06	0.000173	0.7	5425.44	1814.38	0.05
Reach 1	143302.5	50 yr	4241.6	256	262.54	262	262.56	0.000958	1.54	4652.19	1781.87	0.13
Reach 1	143302.5	100 yr	5349.3	256	262.8	262.01	262.82	0.001178	1.77	5040.03	1798.27	0.14
Reach 1	142295.6	10 yr	2303.8	254	260.43	260.12	262.25	0.050765	10.82	212.88	1483.3	0.91

Reach 1	142295.6	50 yr	4241.6	254	261.96	261.96	261.97	0.000385	0.74	6020.56	1575.56	0.08
Reach 1	142295.6	100 yr	5349.3	254	261.96	261.96	261.97	0.000613	0.93	6020.56	1575.56	0.1
Reach 1	140841.3	10 yr	2303.8	254	260.72	258.54	260.72	0.000191	0.55	5054.97	1592.24	0.05
Reach 1	140841.3	50 yr	4241.6	254	260.42	259.02	260.44	0.000881	1.11	4586.11	1587.27	0.12
Reach 1	140841.3	100 yr	5349.3	254	260.89	259.26	260.91	0.000868	1.22	5329.24	1594.77	0.12
Reach 1	139478.8	10 yr	2303.8	250	257.65	257.65	259.6	0.062775	11.21	205.58	958.04	1
Reach 1	139478.8	50 yr	4241.6	250	258.86	258	258.88	0.001573	2.1	3635.21	1471.12	0.17
Reach 1	139478.8	100 yr	5349.3	250	259.37	258.01	259.4	0.001486	2.18	4412.09	1565.33	0.16
Reach 1	137957	10 yr	2303.8	250	256.6		256.61	0.000415	0.82	3669.35	1341.27	0.08
Reach 1	137957	50 yr	4241.6	250	257.62		257.63	0.000505	1.09	5035.48	1346.01	0.09
Reach 1	137957	100 yr	5349.3	250	258.1		258.11	0.000542	1.21	5687.78	1353.86	0.1
Reach 1	136943.4	10 yr	2303.8	250	255.74		255.78	0.002314	2.64	2269.19	1460.79	0.2
Reach 1	136943.4	50 yr	4241.6	250	256.72		256.75	0.001815	2.62	3703.1	1471.59	0.19
Reach 1	136943.4	100 yr	5349.3	250	257.19		257.22	0.001678	2.65	4401.96	1473.81	0.18
Reach 1	135924.9	10 yr	2303.8	248	254.62	254	254.63	0.000661	1.2	3604.41	1561.86	0.1
Reach 1	135924.9	50 yr	4241.6	248	255.65	254	255.66	0.000698	1.43	5257.84	1631.19	0.11
Reach 1	135924.9	100 yr	5349.3	248	256.16	254.01	256.17	0.000696	1.52	6089.49	1644.71	0.11
Reach 1	134950.8	10 yr	2303.8	248	253.53	251.34	253.56	0.002171	1.95	1833.99	725.69	0.19
Reach 1	134950.8	50 yr	4241.6	248	254.4	251.78	254.45	0.002857	2.6	2471.85	745.76	0.22
Reach 1	134950.8	100 yr	5349.3	248	254.88	251.77	254.95	0.002934	2.83	2838.13	756.5	0.23
Reach 1	134000.7	10 yr	2303.8	248	252.97	252	252.97	0.000281	0.75	4534.73	1448.23	0.07
Reach 1	134000.7	50 yr	4241.6	248	252.81	252	252.83	0.001119	1.45	4304.66	1443.37	0.13
Reach 1	134000.7	100 yr	5349.3	248	253.28	252	253.29	0.001133	1.58	4978.19	1457.54	0.14
Reach 1	132978.5	10 yr	2303.8	244	251.5	249.42	252.03	0.014841	5.84	394.53	1631.53	0.5
Reach 1	132978.5	50 yr	4241.6	244	251.87	251.25	251.88	0.000777	1.28	4862.98	1661.62	0.11
Reach 1	132978.5	100 yr	5349.3	244	252.37	251.88	252.38	0.000727	1.3	6009.95	1699.85	0.11
Reach 1	131987.2	10 yr	2303.8	244	250.11		250.12	0.000646	1.33	3681.99	1740.38	0.11
Reach 1	131987.2	50 yr	4241.6	244	251.19		251.2	0.000598	1.47	5574.76	1750.27	0.11
Reach 1	131987.2	100 yr	5349.3	244	251.72		251.73	0.000587	1.54	6492.82	1759.74	0.11
Reach 1	130964.6	10 yr	2303.8	244	249.14	247.69	249.15	0.001549	1.55	2348.33	1106.35	0.16
Reach 1	130964.6	50 yr	4241.6	244	250.31	247.96	250.34	0.001323	1.77	3703.79	1183.59	0.15
Reach 1	130964.6	100 yr	5349.3	244	250.87	247.96	250.9	0.001245	1.87	4362.25	1187.5	0.15
Reach 1	129697	10 yr	2303.8	240	247.78	246	247.79	0.000785	1.68	2958.27	1239.68	0.12
Reach 1	129697	50 yr	4241.6	240	249.15	246.15	249.17	0.00067	1.78	4688.47	1276.33	0.12
Reach 1	129697	100 yr	5349.3	240	249.73	246.15	249.75	0.000679	1.89	5427.67	1290.8	0.12
Reach 1	128641.7	10 yr	2303.8	240	246.84	245.74	246.86	0.000997	1.51	2414.54	796.99	0.13
Reach 1	128641.7	50 yr	4241.6	240	248.22	246	248.25	0.001169	1.98	3654.38	1019.99	0.15
Reach 1	128641.7	100 yr	5349.3	240	248.79	246	248.82	0.001158	2.1	4238.31	1025.79	0.15
Reach 1	127244	10 yr	2303.8	238	245.13	243.3	245.16	0.001521	2.16	2029.75	800.66	0.17
Reach 1	127244	50 yr	4241.6	238	246.25	243.88	246.3	0.00168	2.59	2939.84	813.25	0.18
Reach 1	127244	100 yr	5349.3	238	246.82	244.15	246.87	0.001711	2.76	3400.96	823.95	0.19
Reach 1	126289.9	10 yr	2303.8	238	243.69	241.52	243.72	0.001518	1.96	2369.25	1148.03	0.16
Reach 1	126289.9	50 yr	4241.6	238	244.93	242.1	244.95	0.001215	2.06	3804.56	1169.32	0.15
Reach 1	126289.9	100 yr	5349.3	238	245.54	242.1	245.56	0.001133	2.12	4518.07	1181.2	0.15
Reach 1	124780.6	10 yr	2303.8	234	242		242.02	0.000865	1.83	2506.68	871.02	0.13
Reach 1	124780.6	50 yr	4241.6	234	243.34		243.37	0.000914	2.14	3688.83	888.91	0.14
Reach 1	124780.6	100 yr	5349.3	234	243.98		244.01	0.000933	2.28	4258.38	897.18	0.14
Reach 1	123738.1	10 yr	2303.8	234	241.06		241.07	0.000957	1.67	2658.67	966.19	0.13
Reach 1	123738.1	50 yr	4241.6	234	242.37		242.39	0.00095	1.95	3951.68	1011.9	0.14

Reach 1	123738.1	100 yr	5349.3	234	242.99		243.02	0.000969	2.09	4591.3	1050.02	0.14
Reach 1	122650.8	10 yr	2303.8	234	240.16		240.18	0.000714	1.44	2655.38	1046.51	0.11
Reach 1	122650.8	50 yr	4241.6	234	241.47		241.5	0.00072	1.69	4036.97	1055.75	0.12
Reach 1	122650.8	100 yr	5349.3	234	242.07		242.1	0.000742	1.82	4669.27	1065.88	0.12
Reach 1	121693	10 yr	2303.8	234	239.44	236.57	239.45	0.000811	1.36	2918.66	1185.7	0.12
Reach 1	121693	50 yr	4241.6	234	240.81	237.23	240.82	0.000688	1.52	4577.54	1235.34	0.11
Reach 1	121693	100 yr	5349.3	234	241.4	237.56	241.42	0.000685	1.62	5312.13	1253.11	0.12
Reach 1	120667.8	10 yr	2303.8	230.54	238.59	235.01	238.61	0.000825	1.7	2284.17	758.7	0.13
Reach 1	120667.8	50 yr	4241.6	230.54	239.94	236.09	239.98	0.001005	2.16	3382.48	873.06	0.14
Reach 1	120667.8	100 yr	5349.3	230.54	240.51	236.46	240.55	0.001069	2.35	3882.39	881.97	0.15
Reach 1	119080	10 yr	2303.8	230	235.96	234.31	236.06	0.00435	3.38	1182.87	673.68	0.28
Reach 1	119080	50 yr	4241.6	230	237.28	235.14	237.36	0.003152	3.4	2511.83	959.78	0.25
Reach 1	119080	100 yr	5349.3	230	237.98	235.54	238.05	0.002505	3.27	3193.96	985.98	0.22
Reach 1	118001.1	10 yr	2303.8	228	234.78	232	234.79	0.000523	1.33	3452.86	1276.76	0.1
Reach 1	118001.1	50 yr	4241.6	228	236.32	232.56	236.33	0.000443	1.44	5434.74	1324.14	0.1
Reach 1	118001.1	100 yr	5349.3	228	237.1	232.84	237.12	0.000423	1.51	6514.76	1423.8	0.09
Reach 1	116862.3	10 yr	2303.8	228	233.9	230.71	233.94	0.001144	1.63	1798.05	630.11	0.14
Reach 1	116862.3	50 yr	4241.6	228	235.56	231.66	235.6	0.001005	1.91	2908.99	686.81	0.14
Reach 1	116862.3	100 yr	5349.3	228	236.36	231.77	236.41	0.000983	2.06	3476.97	729.44	0.14
Reach 1	115784.5	10 yr	2303.8	228	232.93	229.7	232.96	0.00073	1.29	1973.05	534.04	0.11
Reach 1	115784.5	50 yr	4241.6	228	234.64	230.33	234.68	0.000735	1.63	2903.42	555.36	0.12
Reach 1	115784.5	100 yr	5349.3	228	235.44	230.61	235.49	0.000751	1.8	3354.89	571.37	0.12
Reach 1	114617.3	10 yr	2303.8	224	232.27	228.11	232.28	0.000472	1.38	2761.44	617.57	0.09
Reach 1	114617.3	50 yr	4241.6	224	233.88	228.11	233.9	0.000603	1.8	3793.97	664.59	0.11
Reach 1	114617.3	100 yr	5349.3	224	234.65	228.11	234.68	0.000644	1.97	4310.38	673.86	0.12
Reach 1	112591.1	10 yr	2303.8	220	230.4	227.48	230.48	0.002224	2.82	1603.68	754.87	0.2
Reach 1	112591.1	50 yr	4241.6	220	231.9	229.5	231.96	0.001729	2.88	2736.22	762.3	0.19
Reach 1	112591.1	100 yr	5349.3	220	232.64	229.82	232.71	0.001607	2.96	3317.4	794.92	0.18
Reach 1	111434.1	10 yr	2303.8	220	229.26	225.83	229.27	0.000586	1.43	3279.44	1211.37	0.1
Reach 1	111434.1	50 yr	4241.6	220	231.1	225.83	231.11	0.000388	1.39	5546.83	1238.23	0.09
Reach 1	111434.1	100 yr	5349.3	220	231.9	227.26	231.91	0.000366	1.45	6539.55	1244.86	0.09
Reach 1	110204.6	10 yr	2303.8	218	228.74	225.51	228.75	0.000318	1.2	4025.53	1286.36	0.08
Reach 1	110204.6	50 yr	4241.6	218	230.74	226.69	230.75	0.000231	1.2	6661.55	1337.12	0.07
Reach 1	110204.6	100 yr	5349.3	218	231.55	227.05	231.56	0.000227	1.26	7750.73	1343.49	0.07
Reach 1	109036.8	10 yr	2541	218	227.9	223.57	228	0.001623	3.14	1425.04	455.47	0.19
Reach 1	109036.8	50 yr	4667	218	230.02	225.09	230.13	0.001734	3.75	2751	784.19	0.2
Reach 1	109036.8	100 yr	5881	218	230.87	225.61	230.97	0.001589	3.77	3449.38	859.37	0.19
Reach 1	108031.1	10 yr	2541	214	226.49	220.37	226.58	0.001238	2.87	1487.89	441.81	0.16
Reach 1	108031.1	50 yr	4667	214	228.32	222.19	228.44	0.001621	3.69	2355.33	568.2	0.19
Reach 1	108031.1	100 yr	5881	214	229.04	223.48	229.2	0.001938	4.2	2838.87	760.74	0.21
Reach 1	107075.8	10 yr	2541	214	225.58	220.43	225.62	0.000803	2.02	2380.53	744.85	0.13
Reach 1	107075.8	50 yr	4667	214	227.12	223.03	227.17	0.00109	2.66	3815.25	1181.88	0.15
Reach 1	107075.8	100 yr	5881	214	227.74	224.08	227.79	0.001121	2.81	4589.38	1301.68	0.16
Reach 1	105740.9	10 yr	2541	210	224.09	218.66	224.18	0.001522	2.76	1841.13	967.05	0.17
Reach 1	105740.9	50 yr	4667	210	225.33	221	225.41	0.001611	3.13	3048.52	979.8	0.18
Reach 1	105740.9	100 yr	5881	210	225.95	222.44	226.03	0.00158	3.24	3656.09	985.92	0.18
Reach 1	105073.7	10 yr	2541	210	223.34	217.36	223.4	0.000904	2.42	2170.49	835.04	0.14
Reach 1	105073.7	50 yr	4667	210	224.28	220.16	224.37	0.001528	3.36	3057.16	999.19	0.18
Reach 1	105073.7	100 yr	5881	210	224.92	220.7	225.01	0.001491	3.45	3703.58	1003.22	0.18

Reach 1	104400.4	10 yr	2541	210	221.79	217.07	222.07	0.006572	4.25	602.72	851.94	0.34
Reach 1	104400.4	50 yr	4667	210	223.32	220.08	223.36	0.001401	2.35	3440.77	1038.7	0.16
Reach 1	104400.4	100 yr	5881	210	224.01	220.95	224.06	0.001288	2.41	4178.06	1077.87	0.16
Reach 1	104005.1	10 yr	2541	210	221.28	217.31	221.32	0.001017	2.27	2209.92	724.98	0.14
Reach 1	104005.1	50 yr	4667	210	222.8	219.1	222.85	0.001199	2.77	3514.84	902.72	0.16
Reach 1	104005.1	100 yr	5881	210	223.51	219.49	223.57	0.001207	2.92	4181.6	966.57	0.16
Reach 1	103025.1	10 yr	2541	210	220.48	218.2	220.5	0.000695	1.73	3082.92	1054.52	0.11
Reach 1	103025.1	50 yr	4667	210	221.97	218.71	221.99	0.000661	1.91	4659.47	1063.99	0.12
Reach 1	103025.1	100 yr	5881	210	222.66	218.93	222.69	0.000681	2.05	5413.25	1104.42	0.12
Reach 1	101979.6	10 yr	2541	208	219.53	213.52	219.58	0.00112	2.06	2006.01	828.18	0.15
Reach 1	101979.6	50 yr	4667	208	221.06	215.43	221.12	0.001074	2.34	3437.43	963.79	0.15
Reach 1	101979.6	100 yr	5881	208	221.76	216.43	221.82	0.00104	2.44	4111.23	968.3	0.15
Reach 1	100998.5	10 yr	2541	208	218.59	214.31	218.61	0.000873	1.12	2731.62	917.74	0.11
Reach 1	100998.5	50 yr	4667	208	220.19	216	220.21	0.000781	1.41	4287.89	1014.55	0.12
Reach 1	100998.5	100 yr	5881	208	220.93	216.01	220.95	0.000743	1.52	5033.49	1020.91	0.12
Reach 1	100268.9	10 yr	2541	204	217.85	212.66	217.88	0.001125	1.8	2182.61	786.94	0.14
Reach 1	100268.9	50 yr	4667	204	219.53	214.66	219.57	0.000982	2.04	3669.37	946.05	0.14
Reach 1	100268.9	100 yr	5881	204	220.3	216.16	220.34	0.000926	2.13	4410.2	977.27	0.14
Reach 1	98606.43	10 yr	2541	204	216.29	211.24	216.32	0.000792	1.93	2489.19	816.02	0.12
Reach 1	98606.43	50 yr	4667	204	218.11	214.46	218.14	0.000757	2.19	4308.82	1149.31	0.13
Reach 1	98606.43	100 yr	5881	204	219	214.81	219.03	0.000676	2.2	5356.9	1216.4	0.12
Reach 1	97734.7	10 yr	2541	205.01	215.6		215.64	0.000779	2.04	2425.93	915.24	0.13
Reach 1	97734.7	50 yr	4667	205.01	217.5		217.53	0.000649	2.15	4315.28	1056.88	0.12
Reach 1	97734.7	100 yr	5881	205.01	218.45		218.48	0.000585	2.17	5347.35	1114.24	0.12
Reach 1	96250.23	10 yr	2541	202	214.24	208.72	214.29	0.00106	2.3	1879.91	556.77	0.15
Reach 1	96250.23	50 yr	4667	202	216.27	211.13	216.33	0.001031	2.65	3032.41	612.8	0.15
Reach 1	96250.23	100 yr	5881	202	217.27	212.01	217.34	0.001054	2.85	3702.49	726.08	0.15
Reach 1	95264.73	10 yr	2541	202	213.36	207.44	213.4	0.000787	1.87	2157.61	630.27	0.12
Reach 1	95264.73	50 yr	4667	202	215.47	210.03	215.51	0.000685	2.08	3603.05	701.27	0.12
Reach 1	95264.73	100 yr	5881	202	216.47	210.64	216.51	0.000672	2.21	4321.28	769.58	0.12
Reach 1	94258.65	10 yr	2541	202	212.83		212.85	0.000393	1.52	3216.33	732.84	0.09
Reach 1	94258.65	50 yr	4667	202	214.98		215	0.000386	1.74	4871.29	825.81	0.09
Reach 1	94258.65	100 yr	5881	202	215.99		216.01	0.000379	1.83	5733.22	879.39	0.09
Reach 1	93272.17	10 yr	4732.6	202	212.41	208.11	212.43	0.000448	1.34	5390.93	1250.31	0.09
Reach 1	93272.17	50 yr	8607.6	202	214.56	208.51	214.59	0.000438	1.61	8172.61	1317.82	0.1
Reach 1	93272.17	100 yr	10811.7	202	215.58	208.77	215.6	0.00043	1.72	9513.54	1324.61	0.1
Reach 1	92980.49	10 yr	4732.6	202	212.23	207.91	212.25	0.000713	1.88	4159.07	936.12	0.12
Reach 1	92980.49	50 yr	8607.6	202	214.38	208.96	214.41	0.000735	2.25	6268.61	1020.38	0.13
Reach 1	92980.49	100 yr	10811.7	202	215.39	209.28	215.43	0.000722	2.39	7308.33	1027.27	0.13
Reach 1	92829.37		Bridge									
Reach 1	92734.37	10 yr	4732.6	202	211.99	208.67	212.03	0.001054	2.14	3725.69	901.6	0.14
Reach 1	92734.37	50 yr	8607.6	202	214.15	209.4	214.19	0.000954	2.45	5747.9	972.73	0.14
Reach 1	92734.37	100 yr	10811.7	202	215.17	209.71	215.22	0.000921	2.59	6736.99	1029.33	0.14
Reach 1	92504.4	10 yr	4732.6	202	211.79	208.01	211.81	0.0008	1.86	4068.37	891.01	0.13
Reach 1	92504.4	50 yr	8607.6	202	213.95	208.57	213.99	0.000797	2.24	6071.55	961.44	0.13
Reach 1	92504.4	100 yr	10811.7	202	214.98	208.91	215.02	0.000787	2.39	7099.19	1054.79	0.13
Reach 1	91303.04	10 yr	4732.6	198	211.13		211.16	0.000384	1.69	4429.08	936.42	0.09
Reach 1	91303.04	50 yr	8607.6	198	213.2		213.24	0.000493	2.17	6431.71	1017.21	0.11

Reach 1	91303.04	100 yr	10811.7	198	214.2		214.26	0.000517	2.34	7457.09	1023.86	0.11
Reach 1	90295.13	10 yr	4732.6	198	210.34	206.74	210.43	0.001843	3.15	2767.47	793.51	0.2
Reach 1	90295.13	50 yr	8607.6	198	212.3	207.67	212.4	0.001723	3.52	4340.56	827.18	0.2
Reach 1	90295.13	100 yr	10811.7	198	213.29	208	213.39	0.001704	3.73	5184.89	893.06	0.2
Reach 1	89313.17	10 yr	4732.6	198	208.66	204.96	208.73	0.001614	2.63	2737.66	812.87	0.18
Reach 1	89313.17	50 yr	8607.6	198	210.8	206.21	210.88	0.001378	2.92	4548.22	867.07	0.17
Reach 1	89313.17	100 yr	10811.7	198	211.85	206.68	211.94	0.001275	3.03	5469.79	879.55	0.17
Reach 1	88360.79	10 yr	4732.6	195.92	207.71	202.53	207.75	0.000701	2.13	4040.68	1003.51	0.12
Reach 1	88360.79	50 yr	8607.6	195.92	209.93	203.95	209.97	0.000681	2.42	6398.38	1112.09	0.13
Reach 1	88360.79	100 yr	10811.7	195.92	211.04	204.44	211.09	0.000637	2.49	7649.68	1126.45	0.12
Reach 1	86946.23	10 yr	5375	194	207.01	203.03	207.02	0.000401	1.64	6953.03	1682	0.09
Reach 1	86946.23	50 yr	9757	194	209.3	203.74	209.32	0.000345	1.75	10926.32	1768.9	0.09
Reach 1	86946.23	100 yr	12249	194	210.47	204.1	210.48	0.000316	1.79	13005.46	1787.92	0.09
Reach 1	85763.68	10 yr	5375	194	206.24	202.76	206.29	0.001064	2.67	3918.77	858.26	0.15
Reach 1	85763.68	50 yr	9757	194	208.61	203.76	208.67	0.000986	2.98	6143.35	959.99	0.15
Reach 1	85763.68	100 yr	12249	194	209.83	204.13	209.89	0.000909	3.05	7319.7	970.54	0.15
Reach 1	84304.58	10 yr	5375	192	205.14	200.63	205.17	0.000572	1.85	4986.56	1058.36	0.11
Reach 1	84304.58	50 yr	9757	192	207.56	201.61	207.6	0.000559	2.15	7599.16	1119.34	0.11
Reach 1	84304.58	100 yr	12249	192	208.75	202.08	208.79	0.000626	2.44	9082.35	1364.68	0.12
Reach 1	83700.74	10 yr	5375	192	204.77	199.12	204.81	0.000619	1.98	3842.94	817.35	0.12
Reach 1	83700.74	50 yr	9757	192	207.18	200.67	207.24	0.00065	2.38	6407.53	1016.02	0.12
Reach 1	83700.74	100 yr	12249	192	208.35	201.11	208.41	0.000653	2.55	7635.39	1100.36	0.13
Reach 1	82541.44	10 yr	5375	192	203.9	198.84	203.95	0.000902	2.16	3810.45	996.68	0.14
Reach 1	82541.44	50 yr	9757	192	206.37	200.34	206.43	0.000755	2.38	6326.15	1059.72	0.13
Reach 1	82541.44	100 yr	12249	192	207.56	200.79	207.62	0.000715	2.49	7616.96	1116.26	0.13
Reach 1	81753.13	10 yr	5375	192	203.28	197.58	203.31	0.000718	2.21	4286.24	826.4	0.13
Reach 1	81753.13	50 yr	9757	192	205.8	199.07	205.84	0.000712	2.58	6541.88	1003.18	0.13
Reach 1	81753.13	100 yr	12249	192	206.94	199.55	207	0.000839	2.97	7752.95	1107.46	0.14
Reach 1	80430.07	10 yr	5375	188	202.06	195.99	202.13	0.001137	2.87	3268.56	668.97	0.16
Reach 1	80430.07	50 yr	9757	188	204.56	198.73	204.65	0.00117	3.37	5110.92	788.1	0.17
Reach 1	80430.07	100 yr	12249	188	205.58	199.21	205.68	0.001199	3.6	5919.4	795.83	0.17
Reach 1	79347.86	10 yr	5375	188	201.05	195.89	201.1	0.000796	2.17	3924.23	979.01	0.13
Reach 1	79347.86	50 yr	9757	188	203.6	197.69	203.64	0.000733	2.48	7498.95	1521.88	0.13
Reach 1	79347.86	100 yr	12249	188	204.68	198	204.72	0.000653	2.49	9153.33	1532.26	0.13
Reach 1	78173.07	10 yr	5375	188	200.4	194.7	200.43	0.000426	1.63	5775.19	1307.43	0.1
Reach 1	78173.07	50 yr	9757	188	203.03	196.21	203.06	0.000359	1.78	9313.48	1394.12	0.09
Reach 1	78173.07	100 yr	12249	188	204.14	197.08	204.17	0.000354	1.88	10861.15	1394.12	0.09
Reach 1	77126.59	10 yr	5375	188	199.67	194.17	199.74	0.001088	2.84	2888.61	450.1	0.16
Reach 1	77126.59	50 yr	9757	188	202.25	195.38	202.38	0.001449	3.82	4241.36	756.08	0.19
Reach 1	77126.59	100 yr	12249	188	203.34	195.81	203.48	0.00151	4.12	5152.87	892.84	0.2
Reach 1	75906.48	10 yr	5375	184	197.45	193.28	197.64	0.003148	4.89	2134.39	463.78	0.26
Reach 1	75906.48	50 yr	9757	184	199.62	195.5	199.84	0.003247	5.62	3322.72	725.49	0.28
Reach 1	75906.48	100 yr	12249	184	200.66	196.66	200.89	0.003221	5.9	4263.38	962.27	0.28
Reach 1	74771.55	10 yr	5375	184	196.33	192	196.35	0.000548	1.98	5604.81	1377.26	0.11
Reach 1	74771.55	50 yr	9757	184	198.61	192.62	198.64	0.000485	2.14	8815.24	1423.05	0.11
Reach 1	74771.55	100 yr	12249	184	199.69	193.07	199.72	0.000469	2.22	10352.6	1433.88	0.11
Reach 1	73882.51	10 yr	5375	184	195.78	190.74	195.81	0.000676	1.56	4571.57	966.58	0.11
Reach 1	73882.51	50 yr	9757	184	198.11	191.88	198.14	0.000639	1.9	6826.08	974.6	0.12
Reach 1	73882.51	100 yr	12249	184	199.19	192.09	199.23	0.000639	2.06	7881.89	978.34	0.12

Reach 1	72505.33	10 yr	5375	182	195.1	189.47	195.12	0.000383	1.6	6494.28	1481.8	0.09
Reach 1	72505.33	50 yr	9757	182	197.5	191.61	197.52	0.000336	1.75	10059.5	1498.44	0.09
Reach 1	72505.33	100 yr	12249	182	198.59	191.74	198.61	0.000331	1.84	11697.09	1504.47	0.09
Reach 1	71346.87	10 yr	5375	182	194.23	188.53	194.3	0.001687	2.77	2690.69	452.83	0.18
Reach 1	71346.87	50 yr	9757	182	196.63	189.85	196.74	0.001911	3.33	3787.34	468.09	0.2
Reach 1	71346.87	100 yr	12249	182	197.69	190	197.83	0.002009	3.69	4292.45	483.62	0.21
Reach 1	70186.09	10 yr	5373	182	192.65	188.25	192.7	0.001151	2.81	3572.38	766.6	0.16
Reach 1	70186.09	50 yr	9753	182	194.95	189.27	195.02	0.001166	3.27	5476.87	852.87	0.17
Reach 1	70186.09	100 yr	12244	182	195.99	189.75	196.07	0.001162	3.45	6367.44	859.88	0.17
Reach 1	69207.5	10 yr	5373	178	191.74		191.79	0.000767	2.14	3898.54	943.34	0.13
Reach 1	69207.5	50 yr	9753	178	194.04		194.11	0.000772	2.51	6215.48	1045.98	0.13
Reach 1	69207.5	100 yr	12244	178	195.09		195.16	0.000764	2.66	7316.67	1052.3	0.14
Reach 1	67710.94	10 yr	5373	178	190.31	185.43	190.38	0.00119	2.61	3320.31	772.14	0.16
Reach 1	67710.94	50 yr	9753	178	192.61	187.56	192.7	0.001166	3.04	5425.79	1017.1	0.16
Reach 1	67710.94	100 yr	12244	178	193.71	188.27	193.79	0.001107	3.16	6558.54	1059.21	0.16
Reach 1	66841.3	10 yr	5373	178	189.67	184.46	189.7	0.000534	1.66	4983.32	1177.92	0.11
Reach 1	66841.3	50 yr	9753	178	192.01	185.76	192.04	0.00051	1.93	7862.92	1271.83	0.11
Reach 1	66841.3	100 yr	12244	178	193.12	186.2	193.16	0.000491	2.04	9298.64	1295.75	0.11
Reach 1	65899.21	10 yr	5373	178	189.2	183.44	189.23	0.000473	1.58	4652.56	917.19	0.1
Reach 1	65899.21	50 yr	9753	178	191.51	184.61	191.55	0.000528	1.98	6827.72	977.78	0.11
Reach 1	65899.21	100 yr	12244	178	192.62	185.18	192.67	0.000557	2.18	7940.58	1041.41	0.12
Reach 1	64371.68	10 yr	5373	176	188.15	183.29	188.21	0.000998	2.34	3360.64	683.36	0.15
Reach 1	64371.68	50 yr	9753	176	190.31	184.46	190.4	0.001147	2.95	4865	723.08	0.16
Reach 1	64371.68	100 yr	12244	176	191.34	184.96	191.45	0.001227	3.25	5640.49	777.45	0.17
Reach 1	63293.49	10 yr	5373	174	187.02	182.82	187.07	0.001108	2.48	3740.48	965.11	0.15
Reach 1	63293.49	50 yr	9753	174	189.14	184.09	189.2	0.001061	2.83	5916.98	1050.15	0.16
Reach 1	63293.49	100 yr	12244	174	190.16	184.61	190.23	0.001028	2.97	6991.63	1065.04	0.16
Reach 1	62734.52	10 yr	5373	174	186.53	181.8	186.57	0.000739	2.27	4134.76	701.32	0.13
Reach 1	62734.52	50 yr	9753	174	188.59	183.14	188.65	0.00094	2.9	5581.73	706.84	0.15
Reach 1	62734.52	100 yr	12244	174	189.59	183.47	189.66	0.001011	3.18	6290.08	710.11	0.16
Reach 1	61445.96	10 yr	5373	174	184.94		185.05	0.002151	3.29	2945.53	906.58	0.21
Reach 1	61445.96	50 yr	9753	174	186.83		186.94	0.00199	3.67	4676.08	948.33	0.21
Reach 1	61445.96	100 yr	12244	174	187.8		187.92	0.001882	3.81	5622.43	990.47	0.21
Reach 1	60665.99	10 yr	5373	174	183.76		183.82	0.00118	2.53	4191.21	1323.36	0.16
Reach 1	60665.99	50 yr	9753	174	185.87		185.92	0.000894	2.58	7041.79	1366.27	0.14
Reach 1	60665.99	100 yr	12244	174	186.92		186.97	0.000829	2.65	8496.48	1426.19	0.14
Reach 1	59655.91	10 yr	5374	172	183.36	180	183.37	0.000219	1.05	8135.7	1461.85	0.07
Reach 1	59655.91	50 yr	9754	172	185.46	180.01	185.47	0.000256	1.34	11213.92	1476.06	0.08
Reach 1	59655.91	100 yr	12245	172	186.5	180.02	186.51	0.000269	1.47	12756.21	1495.04	0.08
Reach 1	58792.02	10 yr	5374	172	183.06	179.06	183.08	0.000568	1.56	5917.09	1818.51	0.11
Reach 1	58792.02	50 yr	9754	172	185.16	180	185.18	0.000444	1.65	9860.63	1892.82	0.1
Reach 1	58792.02	100 yr	12245	172	186.21	180.22	186.23	0.0004	1.69	11848.26	1900	0.1
Reach 1	57476.03	10 yr	5374	172	182.27	178.32	182.29	0.000631	1.83	5357.78	1288.34	0.12
Reach 1	57476.03	50 yr	9754	172	184.5	179.85	184.53	0.000555	2.03	8307.51	1344.18	0.11
Reach 1	57476.03	100 yr	12245	172	185.6	179.85	185.63	0.000521	2.1	9788.98	1349.46	0.11
Reach 1	56111.01	10 yr	5374	171.61	181.37	176.08	181.41	0.000664	1.99	4552.21	1014.64	0.12
Reach 1	56111.01	50 yr	9754	171.61	183.68	177.38	183.72	0.000638	2.29	6893.74	1020.59	0.12
Reach 1	56111.01	100 yr	12245	171.61	184.81	178.24	184.86	0.000624	2.41	8050.6	1094.41	0.12

Reach 1	54998.39	10 yr	5374	168	180.68	175.9	180.71	0.000614	2.17	4663.97	805.96	0.12
Reach 1	54998.39	50 yr	9754	168	182.94	176.72	182.99	0.000703	2.65	6493.64	811.2	0.13
Reach 1	54998.39	100 yr	12245	168	184.07	177.12	184.12	0.000725	2.84	7410.96	830.31	0.13
Reach 1	53922.78	10 yr	5374	168	179.95	175.23	179.99	0.000728	2.12	4471.82	960.23	0.13
Reach 1	53922.78	50 yr	9754	168	182.16	175.54	182.2	0.000748	2.49	6649.35	1012.17	0.13
Reach 1	53922.78	100 yr	12245	168	183.29	177.18	183.34	0.000731	2.63	7807.04	1039.01	0.13
Reach 1	52312.84	10 yr	5374	168	179.03	174.16	179.05	0.000478	1.53	6049.53	1617.07	0.1
Reach 1	52312.84	50 yr	9754	168	181.34	175.61	181.36	0.000384	1.65	9835.97	1674.91	0.09
Reach 1	52312.84	100 yr	12245	168	182.52	176.03	182.55	0.000348	1.69	11848.52	1716.38	0.09
Reach 1	51397.14	10 yr	5374	168	178.49	173.67	178.52	0.000698	2.12	4385.87	935.94	0.12
Reach 1	51397.14	50 yr	9754	168	180.86	175.34	180.9	0.000656	2.41	6875.15	963.31	0.13
Reach 1	51397.14	100 yr	12245	168	182.07	176	182.12	0.000641	2.54	8043.73	979.81	0.13
Reach 1	49873.99	10 yr	5374	168	177.58	171.99	177.61	0.000518	1.83	4767.71	816.94	0.11
Reach 1	49873.99	50 yr	9754	168	179.9	171.99	179.94	0.000607	2.3	6703.41	909.52	0.12
Reach 1	49873.99	100 yr	12245	168	181.02	171.99	181.08	0.000733	2.69	7875.02	1065.16	0.13
Reach 1	48863.91	10 yr	5374	166	177.2	172	177.21	0.000302	1.41	6571.66	1359.1	0.08
Reach 1	48863.91	50 yr	9754	166	179.47	172.01	179.5	0.000329	1.71	9879.98	1492.55	0.09
Reach 1	48863.91	100 yr	12245	166	180.55	172.15	180.58	0.000341	1.85	11513.21	1540.57	0.09
Reach 1	47468.78	10 yr	5374	166	176.6	171.34	176.63	0.000614	1.85	5090.75	1373.59	0.11
Reach 1	47468.78	50 yr	9754	166	178.9	173.09	178.93	0.000514	2	8386.78	1462.72	0.11
Reach 1	47468.78	100 yr	12245	166	179.98	173.66	180.02	0.00048	2.06	9980.44	1467.34	0.11
Reach 1	46475.52	10 yr	5413	162	176.08	168.72	176.11	0.000442	1.89	5008.74	1173.54	0.1
Reach 1	46475.52	50 yr	9813	162	178.4	170.57	178.44	0.000466	2.21	7741.69	1181.17	0.11
Reach 1	46475.52	100 yr	12314	162	179.5	171.2	179.54	0.000471	2.35	9040.9	1184.79	0.11
Reach 1	45311.81	10 yr	5413	162	175.63	168.97	175.65	0.00036	1.44	6266.58	1417.86	0.09
Reach 1	45311.81	50 yr	9813	162	177.95	170.86	177.97	0.000346	1.67	9652.56	1507.39	0.09
Reach 1	45311.81	100 yr	12314	162	179.05	172.26	179.08	0.000337	1.76	11322.29	1516.66	0.09
Reach 1	44122.59	10 yr	5413	162	174.79	170.63	174.88	0.001404	3.04	2678.88	514.44	0.17
Reach 1	44122.59	50 yr	9813	162	177.07	171.79	177.2	0.001578	3.72	4293.93	780.77	0.19
Reach 1	44122.59	100 yr	12314	162	178.19	172.3	178.32	0.001547	3.92	5165.39	780.77	0.19
Reach 1	43305.32	10 yr	5413	162	173.68	169.6	173.76	0.001359	2.85	2818.85	502.19	0.17
Reach 1	43305.32	50 yr	9813	162	175.71	170.57	175.84	0.001764	3.74	3860.29	531.45	0.2
Reach 1	43305.32	100 yr	12314	162	176.78	171.04	176.94	0.001878	4.11	4435.87	600.32	0.21
Reach 1	42249.08	10 yr	5413	162	172.77	168.62	172.79	0.000649	1.34	5496.04	1598.92	0.11
Reach 1	42249.08	50 yr	9813	162	174.92	170.08	174.94	0.000478	1.47	8970.03	1629.01	0.1
Reach 1	42249.08	100 yr	12314	162	176.07	170.3	176.09	0.000414	1.52	10845.61	1637.42	0.09
Reach 1	40966.61	10 yr	5413	162	171.93	167.1	171.95	0.000668	1.59	5675.62	1425	0.11
Reach 1	40966.61	50 yr	9813	162	174.3	168.26	174.32	0.000489	1.69	9082.22	1435.94	0.1
Reach 1	40966.61	100 yr	12314	162	175.52	168.81	175.55	0.000433	1.74	10840.6	1435.94	0.1
Reach 1	39658.88	10 yr	5413	162	171.02	167.07	171.05	0.00071	1.93	5207.3	1335.48	0.12
Reach 1	39658.88	50 yr	9813	162	173.66	168.19	173.68	0.000488	1.95	8869.17	1437.4	0.11
Reach 1	39658.88	100 yr	12314	162	174.96	168.69	174.99	0.000423	1.96	10762.46	1460.26	0.1
Reach 1	38757.5	10 yr	5413	158	170.51	165.62	170.53	0.00047	1.94	6282.71	1468.05	0.1
Reach 1	38757.5	50 yr	9813	158	173.3	165.83	173.32	0.000335	1.91	10510.81	1557.46	0.09
Reach 1	38757.5	100 yr	12314	158	174.65	165.84	174.67	0.000299	1.92	12631.95	1587.52	0.09
Reach 1	38200.74	10 yr	5413	158	170.18	165.63	170.22	0.000692	2.13	4395.94	794.2	0.12
Reach 1	38200.74	50 yr	9813	158	173.02	166.76	173.06	0.000657	2.48	7054.33	993.41	0.13
Reach 1	38200.74	100 yr	12314	158	174.4	167.09	174.44	0.0006	2.55	8431.73	1011.56	0.12
Reach 1	37492.84	10 yr	5413	158	169.85	164.11	169.87	0.000352	1.29	5486.14	960.03	0.09

Reach 1	37492.84	50 yr	9813	158	172.71	164.74	172.73	0.000344	1.59	8657.65	1209.09	0.09
Reach 1	37492.84	100 yr	12314	158	174.1	165.05	174.13	0.000316	1.67	10367.28	1228.66	0.09
Reach 1	36580.05	10 yr	5413	161.01	169.45	164.01	169.47	0.000552	1.68	5222.47	971	0.11
Reach 1	36580.05	50 yr	9813	161.01	172.35	164.69	172.37	0.00045	1.89	8034.93	971	0.1
Reach 1	36580.05	100 yr	12314	161.01	173.77	165.08	173.8	0.000423	1.99	9416.2	971	0.1
Reach 1	35507.14	10 yr	5413	158	169.02	162.04	169.03	0.000314	1.53	6258.09	969.62	0.08
Reach 1	35507.14	50 yr	9813	158	171.95	163.18	171.97	0.000322	1.84	9188.81	1047.53	0.09
Reach 1	35507.14	100 yr	12314	158	173.38	163.73	173.4	0.000325	1.98	10729.98	1102.02	0.09
Reach 1	34849.13	10 yr	5413	158	168.78	161.9	168.8	0.000381	1.5	4913.16	945.54	0.09
Reach 1	34849.13	50 yr	9813	158	171.71	163.09	171.75	0.000346	1.74	7744.63	987.6	0.09
Reach 1	34849.13	100 yr	12314	158	173.15	163.65	173.18	0.000331	1.84	9178.86	1011.03	0.09
Reach 1	33370.94	10 yr	5413	156	168.43	162.88	168.43	0.000169	0.99	7452.23	1113.8	0.06
Reach 1	33370.94	50 yr	9813	156	171.36	164	171.37	0.000184	1.26	10775.7	1166.6	0.07
Reach 1	33370.94	100 yr	12314	156	172.8	164	172.81	0.000187	1.38	12487.27	1214.93	0.07
Reach 1	32021.58	10 yr	5413	156	168.01	162	168.04	0.000595	2.19	4249.46	659.04	0.12
Reach 1	32021.58	50 yr	9813	156	170.91	163.63	170.96	0.000608	2.59	6188.69	696.75	0.12
Reach 1	32021.58	100 yr	12314	156	172.34	163.99	172.4	0.000602	2.75	7276.28	813.59	0.12
Reach 1	31212.27	10 yr	5413	156	167.38	161.7	167.44	0.000966	2.72	4121.24	1004.35	0.15
Reach 1	31212.27	50 yr	9813	156	170.42	163.1	170.46	0.000613	2.57	7215.22	1034.75	0.12
Reach 1	31212.27	100 yr	12314	156	171.89	163.71	171.93	0.00054	2.59	8756.73	1066.86	0.12
Reach 1	29931.87	10 yr	5413	152	166.48	160	166.51	0.000558	1.96	4459.87	762.41	0.11
Reach 1	29931.87	50 yr	9813	152	169.74	160.65	169.78	0.000473	2.19	7032.76	800.4	0.11
Reach 1	29931.87	100 yr	12314	152	171.24	161.16	171.28	0.000476	2.37	8266.2	853.66	0.11
Reach 1	28687.16	10 yr	5413	152	166.16	158.06	166.17	0.000155	1.18	7381.96	949.92	0.06
Reach 1	28687.16	50 yr	9813	152	169.43	159.07	169.44	0.00017	1.45	10573.19	992.27	0.07
Reach 1	28687.16	100 yr	12314	152	170.91	159.49	170.93	0.00018	1.6	12064.27	1023.52	0.07
Reach 1	27568.89	10 yr	5413	152	165.87		165.9	0.000419	1.82	4257.72	548.84	0.1
Reach 1	27568.89	50 yr	9813	152	169.09		169.14	0.000472	2.31	6144.05	608.12	0.11
Reach 1	27568.89	100 yr	12314	152	170.55		170.61	0.000502	2.55	7044.14	643.73	0.11
Reach 1	26738.66	10 yr	5413	152	165.68		165.69	0.000166	1.24	7208.18	943.81	0.06
Reach 1	26738.66	50 yr	9813	152	168.88		168.9	0.00019	1.55	10426.83	1049.59	0.07
Reach 1	26738.66	100 yr	12314	152	170.33		170.35	0.000205	1.72	11967.72	1095.23	0.07
Reach 1	25956.46	10 yr	5413	152	165.51		165.53	0.000248	1.45	5586.78	678.95	0.08
Reach 1	25956.46	50 yr	9813	152	168.68		168.71	0.000316	1.94	7942.23	800.17	0.09
Reach 1	25956.46	100 yr	12314	152	170.11		170.15	0.000326	2.1	9096.17	809.69	0.09
Reach 1	25307.43	10 yr	5413	152	165.26		165.3	0.000546	2.26	4169.13	631.66	0.11
Reach 1	25307.43	50 yr	9813	152	168.37		168.42	0.000635	2.83	6573.22	883.68	0.13
Reach 1	25307.43	100 yr	12314	152	169.81		169.87	0.000595	2.91	7853.1	893.98	0.13
Reach 1	24484.37	10 yr	5413	148	164.97	156	164.99	0.000264	1.63	5906.36	951.03	0.08
Reach 1	24484.37	50 yr	9813	148	168.05	156	168.08	0.000284	1.95	8950.8	1017.98	0.09
Reach 1	24484.37	100 yr	12314	148	169.5	156	169.53	0.000282	2.06	10430.92	1024.2	0.09
Reach 1	23186.49	10 yr	5413	148	164.46		164.5	0.000605	1.69	4088.55	919.29	0.11
Reach 1	23186.49	50 yr	9813	148	167.6		167.64	0.000423	1.8	7327.85	1066.6	0.1
Reach 1	23186.49	100 yr	12314	148	169.08		169.12	0.00038	1.86	8900.11	1066.6	0.1
Reach 1	22034.16	10 yr	5413	148	163.64	155.26	163.72	0.000872	2.52	2699.22	353.76	0.14
Reach 1	22034.16	50 yr	9813	148	166.83	157.51	166.94	0.001091	3.06	3903.46	454.77	0.16
Reach 1	22034.16	100 yr	12314	148	168.33	158.51	168.47	0.001076	3.31	4764.02	701.23	0.16
Reach 1	20846.64	10 yr	5413	146	162.85	153.73	162.9	0.000559	1.93	3678.33	780.48	0.11
Reach 1	20846.64	50 yr	9813	146	166.03	155.72	166.09	0.000495	2.2	6309.84	867.84	0.11

Reach 1	20846.64	100 yr	12314	146	167.57	156.9	167.63	0.000477	2.34	7714.96	962.47	0.11
Reach 1	19733.75	10 yr	5413	146	161.54		161.8	0.002049	4.11	1406.98	161.57	0.22
Reach 1	19733.75	50 yr	9813	146	164.45		164.94	0.002919	5.73	1921.65	194.01	0.27
Reach 1	19733.75	100 yr	12314	146	165.76		166.43	0.003525	6.69	2189.78	366.27	0.3
Reach 1	18610.39	10 yr	5871	146	160.42	153.86	160.47	0.00073	2.26	3935.28	761.04	0.13
Reach 1	18610.39	50 yr	10625	146	163.42	156.21	163.48	0.00066	2.57	6313.75	811.27	0.13
Reach 1	18610.39	100 yr	13332	146	164.78	156.21	164.85	0.000654	2.74	7438.76	842.95	0.13
Reach 1	17427.55	10 yr	5871	146	159.3		159.4	0.001176	2.55	2717.9	465.03	0.16
Reach 1	17427.55	50 yr	10625	146	162.36		162.49	0.001116	3.07	4183.12	495.57	0.16
Reach 1	17427.55	100 yr	13332	146	163.71		163.85	0.001132	3.34	4854.56	500.83	0.17
Reach 1	16506.49	10 yr	5871	146	158.8	153.58	158.82	0.00036	1.46	5601.58	858.36	0.09
Reach 1	16506.49	50 yr	10625	146	161.84	154	161.87	0.000409	1.91	8413.32	999.12	0.1
Reach 1	16506.49	100 yr	13332	146	163.2	154	163.24	0.000402	2.04	9780.97	1006.26	0.1
Reach 1	15082.54	10 yr	5871	146	158.09		158.15	0.000637	2.08	3552.58	760.32	0.12
Reach 1	15082.54	50 yr	10625	146	161.07		161.15	0.000628	2.48	5904.82	872.92	0.12
Reach 1	15082.54	100 yr	13332	146	162.45		162.53	0.000618	2.64	7161.47	938.45	0.13
Reach 1	14205	10 yr	5871	146	157.32	150.09	157.4	0.001207	2.98	3216.35	561.43	0.17
Reach 1	14205	50 yr	10625	146	160.32	153.29	160.42	0.001152	3.47	5018.8	636.17	0.17
Reach 1	14205	100 yr	13332	146	161.7	153.89	161.81	0.001134	3.68	5929.52	679.01	0.17
Reach 1	13144.96	10 yr	5871	146	156.35	150.22	156.41	0.00074	2.25	3479.23	502.22	0.13
Reach 1	13144.96	50 yr	10625	146	159.32	151.58	159.4	0.000809	2.83	4976.8	509.01	0.14
Reach 1	13144.96	100 yr	13332	146	160.65	152.16	160.76	0.000874	3.14	5694.32	615.96	0.15
Reach 1	11937.65	10 yr	5871	146	155.47	150.79	155.51	0.000757	1.92	4600.73	1025.63	0.13
Reach 1	11937.65	50 yr	10625	146	158.59	152.03	158.63	0.000508	2	7917.49	1086.02	0.11
Reach 1	11937.65	100 yr	13332	146	159.95	152.41	159.99	0.000473	2.09	9389.64	1090.74	0.11
Reach 1	11143.64	10 yr	5871	146	155.02	149.71	155.05	0.000455	1.58	5229.98	911.93	0.1
Reach 1	11143.64	50 yr	10625	146	158.26	150.07	158.29	0.000374	1.8	8178.45	911.93	0.09
Reach 1	11143.64	100 yr	13332	146	159.62	150.07	159.66	0.000376	1.95	9419.54	911.93	0.1
Reach 1	10738.33	10 yr	5871	146	154.89	148.52	154.91	0.000258	1.18	5872.07	970.7	0.07
Reach 1	10738.33	50 yr	10625	146	158.14	149.29	158.17	0.000228	1.4	9135.13	1019.34	0.07
Reach 1	10738.33	100 yr	13332	146	159.5	149.68	159.53	0.000232	1.52	10521.41	1019.34	0.08
Reach 1	9866.886	10 yr	5871	146	154.59		154.62	0.000443	1.5	4191.68	651.3	0.1
Reach 1	9866.886	50 yr	10625	146	157.86		157.91	0.000408	1.83	6506.12	778.48	0.1
Reach 1	9866.886	100 yr	13332	146	159.21		159.27	0.000417	2	7585.37	815.4	0.1
Reach 1	9171.781	10 yr	5871	146	154.21	148.56	154.25	0.000664	1.76	4260.78	621.19	0.12
Reach 1	9171.781	50 yr	10625	146	157.52	149.33	157.57	0.000593	2.15	6321.92	625.77	0.12
Reach 1	9171.781	100 yr	13332	146	158.86	149.68	158.92	0.000621	2.39	7162.07	633.5	0.12
Reach 1	8187.326	10 yr	5871	146	153.41	148.74	153.47	0.000963	1.82	3219.35	637.22	0.14
Reach 1	8187.326	50 yr	10625	146	156.97	149.58	157.02	0.000535	1.88	6398.85	943.44	0.11
Reach 1	8187.326	100 yr	13332	146	158.31	149.99	158.37	0.000503	2	7689.62	969.2	0.11
Reach 1	7303.347	10 yr	5871	146	152.75		152.79	0.000615	1.54	4055.86	902.4	0.11
Reach 1	7303.347	50 yr	10625	146	156.62		156.65	0.000321	1.54	8018.5	1068.48	0.09
Reach 1	7303.347	100 yr	13332	146	157.98		158.02	0.00031	1.65	9476.69	1068.48	0.09
Reach 1	6470.493	10 yr	5871	142	152.39	146.04	152.41	0.000347	1.4	6226.58	953.97	0.09
Reach 1	6470.493	50 yr	10625	142	156.39	147.39	156.41	0.000246	1.54	10132.85	1010.1	0.08
Reach 1	6470.493	100 yr	13332	142	157.75	147.69	157.78	0.000265	1.71	11533.7	1053.37	0.08
Reach 1	5530.472	10 yr	5871	142	152.02	146.51	152.04	0.000435	1.45	5283.07	983.86	0.09
Reach 1	5530.472	50 yr	10625	142	156.15	147.58	156.18	0.00026	1.51	9588.89	1199.61	0.08
Reach 1	5530.472	100 yr	13332	142	157.5	148.2	157.53	0.000271	1.66	11316.79	1367.31	0.08

Reach 1	4587.731	10 yr	5871	142	151.59		151.62	0.00047	1.66	5346.81	941.35	0.1
Reach 1	4587.731	50 yr	10625	142	155.91		155.93	0.000256	1.62	9646.69	1069.82	0.08
Reach 1	4587.731	100 yr	13332	142	157.24		157.27	0.000267	1.77	11133.16	1158.78	0.08
Reach 1	3812.865	10 yr	5871	142	151.22		151.24	0.000503	1.79	5725.28	1066.55	0.11
Reach 1	3812.865	50 yr	10625	142	155.72		155.74	0.000247	1.65	11000.81	1436.89	0.08
Reach 1	3812.865	100 yr	13332	142	157.05		157.07	0.000254	1.78	13063.61	1573.57	0.08
Reach 1	2830.46	10 yr	5871	142	150.79		150.82	0.000376	1.52	5686.07	959.85	0.09
Reach 1	2830.46	50 yr	10625	142	155.49		155.51	0.00021	1.52	10420.61	1106.09	0.07
Reach 1	2830.46	100 yr	13332	142	156.81		156.83	0.000225	1.67	11935.33	1161.16	0.08
Reach 1	1704.934	10 yr	5871	142	150.45	143.85	150.47	0.000258	1.1	5352.75	1361.41	0.07
Reach 1	1704.934	50 yr	10625	142	155.34	144.59	155.35	0.000099	0.94	13252.38	1630.57	0.05
Reach 1	1704.934	100 yr	13332	142	156.65	144.96	156.66	0.000105	1.04	15109.06	1732.45	0.05
Reach 1	699.9124	10 yr	5871	128	150.4	133.72	150.4	0.000026	0.66	15420.79	1404.65	0.03
Reach 1	699.9124	50 yr	10625	128	155.3	134.86	155.3	0.000028	0.79	22303.58	1404.65	0.03
Reach 1	699.9124	100 yr	13332	128	156.6	134.86	156.61	0.000034	0.91	24129.63	1404.65	0.03

APPENDIX D
HEC-RAS DATA OUTPUT
TRIBUTARY NO. 1 TO MILL CREEK

HEC-RAS PLAN: EXISTING			RIVER: TRIBUTARY NO. 1				REACH: 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)	
Reach1	4227.758	10 YR	376	200	202.43		202.45	0.003403	1.1	340.36	204.93	0.15
Reach1	4227.758	50 YR	544	200	202.9		202.93	0.003337	1.23	441.95	222.97	0.15
Reach1	4227.758	100 YR	628	200	203.11		203.13	0.003339	1.29	488.21	230.61	0.16
Reach1	3977.766	10 YR	376	198	202.16		202.17	0.000548	0.66	570.79	189.63	0.07
Reach1	3977.766	50 YR	544	198	202.55		202.56	0.000798	0.84	647.04	197.4	0.08
Reach1	3977.766	100 YR	628	198	202.72		202.73	0.000919	0.92	680.58	200.78	0.09
Reach1	3727.773	10 YR	376	196	202.07		202.07	0.000276	0.53	710.32	195	0.05
Reach1	3727.773	50 YR	544	196	202.41		202.42	0.000446	0.7	778.41	202.03	0.06
Reach1	3727.773	100 YR	628	196	202.55		202.56	0.000536	0.78	807.38	204.95	0.07
Reach1	3477.781	10 YR	376	196	202.05		202.05	0.000038	0.22	1694.17	386.48	0.02
Reach1	3477.781	50 YR	544	196	202.38		202.38	0.000065	0.3	1824.92	400.67	0.02
Reach1	3477.781	100 YR	628	196	202.52		202.52	0.000079	0.33	1879.65	403.71	0.03
Reach1	3227.788	10 YR	376	194	202.04		202.04	0.000019	0.19	1987.29	346.06	0.01
Reach1	3227.788	50 YR	544	194	202.37		202.37	0.000034	0.26	2101.8	355.93	0.02
Reach1	3227.788	100 YR	628	194	202.5		202.5	0.000042	0.29	2149.57	359.91	0.02
Reach1	2977.796	10 YR	376	200	201.58	201.58	201.98	0.196397	5.11	73.62	93.34	1.01
Reach1	2977.796	50 YR	544	200	201.88	201.86	202.29	0.180694	5.19	104.78	121.77	0.99
Reach1	2977.796	100 YR	628	200	202.03	201.97	202.42	0.155534	5.05	124.48	137.01	0.93
Reach1	2727.803	10 YR	376	192	195.92		195.97	0.007441	1.94	193.82	89.82	0.23
Reach1	2727.803	50 YR	544	192	196.53		196.6	0.008236	2.14	254.7	110.3	0.25
Reach1	2727.803	100 YR	628	192	196.79		196.86	0.00827	2.21	284.33	117.45	0.25
Reach1	2477.81	10 YR	376	192	194.93		194.95	0.002541	1.14	330.64	152.87	0.14
Reach1	2477.81	50 YR	544	192	195.54		195.56	0.002433	1.28	425.8	159.94	0.14
Reach1	2477.81	100 YR	628	192	195.8		195.83	0.002423	1.34	468.3	163	0.14
Reach1	2227.818	10 YR	376	190	194.12		194.16	0.003982	1.65	227.9	83.81	0.18
Reach1	2227.818	50 YR	544	190	194.67		194.73	0.004765	1.98	275.36	88.31	0.2
Reach1	2227.818	100 YR	628	190	194.9		194.97	0.005131	2.12	296.09	90.2	0.21
Reach1	1977.825	10 YR	376	190	191.85		191.99	0.031373	3.08	136.08	123.52	0.45
Reach1	1977.825	50 YR	544	190	192.33		192.47	0.023051	3.19	200.52	147.16	0.4
Reach1	1977.825	100 YR	628	190	192.54		192.69	0.020635	3.23	232.91	157.11	0.39
Reach1	1727.833	10 YR	376	188	190.76		190.78	0.001806	0.99	391.58	198.77	0.12
Reach1	1727.833	50 YR	544	188	191.21		191.23	0.002024	1.18	485.26	220.07	0.13
Reach1	1727.833	100 YR	628	188	191.4		191.43	0.002145	1.27	529.84	255.16	0.13
Reach1	1477.84	10 YR	376	188	189.08		189.34	0.105598	4.08	92.11	102.63	0.76
Reach1	1477.84	50 YR	544	188	189.63		189.78	0.058831	3.12	174.27	187.23	0.57
Reach1	1477.84	100 YR	628	188	189.83		189.96	0.04563	2.94	213.37	206.93	0.51
Reach1	1318.937	10 YR	376	186	188.64		188.65	0.001184	0.76	494.53	236.12	0.09
Reach1	1318.937	50 YR	544	186	189.04		189.06	0.001439	0.92	591.13	245.26	0.1
Reach1	1318.937	100 YR	628	186	189.21		189.22	0.001558	0.99	631.26	247.33	0.11
Reach1	1112.409	10 YR	376	186	188.2		188.23	0.004438	1.24	302.51	186.02	0.17
Reach1	1112.409	50 YR	544	186	188.49		188.53	0.005738	1.52	357.6	196.9	0.2
Reach1	1112.409	100 YR	628	186	188.6		188.64	0.006463	1.66	379.25	201.01	0.21
Reach1	1033.894	10 YR	376	185.32	187.74		187.78	0.007414	1.69	222.63	126.97	0.22
Reach1	1033.894	50 YR	544	185.32	186.72	186.72	187.17	0.188711	5.42	100.44	113.14	1.01
Reach1	1033.894	100 YR	628	185.32	187.17		187.43	0.067178	4.12	152.39	119.14	0.64
Reach1	727.8633	10 YR	376	182	183.49	183.08	183.59	0.033295	2.59	162.06	520.64	0.44
Reach1	727.8633	50 YR	544	182	186.31	183.27	186.31	0.000054	0.24	2653.4	687.35	0.02
Reach1	727.8633	100 YR	628	182	187.31	183.35	187.31	0.000035	0.23	3357.37	723.9	0.02
Reach1	477.8703	10 YR	376	180	183.41		183.41	0.000169	0.38	1108.37	432.05	0.04
Reach1	477.8703	50 YR	544	180	186.3		186.3	0.000033	0.26	2377.66	447.47	0.02
Reach1	477.8703	100 YR	628	180	187.3		187.3	0.000025	0.25	2831.48	460.61	0.02

Reach1	227.8779	10 YR	376	176	183.4	177.18	183.4	0.000017	0.2	2735.75	581.27	0.01
Reach1	227.8779	50 YR	544	176	186.3	177.32	186.3	0.000008	0.17	4438.43	593.38	0.01
Reach1	227.8779	100 YR	628	176	187.3	177.36	187.3	0.000007	0.17	5034.62	598.98	0.01
HEC-RAS PLAN: PROPOSED				RIVER: TRIBUTARY NO. 1			REACH: 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)	
Reach1	4227.758	10 YR	377	200	202.43		202.45	0.003402	1.11	341	205.06	0.15
Reach1	4227.758	50 YR	545	200	202.91		202.93	0.003338	1.23	442.5	223.06	0.15
Reach1	4227.758	100 YR	631	200	203.11		203.14	0.003339	1.29	489.84	230.88	0.16
Reach1	3977.766	10 YR	377	198	202.16		202.17	0.00055	0.66	571.29	189.68	0.07
Reach1	3977.766	50 YR	545	198	202.56		202.57	0.000799	0.84	647.44	197.44	0.08
Reach1	3977.766	100 YR	631	198	202.73		202.74	0.000923	0.93	681.77	200.89	0.09
Reach1	3727.773	10 YR	377	196	202.07		202.07	0.000276	0.53	710.77	195.05	0.05
Reach1	3727.773	50 YR	545	196	202.41		202.42	0.000447	0.7	778.75	202.06	0.06
Reach1	3727.773	100 YR	631	196	202.56		202.57	0.000539	0.78	808.4	205.05	0.07
Reach1	3477.781	10 YR	377	196	202.05		202.05	0.000038	0.22	1695.05	386.61	0.02
Reach1	3477.781	50 YR	545	196	202.38		202.38	0.000065	0.3	1825.56	400.71	0.02
Reach1	3477.781	100 YR	631	196	202.52		202.52	0.000079	0.34	1881.57	403.82	0.03
Reach1	3227.788	10 YR	377	194	202.04		202.04	0.000019	0.19	1988.07	346.13	0.01
Reach1	3227.788	50 YR	545	194	202.37		202.37	0.000034	0.26	2102.37	355.97	0.02
Reach1	3227.788	100 YR	631	194	202.51		202.51	0.000043	0.29	2151.24	360.04	0.02
Reach1	2977.796	10 YR	377	200	201.58	201.58	201.99	0.196327	5.11	73.78	93.44	1.01
Reach1	2977.796	50 YR	545	200	201.88	201.86	202.3	0.180192	5.19	105.11	122.15	0.99
Reach1	2977.796	100 YR	631	200	202.03	201.97	202.43	0.15492	5.05	125	137.12	0.92
Reach1	2727.803	10 YR	377	192	195.92		195.98	0.007444	1.94	194.17	89.91	0.23
Reach1	2727.803	50 YR	545	192	196.53		196.6	0.008239	2.14	255.07	110.43	0.25
Reach1	2727.803	100 YR	631	192	196.8		196.87	0.008269	2.21	285.38	117.67	0.25
Reach1	2477.81	10 YR	377	192	194.93		194.95	0.00254	1.14	331.24	152.92	0.14
Reach1	2477.81	50 YR	545	192	195.54		195.57	0.002433	1.28	426.33	159.98	0.14
Reach1	2477.81	100 YR	631	192	195.81		195.84	0.002423	1.34	469.77	163.11	0.14
Reach1	2227.818	10 YR	377	190	194.12		194.17	0.003988	1.65	228.18	83.84	0.18
Reach1	2227.818	50 YR	545	190	194.68		194.74	0.004769	1.98	275.62	88.34	0.2
Reach1	2227.818	100 YR	631	190	194.91		194.98	0.005143	2.13	296.81	90.26	0.21
Reach1	1977.825	10 YR	377	190	191.86		192	0.031199	3.08	136.62	123.72	0.45
Reach1	1977.825	50 YR	545	190	192.33		192.47	0.023026	3.19	200.88	147.29	0.4
Reach1	1977.825	100 YR	631	190	192.55		192.69	0.020577	3.23	233.98	157.38	0.39
Reach1	1727.833	10 YR	377	188	190.76		190.78	0.001818	0.99	391.47	198.74	0.12
Reach1	1727.833	50 YR	545	188	191.22		191.24	0.002023	1.18	485.98	220.27	0.13
Reach1	1727.833	100 YR	631	188	191.41		191.43	0.002143	1.27	531.97	256.39	0.13
Reach1	1477.84	10 YR	377	188	189.16		189.38	0.082656	3.77	99.98	104.41	0.68
Reach1	1477.84	50 YR	545	188	189.68		189.82	0.051781	2.97	183.41	192.81	0.54
Reach1	1477.84	100 YR	631	188	189.88		190	0.040505	2.82	223.71	211.5	0.48
Reach1	1318.937	10 YR	377	186	188.7	186.66	188.71	0.001097	0.74	508.78	238.44	0.09
Reach1	1318.937	50 YR	545	186	189.13	186.81	189.14	0.001297	0.89	611.62	246.32	0.1
Reach1	1318.937	100 YR	631	186	189.29	186.88	189.31	0.001412	0.97	653.25	248.46	0.1
Reach1	1215.673		Bridge									
Reach1	1112.409	10 YR	377	186	188.21	186.92	188.23	0.004413	1.24	303.65	186.25	0.17
Reach1	1112.409	50 YR	545	186	188.52	187.09	188.56	0.005463	1.5	364.26	198.17	0.19
Reach1	1112.409	100 YR	631	186	188.62	187.17	188.66	0.006295	1.64	384.04	201.91	0.21
Reach1	1033.894	10 YR	377	185.32	187.74		187.79	0.007408	1.69	223.08	127.01	0.22
Reach1	1033.894	50 YR	545	185.32	186.72	186.72	187.18	0.188648	5.42	100.56	113.15	1.01
Reach1	1033.894	100 YR	631	185.32	187.18		187.44	0.065332	4.09	154.22	119.36	0.63

Reach1	727.8633	10 YR	377	182	183.49	183.09	183.59	0.033413	2.59	162.17	460.03	0.44
Reach1	727.8633	50 YR	545	182	186.31	183.27	186.32	0.00007	0.28	2297.72	585.78	0.02
Reach1	727.8633	100 YR	631	182	187.31	183.35	187.31	0.000045	0.26	2893.12	607.88	0.02
Reach1	477.8703	10 YR	377	180	183.41		183.41	0.00017	0.38	1108.39	432.05	0.04
Reach1	477.8703	50 YR	545	180	186.3		186.3	0.000033	0.26	2377.67	447.47	0.02
Reach1	477.8703	100 YR	631	180	187.3		187.3	0.000025	0.25	2831.49	460.61	0.02
Reach1	227.8779	10 YR	377	176	183.4	177.18	183.4	0.000018	0.2	2735.75	581.27	0.01
Reach1	227.8779	50 YR	545	176	186.3	177.32	186.3	0.000008	0.17	4438.43	593.38	0.01
Reach1	227.8779	100 YR	631	176	187.3	177.36	187.3	0.000007	0.18	5034.62	598.98	0.01

APPENDIX D
HEC-RAS DATA OUTPUT
TRIBUTARY NO. 2 TO MILL CREEK

HEC-RAS PLAN: EXISTING			RIVER: TRIBUTARY NO. 2			REACH: 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)	
Reach 1	9746.621	10 YR	773	216	219.62		219.85	0.010518	3.97	216.91	103.46	0.4
Reach 1	9746.621	50 YR	1121	216	220.32		220.61	0.010232	4.49	298.31	139.9	0.41
Reach 1	9746.621	100 YR	1294	216	220.61		220.92	0.010084	4.69	342.69	163.02	0.41
Reach 1	9496.611	10 YR	773	214	217.99		218.1	0.004835	2.72	301.37	118.48	0.27
Reach 1	9496.611	50 YR	1121	214	218.55		218.71	0.00558	3.27	372.68	132.81	0.3
Reach 1	9496.611	100 YR	1294	214	218.8		218.98	0.005893	3.51	405.63	138.97	0.31
Reach 1	9246.602	10 YR	773	214	216.49		216.58	0.007883	2.49	319.4	193.61	0.32
Reach 1	9246.602	50 YR	1121	214	216.89		217.02	0.008352	2.92	400.78	206.2	0.34
Reach 1	9246.602	100 YR	1294	214	217.07		217.22	0.008538	3.11	438.08	211.72	0.35
Reach 1	8996.593	10 YR	773	211.55	214.29		214.39	0.009875	2.53	310.93	213.42	0.35
Reach 1	8996.593	50 YR	1121	211.55	214.72		214.85	0.009125	2.86	409.21	238.94	0.35
Reach 1	8996.593	100 YR	1294	211.55	214.92		215.05	0.008821	2.99	456.85	248.47	0.35
Reach 1	8746.583	10 YR	773	210	212.78		212.84	0.004164	2.01	420.94	243.59	0.24
Reach 1	8746.583	50 YR	1121	210	213.3		213.37	0.004046	2.28	551.2	263.86	0.25
Reach 1	8746.583	100 YR	1294	210	213.53		213.61	0.003993	2.4	612.65	272.93	0.25
Reach 1	8496.573	10 YR	773	208	211.45		211.55	0.006596	2.72	327.01	184.89	0.31
Reach 1	8496.573	50 YR	1121	208	211.94		212.07	0.006898	3.14	422.21	203.65	0.32
Reach 1	8496.573	100 YR	1294	208	212.15		212.3	0.006986	3.31	467.03	211.98	0.33
Reach 1	8246.564	10 YR	773	208	210.41		210.45	0.003052	1.62	483.55	263.34	0.2
Reach 1	8246.564	50 YR	1121	208	210.87		210.92	0.003176	1.89	606.94	279.55	0.21
Reach 1	8246.564	100 YR	1294	208	211.06		211.12	0.003243	2.01	662.45	286.48	0.22
Reach 1	7996.555	10 YR	773	206	209	208.13	209.13	0.011389	3.25	310.54	245.23	0.39
Reach 1	7996.555	50 YR	1121	206	209.49	208.45	209.62	0.009912	3.49	450.84	305.59	0.38
Reach 1	7996.555	100 YR	1294	206	209.69	208.6	209.83	0.009408	3.57	515.61	320.54	0.38
Reach 1	7746.545	10 YR	773	204	207.57		207.62	0.003654	1.95	418.42	229.32	0.23
Reach 1	7746.545	50 YR	1121	204	207.97		208.05	0.004293	2.36	516.34	253.33	0.25
Reach 1	7746.545	100 YR	1294	204	208.15		208.25	0.004517	2.52	562.59	260.9	0.26
Reach 1	7496.536	10 YR	773	204	205.81		205.91	0.01694	2.57	301.22	275.37	0.43
Reach 1	7496.536	50 YR	1121	204	206.22		206.33	0.012754	2.69	416.32	286.15	0.39
Reach 1	7496.536	100 YR	1294	204	206.4		206.52	0.011716	2.76	468.02	290.09	0.38
Reach 1	7246.526	10 YR	773	202	204.77		204.79	0.001981	1.3	604.86	331.39	0.16
Reach 1	7246.526	50 YR	1121	202	205.14		205.18	0.002289	1.57	732.85	346.26	0.18
Reach 1	7246.526	100 YR	1294	202	205.3		205.34	0.002447	1.69	787.28	353.09	0.19
Reach 1	6996.517	10 YR	773	201.79	203.97	202.99	204.02	0.005362	1.75	497.04	502.84	0.26
Reach 1	6996.517	50 YR	1121	201.79	204.29	203.22	204.34	0.005325	1.96	672.63	588.39	0.26
Reach 1	6996.517	100 YR	1294	201.79	204.42	203.31	204.47	0.005307	2.06	749.81	597.42	0.26
Reach 1	6496.498	10 YR	773	198.66	201.57	201.57	201.59	0.003865	1.17	666.43	543.62	0.2
Reach 1	6496.498	50 YR	1121	198.66	201.8	201.57	201.83	0.004866	1.5	796.95	590.57	0.24
Reach 1	6496.498	100 YR	1294	198.66	201.95	201.57	201.98	0.004811	1.61	887.93	641.21	0.24
Reach 1	5996.479	10 YR	773	196	199.43		199.46	0.003312	1.65	647.69	541.12	0.21
Reach 1	5996.479	50 YR	1121	196	199.77		199.81	0.003415	1.87	836.54	570.85	0.22
Reach 1	5996.479	100 YR	1294	196	199.92		199.96	0.00345	1.96	922.69	583.66	0.22
Reach 1	5932.8	10 YR	773	194.27	199.09		199.16	0.007196	2.46	414.21	360.37	0.31
Reach 1	5932.8	50 YR	1121	194.27	199.4		199.49	0.007904	2.84	529.36	383.23	0.33
Reach 1	5932.8	100 YR	1294	194.27	199.53		199.64	0.00816	3	582.25	393.97	0.34
Reach 1	5793.241	10 YR	773	196	198.23	198	198.25	0.005155	1.45	650.19	593.31	0.24
Reach 1	5793.241	50 YR	1121	196	198.53	198	198.55	0.004931	1.66	830.57	609.68	0.24
Reach 1	5793.241	100 YR	1294	196	198.66	198	198.69	0.004833	1.74	914.45	617.26	0.24
Reach 1	5746.469	10 YR	773	196	197.95	197.95	197.97	0.005101	1.44	655.87	579.53	0.24
Reach 1	5746.469	50 YR	1121	196	198.27	197.95	198.29	0.004857	1.55	841.8	599.42	0.24
Reach 1	5746.469	100 YR	1294	196	198.41	197.95	198.44	0.004716	1.63	928.09	604.77	0.24

Reach 1	5496.46	10 YR	773	194	197.12	197.02	197.14	0.003033	1.08	759.7	587.87	0.18
Reach 1	5496.46	50 YR	1121	194	197.49	197.12	197.51	0.002837	1.26	978.85	613.01	0.19
Reach 1	5496.46	100 YR	1294	194	197.65	197.12	197.67	0.002785	1.34	1078.32	624.99	0.19
Reach 1	5246.451	10 YR	773	192	196.56	195.77	196.58	0.002076	1.25	816.27	566.17	0.16
Reach 1	5246.451	50 YR	1121	192	196.93	196	196.95	0.002168	1.45	1030.33	598.44	0.17
Reach 1	5246.451	100 YR	1294	192	197.09	196	197.11	0.002215	1.53	1126.46	612.73	0.18
Reach 1	4746.432	10 YR	773	192	194.98		195.07	0.006567	2.73	429.1	454.22	0.31
Reach 1	4746.432	50 YR	1121	192	195.32		195.42	0.006579	2.99	590.29	478.86	0.31
Reach 1	4746.432	100 YR	1294	192	195.48		195.58	0.006439	3.07	667.8	489.62	0.31
Reach 1	4496.422	10 YR	773	192	194.29	193.15	194.3	0.001825	1.03	796.04	601.82	0.15
Reach 1	4496.422	50 YR	1121	192	194.7	193.31	194.72	0.001605	1.14	1049.29	614.45	0.15
Reach 1	4496.422	100 YR	1294	192	194.89	193.38	194.91	0.001528	1.19	1167	620.24	0.14
Reach 1	4246.413	10 YR	773	189.76	193.64		193.68	0.003568	1.59	489.13	302.21	0.21
Reach 1	4246.413	50 YR	1121	189.76	194.12		194.17	0.00324	1.78	647.25	350.96	0.21
Reach 1	4246.413	100 YR	1294	189.76	194.33		194.38	0.003138	1.86	721.35	355.89	0.21
Reach 1	3996.403	10 YR	773	188	193	191.91	193.02	0.002123	1.28	692.03	385.62	0.17
Reach 1	3996.403	50 YR	1121	188	193.52	191.91	193.55	0.00204	1.41	900.48	412.68	0.17
Reach 1	3996.403	100 YR	1294	188	193.74	191.91	193.77	0.002036	1.47	992.56	423.47	0.17
Reach 1	3496.385	10 YR	773	188	191.51		191.57	0.004318	1.95	397.43	197.04	0.24
Reach 1	3496.385	50 YR	1121	188	191.95		192.04	0.005077	2.3	486.82	211.53	0.27
Reach 1	3496.385	100 YR	1294	188	192.07		192.17	0.005847	2.52	513.19	228.87	0.29
Reach 1	2996.365	10 YR	773	186	190.03	189.08	190.05	0.002318	1.44	809.21	609.09	0.18
Reach 1	2996.365	50 YR	1121	186	190.4	189.59	190.42	0.002258	1.58	1034.95	617.37	0.18
Reach 1	2996.365	100 YR	1294	186	190.76	189.84	190.77	0.001642	1.48	1254.54	625.85	0.16
Reach 1	2496.346	10 YR	773	184	188.77	187.29	188.81	0.003148	1.96	646.34	512.29	0.21
Reach 1	2496.346	50 YR	1121	184	189.46	188.17	189.49	0.001856	1.76	1007.27	534.17	0.17
Reach 1	2496.346	100 YR	1294	184	190.21	188.25	190.23	0.000902	1.41	1418.06	563.16	0.12
Reach 1	2246.337	10 YR	773	184	188.08	186.68	188.11	0.00274	1.56	630.63	424.27	0.19
Reach 1	2246.337	50 YR	1121	184	189.14	186.98	189.16	0.001069	1.29	1095.99	452.56	0.13
Reach 1	2246.337	100 YR	1294	184	190.06	187.11	190.07	0.000522	1.07	1521.49	475.58	0.09
Reach 1	1996.327	10 YR	773	184	187.66		187.68	0.001173	1.02	760.65	375.53	0.13
Reach 1	1996.327	50 YR	1121	184	188.98		188.99	0.000475	0.89	1261.75	387.06	0.09
Reach 1	1996.327	100 YR	1294	184	189.97		189.98	0.00026	0.79	1651.43	395.61	0.07
Reach 1	1746.318	10 YR	773	182	187.25		187.29	0.002151	1.63	556.44	281.24	0.18
Reach 1	1746.318	50 YR	1121	182	188.82		188.84	0.00075	1.32	1045.21	341.69	0.11
Reach 1	1746.318	100 YR	1294	182	189.88		189.9	0.000414	1.14	1429.11	378.66	0.09
Reach 1	1496.309	10 YR	773	182	186.19	185.06	186.29	0.009485	2.78	312.42	194.16	0.35
Reach 1	1496.309	50 YR	1121	182	188.59	185.54	188.62	0.001008	1.56	875.76	273.33	0.13
Reach 1	1496.309	100 YR	1294	182	189.76	185.73	189.78	0.000538	1.34	1214.05	305.72	0.1
Reach 1	1246.299	10 YR	773	180.96	185.69		185.7	0.000999	1.1	820.96	449.78	0.12
Reach 1	1246.299	50 YR	1121	180.96	188.55		188.55	0.000113	0.61	2281.56	568.52	0.05
Reach 1	1246.299	100 YR	1294	180.96	189.74		189.74	0.00007	0.55	2981.64	611.51	0.04
Reach 1	747.6005	10 YR	773	178.42	185.57	181.73	185.57	0.000115	0.53	1624.58	414.26	0.04
Reach 1	747.6005	50 YR	1121	178.42	188.52	182.02	188.52	0.000039	0.44	2897.02	453.6	0.03
Reach 1	747.6005	100 YR	1294	178.42	189.71	182.1	189.72	0.000031	0.43	3451.16	473.46	0.03
Reach 1	247.0521	10 YR	773	178	185.5	181.53	185.5	0.000198	0.71	1522.63	526.9	0.06
Reach 1	247.0521	50 YR	1121	178	188.5	182.19	188.5	0.000047	0.49	3184.06	570.92	0.03
Reach 1	247.0521	100 YR	1294	178	189.7	182.47	189.7	0.000035	0.46	3882.45	593.06	0.03

HEC-RAS PLAN: PROPOSED			RIVER: TRIBUTARY NO. 2			REACH: 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)	
Reach 1	9746.621	10 YR	792	216	219.66		219.9	0.010487	4	221.27	104.5	0.4
Reach 1	9746.621	50 YR	1151	216	220.37		220.66	0.01021	4.53	305.83	144.08	0.41

Reach 1	9746.621	100 YR	1327	216	220.66		220.97	0.010053	4.73	351.37	167.15	0.41
Reach 1	9496.611	10 YR	792	214	218.02		218.14	0.004879	2.75	305.5	119.22	0.28
Reach 1	9496.611	50 YR	1151	214	218.6		218.76	0.005637	3.32	378.49	133.91	0.3
Reach 1	9496.611	100 YR	1327	214	218.84		219.03	0.005934	3.55	412.15	140.18	0.32
Reach 1	9246.602	10 YR	792	214	216.51		216.61	0.007914	2.51	324.11	194.36	0.32
Reach 1	9246.602	50 YR	1151	214	216.92		217.06	0.008387	2.96	407.36	207.18	0.34
Reach 1	9246.602	100 YR	1327	214	217.1		217.25	0.008572	3.14	445	212.73	0.35
Reach 1	8996.593	10 YR	792	211.55	214.31		214.41	0.009829	2.56	316.34	214.85	0.35
Reach 1	8996.593	50 YR	1151	211.55	214.76		214.88	0.009068	2.88	417.54	240.64	0.35
Reach 1	8996.593	100 YR	1327	211.55	214.95		215.09	0.008765	3.01	465.91	250.25	0.35
Reach 1	8746.583	10 YR	792	210	212.82		212.88	0.004154	2.03	428.46	244.78	0.24
Reach 1	8746.583	50 YR	1151	210	213.34		213.41	0.00404	2.3	561.82	265.45	0.25
Reach 1	8746.583	100 YR	1327	210	213.57		213.65	0.003994	2.42	623.6	274.62	0.25
Reach 1	8496.573	10 YR	792	208	211.48		211.58	0.006618	2.74	332.47	186.15	0.31
Reach 1	8496.573	50 YR	1151	208	211.98		212.11	0.006919	3.17	430	205.07	0.33
Reach 1	8496.573	100 YR	1327	208	212.19		212.34	0.007009	3.35	475.21	213.46	0.33
Reach 1	8246.564	10 YR	792	208	210.44		210.48	0.003056	1.63	490.9	264.33	0.2
Reach 1	8246.564	50 YR	1151	208	210.9		210.96	0.003189	1.91	616.69	280.79	0.21
Reach 1	8246.564	100 YR	1327	208	211.1		211.16	0.003255	2.04	672.75	287.75	0.22
Reach 1	7996.555	10 YR	792	206	209.03	208.14	209.16	0.011287	3.27	318.09	255.25	0.39
Reach 1	7996.555	50 YR	1151	206	209.52	208.49	209.66	0.00983	3.5	461.81	307.4	0.38
Reach 1	7996.555	100 YR	1327	206	209.73	208.63	209.87	0.009339	3.59	527.52	323.48	0.38
Reach 1	7746.545	10 YR	792	204	207.59		207.65	0.003682	1.97	424.58	231.08	0.23
Reach 1	7746.545	50 YR	1151	204	208.01		208.09	0.004316	2.38	525.39	255.3	0.25
Reach 1	7746.545	100 YR	1327	204	208.18		208.28	0.00456	2.55	571	262.09	0.26
Reach 1	7496.536	10 YR	792	204	205.83		205.93	0.016893	2.59	306.15	275.94	0.43
Reach 1	7496.536	50 YR	1151	204	206.25		206.37	0.012536	2.7	425.59	286.86	0.39
Reach 1	7496.536	100 YR	1327	204	206.43		206.55	0.011563	2.78	477.5	290.8	0.38
Reach 1	7246.526	10 YR	792	202	204.82		204.84	0.001902	1.29	622.24	333.33	0.16
Reach 1	7246.526	50 YR	1151	202	205.17		205.21	0.002325	1.59	741.71	347.38	0.18
Reach 1	7246.526	100 YR	1327	202	205.33		205.38	0.002471	1.71	797.85	354.4	0.19
Reach 1	6996.517	10 YR	792	201.79	204	203	204.05	0.006244	1.9	419.53	538.87	0.28
Reach 1	6996.517	50 YR	1151	201.79	204.32	203.24	204.37	0.005214	1.97	691.65	590.81	0.26
Reach 1	6996.517	100 YR	1327	201.79	204.45	203.33	204.5	0.005229	2.06	768.03	599.48	0.26
Reach 1	6496.498	10 YR	792	198.66	201.57	201.57	201.59	0.004057	1.19	666.43	543.62	0.21
Reach 1	6496.498	50 YR	1151	198.66	201.81	201.57	201.84	0.005052	1.53	801.29	592.17	0.24
Reach 1	6496.498	100 YR	1327	198.66	201.96	201.57	201.99	0.004981	1.64	893.72	645.85	0.24
Reach 1	5996.479	10 YR	792	196	199.49		199.51	0.003087	1.62	676.24	545.75	0.2
Reach 1	5996.479	50 YR	1151	196	199.84		199.88	0.003152	1.83	876.88	576.88	0.21
Reach 1	5996.479	100 YR	1327	196	200		200.03	0.003187	1.92	965.97	589.99	0.21
Reach 1	5932.8	10 YR	792	194.27	199.17	198.27	199.24	0.006334	2.37	442.98	366.01	0.29
Reach 1	5932.8	50 YR	1151	194.27	199.49	198.64	199.58	0.006962	2.74	566.11	390.72	0.31
Reach 1	5932.8	100 YR	1327	194.27	199.63	198.73	199.73	0.007204	2.89	621.3	401.51	0.32
Reach 1	5870.036		Bridge									
Reach 1	5793.241	10 YR	792	196	198.24	197.25	198.27	0.005139	1.46	660.67	594.36	0.24
Reach 1	5793.241	50 YR	1151	196	198.55	197.47	198.58	0.00491	1.67	845.49	611.04	0.24
Reach 1	5793.241	100 YR	1327	196	198.69	197.55	198.72	0.004812	1.76	930.32	618.62	0.25
Reach 1	5746.469	10 YR	792	196	197.97	197.79	197.99	0.005137	1.42	665.79	582.83	0.24
Reach 1	5746.469	50 YR	1151	196	198.29	197.79	198.32	0.004831	1.56	857.03	600.37	0.24
Reach 1	5746.469	100 YR	1327	196	198.44	197.79	198.47	0.004692	1.65	944.16	605.77	0.24
Reach 1	5496.46	10 YR	792	194	197.14	197	197.16	0.003021	1.09	772.61	589.7	0.18
Reach 1	5496.46	50 YR	1151	194	197.52	197	197.54	0.002826	1.27	996.48	614.95	0.19

Reach 1	5496.46	100 YR	1327	194	197.68	197	197.7	0.002777	1.35	1096.73	626.99	0.19
Reach 1	5246.451	10 YR	792	192	196.59	195.79	196.6	0.002083	1.26	828.61	568.06	0.16
Reach 1	5246.451	50 YR	1151	192	196.96	196	196.98	0.002176	1.46	1047.39	600.94	0.17
Reach 1	5246.451	100 YR	1327	192	197.12	196	197.14	0.002224	1.55	1144.19	615.35	0.18
Reach 1	4746.432	10 YR	792	192	195		195.09	0.006586	2.75	438.2	455.96	0.31
Reach 1	4746.432	50 YR	1151	192	195.35		195.45	0.006558	3	603.83	480.75	0.31
Reach 1	4746.432	100 YR	1327	192	195.51		195.61	0.006407	3.08	682.48	491.63	0.31
Reach 1	4496.422	10 YR	792	192	194.31	193.16	194.33	0.00181	1.04	810.48	602.55	0.15
Reach 1	4496.422	50 YR	1151	192	194.74	193.32	194.76	0.001589	1.15	1070.22	615.49	0.15
Reach 1	4496.422	100 YR	1327	192	194.93	193.39	194.95	0.001515	1.2	1188.94	621.31	0.14
Reach 1	4246.413	10 YR	792	189.76	193.67		193.71	0.003546	1.6	497.64	303.68	0.21
Reach 1	4246.413	50 YR	1151	189.76	194.16		194.21	0.003217	1.8	660.62	351.86	0.21
Reach 1	4246.413	100 YR	1327	189.76	194.37		194.42	0.003121	1.88	735.09	356.8	0.21
Reach 1	3996.403	10 YR	792	188	193.03	191.91	193.05	0.002118	1.29	703.93	387.22	0.17
Reach 1	3996.403	50 YR	1151	188	193.56	191.91	193.59	0.002034	1.42	917.53	414.7	0.17
Reach 1	3996.403	100 YR	1327	188	193.78	191.91	193.81	0.002035	1.48	1009.72	425.46	0.17
Reach 1	3496.385	10 YR	792	188	191.54	190.15	191.6	0.004363	1.97	402.45	197.58	0.24
Reach 1	3496.385	50 YR	1151	188	191.99	190.4	192.07	0.005148	2.33	494.01	213.11	0.27
Reach 1	3496.385	100 YR	1327	188	192.11	190.52	192.21	0.005914	2.55	519.65	235.42	0.29
Reach 1	2996.365	10 YR	792	186	190.06	189.12	190.07	0.002317	1.45	822.05	609.56	0.18
Reach 1	2996.365	50 YR	1151	186	190.43	189.65	190.46	0.002246	1.59	1054.21	618.1	0.18
Reach 1	2996.365	100 YR	1327	186	190.79	189.87	190.81	0.001647	1.49	1273.46	626.6	0.16
Reach 1	2496.346	10 YR	792	184	188.8	187.34	188.83	0.003135	1.97	658.78	513.06	0.21
Reach 1	2496.346	50 YR	1151	184	189.49	188.17	189.52	0.001867	1.78	1023.4	535.12	0.17
Reach 1	2496.346	100 YR	1327	184	190.23	188.25	190.25	0.000926	1.43	1429.95	564.39	0.13
Reach 1	2246.337	10 YR	792	184	188.11	186.7	188.14	0.002713	1.56	642.97	425.07	0.19
Reach 1	2246.337	50 YR	1151	184	189.17	187.01	189.19	0.001091	1.31	1107.51	453.2	0.13
Reach 1	2246.337	100 YR	1327	184	190.07	187.14	190.09	0.000541	1.09	1529.15	476.03	0.1
Reach 1	1996.327	10 YR	792	184	187.69		187.71	0.001171	1.03	772.31	375.83	0.13
Reach 1	1996.327	50 YR	1151	184	189		189.01	0.00049	0.91	1269.8	387.24	0.09
Reach 1	1996.327	100 YR	1327	184	189.98		189.99	0.000271	0.8	1656.45	395.72	0.07
Reach 1	1746.318	10 YR	792	182	187.28		187.32	0.002162	1.65	564.89	282.21	0.18
Reach 1	1746.318	50 YR	1151	182	188.83		188.85	0.00078	1.35	1050.35	342.22	0.12
Reach 1	1746.318	100 YR	1327	182	189.89		189.91	0.000433	1.17	1432.47	378.95	0.09
Reach 1	1496.309	10 YR	792	182	186.21	185.09	186.32	0.009528	2.81	316.98	194.93	0.36
Reach 1	1496.309	50 YR	1151	182	188.6	185.57	188.63	0.001058	1.6	877.08	273.46	0.14
Reach 1	1496.309	100 YR	1327	182	189.76	185.77	189.79	0.000564	1.37	1214.97	305.8	0.1
Reach 1	1246.299	10 YR	792	180.96	185.7		185.71	0.001035	1.13	824.83	450.16	0.12
Reach 1	1246.299	50 YR	1151	180.96	188.55		188.56	0.000119	0.63	2283.03	568.61	0.05
Reach 1	1246.299	100 YR	1327	180.96	189.74		189.74	0.000073	0.56	2982.74	611.58	0.04
Reach 1	747.6005	10 YR	792	178.42	185.57	181.75	185.58	0.00012	0.55	1625.97	414.29	0.05
Reach 1	747.6005	50 YR	1151	178.42	188.52	182.03	188.52	0.000042	0.45	2897.49	453.63	0.03
Reach 1	747.6005	100 YR	1327	178.42	189.72	182.12	189.72	0.000032	0.44	3451.52	473.47	0.03
Reach 1	247.0521	10 YR	792	178	185.5	181.58	185.51	0.000208	0.73	1522.63	526.9	0.06
Reach 1	247.0521	50 YR	1151	178	188.5	182.25	188.5	0.00005	0.5	3184.06	570.92	0.03
Reach 1	247.0521	100 YR	1327	178	189.7	182.52	189.7	0.000036	0.47	3882.45	593.06	0.03

APPENDIX D
HEC-RAS DATA OUTPUT
TRIBUTARY NO. 4 TO MILL CREEK

HEC-RAS PLAN: EXISTING			RIVER: TRIB NO. 4 TO MILL CREEK				REACH: 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)	
Reach 1	15024.42	10 YR	212	234	237.35	235.95	237.39	0.005434	1.69	150.89	183.17	0.27
Reach 1	15024.42	50 YR	318	234	237.77	236.51	237.8	0.003926	1.68	243.6	260.04	0.24
Reach 1	15024.42	100 YR	375	234	237.91	236.72	237.95	0.003838	1.76	281.03	274.91	0.24
Reach 1	14774.43	10 YR	212	232	234.77	234.08	234.94	0.022015	3.4	62.4	233.82	0.54
Reach 1	14774.43	50 YR	318	232	234.52	234.52	235.12	0.078559	6.23	51.05	209.8	1
Reach 1	14774.43	100 YR	375	232	234.7	234.7	235.32	0.077881	6.31	59.39	228.1	1
Reach 1	14524.44	10 YR	212	230	233.54	231.63	233.56	0.002337	1.14	186.35	184.52	0.18
Reach 1	14524.44	50 YR	318	230	233.61	232.04	233.65	0.004619	1.62	195.88	189.51	0.25
Reach 1	14524.44	100 YR	375	230	233.73	232.33	233.78	0.005096	1.75	213.95	198.46	0.26
Reach 1	14274.44	10 YR	212	230	231.5	231.5	231.79	0.097917	4.34	48.89	122.3	1
Reach 1	14274.44	50 YR	318	230	232.19	231.71	232.22	0.007523	1.72	217.22	249.3	0.3
Reach 1	14274.44	100 YR	375	230	232.33	231.79	232.36	0.006546	1.75	252.31	254.49	0.29
Reach 1	14024.45	10 YR	212	228	229.82	229.82	229.84	0.005567	1.45	186.81	211.35	0.26
Reach 1	14024.45	50 YR	318	228	229.82	229.82	229.87	0.012527	2.17	186.79	211.29	0.39
Reach 1	14024.45	100 YR	375	228	229.82	229.82	229.89	0.01742	2.56	186.78	211.28	0.46
Reach 1	13774.46	10 YR	212	226	228.01	227.72	228.02	0.001482	0.76	331.87	317.99	0.13
Reach 1	13774.46	50 YR	318	226	228.27	227.72	228.28	0.001622	0.93	415.77	331.25	0.15
Reach 1	13774.46	100 YR	375	226	228.38	227.72	228.4	0.001697	1	455.01	337.28	0.15
Reach 1	13524.47	10 YR	212	226	227.34		227.36	0.006801	1.25	170.26	255.9	0.27
Reach 1	13524.47	50 YR	318	226	227.6		227.62	0.005597	1.31	242.13	290.24	0.25
Reach 1	13524.47	100 YR	375	226	227.71		227.74	0.005123	1.36	276.42	295.34	0.25
Reach 1	13274.47	10 YR	212	224	226.56		226.58	0.001796	0.99	231.89	252.19	0.15
Reach 1	13274.47	50 YR	318	224	226.86		226.88	0.001824	1.15	313.04	277.33	0.16
Reach 1	13274.47	100 YR	375	224	227.01		227.03	0.001812	1.22	354.26	286.03	0.16
Reach 1	13024.48	10 YR	212	224	225.55		225.61	0.013198	2.09	101.48	115.33	0.39
Reach 1	13024.48	50 YR	318	224	225.91		225.99	0.010058	2.19	145.38	125.76	0.36
Reach 1	13024.48	100 YR	375	224	226.07		226.15	0.00943	2.26	166.12	130.61	0.35
Reach 1	12774.49	10 YR	212	222	224.43		224.45	0.002311	1.12	189.73	149.14	0.17
Reach 1	12774.49	50 YR	318	222	224.72		224.75	0.002885	1.36	234.52	162.87	0.2
Reach 1	12774.49	100 YR	375	222	224.86		224.89	0.003115	1.46	256.97	169.34	0.21
Reach 1	12524.5	10 YR	212	222	223.04		223.11	0.023791	2.01	105.3	196.88	0.49
Reach 1	12524.5	50 YR	318	222	223.32		223.38	0.01408	1.95	162.75	214.77	0.4
Reach 1	12524.5	100 YR	375	222	223.43		223.5	0.012819	2	187.26	221.95	0.38
Reach 1	12274.5	10 YR	212	220	221.67		221.68	0.002457	1.09	194.91	167.13	0.18
Reach 1	12274.5	50 YR	318	220	221.99		222.01	0.002857	1.25	253.8	197.13	0.19
Reach 1	12274.5	100 YR	375	220	222.11		222.14	0.002948	1.35	278.54	206.79	0.2
Reach 1	12024.51	10 YR	212	219.24	220.84		220.86	0.004736	1.18	179.05	221.17	0.23
Reach 1	12024.51	50 YR	318	219.24	221.1		221.13	0.004465	1.33	239.31	237.9	0.23
Reach 1	12024.51	100 YR	375	219.24	221.22		221.25	0.004417	1.4	268.53	245.78	0.24
Reach 1	11774.52	10 YR	212	218	219.84		219.86	0.003424	1.14	185.36	189.13	0.2
Reach 1	11774.52	50 YR	318	218	220.11		220.13	0.003595	1.33	239.61	210.71	0.22
Reach 1	11774.52	100 YR	375	218	220.23		220.26	0.003564	1.42	266.74	221.18	0.22
Reach 1	11687.26	10 YR	212	218	219.07		219.18	0.030016	2.64	80.34	119.16	0.57
Reach 1	11687.26	50 YR	318	218	219.39		219.5	0.02102	2.59	122.98	143.94	0.49
Reach 1	11687.26	100 YR	375	218	219.54		219.64	0.018754	2.59	144.74	155.06	0.47
Reach 1	11524.53	10 YR	212	216	218.77		218.78	0.000759	0.69	318.07	253.83	0.1
Reach 1	11524.53	50 YR	318	216	219.05		219.06	0.000931	0.86	389.14	267.62	0.12
Reach 1	11524.53	100 YR	375	216	219.17		219.18	0.00101	0.94	423.06	273.96	0.12
Reach 1	11472.86	10 YR	212	216	218.71		218.72	0.001634	0.88	251.73	249.05	0.14
Reach 1	11472.86	50 YR	318	216	218.97		218.99	0.001798	1.05	318.94	264.45	0.16
Reach 1	11472.86	100 YR	375	216	219.09		219.11	0.001875	1.14	351.18	271.53	0.16

Reach 1	11024.54	10 YR	212	216	217.19		217.23	0.009992	1.48	143.69	223.45	0.32
Reach 1	11024.54	50 YR	318	216	217.44		217.48	0.00838	1.57	202.65	251.76	0.31
Reach 1	11024.54	100 YR	375	216	217.56		217.6	0.007684	1.6	234.08	264.19	0.3
Reach 1	10524.56	10 YR	212	214	215.77		215.78	0.001348	0.79	283.28	293.46	0.13
Reach 1	10524.56	50 YR	318	214	216.04		216.05	0.001424	0.94	365.78	313.33	0.14
Reach 1	10524.56	100 YR	375	214	216.16		216.18	0.001466	1.01	404.87	319.73	0.14
Reach 1	10274.56	10 YR	212	214	215.3		215.31	0.002713	1.03	206.63	208.38	0.18
Reach 1	10274.56	50 YR	318	214	215.5		215.52	0.003474	1.28	249.1	217.89	0.21
Reach 1	10274.56	100 YR	375	214	215.6		215.63	0.00376	1.38	270.87	222.6	0.22
Reach 1	10024.57	10 YR	212	212.52	214.16		214.19	0.008978	1.28	167.25	310.64	0.3
Reach 1	10024.57	50 YR	318	212.52	214.43		214.45	0.005481	1.29	251.66	328.43	0.25
Reach 1	10024.57	100 YR	375	212.52	214.55		214.58	0.004754	1.32	292.52	337.46	0.24
Reach 1	9774.58	10 YR	212	212	213.52		213.53	0.001241	0.81	262.26	210.37	0.13
Reach 1	9774.58	50 YR	318	212	213.78		213.8	0.001532	1	319.01	218.83	0.15
Reach 1	9774.58	100 YR	375	212	213.91		213.92	0.001647	1.08	346.37	223.18	0.15
Reach 1	9274.595	10 YR	212	212	213.4		213.41	0.000098	0.23	902.14	688.96	0.04
Reach 1	9274.595	50 YR	318	212	213.63		213.64	0.000131	0.3	1062.11	700.3	0.04
Reach 1	9274.595	100 YR	375	212	213.74		213.75	0.000146	0.33	1138.85	705.68	0.05
Reach 1	8774.61	10 YR	212	212	213.29		213.3	0.000833	0.52	406.68	467.16	0.1
Reach 1	8774.61	50 YR	318	212	213.49		213.5	0.000969	0.64	500.47	478.27	0.11
Reach 1	8774.61	100 YR	375	212	213.58		213.59	0.001029	0.69	544.9	483.35	0.11
Reach 1	8524.617	10 YR	212	212	212.45	212.45	212.57	0.137231	2.72	77.92	345.53	1.01
Reach 1	8524.617	50 YR	318	212	212.53	212.53	212.67	0.130479	2.96	107.63	406.11	1.01
Reach 1	8524.617	100 YR	375	212	212.57	212.57	212.71	0.128229	3.06	122.6	433.44	1.01
Reach 1	8024.633	10 YR	212	203.32	205.82		205.86	0.003856	1.64	146.87	222	0.23
Reach 1	8024.633	50 YR	318	203.32	206.12		206.17	0.003914	1.84	232.92	312.53	0.24
Reach 1	8024.633	100 YR	375	203.32	206.26		206.31	0.003769	1.89	275.98	317.29	0.24
Reach 1	7774.64	10 YR	212	202	204.97	204.28	205	0.003111	1.64	206.16	223.16	0.21
Reach 1	7774.64	50 YR	318	202	205.34		205.36	0.002719	1.73	290.74	239	0.21
Reach 1	7774.64	100 YR	375	202	205.51		205.54	0.002568	1.77	333.26	245.47	0.2
Reach 1	7524.647	10 YR	212	200	202.13	202.13	202.8	0.078225	6.58	32.22	24.44	1.01
Reach 1	7524.647	50 YR	318	200	202.59	202.59	203.38	0.074101	7.16	44.44	28.5	1.01
Reach 1	7524.647	100 YR	375	200	202.8	202.8	203.65	0.072255	7.4	50.65	30.27	1.01

HEC-RAS PLAN: PROPOSED			RIVER: TRIB NO. 4 TO MILL CREEK				REACH: 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)	
Reach 1	15024.42	10 YR	218	234	237.37	235.98	237.41	0.005405	1.7	154.24	186.55	0.27
Reach 1	15024.42	50 YR	325	234	237.79	236.53	237.82	0.003916	1.69	248.2	261.79	0.24
Reach 1	15024.42	100 YR	383	234	237.93	236.74	237.96	0.003834	1.77	285.97	276.83	0.24
Reach 1	14774.43	10 YR	218	232	234.79	234.11	234.97	0.022114	3.42	63.66	236.13	0.54
Reach 1	14774.43	50 YR	325	232	234.55	234.55	235.15	0.078194	6.23	52.18	212.43	1
Reach 1	14774.43	100 YR	383	232	234.73	234.73	235.35	0.077017	6.31	60.73	230.74	1
Reach 1	14524.44	10 YR	218	230	233.57	231.66	233.59	0.002337	1.14	190.41	186.66	0.18
Reach 1	14524.44	50 YR	325	230	233.62	232.08	233.67	0.004686	1.64	198.07	190.63	0.25
Reach 1	14524.44	100 YR	383	230	233.75	232.36	233.79	0.005154	1.77	216.46	199.64	0.26
Reach 1	14274.44	10 YR	218	230	231.5	231.5	231.8	0.099101	4.39	49.65	122.99	1.01
Reach 1	14274.44	50 YR	325	230	232.2	231.71	232.24	0.007357	1.72	221.83	249.98	0.3
Reach 1	14274.44	100 YR	383	230	232.34	231.85	232.38	0.006447	1.76	257.01	255.21	0.29
Reach 1	14024.45	10 YR	218	228	229.82	229.82	229.84	0.005887	1.49	186.81	211.34	0.27
Reach 1	14024.45	50 YR	325	228	229.82	229.82	229.87	0.013085	2.22	186.79	211.29	0.4
Reach 1	14024.45	100 YR	383	228	229.82	229.82	229.89	0.018172	2.62	186.78	211.28	0.47
Reach 1	13774.46	10 YR	218	226	228.03	227.72	228.04	0.00147	0.77	338.54	319.1	0.13
Reach 1	13774.46	50 YR	325	226	228.28	227.72	228.29	0.001631	0.94	420.75	332.01	0.15

Reach 1	13774.46	100 YR	383	226	228.4	227.72	228.41	0.001707	1.02	460.35	338.1	0.15
Reach 1	13524.47	10 YR	218	226	227.35		227.38	0.006721	1.25	174.65	259.2	0.27
Reach 1	13524.47	50 YR	325	226	227.61		227.64	0.005536	1.32	246.33	290.87	0.25
Reach 1	13524.47	100 YR	383	226	227.73		227.76	0.005063	1.36	281.2	296.04	0.25
Reach 1	13274.47	10 YR	218	224	226.58		226.59	0.0018	1.01	236.72	255.23	0.15
Reach 1	13274.47	50 YR	325	224	226.89		226.9	0.001811	1.16	318.98	278.6	0.16
Reach 1	13274.47	100 YR	383	224	227.03		227.05	0.001807	1.23	360.12	287.24	0.16
Reach 1	13024.48	10 YR	218	224	225.57		225.64	0.012904	2.09	104.13	115.99	0.39
Reach 1	13024.48	50 YR	325	224	225.93		226	0.010076	2.2	147.42	126.22	0.36
Reach 1	13024.48	100 YR	383	224	226.1		226.17	0.009352	2.27	169.02	131.3	0.35
Reach 1	12774.49	10 YR	218	222	224.45		224.47	0.002343	1.13	192.61	150.06	0.18
Reach 1	12774.49	50 YR	325	222	224.74		224.77	0.002916	1.37	237.31	163.69	0.2
Reach 1	12774.49	100 YR	383	222	224.87		224.91	0.003145	1.47	260.04	170.2	0.21
Reach 1	12524.5	10 YR	218	222	223.06		223.12	0.022948	2.01	108.47	197.91	0.48
Reach 1	12524.5	50 YR	325	222	223.34		223.4	0.013803	1.96	166.2	215.79	0.39
Reach 1	12524.5	100 YR	383	222	223.45		223.51	0.01264	2.01	190.79	222.97	0.38
Reach 1	12274.5	10 YR	218	220	221.69		221.71	0.002465	1.1	199.07	169.42	0.18
Reach 1	12274.5	50 YR	325	220	222.01		222.03	0.002882	1.26	256.95	198.52	0.2
Reach 1	12274.5	100 YR	383	220	222.13		222.16	0.002972	1.36	281.53	207.9	0.2
Reach 1	12024.51	10 YR	218	219.24	220.84		220.86	0.004954	1.21	179.68	221.35	0.24
Reach 1	12024.51	50 YR	325	219.24	221.11		221.14	0.00457	1.35	240.94	238.35	0.24
Reach 1	12024.51	100 YR	383	219.24	221.23		221.26	0.004516	1.42	270.37	246.27	0.24
Reach 1	11774.52	10 YR	218	218	219.92		219.94	0.002868	1.08	201.49	195.65	0.19
Reach 1	11774.52	50 YR	325	218	220.19		220.22	0.002953	1.26	258.46	218.04	0.2
Reach 1	11774.52	100 YR	383	218	220.32		220.35	0.002981	1.35	286.65	228.55	0.2
Reach 1	11687.26	10 YR	218	218	219.54	218.82	219.58	0.006335	1.51	144.77	155.08	0.27
Reach 1	11687.26	50 YR	325	218	219.78	219	219.83	0.007353	1.77	183.91	173.3	0.3
Reach 1	11687.26	100 YR	383	218	219.89	219.09	219.95	0.007569	1.87	204.46	180.4	0.31
Reach 1	11603.26		Bridge									
Reach 1	11524.53	10 YR	218	216	218.79	217.51	218.8	0.000769	0.7	322.63	254.74	0.1
Reach 1	11524.53	50 YR	325	216	219.06	217.68	219.07	0.000939	0.87	393.71	268.49	0.12
Reach 1	11524.53	100 YR	383	216	219.19	217.75	219.2	0.001017	0.95	428.05	274.88	0.12
Reach 1	11472.86	10 YR	218	216	218.73		218.74	0.001645	0.89	255.81	250.02	0.15
Reach 1	11472.86	50 YR	325	216	218.99		219.01	0.001808	1.06	323	265.36	0.16
Reach 1	11472.86	100 YR	383	216	219.11		219.13	0.001884	1.15	355.64	272.5	0.16
Reach 1	11024.54	10 YR	218	216	217.21		217.24	0.009863	1.48	147.02	224.69	0.32
Reach 1	11024.54	50 YR	325	216	217.46		217.49	0.00829	1.57	206.42	253.11	0.31
Reach 1	11024.54	100 YR	383	216	217.58		217.62	0.007635	1.61	238.03	265.6	0.3
Reach 1	10524.56	10 YR	218	214	215.79		215.8	0.001352	0.8	288.34	294.78	0.13
Reach 1	10524.56	50 YR	325	214	216.06		216.07	0.001429	0.95	370.8	314.16	0.14
Reach 1	10524.56	100 YR	383	214	216.18		216.2	0.00147	1.02	410.33	320.62	0.14
Reach 1	10274.56	10 YR	218	214	215.31		215.33	0.002762	1.04	209.22	208.98	0.18
Reach 1	10274.56	50 YR	325	214	215.51		215.54	0.003514	1.29	251.78	218.47	0.21
Reach 1	10274.56	100 YR	383	214	215.61		215.64	0.003797	1.4	273.83	223.23	0.22
Reach 1	10024.57	10 YR	218	212.52	214.18		214.21	0.008613	1.27	172.38	311.74	0.3
Reach 1	10024.57	50 YR	325	212.52	214.44		214.47	0.005367	1.29	256.88	329.73	0.25
Reach 1	10024.57	100 YR	383	212.52	214.57		214.59	0.004668	1.32	298.23	338.63	0.24
Reach 1	9774.58	10 YR	218	212	213.53		213.54	0.00126	0.82	265.77	210.9	0.13
Reach 1	9774.58	50 YR	325	212	213.8		213.81	0.001549	1.01	322.47	219.33	0.15
Reach 1	9774.58	100 YR	383	212	213.92		213.94	0.001659	1.09	350.38	224.05	0.15
Reach 1	9274.595	10 YR	218	212	213.42		213.42	0.0001	0.24	912.17	689.68	0.04
Reach 1	9274.595	50 YR	325	212	213.65		213.65	0.000133	0.3	1071.83	700.99	0.04

Reach 1	9274.595	100 YR	383	212	213.76		213.76	0.000147	0.33	1150.55	706.5	0.05
Reach 1	8774.61	10 YR	218	212	213.31		213.31	0.000842	0.53	412.55	467.87	0.1
Reach 1	8774.61	50 YR	325	212	213.5		213.51	0.000976	0.64	506.26	478.94	0.11
Reach 1	8774.61	100 YR	383	212	213.6		213.61	0.001028	0.69	552.37	484.2	0.11
Reach 1	8524.617	10 YR	218	212	212.46	212.46	212.57	0.1363	2.73	79.77	349.61	1.01
Reach 1	8524.617	50 YR	325	212	212.53	212.53	212.67	0.130337	2.97	109.44	409.53	1.01
Reach 1	8524.617	100 YR	383	212	212.57	212.57	212.72	0.128024	3.08	124.63	437.02	1.01
Reach 1	8024.633	10 YR	218	203.32	205.84		205.88	0.00388	1.65	151.48	231.71	0.23
Reach 1	8024.633	50 YR	325	203.32	206.14		206.19	0.0039	1.84	238.27	313.13	0.24
Reach 1	8024.633	100 YR	383	203.32	206.28		206.33	0.003747	1.9	281.87	317.94	0.24
Reach 1	7774.64	10 YR	218	202	205	204.28	205.02	0.003066	1.65	211.8	224.97	0.21
Reach 1	7774.64	50 YR	325	202	205.36		205.38	0.002698	1.74	296.09	239.83	0.21
Reach 1	7774.64	100 YR	383	202	205.53		205.56	0.00256	1.78	338.61	246.27	0.2
Reach 1	7524.647	10 YR	218	200	202.16	202.16	202.84	0.077905	6.62	32.95	24.7	1.01
Reach 1	7524.647	50 YR	325	200	202.62	202.62	203.42	0.07388	7.19	45.22	28.74	1.01
Reach 1	7524.647	100 YR	383	200	202.83	202.83	203.69	0.072102	7.44	51.48	30.5	1.01

APPENDIX D
HEC-RAS DATA OUTPUT
UNNAMED TRIBUTARY TO TRIBUTARY NO. 4 TO
MILL CREEK (DA14A)

HEC-RAS PLAN: EXISTING				RIVER: UNNAMED TRIB TO TRIB NO. 4 (14A)				REACH: 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	1000	10 yr	281	197.59	206.18		206.19	0.000025	0.56	918.26	380.27	0.04
1	1000	25 yr	353	197.59	206.39		206.39	0.000032	0.64	997.51	390.85	0.05
1	1000	50 yr	422	197.59	206.56		206.56	0.000038	0.72	1064.19	397.92	0.05
1	1000	100 yr	498	197.59	206.72		206.73	0.000045	0.79	1128.68	402.01	0.06
1	900	10 yr	281	197.9	206.18		206.18	0.000031	0.57	829.66	379.9	0.05
1	900	25 yr	353	197.9	206.39		206.39	0.000039	0.65	908.38	387.71	0.05
1	900	50 yr	422	197.9	206.55		206.56	0.000046	0.73	974.22	395.6	0.06
1	900	100 yr	498	197.9	206.72		206.72	0.000053	0.8	1038.48	406.3	0.06
1	820	10 yr	281	198.5	206.18		206.18	0.000035	0.55	657.13	247.7	0.05
1	820	25 yr	353	198.5	206.38		206.39	0.000047	0.64	708.45	255.19	0.06
1	820	50 yr	422	198.5	206.55		206.55	0.000058	0.72	751.55	266.18	0.06
1	820	100 yr	498	198.5	206.71		206.72	0.00007	0.8	795.01	281.56	0.07
1	460	10 yr	281	199.47	206.16		206.17	0.000053	0.65	723.45	377.15	0.06
1	460	25 yr	353	199.47	206.36		206.37	0.000063	0.73	799.7	384.39	0.06
1	460	50 yr	422	199.47	206.53		206.53	0.000073	0.81	862.9	390.33	0.07
1	460	100 yr	498	199.47	206.68		206.69	0.000084	0.89	923.86	396.71	0.07
1	380	10 yr	281	200.02	206.15		206.16	0.000145	0.93	529.39	409.25	0.09
1	380	25 yr	353	200.02	206.35		206.36	0.000156	1.01	612.38	424.75	0.1
1	380	50 yr	422	200.02	206.51		206.52	0.000166	1.07	682.17	433.51	0.1
1	380	100 yr	498	200.02	206.67		206.68	0.000177	1.14	749.25	438.49	0.1
1	280	10 yr	281	201.12	206.1	204.29	206.13	0.000922	1.46	227.9	253.93	0.21
1	280	25 yr	353	201.12	206.29	204.52	206.32	0.000921	1.54	280.89	278.8	0.21
1	280	50 yr	422	201.12	206.45	204.69	206.49	0.000922	1.6	326.77	293.99	0.22
1	280	100 yr	498	201.12	206.6	204.87	206.64	0.000921	1.67	371.8	301.59	0.22

HEC-RAS PLAN: PROPOSED				RIVER: UNNAMED TRIB TO TRIB NO. 4 (14A)				REACH: 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	1000	10 yr	286	197.59	206.2		206.2	0.000025	0.56	924.48	380.8	0.04
1	1000	25 yr	363	197.59	206.42		206.42	0.000033	0.66	1007.95	392.16	0.05
1	1000	50 yr	428	197.59	206.57		206.58	0.000039	0.72	1069.9	398.28	0.05
1	1000	100 yr	504	197.59	206.73		206.74	0.000045	0.8	1133.74	402.33	0.06
1	900	10 yr	286	197.9	206.2		206.2	0.000032	0.58	835.85	380.24	0.05
1	900	25 yr	363	197.9	206.41		206.42	0.00004	0.67	918.69	388.94	0.05
1	900	50 yr	428	197.9	206.57		206.57	0.000046	0.73	979.87	396.35	0.06
1	900	100 yr	504	197.9	206.73		206.73	0.000054	0.81	1043.57	407.2	0.06
1	820	10 yr	286	198.5	206.19	200.49	206.2	0.000036	0.56	661.15	248.32	0.05
1	820	25 yr	363	198.5	206.41	200.75	206.41	0.000048	0.65	715.2	256.12	0.06
1	820	50 yr	428	198.5	206.56	200.95	206.57	0.000059	0.73	755.33	267.53	0.06
1	820	100 yr	504	198.5	206.72	201.16	206.73	0.00007	0.81	798.52	284.62	0.07
1	810		Bridge									
1	460	10 yr	286	199.47	206.18		206.18	0.000054	0.65	729.16	377.7	0.06
1	460	25 yr	363	199.47	206.39		206.39	0.000065	0.74	809.3	385.29	0.06
1	460	50 yr	428	199.47	206.54		206.54	0.000074	0.81	867.9	390.84	0.07
1	460	100 yr	504	199.47	206.69		206.7	0.000085	0.89	928.17	397.16	0.07
1	380	10 yr	286	200.02	206.17		206.17	0.000146	0.94	535.6	410.82	0.09
1	380	25 yr	363	200.02	206.37		206.38	0.000157	1.02	622.97	426.82	0.1
1	380	50 yr	428	200.02	206.52		206.53	0.000167	1.08	687.71	433.93	0.1
1	380	100 yr	504	200.02	206.68		206.69	0.000179	1.15	754.01	438.85	0.11
1	280	10 yr	286	201.12	206.11	204.3	206.14	0.000922	1.47	231.72	257.02	0.21
1	280	25 yr	363	201.12	206.32	204.53	206.35	0.000921	1.55	287.77	280.69	0.21
1	280	50 yr	428	201.12	206.46	204.71	206.5	0.000921	1.61	330.48	294.6	0.22
1	280	100 yr	504	201.12	206.61	204.86	206.65	0.00092	1.67	374.99	302.3	0.22

APPENDIX D
HEC-RAS DATA OUTPUT
UNNAMED TRIBUTARY TO TRIBUTARY NO. 4 TO
MILL CREEK (DA14C)

HEC-RAS PLAN: EXISTING				RIVER: UNNAMED TRIB TO TRIB NO. 4 (14C)				REACH: 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	1000	10 yr	71	200.08	208.43		208.43	0.000001	0.09	889.64	258.16	0.01
1	1000	25 yr	90	200.08	208.64		208.64	0.000001	0.11	946.01	265.88	0.01
1	1000	50 yr	108	200.08	208.87		208.87	0.000001	0.13	1007.69	277.99	0.01
1	1000	100 yr	128	200.08	209.08		209.08	0.000002	0.15	1066.76	286.37	0.01
1	900	10 yr	71	200.78	208.43		208.43	0.000001	0.08	1108.15	496.63	0.01
1	900	25 yr	90	200.78	208.64		208.64	0.000001	0.09	1216.79	512.34	0.01
1	900	50 yr	108	200.78	208.87		208.87	0.000001	0.1	1334.38	529.29	0.01
1	900	100 yr	128	200.78	209.08		209.08	0.000001	0.12	1446.98	544.61	0.01
1	820	10 yr	71	201.41	208.43		208.43	0	0.05	1722.86	513.4	0
1	820	25 yr	90	201.41	208.64		208.64	0	0.06	1834.32	522.87	0
1	820	50 yr	108	201.41	208.87		208.87	0	0.06	1953.9	533.71	0
1	820	100 yr	128	201.41	209.08		209.08	0	0.07	2066.83	544.26	0.01
1	460	10 yr	71	203.88	208.41		208.42	0.000247	0.75	109.99	122.58	0.11
1	460	25 yr	90	203.88	208.63		208.64	0.000239	0.8	140.2	157.32	0.11
1	460	50 yr	108	203.88	208.86		208.86	0.000197	0.79	180.46	191.79	0.1
1	460	100 yr	128	203.88	209.07		209.07	0.000171	0.79	223.33	218.88	0.1
1	380	10 yr	71	205.06	208.35		208.38	0.001614	1.3	54.42	65.75	0.25
1	380	25 yr	90	205.06	208.57		208.6	0.00134	1.29	70.02	75.35	0.23
1	380	50 yr	108	205.06	208.81		208.83	0.001019	1.21	89.06	85.21	0.21
1	380	100 yr	128	205.06	209.02		209.04	0.000829	1.18	108.17	92.07	0.19
1	280	10 yr	71	205.3	208.23	206.55	208.26	0.000921	1.27	55.89	45.86	0.2
1	280	25 yr	90	205.3	208.46	206.69	208.49	0.000921	1.35	66.73	50.09	0.21
1	280	50 yr	108	205.3	208.7	206.81	208.73	0.00092	1.34	80.73	61.49	0.21
1	280	100 yr	128	205.3	208.93	206.94	208.96	0.000921	1.34	95.54	72.8	0.21

HEC-RAS PLAN: PROPOSED				RIVER: UNNAMED TRIB TO TRIB NO. 4 (14C)				REACH: 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	1000	10 yr	73	200.08	208.46		208.46	0.000001	0.1	899.18	259.45	0.01
1	1000	25 yr	93	200.08	208.68		208.68	0.000001	0.12	956.77	268.38	0.01
1	1000	50 yr	111	200.08	208.9		208.9	0.000001	0.13	1017.19	279.47	0.01
1	1000	100 yr	131	200.08	209.11		209.11	0.000002	0.15	1076.32	287.55	0.01
1	900	10 yr	73	200.78	208.46		208.46	0.000001	0.08	1126.5	499.6	0.01
1	900	25 yr	93	200.78	208.68		208.68	0.000001	0.1	1237.47	514.68	0.01
1	900	50 yr	111	200.78	208.9		208.9	0.000001	0.11	1352.48	532.82	0.01
1	900	100 yr	131	200.78	209.11		209.11	0.000001	0.12	1465.15	546.19	0.01
1	820	10 yr	73	201.41	208.46	202.74	208.46	0	0.05	1741.8	514.88	0
1	820	25 yr	93	201.41	208.68	202.83	208.68	0	0.06	1855.42	524.75	0
1	820	50 yr	111	201.41	208.9	202.88	208.9	0	0.06	1972.11	535.8	0
1	820	100 yr	131	201.41	209.11	202.95	209.11	0	0.07	2084.98	545.3	0.01
1	810		Bridge									
1	460	10 yr	73	203.88	208.44		208.45	0.000251	0.75	113.37	127.38	0.11
1	460	25 yr	93	203.88	208.66		208.67	0.000236	0.8	145.17	165.21	0.11
1	460	50 yr	111	203.88	208.88		208.89	0.000196	0.79	185.51	194.62	0.1
1	460	100 yr	131	203.88	209.09		209.1	0.00017	0.79	229.14	222.31	0.1
1	380	10 yr	73	205.06	208.38		208.4	0.001571	1.3	56.28	67.21	0.25
1	380	25 yr	93	205.06	208.6		208.63	0.001304	1.28	72.42	76.47	0.23
1	380	50 yr	111	205.06	208.83		208.86	0.001005	1.22	91.31	86.18	0.21
1	380	100 yr	131	205.06	209.05		209.07	0.000818	1.18	110.63	93.07	0.19
1	280	10 yr	73	205.3	208.26	206.56	208.29	0.000921	1.28	57.24	46.68	0.2
1	280	25 yr	93	205.3	208.49	206.71	208.52	0.00092	1.36	68.36	50.65	0.21
1	280	50 yr	111	205.3	208.73	206.83	208.76	0.000921	1.35	82.37	62.12	0.21
1	280	100 yr	131	205.3	208.96	206.96	208.98	0.000921	1.34	97.53	74.04	0.21

APPENDIX D
HEC-RAS DATA OUTPUT
TRIBUTARY NO. 5 TO MILL CREEK

HEC-RAS PLAN: EXISTING				RIVER: TRIB NO. 5 TO MILL CREEK				REACH: 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)	
Reach 1	19287.3	10 YR	1056	234	239.36		239.4	0.002533	1.65	865.36	718.66	0.17
Reach 1	19287.3	50 YR	1887	234	240.12		240.16	0.002362	1.85	1435.76	772.55	0.17
Reach 1	19287.3	100 YR	2347	234	240.47		240.51	0.002257	1.92	1706.35	776.7	0.17
Reach 1	19037.31	10 YR	1056	234	238.91		238.93	0.001473	1.23	1224.06	737.95	0.13
Reach 1	19037.31	50 YR	1887	234	239.69		239.71	0.001437	1.42	1831.26	825.25	0.13
Reach 1	19037.31	100 YR	2347	234	240.06		240.08	0.001411	1.5	2141.62	870.8	0.13
Reach 1	18787.32	10 YR	1056	234	238.47	236.35	238.49	0.001975	1.58	1000.78	608.67	0.15
Reach 1	18787.32	50 YR	1887	234	239.25	236.91	239.28	0.002056	1.85	1497.98	671.1	0.16
Reach 1	18787.32	100 YR	2347	234	239.61	237.32	239.65	0.002048	1.95	1751.32	701.66	0.16
Reach 1	18537.33	10 YR	1056	234	237.81	236.35	237.85	0.004256	1.75	738.21	460.96	0.21
Reach 1	18537.33	50 YR	1887	234	238.59	236.77	238.64	0.003975	2.07	1120	511.32	0.21
Reach 1	18537.33	100 YR	2347	234	238.98	236.95	239.04	0.003767	2.18	1321.47	533.23	0.21
Reach 1	18287.34	10 YR	1056	234	236.54	235.8	236.59	0.006255	2	622.57	386.82	0.24
Reach 1	18287.34	50 YR	1887	234	237.6	236	237.65	0.004186	2.15	1079.79	480.1	0.21
Reach 1	18287.34	100 YR	2347	234	238.05	236	238.11	0.003834	2.25	1308.64	525.04	0.21
Reach 1	18037.34	10 YR	1056	230	235.87		235.9	0.001569	1.51	811.68	276.4	0.14
Reach 1	18037.34	50 YR	1887	230	236.88		236.94	0.002161	2.07	1143.9	381.56	0.17
Reach 1	18037.34	100 YR	2347	230	237.34		237.4	0.002292	2.26	1323.21	410.41	0.17
Reach 1	17787.35	10 YR	1056	230	235.5		235.53	0.001571	1.59	886.07	349.04	0.14
Reach 1	17787.35	50 YR	1887	230	236.39		236.43	0.002087	2.08	1203.67	378.4	0.16
Reach 1	17787.35	100 YR	2347	230	236.8		236.85	0.00231	2.31	1364.46	402.12	0.17
Reach 1	17537.36	10 YR	1056	230	234.9		234.95	0.003929	2.11	692.72	409.35	0.21
Reach 1	17537.36	50 YR	1887	230	235.67		235.73	0.00415	2.51	1009.77	419.43	0.22
Reach 1	17537.36	100 YR	2347	230	236.03		236.11	0.004221	2.68	1165.1	430.82	0.23
Reach 1	17287.37	10 YR	1056	230	234.15		234.17	0.002551	1.58	994.48	673.36	0.17
Reach 1	17287.37	50 YR	1887	230	235.04		235.07	0.001862	1.62	1604.85	690.49	0.15
Reach 1	17287.37	100 YR	2347	230	235.43		235.46	0.001753	1.68	1875.58	694.8	0.15
Reach 1	17037.37	10 YR	1056	228	233.54	232	233.57	0.002371	1.6	859.87	471.5	0.16
Reach 1	17037.37	50 YR	1887	228	234.55	232.01	234.58	0.002116	1.82	1431.21	589.39	0.16
Reach 1	17037.37	100 YR	2347	228	234.97	232.15	235	0.002008	1.89	1678.29	594.48	0.16
Reach 1	16787.38	10 YR	1056	230	232.84	232	232.87	0.003026	1.47	718.12	312.03	0.17
Reach 1	16787.38	50 YR	1887	230	233.86	232	233.91	0.003106	1.91	1058.24	353.86	0.19
Reach 1	16787.38	100 YR	2347	230	234.28	232	234.34	0.003193	2.1	1209.64	365.07	0.19
Reach 1	16287.4	10 YR	1056	228	231.71	229.51	231.73	0.001815	1.46	843.42	403.15	0.14
Reach 1	16287.4	50 YR	1887	228	232.6	229.96	232.65	0.002146	1.87	1293.67	554.53	0.16
Reach 1	16287.4	100 YR	2347	228	232.98	230.24	233.03	0.002263	2.03	1508.51	589.81	0.17
Reach 1	16144.15	10 YR	1056	228	231.47	229.31	231.49	0.001614	1.34	909.32	539.99	0.13
Reach 1	16144.15	50 YR	1887	228	232.36	229.78	232.39	0.001569	1.56	1577.24	691.72	0.14
Reach 1	16144.15	100 YR	2347	228	232.73	229.99	232.76	0.001631	1.69	1837.29	730.06	0.14
Reach 1	15897.73	10 YR	1056	228	231.14	229.08	231.15	0.001167	0.96	1113.58	497.75	0.11
Reach 1	15897.73	50 YR	1887	228	232.02	229.45	232.04	0.001274	1.23	1610.97	693.81	0.12
Reach 1	15897.73	100 YR	2347	228	232.36	229.62	232.39	0.00137	1.36	1856.41	730.58	0.13
Reach 1	15787.41	10 YR	1056	228	230.99	229.08	231.01	0.001415	1.16	1047.74	627.12	0.12
Reach 1	15787.41	50 YR	1887	228	231.86	229.49	231.88	0.001568	1.46	1478.64	656.8	0.14
Reach 1	15787.41	100 YR	2347	228	232.21	229.68	232.23	0.001469	1.5	1902.09	675.65	0.13
Reach 1	15287.43	10 YR	1056	227.2	230.05		230.07	0.002705	1.54	871.61	479.8	0.17
Reach 1	15287.43	50 YR	1887	227.2	230.87		230.9	0.002645	1.82	1278.58	506.82	0.17
Reach 1	15287.43	100 YR	2347	227.2	231.25		231.29	0.002615	1.95	1472.32	510.42	0.18
Reach 1	14537.45	10 YR	1056	224	228.58	226.62	228.6	0.001523	1.22	1168	664.76	0.13

Reach 1	14537.45	50 YR	1887	224	229.49	227.08	229.51	0.001403	1.41	1804.97	744.48	0.13
Reach 1	14537.45	100 YR	2347	224	229.9	227.28	229.92	0.001368	1.49	2117.89	781.12	0.13
Reach 1	14287.46	10 YR	1056	224	228.07	226	228.11	0.002573	1.91	759.78	373.01	0.17
Reach 1	14287.46	50 YR	1887	224	228.95	226.5	229.01	0.003006	2.38	1120.65	447.29	0.19
Reach 1	14287.46	100 YR	2347	224	229.36	226.8	229.42	0.003129	2.56	1308.27	484.21	0.2
Reach 1	14037.46	10 YR	1056	224	227.26	226.06	227.3	0.0043	2.02	753.37	494.73	0.21
Reach 1	14037.46	50 YR	1887	224	228.19	226.48	228.23	0.003185	2.11	1279.51	598.25	0.19
Reach 1	14037.46	100 YR	2347	224	228.64	226.63	228.68	0.002811	2.14	1551.37	626.7	0.18
Reach 1	13787.47	10 YR	1056	223.77	226.59	224.85	226.61	0.002005	1.34	931.45	473.56	0.14
Reach 1	13787.47	50 YR	1887	223.77	227.67	225.31	227.7	0.001613	1.51	1461.6	503.13	0.14
Reach 1	13787.47	100 YR	2347	223.77	228.15	225.54	228.19	0.001548	1.6	1708.61	534.34	0.14
Reach 1	13287.49	10 YR	1056	220	225.78		225.81	0.001296	1.51	751.92	306.14	0.13
Reach 1	13287.49	50 YR	1887	220	226.81		226.87	0.001723	2.01	1152.6	468.48	0.15
Reach 1	13287.49	100 YR	2347	220	227.29		227.36	0.001803	2.17	1393.73	537.76	0.16
Reach 1	12787.5	10 YR	1056	220	225.13		225.15	0.001422	1.55	1087.1	518.25	0.13
Reach 1	12787.5	50 YR	1887	220	226.08		226.11	0.001401	1.76	1583.8	529.04	0.13
Reach 1	12787.5	100 YR	2347	220	226.54		226.57	0.001429	1.88	1832.23	556.25	0.14
Reach 1	12287.52	10 YR	1056	220	224.1	222.14	224.14	0.003318	2.02	750.27	411.38	0.19
Reach 1	12287.52	50 YR	1887	220	225.16	222.84	225.21	0.002563	2.13	1196.99	424.81	0.18
Reach 1	12287.52	100 YR	2347	220	225.63	223.11	225.68	0.002446	2.22	1396.11	428.06	0.18
Reach 1	11787.53	10 YR	1056	218	223.02		223.05	0.001536	1.56	746.45	275.39	0.14
Reach 1	11787.53	50 YR	1887	218	223.98		224.05	0.00212	2.12	1035.88	324.26	0.17
Reach 1	11787.53	100 YR	2347	218	224.41		224.48	0.002328	2.34	1175.11	328.7	0.18
Reach 1	11537.54	10 YR	1056	218	222.7		222.73	0.001092	1.36	894.35	285.83	0.12
Reach 1	11537.54	50 YR	1887	218	223.5		223.55	0.001839	1.98	1174.94	464.34	0.15
Reach 1	11537.54	100 YR	2347	218	223.86		223.92	0.00212	2.22	1359.85	551.51	0.17
Reach 1	11287.55	10 YR	1056	218	222.37	220.52	222.4	0.001905	1.48	788.68	361.69	0.15
Reach 1	11287.55	50 YR	1887	218	222.91	221.33	222.98	0.003465	2.21	947.85	434.51	0.2
Reach 1	11287.55	100 YR	2347	218	223.17	221.72	223.25	0.004241	2.55	1026.19	489.81	0.23
Reach 1	9182.919	10 YR	1056	214	218.29	215.89	218.31	0.002017	1.46	1146.86	1110.84	0.15
Reach 1	9182.919	50 YR	1887	214	219.25	216.86	219.27	0.001077	1.28	2245.66	1173.18	0.11
Reach 1	9182.919	100 YR	2347	214	219.69	217.19	219.7	0.000908	1.26	2764.71	1200.45	0.11
Reach 1	8932.927	10 YR	1056	210	217.98	214.04	218	0.000893	1.15	1561.3	1272.7	0.1
Reach 1	8932.927	50 YR	1887	210	219.09	214.99	219.1	0.000488	1.01	3011.49	1334.81	0.08
Reach 1	8932.927	100 YR	2347	210	219.55	215.43	219.56	0.000436	1.01	3628.49	1355.66	0.08
Reach 1	8682.935	10 YR	1056	210	217.65	212.96	217.69	0.001763	1.6	675.53	279.6	0.14
Reach 1	8682.935	50 YR	1887	210	218.83	214	218.88	0.00181	1.93	1192.24	484.07	0.15
Reach 1	8682.935	100 YR	2347	210	219.29	214.38	219.35	0.001835	2.07	1422.59	593.05	0.16
Reach 1	8432.942	10 YR	1056	210	217.17	214.36	217.21	0.002116	1.96	784.37	399.94	0.16
Reach 1	8432.942	50 YR	1887	210	218.4	215.48	218.44	0.001797	2.12	1338.47	538.62	0.16
Reach 1	8432.942	100 YR	2347	210	218.87	215.93	218.91	0.001799	2.23	1579.83	616.61	0.16
Reach 1	8182.949	10 YR	1056	210	216.72		216.76	0.001536	1.49	723.7	240.6	0.13
Reach 1	8182.949	50 YR	1887	210	217.93		217.98	0.001816	1.95	1094.02	502.19	0.15
Reach 1	8182.949	100 YR	2347	210	218.38		218.44	0.00191	2.12	1346.8	575.49	0.16
Reach 1	7932.957	10 YR	1056	210	216.31		216.35	0.001708	1.58	676.18	218.94	0.14
Reach 1	7932.957	50 YR	1887	210	217.43		217.5	0.00211	2.08	1048.81	473.14	0.16
Reach 1	7932.957	100 YR	2347	210	217.85		217.92	0.002284	2.28	1267.49	570.23	0.17
Reach 1	7682.964	10 YR	1056	208	215.76	211.7	215.82	0.002706	1.99	529.67	381.22	0.18
Reach 1	7682.964	50 YR	1887	208	217.02	213.1	217.06	0.001419	1.73	1370.95	421.29	0.14
Reach 1	7682.964	100 YR	2347	208	217.39	213.57	217.44	0.001612	1.93	1530.1	435.46	0.15
Reach 1	7432.972	10 YR	1056	208	215.47	211.32	215.49	0.000741	1.33	1071.12	450.74	0.1

Reach 1	7432.972	50 YR	1887	208	216.74	212.86	216.77	0.000902	1.69	1517.78	603.34	0.11
Reach 1	7432.972	100 YR	2347	208	217.05	213.2	217.09	0.001165	1.97	1640.61	685.67	0.13
Reach 1	6932.987	10 YR	1056	208	215.18	210.89	215.2	0.000488	1.12	1370.73	527.61	0.08
Reach 1	6932.987	50 YR	1887	208	216.42	211.83	216.43	0.000568	1.37	1964.42	619.5	0.09
Reach 1	6932.987	100 YR	2347	208	216.62	212.38	216.64	0.000766	1.62	2068.16	654.32	0.11
Reach 1	6433.002	10 YR	1592	207.93	214.56	212.47	214.61	0.003258	2.1	1090.05	820.51	0.19
Reach 1	6433.002	50 YR	2848	207.93	216.18	213.26	216.19	0.000474	0.7	3536.23	963.57	0.07
Reach 1	6433.002	100 YR	3543	207.93	216.29	213.88	216.3	0.000673	0.86	3641.97	969.16	0.09
Reach 1	6366.862	10 YR	1592	204	214.02	210.16	214.26	0.007362	3.88	410.7	305.97	0.3
Reach 1	6366.862	50 YR	2848	204	215.71	211.74	216.06	0.020503	4.74	601.14	434.88	0.47
Reach 1	6366.862	100 YR	3543	204	216.17	212.51	216.22	0.002065	1.5	1961.78	483.1	0.15
Reach 1	6183.009	10 YR	1592	204	213.4	210.34	213.45	0.002639	2.24	969.64	378.47	0.18
Reach 1	6183.009	50 YR	2848	204	215.18	212.13	215.23	0.001685	2.21	1722.14	442.94	0.15
Reach 1	6183.009	100 YR	3543	204	215.84	212.32	215.9	0.001626	2.32	2019.86	451.61	0.15
Reach 1	6095.752	10 YR	1592	204	213.29		213.32	0.000939	1.71	1400.15	497.37	0.11
Reach 1	6095.752	50 YR	2848	204	215.1		215.13	0.000775	1.82	2370.96	558.27	0.11
Reach 1	6095.752	100 YR	3543	204	215.77		215.8	0.000782	1.92	2744.96	563.77	0.11
Reach 1	5933.017	10 YR	1592	204.3	213.2		213.21	0.000362	1.12	1992.72	448.93	0.07
Reach 1	5933.017	50 YR	2848	204.3	215.01		215.03	0.000406	1.37	2858.81	494.88	0.08
Reach 1	5933.017	100 YR	3543	204.3	215.67		215.69	0.000457	1.52	3187.95	506.89	0.09
Reach 1	5433.032	10 YR	1592	204	212.84	208.57	212.9	0.001617	2.55	937.97	221.89	0.16
Reach 1	5433.032	50 YR	2848	204	214.57	209.49	214.65	0.002127	3.32	1429.02	409.43	0.18
Reach 1	5433.032	100 YR	3543	204	215.18	209.91	215.28	0.002218	3.52	1633.15	419.87	0.19
Reach 1	5183.04	10 YR	1592	204	212.42		212.48	0.00178	2.32	1002.5	305.11	0.16
Reach 1	5183.04	50 YR	2848	204	214.09		214.16	0.001847	2.74	1595.98	404.06	0.17
Reach 1	5183.04	100 YR	3543	204	214.69		214.77	0.001886	2.9	1841.01	409.02	0.17
Reach 1	4933.047	10 YR	1592	204	211.97		212.03	0.002107	2.62	881.7	216.71	0.17
Reach 1	4933.047	50 YR	2848	204	213.55		213.64	0.002747	3.41	1308.83	322.3	0.2
Reach 1	4933.047	100 YR	3543	204	214.12		214.22	0.003043	3.75	1501.54	355.05	0.22
Reach 1	4433.062	10 YR	1592	204	210.35		210.48	0.005641	3.68	650.93	250.04	0.27
Reach 1	4433.062	50 YR	2848	204	211.33		211.55	0.008288	4.97	960	376.24	0.34
Reach 1	4433.062	100 YR	3543	204	211.79		212.02	0.00805	5.12	1135.49	381.53	0.34
Reach 1	4183.069	10 YR	1592	204	209.6	207.88	209.62	0.00217	1.37	1345.24	699.03	0.15
Reach 1	4183.069	50 YR	2848	204	210.58	208.17	210.61	0.001934	1.6	2064.86	744.16	0.15
Reach 1	4183.069	100 YR	3543	204	211.13	208.37	211.17	0.001687	1.65	2476.9	750.38	0.14
Reach 1	3933.077	10 YR	1592	202	209.13	205.71	209.16	0.001659	1.52	1392.37	671.97	0.14
Reach 1	3933.077	50 YR	2848	202	210.14	207.23	210.18	0.001651	1.78	2096	714.67	0.14
Reach 1	3933.077	100 YR	3543	202	210.75	207.41	210.79	0.001436	1.8	2534.94	724.34	0.14
Reach 1	3433.092	10 YR	1592	202	205.63	205.63	206.59	0.074181	8.11	219.84	128.65	0.88
Reach 1	3433.092	50 YR	2848	202	208	206.75	208.35	0.014792	5.55	729.05	316.33	0.44
Reach 1	3433.092	100 YR	3543	202	209.3	207.21	209.49	0.00664	4.34	1236.38	446.74	0.3

HEC-RAS PLAN: PROPOSED NO PONDS				RIVER: TRIB NO. 5 TO MILL CREEK				REACH: 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)	
Reach 1	19287.3	10 YR	1062.8	234	239.37		239.41	0.002533	1.66	870.57	719.26	0.17
Reach 1	19287.3	50 YR	1897.8	234	240.13		240.17	0.00236	1.85	1442.44	772.65	0.17
Reach 1	19287.3	100 YR	2358.3	234	240.48		240.52	0.002255	1.92	1712.57	776.8	0.17
Reach 1	19037.31	10 YR	1062.8	234	238.92		238.93	0.001472	1.23	1229.52	738.53	0.13
Reach 1	19037.31	50 YR	1897.8	234	239.7		239.72	0.001436	1.42	1838.74	826.52	0.13
Reach 1	19037.31	100 YR	2358.3	234	240.07		240.09	0.00141	1.5	2148.92	871.29	0.13
Reach 1	18787.32	10 YR	1062.8	234	238.48	236.35	238.5	0.001977	1.58	1005.21	609.27	0.15
Reach 1	18787.32	50 YR	1897.8	234	239.25	236.91	239.29	0.002056	1.85	1504.11	671.86	0.16

Reach 1	18787.32	100 YR	2358.3	234	239.62	237.33	239.66	0.002048	1.95	1757.28	702.36	0.16
Reach 1	18537.33	10 YR	1062.8	234	237.82	236.35	237.86	0.004258	1.76	741.37	461.51	0.21
Reach 1	18537.33	50 YR	1897.8	234	238.6	236.77	238.65	0.003969	2.07	1124.92	511.86	0.21
Reach 1	18537.33	100 YR	2358.3	234	238.99	236.96	239.04	0.003764	2.18	1326.11	533.72	0.21
Reach 1	18287.34	10 YR	1062.8	234	236.55	235.79	236.6	0.006225	2	626.37	387.69	0.24
Reach 1	18287.34	50 YR	1897.8	234	237.61	236	237.66	0.004175	2.15	1085.41	481.31	0.21
Reach 1	18287.34	100 YR	2358.3	234	238.06	236	238.12	0.003824	2.25	1314.05	525.69	0.21
Reach 1	18037.34	10 YR	1062.8	230	235.88		235.91	0.001574	1.51	814.29	276.58	0.14
Reach 1	18037.34	50 YR	1897.8	230	236.89		236.95	0.002165	2.08	1148.26	382.86	0.17
Reach 1	18037.34	100 YR	2358.3	230	237.35		237.41	0.002295	2.27	1327.53	411.06	0.17
Reach 1	17787.35	10 YR	1062.8	230	235.51		235.54	0.001576	1.59	888.96	349.15	0.14
Reach 1	17787.35	50 YR	1897.8	230	236.4		236.44	0.002093	2.09	1207.51	378.99	0.16
Reach 1	17787.35	100 YR	2358.3	230	236.81		236.86	0.002314	2.31	1368.38	402.62	0.17
Reach 1	17537.36	10 YR	1062.8	230	234.91		234.96	0.003934	2.12	695.55	409.44	0.21
Reach 1	17537.36	50 YR	1897.8	230	235.67		235.74	0.004151	2.51	1013.48	419.53	0.22
Reach 1	17537.36	100 YR	2358.3	230	236.04		236.12	0.00422	2.69	1168.99	431.17	0.23
Reach 1	17287.37	10 YR	1062.8	230	234.16		234.18	0.002543	1.58	999.86	673.74	0.16
Reach 1	17287.37	50 YR	1897.8	230	235.05		235.07	0.001859	1.62	1611.36	690.55	0.15
Reach 1	17287.37	100 YR	2358.3	230	235.44		235.47	0.001749	1.68	1882.54	695.03	0.15
Reach 1	17037.37	10 YR	1062.8	228	233.55	232	233.58	0.002376	1.6	863.75	475.75	0.16
Reach 1	17037.37	50 YR	1897.8	228	234.56	232.01	234.59	0.002114	1.82	1437.13	589.52	0.16
Reach 1	17037.37	100 YR	2358.3	228	234.98	232.15	235.01	0.002002	1.89	1684.9	594.61	0.16
Reach 1	16787.38	10 YR	1062.8	230	232.84	232	232.87	0.003046	1.48	719.63	312.22	0.17
Reach 1	16787.38	50 YR	1897.8	230	233.87	232	233.92	0.003113	1.92	1061.59	354.25	0.19
Reach 1	16787.38	100 YR	2358.3	230	234.29	232	234.35	0.003185	2.1	1214.3	365.16	0.19
Reach 1	16287.4	10 YR	1062.8	228	231.68	229.52	231.71	0.001897	1.49	832.33	393.75	0.15
Reach 1	16287.4	50 YR	1897.8	228	232.6	230.04	232.65	0.002168	1.88	1294.4	554.66	0.16
Reach 1	16287.4	100 YR	2358.3	228	232.98	230.24	233.03	0.002287	2.04	1507.91	589.73	0.17
Reach 1	16144.15	10 YR	1062.8	228	231.45	229.31	231.47	0.001496	1.28	1019.21	539.64	0.13
Reach 1	16144.15	50 YR	1897.8	228	232.36	229.79	232.39	0.001594	1.57	1574.3	691.28	0.14
Reach 1	16144.15	100 YR	2358.3	228	232.72	230	232.75	0.00166	1.7	1831.76	729.27	0.14
Reach 1	16020.94		Bridge									
Reach 1	15897.73	10 YR	1062.8	228	231.15	229.09	231.16	0.001156	0.95	1131.37	497.87	0.11
Reach 1	15897.73	50 YR	1897.8	228	232.03	229.45	232.05	0.001274	1.23	1618.5	695.24	0.12
Reach 1	15897.73	100 YR	2358.3	228	232.37	229.62	232.4	0.00137	1.37	1863.18	731.36	0.13
Reach 1	15787.41	10 YR	1062.8	228	231	229.08	231.02	0.001416	1.16	1051.76	628.34	0.12
Reach 1	15787.41	50 YR	1897.8	228	231.87	229.49	231.89	0.00157	1.47	1483.65	657.13	0.14
Reach 1	15787.41	100 YR	2358.3	228	232.21	229.69	232.24	0.00147	1.51	1908.22	676.18	0.13
Reach 1	15287.43	10 YR	1062.8	227.2	230.06		230.08	0.002704	1.54	875.3	480.17	0.17
Reach 1	15287.43	50 YR	1897.8	227.2	230.88		230.91	0.002644	1.83	1283.33	506.91	0.17
Reach 1	15287.43	100 YR	2358.3	227.2	231.26		231.3	0.002615	1.95	1476.87	510.51	0.18
Reach 1	14537.45	10 YR	1062.8	224	228.59	226.62	228.61	0.001521	1.22	1173.86	665.55	0.13
Reach 1	14537.45	50 YR	1897.8	224	229.5	227.08	229.52	0.001402	1.41	1812.55	745.38	0.13
Reach 1	14537.45	100 YR	2358.3	224	229.91	227.29	229.93	0.001367	1.49	2125.42	781.92	0.13
Reach 1	14287.46	10 YR	1062.8	224	228.08	226	228.12	0.002579	1.92	762.96	373.72	0.17
Reach 1	14287.46	50 YR	1897.8	224	228.96	226.51	229.02	0.003009	2.38	1125.14	448.14	0.19
Reach 1	14287.46	100 YR	2358.3	224	229.37	226.81	229.43	0.003132	2.57	1312.91	485.24	0.2
Reach 1	14037.46	10 YR	1062.8	224	227.27	226.06	227.3	0.004289	2.02	757.59	495.73	0.21
Reach 1	14037.46	50 YR	1897.8	224	228.2	226.48	228.24	0.003174	2.11	1286.07	598.95	0.19
Reach 1	14037.46	100 YR	2358.3	224	228.65	226.63	228.69	0.002804	2.14	1557.83	627.39	0.18

Reach 1	13787.47	10 YR	1062.8	223.77	226.6	224.85	226.62	0.001997	1.34	936.56	473.85	0.14
Reach 1	13787.47	50 YR	1897.8	223.77	227.68	225.31	227.71	0.001611	1.51	1467.72	503.46	0.14
Reach 1	13787.47	100 YR	2358.3	223.77	228.17	225.53	228.2	0.001547	1.6	1714.51	535.15	0.14
Reach 1	13287.49	10 YR	1062.8	220	225.79		225.82	0.001301	1.52	755.01	307.85	0.13
Reach 1	13287.49	50 YR	1897.8	220	226.83		226.88	0.001726	2.01	1158.25	470.35	0.15
Reach 1	13287.49	100 YR	2358.3	220	227.3		227.37	0.001804	2.17	1399.63	539.31	0.16
Reach 1	12787.5	10 YR	1062.8	220	225.14		225.16	0.001421	1.55	1091.68	518.31	0.13
Reach 1	12787.5	50 YR	1897.8	220	226.1		226.12	0.001401	1.76	1589.85	529.71	0.13
Reach 1	12787.5	100 YR	2358.3	220	226.55		226.58	0.00143	1.88	1838.08	556.87	0.14
Reach 1	12287.52	10 YR	1062.8	220	224.11	222.15	224.15	0.003302	2.01	754.81	411.62	0.19
Reach 1	12287.52	50 YR	1897.8	220	225.17	222.85	225.22	0.002558	2.13	1202.18	424.89	0.18
Reach 1	12287.52	100 YR	2358.3	220	225.64	223.11	225.69	0.002446	2.23	1400.51	428.13	0.18
Reach 1	11787.53	10 YR	1062.8	218	223.03		223.07	0.001538	1.57	749.82	276.01	0.14
Reach 1	11787.53	50 YR	1897.8	218	223.99		224.06	0.002125	2.12	1039.66	324.99	0.17
Reach 1	11787.53	100 YR	2358.3	218	224.42		224.49	0.002335	2.35	1177.82	328.77	0.18
Reach 1	11537.54	10 YR	1062.8	218	222.72		222.74	0.001096	1.36	897.63	286.62	0.12
Reach 1	11537.54	50 YR	1897.8	218	223.51		223.56	0.001845	1.98	1179.74	466.86	0.16
Reach 1	11537.54	100 YR	2358.3	218	223.87		223.93	0.002131	2.23	1363.14	552.88	0.17
Reach 1	11287.55	10 YR	1062.8	218	222.38	220.53	222.41	0.001907	1.48	791.73	364.31	0.15
Reach 1	11287.55	50 YR	1897.8	218	222.92	221.34	222.99	0.003477	2.22	950.39	435.96	0.2
Reach 1	11287.55	100 YR	2358.3	218	223.17	221.73	223.25	0.004277	2.57	1026.62	490.13	0.23
Reach 1	9182.919	10 YR	1062.8	214	218.3	215.89	218.32	0.002022	1.46	1151.83	1111.11	0.15
Reach 1	9182.919	50 YR	1897.8	214	219.26	216.86	219.28	0.001075	1.29	2256.1	1173.74	0.11
Reach 1	9182.919	100 YR	2358.3	214	219.71	217.19	219.72	0.0009	1.26	2782.36	1201.36	0.11
Reach 1	8932.927	10 YR	1062.8	210	217.98	214.06	218	0.000901	1.16	1564.41	1274.52	0.1
Reach 1	8932.927	50 YR	1897.8	210	219.1	215	219.11	0.000488	1.01	3023.59	1335.21	0.08
Reach 1	8932.927	100 YR	2358.3	210	219.56	215.44	219.57	0.000432	1.01	3650.07	1356.46	0.08
Reach 1	8682.935	10 YR	1062.8	210	217.64	212.96	217.68	0.001788	1.61	675.13	278.9	0.14
Reach 1	8682.935	50 YR	1897.8	210	218.83	214	218.89	0.001817	1.94	1196.4	484.37	0.15
Reach 1	8682.935	100 YR	2358.3	210	219.31	214.39	219.37	0.001825	2.06	1431.34	598.53	0.16
Reach 1	8432.942	10 YR	1062.8	210	217.16	214.37	217.2	0.002173	1.98	779.76	398.97	0.16
Reach 1	8432.942	50 YR	1897.8	210	218.41	215.5	218.45	0.001805	2.13	1341.92	539.78	0.16
Reach 1	8432.942	100 YR	2358.3	210	218.89	215.94	218.93	0.001785	2.23	1590.77	620.23	0.16
Reach 1	8182.949	10 YR	1062.8	210	216.69		216.73	0.001593	1.51	717.47	238.55	0.14
Reach 1	8182.949	50 YR	1897.8	210	217.93		217.99	0.001832	1.96	1095.86	504.8	0.15
Reach 1	8182.949	100 YR	2358.3	210	218.4		218.47	0.001886	2.11	1361.48	576.91	0.16
Reach 1	7932.957	10 YR	1062.8	210	216.27		216.31	0.001801	1.61	666.48	212.5	0.15
Reach 1	7932.957	50 YR	1897.8	210	217.43		217.49	0.002137	2.09	1047.91	472.65	0.17
Reach 1	7932.957	100 YR	2358.3	210	217.88		217.96	0.00224	2.27	1287.14	578.09	0.17
Reach 1	7682.964	10 YR	1062.8	208	215.67	211.71	215.74	0.002927	2.05	518.45	379.79	0.18
Reach 1	7682.964	50 YR	1897.8	208	217.01	213.11	217.05	0.001447	1.75	1367.2	420.97	0.14
Reach 1	7682.964	100 YR	2358.3	208	217.44	213.57	217.48	0.001572	1.92	1549.59	437.58	0.14
Reach 1	7432.972	10 YR	1062.8	208	215.35	211.34	215.37	0.000837	1.39	1032.14	448.73	0.11
Reach 1	7432.972	50 YR	1897.8	208	216.73	212.87	216.76	0.000921	1.7	1512.23	599.84	0.11
Reach 1	7432.972	100 YR	2358.3	208	217.1	213.21	217.14	0.001158	1.98	1661.5	716.69	0.13
Reach 1	6932.987	10 YR	1062.8	208	215.02	210.91	215.03	0.000582	1.2	1293.32	523.9	0.09
Reach 1	6932.987	50 YR	1897.8	208	216.39	211.84	216.41	0.000584	1.39	1952.86	615.57	0.09
Reach 1	6932.987	100 YR	2358.3	208	216.68	212.39	216.7	0.000744	1.61	2097.88	664.16	0.1
Reach 1	6433.002	10 YR	1613	207.93	214.02	212.48	214.12	0.008278	3.05	786.53	803.17	0.3
Reach 1	6433.002	50 YR	2877.7	207.93	215.74	213.26	215.78	0.002901	1.69	1816.52	928.03	0.18
Reach 1	6433.002	100 YR	3575.6	207.93	216.36	213.9	216.37	0.000651	0.86	3707.93	972.62	0.08

Reach 1	6366.862	10 YR	1613	204	213.84	210.06	213.88	0.001536	1.75	1111.18	296.21	0.14
Reach 1	6366.862	50 YR	2877.7	204	215.56	210.78	215.61	0.001936	1.5	1687.14	415.86	0.15
Reach 1	6366.862	100 YR	3575.6	204	216.23	211.11	216.29	0.002015	1.5	1992.49	485.58	0.15
Reach 1	6274.936		Bridge									
Reach 1	6183.009	10 YR	1613	204	213.44	210.82	213.49	0.002593	2.23	985.07	380.3	0.18
Reach 1	6183.009	50 YR	2877.7	204	215.21	212.13	215.26	0.001676	2.21	1737.44	443.64	0.15
Reach 1	6183.009	100 YR	3575.6	204	215.88	212.33	215.93	0.001619	2.32	2034.77	451.91	0.15
Reach 1	6095.752	10 YR	1613	204	213.33		213.35	0.000934	1.72	1418.31	499.57	0.11
Reach 1	6095.752	50 YR	2877.7	204	215.13		215.16	0.000775	1.82	2387.88	558.52	0.11
Reach 1	6095.752	100 YR	3575.6	204	215.79		215.82	0.000783	1.92	2760.85	564	0.11
Reach 1	5933.017	10 YR	1613	204.3	213.24		213.25	0.000363	1.12	2009.05	450.48	0.07
Reach 1	5933.017	50 YR	2877.7	204.3	215.04		215.06	0.000408	1.37	2873.66	495.08	0.08
Reach 1	5933.017	100 YR	3575.6	204.3	215.69		215.72	0.000459	1.53	3202.03	507.55	0.09
Reach 1	5433.032	10 YR	1613	204	212.87	208.58	212.93	0.001635	2.57	945.48	224.03	0.16
Reach 1	5433.032	50 YR	2877.7	204	214.59	209.5	214.68	0.00213	3.32	1438.38	409.94	0.18
Reach 1	5433.032	100 YR	3575.6	204	215.21	209.93	215.3	0.002224	3.53	1641.62	420.23	0.19
Reach 1	5183.04	10 YR	1613	204	212.45		212.51	0.001785	2.33	1011.99	306.55	0.16
Reach 1	5183.04	50 YR	2877.7	204	214.12		214.19	0.001847	2.75	1607.32	404.29	0.17
Reach 1	5183.04	100 YR	3575.6	204	214.72		214.79	0.001891	2.91	1850.87	409.22	0.17
Reach 1	4933.047	10 YR	1613	204	212		212.06	0.002118	2.63	887.98	217.13	0.17
Reach 1	4933.047	50 YR	2877.7	204	213.58		213.67	0.002763	3.43	1317.28	324.16	0.2
Reach 1	4933.047	100 YR	3575.6	204	214.14		214.25	0.003053	3.76	1509.46	355.24	0.22
Reach 1	4433.062	10 YR	1613	204	210.37		210.5	0.005709	3.71	656.12	252.74	0.28
Reach 1	4433.062	50 YR	2877.7	204	211.35		211.57	0.008294	4.98	966.98	376.36	0.34
Reach 1	4433.062	100 YR	3575.6	204	211.81		212.03	0.008064	5.14	1142.37	381.88	0.34
Reach 1	4183.069	10 YR	1613	204	209.62	207.9	209.64	0.002164	1.37	1358.78	700.57	0.15
Reach 1	4183.069	50 YR	2877.7	204	210.6	208.18	210.63	0.001933	1.61	2079.11	744.39	0.15
Reach 1	4183.069	100 YR	3575.6	204	211.15	208.37	211.18	0.00169	1.65	2489.49	750.57	0.14
Reach 1	3933.077	10 YR	1613	202	209.15	205.73	209.18	0.001658	1.53	1405.91	672.84	0.14
Reach 1	3933.077	50 YR	2877.7	202	210.16	207.25	210.2	0.001653	1.79	2109.63	714.98	0.14
Reach 1	3933.077	100 YR	3575.6	202	210.77	207.41	210.81	0.001444	1.81	2546.07	724.58	0.14
Reach 1	3433.092	10 YR	1613	202	205.66	205.66	206.62	0.073638	8.13	222.81	129.78	0.88
Reach 1	3433.092	50 YR	2877.7	202	208	206.77	208.36	0.015102	5.61	729.05	316.33	0.44
Reach 1	3433.092	100 YR	3575.6	202	209.3	207.22	209.49	0.006763	4.38	1236.38	446.74	0.31

HEC-RAS PLAN: PROPOSED 2 PONDS			RIVER: TRIB NO. 5 TO MILL CREEK				REACH: REACH 1					
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach 1	19287.3	10 YR	1025	234	239.33		239.37	0.002535	1.64	841.46	715.92	0.17
Reach 1	19287.3	50 YR	1846	234	240.09		240.13	0.002374	1.85	1410.28	772.16	0.17
Reach 1	19287.3	100 YR	2301.8	234	240.44		240.48	0.002264	1.91	1681.39	776.32	0.17
Reach 1	19037.31	10 YR	1025	234	238.88		238.89	0.001475	1.22	1198.99	735.32	0.13
Reach 1	19037.31	50 YR	1846	234	239.66		239.68	0.001439	1.41	1802.84	820.4	0.13
Reach 1	19037.31	100 YR	2301.8	234	240.02		240.05	0.001415	1.49	2112.38	868.83	0.13
Reach 1	18787.32	10 YR	1025	234	238.44	236.32	238.46	0.001967	1.57	980.47	605.89	0.15
Reach 1	18787.32	50 YR	1846	234	239.21	236.92	239.24	0.002057	1.84	1474.63	668.34	0.16
Reach 1	18787.32	100 YR	2301.8	234	239.58	237.29	239.62	0.002047	1.94	1727.42	698.83	0.16
Reach 1	18537.33	10 YR	1025	234	237.78	236.34	237.82	0.004245	1.73	723.85	458.43	0.2
Reach 1	18537.33	50 YR	1846	234	238.56	236.75	238.61	0.004001	2.06	1101.17	509.22	0.21
Reach 1	18537.33	100 YR	2301.8	234	238.95	236.94	239	0.003778	2.17	1302.93	531.25	0.21
Reach 1	18287.34	10 YR	1025	234	236.49	235.76	236.54	0.006398	1.99	605.18	382.84	0.25
Reach 1	18287.34	50 YR	1846	234	237.55	236	237.6	0.004232	2.14	1058.09	475.41	0.22
Reach 1	18287.34	100 YR	2301.8	234	238.01	236	238.06	0.003873	2.25	1287.04	522.45	0.21

Reach 1	18037.34	10 YR	1025	230	235.83		235.86	0.001546	1.49	799.7	275.6	0.13
Reach 1	18037.34	50 YR	1846	230	236.84		236.89	0.00214	2.05	1127.17	375	0.17
Reach 1	18037.34	100 YR	2301.8	230	237.29		237.35	0.002281	2.25	1306.04	407.79	0.17
Reach 1	17787.35	10 YR	1025	230	235.47		235.49	0.001549	1.57	872.75	348.53	0.14
Reach 1	17787.35	50 YR	1846	230	236.35		236.39	0.002064	2.06	1188.91	376.11	0.16
Reach 1	17787.35	100 YR	2301.8	230	236.76		236.82	0.002292	2.29	1348.94	400.14	0.17
Reach 1	17537.36	10 YR	1025	230	234.87		234.92	0.003907	2.09	679.65	408.91	0.21
Reach 1	17537.36	50 YR	1846	230	235.63		235.7	0.004147	2.49	995.36	419.01	0.22
Reach 1	17537.36	100 YR	2301.8	230	236		236.07	0.004214	2.67	1150.07	429.41	0.23
Reach 1	17287.37	10 YR	1025	230	234.11		234.13	0.002612	1.58	967.05	671.43	0.17
Reach 1	17287.37	50 YR	1846	230	235		235.03	0.001877	1.61	1578.71	690.25	0.15
Reach 1	17287.37	100 YR	2301.8	230	235.4		235.42	0.001762	1.67	1849.84	693.94	0.15
Reach 1	17037.37	10 YR	1025	228	233.5	232	233.52	0.002382	1.58	837.25	453.73	0.16
Reach 1	17037.37	50 YR	1846	228	234.51	232.01	234.54	0.002136	1.82	1406.46	588.86	0.16
Reach 1	17037.37	100 YR	2301.8	228	234.93	232.14	234.96	0.002016	1.89	1654.98	594.03	0.16
Reach 1	16787.38	10 YR	1025	230	232.78	232	232.81	0.003059	1.45	701.34	309.87	0.17
Reach 1	16787.38	50 YR	1846	230	233.81	232	233.86	0.003101	1.89	1042.77	352.03	0.19
Reach 1	16787.38	100 YR	2301.8	230	234.24	232	234.3	0.003192	2.09	1195.1	364.77	0.19
Reach 1	16287.4	10 YR	1025	228	231.63	229.49	231.66	0.001866	1.46	813.1	376.9	0.14
Reach 1	16287.4	50 YR	1846	228	232.55	229.96	232.6	0.00216	1.86	1266.99	549.82	0.16
Reach 1	16287.4	100 YR	2301.8	228	232.93	230.22	232.98	0.002283	2.03	1480.93	586.18	0.17
Reach 1	16144.15	10 YR	1025	228	231.4	229.3	231.42	0.001494	1.27	993.17	538.83	0.13
Reach 1	16144.15	50 YR	1846	228	232.31	229.76	232.34	0.001598	1.56	1539.95	686.64	0.14
Reach 1	16144.15	100 YR	2301.8	228	232.67	229.98	232.71	0.00166	1.69	1798.38	724.45	0.14
Reach 1	16020.94		Bridge									
Reach 1	15897.73	10 YR	1025	228	231.1	229.06	231.11	0.001149	0.94	1108.11	497.08	0.11
Reach 1	15897.73	50 YR	1846	228	231.98	229.43	232	0.001258	1.21	1585.05	682.43	0.12
Reach 1	15897.73	100 YR	2301.8	228	232.32	229.6	232.35	0.001368	1.36	1830.03	727.53	0.13
Reach 1	15787.41	10 YR	1025	228	230.96	229.07	230.97	0.001409	1.15	1029.3	621.51	0.12
Reach 1	15787.41	50 YR	1846	228	231.82	229.47	231.85	0.001562	1.45	1459.52	655.53	0.13
Reach 1	15787.41	100 YR	2301.8	228	232.17	229.67	232.2	0.001467	1.49	1877.71	673.61	0.13
Reach 1	15287.43	10 YR	1025	227.2	230.01		230.04	0.002706	1.52	854.68	478.12	0.17
Reach 1	15287.43	50 YR	1846	227.2	230.83		230.87	0.002648	1.81	1260.45	506.52	0.17
Reach 1	15287.43	100 YR	2301.8	227.2	231.21		231.25	0.002617	1.93	1454.08	510.08	0.18
Reach 1	14537.45	10 YR	1025	224	228.54	226.6	228.56	0.001531	1.21	1141.12	661.13	0.13
Reach 1	14537.45	50 YR	1846	224	229.45	227.05	229.47	0.001407	1.4	1776.08	741.05	0.13
Reach 1	14537.45	100 YR	2301.8	224	229.86	227.27	229.88	0.001372	1.48	2087.57	777.89	0.13
Reach 1	14287.46	10 YR	1025	224	228.03	225.94	228.07	0.002548	1.89	745.24	369.7	0.17
Reach 1	14287.46	50 YR	1846	224	228.91	226.48	228.97	0.002993	2.36	1103.6	444.06	0.19
Reach 1	14287.46	100 YR	2301.8	224	229.32	226.78	229.38	0.003119	2.55	1289.64	480.08	0.2
Reach 1	14037.46	10 YR	1025	224	227.22	226.06	227.26	0.004347	2.01	734.18	490.12	0.21
Reach 1	14037.46	50 YR	1846	224	228.15	226.46	228.19	0.003228	2.11	1254.64	595.62	0.19
Reach 1	14037.46	100 YR	2301.8	224	228.59	226.62	228.63	0.002841	2.13	1525.11	623.89	0.19
Reach 1	13787.47	10 YR	1025	223.77	226.54	224.83	226.56	0.002041	1.33	907.98	472.21	0.15
Reach 1	13787.47	50 YR	1846	223.77	227.63	225.28	227.65	0.001621	1.5	1438.46	501.88	0.14
Reach 1	13787.47	100 YR	2301.8	223.77	228.11	225.51	228.14	0.001554	1.59	1684.61	527.68	0.14
Reach 1	13287.49	10 YR	1025	220	225.73		225.77	0.00127	1.49	738.01	298.31	0.13
Reach 1	13287.49	50 YR	1846	220	226.77		226.82	0.001712	1.99	1131.66	461.48	0.15
Reach 1	13287.49	100 YR	2301.8	220	227.25		227.31	0.001799	2.16	1369.14	531.28	0.16
Reach 1	12787.5	10 YR	1025	220	225.09		225.11	0.001421	1.54	1066.47	517.98	0.13

Reach 1	12787.5	50 YR	1846	220	226.04		226.07	0.001395	1.75	1561.87	526.57	0.13
Reach 1	12787.5	100 YR	2301.8	220	226.5		226.52	0.00143	1.87	1806.7	553.51	0.14
Reach 1	12287.52	10 YR	1025	220	224.05	222.06	224.09	0.003376	2.01	730.89	410.36	0.19
Reach 1	12287.52	50 YR	1846	220	225.12	222.82	225.16	0.002566	2.12	1179.86	424.53	0.18
Reach 1	12287.52	100 YR	2301.8	220	225.59	223.09	225.63	0.002455	2.21	1377.36	427.75	0.18
Reach 1	11787.53	10 YR	1025	218	222.98		223.01	0.001501	1.54	735.72	273.41	0.13
Reach 1	11787.53	50 YR	1846	218	223.94		224.01	0.002093	2.09	1023.28	322.19	0.16
Reach 1	11787.53	100 YR	2301.8	218	224.37		224.44	0.002311	2.32	1161.79	328.36	0.18
Reach 1	11537.54	10 YR	1025	218	222.67		222.7	0.001056	1.33	885.77	283.73	0.11
Reach 1	11537.54	50 YR	1846	218	223.47		223.52	0.001805	1.95	1160.54	456.68	0.15
Reach 1	11537.54	100 YR	2301.8	218	223.83		223.89	0.0021	2.2	1340.24	543.26	0.17
Reach 1	11287.55	10 YR	1025	218	222.35	220.49	222.38	0.001832	1.44	783.54	357.25	0.14
Reach 1	11287.55	50 YR	1846	218	222.9	221.3	222.96	0.003375	2.18	942.37	431.5	0.2
Reach 1	11287.55	100 YR	2301.8	218	223.14	221.69	223.22	0.004181	2.52	1017.53	483.21	0.22
Reach 1	9182.919	10 YR	1025	214	218.24	215.85	218.27	0.002127	1.48	1092.85	1107.84	0.15
Reach 1	9182.919	50 YR	1846	214	219.21	216.82	219.22	0.001106	1.29	2191.7	1170.25	0.11
Reach 1	9182.919	100 YR	2301.8	214	219.65	217.15	219.67	0.000918	1.26	2718.38	1198.04	0.11
Reach 1	8932.927	10 YR	1025	210	217.92	214.01	217.93	0.000936	1.17	1480.68	1224.45	0.1
Reach 1	8932.927	50 YR	1846	210	219.04	214.95	219.05	0.000499	1.01	2944.9	1332.58	0.08
Reach 1	8932.927	100 YR	2301.8	210	219.51	215.39	219.52	0.000438	1.01	3574.6	1353.65	0.08
Reach 1	8682.935	10 YR	1025	210	217.57	212.91	217.61	0.001764	1.58	656.76	244.54	0.14
Reach 1	8682.935	50 YR	1846	210	218.77	213.93	218.83	0.001821	1.92	1166.57	482.22	0.15
Reach 1	8682.935	100 YR	2301.8	210	219.25	214.35	219.31	0.001827	2.05	1402.8	567.27	0.16
Reach 1	8432.942	10 YR	1025	210	217.08	214.32	217.13	0.002208	1.98	751.09	392.86	0.17
Reach 1	8432.942	50 YR	1846	210	218.34	215.44	218.38	0.001819	2.12	1309.85	528.95	0.16
Reach 1	8432.942	100 YR	2301.8	210	218.83	215.89	218.88	0.00179	2.22	1559.75	610.44	0.16
Reach 1	8182.949	10 YR	1025	210	216.62		216.66	0.001586	1.49	700.07	232.74	0.14
Reach 1	8182.949	50 YR	1846	210	217.87		217.92	0.001823	1.94	1064.88	458.83	0.15
Reach 1	8182.949	100 YR	2301.8	210	218.35		218.41	0.001891	2.1	1327.25	573.59	0.16
Reach 1	7932.957	10 YR	1025	210	216.2		216.23	0.001785	1.58	651.81	202.38	0.14
Reach 1	7932.957	50 YR	1846	210	217.37		217.43	0.002132	2.07	1018.75	456.3	0.16
Reach 1	7932.957	100 YR	2301.8	210	217.82		217.9	0.002248	2.26	1252.13	564.24	0.17
Reach 1	7682.964	10 YR	1025	208	215.61	211.64	215.68	0.002861	2.01	510.2	378.74	0.18
Reach 1	7682.964	50 YR	1846	208	216.95	213.05	216.98	0.001446	1.73	1341.02	418.76	0.14
Reach 1	7682.964	100 YR	2301.8	208	217.37	213.53	217.41	0.001574	1.91	1521.77	434.68	0.14
Reach 1	7432.972	10 YR	1025	208	215.29	211.29	215.32	0.000819	1.37	1014.03	447.79	0.1
Reach 1	7432.972	50 YR	1846	208	216.67	212.82	216.7	0.000906	1.68	1489.61	585.51	0.11
Reach 1	7432.972	100 YR	2301.8	208	217.05	213.18	217.08	0.001126	1.94	1636.79	683.02	0.13
Reach 1	6932.987	10 YR	1025	208	214.97	210.85	214.99	0.000568	1.18	1271.14	522.83	0.09
Reach 1	6932.987	50 YR	1846	208	216.34	211.78	216.36	0.000573	1.37	1925.77	606.33	0.09
Reach 1	6932.987	100 YR	2301.8	208	216.63	212.32	216.65	0.000733	1.59	2072.22	655.67	0.1
Reach 1	6433.002	10 YR	1576	207.93	213.96	212.45	214.06	0.008772	3.11	753.19	794.15	0.31
Reach 1	6433.002	50 YR	2825	207.93	215.69	213.26	215.73	0.002962	1.71	1779.53	922.91	0.18
Reach 1	6433.002	100 YR	3519	207.93	216.31	213.88	216.32	0.000655	0.85	3660.32	970.12	0.08
Reach 1	6366.862	10 YR	1576	204	213.78	209.98	213.82	0.001525	1.74	1093.57	293.2	0.14
Reach 1	6366.862	50 YR	2825	204	215.51	210.75	215.56	0.001917	1.51	1664.43	408.49	0.15
Reach 1	6366.862	100 YR	3519	204	216.18	211.09	216.24	0.002017	1.48	1968.76	483.67	0.15
Reach 1	6274.936		Bridge									
Reach 1	6183.009	10 YR	1576	204	213.38	210.71	213.43	0.002651	2.24	960.98	377.43	0.18
Reach 1	6183.009	50 YR	2825	204	215.16	212.13	215.21	0.001682	2.2	1713.62	442.54	0.15
Reach 1	6183.009	100 YR	3519	204	215.83	212.31	215.88	0.001621	2.31	2012.62	451.46	0.15

Reach 1	6095.752	10 YR	1576	204	213.26		213.29	0.000943	1.71	1385.84	495.63	0.11
Reach 1	6095.752	50 YR	2825	204	215.08		215.1	0.000775	1.81	2357.77	558.08	0.11
Reach 1	6095.752	100 YR	3519	204	215.74		215.78	0.000782	1.91	2733.2	563.59	0.11
Reach 1	5933.017	10 YR	1576	204.3	213.17		213.19	0.000361	1.11	1979.81	447.7	0.07
Reach 1	5933.017	50 YR	2825	204.3	214.99		215	0.000404	1.36	2847.25	494.72	0.08
Reach 1	5933.017	100 YR	3519	204.3	215.65		215.67	0.000455	1.52	3177.54	506.4	0.09
Reach 1	5433.032	10 YR	1576	204	212.81	208.56	212.87	0.001604	2.53	932.01	220.18	0.16
Reach 1	5433.032	50 YR	2825	204	214.54	209.47	214.63	0.002124	3.31	1421.72	409.03	0.18
Reach 1	5433.032	100 YR	3519	204	215.16	209.9	215.26	0.002213	3.51	1626.89	419.6	0.19
Reach 1	5183.04	10 YR	1576	204	212.4		212.45	0.001778	2.31	994.82	303.94	0.16
Reach 1	5183.04	50 YR	2825	204	214.07		214.14	0.001846	2.74	1587.13	403.89	0.17
Reach 1	5183.04	100 YR	3519	204	214.68		214.75	0.001883	2.9	1833.74	408.87	0.17
Reach 1	4933.047	10 YR	1576	204	211.95		212	0.002101	2.61	876.44	216.39	0.17
Reach 1	4933.047	50 YR	2825	204	213.53		213.62	0.002734	3.4	1302.27	320.86	0.2
Reach 1	4933.047	100 YR	3519	204	214.1		214.21	0.003036	3.74	1495.69	354.9	0.22
Reach 1	4433.062	10 YR	1576	204	210.33		210.46	0.005587	3.66	646.99	247.97	0.27
Reach 1	4433.062	50 YR	2825	204	211.31		211.53	0.008282	4.96	954.57	376.15	0.34
Reach 1	4433.062	100 YR	3519	204	211.78		212	0.008041	5.11	1130.42	381.26	0.34
Reach 1	4183.069	10 YR	1576	204	209.58	207.49	209.61	0.002174	1.37	1334.87	697.87	0.15
Reach 1	4183.069	50 YR	2825	204	210.57	208.16	210.6	0.001936	1.6	2053.78	743.98	0.15
Reach 1	4183.069	100 YR	3519	204	211.12	208.36	211.16	0.001684	1.64	2467.62	750.24	0.14
Reach 1	3933.077	10 YR	1576	202	209.12	205.7	209.14	0.00166	1.52	1381.97	671.31	0.14
Reach 1	3933.077	50 YR	2825	202	210.13	207.22	210.16	0.001649	1.78	2085.42	714.44	0.14
Reach 1	3933.077	100 YR	3519	202	210.74	207.41	210.78	0.001431	1.8	2526.73	724.16	0.14
Reach 1	3433.092	10 YR	1576	202	205.62	205.62	206.57	0.074507	8.1	217.7	127.83	0.88
Reach 1	3433.092	50 YR	2825	202	208	206.73	208.35	0.014554	5.5	729.05	316.33	0.43
Reach 1	3433.092	100 YR	3519	202	209.3	207.18	209.49	0.006551	4.31	1236.38	446.74	0.3

HEC-RAS PLAN: PROPOSED 3 PONDS				RIVER: TRIB NO. 5 TO MILL CREEK				REACH: 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)	
Reach 1	19287.3	10 YR	1034.6	234	239.34		239.38	0.002534	1.65	848.89	716.78	0.17
Reach 1	19287.3	50 YR	1855.1	234	240.1		240.14	0.002371	1.85	1415.95	772.25	0.17
Reach 1	19287.3	100 YR	2309.7	234	240.45		240.49	0.002262	1.91	1685.77	776.39	0.17
Reach 1	19037.31	10 YR	1034.6	234	238.89		238.9	0.001475	1.22	1206.78	736.14	0.13
Reach 1	19037.31	50 YR	1855.1	234	239.67		239.68	0.001439	1.41	1809.14	821.48	0.13
Reach 1	19037.31	100 YR	2309.7	234	240.03		240.05	0.001414	1.49	2117.51	869.18	0.13
Reach 1	18787.32	10 YR	1034.6	234	238.45	236.33	238.47	0.00197	1.57	986.77	606.76	0.15
Reach 1	18787.32	50 YR	1855.1	234	239.22	236.91	239.25	0.002056	1.84	1479.81	668.93	0.16
Reach 1	18787.32	100 YR	2309.7	234	239.59	237.29	239.62	0.002047	1.94	1731.61	699.33	0.16
Reach 1	18537.33	10 YR	1034.6	234	237.79	236.34	237.83	0.004249	1.74	728.29	459.21	0.21
Reach 1	18537.33	50 YR	1855.1	234	238.57	236.76	238.62	0.003995	2.06	1105.35	509.69	0.21
Reach 1	18537.33	100 YR	2309.7	234	238.95	236.94	239.01	0.003776	2.17	1306.17	531.59	0.21
Reach 1	18287.34	10 YR	1034.6	234	236.51	235.77	236.56	0.006352	1.99	610.57	384.09	0.25
Reach 1	18287.34	50 YR	1855.1	234	237.56	236	237.61	0.004222	2.14	1062.9	476.45	0.22
Reach 1	18287.34	100 YR	2309.7	234	238.02	236	238.07	0.003866	2.25	1290.83	522.91	0.21
Reach 1	18037.34	10 YR	1034.6	230	235.84		235.87	0.001553	1.49	803.43	275.85	0.14
Reach 1	18037.34	50 YR	1855.1	230	236.85		236.9	0.002144	2.05	1130.86	376.39	0.17
Reach 1	18037.34	100 YR	2309.7	230	237.3		237.36	0.002283	2.25	1309.06	408.25	0.17
Reach 1	17787.35	10 YR	1034.6	230	235.48		235.5	0.001556	1.57	876.89	348.69	0.14
Reach 1	17787.35	50 YR	1855.1	230	236.36		236.4	0.002069	2.06	1192.19	376.62	0.16
Reach 1	17787.35	100 YR	2309.7	230	236.77		236.82	0.002295	2.29	1351.68	400.49	0.17

Reach 1	17537.36	10 YR	1034.6	230	234.88		234.93	0.003915	2.1	683.7	409.04	0.21
Reach 1	17537.36	50 YR	1855.1	230	235.64		235.7	0.004148	2.5	998.56	419.1	0.22
Reach 1	17537.36	100 YR	2309.7	230	236		236.08	0.004216	2.67	1152.73	429.71	0.23
Reach 1	17287.37	10 YR	1034.6	230	234.12		234.14	0.002594	1.58	975.42	672.02	0.17
Reach 1	17287.37	50 YR	1855.1	230	235.01		235.04	0.001874	1.62	1584.48	690.3	0.15
Reach 1	17287.37	100 YR	2309.7	230	235.4		235.43	0.00176	1.67	1854.43	694.08	0.15
Reach 1	17037.37	10 YR	1034.6	228	233.51	232	233.54	0.002381	1.59	843.93	458.68	0.16
Reach 1	17037.37	50 YR	1855.1	228	234.52	232.01	234.55	0.002132	1.82	1411.88	588.98	0.16
Reach 1	17037.37	100 YR	2309.7	228	234.93	232.14	234.97	0.002014	1.89	1659.19	594.11	0.16
Reach 1	16787.38	10 YR	1034.6	230	232.8	232	232.83	0.003056	1.46	706.04	310.47	0.17
Reach 1	16787.38	50 YR	1855.1	230	233.82	232	233.87	0.003103	1.9	1046.08	352.43	0.19
Reach 1	16787.38	100 YR	2309.7	230	234.24	232	234.3	0.003191	2.09	1197.8	364.82	0.19
Reach 1	16287.4	10 YR	1034.6	228	231.64	229.5	231.67	0.001875	1.47	817.94	381.22	0.14
Reach 1	16287.4	50 YR	1855.1	228	232.56	229.96	232.61	0.002162	1.86	1271.71	550.65	0.16
Reach 1	16287.4	100 YR	2309.7	228	232.94	230.22	232.99	0.002283	2.03	1484.74	586.68	0.17
Reach 1	16144.15	10 YR	1034.6	228	231.41	229.3	231.43	0.001494	1.27	999.82	539.04	0.13
Reach 1	16144.15	50 YR	1855.1	228	232.32	229.77	232.35	0.001597	1.56	1545.85	687.32	0.14
Reach 1	16144.15	100 YR	2309.7	228	232.68	229.98	232.71	0.00166	1.69	1803.1	725.13	0.14
Reach 1	16020.94		Bridge									
Reach 1	15897.73	10 YR	1034.6	228	231.11	229.07	231.13	0.001151	0.94	1114.05	497.29	0.11
Reach 1	15897.73	50 YR	1855.1	228	231.99	229.43	232.01	0.001258	1.22	1590.82	686.2	0.12
Reach 1	15897.73	100 YR	2309.7	228	232.33	229.6	232.36	0.001368	1.36	1834.73	728.07	0.13
Reach 1	15787.41	10 YR	1034.6	228	230.97	229.07	230.99	0.001411	1.15	1035.03	623.25	0.12
Reach 1	15787.41	50 YR	1855.1	228	231.83	229.48	231.86	0.001563	1.45	1463.77	655.81	0.13
Reach 1	15787.41	100 YR	2309.7	228	232.18	229.67	232.2	0.001468	1.5	1882.04	674.06	0.13
Reach 1	15287.43	10 YR	1034.6	227.2	230.02		230.05	0.002706	1.53	859.94	478.64	0.17
Reach 1	15287.43	50 YR	1855.1	227.2	230.84		230.88	0.002647	1.81	1264.49	506.58	0.17
Reach 1	15287.43	100 YR	2309.7	227.2	231.22		231.26	0.002617	1.94	1457.28	510.14	0.18
Reach 1	14537.45	10 YR	1034.6	224	228.56	226.61	228.57	0.001529	1.21	1149.47	662.26	0.13
Reach 1	14537.45	50 YR	1855.1	224	229.46	227.07	229.48	0.001406	1.4	1782.49	741.82	0.13
Reach 1	14537.45	100 YR	2309.7	224	229.87	227.27	229.89	0.001371	1.48	2092.88	778.46	0.13
Reach 1	14287.46	10 YR	1034.6	224	228.05	226	228.09	0.002556	1.9	749.75	370.73	0.17
Reach 1	14287.46	50 YR	1855.1	224	228.92	226.48	228.98	0.002996	2.36	1107.37	444.77	0.19
Reach 1	14287.46	100 YR	2309.7	224	229.32	226.78	229.39	0.003121	2.55	1292.88	480.8	0.2
Reach 1	14037.46	10 YR	1034.6	224	227.23	226.06	227.27	0.004332	2.02	740.11	491.55	0.21
Reach 1	14037.46	50 YR	1855.1	224	228.16	226.46	228.2	0.003219	2.11	1260.12	596.2	0.19
Reach 1	14037.46	100 YR	2309.7	224	228.6	226.62	228.64	0.002836	2.13	1529.67	624.38	0.19
Reach 1	13787.47	10 YR	1034.6	223.77	226.55	224.84	226.57	0.00203	1.33	915.29	472.63	0.15
Reach 1	13787.47	50 YR	1855.1	223.77	227.64	225.29	227.66	0.001619	1.5	1443.54	502.16	0.14
Reach 1	13787.47	100 YR	2309.7	223.77	228.12	225.51	228.15	0.001553	1.59	1688.75	528.89	0.14
Reach 1	13287.49	10 YR	1034.6	220	225.75		225.78	0.001278	1.5	742.31	300.75	0.13
Reach 1	13287.49	50 YR	1855.1	220	226.78		226.83	0.001715	1.99	1136.12	462.98	0.15
Reach 1	13287.49	100 YR	2309.7	220	227.25		227.32	0.0018	2.16	1373.32	532.39	0.16
Reach 1	12787.5	10 YR	1034.6	220	225.1		225.12	0.001421	1.54	1072.91	518.07	0.13
Reach 1	12787.5	50 YR	1855.1	220	226.05		226.07	0.001397	1.75	1566.33	527.07	0.13
Reach 1	12787.5	100 YR	2309.7	220	226.5		226.53	0.001431	1.87	1810.93	553.96	0.14
Reach 1	12287.52	10 YR	1034.6	220	224.07	222.06	224.1	0.003355	2.01	737.07	410.69	0.19
Reach 1	12287.52	50 YR	1855.1	220	225.13	222.82	225.17	0.002573	2.12	1182.62	424.57	0.18
Reach 1	12287.52	100 YR	2309.7	220	225.59	223.09	225.64	0.002453	2.21	1380.79	427.81	0.18
Reach 1	11787.53	10 YR	1034.6	218	222.99		223.03	0.00151	1.54	739.5	274.11	0.14
Reach 1	11787.53	50 YR	1855.1	218	223.95		224.02	0.002097	2.1	1026.57	322.73	0.17

Reach 1	11787.53	100 YR	2309.7	218	224.38		224.45	0.002312	2.33	1164.45	328.43	0.18
Reach 1	11537.54	10 YR	1034.6	218	222.69		222.71	0.001065	1.34	889.04	284.53	0.11
Reach 1	11537.54	50 YR	1855.1	218	223.48		223.53	0.001809	1.95	1164.76	458.95	0.15
Reach 1	11537.54	100 YR	2309.7	218	223.83		223.89	0.002101	2.2	1344.49	545.05	0.17
Reach 1	11287.55	10 YR	1034.6	218	222.36	220.5	222.39	0.001848	1.45	785.99	359.36	0.14
Reach 1	11287.55	50 YR	1855.1	218	222.9	221.31	222.97	0.003382	2.18	944.74	432.73	0.2
Reach 1	11287.55	100 YR	2309.7	218	223.15	221.69	223.23	0.004181	2.53	1019.93	485.04	0.22
Reach 1	9182.919	10 YR	1034.6	214	218.26	215.85	218.28	0.002103	1.48	1107.07	1108.63	0.15
Reach 1	9182.919	50 YR	1855.1	214	219.21	216.83	219.23	0.001105	1.29	2199.86	1170.7	0.11
Reach 1	9182.919	100 YR	2309.7	214	219.66	217.17	219.67	0.00092	1.27	2723.39	1198.3	0.11
Reach 1	8932.927	10 YR	1034.6	210	217.93	214.03	217.95	0.000929	1.17	1500.07	1236.23	0.1
Reach 1	8932.927	50 YR	1855.1	210	219.05	214.95	219.05	0.000499	1.01	2954.17	1332.89	0.08
Reach 1	8932.927	100 YR	2309.7	210	219.51	215.39	219.52	0.000439	1.01	3579.87	1353.84	0.08
Reach 1	8682.935	10 YR	1034.6	210	217.59	212.93	217.63	0.001773	1.59	660.7	252.3	0.14
Reach 1	8682.935	50 YR	1855.1	210	218.78	213.95	218.83	0.001828	1.93	1169.61	482.44	0.15
Reach 1	8682.935	100 YR	2309.7	210	219.26	214.36	219.31	0.001835	2.06	1404.3	569.17	0.16
Reach 1	8432.942	10 YR	1034.6	210	217.1	214.34	217.14	0.002209	1.98	756.89	394.1	0.17
Reach 1	8432.942	50 YR	1855.1	210	218.34	215.45	218.39	0.001829	2.12	1311.95	529.66	0.16
Reach 1	8432.942	100 YR	2309.7	210	218.83	215.89	218.88	0.001801	2.23	1560.18	610.57	0.16
Reach 1	8182.949	10 YR	1034.6	210	216.63		216.67	0.001597	1.5	703.04	233.74	0.14
Reach 1	8182.949	50 YR	1855.1	210	217.87		217.92	0.001841	1.95	1065.14	459.23	0.15
Reach 1	8182.949	100 YR	2309.7	210	218.34		218.41	0.001909	2.11	1325.5	573.42	0.16
Reach 1	7932.957	10 YR	1034.6	210	216.2		216.24	0.001804	1.59	653.61	203.65	0.14
Reach 1	7932.957	50 YR	1855.1	210	217.36		217.43	0.002164	2.08	1016.15	454.82	0.17
Reach 1	7932.957	100 YR	2309.7	210	217.81		217.89	0.002283	2.27	1246.57	562.05	0.17
Reach 1	7682.964	10 YR	1034.6	208	215.61	211.67	215.68	0.002914	2.03	510.25	378.74	0.18
Reach 1	7682.964	50 YR	1855.1	208	216.93	213.06	216.97	0.001478	1.75	1335.22	418.27	0.14
Reach 1	7682.964	100 YR	2309.7	208	217.35	213.53	217.4	0.001609	1.92	1513.66	433.93	0.15
Reach 1	7432.972	10 YR	1034.6	208	215.29	211.3	215.31	0.00084	1.39	1011.58	447.67	0.11
Reach 1	7432.972	50 YR	1855.1	208	216.65	212.83	216.68	0.000927	1.69	1481.99	580.64	0.11
Reach 1	7432.972	100 YR	2309.7	208	217.02	213.17	217.06	0.001147	1.95	1626.42	675.16	0.13
Reach 1	6932.987	10 YR	1034.6	208	214.95	210.87	214.97	0.000589	1.2	1262.69	522.43	0.09
Reach 1	6932.987	50 YR	1855.1	208	216.31	211.79	216.33	0.000591	1.39	1910.98	601.27	0.09
Reach 1	6932.987	100 YR	2309.7	208	216.59	212.32	216.61	0.000756	1.61	2053.43	649.42	0.11
Reach 1	6433.002	10 YR	1552	207.93	213.92	212.48	214.03	0.00911	3.16	730.75	785.47	0.32
Reach 1	6433.002	50 YR	2788	207.93	215.65	213.26	215.69	0.003009	1.73	1752.91	919.2	0.18
Reach 1	6433.002	100 YR	3472	207.93	216.26	213.26	216.28	0.000658	0.84	3620.51	968.03	0.08
Reach 1	6366.862	10 YR	1552	204	213.74	209.96	213.78	0.00152	1.73	1081.65	291.29	0.14
Reach 1	6366.862	50 YR	2788	204	215.47	210.73	215.52	0.001903	1.52	1648.24	403.15	0.15
Reach 1	6366.862	100 YR	3472	204	216.14	211.07	216.19	0.002019	1.47	1948.94	481.53	0.15
Reach 1	6274.936		Bridge									
Reach 1	6183.009	10 YR	1552	204	213.33	210.66	213.39	0.002698	2.24	944.33	375.43	0.18
Reach 1	6183.009	50 YR	2788	204	215.12	212.12	215.17	0.001687	2.2	1696.36	441.74	0.15
Reach 1	6183.009	100 YR	3472	204	215.79	212.29	215.84	0.001622	2.3	1994.06	451.09	0.15
Reach 1	6095.752	10 YR	1552	204	213.22		213.24	0.00095	1.71	1363.37	490.23	0.11
Reach 1	6095.752	50 YR	2788	204	215.04		215.06	0.000775	1.81	2335.88	557.75	0.11
Reach 1	6095.752	100 YR	3472	204	215.7		215.73	0.00078	1.91	2710.02	563.25	0.11
Reach 1	5933.017	10 YR	1552	204.3	213.13		213.14	0.00036	1.11	1959.43	445.77	0.07
Reach 1	5933.017	50 YR	2788	204.3	214.95		214.96	0.000402	1.36	2827.99	494.45	0.08
Reach 1	5933.017	100 YR	3472	204.3	215.61		215.63	0.000451	1.51	3157.03	505.45	0.08

Reach 1	5433.032	10 YR	1552	204	212.77	208.54	212.82	0.001586	2.51	922.55	217.43	0.15
Reach 1	5433.032	50 YR	2788	204	214.51	209.45	214.59	0.002122	3.3	1409.45	408.36	0.18
Reach 1	5433.032	100 YR	3472	204	215.12	209.87	215.22	0.002203	3.5	1614.57	419.07	0.19
Reach 1	5183.04	10 YR	1552	204	212.36		212.41	0.001779	2.31	982.29	302.02	0.16
Reach 1	5183.04	50 YR	2788	204	214.03		214.1	0.001848	2.73	1572	403.59	0.17
Reach 1	5183.04	100 YR	3472	204	214.64		214.71	0.001875	2.88	1819.39	408.57	0.17
Reach 1	4933.047	10 YR	1552	204	211.91		211.96	0.0021	2.59	867.54	215.85	0.17
Reach 1	4933.047	50 YR	2788	204	213.5		213.59	0.002718	3.38	1290.8	318.31	0.2
Reach 1	4933.047	100 YR	3472	204	214.07		214.17	0.003022	3.72	1484.15	354.63	0.22
Reach 1	4433.062	10 YR	1552	204	210.31		210.44	0.005507	3.62	641.03	244.81	0.27
Reach 1	4433.062	50 YR	2788	204	211.29		211.51	0.008239	4.93	945.61	373.61	0.34
Reach 1	4433.062	100 YR	3472	204	211.75		211.97	0.008021	5.1	1120.44	380.75	0.34
Reach 1	4183.069	10 YR	1552	204	209.56	207.47	209.58	0.002183	1.36	1318.69	696.06	0.15
Reach 1	4183.069	50 YR	2788	204	210.54	208.15	210.58	0.001938	1.59	2035.9	743.69	0.15
Reach 1	4183.069	100 YR	3472	204	211.1	208.34	211.13	0.001678	1.63	2449.37	749.97	0.14
Reach 1	3933.077	10 YR	1552	202	209.09	205.67	209.12	0.001665	1.51	1365.15	670.22	0.14
Reach 1	3933.077	50 YR	2788	202	210.11	207.19	210.14	0.001646	1.77	2068.35	714.06	0.14
Reach 1	3933.077	100 YR	3472	202	210.72	207.41	210.76	0.001421	1.79	2510.63	723.8	0.14
Reach 1	3433.092	10 YR	1552	202	205.6	205.6	206.55	0.073721	8.03	215.96	127.16	0.88
Reach 1	3433.092	50 YR	2788	202	208	206.7	208.34	0.014175	5.43	729.05	316.33	0.43
Reach 1	3433.092	100 YR	3472	202	209.3	207.15	209.48	0.006377	4.25	1236.38	446.74	0.3

HEC-RAS PLAN: PROPOSED 4 PONDS			RIVER: TRIB NO. 5 TO MILL CREEK				REACH: REACH 1					
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach 1	19287.3	10 YR	1034.9	234	239.34		239.38	0.002534	1.65	849.12	716.8	0.17
Reach 1	19287.3	50 YR	1866.5	234	240.11		240.15	0.002368	1.85	1423.04	772.36	0.17
Reach 1	19287.3	100 YR	2320.5	234	240.46		240.49	0.002261	1.91	1691.74	776.48	0.17
Reach 1	19037.31	10 YR	1034.9	234	238.89		238.9	0.001475	1.22	1207.03	736.16	0.13
Reach 1	19037.31	50 YR	1866.5	234	239.68		239.69	0.001438	1.42	1817.04	822.83	0.13
Reach 1	19037.31	100 YR	2320.5	234	240.04		240.06	0.001413	1.49	2124.51	869.65	0.13
Reach 1	18787.32	10 YR	1034.9	234	238.45	236.33	238.47	0.00197	1.57	986.97	606.78	0.15
Reach 1	18787.32	50 YR	1866.5	234	239.23	236.92	239.26	0.002056	1.84	1486.3	669.67	0.16
Reach 1	18787.32	100 YR	2320.5	234	239.59	237.3	239.63	0.002047	1.94	1737.33	700.01	0.16
Reach 1	18537.33	10 YR	1034.9	234	237.79	236.33	237.83	0.004249	1.74	728.43	459.24	0.21
Reach 1	18537.33	50 YR	1866.5	234	238.58	236.76	238.63	0.003988	2.06	1110.59	510.27	0.21
Reach 1	18537.33	100 YR	2320.5	234	238.96	236.95	239.01	0.003773	2.17	1310.61	532.07	0.21
Reach 1	18287.34	10 YR	1034.9	234	236.51	235.77	236.56	0.006351	1.99	610.74	384.13	0.25
Reach 1	18287.34	50 YR	1866.5	234	237.57	236	237.62	0.004209	2.15	1068.94	477.76	0.21
Reach 1	18287.34	100 YR	2320.5	234	238.03	236	238.08	0.003857	2.25	1296	523.53	0.21
Reach 1	18037.34	10 YR	1034.9	230	235.84		235.87	0.001554	1.49	803.54	275.86	0.14
Reach 1	18037.34	50 YR	1866.5	230	236.86		236.91	0.00215	2.06	1135.51	378.24	0.17
Reach 1	18037.34	100 YR	2320.5	230	237.31		237.37	0.002286	2.25	1313.17	408.88	0.17
Reach 1	17787.35	10 YR	1034.9	230	235.48		235.5	0.001556	1.57	877.01	348.69	0.14
Reach 1	17787.35	50 YR	1866.5	230	236.37		236.41	0.002075	2.07	1196.29	377.25	0.16
Reach 1	17787.35	100 YR	2320.5	230	236.78		236.83	0.002299	2.3	1355.4	400.97	0.17
Reach 1	17537.36	10 YR	1034.9	230	234.88		234.93	0.003915	2.1	683.82	409.05	0.21
Reach 1	17537.36	50 YR	1866.5	230	235.65		235.71	0.004149	2.5	1002.55	419.22	0.22
Reach 1	17537.36	100 YR	2320.5	230	236.01		236.09	0.004217	2.67	1156.34	430.04	0.23
Reach 1	17287.37	10 YR	1034.9	230	234.12		234.15	0.002593	1.58	975.69	672.04	0.17
Reach 1	17287.37	50 YR	1866.5	230	235.02		235.05	0.00187	1.62	1591.66	690.37	0.15
Reach 1	17287.37	100 YR	2320.5	230	235.41		235.44	0.001758	1.68	1860.69	694.3	0.15
Reach 1	17037.37	10 YR	1034.9	228	233.51	232	233.54	0.002381	1.59	844.14	458.84	0.16

Reach 1	17037.37	50 YR	1866.5	228	234.53	232.01	234.56	0.002127	1.82	1418.63	589.12	0.16
Reach 1	17037.37	100 YR	2320.5	228	234.94	232.14	234.98	0.002012	1.89	1664.92	594.22	0.16
Reach 1	16787.38	10 YR	1034.9	230	232.8	232	232.83	0.003056	1.46	706.18	310.49	0.17
Reach 1	16787.38	50 YR	1866.5	230	233.83	232	233.88	0.003106	1.9	1050.21	352.91	0.19
Reach 1	16787.38	100 YR	2320.5	230	234.25	232	234.31	0.00319	2.09	1201.48	364.9	0.19
Reach 1	16287.4	10 YR	1034.9	228	231.64	229.5	231.67	0.001875	1.47	818.09	381.34	0.14
Reach 1	16287.4	50 YR	1866.5	228	232.57	229.96	232.62	0.002164	1.87	1277.63	551.7	0.16
Reach 1	16287.4	100 YR	2320.5	228	232.95	230.22	232.99	0.002284	2.03	1489.89	587.36	0.17
Reach 1	16144.15	10 YR	1034.9	228	231.41	229.3	231.43	0.001495	1.27	1000.02	539.04	0.13
Reach 1	16144.15	50 YR	1866.5	228	232.33	229.77	232.36	0.001597	1.57	1553.24	688.16	0.14
Reach 1	16144.15	100 YR	2320.5	228	232.69	229.99	232.72	0.00166	1.69	1809.47	726.05	0.14
Reach 1	16020.94		Bridge									
Reach 1	15897.73	10 YR	1034.9	228	231.11	229.07	231.13	0.001151	0.94	1114.23	497.3	0.11
Reach 1	15897.73	50 YR	1866.5	228	232	229.43	232.02	0.001259	1.22	1598.11	690.94	0.12
Reach 1	15897.73	100 YR	2320.5	228	232.34	229.6	232.37	0.001369	1.36	1841.05	728.81	0.13
Reach 1	15787.41	10 YR	1034.9	228	230.97	229.07	230.99	0.001411	1.15	1035.21	623.31	0.12
Reach 1	15787.41	50 YR	1866.5	228	231.84	229.48	231.87	0.001565	1.46	1469.09	656.16	0.14
Reach 1	15787.41	100 YR	2320.5	228	232.18	229.67	232.21	0.001468	1.5	1887.85	674.59	0.13
Reach 1	15287.43	10 YR	1034.9	227.2	230.02		230.05	0.002705	1.53	860.11	478.66	0.17
Reach 1	15287.43	50 YR	1866.5	227.2	230.85		230.89	0.002646	1.82	1269.53	506.65	0.17
Reach 1	15287.43	100 YR	2320.5	227.2	231.23		231.27	0.002616	1.94	1461.65	510.23	0.18
Reach 1	14537.45	10 YR	1034.9	224	228.56	226.61	228.57	0.001528	1.21	1149.74	662.3	0.13
Reach 1	14537.45	50 YR	1866.5	224	229.47	227.07	229.49	0.001405	1.4	1790.54	742.77	0.13
Reach 1	14537.45	100 YR	2320.5	224	229.87	227.27	229.9	0.00137	1.48	2100.11	779.23	0.13
Reach 1	14287.46	10 YR	1034.9	224	228.05	226	228.09	0.002556	1.9	749.9	370.76	0.17
Reach 1	14287.46	50 YR	1866.5	224	228.93	226.49	228.99	0.002999	2.37	1112.12	445.68	0.19
Reach 1	14287.46	100 YR	2320.5	224	229.33	226.78	229.4	0.003123	2.55	1297.32	481.79	0.2
Reach 1	14037.46	10 YR	1034.9	224	227.23	226.06	227.27	0.004332	2.02	740.3	491.6	0.21
Reach 1	14037.46	50 YR	1866.5	224	228.17	226.47	228.21	0.003207	2.11	1267.06	596.94	0.19
Reach 1	14037.46	100 YR	2320.5	224	228.61	226.63	228.65	0.002829	2.14	1535.89	625.04	0.19
Reach 1	13787.47	10 YR	1034.9	223.77	226.55	224.84	226.58	0.002029	1.33	915.52	472.64	0.15
Reach 1	13787.47	50 YR	1866.5	223.77	227.65	225.3	227.68	0.001617	1.5	1450.02	502.51	0.14
Reach 1	13787.47	100 YR	2320.5	223.77	228.13	225.52	228.16	0.001552	1.6	1694.38	530.54	0.14
Reach 1	13287.49	10 YR	1034.9	220	225.75		225.78	0.001278	1.5	742.44	300.82	0.13
Reach 1	13287.49	50 YR	1866.5	220	226.79		226.85	0.001718	2	1142.02	464.96	0.15
Reach 1	13287.49	100 YR	2320.5	220	227.26		227.33	0.001802	2.16	1378.99	533.88	0.16
Reach 1	12787.5	10 YR	1034.9	220	225.1		225.12	0.001421	1.54	1073.11	518.07	0.13
Reach 1	12787.5	50 YR	1866.5	220	226.06		226.09	0.001398	1.75	1572.61	527.78	0.13
Reach 1	12787.5	100 YR	2320.5	220	226.51		226.54	0.001431	1.87	1816.59	554.57	0.14
Reach 1	12287.52	10 YR	1034.9	220	224.07	222.06	224.11	0.003355	2.01	737.27	410.7	0.19
Reach 1	12287.52	50 YR	1866.5	220	225.14	222.82	225.18	0.002569	2.12	1187.86	424.66	0.18
Reach 1	12287.52	100 YR	2320.5	220	225.6	223.1	225.65	0.002451	2.22	1385.23	427.88	0.18
Reach 1	11787.53	10 YR	1034.9	218	222.99		223.03	0.00151	1.54	739.63	274.14	0.14
Reach 1	11787.53	50 YR	1866.5	218	223.97		224.03	0.002104	2.1	1030.16	323.26	0.17
Reach 1	11787.53	100 YR	2320.5	218	224.39		224.46	0.002317	2.33	1167.53	328.51	0.18
Reach 1	11537.54	10 YR	1034.9	218	222.69		222.71	0.001065	1.34	889.16	284.56	0.11
Reach 1	11537.54	50 YR	1866.5	218	223.49		223.53	0.001818	1.96	1168.95	461.18	0.15
Reach 1	11537.54	100 YR	2320.5	218	223.84		223.9	0.002107	2.21	1348.89	546.91	0.17
Reach 1	11287.55	10 YR	1034.9	218	222.36	220.5	222.39	0.001849	1.45	786.08	359.44	0.14
Reach 1	11287.55	50 YR	1866.5	218	222.91	221.32	222.97	0.003405	2.19	946.48	433.73	0.2
Reach 1	11287.55	100 YR	2320.5	218	223.15	221.7	223.23	0.004199	2.54	1021.7	486.39	0.22

Reach 1	9182.919	10 YR	1034.9	214	218.26	215.86	218.28	0.002102	1.48	1107.48	1108.65	0.15
Reach 1	9182.919	50 YR	1866.5	214	219.23	216.83	219.24	0.001098	1.29	2214.18	1171.5	0.11
Reach 1	9182.919	100 YR	2320.5	214	219.67	217.17	219.68	0.000916	1.27	2735.53	1198.93	0.11
Reach 1	8932.927	10 YR	1034.9	210	217.93	214.03	217.95	0.000929	1.17	1500.58	1236.53	0.1
Reach 1	8932.927	50 YR	1866.5	210	219.06	214.97	219.07	0.000497	1.01	2971.71	1333.47	0.08
Reach 1	8932.927	100 YR	2320.5	210	219.52	215.4	219.53	0.000438	1.01	3594.18	1354.38	0.08
Reach 1	8682.935	10 YR	1034.9	210	217.59	212.93	217.63	0.001774	1.59	660.8	252.5	0.14
Reach 1	8682.935	50 YR	1866.5	210	218.79	213.97	218.85	0.001827	1.93	1176.28	482.92	0.15
Reach 1	8682.935	100 YR	2320.5	210	219.27	214.36	219.33	0.001835	2.06	1409.71	576.64	0.16
Reach 1	8432.942	10 YR	1034.9	210	217.1	214.34	217.14	0.00221	1.98	757.01	394.13	0.17
Reach 1	8432.942	50 YR	1866.5	210	218.36	215.46	218.4	0.001826	2.13	1319.17	532.11	0.16
Reach 1	8432.942	100 YR	2320.5	210	218.84	215.91	218.89	0.0018	2.23	1566.03	612.37	0.16
Reach 1	8182.949	10 YR	1034.9	210	216.63		216.67	0.001597	1.5	703.07	233.76	0.14
Reach 1	8182.949	50 YR	1866.5	210	217.88		217.94	0.001842	1.95	1071.94	469.69	0.15
Reach 1	8182.949	100 YR	2320.5	210	218.35		218.42	0.001909	2.11	1331.94	574.05	0.16
Reach 1	7932.957	10 YR	1034.9	210	216.2		216.24	0.001805	1.59	653.6	203.64	0.14
Reach 1	7932.957	50 YR	1866.5	210	217.38		217.44	0.002164	2.09	1022.77	458.59	0.17
Reach 1	7932.957	100 YR	2320.5	210	217.82		217.9	0.002282	2.27	1253.02	564.58	0.17
Reach 1	7682.964	10 YR	1034.9	208	215.61	211.66	215.68	0.002917	2.03	510.17	378.73	0.18
Reach 1	7682.964	50 YR	1866.5	208	216.95	213.08	216.99	0.001477	1.75	1341.39	418.8	0.14
Reach 1	7682.964	100 YR	2320.5	208	217.37	213.54	217.41	0.001607	1.92	1519.48	434.47	0.15
Reach 1	7432.972	10 YR	1034.9	208	215.29	211.29	215.31	0.000842	1.39	1011.25	447.65	0.11
Reach 1	7432.972	50 YR	1866.5	208	216.67	212.84	216.7	0.00093	1.7	1487.39	584.09	0.11
Reach 1	7432.972	100 YR	2320.5	208	217.03	213.18	217.07	0.001151	1.96	1631.73	679.18	0.13
Reach 1	6932.987	10 YR	1034.9	208	214.95	210.87	214.97	0.000591	1.2	1261.91	522.39	0.09
Reach 1	6932.987	50 YR	1866.5	208	216.32	211.8	216.34	0.000593	1.39	1917.67	603.56	0.09
Reach 1	6932.987	100 YR	2320.5	208	216.6	212.35	216.63	0.000757	1.61	2059.65	651.49	0.11
Reach 1	6433.002	10 YR	1550	207.93	213.92	212.48	214.02	0.009138	3.16	728.92	784.75	0.32
Reach 1	6433.002	50 YR	2801	207.93	215.66	213.26	215.7	0.002992	1.72	1762.34	920.51	0.18
Reach 1	6433.002	100 YR	3486	207.93	216.28	213.26	216.29	0.000657	0.85	3632.38	968.65	0.08
Reach 1	6366.862	10 YR	1550	204	213.74	209.96	213.77	0.00152	1.73	1080.67	291.14	0.14
Reach 1	6366.862	50 YR	2801	204	215.48	210.75	215.53	0.001908	1.52	1653.96	405.05	0.15
Reach 1	6366.862	100 YR	3486	204	216.16	211.08	216.21	0.002018	1.48	1954.84	482.25	0.15
Reach 1	6274.936		Bridge									
Reach 1	6183.009	10 YR	1550	204	213.33	210.66	213.38	0.002702	2.24	942.98	375.27	0.18
Reach 1	6183.009	50 YR	2801	204	215.14	212.12	215.18	0.001685	2.2	1702.48	442.03	0.15
Reach 1	6183.009	100 YR	3486	204	215.8	212.3	215.85	0.001622	2.3	1999.6	451.2	0.15
Reach 1	6095.752	10 YR	1550	204	213.21		213.24	0.000951	1.71	1361.56	489.72	0.11
Reach 1	6095.752	50 YR	2801	204	215.05		215.08	0.000775	1.81	2343.65	557.87	0.11
Reach 1	6095.752	100 YR	3486	204	215.72		215.75	0.000781	1.91	2716.95	563.36	0.11
Reach 1	5933.017	10 YR	1550	204.3	213.13		213.14	0.00036	1.11	1957.79	445.61	0.07
Reach 1	5933.017	50 YR	2801	204.3	214.96		214.98	0.000403	1.36	2834.83	494.54	0.08
Reach 1	5933.017	100 YR	3486	204.3	215.62		215.64	0.000452	1.51	3163.16	505.73	0.09
Reach 1	5433.032	10 YR	1550	204	212.77	208.53	212.82	0.001584	2.51	921.8	217.21	0.15
Reach 1	5433.032	50 YR	2801	204	214.52	209.46	214.6	0.002123	3.3	1413.82	408.6	0.18
Reach 1	5433.032	100 YR	3486	204	215.14	209.88	215.23	0.002206	3.5	1618.25	419.23	0.19
Reach 1	5183.04	10 YR	1550	204	212.35		212.41	0.001779	2.31	981.31	301.87	0.16
Reach 1	5183.04	50 YR	2801	204	214.04		214.11	0.001847	2.73	1577.41	403.7	0.17
Reach 1	5183.04	100 YR	3486	204	214.65		214.73	0.001878	2.89	1823.67	408.66	0.17
Reach 1	4933.047	10 YR	1550	204	211.9		211.96	0.002099	2.59	866.86	215.8	0.17

Reach 1	4933.047	50 YR	2801	204	213.51		213.6	0.002724	3.39	1294.92	319.22	0.2
Reach 1	4933.047	100 YR	3486	204	214.08		214.18	0.003026	3.73	1487.6	354.71	0.22
Reach 1	4433.062	10 YR	1550	204	210.3		210.43	0.0055	3.62	640.55	244.55	0.27
Reach 1	4433.062	50 YR	2801	204	211.3		211.52	0.008258	4.94	948.78	374.72	0.34
Reach 1	4433.062	100 YR	3486	204	211.76		211.98	0.008027	5.1	1123.42	380.9	0.34
Reach 1	4183.069	10 YR	1550	204	209.56	207.46	209.58	0.002182	1.36	1317.67	695.95	0.15
Reach 1	4183.069	50 YR	2801	204	210.55	208.15	210.58	0.001937	1.6	2042.19	743.79	0.15
Reach 1	4183.069	100 YR	3486	204	211.1	208.34	211.14	0.00168	1.64	2454.81	750.05	0.14
Reach 1	3933.077	10 YR	1550	202	209.09	205.66	209.12	0.001664	1.51	1364.41	670.18	0.14
Reach 1	3933.077	50 YR	2801	202	210.11	207.19	210.15	0.001647	1.77	2074.36	714.19	0.14
Reach 1	3933.077	100 YR	3486	202	210.73	207.41	210.76	0.001424	1.79	2515.42	723.91	0.14
Reach 1	3433.092	10 YR	1550	202	205.59	205.59	206.54	0.074541	8.05	214.79	126.71	0.88
Reach 1	3433.092	50 YR	2801	202	208	206.72	208.34	0.014308	5.46	729.05	316.33	0.43
Reach 1	3433.092	100 YR	3486	202	209.3	207.16	209.48	0.006428	4.27	1236.38	446.74	0.3

APPENDIX D
HEC-RAS DATA OUTPUT
UNNAMED TRIBUTARY TO TRIBUTARY NO. 5 TO
MILL CREEK (DA 5)

HEC-RAS PLAN: EXISTING			RIVER: UNNAMED TRIB TO MILL CREEK (DA 5)					REACH: 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	1000	10 yr	62	181.22	182.64		182.91	0.017799	4.19	14.8	18.8	0.83
1	1000	50 yr	94	181.22	182.97		183.26	0.015274	4.36	21.56	22.98	0.79
1	1000	100 yr	110	181.22	183.11		183.41	0.014369	4.42	24.89	24.85	0.78
1	900	10 yr	62	180.48	182.24		182.31	0.002609	2.02	30.77	27.81	0.34
1	900	50 yr	94	180.48	182.57		182.65	0.002767	2.33	40.26	30.42	0.36
1	900	100 yr	110	180.48	182.71		182.8	0.002842	2.47	44.54	31.53	0.37
1	820	10 yr	62	180.28	181.39	181.39	181.74	0.027324	4.74	13.07	19.06	1.01
1	820	50 yr	94	180.28	181.63	181.63	182.05	0.025744	5.18	18.14	22.15	1.01
1	820	100 yr	110	180.28	181.74	181.74	182.18	0.025258	5.36	20.53	23.49	1.01
1	460	10 yr	62	174.07	174.61		174.62	0.004628	1.09	57	201.85	0.36
1	460	50 yr	94	174.07	174.7		174.72	0.004609	1.24	75.62	218.48	0.37
1	460	100 yr	110	174.07	174.73		174.76	0.004653	1.31	83.98	225.96	0.38
1	380	10 yr	62	173.16	173.68	173.68	173.78	0.040339	2.53	24.53	124.39	1
1	380	50 yr	94	173.16	173.75	173.75	173.87	0.038332	2.83	33.24	137.09	1.01
1	380	100 yr	110	173.16	173.78	173.78	173.91	0.036408	2.91	37.74	143.13	1
1	280	10 yr	62	172.19	173.33	172.79	173.34	0.000921	0.67	92.88	203.81	0.17
1	280	50 yr	94	172.19	173.49	172.9	173.5	0.000921	0.73	129.18	249.1	0.18
1	280	100 yr	110	172.19	173.56	172.93	173.57	0.00092	0.75	147.09	272.01	0.18

HEC-RAS PLAN: PROPOSED			RIVER: UNNAMED TRIB TO MILL CREEK (DA 5)					REACH: 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	1000	10 yr	67	181.22	182.7		182.98	0.01706	4.2	15.95	19.53	0.82
1	1000	25 yr	86	181.22	182.89		183.18	0.015816	4.33	19.86	21.97	0.8
1	1000	50 yr	101	181.22	183.02		183.33	0.015007	4.4	22.93	23.77	0.79
1	900	10 yr	67	180.48	182.26		182.33	0.002923	2.15	31.21	27.94	0.36
1	900	25 yr	86	180.48	182.45		182.54	0.00302	2.34	36.69	29.47	0.37
1	900	50 yr	101	180.48	182.58		182.68	0.003104	2.48	40.67	30.53	0.38
1	820	10 yr	67	180.28	181.56	181.43	181.82	0.016493	4.02	16.65	21.29	0.8
1	820	25 yr	86	180.28	181.72	181.58	182	0.016288	4.27	20.12	23.27	0.81
1	820	50 yr	101	180.28	181.83	181.68	182.14	0.015994	4.42	22.83	24.72	0.81
1	620		Bridge									
1	460	10 yr	67	174.07	176.35	176.33	176.51	0.029059	3.2	20.93	413.57	0.94
1	460	25 yr	86	174.07	176.41	176.4	176.6	0.028752	3.49	24.64	426.76	0.96
1	460	50 yr	101	174.07	176.45	176.45	176.67	0.031053	3.79	26.68	434.36	1.01
1	380	10 yr	67	173.16	173.7	173.7	173.8	0.039132	2.55	26.22	127.89	0.99
1	380	25 yr	86	173.16	173.73	173.73	173.85	0.040627	2.79	30.81	135.29	1.03
1	380	50 yr	101	173.16	173.76	173.76	173.89	0.036988	2.85	35.46	140.84	1
1	280	10 yr	67	172.19	173.36	172.8	173.37	0.000921	0.67	99.43	215.04	0.17
1	280	25 yr	86	172.19	173.45	172.88	173.46	0.000921	0.71	120.52	239.24	0.18
1	280	50 yr	101	172.19	173.52	172.92	173.53	0.000921	0.73	137.53	261.54	0.18

APPENDIX D
HEC-RAS DATA OUTPUT
UNNAMED TRIBUTARY TO TRIBUTARY NO. 5 TO
MILL CREEK (DA 30)

HEC-RAS PLAN: EXISTING				RIVER: UNNAMED TRIB TO MILL CREEK (DA 30)				REACH: 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	1000	10 yr	58	284.74	286.88		286.99	0.004053	2.68	21.61	17.19	0.42
1	1000	25 yr	77	284.74	287.12		287.26	0.004321	2.97	25.94	18.57	0.44
1	1000	50 yr	90	284.74	287.27		287.42	0.00447	3.14	28.67	19.34	0.45
1	1000	100 yr	107	284.74	287.43		287.6	0.004697	3.35	31.93	20.21	0.47
1	900	10 yr	58	284.26	285.73	285.73	286.13	0.026901	5.02	11.55	15.15	1.01
1	900	25 yr	77	284.26	285.91	285.91	286.36	0.025855	5.33	14.45	16.82	1.01
1	900	50 yr	90	284.26	286.02	286.02	286.5	0.025591	5.53	16.28	17.8	1.02
1	900	100 yr	107	284.26	286.17	286.17	286.66	0.024693	5.63	19.01	19.71	1.01
1	820	10 yr	58	282.33	283.94		284.01	0.004869	2.15	27.04	35.41	0.43
1	820	25 yr	77	282.33	284.15		284.23	0.004419	2.18	35.29	41.89	0.42
1	820	50 yr	90	282.33	284.29		284.36	0.004172	2.18	41.34	47.17	0.41
1	820	100 yr	107	282.33	284.44		284.52	0.003896	2.18	49.07	53.07	0.4
1	460	10 yr	58	279.68	281.78	281.27	281.94	0.006747	3.2	18.12	16.18	0.53
1	460	25 yr	77	279.68	281.99	281.49	282.18	0.007312	3.54	21.72	17.68	0.56
1	460	50 yr	90	279.68	282.12	281.6	282.33	0.007651	3.75	24	18.57	0.58
1	460	100 yr	107	279.68	282.27	281.75	282.51	0.008094	3.97	26.92	19.93	0.6
1	380	10 yr	58	279.62	280.58	280.58	280.92	0.027374	4.66	12.45	18.65	1
1	380	25 yr	77	279.62	280.74	280.74	281.12	0.026131	4.98	15.45	20.17	1
1	380	50 yr	90	279.62	280.83	280.83	281.25	0.025714	5.19	17.35	21.08	1.01
1	380	100 yr	107	279.62	280.94	280.94	281.39	0.025097	5.4	19.8	22.19	1.01
1	280	10 yr	58	277.96	280.29	279.3	280.3	0.00092	1.02	56.82	65.18	0.19
1	280	25 yr	77	277.96	280.47	279.45	280.49	0.00092	1.12	69.05	69.34	0.2
1	280	50 yr	90	277.96	280.58	279.54	280.6	0.000919	1.17	76.95	71.84	0.2
1	280	100 yr	107	277.96	280.71	279.64	280.74	0.000922	1.23	86.75	74.93	0.2

HEC-RAS PLAN: PROPOSED				RIVER: UNNAMED TRIB TO MILL CREEK (DA 30)				REACH: 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	1000	10 yr	62	284.74	286.94		287.05	0.004099	2.74	22.6	17.55	0.43
1	1000	25 yr	82	284.74	287.18		287.32	0.004373	3.03	27.02	18.88	0.45
1	1000	50 yr	95	284.74	287.31		287.47	0.004562	3.21	29.6	19.59	0.46
1	1000	100 yr	114	284.74	287.49		287.68	0.004789	3.43	33.19	20.54	0.48
1	900	10 yr	62	284.26	285.77	285.77	286.18	0.026624	5.09	12.18	15.53	1.01
1	900	25 yr	82	284.26	285.96	285.96	286.41	0.025771	5.41	15.16	17.21	1.02
1	900	50 yr	95	284.26	286.07	286.07	286.55	0.024845	5.54	17.13	18.24	1.01
1	900	100 yr	114	284.26	286.22	286.22	286.72	0.024601	5.67	20.11	20.57	1.01
1	820	10 yr	62	282.33	283.99	283.55	284.06	0.004752	2.15	28.82	36.9	0.43
1	820	25 yr	82	282.33	284.24	283.67	284.31	0.003978	2.11	38.92	45.02	0.4
1	820	50 yr	95	282.33	284.33	283.74	284.4	0.004188	2.2	43.23	48.79	0.41
1	820	100 yr	114	282.33	284.44	283.83	284.52	0.004457	2.33	48.92	52.97	0.43
1	810		Bridge									
1	460	10 yr	62	279.68	281.83	281.32	281.99	0.006857	3.28	18.93	16.53	0.54
1	460	25 yr	82	279.68	282.04	281.53	282.24	0.007447	3.63	22.61	18.03	0.57
1	460	50 yr	95	279.68	282.16	281.65	282.39	0.007771	3.82	24.87	18.95	0.59
1	460	100 yr	114	279.68	282.47	281.81	282.66	0.009075	3.5	32.59	32.29	0.61
1	380	10 yr	62	279.62	280.61	280.61	280.96	0.027333	4.75	13.05	18.97	1.01
1	380	25 yr	82	279.62	280.77	280.77	281.17	0.02595	5.06	16.19	20.53	1.01
1	380	50 yr	95	279.62	280.86	280.86	281.29	0.025565	5.26	18.07	21.41	1.01
1	380	100 yr	114	279.62	280.99	280.99	281.45	0.024798	5.48	20.81	22.64	1.01
1	280	10 yr	62	277.96	280.33	279.33	280.35	0.00092	1.04	59.52	66.2	0.19
1	280	25 yr	82	277.96	280.51	279.49	280.53	0.00092	1.14	72.12	70.32	0.2
1	280	50 yr	95	277.96	280.62	279.57	280.64	0.000922	1.19	79.81	72.72	0.2
1	280	100 yr	114	277.96	280.77	279.67	280.79	0.000921	1.26	90.8	76.3	0.2

Appendix E – Culvert Program Output

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA2

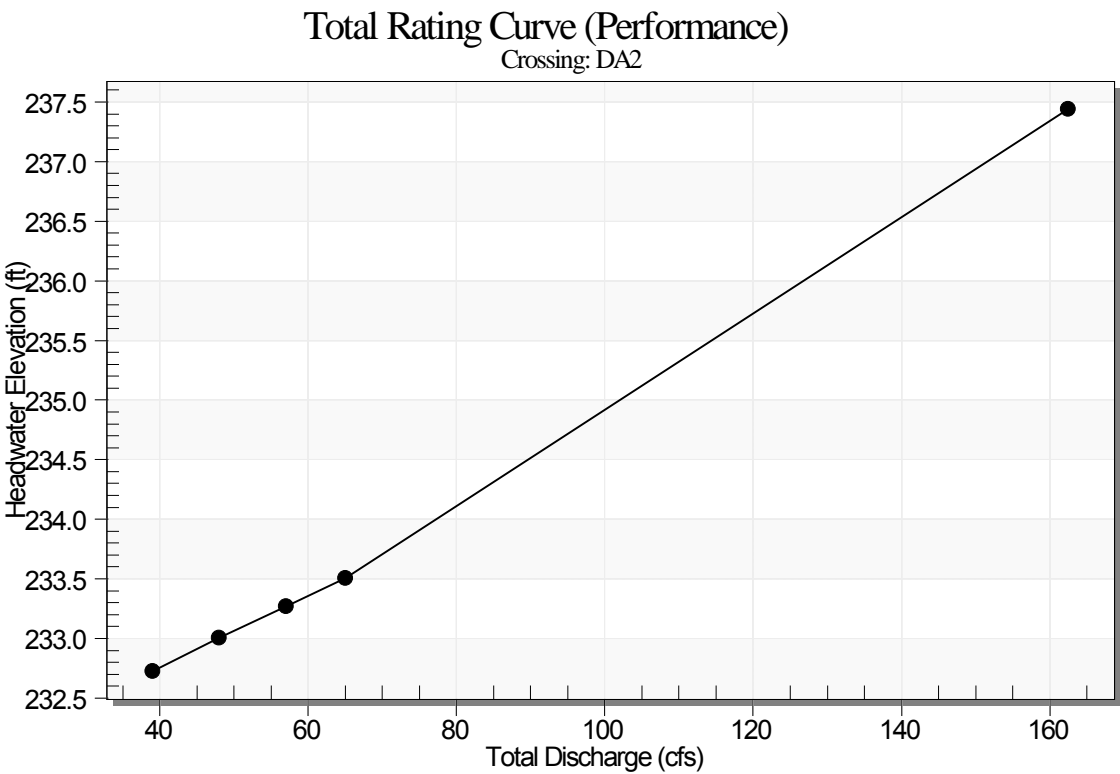
Crossing Discharge Data

Discharge Selection Method: Recurrence

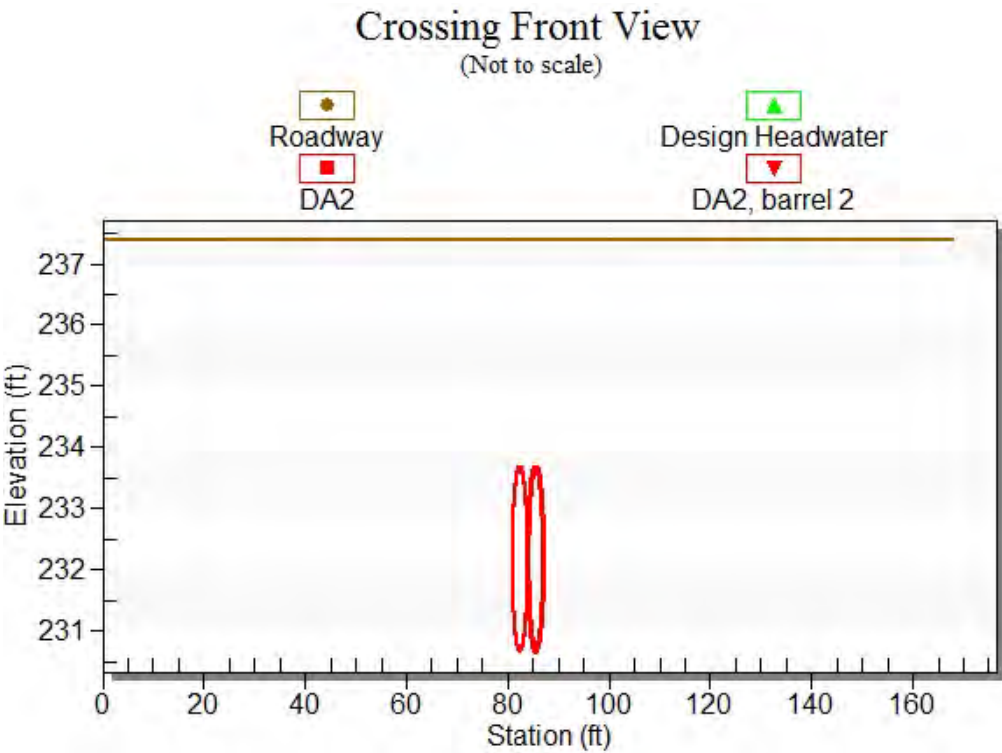
Table 1 - Summary of Culvert Flows at Crossing: DA2

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA2 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
232.73	10 year	39.00	39.00	0.00	1
233.01	25 year	48.00	48.00	0.00	1
233.27	50 year	57.00	57.00	0.00	1
233.50	100 year	65.00	65.00	0.00	1
237.38	Overtopping	154.34	154.34	0.00	Overtopping

Rating Curve Plot for Crossing: DA2



Crossing Front View (Roadway Profile): DA2



Culvert Notes: DA2

Table 2 - Culvert Summary Table: DA2

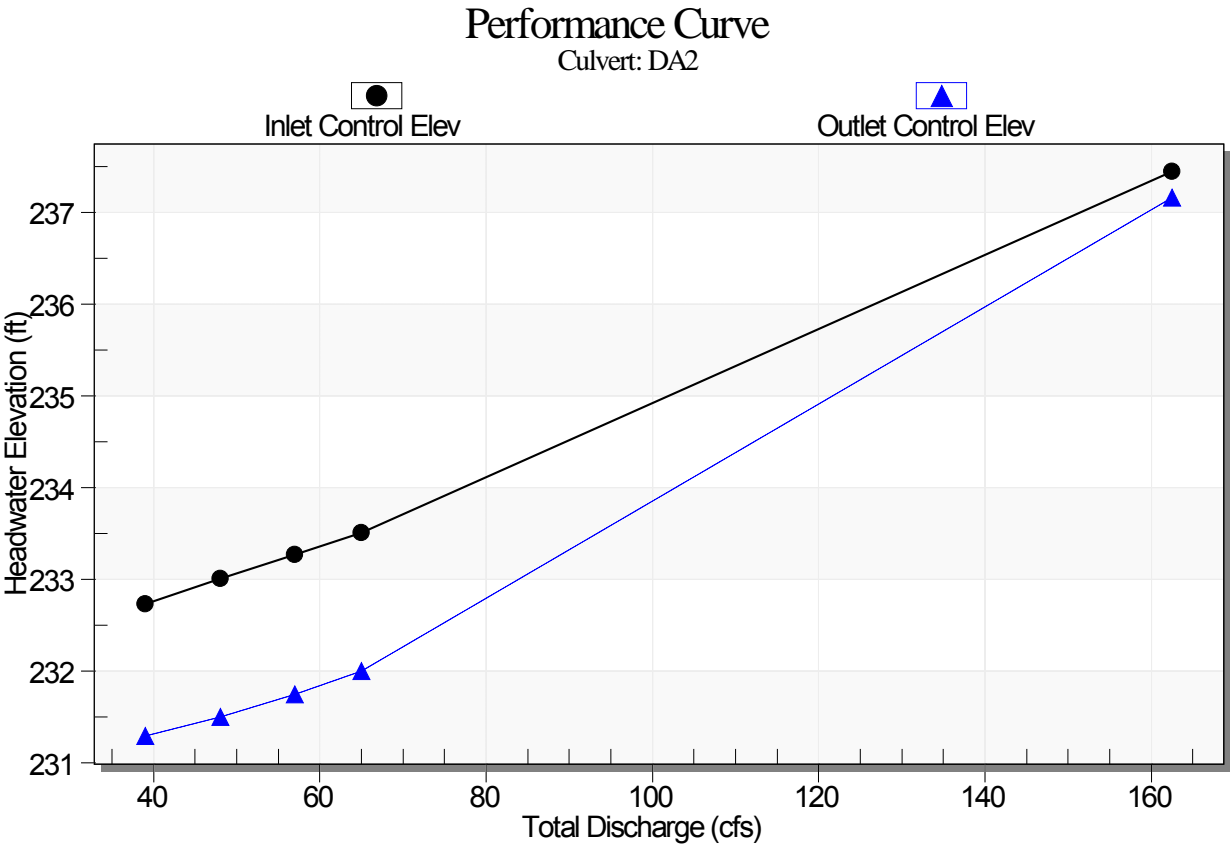
Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	39.00	39.00	232.73	2.057	0.624	1-JS1f	1.081	1.417	3.000	3.000	2.937	0.000
25 year	48.00	48.00	233.01	2.336	0.828	1-JS1f	1.209	1.577	3.000	3.000	3.615	0.000
50 year	57.00	57.00	233.27	2.601	1.073	1-JS1f	1.337	1.724	3.000	3.000	4.293	0.000
100 year	65.00	65.00	233.50	2.833	1.326	1-JS1f	1.439	1.847	3.000	3.000	4.895	0.000

Straight Culvert

Inlet Elevation (invert): 230.67 ft, Outlet Elevation (invert): 227.90 ft

Culvert Length: 300.01 ft, Culvert Slope: 0.0092

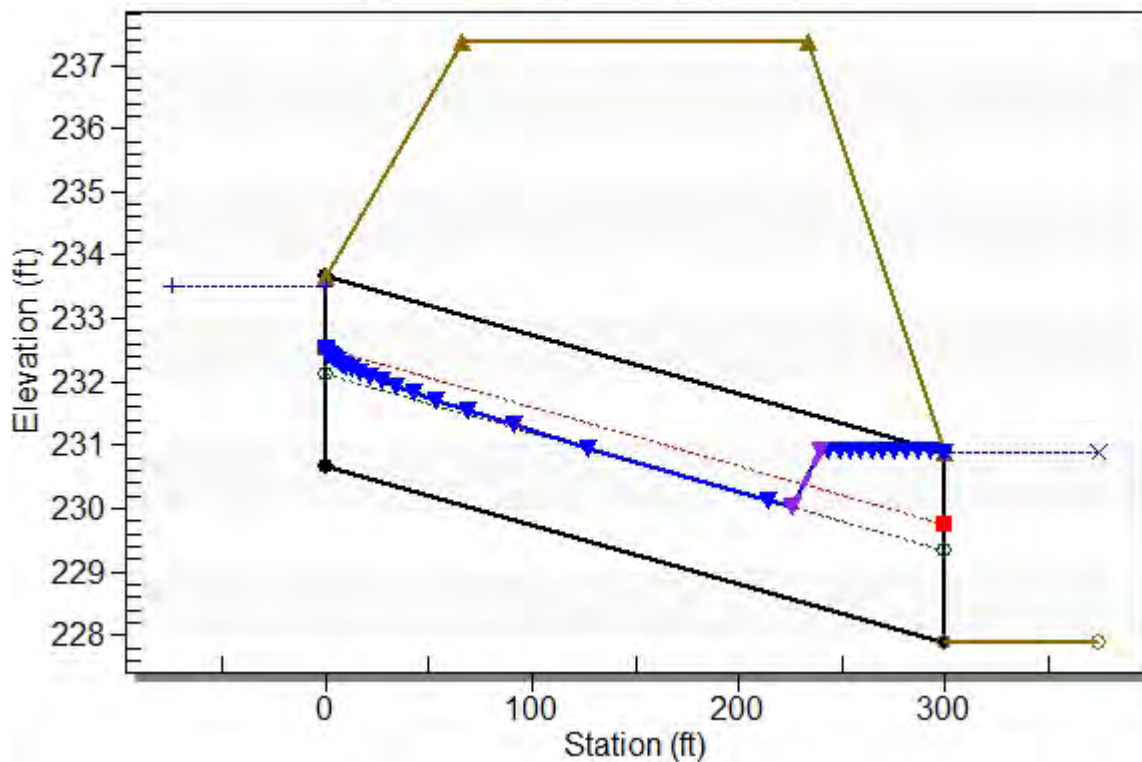
Culvert Performance Curve Plot: DA2



Water Surface Profile Plot for Culvert: DA2

Crossing - DA2, Design Discharge - 65.0 cfs

Culvert - DA2, Culvert Discharge - 65.0 cfs



Site Data - DA2

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 230.67 ft

Outlet Station: 300.00 ft

Outlet Elevation: 227.90 ft

Number of Barrels: 2

Culvert Data Summary - DA2

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: DA2)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
39.00	230.90	3.00
48.00	230.90	3.00
57.00	230.90	3.00
65.00	230.90	3.00

Tailwater Channel Data - DA2

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 230.90 ft

Roadway Data for Crossing: DA2

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	237.38
1	84.00	237.38
2	168.00	237.38

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA3

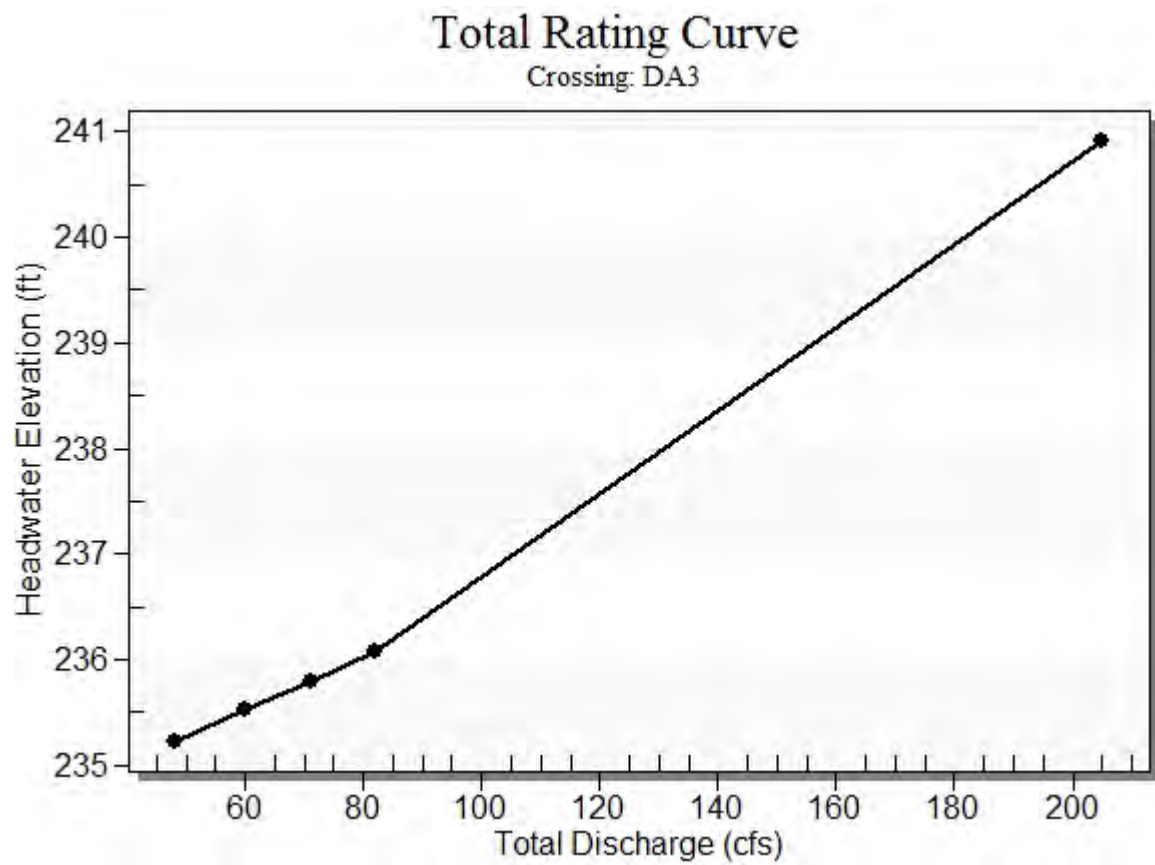
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: DA3

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA3 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
235.23	10 year	48.00	48.00	0.00	1
235.53	25 year	60.00	60.00	0.00	1
235.80	50 year	71.00	71.00	0.00	1
236.08	100 year	82.00	82.00	0.00	1
240.82	Overtopping	188.43	188.43	0.00	Overtopping

Rating Curve Plot for Crossing: DA3



Culvert Notes: DA3

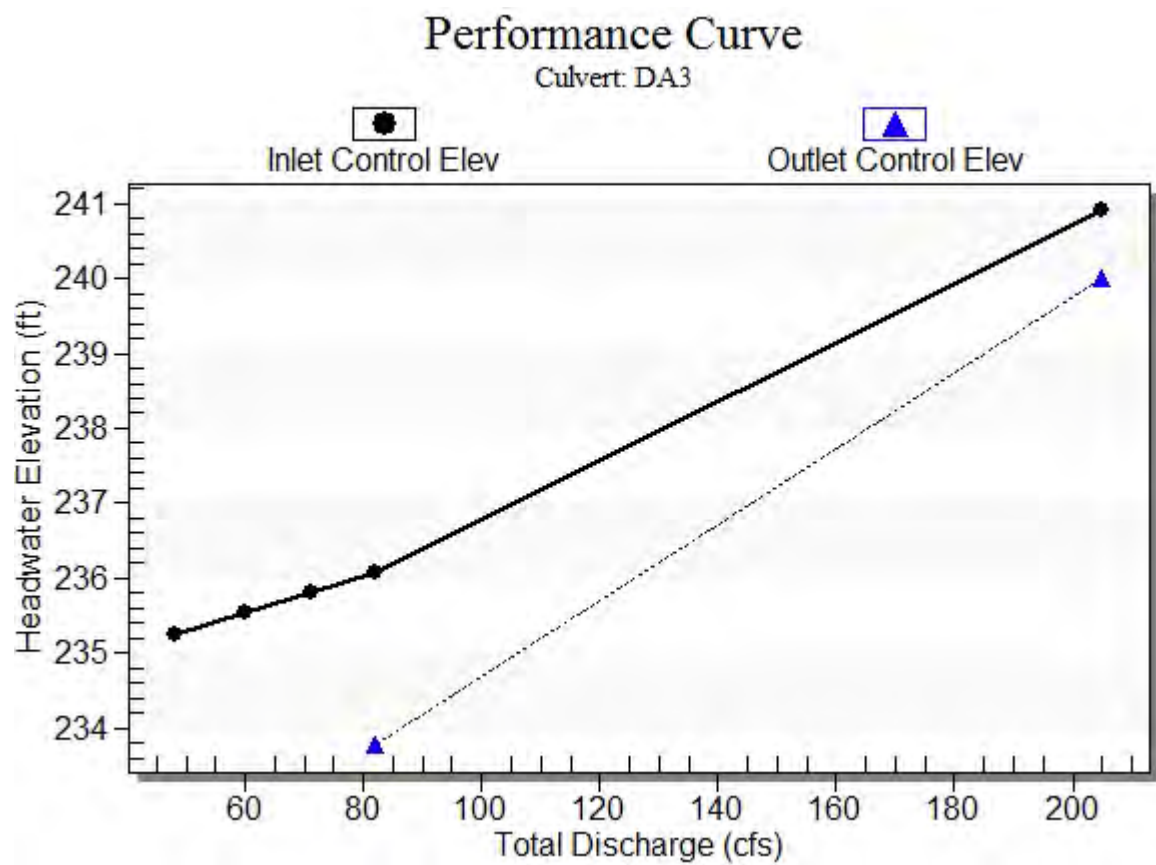
Table 2 - Culvert Summary Table: DA3

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	48.00	48.00	235.23	1.745	0.0*	1-JS1f	0.702	1.038	2.000	2.000	3.000	0.000
25 year	60.00	60.00	235.53	2.036	0.0*	5-JS1f	0.816	1.204	2.000	2.000	3.750	0.000
50 year	71.00	71.00	235.80	2.307	0.0*	5-JS1f	0.917	1.347	2.000	2.000	4.438	0.000
100 year	82.00	82.00	236.08	2.594	0.280	5-S2n	1.012	1.483	1.012	2.000	10.127	0.000

* Full Flow Headwater elevation is below inlet invert.

Straight Culvert
Inlet Elevation (invert): 233.49 ft, Outlet Elevation (invert): 230.34 ft
Culvert Length: 280.02 ft, Culvert Slope: 0.0113

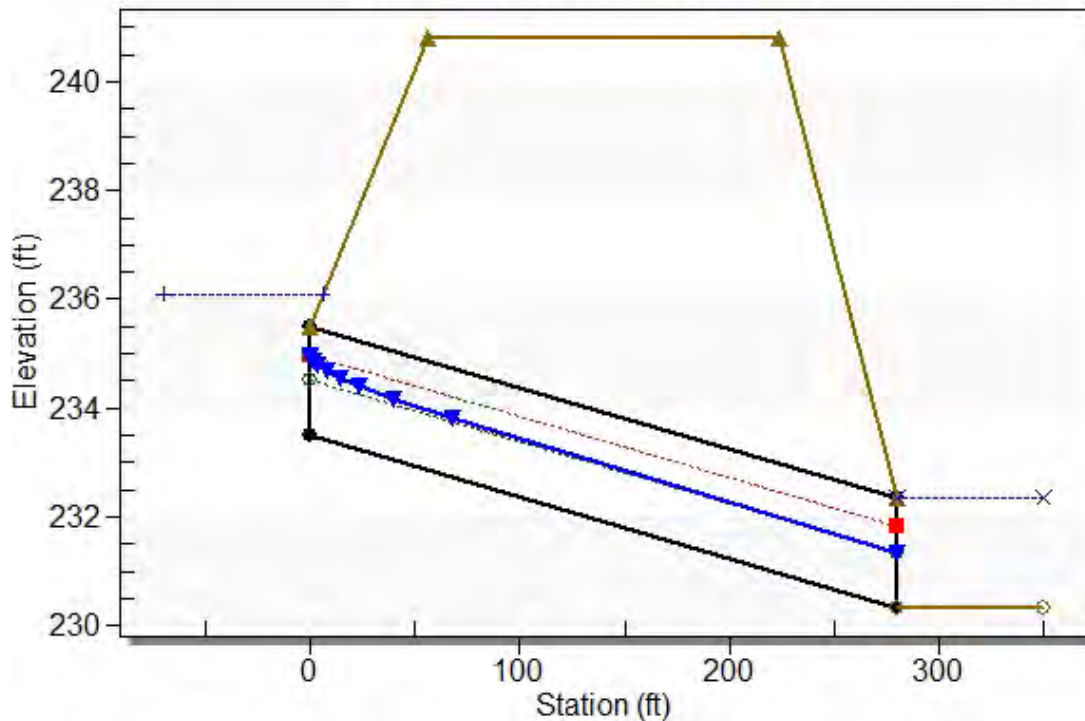
Culvert Performance Curve Plot: DA3



Water Surface Profile Plot for Culvert: DA3

Crossing - DA3, Design Discharge - 82.0 cfs

Culvert - DA3, Culvert Discharge - 82.0 cfs



Site Data - DA3

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 233.49 ft

Outlet Station: 280.00 ft

Outlet Elevation: 230.34 ft

Number of Barrels: 2

Culvert Data Summary - DA3

Barrel Shape: Concrete Box

Barrel Span: 4.00 ft

Barrel Rise: 2.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90°) Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: DA3)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
48.00	232.34	2.00
60.00	232.34	2.00
71.00	232.34	2.00
82.00	232.34	2.00

Tailwater Channel Data - DA3

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 232.34 ft

Roadway Data for Crossing: DA3

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	240.82
1	84.00	240.82
2	168.00	240.82

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA4

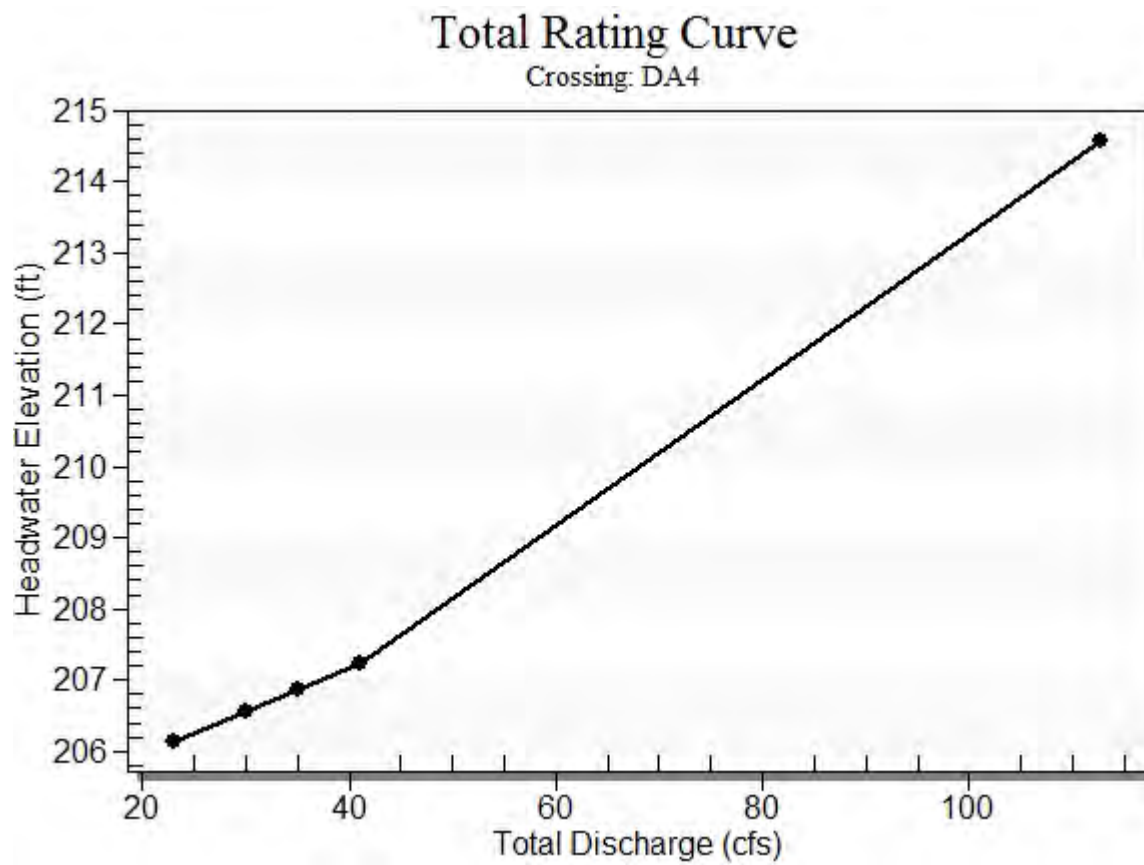
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: DA4

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA4 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
206.15	10 year	23.00	23.00	0.00	1
206.56	25 year	30.00	30.00	0.00	1
206.85	50 year	35.00	35.00	0.00	1
207.23	100 year	41.00	41.00	0.00	1
214.52	Overtopping	103.69	103.69	0.00	Overtopping

Rating Curve Plot for Crossing: DA4



Culvert Notes: DA4

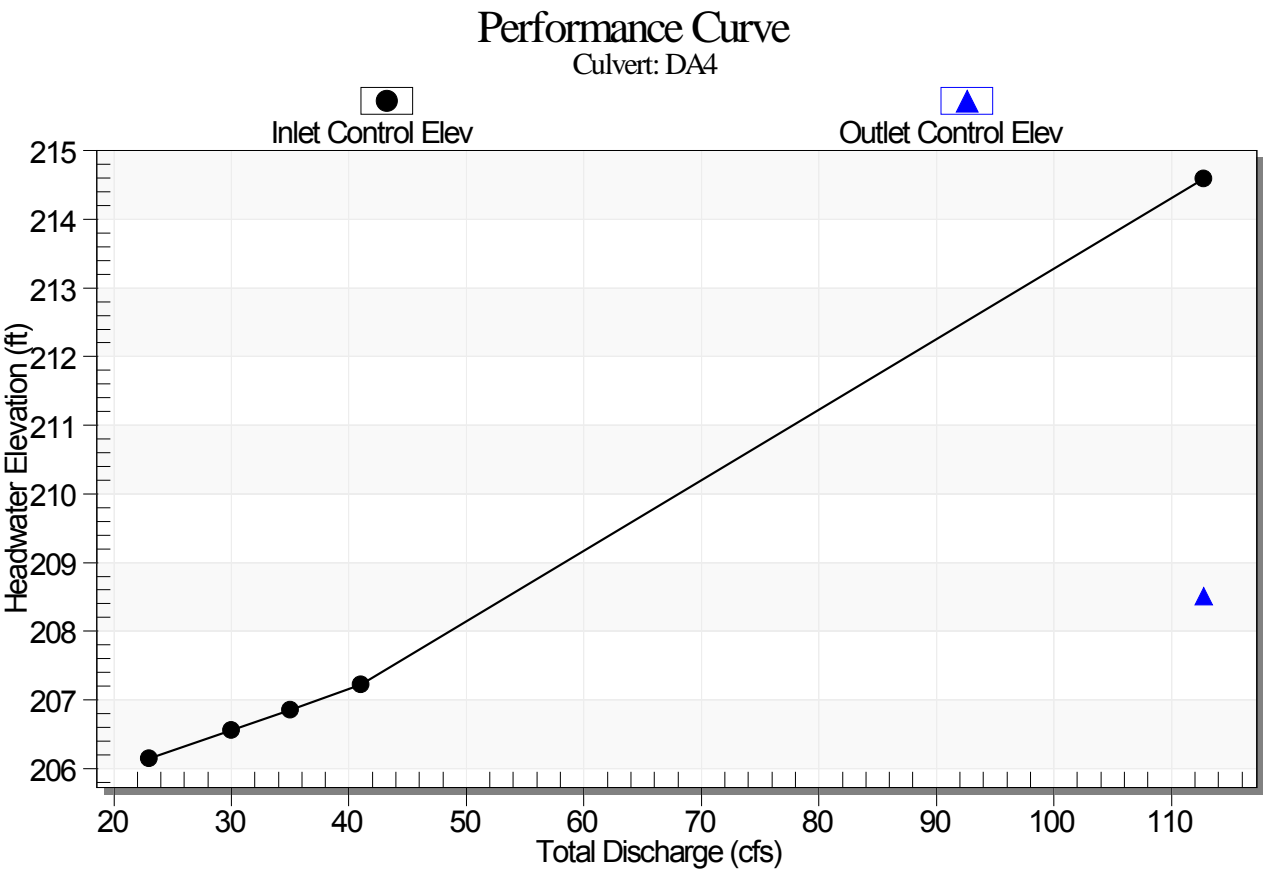
Table 2 - Culvert Summary Table: DA4

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	23.00	23.00	206.15	2.250	0.0*	1-JS1f	0.884	1.543	3.000	3.000	3.464	0.000
25 year	30.00	30.00	206.56	2.661	0.0*	1-S2n	1.027	1.769	1.027	3.000	14.054	0.000
50 year	35.00	35.00	206.85	2.954	0.0*	1-S2n	1.111	1.919	1.111	3.000	14.670	0.000
100 year	41.00	41.00	207.23	3.326	0.0*	5-S2n	1.211	2.083	1.211	3.000	15.301	0.000

* Full Flow Headwater elevation is below inlet invert.

Straight Culvert
Inlet Elevation (invert): 203.90 ft, Outlet Elevation (invert): 188.91 ft
Culvert Length: 560.20 ft, Culvert Slope: 0.0268

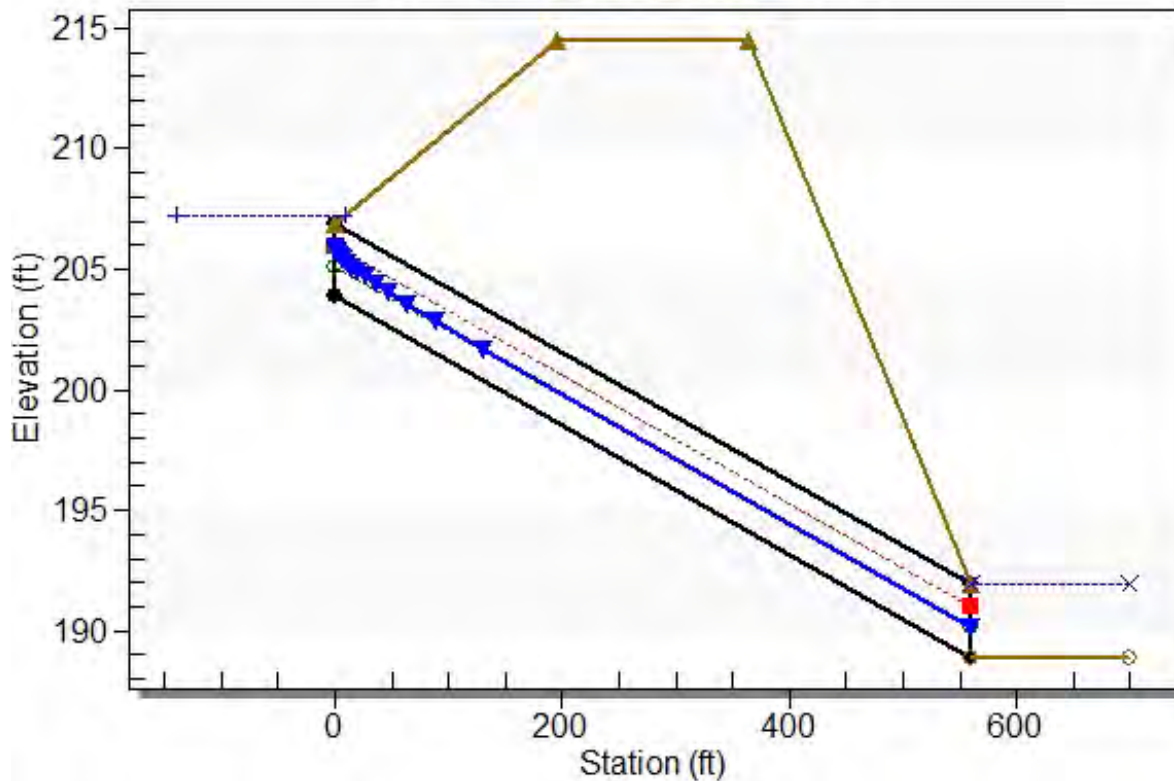
Culvert Performance Curve Plot: DA4



Water Surface Profile Plot for Culvert: DA4

Crossing - DA4, Design Discharge - 41.0 cfs

Culvert - DA4, Culvert Discharge - 41.0 cfs



Site Data - DA4

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 203.90 ft

Outlet Station: 560.00 ft

Outlet Elevation: 188.91 ft

Number of Barrels: 1

Culvert Data Summary - DA4

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: DA4)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
23.00	191.91	3.00
30.00	191.91	3.00
35.00	191.91	3.00
41.00	191.91	3.00

Tailwater Channel Data - DA4

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 191.91 ft

Roadway Data for Crossing: DA4

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	214.52
1	84.00	214.52
2	168.00	214.52

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA6

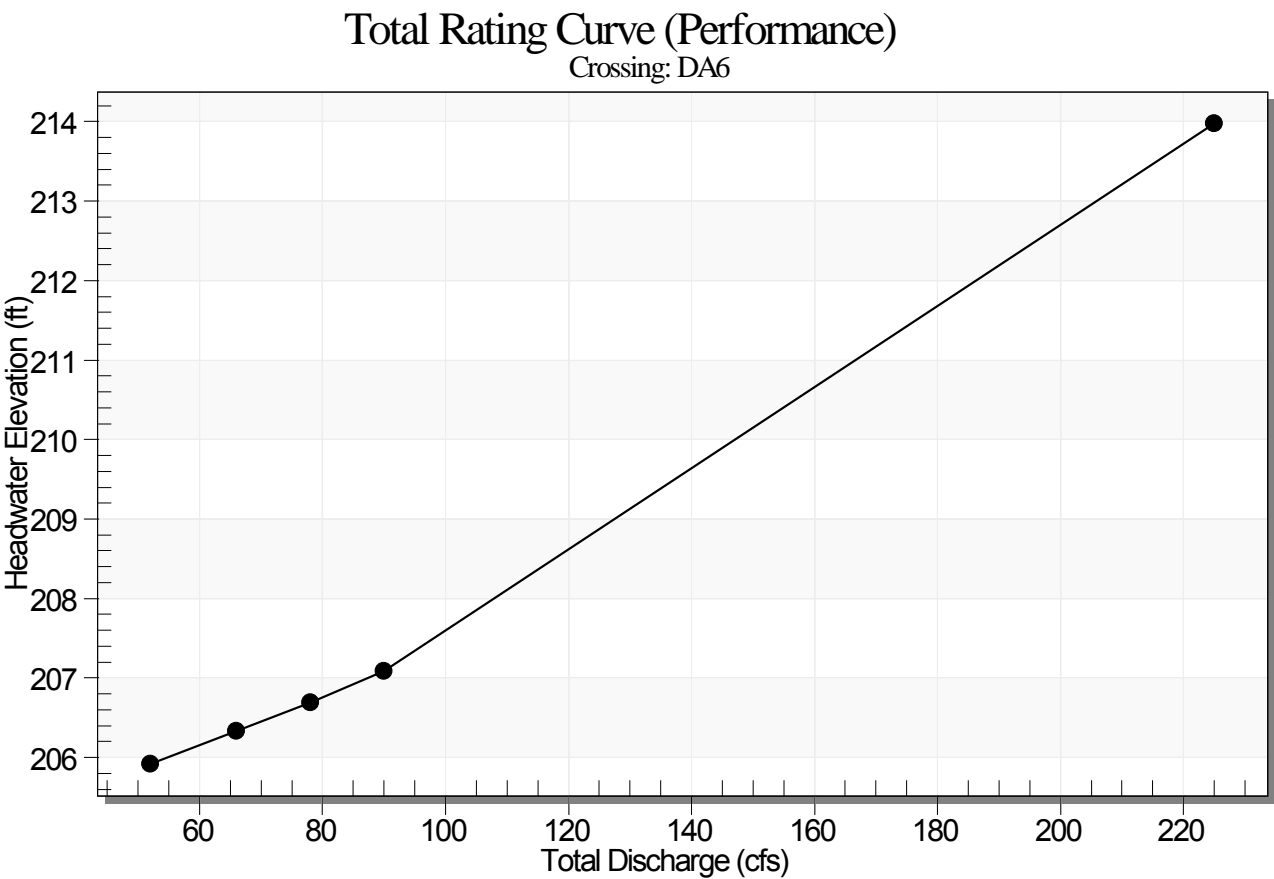
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: DA6

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA6 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
205.92	10 year	52.00	52.00	0.00	1
206.33	25 year	66.00	66.00	0.00	1
206.69	50 year	78.00	78.00	0.00	1
207.09	100 year	90.00	90.00	0.00	1
213.86	Overtopping	204.54	204.54	0.00	Overtopping

Rating Curve Plot for Crossing: DA6



Culvert Notes: DA6

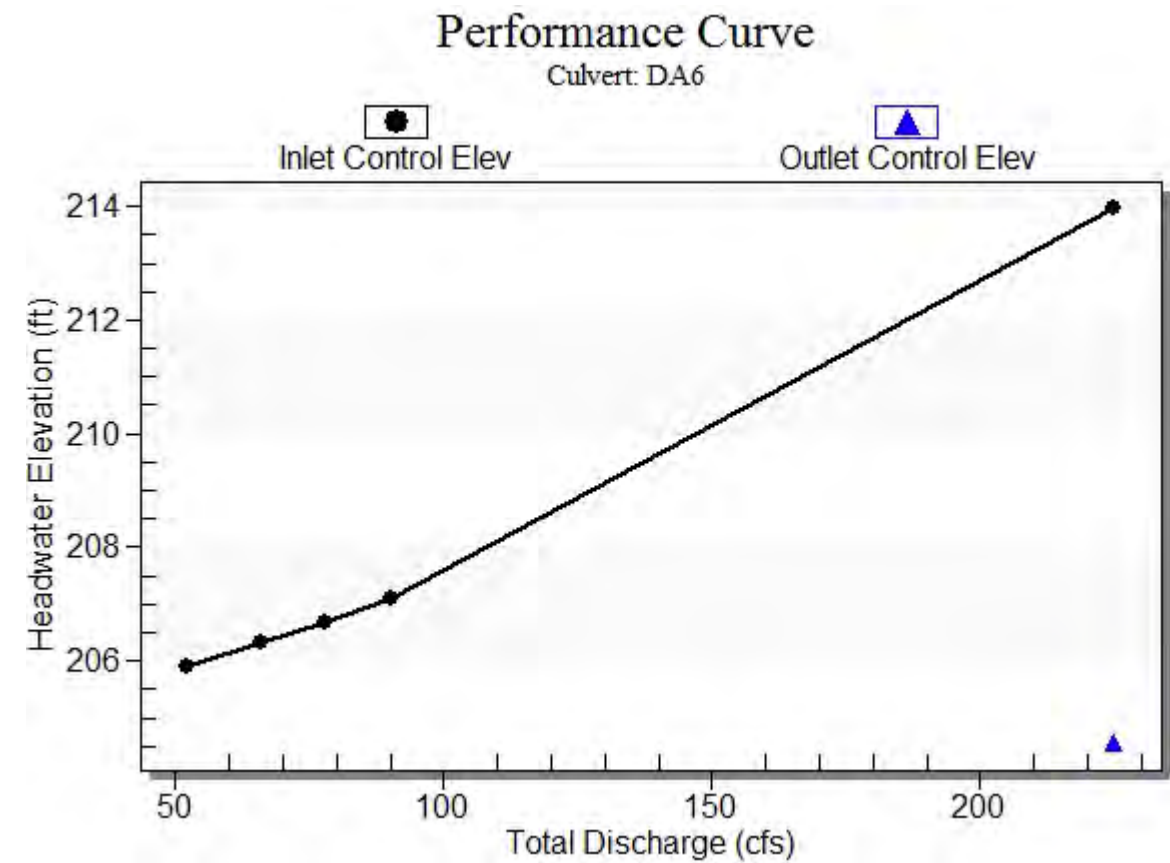
Table 2 - Culvert Summary Table: DA6

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	52.00	52.00	205.92	2.411	0.0*	1-S2n	0.857	1.641	0.857	3.000	15.470	0.000
25 year	66.00	66.00	206.33	2.819	0.0*	1-S2n	0.983	1.862	0.983	3.000	16.366	0.000
50 year	78.00	78.00	206.69	3.181	0.0*	5-S2n	1.071	2.027	1.071	3.000	17.190	0.000
100 year	90.00	90.00	207.09	3.578	0.0*	5-S2n	1.155	2.183	1.155	3.000	17.898	0.000

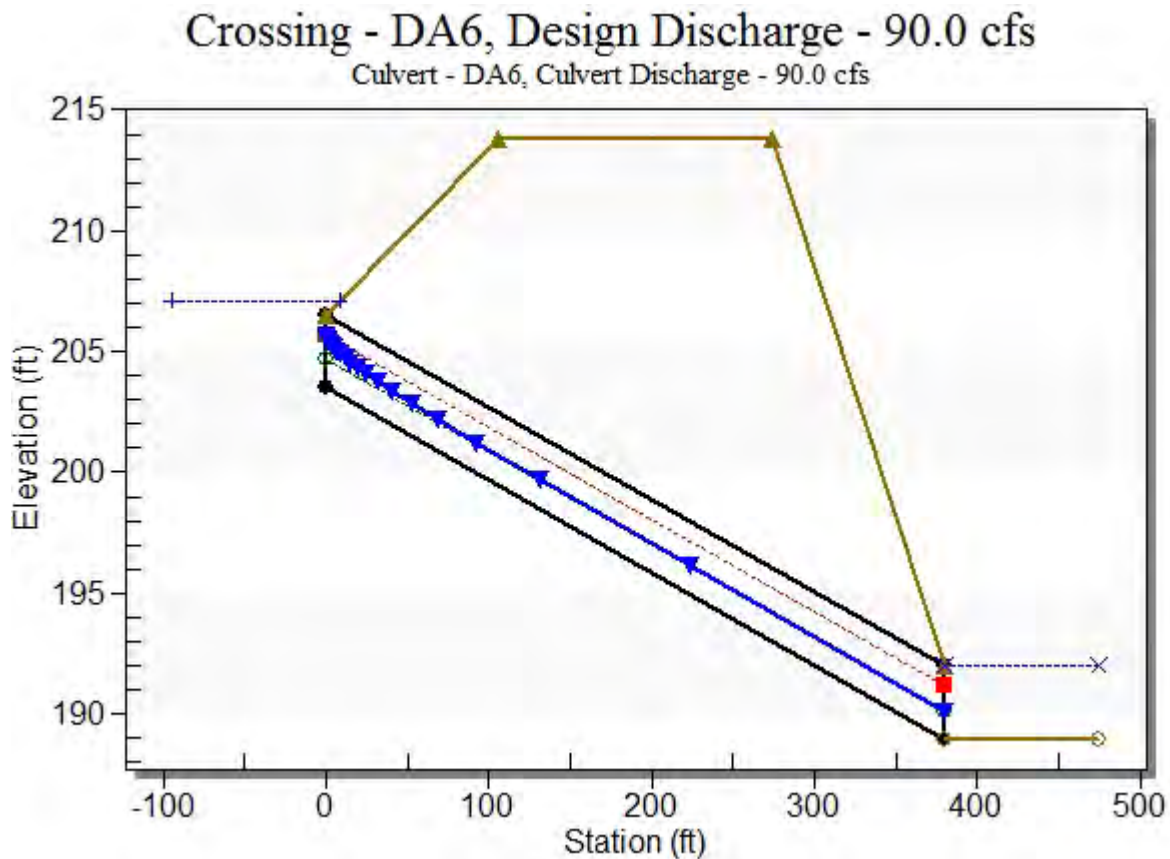
* Full Flow Headwater elevation is below inlet invert.

Straight Culvert
Inlet Elevation (invert): 203.51 ft, Outlet Elevation (invert): 188.96 ft
Culvert Length: 380.28 ft, Culvert Slope: 0.0383

Culvert Performance Curve Plot: DA6



Water Surface Profile Plot for Culvert: DA6



Site Data - DA6

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 203.51 ft

Outlet Station: 380.00 ft

Outlet Elevation: 188.96 ft

Number of Barrels: 2

Culvert Data Summary - DA6

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: DA6)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
52.00	191.96	3.00
66.00	191.96	3.00
78.00	191.96	3.00
90.00	191.96	3.00

Tailwater Channel Data - DA6

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 191.96 ft

Roadway Data for Crossing: DA6

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	213.86
1	84.00	213.86
2	168.00	213.86

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA7

Crossing Discharge Data

Discharge Selection Method: Recurrence

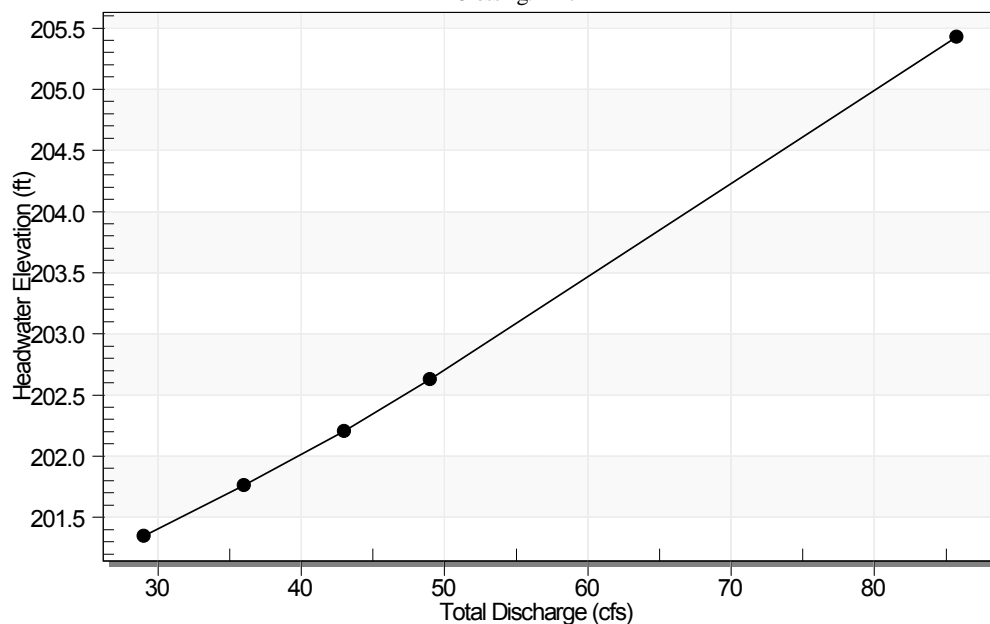
Table 1 - Summary of Culvert Flows at Crossing: DA7

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA7 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
201.35	10 year	29.00	29.00	0.00	1
201.76	25 year	36.00	36.00	0.00	1
202.20	50 year	43.00	43.00	0.00	1
202.63	100 year	49.00	49.00	0.00	1
205.36	Overtopping	76.60	76.60	0.00	Overtopping

Rating Curve Plot for Crossing: DA7

Total Rating Curve (Performance)

Crossing: DA7



Culvert Notes: DA7

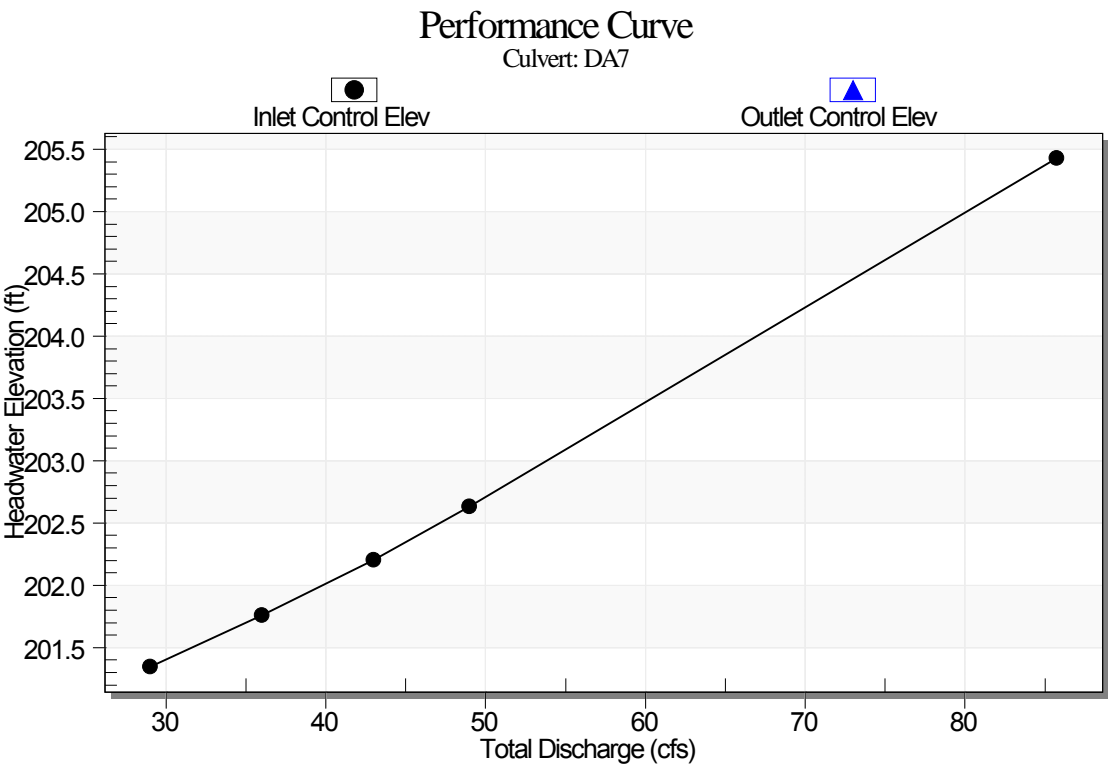
Table 2 - Culvert Summary Table: DA7

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	29.00	29.00	201.35	2.598	0.0*	1-S2n	0.979	1.739	0.979	3.000	14.449	0.000
25 year	36.00	36.00	201.76	3.010	0.0*	5-S2n	1.095	1.947	1.095	3.000	15.389	0.000
50 year	43.00	43.00	202.20	3.454	0.0*	5-S2n	1.206	2.134	1.206	3.000	16.145	0.000
100 year	49.00	49.00	202.63	3.880	0.0*	5-S2n	1.301	2.276	1.301	3.000	16.659	0.000

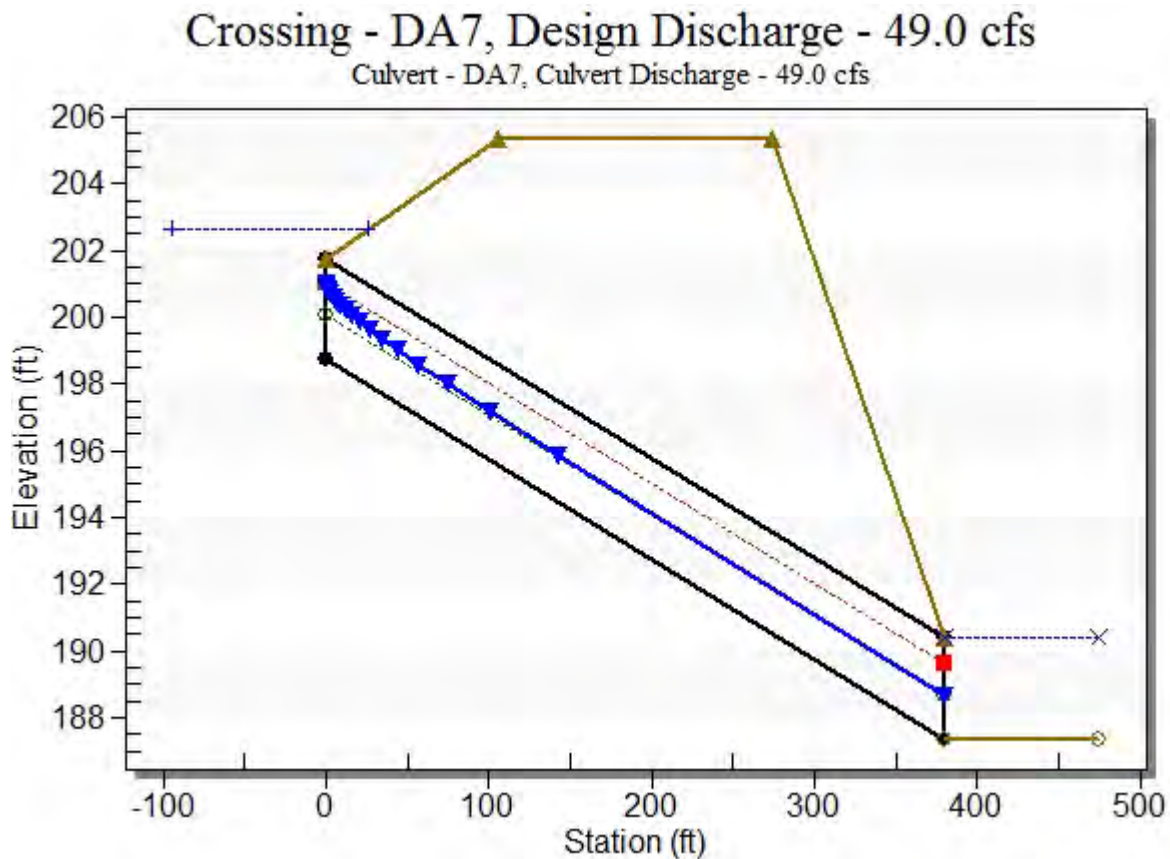
* Full Flow Headwater elevation is below inlet invert.

Straight Culvert
Inlet Elevation (invert): 198.75 ft, Outlet Elevation (invert): 187.38 ft
Culvert Length: 380.17 ft, Culvert Slope: 0.0299

Culvert Performance Curve Plot: DA7



Water Surface Profile Plot for Culvert: DA7



Site Data - DA7

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 198.75 ft

Outlet Station: 380.00 ft

Outlet Elevation: 187.38 ft

Number of Barrels: 1

Culvert Data Summary - DA7

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: DA7)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
29.00	190.38	3.00
36.00	190.38	3.00
43.00	190.38	3.00
49.00	190.38	3.00

Tailwater Channel Data - DA7

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 190.38 ft

Roadway Data for Crossing: DA7

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	205.36
1	84.00	205.36
2	168.00	205.36

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA8

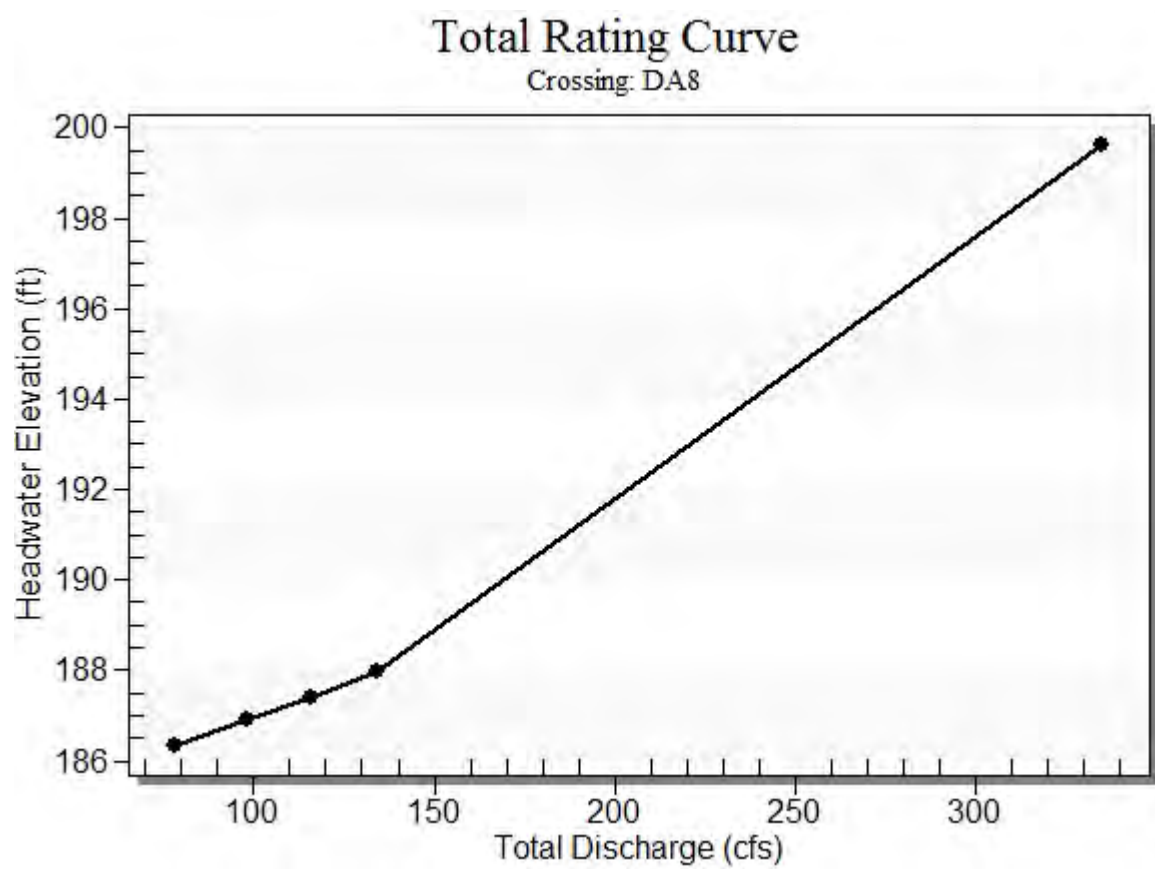
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: DA8

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA8 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
186.35	10 year	78.00	78.00	0.00	1
186.89	25 year	98.00	98.00	0.00	1
187.41	50 year	116.00	116.00	0.00	1
187.98	100 year	134.00	134.00	0.00	1
199.56	Overtopping	322.54	322.54	0.00	Overtopping

Rating Curve Plot for Crossing: DA8



Culvert Notes: DA8

Table 2 - Culvert Summary Table: DA8

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	78.00	78.00	186.35	2.915	0.0*	1-S2n	0.903	1.738	0.936	3.000	13.885	0.000
25 year	98.00	98.00	186.89	3.450	0.0*	5-S2n	1.055	2.023	1.055	3.000	15.475	0.000
50 year	116.00	116.00	187.41	3.966	0.0*	5-S2n	1.181	2.264	1.214	3.000	15.926	0.000
100 year	134.00	134.00	187.98	4.537	0.0*	5-S2n	1.306	2.493	1.342	3.000	16.636	0.000

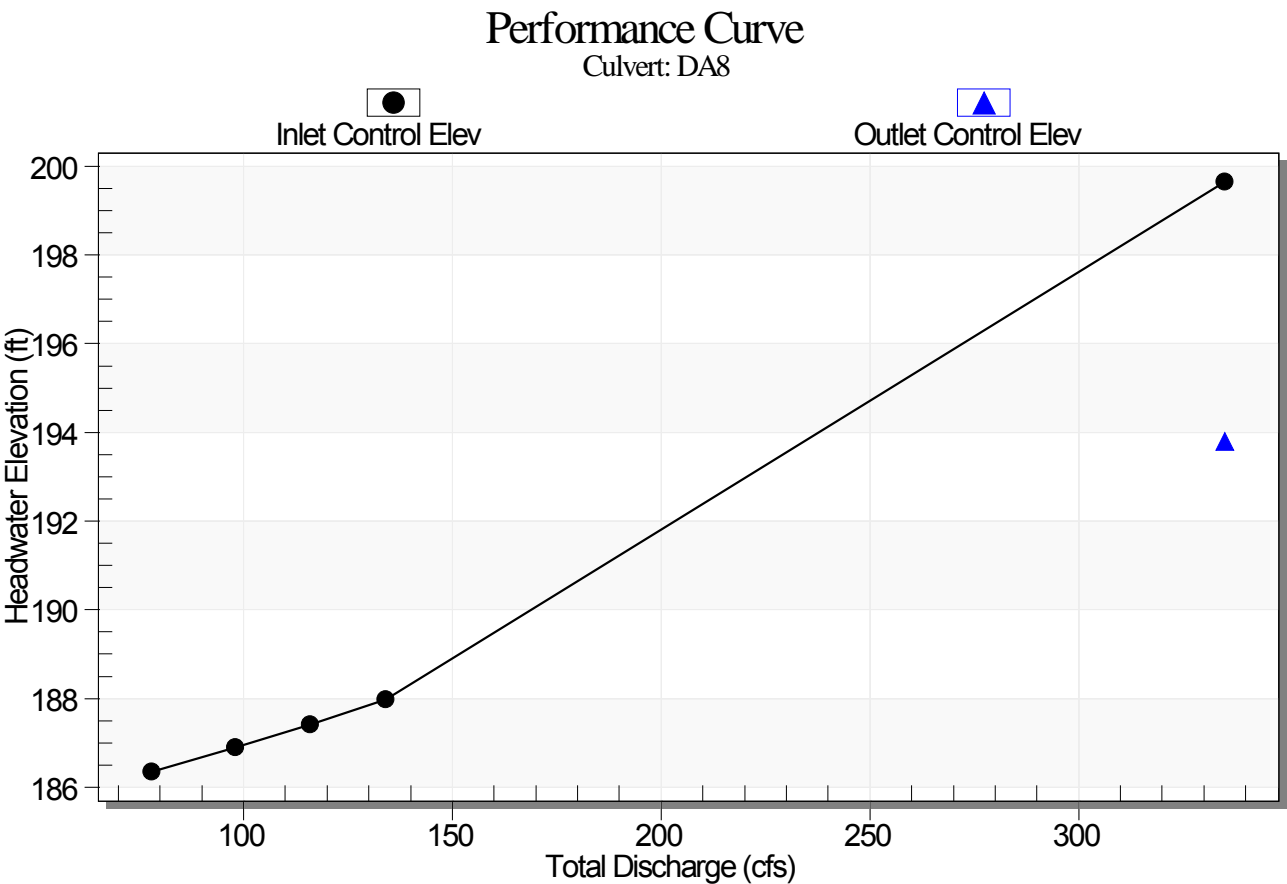
* Full Flow Headwater elevation is below inlet invert.

Straight Culvert

Inlet Elevation (invert): 183.44 ft, Outlet Elevation (invert): 177.00 ft

Culvert Length: 300.07 ft, Culvert Slope: 0.0215

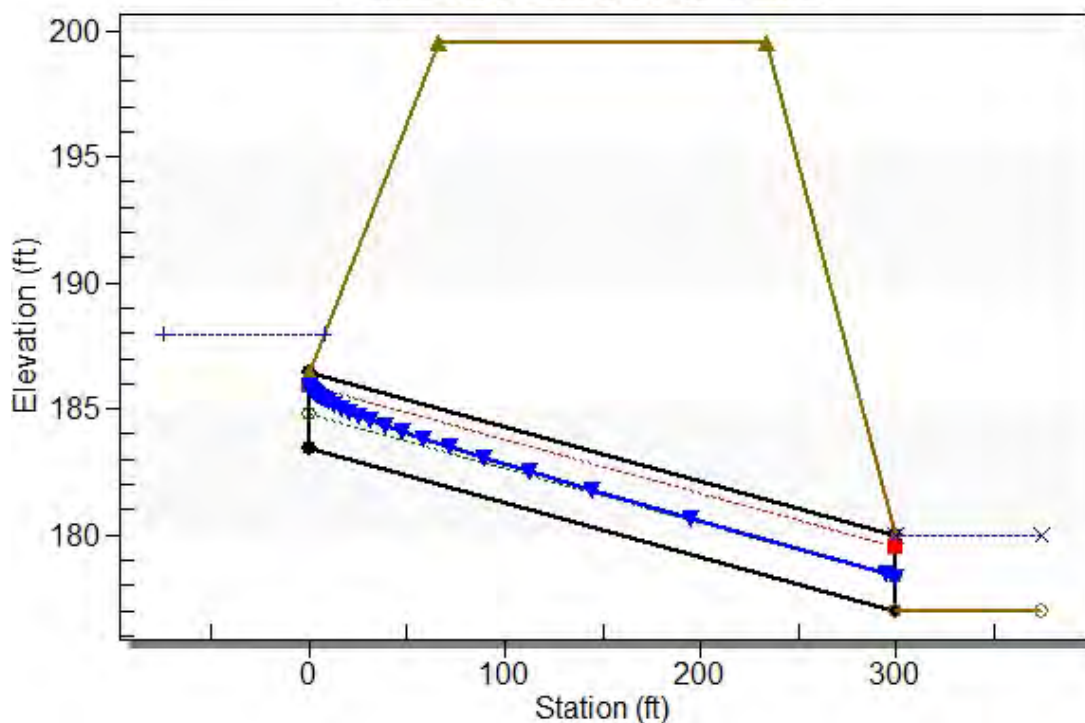
Culvert Performance Curve Plot: DA8



Water Surface Profile Plot for Culvert: DA8

Crossing - DA8, Design Discharge - 134.0 cfs

Culvert - DA8, Culvert Discharge - 134.0 cfs



Site Data - DA8

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 183.44 ft

Outlet Station: 300.00 ft

Outlet Elevation: 177.00 ft

Number of Barrels: 1

Culvert Data Summary - DA8

Barrel Shape: Concrete Box

Barrel Span: 6.00 ft

Barrel Rise: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90°) Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: DA8)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
78.00	180.00	3.00
98.00	180.00	3.00
116.00	180.00	3.00
134.00	180.00	3.00

Tailwater Channel Data - DA8

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 180.00 ft

Roadway Data for Crossing: DA8

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	199.56
1	84.00	199.56
2	168.00	199.56

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA9

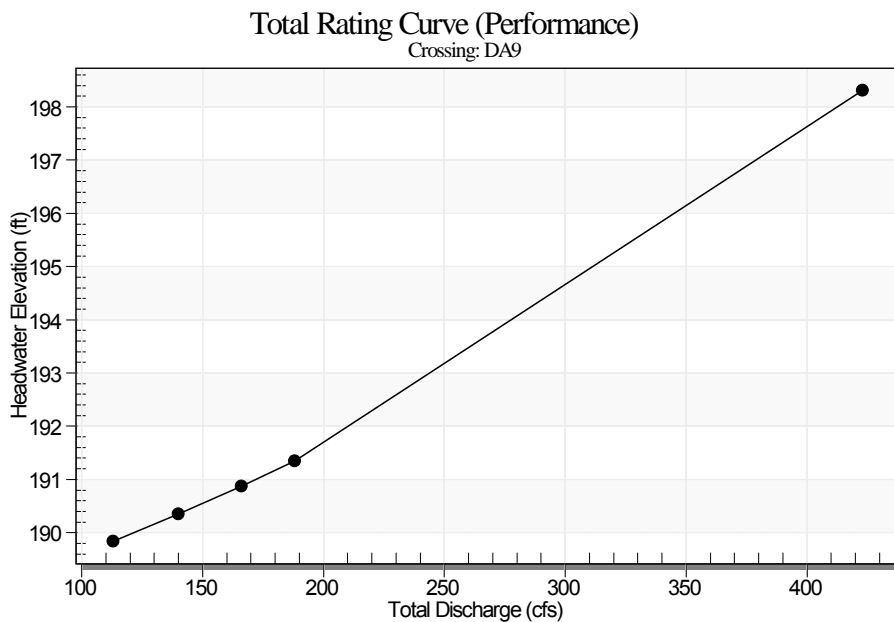
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: DA9

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA9 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
189.84	10 year	113.00	113.00	0.00	1
190.35	25 year	140.00	140.00	0.00	1
190.87	50 year	166.00	166.00	0.00	1
191.35	100 year	188.00	188.00	0.00	1
198.12	Overtopping	378.44	378.44	0.00	Overtopping

Rating Curve Plot for Crossing: DA9



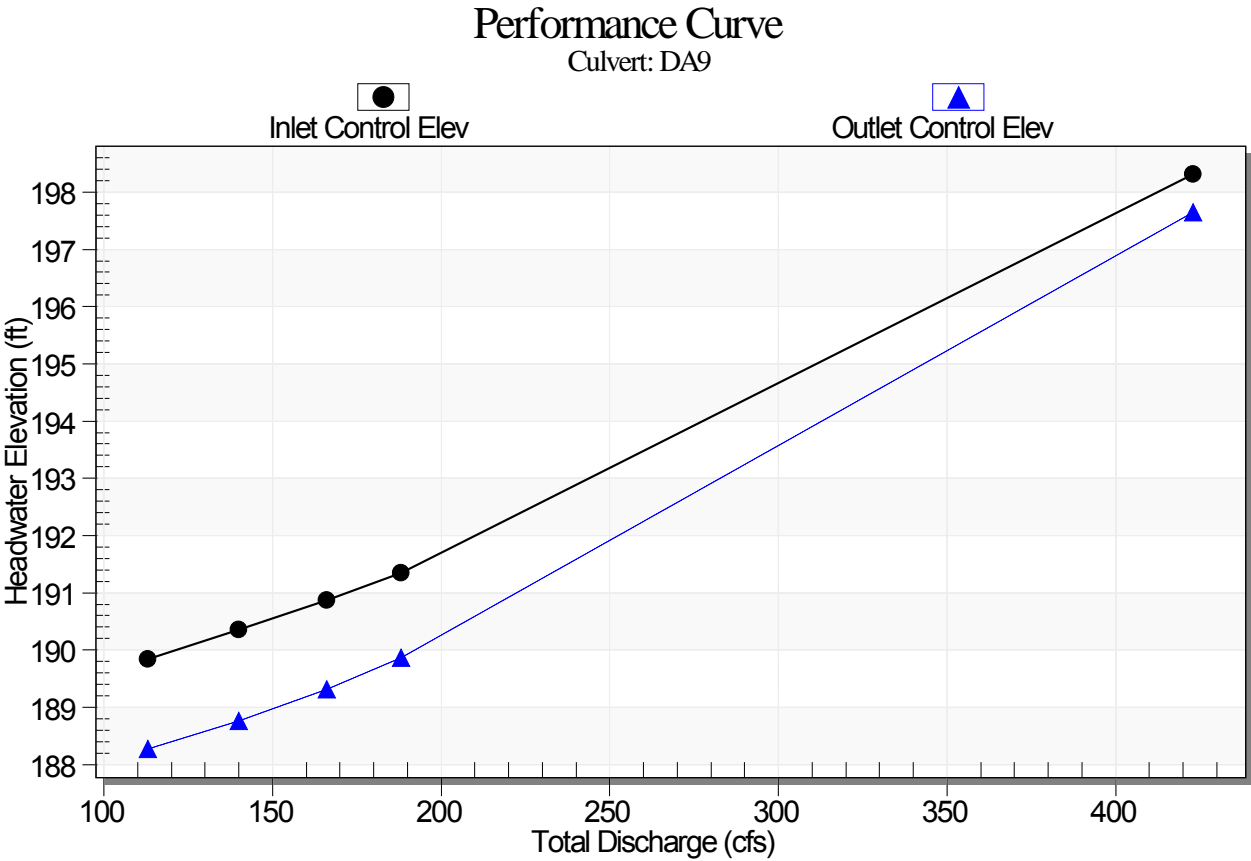
Culvert Notes: DA9

Table 2 - Culvert Summary Table: DA9

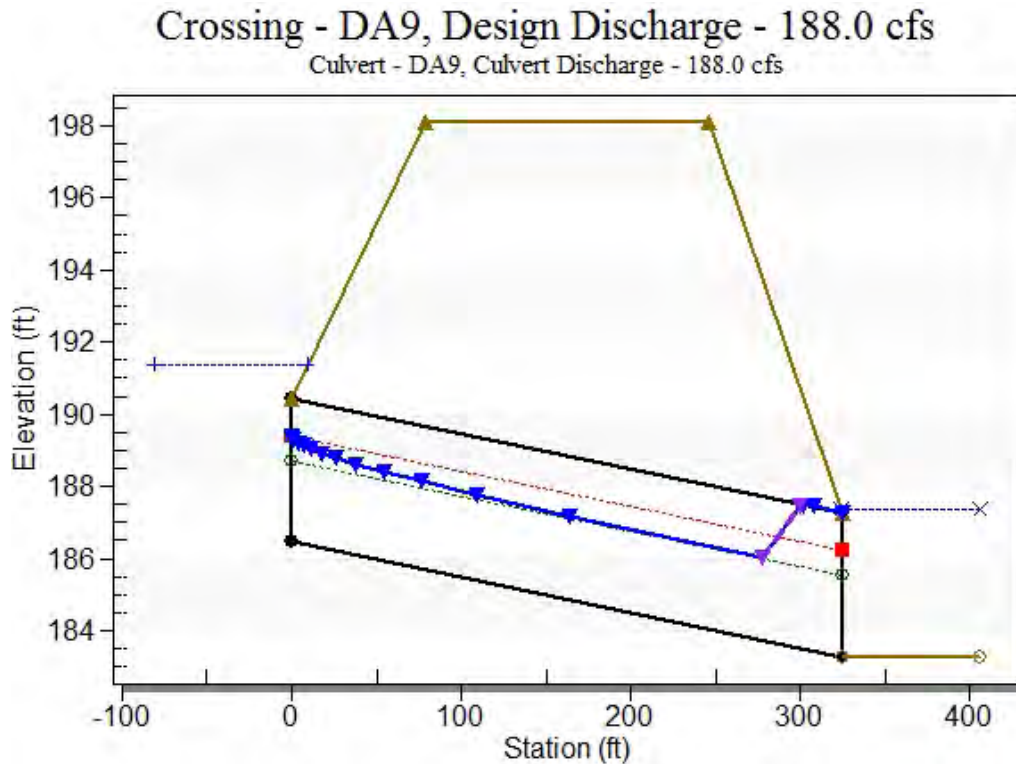
Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	113.00	113.00	189.84	3.391	1.827	1-JS1f	1.670	2.258	4.000	4.100	4.787	0.000
25 year	140.00	140.00	190.35	3.902	2.307	1-JS1f	1.889	2.524	4.000	4.100	5.931	0.000
50 year	166.00	166.00	190.87	4.420	2.865	5-JS1f	2.089	2.758	4.000	4.100	7.032	0.000
100 year	188.00	188.00	191.35	4.901	3.412	5-JS1f	2.258	2.936	4.000	4.100	7.964	0.000

Straight Culvert
Inlet Elevation (invert): 186.45 ft, Outlet Elevation (invert): 183.28 ft
Culvert Length: 325.02 ft, Culvert Slope: 0.0098

Culvert Performance Curve Plot: DA9



Water Surface Profile Plot for Culvert: DA9



Site Data - DA9

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 186.45 ft

Outlet Station: 325.00 ft

Outlet Elevation: 183.28 ft

Number of Barrels: 2

Culvert Data Summary - DA9

Barrel Shape: Circular

Barrel Diameter: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: DA9)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
113.00	187.38	4.10
140.00	187.38	4.10
166.00	187.38	4.10
188.00	187.38	4.10

Tailwater Channel Data - DA9

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 187.38 ft

Roadway Data for Crossing: DA9

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	198.12
1	84.00	198.12
2	168.00	198.12

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA11

Crossing Discharge Data

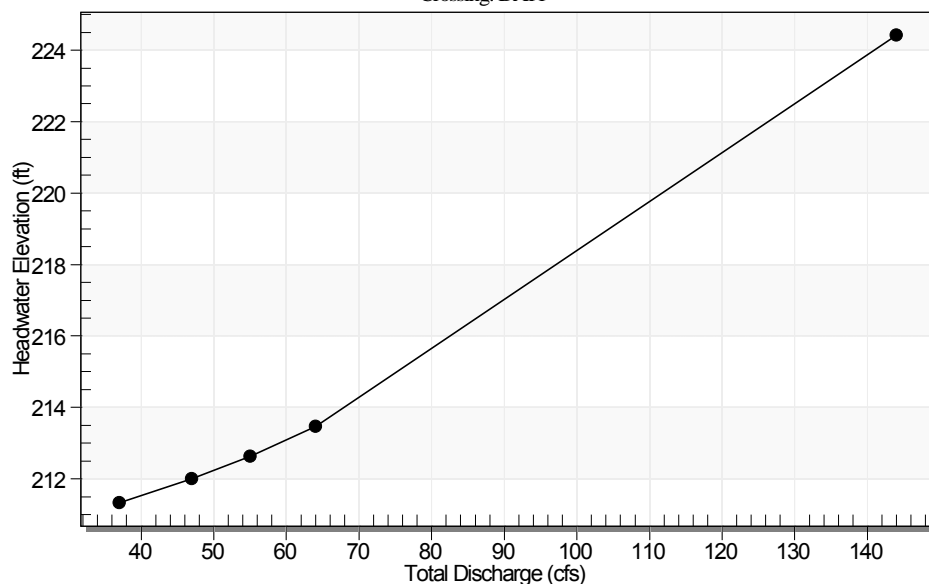
Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: DA11

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA11 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
211.33	10 year	37.00	37.00	0.00	1
211.99	25 year	47.00	47.00	0.00	1
212.62	50 year	55.00	55.00	0.00	1
213.46	100 year	64.00	64.00	0.00	1
224.33	Overtopping	131.08	131.08	0.00	Overtopping

Rating Curve Plot for Crossing: DA11

Total Rating Curve (Performance)
Crossing: DA11



Culvert Notes: DA11

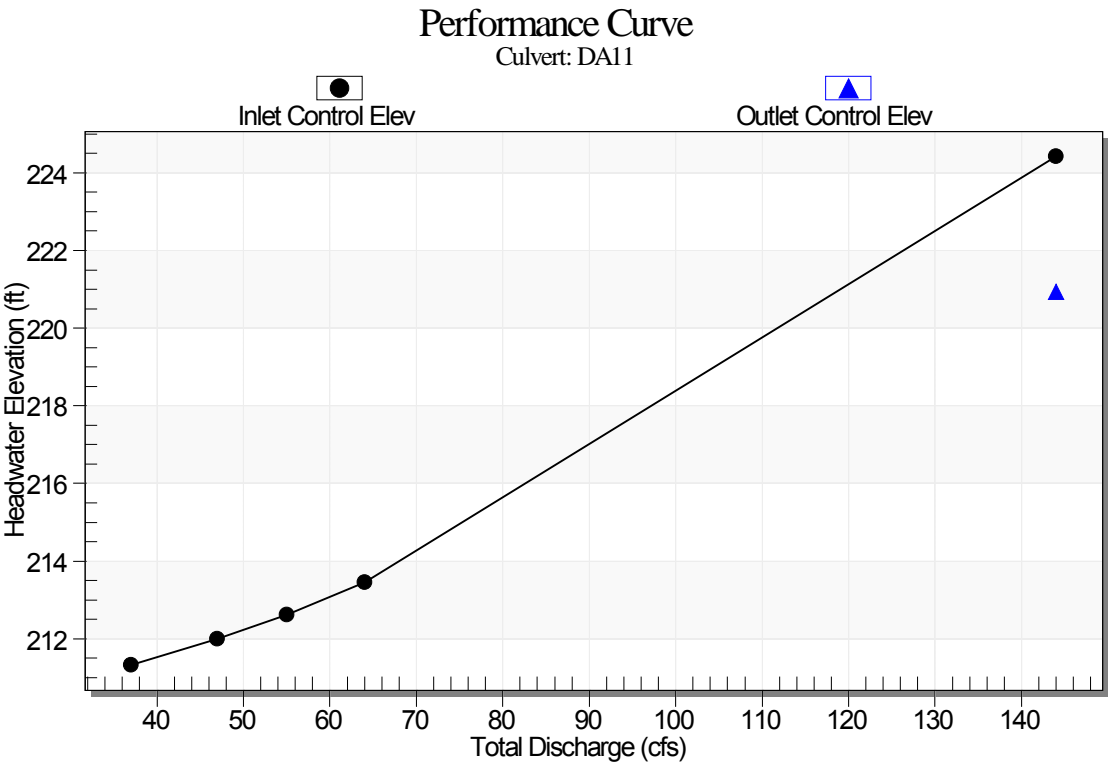
Table 2 - Culvert Summary Table: DA11

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	37.00	37.00	211.33	3.073	0.0*	5-S2n	1.129	1.974	1.149	3.000	14.816	0.000
25 year	47.00	47.00	211.99	3.735	0.0*	5-S2n	1.292	2.230	1.318	3.000	15.715	0.000
50 year	55.00	55.00	212.62	4.363	0.0*	5-S2n	1.413	2.404	1.440	3.000	16.393	0.000
100 year	64.00	64.00	213.46	5.199	0.0*	5-S2n	1.545	2.568	1.545	3.000	17.447	0.000

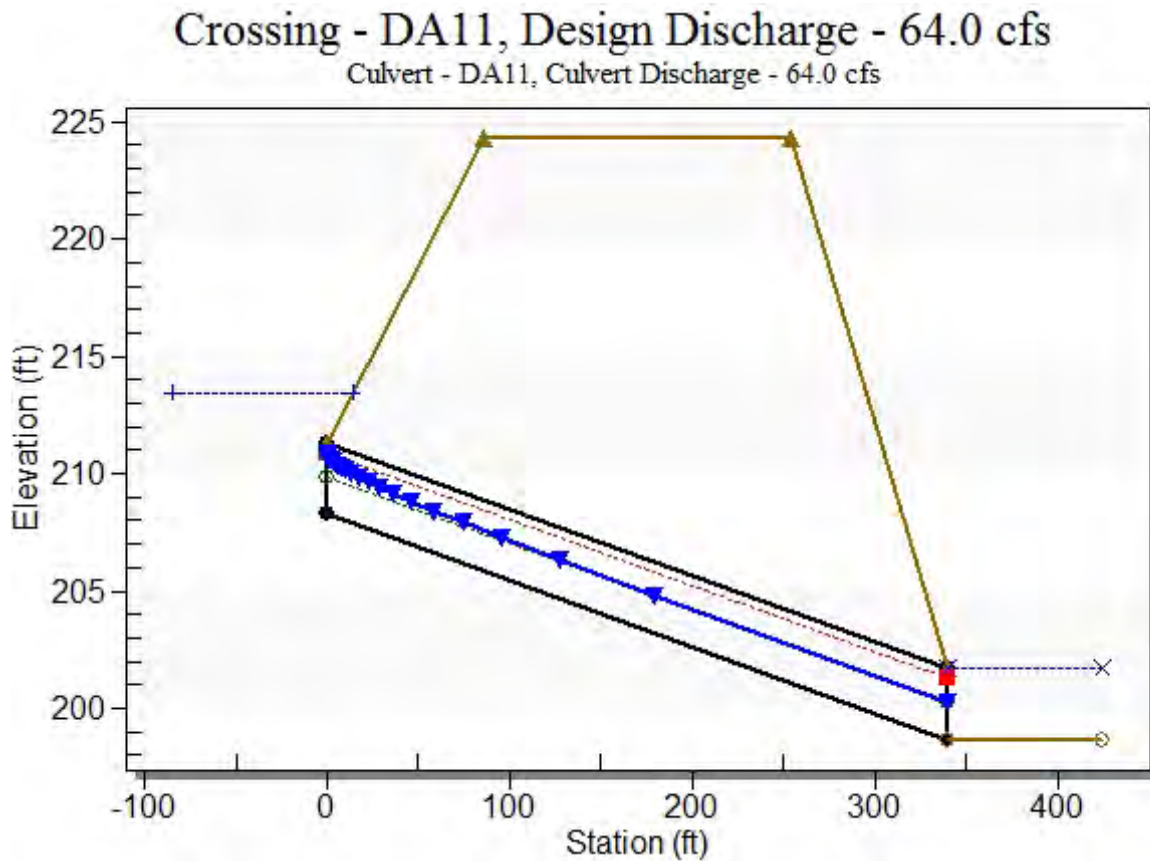
* Full Flow Headwater elevation is below inlet invert.

Straight Culvert
Inlet Elevation (invert): 208.26 ft, Outlet Elevation (invert): 198.68 ft
Culvert Length: 340.13 ft, Culvert Slope: 0.0282

Culvert Performance Curve Plot: DA11



Water Surface Profile Plot for Culvert: DA11



Site Data - DA11

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 208.26 ft

Outlet Station: 340.00 ft

Outlet Elevation: 198.68 ft

Number of Barrels: 1

Culvert Data Summary - DA11

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: DA11)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
37.00	201.68	3.00
47.00	201.68	3.00
55.00	201.68	3.00
64.00	201.68	3.00

Tailwater Channel Data - DA11

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 201.68 ft

Roadway Data for Crossing: DA11

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	224.33
1	84.00	224.33
2	168.00	224.33

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA 14B

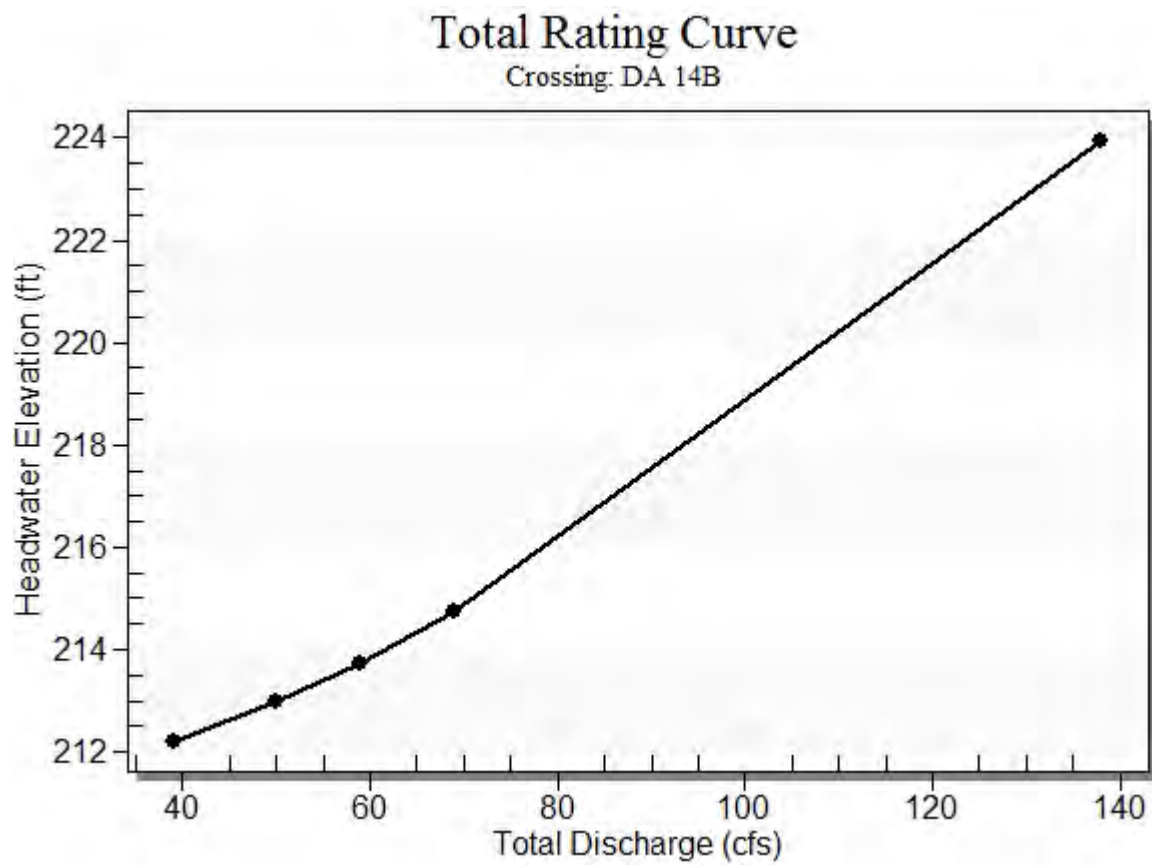
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: DA 14B

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA14B Discharge (cfs)	Roadway Discharge (cfs)	Iterations
212.22	10 year	39.00	39.00	0.00	1
212.98	25 year	50.00	50.00	0.00	1
213.74	50 year	59.00	59.00	0.00	1
214.75	100 year	69.00	69.00	0.00	1
223.86	Overtopping	122.41	122.41	0.00	Overtopping

Rating Curve Plot for Crossing: DA 14B



Culvert Notes: DA14B

Table 2 - Culvert Summary Table: DA14B

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	39.00	39.00	212.22	3.218	0.0*	5-S2n	1.412	2.027	1.412	3.000	11.921	0.000
25 year	50.00	50.00	212.98	3.980	0.954	5-S2n	1.638	2.298	1.638	3.000	12.662	0.000
50 year	59.00	59.00	213.74	4.738	2.047	5-S2n	1.823	2.481	1.823	3.000	13.142	0.000
100 year	69.00	69.00	214.75	5.747	3.472	5-S2n	2.032	2.644	2.032	3.000	13.534	0.000

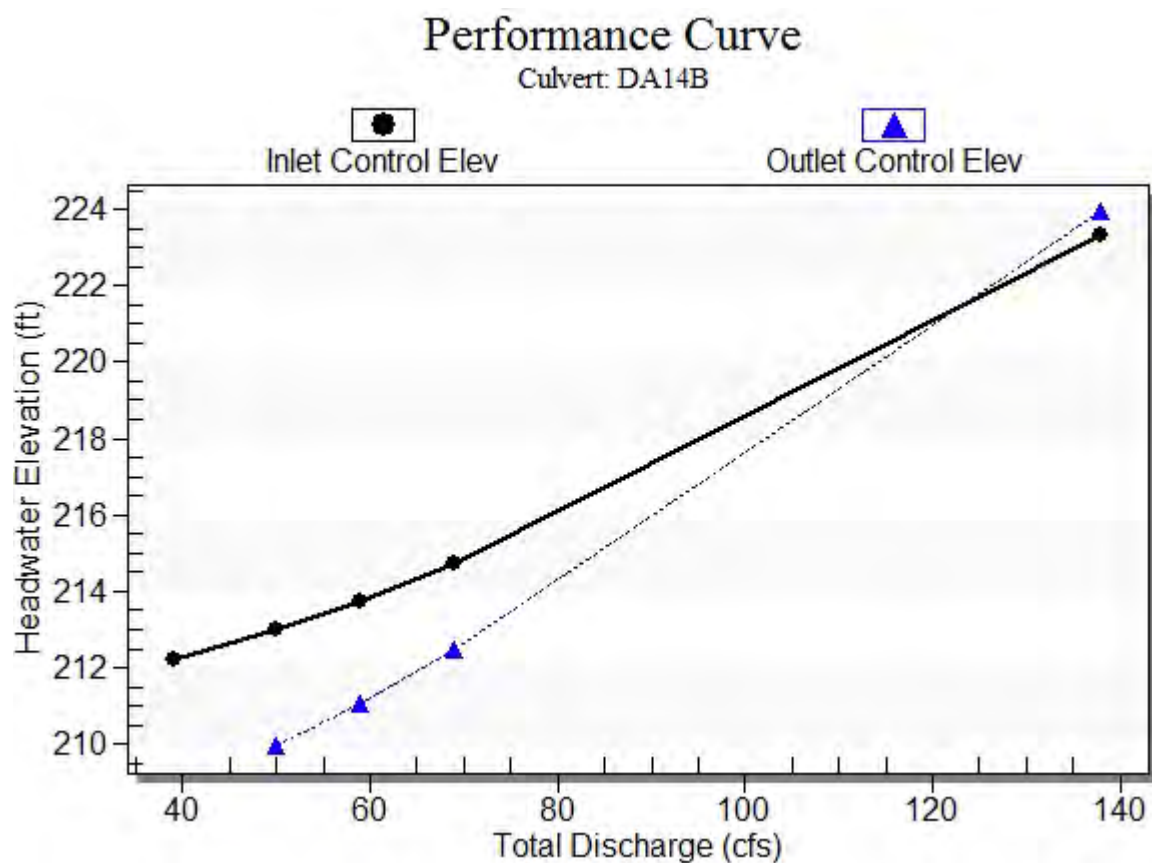
* Full Flow Headwater elevation is below inlet invert.

Straight Culvert

Inlet Elevation (invert): 209.00 ft, Outlet Elevation (invert): 204.17 ft

Culvert Length: 340.03 ft, Culvert Slope: 0.0142

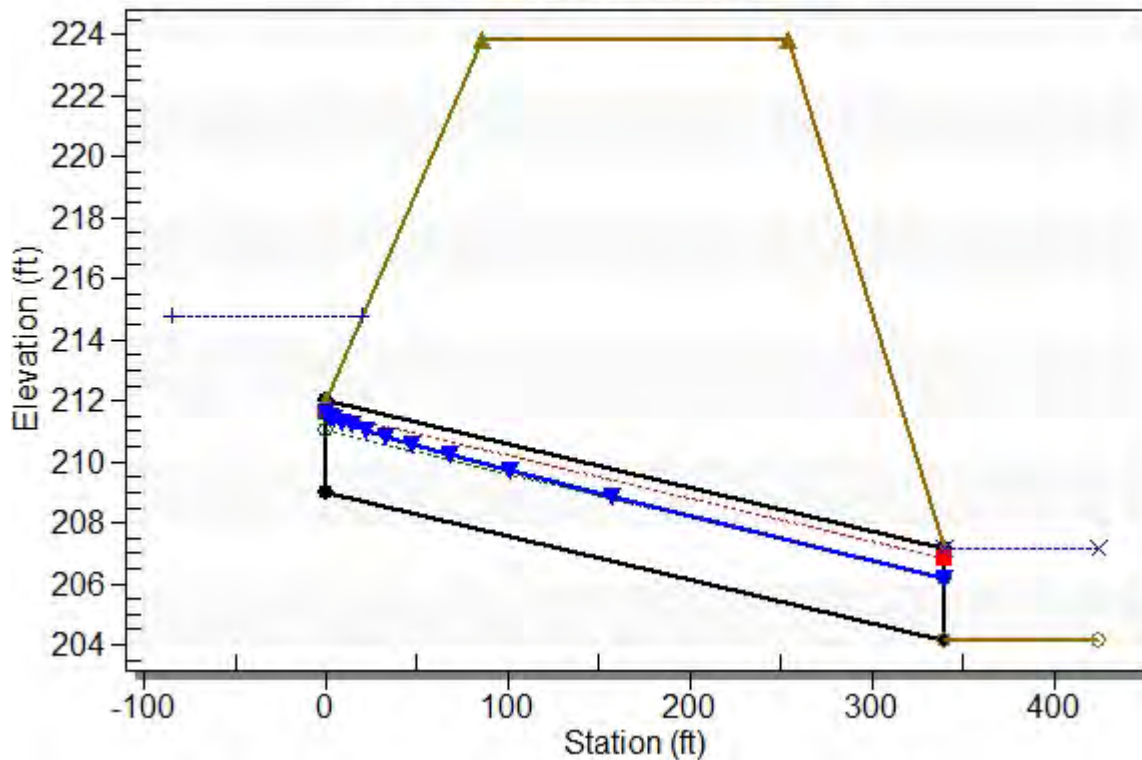
Culvert Performance Curve Plot: DA14B



Water Surface Profile Plot for Culvert: DA14B

Crossing - DA 14B, Design Discharge - 69.0 cfs

Culvert - DA14B, Culvert Discharge - 69.0 cfs



Site Data - DA14B

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 209.00 ft

Outlet Station: 340.00 ft

Outlet Elevation: 204.17 ft

Number of Barrels: 1

Culvert Data Summary - DA14B

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: DA 14B)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
39.00	207.17	3.00
50.00	207.17	3.00
59.00	207.17	3.00
69.00	207.17	3.00

Tailwater Channel Data - DA 14B

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 207.17 ft

Roadway Data for Crossing: DA 14B

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	223.86
1	84.00	223.86
2	168.00	223.86

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA16

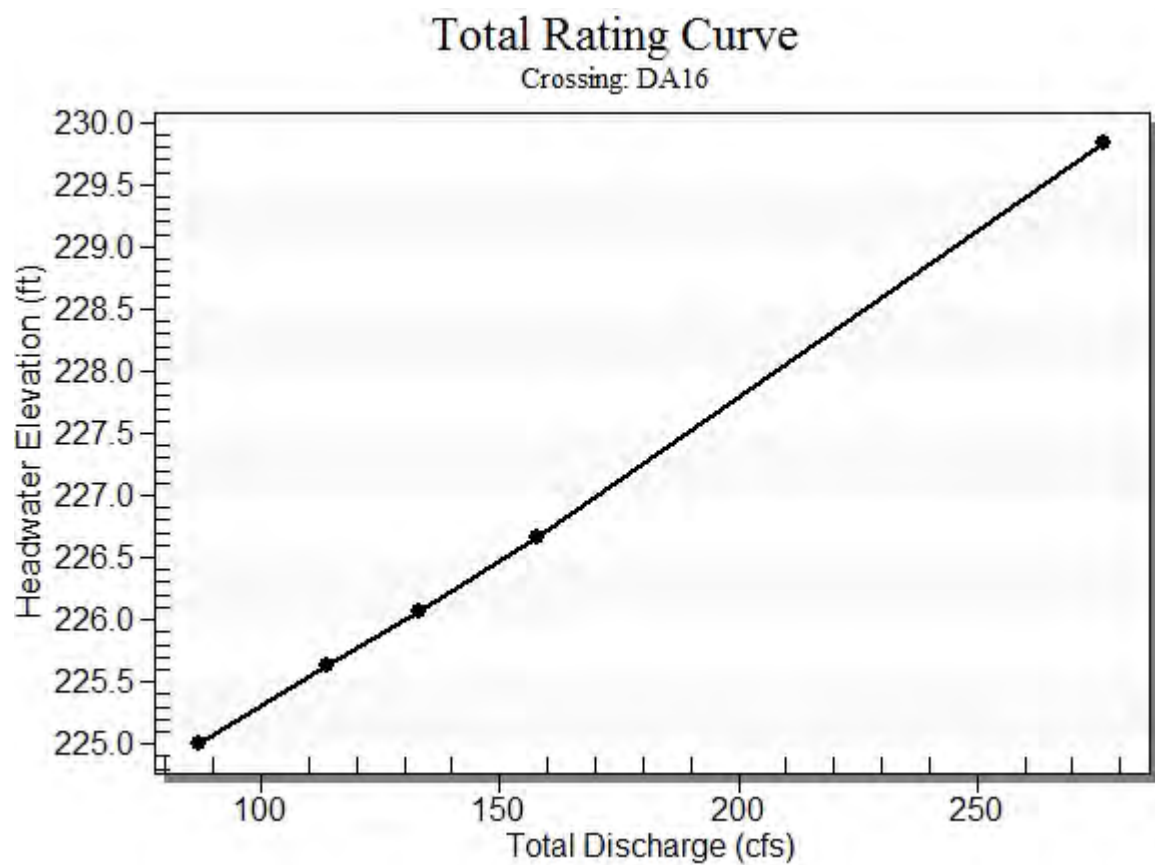
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: DA16

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA16 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
225.01	10 year	87.00	87.00	0.00	1
225.64	25 year	114.00	114.00	0.00	1
226.07	50 year	133.00	133.00	0.00	1
226.66	100 year	158.00	158.00	0.00	1
229.76	Overtopping	261.88	261.88	0.00	Overtopping

Rating Curve Plot for Crossing: DA16



Culvert Notes: DA16

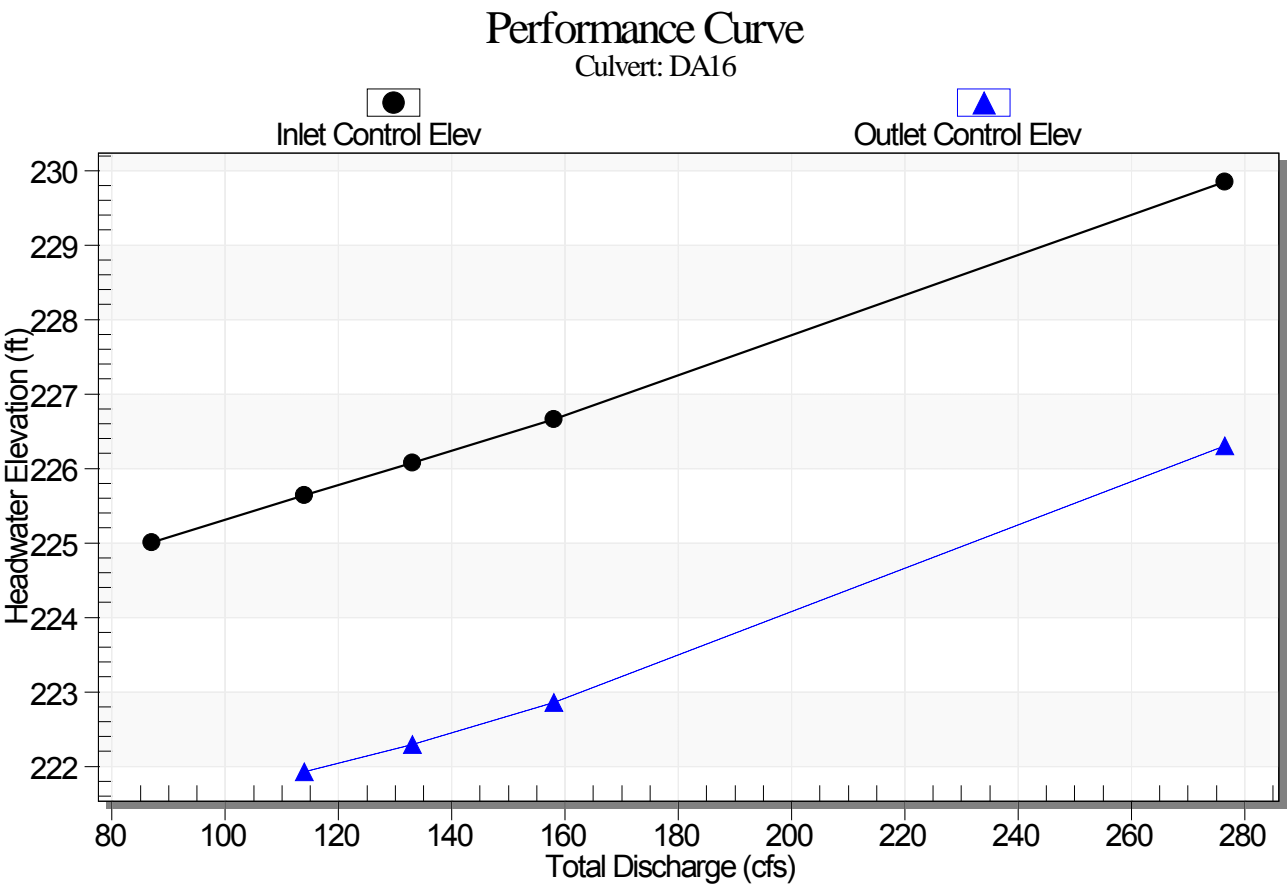
Table 2 - Culvert Summary Table: DA16

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	87.00	87.00	225.01	3.141	0.0*	1-JS1f	1.184	1.869	4.000	4.000	3.625	0.000
25 year	114.00	114.00	225.64	3.767	0.061	1-JS1f	1.429	2.238	4.000	4.000	4.750	0.000
50 year	133.00	133.00	226.07	4.201	0.423	5-JS1f	1.589	2.480	4.000	4.000	5.542	0.000
100 year	158.00	158.00	226.66	4.790	0.984	5-S2n	1.798	2.782	1.829	4.000	14.395	0.000

* Full Flow Headwater elevation is below inlet invert.

Straight Culvert
Inlet Elevation (invert): 221.87 ft, Outlet Elevation (invert): 216.93 ft
Culvert Length: 415.03 ft, Culvert Slope: 0.0119

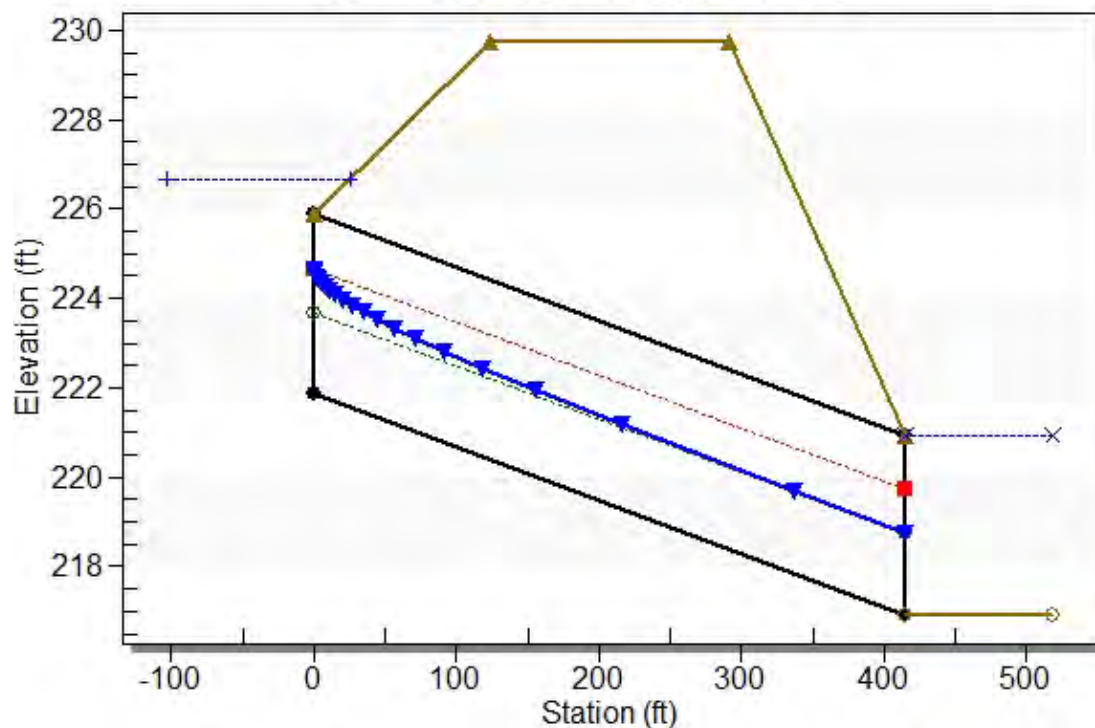
Culvert Performance Curve Plot: DA16



Water Surface Profile Plot for Culvert: DA16

Crossing - DA16, Design Discharge - 158.0 cfs

Culvert - DA16, Culvert Discharge - 158.0 cfs



Site Data - DA16

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 221.87 ft

Outlet Station: 415.00 ft

Outlet Elevation: 216.93 ft

Number of Barrels: 1

Culvert Data Summary - DA16

Barrel Shape: Concrete Box

Barrel Span: 6.00 ft

Barrel Rise: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90°) Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: DA16)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
87.00	220.93	4.00
114.00	220.93	4.00
133.00	220.93	4.00
158.00	220.93	4.00

Tailwater Channel Data - DA16

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 220.93 ft

Roadway Data for Crossing: DA16

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	229.76
1	84.00	229.76
2	168.00	229.76

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA17B

Crossing Discharge Data

Discharge Selection Method: Recurrence

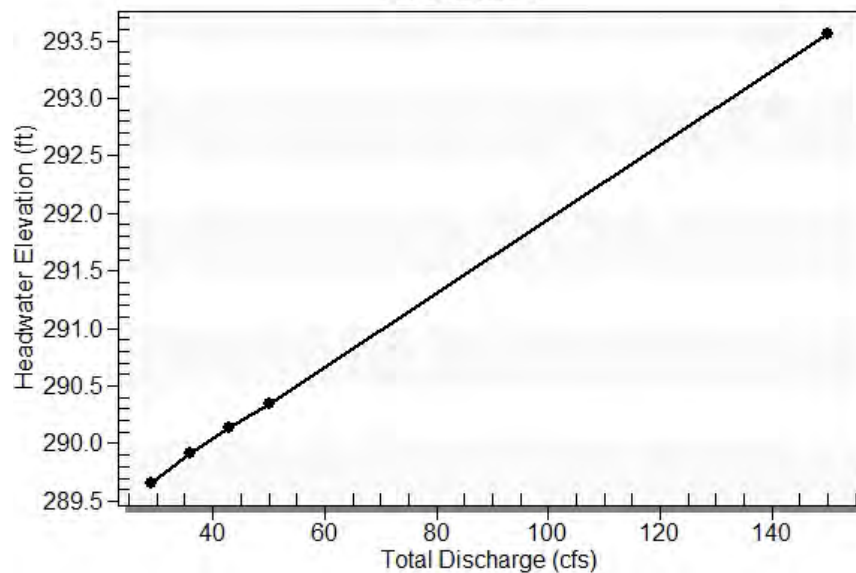
Table 1 - Summary of Culvert Flows at Crossing: DA17B

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA17B Discharge (cfs)	Roadway Discharge (cfs)	Iterations
289.66	10 year	29.00	29.00	0.00	1
289.91	25 year	36.00	36.00	0.00	1
290.14	50 year	43.00	43.00	0.00	1
290.35	100 year	50.00	50.00	0.00	1
293.47	Overtopping	133.62	133.62	0.00	Overtopping

Rating Curve Plot for Crossing: DA17B

Total Rating Curve

Crossing: DA17B



Culvert Notes: DA17B

Table 2 - Culvert Summary Table: DA17B

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	29.00	29.00	289.66	1.661	0.0*	1-JS1f	0.626	1.208	3.000	3.000	2.184	0.000
25 year	36.00	36.00	289.91	1.909	0.0*	1-JS1f	0.701	1.358	3.000	3.000	2.711	0.000
50 year	43.00	43.00	290.14	2.135	0.0*	1-S2n	0.762	1.491	0.762	3.000	15.100	0.000
100 year	50.00	50.00	290.35	2.347	0.0*	1-S2n	0.822	1.609	0.822	3.000	15.773	0.000

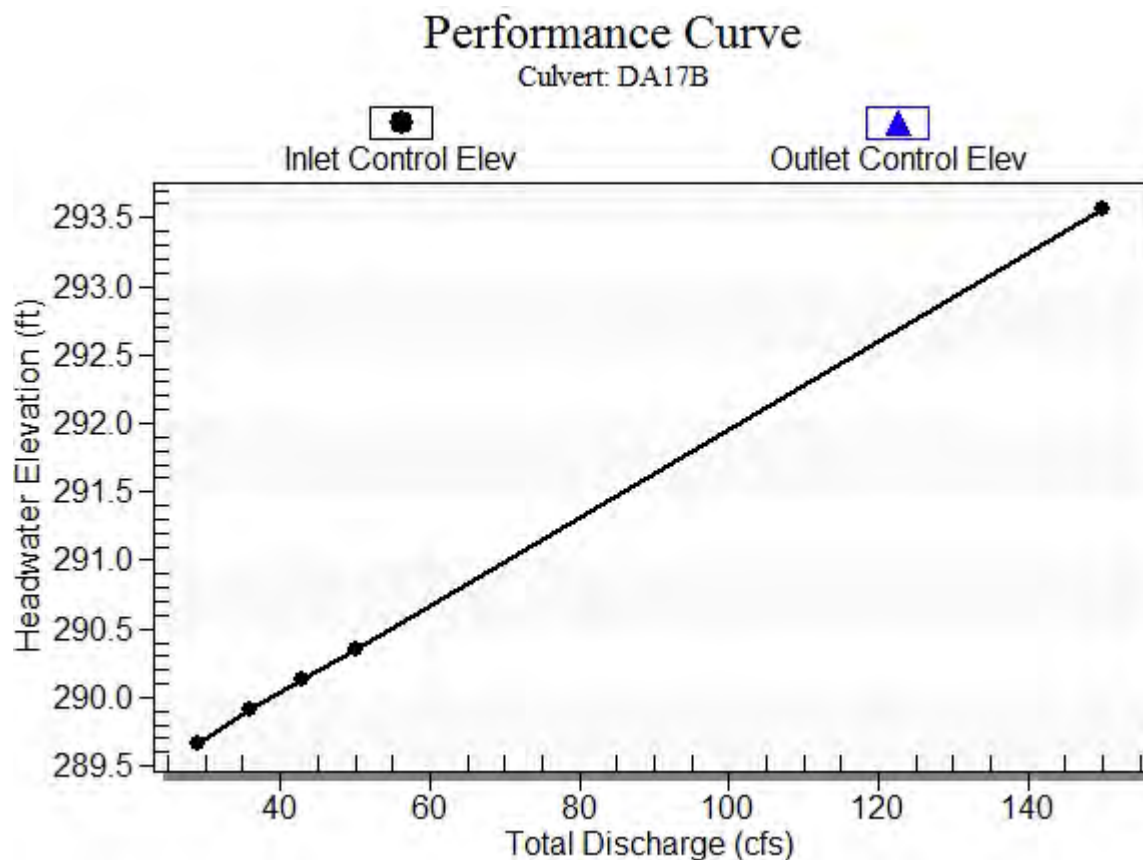
* Full Flow Headwater elevation is below inlet invert.

Straight Culvert

Inlet Elevation (invert): 288.00 ft, Outlet Elevation (invert): 274.71 ft

Culvert Length: 320.28 ft, Culvert Slope: 0.0415

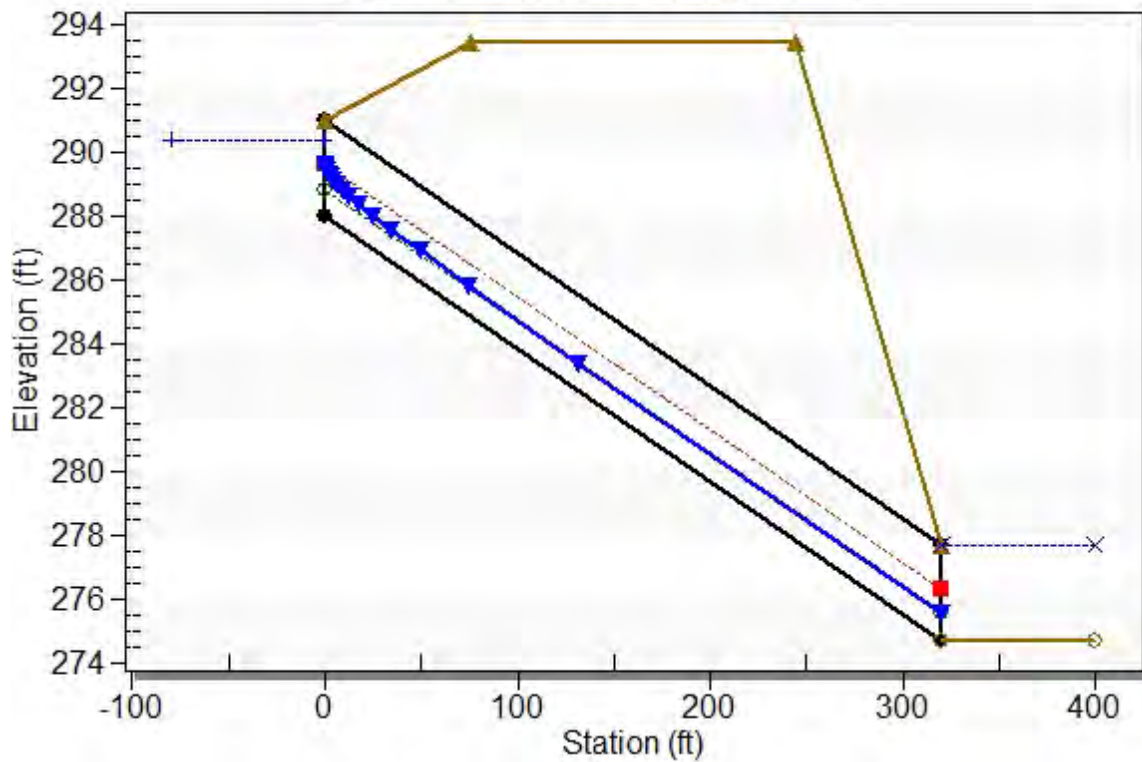
Culvert Performance Curve Plot: DA17B



Water Surface Profile Plot for Culvert: DA17B

Crossing - DA17B, Design Discharge - 50.0 cfs

Culvert - DA17B, Culvert Discharge - 50.0 cfs



Site Data - DA17B

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 288.00 ft

Outlet Station: 320.00 ft

Outlet Elevation: 274.71 ft

Number of Barrels: 2

Culvert Data Summary - DA17B

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: DA17B)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
29.00	277.71	3.00
36.00	277.71	3.00
43.00	277.71	3.00
50.00	277.71	3.00

Tailwater Channel Data - DA17B

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 277.71 ft

Roadway Data for Crossing: DA17B

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	293.47
1	84.00	293.47
2	168.00	293.47

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA17C

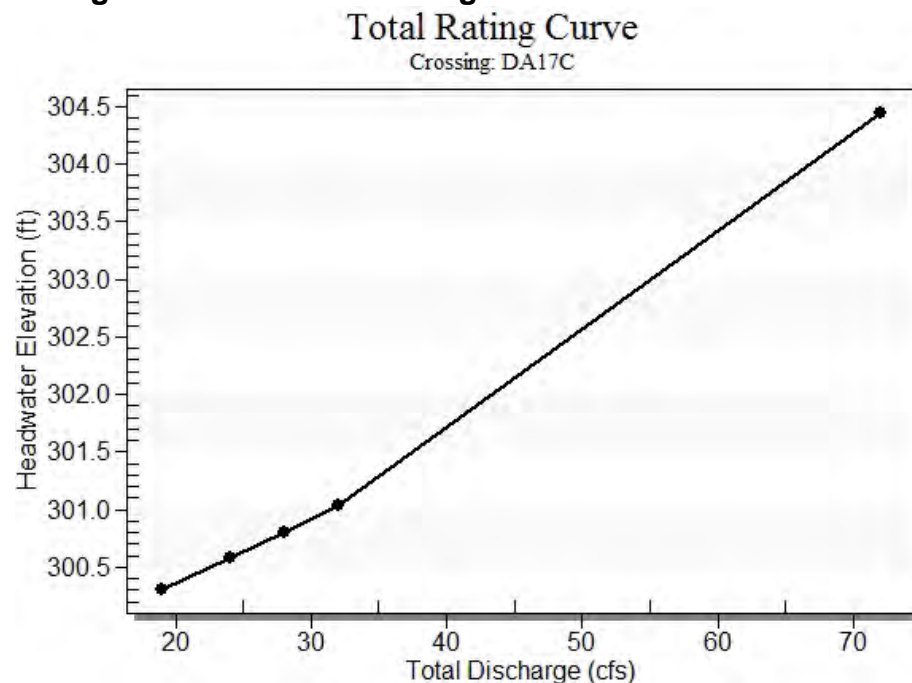
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: DA17C

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA17C Discharge (cfs)	Roadway Discharge (cfs)	Iterations
300.31	10 year	19.00	19.00	0.00	1
300.58	25 year	24.00	24.00	0.00	1
300.80	50 year	28.00	28.00	0.00	1
301.04	100 year	32.00	32.00	0.00	1
304.40	Overtopping	66.13	66.13	0.00	Overtopping

Rating Curve Plot for Crossing: DA17C



Culvert Notes: DA17C

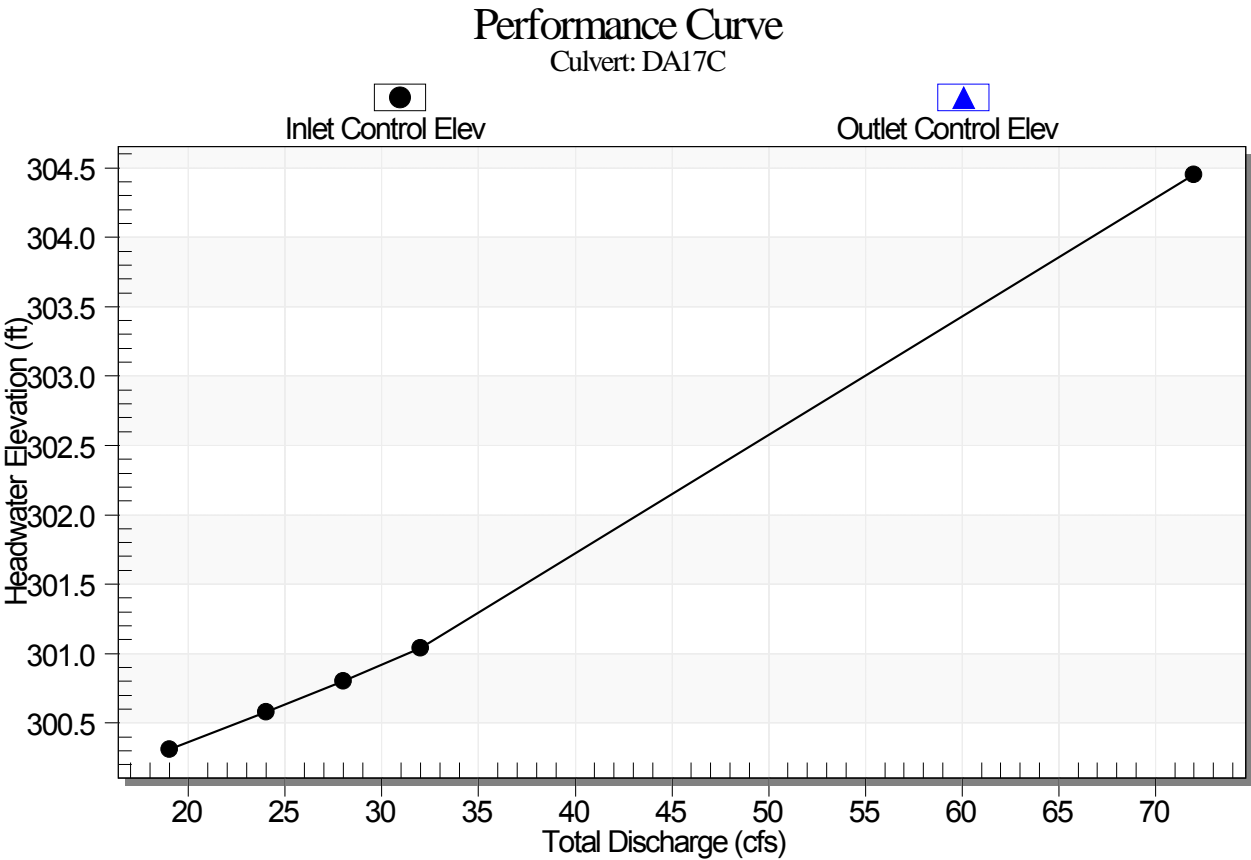
Table 2 - Culvert Summary Table: DA17C

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	19.00	19.00	300.31	1.622	0.0*	1-S2n	0.635	1.098	0.635	2.000	11.048	0.000
25 year	24.00	24.00	300.58	1.889	0.0*	1-S2n	0.719	1.239	0.719	2.000	11.788	0.000
50 year	28.00	28.00	300.80	2.111	0.0*	5-S2n	0.780	1.344	0.780	2.000	12.303	0.000
100 year	32.00	32.00	301.04	2.351	0.0*	5-S2n	0.842	1.437	0.842	2.000	12.721	0.000

* Full Flow Headwater elevation is below inlet invert.

Straight Culvert
Inlet Elevation (invert): 298.69 ft, Outlet Elevation (invert): 284.89 ft
Culvert Length: 450.21 ft, Culvert Slope: 0.0307

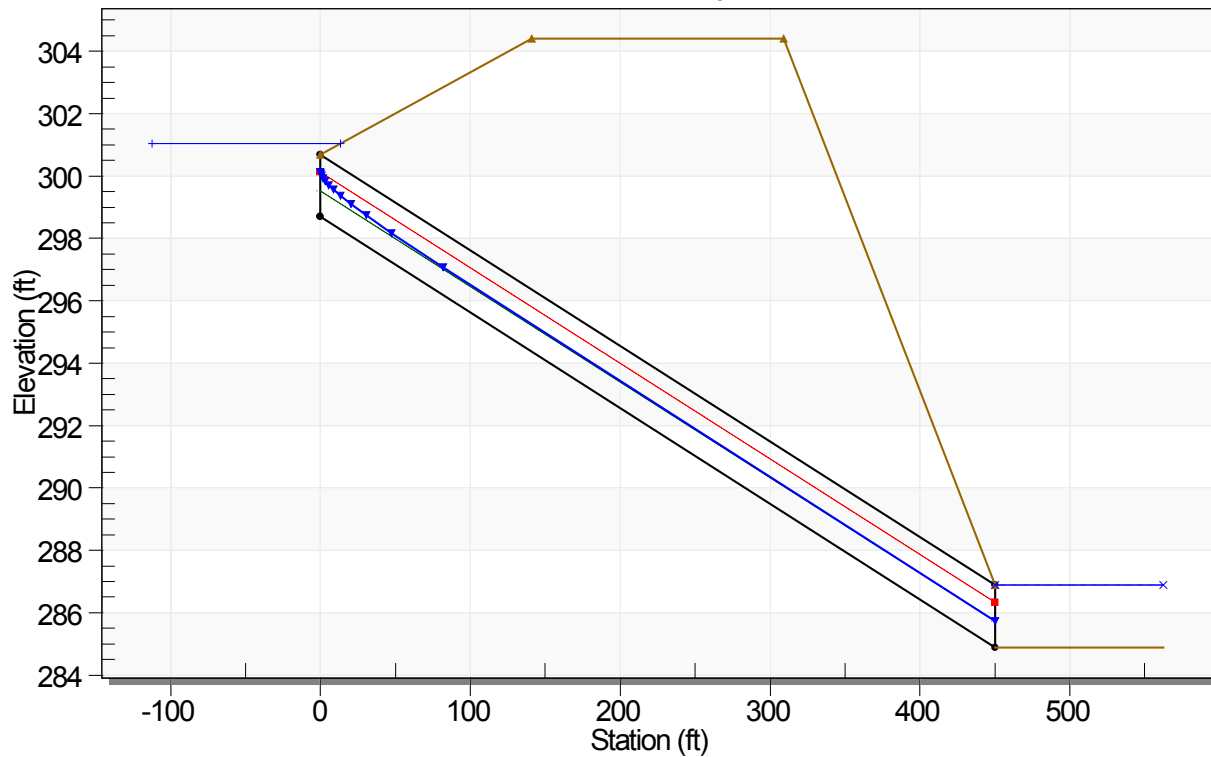
Culvert Performance Curve Plot: DA17C



Water Surface Profile Plot for Culvert: DA17C

Crossing - DA17C, Design Discharge - 32.0 cfs

Culvert - DA17C, Culvert Discharge - 32.0 cfs



Site Data - DA17C

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 298.69 ft

Outlet Station: 450.00 ft

Outlet Elevation: 284.89 ft

Number of Barrels: 2

Culvert Data Summary - DA17C

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: DA17C)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
19.00	286.89	2.00
24.00	286.89	2.00
28.00	286.89	2.00
32.00	286.89	2.00

Tailwater Channel Data - DA17C

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 286.89 ft

Roadway Data for Crossing: DA17C

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	304.40
1	84.00	304.40
2	168.00	304.40

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA19

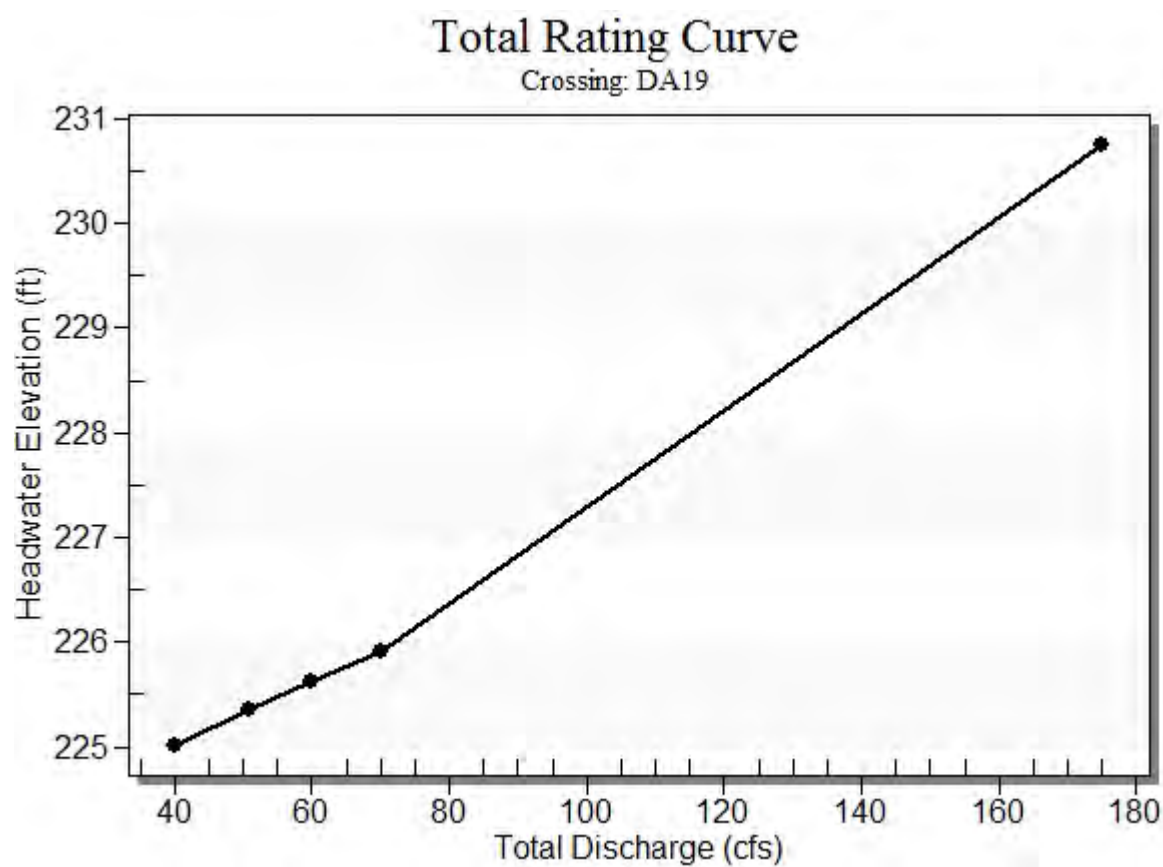
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: DA19

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA19 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
225.02	10 year	40.00	40.00	0.00	1
225.36	25 year	51.00	51.00	0.00	1
225.62	50 year	60.00	60.00	0.00	1
225.91	100 year	70.00	70.00	0.00	1
230.72	Overtopping	170.82	170.82	0.00	Overtopping

Rating Curve Plot for Crossing: DA19



Culvert Notes: DA19

Table 2 - Culvert Summary Table: DA19

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	40.00	40.00	225.02	2.081	0.0*	1-JS1f	0.973	1.436	3.000	3.000	3.012	0.000
25 year	51.00	51.00	225.36	2.417	0.0*	1-JS1f	1.104	1.625	3.000	3.000	3.841	0.000
50 year	60.00	60.00	225.62	2.679	0.0*	1-JS1f	1.206	1.769	3.000	3.000	4.519	0.000
100 year	70.00	70.00	225.91	2.973	0.0*	1-JS1f	1.320	1.919	3.000	3.000	5.272	0.000

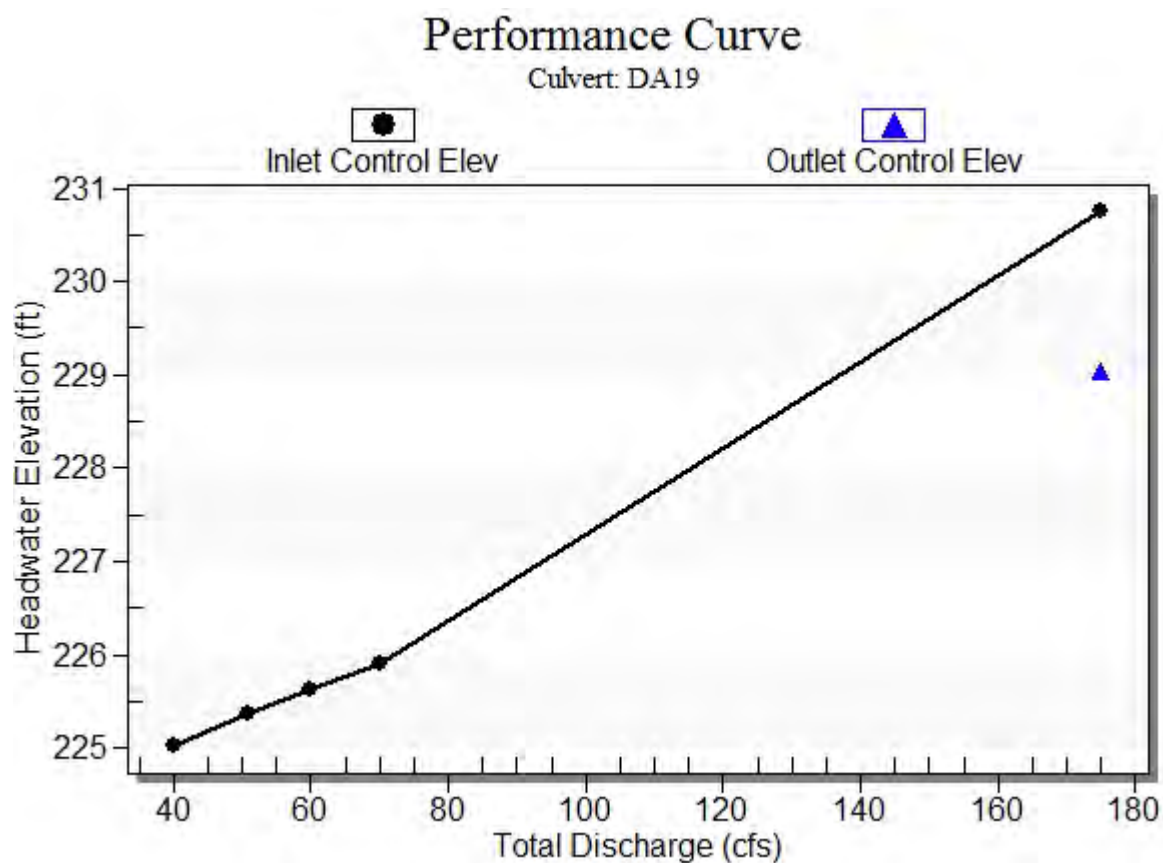
* Full Flow Headwater elevation is below inlet invert.

Straight Culvert

Inlet Elevation (invert): 222.94 ft, Outlet Elevation (invert): 214.79 ft

Culvert Length: 560.06 ft, Culvert Slope: 0.0146

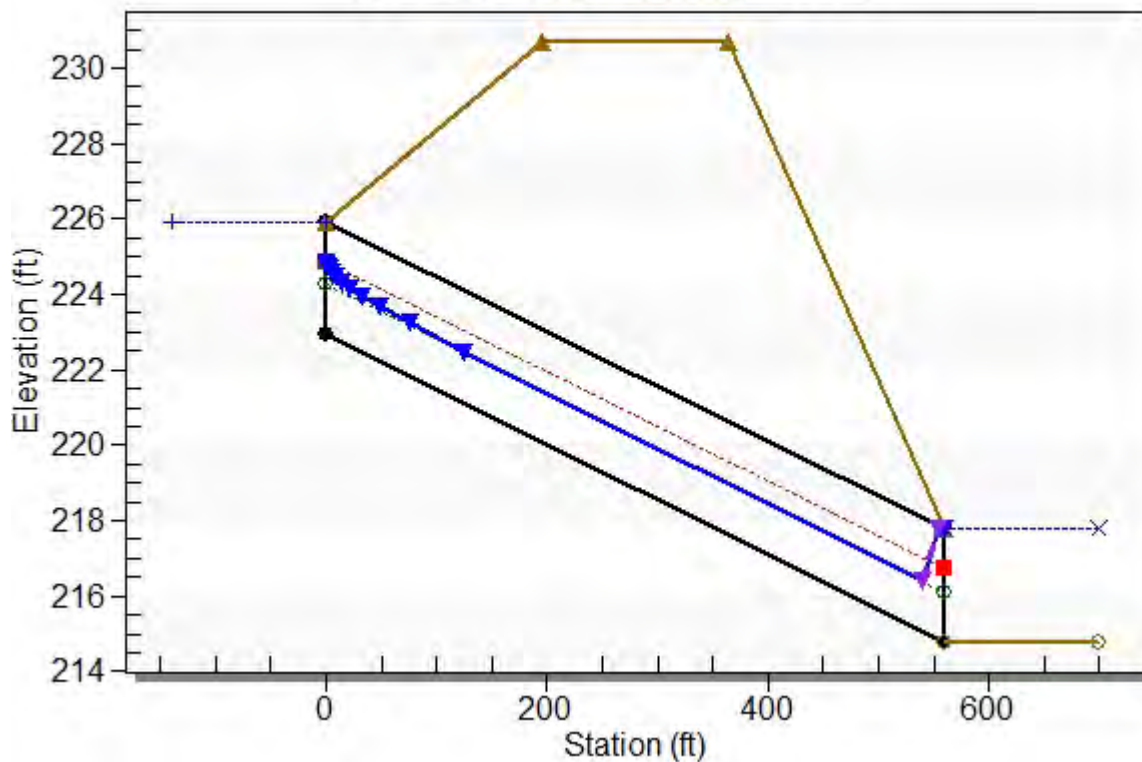
Culvert Performance Curve Plot: DA19



Water Surface Profile Plot for Culvert: DA19

Crossing - DA19, Design Discharge - 70.0 cfs

Culvert - DA19, Culvert Discharge - 70.0 cfs



Site Data - DA19

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 222.94 ft

Outlet Station: 560.00 ft

Outlet Elevation: 214.79 ft

Number of Barrels: 2

Culvert Data Summary - DA19

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: DA19)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
40.00	217.79	3.00
51.00	217.79	3.00
60.00	217.79	3.00
70.00	217.79	3.00

Tailwater Channel Data - DA19

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 217.79 ft

Roadway Data for Crossing: DA19

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	230.72
1	84.00	230.72
2	168.00	230.72

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA20

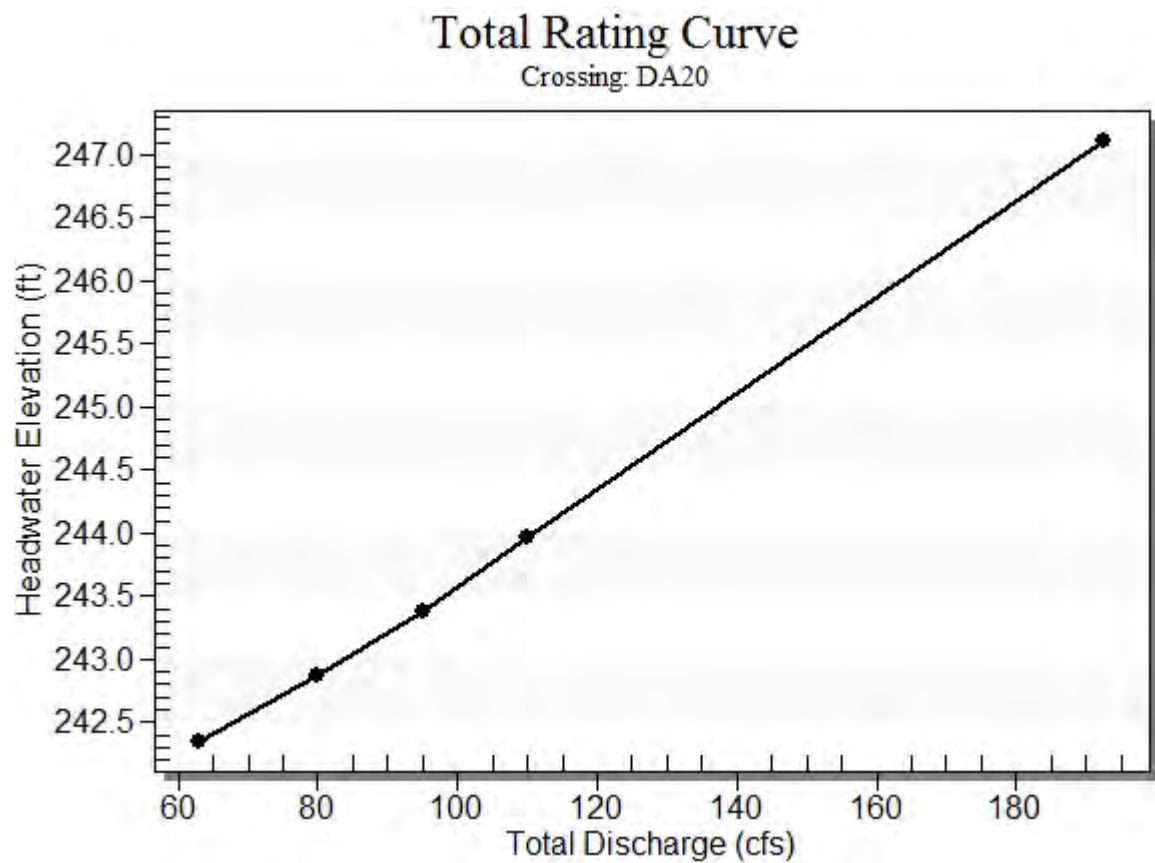
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: DA20

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA20 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
242.35	10 year	63.00	63.00	0.00	1
242.87	25 year	80.00	80.00	0.00	1
243.38	50 year	95.00	95.00	0.00	1
243.97	100 year	110.00	110.00	0.00	1
246.98	Overtopping	165.08	165.08	0.00	Overtopping

Rating Curve Plot for Crossing: DA20



Culvert Notes: DA20

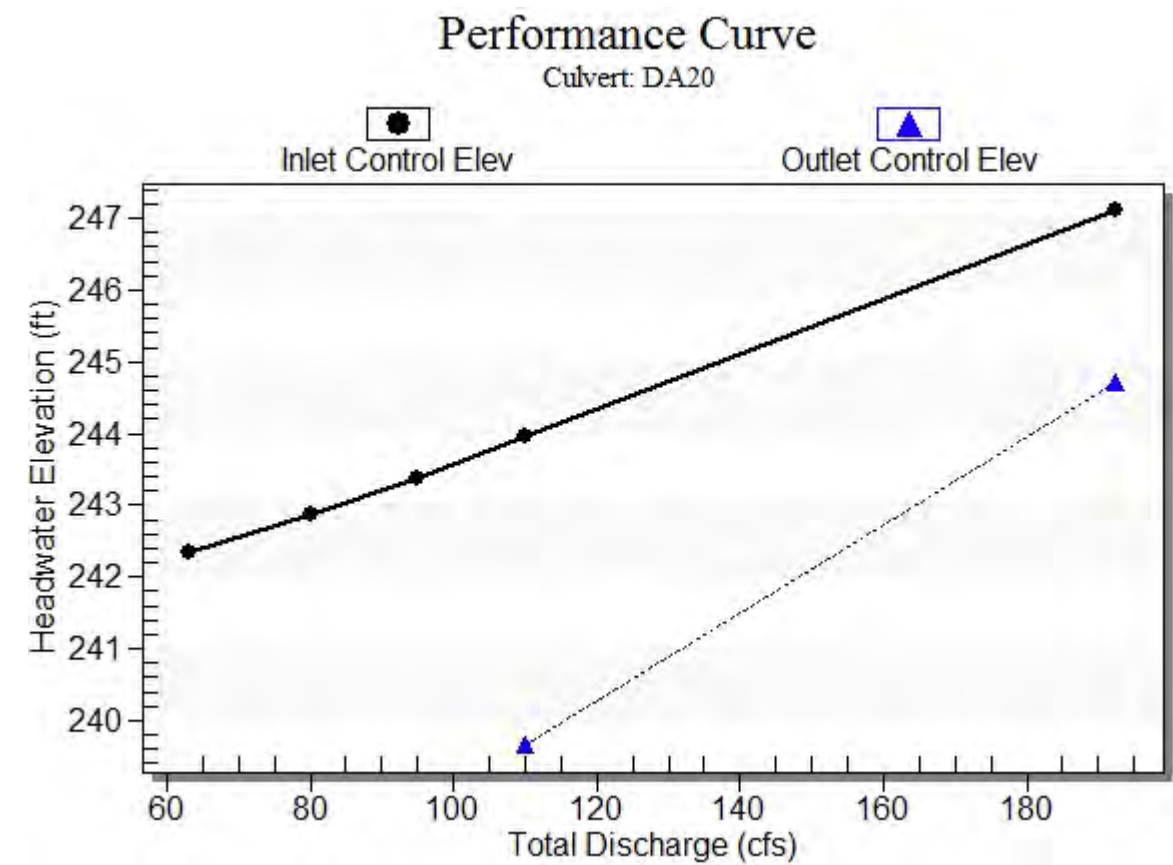
Table 2 - Culvert Summary Table: DA20

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	63.00	63.00	242.35	2.764	0.0*	1-JS1f	1.208	1.818	3.000	3.000	4.745	0.000
25 year	80.00	80.00	242.87	3.278	0.0*	5-S2n	1.386	2.057	1.386	3.000	12.529	0.000
50 year	95.00	95.00	243.38	3.790	0.0*	5-S2n	1.531	2.242	1.531	3.000	13.092	0.000
100 year	110.00	110.00	243.97	4.382	0.068	5-S2n	1.677	2.404	1.677	3.000	13.535	0.000

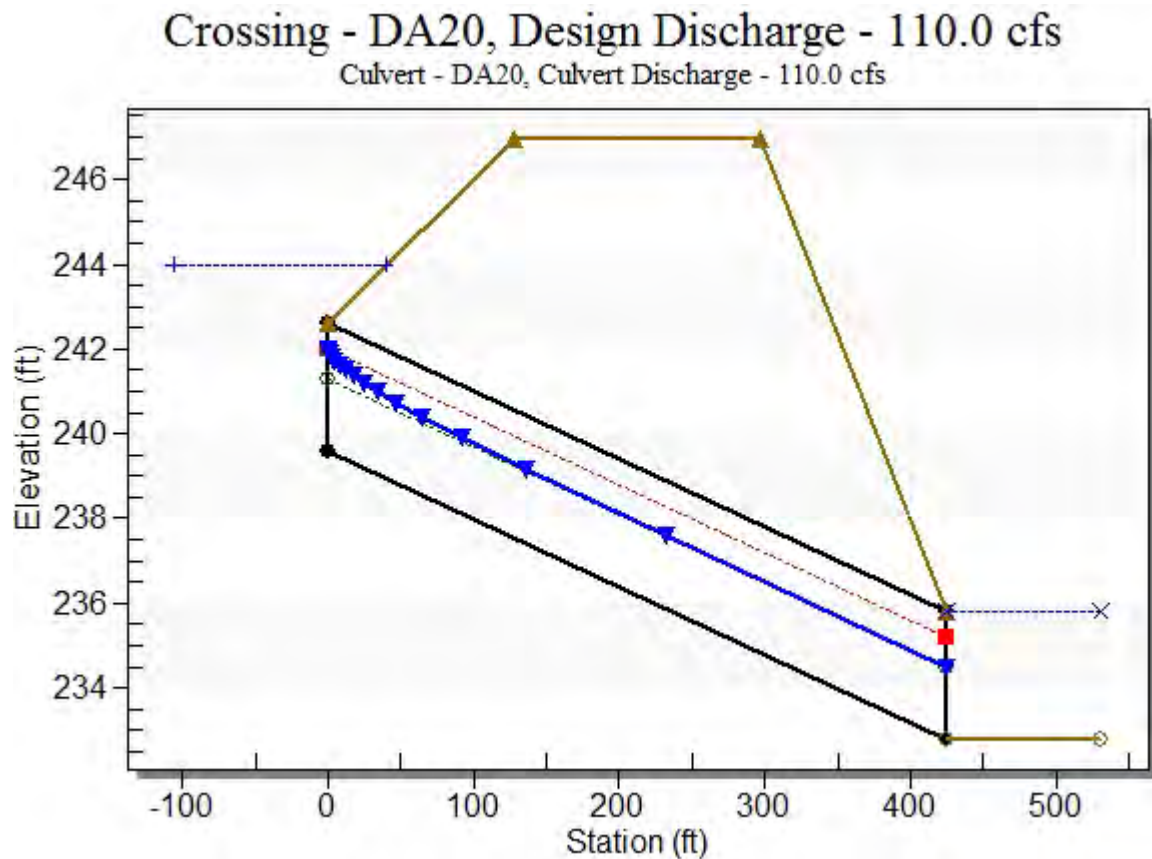
* Full Flow Headwater elevation is below inlet invert.

Straight Culvert
Inlet Elevation (invert): 239.59 ft, Outlet Elevation (invert): 232.80 ft
Culvert Length: 425.05 ft, Culvert Slope: 0.0160

Culvert Performance Curve Plot: DA20



Water Surface Profile Plot for Culvert: DA20



Site Data - DA20

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 239.59 ft

Outlet Station: 425.00 ft

Outlet Elevation: 232.80 ft

Number of Barrels: 2

Culvert Data Summary - DA20

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: DA20)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
63.00	235.80	3.00
80.00	235.80	3.00
95.00	235.80	3.00
110.00	235.80	3.00

Tailwater Channel Data - DA20

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 235.80 ft

Roadway Data for Crossing: DA20

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	246.98
1	84.00	246.98
2	168.00	246.98

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA21

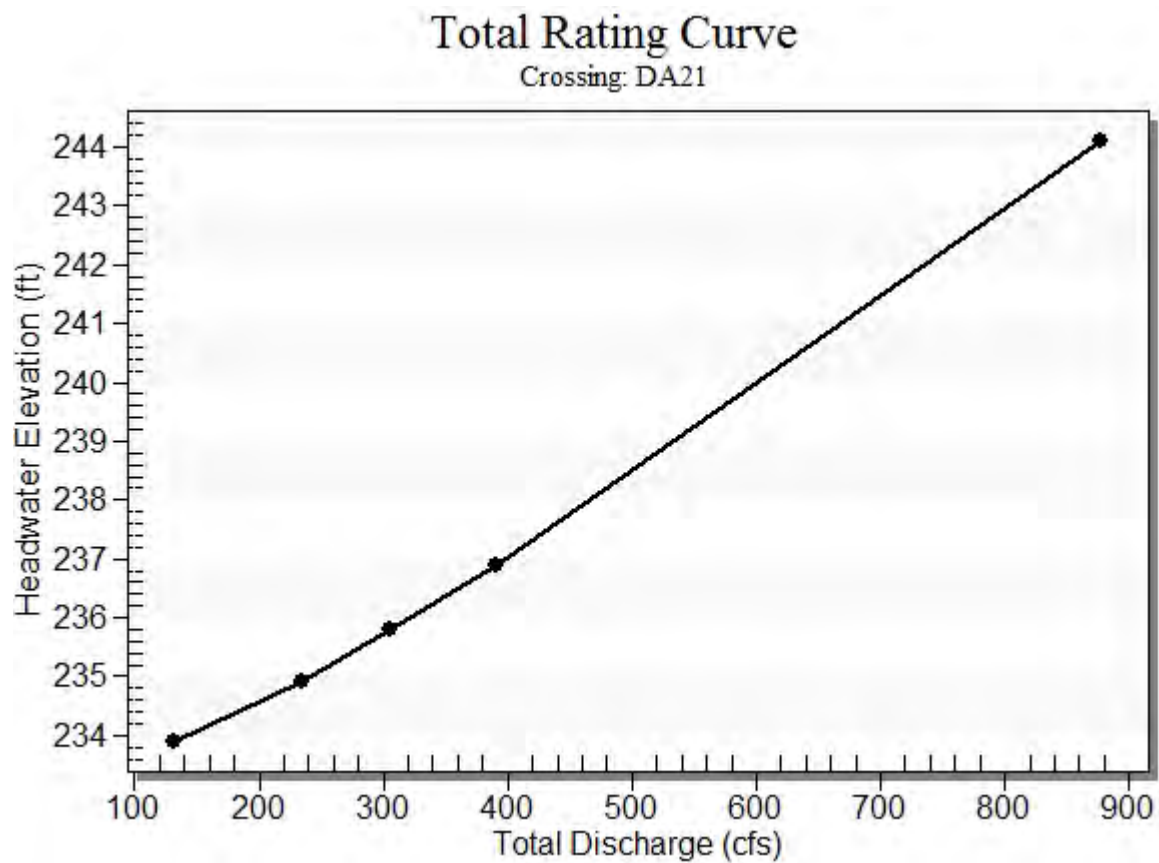
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: DA21

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA21 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
233.91	10 year	131.00	131.00	0.00	1
234.93	25 year	235.00	235.00	0.00	1
235.79	50 year	305.00	305.00	0.00	1
236.87	100 year	390.00	390.00	0.00	1
243.77	Overtopping	758.09	758.09	0.00	Overtopping

Rating Curve Plot for Crossing: DA21



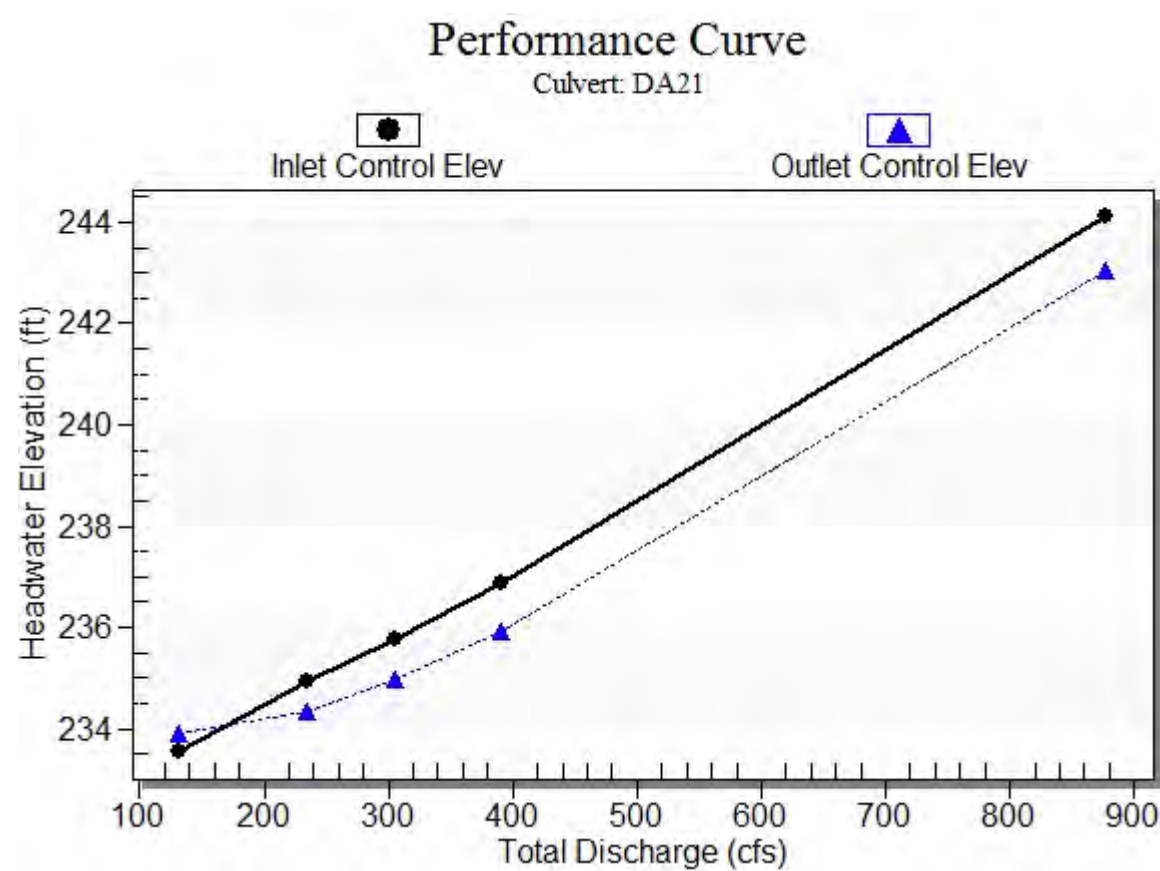
Culvert Notes: DA21

Table 2 - Culvert Summary Table: DA21

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	131.00	131.00	233.91	2.966	3.327	1-S1f	1.434	1.747	5.000	5.000	2.620	0.000
25 year	235.00	235.00	234.93	4.348	3.777	1-JS1f	2.197	2.579	5.000	5.000	4.700	0.000
50 year	305.00	305.00	235.79	5.207	4.384	5-JS1f	2.668	3.068	5.000	5.000	6.100	0.000
100 year	390.00	390.00	236.87	6.293	5.333	5-JS1f	3.221	3.615	5.000	5.000	7.800	0.000

Straight Culvert
Inlet Elevation (invert): 230.58 ft, Outlet Elevation (invert): 228.47 ft
Culvert Length: 350.01 ft, Culvert Slope: 0.0060

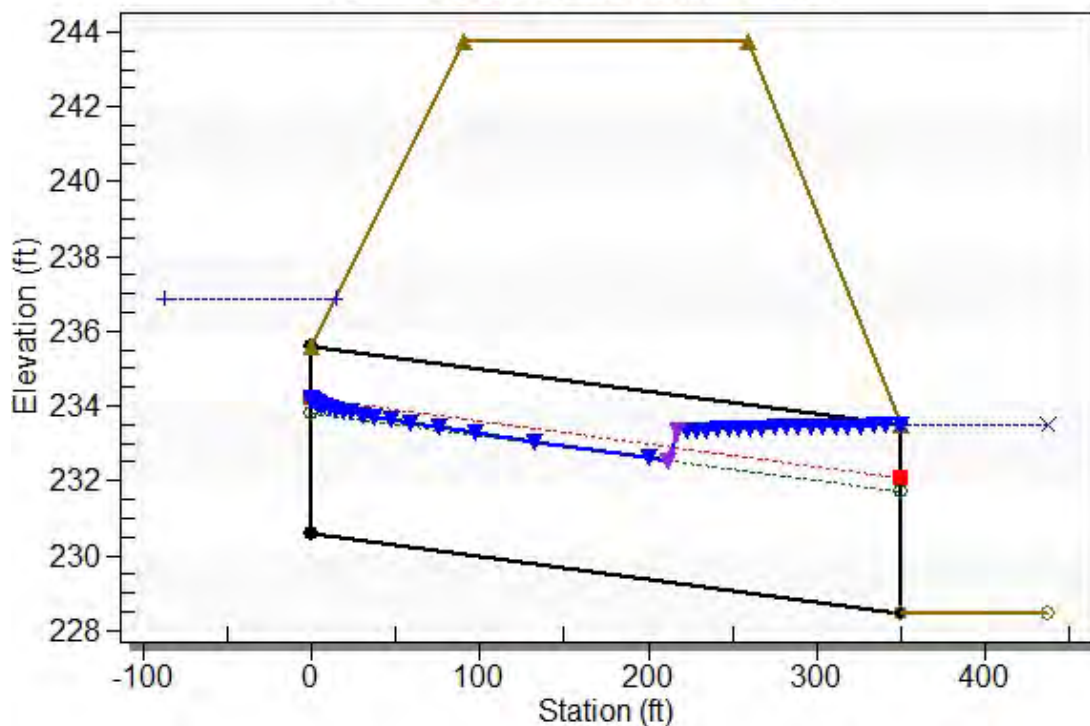
Culvert Performance Curve Plot: DA21



Water Surface Profile Plot for Culvert: DA21

Crossing - DA21, Design Discharge - 390.0 cfs

Culvert - DA21, Culvert Discharge - 390.0 cfs



Site Data - DA21

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 230.58 ft

Outlet Station: 350.00 ft

Outlet Elevation: 228.47 ft

Number of Barrels: 2

Culvert Data Summary - DA21

Barrel Shape: Concrete Box

Barrel Span: 5.00 ft

Barrel Rise: 5.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90°) Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: DA21)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
131.00	233.47	5.00
235.00	233.47	5.00
305.00	233.47	5.00
390.00	233.47	5.00

Tailwater Channel Data - DA21

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 233.47 ft

Roadway Data for Crossing: DA21

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	243.77
1	84.00	243.77
2	168.00	243.77

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA22

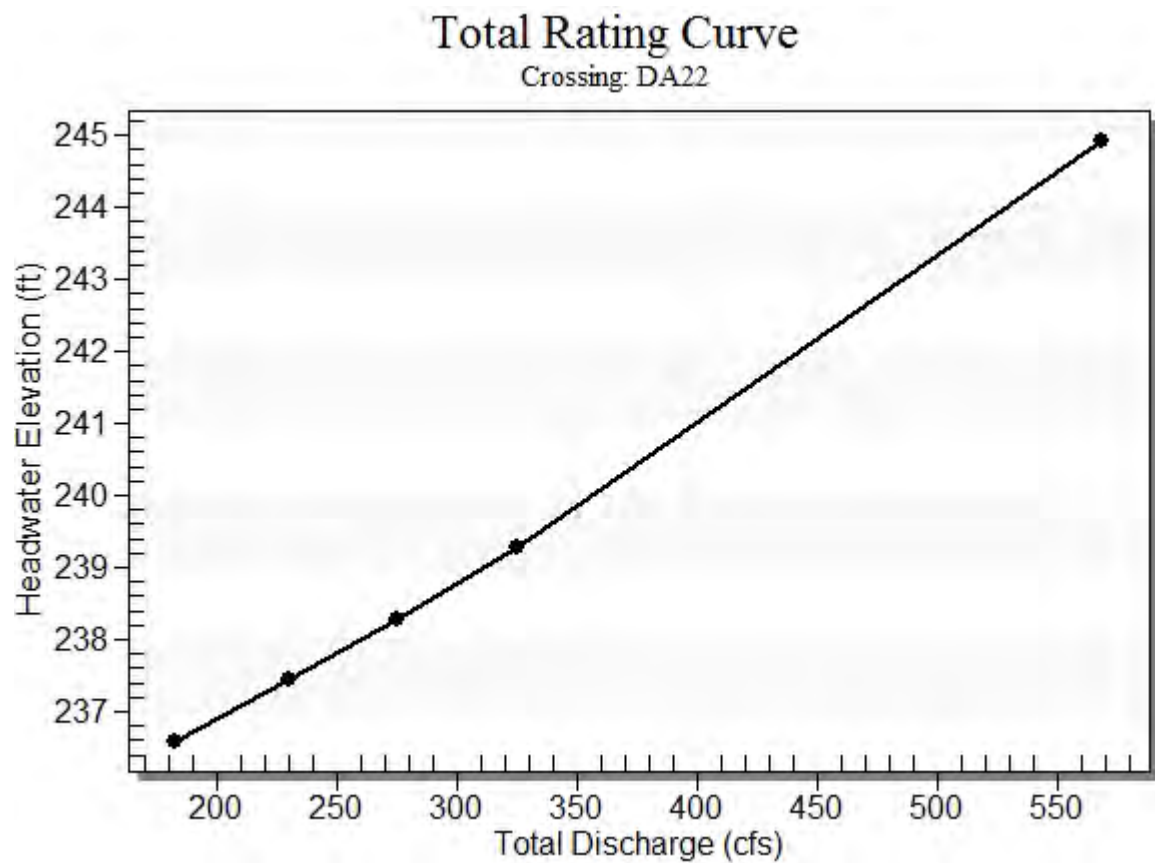
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: DA22

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA22 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
236.60	10 year	182.00	182.00	0.00	1
237.44	25 year	230.00	230.00	0.00	1
238.27	50 year	275.00	275.00	0.00	1
239.29	100 year	325.00	325.00	0.00	1
244.74	Overtopping	519.58	519.58	0.00	Overtopping

Rating Curve Plot for Crossing: DA22



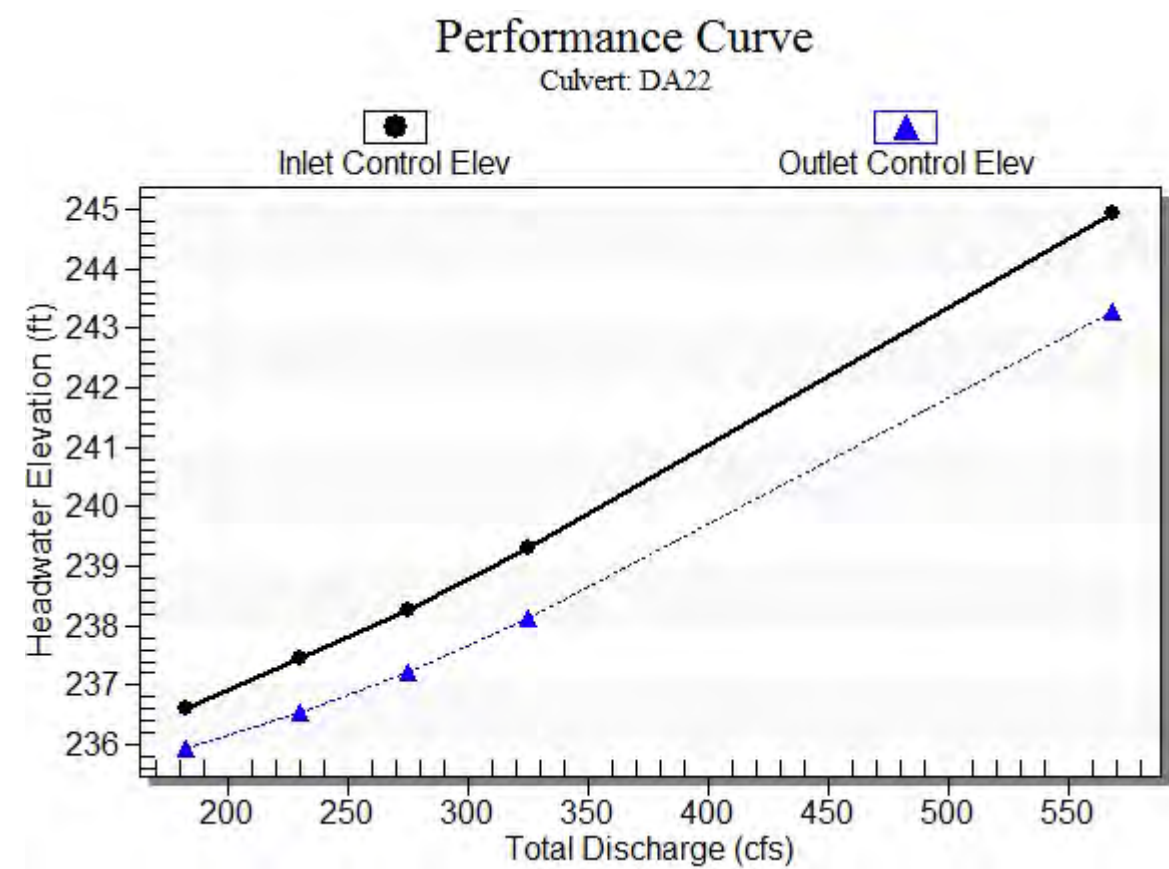
Culvert Notes: DA22

Table 2 - Culvert Summary Table: DA22

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	182.00	182.00	236.60	4.656	3.991	1-JS1f	2.244	2.759	5.000	5.000	5.200	0.000
25 year	230.00	230.00	237.44	5.500	4.588	5-JS1f	2.652	3.225	5.000	5.000	6.571	0.000
50 year	275.00	275.00	238.27	6.332	5.275	5-JS1f	3.023	3.632	5.000	5.000	7.857	0.000
100 year	325.00	325.00	239.29	7.351	6.182	5-JS1f	3.424	4.060	5.000	5.000	9.286	0.000

Straight Culvert
Inlet Elevation (invert): 231.94 ft, Outlet Elevation (invert): 229.93 ft
Culvert Length: 350.01 ft, Culvert Slope: 0.0057

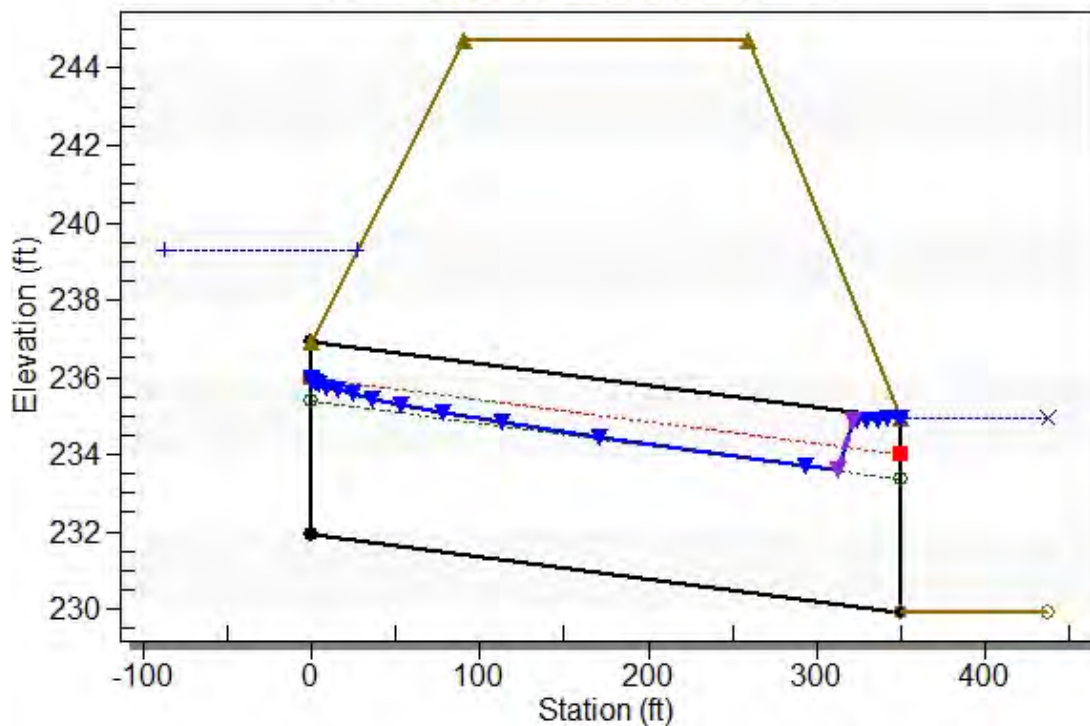
Culvert Performance Curve Plot: DA22



Water Surface Profile Plot for Culvert: DA22

Crossing - DA22, Design Discharge - 325.0 cfs

Culvert - DA22, Culvert Discharge - 325.0 cfs



Site Data - DA22

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 231.94 ft

Outlet Station: 350.00 ft

Outlet Elevation: 229.93 ft

Number of Barrels: 1

Culvert Data Summary - DA22

Barrel Shape: Concrete Box

Barrel Span: 7.00 ft

Barrel Rise: 5.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90°) Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: DA22)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
182.00	234.93	5.00
230.00	234.93	5.00
275.00	234.93	5.00
325.00	234.93	5.00

Tailwater Channel Data - DA22

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 234.93 ft

Roadway Data for Crossing: DA22

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	244.74
1	84.00	244.74
2	168.00	244.74

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA23

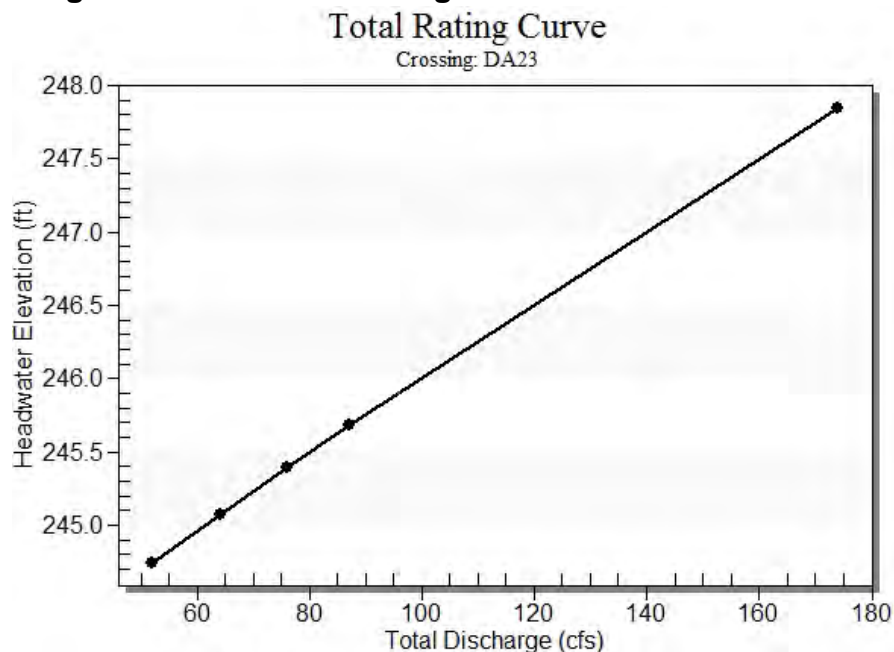
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: DA23

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA23 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
244.75	10 year	52.00	52.00	0.00	1
245.07	25 year	64.00	64.00	0.00	1
245.39	50 year	76.00	76.00	0.00	1
245.68	100 year	87.00	87.00	0.00	1
247.74	Overtopping	152.85	152.85	0.00	Overtopping

Rating Curve Plot for Crossing: DA23



Culvert Notes: DA23

Table 2 - Culvert Summary Table: DA23

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	52.00	52.00	244.75	2.225	0.0*	1-JS1f	0.772	1.326	3.000	3.000	2.889	0.000
25 year	64.00	64.00	245.07	2.554	0.0*	1-JS1f	0.886	1.523	3.000	3.000	3.556	0.000
50 year	76.00	76.00	245.39	2.872	0.0*	1-JS1f	1.000	1.708	3.000	3.000	4.222	0.000
100 year	87.00	87.00	245.68	3.162	0.0*	5-S2n	1.091	1.869	1.091	3.000	13.288	0.000

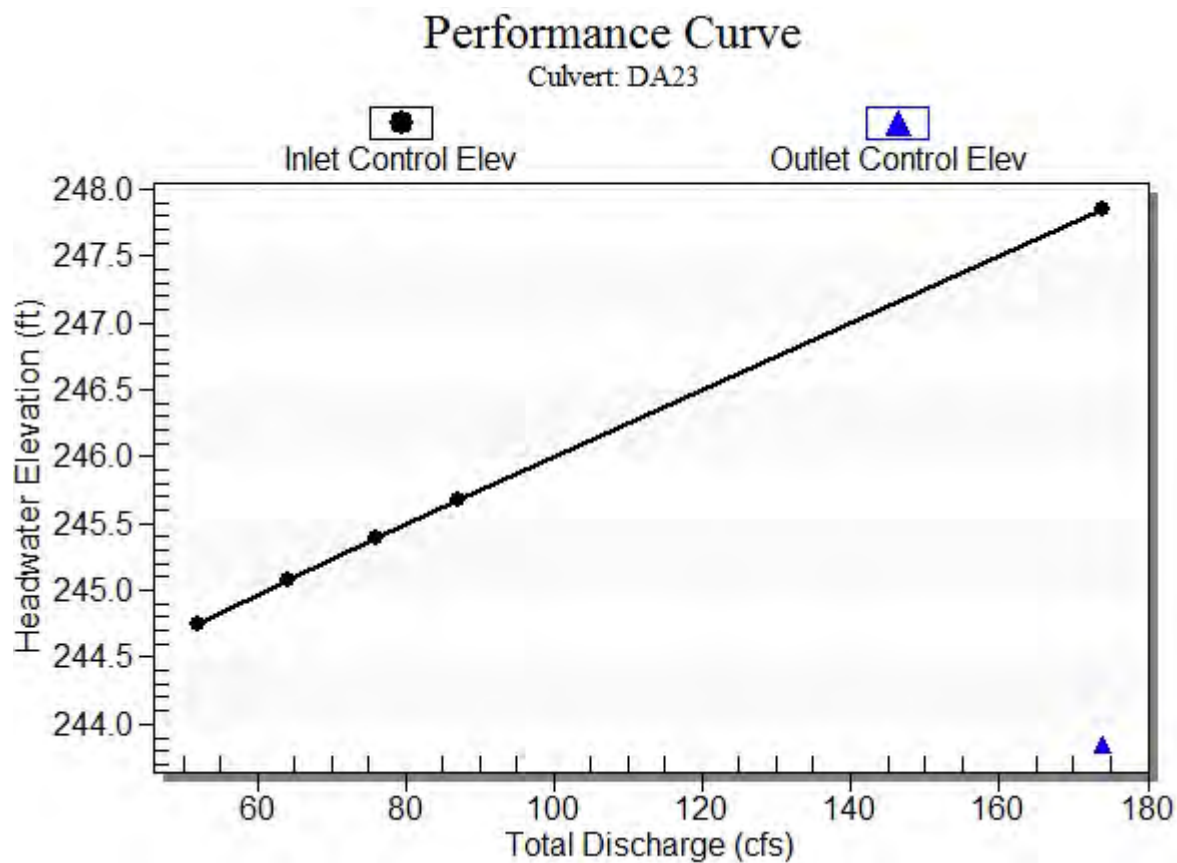
* Full Flow Headwater elevation is below inlet invert.

Straight Culvert

Inlet Elevation (invert): 242.52 ft, Outlet Elevation (invert): 237.51 ft

Culvert Length: 328.04 ft, Culvert Slope: 0.0153

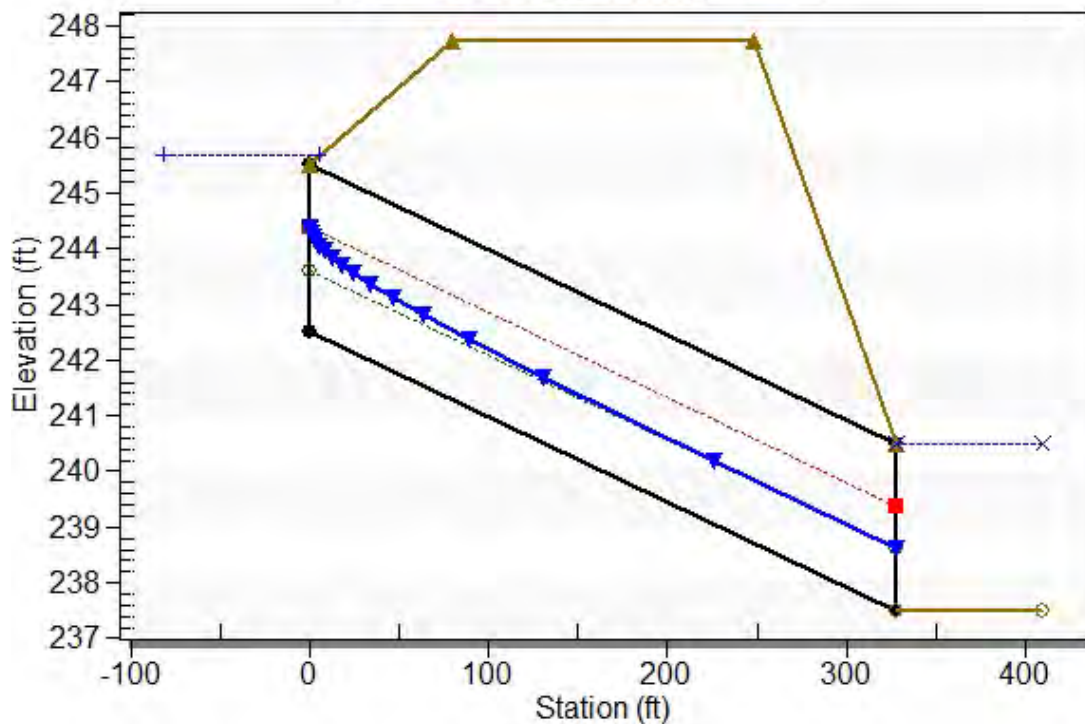
Culvert Performance Curve Plot: DA23



Water Surface Profile Plot for Culvert: DA23

Crossing - DA23, Design Discharge - 87.0 cfs

Culvert - DA23, Culvert Discharge - 87.0 cfs



Site Data - DA23

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 242.52 ft

Outlet Station: 328.00 ft

Outlet Elevation: 237.51 ft

Number of Barrels: 1

Culvert Data Summary - DA23

Barrel Shape: Concrete Box

Barrel Span: 6.00 ft

Barrel Rise: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90°) Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: DA23)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
52.00	240.51	3.00
64.00	240.51	3.00
76.00	240.51	3.00
87.00	240.51	3.00

Tailwater Channel Data - DA23

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 240.51 ft

Roadway Data for Crossing: DA23

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	247.74
1	84.00	247.74
2	168.00	247.74

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA24

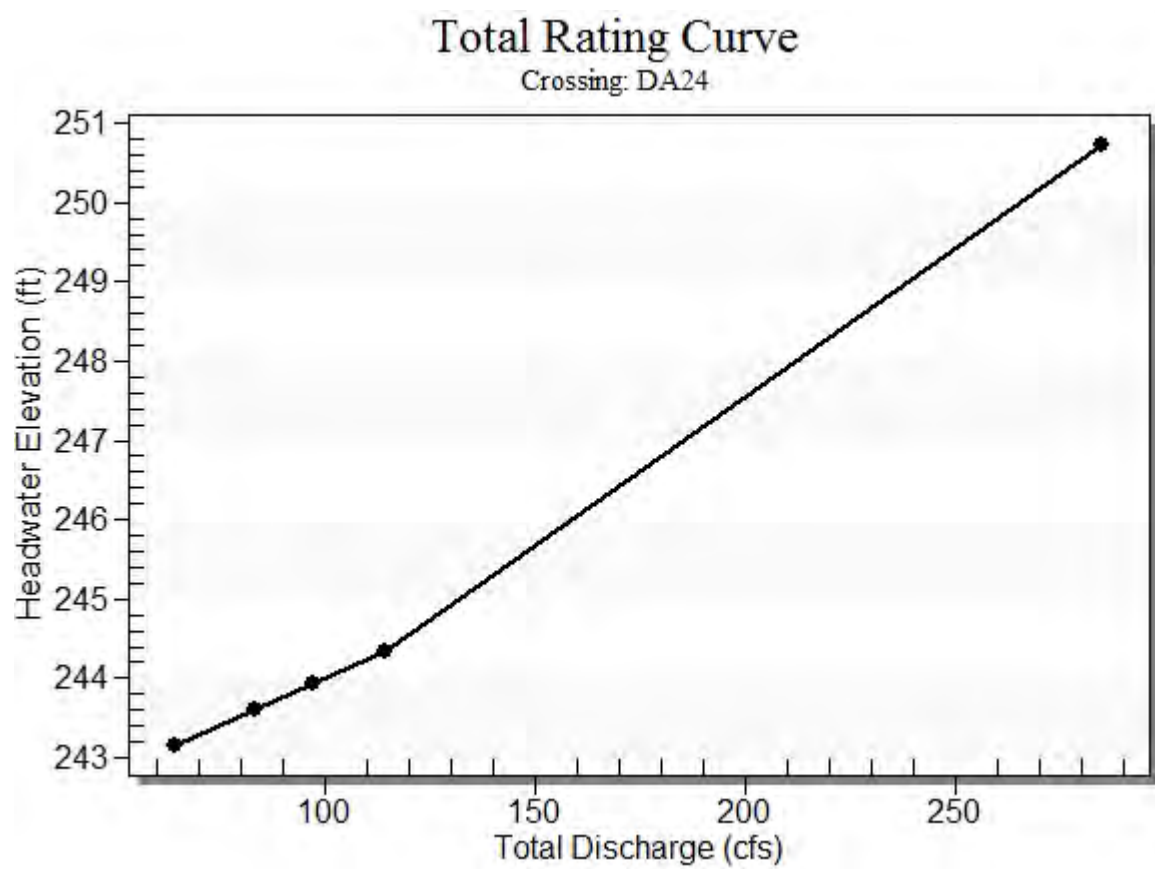
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: DA24

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA24 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
243.16	10 year	64.00	64.00	0.00	1
243.61	25 year	83.00	83.00	0.00	1
243.93	50 year	97.00	97.00	0.00	1
244.34	100 year	114.00	114.00	0.00	1
250.64	Overtopping	268.15	268.15	0.00	Overtopping

Rating Curve Plot for Crossing: DA24



Culvert Notes: DA24

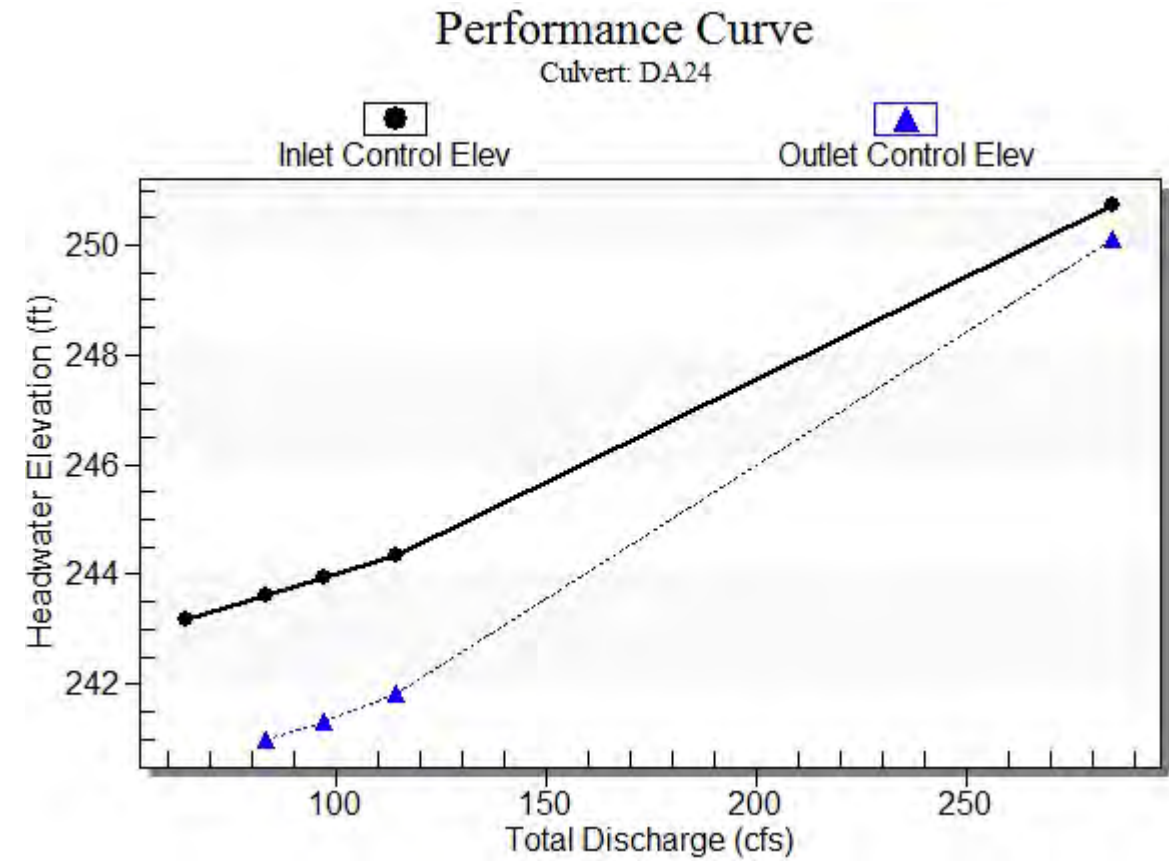
Table 2 - Culvert Summary Table: DA24

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	64.00	64.00	243.16	2.563	0.0*	1-JS1f	1.250	1.750	3.500	3.500	3.541	0.000
25 year	83.00	83.00	243.61	3.012	0.382	1-JS1f	1.439	2.001	3.500	3.500	4.592	0.000
50 year	97.00	97.00	243.93	3.335	0.730	1-JS1f	1.577	2.172	3.500	3.500	5.367	0.000
100 year	114.00	114.00	244.34	3.742	1.226	5-JS1f	1.728	2.362	3.500	3.500	6.308	0.000

* Full Flow Headwater elevation is below inlet invert.

Straight Culvert
Inlet Elevation (invert): 240.60 ft, Outlet Elevation (invert): 236.53 ft
Culvert Length: 360.02 ft, Culvert Slope: 0.0113

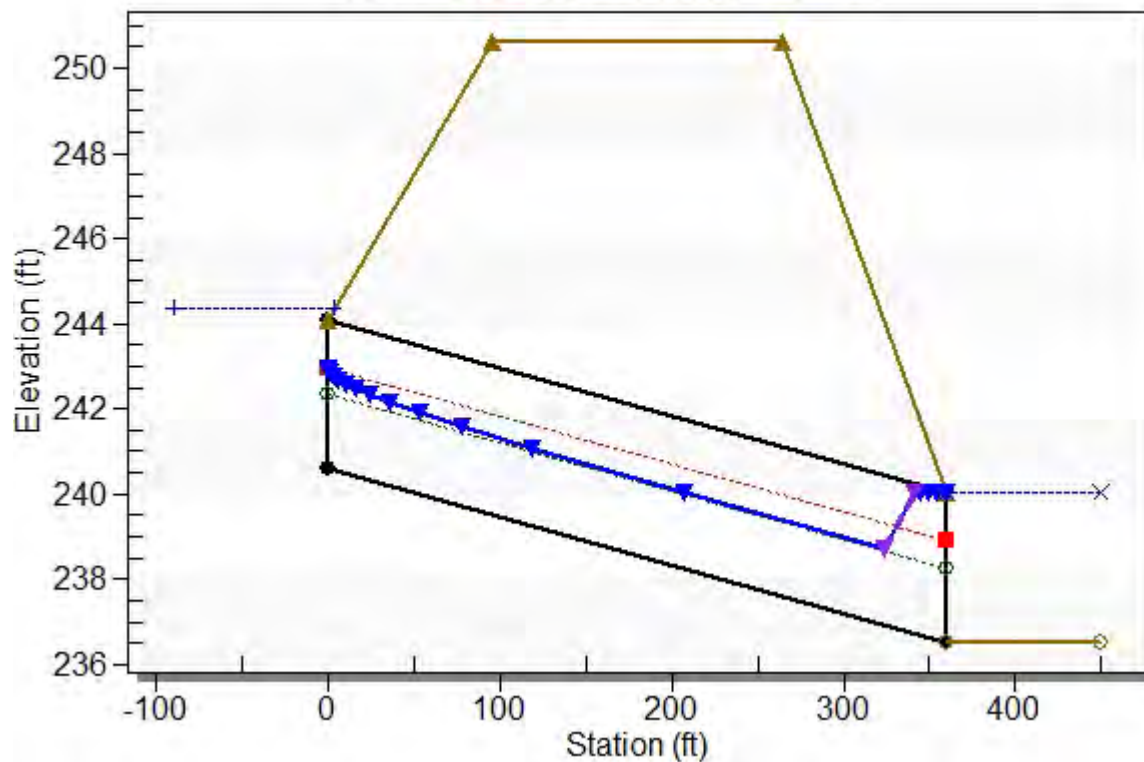
Culvert Performance Curve Plot: DA24



Water Surface Profile Plot for Culvert: DA24

Crossing - DA24, Design Discharge - 114.0 cfs

Culvert - DA24, Culvert Discharge - 114.0 cfs



Site Data - DA24

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 240.60 ft

Outlet Station: 360.00 ft

Outlet Elevation: 236.53 ft

Number of Barrels: 2

Culvert Data Summary - DA24

Barrel Shape: Circular

Barrel Diameter: 3.50 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: DA24)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
64.00	240.03	3.50
83.00	240.03	3.50
97.00	240.03	3.50
114.00	240.03	3.50

Tailwater Channel Data - DA24

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 240.03 ft

Roadway Data for Crossing: DA24

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	250.64
1	84.00	250.64
2	168.00	250.64

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA26

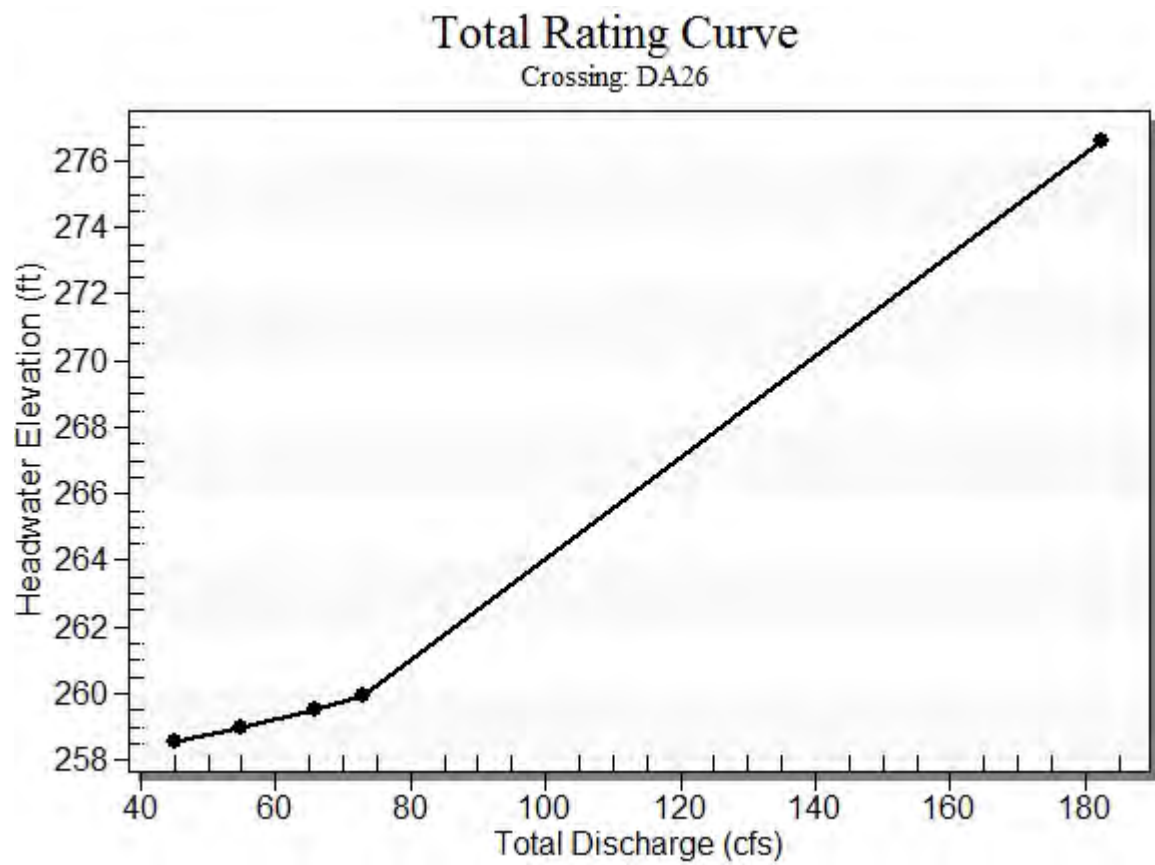
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: DA26

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA26 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
258.59	10 year	45.00	45.00	0.00	1
259.00	25 year	55.00	55.00	0.00	1
259.53	50 year	66.00	66.00	0.00	1
259.92	100 year	73.00	73.00	0.00	1
276.56	Overtopping	173.48	173.48	0.00	Overtopping

Rating Curve Plot for Crossing: DA26



Culvert Notes: DA26

Table 2 - Culvert Summary Table: DA26

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	45.00	45.00	258.59	2.506	0.0*	5-JS1f	1.217	1.610	2.500	2.500	4.880	0.000
25 year	55.00	55.00	259.00	2.923	0.304	5-JS1f	1.375	1.786	2.500	2.500	5.965	0.000
50 year	66.00	66.00	259.53	3.455	1.296	5-S2n	1.547	1.953	1.547	2.500	10.359	0.000
100 year	73.00	73.00	259.92	3.845	2.021	5-S2n	1.657	2.046	1.657	2.500	10.572	0.000

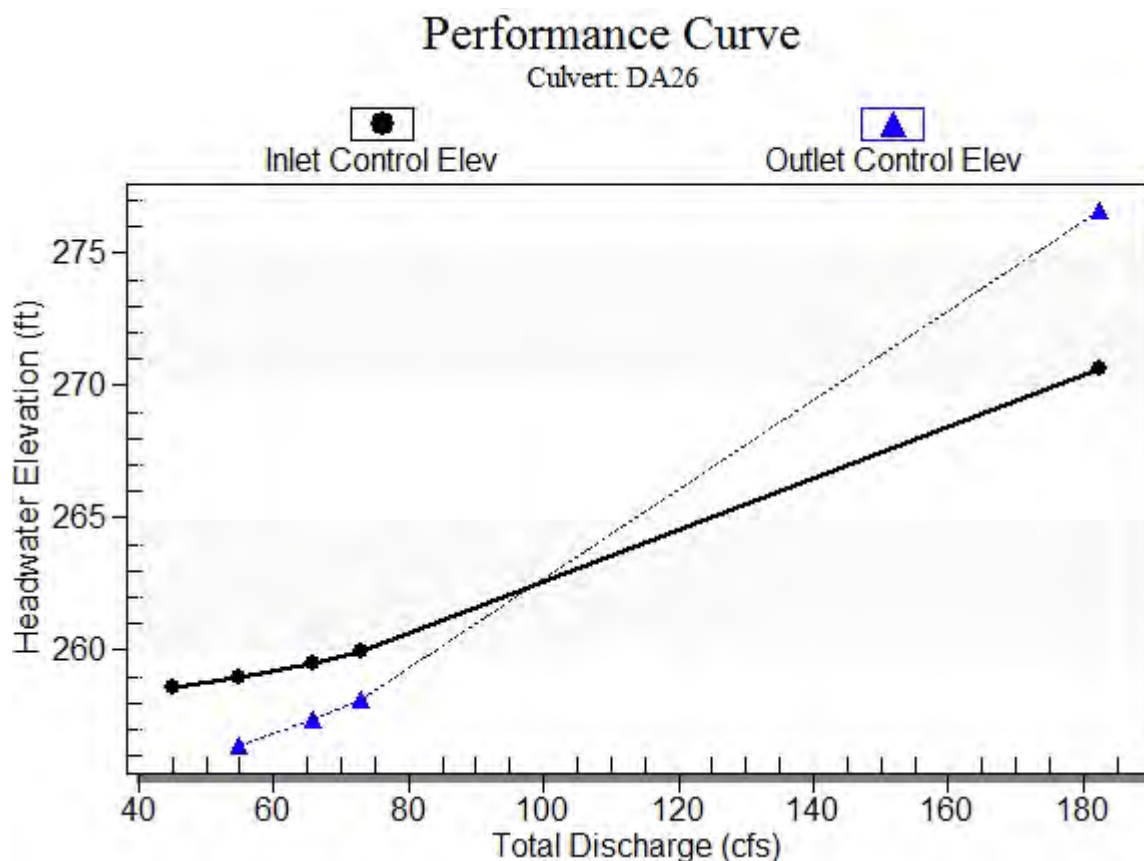
* Full Flow Headwater elevation is below inlet invert.

Straight Culvert

Inlet Elevation (invert): 256.08 ft, Outlet Elevation (invert): 251.63 ft

Culvert Length: 400.02 ft, Culvert Slope: 0.0111

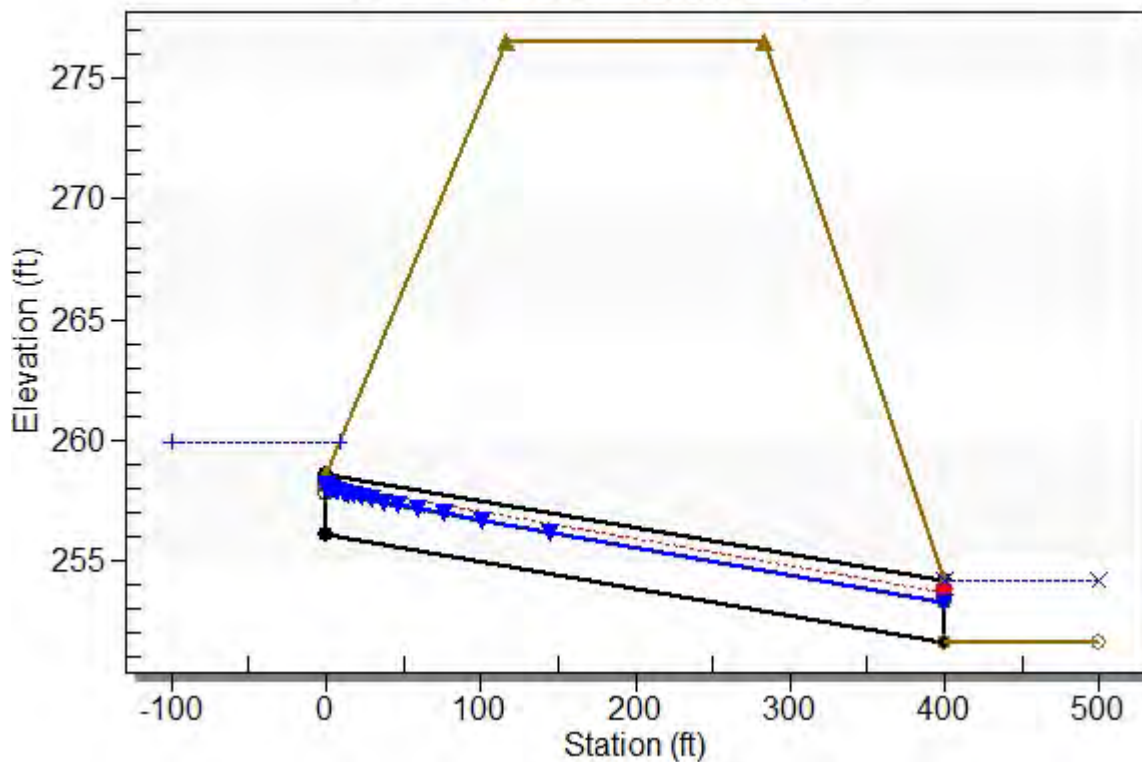
Culvert Performance Curve Plot: DA26



Water Surface Profile Plot for Culvert: DA26

Crossing - DA26, Design Discharge - 73.0 cfs

Culvert - DA26, Culvert Discharge - 73.0 cfs



Site Data - DA26

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 256.08 ft

Outlet Station: 400.00 ft

Outlet Elevation: 251.63 ft

Number of Barrels: 2

Culvert Data Summary - DA26

Barrel Shape: Circular

Barrel Diameter: 2.50 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: DA26)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
45.00	254.13	2.50
55.00	254.13	2.50
66.00	254.13	2.50
73.00	254.13	2.50

Tailwater Channel Data - DA26

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 254.13 ft

Roadway Data for Crossing: DA26

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	276.56
1	84.00	276.56
2	168.00	276.56

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA27

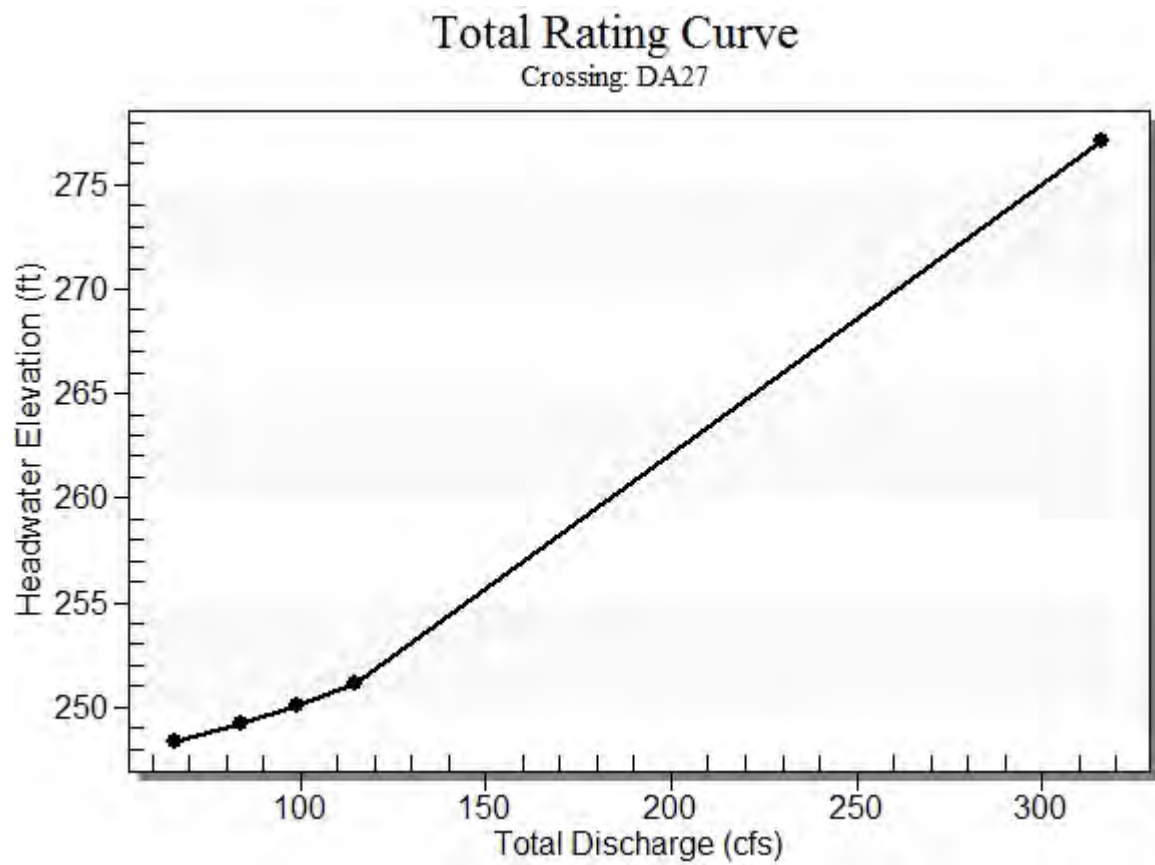
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: DA27

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA27 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
248.39	10 year	66.00	66.00	0.00	1
249.22	25 year	84.00	84.00	0.00	1
250.06	50 year	99.00	99.00	0.00	1
251.11	100 year	115.00	115.00	0.00	1
277.11	Overtopping	312.91	312.91	0.00	Overtopping

Rating Curve Plot for Crossing: DA27



Culvert Notes: DA27

Table 2 - Culvert Summary Table: DA27

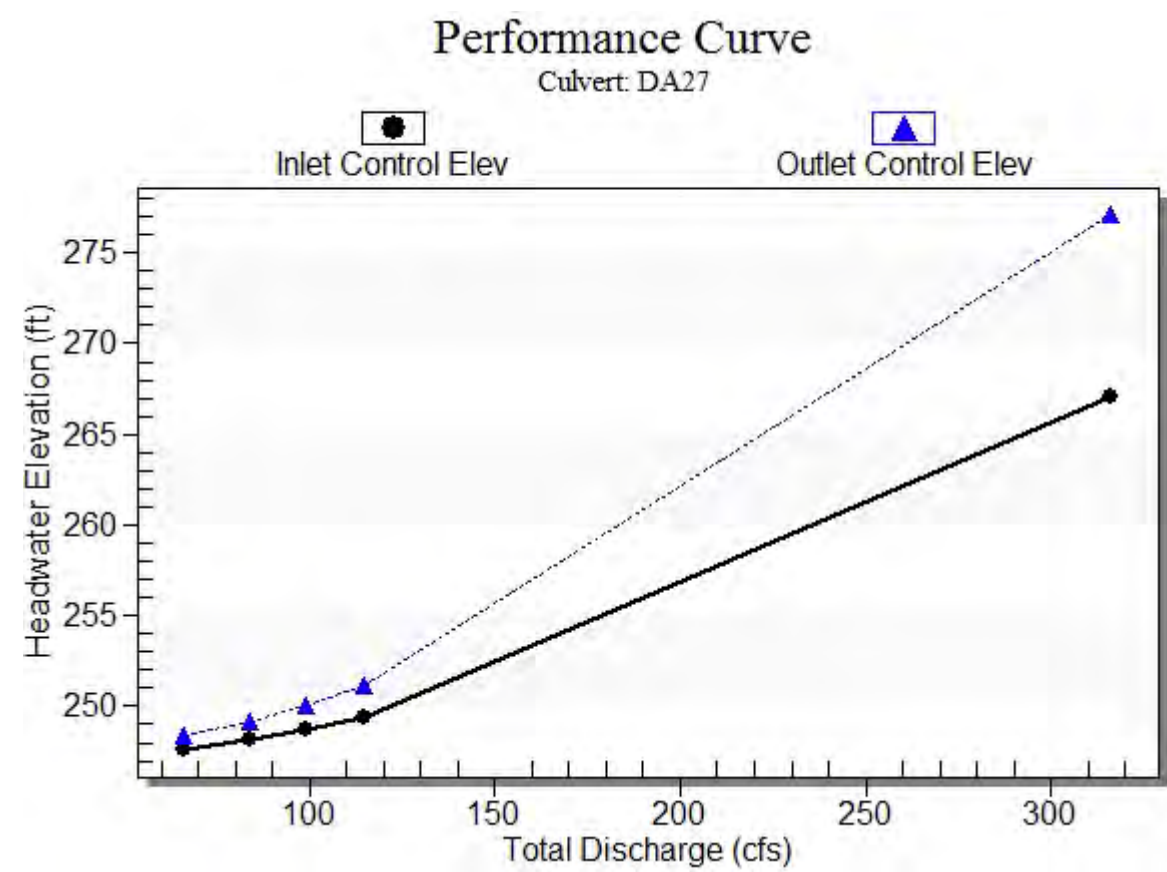
Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	66.00	66.00	248.39	2.870	3.657	4-FFf	1.858	1.862	3.000	4.000	4.669	0.000
25 year	84.00	84.00	249.22	3.426	4.486	4-FFf	2.224	2.109	3.000	4.000	5.942	0.000
50 year	99.00	99.00	250.06	3.957	5.329	4-FFf	2.652	2.287	3.000	4.000	7.003	0.000
100 year	115.00	115.00	251.11	4.617	6.380	4-FFf	3.000	2.453	3.000	4.000	8.135	0.000

Straight Culvert

Inlet Elevation (invert): 244.73 ft, Outlet Elevation (invert): 243.05 ft

Culvert Length: 400.00 ft, Culvert Slope: 0.0042

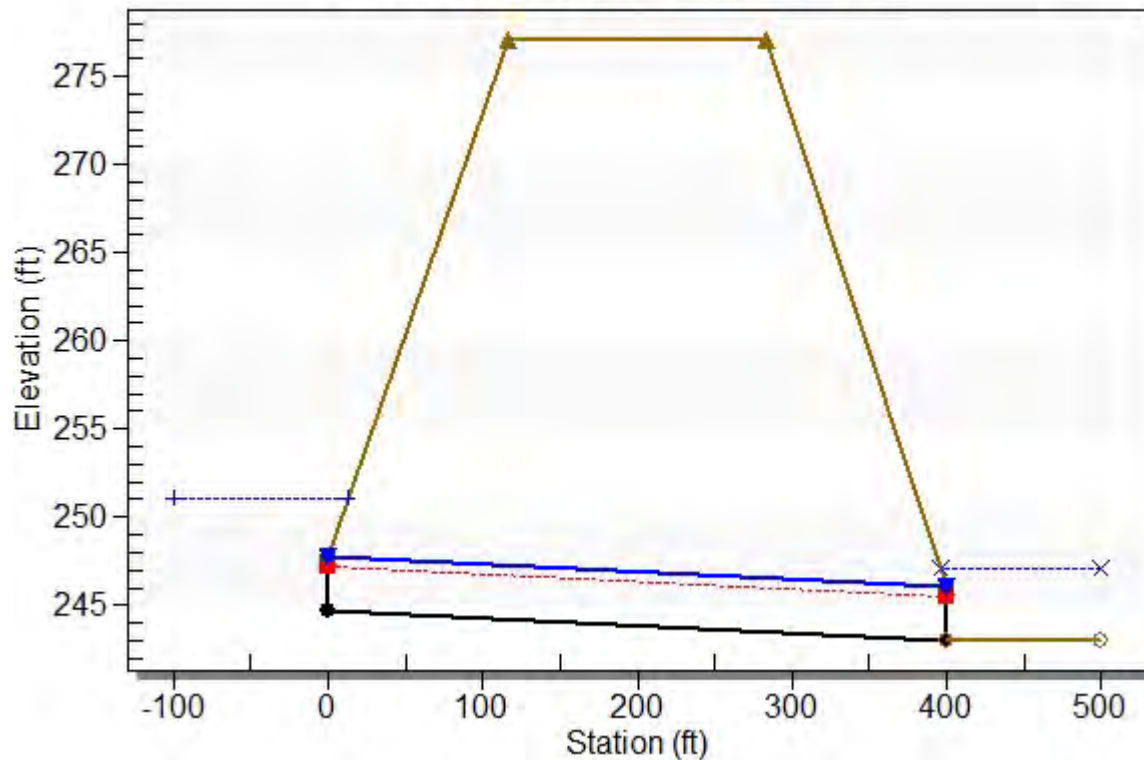
Culvert Performance Curve Plot: DA27



Water Surface Profile Plot for Culvert: DA27

Crossing - DA27, Design Discharge - 115.0 cfs

Culvert - DA27, Culvert Discharge - 115.0 cfs



Site Data - DA27

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 244.73 ft

Outlet Station: 400.00 ft

Outlet Elevation: 243.05 ft

Number of Barrels: 2

Culvert Data Summary - DA27

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: DA27)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
66.00	247.05	4.00
84.00	247.05	4.00
99.00	247.05	4.00
115.00	247.05	4.00

Tailwater Channel Data - DA27

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 247.05 ft

Roadway Data for Crossing: DA27

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	277.11
1	84.00	277.11
2	168.00	277.11

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA28

Crossing Discharge Data

Discharge Selection Method: Recurrence

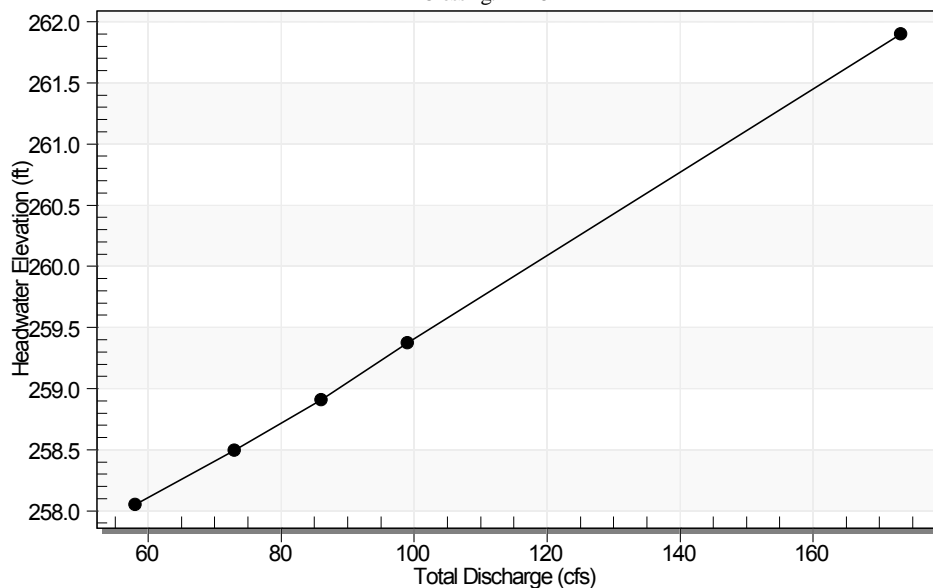
Table 1 - Summary of Culvert Flows at Crossing: DA28

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA28 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
258.05	10 year	58.00	58.00	0.00	1
258.49	25 year	73.00	73.00	0.00	1
258.91	50 year	86.00	86.00	0.00	1
259.37	100 year	99.00	99.00	0.00	1
261.77	Overtopping	148.36	148.36	0.00	Overtopping

Rating Curve Plot for Crossing: DA28

Total Rating Curve (Performance)

Crossing: DA28



Culvert Notes: DA28

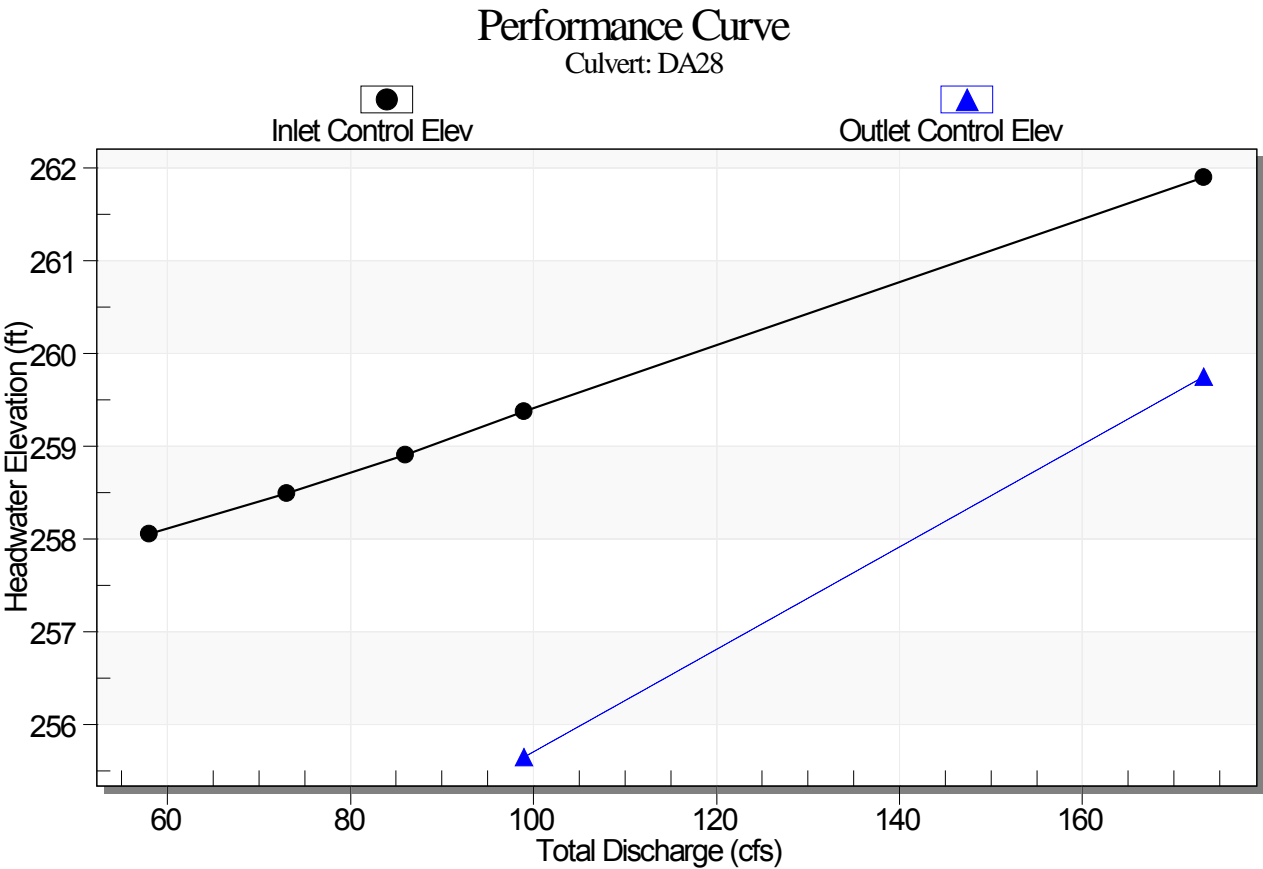
Table 2 - Culvert Summary Table: DA28

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	58.00	58.00	258.05	2.623	0.0*	1-JS1f	1.199	1.739	3.000	3.000	4.368	0.000
25 year	73.00	73.00	258.49	3.064	0.0*	5-JS1f	1.370	1.960	3.000	3.000	5.498	0.000
50 year	86.00	86.00	258.91	3.478	0.0*	5-S2n	1.505	2.134	1.505	3.000	12.115	0.000
100 year	99.00	99.00	259.37	3.942	0.220	5-S2n	1.640	2.287	1.640	3.000	12.518	0.000

* Full Flow Headwater elevation is below inlet invert.

Straight Culvert
Inlet Elevation (invert): 255.43 ft, Outlet Elevation (invert): 249.52 ft
Culvert Length: 426.04 ft, Culvert Slope: 0.0139

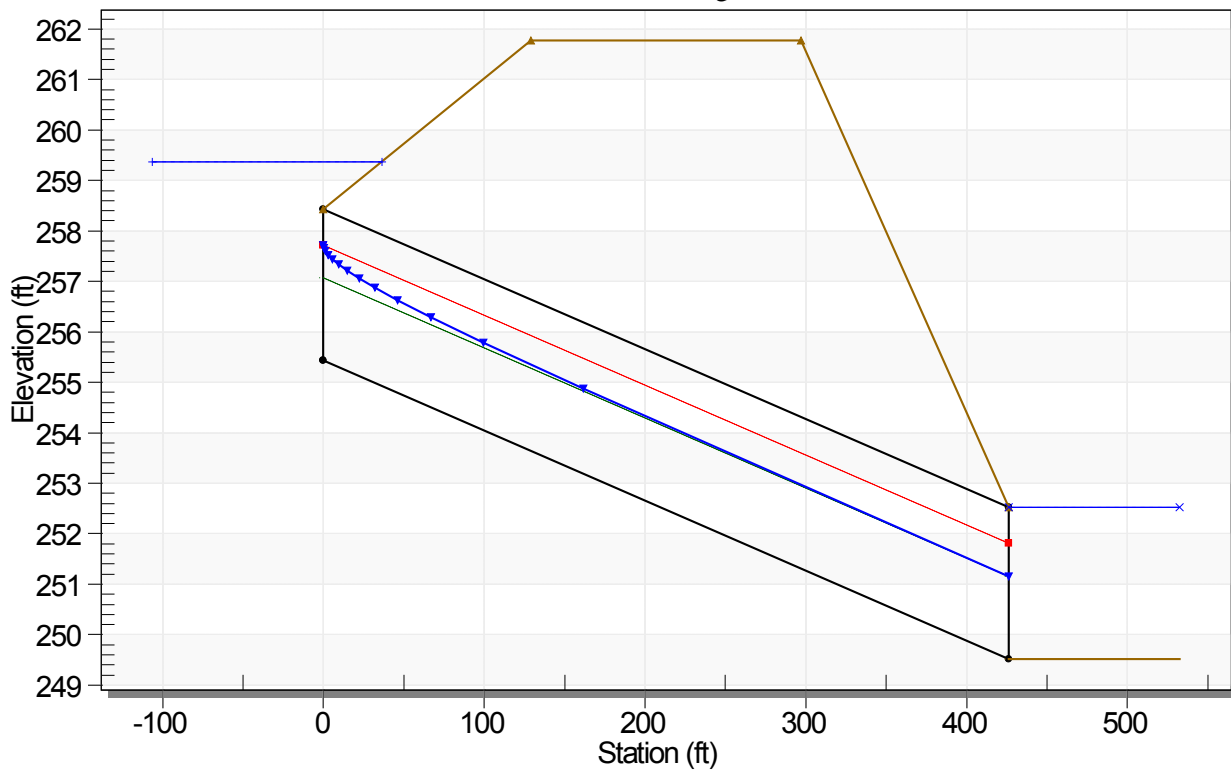
Culvert Performance Curve Plot: DA28



Water Surface Profile Plot for Culvert: DA28

Crossing - DA28, Design Discharge - 99.0 cfs

Culvert - DA28, Culvert Discharge - 99.0 cfs



Site Data - DA28

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 255.43 ft

Outlet Station: 426.00 ft

Outlet Elevation: 249.52 ft

Number of Barrels: 2

Culvert Data Summary - DA28

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: DA28)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
58.00	252.52	3.00
73.00	252.52	3.00
86.00	252.52	3.00
99.00	252.52	3.00

Tailwater Channel Data - DA28

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 252.52 ft

Roadway Data for Crossing: DA28

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	261.77
1	84.00	261.77
2	168.00	261.77

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA29

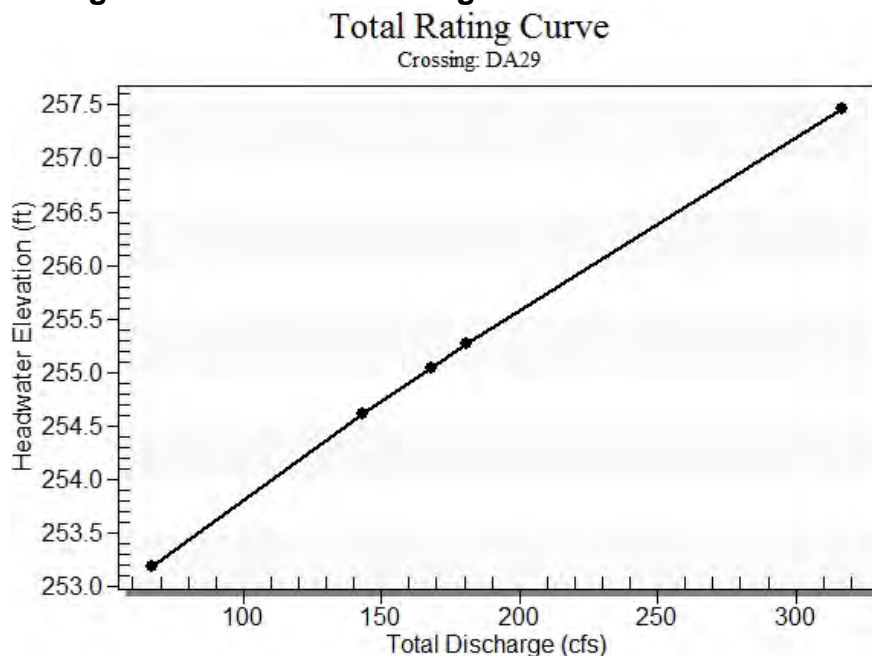
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: DA29

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA29 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
253.19	10 year	67.00	67.00	0.00	1
254.61	25 year	143.00	143.00	0.00	1
255.04	50 year	168.00	168.00	0.00	1
255.26	100 year	181.00	181.00	0.00	1
257.34	Overtopping	287.53	287.53	0.00	Overtopping

Rating Curve Plot for Crossing: DA29



Culvert Notes: DA29

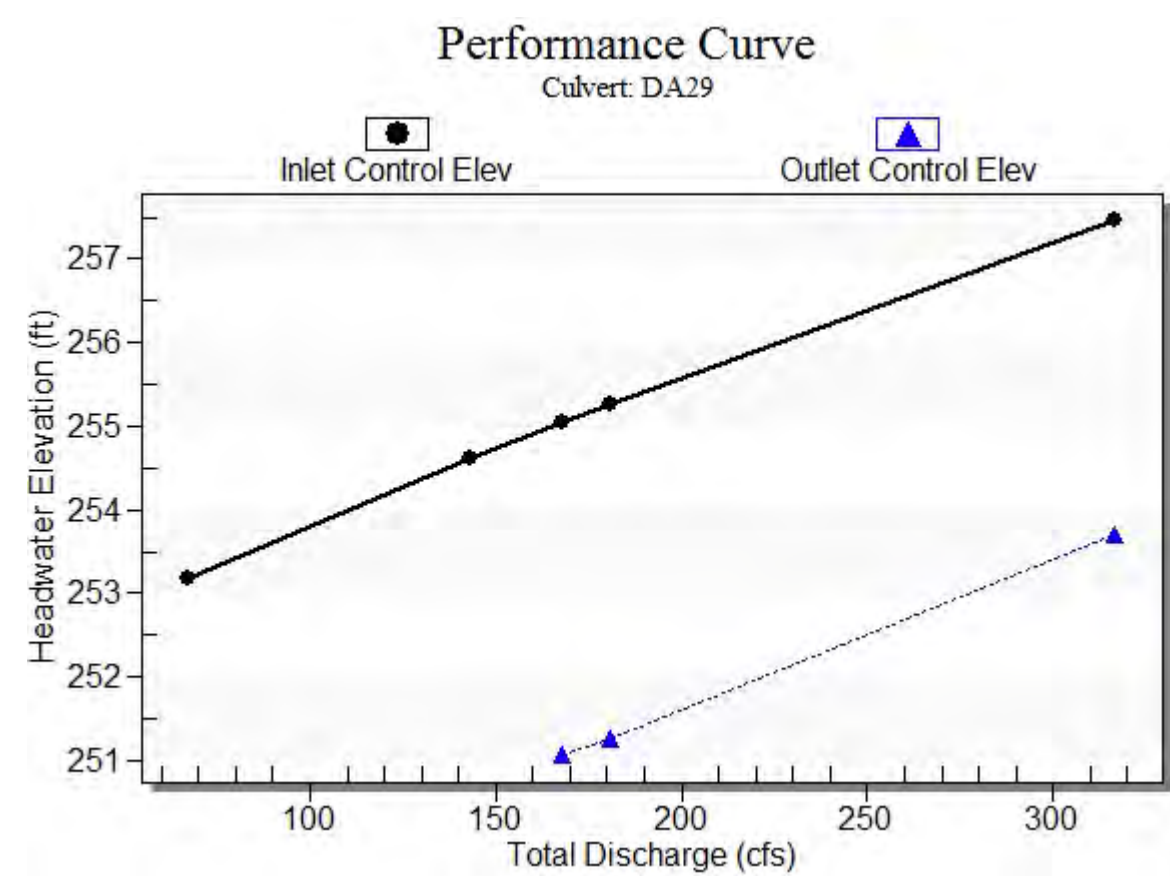
Table 2 - Culvert Summary Table: DA29

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	67.00	67.00	253.19	2.189	0.0*	1-JS1f	0.801	1.296	4.000	4.000	2.094	0.000
25 year	143.00	143.00	254.61	3.607	0.0*	1-JS1f	1.371	2.149	4.000	4.000	4.469	0.000
50 year	168.00	168.00	255.04	4.035	0.065	5-JS1f	1.537	2.393	4.000	4.000	5.250	0.000
100 year	181.00	181.00	255.26	4.259	0.272	5-JS1f	1.624	2.514	4.000	4.000	5.656	0.000

* Full Flow Headwater elevation is below inlet invert.

Straight Culvert
Inlet Elevation (invert): 251.00 ft, Outlet Elevation (invert): 245.78 ft
Culvert Length: 360.04 ft, Culvert Slope: 0.0145

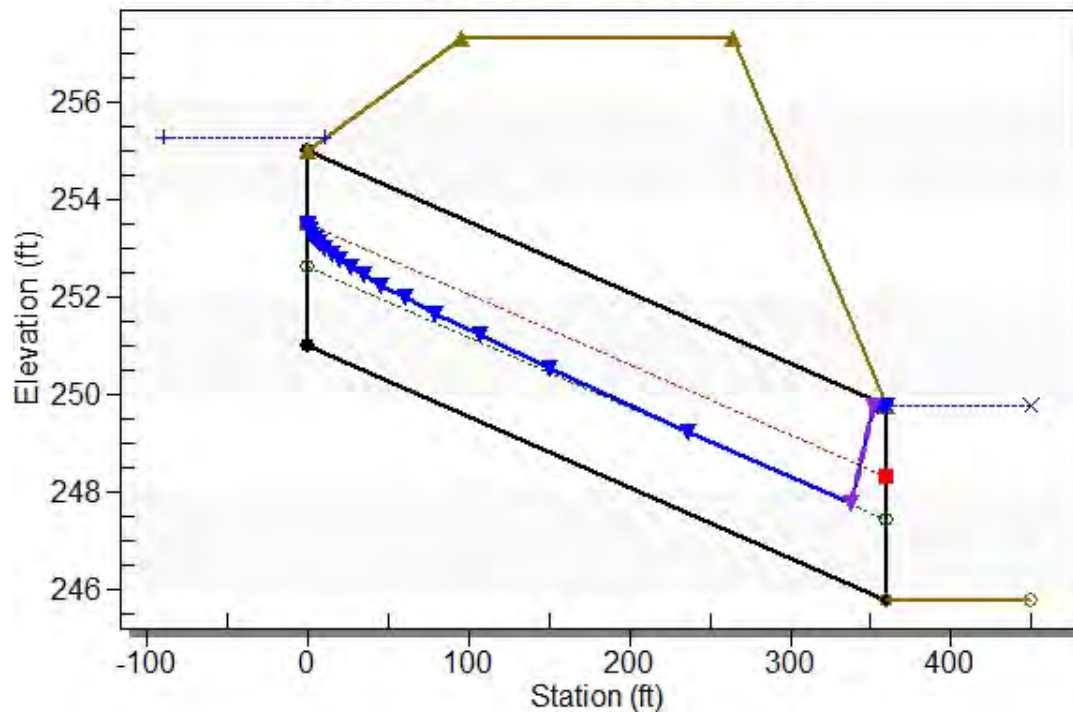
Culvert Performance Curve Plot: DA29



Water Surface Profile Plot for Culvert: DA29

Crossing - DA29, Design Discharge - 181.0 cfs

Culvert - DA29, Culvert Discharge - 181.0 cfs



Site Data - DA29

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 251.00 ft

Outlet Station: 360.00 ft

Outlet Elevation: 245.78 ft

Number of Barrels: 2

Culvert Data Summary - DA29

Barrel Shape: Concrete Box

Barrel Span: 4.00 ft

Barrel Rise: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90°) Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: DA29)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
67.00	249.78	4.00
143.00	249.78	4.00
168.00	249.78	4.00
181.00	249.78	4.00

Tailwater Channel Data - DA29

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 249.78 ft

Roadway Data for Crossing: DA29

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	257.34
1	84.00	257.34
2	168.00	257.34

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA29A

Crossing Discharge Data

Discharge Selection Method: Recurrence

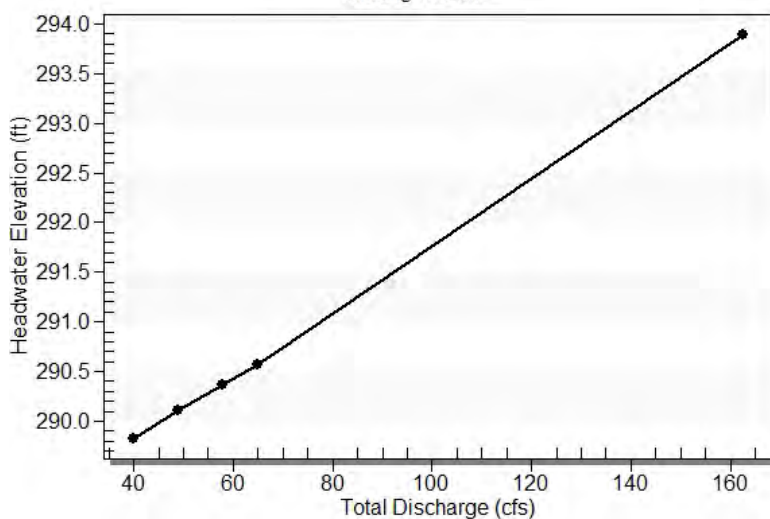
Table 1 - Summary of Culvert Flows at Crossing: DA29A

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA29A Discharge (cfs)	Roadway Discharge (cfs)	Iterations
289.83	10 year	40.00	40.00	0.00	1
290.11	25 year	49.00	49.00	0.00	1
290.37	50 year	58.00	58.00	0.00	1
290.57	100 year	65.00	65.00	0.00	1
293.79	Overtopping	143.25	143.25	0.00	Overtopping

Rating Curve Plot for Crossing: DA29A

Total Rating Curve

Crossing: DA29A



Culvert Notes: DA29A

Table 2 - Culvert Summary Table: DA29A

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	40.00	40.00	289.83	2.070	0.0*	1-JS1f	0.864	1.436	3.000	3.000	3.012	0.000
25 year	49.00	49.00	290.11	2.347	0.0*	1-JS1f	0.971	1.593	3.000	3.000	3.690	0.000
50 year	58.00	58.00	290.37	2.610	0.0*	1-S2n	1.060	1.739	1.060	3.000	12.956	0.000
100 year	65.00	65.00	290.57	2.814	0.0*	1-S2n	1.125	1.847	1.125	3.000	13.389	0.000

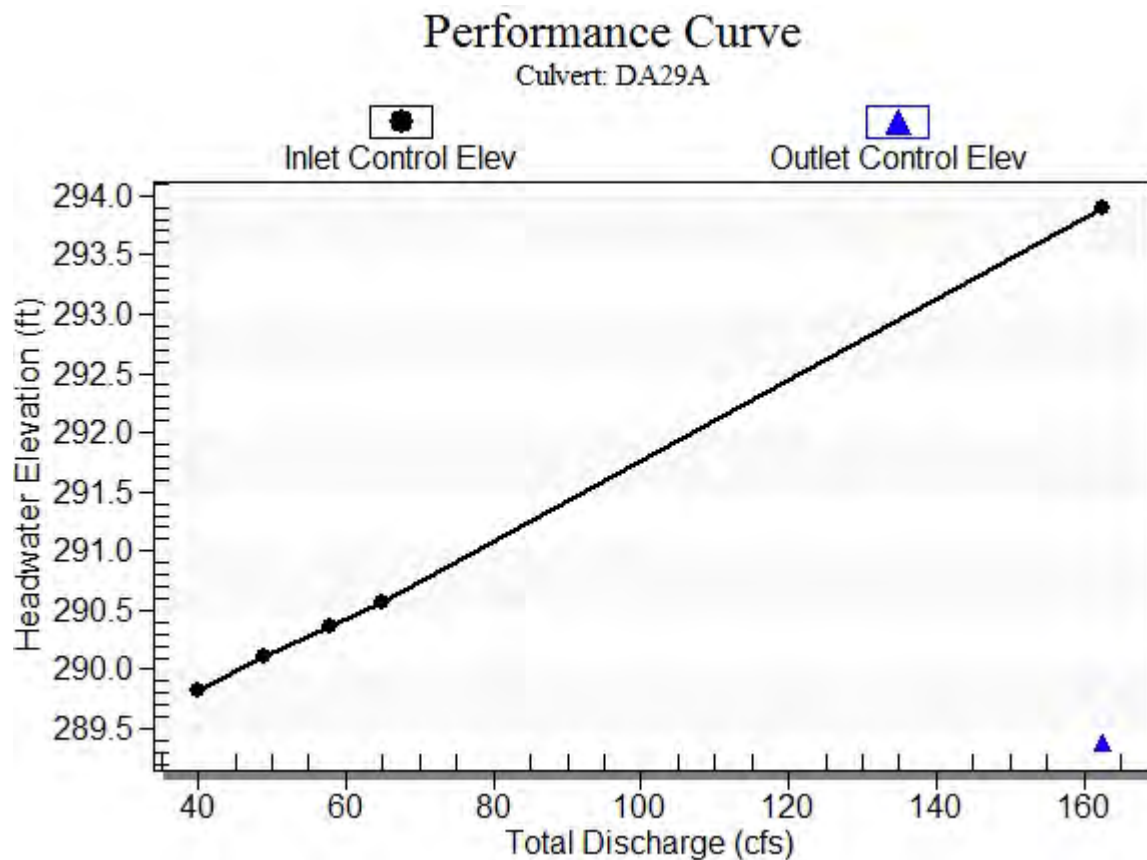
* Full Flow Headwater elevation is below inlet invert.

Straight Culvert

Inlet Elevation (invert): 287.76 ft, Outlet Elevation (invert): 280.72 ft

Culvert Length: 320.08 ft, Culvert Slope: 0.0220

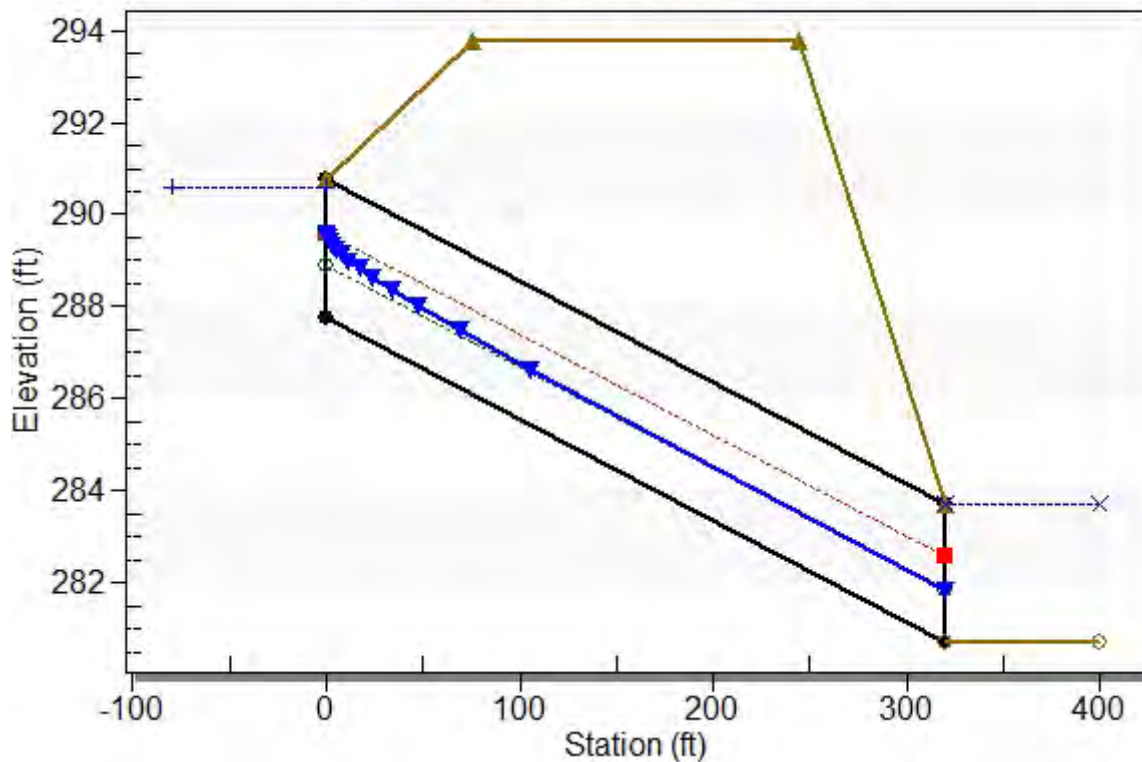
Culvert Performance Curve Plot: DA29A



Water Surface Profile Plot for Culvert: DA29A

Crossing - DA29A, Design Discharge - 65.0 cfs

Culvert - DA29A, Culvert Discharge - 65.0 cfs



Site Data - DA29A

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 287.76 ft

Outlet Station: 320.00 ft

Outlet Elevation: 280.72 ft

Number of Barrels: 2

Culvert Data Summary - DA29A

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: DA29A)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
40.00	283.72	3.00
49.00	283.72	3.00
58.00	283.72	3.00
65.00	283.72	3.00

Tailwater Channel Data - DA29A

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 283.72 ft

Roadway Data for Crossing: DA29A

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	293.79
1	84.00	293.79
2	168.00	293.79

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA30A

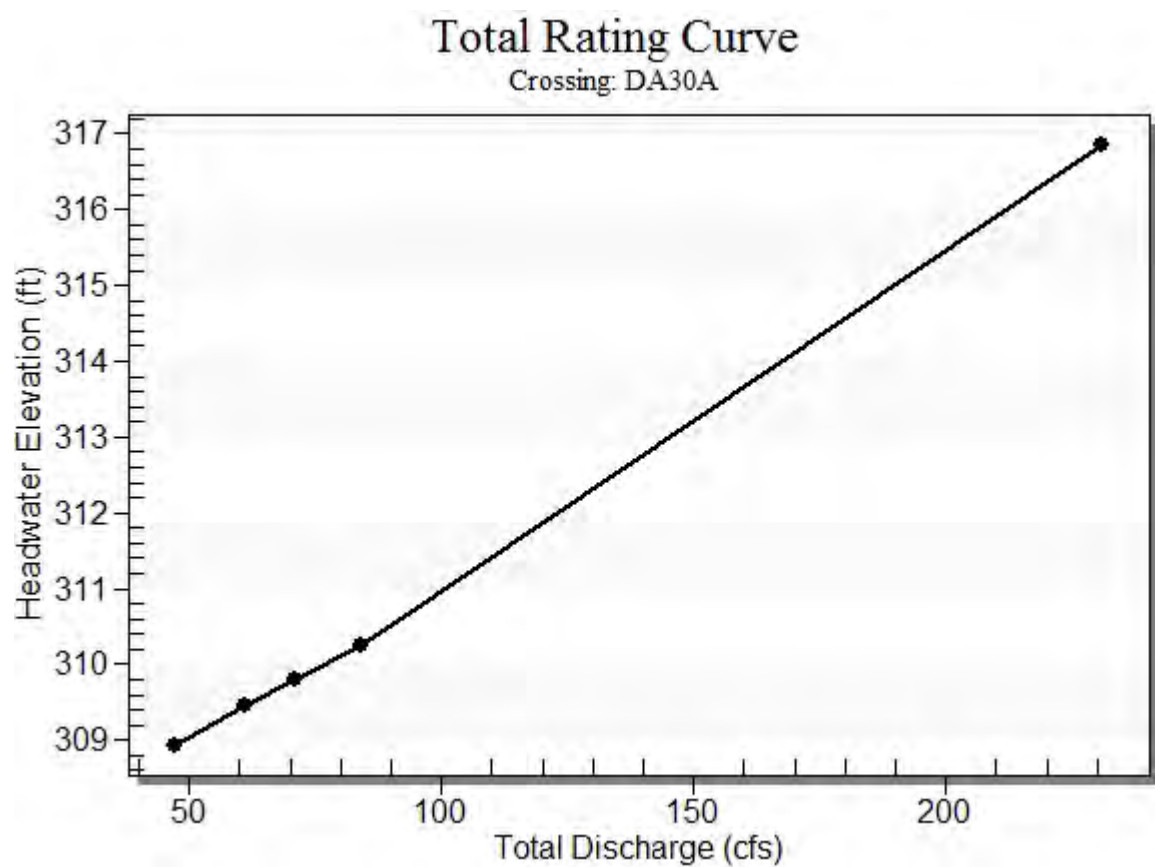
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: DA30A

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA30A Discharge (cfs)	Roadway Discharge (cfs)	Iterations
308.94	10 year	47.00	47.00	0.00	1
309.45	25 year	61.00	61.00	0.00	1
309.80	50 year	71.00	71.00	0.00	1
310.25	100 year	84.00	84.00	0.00	1
316.78	Overtopping	217.48	217.48	0.00	Overtopping

Rating Curve Plot for Crossing: DA30A



Culvert Notes: DA30A

Table 2 - Culvert Summary Table: DA30A

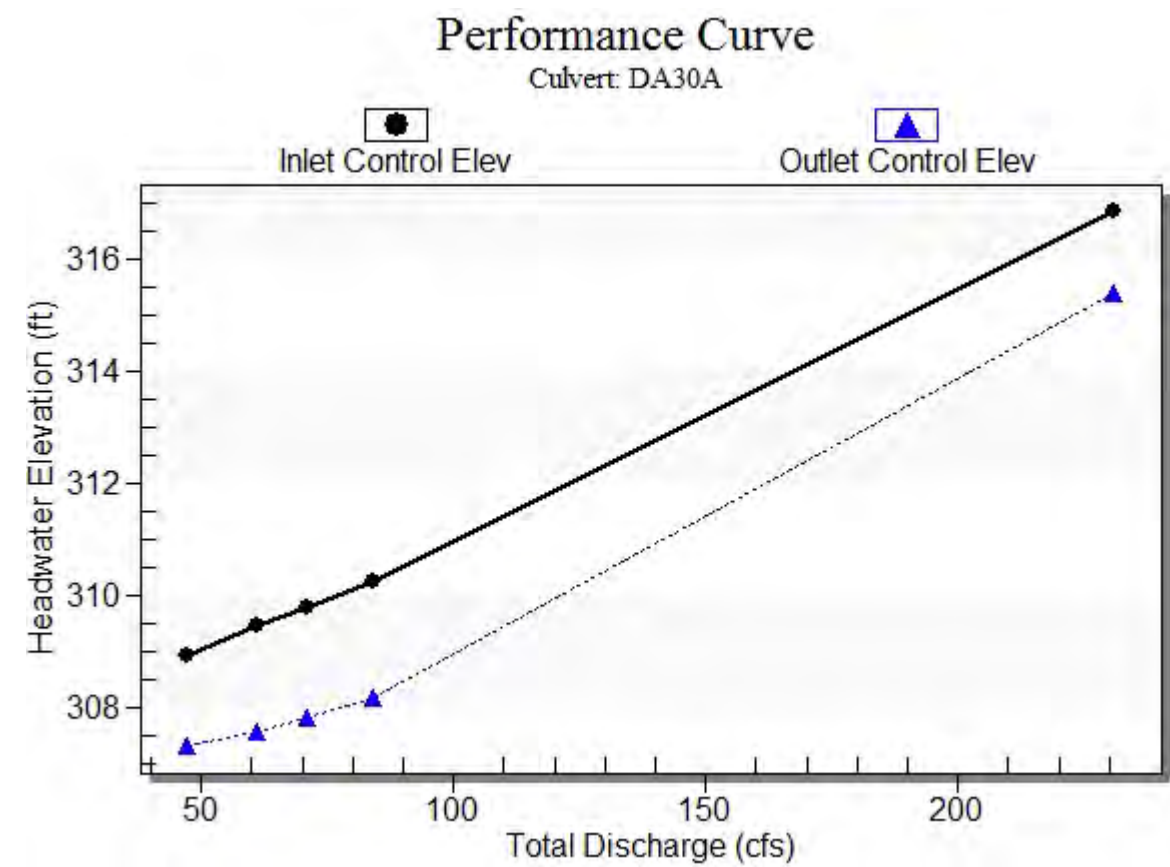
Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	47.00	47.00	308.94	2.741	1.121	1-JS1f	1.172	1.625	4.000	4.000	2.938	0.000
25 year	61.00	61.00	309.45	3.252	1.389	1-JS1f	1.416	1.933	4.000	4.000	3.813	0.000
50 year	71.00	71.00	309.80	3.600	1.623	1-JS1f	1.580	2.139	4.000	4.000	4.438	0.000
100 year	84.00	84.00	310.25	4.045	1.980	5-JS1f	1.792	2.393	4.000	4.000	5.250	0.000

Straight Culvert

Inlet Elevation (invert): 306.20 ft, Outlet Elevation (invert): 302.93 ft

Culvert Length: 340.02 ft, Culvert Slope: 0.0096

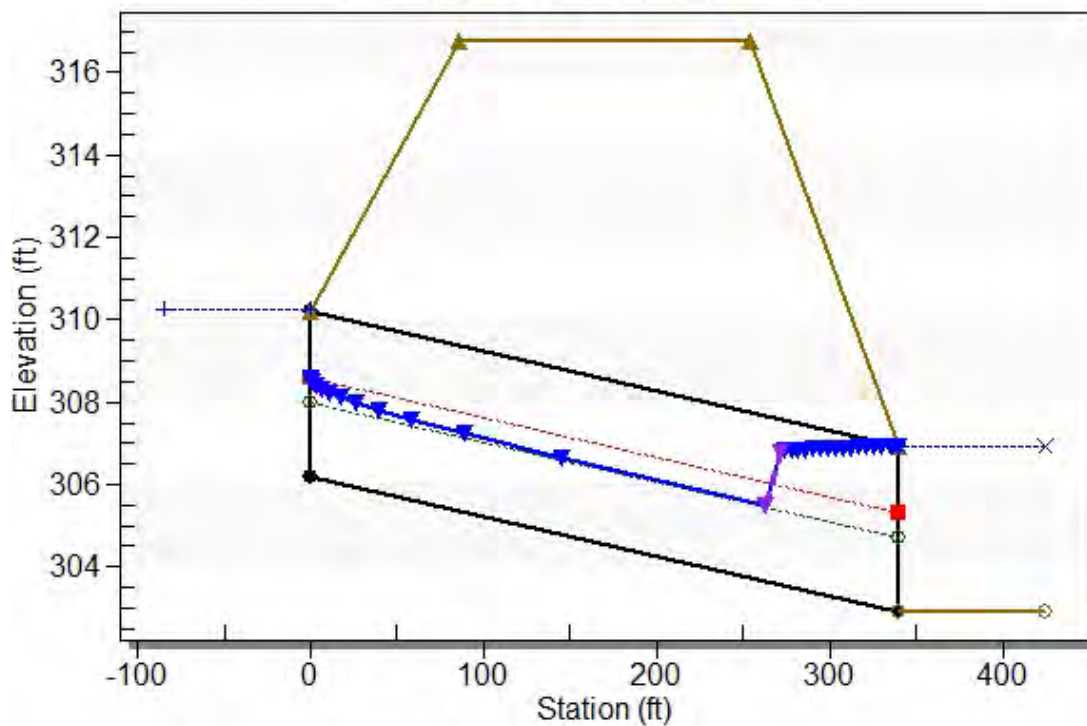
Culvert Performance Curve Plot: DA30A



Water Surface Profile Plot for Culvert: DA30A

Crossing - DA30A, Design Discharge - 84.0 cfs

Culvert - DA30A, Culvert Discharge - 84.0 cfs



Site Data - DA30A

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 306.20 ft

Outlet Station: 340.00 ft

Outlet Elevation: 302.93 ft

Number of Barrels: 1

Culvert Data Summary - DA30A

Barrel Shape: Concrete Box

Barrel Span: 4.00 ft

Barrel Rise: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90°) Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: DA30A)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
47.00	306.93	4.00
61.00	306.93	4.00
71.00	306.93	4.00
84.00	306.93	4.00

Tailwater Channel Data - DA30A

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 306.93 ft

Roadway Data for Crossing: DA30A

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	316.78
1	84.00	316.78
2	168.00	316.78

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA31

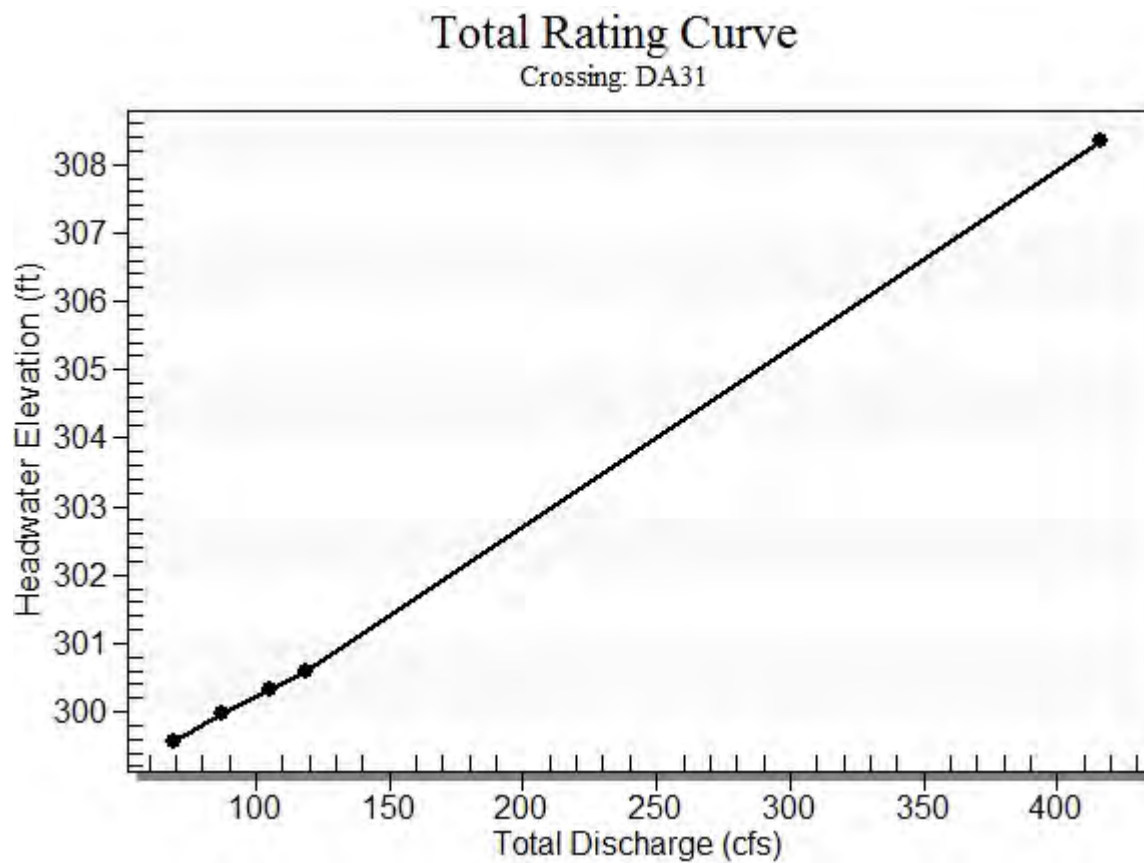
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: DA31

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA31 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
299.58	10 year	69.00	69.00	0.00	1
299.96	25 year	87.00	87.00	0.00	1
300.32	50 year	105.00	105.00	0.00	1
300.58	100 year	119.00	119.00	0.00	1
306.50	Overtopping	328.43	328.43	0.00	Overtopping

Rating Curve Plot for Crossing: DA31



Culvert Notes: DA31

Table 2 - Culvert Summary Table: DA31

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	69.00	69.00	299.58	2.468	0.0*	1-JS1f	0.989	1.745	4.000	4.000	2.923	0.000
25 year	87.00	87.00	299.96	2.853	0.0*	1-JS1f	1.110	1.972	4.000	4.000	3.685	0.000
50 year	105.00	105.00	300.32	3.207	0.0*	1-S2n	1.232	2.171	1.232	4.000	15.889	0.000
100 year	119.00	119.00	300.58	3.472	0.0*	1-S2n	1.326	2.318	1.348	4.000	15.994	0.000

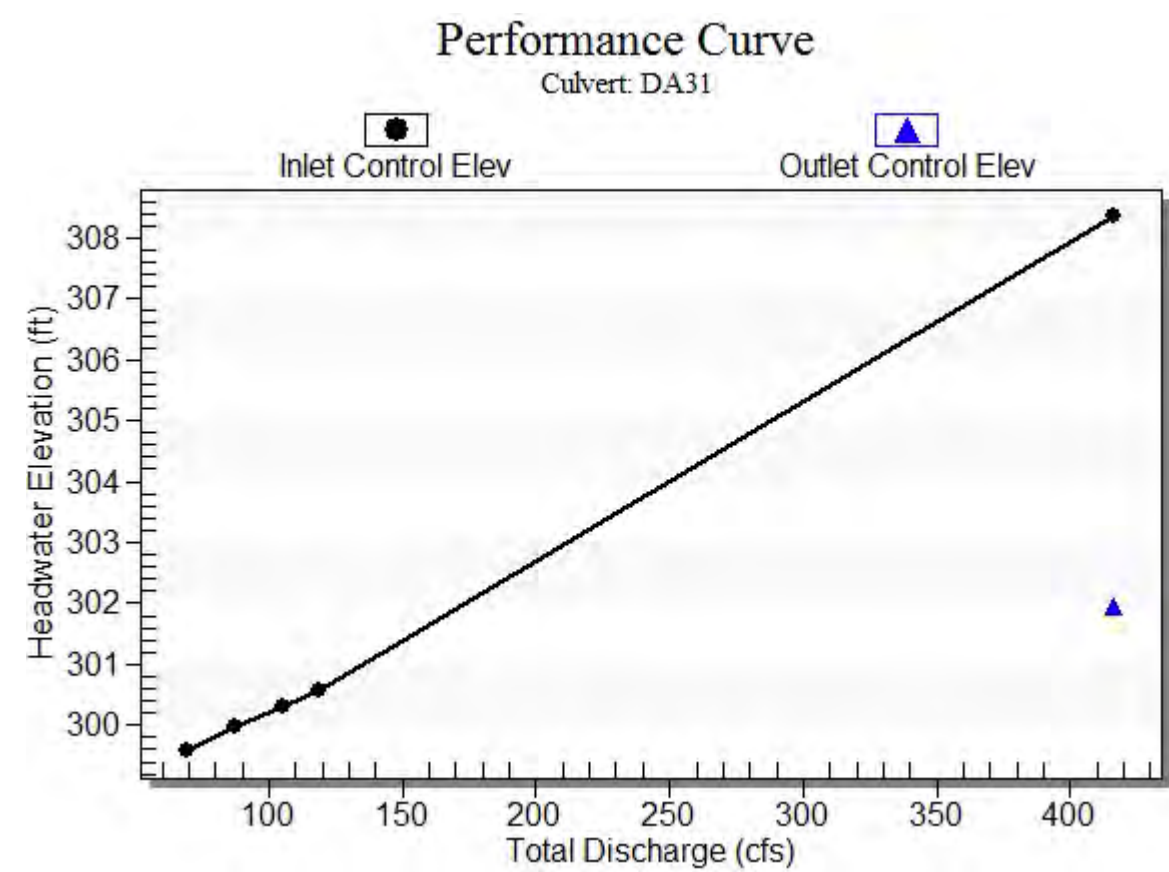
* Full Flow Headwater elevation is below inlet invert.

Straight Culvert

Inlet Elevation (invert): 297.11 ft, Outlet Elevation (invert): 287.83 ft

Culvert Length: 360.12 ft, Culvert Slope: 0.0258

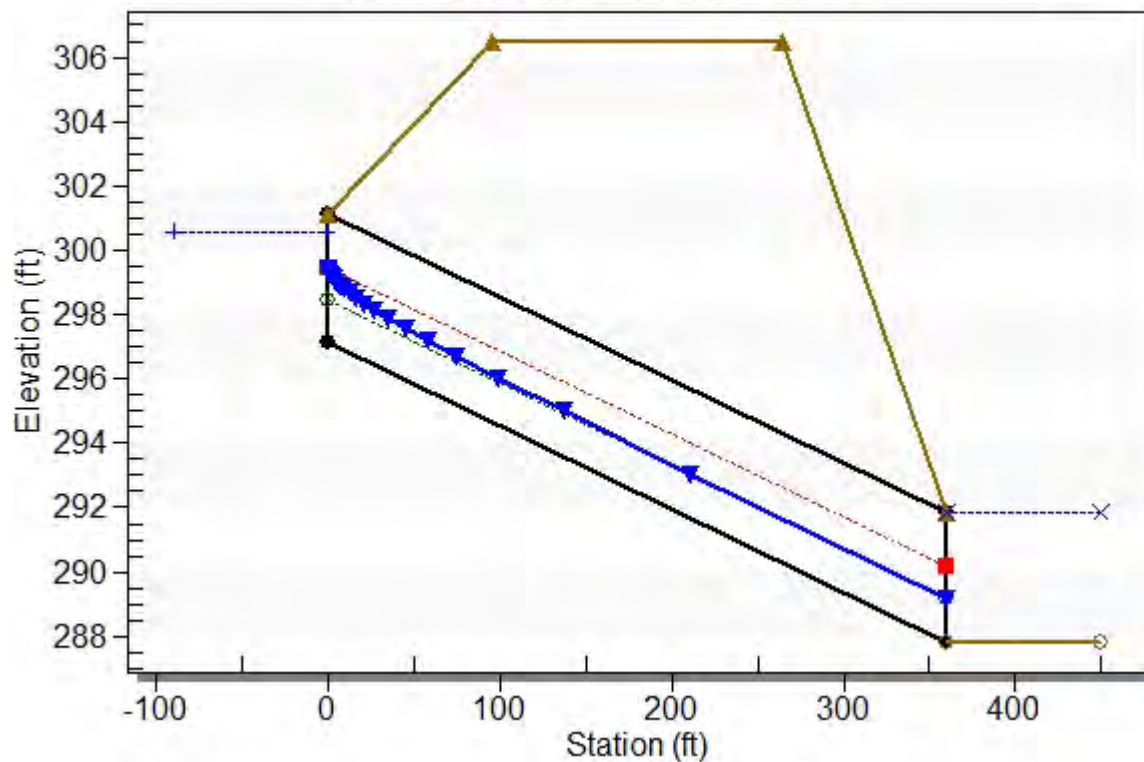
Culvert Performance Curve Plot: DA31



Water Surface Profile Plot for Culvert: DA31

Crossing - DA31, Design Discharge - 119.0 cfs

Culvert - DA31, Culvert Discharge - 119.0 cfs



Site Data - DA31

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 297.11 ft

Outlet Station: 360.00 ft

Outlet Elevation: 287.83 ft

Number of Barrels: 2

Culvert Data Summary - DA31

Barrel Shape: Circular

Barrel Diameter: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: DA31)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
69.00	291.83	4.00
87.00	291.83	4.00
105.00	291.83	4.00
119.00	291.83	4.00

Tailwater Channel Data - DA31

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 291.83 ft

Roadway Data for Crossing: DA31

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	306.50
1	3.00	306.50
2	6.00	306.50

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA32

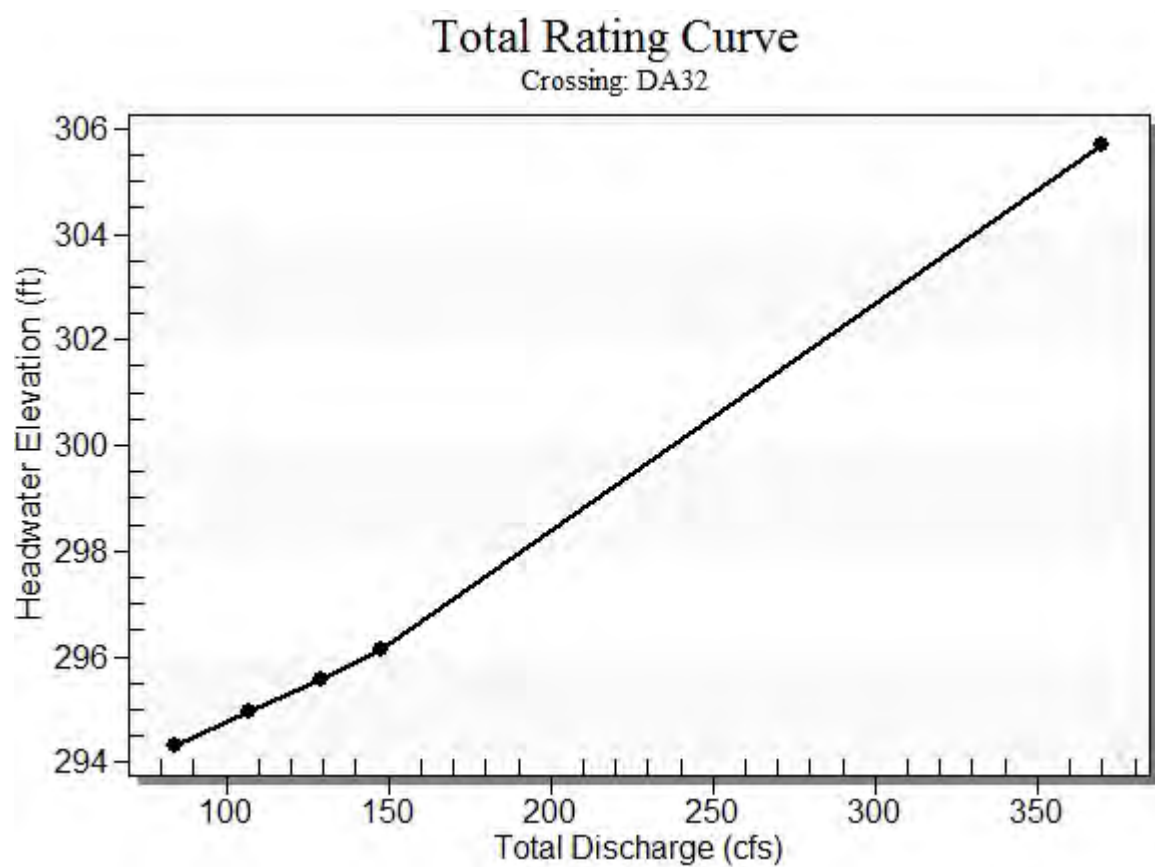
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: DA32

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA32 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
294.33	10 year	84.00	84.00	0.00	1
294.96	25 year	107.00	107.00	0.00	1
295.58	50 year	129.00	129.00	0.00	1
296.15	100 year	148.00	148.00	0.00	1
305.54	Overtopping	333.28	333.28	0.00	Overtopping

Rating Curve Plot for Crossing: DA32



Culvert Notes: DA32

Table 2 - Culvert Summary Table: DA32

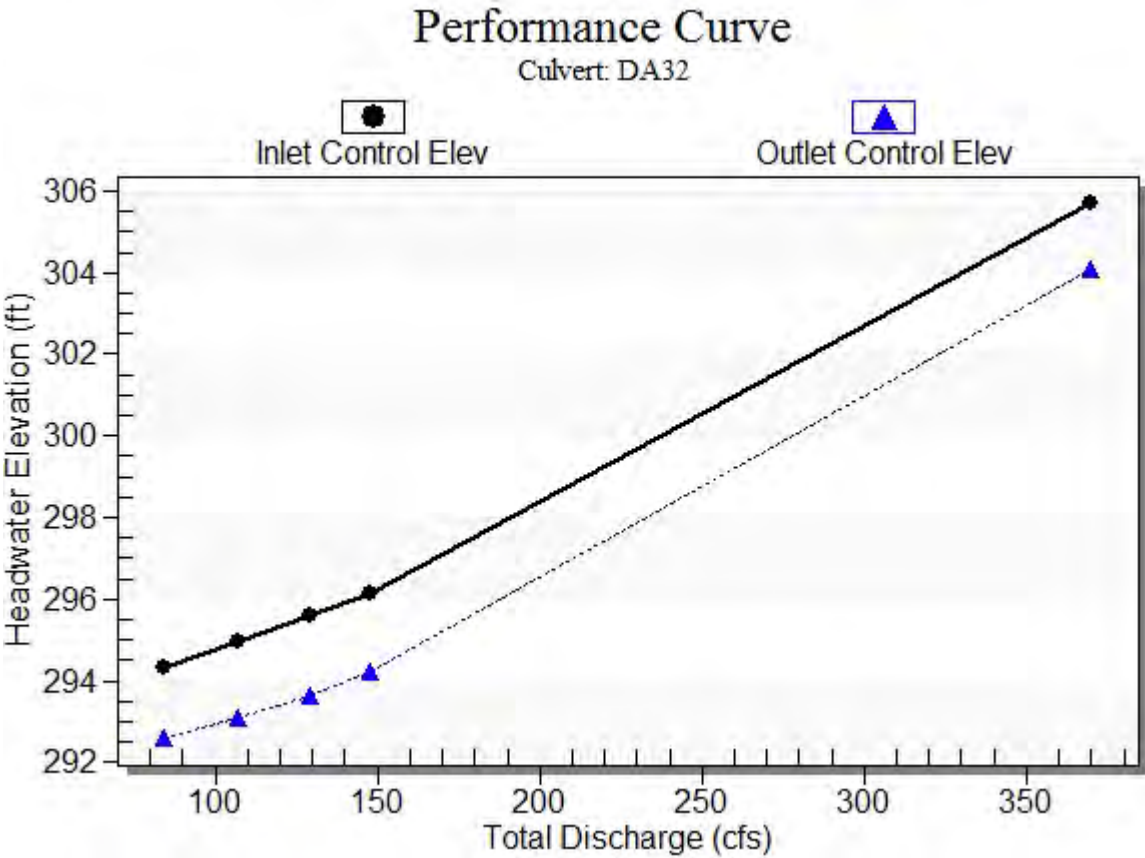
Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	84.00	84.00	294.33	3.471	1.739	1-JS1f	1.524	2.062	4.000	4.000	4.200	0.000
25 year	107.00	107.00	294.96	4.102	2.217	5-JS1f	1.816	2.423	4.000	4.000	5.350	0.000
50 year	129.00	129.00	295.58	4.720	2.783	5-JS1f	2.079	2.744	4.000	4.000	6.450	0.000
100 year	148.00	148.00	296.15	5.288	3.356	5-JS1f	2.303	3.008	4.000	4.000	7.400	0.000

Straight Culvert

Inlet Elevation (invert): 290.86 ft, Outlet Elevation (invert): 287.83 ft

Culvert Length: 360.01 ft, Culvert Slope: 0.0084

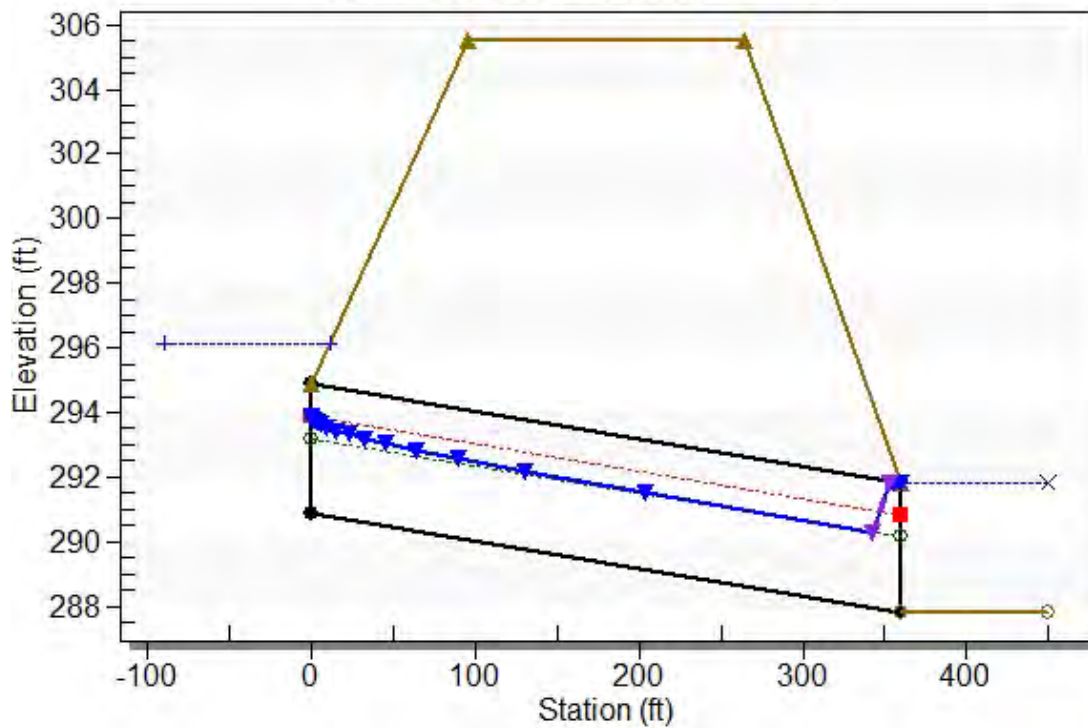
Culvert Performance Curve Plot: DA32



Water Surface Profile Plot for Culvert: DA32
Crossing - DA32, Design Discharge - 148.0 cfs
 Culvert - DA32, Culvert Discharge - 148.0 cfs

Water Surface Profile Plot for Culvert: DA32
Crossing - DA32, Design Discharge - 148.0 cfs
 Culvert - DA32, Culvert Discharge - 148.0 cfs

Water Surface Profile Plot for Culvert: DA32
Crossing - DA32, Design Discharge - 148.0 cfs
 Culvert - DA32, Culvert Discharge - 148.0 cfs



Site Data - DA32

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 290.86 ft

Outlet Station: 360.00 ft

Outlet Elevation: 287.83 ft

Number of Barrels: 1

Culvert Data Summary - DA32

Barrel Shape: Concrete Box

Barrel Span: 5.00 ft

Barrel Rise: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90°) Headwall

Inlet Depression: N O N E

Table 3 - Downstream Channel Rating Curve (Crossing: DA32)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
84.00	291.83	4.00
107.00	291.83	4.00
129.00	291.83	4.00
148.00	291.83	4.00

Tailwater Channel Data - DA32

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 291.83 ft

Roadway Data for Crossing: DA32

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	305.54
1	84.00	305.54
2	168.00	305.54

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA33

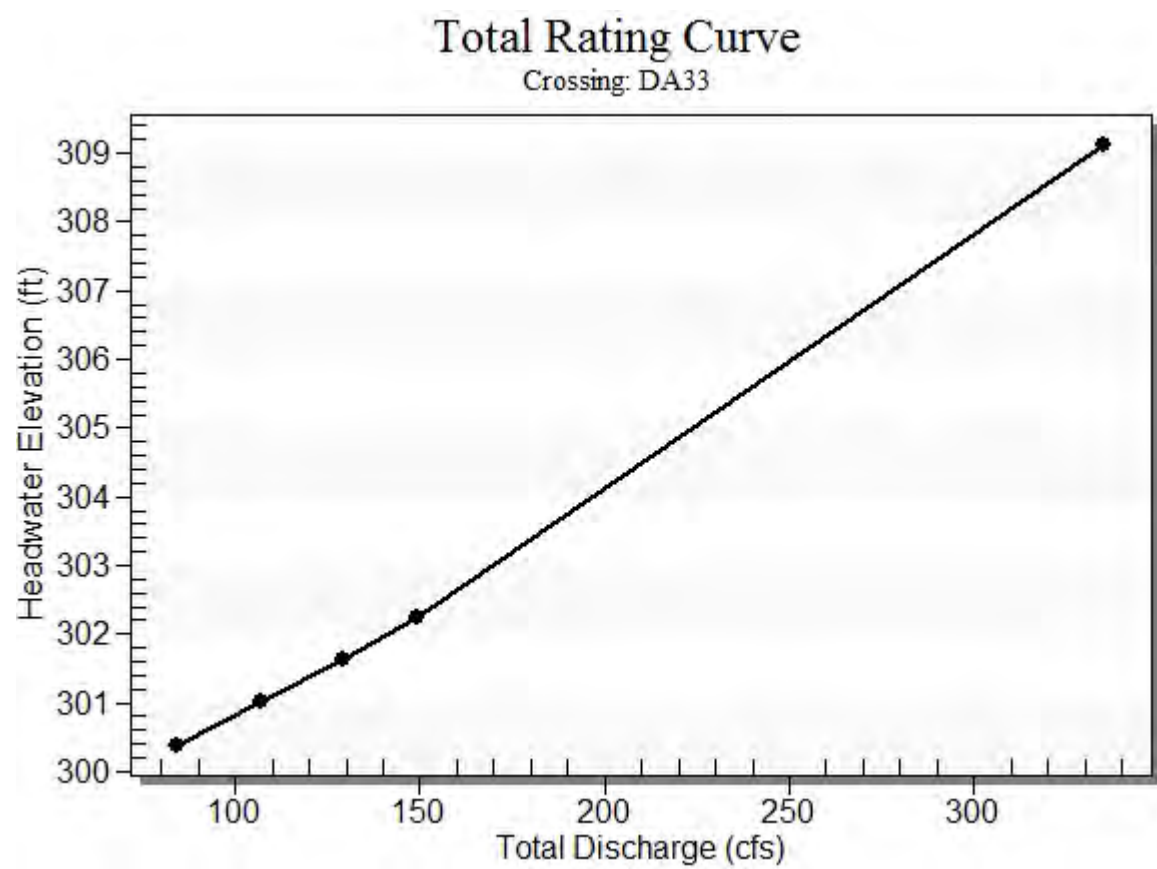
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: DA33

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA33 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
300.39	10 year	84.00	84.00	0.00	1
301.02	25 year	107.00	107.00	0.00	1
301.64	50 year	129.00	129.00	0.00	1
302.24	100 year	149.00	149.00	0.00	1
308.96	Overtopping	296.54	296.54	0.00	Overtopping

Rating Curve Plot for Crossing: DA33



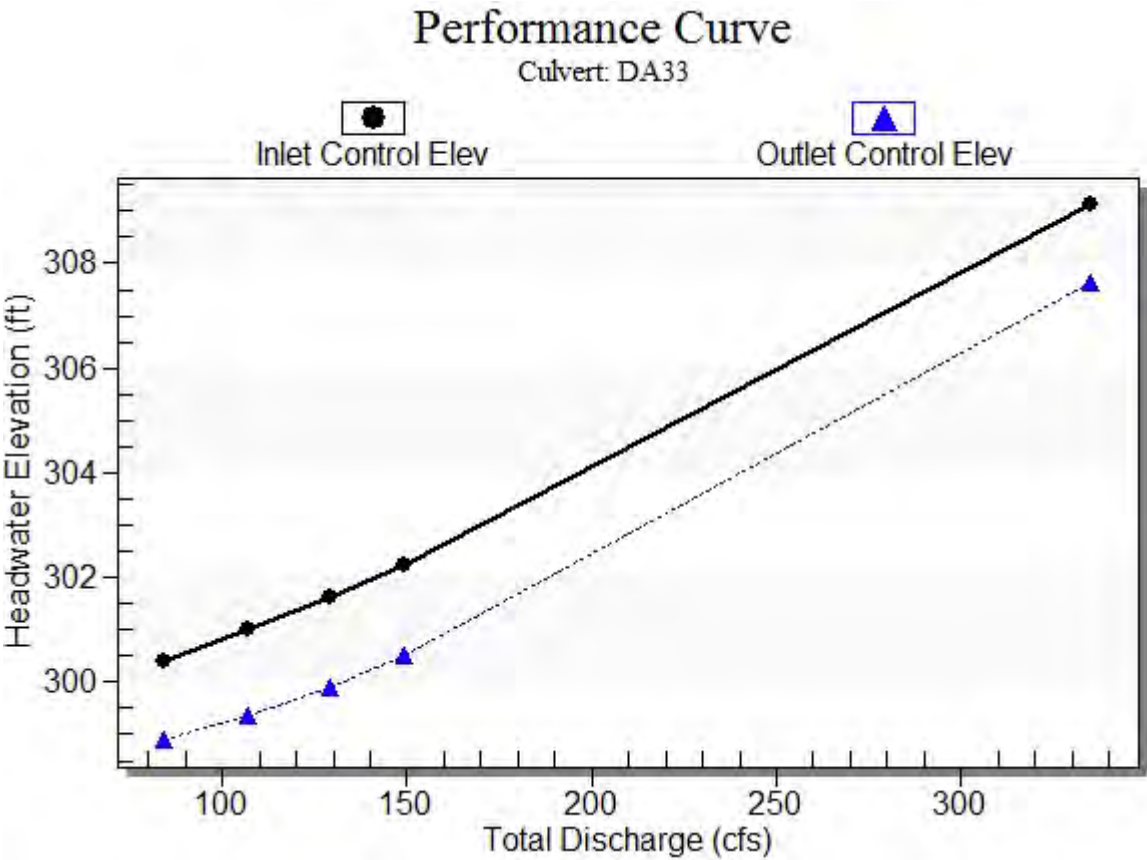
Culvert Notes: DA33

Table 2 - Culvert Summary Table: DA33

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	84.00	84.00	300.39	3.472	1.979	1-JS1f	1.542	2.062	4.000	4.000	4.200	0.000
25 year	107.00	107.00	301.02	4.103	2.445	5-JS1f	1.837	2.423	4.000	4.000	5.350	0.000
50 year	129.00	129.00	301.64	4.721	2.996	5-JS1f	2.105	2.744	4.000	4.000	6.450	0.000
100 year	149.00	149.00	302.24	5.320	3.586	5-JS1f	2.342	3.021	4.000	4.000	7.450	0.000

Straight Culvert
Inlet Elevation (invert): 296.92 ft, Outlet Elevation (invert): 294.15 ft
Culvert Length: 340.01 ft, Culvert Slope: 0.0081

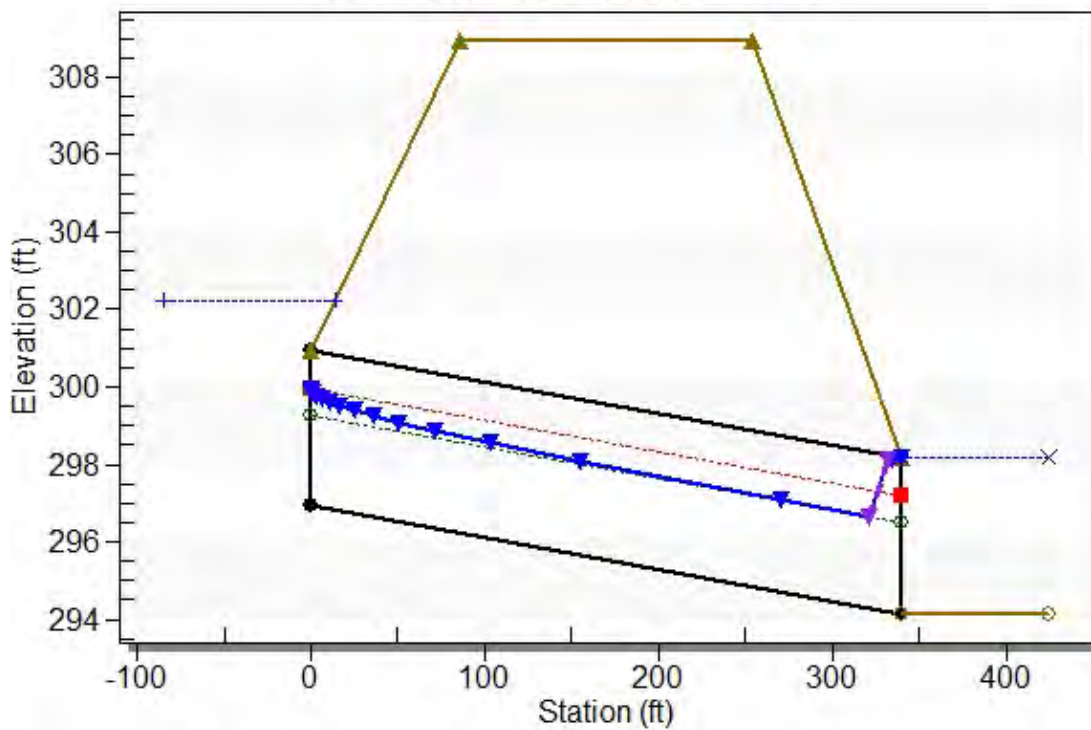
Culvert Performance Curve Plot: DA33



Water Surface Profile Plot for Culvert: DA33
Crossing - DA33, Design Discharge - 149.0 cfs
 Culvert - DA33, Culvert Discharge - 149.0 cfs

Water Surface Profile Plot for Culvert: DA33
Crossing - DA33, Design Discharge - 149.0 cfs
 Culvert - DA33, Culvert Discharge - 149.0 cfs

Water Surface Profile Plot for Culvert: DA33
Crossing - DA33, Design Discharge - 149.0 cfs
 Culvert - DA33, Culvert Discharge - 149.0 cfs



Site Data - DA33

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 296.92 ft

Outlet Station: 340.00 ft

Outlet Elevation: 294.15 ft

Number of Barrels: 1

Culvert Data Summary - DA33

Barrel Shape: Concrete Box

Barrel Span: 5.00 ft

Barrel Rise: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90°) Headwall

Inlet Depression: N O N E

Table 3 - Downstream Channel Rating Curve (Crossing: DA33)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
84.00	298.15	4.00
107.00	298.15	4.00
129.00	298.15	4.00
149.00	298.15	4.00

Tailwater Channel Data - DA33

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 298.15 ft

Roadway Data for Crossing: DA33

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	308.96
1	84.00	308.96
2	168.00	308.96

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

Project Notes

Project Title: SH 249 EXT – MONTGOMERY COUNTY

Designer: JACOBS

Project Date: October 2014

Notes:

Project Units: U.S. Customary Units

Outlet Control Option: Profiles

Exit Loss Option: Standard Method

Crossing Notes: DA34

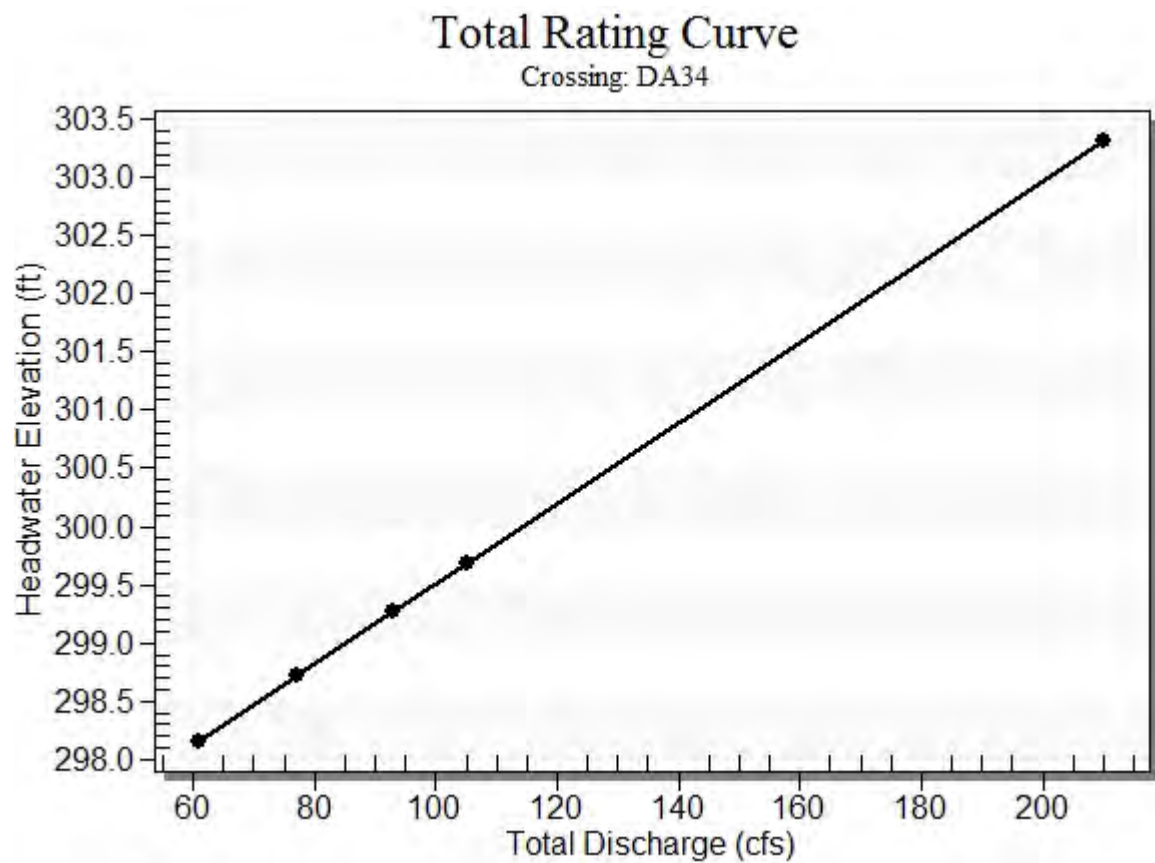
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: DA34

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	DA34 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
298.16	10 year	61.00	61.00	0.00	1
298.71	25 year	77.00	77.00	0.00	1
299.26	50 year	93.00	93.00	0.00	1
299.69	100 year	105.00	105.00	0.00	1
303.18	Overtopping	181.28	181.28	0.00	Overtopping

Rating Curve Plot for Crossing: DA34



Culvert Notes: DA34

Table 2 - Culvert Summary Table: DA34

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	61.00	61.00	298.16	3.221	0.0*	1-JS1f	1.001	1.933	4.000	4.000	3.813	0.000
25 year	77.00	77.00	298.71	3.774	0.0*	1-S2n	1.179	2.258	1.179	4.000	16.330	0.000
50 year	93.00	93.00	299.26	4.324	0.0*	5-S2n	1.354	2.561	1.373	4.000	16.932	0.000
100 year	105.00	105.00	299.69	4.751	0.0*	5-S2n	1.475	2.776	1.509	4.000	17.395	0.000

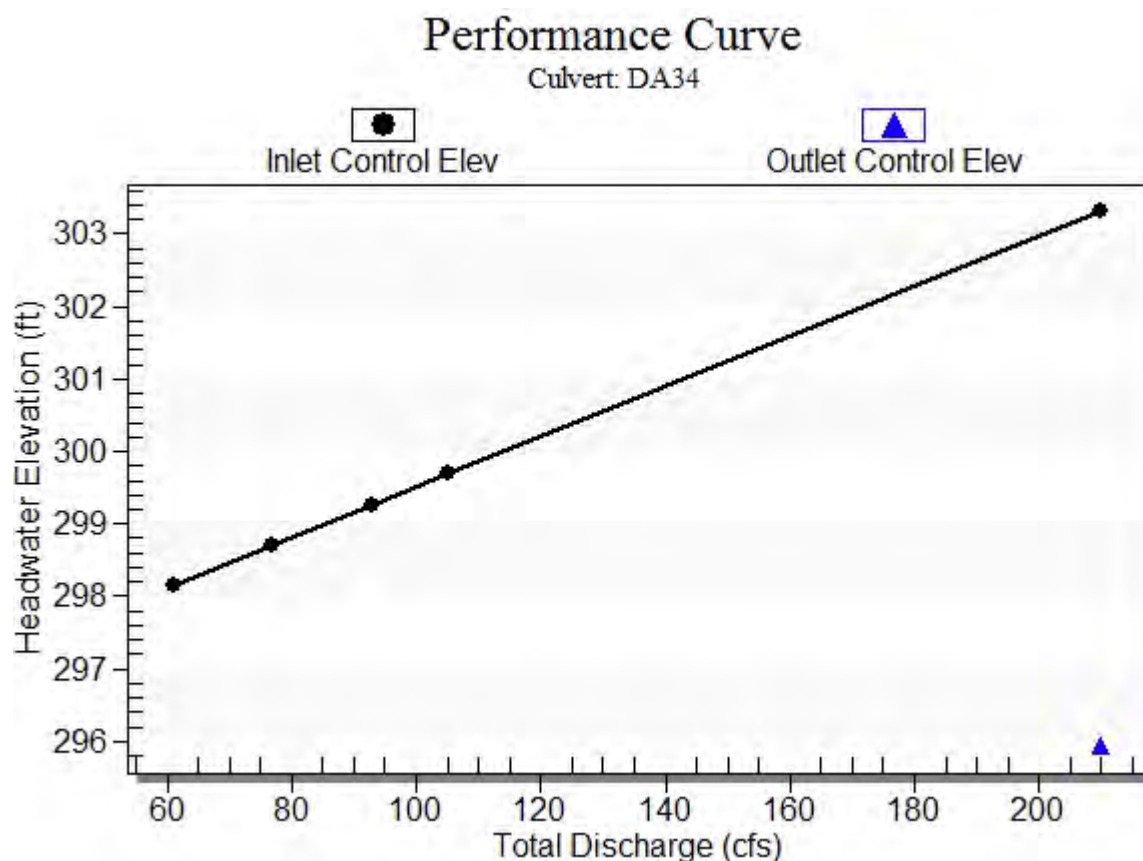
* Full Flow Headwater elevation is below inlet invert.

Straight Culvert

Inlet Elevation (invert): 294.94 ft, Outlet Elevation (invert): 285.79 ft

Culvert Length: 360.12 ft, Culvert Slope: 0.0254

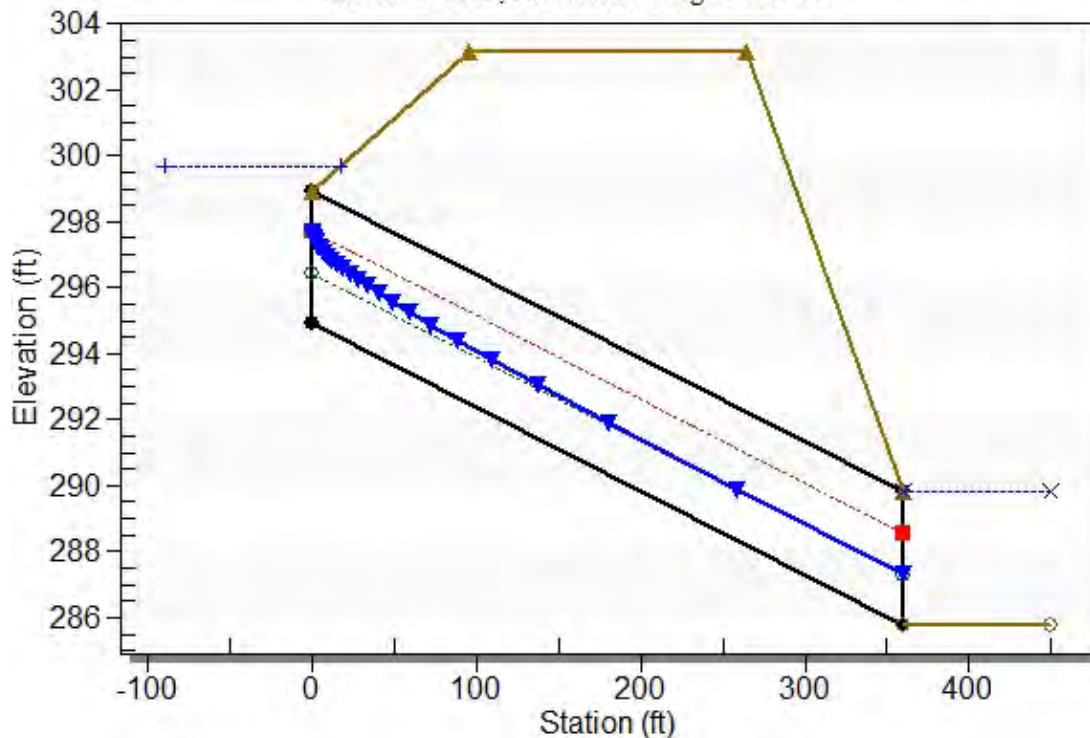
Culvert Performance Curve Plot: DA34



Water Surface Profile Plot for Culvert: DA34

Crossing - DA34, Design Discharge - 105.0 cfs

Culvert - DA34, Culvert Discharge - 105.0 cfs



Site Data - DA34

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 294.94 ft

Outlet Station: 360.00 ft

Outlet Elevation: 285.79 ft

Number of Barrels: 1

Culvert Data Summary - DA34

Barrel Shape: Concrete Box

Barrel Span: 4.00 ft

Barrel Rise: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90°) Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: DA34)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
61.00	289.79	4.00
77.00	289.79	4.00
93.00	289.79	4.00
105.00	289.79	4.00

Tailwater Channel Data - DA34

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 289.79 ft

Roadway Data for Crossing: DA34

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	303.18
1	84.00	303.18
2	168.00	303.18

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

Appendix F – Carter & Burgess (Jacobs) SH
249 Preliminary Drainage Report, September
2006



Texas Department of Transportation

STATE HIGHWAY 249
From FM 1774/FM 149 in Pinehurst to
FM 1774 in Todd Mission
CSJ 0912-00-144 & 0720-02-900
MONTGOMERY / GRIMES COUNTY

PRELIMINARY DRAINAGE REPORT

Prepared For:
TEXAS DEPARTMENT OF TRANSPORTATION
HOUSTON DISTRICT

SEPTEMBER 2006

FOR INTERIM REVIEW ONLY
NOT INTENDED FOR CONSTRUCTION
BIDDING OR PERMIT PURPOSES

NASIR KHATTAK, P.E.
SERIAL NUMBER 91023

Prepared By:

CarterBurgess

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APPENDICES

APPENDIX 1.0 - HYDROLOGIC DATA

APPENDIX 2.0 - HEC-RAS DATA OUTPUT

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APPENDIX 4.0 - PROPOSED CROSS DRAINAGE STRUCTURES & 100-YR
WATER SURFACE PROFILE (8 SHEETS)

I. GENERAL INFORMATION

This report summarizes findings for the drainage design of the SH 249 Extension project from FM 1774/FM 149 in Pinehurst to FM 1774 in Todd Mission. This work was performed by Carter & Burgess, Inc. for Texas Department of Transportation (TxDOT) under Contract number 12-245P5002. The objectives of the drainage design, during the schematic development, were as follows:

- Determine outfalls along the project corridor.
- Develop a drainage area map for all bridges and cross drainage structures.
- Determine the hydrologic data for all bridges and cross drainage structures for the 10-, 25-, 50- and 100- year flow frequencies.
- Analyze all proposed bridge and cross drainage structures for 10-, 25-, 50- and 100- year flow frequencies.
- Determine proposed structure size and analyze for proposed roadway conditions.
- Prepare letter report summarizing methodology, hydrologic and hydraulic results for the project.

A. Project Location and Description

The project site is located in northwest Montgomery County and Southeast Grimes County from FM 149 in Pinehurst to FM 1774 in Todd Mission. A vicinity map for the roadway extension is shown on Exhibit 1. The proposed project will be constructed as a four-mainlane controlled access highway facility consisting of two mainlanes in each direction within a 400 ft wide right-of-way (ROW) to allow for the inclusion of auxiliary lanes between on-ramps and off-ramps where appropriate. The drainage area for this project is part of the Mill Creek watershed and crosses Mill Creek and its tributaries at various locations. Montgomery County participates in the National flood Insurance Program (NFIP) and has a published Flood Insurance Study (FIS) for the entire county. The portion of the project in Grimes County has no flood information available for Mill Creek. A drainage area map is provided in Exhibit 1.

B. Drainage Design Criteria

The 50-year frequency flood event was analyzed in determining the preliminary drainage design for the structures. This design frequency selection is consistent with guidance from the TxDOT Hydraulic Design Manual, dated March 2004, for this roadway classification. The 100-year frequency storm was also evaluated to ensure that new structures would not cause any additional backwater above the existing water surface elevations. In addition headwaters elevations were analyzed for the 10- and 25-years frequencies at these cross structure locations to establish tailwater boundary conditions for designing road side ditches.

II. HYDROLOGIC ANALYSIS

Drainage area boundaries for various creek crossings were derived from the U.S. Geological Survey (USGS) topographic maps for the "Keenan, Texas", "Stoneham, Texas", "Plantersville, Texas", "Magnolia East, Texas" and "Magnolia West, Texas" 7.5 minute quadrangles, survey data, and field visits by Carter & Burgess in March/April 2006. Existing HEC-1/ HEC-2/ WSP2 data for Mill Creek and its tributaries was requested and received from Federal Emergency Management Agency (FEMA). In addition, TxDOT Montgomery County Area Office was contacted to verify project specific hydrologic data. Drainage basins were computed based on land use including woods, pasture, residential and industry utilizing current aerial imagery. These drainage areas, based on land use, were used to compute weighted run-off coefficient factors for each basin.

Various hydrologic methods were used from TxDOT Hydraulic Design Manual depending on the size of the drainage basin. The Rural Regional Regression Equations were used to compute flow for 10-, 25-, 50- and 100-year for areas greater than 200 acres while the Rational Method was employed to compute flows for 10-, 25-, 50- and 100-years for areas less than 200 acres.

The project site is located in hydrologic region number 11 for the Rural Regional Regression Equations. These equations use the size of the drainage basin, basin shape factor and slope of the channel to compute flows.

The Rational Method employs the size of the drainage basin, a runoff coefficient and rainfall intensity. The runoff coefficient for the subject areas were derived from TxDOT hydraulic design manual for rural watersheds and include 1.1, 1.2 and 1.25 multiple factors to compute runoff coefficient factors for 25-, 50- and 100-year frequencies respectively. Runoff coefficients of 0.32 and 0.40 were used for woods and pasture lands respectively. The time of concentration for each cross structure was calculated based on the average velocity for overland flow (from 0.30 to 0.90 feet per second (fps)) and average velocity over the channel length through the watershed (from 0.50 to 1.50 fps). The storm frequency-specific watershed coefficients, that is, e, b and d were used both for Montgomery and Grimes counties.

A summary of the hydrologic analysis and results are included in Appendix 1.0. In addition, individual Rural Regional Equations computations for each drainage basin are contained in Appendix 1.0.

III. HYDRAULIC ANALYSIS

A. Project Datum

The horizontal datum control for the project is NAD 83 (1993 Adj.) and elevations are based on NAVD 88 established by GPS static survey from NGS control monument designation A 1281 (TSARP RM 100195 Elev. 231.72 feet). Survey data was extracted from a digital terrain model, created for the project site, provided by Martinez Corporation.

Additionally, Carter & Burgess, Inc. subsequently surveyed FEMA Reference Marker (RM) 840 on FM1486 to obtain an elevation difference between FEMA and the SH 249 project vertical datum (NAVD 88). The flood elevations on FEMA Flood Insurance Rate Maps (FIRM) were found to be

0.89 feet higher than the SH 249 project elevations. This datum adjustment was later used to accurately depict, relative to the project datum, the 100-year floodplain elevations at various cross structure locations along the project.

B. Hydraulic Analysis

In accordance with the Hydraulic Design Manual the cross structures are designed for a 50-year storm and will have a free board of 2 ft for freeway mainlanes. The proposed roadway does not have any frontage roads. In order to assess any backwater effects the structures were analyzed for 100-year storm frequency. Counter-erosive measures including riprap, energy dissipater blocks etc may be provided where the average through-bridge/culvert velocity exceeds 6 feet per second (fps). The water surface elevations upstream of proposed bridge/culverts locations should not exceed by more than 1 ft of rise from the existing according to FEMA regulations for unstudied creeks/tributaries.

A total of 41 cross structures including pipe culverts, box culverts and bridge openings were identified from USGS topographic maps, a digital terrain model for the project corridor and field visits. These structures are classified as bridge class culverts (total structure width > 20 ft) and non-bridge class culverts (total structure width < 20 ft). Out of these 41 locations 11 were estimated to be bridge-class and the remainder to be non-bridge class structures.

Headwater elevations for each of these crossings were computed using Hydrologic Engineering Center River Analysis Systems (HEC-RAS) (v 3.1.2, April 2004) or TxDOT Culvert design program (v 1.1, 1998). Manning's "n" values for main channel and overbanks were extracted from the Flood Insurance Study (FIS) for Montgomery County. For tributary no. 1 an average value of 0.11 and 0.14 was used for main channel and overbanks respectively. For tributary no. 2 an average value of 0.08 and 0.10 was used for main channel and overbanks respectively. For tributary no. 4 an average

value of 0.075 and 0.095 was used for main channel and overbanks respectively. For the Mill Creek crossing an average value of 0.08 and 0.11 was used for main channel and overbanks respectively. For tributary no. 5 an average value of 0.095 and 0.10 was used for main channel and overbanks respectively.

Hydraulic results are included in Appendix 2.0 and 3.0 for HEC-RAS and Culvert runs respectively. Headwater elevations for the 100-year storm are shown along the proposed roadway profile at these locations in Appendix 4.0.

C Preliminary Hydraulic Results

Several design criterion as mentioned earlier were used to preliminarily sizing the cross structures. Various computer programs including HEC-RAS (version 3.1.2 April 2004) and TxDOT THYSYS Culvert (version 1.1, 1998) programs were utilized to run hydraulics for these structures. HEC-RAS was used to analyze bridge sections while TxDOT Culvert program was used to analyze pipe and box culverts.

1. Bridge Crossing Analysis using HEC-RAS

Following are the locations where HEC-RAS was used to analyze bridge hydraulics:

- i) Drainage Area no. 10 (Tributary no. 1 to Mill Creek)
- ii) Drainage Area no. 12 (Tributary no. 2 to Mill Creek)
- iii) Drainage Area no. 14 (Tributary no. 4 to Mill Creek)
- iv) Drainage Area no. 17 (Mill Creek)
- v) Drainage Area no. 18 (Tributary no. 5 to Mill Creek)
- vi) Drainage Area no. 25 (Tributary no. 5 to Mill Creek)
- vii) Drainage Area no. 35 (Mill Creek)

The boundary conditions included either slope of the channel for computations or known water surface elevations at locations where backwater effects from Mill Creek are propagated into tributaries.

HEC-RAS models for the above-mentioned locations were created by generating four sections from the digital terrain model two sections each at

upstream and downstream end of the structure. Water surface elevations for 10-, 50- and 100-year were compared to the Flood Insurance Study (FIS) and adjusted to the project vertical datum (NAVD 88) for existing conditions. The proposed condition used bridge sections at these locations and results are summarized in Table 1.0 while detailed output results are included in Appendix 2.0.

2. Pipe/Box Culvert Crossing Analysis using THYSYS Culvert Program

TxDOT Culvert program was used to analyze pipe/box culvert crossings for headwater elevations. This was accomplished by identifying approximate upstream and downstream flow line at these locations from the digital terrain model. Tailwater was determined assuming normal depth at downstream cross section for various frequencies. Generally a 6:1 front slope was assumed to determine length of these culverts along with a 6:1 Safety End Treatment (SET). Also 3:1 and 4:1 front slopes were assumed where ROW was limited. Concrete culvert headwalls were assumed at retaining wall locations.

Tailwater elevations for 10-, 25-, 50- and 100-year storm frequencies are included in Table no. 2.0.

Results for headwater computations are tabulated in Table no. 3.0. This table also lists profile grade line (PGL) elevation comparison to the 50-year headwater elevations at these culvert crossings. Velocities for 50- and 100-yr storm frequencies are included in this table while detailed outputs for Culvert runs are included in Appendix no. 3.0 of the report.

IV. CONCLUSIONS

This report presents a preliminary drainage assessment of the SH249 Extension Project from FM 1774/FM 149 in Pinehurst to FM 1774 in Todd Mission. Procedures presented in the TxDOT Hydraulic Design Manual were followed to perform hydrology and hydraulics for various crossings. This assessment identified cross culvert (including bridge and non-bridge class structures) locations, sizing and 50- and 100-year headwater elevations.

Conclusions and recommendations are summarized below based on the analysis in the report:

- A total of 41 bridges and culverts crossings were identified in this drainage assessment using the USGS topographic maps, a digital terrain model of the project corridor and field visits. Drainage area maps for these basins are included in Exhibit 1.0 of this report.
- Rational Method or Rural Regional Regression Equations, where applicable, were used to compute flows for 10-, 25-, 50- and 100-year storm frequencies.
- Culvert lengths were based on a usual 6:1 front slope with a maximum 3:1 slope where ROW was limited. Safety End Treatments (SET) were assumed for end treatment.
- Hydraulic analysis showed that velocities through some structures are higher than 6 fps and, therefore, downstream ends would require measures including riprap, energy dissipator blocks etc to accommodate these high velocities. A summary of velocities for the 50-year design frequency are presented in Table 3.0. Detailed run outputs from Culvert program are included in Appendix 3.0.
- Hydraulic analysis for Mill Creek tributaries 1, 2, and 5, corresponding to drainage area 10, 12, and 18 respectively, showed that flood profiles were impacted by back water effects from Mill Creek. Therefore, boundary conditions were accordingly defined to realize these back water effects from Mill Creek. The 100-year Water Surface Elevations at these bridge sections were checked to verify any back water effects. Results are presented in Table 1.0 of this report. HEC-RAS output are included in Appendix 2.0 of this report.
- The upstream reach of Mill Creek that contains crossing no. 35 is not studied by FEMA. The existing model run under this analysis forms the basis to establishing 100-year water surface elevations for the proposed bridge crossing.
- Headwater elevations for 100-year storm events are plotted against roadway profile and included in Appendix 4.0.
- In order to mitigate drainage impacts from the proposed roadway, approximately 28% increase in imperviousness, a drainage impact

study is recommended to identify potential flood plain impacts and propose locations for detention/retention basins. Additionally this study would help in determining further right-of-way needs along the project corridor.

Table No. 1.0 Comparison of 50- & 100- Yr Water Surface Elevation for Existing and Proposed Conditions

DRAIN- AGE AREA ID	APPROX. ROADWAY STATION	BRIDGE LENGTH (FT)	NO. OF SPANS	WATER SURFACE ELEVATIONS (FT)				*FEMA 100-YR WSEL (FT)	MIN. LOW CORD DECK ELEV. (FT)	COMMENTS
				50-YR		100-YR				
				EXIST	PROP	EXIST	PROP			
10	1321+40	165.0	3	185.37	185.96	186.44	186.75	**189.11	194.66	Tributary no. 1 to Mill Creek
12	1347+00	480.0	4	192.35	192.81	192.59	193.09	193.41	197.62	Tributary no. 2 to Mill Creek
14	1421+00	575.00	5	196.07	196.10	198.53	198.54	198.43	202.05	Tributary no. 4 to Mill Creek
17	1537+25	1060.0 1080.0	10 9	212.83	213.02	213.49	213.71	213.11	216.15	Mill Creek
18	1558+75	500.0 480.0	5 4	211.47	211.72	212.94	212.99	213.11	218.01	Tributary no. 5 to Mill Creek
25	1636+00	960.0 1000.0	8 9	231.97	232.03	232.39	232.45	232.11	236.31	Tributary no. 5 to Mill Creek
35	1931+00	320.0	3	280.13	280.47	281.06	281.60	NA	282.51	Mill Creek at Mainlanes
	1930+50	320.0	3	280.27	280.67	281.21	281.84	NA	282.67	Mill Creek at SH 249 Northbound Frontage Rd

* Approximate 100-yr water surface elevation from FEMA's FIRM Panels, dated December 19, 1996. (Adjusted to project datum, NAVD 88).

**WSEL at approximately 300ft upstream of the proposed bridge section.

Table No. 2.0 Tailwater Elevations for Various Frequencies

DRAINAGE AREA ID	APPROXIMATE CULVERT STA.	TAILWATER ELEVATIONS (FT)			
		10-YR	25-YR	50-YR	100-YR
1	NA	NA	NA	NA	NA
2	1211+22	226.60	226.66	226.70	226.74
3	1224+20	230.25	230.31	230.35	230.39
4	1240+00	196.67	196.79	196.87	196.96
5	1253+56	176.99	177.03	177.07	177.10
6	1269+63	187.50	187.59	187.65	187.71
7	1274+65	189.43	189.47	189.50	189.52
8	1285+08	177.04	177.08	177.11	177.14
9	1296+14	185.16	185.20	185.24	185.27
9A	1308+37	180.47	180.51	180.54	180.57
11	1336+39	189.75	189.77	189.79	189.80
13	1365+16	198.98	199.06	199.11	199.17
15	1492+95	239.35	239.45	239.55	239.61
16	1513+59	212.97	213.46	213.98	214.56
17A	1820+56	300.74	300.83	300.92	300.99
17B	1753+00	277.15	277.20	277.24	277.27
17C	1766+70	294.04	294.09	294.16	294.20
19	1568+77	220.75	220.82	220.87	220.92
20	1587+39	234.94	235.04	235.11	235.17
21	1595+59	232.39	233.37	234.10	234.91
22	1603+34	234.39	234.87	235.25	235.67
23	1611+78	240.23	240.30	240.36	240.40
24	1620+80	240.51	240.68	240.81	240.94
26	1656+26	253.22	253.28	253.33	253.37
27	1665+28	246.61	246.80	246.93	247.08
28	1675+77	256.21	256.45	256.62	256.80
29	1691+08	252.93	253.20	253.41	253.63
29A	1719+50	283.19	283.26	283.31	283.36
30	1807+37	278.91	279.99	280.47	280.98
30A	1841+41	305.06	305.12	305.16	305.21
31	1870+67	299.86	300.00	300.11	300.21
32	1876+37	297.80	298.08	298.31	298.49
33	1897+79	302.95	303.15	303.32	303.47
34	1924+54	275.76	275.85	275.93	275.98

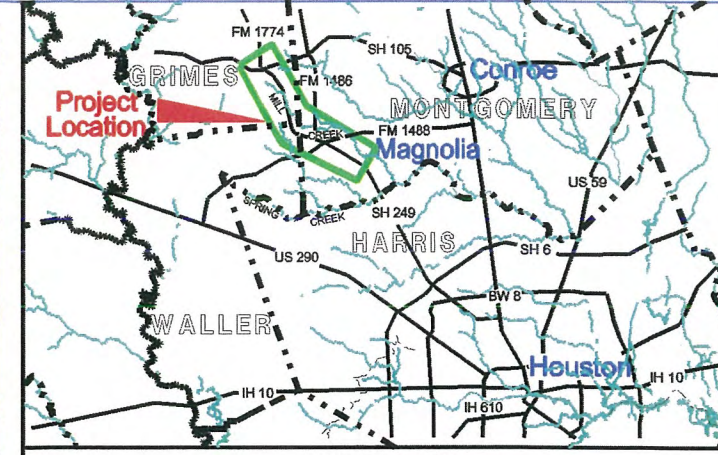
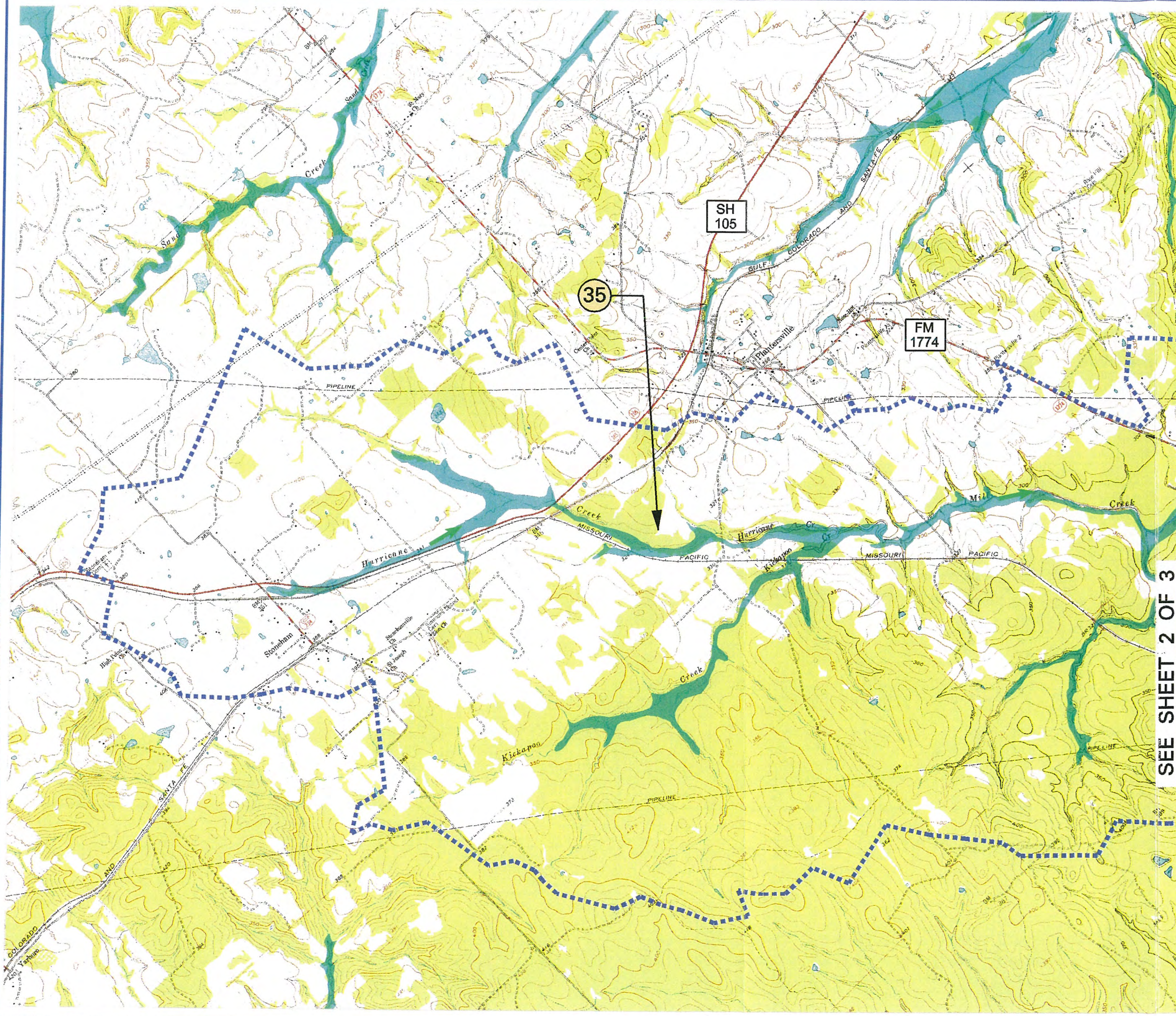
Table No. 3.0 Hydraulic Computations

STR ID	STRUCTURE TYPE	FLOWLINE		PROP. GRADELINE ELEVATION (FT)	SIDE SLOPE		50-YR HEADWATER (FT)	50-YR VELOCITY (FPS)	100-YR HEADWATER (FT)	100-YR VELOCITY (FPS)	SKEW ANGLE (DEG)	OUTFALL TREATMENT	COMMENTS
		U/S (FT)	D/S (FT)		LT	RT							
1				(FT)									Drainage facilitated by existing road side ditch
2	2-36"X181' RCP	230.17	228.63	239.5	6:1	6:1	232.23	7.9	232.41	8.1	15° RT	RIPRAP OUTFALL	Safety End Treatment
3	2-4'X2'X184'CBC	233.79	230.83	239.5	6:1	6:1	235.02	10.4	235.68	10.8	0°	RIPRAP OUTFALL	Safety End Treatment
4	2-36"X388' RCP	202.96	195.10	210.9	6:1	6:1	206.20	13.6	207.76	14.1	60° RT	RIPRAP OUTFALL	Safety End Treatment
5	3-36"X285' RCP	177.60	177.20	208.1	0	0	180.75	4.7	181.16	5.5	0°	NA	Headwall Treatment
6	2-30"X385' RCP	200.64	186.66	206.7	0	0	204.76	17.0	205.58	17.5	30° RT	RIPRAP OUTFALL	Headwall Treatment (Pavement in Super)
7	2-24"X252' RCP	192.92	185.80	200.0	0	0	195.88	6.4	196.15	7.0	0°	RIPRAP OUTFALL	Headwall Treatment
8	3-36"X267' RCP	181.37	177.00	189.4	6:1	6:1	184.04	11.5	184.37	11.9	30° LT	RIPRAP OUTFALL	Safety End Treatment
9	4-36"X240' RCP	183.77	182.61	194.4	6:1	6:1	187.18	6.4	187.48	7.2	0°	RIPRAP OUTFALL	Safety End Treatment
9A	2-24"X261' RCP	187.34	180.72	194.4	6:1	6:1	189.36	11.5	189.62	11.8	0°	RIPRAP OUTFALL	Safety End Treatment
11	2-36"X285' RCP	193.75	187.79	199.2	6:1	6:1	195.92	11.9	196.18	12.3	45° LT	RIPRAP OUTFALL	Safety End Treatment
13	3-36"X240' RCP	198.74	195.07	205.2	6:1	6:1	201.74	5.6	202.21	6.6	15° RT	NA	Safety End Treatment
15	2-30"X485' RCP	245.79	238.20	256.0	3:1	3:1	249.02	11.7	249.46	11.9	30° RT	RIPRAP OUTFALL	Safety End Treatment
16	4-8'X5'X297'CBC	214.48	210.75	224.2	6:1	6:1	217.03	5.0	217.61	5.5	30° RT	NA	BRIDGE CLASS CULVERT
17A	2-24"X245' RCP	300.48	299.94	307.1	6:1	6:1	302.69	4.1	302.99	4.8	30° RT	NA	Safety End Treatment
17B	2-24"X204' RCP	286.45	278.96	293.3	6:1	6:1	288.74	13.5	289.13	13.9	0°	RIPRAP OUTFALL	Safety End Treatment
17C	1-24"X246' RCP	300.00	298.00	307.3	6:1	6:1	302.79	12.1	302.91	12.4	0°	RIPRAP OUTFALL	Safety End Treatment
19	3-24"X344' RCP	222.18	220.03	231.2	6:1	6:1	223.99	6.2	224.22	6.5	45° RT	RIPRAP OUTFALL	Safety End Treatment
20	2-30"X304' RCP	238.00	234.13	244.1	6:1	6:1	245.85	10.6	246.26	10.9	45° LT	RIPRAP OUTFALL	Safety End Treatment (Pavement in Super)
21	4-5'X5'X251'CBC	230.55	229.21	241.6	6:1	6:1	235.31	5.7	236.60	7.1	15° RT	NA	BRIDGE CLASS CULVERT
22	4-5'X5'X293'CBC	232.85	231.91	243.8	6:1	6:1	237.13	7.3	237.99	8.4	30° LT	RIPRAP OUTFALL	BRIDGE CLASS CULVERT
23	2-30"X234' RCP	244.84	239.55	249.6	6:1	6:1	247.73	12.7	248.14	13.0	0°	RIPRAP OUTFALL	Safety End Treatment
24	3-30"X264' RCP	239.84	239.28	246.7	6:1	6:1	243.83	8.1	244.39	9.4	15° LT	RIPRAP OUTFALL	Safety End Treatment
26	2-24"X350' RCP	254.00	252.65	276.0	0	0	256.90	6.2	257.37	7.0	0°	RIPRAP OUTFALL	Headwall Treatment
27	2-36"X370' RCP	247.89	243.85	262.6	0	0	251.44	6.2	251.99	7.3	15° LT	RIPRAP OUTFALL	Headwall Treatment
28	2-30"X302' RCP	256.19	253.81	262.7	6:1	6:1	259.60	6.8	260.26	7.9	30° RT	RIPRAP OUTFALL	Safety End Treatment
29	2-48"X229' RCP	251.91	249.97	258.9	6:1	6:1	255.48	5.9	255.90	6.6	15° RT	NA	Safety End Treatment
29A	3-30"X258' RCP	285.95	282.48	291.6	6:1	6:1	288.18	9.7	288.39	9.9	0°	RIPRAP OUTFALL	Safety End Treatment
30	3-6'X6'X360'CBC	279.58	276.14	296.4	6:1	6:1	283.39	6.1	284.17	7.0	30° RT	NA	BRIDGE CLASS CULVERT
30A	4-24"X216' RCP	306.69	305.68	312.1	6:1	6:1	309.33	5.7	309.68	6.7	0°	NA	Safety End Treatment
31	2-42"X288' RCP	303.93	298.48	310.4	6:1	6:1	306.72	12.4	307.04	12.7	0°	RIPRAP OUTFALL	Safety End Treatment
32	3-36"X314' RCP	298.43	294.09	310.4	6:1	6:1	301.34	5.3	301.71	6.1	30° RT	NA	Safety End Treatment
33	3-36"X332' RCP	302.67	300.63	319.1	6:1	6:1	305.66	5.6	306.01	6.2	15° LT	NA	Safety End Treatment
34	2-36"X244' RCP	276.24	274.83	283.1	6:1	6:1	278.91	7.1	279.18	7.3	15° RT	RIPRAP OUTFALL	Safety End Treatment

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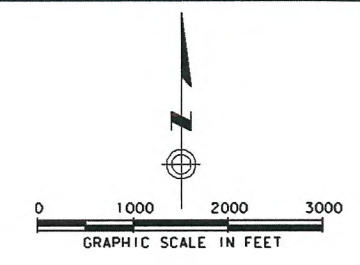


VICINITY MAP

USGS QUADRANGLE MAPS

DACUS
ANDERSON
STONEHAM
PLANTERSVILLE

MAGNOLIA EAST
MAGNOLIA WEST
KEENAN



LEGEND

- DRAINAGE AREA BOUNDARY
- FLOW DIRECTION
- DRAINAGE AREA ID
- FLOOD PLAIN (100 YEAR)
- PROPOSED ROW

REV. NO.	DATE	DESCRIPTION	BY
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CarterBurgess

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(713) 869-7900 (713) 869-5502 FAX

UNIT	JOB NO.	DESIGN FILE
TRANS	030835.010	835+da002.dgn



SH 249

DRAINAGE AREA MAP
EXHIBIT NO. 1

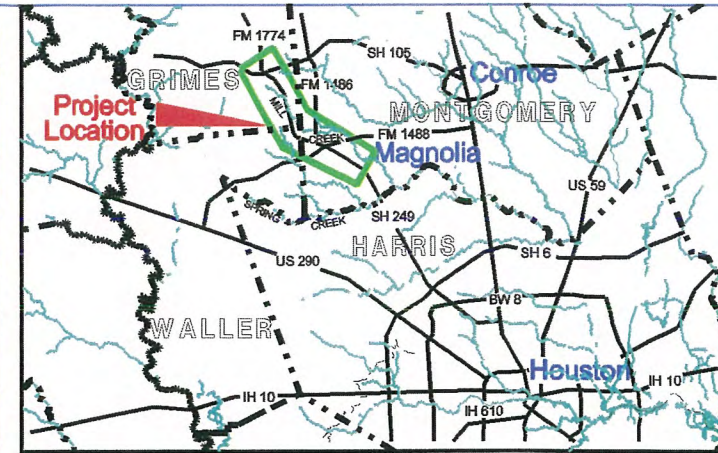
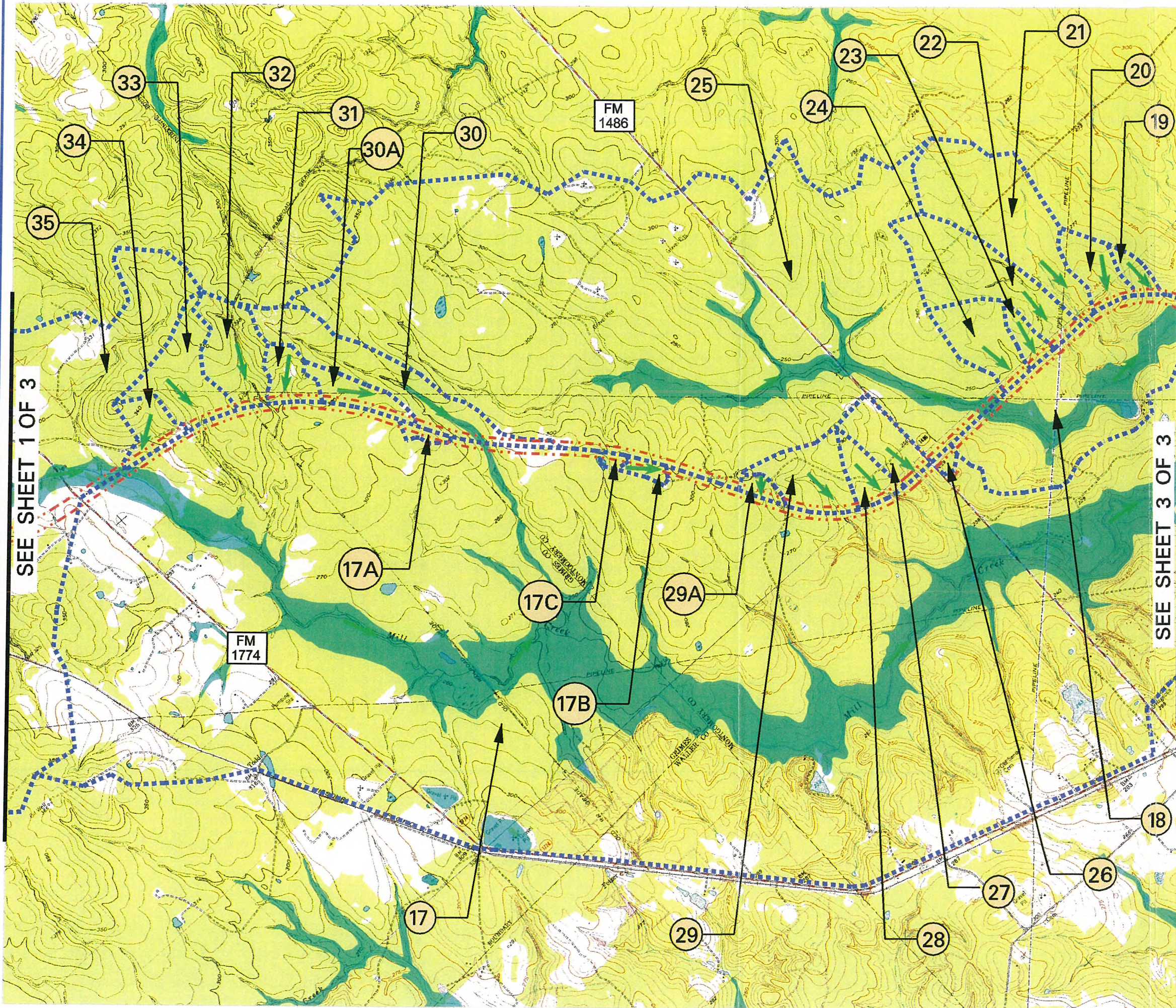
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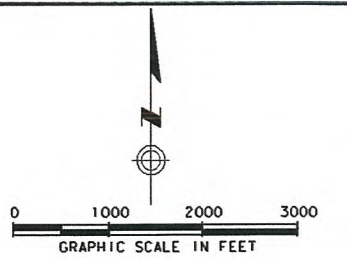


VICINITY MAP

USGS QUADRANGLE MAPS

DACUS
ANDERSON
STONEHAM
PLANTERSVILLE

MAGNOLIA EAST
MAGNOLIA WEST
KEENAN



LEGEND

DRAINAGE AREA BOUNDARY
FLOW DIRECTION
DRAINAGE AREA ID
FLOOD PLAIN (100 YEAR)
PROPOSED ROW



REV. NO.	DATE	DESCRIPTION	BY
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SH 249

DRAINAGE AREA MAP

EXHIBIT NO. 1

SHEET 2 OF 3

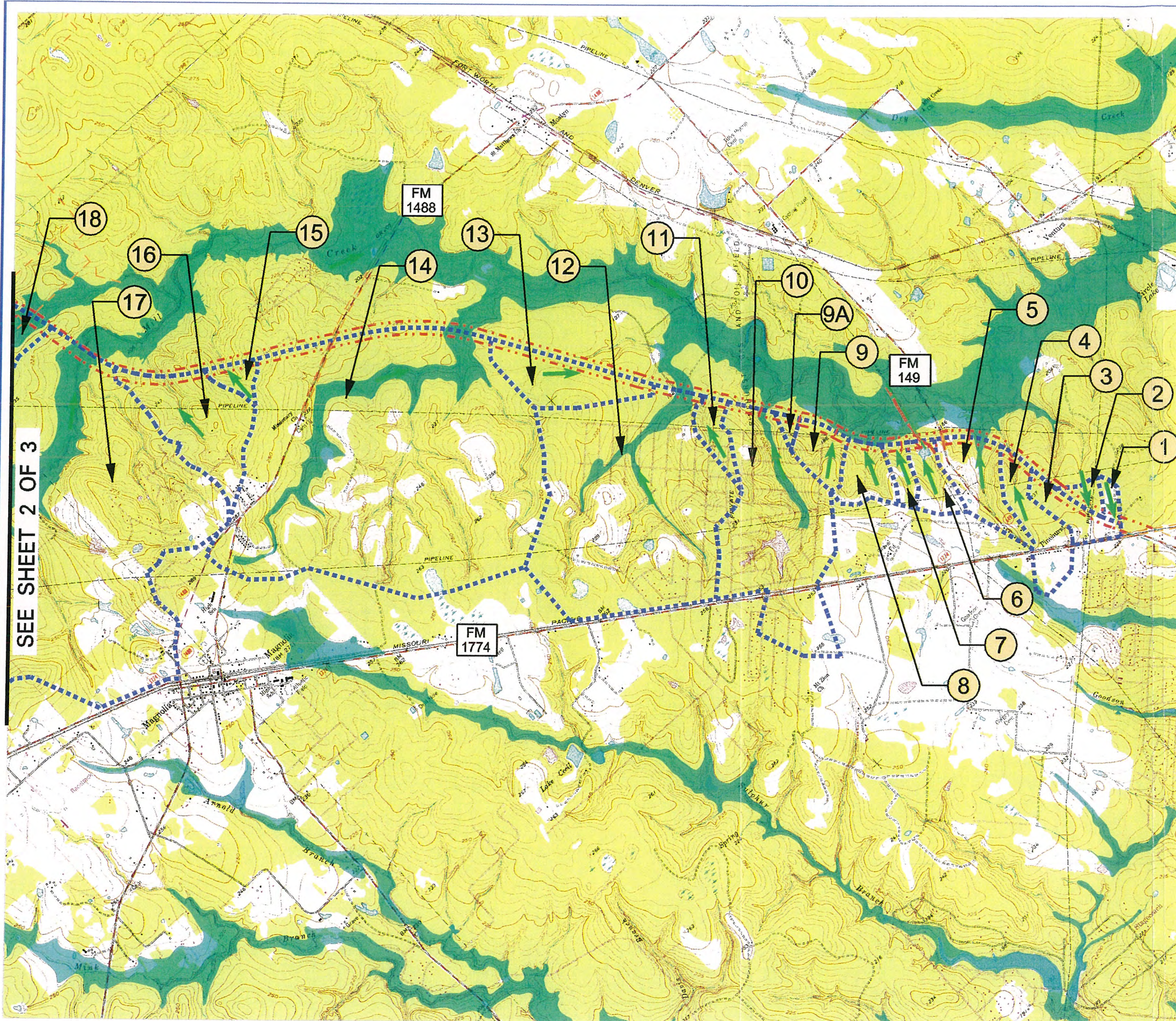
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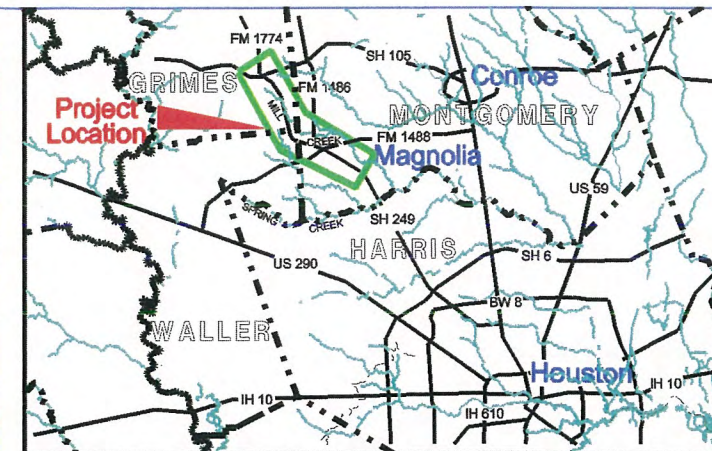
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SEE SHEET 2 OF 3



VICINITY MAP

USGS QUADRANGLE MAPS

DACUS
ANDERSON
STONEHAM
PLANTERSVILLE

MAGNOLIA EAST
MAGNOLIA WEST
KEENAN



0 1000 2000 3000
GRAPHIC SCALE IN FEET

LEGEND

DRAINAGE AREA BOUNDARY
FLOW DIRECTION
DRAINAGE AREA ID
FLOOD PLAIN (100 YEAR)
PROPOSED ROW

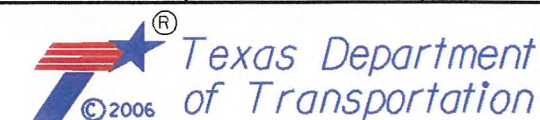


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TRANS	030835.010	835+da004.dgn



SH 249

DRAINAGE AREA MAP

EXHIBIT NO. 1

SHEET 3 OF 3

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CK:	ODH	6	TEXAS		SH 249
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HYDROLOGIC COMPUTATIONS (RATDNAL METHQD OR REGIONAL REGRESSION EQUATIONS)

DRAINAGE AREA ID	DA (ACRES)	DA (SQ. MILES)	RUNOFF COEFFICIENT*	TIME OF CONCENTRATION (MIN)	INTENSITY (IN/HR)				BASIN SHAPE FACTOR	CHANNEL SLOPE (FT/MILE)	FLOW (CFS)			
					10-YR	25-YR	50-YR	100-YR			10-YR	25-YR	50-YR	100-YR
1	15.0	0.02	0.33	57	3.45	3.94	4.28	4.71			17	21	25	29
2	20.0	0.03	0.33	38	4.49	5.07	5.52	6.03			29	36	43	49
3	91.0	0.14	0.32	85	2.63	3.03	3.28	3.65			77	98	116	134
4	100.0	0.16	0.33	148	1.77	2.08	2.24	2.53			59	76	89	104
5	108.0	0.17	0.32	135	1.89	2.22	2.39	2.69			65	84	99	116
6	56.0	0.09	0.34	79	2.76	3.18	3.45	3.83			52	66	78	90
7	29.0	0.05	0.32	72	2.94	3.38	3.67	4.07			27	35	41	47
8	65.0	0.10	0.32	61	3.30	3.77	4.09	4.52			69	87	103	119
9	57.0	0.09	0.40	33	4.90	5.52	6.01	6.55			112	138	165	187
9A	10.0	0.02	0.40	30	5.19	5.84	6.36	6.92			21	26	31	35
10	449.0	0.70							2.60	38.88	300	491	641	822
11	43.0	0.07	0.36	99	2.36	2.74	2.96	3.30			36	46	54	63
12	819.0	1.28							1.31	41.84	521	771	1025	1337
13	131.0	0.20	0.32	138	1.87	2.18	2.35	2.65			78	101	118	139
14	1547.0	2.42							2.50	37.61	728	1174	1571	2061
15	28.0	0.04	0.32	34	4.81	5.42	5.91	6.44			43	53	64	72
16	206.0	0.32							0.64	75.20	245	346	465	611
17	22350.0	34.92							8.65	12.86	3239	5632	7442	9632
17A	13.0	0.02	0.40	58	3.41	3.90	4.23	4.66			18	22	26	30
17B	17.0	0.03	0.33	37	4.56	5.16	5.61	6.13			25	31	37	42
17C	8.0	0.01	0.32	15	7.62	8.45	9.24	9.90			20	24	29	32
18	4688.0	7.33							4.76	18.77	1256	2081	2726	3501
19	28.0	0.04	0.32	88	2.56	2.96	3.21	3.57			23	29	34	40
20	69.0	0.11	0.32	82	2.69	3.11	3.36	3.74			59	75	89	103
21	312.0	0.49							1.89	51.13	257	413	544	705
22	229.0	0.36							1.35	64.34	228	356	473	618
23	30.0	0.05	0.32	41	4.28	4.84	5.27	5.77			41	51	61	69
24	125.0	0.20	0.32	128	1.97	2.30	2.48	2.79			79	101	119	139
25	3364.0	5.26							3.43	21.31	1069	1710	2242	2882
26	10.0	0.01	0.32	12	8.48	9.36	10.26	10.94			27	33	39	44
27	84.0	0.13	0.32	113	2.15	2.50	2.70	3.03			58	75	88	103
28	53.0	0.08	0.32	85	2.63	3.03	3.28	3.65			45	57	67	78
29	132.0	0.21	0.32	122	2.04	2.37	2.56	2.88			87	111	131	153
29A	18.0	0.03	0.32	15	7.62	8.45	9.24	9.90			44	54	64	72
30	222.0	0.35							5.88	58.02	175	337	445	576
30A	55.0	0.09	0.34	86	2.61	3.01	3.26	3.62			48	61	72	84
31	54.0	0.08	0.32	75	2.81	3.24	3.57	3.89			49	62	74	84
32	130.0	0.20	0.32	145	1.77	2.06	2.27	2.50			74	94	113	130
33	139.0	0.22	0.32	168	1.59	1.85	2.05	2.26			71	91	109	126
34	56.0	0.09	0.32	82	2.64	3.05	3.36	3.67			47	60	72	82
35	11115.0	17.37							2.58	20.67	2615	3971	5334	7011

* Runoff Coefficients for 25-, 50-, and 100-year storm frequency include multiple factors of 1.1, 1.2 & 1.25 respectively as indicated in the TxDOT Hydraulic Design Manual.

Regional Regression Equations For Region 11

$$Q_{10} = (199)(area^{0.718})(m^{0.291})(BSF^{0.51})$$
$$Q_{25} = (201)(area^{0.718})(m^{0.333})$$
$$Q_{50} = (207)(area^{0.735})(m^{0.380})$$
$$Q_{100} = (213)(area^{0.758})(m^{0.442})$$

Where:

area = Drainage Area in square miles

BSF = Ratio of the longest mapped channel squared to the contributing drainage area.

m = Ratio of change in elevation of the longest mapped channel from the site to the headwaters to the length of the longest mapped channel in feet/mile units (Slope)

REV. NO.	DATE	DESCRIPTION	BY
----------	------	-------------	----

Carter Burgess

CARTER & BURGESS, INC.
55 WAUGH DRIVE, SUITE 300
HOUSTON, TX 77007-5842
(713) 869-7900 (713) 869-5502 FAX

UNIT	JOB NO.	DESIGN FILE
TRANS	030835.010	835+da001.dgn



SH 249

HYDROLOGIC DATA

SHEET 1 OF 1

DSN:	FED.RD. DIV.NO.	STATE	PROJECT NO.			HIGHWAY NO.
CK:		TEXAS				SH 249
DRN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
CK:	HOU	MONTGOMERY	0912	00	144	

REGION 11 REGRESSION EQUATIONS

County: Montgomery

CSJ: 0912-00-144

Stream: Mill Creek Trib (DA 10)

	English Units	Metric Units
Drainage Area	0.70 mi ²	1.82 km ²
BSF	2.60	2.6
Slope, m	38.88 feet/mile	0.0074 m/m

Frequency (years)	2	5	10	25	50	100
Flows (cfs)	98	201	300	491	641	822
Flows (m ³ /s)	3	6	8	14	18	23
Standard error (%)	43	43	49	54	60	66

Flows for Region 11 are calculated based upon the following formulas:

Flows in English Units (cfs)

$$\begin{aligned}
 Q_2 &= (159)(\text{area}^{0.669})(\text{BSF}^{-0.262}) \\
 Q_5 &= (191)(\text{area}^{0.696})(\text{m}^{0.130})(\text{BSF}^{-0.186}) \\
 Q_{10} &= (199)(\text{area}^{0.718})(\text{m}^{0.221})(\text{BSF}^{-0.151}) \\
 Q_{25} &= (201)(\text{area}^{0.713})(\text{m}^{0.313}) \\
 Q_{50} &= (207)(\text{area}^{0.735})(\text{m}^{0.380}) \\
 Q_{100} &= (213)(\text{area}^{0.755})(\text{m}^{0.442})
 \end{aligned}$$

Range of independent variables

Area: 0.13 to 3,636 mi²
 BSF: 0.082 to 18.8
 Slope: 0.38 to 169 feet/mile

Where:

Area is the contributing drainage area in square miles.

BSF is the ratio of the longest mapped channel squared to the contributing drainage area.

Slope is the ratio of change in elevation of the longest mapped channel from the site to the headwaters to the length of the longest mapped channel. Slope in English units are feet/mile or meters/meters in Metric units.

Flows in Metric Units (m³/s)

$$\begin{aligned}
 Q_2 &= (2.3820)(\text{area}^{0.669})(\text{BSF}^{-0.262}) \\
 Q_5 &= (8.4989)(\text{area}^{0.696})(\text{m}^{0.13})(\text{BSF}^{-0.186}) \\
 Q_{10} &= (18.9170)(\text{area}^{0.718})(\text{m}^{0.221})(\text{BSF}^{-0.151}) \\
 Q_{25} &= (42.2418)(\text{area}^{0.713})(\text{m}^{0.313}) \\
 Q_{50} &= (75.6556)(\text{area}^{0.735})(\text{m}^{0.38}) \\
 Q_{100} &= (129.9534)(\text{area}^{0.755})(\text{m}^{0.442})
 \end{aligned}$$

Range of independent variables

Area: 0.3 to 9,417 km²
 BSF: 0.082 to 18.8
 Slope: 0.0001 to 0.0320 m/m

Where:

Area is the contributing drainage area in square kilometers.

REGION 11 REGRESSION EQUATIONS

County: Montgomery

CSJ: 0912-00-144

Stream: Mill Creek Trib (DA 12)

	English Units	Metric Units
Drainage Area	1.28 mi ²	3.31 km ²
BSF	1.31	1.3
Slope, m	41.84 feet/mile	0.0079 m/m

Frequency (years)	2	5	10	25	50	100
Flows (cfs)	175	351	521	771	1,025	1,337
Flows (m ³ /s)	5	10	15	22	29	38
Standard error (%)	43	43	49	54	60	66

Flows for Region 11 are calculated based upon the following formulas:

Flows in English Units (cfs)

$$\begin{aligned}
 Q_2 &= (159)(\text{area}^{0.669})(\text{BSF}^{-0.262}) \\
 Q_5 &= (191)(\text{area}^{0.696})(\text{m}^{0.130})(\text{BSF}^{-0.186}) \\
 Q_{10} &= (199)(\text{area}^{0.718})(\text{m}^{0.221})(\text{BSF}^{-0.151}) \\
 Q_{25} &= (201)(\text{area}^{0.713})(\text{m}^{0.313}) \\
 Q_{50} &= (207)(\text{area}^{0.735})(\text{m}^{0.380}) \\
 Q_{100} &= (213)(\text{area}^{0.755})(\text{m}^{0.442})
 \end{aligned}$$

Range of independent variables

Area: 0.13 to 3,636 mi²
 BSF: 0.082 to 18.8
 Slope: 0.38 to 169 feet/mile

Where:

Area is the contributing drainage area in square miles.

BSF is the ratio of the longest mapped channel squared to the contributing drainage area.

Slope is the ratio of change in elevation of the longest mapped channel from the site to the headwaters to the length of the longest mapped channel. Slope in English units are feet/mile or meters/meters in Metric units.

Flows in Metric Units (m³/s)

$$\begin{aligned}
 Q_2 &= (2.3820)(\text{area}^{0.669})(\text{BSF}^{-0.262}) \\
 Q_5 &= (8.4989)(\text{area}^{0.696})(\text{m}^{0.13})(\text{BSF}^{-0.186}) \\
 Q_{10} &= (18.9170)(\text{area}^{0.718})(\text{m}^{0.221})(\text{BSF}^{-0.151}) \\
 Q_{25} &= (42.2418)(\text{area}^{0.713})(\text{m}^{0.313}) \\
 Q_{50} &= (75.6556)(\text{area}^{0.735})(\text{m}^{0.38}) \\
 Q_{100} &= (129.9534)(\text{area}^{0.755})(\text{m}^{0.442})
 \end{aligned}$$

Range of independent variables

Area: 0.3 to 9,417 km²
 BSF: 0.082 to 18.8
 Slope: 0.0001 to 0.0320 m/m

Where:

Area is the contributing drainage area in square kilometers.

REGION 11 REGRESSION EQUATIONS

County: Montgomery

CSJ: 0912-00-144

Stream: Mill Creek Trib (DA 14)

	English Units	Metric Units
Drainage Area	2.42 mi ²	6.26 km ²
BSF	2.50	2.5
Slope, m	37.61 feet/mile	0.0071 m/m

Frequency (years)	2	5	10	25	50	100
Flows (cfs)	226	477	728	1,174	1,571	2,061
Flows (m ³ /s)	6	14	21	33	44	58
Standard error (%)	43	43	49	54	60	66

Flows for Region 11 are calculated based upon the following formulas:

Flows in English Units (cfs)

$$\begin{aligned}
 Q_2 &= (159)(\text{area}^{0.669})(\text{BSF}^{-0.262}) \\
 Q_5 &= (191)(\text{area}^{0.696})(m^{0.130})(\text{BSF}^{-0.186}) \\
 Q_{10} &= (199)(\text{area}^{0.718})(m^{0.221})(\text{BSF}^{-0.151}) \\
 Q_{25} &= (201)(\text{area}^{0.713})(m^{0.313}) \\
 Q_{50} &= (207)(\text{area}^{0.735})(m^{0.380}) \\
 Q_{100} &= (213)(\text{area}^{0.755})(m^{0.442})
 \end{aligned}$$

Range of independent variables

Area: 0.13 to 3,636 mi²
 BSF: 0.082 to 18.8
 Slope: 0.38 to 169 feet/mile

Where:

Area is the contributing drainage area in square miles.

BSF is the ratio of the longest mapped channel squared to the contributing drainage area.

Slope is the ratio of change in elevation of the longest mapped channel from the site to the headwaters to the length of the longest mapped channel. Slope in English units are feet/mile or meters/meters in Metric units.

Flows in Metric Units (m³/s)

$$\begin{aligned}
 Q_2 &= (2.3820)(\text{area}^{0.669})(\text{BSF}^{-0.262}) \\
 Q_5 &= (8.4989)(\text{area}^{0.696})(m^{0.13})(\text{BSF}^{-0.186}) \\
 Q_{10} &= (18.9170)(\text{area}^{0.718})(m^{0.221})(\text{BSF}^{-0.151}) \\
 Q_{25} &= (42.2418)(\text{area}^{0.713})(m^{0.313}) \\
 Q_{50} &= (75.6556)(\text{area}^{0.735})(m^{0.38}) \\
 Q_{100} &= (129.9534)(\text{area}^{0.755})(m^{0.442})
 \end{aligned}$$

Range of independent variables

Area: 0.3 to 9,417 km²
 BSF: 0.082 to 18.8
 Slope: 0.0001 to 0.0320 m/m

Where:

Area is the contributing drainage area in square kilometers.

REGION 11 REGRESSION EQUATIONS

County: Montgomery

CSJ: 0912-00-144

Stream: Mill Creek Trib (DA 16)

	English Units	Metric Units
Drainage Area	0.32 mi ²	0.83 km ²
BSF	0.64	0.6
Slope, m	75.20 feet/mile	0.0142 m/m

Frequency (years)	2	5	10	25	50	100
Flows (cfs)	84	165	245	346	465	611
Flows (m ³ /s)	2	5	7	10	13	17
Standard error (%)	43	43	49	54	60	66

Flows for Region 11 are calculated based upon the following formulas:

Flows in English Units (cfs)

$$\begin{aligned}
 Q_2 &= (159)(\text{area}^{0.669})(\text{BSF}^{-0.262}) \\
 Q_5 &= (191)(\text{area}^{0.696})(m^{0.130})(\text{BSF}^{-0.186}) \\
 Q_{10} &= (199)(\text{area}^{0.718})(m^{0.221})(\text{BSF}^{-0.151}) \\
 Q_{25} &= (201)(\text{area}^{0.713})(m^{0.313}) \\
 Q_{50} &= (207)(\text{area}^{0.735})(m^{0.380}) \\
 Q_{100} &= (213)(\text{area}^{0.755})(m^{0.442})
 \end{aligned}$$

Range of independent variables

Area: 0.13 to 3,636 mi²
 BSF: 0.082 to 18.8
 Slope: 0.38 to 169 feet/mile

Where:

Area is the contributing drainage area in square miles.

BSF is the ratio of the longest mapped channel squared to the contributing drainage area.

Slope is the ratio of change in elevation of the longest mapped channel from the site to the headwaters to the length of the longest mapped channel. Slope in English units are feet/mile or meters/meters in Metric units.

Flows in Metric Units (m³/s)

$$\begin{aligned}
 Q_2 &= (2.3820)(\text{area}^{0.669})(\text{BSF}^{-0.262}) \\
 Q_5 &= (8.4989)(\text{area}^{0.696})(m^{0.13})(\text{BSF}^{-0.186}) \\
 Q_{10} &= (18.9170)(\text{area}^{0.718})(m^{0.221})(\text{BSF}^{-0.151}) \\
 Q_{25} &= (42.2418)(\text{area}^{0.713})(m^{0.313}) \\
 Q_{50} &= (75.6556)(\text{area}^{0.735})(m^{0.38}) \\
 Q_{100} &= (129.9534)(\text{area}^{0.755})(m^{0.442})
 \end{aligned}$$

Range of independent variables

Area: 0.3 to 9,417 km²
 BSF: 0.082 to 18.8
 Slope: 0.0001 to 0.0320 m/m

Where:

Area is the contributing drainage area in square kilometers.

REGION 11 REGRESSION EQUATIONS

County: Montgomery

CSJ: 0912-00-144

Stream: Mill Creek (DA 17)

	English Units	Metric Units
Drainage Area	34.92 mi ²	90.44 km ²
BSF	8.65	8.6
Slope, m	12.86 feet/mile	0.0024 m/m

Frequency (years)	2	5	10	25	50	100
Flows (cfs)	973	2,113	3,239	5,632	7,442	9,632
Flows (m ³ /s)	28	60	92	159	211	273
Standard error (%)	43	43	49	54	60	66

Flows for Region 11 are calculated based upon the following formulas:

Flows in English Units (cfs)

$$\begin{aligned}
 Q_2 &= (159)(\text{area}^{0.669})(\text{BSF}^{-0.262}) \\
 Q_5 &= (191)(\text{area}^{0.696})(\text{m}^{0.130})(\text{BSF}^{-0.186}) \\
 Q_{10} &= (199)(\text{area}^{0.718})(\text{m}^{0.221})(\text{BSF}^{-0.151}) \\
 Q_{25} &= (201)(\text{area}^{0.713})(\text{m}^{0.313}) \\
 Q_{50} &= (207)(\text{area}^{0.735})(\text{m}^{0.380}) \\
 Q_{100} &= (213)(\text{area}^{0.755})(\text{m}^{0.442})
 \end{aligned}$$

Range of independent variables

Area: 0.13 to 3,636 mi²
 BSF: 0.082 to 18.8
 Slope: 0.38 to 169 feet/mile

Where:

Area is the contributing drainage area in square miles.

BSF is the ratio of the longest mapped channel squared to the contributing drainage area.

Slope is the ratio of change in elevation of the longest mapped channel from the site to the headwaters to the length of the longest mapped channel. Slope in English units are feet/mile or meters/meters in Metric units.

Flows in Metric Units (m³/s)

$$\begin{aligned}
 Q_2 &= (2.3820)(\text{area}^{0.669})(\text{BSF}^{-0.262}) \\
 Q_5 &= (8.4989)(\text{area}^{0.696})(\text{m}^{0.13})(\text{BSF}^{-0.186}) \\
 Q_{10} &= (18.9170)(\text{area}^{0.718})(\text{m}^{0.221})(\text{BSF}^{-0.151}) \\
 Q_{25} &= (42.2418)(\text{area}^{0.713})(\text{m}^{0.313}) \\
 Q_{50} &= (75.6556)(\text{area}^{0.735})(\text{m}^{0.38}) \\
 Q_{100} &= (129.9534)(\text{area}^{0.755})(\text{m}^{0.442})
 \end{aligned}$$

Range of independent variables

Area: 0.3 to 9,417 km²
 BSF: 0.082 to 18.8
 Slope: 0.0001 to 0.0320 m/m

Where:

Area is the contributing drainage area in square kilometers.

REGION 11 REGRESSION EQUATIONS

County: Montgomery

CSJ: 0912-00-144

Stream: Mill Creek Trib (DA 18)

	English Units	Metric Units
Drainage Area	7.33 mi ²	18.97 km ²
BSF	4.76	4.8
Slope, m	18.77 feet/mile	0.0036 m/m

Frequency (years)	2	5	10	25	50	100
Flows (cfs)	400	836	1,256	2,081	2,726	3,501
Flows (m ³ /s)	11	24	36	59	77	99
Standard error (%)	43	43	49	54	60	66

Flows for Region 11 are calculated based upon the following formulas:

Flows in English Units (cfs)

$$\begin{aligned}
 Q_2 &= (159)(\text{area}^{0.669})(\text{BSF}^{-0.262}) \\
 Q_5 &= (191)(\text{area}^{0.696})(\text{m}^{0.130})(\text{BSF}^{-0.186}) \\
 Q_{10} &= (199)(\text{area}^{0.718})(\text{m}^{0.221})(\text{BSF}^{-0.151}) \\
 Q_{25} &= (201)(\text{area}^{0.713})(\text{m}^{0.313}) \\
 Q_{50} &= (207)(\text{area}^{0.735})(\text{m}^{0.380}) \\
 Q_{100} &= (213)(\text{area}^{0.755})(\text{m}^{0.442})
 \end{aligned}$$

Range of independent variables

Area: 0.13 to 3,636 mi²
 BSF: 0.082 to 18.8
 Slope: 0.38 to 169 feet/mile

Where:

Area is the contributing drainage area in square miles.

BSF is the ratio of the longest mapped channel squared to the contributing drainage area.

Slope is the ratio of change in elevation of the longest mapped channel from the site to the headwaters to the length of the longest mapped channel. Slope in English units are feet/mile or meters/meters in Metric units.

Flows in Metric Units (m³/s)

$$\begin{aligned}
 Q_2 &= (2.3820)(\text{area}^{0.669})(\text{BSF}^{-0.262}) \\
 Q_5 &= (8.4989)(\text{area}^{0.696})(\text{m}^{0.13})(\text{BSF}^{-0.186}) \\
 Q_{10} &= (18.9170)(\text{area}^{0.718})(\text{m}^{0.221})(\text{BSF}^{-0.151}) \\
 Q_{25} &= (42.2418)(\text{area}^{0.713})(\text{m}^{0.313}) \\
 Q_{50} &= (75.6556)(\text{area}^{0.735})(\text{m}^{0.38}) \\
 Q_{100} &= (129.9534)(\text{area}^{0.755})(\text{m}^{0.442})
 \end{aligned}$$

Range of independent variables

Area: 0.3 to 9,417 km²
 BSF: 0.082 to 18.8
 Slope: 0.0001 to 0.0320 m/m

Where:

Area is the contributing drainage area in square kilometers.

REGION 11 REGRESSION EQUATIONS

County: Montgomery

CSJ: 0912-00-144

Stream: Mill Creek Trib (DA 21)

	English Units	Metric Units
Drainage Area	0.49 mi ²	1.26 km ²
BSF	1.89	1.9
Slope, m	51.13 feet/mile	0.0097 m/m

Frequency (years)	2	5	10	25	50	100
Flows (cfs)	83	172	257	413	544	705
Flows (m ³ /s)	2	5	7	12	15	20
Standard error (%)	43	43	49	54	60	66

Flows for Region 11 are calculated based upon the following formulas:

Flows in English Units (cfs)

$$\begin{aligned}
 Q_2 &= (159)(\text{area}^{0.669})(\text{BSF}^{-0.262}) \\
 Q_5 &= (191)(\text{area}^{0.696})(m^{0.130})(\text{BSF}^{-0.186}) \\
 Q_{10} &= (199)(\text{area}^{0.718})(m^{0.221})(\text{BSF}^{-0.151}) \\
 Q_{25} &= (201)(\text{area}^{0.713})(m^{0.313}) \\
 Q_{50} &= (207)(\text{area}^{0.735})(m^{0.380}) \\
 Q_{100} &= (213)(\text{area}^{0.755})(m^{0.442})
 \end{aligned}$$

Range of independent variables

Area: 0.13 to 3,636 mi²
 BSF: 0.082 to 18.8
 Slope: 0.38 to 169 feet/mile

Where:

Area is the contributing drainage area in square miles.

BSF is the ratio of the longest mapped channel squared to the contributing drainage area.

Slope is the ratio of change in elevation of the longest mapped channel from the site to the headwaters to the length of the longest mapped channel. Slope in English units are feet/mile or meters/meters in Metric units.

Flows in Metric Units (m³/s)

$$\begin{aligned}
 Q_2 &= (2.3820)(\text{area}^{0.669})(\text{BSF}^{-0.262}) \\
 Q_5 &= (8.4989)(\text{area}^{0.696})(m^{0.13})(\text{BSF}^{-0.186}) \\
 Q_{10} &= (18.9170)(\text{area}^{0.718})(m^{0.221})(\text{BSF}^{-0.151}) \\
 Q_{25} &= (42.2418)(\text{area}^{0.713})(m^{0.313}) \\
 Q_{50} &= (75.6556)(\text{area}^{0.735})(m^{0.38}) \\
 Q_{100} &= (129.9534)(\text{area}^{0.755})(m^{0.442})
 \end{aligned}$$

Range of independent variables

Area: 0.3 to 9,417 km²
 BSF: 0.082 to 18.8
 Slope: 0.0001 to 0.0320 m/m

Where:

Area is the contributing drainage area in square kilometers.

REGION 11 REGRESSION EQUATIONS

County: Montgomery

CSJ: 0912-00-144

Stream: Mill Creek Trib (DA 22)

	English Units	Metric Units
Drainage Area	0.36 mi ²	0.93 km ²
BSF	1.35	1.3
Slope, m	64.34 feet/mile	0.0122 m/m

Frequency (years)	2	5	10	25	50	100
Flows (cfs)	74	152	228	356	473	618
Flows (m ³ /s)	2	4	6	10	13	17
Standard error (%)	43	43	49	54	60	66

Flows for Region 11 are calculated based upon the following formulas:

Flows in English Units (cfs)

$$\begin{aligned}
 Q_2 &= (159)(\text{area}^{0.669})(\text{BSF}^{-0.262}) \\
 Q_5 &= (191)(\text{area}^{0.696})(\text{m}^{0.130})(\text{BSF}^{-0.186}) \\
 Q_{10} &= (199)(\text{area}^{0.718})(\text{m}^{0.221})(\text{BSF}^{-0.151}) \\
 Q_{25} &= (201)(\text{area}^{0.713})(\text{m}^{0.313}) \\
 Q_{50} &= (207)(\text{area}^{0.735})(\text{m}^{0.380}) \\
 Q_{100} &= (213)(\text{area}^{0.755})(\text{m}^{0.442})
 \end{aligned}$$

Range of independent variables

Area: 0.13 to 3,636 mi²
 BSF: 0.082 to 18.8
 Slope: 0.38 to 169 feet/mile

Where:

Area is the contributing drainage area in square miles.

BSF is the ratio of the longest mapped channel squared to the contributing drainage area.

Slope is the ratio of change in elevation of the longest mapped channel from the site to the headwaters to the length of the longest mapped channel. Slope in English units are feet/mile or meters/meters in Metric units.

Flows in Metric Units (m³/s)

$$\begin{aligned}
 Q_2 &= (2.3820)(\text{area}^{0.669})(\text{BSF}^{-0.262}) \\
 Q_5 &= (8.4989)(\text{area}^{0.696})(\text{m}^{0.13})(\text{BSF}^{-0.186}) \\
 Q_{10} &= (18.9170)(\text{area}^{0.718})(\text{m}^{0.221})(\text{BSF}^{-0.151}) \\
 Q_{25} &= (42.2418)(\text{area}^{0.713})(\text{m}^{0.313}) \\
 Q_{50} &= (75.6556)(\text{area}^{0.735})(\text{m}^{0.38}) \\
 Q_{100} &= (129.9534)(\text{area}^{0.755})(\text{m}^{0.442})
 \end{aligned}$$

Range of independent variables

Area: 0.3 to 9,417 km²
 BSF: 0.082 to 18.8
 Slope: 0.0001 to 0.0320 m/m

Where:

Area is the contributing drainage area in square kilometers.

REGION 11 REGRESSION EQUATIONS

County: Montgomery

CSJ: 0912-00-144

Stream: Mill Creek Trib (DA 25)

	English Units	Metric Units
Drainage Area	5.26 mi ²	13.61 km ²
BSF	3.43	3.4
Slope, m	21.31 feet/mile	0.0040 m/m

Frequency (years)	2	5	10	25	50	100
Flows (cfs)	349	717	1,069	1,710	2,242	2,882
Flows (m ³ /s)	10	20	30	48	63	82
Standard error (%)	43	43	49	54	60	66

Flows for Region 11 are calculated based upon the following formulas:

Flows in English Units (cfs)

$$\begin{aligned}
 Q_2 &= (159)(\text{area}^{0.669})(\text{BSF}^{-0.262}) \\
 Q_5 &= (191)(\text{area}^{0.696})(\text{m}^{0.130})(\text{BSF}^{-0.186}) \\
 Q_{10} &= (199)(\text{area}^{0.718})(\text{m}^{0.221})(\text{BSF}^{-0.151}) \\
 Q_{25} &= (201)(\text{area}^{0.713})(\text{m}^{0.313}) \\
 Q_{50} &= (207)(\text{area}^{0.735})(\text{m}^{0.380}) \\
 Q_{100} &= (213)(\text{area}^{0.755})(\text{m}^{0.442})
 \end{aligned}$$

Range of independent variables

Area: 0.13 to 3,636 mi²
 BSF: 0.082 to 18.8
 Slope: 0.38 to 169 feet/mile

Where:

Area is the contributing drainage area in square miles.

BSF is the ratio of the longest mapped channel squared to the contributing drainage area.

Slope is the ratio of change in elevation of the longest mapped channel from the site to the headwaters to the length of the longest mapped channel. Slope in English units are feet/mile or meters/meters in Metric units.

Flows in Metric Units (m³/s)

$$\begin{aligned}
 Q_2 &= (2.3820)(\text{area}^{0.669})(\text{BSF}^{-0.262}) \\
 Q_5 &= (8.4989)(\text{area}^{0.696})(\text{m}^{0.13})(\text{BSF}^{-0.186}) \\
 Q_{10} &= (18.9170)(\text{area}^{0.718})(\text{m}^{0.221})(\text{BSF}^{-0.151}) \\
 Q_{25} &= (42.2418)(\text{area}^{0.713})(\text{m}^{0.313}) \\
 Q_{50} &= (75.6556)(\text{area}^{0.735})(\text{m}^{0.38}) \\
 Q_{100} &= (129.9534)(\text{area}^{0.755})(\text{m}^{0.442})
 \end{aligned}$$

Range of independent variables

Area: 0.3 to 9,417 km²
 BSF: 0.082 to 18.8
 Slope: 0.0001 to 0.0320 m/m

Where:

Area is the contributing drainage area in square kilometers.

REGION 11 REGRESSION EQUATIONS

County: Montgomery

CSJ: 0912-00-144

Stream: Mill Creek Trib (DA30)

	English Units	Metric Units
Drainage Area	0.35 mi ²	0.90 km ²
BSF	5.88	5.9
Slope, m	58.02 feet/mile	0.0110 m/m

Frequency (years)	2	5	10	25	50	100
Flows (cfs)	49	111	175	337	445	576
Flows (m ³ /s)	1	3	5	10	13	16
Standard error (%)	43	43	49	54	60	66

Flows for Region 11 are calculated based upon the following formulas:

Flows in English Units (cfs)

$$\begin{aligned}
 Q_2 &= (159)(\text{area}^{0.669})(\text{BSF}^{-0.262}) \\
 Q_5 &= (191)(\text{area}^{0.696})(m^{0.130})(\text{BSF}^{-0.186}) \\
 Q_{10} &= (199)(\text{area}^{0.718})(m^{0.221})(\text{BSF}^{-0.151}) \\
 Q_{25} &= (201)(\text{area}^{0.713})(m^{0.313}) \\
 Q_{50} &= (207)(\text{area}^{0.735})(m^{0.380}) \\
 Q_{100} &= (213)(\text{area}^{0.755})(m^{0.442})
 \end{aligned}$$

Range of independent variables

Area: 0.13 to 3,636 mi²
 BSF: 0.082 to 18.8
 Slope: 0.38 to 169 feet/mile

Where:

Area is the contributing drainage area in square miles.

BSF is the ratio of the longest mapped channel squared to the contributing drainage area.

Slope is the ratio of change in elevation of the longest mapped channel from the site to the headwaters to the length of the longest mapped channel. Slope in English units are feet/mile or meters/meters in Metric units.

Flows in Metric Units (m³/s)

$$\begin{aligned}
 Q_2 &= (2.3820)(\text{area}^{0.669})(\text{BSF}^{-0.262}) \\
 Q_5 &= (8.4989)(\text{area}^{0.696})(m^{0.13})(\text{BSF}^{-0.186}) \\
 Q_{10} &= (18.9170)(\text{area}^{0.718})(m^{0.221})(\text{BSF}^{-0.151}) \\
 Q_{25} &= (42.2418)(\text{area}^{0.713})(m^{0.313}) \\
 Q_{50} &= (75.6556)(\text{area}^{0.735})(m^{0.38}) \\
 Q_{100} &= (129.9534)(\text{area}^{0.755})(m^{0.442})
 \end{aligned}$$

Range of independent variables

Area: 0.3 to 9,417 km²
 BSF: 0.082 to 18.8
 Slope: 0.0001 to 0.0320 m/m

Where:

Area is the contributing drainage area in square kilometers.

REGION 11 REGRESSION EQUATIONS

County: Montgomery

CSJ: 0912-00-144

Stream: Mill Creek Trib (DA 35)

	English Units	Metric Units
Drainage Area	17.37 mi ²	44.98 km ²
BSF	2.58	2.6
Slope, m	20.67 feet/mile	0.0039 m/m

Frequency (years)	2	5	10	25	50	100
Flows (cfs)	837	1,731	2,615	3,971	5,334	7,011
Flows (m ³ /s)	24	49	74	112	151	199
Standard error (%)	43	43	49	54	60	66

Flows for Region 11 are calculated based upon the following formulas:

Flows in English Units (cfs)

$$\begin{aligned}
 Q_2 &= (159)(\text{area}^{0.669})(\text{BSF}^{-0.262}) \\
 Q_5 &= (191)(\text{area}^{0.696})(\text{m}^{0.130})(\text{BSF}^{-0.186}) \\
 Q_{10} &= (199)(\text{area}^{0.718})(\text{m}^{0.221})(\text{BSF}^{-0.151}) \\
 Q_{25} &= (201)(\text{area}^{0.713})(\text{m}^{0.313}) \\
 Q_{50} &= (207)(\text{area}^{0.735})(\text{m}^{0.380}) \\
 Q_{100} &= (213)(\text{area}^{0.755})(\text{m}^{0.442})
 \end{aligned}$$

Range of independent variables

Area: 0.13 to 3,636 mi²
 BSF: 0.082 to 18.8
 Slope: 0.38 to 169 feet/mile

Where:

Area is the contributing drainage area in square miles.

BSF is the ratio of the longest mapped channel squared to the contributing drainage area.

Slope is the ratio of change in elevation of the longest mapped channel from the site to the headwaters to the length of the longest mapped channel. Slope in English units are feet/mile or meters/meters in Metric units.

Flows in Metric Units (m³/s)

$$\begin{aligned}
 Q_2 &= (2.3820)(\text{area}^{0.669})(\text{BSF}^{-0.262}) \\
 Q_5 &= (8.4989)(\text{area}^{0.696})(\text{m}^{0.13})(\text{BSF}^{-0.186}) \\
 Q_{10} &= (18.9170)(\text{area}^{0.718})(\text{m}^{0.221})(\text{BSF}^{-0.151}) \\
 Q_{25} &= (42.2418)(\text{area}^{0.713})(\text{m}^{0.313}) \\
 Q_{50} &= (75.6556)(\text{area}^{0.735})(\text{m}^{0.38}) \\
 Q_{100} &= (129.9534)(\text{area}^{0.755})(\text{m}^{0.442})
 \end{aligned}$$

Range of independent variables

Area: 0.3 to 9,417 km²
 BSF: 0.082 to 18.8
 Slope: 0.0001 to 0.0320 m/m

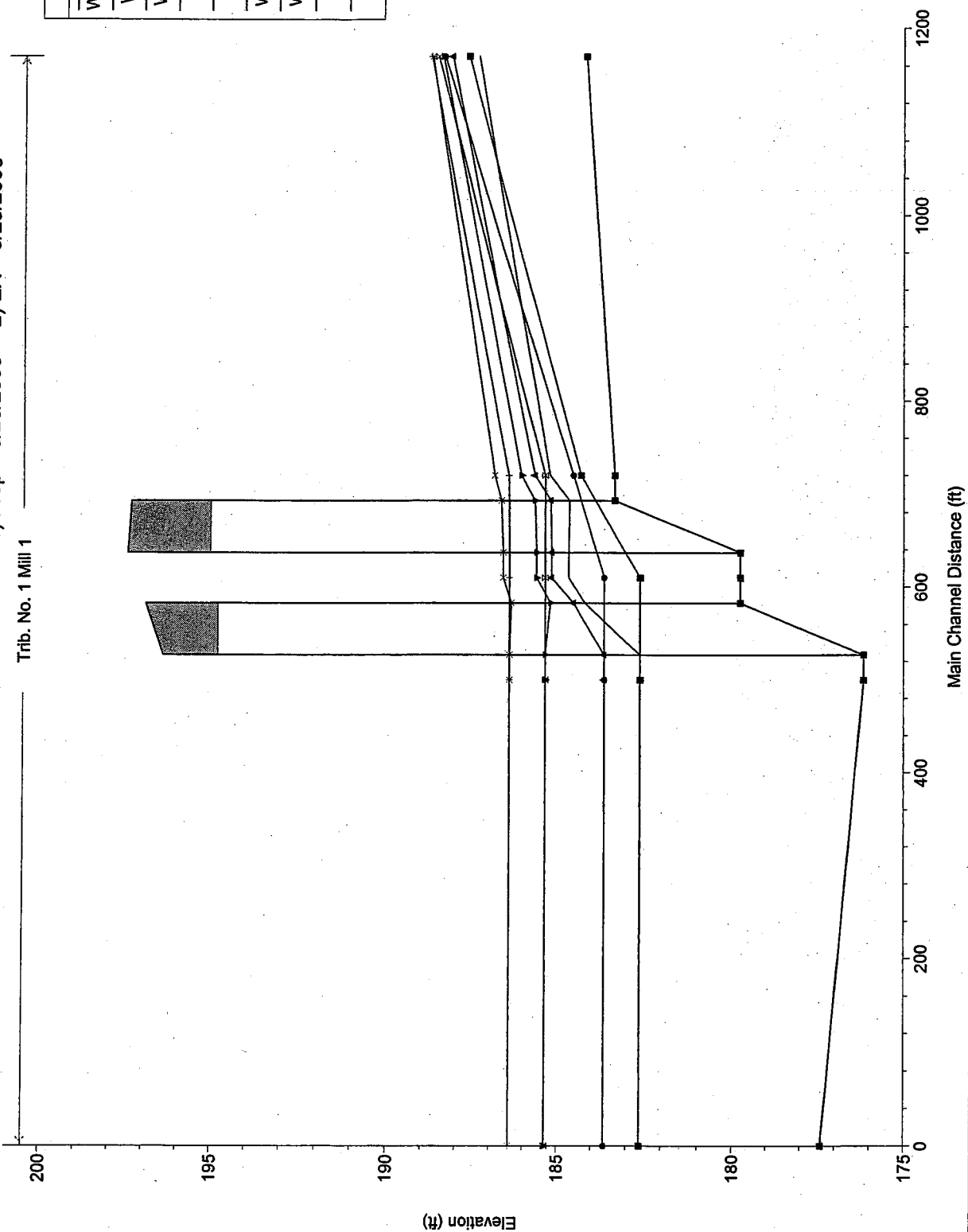
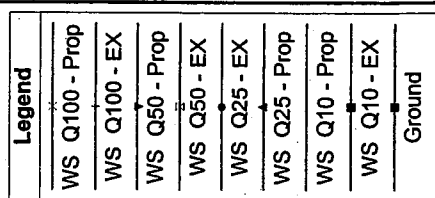
Where:

Area is the contributing drainage area in square kilometers.

TRIBUTARY NO. 1 TO MILL CREEK

(DA 10)

Trib. No. 1 Mill 1



Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Chl El (ft)	W.S. Elev (ft)	Gnt W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	1170	Q10	Prop	300.00	184.18	187.35	187.35	187.37	0.002837	1.05	285.37	160.85	0.14
1	1170	Q10	EX	300.00	184.18	187.65	187.65	187.67	0.002026	0.89	338.64	191.79	0.12
1	1170	Q25	Prop	491.00	184.18	188.14	188.14	188.16	0.003570	1.05	467.11	313.40	0.15
1	1170	Q25	EX	491.00	184.18	188.37	188.37	188.38	0.002334	0.91	539.84	327.12	0.12
1	1170	Q50	Prop	641.00	184.18	188.42	188.42	188.44	0.003630	1.15	557.00	330.27	0.16
1	1170	Q50	EX	641.00	184.18	188.56	188.56	188.58	0.002930	1.06	603.48	343.69	0.14
1	1170	Q100	Prop	822.00	184.18	188.74	188.74	188.76	0.003786	1.23	667.41	368.92	0.16
1	1170	Q100	EX	822.00	184.18	188.77	188.77	188.79	0.003591	1.21	678.55	369.59	0.16
1	720	Q10	Prop	300.00	183.34	185.23	184.32	185.27	0.009065	1.52	198.02	154.70	0.24
1	720	Q10	EX	300.00	183.34	184.31	184.31	184.60	0.221409	4.31	69.63	124.69	1.02
1	720	Q25	Prop	491.00	183.34	185.68	184.55	185.73	0.009036	1.82	269.54	176.95	0.25
1	720	Q25	EX	491.00	183.34	184.54	184.54	184.92	0.199885	4.96	99.08	133.25	1.01
1	720	Q50	Prop	641.00	183.34	186.07	184.70	186.12	0.007867	1.94	331.07	184.56	0.24
1	720	Q50	EX	641.00	183.34	185.37	185.37	185.50	0.030148	2.91	220.23	159.12	0.44
1	720	Q100	Prop	822.00	183.34	186.86	184.87	186.91	0.004462	1.79	459.41	208.01	0.19
1	720	Q100	EX	822.00	183.34	186.44	186.44	186.50	0.007801	1.99	412.14	190.34	0.24
1	665		Bridge										
1	610*	Q10	Prop	300.00	179.76	184.67	180.74	184.67	0.000105	0.30	987.72	319.54	0.03
1	610*	Q10	EX	300.00	179.76	182.61	182.61	182.62	0.001209	0.71	424.52	229.72	0.09
1	610*	Q25	Prop	491.00	179.76	185.17	180.96	185.18	0.000176	0.43	1140.62	325.86	0.04
1	610*	Q25	EX	491.00	179.76	183.64	183.64	183.64	0.000884	0.72	684.07	285.88	0.08
1	610*	Q50	Prop	641.00	179.76	185.63	181.09	185.63	0.000206	0.50	1279.49	330.48	0.04
1	610*	Q50	EX	641.00	179.76	185.36	185.36	185.37	0.000258	0.52	1226.45	327.80	0.05
1	610*	Q100	Prop	822.00	179.76	186.80	181.25	186.80	0.000170	0.52	1580.22	339.16	0.04
1	610*	Q100	EX	822.00	179.76	186.41	186.41	186.42	0.000192	0.52	1576.13	337.86	0.04
1	555		Bridge										
1	500	Q10	Prop	300.00	176.17	182.61	176.90	182.62	0.000201	0.47	636.84	415.56	0.04
1	500	Q10	EX	300.00	176.17	182.61	182.61	182.61	0.000017	0.16	1919.30	415.61	0.01
1	500	Q25	Prop	491.00	176.17	183.63	179.25	183.64	0.000247	0.61	805.20	526.89	0.05
1	500	Q25	EX	491.00	176.17	183.63	183.63	183.63	0.000024	0.21	2418.13	526.97	0.02
1	500	Q50	Prop	641.00	176.17	185.36	179.48	185.37	0.000153	0.59	1090.42	618.31	0.04
1	500	Q50	EX	641.00	176.17	185.36	185.36	185.36	0.000017	0.20	3406.74	618.36	0.01
1	500	Q100	Prop	822.00	176.17	186.41	179.65	186.42	0.000154	0.85	1263.59	645.38	0.04
1	500	Q100	EX	822.00	176.17	186.41	186.41	186.41	0.000017	0.22	4070.56	645.44	0.01
1	0	Q10	Prop	300.00	177.41	182.61	176.08	182.61	0.000003	0.06	5243.92	1042.01	0.01
1	0	Q10	EX	300.00	177.41	182.61	176.08	182.61	0.000003	0.06	5243.92	1042.01	0.01

HEC-RAS River: Trib No. 1 Mill Reach: 1 (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Chl El (ft)	W.S. Elev (ft)	Grit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	0	Q25	Prop	491.00	177.41	183.63	176.23	183.63	0.000004	0.08	6318.26	1062.07	0.01
1	0	Q25	EX	491.00	177.41	183.63	176.23	183.63	0.000004	0.08	6318.26	1062.07	0.01
1	0	Q50	Prop	641.00	177.41	185.36	176.33	185.36	0.000003	0.09	8180.09	1094.22	0.01
1	0	Q50	EX	641.00	177.41	185.36	176.33	185.36	0.000003	0.09	8180.09	1094.22	0.01
1	0	Q100	Prop	822.00	177.41	186.41	176.44	186.41	0.000003	0.10	9349.55	1130.00	0.01
1	0	Q100	EX	822.00	177.41	186.41	176.44	186.41	0.000003	0.10	9349.55	1130.00	0.01

Plan: Prop Trib. No. 1 Mill 1 RS: 1170 Profile: Q10

E.G. Elev (ft)	187.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.110	
W.S. Elev (ft)	187.35	Reach Len. (ft)	450.00	450.00	450.00
Crit W.S. (ft)		Flow Area (sq ft)		285.37	
E.G. Slope (ft/ft)	0.002837	Area (sq ft)		285.37	
Q Total (cfs)	300.00	Flow (cfs)		300.00	
Top Width (ft)	160.85	Top Width (ft)		160.85	
Vel Total (ft/s)	1.05	Avg. Vel. (ft/s)		1.05	
Max Chl Dpth (ft)	3.17	Hydr. Depth (ft)		1.77	
Conv. Total (cfs)	5632.4	Conv. (cfs)		5632.4	
Length Wtd. (ft)	450.00	Wetted Per. (ft)		161.58	
Min Ch EI (ft)	184.18	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)		0.33	
Frcn Loss (ft)	2.10	Cum Volume (acre-ft)	16.40	29.57	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	2.94	7.74	0.11

Plan: Prop Trib. No. 1 Mill 1 RS: 1170 Profile: Q25

E.G. Elev (ft)	188.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.110	
W.S. Elev (ft)	188.14	Reach Len. (ft)	450.00	450.00	450.00
Crit W.S. (ft)		Flow Area (sq ft)		467.11	
E.G. Slope (ft/ft)	0.003570	Area (sq ft)		467.11	
Q Total (cfs)	491.00	Flow (cfs)		491.00	
Top Width (ft)	313.40	Top Width (ft)		313.40	
Vel Total (ft/s)	1.05	Avg. Vel. (ft/s)		1.05	
Max Chl Dpth (ft)	3.96	Hydr. Depth (ft)		1.49	
Conv. Total (cfs)	8217.2	Conv. (cfs)		8217.2	
Length Wtd. (ft)	450.00	Wetted Per. (ft)		314.31	
Min Ch EI (ft)	184.18	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)		0.35	
Frcn Loss (ft)	2.42	Cum Volume (acre-ft)	19.44	36.89	0.54
C & E Loss (ft)	0.00	Cum SA (acres)	3.00	8.80	0.69

Plan: Prop Trib. No. 1 Mill 1 RS: 1170 Profile: Q50

E.G. Elev (ft)	188.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.110	
W.S. Elev (ft)	188.42	Reach Len. (ft)	450.00	450.00	450.00
Crit W.S. (ft)		Flow Area (sq ft)		557.00	
E.G. Slope (ft/ft)	0.003630	Area (sq ft)		557.00	
Q Total (cfs)	641.00	Flow (cfs)		641.00	
Top Width (ft)	330.27	Top Width (ft)		330.27	
Vel Total (ft/s)	1.15	Avg. Vel. (ft/s)		1.15	
Max Chl Dpth (ft)	4.24	Hydr. Depth (ft)		1.69	
Conv. Total (cfs)	10639.3	Conv. (cfs)		10639.3	
Length Wtd. (ft)	450.00	Wetted Per. (ft)		331.27	
Min Ch EI (ft)	184.18	Shear (lb/sq ft)		0.38	
Alpha	1.00	Stream Power (lb/ft s)		0.44	
Frcn Loss (ft)	2.32	Cum Volume (acre-ft)	24.73	48.02	2.09
C & E Loss (ft)	0.00	Cum SA (acres)	3.14	9.12	1.12

Plan: Prop Trib. No. 1 Mill 1 RS: 1170 Profile: Q100

E.G. Elev (ft)	188.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.110	
W.S. Elev (ft)	188.74	Reach Len. (ft)	450.00	450.00	450.00
Crit W.S. (ft)		Flow Area (sq ft)		667.41	
E.G. Slope (ft/ft)	0.003786	Area (sq ft)		667.41	
Q Total (cfs)	822.00	Flow (cfs)		822.00	
Top Width (ft)	368.92	Top Width (ft)		368.92	
Vel Total (ft/s)	1.23	Avg. Vel. (ft/s)		1.23	
Max Chl Dpth (ft)	4.56	Hydr. Depth (ft)		1.81	
Conv. Total (cfs)	13359.8	Conv. (cfs)		13359.8	
Length Wtd. (ft)	450.00	Wetted Per. (ft)		369.99	
Min Ch EI (ft)	184.18	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)		0.53	
Frctn Loss (ft)	1.85	Cum Volume (acre-ft)	28.13	56.18	3.33
C & E Loss (ft)	0.00	Cum SA (acres)	3.30	9.55	1.25

Plan: Prop Trib. No. 1 Mill 1 RS: 720 Profile: Q10

E.G. Elev (ft)	185.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.110	
W.S. Elev (ft)	185.23	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	184.32	Flow Area (sq ft)		198.02	
E.G. Slope (ft/ft)	0.009065	Area (sq ft)		198.02	
Q Total (cfs)	300.00	Flow (cfs)		300.00	
Top Width (ft)	154.70	Top Width (ft)		154.70	
Vel Total (ft/s)	1.52	Avg. Vel. (ft/s)		1.52	
Max Chl Dpth (ft)	1.89	Hydr. Depth (ft)		1.28	
Conv. Total (cfs)	3151.0	Conv. (cfs)		3151.0	
Length Wtd. (ft)	27.00	Wetted Per. (ft)		154.88	
Min Ch EI (ft)	183.34	Shear (lb/sq ft)		0.72	
Alpha	1.00	Stream Power (lb/ft s)		1.10	
Frctn Loss (ft)	0.48	Cum Volume (acre-ft)	16.40	27.07	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	2.94	6.11	0.11

Plan: Prop Trib. No. 1 Mill 1 RS: 720 Profile: Q25

E.G. Elev (ft)	185.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.110	
W.S. Elev (ft)	185.68	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	184.55	Flow Area (sq ft)		269.54	
E.G. Slope (ft/ft)	0.009036	Area (sq ft)		272.94	
Q Total (cfs)	491.00	Flow (cfs)		491.00	
Top Width (ft)	176.95	Top Width (ft)		176.95	
Vel Total (ft/s)	1.82	Avg. Vel. (ft/s)		1.82	
Max Chl Dpth (ft)	2.34	Hydr. Depth (ft)		1.69	
Conv. Total (cfs)	5165.1	Conv. (cfs)		5165.1	
Length Wtd. (ft)	27.00	Wetted Per. (ft)		159.52	
Min Ch EI (ft)	183.34	Shear (lb/sq ft)		0.95	
Alpha	1.00	Stream Power (lb/ft s)		1.74	
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	19.44	33.07	0.54
C & E Loss (ft)	0.01	Cum SA (acres)	3.00	6.27	0.69

Plan: Prop Trib. No. 1 Mill 1 RS: 720 Profile: Q50

E.G. Elev (ft)	186.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.110	
W.S. Elev (ft)	186.07	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	184.70	Flow Area (sq ft)		331.07	
E.G. Slope (ft/ft)	0.007867	Area (sq ft)		342.42	
Q Total (cfs)	641.00	Flow (cfs)		641.00	
Top Width (ft)	184.56	Top Width (ft)		184.56	
Vel Total (ft/s)	1.94	Avg. Vel. (ft/s)		1.94	
Max Chl Dpth (ft)	2.73	Hydr. Depth (ft)		2.06	
Conv. Total (cfs)	7227.0	Conv. (cfs)		7227.0	
Length Wtd. (ft)	27.00	Wetted Per. (ft)		161.16	
Min Ch El (ft)	183.34	Shear (lb/sq ft)		1.01	
Alpha	1.00	Stream Power (lb/ft s)		1.95	
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	24.73	43.37	2.09
C & E Loss (ft)	0.01	Cum SA (acres)	3.14	6.46	1.12

Plan: Prop Trib. No. 1 Mill 1 RS: 720 Profile: Q100

E.G. Elev (ft)	186.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.110	
W.S. Elev (ft)	186.86	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	184.87	Flow Area (sq ft)		459.41	
E.G. Slope (ft/ft)	0.004462	Area (sq ft)		496.74	
Q Total (cfs)	822.00	Flow (cfs)		822.00	
Top Width (ft)	208.01	Top Width (ft)		208.01	
Vel Total (ft/s)	1.79	Avg. Vel. (ft/s)		1.79	
Max Chl Dpth (ft)	3.52	Hydr. Depth (ft)		2.80	
Conv. Total (cfs)	12305.1	Conv. (cfs)		12305.1	
Length Wtd. (ft)	27.00	Wetted Per. (ft)		164.54	
Min Ch El (ft)	183.34	Shear (lb/sq ft)		0.78	
Alpha	1.00	Stream Power (lb/ft s)		1.39	
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	28.13	50.16	3.33
C & E Loss (ft)	0.00	Cum SA (acres)	3.30	6.57	1.25

Plan: Prop Trib. No. 1 Mill 1 RS: 665 BR U Profile: Q10

E.G. Elev (ft)	184.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.110	
W.S. Elev (ft)	184.66	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	184.32	Flow Area (sq ft)		107.89	
E.G. Slope (ft/ft)	0.049906	Area (sq ft)		107.89	
Q Total (cfs)	300.00	Flow (cfs)		300.00	
Top Width (ft)	118.56	Top Width (ft)		118.56	
Vel Total (ft/s)	2.78	Avg. Vel. (ft/s)		2.78	
Max Chl Dpth (ft)	1.32	Hydr. Depth (ft)		0.91	
Conv. Total (cfs)	1342.9	Conv. (cfs)		1342.9	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		121.97	
Min Ch El (ft)	183.34	Shear (lb/sq ft)		2.76	
Alpha	1.00	Stream Power (lb/ft s)		7.66	
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	16.40	26.98	0.01
C & E Loss (ft)	0.03	Cum SA (acres)	2.94	6.02	0.11

Plan: Prop Trib. No. 1 Mill 1 RS: 665 BR U Profile: Q25

E.G. Elev (ft)	185.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.110	
W.S. Elev (ft)	185.20	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	184.55	Flow Area (sq ft)		173.39	
E.G. Slope (ft/ft)	0.028947	Area (sq ft)		173.39	
Q Total (cfs)	491.00	Flow (cfs)		491.00	
Top Width (ft)	120.93	Top Width (ft)		120.93	
Vel Total (ft/s)	2.83	Avg. Vel. (ft/s)		2.83	
Max Chl Dpth (ft)	1.86	Hydr. Depth (ft)		1.43	
Conv. Total (cfs)	2885.9	Conv. (cfs)		2885.9	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		126.79	
Min Ch El (ft)	183.34	Shear (lb/sq ft)		2.47	
Alpha	1.00	Stream Power (lb/ft s)		7.00	
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	19.44	32.93	0.54
C & E Loss (ft)	0.03	Cum SA (acres)	3.00	6.18	0.69

Plan: Prop Trib. No. 1 Mill 1 RS: 665 BR U Profile: Q50

E.G. Elev (ft)	185.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.110	
W.S. Elev (ft)	185.68	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	184.71	Flow Area (sq ft)		231.75	
E.G. Slope (ft/ft)	0.019594	Area (sq ft)		231.75	
Q Total (cfs)	641.00	Flow (cfs)		641.00	
Top Width (ft)	123.01	Top Width (ft)		123.01	
Vel Total (ft/s)	2.77	Avg. Vel. (ft/s)		2.77	
Max Chl Dpth (ft)	2.34	Hydr. Depth (ft)		1.88	
Conv. Total (cfs)	4579.3	Conv. (cfs)		4579.3	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		130.99	
Min Ch El (ft)	183.34	Shear (lb/sq ft)		2.16	
Alpha	1.00	Stream Power (lb/ft s)		5.99	
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	24.73	43.19	2.09
C & E Loss (ft)	0.03	Cum SA (acres)	3.14	6.36	1.12

Plan: Prop Trib. No. 1 Mill 1 RS: 665 BR U Profile: Q100

E.G. Elev (ft)	186.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.110	
W.S. Elev (ft)	186.66	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	184.89	Flow Area (sq ft)		353.72	
E.G. Slope (ft/ft)	0.008565	Area (sq ft)		353.72	
Q Total (cfs)	822.00	Flow (cfs)		822.00	
Top Width (ft)	127.24	Top Width (ft)		127.24	
Vel Total (ft/s)	2.32	Avg. Vel. (ft/s)		2.32	
Max Chl Dpth (ft)	3.32	Hydr. Depth (ft)		2.78	
Conv. Total (cfs)	8882.1	Conv. (cfs)		8882.1	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		139.57	
Min Ch El (ft)	183.34	Shear (lb/sq ft)		1.36	
Alpha	1.00	Stream Power (lb/ft s)		3.15	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	28.13	49.90	3.33
C & E Loss (ft)	0.02	Cum SA (acres)	3.30	6.47	1.25

Plan: Prop Trib. No. 1 Mill 1 RS: 665 BR D Profile: Q10

E.G. Elev (ft)	184.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.110	
W.S. Elev (ft)	184.67	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	180.74	Flow Area (sq ft)		543.07	
E.G. Slope (ft/ft)	0.000321	Area (sq ft)		543.07	
Q Total (cfs)	300.00	Flow (cfs)		300.00	
Top Width (ft)	127.40	Top Width (ft)		127.40	
Vel Total (ft/s)	0.55	Avg. Vel. (ft/s)		0.55	
Max Chl Dpth (ft)	4.91	Hydr. Depth (ft)		4.26	
Conv. Total (cfs)	16737.9	Conv. (cfs)		16737.9	
Length Wtd. (ft)	27.00	Wetted Per. (ft)		157.58	
Min Ch El (ft)	179.76	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)		0.04	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	16.40	26.56	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	2.94	5.86	0.11

Plan: Prop Trib. No. 1 Mill 1 RS: 665 BR D Profile: Q25

E.G. Elev (ft)	185.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.110	
W.S. Elev (ft)	185.18	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	180.98	Flow Area (sq ft)		607.64	
E.G. Slope (ft/ft)	0.000618	Area (sq ft)		607.64	
Q Total (cfs)	491.00	Flow (cfs)		491.00	
Top Width (ft)	129.15	Top Width (ft)		129.15	
Vel Total (ft/s)	0.81	Avg. Vel. (ft/s)		0.81	
Max Chl Dpth (ft)	5.42	Hydr. Depth (ft)		4.71	
Conv. Total (cfs)	19750.7	Conv. (cfs)		19750.7	
Length Wtd. (ft)	27.00	Wetted Per. (ft)		162.80	
Min Ch El (ft)	179.76	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)		0.12	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	19.44	32.43	0.54
C & E Loss (ft)	0.00	Cum SA (acres)	3.00	6.02	0.69

Plan: Prop Trib. No. 1 Mill 1 RS: 665 BR D Profile: Q50

E.G. Elev (ft)	185.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.110	
W.S. Elev (ft)	185.63	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	181.14	Flow Area (sq ft)		666.42	
E.G. Slope (ft/ft)	0.000804	Area (sq ft)		666.42	
Q Total (cfs)	641.00	Flow (cfs)		641.00	
Top Width (ft)	130.71	Top Width (ft)		130.71	
Vel Total (ft/s)	0.96	Avg. Vel. (ft/s)		0.96	
Max Chl Dpth (ft)	5.87	Hydr. Depth (ft)		5.10	
Conv. Total (cfs)	22604.8	Conv. (cfs)		22604.8	
Length Wtd. (ft)	27.00	Wetted Per. (ft)		167.49	
Min Ch El (ft)	179.76	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)		0.19	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	24.73	42.61	2.09
C & E Loss (ft)	0.00	Cum SA (acres)	3.14	6.20	1.12

Plan: Prop Trib. No. 1 Mill 1 RS: 665 BR D Profile: Q100

E.G. Elev (ft)	186.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.110	
W.S. Elev (ft)	186.60	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	181.32	Flow Area (sq ft)		794.67	
E.G. Slope (ft/ft)	0.000795	Area (sq ft)		794.67	
Q Total (cfs)	822.00	Flow (cfs)		822.00	
Top Width (ft)	134.07	Top Width (ft)		134.07	
Vel Total (ft/s)	1.03	Avg. Vel. (ft/s)		1.03	
Max Chl Dpth (ft)	6.84	Hydr. Depth (ft)		5.93	
Conv. Total (cfs)	29156.6	Conv. (cfs)		29156.6	
Length Wtd. (ft)	27.00	Wetted Per. (ft)		177.53	
Min Ch El (ft)	179.76	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)		0.23	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	28.13	49.16	3.33
C & E Loss (ft)	0.00	Cum SA (acres)	3.30	6.30	1.25

Plan: Prop Trib. No. 1 Mill 1 RS: 610.* Profile: Q10

E.G. Elev (ft)	184.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.110	
W.S. Elev (ft)	184.67	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	180.74	Flow Area (sq ft)		987.72	
E.G. Slope (ft/ft)	0.000105	Area (sq ft)		1001.83	
Q Total (cfs)	300.00	Flow (cfs)		300.00	
Top Width (ft)	319.54	Top Width (ft)		319.54	
Vel Total (ft/s)	0.30	Avg. Vel. (ft/s)		0.30	
Max Chl Dpth (ft)	4.91	Hydr. Depth (ft)		3.26	
Conv. Total (cfs)	29325.3	Conv. (cfs)		29325.3	
Length Wtd. (ft)	27.00	Wetted Per. (ft)		303.13	
Min Ch El (ft)	179.76	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)		0.01	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	16.40	26.08	0.01
C & E Loss (ft)	0.04	Cum SA (acres)	2.94	5.72	0.11

Plan: Prop Trib. No. 1 Mill 1 RS: 610.* Profile: Q25

E.G. Elev (ft)	185.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.110	
W.S. Elev (ft)	185.17	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	180.96	Flow Area (sq ft)		1140.62	
E.G. Slope (ft/ft)	0.000176	Area (sq ft)		1164.17	
Q Total (cfs)	491.00	Flow (cfs)		491.00	
Top Width (ft)	325.86	Top Width (ft)		325.86	
Vel Total (ft/s)	0.43	Avg. Vel. (ft/s)		0.43	
Max Chl Dpth (ft)	5.41	Hydr. Depth (ft)		3.73	
Conv. Total (cfs)	37038.7	Conv. (cfs)		37038.7	
Length Wtd. (ft)	27.00	Wetted Per. (ft)		306.04	
Min Ch El (ft)	179.76	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)		0.02	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	19.44	31.88	0.54
C & E Loss (ft)	0.06	Cum SA (acres)	3.00	5.88	0.69

Plan: Prop Trib. No. 1 Mill 1 RS: 610.* Profile: Q50

E.G. Elev (ft)	185.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.110	
W.S. Elev (ft)	185.63	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	181.09	Flow Area (sq ft)		1279.49	
E.G. Slope (ft/ft)	0.000206	Area (sq ft)		1312.81	
Q Total (cfs)	641.00	Flow (cfs)		641.00	
Top Width (ft)	330.48	Top Width (ft)		330.48	
Vel Total (ft/s)	0.50	Avg. Vel. (ft/s)		0.50	
Max Chl Dpth (ft)	5.87	Hydr. Depth (ft)		4.16	
Conv. Total (cfs)	44647.3	Conv. (cfs)		44647.3	
Length Wtd. (ft)	27.00	Wetted Per. (ft)		308.18	
Min Ch El (ft)	179.76	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)		0.03	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	24.73	42.00	2.09
C & E Loss (ft)	0.04	Cum SA (acres)	3.14	6.06	1.12

Plan: Prop Trib. No. 1 Mill 1 RS: 610.* Profile: Q100

E.G. Elev (ft)	186.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.110	
W.S. Elev (ft)	186.60	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	181.25	Flow Area (sq ft)		1580.22	
E.G. Slope (ft/ft)	0.000170	Area (sq ft)		1638.32	
Q Total (cfs)	822.00	Flow (cfs)		822.00	
Top Width (ft)	339.16	Top Width (ft)		339.16	
Vel Total (ft/s)	0.52	Avg. Vel. (ft/s)		0.52	
Max Chl Dpth (ft)	6.84	Hydr. Depth (ft)		5.08	
Conv. Total (cfs)	62978.7	Conv. (cfs)		62978.7	
Length Wtd. (ft)	27.00	Wetted Per. (ft)		311.82	
Min Ch El (ft)	179.76	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)		0.03	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	28.13	48.41	3.33
C & E Loss (ft)	0.02	Cum SA (acres)	3.30	6.15	1.25

Plan: Prop Trib. No. 1 Mill 1 RS: 555 BR U Profile: Q10

E.G. Elev (ft)	184.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.		0.110	
W.S. Elev (ft)	184.20	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	184.20	Flow Area (sq ft)		57.59	
E.G. Slope (ft/ft)	0.217820	Area (sq ft)		57.59	
Q Total (cfs)	300.00	Flow (cfs)		300.00	
Top Width (ft)	68.78	Top Width (ft)		68.78	
Vel Total (ft/s)	5.21	Avg. Vel. (ft/s)		5.21	
Max Chl Dpth (ft)	2.60	Hydr. Depth (ft)		0.84	
Conv. Total (cfs)	642.8	Conv. (cfs)		642.8	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		76.69	
Min Ch El (ft)	181.60	Shear (lb/sq ft)		10.21	
Alpha	1.00	Stream Power (lb/ft s)		53.20	
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	16.40	25.75	0.01
C & E Loss (ft)	0.12	Cum SA (acres)	2.94	5.60	0.11

Plan: Prop Trib. No. 1 Mill 1 RS: 555 BR U Profile: Q25

E.G. Elev (ft)	185.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.		0.110	
W.S. Elev (ft)	184.53	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	184.53	Flow Area (sq ft)		81.01	
E.G. Slope (ft/ft)	0.201794	Area (sq ft)		81.01	
Q Total (cfs)	491.00	Flow (cfs)		491.00	
Top Width (ft)	71.80	Top Width (ft)		71.80	
Vel Total (ft/s)	6.06	Avg. Vel. (ft/s)		6.06	
Max Chl Dpth (ft)	2.94	Hydr. Depth (ft)		1.13	
Conv. Total (cfs)	1093.0	Conv. (cfs)		1093.0	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		81.15	
Min Ch EI (ft)	181.60	Shear (lb/sq ft)		12.58	
Alpha	1.00	Stream Power (lb/ft s)		76.22	
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	19.44	31.49	0.54
C & E Loss (ft)	0.17	Cum SA (acres)	3.00	5.75	0.69

Plan: Prop Trib. No. 1 Mill 1 RS: 555 BR U Profile: Q50

E.G. Elev (ft)	185.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.		0.110	
W.S. Elev (ft)	185.20	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	184.77	Flow Area (sq ft)		131.28	
E.G. Slope (ft/ft)	0.078828	Area (sq ft)		131.28	
Q Total (cfs)	641.00	Flow (cfs)		641.00	
Top Width (ft)	77.58	Top Width (ft)		77.58	
Vel Total (ft/s)	4.88	Avg. Vel. (ft/s)		4.88	
Max Chl Dpth (ft)	3.61	Hydr. Depth (ft)		1.69	
Conv. Total (cfs)	2283.1	Conv. (cfs)		2283.1	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		89.86	
Min Ch EI (ft)	181.60	Shear (lb/sq ft)		7.19	
Alpha	1.00	Stream Power (lb/ft s)		35.10	
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	24.73	41.55	2.09
C & E Loss (ft)	0.11	Cum SA (acres)	3.14	5.93	1.12

Plan: Prop Trib. No. 1 Mill 1 RS: 555 BR U Profile: Q100

E.G. Elev (ft)	186.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.		0.110	
W.S. Elev (ft)	186.36	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	185.02	Flow Area (sq ft)		225.67	
E.G. Slope (ft/ft)	0.025265	Area (sq ft)		225.67	
Q Total (cfs)	822.00	Flow (cfs)		822.00	
Top Width (ft)	84.44	Top Width (ft)		84.44	
Vel Total (ft/s)	3.64	Avg. Vel. (ft/s)		3.64	
Max Chl Dpth (ft)	4.76	Hydr. Depth (ft)		2.67	
Conv. Total (cfs)	5171.4	Conv. (cfs)		5171.4	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		102.13	
Min Ch EI (ft)	181.60	Shear (lb/sq ft)		3.49	
Alpha	1.00	Stream Power (lb/ft s)		12.69	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	28.13	47.83	3.33
C & E Loss (ft)	0.06	Cum SA (acres)	3.30	6.02	1.25

Plan: Prop Trib. No. 1 Mill 1 RS: 555 BR D Profile: Q10

E.G. Elev (ft)	182.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.110	
W.S. Elev (ft)	182.62	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	179.42	Flow Area (sq ft)		424.92	
E.G. Slope (ft/ft)	0.000605	Area (sq ft)		432.44	
Q Total (cfs)	300.00	Flow (cfs)		300.00	
Top Width (ft)	121.48	Top Width (ft)		121.48	
Vel Total (ft/s)	0.71	Avg. Vel. (ft/s)		0.71	
Max Chl Dpth (ft)	5.12	Hydr. Depth (ft)		3.55	
Conv. Total (cfs)	12196.1	Conv. (cfs)		12196.1	
Length Wtd. (ft)	27.00	Wetted Per. (ft)		137.20	
Min Ch El (ft)	177.49	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)		0.08	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	16.40	25.44	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	2.94	5.48	0.11

Plan: Prop Trib. No. 1 Mill 1 RS: 555 BR D Profile: Q25

E.G. Elev (ft)	183.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.110	
W.S. Elev (ft)	183.64	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	179.72	Flow Area (sq ft)		548.98	
E.G. Slope (ft/ft)	0.000746	Area (sq ft)		558.43	
Q Total (cfs)	491.00	Flow (cfs)		491.00	
Top Width (ft)	125.40	Top Width (ft)		125.40	
Vel Total (ft/s)	0.89	Avg. Vel. (ft/s)		0.89	
Max Chl Dpth (ft)	6.15	Hydr. Depth (ft)		4.45	
Conv. Total (cfs)	17977.7	Conv. (cfs)		17977.7	
Length Wtd. (ft)	27.00	Wetted Per. (ft)		145.44	
Min Ch El (ft)	177.49	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)		0.16	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	19.44	31.08	0.54
C & E Loss (ft)	0.00	Cum SA (acres)	3.00	5.63	0.69

Plan: Prop Trib. No. 1 Mill 1 RS: 555 BR D Profile: Q50

E.G. Elev (ft)	185.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.110	
W.S. Elev (ft)	185.36	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	179.89	Flow Area (sq ft)		767.10	
E.G. Slope (ft/ft)	0.000471	Area (sq ft)		780.51	
Q Total (cfs)	641.00	Flow (cfs)		641.00	
Top Width (ft)	132.03	Top Width (ft)		132.03	
Vel Total (ft/s)	0.84	Avg. Vel. (ft/s)		0.84	
Max Chl Dpth (ft)	7.87	Hydr. Depth (ft)		5.92	
Conv. Total (cfs)	29539.1	Conv. (cfs)		29539.1	
Length Wtd. (ft)	27.00	Wetted Per. (ft)		159.38	
Min Ch El (ft)	177.49	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)		0.12	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	24.73	40.97	2.09
C & E Loss (ft)	0.00	Cum SA (acres)	3.14	5.80	1.12

Plan: Prop Trib. No. 1 Mill 1 RS: 555 BR D Profile: Q100

E.G. Elev (ft)	186.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.110	
W.S. Elev (ft)	186.41	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	180.08	Flow Area (sq ft)		904.89	
E.G. Slope (ft/ft)	0.000478	Area (sq ft)		921.13	
Q Total (cfs)	822.00	Flow (cfs)		822.00	
Top Width (ft)	136.06	Top Width (ft)		136.06	
Vel Total (ft/s)	0.91	Avg. Vel. (ft/s)		0.91	
Max Chl Dpth (ft)	8.92	Hydr. Depth (ft)		6.79	
Conv. Total (cfs)	37581.0	Conv. (cfs)		37581.0	
Length Wtd. (ft)	27.00	Wetted Per. (ft)		167.86	
Min Ch El (ft)	177.49	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)		0.15	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	28.13	47.09	3.33
C & E Loss (ft)	0.00	Cum SA (acres)	3.30	5.88	1.25

Plan: Prop Trib. No. 1 Mill 1 RS: 500 Profile: Q10

E.G. Elev (ft)	182.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.110	
W.S. Elev (ft)	182.61	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	178.90	Flow Area (sq ft)		636.84	
E.G. Slope (ft/ft)	0.000201	Area (sq ft)		1918.00	1.07
Q Total (cfs)	300.00	Flow (cfs)		300.00	
Top Width (ft)	415.56	Top Width (ft)		397.36	18.20
Vel Total (ft/s)	0.47	Avg. Vel. (ft/s)		0.47	
Max Chl Dpth (ft)	6.44	Hydr. Depth (ft)		3.86	
Conv. Total (cfs)	21152.2	Conv. (cfs)		21152.2	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		165.18	
Min Ch El (ft)	176.17	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)		0.02	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	16.40	24.71	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	2.94	5.32	0.10

Plan: Prop Trib. No. 1 Mill 1 RS: 500 Profile: Q25

E.G. Elev (ft)	183.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.110	
W.S. Elev (ft)	183.63	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	179.25	Flow Area (sq ft)		805.20	
E.G. Slope (ft/ft)	0.000247	Area (sq ft)		2328.18	89.24
Q Total (cfs)	491.00	Flow (cfs)		491.00	
Top Width (ft)	526.89	Top Width (ft)		412.64	114.26
Vel Total (ft/s)	0.61	Avg. Vel. (ft/s)		0.61	
Max Chl Dpth (ft)	7.46	Hydr. Depth (ft)		4.88	
Conv. Total (cfs)	31270.6	Conv. (cfs)		31270.6	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		165.18	
Min Ch El (ft)	176.17	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)		0.05	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	19.44	30.19	0.51
C & E Loss (ft)	0.00	Cum SA (acres)	3.00	5.46	0.66

Plan: Prop Trib. No. 1 Mill 1 RS: 500 Profile: Q50

E.G. Elev (ft)	185.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.110	
W.S. Elev (ft)	185.36	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	179.48	Flow Area (sq ft)		1090.42	
E.G. Slope (ft/ft)	0.000153	Area (sq ft)		3059.98	345.71
Q Total (cfs)	641.00	Flow (cfs)		641.00	
Top Width (ft)	618.31	Top Width (ft)		432.98	185.32
Vel Total (ft/s)	0.59	Avg. Vel. (ft/s)		0.59	
Max Chl Dpth (ft)	9.19	Hydr. Depth (ft)		6.61	
Conv. Total (cfs)	51834.7	Conv. (cfs)		51834.7	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		165.18	
Min Ch El (ft)	176.17	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)		0.04	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	24.73	39.78	1.98
C & E Loss (ft)	0.00	Cum SA (acres)	3.14	5.62	1.06

Plan: Prop Trib. No. 1 Mill 1 RS: 500 Profile: Q100

E.G. Elev (ft)	186.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.110	
W.S. Elev (ft)	186.41	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	179.65	Flow Area (sq ft)		1263.59	
E.G. Slope (ft/ft)	0.000154	Area (sq ft)		3517.91	551.17
Q Total (cfs)	822.00	Flow (cfs)		822.00	
Top Width (ft)	645.38	Top Width (ft)		438.77	206.61
Vel Total (ft/s)	0.65	Avg. Vel. (ft/s)		0.65	
Max Chl Dpth (ft)	10.24	Hydr. Depth (ft)		7.66	
Conv. Total (cfs)	66269.4	Conv. (cfs)		66269.4	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		165.18	
Min Ch El (ft)	176.17	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)		0.05	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	28.13	45.72	3.16
C & E Loss (ft)	0.00	Cum SA (acres)	3.30	5.70	1.19

Plan: Prop Trib. No. 1 Mill 1 RS: 0 Profile: Q10

E.G. Elev (ft)	182.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.140	0.110	
W.S. Elev (ft)	182.61	Reach Len. (ft)			
Crit W.S. (ft)	176.08	Flow Area (sq ft)	2858.96	2386.96	
E.G. Slope (ft/ft)	0.000003	Area (sq ft)	2856.96	2386.96	
Q Total (cfs)	300.00	Flow (cfs)	156.05	143.95	
Top Width (ft)	1042.01	Top Width (ft)	512.19	529.82	
Vel Total (ft/s)	0.06	Avg. Vel. (ft/s)	0.05	0.06	
Max Chl Dpth (ft)	6.90	Hydr. Depth (ft)	5.58	4.51	
Conv. Total (cfs)	183196.7	Conv. (cfs)	95293.3	87903.4	
Length Wtd. (ft)		Wetted Per. (ft)	512.82	530.28	
Min Ch El (ft)	177.41	Shear (lb/sq ft)	0.00	0.00	
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.00	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Prop Trib. No. 1 Mill 1 RS: 0 Profile: Q25

E.G. Elev (ft)	183.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.140	0.110	
W.S. Elev (ft)	183.63	Reach Len. (ft)			
Crit W.S. (ft)	176.23	Flow Area (sq ft)	3386.38	2931.88	
E.G. Slope (ft/ft)	0.000004	Area (sq ft)	3386.38	2931.88	
Q Total (cfs)	491.00	Flow (cfs)	247.74	243.26	
Top Width (ft)	1062.07	Top Width (ft)	523.29	538.77	
Vel Total (ft/s)	0.08	Avg. Vel. (ft/s)	0.07	0.08	
Max Chl Dpth (ft)	7.92	Hydr. Depth (ft)	6.47	5.44	
Conv. Total (cfs)	247154.9	Conv. (cfs)	124704.1	122450.8	
Length Wtd. (ft)		Wetted Per. (ft)	523.98	539.30	
Min Ch El (ft)	177.41	Shear (lb/sq ft)	0.00	0.00	
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.00	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Prop Trib. No. 1 Mill 1 RS: 0 Profile: Q50

E.G. Elev (ft)	185.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.140	0.110	
W.S. Elev (ft)	185.36	Reach Len. (ft)			
Crit W.S. (ft)	176.33	Flow Area (sq ft)	4309.30	3870.79	
E.G. Slope (ft/ft)	0.000003	Area (sq ft)	4309.30	3870.79	
Q Total (cfs)	641.00	Flow (cfs)	310.34	330.66	
Top Width (ft)	1094.22	Top Width (ft)	547.55	546.68	
Vel Total (ft/s)	0.08	Avg. Vel. (ft/s)	0.07	0.09	
Max Chl Dpth (ft)	9.65	Hydr. Depth (ft)	7.87	7.08	
Conv. Total (cfs)	373435.0	Conv. (cfs)	180799.2	192635.8	
Length Wtd. (ft)		Wetted Per. (ft)	548.31	547.39	
Min Ch El (ft)	177.41	Shear (lb/sq ft)	0.00	0.00	
Alpha	1.02	Stream Power (lb/ft s)	0.00	0.00	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Prop Trib. No. 1 Mill 1 RS: 0 Profile: Q100

E.G. Elev (ft)	186.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.140	0.110	
W.S. Elev (ft)	186.41	Reach Len. (ft)			
Crit W.S. (ft)	176.44	Flow Area (sq ft)	4901.66	4447.89	
E.G. Slope (ft/ft)	0.000003	Area (sq ft)	4901.66	4447.89	
Q Total (cfs)	822.00	Flow (cfs)	389.63	432.37	
Top Width (ft)	1130.00	Top Width (ft)	575.53	554.47	
Vel Total (ft/s)	0.09	Avg. Vel. (ft/s)	0.08	0.10	
Max Chl Dpth (ft)	10.70	Hydr. Depth (ft)	8.52	8.02	
Conv. Total (cfs)	457306.3	Conv. (cfs)	216765.4	240540.8	
Length Wtd. (ft)		Wetted Per. (ft)	576.33	555.27	
Min Ch El (ft)	177.41	Shear (lb/sq ft)	0.00	0.00	
Alpha	1.03	Stream Power (lb/ft s)	0.00	0.00	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

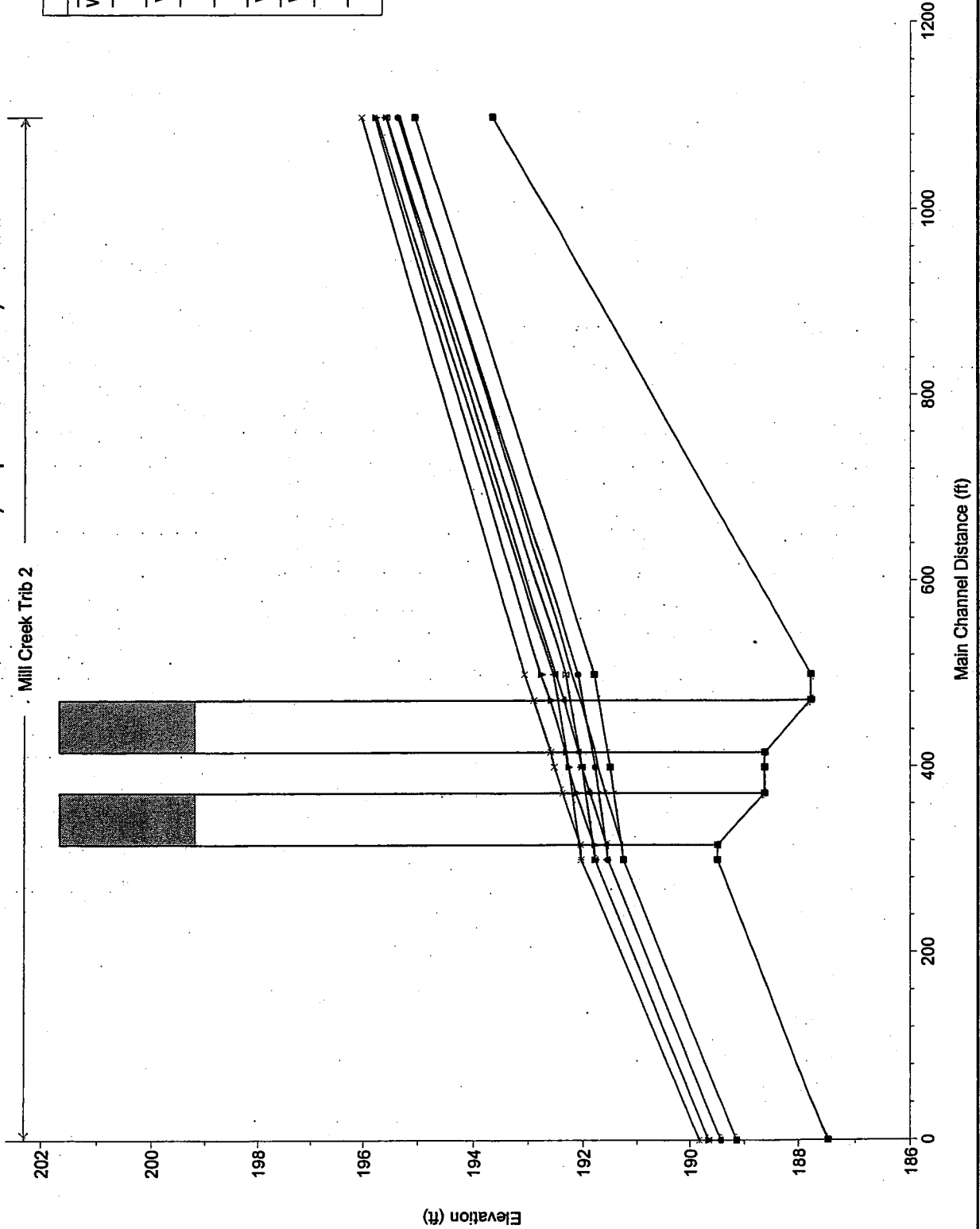
TRIBUTARY NO. 2 TO MILL CREEK

(DA 12)

SH249-Trib. No. 2 to Mill Creek Plan: 1) Prop 8/9/2006 2) Ex 8/9/2006

Mill Creek Trib 2

Legend
WS Q100 - Prop
WS Q100 - Ex
WS Q50 - Prop
WS Q50 - Ex
WS Q25 - Ex
WS Q25 - Prop
WS Q10 - Prop
WS Q10 - Ex
Ground



HEC-RAS River: Mill Creek Trib Reach: 2

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Chl El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
2	1100	Q10	Prop	521.00	193.70	195.35	194.75	195.38	0.007143	1.50	381.82	488.23	0.27
2	1100	Q10	Ex	521.00	193.70	195.08	194.75	195.15	0.021844	2.19	258.49	416.09	0.46
2	1100	Q25	Prop	771.00	193.70	195.61	194.92	195.65	0.008783	1.71	517.46	558.91	0.28
2	1100	Q25	Ex	771.00	193.70	195.39	194.92	195.45	0.013796	2.13	399.95	506.41	0.38
2	1100	Q50	Prop	1025.00	193.70	195.82	195.04	195.86	0.008434	1.86	636.45	568.54	0.28
2	1100	Q50	Ex	1025.00	193.70	195.60	195.04	195.67	0.012366	2.30	512.07	558.11	0.37
2	1100	Q100	Prop	1337.00	193.70	196.05	195.16	196.11	0.006070	2.01	772.18	578.33	0.28
2	1100	Q100	Ex	1337.00	193.70	195.78	195.16	195.86	0.012163	2.51	614.70	566.95	0.38
2	500	Q10	Prop	521.00	187.79	192.23	191.11	192.25	0.003978	1.29	404.22	602.17	0.21
2	500	Q10	Ex	521.00	187.79	191.82		191.84	0.002441	0.98	533.36	484.65	0.16
2	500	Q25	Prop	771.00	187.79	192.54	191.35	192.58	0.003976	1.49	517.66	628.32	0.22
2	500	Q25	Ex	771.00	187.79	192.11		192.13	0.002923	1.13	684.61	575.33	0.18
2	500	Q50	Prop	1025.00	187.79	192.81	191.51	192.85	0.004031	1.68	611.58	632.94	0.23
2	500	Q50	Ex	1025.00	187.79	192.35		192.37	0.003073	1.24	826.22	623.83	0.19
2	500	Q100	Prop	1337.00	187.79	193.09	191.88	193.14	0.004102	1.87	713.52	640.62	0.23
2	500	Q100	Ex	1337.00	187.79	192.59		192.62	0.003013	1.37	977.63	629.10	0.19
2	450			Bridge									
2	400*	Q10	Prop	521.00	188.65	191.75	190.87	191.77	0.003459	1.22	426.30	599.96	0.20
2	400*	Q10	Ex	521.00	188.65	191.52		191.54	0.003678	1.03	507.77	583.72	0.19
2	400*	Q25	Prop	771.00	188.65	192.04	191.04	192.08	0.003609	1.45	532.50	606.28	0.21
2	400*	Q25	Ex	771.00	188.65	191.80		191.82	0.003280	1.15	672.31	601.13	0.19
2	400*	Q50	Prop	1025.00	188.65	192.30	191.17	192.34	0.003758	1.64	624.12	615.95	0.22
2	400*	Q50	Ex	1025.00	188.65	192.04		192.06	0.003076	1.26	815.36	606.14	0.19
2	400*	Q100	Prop	1337.00	188.65	192.57	191.31	192.62	0.003940	1.85	721.65	623.29	0.23
2	400*	Q100	Ex	1337.00	188.65	192.29		192.32	0.002990	1.38	967.06	614.79	0.19
2	350			Bridge									
2	300	Q10	Prop	521.00	189.51	191.27		191.28	0.001872	0.84	619.54	585.63	0.14
2	300	Q10	Ex	521.00	189.51	191.27		191.28	0.001872	0.84	619.54	585.63	0.14
2	300	Q25	Prop	771.00	189.51	191.56		191.58	0.001859	0.98	791.28	610.97	0.15
2	300	Q25	Ex	771.00	189.51	191.56		191.58	0.001859	0.98	791.28	610.97	0.15
2	300	Q50	Prop	1025.00	189.51	191.80		191.82	0.001888	1.10	941.92	654.42	0.15
2	300	Q50	Ex	1025.00	189.51	191.80		191.82	0.001888	1.10	941.92	654.42	0.15
2	300	Q100	Prop	1337.00	189.51	192.05		192.07	0.001959	1.24	1114.86	725.82	0.16
2	300	Q100	Ex	1337.00	189.51	192.05		192.07	0.001959	1.24	1114.86	725.82	0.16
2	0	Q10	Prop	521.00	187.49	189.14	189.14	189.51	0.103663	4.86	107.13	145.92	1.00
2	0	Q10	Ex	521.00	187.49	189.14	189.14	189.51	0.103663	4.86	107.13	145.92	1.00

HEC-RAS River Mill Creek Trib Reach: 2 (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Chl W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
2	0	Q25	Prop	771.00	187.49	189.43	189.43	189.81	0.105570	4.96	155.53	208.73	1.01
2	0	Q25	Ex	771.00	187.49	189.43	189.43	189.81	0.105570	4.96	155.53	208.73	1.01
2	0	Q50	Prop	1025.00	187.49	189.65	189.65	190.02	0.109160	4.88	209.87	295.41	1.02
2	0	Q50	Ex	1025.00	187.49	189.65	189.65	190.02	0.109160	4.88	209.87	295.41	1.02
2	0	Q100	Prop	1337.00	187.49	189.82	189.82	190.22	0.107689	5.06	264.21	349.06	1.03
2	0	Q100	Ex	1337.00	187.49	189.82	189.82	190.22	0.107689	5.06	264.21	349.06	1.03

Plan: Prop Mill Creek Trib 2 RS: 1100 Profile: Q10

E.G. Elev (ft)	195.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	195.35	Reach Len. (ft)	600.00	600.00	600.00
Crit W.S. (ft)	194.75	Flow Area (sq ft)	60.72	302.73	18.37
E.G. Slope (ft/ft)	0.007143	Area (sq ft)	60.72	302.73	18.37
Q Total (cfs)	521.00	Flow (cfs)	55.93	452.85	12.23
Top Width (ft)	488.23	Top Width (ft)	115.21	325.40	47.62
Vel Total (ft/s)	1.36	Avg. Vel. (ft/s)	0.92	1.50	0.67
Max Chl Dpth (ft)	1.66	Hydr. Depth (ft)	0.53	0.93	0.39
Conv. Total (cfs)	6164.4	Conv. (cfs)	661.7	5358.0	144.7
Length Wtd. (ft)	600.00	Wetted Per. (ft)	115.27	325.47	47.63
Min Ch El (ft)	193.70	Shear (lb/sq ft)	0.23	0.41	0.17
Alpha	1.10	Stream Power (lb/ft s)	0.22	0.62	0.11
Frcn Loss (ft)	3.13	Cum Volume (acre-ft)	0.42	11.74	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.83	10.63	0.33

Plan: Prop Mill Creek Trib 2 RS: 1100 Profile: Q25

E.G. Elev (ft)	195.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	195.61	Reach Len. (ft)	600.00	600.00	600.00
Crit W.S. (ft)	194.92	Flow Area (sq ft)	99.07	385.61	32.79
E.G. Slope (ft/ft)	0.006783	Area (sq ft)	99.07	385.61	32.79
Q Total (cfs)	771.00	Flow (cfs)	85.24	660.48	25.27
Top Width (ft)	558.91	Top Width (ft)	167.94	325.40	65.57
Vel Total (ft/s)	1.49	Avg. Vel. (ft/s)	0.86	1.71	0.77
Max Chl Dpth (ft)	1.91	Hydr. Depth (ft)	0.59	1.19	0.50
Conv. Total (cfs)	9361.4	Conv. (cfs)	1035.0	8019.5	306.9
Length Wtd. (ft)	600.00	Wetted Per. (ft)	168.02	325.47	65.58
Min Ch El (ft)	193.70	Shear (lb/sq ft)	0.25	0.50	0.21
Alpha	1.18	Stream Power (lb/ft s)	0.21	0.86	0.16
Frcn Loss (ft)	3.06	Cum Volume (acre-ft)	0.70	14.94	0.23
C & E Loss (ft)	0.00	Cum SA (acres)	1.24	11.08	0.49

Plan: Prop Mill Creek Trib 2 RS: 1100 Profile: Q50

E.G. Elev (ft)	195.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	195.82	Reach Len. (ft)	600.00	600.00	600.00
Crit W.S. (ft)	195.04	Flow Area (sq ft)	134.76	454.24	47.44
E.G. Slope (ft/ft)	0.006434	Area (sq ft)	134.76	454.24	47.44
Q Total (cfs)	1025.00	Flow (cfs)	137.24	845.18	42.57
Top Width (ft)	568.54	Top Width (ft)	170.52	325.40	72.61
Vel Total (ft/s)	1.61	Avg. Vel. (ft/s)	1.02	1.86	0.90
Max Chl Dpth (ft)	2.12	Hydr. Depth (ft)	0.79	1.40	0.65
Conv. Total (cfs)	12778.8	Conv. (cfs)	1711.0	10537.0	530.8
Length Wtd. (ft)	600.00	Wetted Per. (ft)	170.61	325.47	72.62
Min Ch El (ft)	193.70	Shear (lb/sq ft)	0.32	0.56	0.26
Alpha	1.17	Stream Power (lb/ft s)	0.32	1.04	0.24
Frcn Loss (ft)	3.01	Cum Volume (acre-ft)	0.97	17.67	0.34
C & E Loss (ft)	0.00	Cum SA (acres)	1.28	11.41	0.68

Plan: Prop Mill Creek Trib 2 RS: 1100 Profile: Q100

E.G. Elev (ft)	196.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	196.05	Reach Len. (ft)	600.00	600.00	600.00
Crit W.S. (ft)	195.16	Flow Area (sq ft)	175.47	531.27	65.45
E.G. Slope (ft/ft)	0.006070	Area (sq ft)	175.47	531.27	65.45
Q Total (cfs)	1337.00	Flow (cfs)	204.65	1065.81	66.54
Top Width (ft)	578.33	Top Width (ft)	173.42	325.40	79.51
Vel Total (ft/s)	1.73	Avg. Vel. (ft/s)	1.17	2.01	1.02
Max Chl Dpth (ft)	2.36	Hydr. Depth (ft)	1.01	1.63	0.82
Conv. Total (cfs)	17161.0	Conv. (cfs)	2626.8	13680.2	854.0
Length Wtd. (ft)	600.00	Wetted Per. (ft)	173.52	325.47	79.53
Min Ch El (ft)	193.70	Shear (lb/sq ft)	0.38	0.62	0.31
Alpha	1.16	Stream Power (lb/ft s)	0.45	1.24	0.32
Frctn Loss (ft)	2.97	Cum Volume (acre-ft)	1.29	20.60	0.55
C & E Loss (ft)	0.00	Cum SA (acres)	1.34	11.61	1.00

Plan: Prop Mill Creek Trib 2 RS: 500 Profile: Q10

E.G. Elev (ft)	192.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.080	
W.S. Elev (ft)	192.23	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	191.11	Flow Area (sq ft)		404.22	
E.G. Slope (ft/ft)	0.003978	Area (sq ft)		753.30	
Q Total (cfs)	521.00	Flow (cfs)		521.00	
Top Width (ft)	602.17	Top Width (ft)		602.17	
Vel Total (ft/s)	1.29	Avg. Vel. (ft/s)		1.29	
Max Chl Dpth (ft)	4.44	Hydr. Depth (ft)		1.16	
Conv. Total (cfs)	8260.9	Conv. (cfs)		8260.9	
Length Wtd. (ft)	28.00	Wetted Per. (ft)		350.24	
Min Ch El (ft)	187.79	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)		0.37	
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	0.00	4.47	
C & E Loss (ft)	0.00	Cum SA (acres)	0.04	4.24	

Plan: Prop Mill Creek Trib 2 RS: 500 Profile: Q25

E.G. Elev (ft)	192.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.080	
W.S. Elev (ft)	192.54	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	191.35	Flow Area (sq ft)		517.66	
E.G. Slope (ft/ft)	0.003976	Area (sq ft)	0.15	950.05	
Q Total (cfs)	771.00	Flow (cfs)		771.00	
Top Width (ft)	628.32	Top Width (ft)	1.06	627.27	
Vel Total (ft/s)	1.49	Avg. Vel. (ft/s)		1.49	
Max Chl Dpth (ft)	4.76	Hydr. Depth (ft)		1.44	
Conv. Total (cfs)	12227.7	Conv. (cfs)		12227.7	
Length Wtd. (ft)	28.00	Wetted Per. (ft)		360.95	
Min Ch El (ft)	187.79	Shear (lb/sq ft)		0.36	
Alpha	1.00	Stream Power (lb/ft s)		0.53	
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	0.02	5.75	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.07	4.52	0.04

Plan: Prop Mill Creek Trib 2 RS: 500 Profile: Q50

E.G. Elev (ft)	192.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.080	
W.S. Elev (ft)	192.81	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	191.51	Flow Area (sq ft)		611.58	
E.G. Slope (ft/ft)	0.004031	Area (sq ft)	0.55	1114.18	
Q Total (cfs)	1025.00	Flow (cfs)		1025.00	
Top Width (ft)	632.94	Top Width (ft)	2.05	630.89	
Vel Total (ft/s)	1.68	Avg. Vel. (ft/s)		1.68	
Max Chl Dpth (ft)	5.02	Hydr. Depth (ft)		1.70	
Conv. Total (cfs)	16144.6	Conv. (cfs)		16144.6	
Length Wtd. (ft)	28.00	Wetted Per. (ft)		360.95	
Min Ch El (ft)	187.79	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)		0.71	
Frcn Loss (ft)	0.14	Cum Volume (acre-ft)	0.04	6.87	0.02
C & E Loss (ft)	0.00	Cum SA (acres)	0.10	4.83	0.18

Plan: Prop Mill Creek Trib 2 RS: 500 Profile: Q100

E.G. Elev (ft)	193.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.080	
W.S. Elev (ft)	193.09	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	191.68	Flow Area (sq ft)		713.52	
E.G. Slope (ft/ft)	0.004102	Area (sq ft)	1.29	1293.18	0.43
Q Total (cfs)	1337.00	Flow (cfs)		1337.00	
Top Width (ft)	640.62	Top Width (ft)	3.14	632.46	5.01
Vel Total (ft/s)	1.87	Avg. Vel. (ft/s)		1.87	
Max Chl Dpth (ft)	5.30	Hydr. Depth (ft)		1.98	
Conv. Total (cfs)	20874.3	Conv. (cfs)		20874.3	
Length Wtd. (ft)	28.00	Wetted Per. (ft)		360.95	
Min Ch El (ft)	187.79	Shear (lb/sq ft)		0.51	
Alpha	1.00	Stream Power (lb/ft s)		0.95	
Frcn Loss (ft)	0.14	Cum Volume (acre-ft)	0.07	8.04	0.10
C & E Loss (ft)	0.00	Cum SA (acres)	0.12	5.01	0.42

Plan: Prop Mill Creek Trib 2 RS: 450 BR U Profile: Q10

E.G. Elev (ft)	192.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.080	
W.S. Elev (ft)	192.07	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	191.18	Flow Area (sq ft)		322.30	
E.G. Slope (ft/ft)	0.007001	Area (sq ft)		322.30	
Q Total (cfs)	521.00	Flow (cfs)		521.00	
Top Width (ft)	298.42	Top Width (ft)		298.42	
Vel Total (ft/s)	1.62	Avg. Vel. (ft/s)		1.62	
Max Chl Dpth (ft)	4.28	Hydr. Depth (ft)		1.08	
Conv. Total (cfs)	6226.8	Conv. (cfs)		6226.8	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		303.82	
Min Ch El (ft)	187.79	Shear (lb/sq ft)		0.46	
Alpha	1.00	Stream Power (lb/ft s)		0.75	
Frcn Loss (ft)	0.27	Cum Volume (acre-ft)	0.00	4.12	
C & E Loss (ft)	0.00	Cum SA (acres)	0.04	3.95	

Plan: Prop Mill Creek Trib 2 RS: 450 BR U Profile: Q25

E.G. Elev (ft)	192.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.080	
W.S. Elev (ft)	192.38	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	191.40	Flow Area (sq ft)		423.07	
E.G. Slope (ft/ft)	0.007202	Area (sq ft)		423.07	
Q Total (cfs)	771.00	Flow (cfs)		771.00	
Top Width (ft)	333.57	Top Width (ft)		333.57	
Vel Total (ft/s)	1.82	Avg. Vel. (ft/s)		1.82	
Max Chl Dpth (ft)	4.59	Hydr. Depth (ft)		1.27	
Conv. Total (cfs)	9085.2	Conv. (cfs)		9085.2	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		340.31	
Min Ch El (ft)	187.79	Shear (lb/sq ft)		0.56	
Alpha	1.00	Stream Power (lb/ft s)		1.02	
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)	0.02	5.30	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.07	4.21	0.04

Plan: Prop Mill Creek Trib 2 RS: 450 BR U Profile: Q50

E.G. Elev (ft)	192.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.080	
W.S. Elev (ft)	192.64	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	191.56	Flow Area (sq ft)		510.14	
E.G. Slope (ft/ft)	0.006879	Area (sq ft)		510.14	
Q Total (cfs)	1025.00	Flow (cfs)		1025.00	
Top Width (ft)	334.59	Top Width (ft)		334.59	
Vel Total (ft/s)	2.01	Avg. Vel. (ft/s)		2.01	
Max Chl Dpth (ft)	4.85	Hydr. Depth (ft)		1.52	
Conv. Total (cfs)	12358.1	Conv. (cfs)		12358.1	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		342.50	
Min Ch El (ft)	187.79	Shear (lb/sq ft)		0.64	
Alpha	1.00	Stream Power (lb/ft s)		1.29	
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)	0.04	6.35	0.02
C & E Loss (ft)	0.00	Cum SA (acres)	0.10	4.52	0.18

Plan: Prop Mill Creek Trib 2 RS: 450 BR U Profile: Q100

E.G. Elev (ft)	193.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.080	
W.S. Elev (ft)	192.92	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	191.74	Flow Area (sq ft)		604.20	
E.G. Slope (ft/ft)	0.006720	Area (sq ft)		604.20	
Q Total (cfs)	1337.00	Flow (cfs)		1337.00	
Top Width (ft)	335.69	Top Width (ft)		335.69	
Vel Total (ft/s)	2.21	Avg. Vel. (ft/s)		2.21	
Max Chl Dpth (ft)	5.13	Hydr. Depth (ft)		1.80	
Conv. Total (cfs)	16309.8	Conv. (cfs)		16309.8	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		344.86	
Min Ch El (ft)	187.79	Shear (lb/sq ft)		0.74	
Alpha	1.00	Stream Power (lb/ft s)		1.63	
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	0.07	7.43	0.10
C & E Loss (ft)	0.01	Cum SA (acres)	0.12	4.70	0.42

Plan: Prop Mill Creek Trib 2 RS: 450 BR D Profile: Q10

E.G. Elev (ft)	191.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.080	
W.S. Elev (ft)	191.80	Reach Len. (ft)	16.00	16.00	16.00
Crit W.S. (ft)	190.90	Flow Area (sq ft)		409.80	
E.G. Slope (ft/ft)	0.003609	Area (sq ft)		409.80	
Q Total (cfs)	521.00	Flow (cfs)		521.00	
Top Width (ft)	331.32	Top Width (ft)		331.32	
Vel Total (ft/s)	1.27	Avg. Vel. (ft/s)		1.27	
Max Chl Dpth (ft)	3.15	Hydr. Depth (ft)		1.24	
Conv. Total (cfs)	8672.1	Conv. (cfs)		8672.1	
Length Wtd. (ft)	16.00	Wetted Per. (ft)		336.97	
Min Ch EI (ft)	188.65	Shear (lb/sq ft)		0.27	
Alpha	1.00	Stream Power (lb/ft s)		0.35	
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.00	3.65	
C & E Loss (ft)	0.00	Cum SA (acres)	0.04	3.55	

Plan: Prop Mill Creek Trib 2 RS: 450 BR D Profile: Q25

E.G. Elev (ft)	192.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.080	
W.S. Elev (ft)	192.10	Reach Len. (ft)	16.00	16.00	16.00
Crit W.S. (ft)	191.07	Flow Area (sq ft)		508.56	
E.G. Slope (ft/ft)	0.003886	Area (sq ft)		508.56	
Q Total (cfs)	771.00	Flow (cfs)		771.00	
Top Width (ft)	332.48	Top Width (ft)		332.48	
Vel Total (ft/s)	1.52	Avg. Vel. (ft/s)		1.52	
Max Chl Dpth (ft)	3.45	Hydr. Depth (ft)		1.53	
Conv. Total (cfs)	12367.4	Conv. (cfs)		12367.4	
Length Wtd. (ft)	16.00	Wetted Per. (ft)		339.47	
Min Ch EI (ft)	188.65	Shear (lb/sq ft)		0.36	
Alpha	1.00	Stream Power (lb/ft s)		0.55	
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.02	4.71	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.07	3.78	0.04

Plan: Prop Mill Creek Trib 2 RS: 450 BR D Profile: Q50

E.G. Elev (ft)	192.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.080	
W.S. Elev (ft)	192.36	Reach Len. (ft)	16.00	16.00	16.00
Crit W.S. (ft)	191.21	Flow Area (sq ft)		594.07	
E.G. Slope (ft/ft)	0.004127	Area (sq ft)		594.07	
Q Total (cfs)	1025.00	Flow (cfs)		1025.00	
Top Width (ft)	333.49	Top Width (ft)		333.49	
Vel Total (ft/s)	1.73	Avg. Vel. (ft/s)		1.73	
Max Chl Dpth (ft)	3.71	Hydr. Depth (ft)		1.78	
Conv. Total (cfs)	15956.1	Conv. (cfs)		15956.1	
Length Wtd. (ft)	16.00	Wetted Per. (ft)		341.63	
Min Ch EI (ft)	188.65	Shear (lb/sq ft)		0.45	
Alpha	1.00	Stream Power (lb/ft s)		0.77	
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.04	5.64	0.02
C & E Loss (ft)	0.00	Cum SA (acres)	0.10	4.09	0.18

Plan: Prop Mill Creek Trib 2 RS: 450 BR D Profile: Q100

E.G. Elev (ft)	192.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.080	
W.S. Elev (ft)	192.63	Reach Len. (ft)	16.00	16.00	16.00
Crit W.S. (ft)	191.35	Flow Area (sq ft)		685.44	
E.G. Slope (ft/ft)	0.004397	Area (sq ft)		685.44	
Q Total (cfs)	1337.00	Flow (cfs)		1337.00	
Top Width (ft)	334.56	Top Width (ft)		334.56	
Vel Total (ft/s)	1.95	Avg. Vel. (ft/s)		1.95	
Max Chl Dpth (ft)	3.98	Hydr. Depth (ft)		2.05	
Conv. Total (cfs)	20162.3	Conv. (cfs)		20162.3	
Length Wtd. (ft)	16.00	Wetted Per. (ft)		343.93	
Min Ch El (ft)	188.65	Shear (lb/sq ft)		0.55	
Alpha	1.00	Stream Power (lb/ft s)		1.07	
Frcn Loss (ft)	0.07	Cum Volume (acre-ft)	0.07	6.60	0.10
C & E Loss (ft)	0.00	Cum SA (acres)	0.12	4.27	0.42

Plan: Prop Mill Creek Trib 2 RS: 400.* Profile: Q10

E.G. Elev (ft)	191.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.080	
W.S. Elev (ft)	191.75	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	190.87	Flow Area (sq ft)		426.30	
E.G. Slope (ft/ft)	0.003459	Area (sq ft)	0.04	641.35	
Q Total (cfs)	521.00	Flow (cfs)		521.00	
Top Width (ft)	599.96	Top Width (ft)	0.73	599.23	
Vel Total (ft/s)	1.22	Avg. Vel. (ft/s)		1.22	
Max Chl Dpth (ft)	3.10	Hydr. Depth (ft)		1.18	
Conv. Total (cfs)	8858.3	Conv. (cfs)		8858.3	
Length Wtd. (ft)	28.00	Wetted Per. (ft)		360.27	
Min Ch El (ft)	188.65	Shear (lb/sq ft)		0.26	
Alpha	1.00	Stream Power (lb/ft s)		0.31	
Frcn Loss (ft)	0.13	Cum Volume (acre-ft)	0.00	3.46	
C & E Loss (ft)	0.00	Cum SA (acres)	0.04	3.38	

Plan: Prop Mill Creek Trib 2 RS: 400.* Profile: Q25

E.G. Elev (ft)	192.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.080	
W.S. Elev (ft)	192.04	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	191.04	Flow Area (sq ft)		532.50	
E.G. Slope (ft/ft)	0.003609	Area (sq ft)	0.53	818.80	
Q Total (cfs)	771.00	Flow (cfs)		771.00	
Top Width (ft)	606.28	Top Width (ft)	2.56	603.72	
Vel Total (ft/s)	1.45	Avg. Vel. (ft/s)		1.45	
Max Chl Dpth (ft)	3.39	Hydr. Depth (ft)		1.48	
Conv. Total (cfs)	12833.6	Conv. (cfs)		12833.6	
Length Wtd. (ft)	28.00	Wetted Per. (ft)		360.27	
Min Ch El (ft)	188.65	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)		0.48	
Frcn Loss (ft)	0.13	Cum Volume (acre-ft)	0.02	4.46	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.07	3.61	0.04

Plan: Prop Mill Creek Trib 2 RS: 400.* Profile: Q50

E.G. Elev (ft)	192.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.080	
W.S. Elev (ft)	192.30	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	191.17	Flow Area (sq ft)		624.12	
E.G. Slope (ft/ft)	0.003758	Area (sq ft)	1.38	972.89	0.15
Q Total (cfs)	1025.00	Flow (cfs)		1025.00	
Top Width (ft)	615.95	Top Width (ft)	4.13	606.59	5.23
Vel Total (ft/s)	1.64	Avg. Vel. (ft/s)		1.64	
Max Chl Dpth (ft)	3.65	Hydr. Depth (ft)		1.73	
Conv. Total (cfs)	16721.1	Conv. (cfs)		16721.1	
Length Wtd. (ft)	28.00	Wetted Per. (ft)		360.27	
Min Ch El (ft)	188.65	Shear (lb/sq ft)		0.41	
Alpha	1.00	Stream Power (lb/ft s)		0.67	
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.04	5.35	0.02
C & E Loss (ft)	0.00	Cum SA (acres)	0.09	3.91	0.18

Plan: Prop Mill Creek Trib 2 RS: 400.* Profile: Q100

E.G. Elev (ft)	192.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.080	
W.S. Elev (ft)	192.57	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	191.31	Flow Area (sq ft)		721.65	
E.G. Slope (ft/ft)	0.003940	Area (sq ft)	2.73	1137.23	2.55
Q Total (cfs)	1337.00	Flow (cfs)		1337.00	
Top Width (ft)	623.29	Top Width (ft)	5.81	606.59	10.89
Vel Total (ft/s)	1.85	Avg. Vel. (ft/s)		1.85	
Max Chl Dpth (ft)	3.92	Hydr. Depth (ft)		2.00	
Conv. Total (cfs)	21299.2	Conv. (cfs)		21299.2	
Length Wtd. (ft)	28.00	Wetted Per. (ft)		360.27	
Min Ch El (ft)	188.65	Shear (lb/sq ft)		0.49	
Alpha	1.00	Stream Power (lb/ft s)		0.91	
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	0.07	6.26	0.10
C & E Loss (ft)	0.00	Cum SA (acres)	0.12	4.10	0.41

Plan: Prop Mill Creek Trib 2 RS: 350 BR U Profile: Q10

E.G. Elev (ft)	191.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.080	
W.S. Elev (ft)	191.61	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	190.90	Flow Area (sq ft)		344.76	
E.G. Slope (ft/ft)	0.006379	Area (sq ft)		344.76	
Q Total (cfs)	521.00	Flow (cfs)		521.00	
Top Width (ft)	330.55	Top Width (ft)		330.55	
Vel Total (ft/s)	1.51	Avg. Vel. (ft/s)		1.51	
Max Chl Dpth (ft)	2.96	Hydr. Depth (ft)		1.04	
Conv. Total (cfs)	6523.2	Conv. (cfs)		6523.2	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		335.32	
Min Ch El (ft)	188.65	Shear (lb/sq ft)		0.41	
Alpha	1.00	Stream Power (lb/ft s)		0.62	
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)	0.00	3.14	
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	3.08	

Plan: Prop Mill Creek Trib 2 RS: 350 BR U Profile: Q25

E.G. Elev (ft)	191.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.080	
W.S. Elev (ft)	191.90	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	191.07	Flow Area (sq ft)		440.85	
E.G. Slope (ft/ft)	0.006215	Area (sq ft)		440.85	
Q Total (cfs)	771.00	Flow (cfs)		771.00	
Top Width (ft)	331.69	Top Width (ft)		331.69	
Vel Total (ft/s)	1.75	Avg. Vel. (ft/s)		1.75	
Max Chl Dpth (ft)	3.25	Hydr. Depth (ft)		1.33	
Conv. Total (cfs)	9779.6	Conv. (cfs)		9779.6	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		337.76	
Min Ch El (ft)	188.65	Shear (lb/sq ft)		0.51	
Alpha	1.00	Stream Power (lb/ft s)		0.89	
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)	0.02	4.06	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.07	3.31	0.04

Plan: Prop Mill Creek Trib 2 RS: 350 BR U Profile: Q50

E.G. Elev (ft)	192.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.080	
W.S. Elev (ft)	192.15	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	191.21	Flow Area (sq ft)		523.51	
E.G. Slope (ft/ft)	0.006246	Area (sq ft)		523.51	
Q Total (cfs)	1025.00	Flow (cfs)		1025.00	
Top Width (ft)	332.66	Top Width (ft)		332.66	
Vel Total (ft/s)	1.96	Avg. Vel. (ft/s)		1.96	
Max Chl Dpth (ft)	3.50	Hydr. Depth (ft)		1.57	
Conv. Total (cfs)	12969.6	Conv. (cfs)		12969.6	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		339.85	
Min Ch El (ft)	188.65	Shear (lb/sq ft)		0.60	
Alpha	1.00	Stream Power (lb/ft s)		1.18	
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.04	4.87	0.02
C & E Loss (ft)	0.00	Cum SA (acres)	0.09	3.61	0.17

Plan: Prop Mill Creek Trib 2 RS: 350 BR U Profile: Q100

E.G. Elev (ft)	192.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.080	
W.S. Elev (ft)	192.41	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	191.35	Flow Area (sq ft)		610.70	
E.G. Slope (ft/ft)	0.006414	Area (sq ft)		610.70	
Q Total (cfs)	1337.00	Flow (cfs)		1337.00	
Top Width (ft)	333.68	Top Width (ft)		333.68	
Vel Total (ft/s)	2.19	Avg. Vel. (ft/s)		2.19	
Max Chl Dpth (ft)	3.76	Hydr. Depth (ft)		1.83	
Conv. Total (cfs)	16694.0	Conv. (cfs)		16694.0	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		342.05	
Min Ch El (ft)	188.65	Shear (lb/sq ft)		0.71	
Alpha	1.00	Stream Power (lb/ft s)		1.57	
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)	0.07	5.70	0.10
C & E Loss (ft)	0.00	Cum SA (acres)	0.12	3.80	0.41

Plan: Prop Mill Creek Trib 2 RS: 350 BR D Profile: Q10

E.G. Elev (ft)	191.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.080	
W.S. Elev (ft)	191.30	Reach Len. (ft)	16.00	16.00	16.00
Crit W.S. (ft)	190.53	Flow Area (sq ft)		376.28	
E.G. Slope (ft/ft)	0.004794	Area (sq ft)		376.28	
Q Total (cfs)	521.00	Flow (cfs)		521.00	
Top Width (ft)	329.37	Top Width (ft)		329.37	
Vel Total (ft/s)	1.38	Avg. Vel. (ft/s)		1.38	
Max Chl Dpth (ft)	1.80	Hydr. Depth (ft)		1.14	
Conv. Total (cfs)	7524.6	Conv. (cfs)		7524.6	
Length Wtd. (ft)	16.00	Wetted Per. (ft)		336.83	
Min Ch El (ft)	189.51	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)		0.46	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.00	2.68	
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	2.65	

Plan: Prop Mill Creek Trib 2 RS: 350 BR D Profile: Q25

E.G. Elev (ft)	191.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.080	
W.S. Elev (ft)	191.59	Reach Len. (ft)	16.00	16.00	16.00
Crit W.S. (ft)	190.68	Flow Area (sq ft)		470.11	
E.G. Slope (ft/ft)	0.005046	Area (sq ft)		470.11	
Q Total (cfs)	771.00	Flow (cfs)		771.00	
Top Width (ft)	330.48	Top Width (ft)		330.48	
Vel Total (ft/s)	1.64	Avg. Vel. (ft/s)		1.64	
Max Chl Dpth (ft)	2.08	Hydr. Depth (ft)		1.42	
Conv. Total (cfs)	10854.0	Conv. (cfs)		10854.0	
Length Wtd. (ft)	16.00	Wetted Per. (ft)		339.22	
Min Ch El (ft)	189.51	Shear (lb/sq ft)		0.44	
Alpha	1.00	Stream Power (lb/ft s)		0.72	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.02	3.47	0.00
C & E Loss (ft)	0.01	Cum SA (acres)	0.07	2.89	0.04

Plan: Prop Mill Creek Trib 2 RS: 350 BR D Profile: Q50

E.G. Elev (ft)	191.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.080	
W.S. Elev (ft)	191.83	Reach Len. (ft)	16.00	16.00	16.00
Crit W.S. (ft)	190.83	Flow Area (sq ft)		548.72	
E.G. Slope (ft/ft)	0.005368	Area (sq ft)		548.72	
Q Total (cfs)	1025.00	Flow (cfs)		1025.00	
Top Width (ft)	331.41	Top Width (ft)		331.41	
Vel Total (ft/s)	1.87	Avg. Vel. (ft/s)		1.87	
Max Chl Dpth (ft)	2.32	Hydr. Depth (ft)		1.66	
Conv. Total (cfs)	13989.7	Conv. (cfs)		13989.7	
Length Wtd. (ft)	16.00	Wetted Per. (ft)		341.22	
Min Ch El (ft)	189.51	Shear (lb/sq ft)		0.54	
Alpha	1.00	Stream Power (lb/ft s)		1.01	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.04	4.18	0.02
C & E Loss (ft)	0.01	Cum SA (acres)	0.09	3.18	0.17

Plan: Prop Mill Creek Trib 2 RS: 350 BR D Profile: Q100

E.G. Elev (ft)	192.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.080	
W.S. Elev (ft)	192.07	Reach Len. (ft)	16.00	16.00	16.00
Crit W.S. (ft)	190.96	Flow Area (sq ft)		629.15	
E.G. Slope (ft/ft)	0.005836	Area (sq ft)		629.15	
Q Total (cfs)	1337.00	Flow (cfs)		1337.00	
Top Width (ft)	332.36	Top Width (ft)		332.36	
Vel Total (ft/s)	2.13	Avg. Vel. (ft/s)		2.13	
Max Chl Dpth (ft)	2.56	Hydr. Depth (ft)		1.89	
Conv. Total (cfs)	17502.1	Conv. (cfs)		17502.1	
Length Wtd. (ft)	16.00	Wetted Per. (ft)		343.25	
Min Ch El (ft)	189.51	Shear (lb/sq ft)		0.67	
Alpha	1.00	Stream Power (lb/ft s)		1.42	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.07	4.91	0.10
C & E Loss (ft)	0.01	Cum SA (acres)	0.12	3.37	0.41

Plan: Prop Mill Creek Trib 2 RS: 300 Profile: Q10

E.G. Elev (ft)	191.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.	0.100	0.080	
W.S. Elev (ft)	191.27	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)		Flow Area (sq ft)	1.33	618.21	
E.G. Slope (ft/ft)	0.001872	Area (sq ft)	1.33	618.21	
Q Total (cfs)	521.00	Flow (cfs)	0.23	520.77	
Top Width (ft)	585.63	Top Width (ft)	9.59	576.04	
Vel Total (ft/s)	0.84	Avg. Vel. (ft/s)	0.17	0.84	
Max Chl Dpth (ft)	1.76	Hydr. Depth (ft)	0.14	1.07	
Conv. Total (cfs)	12040.1	Conv. (cfs)	5.3	12034.8	
Length Wtd. (ft)	300.00	Wetted Per. (ft)	9.60	576.15	
Min Ch El (ft)	189.51	Shear (lb/sq ft)	0.02	0.13	
Alpha	1.00	Stream Power (lb/ft s)	0.00	0.11	
Frctn Loss (ft)	1.75	Cum Volume (acre-ft)	0.00	2.50	
C & E Loss (ft)	0.04	Cum SA (acres)	0.03	2.49	

Plan: Prop Mill Creek Trib 2 RS: 300 Profile: Q25

E.G. Elev (ft)	191.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	191.56	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)		Flow Area (sq ft)	5.54	785.62	0.12
E.G. Slope (ft/ft)	0.001859	Area (sq ft)	5.54	785.62	0.12
Q Total (cfs)	771.00	Flow (cfs)	1.53	769.46	0.00
Top Width (ft)	610.97	Top Width (ft)	19.46	580.72	10.80
Vel Total (ft/s)	0.97	Avg. Vel. (ft/s)	0.28	0.98	0.03
Max Chl Dpth (ft)	2.05	Hydr. Depth (ft)	0.28	1.35	0.01
Conv. Total (cfs)	17882.3	Conv. (cfs)	35.6	17846.6	0.1
Length Wtd. (ft)	300.00	Wetted Per. (ft)	19.47	580.84	10.80
Min Ch El (ft)	189.51	Shear (lb/sq ft)	0.03	0.16	0.00
Alpha	1.01	Stream Power (lb/ft s)	0.01	0.15	0.00
Frctn Loss (ft)	1.74	Cum Volume (acre-ft)	0.02	3.24	0.00
C & E Loss (ft)	0.04	Cum SA (acres)	0.07	2.72	0.04

Plan: Prop Mill Creek Trib 2 RS: 300 Profile: Q50

E.G. Elev (ft)	191.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	191.80	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)		Flow Area (sq ft)	11.03	926.13	4.76
E.G. Slope (ft/ft)	0.001888	Area (sq ft)	11.03	926.13	4.76
Q Total (cfs)	1025.00	Flow (cfs)	4.04	1020.04	0.91
Top Width (ft)	654.42	Top Width (ft)	25.75	580.72	47.95
Vel Total (ft/s)	1.09	Avg. Vel. (ft/s)	0.37	1.10	0.19
Max Chl Dpth (ft)	2.29	Hydr. Depth (ft)	0.43	1.59	0.10
Conv. Total (cfs)	23591.7	Conv. (cfs)	93.1	23477.7	21.0
Length Wtd. (ft)	300.00	Wetted Per. (ft)	25.76	580.84	47.98
Min Ch El (ft)	189.51	Shear (lb/sq ft)	0.05	0.19	0.01
Alpha	1.02	Stream Power (lb/ft s)	0.02	0.21	0.00
Frctn Loss (ft)	1.77	Cum Volume (acre-ft)	0.04	3.91	0.02
C & E Loss (ft)	0.04	Cum SA (acres)	0.09	3.02	0.17

Plan: Prop Mill Creek Trib 2 RS: 300 Profile: Q100

E.G. Elev (ft)	192.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	192.05	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)		Flow Area (sq ft)	18.17	1069.88	26.81
E.G. Slope (ft/ft)	0.001959	Area (sq ft)	18.17	1069.88	26.81
Q Total (cfs)	1337.00	Flow (cfs)	8.19	1321.79	7.02
Top Width (ft)	725.82	Top Width (ft)	32.01	580.72	113.09
Vel Total (ft/s)	1.20	Avg. Vel. (ft/s)	0.45	1.24	0.26
Max Chl Dpth (ft)	2.54	Hydr. Depth (ft)	0.57	1.84	0.24
Conv. Total (cfs)	30204.1	Conv. (cfs)	185.1	29860.4	158.6
Length Wtd. (ft)	300.00	Wetted Per. (ft)	32.03	580.84	113.14
Min Ch El (ft)	189.51	Shear (lb/sq ft)	0.07	0.23	0.03
Alpha	1.05	Stream Power (lb/ft s)	0.03	0.28	0.01
Frctn Loss (ft)	1.83	Cum Volume (acre-ft)	0.06	4.59	0.09
C & E Loss (ft)	0.04	Cum SA (acres)	0.11	3.20	0.39

Plan: Prop Mill Creek Trib 2 RS: 0 Profile: Q10

E.G. Elev (ft)	189.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.		0.080	
W.S. Elev (ft)	189.14	Reach Len. (ft)			
Crit W.S. (ft)	189.14	Flow Area (sq ft)		107.13	
E.G. Slope (ft/ft)	0.103663	Area (sq ft)		107.13	
Q Total (cfs)	521.00	Flow (cfs)		521.00	
Top Width (ft)	145.92	Top Width (ft)		145.92	
Vel Total (ft/s)	4.86	Avg. Vel. (ft/s)		4.86	
Max Chl Dpth (ft)	1.65	Hydr. Depth (ft)		0.73	
Conv. Total (cfs)	1618.2	Conv. (cfs)		1618.2	
Length Wtd. (ft)		Wetted Per. (ft)		146.08	
Min Ch El (ft)	187.49	Shear (lb/sq ft)		4.75	
Alpha	1.00	Stream Power (lb/ft s)		23.08	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Prop Mill Creek Trib 2 RS: 0 Profile: Q25

E.G. Elev (ft)	189.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.		0.080	
W.S. Elev (ft)	189.43	Reach Len. (ft)			
Crit W.S. (ft)	189.43	Flow Area (sq ft)		155.53	
E.G. Slope (ft/ft)	0.105570	Area (sq ft)		155.53	
Q Total (cfs)	771.00	Flow (cfs)		771.00	
Top Width (ft)	208.73	Top Width (ft)		208.73	
Vel Total (ft/s)	4.96	Avg. Vel. (ft/s)		4.96	
Max Chl Dpth (ft)	1.94	Hydr. Depth (ft)		0.75	
Conv. Total (cfs)	2372.9	Conv. (cfs)		2372.9	
Length Wtd. (ft)		Wetted Per. (ft)		208.91	
Min Ch El (ft)	187.49	Shear (lb/sq ft)		4.91	
Alpha	1.00	Stream Power (lb/ft s)		24.32	
Frcn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Prop Mill Creek Trib 2 RS: 0 Profile: Q50

E.G. Elev (ft)	190.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.		0.080	
W.S. Elev (ft)	189.65	Reach Len. (ft)			
Crit W.S. (ft)	189.65	Flow Area (sq ft)		209.87	
E.G. Slope (ft/ft)	0.109160	Area (sq ft)		209.87	
Q Total (cfs)	1025.00	Flow (cfs)		1025.00	
Top Width (ft)	295.41	Top Width (ft)		295.41	
Vel Total (ft/s)	4.88	Avg. Vel. (ft/s)		4.88	
Max Chl Dpth (ft)	2.16	Hydr. Depth (ft)		0.71	
Conv. Total (cfs)	3102.4	Conv. (cfs)		3102.4	
Length Wtd. (ft)		Wetted Per. (ft)		295.61	
Min Ch El (ft)	187.49	Shear (lb/sq ft)		4.84	
Alpha	1.00	Stream Power (lb/ft s)		23.63	
Frcn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Prop Mill Creek Trib 2 RS: 0 Profile: Q100

E.G. Elev (ft)	190.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.		0.080	
W.S. Elev (ft)	189.82	Reach Len. (ft)			
Crit W.S. (ft)	189.82	Flow Area (sq ft)		264.21	
E.G. Slope (ft/ft)	0.107689	Area (sq ft)		264.21	
Q Total (cfs)	1337.00	Flow (cfs)		1337.00	
Top Width (ft)	349.06	Top Width (ft)		349.06	
Vel Total (ft/s)	5.06	Avg. Vel. (ft/s)		5.06	
Max Chl Dpth (ft)	2.33	Hydr. Depth (ft)		0.76	
Conv. Total (cfs)	4074.2	Conv. (cfs)		4074.2	
Length Wtd. (ft)		Wetted Per. (ft)		349.27	
Min Ch El (ft)	187.49	Shear (lb/sq ft)		5.09	
Alpha	1.00	Stream Power (lb/ft s)		25.74	
Frcn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

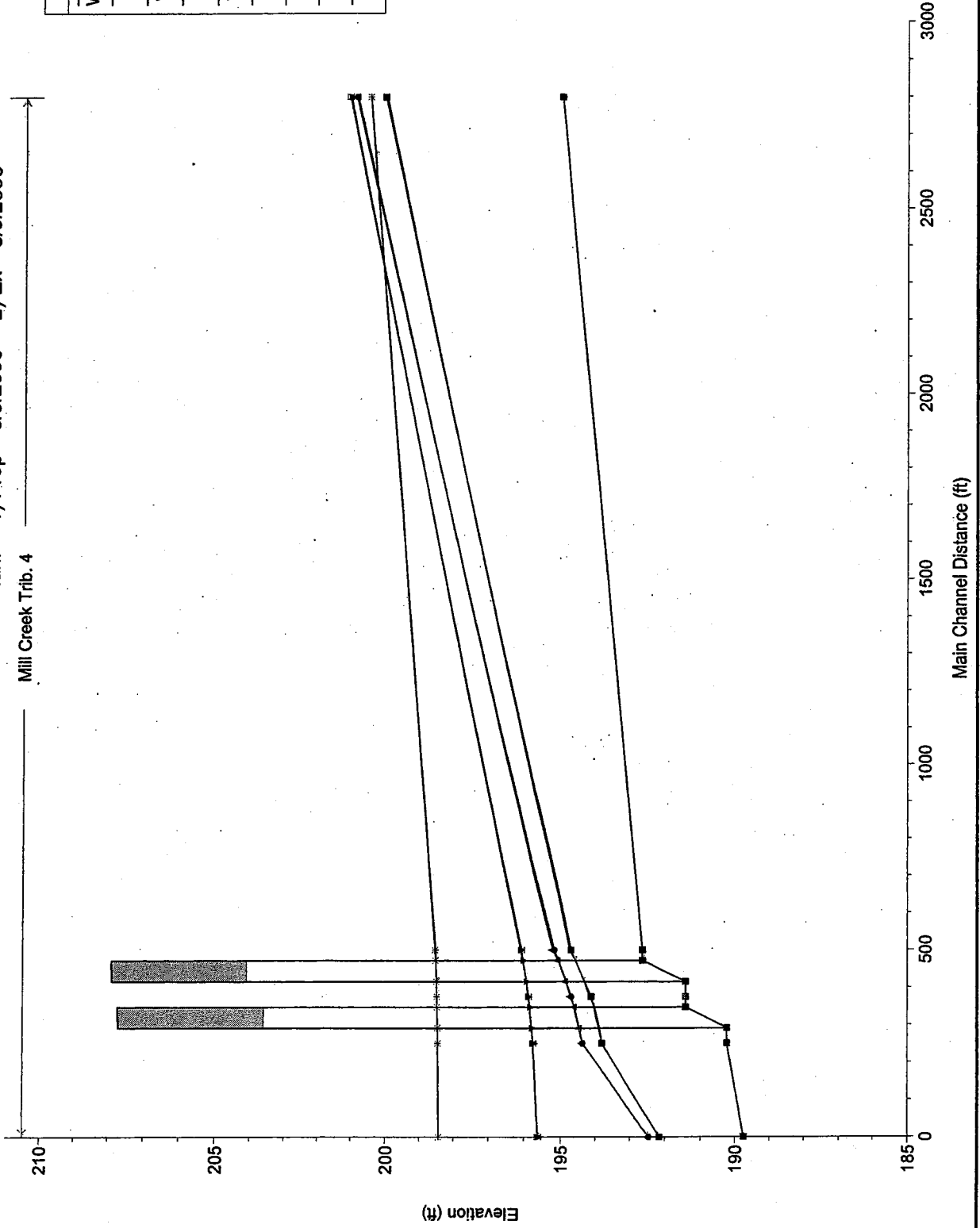
TRIBUTARY NO. 4 TO MILL CREEK

(DA 14)

SH249-Trib. No. 4 to Mill Creek Plan: 1) Prop 8/9/2006 2) Ex 8/9/2006

Mill Creek Trib. 4

Legend
WS Q100 - Prop
WS Q100 - Ex
WS Q50 - Prop
WS Q50 - Ex
WS Q25 - Prop
WS Q25 - Ex
WS Q10 - Prop
WS Q10 - Ex
Ground



HEC-RAS River Mill Creek Trib. Reach: 4

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Chl El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
4	2700	Q10	Prop	728.00	195.00	200.05		200.09	0.001406	1.64	444.28	139.25	0.16
4	2700	Q10	Ex	728.00	195.00	200.09		200.13	0.001354	1.62	449.49	142.43	0.16
4	2700	Q25	Prop	1174.00	195.00	200.90		200.97	0.001659	2.08	594.20	212.55	0.18
4	2700	Q25	Ex	1174.00	195.00	200.93		201.00	0.001613	2.06	601.12	215.33	0.18
4	2700	Q50	Prop	1571.00	195.00	201.11		201.21	0.002497	2.63	639.46	230.13	0.22
4	2700	Q50	Ex	1571.00	195.00	201.13		201.23	0.002451	2.61	644.52	232.02	0.22
4	2700	Q100	Prop	2061.00	195.00	200.52		200.77	0.001719	4.05	519.15	179.64	0.37
4	2700	Q100	Ex	2061.00	195.00	200.52		200.77	0.001768	4.05	519.46	179.78	0.37
4	500	Q10	Prop	728.00	192.64	194.74	193.86	194.77	0.004481	1.55	468.45	369.06	0.24
4	500	Q10	Ex	728.00	192.64	194.89		194.73	0.005001	1.61	452.77	368.07	0.26
4	500	Q25	Prop	1174.00	192.64	195.23	194.08	195.28	0.004069	1.80	653.23	384.89	0.24
4	500	Q25	Ex	1174.00	192.64	195.19		195.24	0.004390	1.84	637.43	383.29	0.25
4	500	Q50	Prop	1571.00	192.64	196.10	194.24	196.14	0.001952	1.56	1003.87	419.57	0.18
4	500	Q50	Ex	1571.00	192.64	196.07		196.11	0.002019	1.58	992.33	418.11	0.18
4	500	Q100	Prop	2061.00	192.64	198.54	194.42	198.56	0.000347	0.98	2106.36	487.45	0.08
4	500	Q100	Ex	2061.00	192.64	198.53		198.55	0.000349	0.98	2102.28	487.27	0.08
4	425		Bridge										
4	375*	Q10	Prop	728.00	191.43	194.16	193.11	194.20	0.003834	1.55	468.97	329.32	0.23
4	375*	Q10	Ex	728.00	191.43	194.12		194.16	0.004270	1.61	453.32	327.96	0.24
4	375*	Q25	Prop	1174.00	191.43	194.71	193.41	194.76	0.003492	1.80	654.04	344.35	0.23
4	375*	Q25	Ex	1174.00	191.43	194.68		194.73	0.003693	1.83	642.54	343.53	0.24
4	375*	Q50	Prop	1571.00	191.43	195.88	193.58	195.92	0.001355	1.46	1075.10	378.89	0.15
4	375*	Q50	Ex	1571.00	191.43	195.87		195.90	0.001373	1.47	1070.37	378.37	0.15
4	375*	Q100	Prop	2061.00	191.43	198.50	193.79	198.51	0.000301	0.94	2189.98	483.01	0.08
4	375*	Q100	Ex	2061.00	191.43	198.49		198.51	0.000302	0.94	2188.27	482.88	0.08
4	325		Bridge										
4	250	Q10	Prop	728.00	190.23	193.81		193.84	0.001670	1.26	578.87	298.77	0.16
4	250	Q10	Ex	728.00	190.23	193.81		193.84	0.001670	1.26	578.87	298.77	0.16
4	250	Q25	Prop	1174.00	190.23	194.36		194.40	0.001990	1.57	746.15	313.87	0.18
4	250	Q25	Ex	1174.00	190.23	194.36		194.40	0.001985	1.57	746.77	313.92	0.18
4	250	Q50	Prop	1571.00	190.23	195.74		195.77	0.000827	1.31	1203.50	346.61	0.12
4	250	Q50	Ex	1571.00	190.23	195.74		195.77	0.000827	1.31	1203.50	346.61	0.12
4	250	Q100	Prop	2061.00	190.23	198.46		198.47	0.000227	0.86	2401.96	491.92	0.07
4	250	Q100	Ex	2061.00	190.23	198.46		198.47	0.000227	0.86	2401.96	491.92	0.07
4	0	Q10	Prop	728.00	189.75	192.15	192.15	192.50	0.096132	4.73	153.94	227.63	1.01
4	0	Q10	Ex	728.00	189.75	192.15		192.50	0.096132	4.73	153.94	227.63	1.01

HEC-RAS River: Mill Creek Trib. Reach: 4 (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Chl El (ft)	W.S. Elev (ft)	Grit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Ch
4	0	Q25	Prop	1174.00	189.75	192.47	192.47	192.84	0.096598	4.88	240.45	340.26	1.02
4	0	Q25	Ex	1174.00	189.75	192.46	192.46	192.84	0.096633	4.92	238.44	338.43	1.03
4	0	Q50	Prop	1571.00	189.75	195.61	192.62	195.62	0.000426	0.89	1772.11	554.88	0.09
4	0	Q50	Ex	1571.00	189.75	195.61	192.64	195.62	0.000426	0.89	1772.11	554.88	0.09
4	0	Q100	Prop	2061.00	189.75	198.43	192.81	198.44	0.000099	0.58	3532.39	690.97	0.05
4	0	Q100	Ex	2061.00	189.75	198.43	192.83	198.44	0.000099	0.58	3532.39	690.97	0.05

Plan: Prop Mill Creek Trib. 4 RS: 2700 Profile: Q10

E.G. Elev (ft)	200.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val	0.095	0.075	0.095
W.S. Elev (ft)	200.05	Reach Len. (ft)	2300.00	2300.00	2300.00
Crit W.S. (ft)		Flow Area (sq ft)	0.10	444.18	0.01
E.G. Slope (ft/ft)	0.001406	Area (sq ft)	0.10	444.18	0.01
Q Total (cfs)	728.00	Flow (cfs)	0.00	727.99	0.00
Top Width (ft)	139.25	Top Width (ft)	3.93	135.00	0.33
Vel Total (ft/s)	1.64	Avg. Vel. (ft/s)	0.05	1.64	0.05
Max Chl Dpth (ft)	5.05	Hydr. Depth (ft)	0.02	3.29	0.02
Conv. Total (cfs)	19416.4	Conv. (cfs)	0.1	19416.2	0.0
Length Wtd. (ft)	2300.00	Wetted Per. (ft)	3.93	135.53	0.33
Min Ch El (ft)	195.00	Shear (lb/sq ft)	0.00	0.29	0.00
Alpha	1.00	Stream Power (lb/ft s)	0.00	0.47	0.00
Frctn Loss (ft)	5.31	Cum Volume (acre-ft)	0.00	28.97	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.10	16.67	0.01

Plan: Prop Mill Creek Trib. 4 RS: 2700 Profile: Q25

E.G. Elev (ft)	200.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val	0.095	0.075	0.095
W.S. Elev (ft)	200.90	Reach Len. (ft)	2300.00	2300.00	2300.00
Crit W.S. (ft)		Flow Area (sq ft)	32.28	559.24	2.68
E.G. Slope (ft/ft)	0.001659	Area (sq ft)	32.28	559.24	2.68
Q Total (cfs)	1174.00	Flow (cfs)	12.09	1160.91	1.00
Top Width (ft)	212.55	Top Width (ft)	71.60	135.00	5.95
Vel Total (ft/s)	1.98	Avg. Vel. (ft/s)	0.37	2.08	0.37
Max Chl Dpth (ft)	5.90	Hydr. Depth (ft)	0.45	4.14	0.45
Conv. Total (cfs)	28825.1	Conv. (cfs)	296.9	28503.7	24.5
Length Wtd. (ft)	2300.00	Wetted Per. (ft)	71.61	135.53	6.02
Min Ch El (ft)	195.00	Shear (lb/sq ft)	0.05	0.43	0.05
Alpha	1.09	Stream Power (lb/ft s)	0.02	0.89	0.02
Frctn Loss (ft)	5.68	Cum Volume (acre-ft)	0.85	38.65	0.07
C & E Loss (ft)	0.00	Cum SA (acres)	1.89	17.54	0.16

Plan: Prop Mill Creek Trib. 4 RS: 2700 Profile: Q50

E.G. Elev (ft)	201.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val	0.095	0.075	0.095
W.S. Elev (ft)	201.11	Reach Len. (ft)	2300.00	2300.00	2300.00
Crit W.S. (ft)		Flow Area (sq ft)	48.58	586.84	4.04
E.G. Slope (ft/ft)	0.002497	Area (sq ft)	48.58	586.84	4.04
Q Total (cfs)	1571.00	Flow (cfs)	25.58	1543.31	2.11
Top Width (ft)	230.13	Top Width (ft)	87.83	135.00	7.30
Vel Total (ft/s)	2.46	Avg. Vel. (ft/s)	0.53	2.63	0.52
Max Chl Dpth (ft)	6.11	Hydr. Depth (ft)	0.55	4.35	0.55
Conv. Total (cfs)	31440.7	Conv. (cfs)	512.0	30886.5	42.2
Length Wtd. (ft)	2300.00	Wetted Per. (ft)	87.84	135.53	7.38
Min Ch El (ft)	195.00	Shear (lb/sq ft)	0.09	0.67	0.09
Alpha	1.13	Stream Power (lb/ft s)	0.05	1.77	0.04
Frctn Loss (ft)	5.06	Cum Volume (acre-ft)	1.28	56.68	0.11
C & E Loss (ft)	0.02	Cum SA (acres)	2.32	19.35	0.19

Plan: Prop Mill Creek Trib. 4 RS: 2700 Profile: Q100

E.G. Elev (ft)	200.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.	0.095	0.075	0.095
W.S. Elev (ft)	200.52	Reach Len. (ft)	2300.00	2300.00	2300.00
Crit W.S. (ft)		Flow Area (sq ft)	10.69	507.57	0.89
E.G. Slope (ft/ft)	0.007179	Area (sq ft)	10.69	507.57	0.89
Q Total (cfs)	2061.00	Flow (cfs)	5.77	2054.76	0.48
Top Width (ft)	179.64	Top Width (ft)	41.21	135.00	3.43
Vel Total (ft/s)	3.97	Avg. Vel. (ft/s)	0.54	4.05	0.54
Max Chl Dpth (ft)	5.52	Hydr. Depth (ft)	0.26	3.76	0.26
Conv. Total (cfs)	24324.6	Conv. (cfs)	68.0	24250.9	5.6
Length Wtd. (ft)	2300.00	Wetted Per. (ft)	41.21	135.53	3.46
Min Ch El (ft)	195.00	Shear (lb/sq ft)	0.12	1.68	0.11
Alpha	1.04	Stream Power (lb/ft s)	0.06	6.79	0.06
Frcn Loss (ft)	2.15	Cum Volume (acre-ft)	0.28	98.53	0.02
C & E Loss (ft)	0.07	Cum SA (acres)	1.09	22.53	0.09

Plan: Prop Mill Creek Trib. 4 RS: 500 Profile: Q10

E.G. Elev (ft)	194.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.075	
W.S. Elev (ft)	194.74	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	193.86	Flow Area (sq ft)		468.45	
E.G. Slope (ft/ft)	0.004481	Area (sq ft)		468.45	
Q Total (cfs)	728.00	Flow (cfs)		728.00	
Top Width (ft)	369.06	Top Width (ft)		369.06	
Vel Total (ft/s)	1.55	Avg. Vel. (ft/s)		1.55	
Max Chl Dpth (ft)	2.10	Hydr. Depth (ft)		1.27	
Conv. Total (cfs)	10875.3	Conv. (cfs)		10875.3	
Length Wtd. (ft)	28.00	Wetted Per. (ft)		369.31	
Min Ch El (ft)	192.64	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)		0.55	
Frcn Loss (ft)	0.16	Cum Volume (acre-ft)		4.88	
C & E Loss (ft)	0.00	Cum SA (acres)		3.36	

Plan: Prop Mill Creek Trib. 4 RS: 500 Profile: Q25

E.G. Elev (ft)	195.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.075	
W.S. Elev (ft)	195.23	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	194.08	Flow Area (sq ft)		653.23	
E.G. Slope (ft/ft)	0.004069	Area (sq ft)		653.23	
Q Total (cfs)	1174.00	Flow (cfs)		1174.00	
Top Width (ft)	384.89	Top Width (ft)		384.89	
Vel Total (ft/s)	1.80	Avg. Vel. (ft/s)		1.80	
Max Chl Dpth (ft)	2.59	Hydr. Depth (ft)		1.70	
Conv. Total (cfs)	18405.3	Conv. (cfs)		18405.3	
Length Wtd. (ft)	28.00	Wetted Per. (ft)		385.18	
Min Ch El (ft)	192.64	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)		0.77	
Frcn Loss (ft)	0.14	Cum Volume (acre-ft)		6.64	
C & E Loss (ft)	0.00	Cum SA (acres)		3.81	

Plan: Prop Mill Creek Trib. 4 RS: 500 Profile: Q50

E.G. Elev (ft)	196.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.075	
W.S. Elev (ft)	196.10	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	194.24	Flow Area (sq ft)		1003.87	
E.G. Slope (ft/ft)	0.001952	Area (sq ft)		1003.87	
Q Total (cfs)	1571.00	Flow (cfs)		1571.00	
Top Width (ft)	419.57	Top Width (ft)		419.57	
Vel Total (ft/s)	1.56	Avg. Vel. (ft/s)		1.56	
Max Chl Dpth (ft)	3.46	Hydr. Depth (ft)		2.39	
Conv. Total (cfs)	35560.2	Conv. (cfs)		35560.2	
Length Wtd. (ft)	28.00	Wetted Per. (ft)		419.90	
Min Ch El (ft)	192.64	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)		0.46	
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)		14.69	
C & E Loss (ft)	0.00	Cum SA (acres)		4.71	

Plan: Prop Mill Creek Trib. 4 RS: 500 Profile: Q100

E.G. Elev (ft)	198.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.075	
W.S. Elev (ft)	198.54	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	194.42	Flow Area (sq ft)		2106.36	
E.G. Slope (ft/ft)	0.000347	Area (sq ft)		2106.36	
Q Total (cfs)	2061.00	Flow (cfs)		2061.00	
Top Width (ft)	487.45	Top Width (ft)		487.45	
Vel Total (ft/s)	0.98	Avg. Vel. (ft/s)		0.98	
Max Chl Dpth (ft)	5.90	Hydr. Depth (ft)		4.32	
Conv. Total (cfs)	110625.1	Conv. (cfs)		110625.1	
Length Wtd. (ft)	28.00	Wetted Per. (ft)		488.04	
Min Ch El (ft)	192.64	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)		0.09	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		29.53	
C & E Loss (ft)	0.00	Cum SA (acres)		6.10	

Plan: Prop Mill Creek Trib. 4 RS: 425 BRU Profile: Q10

E.G. Elev (ft)	194.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.075	
W.S. Elev (ft)	194.56	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	193.87	Flow Area (sq ft)		393.06	
E.G. Slope (ft/ft)	0.007668	Area (sq ft)		393.06	
Q Total (cfs)	728.00	Flow (cfs)		728.00	
Top Width (ft)	350.45	Top Width (ft)		350.45	
Vel Total (ft/s)	1.85	Avg. Vel. (ft/s)		1.85	
Max Chl Dpth (ft)	1.92	Hydr. Depth (ft)		1.12	
Conv. Total (cfs)	8313.5	Conv. (cfs)		8313.5	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		356.36	
Min Ch El (ft)	192.64	Shear (lb/sq ft)		0.53	
Alpha	1.00	Stream Power (lb/ft s)		0.98	
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)		4.60	
C & E Loss (ft)	0.01	Cum SA (acres)		3.13	

Plan: Prop Mill Creek Trib. 4 RS: 425 BR U Profile: Q25

E.G. Elev (ft)	195.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.075	
W.S. Elev (ft)	195.08	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	194.10	Flow Area (sq ft)		579.96	
E.G. Slope (ft/ft)	0.005890	Area (sq ft)		579.96	
Q Total (cfs)	1174.00	Flow (cfs)		1174.00	
Top Width (ft)	368.48	Top Width (ft)		368.48	
Vel Total (ft/s)	2.02	Avg. Vel. (ft/s)		2.02	
Max Chl Dpth (ft)	2.44	Hydr. Depth (ft)		1.57	
Conv. Total (cfs)	15297.4	Conv. (cfs)		15297.4	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		377.55	
Min Ch El (ft)	192.64	Shear (lb/sq ft)		0.56	
Alpha	1.00	Stream Power (lb/ft s)		1.14	
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)		6.24	
C & E Loss (ft)	0.01	Cum SA (acres)		3.57	

Plan: Prop Mill Creek Trib. 4 RS: 425 BR U Profile: Q50

E.G. Elev (ft)	196.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.075	
W.S. Elev (ft)	196.04	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	194.26	Flow Area (sq ft)		948.56	
E.G. Slope (ft/ft)	0.002343	Area (sq ft)		948.56	
Q Total (cfs)	1571.00	Flow (cfs)		1571.00	
Top Width (ft)	401.53	Top Width (ft)		401.53	
Vel Total (ft/s)	1.66	Avg. Vel. (ft/s)		1.66	
Max Chl Dpth (ft)	3.40	Hydr. Depth (ft)		2.36	
Conv. Total (cfs)	32456.8	Conv. (cfs)		32456.8	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		417.93	
Min Ch El (ft)	192.64	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)		0.55	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)		14.06	
C & E Loss (ft)	0.00	Cum SA (acres)		4.45	

Plan: Prop Mill Creek Trib. 4 RS: 425 BR U Profile: Q100

E.G. Elev (ft)	198.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.075	
W.S. Elev (ft)	198.53	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	194.45	Flow Area (sq ft)		2037.54	
E.G. Slope (ft/ft)	0.000411	Area (sq ft)		2037.54	
Q Total (cfs)	2061.00	Flow (cfs)		2061.00	
Top Width (ft)	473.19	Top Width (ft)		473.19	
Vel Total (ft/s)	1.01	Avg. Vel. (ft/s)		1.01	
Max Chl Dpth (ft)	5.89	Hydr. Depth (ft)		4.31	
Conv. Total (cfs)	101668.4	Conv. (cfs)		101668.4	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		509.78	
Min Ch El (ft)	192.64	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)		0.10	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)		28.19	
C & E Loss (ft)	0.00	Cum SA (acres)		5.79	

Plan: Prop Mill Creek Trib. 4 RS: 425 BR D Profile: Q10

E.G. Elev (ft)	194.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.075	
W.S. Elev (ft)	194.31	Reach Len. (ft)	41.00	41.00	41.00
Crit W.S. (ft)	193.14	Flow Area (sq ft)		501.22	
E.G. Slope (ft/ft)	0.003108	Area (sq ft)		501.22	
Q Total (cfs)	728.00	Flow (cfs)		728.00	
Top Width (ft)	322.98	Top Width (ft)		322.98	
Vel Total (ft/s)	1.45	Avg. Vel. (ft/s)		1.45	
Max Chl Dpth (ft)	2.88	Hydr. Depth (ft)		1.55	
Conv. Total (cfs)	13058.1	Conv. (cfs)		13058.1	
Length Wtd. (ft)	41.00	Wetted Per. (ft)		332.39	
Min Ch El (ft)	191.43	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)		0.42	
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)		4.03	
C & E Loss (ft)	0.00	Cum SA (acres)		2.69	

Plan: Prop Mill Creek Trib. 4 RS: 425 BR D Profile: Q25

E.G. Elev (ft)	194.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.075	
W.S. Elev (ft)	194.85	Reach Len. (ft)	41.00	41.00	41.00
Crit W.S. (ft)	193.43	Flow Area (sq ft)		680.26	
E.G. Slope (ft/ft)	0.003127	Area (sq ft)		680.26	
Q Total (cfs)	1174.00	Flow (cfs)		1174.00	
Top Width (ft)	337.20	Top Width (ft)		337.20	
Vel Total (ft/s)	1.73	Avg. Vel. (ft/s)		1.73	
Max Chl Dpth (ft)	3.42	Hydr. Depth (ft)		2.02	
Conv. Total (cfs)	20994.0	Conv. (cfs)		20994.0	
Length Wtd. (ft)	41.00	Wetted Per. (ft)		349.90	
Min Ch El (ft)	191.43	Shear (lb/sq ft)		0.38	
Alpha	1.00	Stream Power (lb/ft s)		0.66	
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)		5.43	
C & E Loss (ft)	0.00	Cum SA (acres)		3.12	

Plan: Prop Mill Creek Trib. 4 RS: 425 BR D Profile: Q50

E.G. Elev (ft)	195.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.075	
W.S. Elev (ft)	195.94	Reach Len. (ft)	41.00	41.00	41.00
Crit W.S. (ft)	193.62	Flow Area (sq ft)		1063.46	
E.G. Slope (ft/ft)	0.001459	Area (sq ft)		1063.46	
Q Total (cfs)	1571.00	Flow (cfs)		1571.00	
Top Width (ft)	370.57	Top Width (ft)		370.57	
Vel Total (ft/s)	1.48	Avg. Vel. (ft/s)		1.48	
Max Chl Dpth (ft)	4.51	Hydr. Depth (ft)		2.87	
Conv. Total (cfs)	41133.0	Conv. (cfs)		41133.0	
Length Wtd. (ft)	41.00	Wetted Per. (ft)		389.87	
Min Ch El (ft)	191.43	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)		0.37	
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)		12.77	
C & E Loss (ft)	0.00	Cum SA (acres)		3.95	

Plan: Prop Mill Creek Trib. 4 RS: 425 BR D Profile: Q100

E.G. Elev (ft)	198.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.075	
W.S. Elev (ft)	198.51	Reach Len. (ft)	41.00	41.00	41.00
Crit W.S. (ft)	193.82	Flow Area (sq ft)		2134.36	
E.G. Slope (ft/ft)	0.000348	Area (sq ft)		2134.36	
Q Total (cfs)	2061.00	Flow (cfs)		2061.00	
Top Width (ft)	469.49	Top Width (ft)		469.49	
Vel Total (ft/s)	0.97	Avg. Vel. (ft/s)		0.97	
Max Chl Dpth (ft)	7.08	Hydr. Depth (ft)		4.55	
Conv. Total (cfs)	110511.6	Conv. (cfs)		110511.6	
Length Wtd. (ft)	41.00	Wetted Per. (ft)		505.19	
Min Ch El (ft)	191.43	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)		0.09	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		25.51	
C & E Loss (ft)	0.00	Cum SA (acres)		5.18	

Plan: Prop Mill Creek Trib. 4 RS: 375.* Profile: Q10

E.G. Elev (ft)	194.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.075	
W.S. Elev (ft)	194.16	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	193.11	Flow Area (sq ft)		468.97	
E.G. Slope (ft/ft)	0.003834	Area (sq ft)		468.97	
Q Total (cfs)	728.00	Flow (cfs)		728.00	
Top Width (ft)	329.32	Top Width (ft)		329.32	
Vel Total (ft/s)	1.55	Avg. Vel. (ft/s)		1.55	
Max Chl Dpth (ft)	2.73	Hydr. Depth (ft)		1.42	
Conv. Total (cfs)	11757.6	Conv. (cfs)		11757.6	
Length Wtd. (ft)	28.00	Wetted Per. (ft)		329.45	
Min Ch El (ft)	191.43	Shear (lb/sq ft)		0.34	
Alpha	1.00	Stream Power (lb/ft s)		0.53	
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)		3.57	
C & E Loss (ft)	0.00	Cum SA (acres)		2.39	

Plan: Prop Mill Creek Trib. 4 RS: 375.* Profile: Q25

E.G. Elev (ft)	194.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.075	
W.S. Elev (ft)	194.71	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	193.41	Flow Area (sq ft)		654.04	
E.G. Slope (ft/ft)	0.003492	Area (sq ft)		654.04	
Q Total (cfs)	1174.00	Flow (cfs)		1174.00	
Top Width (ft)	344.35	Top Width (ft)		344.35	
Vel Total (ft/s)	1.80	Avg. Vel. (ft/s)		1.80	
Max Chl Dpth (ft)	3.28	Hydr. Depth (ft)		1.90	
Conv. Total (cfs)	19866.8	Conv. (cfs)		19866.8	
Length Wtd. (ft)	28.00	Wetted Per. (ft)		344.52	
Min Ch El (ft)	191.43	Shear (lb/sq ft)		0.41	
Alpha	1.00	Stream Power (lb/ft s)		0.74	
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)		4.80	
C & E Loss (ft)	0.00	Cum SA (acres)		2.80	

Plan: Prop Mill Creek Trib. 4 RS: 375.* Profile: Q50

E.G. Elev (ft)	195.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.075	
W.S. Elev (ft)	195.88	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	193.58	Flow Area (sq ft)		1075.10	
E.G. Slope (ft/ft)	0.001355	Area (sq ft)		1075.10	
Q Total (cfs)	1571.00	Flow (cfs)		1571.00	
Top Width (ft)	378.89	Top Width (ft)		378.89	
Vel Total (ft/s)	1.46	Avg. Vel. (ft/s)		1.46	
Max Chl Dpth (ft)	4.45	Hydr. Depth (ft)		2.84	
Conv. Total (cfs)	42672.3	Conv. (cfs)		42672.3	
Length Wtd. (ft)	28.00	Wetted Per. (ft)		379.15	
Min Ch El (ft)	191.43	Shear (lb/sq ft)		0.24	
Alpha	1.00	Stream Power (lb/ft s)		0.35	
Frcn Loss (ft)	0.04	Cum Volume (acre-ft)		11.76	
C & E Loss (ft)	0.00	Cum SA (acres)		3.60	

Plan: Prop Mill Creek Trib. 4 RS: 375.* Profile: Q100

E.G. Elev (ft)	198.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.075	
W.S. Elev (ft)	198.50	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	193.79	Flow Area (sq ft)		2189.98	
E.G. Slope (ft/ft)	0.000301	Area (sq ft)		2189.98	
Q Total (cfs)	2061.00	Flow (cfs)		2061.00	
Top Width (ft)	483.01	Top Width (ft)		483.01	
Vel Total (ft/s)	0.94	Avg. Vel. (ft/s)		0.94	
Max Chl Dpth (ft)	7.07	Hydr. Depth (ft)		4.53	
Conv. Total (cfs)	118789.9	Conv. (cfs)		118789.9	
Length Wtd. (ft)	28.00	Wetted Per. (ft)		483.43	
Min Ch El (ft)	191.43	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)		0.08	
Frcn Loss (ft)	0.01	Cum Volume (acre-ft)		23.48	
C & E Loss (ft)	0.00	Cum SA (acres)		4.74	

Plan: Prop Mill Creek Trib. 4 RS: 325 BR U Profile: Q10

E.G. Elev (ft)	194.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.075	
W.S. Elev (ft)	194.02	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	193.14	Flow Area (sq ft)		408.42	
E.G. Slope (ft/ft)	0.005904	Area (sq ft)		408.42	
Q Total (cfs)	728.00	Flow (cfs)		728.00	
Top Width (ft)	314.70	Top Width (ft)		314.70	
Vel Total (ft/s)	1.78	Avg. Vel. (ft/s)		1.78	
Max Chl Dpth (ft)	2.59	Hydr. Depth (ft)		1.30	
Conv. Total (cfs)	9474.9	Conv. (cfs)		9474.9	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		322.34	
Min Ch El (ft)	191.43	Shear (lb/sq ft)		0.47	
Alpha	1.00	Stream Power (lb/ft s)		0.83	
Frcn Loss (ft)	0.16	Cum Volume (acre-ft)		3.29	
C & E Loss (ft)	0.01	Cum SA (acres)		2.18	

Plan: Prop Mill Creek Trib. 4 RS: 325 BR U Profile: Q25

E.G. Elev (ft)	194.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.075	
W.S. Elev (ft)	194.59	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	193.44	Flow Area (sq ft)		591.55	
E.G. Slope (ft/ft)	0.004830	Area (sq ft)		591.55	
Q Total (cfs)	1174.00	Flow (cfs)		1174.00	
Top Width (ft)	330.74	Top Width (ft)		330.74	
Vel Total (ft/s)	1.98	Avg. Vel. (ft/s)		1.98	
Max Chl Dpth (ft)	3.16	Hydr. Depth (ft)		1.79	
Conv. Total (cfs)	16893.4	Conv. (cfs)		16893.4	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		341.83	
Min Ch El (ft)	191.43	Shear (lb/sq ft)		0.52	
Alpha	1.00	Stream Power (lb/ft s)		1.04	
Frcn Loss (ft)	0.16	Cum Volume (acre-ft)		4.40	
C & E Loss (ft)	0.01	Cum SA (acres)		2.58	

Plan: Prop Mill Creek Trib. 4 RS: 325 BR U Profile: Q50

E.G. Elev (ft)	195.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.075	
W.S. Elev (ft)	195.84	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	193.62	Flow Area (sq ft)		1025.84	
E.G. Slope (ft/ft)	0.001618	Area (sq ft)		1025.84	
Q Total (cfs)	1571.00	Flow (cfs)		1571.00	
Top Width (ft)	366.50	Top Width (ft)		366.50	
Vel Total (ft/s)	1.53	Avg. Vel. (ft/s)		1.53	
Max Chl Dpth (ft)	4.41	Hydr. Depth (ft)		2.80	
Conv. Total (cfs)	39050.2	Conv. (cfs)		39050.2	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		385.18	
Min Ch El (ft)	191.43	Shear (lb/sq ft)		0.27	
Alpha	1.00	Stream Power (lb/ft s)		0.41	
Frcn Loss (ft)	0.07	Cum Volume (acre-ft)		11.09	
C & E Loss (ft)	0.00	Cum SA (acres)		3.36	

Plan: Prop Mill Creek Trib. 4 RS: 325 BR U Profile: Q100

E.G. Elev (ft)	198.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.075	
W.S. Elev (ft)	198.49	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	193.81	Flow Area (sq ft)		2123.67	
E.G. Slope (ft/ft)	0.000353	Area (sq ft)		2123.67	
Q Total (cfs)	2061.00	Flow (cfs)		2061.00	
Top Width (ft)	468.64	Top Width (ft)		468.64	
Vel Total (ft/s)	0.97	Avg. Vel. (ft/s)		0.97	
Max Chl Dpth (ft)	7.06	Hydr. Depth (ft)		4.53	
Conv. Total (cfs)	109739.8	Conv. (cfs)		109739.8	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		504.16	
Min Ch El (ft)	191.43	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)		0.09	
Frcn Loss (ft)	0.02	Cum Volume (acre-ft)		22.09	
C & E Loss (ft)	0.00	Cum SA (acres)		4.43	

Plan: Prop Mill Creek Trib. 4 RS: 325 BR D Profile: Q10

E.G. Elev (ft)	193.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.075	
W.S. Elev (ft)	193.88	Reach Len. (ft)	41.00	41.00	41.00
Crit W.S. (ft)	191.89	Flow Area (sq ft)		585.29	
E.G. Slope (ft/ft)	0.001631	Area (sq ft)		585.29	
Q Total (cfs)	728.00	Flow (cfs)		728.00	
Top Width (ft)	293.77	Top Width (ft)		293.77	
Vel Total (ft/s)	1.24	Avg. Vel. (ft/s)		1.24	
Max Chl Dpth (ft)	3.65	Hydr. Depth (ft)		1.99	
Conv. Total (cfs)	18023.6	Conv. (cfs)		18023.6	
Length Wtd. (ft)	41.00	Wetted Per. (ft)		302.04	
Min Ch El (ft)	190.23	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)		0.25	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)		2.65	
C & E Loss (ft)	0.00	Cum SA (acres)		1.79	

Plan: Prop Mill Creek Trib. 4 RS: 325 BR D Profile: Q25

E.G. Elev (ft)	194.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.075	
W.S. Elev (ft)	194.44	Reach Len. (ft)	41.00	41.00	41.00
Crit W.S. (ft)	192.29	Flow Area (sq ft)		754.00	
E.G. Slope (ft/ft)	0.001965	Area (sq ft)		754.00	
Q Total (cfs)	1174.00	Flow (cfs)		1174.00	
Top Width (ft)	308.83	Top Width (ft)		308.83	
Vel Total (ft/s)	1.56	Avg. Vel. (ft/s)		1.56	
Max Chl Dpth (ft)	4.21	Hydr. Depth (ft)		2.44	
Conv. Total (cfs)	26485.6	Conv. (cfs)		26485.6	
Length Wtd. (ft)	41.00	Wetted Per. (ft)		319.38	
Min Ch El (ft)	190.23	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)		0.45	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)		3.54	
C & E Loss (ft)	0.00	Cum SA (acres)		2.17	

Plan: Prop Mill Creek Trib. 4 RS: 325 BR D Profile: Q50

E.G. Elev (ft)	195.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.075	
W.S. Elev (ft)	195.78	Reach Len. (ft)	41.00	41.00	41.00
Crit W.S. (ft)	192.62	Flow Area (sq ft)		1187.13	
E.G. Slope (ft/ft)	0.000888	Area (sq ft)		1187.13	
Q Total (cfs)	1571.00	Flow (cfs)		1571.00	
Top Width (ft)	337.27	Top Width (ft)		337.27	
Vel Total (ft/s)	1.32	Avg. Vel. (ft/s)		1.32	
Max Chl Dpth (ft)	5.55	Hydr. Depth (ft)		3.52	
Conv. Total (cfs)	52704.7	Conv. (cfs)		52704.7	
Length Wtd. (ft)	41.00	Wetted Per. (ft)		353.90	
Min Ch El (ft)	190.23	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)		0.25	
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)		9.66	
C & E Loss (ft)	0.00	Cum SA (acres)		2.91	

Plan: Prop Mill Creek Trib. 4 RS: 325 BR D Profile: Q100

E.G. Elev (ft)	198.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.075	
W.S. Elev (ft)	198.47	Reach Len. (ft)	41.00	41.00	41.00
Crit W.S. (ft)	192.90	Flow Area (sq ft)		2304.35	
E.G. Slope (ft/ft)	0.000256	Area (sq ft)		2304.35	
Q Total (cfs)	2061.00	Flow (cfs)		2061.00	
Top Width (ft)	451.17	Top Width (ft)		451.17	
Vel Total (ft/s)	0.89	Avg. Vel. (ft/s)		0.89	
Max Chl Dpth (ft)	8.24	Hydr. Depth (ft)		5.11	
Conv. Total (cfs)	128696.2	Conv. (cfs)		128696.2	
Length Wtd. (ft)	41.00	Wetted Per. (ft)		486.88	
Min Ch El (ft)	190.23	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)		0.07	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		19.24	
C & E Loss (ft)	0.00	Cum SA (acres)		3.84	

Plan: Prop Mill Creek Trib. 4 RS: 250 Profile: Q10

E.G. Elev (ft)	193.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.075	
W.S. Elev (ft)	193.81	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)		Flow Area (sq ft)		578.87	
E.G. Slope (ft/ft)	0.001670	Area (sq ft)		578.87	
Q Total (cfs)	728.00	Flow (cfs)		728.00	
Top Width (ft)	298.77	Top Width (ft)		298.77	
Vel Total (ft/s)	1.26	Avg. Vel. (ft/s)		1.26	
Max Chl Dpth (ft)	3.58	Hydr. Depth (ft)		1.94	
Conv. Total (cfs)	17814.0	Conv. (cfs)		17814.0	
Length Wtd. (ft)	250.00	Wetted Per. (ft)		299.03	
Min Ch El (ft)	190.23	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)		0.25	
Frctn Loss (ft)	1.30	Cum Volume (acre-ft)		2.10	
C & E Loss (ft)	0.03	Cum SA (acres)		1.51	

Plan: Prop Mill Creek Trib. 4 RS: 250 Profile: Q25

E.G. Elev (ft)	194.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.075	
W.S. Elev (ft)	194.36	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)		Flow Area (sq ft)		746.15	
E.G. Slope (ft/ft)	0.001990	Area (sq ft)		746.15	
Q Total (cfs)	1174.00	Flow (cfs)		1174.00	
Top Width (ft)	313.87	Top Width (ft)		313.87	
Vel Total (ft/s)	1.57	Avg. Vel. (ft/s)		1.57	
Max Chl Dpth (ft)	4.13	Hydr. Depth (ft)		2.38	
Conv. Total (cfs)	26315.1	Conv. (cfs)		26315.1	
Length Wtd. (ft)	250.00	Wetted Per. (ft)		314.16	
Min Ch El (ft)	190.23	Shear (lb/sq ft)		0.30	
Alpha	1.00	Stream Power (lb/ft s)		0.46	
Frctn Loss (ft)	1.52	Cum Volume (acre-ft)		2.83	
C & E Loss (ft)	0.03	Cum SA (acres)		1.88	

Plan: Prop Mill Creek Trib. 4 RS: 250 Profile: Q50

E.G. Elev (ft)	195.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.075	
W.S. Elev (ft)	195.74	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)		Flow Area (sq ft)		1203.50	
E.G. Slope (ft/ft)	0.000827	Area (sq ft)		1203.50	
Q Total (cfs)	1571.00	Flow (cfs)		1571.00	
Top Width (ft)	346.61	Top Width (ft)		346.61	
Vel Total (ft/s)	1.31	Avg. Vel. (ft/s)		1.31	
Max Chl Dpth (ft)	5.51	Hydr. Depth (ft)		3.47	
Conv. Total (cfs)	54630.5	Conv. (cfs)		54630.5	
Length Wtd. (ft)	250.00	Wetted Per. (ft)		347.03	
Min Ch El (ft)	190.23	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)		0.23	
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)		8.54	
C & E Loss (ft)	0.00	Cum SA (acres)		2.59	

Plan: Prop Mill Creek Trib. 4 RS: 250 Profile: Q100

E.G. Elev (ft)	198.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.075	
W.S. Elev (ft)	198.46	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)		Flow Area (sq ft)		2401.96	
E.G. Slope (ft/ft)	0.000227	Area (sq ft)		2401.96	
Q Total (cfs)	2061.00	Flow (cfs)		2061.00	
Top Width (ft)	491.92	Top Width (ft)		491.92	
Vel Total (ft/s)	0.86	Avg. Vel. (ft/s)		0.86	
Max Chl Dpth (ft)	8.23	Hydr. Depth (ft)		4.88	
Conv. Total (cfs)	136856.2	Conv. (cfs)		136856.2	
Length Wtd. (ft)	250.00	Wetted Per. (ft)		492.52	
Min Ch El (ft)	190.23	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)		0.06	
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)		17.03	
C & E Loss (ft)	0.00	Cum SA (acres)		3.39	

Plan: Prop Mill Creek Trib. 4 RS: 0 Profile: Q10

E.G. Elev (ft)	192.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.		0.075	
W.S. Elev (ft)	192.15	Reach Len. (ft)			
Crit W.S. (ft)	192.15	Flow Area (sq ft)		153.94	
E.G. Slope (ft/ft)	0.096132	Area (sq ft)		153.94	
Q Total (cfs)	728.00	Flow (cfs)		728.00	
Top Width (ft)	227.63	Top Width (ft)		227.63	
Vel Total (ft/s)	4.73	Avg. Vel. (ft/s)		4.73	
Max Chl Dpth (ft)	2.40	Hydr. Depth (ft)		0.68	
Conv. Total (cfs)	2348.0	Conv. (cfs)		2348.0	
Length Wtd. (ft)		Wetted Per. (ft)		227.91	
Min Ch El (ft)	189.75	Shear (lb/sq ft)		4.05	
Alpha	1.00	Stream Power (lb/ft s)		19.17	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Prop Mill Creek Trib. 4 RS: 0 Profile: Q25

E.G. Elev (ft)	192.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.		0.075	
W.S. Elev (ft)	192.47	Reach Len. (ft)			
Crit W.S. (ft)	192.47	Flow Area (sq ft)		240.45	
E.G. Slope (ft/ft)	0.096598	Area (sq ft)		240.45	
Q Total (cfs)	1174.00	Flow (cfs)		1174.00	
Top Width (ft)	340.26	Top Width (ft)		340.26	
Vel Total (ft/s)	4.88	Avg. Vel. (ft/s)		4.88	
Max Chl Dpth (ft)	2.72	Hydr. Depth (ft)		0.71	
Conv. Total (cfs)	3777.3	Conv. (cfs)		3777.3	
Length Wtd. (ft)	*	Wetted Per. (ft)		340.57	
Min Ch El (ft)	189.75	Shear (lb/sq ft)		4.26	
Alpha	1.00	Stream Power (lb/ft s)		20.79	
Frcn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Prop Mill Creek Trib. 4 RS: 0 Profile: Q50

E.G. Elev (ft)	195.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.075	
W.S. Elev (ft)	195.61	Reach Len. (ft)			
Crit W.S. (ft)	192.62	Flow Area (sq ft)		1772.11	
E.G. Slope (ft/ft)	0.000426	Area (sq ft)		1772.11	
Q Total (cfs)	1571.00	Flow (cfs)		1571.00	
Top Width (ft)	554.88	Top Width (ft)		554.88	
Vel Total (ft/s)	0.89	Avg. Vel. (ft/s)		0.89	
Max Chl Dpth (ft)	5.86	Hydr. Depth (ft)		3.19	
Conv. Total (cfs)	76091.7	Conv. (cfs)		76091.7	
Length Wtd. (ft)		Wetted Per. (ft)		555.42	
Min Ch El (ft)	189.75	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)		0.08	
Frcn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Prop Mill Creek Trib. 4 RS: 0 Profile: Q100

E.G. Elev (ft)	198.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.075	
W.S. Elev (ft)	198.43	Reach Len. (ft)			
Crit W.S. (ft)	192.81	Flow Area (sq ft)		3532.39	
E.G. Slope (ft/ft)	0.000099	Area (sq ft)		3532.39	
Q Total (cfs)	2061.00	Flow (cfs)		2061.00	
Top Width (ft)	690.97	Top Width (ft)		690.97	
Vel Total (ft/s)	0.58	Avg. Vel. (ft/s)		0.58	
Max Chl Dpth (ft)	8.68	Hydr. Depth (ft)		5.11	
Conv. Total (cfs)	207537.2	Conv. (cfs)		207537.2	
Length Wtd. (ft)		Wetted Per. (ft)		691.72	
Min Ch El (ft)	189.75	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)		0.02	
Frcn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

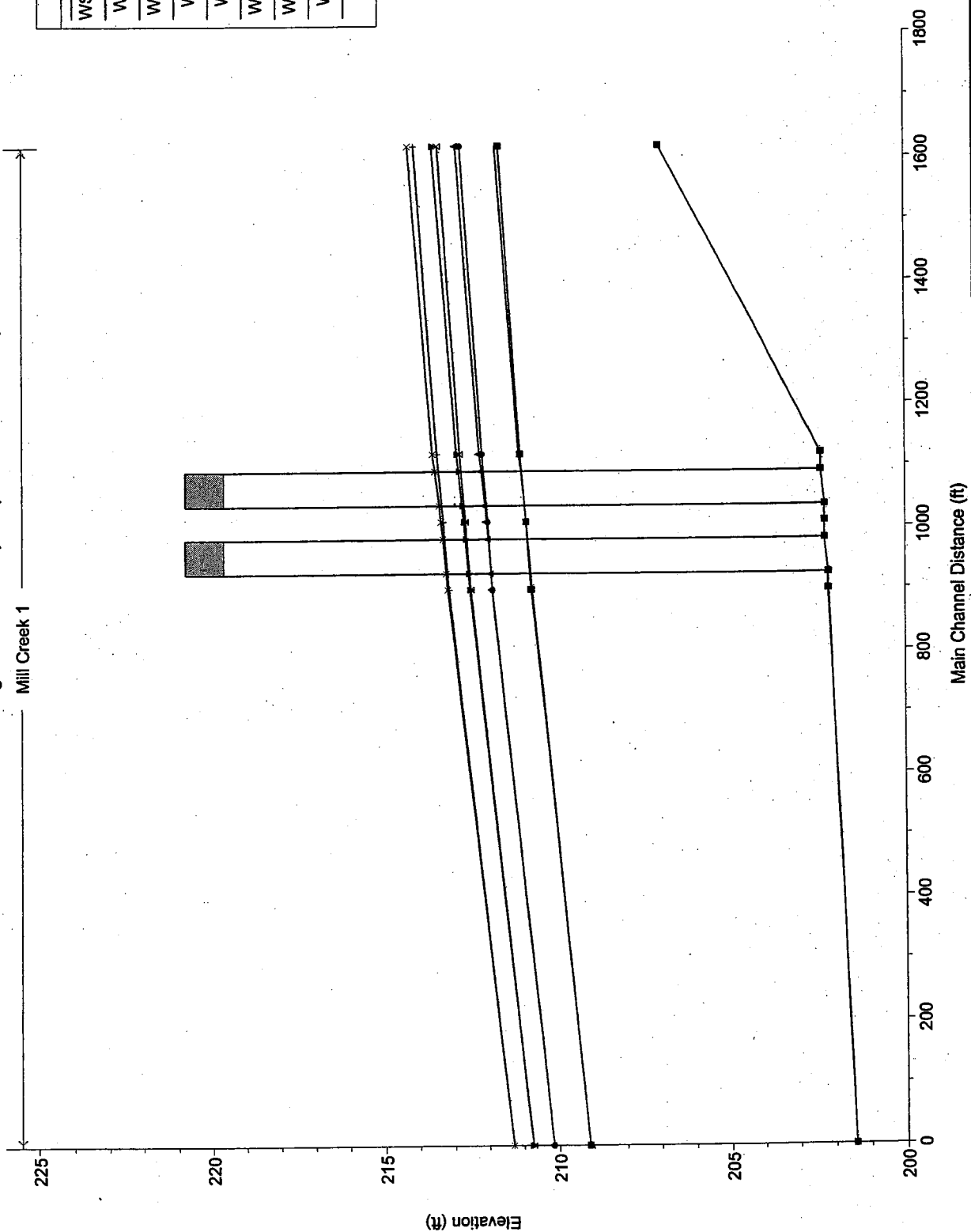
MILL CREEK

(DA 17)

SH249 - Mill Creek Crossing Plan: 1) Prop 6/27/2006 2) Ex 6/27/2006

Mill Creek 1

Legend
WS Q100 - Prop
WS Q100 - Ex
WS Q50 - Prop
WS Q50 - Ex
WS Q25 - Ex
WS Q25 - Prop
WS Q10 - Prop
WS Q10 - Ex
Ground



HEC-RAS River: Mill Creek Reach: 1

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Chl El (ft)	W.S. Elev (ft)	Crtk W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	1600	Q10	Prop	3239.00	207.07	211.78		211.80	0.000882	1.06	3059.45	1150.33	0.11
1	1600	Q10	Ex	3239.00	207.07	211.68		211.70	0.000866	1.10	2852.16	1125.75	0.12
1	1600	Q25	Prop	5632.00	207.07	212.93		212.95	0.000885	1.25	4510.66	1327.69	0.12
1	1600	Q25	Ex	5632.00	207.07	212.80		212.82	0.001002	1.30	4336.71	1322.25	0.13
1	1600	Q50	Prop	7442.00	207.07	213.60		213.63	0.000873	1.37	5415.77	1366.46	0.12
1	1600	Q50	Ex	7442.00	207.07	213.44		213.48	0.000982	1.43	5203.56	1349.80	0.13
1	1600	Q100	Prop	9632.00	207.07	214.30		214.34	0.000866	1.51	6383.56	1391.14	0.12
1	1600	Q100	Ex	9632.00	207.07	214.12		214.16	0.000983	1.57	6134.25	1384.71	0.13
1	1100	Q10	Prop	3239.00	202.41	211.12	208.35	211.16	0.001983	1.60	2023.80	914.35	0.17
1	1100	Q10	Ex	3239.00	202.41	211.08		211.11	0.001483	1.36	2384.98	906.73	0.15
1	1100	Q25	Prop	5632.00	202.41	212.26	209.00	212.32	0.001928	1.93	2922.05	979.40	0.18
1	1100	Q25	Ex	5632.00	202.41	212.18		212.22	0.001465	1.64	3436.08	978.03	0.15
1	1100	Q50	Prop	7442.00	202.41	212.93	209.38	213.00	0.001934	2.15	3459.22	991.03	0.18
1	1100	Q50	Ex	7442.00	202.41	212.83		212.88	0.001476	1.83	4073.63	989.30	0.16
1	1100	Q100	Prop	9632.00	202.41	213.61	209.87	213.70	0.002017	2.40	4009.35	1016.51	0.19
1	1100	Q100	Ex	9632.00	202.41	213.49		213.55	0.001543	2.04	4729.67	1009.09	0.17
1	1040		Bridge										
1	990*	Q10	Prop	3239.00	202.30	210.91	208.10	210.94	0.001577	1.46	2219.65	921.30	0.15
1	990*	Q10	Ex	3239.00	202.30	210.92		210.95	0.001509	1.36	2386.33	921.51	0.15
1	990*	Q25	Prop	5632.00	202.30	212.05	208.88	212.10	0.001553	1.80	3136.99	956.42	0.16
1	990*	Q25	Ex	5632.00	202.30	212.02		212.06	0.001440	1.65	3422.51	955.74	0.15
1	990*	Q50	Prop	7442.00	202.30	212.71	209.24	212.78	0.001623	2.02	3679.74	974.69	0.17
1	990*	Q50	Ex	7442.00	202.30	212.66		212.72	0.001478	1.84	4041.86	972.76	0.16
1	990*	Q100	Prop	9632.00	202.30	213.38	209.58	213.46	0.001748	2.27	4235.52	1001.25	0.18
1	990*	Q100	Ex	9632.00	202.30	213.31		213.38	0.001571	2.06	4681.69	998.61	0.17
1	940		Bridge										
1	880	Q10	Prop	3239.00	202.20	210.75	207.57	210.78	0.001184	1.34	2420.32	882.42	0.14
1	880	Q10	Ex	3239.00	202.20	210.77		210.80	0.001208	1.29	2509.98	884.00	0.13
1	880	Q25	Prop	5632.00	202.20	211.88	208.26	211.93	0.001285	1.68	3345.08	927.53	0.15
1	880	Q25	Ex	5632.00	202.20	211.87		211.91	0.001266	1.60	3515.47	927.40	0.15
1	880	Q50	Prop	7442.00	202.20	212.54	208.66	212.59	0.001383	1.91	3887.12	942.78	0.16
1	880	Q50	Ex	7442.00	202.20	212.51		212.56	0.001342	1.81	4109.09	941.86	0.15
1	880	Q100	Prop	9632.00	202.20	213.18	209.09	213.26	0.001520	2.17	4435.36	992.92	0.17
1	880	Q100	Ex	9632.00	202.20	213.15		213.21	0.001457	2.04	4725.40	991.53	0.16
1	0	Q10	Prop	3239.00	201.44	209.12	206.70	209.17	0.003001	1.94	2033.29	932.82	0.21
1	0	Q10	Ex	3239.00	201.44	209.12	206.70	209.17	0.003001	1.94	2033.29	932.82	0.21

HEC-RAS River Mill Creek Reach: 1 (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Chl El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Ch
1	0	Q25	Prop	5632.00	201.44	210.17	207.66	210.23	0.003005	2.30	3126.22	1184.56	0.22
1	0	Q25	Ex	5632.00	201.44	210.17	207.65	210.23	0.003005	2.30	3126.26	1184.57	0.22
1	0	Q50	Prop	7442.00	201.44	210.75	208.00	210.82	0.003000	2.54	3853.87	1292.78	0.22
1	0	Q50	Ex	7442.00	201.44	210.75	208.01	210.82	0.003000	2.54	3853.87	1292.78	0.22
1	0	Q100	Prop	9632.00	201.44	211.30	208.30	211.39	0.003003	2.76	4572.14	1311.80	0.23
1	0	Q100	Ex	9632.00	201.44	211.30	208.30	211.39	0.003003	2.76	4572.12	1311.80	0.23

Plan: Prop Mill Creek 1 RS: 1600 Profile: Q10

E.G. Elev (ft)	211.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.080	
W.S. Elev (ft)	211.78	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)		Flow Area (sq ft)		3059.45	
E.G. Slope (ft/ft)	0.000882	Area (sq ft)		3059.45	
Q Total (cfs)	3239.00	Flow (cfs)		3239.00	
Top Width (ft)	1150.33	Top Width (ft)		1150.33	
Vel Total (ft/s)	1.06	Avg. Vel. (ft/s)		1.06	
Max Chl Dpth (ft)	4.71	Hydr. Depth (ft)		2.66	
Conv. Total (cfs)	109042.0	Conv. (cfs)		109042.0	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		1151.00	
Min Ch EI (ft)	207.07	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)		0.16	
Frctn Loss (ft)	0.63	Cum Volume (acre-ft)	0.76	80.46	8.20
C & E Loss (ft)	0.00	Cum SA (acres)	0.74	29.52	4.37

Plan: Prop Mill Creek 1 RS: 1600 Profile: Q25

E.G. Elev (ft)	212.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.080	
W.S. Elev (ft)	212.93	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)		Flow Area (sq ft)		4510.66	
E.G. Slope (ft/ft)	0.000885	Area (sq ft)		4510.66	
Q Total (cfs)	5632.00	Flow (cfs)		5632.00	
Top Width (ft)	1327.69	Top Width (ft)		1327.69	
Vel Total (ft/s)	1.25	Avg. Vel. (ft/s)		1.25	
Max Chl Dpth (ft)	5.86	Hydr. Depth (ft)		3.40	
Conv. Total (cfs)	189265.3	Conv. (cfs)		189265.3	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		1328.47	
Min Ch EI (ft)	207.07	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)		0.23	
Frctn Loss (ft)	0.63	Cum Volume (acre-ft)	1.67	115.49	13.57
C & E Loss (ft)	0.00	Cum SA (acres)	0.94	32.01	6.33

Plan: Prop Mill Creek 1 RS: 1600 Profile: Q50

E.G. Elev (ft)	213.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.080	
W.S. Elev (ft)	213.60	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)		Flow Area (sq ft)		5415.77	
E.G. Slope (ft/ft)	0.000873	Area (sq ft)		5415.77	
Q Total (cfs)	7442.00	Flow (cfs)		7442.00	
Top Width (ft)	1366.46	Top Width (ft)		1366.46	
Vel Total (ft/s)	1.37	Avg. Vel. (ft/s)		1.37	
Max Chl Dpth (ft)	6.53	Hydr. Depth (ft)		3.96	
Conv. Total (cfs)	251826.0	Conv. (cfs)		251826.0	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		1367.28	
Min Ch EI (ft)	207.07	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)		0.30	
Frctn Loss (ft)	0.62	Cum Volume (acre-ft)	2.24	136.46	17.64
C & E Loss (ft)	0.00	Cum SA (acres)	1.03	32.57	7.31

Plan: Prop Mill Creek 1 RS: 1600 Profile: Q100

E.G. Elev (ft)	214.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.080	
W.S. Elev (ft)	214.30	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)		Flow Area (sq ft)		6383.56	
E.G. Slope (ft/ft)	0.000866	Area (sq ft)		6383.56	
Q Total (cfs)	9632.00	Flow (cfs)		9632.00	
Top Width (ft)	1391.14	Top Width (ft)		1391.14	
Vel Total (ft/s)	1.51	Avg. Vel. (ft/s)		1.51	
Max Chl Dpth (ft)	7.23	Hydr. Depth (ft)		4.59	
Conv. Total (cfs)	327277.3	Conv. (cfs)		327277.3	
Length Wid. (ft)	500.00	Wetted Per. (ft)		1392.01	
Min Ch EI (ft)	207.07	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)		0.37	
Frctn Loss (ft)	0.63	Cum Volume (acre-ft)	2.83	157.95	21.81
C & E Loss (ft)	0.01	Cum SA (acres)	1.09	33.15	7.76

Plan: Prop Mill Creek 1 RS: 1100 Profile: Q10

E.G. Elev (ft)	211.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.080	
W.S. Elev (ft)	211.12	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	208.35	Flow Area (sq ft)		2023.80	
E.G. Slope (ft/ft)	0.001983	Area (sq ft)		2419.45	
Q Total (cfs)	3239.00	Flow (cfs)		3239.00	
Top Width (ft)	914.35	Top Width (ft)		914.35	
Vel Total (ft/s)	1.60	Avg. Vel. (ft/s)		1.60	
Max Chl Dpth (ft)	8.71	Hydr. Depth (ft)		2.71	
Conv. Total (cfs)	72739.3	Conv. (cfs)		72739.3	
Length Wid. (ft)	28.00	Wetted Per. (ft)		751.84	
Min Ch EI (ft)	202.41	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)		0.53	
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.76	49.02	8.20
C & E Loss (ft)	0.00	Cum SA (acres)	0.74	17.67	4.37

Plan: Prop Mill Creek 1 RS: 1100 Profile: Q25

E.G. Elev (ft)	212.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.080	
W.S. Elev (ft)	212.26	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	209.00	Flow Area (sq ft)		2922.05	
E.G. Slope (ft/ft)	0.001928	Area (sq ft)		3515.23	
Q Total (cfs)	5632.00	Flow (cfs)		5632.00	
Top Width (ft)	979.40	Top Width (ft)		979.40	
Vel Total (ft/s)	1.93	Avg. Vel. (ft/s)		1.93	
Max Chl Dpth (ft)	9.85	Hydr. Depth (ft)		3.65	
Conv. Total (cfs)	128280.5	Conv. (cfs)		128280.5	
Length Wid. (ft)	28.00	Wetted Per. (ft)		804.15	
Min Ch EI (ft)	202.41	Shear (lb/sq ft)		0.44	
Alpha	1.00	Stream Power (lb/ft s)		0.84	
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	1.67	69.43	13.57
C & E Loss (ft)	0.00	Cum SA (acres)	0.94	18.77	6.33

Plan: Prop Mill Creek 1 RS: 1100 Profile: Q50

E.G. Elev (ft)	213.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.080	
W.S. Elev (ft)	212.93	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	209.38	Flow Area (sq ft)		3459.22	
E.G. Slope (ft/ft)	0.001934	Area (sq ft)		4175.05	
Q Total (cfs)	7442.00	Flow (cfs)		7442.00	
Top Width (ft)	991.03	Top Width (ft)		991.03	
Vel Total (ft/s)	2.15	Avg. Vel. (ft/s)		2.15	
Max Chl Dpth (ft)	10.52	Hydr. Depth (ft)		4.30	
Conv. Total (cfs)	169245.7	Conv. (cfs)		169245.7	
Length Wtd. (ft)	28.00	Wetted Per. (ft)		809.14	
Min Ch El (ft)	202.41	Shear (lb/sq ft)		0.52	
Alpha	1.00	Stream Power (lb/ft s)		1.11	
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	2.24	81.41	17.64
C & E Loss (ft)	0.00	Cum SA (acres)	1.03	19.04	7.31

Plan: Prop Mill Creek 1 RS: 1100 Profile: Q100

E.G. Elev (ft)	213.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.080	
W.S. Elev (ft)	213.61	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	209.87	Flow Area (sq ft)		4009.35	
E.G. Slope (ft/ft)	0.002017	Area (sq ft)		4855.96	
Q Total (cfs)	9632.00	Flow (cfs)		9632.00	
Top Width (ft)	1016.51	Top Width (ft)		1016.51	
Vel Total (ft/s)	2.40	Avg. Vel. (ft/s)		2.40	
Max Chl Dpth (ft)	11.20	Hydr. Depth (ft)		4.91	
Conv. Total (cfs)	214443.8	Conv. (cfs)		214443.8	
Length Wtd. (ft)	28.00	Wetted Per. (ft)		820.49	
Min Ch El (ft)	202.41	Shear (lb/sq ft)		0.62	
Alpha	1.00	Stream Power (lb/ft s)		1.48	
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	2.83	93.45	21.81
C & E Loss (ft)	0.00	Cum SA (acres)	1.09	19.34	7.76

Plan: Prop Mill Creek 1 RS: 1040 BR U Profile: Q10

E.G. Elev (ft)	211.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.080	
W.S. Elev (ft)	211.06	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	208.35	Flow Area (sq ft)		1913.61	
E.G. Slope (ft/ft)	0.002372	Area (sq ft)		1913.61	
Q Total (cfs)	3239.00	Flow (cfs)		3239.00	
Top Width (ft)	712.38	Top Width (ft)		712.38	
Vel Total (ft/s)	1.69	Avg. Vel. (ft/s)		1.69	
Max Chl Dpth (ft)	8.65	Hydr. Depth (ft)		2.69	
Conv. Total (cfs)	66504.3	Conv. (cfs)		66504.3	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		747.68	
Min Ch El (ft)	202.41	Shear (lb/sq ft)		0.38	
Alpha	1.00	Stream Power (lb/ft s)		0.64	
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	0.76	47.63	8.20
C & E Loss (ft)	0.00	Cum SA (acres)	0.74	17.15	4.37

Plan: Prop Mill Creek 1 RS: 1040 BR U Profile: Q25

E.G. Elev (ft)	212.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.080	
W.S. Elev (ft)	212.20	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	209.03	Flow Area (sq ft)		2787.61	
E.G. Slope (ft/ft)	0.002359	Area (sq ft)		2787.61	
Q Total (cfs)	5632.00	Flow (cfs)		5632.00	
Top Width (ft)	782.33	Top Width (ft)		782.33	
Vel Total (ft/s)	2.02	Avg. Vel. (ft/s)		2.02	
Max Chl Dpth (ft)	9.78	Hydr. Depth (ft)		3.56	
Conv. Total (cfs)	115965.4	Conv. (cfs)		115965.4	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		831.66	
Min Ch El (ft)	202.41	Shear (lb/sq ft)		0.49	
Alpha	1.00	Stream Power (lb/ft s)		1.00	
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	1.67	67.40	13.57
C & E Loss (ft)	0.00	Cum SA (acres)	0.94	18.21	6.33

Plan: Prop Mill Creek 1 RS: 1040 BR U Profile: Q50

E.G. Elev (ft)	212.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.080	
W.S. Elev (ft)	212.86	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	209.41	Flow Area (sq ft)		3312.86	
E.G. Slope (ft/ft)	0.002371	Area (sq ft)		3312.86	
Q Total (cfs)	7442.00	Flow (cfs)		7442.00	
Top Width (ft)	788.64	Top Width (ft)		788.64	
Vel Total (ft/s)	2.25	Avg. Vel. (ft/s)		2.25	
Max Chl Dpth (ft)	10.45	Hydr. Depth (ft)		4.20	
Conv. Total (cfs)	152849.5	Conv. (cfs)		152849.5	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		846.19	
Min Ch El (ft)	202.41	Shear (lb/sq ft)		0.58	
Alpha	1.00	Stream Power (lb/ft s)		1.30	
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	2.24	79.01	17.64
C & E Loss (ft)	0.00	Cum SA (acres)	1.03	18.46	7.31

Plan: Prop Mill Creek 1 RS: 1040 BR U Profile: Q100

E.G. Elev (ft)	213.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.080	
W.S. Elev (ft)	213.54	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	209.92	Flow Area (sq ft)		3849.14	
E.G. Slope (ft/ft)	0.002481	Area (sq ft)		3849.14	
Q Total (cfs)	9632.00	Flow (cfs)		9632.00	
Top Width (ft)	799.50	Top Width (ft)		799.50	
Vel Total (ft/s)	2.50	Avg. Vel. (ft/s)		2.50	
Max Chl Dpth (ft)	11.13	Hydr. Depth (ft)		4.81	
Conv. Total (cfs)	193362.8	Conv. (cfs)		193362.8	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		865.38	
Min Ch El (ft)	202.41	Shear (lb/sq ft)		0.69	
Alpha	1.00	Stream Power (lb/ft s)		1.72	
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	2.83	90.65	21.81
C & E Loss (ft)	0.00	Cum SA (acres)	1.09	18.75	7.76

Plan: Prop Mill Creek 1 RS: 1040 BR D Profile: Q10

E.G. Elev (ft)	210.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.080	
W.S. Elev (ft)	210.95	Reach Len. (ft)	26.00	26.00	26.00
Crit W.S. (ft)	208.11	Flow Area (sq ft)		2198.76	
E.G. Slope (ft/ft)	0.001662	Area (sq ft)		2198.76	
Q Total (cfs)	3239.00	Flow (cfs)		3239.00	
Top Width (ft)	775.79	Top Width (ft)		775.79	
Vel Total (ft/s)	1.47	Avg. Vel. (ft/s)		1.47	
Max Chl Dpth (ft)	8.65	Hydr. Depth (ft)		2.83	
Conv. Total (cfs)	79460.0	Conv. (cfs)		79460.0	
Length Wtd. (ft)	26.00	Wetted Per. (ft)		810.17	
Min Ch El (ft)	202.30	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)		0.41	
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.76	44.98	8.20
C & E Loss (ft)	0.00	Cum SA (acres)	0.74	16.19	4.37

Plan: Prop Mill Creek 1 RS: 1040 BR D Profile: Q25

E.G. Elev (ft)	212.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.080	
W.S. Elev (ft)	212.09	Reach Len. (ft)	26.00	26.00	26.00
Crit W.S. (ft)	208.89	Flow Area (sq ft)		3095.99	
E.G. Slope (ft/ft)	0.001699	Area (sq ft)		3095.99	
Q Total (cfs)	5632.00	Flow (cfs)		5632.00	
Top Width (ft)	796.75	Top Width (ft)		796.75	
Vel Total (ft/s)	1.82	Avg. Vel. (ft/s)		1.82	
Max Chl Dpth (ft)	9.79	Hydr. Depth (ft)		3.89	
Conv. Total (cfs)	136655.7	Conv. (cfs)		136655.7	
Length Wtd. (ft)	26.00	Wetted Per. (ft)		845.12	
Min Ch El (ft)	202.30	Shear (lb/sq ft)		0.39	
Alpha	1.00	Stream Power (lb/ft s)		0.71	
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	1.67	63.62	13.57
C & E Loss (ft)	0.00	Cum SA (acres)	0.94	17.19	6.33

Plan: Prop Mill Creek 1 RS: 1040 BR D Profile: Q50

E.G. Elev (ft)	212.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.080	
W.S. Elev (ft)	212.76	Reach Len. (ft)	26.00	26.00	26.00
Crit W.S. (ft)	209.25	Flow Area (sq ft)		3630.04	
E.G. Slope (ft/ft)	0.001805	Area (sq ft)		3630.04	
Q Total (cfs)	7442.00	Flow (cfs)		7442.00	
Top Width (ft)	810.48	Top Width (ft)		810.48	
Vel Total (ft/s)	2.05	Avg. Vel. (ft/s)		2.05	
Max Chl Dpth (ft)	10.46	Hydr. Depth (ft)		4.48	
Conv. Total (cfs)	175148.8	Conv. (cfs)		175148.8	
Length Wtd. (ft)	26.00	Wetted Per. (ft)		867.01	
Min Ch El (ft)	202.30	Shear (lb/sq ft)		0.47	
Alpha	1.00	Stream Power (lb/ft s)		0.97	
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	2.24	74.54	17.64
C & E Loss (ft)	0.00	Cum SA (acres)	1.03	17.44	7.31

Plan: Prop Mill Creek 1 RS: 1040 BR D Profile: Q100

E.G. Elev (ft)	213.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.080	
W.S. Elev (ft)	213.43	Reach Len. (ft)	26.00	26.00	26.00
Crit W.S. (ft)	209.61	Flow Area (sq ft)		4179.02	
E.G. Slope (ft/ft)	0.001965	Area (sq ft)		4179.02	
Q Total (cfs)	9632.00	Flow (cfs)		9632.00	
Top Width (ft)	827.00	Top Width (ft)		827.00	
Vel Total (ft/s)	2.30	Avg. Vel. (ft/s)		2.30	
Max Chl Dpth (ft)	11.13	Hydr. Depth (ft)		5.05	
Conv. Total (cfs)	217305.3	Conv. (cfs)		217305.3	
Length Wtd. (ft)	26.00	Wetted Per. (ft)		892.15	
Min Ch El (ft)	202.30	Shear (lb/sq ft)		0.57	
Alpha	1.00	Stream Power (lb/ft s)		1.32	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	2.83	85.49	21.81
C & E Loss (ft)	0.00	Cum SA (acres)	1.09	17.71	7.76

Plan: Prop Mill Creek 1 RS: 990.* Profile: Q10

E.G. Elev (ft)	210.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.080	
W.S. Elev (ft)	210.91	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	208.10	Flow Area (sq ft)		2219.65	
E.G. Slope (ft/ft)	0.001577	Area (sq ft)		2379.47	
Q Total (cfs)	3239.00	Flow (cfs)		3239.00	
Top Width (ft)	921.30	Top Width (ft)		921.30	
Vel Total (ft/s)	1.46	Avg. Vel. (ft/s)		1.46	
Max Chl Dpth (ft)	8.61	Hydr. Depth (ft)		2.79	
Conv. Total (cfs)	81560.2	Conv. (cfs)		81560.2	
Length Wtd. (ft)	28.00	Wetted Per. (ft)		797.72	
Min Ch El (ft)	202.30	Shear (lb/sq ft)		0.27	
Alpha	1.00	Stream Power (lb/ft s)		0.40	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.76	43.62	8.20
C & E Loss (ft)	0.00	Cum SA (acres)	0.74	15.69	4.37

Plan: Prop Mill Creek 1 RS: 990.* Profile: Q25

E.G. Elev (ft)	212.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.080	
W.S. Elev (ft)	212.05	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	208.88	Flow Area (sq ft)		3136.99	
E.G. Slope (ft/ft)	0.001553	Area (sq ft)		3450.54	
Q Total (cfs)	5632.00	Flow (cfs)		5632.00	
Top Width (ft)	956.42	Top Width (ft)		956.42	
Vel Total (ft/s)	1.80	Avg. Vel. (ft/s)		1.80	
Max Chl Dpth (ft)	9.75	Hydr. Depth (ft)		3.86	
Conv. Total (cfs)	142925.3	Conv. (cfs)		142925.3	
Length Wtd. (ft)	28.00	Wetted Per. (ft)		816.54	
Min Ch El (ft)	202.30	Shear (lb/sq ft)		0.37	
Alpha	1.00	Stream Power (lb/ft s)		0.67	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	1.67	61.67	13.57
C & E Loss (ft)	0.00	Cum SA (acres)	0.94	16.67	6.33

Plan: Prop Mill Creek 1 RS: 990.* Profile: Q50

E.G. Elev (ft)	212.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.080	
W.S. Elev (ft)	212.71	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	209.24	Flow Area (sq ft)		3679.74	
E.G. Slope (ft/ft)	0.001623	Area (sq ft)		4090.49	
Q Total (cfs)	7442.00	Flow (cfs)		7442.00	
Top Width (ft)	974.69	Top Width (ft)		974.69	
Vel Total (ft/s)	2.02	Avg. Vel. (ft/s)		2.02	
Max Chl Dpth (ft)	10.41	Hydr. Depth (ft)		4.46	
Conv. Total (cfs)	184706.4	Conv. (cfs)		184706.4	
Length Wtd. (ft)	28.00	Wetted Per. (ft)		828.28	
Min Ch El (ft)	202.30	Shear (lb/sq ft)		0.45	
Alpha	1.00	Stream Power (lb/ft s)		0.91	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	2.24	72.24	17.64
C & E Loss (ft)	0.00	Cum SA (acres)	1.03	16.90	7.31

Plan: Prop Mill Creek 1 RS: 990.* Profile: Q100

E.G. Elev (ft)	213.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.080	
W.S. Elev (ft)	213.38	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	209.58	Flow Area (sq ft)		4235.52	
E.G. Slope (ft/ft)	0.001748	Area (sq ft)		4749.02	
Q Total (cfs)	9632.00	Flow (cfs)		9632.00	
Top Width (ft)	1001.25	Top Width (ft)		1001.25	
Vel Total (ft/s)	2.27	Avg. Vel. (ft/s)		2.27	
Max Chl Dpth (ft)	11.08	Hydr. Depth (ft)		5.03	
Conv. Total (cfs)	230396.3	Conv. (cfs)		230396.3	
Length Wtd. (ft)	28.00	Wetted Per. (ft)		845.11	
Min Ch El (ft)	202.30	Shear (lb/sq ft)		0.55	
Alpha	1.00	Stream Power (lb/ft s)		1.24	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	2.83	82.83	21.81
C & E Loss (ft)	0.00	Cum SA (acres)	1.09	17.16	7.76

Plan: Prop Mill Creek 1 RS: 940 BR U Profile: Q10

E.G. Elev (ft)	210.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.080	
W.S. Elev (ft)	210.86	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	208.11	Flow Area (sq ft)		2126.97	
E.G. Slope (ft/ft)	0.001848	Area (sq ft)		2126.97	
Q Total (cfs)	3239.00	Flow (cfs)		3239.00	
Top Width (ft)	774.26	Top Width (ft)		774.26	
Vel Total (ft/s)	1.52	Avg. Vel. (ft/s)		1.52	
Max Chl Dpth (ft)	8.56	Hydr. Depth (ft)		2.75	
Conv. Total (cfs)	75349.0	Conv. (cfs)		75349.0	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		807.51	
Min Ch El (ft)	202.30	Shear (lb/sq ft)		0.30	
Alpha	1.00	Stream Power (lb/ft s)		0.46	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.76	42.17	8.20
C & E Loss (ft)	0.00	Cum SA (acres)	0.74	15.14	4.37

Plan: Prop Mill Creek 1 RS: 940 BR U Profile: Q25

E.G. Elev (ft)	212.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.080	
W.S. Elev (ft)	212.00	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	208.89	Flow Area (sq ft)		3022.25	
E.G. Slope (ft/ft)	0.001833	Area (sq ft)		3022.25	
Q Total (cfs)	5632.00	Flow (cfs)		5632.00	
Top Width (ft)	795.34	Top Width (ft)		795.34	
Vel Total (ft/s)	1.86	Avg. Vel. (ft/s)		1.86	
Max Chl Dpth (ft)	9.70	Hydr. Depth (ft)		3.80	
Conv. Total (cfs)	131538.6	Conv. (cfs)		131538.6	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		842.57	
Min Ch El (ft)	202.30	Shear (lb/sq ft)		0.41	
Alpha	1.00	Stream Power (lb/ft s)		0.77	
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	1.67	59.59	13.57
C & E Loss (ft)	0.00	Cum SA (acres)	0.94	16.10	6.33

Plan: Prop Mill Creek 1 RS: 940 BR U Profile: Q50

E.G. Elev (ft)	212.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.080	
W.S. Elev (ft)	212.66	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	209.25	Flow Area (sq ft)		3550.91	
E.G. Slope (ft/ft)	0.001930	Area (sq ft)		3550.91	
Q Total (cfs)	7442.00	Flow (cfs)		7442.00	
Top Width (ft)	807.46	Top Width (ft)		807.46	
Vel Total (ft/s)	2.10	Avg. Vel. (ft/s)		2.10	
Max Chl Dpth (ft)	10.36	Hydr. Depth (ft)		4.40	
Conv. Total (cfs)	169382.8	Conv. (cfs)		169382.8	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		862.79	
Min Ch El (ft)	202.30	Shear (lb/sq ft)		0.50	
Alpha	1.00	Stream Power (lb/ft s)		1.04	
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	2.24	69.78	17.64
C & E Loss (ft)	0.00	Cum SA (acres)	1.03	16.33	7.31

Plan: Prop Mill Creek 1 RS: 940 BR U Profile: Q100

E.G. Elev (ft)	213.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.080	
W.S. Elev (ft)	213.32	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	209.61	Flow Area (sq ft)		4091.25	
E.G. Slope (ft/ft)	0.002095	Area (sq ft)		4091.25	
Q Total (cfs)	9632.00	Flow (cfs)		9632.00	
Top Width (ft)	824.20	Top Width (ft)		824.20	
Vel Total (ft/s)	2.35	Avg. Vel. (ft/s)		2.35	
Max Chl Dpth (ft)	11.02	Hydr. Depth (ft)		4.96	
Conv. Total (cfs)	210431.5	Conv. (cfs)		210431.5	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		887.83	
Min Ch El (ft)	202.30	Shear (lb/sq ft)		0.60	
Alpha	1.00	Stream Power (lb/ft s)		1.42	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	2.83	79.98	21.81
C & E Loss (ft)	0.00	Cum SA (acres)	1.09	16.58	7.76

Plan: Prop Mill Creek 1 RS: 940 BR D Profile: Q10

E.G. Elev (ft)	210.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.080	
W.S. Elev (ft)	210.78	Reach Len. (ft)	26.00	26.00	26.00
Crit W.S. (ft)	207.57	Flow Area (sq ft)		2421.50	
E.G. Slope (ft/ft)	0.001230	Area (sq ft)		2421.50	
Q Total (cfs)	3239.00	Flow (cfs)		3239.00	
Top Width (ft)	787.46	Top Width (ft)		787.46	
Vel Total (ft/s)	1.34	Avg. Vel. (ft/s)		1.34	
Max Chl Dpth (ft)	8.58	Hydr. Depth (ft)		3.08	
Conv. Total (cfs)	92343.6	Conv. (cfs)		92343.6	
Length Wtd. (ft)	26.00	Wetted Per. (ft)		823.11	
Min Ch El (ft)	202.20	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)		0.30	
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.76	39.24	8.20
C & E Loss (ft)	0.00	Cum SA (acres)	0.74	14.14	4.37

Plan: Prop Mill Creek 1 RS: 940 BR D Profile: Q25

E.G. Elev (ft)	211.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.080	
W.S. Elev (ft)	211.92	Reach Len. (ft)	26.00	26.00	26.00
Crit W.S. (ft)	208.27	Flow Area (sq ft)		3333.19	
E.G. Slope (ft/ft)	0.001360	Area (sq ft)		3333.19	
Q Total (cfs)	5632.00	Flow (cfs)		5632.00	
Top Width (ft)	810.77	Top Width (ft)		810.77	
Vel Total (ft/s)	1.69	Avg. Vel. (ft/s)		1.69	
Max Chl Dpth (ft)	9.72	Hydr. Depth (ft)		4.11	
Conv. Total (cfs)	152724.8	Conv. (cfs)		152724.8	
Length Wtd. (ft)	26.00	Wetted Per. (ft)		860.29	
Min Ch El (ft)	202.20	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)		0.56	
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	1.67	55.50	13.57
C & E Loss (ft)	0.00	Cum SA (acres)	0.94	15.07	6.33

Plan: Prop Mill Creek 1 RS: 940 BR D Profile: Q50

E.G. Elev (ft)	212.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.080	
W.S. Elev (ft)	212.57	Reach Len. (ft)	26.00	26.00	26.00
Crit W.S. (ft)	208.66	Flow Area (sq ft)		3866.95	
E.G. Slope (ft/ft)	0.001491	Area (sq ft)		3866.95	
Q Total (cfs)	7442.00	Flow (cfs)		7442.00	
Top Width (ft)	821.90	Top Width (ft)		821.90	
Vel Total (ft/s)	1.92	Avg. Vel. (ft/s)		1.92	
Max Chl Dpth (ft)	10.37	Hydr. Depth (ft)		4.70	
Conv. Total (cfs)	192758.0	Conv. (cfs)		192758.0	
Length Wtd. (ft)	26.00	Wetted Per. (ft)		879.55	
Min Ch El (ft)	202.20	Shear (lb/sq ft)		0.41	
Alpha	1.00	Stream Power (lb/ft s)		0.79	
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	2.24	65.02	17.64
C & E Loss (ft)	0.00	Cum SA (acres)	1.03	15.28	7.31

Plan: Prop Mill Creek 1 RS: 880 Profile: Q50

E.G. Elev (ft)	212.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.080	
W.S. Elev (ft)	212.54	Reach Len. (ft)	900.00	900.00	900.00
Crit W.S. (ft)	208.66	Flow Area (sq ft)		3887.12	
E.G. Slope (ft/ft)	0.001383	Area (sq ft)		4132.68	
Q Total (cfs)	7442.00	Flow (cfs)		7442.00	
Top Width (ft)	942.78	Top Width (ft)		942.78	
Vel Total (ft/s)	1.91	Avg. Vel. (ft/s)		1.91	
Max Chl Dpth (ft)	10.34	Hydr. Depth (ft)		4.64	
Conv. Total (cfs)	200115.0	Conv. (cfs)		200115.0	
Length Wtd. (ft)	900.00	Wetted Per. (ft)		842.38	
Min Ch El (ft)	202.20	Shear (lb/sq ft)		0.40	
Alpha	1.00	Stream Power (lb/ft s)		0.76	
Frctn Loss (ft)	1.77	Cum Volume (acre-ft)	2.24	62.63	17.64
C & E Loss (ft)	0.00	Cum SA (acres)	1.03	14.76	7.31

Plan: Prop Mill Creek 1 RS: 880 Profile: Q100

E.G. Elev (ft)	213.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.080	
W.S. Elev (ft)	213.18	Reach Len. (ft)	900.00	900.00	900.00
Crit W.S. (ft)	209.09	Flow Area (sq ft)		4435.36	
E.G. Slope (ft/ft)	0.001520	Area (sq ft)		4750.84	10.88
Q Total (cfs)	9632.00	Flow (cfs)		9632.00	
Top Width (ft)	992.92	Top Width (ft)		961.42	31.51
Vel Total (ft/s)	2.17	Avg. Vel. (ft/s)		2.17	
Max Chl Dpth (ft)	10.98	Hydr. Depth (ft)		5.22	
Conv. Total (cfs)	247028.2	Conv. (cfs)		247028.2	
Length Wtd. (ft)	900.00	Wetted Per. (ft)		854.20	
Min Ch El (ft)	202.20	Shear (lb/sq ft)		0.49	
Alpha	1.00	Stream Power (lb/ft s)		1.07	
Frctn Loss (ft)	1.87	Cum Volume (acre-ft)	2.83	71.79	21.81
C & E Loss (ft)	0.00	Cum SA (acres)	1.09	14.97	7.75

Plan: Prop Mill Creek 1 RS: 0 Profile: Q10

E.G. Elev (ft)	209.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	209.12	Reach Len. (ft)			
Crit W.S. (ft)	206.70	Flow Area (sq ft)	73.97	1165.76	793.57
E.G. Slope (ft/ft)	0.003001	Area (sq ft)	73.97	1165.76	793.57
Q Total (cfs)	3239.00	Flow (cfs)	55.74	2267.24	916.01
Top Width (ft)	932.82	Top Width (ft)	71.81	437.73	423.28
Vel Total (ft/s)	1.59	Avg. Vel. (ft/s)	0.75	1.94	1.15
Max Chl Dpth (ft)	7.68	Hydr. Depth (ft)	1.03	2.66	1.87
Conv. Total (cfs)	59129.6	Conv. (cfs)	1017.6	41389.7	16722.3
Length Wtd. (ft)		Wetted Per. (ft)	71.97	441.10	423.67
Min Ch El (ft)	201.44	Shear (lb/sq ft)	0.19	0.50	0.35
Alpha	1.20	Stream Power (lb/ft s)	0.15	0.96	0.41
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Prop Mill Creek 1 RS: 0 Profile: Q25

E.G. Elev (ft)	210.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	210.17	Reach Len. (ft)			
Crit W.S. (ft)	207.66	Flow Area (sq ft)	161.84	1650.34	1314.05
E.G. Slope (ft/ft)	0.003005	Area (sq ft)	161.84	1650.34	1314.05
Q Total (cfs)	5632.00	Flow (cfs)	175.99	3803.50	1652.51
Top Width (ft)	1184.56	Top Width (ft)	90.59	481.20	612.76
Vel Total (ft/s)	1.80	Avg. Vel. (ft/s)	1.09	2.30	1.26
Max Chl Dpth (ft)	8.73	Hydr. Depth (ft)	1.79	3.43	2.14
Conv. Total (cfs)	102736.1	Conv. (cfs)	3210.3	69381.5	30144.3
Length Wtd. (ft)		Wetted Per. (ft)	90.95	484.65	613.25
Min Ch El (ft)	201.44	Shear (lb/sq ft)	0.33	0.64	0.40
Alpha	1.26	Stream Power (lb/ft s)	0.36	1.47	0.51
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Prop Mill Creek 1 RS: 0 Profile: Q50

E.G. Elev (ft)	210.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	210.75	Reach Len. (ft)			
Crit W.S. (ft)	208.00	Flow Area (sq ft)	216.56	1929.76	1707.56
E.G. Slope (ft/ft)	0.003000	Area (sq ft)	216.56	1929.76	1707.56
Q Total (cfs)	7442.00	Flow (cfs)	268.61	4902.05	2271.34
Top Width (ft)	1292.78	Top Width (ft)	99.28	485.63	707.87
Vel Total (ft/s)	1.93	Avg. Vel. (ft/s)	1.24	2.54	1.33
Max Chl Dpth (ft)	9.31	Hydr. Depth (ft)	2.18	3.97	2.41
Conv. Total (cfs)	135867.4	Conv. (cfs)	4903.9	89496.0	41467.5
Length Wtd. (ft)		Wetted Per. (ft)	99.78	489.11	708.40
Min Ch El (ft)	201.44	Shear (lb/sq ft)	0.41	0.74	0.45
Alpha	1.30	Stream Power (lb/ft s)	0.50	1.88	0.60
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

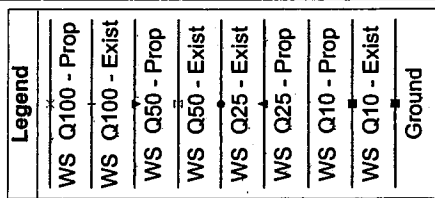
Plan: Prop Mill Creek 1 RS: 0 Profile: Q100

E.G. Elev (ft)	211.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	211.30	Reach Len. (ft)			
Crit W.S. (ft)	208.30	Flow Area (sq ft)	273.47	2198.21	2100.46
E.G. Slope (ft/ft)	0.003003	Area (sq ft)	273.47	2198.21	2100.46
Q Total (cfs)	9632.00	Flow (cfs)	380.46	6073.84	3177.70
Top Width (ft)	1311.80	Top Width (ft)	105.48	487.95	718.37
Vel Total (ft/s)	2.11	Avg. Vel. (ft/s)	1.39	2.76	1.51
Max Chl Dpth (ft)	9.86	Hydr. Depth (ft)	2.59	4.50	2.92
Conv. Total (cfs)	175771.2	Conv. (cfs)	6942.9	110839.5	57988.8
Length Wtd. (ft)		Wetted Per. (ft)	106.13	491.46	718.91
Min Ch El (ft)	201.44	Shear (lb/sq ft)	0.48	0.84	0.55
Alpha	1.27	Stream Power (lb/ft s)	0.67	2.32	0.83
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

TRIBUTARY NO. 5 TO MILL CREEK

(DA 18)

Clear Creek 1



HEC-RAS River: Clear Creek Reach: 1

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Chl El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	2800	Q10	Prop	1256.00	215.00	219.56		219.60	0.001608	1.58	793.89	256.17	0.16
1	2800	Q10	Exist	1256.00	215.00	219.58		219.62	0.001579	1.57	799.07	256.90	0.16
1	2800	Q25	Prop	2081.00	215.00	220.59		220.65	0.001753	1.94	1085.85	320.66	0.17
1	2800	Q25	Exist	2081.00	215.00	220.75		220.81	0.001530	1.86	1138.56	333.87	0.16
1	2800	Q50	Prop	2726.00	215.00	221.28		221.35	0.001722	2.14	1327.04	377.33	0.18
1	2800	Q50	Exist	2726.00	215.00	221.44		221.51	0.001529	2.06	1388.13	390.38	0.17
1	2800	Q100	Prop	3501.00	215.00	221.85		221.94	0.001886	2.42	1552.63	423.53	0.19
1	2800	Q100	Exist	3501.00	215.00	222.08		222.15	0.001614	2.30	1650.92	442.15	0.17
1	1300	Q10	Prop	1256.00	207.09	212.75		213.21	0.029775	5.44	231.77	118.92	0.64
1	1300	Q10	Exist	1256.00	207.09	212.60		213.13	0.034904	5.81	216.03	98.42	0.69
1	1300	Q25	Prop	2081.00	207.09	213.75	213.04	214.16	0.022942	5.36	476.00	419.95	0.58
1	1300	Q25	Exist	2081.00	207.09	213.66	212.93	214.03	0.055187	5.02	441.97	405.02	0.79
1	1300	Q50	Prop	2726.00	207.09	213.86		214.47	0.032528	6.57	527.31	435.53	0.70
1	1300	Q50	Exist	2726.00	207.09	213.69	213.69	214.29	0.088063	6.41	453.67	409.81	1.01
1	1300	Q100	Prop	3501.00	207.09	214.32		214.87	0.025938	6.50	737.23	464.85	0.64
1	1300	Q100	Exist	3501.00	207.09	213.91	213.91	214.61	0.085458	6.94	547.37	441.01	1.02
1	500	Q10	Prop	1256.00	202.41	209.58	205.49	209.62	0.001649	2.09	904.11	653.46	0.17
1	500	Q10	Exist	1256.00	202.41	209.41		209.43	0.001640	1.34	1090.93	586.73	0.15
1	500	Q25	Prop	2081.00	202.41	210.48	206.77	210.54	0.001797	2.45	1324.21	809.24	0.18
1	500	Q25	Exist	2081.00	202.41	210.20		210.23	0.001580	1.55	1649.32	783.29	0.16
1	500	Q50	Prop	2726.00	202.41	211.66	208.53	211.70	0.001146	2.21	1961.58	964.89	0.15
1	500	Q50	Exist	2726.00	202.41	211.47		211.49	0.000774	1.21	2748.66	959.51	0.11
1	500	Q100	Prop	3501.00	202.41	212.94	208.82	212.97	0.000744	2.00	2709.99	991.13	0.12
1	500	Q100	Exist	3501.00	202.41	212.79		212.81	0.000386	1.05	4040.88	988.73	0.08
1	445		Bridge										
1	390*	Q10	Prop	1256.00	202.30	209.36	206.02	209.40	0.001947	2.14	914.98	586.53	0.18
1	390*	Q10	Exist	1256.00	202.30	209.19		209.22	0.002278	1.42	957.45	555.46	0.18
1	390*	Q25	Prop	2081.00	202.30	210.25	207.22	210.31	0.001946	2.42	1369.88	767.98	0.19
1	390*	Q25	Exist	2081.00	202.30	209.99		210.03	0.002140	1.60	1470.49	728.71	0.18
1	390*	Q50	Prop	2726.00	202.30	211.52	208.05	211.56	0.001028	2.04	2101.62	884.24	0.14
1	390*	Q50	Exist	2726.00	202.30	211.39		211.41	0.000747	1.22	2609.97	880.66	0.11
1	390*	Q100	Prop	3501.00	202.30	212.85	208.46	212.87	0.000655	1.84	2876.09	922.75	0.12
1	390*	Q100	Exist	3501.00	202.30	212.75		212.77	0.000383	1.07	3841.36	921.31	0.08
1	335		Bridge										
1	280	Q10	Prop	1256.00	202.20	209.13	206.08	209.17	0.001747	1.99	964.67	631.12	0.17
1	280	Q10	Exist	1256.00	202.20	209.00		209.02	0.001476	1.17	1160.92	601.90	0.14

HEC-RAS River Clear Creek Reach: 1 (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	280	Q25	Prop	2081.00	202.20	210.00	206.94	210.05	0.002072	2.45	1413.78	784.32	0.19
1	280	Q25	Exist	2081.00	202.20	209.81		209.84	0.001429	1.34	1716.80	767.81	0.14
1	280	Q50	Prop	2726.00	202.20	211.39	207.65	211.42	0.000956	1.96	2218.04	921.03	0.13
1	280	Q50	Exist	2726.00	202.20	211.32		211.34	0.000498	1.03	3005.59	920.13	0.09
1	280	Q100	Prop	3501.00	202.20	212.76	208.04	212.78	0.000596	1.75	3018.67	956.65	0.11
1	280	Q100	Exist	3501.00	202.20	212.72		212.73	0.000272	0.93	4305.14	949.31	0.07
1	0	Q10	Prop	1256.00	201.44	207.61	204.99	207.65	0.003290	1.73	850.12	597.15	0.21
1	0	Q10	Exist	1256.00	201.44	207.61	204.99	207.65	0.003309	1.52	850.12	597.15	0.20
1	0	Q25	Prop	2081.00	201.44	208.90	206.15	208.93	0.001470	1.44	1831.23	892.62	0.15
1	0	Q25	Exist	2081.00	201.44	208.90	206.09	208.92	0.001402	1.22	1831.23	892.62	0.14
1	0	Q50	Prop	2726.00	201.44	211.11	206.47	211.12	0.000270	0.86	4323.90	1307.67	0.07
1	0	Q50	Exist	2726.00	201.44	211.11	206.36	211.12	0.000245	0.69	4323.90	1307.67	0.06
1	0	Q100	Prop	3501.00	201.44	212.61	206.71	212.62	0.000139	0.74	6308.60	1335.89	0.05
1	0	Q100	Exist	3501.00	201.44	212.61	206.64	212.62	0.000121	0.61	6308.60	1335.89	0.05

Plan: Prop Clear Creek 1 RS: 2800 Profile: Q10

E.G. Elev (ft)	219.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.080	
W.S. Elev (ft)	219.56	Reach Len. (ft)	1500.00	1500.00	1500.00
Crit W.S. (ft)		Flow Area (sq ft)		793.89	
E.G. Slope (ft/ft)	0.001608	Area (sq ft)		793.89	
Q Total (cfs)	1256.00	Flow (cfs)		1256.00	
Top Width (ft)	256.17	Top Width (ft)		256.17	
Vel Total (ft/s)	1.58	Avg. Vel. (ft/s)		1.58	
Max Chl Dpth (ft)	4.56	Hydr. Depth (ft)		3.10	
Conv. Total (cfs)	31322.9	Conv. (cfs)		31322.9	
Length Wtd. (ft)	1500.00	Wetted Per. (ft)		256.43	
Min Ch El (ft)	215.00	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)		0.49	
Frctn Loss (ft)	6.35	Cum Volume (acre-ft)	13.11	31.16	6.53
C & E Loss (ft)	0.04	Cum SA (acres)	7.79	10.70	6.42

Plan: Prop Clear Creek 1 RS: 2800 Profile: Q25

E.G. Elev (ft)	220.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	220.59	Reach Len. (ft)	1500.00	1500.00	1500.00
Cnt W.S. (ft)		Flow Area (sq ft)	10.21	1071.41	4.23
E.G. Slope (ft/ft)	0.001753	Area (sq ft)	10.21	1071.41	4.23
Q Total (cfs)	2081.00	Flow (cfs)	2.83	2077.01	1.17
Top Width (ft)	320.66	Top Width (ft)	34.42	272.00	14.24
Vel Total (ft/s)	1.92	Avg. Vel. (ft/s)	0.28	1.94	0.28
Max Chl Dpth (ft)	5.59	Hydr. Depth (ft)	0.30	3.94	0.30
Conv. Total (cfs)	49696.2	Conv. (cfs)	67.5	49600.8	27.9
Length Wtd. (ft)	1500.00	Wetted Per. (ft)	34.42	272.28	14.25
Min Ch El (ft)	215.00	Shear (lb/sq ft)	0.03	0.43	0.03
Alpha	1.02	Stream Power (lb/ft s)	0.01	0.84	0.01
Frctn Loss (ft)	6.46	Cum Volume (acre-ft)	21.95	43.54	17.24
C & E Loss (ft)	0.04	Cum SA (acres)	10.85	12.22	16.20

Plan: Prop Clear Creek 1 RS: 2800 Profile: Q50

E.G. Elev (ft)	221.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	221.28	Reach Len. (ft)	1500.00	1500.00	1500.00
Crit W.S. (ft)		Flow Area (sq ft)	47.85	1259.39	19.80
E.G. Slope (ft/ft)	0.001722	Area (sq ft)	47.85	1259.39	19.80
Q Total (cfs)	2726.00	Flow (cfs)	21.96	2694.95	9.08
Top Width (ft)	377.33	Top Width (ft)	74.50	272.00	30.83
Vel Total (ft/s)	2.05	Avg. Vel. (ft/s)	0.46	2.14	0.46
Max Chl Dpth (ft)	6.28	Hydr. Depth (ft)	0.64	4.63	0.64
Conv. Total (cfs)	65686.0	Conv. (cfs)	529.2	64937.9	218.9
Length Wtd. (ft)	1500.00	Wetted Per. (ft)	74.51	272.28	30.86
Min Ch El (ft)	215.00	Shear (lb/sq ft)	0.07	0.50	0.07
Alpha	1.07	Stream Power (lb/ft s)	0.03	1.06	0.03
Frctn Loss (ft)	6.83	Cum Volume (acre-ft)	37.95	54.96	36.18
C & E Loss (ft)	0.05	Cum SA (acres)	13.14	12.49	20.90

Plan: Prop Clear Creek 1 RS: 2800 Profile: Q100

E.G. Elev (ft)	221.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	221.85	Reach Len. (ft)	1500.00	1500.00	1500.00
Crit W.S. (ft)		Flow Area (sq ft)	99.03	1412.63	40.98
E.G. Slope (ft/ft)	0.001886	Area (sq ft)	99.03	1412.63	40.98
Q Total (cfs)	3501.00	Flow (cfs)	60.62	3415.31	25.07
Top Width (ft)	423.53	Top Width (ft)	107.18	272.00	44.35
Vel Total (ft/s)	2.25	Avg. Vel. (ft/s)	0.61	2.42	0.61
Max Chl Dpth (ft)	6.85	Hydr. Depth (ft)	0.92	5.19	0.92
Conv. Total (cfs)	80606.5	Conv. (cfs)	1395.7	78633.5	577.3
Length Wtd. (ft)	1500.00	Wetted Per. (ft)	107.19	272.28	44.39
Min Ch EI (ft)	215.00	Shear (lb/sq ft)	0.11	0.61	0.11
Alpha	1.12	Stream Power (lb/ft s)	0.07	1.48	0.07
Frctn Loss (ft)	7.02	Cum Volume (acre-ft)	54.81	65.35	58.25
C & E Loss (ft)	0.05	Cum SA (acres)	14.09	12.49	22.30

Plan: Prop Clear Creek 1 RS: 1300 Profile: Q10

E.G. Elev (ft)	213.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.46	Wt. n-Val.		0.080	0.100
W.S. Elev (ft)	212.75	Reach Len. (ft)	800.00	800.00	800.00
Crit W.S. (ft)		Flow Area (sq ft)		230.65	1.12
E.G. Slope (ft/ft)	0.029775	Area (sq ft)		230.65	1.12
Q Total (cfs)	1256.00	Flow (cfs)		1255.51	0.49
Top Width (ft)	118.92	Top Width (ft)		103.00	15.92
Vel Total (ft/s)	5.42	Avg. Vel. (ft/s)		5.44	0.44
Max Chl Dpth (ft)	5.66	Hydr. Depth (ft)		2.24	0.07
Conv. Total (cfs)	7278.8	Conv. (cfs)		7276.0	2.8
Length Wtd. (ft)	800.00	Wetted Per. (ft)		104.21	15.92
Min Ch EI (ft)	207.09	Shear (lb/sq ft)		4.11	0.13
Alpha	1.01	Stream Power (lb/ft s)		22.40	0.06
Frctn Loss (ft)	3.46	Cum Volume (acre-ft)	13.11	13.52	6.51
C & E Loss (ft)	0.12	Cum SA (acres)	7.79	4.51	6.14

Plan: Prop Clear Creek 1 RS: 1300 Profile: Q25

E.G. Elev (ft)	214.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	213.75	Reach Len. (ft)	800.00	800.00	800.00
Crit W.S. (ft)	213.04	Flow Area (sq ft)	0.71	354.72	122.58
E.G. Slope (ft/ft)	0.022942	Area (sq ft)	0.71	354.72	122.58
Q Total (cfs)	2081.00	Flow (cfs)	0.50	1902.93	177.57
Top Width (ft)	419.95	Top Width (ft)	4.05	133.45	282.45
Vel Total (ft/s)	4.35	Avg. Vel. (ft/s)	0.70	5.36	1.45
Max Chl Dpth (ft)	6.66	Hydr. Depth (ft)	0.17	2.66	0.43
Conv. Total (cfs)	13739.2	Conv. (cfs)	3.3	12563.5	1172.4
Length Wtd. (ft)	800.00	Wetted Per. (ft)	4.07	134.71	282.53
Min Ch EI (ft)	207.09	Shear (lb/sq ft)	0.25	3.77	0.62
Alpha	1.40	Stream Power (lb/ft s)	0.17	20.23	0.90
Frctn Loss (ft)	3.51	Cum Volume (acre-ft)	21.77	18.98	15.05
C & E Loss (ft)	0.11	Cum SA (acres)	10.18	5.24	11.09

Plan: Prop Clear Creek 1 RS: 1300 Profile: Q50

E.G. Elev (ft)	214.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.60	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	213.86	Reach Len. (ft)	800.00	800.00	800.00
Crit W.S. (ft)		Flow Area (sq ft)	1.25	370.10	155.95
E.G. Slope (ft/ft)	0.032528	Area (sq ft)	1.25	370.10	155.95
Q Total (cfs)	2726.00	Flow (cfs)	1.27	2432.05	292.68
Top Width (ft)	435.53	Top Width (ft)	5.39	133.45	296.69
Vel Total (ft/s)	5.17	Avg. Vel. (ft/s)	1.01	6.57	1.88
Max Chl Dpth (ft)	6.77	Hydr. Depth (ft)	0.23	2.77	0.53
Conv. Total (cfs)	15114.7	Conv. (cfs)	7.0	13484.9	1622.8
Length Wtd. (ft)	800.00	Wetted Per. (ft)	5.41	134.71	296.79
Min Ch El (ft)	207.09	Shear (lb/sq ft)	0.47	5.58	1.07
Alpha	1.46	Stream Power (lb/ft s)	0.47	36.66	2.00
Frctn Loss (ft)	2.60	Cum Volume (acre-ft)	37.10	26.91	33.15
C & E Loss (ft)	0.17	Cum SA (acres)	11.77	5.50	15.26

Plan: Prop Clear Creek 1 RS: 1300 Profile: Q100

E.G. Elev (ft)	214.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	214.32	Reach Len. (ft)	800.00	800.00	800.00
Crit W.S. (ft)		Flow Area (sq ft)	4.95	431.40	300.87
E.G. Slope (ft/ft)	0.025938	Area (sq ft)	4.95	431.40	300.87
Q Total (cfs)	3501.00	Flow (cfs)	7.07	2803.76	690.17
Top Width (ft)	464.65	Top Width (ft)	10.73	133.45	320.47
Vel Total (ft/s)	4.75	Avg. Vel. (ft/s)	1.43	6.50	2.29
Max Chl Dpth (ft)	7.23	Hydr. Depth (ft)	0.46	3.23	0.94
Conv. Total (cfs)	21738.3	Conv. (cfs)	43.9	17409.0	4285.4
Length Wtd. (ft)	800.00	Wetted Per. (ft)	10.77	134.71	320.61
Min Ch El (ft)	207.09	Shear (lb/sq ft)	0.75	5.19	1.52
Alpha	1.55	Stream Power (lb/ft s)	1.06	33.70	3.49
Frctn Loss (ft)	1.74	Cum Volume (acre-ft)	53.02	33.60	52.36
C & E Loss (ft)	0.15	Cum SA (acres)	12.06	5.50	16.01

Plan: Prop Clear Creek 1 RS: 500 Profile: Q10

E.G. Elev (ft)	209.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	209.58	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	205.49	Flow Area (sq ft)	449.23	385.97	68.91
E.G. Slope (ft/ft)	0.001649	Area (sq ft)	706.67	385.97	102.42
Q Total (cfs)	1256.00	Flow (cfs)	409.87	806.74	39.39
Top Width (ft)	653.46	Top Width (ft)	438.42	80.39	134.65
Vel Total (ft/s)	1.39	Avg. Vel. (ft/s)	0.91	2.09	0.57
Max Chl Dpth (ft)	7.17	Hydr. Depth (ft)	1.86	4.80	0.70
Conv. Total (cfs)	30928.4	Conv. (cfs)	10092.8	19865.7	970.0
Length Wtd. (ft)	27.00	Wetted Per. (ft)	241.62	83.67	98.02
Min Ch El (ft)	202.41	Shear (lb/sq ft)	0.19	0.47	0.07
Alpha	1.60	Stream Power (lb/ft s)	0.17	0.99	0.04
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	6.62	7.86	5.56
C & E Loss (ft)	0.00	Cum SA (acres)	3.77	2.83	4.76

Plan: Prop Clear Creek 1 RS: 500 Profile: Q25

E.G. Elev (ft)	210.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	210.48	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	206.77	Flow Area (sq ft)	671.17	458.90	194.14
E.G. Slope (ft/ft)	0.001797	Area (sq ft)	1148.38	458.90	268.37
Q Total (cfs)	2081.00	Flow (cfs)	819.58	1123.67	137.75
Top Width (ft)	809.24	Top Width (ft)	515.73	80.39	213.12
Vel Total (ft/s)	1.57	Avg. Vel. (ft/s)	1.22	2.45	0.71
Max Chl Dpth (ft)	8.07	Hydr. Depth (ft)	2.71	5.71	1.19
Conv. Total (cfs)	49093.6	Conv. (cfs)	19335.1	26508.8	3249.8
Length Wtd. (ft)	27.00	Wetted Per. (ft)	248.63	83.67	163.09
Min Ch EI (ft)	202.41	Shear (lb/sq ft)	0.30	0.62	0.13
Alpha	1.56	Stream Power (lb/ft s)	0.37	1.51	0.09
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	11.22	11.51	11.46
C & E Loss (ft)	0.00	Cum SA (acres)	5.41	3.27	6.54

Plan: Prop Clear Creek 1 RS: 500 Profile: Q50

E.G. Elev (ft)	211.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	211.66	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	208.53	Flow Area (sq ft)	967.99	553.21	440.38
E.G. Slope (ft/ft)	0.001146	Area (sq ft)	1789.99	553.21	584.61
Q Total (cfs)	2726.00	Flow (cfs)	1175.79	1225.09	325.12
Top Width (ft)	964.89	Top Width (ft)	565.08	80.39	319.42
Vel Total (ft/s)	1.39	Avg. Vel. (ft/s)	1.21	2.21	0.74
Max Chl Dpth (ft)	9.25	Hydr. Depth (ft)	3.76	6.88	1.78
Conv. Total (cfs)	80542.4	Conv. (cfs)	34739.9	36196.5	9606.1
Length Wtd. (ft)	27.00	Wetted Per. (ft)	257.89	83.67	247.60
Min Ch EI (ft)	202.41	Shear (lb/sq ft)	0.27	0.47	0.13
Alpha	1.50	Stream Power (lb/ft s)	0.33	1.05	0.09
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	20.65	18.43	26.35
C & E Loss (ft)	0.00	Cum SA (acres)	6.53	3.54	9.60

Plan: Prop Clear Creek 1 RS: 500 Profile: Q100

E.G. Elev (ft)	212.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	212.94	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	208.82	Flow Area (sq ft)	1297.16	656.05	756.77
E.G. Slope (ft/ft)	0.000744	Area (sq ft)	2522.11	656.05	1002.78
Q Total (cfs)	3501.00	Flow (cfs)	1543.33	1311.73	645.95
Top Width (ft)	991.13	Top Width (ft)	578.84	80.39	331.89
Vel Total (ft/s)	1.29	Avg. Vel. (ft/s)	1.19	2.00	0.85
Max Chl Dpth (ft)	10.53	Hydr. Depth (ft)	5.04	8.16	3.06
Conv. Total (cfs)	128361.1	Conv. (cfs)	56584.7	48093.3	23683.1
Length Wtd. (ft)	27.00	Wetted Per. (ft)	257.89	83.67	247.60
Min Ch EI (ft)	202.41	Shear (lb/sq ft)	0.23	0.36	0.14
Alpha	1.35	Stream Power (lb/ft s)	0.28	0.73	0.12
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	29.82	23.61	40.39
C & E Loss (ft)	0.00	Cum SA (acres)	6.65	3.54	10.02

Plan: Prop Clear Creek 1 RS: 445 BR U Profile: Q10

E.G. Elev (ft)	209.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	209.52	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	205.49	Flow Area (sq ft)	420.16	381.27	17.35
E.G. Slope (ft/ft)	0.001928	Area (sq ft)	420.16	381.27	17.35
Q Total (cfs)	1256.00	Flow (cfs)	394.88	854.64	6.48
Top Width (ft)	364.80	Top Width (ft)	232.99	80.39	51.42
Vel Total (ft/s)	1.53	Avg. Vel. (ft/s)	0.94	2.24	0.37
Max Chl Dpth (ft)	7.11	Hydr. Depth (ft)	1.80	4.74	0.34
Conv. Total (cfs)	28605.6	Conv. (cfs)	8993.5	19464.6	147.5
Length Wtd. (ft)	56.00	Wetted Per. (ft)	243.31	83.67	51.74
Min Ch El (ft)	202.41	Shear (lb/sq ft)	0.21	0.55	0.04
Alpha	1.57	Stream Power (lb/ft s)	0.20	1.23	0.02
Frothn Loss (ft)	0.11	Cum Volume (acre-ft)	6.27	7.62	5.52
C & E Loss (ft)	0.00	Cum SA (acres)	3.56	2.78	4.70

Plan: Prop Clear Creek 1 RS: 445 BR U Profile: Q25

E.G. Elev (ft)	210.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	210.42	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	206.76	Flow Area (sq ft)	630.18	453.45	108.01
E.G. Slope (ft/ft)	0.002152	Area (sq ft)	630.18	453.45	108.01
Q Total (cfs)	2081.00	Flow (cfs)	807.15	1205.40	68.46
Top Width (ft)	444.76	Top Width (ft)	234.87	80.39	129.50
Vel Total (ft/s)	1.75	Avg. Vel. (ft/s)	1.28	2.66	0.63
Max Chl Dpth (ft)	8.01	Hydr. Depth (ft)	2.68	5.64	0.83
Conv. Total (cfs)	44861.7	Conv. (cfs)	17400.3	25985.7	1475.7
Length Wtd. (ft)	56.00	Wetted Per. (ft)	248.98	83.67	131.56
Min Ch El (ft)	202.41	Shear (lb/sq ft)	0.34	0.73	0.11
Alpha	1.56	Stream Power (lb/ft s)	0.44	1.94	0.07
Frothn Loss (ft)	0.12	Cum Volume (acre-ft)	10.66	11.23	11.35
C & E Loss (ft)	0.00	Cum SA (acres)	5.18	3.22	6.43

Plan: Prop Clear Creek 1 RS: 445 BR U Profile: Q50

E.G. Elev (ft)	211.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	211.61	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	208.53	Flow Area (sq ft)	912.68	549.63	316.60
E.G. Slope (ft/ft)	0.001362	Area (sq ft)	912.68	549.63	316.60
Q Total (cfs)	2726.00	Flow (cfs)	1167.34	1321.36	237.30
Top Width (ft)	534.36	Top Width (ft)	237.38	80.39	216.59
Vel Total (ft/s)	1.53	Avg. Vel. (ft/s)	1.28	2.40	0.75
Max Chl Dpth (ft)	9.20	Hydr. Depth (ft)	3.84	6.84	1.46
Conv. Total (cfs)	73871.3	Conv. (cfs)	31633.6	35807.1	6430.6
Length Wtd. (ft)	56.00	Wetted Per. (ft)	256.55	83.67	222.85
Min Ch El (ft)	202.41	Shear (lb/sq ft)	0.30	0.56	0.12
Alpha	1.51	Stream Power (lb/ft s)	0.39	1.34	0.09
Frothn Loss (ft)	0.07	Cum Volume (acre-ft)	19.81	18.09	26.07
C & E Loss (ft)	0.00	Cum SA (acres)	6.28	3.49	9.44

Plan: Prop Clear Creek 1 RS: 445 BR U Profile: Q100

E.G. Elev (ft)	212.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	212.90	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	208.82	Flow Area (sq ft)	1221.02	653.45	598.83
E.G. Slope (ft/ft)	0.000924	Area (sq ft)	1221.02	653.45	598.83
Q Total (cfs)	3501.00	Flow (cfs)	1530.46	1452.15	518.39
Top Width (ft)	540.93	Top Width (ft)	240.09	80.39	220.45
Vel Total (ft/s)	1.42	Avg. Vel. (ft/s)	1.25	2.22	0.87
Max Chl Dpth (ft)	10.49	Hydr. Depth (ft)	5.09	8.13	2.72
Conv. Total (cfs)	115185.3	Conv. (cfs)	50353.2	47776.6	17055.5
Length Wtd. (ft)	56.00	Wetted Per. (ft)	264.72	83.67	232.09
Min Ch El (ft)	202.41	Shear (lb/sq ft)	0.27	0.45	0.15
Alpha	1.42	Stream Power (lb/ft s)	0.33	1.00	0.13
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	28.66	23.20	39.90
C & E Loss (ft)	0.00	Cum SA (acres)	6.39	3.49	9.85

Plan: Prop Clear Creek 1 RS: 445 BR D Profile: Q10

E.G. Elev (ft)	209.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	209.41	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	206.02	Flow Area (sq ft)	418.14	341.30	62.07
E.G. Slope (ft/ft)	0.002133	Area (sq ft)	418.14	341.30	62.75
Q Total (cfs)	1256.00	Flow (cfs)	453.28	770.61	32.11
Top Width (ft)	400.42	Top Width (ft)	221.88	77.35	101.19
Vel Total (ft/s)	1.53	Avg. Vel. (ft/s)	1.08	2.26	0.52
Max Chl Dpth (ft)	7.11	Hydr. Depth (ft)	1.88	4.41	0.62
Conv. Total (cfs)	27194.7	Conv. (cfs)	9814.3	16685.2	695.2
Length Wtd. (ft)	27.00	Wetted Per. (ft)	227.23	79.93	101.88
Min Ch El (ft)	202.30	Shear (lb/sq ft)	0.25	0.57	0.08
Alpha	1.52	Stream Power (lb/ft s)	0.27	1.28	0.04
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	5.73	7.15	5.47
C & E Loss (ft)	0.00	Cum SA (acres)	3.27	2.68	4.61

Plan: Prop Clear Creek 1 RS: 445 BR D Profile: Q25

E.G. Elev (ft)	210.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	210.30	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	207.20	Flow Area (sq ft)	616.73	410.24	200.96
E.G. Slope (ft/ft)	0.002235	Area (sq ft)	616.73	410.24	201.97
Q Total (cfs)	2081.00	Flow (cfs)	851.92	1071.94	157.14
Top Width (ft)	496.14	Top Width (ft)	223.75	77.35	195.04
Vel Total (ft/s)	1.69	Avg. Vel. (ft/s)	1.38	2.61	0.78
Max Chl Dpth (ft)	8.00	Hydr. Depth (ft)	2.76	5.30	1.03
Conv. Total (cfs)	44014.5	Conv. (cfs)	18018.6	22672.3	3323.6
Length Wtd. (ft)	27.00	Wetted Per. (ft)	232.87	79.93	198.91
Min Ch El (ft)	202.30	Shear (lb/sq ft)	0.37	0.72	0.14
Alpha	1.51	Stream Power (lb/ft s)	0.51	1.87	0.11
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	9.86	10.67	11.15
C & E Loss (ft)	0.00	Cum SA (acres)	4.88	3.12	6.22

Plan: Prop Clear Creek 1 RS: 445 BR D Profile: Q50

E.G. Elev (ft)	211.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	211.54	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	207.99	Flow Area (sq ft)	897.40	506.71	475.56
E.G. Slope (ft/ft)	0.001273	Area (sq ft)	897.40	506.71	477.03
Q Total (cfs)	2726.00	Flow (cfs)	1163.39	1150.41	412.20
Top Width (ft)	534.38	Top Width (ft)	226.37	77.35	230.67
Vel Total (ft/s)	1.45	Avg. Vel. (ft/s)	1.30	2.27	0.87
Max Chl Dpth (ft)	9.24	Hydr. Depth (ft)	3.96	6.55	2.06
Conv. Total (cfs)	76388.8	Conv. (cfs)	32600.9	32237.1	11550.9
Length Wtd. (ft)	27.00	Wetted Per. (ft)	240.76	79.93	239.76
Min Ch El (ft)	202.30	Shear (lb/sq ft)	0.30	0.50	0.16
Alpha	1.43	Stream Power (lb/ft s)	0.38	1.14	0.14
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	18.65	17.41	25.56
C & E Loss (ft)	0.00	Cum SA (acres)	5.98	3.39	9.15

Plan: Prop Clear Creek 1 RS: 445 BR D Profile: Q100

E.G. Elev (ft)	212.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	212.86	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	208.44	Flow Area (sq ft)	1196.69	608.36	780.78
E.G. Slope (ft/ft)	0.000849	Area (sq ft)	1196.69	608.36	782.73
Q Total (cfs)	3501.00	Flow (cfs)	1495.73	1273.76	731.50
Top Width (ft)	541.06	Top Width (ft)	229.12	77.35	234.59
Vel Total (ft/s)	1.35	Avg. Vel. (ft/s)	1.25	2.09	0.94
Max Chl Dpth (ft)	10.56	Hydr. Depth (ft)	5.22	7.86	3.33
Conv. Total (cfs)	120169.0	Conv. (cfs)	51339.8	43720.9	25108.3
Length Wtd. (ft)	27.00	Wetted Per. (ft)	249.07	79.93	249.15
Min Ch El (ft)	202.30	Shear (lb/sq ft)	0.25	0.40	0.17
Alpha	1.33	Stream Power (lb/ft s)	0.32	0.84	0.16
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	27.10	22.39	39.01
C & E Loss (ft)	0.00	Cum SA (acres)	6.09	3.39	9.56

Plan: Prop Clear Creek 1 RS: 390.* Profile: Q10

E.G. Elev (ft)	209.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	209.36	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	206.02	Flow Area (sq ft)	457.59	337.50	119.89
E.G. Slope (ft/ft)	0.001947	Area (sq ft)	538.43	337.50	177.29
Q Total (cfs)	1256.00	Flow (cfs)	452.77	722.53	80.70
Top Width (ft)	586.53	Top Width (ft)	329.40	77.35	179.79
Vel Total (ft/s)	1.37	Avg. Vel. (ft/s)	0.99	2.14	0.67
Max Chl Dpth (ft)	7.06	Hydr. Depth (ft)	1.86	4.36	0.91
Conv. Total (cfs)	28467.5	Conv. (cfs)	10262.0	16376.4	1829.1
Length Wtd. (ft)	27.00	Wetted Per. (ft)	246.80	79.93	132.33
Min Ch El (ft)	202.30	Shear (lb/sq ft)	0.23	0.51	0.11
Alpha	1.60	Stream Power (lb/ft s)	0.22	1.10	0.07
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	5.43	6.94	5.40
C & E Loss (ft)	0.00	Cum SA (acres)	3.10	2.63	4.52

Plan: Prop Clear Creek 1 RS: 390.* Profile: Q25

E.G. Elev (ft)	210.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	210.25	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	207.22	Flow Area (sq ft)	677.63	406.57	285.69
E.G. Slope (ft/ft)	0.001946	Area (sq ft)	862.51	406.57	392.50
Q Total (cfs)	2081.00	Flow (cfs)	871.05	985.37	224.58
Top Width (ft)	767.98	Top Width (ft)	398.61	77.35	292.02
Vel Total (ft/s)	1.52	Avg. Vel. (ft/s)	1.29	2.42	0.79
Max Chl Dpth (ft)	7.95	Hydr. Depth (ft)	2.75	5.26	1.26
Conv. Total (cfs)	47168.1	Conv. (cfs)	19743.2	22334.6	5090.3
Length Wtd. (ft)	27.00	Wetted Per. (ft)	246.80	79.93	226.58
Min Ch El (ft)	202.30	Shear (lb/sq ft)	0.33	0.62	0.15
Alpha	1.53	Stream Power (lb/ft s)	0.43	1.50	0.12
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	9.40	10.42	10.96
C & E Loss (ft)	0.00	Cum SA (acres)	4.69	3.07	6.07

Plan: Prop Clear Creek 1 RS: 390.* Profile: Q50

E.G. Elev (ft)	211.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	211.52	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	208.05	Flow Area (sq ft)	990.88	504.89	605.85
E.G. Slope (ft/ft)	0.001028	Area (sq ft)	1415.93	504.89	808.99
Q Total (cfs)	2726.00	Flow (cfs)	1192.74	1027.62	505.64
Top Width (ft)	884.24	Top Width (ft)	463.58	77.35	343.31
Vel Total (ft/s)	1.30	Avg. Vel. (ft/s)	1.20	2.04	0.83
Max Chl Dpth (ft)	9.22	Hydr. Depth (ft)	4.02	6.53	2.32
Conv. Total (cfs)	85006.0	Conv. (cfs)	37193.8	32044.7	15767.5
Length Wtd. (ft)	27.00	Wetted Per. (ft)	246.80	79.93	261.37
Min Ch El (ft)	202.30	Shear (lb/sq ft)	0.26	0.41	0.15
Alpha	1.38	Stream Power (lb/ft s)	0.31	0.83	0.12
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	17.93	17.09	25.17
C & E Loss (ft)	0.00	Cum SA (acres)	5.77	3.34	8.97

Plan: Prop Clear Creek 1 RS: 390.* Profile: Q100

E.G. Elev (ft)	212.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	212.85	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	208.46	Flow Area (sq ft)	1317.13	607.29	951.67
E.G. Slope (ft/ft)	0.000655	Area (sq ft)	2040.92	607.29	1280.04
Q Total (cfs)	3501.00	Flow (cfs)	1529.27	1115.40	856.33
Top Width (ft)	922.75	Top Width (ft)	478.82	77.35	366.58
Vel Total (ft/s)	1.22	Avg. Vel. (ft/s)	1.16	1.84	0.90
Max Chl Dpth (ft)	10.55	Hydr. Depth (ft)	5.34	7.85	3.64
Conv. Total (cfs)	136831.7	Conv. (cfs)	59769.4	43593.8	33468.6
Length Wtd. (ft)	27.00	Wetted Per. (ft)	246.80	79.93	261.37
Min Ch El (ft)	202.30	Shear (lb/sq ft)	0.22	0.31	0.15
Alpha	1.26	Stream Power (lb/ft s)	0.25	0.57	0.13
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	26.10	22.02	38.37
C & E Loss (ft)	0.00	Cum SA (acres)	5.87	3.34	9.37

Plan: Prop Clear Creek 1 RS: 335 BR U Profile: Q10

E.G. Elev (ft)	209.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	209.28	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	206.02	Flow Area (sq ft)	390.32	331.60	49.90
E.G. Slope (ft/ft)	0.002475	Area (sq ft)	394.50	331.60	50.54
Q Total (cfs)	1256.00	Flow (cfs)	439.19	791.12	25.70
Top Width (ft)	394.71	Top Width (ft)	223.65	77.35	93.71
Vel Total (ft/s)	1.63	Avg. Vel. (ft/s)	1.13	2.39	0.51
Max Chl Dpth (ft)	6.98	Hydr. Depth (ft)	1.76	4.29	0.53
Conv. Total (cfs)	25246.4	Conv. (cfs)	8827.9	15901.9	516.5
Length Wtd. (ft)	56.00	Wetted Per. (ft)	226.44	79.93	94.12
Min Ch El (ft)	202.30	Shear (lb/sq ft)	0.27	0.64	0.08
Alpha	1.52	Stream Power (lb/ft s)	0.30	1.53	0.04
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	5.14	6.74	5.33
C & E Loss (ft)	0.01	Cum SA (acres)	2.92	2.58	4.43

Plan: Prop Clear Creek 1 RS: 335 BR U Profile: Q25

E.G. Elev (ft)	210.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	210.17	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	207.20	Flow Area (sq ft)	587.73	400.21	176.17
E.G. Slope (ft/ft)	0.002548	Area (sq ft)	593.72	400.21	177.13
Q Total (cfs)	2081.00	Flow (cfs)	843.12	1098.27	139.61
Top Width (ft)	492.20	Top Width (ft)	225.51	77.35	189.33
Vel Total (ft/s)	1.79	Avg. Vel. (ft/s)	1.43	2.74	0.79
Max Chl Dpth (ft)	7.87	Hydr. Depth (ft)	2.63	5.17	0.93
Conv. Total (cfs)	41223.2	Conv. (cfs)	16701.7	21756.0	2765.5
Length Wtd. (ft)	56.00	Wetted Per. (ft)	232.05	79.93	192.65
Min Ch El (ft)	202.30	Shear (lb/sq ft)	0.40	0.80	0.15
Alpha	1.52	Stream Power (lb/ft s)	0.58	2.19	0.12
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	8.95	10.17	10.79
C & E Loss (ft)	0.01	Cum SA (acres)	4.50	3.03	5.92

Plan: Prop Clear Creek 1 RS: 335 BR U Profile: Q50

E.G. Elev (ft)	211.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	211.48	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	207.99	Flow Area (sq ft)	881.79	501.37	459.68
E.G. Slope (ft/ft)	0.001345	Area (sq ft)	890.44	501.37	461.12
Q Total (cfs)	2726.00	Flow (cfs)	1162.71	1161.41	401.89
Top Width (ft)	536.07	Top Width (ft)	228.26	77.35	230.46
Vel Total (ft/s)	1.48	Avg. Vel. (ft/s)	1.32	2.32	0.87
Max Chl Dpth (ft)	9.18	Hydr. Depth (ft)	3.90	6.48	2.00
Conv. Total (cfs)	74341.9	Conv. (cfs)	31708.6	31673.3	10960.0
Length Wtd. (ft)	56.00	Wetted Per. (ft)	240.32	79.93	239.27
Min Ch El (ft)	202.30	Shear (lb/sq ft)	0.31	0.53	0.16
Alpha	1.44	Stream Power (lb/ft s)	0.41	1.22	0.14
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	17.22	16.78	24.77
C & E Loss (ft)	0.00	Cum SA (acres)	5.55	3.29	8.79

Plan: Prop Clear Creek 1 RS: 335 BR U Profile: Q100

E.G. Elev (ft)	212.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	212.81	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	208.44	Flow Area (sq ft)	1186.42	604.89	770.29
E.G. Slope (ft/ft)	0.000872	Area (sq ft)	1197.80	604.89	772.22
Q Total (cfs)	3501.00	Flow (cfs)	1495.95	1279.09	725.96
Top Width (ft)	542.87	Top Width (ft)	231.07	77.35	234.46
Vel Total (ft/s)	1.37	Avg. Vel. (ft/s)	1.26	2.11	0.94
Max Chl Dpth (ft)	10.51	Hydr. Depth (ft)	5.18	7.82	3.29
Conv. Total (cfs)	118534.0	Conv. (cfs)	50648.6	43306.5	24578.9
Length Wtd. (ft)	56.00	Wetted Per. (ft)	248.78	79.93	248.83
Min Ch El (ft)	202.30	Shear (lb/sq ft)	0.26	0.41	0.17
Alpha	1.34	Stream Power (lb/ft s)	0.33	0.87	0.16
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	25.10	21.64	37.73
C & E Loss (ft)	0.00	Cum SA (acres)	5.65	3.29	9.19

Plan: Prop Clear Creek 1 RS: 335 BR D Profile: Q10

E.G. Elev (ft)	209.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	209.18	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	206.08	Flow Area (sq ft)	375.15	271.76	226.23
E.G. Slope (ft/ft)	0.001875	Area (sq ft)	375.15	271.76	228.26
Q Total (cfs)	1256.00	Flow (cfs)	509.54	554.44	192.02
Top Width (ft)	417.16	Top Width (ft)	185.44	61.26	170.46
Vel Total (ft/s)	1.44	Avg. Vel. (ft/s)	1.36	2.04	0.85
Max Chl Dpth (ft)	6.98	Hydr. Depth (ft)	2.02	4.44	1.33
Conv. Total (cfs)	29003.0	Conv. (cfs)	11766.2	12802.8	4434.0
Length Wtd. (ft)	27.00	Wetted Per. (ft)	189.01	67.28	172.85
Min Ch El (ft)	202.20	Shear (lb/sq ft)	0.23	0.47	0.15
Alpha	1.30	Stream Power (lb/ft s)	0.32	0.96	0.13
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	4.65	6.35	5.15
C & E Loss (ft)	0.00	Cum SA (acres)	2.66	2.49	4.26

Plan: Prop Clear Creek 1 RS: 335 BR D Profile: Q25

E.G. Elev (ft)	210.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	210.05	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	206.91	Flow Area (sq ft)	550.35	325.60	402.23
E.G. Slope (ft/ft)	0.002108	Area (sq ft)	550.35	325.60	405.00
Q Total (cfs)	2081.00	Flow (cfs)	854.22	780.95	445.83
Top Width (ft)	494.43	Top Width (ft)	202.70	61.26	230.47
Vel Total (ft/s)	1.63	Avg. Vel. (ft/s)	1.55	2.40	1.11
Max Chl Dpth (ft)	7.85	Hydr. Depth (ft)	2.72	5.32	1.75
Conv. Total (cfs)	45323.0	Conv. (cfs)	18604.4	17008.7	9709.9
Length Wtd. (ft)	27.00	Wetted Per. (ft)	208.25	69.04	236.01
Min Ch El (ft)	202.20	Shear (lb/sq ft)	0.35	0.62	0.22
Alpha	1.29	Stream Power (lb/ft s)	0.54	1.49	0.25
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	8.22	9.70	10.41
C & E Loss (ft)	0.00	Cum SA (acres)	4.22	2.94	5.65

Plan: Prop Clear Creek 1 RS: 335 BR D Profile: Q50

E.G. Elev (ft)	211.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	211.42	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	207.67	Flow Area (sq ft)	828.25	409.01	754.76
E.G. Slope (ft/ft)	0.001150	Area (sq ft)	828.25	409.01	758.68
Q Total (cfs)	2726.00	Flow (cfs)	1119.20	821.98	784.81
Top Width (ft)	534.21	Top Width (ft)	205.56	61.26	267.39
Vel Total (ft/s)	1.37	Avg. Vel. (ft/s)	1.35	2.01	1.04
Max Chl Dpth (ft)	9.22	Hydr. Depth (ft)	4.03	6.68	2.83
Conv. Total (cfs)	80389.6	Conv. (cfs)	33005.3	24240.2	23144.2
Length Wtd. (ft)	27.00	Wetted Per. (ft)	214.14	71.76	278.62
Min Ch El (ft)	202.20	Shear (lb/sq ft)	0.28	0.41	0.19
Alpha	1.22	Stream Power (lb/ft s)	0.38	0.82	0.20
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	16.11	16.20	23.99
C & E Loss (ft)	0.00	Cum SA (acres)	5.27	3.20	8.47

Plan: Prop Clear Creek 1 RS: 335 BR D Profile: Q100

E.G. Elev (ft)	212.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	212.77	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	208.06	Flow Area (sq ft)	1109.52	492.25	1119.72
E.G. Slope (ft/ft)	0.000778	Area (sq ft)	1109.52	492.25	1124.80
Q Total (cfs)	3501.00	Flow (cfs)	1424.06	898.10	1178.84
Top Width (ft)	541.12	Top Width (ft)	208.41	61.26	271.45
Vel Total (ft/s)	1.29	Avg. Vel. (ft/s)	1.28	1.82	1.05
Max Chl Dpth (ft)	10.57	Hydr. Depth (ft)	5.32	8.04	4.14
Conv. Total (cfs)	125526.9	Conv. (cfs)	51059.0	32201.1	42266.7
Length Wtd. (ft)	27.00	Wetted Per. (ft)	220.02	74.48	288.34
Min Ch El (ft)	202.20	Shear (lb/sq ft)	0.24	0.32	0.19
Alpha	1.15	Stream Power (lb/ft s)	0.31	0.59	0.20
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	23.61	20.94	36.51
C & E Loss (ft)	0.00	Cum SA (acres)	5.37	3.20	8.86

Plan: Prop Clear Creek 1 RS: 280 Profile: Q10

E.G. Elev (ft)	209.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	209.13	Reach Len. (ft)	645.00	645.00	645.00
Crit W.S. (ft)	206.08	Flow Area (sq ft)	392.95	274.13	297.59
E.G. Slope (ft/ft)	0.001747	Area (sq ft)	575.30	274.13	392.53
Q Total (cfs)	1256.00	Flow (cfs)	471.40	545.85	238.75
Top Width (ft)	631.12	Top Width (ft)	294.83	64.26	272.03
Vel Total (ft/s)	1.30	Avg. Vel. (ft/s)	1.20	1.99	0.80
Max Chl Dpth (ft)	6.93	Hydr. Depth (ft)	1.99	4.27	1.46
Conv. Total (cfs)	30046.4	Conv. (cfs)	11277.0	13058.0	5711.4
Length Wtd. (ft)	645.00	Wetted Per. (ft)	198.13	66.75	203.32
Min Ch El (ft)	202.20	Shear (lb/sq ft)	0.22	0.45	0.16
Alpha	1.41	Stream Power (lb/ft s)	0.26	0.89	0.13
Frctn Loss (ft)	1.51	Cum Volume (acre-ft)	4.36	6.18	4.96
C & E Loss (ft)	0.00	Cum SA (acres)	2.51	2.45	4.13

Plan: Prop Clear Creek 1 RS: 280 Profile: Q25

E.G. Elev (ft)	210.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	210.00	Reach Len. (ft)	645.00	645.00	645.00
Crit W.S. (ft)	206.94	Flow Area (sq ft)	583.83	330.05	499.89
E.G. Slope (ft/ft)	0.002072	Area (sq ft)	875.06	330.05	659.17
Q Total (cfs)	2081.00	Flow (cfs)	748.79	809.85	522.36
Top Width (ft)	784.32	Top Width (ft)	376.51	64.26	343.55
Vel Total (ft/s)	1.47	Avg. Vel. (ft/s)	1.28	2.45	1.04
Max Chl Dpth (ft)	7.80	Hydr. Depth (ft)	2.62	5.14	1.90
Conv. Total (cfs)	45720.8	Conv. (cfs)	16451.3	17792.9	11476.6
Length Wtd. (ft)	645.00	Wetted Per. (ft)	223.57	66.75	263.69
Min Ch El (ft)	202.20	Shear (lb/sq ft)	0.34	0.64	0.25
Alpha	1.48	Stream Power (lb/ft s)	0.43	1.57	0.26
Frctn Loss (ft)	1.12	Cum Volume (acre-ft)	7.78	9.50	10.08
C & E Loss (ft)	0.01	Cum SA (acres)	4.04	2.90	5.48

Plan: Prop Clear Creek 1 RS: 280 Profile: Q50

E.G. Elev (ft)	211.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	211.39	Reach Len. (ft)	645.00	645.00	645.00
Crit W.S. (ft)	207.65	Flow Area (sq ft)	893.86	419.43	904.75
E.G. Slope (ft/ft)	0.000956	Area (sq ft)	1455.33	419.43	1193.53
Q Total (cfs)	2726.00	Flow (cfs)	1034.46	820.22	871.32
Top Width (ft)	921.03	Top Width (ft)	454.94	64.26	401.84
Vel Total (ft/s)	1.23	Avg. Vel. (ft/s)	1.16	1.96	0.96
Max Chl Dpth (ft)	9.19	Hydr. Depth (ft)	4.01	6.53	3.04
Conv. Total (cfs)	88167.5	Conv. (cfs)	33457.7	26528.5	28181.3
Length Wtd. (ft)	645.00	Wetted Per. (ft)	223.57	66.75	298.11
Min Ch El (ft)	202.20	Shear (lb/sq ft)	0.24	0.38	0.18
Alpha	1.29	Stream Power (lb/ft s)	0.28	0.73	0.17
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	15.41	15.94	23.38
C & E Loss (ft)	0.01	Cum SA (acres)	5.07	3.17	8.27

Plan: Prop Clear Creek 1 RS: 280 Profile: Q100

E.G. Elev (ft)	212.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	212.76	Reach Len. (ft)	645.00	645.00	645.00
Crit W.S. (ft)	208.04	Flow Area (sq ft)	1198.90	507.38	1312.39
E.G. Slope (ft/ft)	0.000596	Area (sq ft)	2083.63	507.38	1753.62
Q Total (cfs)	3501.00	Flow (cfs)	1332.56	889.52	1278.92
Top Width (ft)	956.65	Top Width (ft)	464.60	64.26	427.79
Vel Total (ft/s)	1.16	Avg. Vel. (ft/s)	1.11	1.75	0.97
Max Chl Dpth (ft)	10.56	Hydr. Depth (ft)	5.38	7.90	4.41
Conv. Total (cfs)	143394.3	Conv. (cfs)	54578.9	36433.1	52382.3
Length Wtd. (ft)	645.00	Wetted Per. (ft)	223.57	66.75	298.11
Min Ch El (ft)	202.20	Shear (lb/sq ft)	0.20	0.28	0.16
Alpha	1.19	Stream Power (lb/ft s)	0.22	0.50	0.16
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	22.62	20.63	35.62
C & E Loss (ft)	0.01	Cum SA (acres)	5.16	3.17	8.65

Plan: Prop Clear Creek 1 RS: 0 Profile: Q10

E.G. Elev (ft)	207.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	207.61	Reach Len. (ft)			
Crit W.S. (ft)	204.99	Flow Area (sq ft)	12.99	560.34	276.79
E.G. Slope (ft/ft)	0.003290	Area (sq ft)	12.99	560.34	276.79
Q Total (cfs)	1256.00	Flow (cfs)	4.87	970.01	281.12
Top Width (ft)	597.15	Top Width (ft)	44.51	267.30	285.34
Vel Total (ft/s)	1.48	Avg. Vel. (ft/s)	0.37	1.73	1.02
Max Chl Dpth (ft)	6.17	Hydr. Depth (ft)	0.29	2.10	0.97
Conv. Total (cfs)	21897.3	Conv. (cfs)	84.9	16911.3	4901.1
Length Wtd. (ft)		Wetted Per. (ft)	44.52	270.54	285.53
Min Ch EI (ft)	201.44	Shear (lb/sq ft)	0.06	0.43	0.20
Alpha	1.17	Stream Power (lb/ft s)	0.02	0.74	0.20
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Prop Clear Creek 1 RS: 0 Profile: Q25

E.G. Elev (ft)	208.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	208.90	Reach Len. (ft)			
Crit W.S. (ft)	206.15	Flow Area (sq ft)	175.17	953.27	702.79
E.G. Slope (ft/ft)	0.001470	Area (sq ft)	175.17	953.27	702.79
Q Total (cfs)	2081.00	Flow (cfs)	102.56	1375.93	602.51
Top Width (ft)	892.62	Top Width (ft)	169.47	327.11	396.04
Vel Total (ft/s)	1.14	Avg. Vel. (ft/s)	0.59	1.44	0.86
Max Chl Dpth (ft)	7.46	Hydr. Depth (ft)	1.03	2.91	1.77
Conv. Total (cfs)	54271.6	Conv. (cfs)	2674.7	35883.7	15713.3
Length Wtd. (ft)		Wetted Per. (ft)	169.66	330.41	396.41
Min Ch EI (ft)	201.44	Shear (lb/sq ft)	0.09	0.26	0.16
Alpha	1.24	Stream Power (lb/ft s)	0.06	0.38	0.14
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Prop Clear Creek 1 RS: 0 Profile: Q50

E.G. Elev (ft)	211.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	211.11	Reach Len. (ft)			
Crit W.S. (ft)	206.47	Flow Area (sq ft)	625.61	1733.49	1964.80
E.G. Slope (ft/ft)	0.000270	Area (sq ft)	625.61	1733.49	1964.80
Q Total (cfs)	2726.00	Flow (cfs)	296.93	1488.86	940.21
Top Width (ft)	1307.67	Top Width (ft)	229.72	363.37	714.58
Vel Total (ft/s)	0.63	Avg. Vel. (ft/s)	0.47	0.86	0.48
Max Chl Dpth (ft)	9.67	Hydr. Depth (ft)	2.72	4.77	2.75
Conv. Total (cfs)	166051.8	Conv. (cfs)	18087.4	90692.5	57271.9
Length Wtd. (ft)		Wetted Per. (ft)	230.51	366.70	715.12
Min Ch EI (ft)	201.44	Shear (lb/sq ft)	0.05	0.08	0.05
Alpha	1.27	Stream Power (lb/ft s)	0.02	0.07	0.02
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

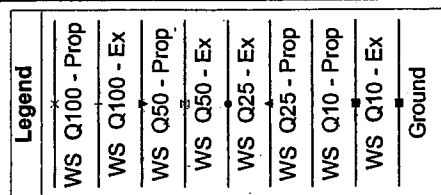
Plan: Prop Clear Creek 1 RS: 0 Profile: Q100

E.G. Elev (ft)	212.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.	0.100	0.080	0.100
W.S. Elev (ft)	212.61	Reach Len. (ft)			
Crit W.S. (ft)	206.71	Flow Area (sq ft)	972.24	2278.55	3057.81
E.G. Slope (ft/ft)	0.000139	Area (sq ft)	972.24	2278.55	3057.81
Q Total (cfs)	3501.00	Flow (cfs)	440.06	1684.17	1376.77
Top Width (ft)	1335.89	Top Width (ft)	232.46	363.37	740.05
Vel Total (ft/s)	0.55	Avg. Vel. (ft/s)	0.45	0.74	0.45
Max Chl Dpth (ft)	11.17	Hydr. Depth (ft)	4.18	6.27	4.13
Conv. Total (cfs)	297353.0	Conv. (cfs)	37376.1	143042.6	116934.4
Length Wtd. (ft)		Wetted Per. (ft)	233.64	366.70	740.64
Min Ch El (ft)	201.44	Shear (lb/sq ft)	0.04	0.05	0.04
Alpha	1.20	Stream Power (lb/ft s)	0.02	0.04	0.02
Frcn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

TRIBUTARY NO. 5 TO MILL CREEK

(DA 25)

Clear Creek 1



HEC-RAS River: Clear Creek Reach: 1

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Val Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	1200	Q10	Prop	1069.00	229.89	233.37		233.39	0.001835	1.19	908.79	414.92	0.14
1	1200	Q10	Ex	1069.00	229.89	233.37		233.40	0.001826	1.19	910.11	415.05	0.14
1	1200	Q25	Prop	1710.00	229.89	234.05		234.09	0.001974	1.46	1202.33	444.61	0.15
1	1200	Q25	Ex	1710.00	229.89	234.07		234.10	0.001945	1.46	1208.14	445.10	0.15
1	1200	Q50	Prop	2242.00	229.89	234.51		234.55	0.002096	1.66	1410.85	470.53	0.16
1	1200	Q50	Ex	2242.00	229.89	234.52		234.56	0.002071	1.65	1416.57	470.96	0.15
1	1200	Q100	Prop	2882.00	229.89	234.97		235.03	0.002237	1.86	1636.32	498.28	0.16
1	1200	Q100	Ex	2882.00	229.89	234.99		235.04	0.002216	1.85	1641.52	498.62	0.16
1	370	Q10	Prop	1069.00	227.38	231.17	229.55	231.21	0.004101	1.40	764.12	462.39	0.19
1	370	Q10	Ex	1069.00	227.38	231.14		231.17	0.004304	1.43	748.34	455.06	0.20
1	370	Q25	Prop	1710.00	227.38	231.69	229.91	231.74	0.004357	1.68	1020.41	513.08	0.21
1	370	Q25	Ex	1710.00	227.38	231.64		231.69	0.004744	1.73	993.71	508.86	0.21
1	370	Q50	Prop	2242.00	227.38	232.03	230.11	232.09	0.004503	1.89	1198.57	536.76	0.21
1	370	Q50	Ex	2242.00	227.38	231.97		232.03	0.004913	1.94	1165.71	533.02	0.22
1	370	Q100	Prop	2882.00	227.38	232.46	230.37	232.53	0.004272	2.05	1433.50	563.06	0.21
1	370	Q100	Ex	2882.00	227.38	232.39		232.46	0.004661	2.11	1393.43	558.20	0.22
1	315		Bridge										
1	260*	Q10	Prop	1069.00	227.15	230.64	229.39	230.68	0.004985	1.50	712.68	483.49	0.21
1	260*	Q10	Ex	1069.00	227.15	230.61		230.64	0.005393	1.54	694.63	471.44	0.22
1	260*	Q25	Prop	1710.00	227.15	231.11	229.66	231.16	0.005272	1.83	965.65	572.96	0.23
1	260*	Q25	Ex	1710.00	227.15	231.06		231.11	0.005758	1.88	936.84	571.11	0.23
1	260*	Q50	Prop	2242.00	227.15	231.43	229.88	231.49	0.005434	2.05	1148.34	586.89	0.23
1	260*	Q50	Ex	2242.00	227.15	231.37		231.44	0.005919	2.10	1115.63	563.01	0.24
1	260*	Q100	Prop	2882.00	227.15	231.92	230.08	231.98	0.004586	2.13	1452.18	657.17	0.22
1	260*	Q100	Ex	2882.00	227.15	231.86		231.93	0.004888	2.17	1417.45	651.56	0.23
1	205		Bridge										
1	150	Q10	Prop	1069.00	226.92	230.10		230.13	0.003951	1.37	862.91	659.83	0.19
1	150	Q10	Ex	1069.00	226.92	230.10		230.13	0.003951	1.37	862.91	659.83	0.19
1	150	Q25	Prop	1710.00	226.92	230.53		230.57	0.004212	1.65	1146.88	678.91	0.20
1	150	Q25	Ex	1710.00	226.92	230.53		230.57	0.004212	1.65	1146.88	678.91	0.20
1	150	Q50	Prop	2242.00	226.92	230.83		230.87	0.004385	1.84	1350.77	697.72	0.21
1	150	Q50	Ex	2242.00	226.92	230.83		230.87	0.004385	1.84	1350.77	697.72	0.21
1	150	Q100	Prop	2882.00	226.92	231.47		231.52	0.002917	1.76	1813.09	726.33	0.18
1	150	Q100	Ex	2882.00	226.92	231.47		231.52	0.002917	1.76	1813.09	726.33	0.18
1	0	Q10	Prop	1069.00	225.11	227.91	227.91	228.35	0.142256	5.31	201.43	235.39	1.01
1	0	Q10	Ex	1069.00	225.11	227.91	227.91	228.35	0.142256	5.31	201.43	235.39	1.01

HEC-RAS River: Clear Creek Reach: 1 (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Chl El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	0	Q25	Prop	1710.00	225.11	228.35	228.24	228.79	0.102333	5.32	321.29	292.13	0.89
1	0	Q25	Ex	1710.00	225.11	228.35	228.24	228.79	0.102333	5.32	321.29	292.13	0.89
1	0	Q50	Prop	2242.00	225.11	229.61	228.48	229.75	0.015181	3.03	740.75	375.59	0.38
1	0	Q50	Ex	2242.00	225.11	229.61	228.47	229.75	0.015181	3.03	740.75	375.59	0.38
1	0	Q100	Prop	2882.00	225.11	230.86	228.71	230.94	0.005221	2.28	1301.02	547.36	0.24
1	0	Q100	Ex	2882.00	225.11	230.86	228.71	230.94	0.005221	2.28	1301.02	547.36	0.24

Plan: Prop Clear Creek 1 RS: 1200 Profile: Q10

E.G. Elev (ft)	233.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.100	0.095	0.100
W.S. Elev (ft)	233.37	Reach Len. (ft)	830.00	830.00	830.00
Crit W.S. (ft)		Flow Area (sq ft)	7.22	889.52	12.05
E.G. Slope (ft/ft)	0.001835	Area (sq ft)	7.22	889.52	12.05
Q Total (cfs)	1069.00	Flow (cfs)	2.84	1061.62	4.54
Top Width (ft)	414.92	Top Width (ft)	14.88	373.65	26.39
Vel Total (ft/s)	1.18	Avg. Vel. (ft/s)	0.39	1.19	0.38
Max Chl Dpth (ft)	3.48	Hydr. Depth (ft)	0.49	2.38	0.46
Conv. Total (cfs)	24957.7	Conv. (cfs)	66.2	24785.4	106.1
Length Wtd. (ft)	830.00	Wetted Per. (ft)	14.91	374.12	26.40
Min Ch El (ft)	229.89	Shear (lb/sq ft)	0.06	0.27	0.05
Alpha	1.02	Stream Power (lb/ft s)	0.02	0.33	0.02
Frctn Loss (ft)	2.19	Cum Volume (acre-ft)	0.07	20.75	0.71
C & E Loss (ft)	0.00	Cum SA (acres)	0.16	11.22	1.07

Plan: Prop Clear Creek 1 RS: 1200 Profile: Q25

E.G. Elev (ft)	234.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.100	0.095	0.100
W.S. Elev (ft)	234.05	Reach Len. (ft)	830.00	830.00	830.00
Crit W.S. (ft)		Flow Area (sq ft)	20.13	1144.79	37.41
E.G. Slope (ft/ft)	0.001974	Area (sq ft)	20.13	1144.79	37.41
Q Total (cfs)	1710.00	Flow (cfs)	11.94	1676.97	21.09
Top Width (ft)	444.61	Top Width (ft)	23.58	373.65	47.38
Vel Total (ft/s)	1.42	Avg. Vel. (ft/s)	0.59	1.46	0.56
Max Chl Dpth (ft)	4.16	Hydr. Depth (ft)	0.85	3.06	0.79
Conv. Total (cfs)	38484.3	Conv. (cfs)	268.6	37741.0	474.7
Length Wtd. (ft)	830.00	Wetted Per. (ft)	23.64	374.12	47.41
Min Ch El (ft)	229.89	Shear (lb/sq ft)	0.10	0.38	0.10
Alpha	1.04	Stream Power (lb/ft s)	0.06	0.55	0.05
Frctn Loss (ft)	2.34	Cum Volume (acre-ft)	0.21	27.11	1.42
C & E Loss (ft)	0.00	Cum SA (acres)	0.31	11.61	1.75

Plan: Prop Clear Creek 1 RS: 1200 Profile: Q50

E.G. Elev (ft)	234.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.100	0.095	0.100
W.S. Elev (ft)	234.51	Reach Len. (ft)	830.00	830.00	830.00
Crit W.S. (ft)		Flow Area (sq ft)	31.75	1314.94	64.15
E.G. Slope (ft/ft)	0.002096	Area (sq ft)	31.75	1314.94	64.15
Q Total (cfs)	2242.00	Flow (cfs)	23.73	2176.86	41.41
Top Width (ft)	470.53	Top Width (ft)	27.49	373.65	69.38
Vel Total (ft/s)	1.59	Avg. Vel. (ft/s)	0.75	1.66	0.65
Max Chl Dpth (ft)	4.62	Hydr. Depth (ft)	1.16	3.52	0.92
Conv. Total (cfs)	48968.4	Conv. (cfs)	518.3	47545.7	904.4
Length Wtd. (ft)	830.00	Wetted Per. (ft)	27.58	374.12	69.42
Min Ch El (ft)	229.89	Shear (lb/sq ft)	0.15	0.46	0.12
Alpha	1.06	Stream Power (lb/ft s)	0.11	0.76	0.08
Frctn Loss (ft)	2.46	Cum Volume (acre-ft)	0.37	31.93	2.12
C & E Loss (ft)	0.00	Cum SA (acres)	0.47	11.76	2.19

Plan: Prop Clear Creek 1 RS: 1200 Profile: Q100

E.G. Elev (ft)	235.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.100	0.095	0.100
W.S. Elev (ft)	234.97	Reach Len. (ft)	830.00	830.00	830.00
Crit W.S. (ft)		Flow Area (sq ft)	47.91	1488.92	99.49
E.G. Slope (ft/ft)	0.002237	Area (sq ft)	47.91	1488.92	99.49
Q Total (cfs)	2882.00	Flow (cfs)	36.62	2766.19	79.19
Top Width (ft)	498.28	Top Width (ft)	42.11	373.65	82.51
Vel Total (ft/s)	1.76	Avg. Vel. (ft/s)	0.76	1.86	0.80
Max Chl Dpth (ft)	5.08	Hydr. Depth (ft)	1.14	3.98	1.21
Conv. Total (cfs)	60934.8	Conv. (cfs)	774.3	58486.3	1674.2
Length Wtd. (ft)	830.00	Wetted Per. (ft)	42.23	374.12	82.55
Min Ch El (ft)	229.89	Shear (lb/sq ft)	0.16	0.56	0.17
Alpha	1.08	Stream Power (lb/ft s)	0.12	1.03	0.13
Frctn Loss (ft)	2.50	Cum Volume (acre-ft)	0.66	38.03	3.47
C & E Loss (ft)	0.00	Cum SA (acres)	0.76	11.86	2.87

Plan: Prop Clear Creek 1 RS: 370 Profile: Q10

E.G. Elev (ft)	231.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.095	
W.S. Elev (ft)	231.17	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	229.55	Flow Area (sq ft)		764.12	
E.G. Slope (ft/ft)	0.004101	Area (sq ft)		764.12	
Q Total (cfs)	1069.00	Flow (cfs)		1069.00	
Top Width (ft)	462.39	Top Width (ft)		462.39	
Vel Total (ft/s)	1.40	Avg. Vel. (ft/s)		1.40	
Max Chl Dpth (ft)	3.79	Hydr. Depth (ft)		1.65	
Conv. Total (cfs)	16691.9	Conv. (cfs)		16691.9	
Length Wtd. (ft)	27.00	Wetted Per. (ft)		462.97	
Min Ch El (ft)	227.38	Shear (lb/sq ft)		0.42	
Alpha	1.00	Stream Power (lb/ft s)		0.59	
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.00	5.00	0.60
C & E Loss (ft)	0.00	Cum SA (acres)	0.01	3.26	0.82

Plan: Prop Clear Creek 1 RS: 370 Profile: Q25

E.G. Elev (ft)	231.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.100	0.095	0.100
W.S. Elev (ft)	231.69	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	229.91	Flow Area (sq ft)	0.10	1014.78	5.53
E.G. Slope (ft/ft)	0.004357	Area (sq ft)	0.10	1014.78	5.53
Q Total (cfs)	1710.00	Flow (cfs)	0.01	1707.94	2.05
Top Width (ft)	513.08	Top Width (ft)	2.29	486.91	23.88
Vel Total (ft/s)	1.68	Avg. Vel. (ft/s)	0.12	1.68	0.37
Max Chl Dpth (ft)	4.31	Hydr. Depth (ft)	0.04	2.08	0.23
Conv. Total (cfs)	25907.1	Conv. (cfs)	0.2	25875.9	31.0
Length Wtd. (ft)	27.00	Wetted Per. (ft)	2.29	487.52	23.89
Min Ch El (ft)	227.38	Shear (lb/sq ft)	0.01	0.57	0.06
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.95	0.02
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	0.02	6.53	1.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.06	3.42	1.07

Plan: Prop Clear Creek 1 RS: 370 Profile: Q50

E.G. Elev (ft)	232.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.100	0.095	0.100
W.S. Elev (ft)	232.03	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	230.11	Flow Area (sq ft)	2.36	1179.78	16.43
E.G. Slope (ft/ft)	0.004503	Area (sq ft)	2.36	1179.78	16.43
Q Total (cfs)	2242.00	Flow (cfs)	0.88	2232.00	9.12
Top Width (ft)	536.76	Top Width (ft)	10.28	486.91	39.56
Vel Total (ft/s)	1.87	Avg. Vel. (ft/s)	0.37	1.89	0.55
Max Chl Dpth (ft)	4.65	Hydr. Depth (ft)	0.23	2.42	0.42
Conv. Total (cfs)	33410.9	Conv. (cfs)	13.1	33262.0	135.9
Length Wtd. (ft)	27.00	Wetted Per. (ft)	10.29	487.52	39.57
Min Ch El (ft)	227.38	Shear (lb/sq ft)	0.06	0.68	0.12
Alpha	1.02	Stream Power (lb/ft s)	0.02	1.29	0.06
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	0.04	8.16	1.35
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	3.56	1.15

Plan: Prop Clear Creek 1 RS: 370 Profile: Q100

E.G. Elev (ft)	232.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.100	0.095	0.100
W.S. Elev (ft)	232.46	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	230.37	Flow Area (sq ft)	8.22	1388.01	37.27
E.G. Slope (ft/ft)	0.004272	Area (sq ft)	8.22	1388.01	37.27
Q Total (cfs)	2882.00	Flow (cfs)	4.83	2850.44	26.73
Top Width (ft)	563.06	Top Width (ft)	17.44	486.91	58.71
Vel Total (ft/s)	2.01	Avg. Vel. (ft/s)	0.59	2.05	0.72
Max Chl Dpth (ft)	5.08	Hydr. Depth (ft)	0.47	2.85	0.63
Conv. Total (cfs)	44094.4	Conv. (cfs)	73.9	43611.5	409.0
Length Wtd. (ft)	27.00	Wetted Per. (ft)	17.46	487.52	58.72
Min Ch El (ft)	227.38	Shear (lb/sq ft)	0.13	0.76	0.17
Alpha	1.03	Stream Power (lb/ft s)	0.07	1.56	0.12
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.13	10.62	2.17
C & E Loss (ft)	0.00	Cum SA (acres)	0.19	3.66	1.53

Plan: Prop Clear Creek 1 RS: 315 BR U Profile: Q10

E.G. Elev (ft)	231.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.095	
W.S. Elev (ft)	231.04	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	229.59	Flow Area (sq ft)		680.91	
E.G. Slope (ft/ft)	0.005578	Area (sq ft)		680.91	
Q Total (cfs)	1069.00	Flow (cfs)		1069.00	
Top Width (ft)	424.20	Top Width (ft)		424.20	
Vel Total (ft/s)	1.57	Avg. Vel. (ft/s)		1.57	
Max Chl Dpth (ft)	3.66	Hydr. Depth (ft)		1.61	
Conv. Total (cfs)	14312.9	Conv. (cfs)		14312.9	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		437.07	
Min Ch El (ft)	227.38	Shear (lb/sq ft)		0.54	
Alpha	1.00	Stream Power (lb/ft s)		0.85	
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	0.00	4.55	0.60
C & E Loss (ft)	0.00	Cum SA (acres)	0.01	2.98	0.82

Plan: Prop Clear Creek 1 RS: 315 BR U Profile: Q25

E.G. Elev (ft)	231.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.095	0.100
W.S. Elev (ft)	231.54	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	229.93	Flow Area (sq ft)		911.06	2.51
E.G. Slope (ft/ft)	0.006226	Area (sq ft)		911.06	2.51
Q Total (cfs)	1710.00	Flow (cfs)		1709.15	0.85
Top Width (ft)	484.69	Top Width (ft)		468.53	16.17
Vel Total (ft/s)	1.87	Avg. Vel. (ft/s)		1.88	0.34
Max Chl Dpth (ft)	4.16	Hydr. Depth (ft)		1.94	0.15
Conv. Total (cfs)	21671.3	Conv. (cfs)		21660.6	10.7
Length Wtd. (ft)	56.00	Wetted Per. (ft)		486.15	16.17
Min Ch El (ft)	227.38	Shear (lb/sq ft)		0.73	0.06
Alpha	1.00	Stream Power (lb/ft s)		1.37	0.02
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	0.02	5.93	1.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.06	3.12	1.06

Plan: Prop Clear Creek 1 RS: 315 BR U Profile: Q50

E.G. Elev (ft)	231.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.100	0.095	0.100
W.S. Elev (ft)	231.88	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	230.15	Flow Area (sq ft)	0.96	1067.39	10.74
E.G. Slope (ft/ft)	0.006357	Area (sq ft)	0.96	1067.39	10.74
Q Total (cfs)	2242.00	Flow (cfs)	0.29	2235.65	6.05
Top Width (ft)	509.40	Top Width (ft)	7.25	469.41	32.74
Vel Total (ft/s)	2.08	Avg. Vel. (ft/s)	0.31	2.09	0.56
Max Chl Dpth (ft)	4.50	Hydr. Depth (ft)	0.13	2.27	0.33
Conv. Total (cfs)	28120.5	Conv. (cfs)	3.7	28040.9	75.9
Length Wtd. (ft)	56.00	Wetted Per. (ft)	7.26	490.37	32.75
Min Ch El (ft)	227.38	Shear (lb/sq ft)	0.05	0.86	0.13
Alpha	1.01	Stream Power (lb/ft s)	0.02	1.81	0.07
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)	0.04	7.47	1.34
C & E Loss (ft)	0.00	Cum SA (acres)	0.10	3.26	1.13

Plan: Prop Clear Creek 1 RS: 315 BR U Profile: Q100

E.G. Elev (ft)	232.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.100	0.095	0.100
W.S. Elev (ft)	232.31	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	230.42	Flow Area (sq ft)	5.84	1272.60	29.11
E.G. Slope (ft/ft)	0.005840	Area (sq ft)	5.84	1272.60	29.11
Q Total (cfs)	2882.00	Flow (cfs)	3.59	2855.80	22.61
Top Width (ft)	535.52	Top Width (ft)	14.66	469.41	51.45
Vel Total (ft/s)	2.20	Avg. Vel. (ft/s)	0.61	2.24	0.78
Max Chl Dpth (ft)	4.93	Hydr. Depth (ft)	0.40	2.71	0.57
Conv. Total (cfs)	37711.1	Conv. (cfs)	47.0	37368.3	295.9
Length Wtd. (ft)	56.00	Wetted Per. (ft)	14.68	494.74	51.46
Min Ch El (ft)	227.38	Shear (lb/sq ft)	0.15	0.94	0.21
Alpha	1.03	Stream Power (lb/ft s)	0.09	2.10	0.16
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	0.12	9.80	2.15
C & E Loss (ft)	0.00	Cum SA (acres)	0.18	3.37	1.49

Plan: Prop Clear Creek 1 RS: 315 BR D Profile: Q10

E.G. Elev (ft)	230.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.000	0.095	0.100
W.S. Elev (ft)	230.77	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	229.39	Flow Area (sq ft)	0.00	745.74	8.98
E.G. Slope (ft/ft)	0.004223	Area (sq ft)	0.00	745.74	8.98
Q Total (cfs)	1069.00	Flow (cfs)	0.00	1066.50	2.50
Top Width (ft)	500.34	Top Width (ft)	0.27	434.32	65.75
Vel Total (ft/s)	1.42	Avg. Vel. (ft/s)	0.03	1.43	0.28
Max Chl Dpth (ft)	3.62	Hydr. Depth (ft)	0.01	1.72	0.14
Conv. Total (cfs)	16449.5	Conv. (cfs)	0.0	16411.0	38.5
Length Wtd. (ft)	27.00	Wetted Per. (ft)	0.27	446.86	65.75
Min Ch El (ft)	227.15	Shear (lb/sq ft)		0.44	0.04
Alpha	1.02	Stream Power (lb/ft s)		0.63	0.01
Frcn Loss (ft)	0.12	Cum Volume (acre-ft)	0.00	3.63	0.59
C & E Loss (ft)	0.00	Cum SA (acres)	0.01	2.43	0.77

Plan: Prop Clear Creek 1 RS: 315 BR D Profile: Q25

E.G. Elev (ft)	231.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.100	0.095	0.100
W.S. Elev (ft)	231.25	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	229.68	Flow Area (sq ft)	2.77	952.91	59.86
E.G. Slope (ft/ft)	0.004622	Area (sq ft)	2.77	952.91	59.86
Q Total (cfs)	1710.00	Flow (cfs)	1.14	1669.34	39.52
Top Width (ft)	560.35	Top Width (ft)	10.70	434.32	115.33
Vel Total (ft/s)	1.68	Avg. Vel. (ft/s)	0.41	1.75	0.66
Max Chl Dpth (ft)	4.10	Hydr. Depth (ft)	0.26	2.19	0.52
Conv. Total (cfs)	25151.7	Conv. (cfs)	16.7	24553.6	581.3
Length Wtd. (ft)	27.00	Wetted Per. (ft)	10.71	450.68	116.26
Min Ch El (ft)	227.15	Shear (lb/sq ft)	0.07	0.61	0.15
Alpha	1.06	Stream Power (lb/ft s)	0.03	1.07	0.10
Frcn Loss (ft)	0.13	Cum Volume (acre-ft)	0.02	4.74	0.97
C & E Loss (ft)	0.00	Cum SA (acres)	0.05	2.54	0.97

Plan: Prop Clear Creek 1 RS: 315 BR D Profile: Q50

E.G. Elev (ft)	231.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.100	0.095	0.100
W.S. Elev (ft)	231.57	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	229.89	Flow Area (sq ft)	7.19	1092.63	98.75
E.G. Slope (ft/ft)	0.004906	Area (sq ft)	7.19	1092.63	98.75
Q Total (cfs)	2242.00	Flow (cfs)	4.20	2152.13	85.67
Top Width (ft)	583.31	Top Width (ft)	17.11	434.32	131.88
Vel Total (ft/s)	1.87	Avg. Vel. (ft/s)	0.58	1.97	0.87
Max Chl Dpth (ft)	4.42	Hydr. Depth (ft)	0.42	2.52	0.75
Conv. Total (cfs)	32008.6	Conv. (cfs)	59.9	30725.5	1223.2
Length Wtd. (ft)	27.00	Wetted Per. (ft)	17.13	453.25	133.46
Min Ch El (ft)	227.15	Shear (lb/sq ft)	0.13	0.74	0.23
Alpha	1.07	Stream Power (lb/ft s)	0.08	1.45	0.20
Frcn Loss (ft)	0.14	Cum Volume (acre-ft)	0.04	6.08	1.27
C & E Loss (ft)	0.00	Cum SA (acres)	0.09	2.68	1.02

Plan: Prop Clear Creek 1 RS: 315 BR D Profile: Q100

E.G. Elev (ft)	232.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.100	0.095	0.100
W.S. Elev (ft)	232.04	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	230.10	Flow Area (sq ft)	19.00	1296.98	174.38
E.G. Slope (ft/ft)	0.004366	Area (sq ft)	19.00	1296.98	174.38
Q Total (cfs)	2882.00	Flow (cfs)	12.79	2687.00	182.22
Top Width (ft)	644.95	Top Width (ft)	33.45	434.32	177.18
Vel Total (ft/s)	1.93	Avg. Vel. (ft/s)	0.67	2.07	1.04
Max Chl Dpth (ft)	4.89	Hydr. Depth (ft)	0.57	2.99	0.98
Conv. Total (cfs)	43614.9	Conv. (cfs)	193.5	40663.8	2757.6
Length Wtd. (ft)	27.00	Wetted Per. (ft)	33.48	457.02	180.33
Min Ch EI (ft)	227.15	Shear (lb/sq ft)	0.15	0.77	0.26
Alpha	1.09	Stream Power (lb/ft s)	0.10	1.60	0.28
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	0.11	8.14	2.02
C & E Loss (ft)	0.00	Cum SA (acres)	0.15	2.79	1.35

Plan: Prop Clear Creek 1 RS: 260.* Profile: Q10

E.G. Elev (ft)	230.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.095	0.100
W.S. Elev (ft)	230.64	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	229.39	Flow Area (sq ft)		710.15	2.53
E.G. Slope (ft/ft)	0.004985	Area (sq ft)		710.15	2.53
Q Total (cfs)	1069.00	Flow (cfs)		1068.52	0.48
Top Width (ft)	483.49	Top Width (ft)		446.29	37.20
Vel Total (ft/s)	1.50	Avg. Vel. (ft/s)		1.50	0.19
Max Chl Dpth (ft)	3.49	Hydr. Depth (ft)		1.59	0.07
Conv. Total (cfs)	15140.6	Conv. (cfs)		15133.8	6.8
Length Wtd. (ft)	27.00	Wetted Per. (ft)		446.54	37.20
Min Ch EI (ft)	227.15	Shear (lb/sq ft)		0.49	0.02
Alpha	1.01	Stream Power (lb/ft s)		0.74	0.00
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)	0.00	3.18	0.59
C & E Loss (ft)	0.00	Cum SA (acres)	0.01	2.16	0.74

Plan: Prop Clear Creek 1 RS: 260.* Profile: Q25

E.G. Elev (ft)	231.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.100	0.095	0.100
W.S. Elev (ft)	231.11	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	229.66	Flow Area (sq ft)	1.46	919.02	45.16
E.G. Slope (ft/ft)	0.005272	Area (sq ft)	1.46	919.02	45.16
Q Total (cfs)	1710.00	Flow (cfs)	0.50	1683.60	25.90
Top Width (ft)	572.96	Top Width (ft)	8.12	448.32	116.52
Vel Total (ft/s)	1.77	Avg. Vel. (ft/s)	0.34	1.83	0.57
Max Chl Dpth (ft)	3.96	Hydr. Depth (ft)	0.18	2.05	0.39
Conv. Total (cfs)	23551.3	Conv. (cfs)	6.9	23187.7	356.7
Length Wtd. (ft)	27.00	Wetted Per. (ft)	8.13	448.58	116.54
Min Ch EI (ft)	227.15	Shear (lb/sq ft)	0.06	0.67	0.13
Alpha	1.06	Stream Power (lb/ft s)	0.02	1.24	0.07
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	0.01	4.16	0.94
C & E Loss (ft)	0.00	Cum SA (acres)	0.05	2.27	0.90

Plan: Prop Clear Creek 1 RS: 260.* Profile: Q50

E.G. Elev (ft)	231.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.100	0.095	0.100
W.S. Elev (ft)	231.43	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	229.88	Flow Area (sq ft)	4.96	1060.50	82.89
E.G. Slope (ft/ft)	0.005434	Area (sq ft)	4.96	1060.50	82.89
Q Total (cfs)	2242.00	Flow (cfs)	2.71	2170.10	69.19
Top Width (ft)	586.89	Top Width (ft)	14.00	448.32	124.57
Vel Total (ft/s)	1.95	Avg. Vel. (ft/s)	0.55	2.05	0.83
Max Chl Dpth (ft)	4.28	Hydr. Depth (ft)	0.35	2.37	0.67
Conv. Total (cfs)	30412.8	Conv. (cfs)	36.8	29437.5	938.5
Length Wtd. (ft)	27.00	Wetted Per. (ft)	14.02	448.58	124.60
Min Ch El (ft)	227.15	Shear (lb/sq ft)	0.12	0.80	0.23
Alpha	1.07	Stream Power (lb/ft s)	0.07	1.64	0.19
Frcn Loss (ft)	0.18	Cum Volume (acre-ft)	0.03	5.41	1.22
C & E Loss (ft)	0.00	Cum SA (acres)	0.08	2.41	0.95

Plan: Prop Clear Creek 1 RS: 260.* Profile: Q100

E.G. Elev (ft)	231.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.100	0.095	0.100
W.S. Elev (ft)	231.92	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	230.08	Flow Area (sq ft)	15.00	1280.02	157.16
E.G. Slope (ft/ft)	0.004586	Area (sq ft)	15.00	1280.02	157.16
Q Total (cfs)	2882.00	Flow (cfs)	9.64	2727.64	144.72
Top Width (ft)	657.17	Top Width (ft)	29.36	448.32	179.49
Vel Total (ft/s)	1.98	Avg. Vel. (ft/s)	0.64	2.13	0.92
Max Chl Dpth (ft)	4.77	Hydr. Depth (ft)	0.51	2.86	0.88
Conv. Total (cfs)	42558.0	Conv. (cfs)	142.4	40278.6	2137.0
Length Wtd. (ft)	27.00	Wetted Per. (ft)	29.38	448.58	179.53
Min Ch El (ft)	227.15	Shear (lb/sq ft)	0.15	0.82	0.25
Alpha	1.10	Stream Power (lb/ft s)	0.09	1.74	0.23
Frcn Loss (ft)	0.14	Cum Volume (acre-ft)	0.10	7.35	1.91
C & E Loss (ft)	0.00	Cum SA (acres)	0.13	2.51	1.24

Plan: Prop Clear Creek 1 RS: 205 BR U Profile: Q10

E.G. Elev (ft)	230.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.095	
W.S. Elev (ft)	230.46	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	229.40	Flow Area (sq ft)		613.55	
E.G. Slope (ft/ft)	0.007855	Area (sq ft)		613.55	
Q Total (cfs)	1069.00	Flow (cfs)		1069.00	
Top Width (ft)	425.69	Top Width (ft)		425.69	
Vel Total (ft/s)	1.74	Avg. Vel. (ft/s)		1.74	
Max Chl Dpth (ft)	3.31	Hydr. Depth (ft)		1.44	
Conv. Total (cfs)	12062.0	Conv. (cfs)		12062.0	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		435.41	
Min Ch El (ft)	227.15	Shear (lb/sq ft)		0.69	
Alpha	1.00	Stream Power (lb/ft s)		1.20	
Frcn Loss (ft)	0.27	Cum Volume (acre-ft)	0.00	2.77	0.59
C & E Loss (ft)	0.01	Cum SA (acres)	0.01	1.89	0.73

Plan: Prop Clear Creek 1 RS: 205 BR U Profile: Q25

E.G. Elev (ft)	230.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.100	0.095	0.100
W.S. Elev (ft)	230.92	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	229.68	Flow Area (sq ft)	0.30	809.25	21.62
E.G. Slope (ft/ft)	0.008186	Area (sq ft)	0.30	809.25	21.62
Q Total (cfs)	1710.00	Flow (cfs)	0.07	1699.40	10.53
Top Width (ft)	548.37	Top Width (ft)	3.79	434.32	110.26
Vel Total (ft/s)	2.06	Avg. Vel. (ft/s)	0.25	2.10	0.49
Max Chl Dpth (ft)	3.77	Hydr. Depth (ft)	0.08	1.86	0.20
Conv. Total (cfs)	18900.3	Conv. (cfs)	0.8	18783.1	116.4
Length Wtd. (ft)	56.00	Wetted Per. (ft)	3.79	447.68	110.98
Min Ch El (ft)	227.15	Shear (lb/sq ft)	0.04	0.92	0.10
Alpha	1.04	Stream Power (lb/ft s)	0.01	1.94	0.05
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	0.01	3.62	0.92
C & E Loss (ft)	0.01	Cum SA (acres)	0.04	1.99	0.83

Plan: Prop Clear Creek 1 RS: 205 BR U Profile: Q50

E.G. Elev (ft)	231.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.100	0.095	0.100
W.S. Elev (ft)	231.23	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	229.89	Flow Area (sq ft)	2.54	943.77	56.48
E.G. Slope (ft/ft)	0.008225	Area (sq ft)	2.54	943.77	56.48
Q Total (cfs)	2242.00	Flow (cfs)	1.34	2193.03	47.62
Top Width (ft)	559.57	Top Width (ft)	10.28	434.32	114.96
Vel Total (ft/s)	2.24	Avg. Vel. (ft/s)	0.53	2.32	0.84
Max Chl Dpth (ft)	4.08	Hydr. Depth (ft)	0.25	2.17	0.49
Conv. Total (cfs)	24720.9	Conv. (cfs)	14.8	24181.0	525.1
Length Wtd. (ft)	56.00	Wetted Per. (ft)	10.30	450.16	116.31
Min Ch El (ft)	227.15	Shear (lb/sq ft)	0.13	1.08	0.25
Alpha	1.06	Stream Power (lb/ft s)	0.07	2.50	0.21
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)	0.03	4.79	1.17
C & E Loss (ft)	0.01	Cum SA (acres)	0.07	2.14	0.87

Plan: Prop Clear Creek 1 RS: 205 BR U Profile: Q100

E.G. Elev (ft)	231.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.100	0.095	0.100
W.S. Elev (ft)	231.76	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	230.10	Flow Area (sq ft)	10.87	1174.19	124.76
E.G. Slope (ft/ft)	0.006255	Area (sq ft)	10.87	1174.19	124.76
Q Total (cfs)	2882.00	Flow (cfs)	7.78	2735.17	139.05
Top Width (ft)	614.00	Top Width (ft)	22.84	434.32	156.84
Vel Total (ft/s)	2.20	Avg. Vel. (ft/s)	0.72	2.33	1.11
Max Chl Dpth (ft)	4.61	Hydr. Depth (ft)	0.48	2.70	0.80
Conv. Total (cfs)	36440.4	Conv. (cfs)	98.3	34583.9	1758.2
Length Wtd. (ft)	56.00	Wetted Per. (ft)	22.86	454.40	159.73
Min Ch El (ft)	227.15	Shear (lb/sq ft)	0.19	1.01	0.30
Alpha	1.08	Stream Power (lb/ft s)	0.13	2.35	0.34
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	0.09	6.58	1.83
C & E Loss (ft)	0.01	Cum SA (acres)	0.11	2.24	1.13

Plan: Prop Clear Creek 1 RS: 205 BR D Profile: Q10

E.G. Elev (ft)	230.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.100	0.095	0.100
W.S. Elev (ft)	230.21	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	228.90	Flow Area (sq ft)	0.94	695.61	210.48
E.G. Slope (ft/ft)	0.003327	Area (sq ft)	0.94	695.61	210.48
Q Total (cfs)	1069.00	Flow (cfs)	0.23	897.78	170.99
Top Width (ft)	643.46	Top Width (ft)	6.12	395.72	241.62
Vel Total (ft/s)	1.18	Avg. Vel. (ft/s)	0.24	1.29	0.81
Max Chl Dpth (ft)	3.29	Hydr. Depth (ft)	0.15	1.76	0.87
Conv. Total (cfs)	18532.1	Conv. (cfs)	4.0	15563.8	2964.4
Length Wtd. (ft)	27.00	Wetted Per. (ft)	6.12	406.58	244.27
Min Ch El (ft)	226.92	Shear (lb/sq ft)	0.03	0.36	0.18
Alpha	1.08	Stream Power (lb/ft s)	0.01	0.46	0.15
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.00	1.93	0.45
C & E Loss (ft)	0.00	Cum SA (acres)	0.01	1.36	0.57

Plan: Prop Clear Creek 1 RS: 205 BR D Profile: Q25

E.G. Elev (ft)	230.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.100	0.095	0.100
W.S. Elev (ft)	230.64	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	229.18	Flow Area (sq ft)	5.59	867.49	317.17
E.G. Slope (ft/ft)	0.003735	Area (sq ft)	5.59	867.49	317.17
Q Total (cfs)	1710.00	Flow (cfs)	2.56	1366.58	340.86
Top Width (ft)	662.72	Top Width (ft)	15.59	395.72	251.41
Vel Total (ft/s)	1.44	Avg. Vel. (ft/s)	0.46	1.58	1.07
Max Chl Dpth (ft)	3.72	Hydr. Depth (ft)	0.36	2.19	1.26
Conv. Total (cfs)	27979.8	Conv. (cfs)	41.9	22360.5	5577.4
Length Wtd. (ft)	27.00	Wetted Per. (ft)	15.61	410.05	255.81
Min Ch El (ft)	226.92	Shear (lb/sq ft)	0.08	0.49	0.29
Alpha	1.07	Stream Power (lb/ft s)	0.04	0.78	0.31
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	0.01	2.54	0.70
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	1.46	0.60

Plan: Prop Clear Creek 1 RS: 205 BR D Profile: Q50

E.G. Elev (ft)	230.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.100	0.095	0.100
W.S. Elev (ft)	230.94	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	229.40	Flow Area (sq ft)	11.35	987.27	395.59
E.G. Slope (ft/ft)	0.003990	Area (sq ft)	11.35	987.27	395.59
Q Total (cfs)	2242.00	Flow (cfs)	6.75	1745.29	489.96
Top Width (ft)	682.93	Top Width (ft)	22.49	395.72	264.72
Vel Total (ft/s)	1.61	Avg. Vel. (ft/s)	0.59	1.77	1.24
Max Chl Dpth (ft)	4.02	Hydr. Depth (ft)	0.50	2.49	1.49
Conv. Total (cfs)	35495.1	Conv. (cfs)	106.9	27631.3	7757.0
Length Wtd. (ft)	27.00	Wetted Per. (ft)	22.52	412.48	270.33
Min Ch El (ft)	226.92	Shear (lb/sq ft)	0.13	0.60	0.36
Alpha	1.07	Stream Power (lb/ft s)	0.07	1.05	0.45
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	0.02	3.55	0.88
C & E Loss (ft)	0.00	Cum SA (acres)	0.05	1.60	0.63

Plan: Prop Clear Creek 1 RS: 205 BR D Profile: Q100

E.G. Elev (ft)	231.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.100	0.095	0.100
W.S. Elev (ft)	231.55	Reach Len. (ft)	27.00	27.00	27.00
Crit W.S. (ft)	229.60	Flow Area (sq ft)	28.95	1229.12	560.11
E.G. Slope (ft/ft)	0.002916	Area (sq ft)	28.95	1229.12	560.11
Q Total (cfs)	2882.00	Flow (cfs)	21.04	2133.07	727.89
Top Width (ft)	704.68	Top Width (ft)	33.55	395.72	275.41
Vel Total (ft/s)	1.59	Avg. Vel. (ft/s)	0.73	1.74	1.30
Max Chl Dpth (ft)	4.63	Hydr. Depth (ft)	0.86	3.11	2.03
Conv. Total (cfs)	53367.1	Conv. (cfs)	389.5	39498.9	13478.7
Length Wtd. (ft)	27.00	Wetted Per. (ft)	33.59	417.37	284.48
Min Ch EI (ft)	226.92	Shear (lb/sq ft)	0.16	0.54	0.36
Alpha	1.06	Stream Power (lb/ft s)	0.11	0.93	0.47
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.06	5.04	1.39
C & E Loss (ft)	0.00	Cum SA (acres)	0.08	1.70	0.86

Plan: Prop Clear Creek 1 RS: 150 Profile: Q10

E.G. Elev (ft)	230.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.100	0.095	0.100
W.S. Elev (ft)	230.10	Reach Len. (ft)	150.00	150.00	150.00
Crit W.S. (ft)		Flow Area (sq ft)	0.42	672.62	189.87
E.G. Slope (ft/ft)	0.003951	Area (sq ft)	0.42	672.62	189.87
Q Total (cfs)	1069.00	Flow (cfs)	0.09	919.75	149.16
Top Width (ft)	659.83	Top Width (ft)	4.10	409.72	246.01
Vel Total (ft/s)	1.24	Avg. Vel. (ft/s)	0.20	1.37	0.79
Max Chl Dpth (ft)	3.18	Hydr. Depth (ft)	0.10	1.64	0.77
Conv. Total (cfs)	17007.5	Conv. (cfs)	1.4	14633.0	2373.1
Length Wtd. (ft)	150.00	Wetted Per. (ft)	4.10	410.04	246.13
Min Ch EI (ft)	226.92	Shear (lb/sq ft)	0.03	0.40	0.19
Alpha	1.10	Stream Power (lb/ft s)	0.01	0.55	0.15
Frctn Loss (ft)	1.74	Cum Volume (acre-ft)	0.00	1.50	0.33
C & E Loss (ft)	0.04	Cum SA (acres)	0.01	1.11	0.42

Plan: Prop Clear Creek 1 RS: 150 Profile: Q25

E.G. Elev (ft)	230.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.100	0.095	0.100
W.S. Elev (ft)	230.53	Reach Len. (ft)	150.00	150.00	150.00
Crit W.S. (ft)		Flow Area (sq ft)	4.01	846.70	296.17
E.G. Slope (ft/ft)	0.004212	Area (sq ft)	4.01	846.70	296.17
Q Total (cfs)	1710.00	Flow (cfs)	1.75	1393.69	314.56
Top Width (ft)	678.91	Top Width (ft)	13.07	409.72	256.12
Vel Total (ft/s)	1.49	Avg. Vel. (ft/s)	0.44	1.65	1.06
Max Chl Dpth (ft)	3.61	Hydr. Depth (ft)	0.31	2.07	1.16
Conv. Total (cfs)	26348.8	Conv. (cfs)	27.0	21474.8	4846.9
Length Wtd. (ft)	150.00	Wetted Per. (ft)	13.09	410.04	256.25
Min Ch EI (ft)	226.92	Shear (lb/sq ft)	0.08	0.54	0.30
Alpha	1.09	Stream Power (lb/ft s)	0.04	0.89	0.32
Frctn Loss (ft)	1.75	Cum Volume (acre-ft)	0.01	2.01	0.51
C & E Loss (ft)	0.04	Cum SA (acres)	0.02	1.21	0.44

Plan: Prop Clear Creek 1 RS: 150 Profile: Q50

E.G. Elev (ft)	230.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.100	0.095	0.100
W.S. Elev (ft)	230.83	Reach Len. (ft)	150.00	150.00	150.00
Crit W.S. (ft)		Flow Area (sq ft)	8.89	968.22	373.66
E.G. Slope (ft/ft)	0.004385	Area (sq ft)	8.89	968.22	373.66
Q Total (cfs)	2242.00	Flow (cfs)	5.12	1778.33	458.55
Top Width (ft)	697.72	Top Width (ft)	19.83	409.72	268.16
Vel Total (ft/s)	1.66	Avg. Vel. (ft/s)	0.58	1.84	1.23
Max Chl Dpth (ft)	3.91	Hydr. Depth (ft)	0.45	2.36	1.39
Conv. Total (cfs)	33855.5	Conv. (cfs)	77.2	26853.9	6924.4
Length Wtd. (ft)	150.00	Wetted Per. (ft)	19.85	410.04	268.30
Min Ch El (ft)	226.92	Shear (lb/sq ft)	0.12	0.65	0.38
Alpha	1.08	Stream Power (lb/ft s)	0.07	1.19	0.47
Frctn Loss (ft)	1.11	Cum Volume (acre-ft)	0.02	2.94	0.64
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	1.35	0.46

Plan: Prop Clear Creek 1 RS: 150 Profile: Q100

E.G. Elev (ft)	231.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.100	0.095	0.100
W.S. Elev (ft)	231.47	Reach Len. (ft)	150.00	150.00	150.00
Crit W.S. (ft)		Flow Area (sq ft)	26.32	1233.77	553.00
E.G. Slope (ft/ft)	0.002917	Area (sq ft)	26.32	1233.77	553.00
Q Total (cfs)	2882.00	Flow (cfs)	18.32	2172.05	691.63
Top Width (ft)	726.33	Top Width (ft)	32.54	409.72	284.07
Vel Total (ft/s)	1.59	Avg. Vel. (ft/s)	0.70	1.76	1.25
Max Chl Dpth (ft)	4.55	Hydr. Depth (ft)	0.81	3.01	1.95
Conv. Total (cfs)	53365.7	Conv. (cfs)	339.2	40219.7	12806.9
Length Wtd. (ft)	150.00	Wetted Per. (ft)	32.58	410.04	284.22
Min Ch El (ft)	226.92	Shear (lb/sq ft)	0.15	0.55	0.35
Alpha	1.07	Stream Power (lb/ft s)	0.10	0.96	0.44
Frctn Loss (ft)	0.57	Cum Volume (acre-ft)	0.05	4.28	1.04
C & E Loss (ft)	0.00	Cum SA (acres)	0.06	1.46	0.68

Plan: Prop Clear Creek 1 RS: 0 Profile: Q10

E.G. Elev (ft)	228.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.		0.095	
W.S. Elev (ft)	227.91	Reach Len. (ft)			
Crit W.S. (ft)	227.91	Flow Area (sq ft)		201.43	
E.G. Slope (ft/ft)	0.142256	Area (sq ft)		201.43	
Q Total (cfs)	1069.00	Flow (cfs)		1069.00	
Top Width (ft)	235.39	Top Width (ft)		235.39	
Vel Total (ft/s)	5.31	Avg. Vel. (ft/s)		5.31	
Max Chl Dpth (ft)	2.80	Hydr. Depth (ft)		0.86	
Conv. Total (cfs)	2834.3	Conv. (cfs)		2834.3	
Length Wtd. (ft)		Wetted Per. (ft)		236.08	
Min Ch El (ft)	225.11	Shear (lb/sq ft)		7.58	
Alpha	1.00	Stream Power (lb/ft s)		40.21	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Prop Clear Creek 1 RS: 0 Profile: Q25

E.G. Elev (ft)	228.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.		0.095	
W.S. Elev (ft)	228.35	Reach Len. (ft)			
Crit W.S. (ft)	228.24	Flow Area (sq ft)		321.29	
E.G. Slope (ft/ft)	0.102333	Area (sq ft)		321.29	
Q Total (cfs)	1710.00	Flow (cfs)		1710.00	
Top Width (ft)	292.13	Top Width (ft)		292.13	
Vel Total (ft/s)	5.32	Avg. Vel. (ft/s)		5.32	
Max Chl Dpth (ft)	3.24	Hydr. Depth (ft)		1.10	
Conv. Total (cfs)	5345.5	Conv. (cfs)		5345.5	
Length Wtd. (ft)		Wetted Per. (ft)		292.86	
Min Ch El (ft)	225.11	Shear (lb/sq ft)		7.01	
Alpha	1.00	Stream Power (lb/ft s)		37.30	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Prop Clear Creek 1 RS: 0 Profile: Q50

E.G. Elev (ft)	229.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.095	
W.S. Elev (ft)	229.61	Reach Len. (ft)			
Crit W.S. (ft)	228.48	Flow Area (sq ft)		740.75	
E.G. Slope (ft/ft)	0.015181	Area (sq ft)		740.75	
Q Total (cfs)	2242.00	Flow (cfs)		2242.00	
Top Width (ft)	375.59	Top Width (ft)		375.59	
Vel Total (ft/s)	3.03	Avg. Vel. (ft/s)		3.03	
Max Chl Dpth (ft)	4.50	Hydr. Depth (ft)		1.97	
Conv. Total (cfs)	18196.6	Conv. (cfs)		18196.6	
Length Wtd. (ft)		Wetted Per. (ft)		376.36	
Min Ch El (ft)	225.11	Shear (lb/sq ft)		1.87	
Alpha	1.00	Stream Power (lb/ft s)		5.65	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Prop Clear Creek 1 RS: 0 Profile: Q100

E.G. Elev (ft)	230.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.095	0.100
W.S. Elev (ft)	230.86	Reach Len. (ft)			
Crit W.S. (ft)	228.71	Flow Area (sq ft)		1249.97	51.05
E.G. Slope (ft/ft)	0.005221	Area (sq ft)		1249.97	51.05
Q Total (cfs)	2882.00	Flow (cfs)		2849.52	32.48
Top Width (ft)	547.36	Top Width (ft)		435.49	111.87
Vel Total (ft/s)	2.22	Avg. Vel. (ft/s)		2.28	0.64
Max Chl Dpth (ft)	5.75	Hydr. Depth (ft)		2.87	0.46
Conv. Total (cfs)	39886.5	Conv. (cfs)		39436.9	449.6
Length Wtd. (ft)		Wetted Per. (ft)		436.32	111.88
Min Ch El (ft)	225.11	Shear (lb/sq ft)		0.93	0.15
Alpha	1.05	Stream Power (lb/ft s)		2.13	0.09
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

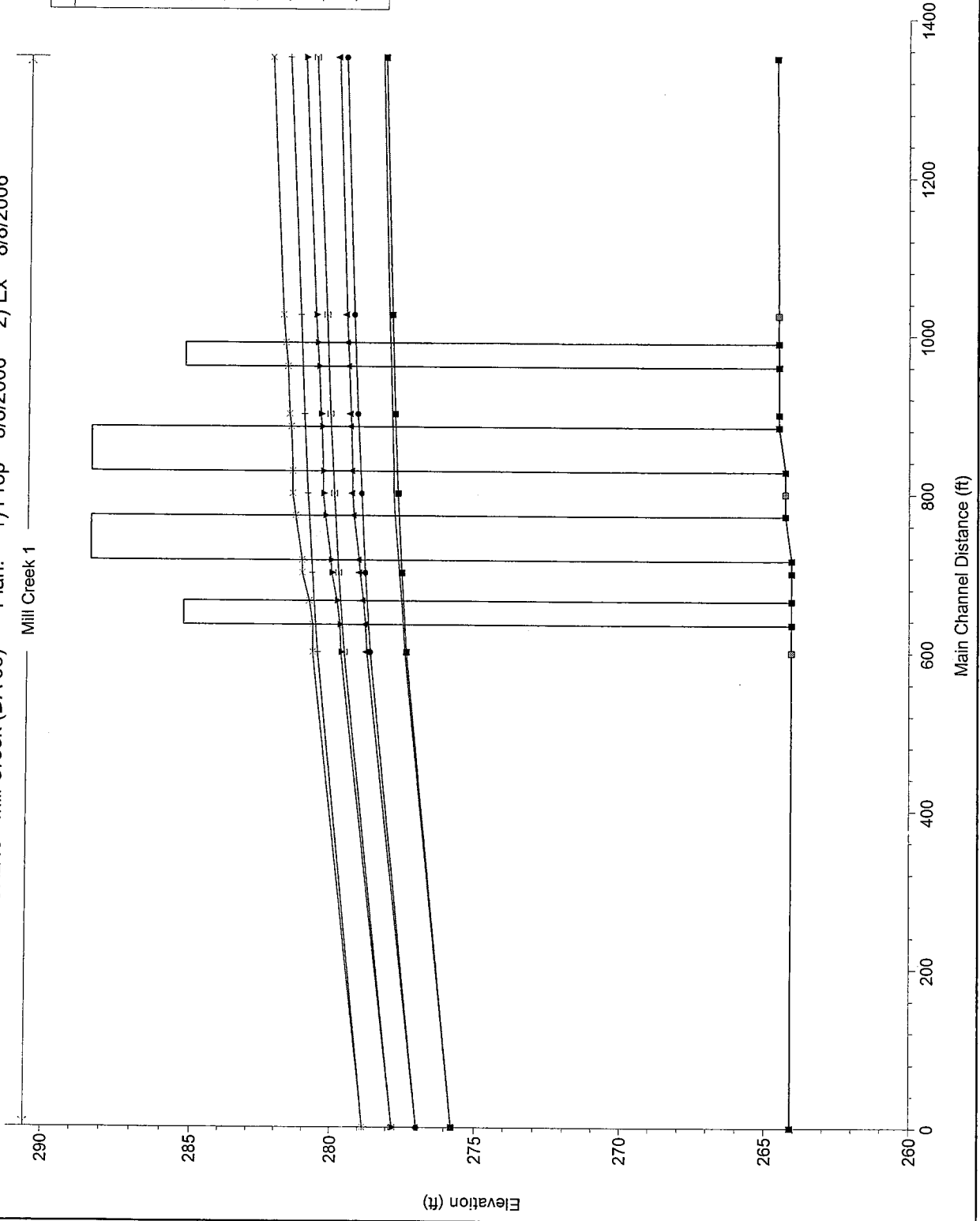
MILL CREEK

(DA 35)

SH249 - Mill Creek (DA 35) Plan: 1) Prop 8/8/2006 2) Ex 8/8/2006

Mill Creek 1

Legend
WS Q100 - Ex
WS Q100 - Prop
WS Q50 - Ex
WS Q50 - Prop
WS Q25 - Prop
WS Q25 - Ex
WS Q10 - Ex
WS Q10 - Prop
Ground



er: Mill Creek

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Cnt W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	1350	Q10	Prop	2615.00	264.61	278.31		278.35	0.000704	1.79	1722.84	304.49	0.12
1	1350	Q10	Ex	2615.00	264.61	278.20		278.25	0.000736	1.82	1692.01	302.14	0.12
1	1350	Q25	Prop	3971.00	264.61	279.88		279.95	0.000943	2.21	2494.70	757.54	0.14
1	1350	Q25	Ex	3971.00	264.61	279.61		279.68	0.001008	2.28	2294.30	703.66	0.14
1	1350	Q50	Prop	5334.00	264.61	281.09		281.14	0.001214	2.18	3676.90	1245.77	0.15
1	1350	Q50	Ex	5334.00	264.61	280.69		280.76	0.001473	2.37	3213.83	1053.80	0.17
1	1350	Q100	Prop	7011.00	264.61	282.26		282.31	0.000935	2.15	5196.47	1423.84	0.14
1	1350	Q100	Ex	7011.00	264.61	281.64		281.71	0.001383	2.46	4374.29	1290.51	0.17
1	1025*	Q10	Prop	2615.00	264.55	278.05	269.44	278.11	0.000767	2.07	1453.37	452.18	0.13
1	1025*	Q10	Ex	2615.00	264.55	277.94		278.00	0.000787	2.07	1550.79	436.86	0.13
1	1025*	Q25	Prop	3971.00	264.55	279.55	270.70	279.64	0.000928	2.54	1971.18	761.53	0.14
1	1025*	Q25	Ex	3971.00	264.55	279.28		279.36	0.000921	2.48	2310.43	689.25	0.14
1	1025*	Q50	Prop	5334.00	264.55	280.67	271.81	280.78	0.001022	2.87	2446.91	961.47	0.15
1	1025*	Q50	Ex	5334.00	264.55	280.27		280.36	0.001002	2.77	3132.29	921.26	0.15
1	1025*	Q100	Prop	7011.00	264.55	281.84	272.94	281.97	0.001107	3.20	2943.92	1102.32	0.16
1	1025*	Q100	Ex	7011.00	264.55	281.21		281.31	0.001041	2.99	4044.31	1016.91	0.16
1	975			Bridge									
1	900	Q10	Prop	2615.00	264.53	277.93	269.27	278.01	0.000731	2.34	1424.38	560.60	0.13
1	900	Q10	Ex	2615.00	264.53	277.83		277.90	0.000742	2.34	1550.24	551.05	0.13
1	900	Q25	Prop	3971.00	264.53	279.39	270.60	279.51	0.000991	2.97	1892.34	786.53	0.15
1	900	Q25	Ex	3971.00	264.53	279.14		279.24	0.000942	2.86	2376.91	713.00	0.15
1	900	Q50	Prop	5334.00	264.53	280.47	271.82	280.61	0.001147	3.39	2286.09	854.86	0.17
1	900	Q50	Ex	5334.00	264.53	280.13		280.24	0.001015	3.13	3154.23	832.55	0.16
1	900	Q100	Prop	7011.00	264.53	281.60	273.22	281.77	0.001303	3.82	2695.19	935.13	0.18
1	900	Q100	Ex	7011.00	264.53	281.06		281.18	0.001086	3.40	3961.67	893.29	0.16
1	850			Bridge									
1	800*	Q10	Prop	2615.00	264.31	277.86	269.97	277.92	0.000779	2.39	1680.30	500.28	0.13
1	800*	Q10	Ex	2615.00	264.31	277.71		277.81	0.001221	2.70	1367.61	445.01	0.16
1	800*	Q25	Prop	3971.00	264.31	279.31	271.55	279.39	0.000890	2.79	2208.91	701.09	0.14
1	800*	Q25	Ex	3971.00	264.31	278.99		279.12	0.001481	3.26	2028.05	677.04	0.18
1	800*	Q50	Prop	5334.00	264.31	280.37	272.92	280.47	0.001029	3.18	2594.47	923.81	0.16
1	800*	Q50	Ex	5334.00	264.31	279.97		280.11	0.001575	3.57	2653.26	942.84	0.19
1	800*	Q100	Prop	7011.00	264.31	281.47	274.91	281.59	0.001178	3.59	2993.75	1118.60	0.17
1	800*	Q100	Ex	7011.00	264.31	280.92		281.05	0.001520	3.71	3797.19	1034.81	0.19
1	750			Bridge									

HEC-RAS River: Mill Creek Reach: 1 (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Chl El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Ch
1	700	Q10	Prop	2615.00	264.09	277.65	270.52	277.79	0.002007	3.23	1046.66	455.42	0.20
1	700	Q10	Ex	2615.00	264.09	277.56		277.66	0.001701	2.96	1361.18	450.46	0.18
1	700	Q25	Prop	3971.00	264.09	279.04	272.17	279.22	0.002499	3.83	1447.99	754.44	0.23
1	700	Q25	Ex	3971.00	264.09	278.84		278.95	0.001858	3.28	2037.05	706.33	0.19
1	700	Q50	Prop	5334.00	264.09	280.05	273.57	280.26	0.002800	4.25	1801.94	910.38	0.24
1	700	Q50	Ex	5334.00	264.09	279.80		279.92	0.002058	3.60	2816.09	885.12	0.21
1	700	Q100	Prop	7011.00	264.09	281.10	275.65	281.34	0.002897	4.63	2186.24	1145.15	0.25
1	700	Q100	Ex	7011.00	264.09	280.74		280.87	0.002059	3.82	3737.71	1116.15	0.21
1	650			Bridge									
1	600*	Q10	Prop	2615.00	264.09	277.44	270.56	277.57	0.001958	3.10	1161.59	456.88	0.20
1	600*	Q10	Ex	2615.00	264.09	277.38		277.49	0.001794	2.96	1340.28	452.81	0.19
1	600*	Q25	Prop	3971.00	264.09	278.77	272.16	278.92	0.002321	3.58	1634.32	699.46	0.22
1	600*	Q25	Ex	3971.00	264.09	278.64		278.76	0.001982	3.29	1972.52	597.90	0.20
1	600*	Q50	Prop	5334.00	264.09	279.70	273.46	279.88	0.002604	3.95	2038.99	886.01	0.23
1	600*	Q50	Ex	5334.00	264.09	279.58		279.71	0.002199	3.61	2712.67	869.94	0.21
1	600*	Q100	Prop	7011.00	264.09	280.71	275.92	280.90	0.002627	4.24	2491.54	1104.13	0.24
1	600*	Q100	Ex	7011.00	264.09	280.54		280.66	0.002103	3.75	3667.19	1088.54	0.21
1	0	Q10	Prop	2615.00	264.11	275.76	270.22	275.94	0.004005	3.65	990.69	428.37	0.27
1	0	Q10	Ex	2615.00	264.11	275.76	270.22	275.94	0.004005	3.65	990.69	428.37	0.27
1	0	Q25	Prop	3971.00	264.11	276.95	271.89	277.12	0.004002	3.86	1582.88	564.38	0.27
1	0	Q25	Ex	3971.00	264.11	276.95	271.93	277.12	0.004002	3.86	1582.87	564.38	0.27
1	0	Q50	Prop	5334.00	264.11	277.79	274.18	277.96	0.004006	4.00	2101.35	655.20	0.27
1	0	Q50	Ex	5334.00	264.11	277.79	274.15	277.96	0.004006	4.00	2101.43	655.21	0.27
1	0	Q100	Prop	7011.00	264.11	278.83	275.30	278.97	0.004002	3.79	2848.69	805.37	0.27
1	0	Q100	Ex	7011.00	264.11	278.83	275.25	278.97	0.004002	3.79	2848.76	805.38	0.27

Plan: Prop Mill Creek 1 RS: 1350 Profile: Q10

E.G. Elev (ft)	278.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.110	0.080	
W.S. Elev (ft)	278.31	Reach Len. (ft)	325.00	325.00	325.00
Crit W.S. (ft)		Flow Area (sq ft)	511.33	1211.52	
E.G. Slope (ft/ft)	0.000704	Area (sq ft)	511.33	1211.52	
Q Total (cfs)	2615.00	Flow (cfs)	449.31	2165.69	
Top Width (ft)	304.49	Top Width (ft)	135.66	168.83	
Vel Total (ft/s)	1.52	Avg. Vel. (ft/s)	0.88	1.79	
Max Chl Dpth (ft)	13.70	Hydr. Depth (ft)	3.77	7.18	
Conv. Total (cfs)	98585.7	Conv. (cfs)	16938.9	81646.8	
Length Wtd. (ft)	325.00	Wetted Per. (ft)	141.54	175.30	
Min Ch El (ft)	264.61	Shear (lb/sq ft)	0.16	0.30	
Alpha	1.21	Stream Power (lb/ft s)	0.14	0.54	
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	11.36	26.19	4.52
C & E Loss (ft)	0.00	Cum SA (acres)	6.40	3.40	2.20

Plan: Prop Mill Creek 1 RS: 1350 Profile: Q25

E.G. Elev (ft)	279.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	279.88	Reach Len. (ft)	325.00	325.00	325.00
Crit W.S. (ft)		Flow Area (sq ft)	847.99	1491.67	155.05
E.G. Slope (ft/ft)	0.000943	Area (sq ft)	847.99	1491.67	155.05
Q Total (cfs)	3971.00	Flow (cfs)	625.35	3294.29	51.35
Top Width (ft)	757.54	Top Width (ft)	351.10	189.08	217.36
Vel Total (ft/s)	1.59	Avg. Vel. (ft/s)	0.74	2.21	0.33
Max Chl Dpth (ft)	15.27	Hydr. Depth (ft)	2.42	7.89	0.71
Conv. Total (cfs)	129281.7	Conv. (cfs)	20359.3	107250.5	1671.9
Length Wtd. (ft)	325.00	Wetted Per. (ft)	357.88	195.86	217.41
Min Ch El (ft)	264.61	Shear (lb/sq ft)	0.14	0.45	0.04
Alpha	1.63	Stream Power (lb/ft s)	0.10	0.99	0.01
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	22.07	31.11	8.85
C & E Loss (ft)	0.00	Cum SA (acres)	9.29	3.64	5.39

Plan: Prop Mill Creek 1 RS: 1350 Profile: Q50

E.G. Elev (ft)	281.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	281.09	Reach Len. (ft)	325.00	325.00	325.00
Crit W.S. (ft)		Flow Area (sq ft)	1352.63	1775.40	548.87
E.G. Slope (ft/ft)	0.001214	Area (sq ft)	1352.63	1775.40	548.87
Q Total (cfs)	5334.00	Flow (cfs)	1142.90	3878.01	313.09
Top Width (ft)	1245.77	Top Width (ft)	555.21	279.38	411.18
Vel Total (ft/s)	1.45	Avg. Vel. (ft/s)	0.84	2.18	0.57
Max Chl Dpth (ft)	16.48	Hydr. Depth (ft)	2.44	6.35	1.33
Conv. Total (cfs)	153118.2	Conv. (cfs)	32808.2	111322.5	8987.6
Length Wtd. (ft)	325.00	Wetted Per. (ft)	562.18	286.24	411.26
Min Ch El (ft)	264.61	Shear (lb/sq ft)	0.18	0.47	0.10
Alpha	1.73	Stream Power (lb/ft s)	0.15	1.03	0.06
Frctn Loss (ft)	0.36	Cum Volume (acre-ft)	32.73	35.09	15.71
C & E Loss (ft)	0.01	Cum SA (acres)	11.68	4.09	7.59

Plan: Prop Mill Creek 1 RS: 1350 Profile: Q100

E.G. Elev (ft)	282.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	282.26	Reach Len. (ft)	325.00	325.00	325.00
Crit W.S. (ft)		Flow Area (sq ft)	2038.67	2101.76	1056.04
E.G. Slope (ft/ft)	0.000935	Area (sq ft)	2038.67	2101.76	1056.04
Q Total (cfs)	7011.00	Flow (cfs)	1758.45	4509.51	743.04
Top Width (ft)	1423.84	Top Width (ft)	668.60	279.38	475.87
Vel Total (ft/s)	1.35	Avg. Vel. (ft/s)	0.86	2.15	0.70
Max Chl Dpth (ft)	17.65	Hydr. Depth (ft)	3.05	7.52	2.22
Conv. Total (cfs)	229285.9	Conv. (cfs)	57507.7	147477.8	24300.3
Length Wtd. (ft)	325.00	Wetted Per. (ft)	675.59	286.24	475.98
Min Ch El (ft)	264.61	Shear (lb/sq ft)	0.18	0.43	0.13
Alpha	1.76	Stream Power (lb/ft s)	0.15	0.92	0.09
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)	46.86	39.67	24.60
C & E Loss (ft)	0.01	Cum SA (acres)	14.15	4.34	9.11

Plan: Prop Mill Creek 1 RS: 1025.* Profile: Q10

E.G. Elev (ft)	278.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	278.05	Reach Len. (ft)	35.00	35.00	35.00
Crit W.S. (ft)	269.44	Flow Area (sq ft)	180.40	1195.76	77.22
E.G. Slope (ft/ft)	0.000767	Area (sq ft)	329.56	1195.76	77.22
Q Total (cfs)	2615.00	Flow (cfs)	107.48	2472.57	34.95
Top Width (ft)	452.18	Top Width (ft)	249.04	145.30	57.84
Vel Total (ft/s)	1.80	Avg. Vel. (ft/s)	0.60	2.07	0.45
Max Chl Dpth (ft)	13.50	Hydr. Depth (ft)	2.02	8.23	1.33
Conv. Total (cfs)	94407.0	Conv. (cfs)	3880.4	89264.8	1261.9
Length Wtd. (ft)	35.00	Wetted Per. (ft)	89.78	148.40	58.03
Min Ch El (ft)	264.55	Shear (lb/sq ft)	0.10	0.39	0.06
Alpha	1.25	Stream Power (lb/ft s)	0.06	0.80	0.03
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	8.23	17.21	4.23
C & E Loss (ft)	0.00	Cum SA (acres)	4.96	2.23	1.98

Plan: Prop Mill Creek 1 RS: 1025.* Profile: Q25

E.G. Elev (ft)	279.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	279.55	Reach Len. (ft)	35.00	35.00	35.00
Crit W.S. (ft)	270.70	Flow Area (sq ft)	365.92	1413.96	191.30
E.G. Slope (ft/ft)	0.000928	Area (sq ft)	900.34	1413.96	193.74
Q Total (cfs)	3971.00	Flow (cfs)	269.06	3596.07	105.87
Top Width (ft)	761.53	Top Width (ft)	462.11	145.30	154.12
Vel Total (ft/s)	2.01	Avg. Vel. (ft/s)	0.74	2.54	0.55
Max Chl Dpth (ft)	15.00	Hydr. Depth (ft)	2.39	9.73	1.56
Conv. Total (cfs)	130340.2	Conv. (cfs)	8831.4	118033.8	3475.0
Length Wtd. (ft)	35.00	Wetted Per. (ft)	153.22	148.40	122.67
Min Ch El (ft)	264.55	Shear (lb/sq ft)	0.14	0.55	0.09
Alpha	1.45	Stream Power (lb/ft s)	0.10	1.40	0.05
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	15.55	20.27	7.55
C & E Loss (ft)	0.00	Cum SA (acres)	6.26	2.39	4.01

Plan: Prop Mill Creek 1 RS: 1025.* Profile: Q50

E.G. Elev (ft)	280.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	280.67	Reach Len. (ft)	35.00	35.00	35.00
Crit W.S. (ft)	271.81	Flow Area (sq ft)	537.05	1576.66	333.20
E.G. Slope (ft/ft)	0.001022	Area (sq ft)	1514.58	1576.66	418.56
Q Total (cfs)	5334.00	Flow (cfs)	535.24	4525.19	273.56
Top Width (ft)	961.47	Top Width (ft)	592.51	145.30	223.66
Vel Total (ft/s)	2.18	Avg. Vel. (ft/s)	1.00	2.87	0.82
Max Chl Dpth (ft)	16.12	Hydr. Depth (ft)	3.51	10.85	2.63
Conv. Total (cfs)	166821.6	Conv. (cfs)	16739.8	141526.0	8555.7
Length Wtd. (ft)	35.00	Wetted Per. (ft)	153.22	148.40	127.14
Min Ch El (ft)	264.55	Shear (lb/sq ft)	0.22	0.68	0.17
Alpha	1.50	Stream Power (lb/ft s)	0.22	1.95	0.14
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	22.03	22.59	12.10
C & E Loss (ft)	0.00	Cum SA (acres)	7.40	2.51	5.22

Plan: Prop Mill Creek 1 RS: 1025.* Profile: Q100

E.G. Elev (ft)	281.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	281.84	Reach Len. (ft)	35.00	35.00	35.00
Crit W.S. (ft)	272.94	Flow Area (sq ft)	715.79	1746.57	481.56
E.G. Slope (ft/ft)	0.001107	Area (sq ft)	2227.39	1746.57	731.02
Q Total (cfs)	7011.00	Flow (cfs)	899.21	5585.79	526.00
Top Width (ft)	1102.32	Top Width (ft)	625.22	145.30	331.80
Vel Total (ft/s)	2.38	Avg. Vel. (ft/s)	1.26	3.20	1.09
Max Chl Dpth (ft)	17.29	Hydr. Depth (ft)	4.68	12.02	3.80
Conv. Total (cfs)	210676.3	Conv. (cfs)	27020.8	167849.5	15806.0
Length Wtd. (ft)	35.00	Wetted Per. (ft)	153.22	148.40	127.14
Min Ch El (ft)	264.55	Shear (lb/sq ft)	0.32	0.81	0.26
Alpha	1.49	Stream Power (lb/ft s)	0.41	2.60	0.29
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	30.95	25.31	17.93
C & E Loss (ft)	0.00	Cum SA (acres)	9.32	2.76	6.10

Plan: Prop Mill Creek 1 RS: 975 BR U Profile: Q10

E.G. Elev (ft)	278.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	278.02	Reach Len. (ft)	30.00	30.00	30.00
Crit W.S. (ft)	269.44	Flow Area (sq ft)	168.63	1185.74	45.59
E.G. Slope (ft/ft)	0.000839	Area (sq ft)	168.63	1185.74	45.59
Q Total (cfs)	2615.00	Flow (cfs)	107.16	2482.39	25.46
Top Width (ft)	246.06	Top Width (ft)	75.87	143.80	26.39
Vel Total (ft/s)	1.87	Avg. Vel. (ft/s)	0.64	2.09	0.56
Max Chl Dpth (ft)	13.47	Hydr. Depth (ft)	2.22	8.25	1.73
Conv. Total (cfs)	90297.3	Conv. (cfs)	3700.1	85718.1	879.1
Length Wtd. (ft)	30.00	Wetted Per. (ft)	82.31	154.43	27.28
Min Ch El (ft)	264.55	Shear (lb/sq ft)	0.11	0.40	0.09
Alpha	1.20	Stream Power (lb/ft s)	0.07	0.84	0.05
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	8.03	16.26	4.18
C & E Loss (ft)	0.00	Cum SA (acres)	4.83	2.12	1.95

Plan: Prop Mill Creek 1 RS: 975 BR U Profile: Q25

E.G. Elev (ft)	279.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	279.51	Reach Len. (ft)	30.00	30.00	30.00
Crit W.S. (ft)	270.70	Flow Area (sq ft)	284.40	1400.41	87.49
E.G. Slope (ft/ft)	0.001050	Area (sq ft)	284.40	1400.41	87.49
Q Total (cfs)	3971.00	Flow (cfs)	274.31	3619.20	77.50
Top Width (ft)	252.78	Top Width (ft)	79.23	143.80	29.75
Vel Total (ft/s)	2.24	Avg. Vel. (ft/s)	0.96	2.58	0.89
Max Chl Dpth (ft)	14.96	Hydr. Depth (ft)	3.59	9.74	2.94
Conv. Total (cfs)	122534.5	Conv. (cfs)	8464.4	111678.8	2391.4
Length Wtd. (ft)	30.00	Wetted Per. (ft)	88.97	157.41	30.95
Min Ch El (ft)	264.55	Shear (lb/sq ft)	0.21	0.58	0.19
Alpha	1.23	Stream Power (lb/ft s)	0.20	1.51	0.16
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	15.07	19.14	7.44
C & E Loss (ft)	0.00	Cum SA (acres)	6.04	2.28	3.93

Plan: Prop Mill Creek 1 RS: 975 BR U Profile: Q50

E.G. Elev (ft)	280.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	280.61	Reach Len. (ft)	30.00	30.00	30.00
Crit W.S. (ft)	271.81	Flow Area (sq ft)	372.74	1558.29	121.51
E.G. Slope (ft/ft)	0.001281	Area (sq ft)	372.74	1558.29	121.51
Q Total (cfs)	5334.00	Flow (cfs)	461.46	4732.72	139.82
Top Width (ft)	257.72	Top Width (ft)	81.70	143.80	32.22
Vel Total (ft/s)	2.60	Avg. Vel. (ft/s)	1.24	3.04	1.15
Max Chl Dpth (ft)	16.06	Hydr. Depth (ft)	4.56	10.84	3.77
Conv. Total (cfs)	149013.4	Conv. (cfs)	12891.6	132215.7	3906.1
Length Wtd. (ft)	30.00	Wetted Per. (ft)	93.87	159.61	33.65
Min Ch El (ft)	264.55	Shear (lb/sq ft)	0.32	0.78	0.29
Alpha	1.24	Stream Power (lb/ft s)	0.39	2.37	0.33
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	21.28	21.33	11.89
C & E Loss (ft)	0.00	Cum SA (acres)	7.13	2.39	5.12

Plan: Prop Mill Creek 1 RS: 975 BR U Profile: Q100

E.G. Elev (ft)	281.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	281.75	Reach Len. (ft)	30.00	30.00	30.00
Crit W.S. (ft)	272.94	Flow Area (sq ft)	467.38	1722.28	159.72
E.G. Slope (ft/ft)	0.001537	Area (sq ft)	467.38	1722.28	159.72
Q Total (cfs)	7011.00	Flow (cfs)	715.30	6066.91	228.79
Top Width (ft)	262.85	Top Width (ft)	84.26	143.80	34.78
Vel Total (ft/s)	2.98	Avg. Vel. (ft/s)	1.53	3.52	1.43
Max Chl Dpth (ft)	17.20	Hydr. Depth (ft)	5.55	11.98	4.59
Conv. Total (cfs)	178819.1	Conv. (cfs)	18244.2	154739.5	5835.4
Length Wtd. (ft)	30.00	Wetted Per. (ft)	98.95	161.89	36.46
Min Ch El (ft)	264.55	Shear (lb/sq ft)	0.45	1.02	0.42
Alpha	1.24	Stream Power (lb/ft s)	0.69	3.60	0.60
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	29.87	23.92	17.57
C & E Loss (ft)	0.00	Cum SA (acres)	9.04	2.64	5.95

Plan: Prop Mill Creek 1 RS: 975 BR D Profile: Q10

E.G. Elev (ft)	278.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	277.98	Reach Len. (ft)	60.00	60.00	60.00
Crit W.S. (ft)	269.27	Flow Area (sq ft)	249.70	967.36	192.51
E.G. Slope (ft/ft)	0.000832	Area (sq ft)	249.70	967.36	192.51
Q Total (cfs)	2615.00	Flow (cfs)	209.36	2266.04	139.59
Top Width (ft)	236.59	Top Width (ft)	68.91	92.23	75.45
Vel Total (ft/s)	1.86	Avg. Vel. (ft/s)	0.84	2.34	0.73
Max Chl Dpth (ft)	13.45	Hydr. Depth (ft)	3.62	10.49	2.55
Conv. Total (cfs)	90666.8	Conv. (cfs)	7259.1	78567.8	4840.0
Length Wtd. (ft)	60.00	Wetted Per. (ft)	83.04	105.79	75.82
Min Ch El (ft)	264.53	Shear (lb/sq ft)	0.16	0.47	0.13
Alpha	1.41	Stream Power (lb/ft s)	0.13	1.11	0.10
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	7.88	15.52	4.10
C & E Loss (ft)	0.00	Cum SA (acres)	4.78	2.03	1.91

Plan: Prop Mill Creek 1 RS: 975 BR D Profile: Q25

E.G. Elev (ft)	279.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	279.46	Reach Len. (ft)	60.00	60.00	60.00
Crit W.S. (ft)	270.60	Flow Area (sq ft)	354.10	1103.79	311.50
E.G. Slope (ft/ft)	0.001127	Area (sq ft)	354.10	1103.79	311.50
Q Total (cfs)	3971.00	Flow (cfs)	406.16	3227.08	337.77
Top Width (ft)	248.22	Top Width (ft)	72.24	92.23	83.76
Vel Total (ft/s)	2.24	Avg. Vel. (ft/s)	1.15	2.92	1.08
Max Chl Dpth (ft)	14.93	Hydr. Depth (ft)	4.90	11.97	3.72
Conv. Total (cfs)	118262.7	Conv. (cfs)	12096.0	96107.5	10059.2
Length Wtd. (ft)	60.00	Wetted Per. (ft)	89.64	108.75	84.28
Min Ch El (ft)	264.53	Shear (lb/sq ft)	0.28	0.71	0.26
Alpha	1.43	Stream Power (lb/ft s)	0.32	2.09	0.28
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	14.85	18.27	7.30
C & E Loss (ft)	0.00	Cum SA (acres)	5.99	2.20	3.90

Plan: Prop Mill Creek 1 RS: 975 BR D Profile: Q50

E.G. Elev (ft)	280.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	280.54	Reach Len. (ft)	60.00	60.00	60.00
Crit W.S. (ft)	271.79	Flow Area (sq ft)	433.78	1203.83	404.47
E.G. Slope (ft/ft)	0.001432	Area (sq ft)	433.78	1203.83	404.47
Q Total (cfs)	5334.00	Flow (cfs)	616.06	4147.78	570.16
Top Width (ft)	254.57	Top Width (ft)	74.68	92.23	87.66
Vel Total (ft/s)	2.61	Avg. Vel. (ft/s)	1.42	3.45	1.41
Max Chl Dpth (ft)	16.01	Hydr. Depth (ft)	5.81	13.05	4.61
Conv. Total (cfs)	140954.1	Conv. (cfs)	16279.8	109607.4	15066.9
Length Wtd. (ft)	60.00	Wetted Per. (ft)	94.48	110.92	88.33
Min Ch El (ft)	264.53	Shear (lb/sq ft)	0.41	0.97	0.41
Alpha	1.42	Stream Power (lb/ft s)	0.58	3.34	0.58
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	21.00	20.38	11.71
C & E Loss (ft)	0.00	Cum SA (acres)	7.07	2.31	5.08

Plan: Prop Mill Creek 1 RS: 975 BR D Profile: Q100

E.G. Elev (ft)	281.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	281.67	Reach Len. (ft)	60.00	60.00	60.00
Crit W.S. (ft)	273.20	Flow Area (sq ft)	519.28	1307.67	505.44
E.G. Slope (ft/ft)	0.001774	Area (sq ft)	519.28	1307.67	505.44
Q Total (cfs)	7011.00	Flow (cfs)	891.04	5228.09	891.88
Top Width (ft)	261.15	Top Width (ft)	77.21	92.23	91.71
Vel Total (ft/s)	3.01	Avg. Vel. (ft/s)	1.72	4.00	1.76
Max Chl Dpth (ft)	17.14	Hydr. Depth (ft)	6.73	14.18	5.51
Conv. Total (cfs)	166473.5	Conv. (cfs)	21157.3	124139.0	21177.3
Length Wtd. (ft)	60.00	Wetted Per. (ft)	99.50	113.17	92.53
Min Ch El (ft)	264.53	Shear (lb/sq ft)	0.58	1.28	0.60
Alpha	1.40	Stream Power (lb/ft s)	0.99	5.12	1.07
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	29.53	22.87	17.35
C & E Loss (ft)	0.01	Cum SA (acres)	8.98	2.56	5.90

Plan: Prop Mill Creek 1 RS: 900 Profile: Q10

E.G. Elev (ft)	278.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	277.93	Reach Len. (ft)	16.00	16.00	16.00
Crit W.S. (ft)	269.27	Flow Area (sq ft)	264.41	970.96	189.01
E.G. Slope (ft/ft)	0.000731	Area (sq ft)	447.67	970.96	189.01
Q Total (cfs)	2615.00	Flow (cfs)	218.62	2269.03	127.35
Top Width (ft)	560.60	Top Width (ft)	391.80	93.73	75.07
Vel Total (ft/s)	1.84	Avg. Vel. (ft/s)	0.83	2.34	0.67
Max Chl Dpth (ft)	13.40	Hydr. Depth (ft)	2.74	10.36	2.52
Conv. Total (cfs)	96717.6	Conv. (cfs)	8085.7	83921.7	4710.2
Length Wtd. (ft)	16.00	Wetted Per. (ft)	97.30	96.73	75.43
Min Ch El (ft)	264.53	Shear (lb/sq ft)	0.12	0.46	0.11
Alpha	1.43	Stream Power (lb/ft s)	0.10	1.07	0.08
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	7.40	14.18	3.84
C & E Loss (ft)	0.00	Cum SA (acres)	4.46	1.91	1.81

Plan: Prop Mill Creek 1 RS: 900 Profile: Q25

E.G. Elev (ft)	279.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	279.39	Reach Len. (ft)	16.00	16.00	16.00
Crit W.S. (ft)	270.60	Flow Area (sq ft)	444.28	1107.63	340.43
E.G. Slope (ft/ft)	0.000991	Area (sq ft)	1102.79	1107.63	348.06
Q Total (cfs)	3971.00	Flow (cfs)	408.24	3290.20	272.56
Top Width (ft)	786.53	Top Width (ft)	484.68	93.73	208.12
Vel Total (ft/s)	2.10	Avg. Vel. (ft/s)	0.92	2.97	0.80
Max Chl Dpth (ft)	14.86	Hydr. Depth (ft)	3.20	11.82	2.59
Conv. Total (cfs)	126145.5	Conv. (cfs)	12968.4	104518.9	8658.2
Length Wtd. (ft)	16.00	Wetted Per. (ft)	139.87	96.73	131.77
Min Ch El (ft)	264.53	Shear (lb/sq ft)	0.20	0.71	0.16
Alpha	1.69	Stream Power (lb/ft s)	0.18	2.10	0.13
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	13.85	16.75	6.84
C & E Loss (ft)	0.00	Cum SA (acres)	5.60	2.07	3.69

Plan: Prop Mill Creek 1 RS: 900 Profile: Q50

E.G. Elev (ft)	280.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	280.47	Reach Len. (ft)	16.00	16.00	16.00
Crit W.S. (ft)	271.82	Flow Area (sq ft)	594.60	1209.02	482.47
E.G. Slope (ft/ft)	0.001147	Area (sq ft)	1644.77	1209.02	590.98
Q Total (cfs)	5334.00	Flow (cfs)	713.81	4095.88	524.31
Top Width (ft)	854.86	Top Width (ft)	518.74	93.73	242.38
Vel Total (ft/s)	2.33	Avg. Vel. (ft/s)	1.20	3.39	1.09
Max Chl Dpth (ft)	15.94	Hydr. Depth (ft)	4.28	12.90	3.67
Conv. Total (cfs)	157506.7	Conv. (cfs)	21078.0	120946.4	15482.4
Length Wtd. (ft)	16.00	Wetted Per. (ft)	139.87	96.73	131.77
Min Ch El (ft)	264.53	Shear (lb/sq ft)	0.30	0.89	0.26
Alpha	1.68	Stream Power (lb/ft s)	0.37	3.03	0.28
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	19.57	18.71	11.02
C & E Loss (ft)	0.00	Cum SA (acres)	6.67	2.18	4.85

Plan: Prop Mill Creek 1 RS: 900 Profile: Q100

E.G. Elev (ft)	281.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	281.60	Reach Len. (ft)	16.00	16.00	16.00
Crit W.S. (ft)	273.22	Flow Area (sq ft)	750.78	1314.36	630.05
E.G. Slope (ft/ft)	0.001303	Area (sq ft)	2249.14	1314.36	883.44
Q Total (cfs)	7011.00	Flow (cfs)	1122.10	5017.13	871.77
Top Width (ft)	935.13	Top Width (ft)	562.26	93.73	279.14
Vel Total (ft/s)	2.60	Avg. Vel. (ft/s)	1.49	3.82	1.38
Max Chl Dpth (ft)	17.07	Hydr. Depth (ft)	5.40	14.02	4.80
Conv. Total (cfs)	194261.9	Conv. (cfs)	31091.3	139015.3	24155.3
Length Wtd. (ft)	16.00	Wetted Per. (ft)	139.87	96.73	131.77
Min Ch El (ft)	264.53	Shear (lb/sq ft)	0.44	1.10	0.39
Alpha	1.63	Stream Power (lb/ft s)	0.65	4.22	0.54
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	27.62	21.07	16.39
C & E Loss (ft)	0.00	Cum SA (acres)	8.54	2.44	5.65

Plan: Prop Mill Creek 1 RS: 850 BR U Profile: Q10

E.G. Elev (ft)	278.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	277.92	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	269.27	Flow Area (sq ft)	246.23	969.50	181.59
E.G. Slope (ft/ft)	0.000757	Area (sq ft)	246.23	969.50	181.59
Q Total (cfs)	2615.00	Flow (cfs)	195.72	2303.78	115.50
Top Width (ft)	237.82	Top Width (ft)	70.64	93.73	73.44
Vel Total (ft/s)	1.87	Avg. Vel. (ft/s)	0.79	2.38	0.64
Max Chl Dpth (ft)	13.39	Hydr. Depth (ft)	3.49	10.34	2.47
Conv. Total (cfs)	95019.5	Conv. (cfs)	7111.9	83710.8	4196.8
Length Wtd. (ft)	56.00	Wetted Per. (ft)	84.33	96.73	82.14
Min Ch El (ft)	264.53	Shear (lb/sq ft)	0.14	0.47	0.10
Alpha	1.44	Stream Power (lb/ft s)	0.11	1.13	0.07
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	7.27	13.82	3.77
C & E Loss (ft)	0.00	Cum SA (acres)	4.38	1.87	1.78

Plan: Prop Mill Creek 1 RS: 850 BR U Profile: Q25

E.G. Elev (ft)	279.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	279.37	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	270.60	Flow Area (sq ft)	380.78	1105.54	300.59
E.G. Slope (ft/ft)	0.001028	Area (sq ft)	380.78	1105.54	300.59
Q Total (cfs)	3971.00	Flow (cfs)	363.12	3340.05	267.83
Top Width (ft)	293.80	Top Width (ft)	109.64	93.73	90.43
Vel Total (ft/s)	2.22	Avg. Vel. (ft/s)	0.95	3.02	0.89
Max Chl Dpth (ft)	14.84	Hydr. Depth (ft)	3.47	11.79	3.32
Conv. Total (cfs)	123873.4	Conv. (cfs)	11327.3	104191.2	8354.9
Length Wtd. (ft)	56.00	Wetted Per. (ft)	126.69	96.73	102.21
Min Ch El (ft)	264.53	Shear (lb/sq ft)	0.19	0.73	0.19
Alpha	1.58	Stream Power (lb/ft s)	0.18	2.22	0.17
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	13.58	16.35	6.72
C & E Loss (ft)	0.00	Cum SA (acres)	5.49	2.03	3.64

Plan: Prop Mill Creek 1 RS: 850 BR U Profile: Q50

E.G. Elev (ft)	280.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	280.43	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	271.81	Flow Area (sq ft)	498.41	1205.25	397.87
E.G. Slope (ft/ft)	0.001263	Area (sq ft)	498.41	1205.25	397.87
Q Total (cfs)	5334.00	Flow (cfs)	598.21	4276.27	459.52
Top Width (ft)	297.72	Top Width (ft)	111.51	93.73	92.47
Vel Total (ft/s)	2.54	Avg. Vel. (ft/s)	1.20	3.55	1.15
Max Chl Dpth (ft)	15.90	Hydr. Depth (ft)	4.47	12.86	4.30
Conv. Total (cfs)	150079.1	Conv. (cfs)	16831.4	120318.5	12929.2
Length Wtd. (ft)	56.00	Wetted Per. (ft)	130.97	96.73	106.64
Min Ch El (ft)	264.53	Shear (lb/sq ft)	0.30	0.98	0.29
Alpha	1.61	Stream Power (lb/ft s)	0.36	3.49	0.34
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	19.17	18.27	10.84
C & E Loss (ft)	0.01	Cum SA (acres)	6.55	2.15	4.79

Plan: Prop Mill Creek 1 RS: 850 BR U Profile: Q100

E.G. Elev (ft)	281.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	281.53	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	273.22	Flow Area (sq ft)	622.18	1308.38	500.79
E.G. Slope (ft/ft)	0.001519	Area (sq ft)	622.18	1308.38	500.79
Q Total (cfs)	7011.00	Flow (cfs)	915.51	5376.16	719.34
Top Width (ft)	301.77	Top Width (ft)	113.45	93.73	94.58
Vel Total (ft/s)	2.88	Avg. Vel. (ft/s)	1.47	4.11	1.44
Max Chl Dpth (ft)	17.00	Hydr. Depth (ft)	5.48	13.96	5.29
Conv. Total (cfs)	179916.5	Conv. (cfs)	23493.7	137963.1	18459.7
Length Wtd. (ft)	56.00	Wetted Per. (ft)	135.40	96.73	111.22
Min Ch El (ft)	264.53	Shear (lb/sq ft)	0.44	1.28	0.43
Alpha	1.62	Stream Power (lb/ft s)	0.64	5.27	0.61
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	27.09	20.59	16.13
C & E Loss (ft)	0.01	Cum SA (acres)	8.42	2.40	5.58

Plan: Prop Mill Creek 1 RS: 850 BR D Profile: Q10

E.G. Elev (ft)	277.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	277.87	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	269.97	Flow Area (sq ft)	433.33	785.39	312.27
E.G. Slope (ft/ft)	0.000852	Area (sq ft)	433.33	785.39	312.27
Q Total (cfs)	2615.00	Flow (cfs)	392.95	1966.79	255.26
Top Width (ft)	289.54	Top Width (ft)	115.81	75.81	97.92
Vel Total (ft/s)	1.71	Avg. Vel. (ft/s)	0.91	2.50	0.82
Max Chl Dpth (ft)	13.56	Hydr. Depth (ft)	3.74	10.36	3.19
Conv. Total (cfs)	89603.1	Conv. (cfs)	13464.5	67392.1	8746.5
Length Wtd. (ft)	28.00	Wetted Per. (ft)	124.27	79.10	108.20
Min Ch El (ft)	264.31	Shear (lb/sq ft)	0.19	0.53	0.15
Alpha	1.68	Stream Power (lb/ft s)	0.17	1.32	0.13
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	6.84	12.70	3.45
C & E Loss (ft)	0.00	Cum SA (acres)	4.26	1.76	1.67

Plan: Prop Mill Creek 1 RS: 850 BR D Profile: Q25

E.G. Elev (ft)	279.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	279.32	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	271.55	Flow Area (sq ft)	602.92	895.13	455.83
E.G. Slope (ft/ft)	0.001059	Area (sq ft)	602.92	895.13	455.83
Q Total (cfs)	3971.00	Flow (cfs)	736.09	2726.87	508.04
Top Width (ft)	294.78	Top Width (ft)	118.52	75.81	100.45
Vel Total (ft/s)	2.03	Avg. Vel. (ft/s)	1.22	3.05	1.11
Max Chl Dpth (ft)	15.01	Hydr. Depth (ft)	5.09	11.81	4.54
Conv. Total (cfs)	122041.4	Conv. (cfs)	22622.4	83805.2	15613.8
Length Wtd. (ft)	28.00	Wetted Per. (ft)	130.24	79.10	114.01
Min Ch El (ft)	264.31	Shear (lb/sq ft)	0.31	0.75	0.26
Alpha	1.65	Stream Power (lb/ft s)	0.37	2.28	0.29
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	12.95	15.06	6.24
C & E Loss (ft)	0.01	Cum SA (acres)	5.35	1.92	3.52

Plan: Prop Mill Creek 1 RS: 850 BR D Profile: Q50

E.G. Elev (ft)	280.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	280.38	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	272.91	Flow Area (sq ft)	729.01	975.11	562.79
E.G. Slope (ft/ft)	0.001289	Area (sq ft)	729.01	975.11	562.79
Q Total (cfs)	5334.00	Flow (cfs)	1090.28	3469.63	774.08
Top Width (ft)	298.61	Top Width (ft)	120.50	75.81	102.30
Vel Total (ft/s)	2.35	Avg. Vel. (ft/s)	1.50	3.56	1.38
Max Chl Dpth (ft)	16.07	Hydr. Depth (ft)	6.05	12.86	5.50
Conv. Total (cfs)	148589.2	Conv. (cfs)	30372.0	96653.6	21563.6
Length Wtd. (ft)	28.00	Wetted Per. (ft)	134.60	79.10	118.25
Min Ch El (ft)	264.31	Shear (lb/sq ft)	0.44	0.99	0.38
Alpha	1.62	Stream Power (lb/ft s)	0.65	3.53	0.53
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	18.38	16.87	10.22
C & E Loss (ft)	0.01	Cum SA (acres)	6.40	2.04	4.66

Plan: Prop Mill Creek 1 RS: 850 BR D Profile: Q100

E.G. Elev (ft)	281.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	281.47	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	274.69	Flow Area (sq ft)	861.52	1057.78	675.38
E.G. Slope (ft/ft)	0.001544	Area (sq ft)	861.52	1057.78	675.38
Q Total (cfs)	7011.00	Flow (cfs)	1542.51	4349.70	1118.79
Top Width (ft)	302.56	Top Width (ft)	122.54	75.81	104.21
Vel Total (ft/s)	2.70	Avg. Vel. (ft/s)	1.79	4.11	1.66
Max Chl Dpth (ft)	17.16	Hydr. Depth (ft)	7.03	13.95	6.48
Conv. Total (cfs)	178418.6	Conv. (cfs)	39254.3	110692.8	28471.5
Length Wtd. (ft)	28.00	Wetted Per. (ft)	139.09	79.10	122.63
Min Ch El (ft)	264.31	Shear (lb/sq ft)	0.60	1.29	0.53
Alpha	1.59	Stream Power (lb/ft s)	1.07	5.30	0.88
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	26.14	19.06	15.38
C & E Loss (ft)	0.02	Cum SA (acres)	8.26	2.29	5.45

Plan: Prop Mill Creek 1 RS: 800.* Profile: Q10

E.G. Elev (ft)	277.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	277.86	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	269.97	Flow Area (sq ft)	550.20	784.15	345.96
E.G. Slope (ft/ft)	0.000779	Area (sq ft)	663.65	784.15	389.31
Q Total (cfs)	2615.00	Flow (cfs)	503.70	1876.28	235.02
Top Width (ft)	500.28	Top Width (ft)	215.85	75.81	208.62
Vel Total (ft/s)	1.56	Avg. Vel. (ft/s)	0.92	2.39	0.68
Max Chl Dpth (ft)	13.55	Hydr. Depth (ft)	3.79	10.34	2.42
Conv. Total (cfs)	93677.1	Conv. (cfs)	18044.1	67213.8	8419.2
Length Wtd. (ft)	28.00	Wetted Per. (ft)	145.44	79.10	143.07
Min Ch El (ft)	264.31	Shear (lb/sq ft)	0.18	0.48	0.12
Alpha	1.78	Stream Power (lb/ft s)	0.17	1.15	0.08
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	6.48	12.19	3.23
C & E Loss (ft)	0.00	Cum SA (acres)	4.15	1.71	1.57

Plan: Prop Mill Creek 1 RS: 800.* Profile: Q25

E.G. Elev (ft)	279.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	279.31	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	271.55	Flow Area (sq ft)	761.21	894.24	553.47
E.G. Slope (ft/ft)	0.000890	Area (sq ft)	1049.39	894.24	720.94
Q Total (cfs)	3971.00	Flow (cfs)	924.85	2496.41	549.73
Top Width (ft)	701.09	Top Width (ft)	370.21	75.81	255.06
Vel Total (ft/s)	1.80	Avg. Vel. (ft/s)	1.21	2.79	0.99
Max Chl Dpth (ft)	15.00	Hydr. Depth (ft)	5.24	11.80	3.87
Conv. Total (cfs)	133087.5	Conv. (cfs)	30996.3	83667.0	18424.3
Length Wtd. (ft)	28.00	Wetted Per. (ft)	145.44	79.10	143.07
Min Ch El (ft)	264.31	Shear (lb/sq ft)	0.29	0.63	0.22
Alpha	1.66	Stream Power (lb/ft s)	0.35	1.75	0.21
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	12.42	14.48	5.86
C & E Loss (ft)	0.00	Cum SA (acres)	5.19	1.88	3.40

Plan: Prop Mill Creek 1 RS: 800.* Profile: Q50

E.G. Elev (ft)	280.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	280.37	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	272.92	Flow Area (sq ft)	915.11	974.54	704.82
E.G. Slope (ft/ft)	0.001029	Area (sq ft)	1554.75	974.54	1035.99
Q Total (cfs)	5334.00	Flow (cfs)	1351.68	3097.93	884.39
Top Width (ft)	923.81	Top Width (ft)	516.97	75.81	331.03
Vel Total (ft/s)	2.06	Avg. Vel. (ft/s)	1.48	3.18	1.25
Max Chl Dpth (ft)	16.06	Hydr. Depth (ft)	6.30	12.86	4.93
Conv. Total (cfs)	166256.2	Conv. (cfs)	42130.6	96560.0	27565.7
Length Wtd. (ft)	28.00	Wetted Per. (ft)	145.44	79.10	143.07
Min Ch El (ft)	264.31	Shear (lb/sq ft)	0.40	0.79	0.32
Alpha	1.58	Stream Power (lb/ft s)	0.60	2.52	0.40
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	17.65	16.24	9.71
C & E Loss (ft)	0.00	Cum SA (acres)	6.20	1.99	4.52

Plan: Prop Mill Creek 1 RS: 800.* Profile: Q100

E.G. Elev (ft)	281.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	281.47	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	274.91	Flow Area (sq ft)	1074.50	1057.70	861.56
E.G. Slope (ft/ft)	0.001178	Area (sq ft)	2152.13	1057.70	1462.40
Q Total (cfs)	7011.00	Flow (cfs)	1889.79	3798.97	1322.25
Top Width (ft)	1118.60	Top Width (ft)	620.50	75.81	422.29
Vel Total (ft/s)	2.34	Avg. Vel. (ft/s)	1.76	3.59	1.53
Max Chl Dpth (ft)	17.16	Hydr. Depth (ft)	7.40	13.95	6.03
Conv. Total (cfs)	204259.1	Conv. (cfs)	55057.2	110679.4	38522.5
Length Wtd. (ft)	28.00	Wetted Per. (ft)	145.44	79.10	143.07
Min Ch El (ft)	264.31	Shear (lb/sq ft)	0.54	0.98	0.44
Alpha	1.51	Stream Power (lb/ft s)	0.96	3.53	0.68
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	25.17	18.38	14.69
C & E Loss (ft)	0.01	Cum SA (acres)	8.02	2.24	5.28

Plan: Prop Mill Creek 1 RS: 750 BR U Profile: Q10

E.G. Elev (ft)	277.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	277.82	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	269.97	Flow Area (sq ft)	416.21	781.43	308.66
E.G. Slope (ft/ft)	0.000878	Area (sq ft)	416.21	781.43	308.66
Q Total (cfs)	2615.00	Flow (cfs)	377.45	1980.14	257.41
Top Width (ft)	288.76	Top Width (ft)	112.99	75.81	99.97
Vel Total (ft/s)	1.74	Avg. Vel. (ft/s)	0.91	2.53	0.83
Max Chl Dpth (ft)	13.51	Hydr. Depth (ft)	3.68	10.31	3.09
Conv. Total (cfs)	88252.6	Conv. (cfs)	12738.3	66826.9	8687.4
Length Wtd. (ft)	56.00	Wetted Per. (ft)	130.61	79.10	109.35
Min Ch El (ft)	264.31	Shear (lb/sq ft)	0.17	0.54	0.15
Alpha	1.68	Stream Power (lb/ft s)	0.16	1.37	0.13
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	6.14	11.69	3.00
C & E Loss (ft)	0.01	Cum SA (acres)	4.05	1.67	1.47

Plan: Prop Mill Creek 1 RS: 750 BR U Profile: Q25

E.G. Elev (ft)	279.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	279.25	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	271.55	Flow Area (sq ft)	579.93	890.03	453.82
E.G. Slope (ft/ft)	0.001095	Area (sq ft)	579.93	890.03	453.82
Q Total (cfs)	3971.00	Flow (cfs)	709.99	2747.02	513.99
Top Width (ft)	294.13	Top Width (ft)	115.60	75.81	102.72
Vel Total (ft/s)	2.06	Avg. Vel. (ft/s)	1.22	3.09	1.13
Max Chl Dpth (ft)	14.94	Hydr. Depth (ft)	5.02	11.74	4.42
Conv. Total (cfs)	119998.1	Conv. (cfs)	21455.0	83011.0	15532.1
Length Wtd. (ft)	56.00	Wetted Per. (ft)	140.02	79.10	115.31
Min Ch El (ft)	264.31	Shear (lb/sq ft)	0.28	0.77	0.27
Alpha	1.65	Stream Power (lb/ft s)	0.35	2.37	0.30
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	11.89	13.91	5.48
C & E Loss (ft)	0.01	Cum SA (acres)	5.03	1.83	3.29

Plan: Prop Mill Creek 1 RS: 750 BR U Profile: Q50

E.G. Elev (ft)	280.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	280.29	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	272.91	Flow Area (sq ft)	700.93	968.72	561.49
E.G. Slope (ft/ft)	0.001338	Area (sq ft)	700.93	968.72	561.49
Q Total (cfs)	5334.00	Flow (cfs)	1053.11	3496.45	784.44
Top Width (ft)	298.02	Top Width (ft)	117.50	75.81	104.71
Vel Total (ft/s)	2.39	Avg. Vel. (ft/s)	1.50	3.61	1.40
Max Chl Dpth (ft)	15.98	Hydr. Depth (ft)	5.97	12.78	5.36
Conv. Total (cfs)	145844.4	Conv. (cfs)	28794.5	95601.4	21448.6
Length Wtd. (ft)	56.00	Wetted Per. (ft)	146.83	79.10	119.64
Min Ch El (ft)	264.31	Shear (lb/sq ft)	0.40	1.02	0.39
Alpha	1.62	Stream Power (lb/ft s)	0.60	3.69	0.55
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	16.93	15.62	9.19
C & E Loss (ft)	0.01	Cum SA (acres)	5.99	1.94	4.38

Plan: Prop Mill Creek 1 RS: 750 BR U Profile: Q100

E.G. Elev (ft)	281.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	281.36	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	274.69	Flow Area (sq ft)	827.78	1049.89	674.70
E.G. Slope (ft/ft)	0.001608	Area (sq ft)	827.78	1049.89	674.70
Q Total (cfs)	7011.00	Flow (cfs)	1491.44	4384.15	1135.41
Top Width (ft)	302.04	Top Width (ft)	119.46	75.81	106.76
Vel Total (ft/s)	2.75	Avg. Vel. (ft/s)	1.80	4.18	1.68
Max Chl Dpth (ft)	17.05	Hydr. Depth (ft)	6.93	13.85	6.32
Conv. Total (cfs)	174823.4	Conv. (cfs)	37190.0	109321.4	28312.1
Length Wtd. (ft)	56.00	Wetted Per. (ft)	153.87	79.10	124.10
Min Ch El (ft)	264.31	Shear (lb/sq ft)	0.54	1.33	0.55
Alpha	1.60	Stream Power (lb/ft s)	0.97	5.57	0.92
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	24.21	17.71	14.00
C & E Loss (ft)	0.01	Cum SA (acres)	7.79	2.19	5.11

Plan: Prop Mill Creek 1 RS: 750 BR D Profile: Q10

E.G. Elev (ft)	277.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	277.68	Reach Len. (ft)	16.00	16.00	16.00
Crit W.S. (ft)	270.52	Flow Area (sq ft)	17.02	684.63	301.87
E.G. Slope (ft/ft)	0.002047	Area (sq ft)	17.02	684.63	301.87
Q Total (cfs)	2615.00	Flow (cfs)	5.38	2238.58	371.03
Top Width (ft)	223.58	Top Width (ft)	41.48	83.85	98.25
Vel Total (ft/s)	2.61	Avg. Vel. (ft/s)	0.32	3.27	1.23
Max Chl Dpth (ft)	13.59	Hydr. Depth (ft)	0.41	8.16	3.07
Conv. Total (cfs)	57800.2	Conv. (cfs)	119.0	49480.2	8201.1
Length Wtd. (ft)	16.00	Wetted Per. (ft)	45.74	89.20	105.90
Min Ch El (ft)	264.09	Shear (lb/sq ft)	0.05	0.98	0.36
Alpha	1.38	Stream Power (lb/ft s)	0.02	3.21	0.45
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	5.86	10.75	2.61
C & E Loss (ft)	0.00	Cum SA (acres)	3.95	1.56	1.35

Plan: Prop Mill Creek 1 RS: 750 BR D Profile: Q25

E.G. Elev (ft)	279.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	279.07	Reach Len. (ft)	16.00	16.00	16.00
Crit W.S. (ft)	272.17	Flow Area (sq ft)	92.16	805.95	440.51
E.G. Slope (ft/ft)	0.002576	Area (sq ft)	92.16	805.95	440.51
Q Total (cfs)	3971.00	Flow (cfs)	73.73	3142.21	755.06
Top Width (ft)	260.09	Top Width (ft)	68.95	90.34	100.81
Vel Total (ft/s)	2.97	Avg. Vel. (ft/s)	0.80	3.90	1.71
Max Chl Dpth (ft)	14.98	Hydr. Depth (ft)	1.34	8.92	4.37
Conv. Total (cfs)	78239.8	Conv. (cfs)	1452.6	61910.3	14876.8
Length Wtd. (ft)	16.00	Wetted Per. (ft)	77.51	95.83	111.60
Min Ch El (ft)	264.09	Shear (lb/sq ft)	0.19	1.35	0.63
Alpha	1.43	Stream Power (lb/ft s)	0.15	5.27	1.09
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	11.46	12.82	4.91
C & E Loss (ft)	0.00	Cum SA (acres)	4.92	1.72	3.16

Plan: Prop Mill Creek 1 RS: 750 BR D Profile: Q50

E.G. Elev (ft)	280.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	280.07	Reach Len. (ft)	16.00	16.00	16.00
Crit W.S. (ft)	273.58	Flow Area (sq ft)	181.18	898.66	542.56
E.G. Slope (ft/ft)	0.003057	Area (sq ft)	181.18	898.66	542.56
Q Total (cfs)	5334.00	Flow (cfs)	201.32	3995.73	1136.95
Top Width (ft)	296.82	Top Width (ft)	100.05	94.13	102.65
Vel Total (ft/s)	3.29	Avg. Vel. (ft/s)	1.11	4.45	2.10
Max Chl Dpth (ft)	15.98	Hydr. Depth (ft)	1.81	9.55	5.29
Conv. Total (cfs)	96473.5	Conv. (cfs)	3641.2	72268.8	20563.5
Length Wtd. (ft)	16.00	Wetted Per. (ft)	112.58	99.75	115.70
Min Ch El (ft)	264.09	Shear (lb/sq ft)	0.31	1.72	0.89
Alpha	1.46	Stream Power (lb/ft s)	0.34	7.64	1.88
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	16.36	14.42	8.48
C & E Loss (ft)	0.01	Cum SA (acres)	5.85	1.83	4.25

Plan: Prop Mill Creek 1 RS: 750 BR D Profile: Q100

E.G. Elev (ft)	281.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	281.11	Reach Len. (ft)	16.00	16.00	16.00
Crit W.S. (ft)	275.61	Flow Area (sq ft)	286.36	996.51	650.26
E.G. Slope (ft/ft)	0.003385	Area (sq ft)	286.36	996.51	650.26
Q Total (cfs)	7011.00	Flow (cfs)	435.71	4995.05	1580.24
Top Width (ft)	301.01	Top Width (ft)	102.33	94.13	104.55
Vel Total (ft/s)	3.63	Avg. Vel. (ft/s)	1.52	5.01	2.43
Max Chl Dpth (ft)	17.02	Hydr. Depth (ft)	2.80	10.59	6.22
Conv. Total (cfs)	120504.6	Conv. (cfs)	7489.0	85854.6	27161.0
Length Wtd. (ft)	16.00	Wetted Per. (ft)	120.11	99.75	119.95
Min Ch El (ft)	264.09	Shear (lb/sq ft)	0.50	2.11	1.15
Alpha	1.47	Stream Power (lb/ft s)	0.77	10.58	2.78
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	23.50	16.39	13.15
C & E Loss (ft)	0.02	Cum SA (acres)	7.64	2.09	4.98

Plan: Prop Mill Creek 1 RS: 700 Profile: Q10

E.G. Elev (ft)	277.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	277.65	Reach Len. (ft)	35.00	35.00	35.00
Crit W.S. (ft)	270.52	Flow Area (sq ft)	58.97	682.19	305.50
E.G. Slope (ft/ft)	0.002007	Area (sq ft)	414.83	682.19	305.50
Q Total (cfs)	2615.00	Flow (cfs)	30.68	2205.72	378.60
Top Width (ft)	455.42	Top Width (ft)	267.68	83.72	104.03
Vel Total (ft/s)	2.50	Avg. Vel. (ft/s)	0.52	3.23	1.24
Max Chl Dpth (ft)	13.56	Hydr. Depth (ft)	0.80	8.15	2.94
Conv. Total (cfs)	58375.0	Conv. (cfs)	685.0	49238.5	8451.5
Length Wtd. (ft)	35.00	Wetted Per. (ft)	73.95	89.06	104.24
Min Ch El (ft)	264.09	Shear (lb/sq ft)	0.10	0.96	0.37
Alpha	1.45	Stream Power (lb/ft s)	0.05	3.10	0.46
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	5.78	10.50	2.50
C & E Loss (ft)	0.00	Cum SA (acres)	3.89	1.53	1.31

Plan: Prop Mill Creek 1 RS: 700 Profile: Q25

E.G. Elev (ft)	279.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	279.04	Reach Len. (ft)	35.00	35.00	35.00
Crit W.S. (ft)	272.17	Flow Area (sq ft)	176.72	802.97	468.29
E.G. Slope (ft/ft)	0.002499	Area (sq ft)	823.45	802.97	554.71
Q Total (cfs)	3971.00	Flow (cfs)	176.80	3079.00	715.19
Top Width (ft)	754.44	Top Width (ft)	327.50	90.18	336.75
Vel Total (ft/s)	2.74	Avg. Vel. (ft/s)	1.00	3.83	1.53
Max Chl Dpth (ft)	14.95	Hydr. Depth (ft)	1.81	8.90	3.41
Conv. Total (cfs)	79441.2	Conv. (cfs)	3537.0	61596.5	14307.7
Length Wtd. (ft)	35.00	Wetted Per. (ft)	97.98	95.67	137.67
Min Ch El (ft)	264.09	Shear (lb/sq ft)	0.28	1.31	0.53
Alpha	1.58	Stream Power (lb/ft s)	0.28	5.02	0.81
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	11.29	12.53	4.73
C & E Loss (ft)	0.00	Cum SA (acres)	4.84	1.69	3.08

Plan: Prop Mill Creek 1 RS: 700 Profile: Q50

E.G. Elev (ft)	280.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	280.05	Reach Len. (ft)	35.00	35.00	35.00
Crit W.S. (ft)	273.57	Flow Area (sq ft)	295.23	896.27	610.44
E.G. Slope (ft/ft)	0.002800	Area (sq ft)	1198.24	896.27	945.17
Q Total (cfs)	5334.00	Flow (cfs)	366.25	3808.31	1159.43
Top Width (ft)	910.38	Top Width (ft)	404.27	94.08	412.03
Vel Total (ft/s)	2.96	Avg. Vel. (ft/s)	1.24	4.25	1.90
Max Chl Dpth (ft)	15.96	Hydr. Depth (ft)	2.29	9.53	4.34
Conv. Total (cfs)	100805.9	Conv. (cfs)	6921.7	71972.3	21911.9
Length Wtd. (ft)	35.00	Wetted Per. (ft)	129.11	99.70	140.93
Min Ch El (ft)	264.09	Shear (lb/sq ft)	0.40	1.57	0.76
Alpha	1.57	Stream Power (lb/ft s)	0.50	6.68	1.44
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	16.11	14.09	8.21
C & E Loss (ft)	0.01	Cum SA (acres)	5.76	1.80	4.15

Plan: Prop Mill Creek 1 RS: 700 Profile: Q100

E.G. Elev (ft)	281.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	281.10	Reach Len. (ft)	35.00	35.00	35.00
Crit W.S. (ft)	275.65	Flow Area (sq ft)	431.62	995.65	758.97
E.G. Slope (ft/ft)	0.002897	Area (sq ft)	1734.53	995.65	1412.85
Q Total (cfs)	7011.00	Flow (cfs)	700.80	4614.65	1695.55
Top Width (ft)	1145.15	Top Width (ft)	579.86	94.13	471.16
Vel Total (ft/s)	3.21	Avg. Vel. (ft/s)	1.62	4.63	2.23
Max Chl Dpth (ft)	17.01	Hydr. Depth (ft)	3.34	10.58	5.40
Conv. Total (cfs)	130251.5	Conv. (cfs)	13019.7	85731.7	31500.2
Length Wtd. (ft)	35.00	Wetted Per. (ft)	129.35	99.75	140.93
Min Ch El (ft)	264.09	Shear (lb/sq ft)	0.60	1.81	0.97
Alpha	1.52	Stream Power (lb/ft s)	0.98	8.37	2.18
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	23.12	16.03	12.77
C & E Loss (ft)	0.01	Cum SA (acres)	7.52	2.05	4.87

Plan: Prop Mill Creek 1 RS: 650 BR U Profile: Q10

E.G. Elev (ft)	277.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	277.56	Reach Len. (ft)	30.00	30.00	30.00
Crit W.S. (ft)	270.52	Flow Area (sq ft)	1.63	675.14	280.54
E.G. Slope (ft/ft)	0.002143	Area (sq ft)	1.63	675.14	280.54
Q Total (cfs)	2615.00	Flow (cfs)	0.34	2246.99	367.67
Top Width (ft)	178.36	Top Width (ft)	8.02	83.32	87.02
Vel Total (ft/s)	2.73	Avg. Vel. (ft/s)	0.21	3.33	1.31
Max Chl Dpth (ft)	13.47	Hydr. Depth (ft)	0.20	8.10	3.22
Conv. Total (cfs)	56489.6	Conv. (cfs)	7.4	48539.7	7942.4
Length Wtd. (ft)	30.00	Wetted Per. (ft)	8.32	88.65	94.88
Min Ch El (ft)	264.09	Shear (lb/sq ft)	0.03	1.02	0.40
Alpha	1.31	Stream Power (lb/ft s)	0.01	3.39	0.52
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	5.61	9.95	2.26
C & E Loss (ft)	0.00	Cum SA (acres)	3.78	1.46	1.23

Plan: Prop Mill Creek 1 RS: 650 BR U Profile: Q25

E.G. Elev (ft)	279.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	278.91	Reach Len. (ft)	30.00	30.00	30.00
Crit W.S. (ft)	272.17	Flow Area (sq ft)	29.37	789.59	398.71
E.G. Slope (ft/ft)	0.002877	Area (sq ft)	29.37	789.59	398.71
Q Total (cfs)	3971.00	Flow (cfs)	18.98	3210.38	741.64
Top Width (ft)	211.28	Top Width (ft)	34.29	88.08	88.90
Vel Total (ft/s)	3.26	Avg. Vel. (ft/s)	0.65	4.07	1.86
Max Chl Dpth (ft)	14.82	Hydr. Depth (ft)	0.86	8.96	4.48
Conv. Total (cfs)	74029.6	Conv. (cfs)	353.9	59849.6	13826.1
Length Wtd. (ft)	30.00	Wetted Per. (ft)	34.86	95.78	102.61
Min Ch El (ft)	264.09	Shear (lb/sq ft)	0.15	1.48	0.70
Alpha	1.32	Stream Power (lb/ft s)	0.10	6.02	1.30
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	10.95	11.89	4.34
C & E Loss (ft)	0.00	Cum SA (acres)	4.70	1.61	2.91

Plan: Prop Mill Creek 1 RS: 650 BR U Profile: Q50

E.G. Elev (ft)	280.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	279.86	Reach Len. (ft)	30.00	30.00	30.00
Crit W.S. (ft)	273.57	Flow Area (sq ft)	80.14	875.27	483.82
E.G. Slope (ft/ft)	0.003659	Area (sq ft)	80.14	875.27	483.82
Q Total (cfs)	5334.00	Flow (cfs)	72.40	4130.91	1130.69
Top Width (ft)	250.37	Top Width (ft)	68.19	91.95	90.24
Vel Total (ft/s)	3.71	Avg. Vel. (ft/s)	0.90	4.72	2.34
Max Chl Dpth (ft)	15.77	Hydr. Depth (ft)	1.18	9.52	5.36
Conv. Total (cfs)	88178.2	Conv. (cfs)	1196.8	68289.6	18691.8
Length Wtd. (ft)	30.00	Wetted Per. (ft)	68.93	101.67	108.08
Min Ch El (ft)	264.09	Shear (lb/sq ft)	0.27	1.97	1.02
Alpha	1.34	Stream Power (lb/ft s)	0.24	9.28	2.39
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	15.59	13.38	7.64
C & E Loss (ft)	0.00	Cum SA (acres)	5.57	1.72	3.95

Plan: Prop Mill Creek 1 RS: 650 BR U Profile: Q100

E.G. Elev (ft)	281.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	280.85	Reach Len. (ft)	30.00	30.00	30.00
Crit W.S. (ft)	275.61	Flow Area (sq ft)	152.56	967.26	574.20
E.G. Slope (ft/ft)	0.004300	Area (sq ft)	152.56	967.26	574.20
Q Total (cfs)	7011.00	Flow (cfs)	215.74	5198.32	1596.93
Top Width (ft)	258.99	Top Width (ft)	74.73	92.63	91.63
Vel Total (ft/s)	4.14	Avg. Vel. (ft/s)	1.41	5.37	2.78
Max Chl Dpth (ft)	16.76	Hydr. Depth (ft)	2.04	10.44	6.27
Conv. Total (cfs)	106910.9	Conv. (cfs)	3289.9	79269.4	24351.7
Length Wtd. (ft)	30.00	Wetted Per. (ft)	75.64	104.37	113.80
Min Ch El (ft)	264.09	Shear (lb/sq ft)	0.54	2.49	1.35
Alpha	1.36	Stream Power (lb/ft s)	0.77	13.37	3.77
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	22.37	15.24	11.98
C & E Loss (ft)	0.00	Cum SA (acres)	7.26	1.98	4.65

Plan: Prop Mill Creek 1 RS: 650 BR D Profile: Q10

E.G. Elev (ft)	277.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	277.50	Reach Len. (ft)	35.00	35.00	35.00
Crit W.S. (ft)	270.56	Flow Area (sq ft)	2.73	701.06	237.56
E.G. Slope (ft/ft)	0.002295	Area (sq ft)	2.73	701.06	237.56
Q Total (cfs)	2615.00	Flow (cfs)	0.72	2302.38	311.90
Top Width (ft)	180.81	Top Width (ft)	10.33	88.99	81.49
Vel Total (ft/s)	2.78	Avg. Vel. (ft/s)	0.26	3.28	1.31
Max Chl Dpth (ft)	13.41	Hydr. Depth (ft)	0.26	7.88	2.92
Conv. Total (cfs)	54581.1	Conv. (cfs)	15.1	48055.9	6510.1
Length Wtd. (ft)	35.00	Wetted Per. (ft)	10.45	98.88	82.22
Min Ch El (ft)	264.09	Shear (lb/sq ft)	0.04	1.02	0.41
Alpha	1.26	Stream Power (lb/ft s)	0.01	3.34	0.54
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	5.61	9.48	2.08
C & E Loss (ft)	0.01	Cum SA (acres)	3.77	1.41	1.17

Plan: Prop Mill Creek 1 RS: 650 BR D Profile: Q25

E.G. Elev (ft)	279.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	278.82	Reach Len. (ft)	35.00	35.00	35.00
Crit W.S. (ft)	272.16	Flow Area (sq ft)	31.81	822.41	346.54
E.G. Slope (ft/ft)	0.003165	Area (sq ft)	31.81	822.41	346.54
Q Total (cfs)	3971.00	Flow (cfs)	22.54	3273.71	674.75
Top Width (ft)	213.83	Top Width (ft)	34.95	95.53	83.35
Vel Total (ft/s)	3.31	Avg. Vel. (ft/s)	0.71	3.98	1.95
Max Chl Dpth (ft)	14.73	Hydr. Depth (ft)	0.91	8.61	4.16
Conv. Total (cfs)	70584.3	Conv. (cfs)	400.6	58190.0	11993.7
Length Wtd. (ft)	35.00	Wetted Per. (ft)	35.35	110.61	84.50
Min Ch El (ft)	264.09	Shear (lb/sq ft)	0.18	1.47	0.81
Alpha	1.25	Stream Power (lb/ft s)	0.13	5.85	1.58
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	10.93	11.33	4.09
C & E Loss (ft)	0.02	Cum SA (acres)	4.67	1.55	2.85

Plan: Prop Mill Creek 1 RS: 650 BR D Profile: Q50

E.G. Elev (ft)	280.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.28	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	279.75	Reach Len. (ft)	35.00	35.00	35.00
Crit W.S. (ft)	273.46	Flow Area (sq ft)	81.85	913.43	424.49
E.G. Slope (ft/ft)	0.004048	Area (sq ft)	81.85	913.43	424.49
Q Total (cfs)	5334.00	Flow (cfs)	79.48	4197.74	1056.78
Top Width (ft)	252.43	Top Width (ft)	67.56	100.22	84.65
Vel Total (ft/s)	3.76	Avg. Vel. (ft/s)	0.97	4.60	2.49
Max Chl Dpth (ft)	15.66	Hydr. Depth (ft)	1.21	9.11	5.01
Conv. Total (cfs)	83839.9	Conv. (cfs)	1249.2	65980.2	16610.5
Length Wtd. (ft)	35.00	Wetted Per. (ft)	68.15	119.11	86.10
Min Ch El (ft)	264.09	Shear (lb/sq ft)	0.30	1.94	1.25
Alpha	1.27	Stream Power (lb/ft s)	0.29	8.91	3.10
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	15.54	12.76	7.32
C & E Loss (ft)	0.03	Cum SA (acres)	5.52	1.66	3.89

Plan: Prop Mill Creek 1 RS: 650 BR D Profile: Q100

E.G. Elev (ft)	281.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	280.72	Reach Len. (ft)	35.00	35.00	35.00
Crit W.S. (ft)	275.58	Flow Area (sq ft)	151.20	1011.97	507.97
E.G. Slope (ft/ft)	0.004743	Area (sq ft)	151.20	1011.97	507.97
Q Total (cfs)	7011.00	Flow (cfs)	228.36	5259.42	1523.22
Top Width (ft)	259.11	Top Width (ft)	72.32	100.76	86.03
Vel Total (ft/s)	4.20	Avg. Vel. (ft/s)	1.51	5.20	3.00
Max Chl Dpth (ft)	16.63	Hydr. Depth (ft)	2.09	10.04	5.90
Conv. Total (cfs)	101797.7	Conv. (cfs)	3315.8	76365.3	22116.7
Length Wtd. (ft)	35.00	Wetted Per. (ft)	73.10	123.58	87.79
Min Ch El (ft)	264.09	Shear (lb/sq ft)	0.61	2.42	1.71
Alpha	1.27	Stream Power (lb/ft s)	0.93	12.60	5.14
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	22.26	14.56	11.60
C & E Loss (ft)	0.05	Cum SA (acres)	7.21	1.91	4.58

Plan: Prop Mill Creek 1 RS: 600.* Profile: Q10

E.G. Elev (ft)	277.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	277.44	Reach Len. (ft)	600.00	600.00	600.00
Crit W.S. (ft)	270.56	Flow Area (sq ft)	208.08	699.66	253.85
E.G. Slope (ft/ft)	0.001958	Area (sq ft)	414.34	699.66	253.85
Q Total (cfs)	2615.00	Flow (cfs)	167.47	2172.08	275.44
Top Width (ft)	456.88	Top Width (ft)	262.74	90.51	103.63
Vel Total (ft/s)	2.25	Avg. Vel. (ft/s)	0.80	3.10	1.09
Max Chl Dpth (ft)	13.35	Hydr. Depth (ft)	1.56	7.73	2.45
Conv. Total (cfs)	59096.4	Conv. (cfs)	3784.7	49087.0	6224.7
Length Wtd. (ft)	600.00	Wetted Per. (ft)	133.18	95.31	103.79
Min Ch El (ft)	264.09	Shear (lb/sq ft)	0.19	0.90	0.30
Alpha	1.61	Stream Power (lb/ft s)	0.15	2.79	0.32
Frctn Loss (ft)	1.63	Cum Volume (acre-ft)	5.44	8.91	1.89
C & E Loss (ft)	0.00	Cum SA (acres)	3.66	1.33	1.10

Plan: Prop Mill Creek 1 RS: 600.* Profile: Q25

E.G. Elev (ft)	278.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	278.77	Reach Len. (ft)	600.00	600.00	600.00
Crit W.S. (ft)	272.16	Flow Area (sq ft)	397.88	824.84	411.60
E.G. Slope (ft/ft)	0.002321	Area (sq ft)	800.16	824.84	427.45
Q Total (cfs)	3971.00	Flow (cfs)	487.33	2951.89	531.78
Top Width (ft)	699.46	Top Width (ft)	323.78	98.22	277.46
Vel Total (ft/s)	2.43	Avg. Vel. (ft/s)	1.22	3.58	1.29
Max Chl Dpth (ft)	14.68	Hydr. Depth (ft)	2.58	8.40	2.74
Conv. Total (cfs)	82426.5	Conv. (cfs)	10115.6	61272.8	11038.2
Length Wtd. (ft)	600.00	Wetted Per. (ft)	154.10	103.13	150.67
Min Ch El (ft)	264.09	Shear (lb/sq ft)	0.37	1.16	0.40
Alpha	1.68	Stream Power (lb/ft s)	0.46	4.15	0.51
Frctn Loss (ft)	1.80	Cum Volume (acre-ft)	10.59	10.67	3.77
C & E Loss (ft)	0.00	Cum SA (acres)	4.53	1.47	2.70

Plan: Prop Mill Creek 1 RS: 600.* Profile: Q50

E.G. Elev (ft)	279.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	279.70	Reach Len. (ft)	600.00	600.00	600.00
Crit W.S. (ft)	273.46	Flow Area (sq ft)	558.84	919.57	560.58
E.G. Slope (ft/ft)	0.002604	Area (sq ft)	1146.35	919.57	757.25
Q Total (cfs)	5334.00	Flow (cfs)	805.72	3633.02	895.26
Top Width (ft)	886.01	Top Width (ft)	402.31	103.05	380.65
Vel Total (ft/s)	2.62	Avg. Vel. (ft/s)	1.44	3.95	1.60
Max Chl Dpth (ft)	15.61	Hydr. Depth (ft)	3.03	8.92	3.53
Conv. Total (cfs)	104533.0	Conv. (cfs)	15790.0	71198.1	17544.9
Length Wtd. (ft)	600.00	Wetted Per. (ft)	184.73	108.05	158.95
Min Ch El (ft)	264.09	Shear (lb/sq ft)	0.49	1.38	0.57
Alpha	1.66	Stream Power (lb/ft s)	0.71	5.47	0.92
Frctn Loss (ft)	1.92	Cum Volume (acre-ft)	15.04	12.02	6.85
C & E Loss (ft)	0.00	Cum SA (acres)	5.33	1.57	3.71

Plan: Prop Mill Creek 1 RS: 600.* Profile: Q100

E.G. Elev (ft)	280.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	280.71	Reach Len. (ft)	600.00	600.00	600.00
Crit W.S. (ft)	275.92	Flow Area (sq ft)	747.27	1023.93	720.34
E.G. Slope (ft/ft)	0.002627	Area (sq ft)	1665.35	1023.93	1170.07
Q Total (cfs)	7011.00	Flow (cfs)	1299.82	4345.45	1365.73
Top Width (ft)	1104.13	Top Width (ft)	557.43	103.76	442.95
Vel Total (ft/s)	2.81	Avg. Vel. (ft/s)	1.74	4.24	1.90
Max Chl Dpth (ft)	16.62	Hydr. Depth (ft)	3.99	9.87	4.54
Conv. Total (cfs)	136795.8	Conv. (cfs)	25361.6	84786.6	26647.6
Length Wtd. (ft)	600.00	Wetted Per. (ft)	187.64	108.78	158.95
Min Ch El (ft)	264.09	Shear (lb/sq ft)	0.65	1.54	0.74
Alpha	1.57	Stream Power (lb/ft s)	1.14	6.55	1.41
Frctn Loss (ft)	1.92	Cum Volume (acre-ft)	21.53	13.74	10.93
C & E Loss (ft)	0.02	Cum SA (acres)	6.95	1.83	4.37

Plan: Prop Mill Creek 1 RS: 0 Profile: Q10

E.G. Elev (ft)	275.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	275.76	Reach Len. (ft)			
Crit W.S. (ft)	270.22	Flow Area (sq ft)	375.99	594.60	20.10
E.G. Slope (ft/ft)	0.004005	Area (sq ft)	375.99	594.60	20.10
Q Total (cfs)	2615.00	Flow (cfs)	436.35	2169.99	8.66
Top Width (ft)	428.37	Top Width (ft)	269.13	103.07	56.18
Vel Total (ft/s)	2.64	Avg. Vel. (ft/s)	1.16	3.65	0.43
Max Chl Dpth (ft)	11.65	Hydr. Depth (ft)	1.40	5.77	0.36
Conv. Total (cfs)	41321.6	Conv. (cfs)	6895.1	34289.6	136.9
Length Wtd. (ft)		Wetted Per. (ft)	269.64	108.68	56.20
Min Ch El (ft)	264.11	Shear (lb/sq ft)	0.35	1.37	0.09
Alpha	1.62	Stream Power (lb/ft s)	0.40	4.99	0.04
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Prop Mill Creek 1 RS: 0 Profile: Q25

E.G. Elev (ft)	277.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	276.95	Reach Len. (ft)			
Crit W.S. (ft)	271.89	Flow Area (sq ft)	738.01	724.24	120.64
E.G. Slope (ft/ft)	0.004002	Area (sq ft)	738.01	724.24	120.64
Q Total (cfs)	3971.00	Flow (cfs)	1069.00	2795.47	106.53
Top Width (ft)	564.38	Top Width (ft)	333.83	115.79	114.76
Vel Total (ft/s)	2.51	Avg. Vel. (ft/s)	1.45	3.86	0.88
Max Chl Dpth (ft)	12.84	Hydr. Depth (ft)	2.21	6.26	1.05
Conv. Total (cfs)	62771.8	Conv. (cfs)	16898.3	44189.6	1684.0
Length Wtd. (ft)		Wetted Per. (ft)	334.42	121.64	114.84
Min Ch El (ft)	264.11	Shear (lb/sq ft)	0.55	1.49	0.26
Alpha	1.76	Stream Power (lb/ft s)	0.80	5.74	0.23
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Prop Mill Creek 1 RS: 0 Profile: Q50

E.G. Elev (ft)	277.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	277.79	Reach Len. (ft)			
Crit W.S. (ft)	274.18	Flow Area (sq ft)	1037.87	826.25	237.23
E.G. Slope (ft/ft)	0.004006	Area (sq ft)	1037.87	826.25	237.23
Q Total (cfs)	5334.00	Flow (cfs)	1756.11	3306.26	271.63
Top Width (ft)	655.20	Top Width (ft)	372.18	125.57	157.46
Vel Total (ft/s)	2.54	Avg. Vel. (ft/s)	1.69	4.00	1.15
Max Chl Dpth (ft)	13.68	Hydr. Depth (ft)	2.79	6.58	1.51
Conv. Total (cfs)	84271.3	Conv. (cfs)	27744.6	52235.1	4291.5
Length Wtd. (ft)		Wetted Per. (ft)	372.81	131.58	157.83
Min Ch El (ft)	264.11	Shear (lb/sq ft)	0.70	1.57	0.38
Alpha	1.70	Stream Power (lb/ft s)	1.18	6.28	0.43
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Prop Mill Creek 1 RS: 0 Profile: Q100

E.G. Elev (ft)	278.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.	0.110	0.080	0.110
W.S. Elev (ft)	278.83	Reach Len. (ft)			
Crit W.S. (ft)	275.30	Flow Area (sq ft)	1461.04	970.82	416.83
E.G. Slope (ft/ft)	0.004002	Area (sq ft)	1461.04	970.82	416.83
Q Total (cfs)	7011.00	Flow (cfs)	2726.59	3680.05	604.36
Top Width (ft)	805.37	Top Width (ft)	452.04	161.48	191.85
Vel Total (ft/s)	2.46	Avg. Vel. (ft/s)	1.87	3.79	1.45
Max Chl Dpth (ft)	14.72	Hydr. Depth (ft)	3.23	6.01	2.17
Conv. Total (cfs)	110829.0	Conv. (cfs)	43101.6	58173.7	9553.7
Length Wtd. (ft)		Wetted Per. (ft)	452.71	167.54	192.63
Min Ch El (ft)	264.11	Shear (lb/sq ft)	0.81	1.45	0.54
Alpha	1.50	Stream Power (lb/ft s)	1.50	5.49	0.78
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 15:57:22 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1211+00 (DA 2) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 29.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 36.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 43.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 49.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 ke value: 0.5000

CULVERT DIAM. = 3.00 ft BARRELS = 2

INLET station: 0.00 elevation: 230.17 ft
 OUTLET station: 217.00 elevation: 228.63 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	228.01	64.40	226.33	139.82	226.05
321.22	227.11				

Road profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	238.08	100.00	238.08		

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 226.60 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	veloc.	out.depth
	cfs	ft	ft	ft	ft	ft	ft		ft/s	ft
2	14.50	3.00	0.00	181.00	0.00	231.75	1.71	Inlet	7.09	0.99

Inlet control depth = 1.71 ft

Outlet control depth = 1.68 ft

Normal depth = 1.00 ft Culvert slope = 0.00710

Critical depth = 1.21 ft Critical slope = 0.00341

Road top width => 168.00 ft. Road pavement type => asphalt

Computed weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 226.66 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	veloc.	out.depth
	cfs	ft	ft	ft	ft	ft	ft		ft/s	ft

2 18.00 3.00 0.00 181.00 0.00 232.00 1.96 Inlet 7.49 1.12

Inlet control depth = 1.96 ft
Outlet control depth = 1.90 ft

Normal depth = 1.12 ft Culvert slope = 0.00710
Critical depth = 1.36 ft Critical slope = 0.00350
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 226.70 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
2	21.50	3.00	0.00	181.00	0.00	232.23	2.19	Inlet	7.87	1.23

Inlet control depth = 2.19 ft
Outlet control depth = 2.11 ft

Normal depth = 1.23 ft Culvert slope = 0.00710
Critical depth = 1.49 ft Critical slope = 0.00362
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 226.74 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
2	24.50	3.00	0.00	181.00	0.00	232.41	2.37	Inlet	8.13	1.33

Inlet control depth = 2.37 ft
Outlet control depth = 2.28 ft

Normal depth = 1.32 ft Culvert slope = 0.00710
Critical depth = 1.60 ft Critical slope = 0.00373
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

- *Computation: Hydraulic jump occurs within culvert.
- *Computation: Outlet velocity is based on tailwater conditions.
- *Computation: Hydraulic jump occurs within culvert.
- *Computation: Outlet velocity is based on tailwater conditions.
- *Computation: Hydraulic jump occurs within culvert.

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 15:59:36 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1224+20 (DA 3) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: CONCRETE BOX.
 ENTRANCE: FLARED 30:75
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 77.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 98.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 116.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 134.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.4000

CULVERT RISE = 2.00 ft CULVERT SPAN = 4.00 ft BARRELS = 2

INLET station: 0.00 elevation: 231.79 ft
 OUTLET station: 208.00 elevation: 229.83 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
62.47	231.04	92.83	229.63	155.44	230.96

Road profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	235.32	400.00	237.26		

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 230.25 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW ft	Control	Veloc. ft/s	Out.depth ft
2	38.50	2.00	4.00	184.00	0.00	233.93	2.25	Inlet	9.32	1.03

Inlet control depth = 2.25 ft
 Outlet control depth = 2.03 ft

Normal depth = 1.03 ft Culvert slope = 0.00942
 Critical depth = 1.42 ft Critical slope = 0.00382
 Road top width => 124.00 ft. Road pavement type => asphalt
 Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 230.31 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW ft	Control	Veloc. ft/s	Out.depth ft

2 49.00 2.00 4.00 184.00 0.00 234.47 2.79 Inlet 9.95 1.23

Inlet control depth = 2.79 ft
Outlet control depth = 2.39 ft

Normal depth = 1.22 ft Culvert slope = 0.00942
Critical depth = 1.67 ft Critical slope = 0.00397
Road top width => 124.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 230.35 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
2	58.00	2.00	4.00	184.00	0.00	235.02	3.35	Inlet	10.43	1.39

Inlet control depth = 3.35 ft
Outlet control depth = 2.69 ft

Normal depth = 1.38 ft Culvert slope = 0.00942
Critical depth = 1.87 ft Critical slope = 0.00411
Road top width => 124.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 230.39 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
2	67.00	2.00	4.00	184.00	0.00	235.68	4.00	Inlet	10.81	1.55

Inlet control depth = 4.00 ft
Outlet control depth = 3.06 ft

Normal depth = 1.53 ft Culvert slope = 0.00942
Critical depth = 2.06 ft Critical slope = 0.00714
Road top width => 124.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

*Computation: Hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on tailwater conditions.
*Computation: Hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on tailwater conditions.
*Computation: Hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on tailwater conditions.
*Computation: Hydraulic jump occurs within culvert.

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:00:07 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1240+50 (DA 4) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 59.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 76.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 89.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 104.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.5000

CULVERT DIAM. = 3.00 ft BARRELS = 2

INLET station: 0.00 elevation: 202.96 ft
 OUTLET station: 424.00 elevation: 195.10 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	198.25	14.78	199.63	25.74	195.44
52.06	202.96				

Road profile (XY Coordinates) ft

X	Y	X	Y
0.00	224.36	6.00	210.87

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 196.67 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
2	29.50	3.00	0.00	388.00	0.00	205.27	2.64	Inlet	12.27	1.12

Inlet control depth = 2.64 ft

Outlet control depth = 2.22 ft

Normal depth = 1.13 ft Culvert slope = 0.01854
 Critical depth = 1.76 ft Critical slope = 0.00397
 Road top width => 168.00 ft. Road pavement type => asphalt
 Computed weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 196.79 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft

2 38.00 3.00 0.00 388.00 0.00 205.77 3.15 Inlet 13.13 1.29

Inlet control depth = 3.15 ft
Outlet control depth = 2.62 ft

Normal depth = 1.29 ft Culvert slope = 0.01854
Critical depth = 2.01 ft Critical slope = 0.00446
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 196.87 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
2	44.50	3.00	0.00	388.00	0.00	206.20	3.57	Inlet	13.59	1.41

Inlet control depth = 3.57 ft
Outlet control depth = 2.94 ft

Normal depth = 1.41 ft Culvert slope = 0.01854
Critical depth = 2.17 ft Critical slope = 0.00496
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 196.96 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
2	52.00	3.00	0.00	388.00	0.00	206.76	4.13	Inlet	14.06	1.56

Inlet control depth = 4.13 ft
Outlet control depth = 3.34 ft

Normal depth = 1.55 ft Culvert slope = 0.01854
Critical depth = 2.35 ft Critical slope = 0.00568
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

*Computation: Hydraulic jump occurs within culvert.

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:00:28 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1252+90 (DA 5) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 65.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 84.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 99.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 116.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.5000

CULVERT DIAM. = 3.00 ft BARRELS = 3

INLET station: 0.00 elevation: 177.60 ft
 OUTLET station: 285.00 elevation: 177.20 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	177.33	46.93	176.53	112.41	177.38

Road profile (XY Coordinates) ft

X	Y	X	Y	X	Y
6.00	208.12	0.00	217.97		

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 176.99 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW ft	Control	Veloc. ft/s	Out.depth ft
3	21.67	3.00	0.00	285.00	206.00	180.00	2.40	Outlet	6.15	1.50

Inlet control depth = 2.21 ft
 Outlet control depth = 2.40 ft

Normal depth = 2.03 ft Culvert slope = 0.00140
 Critical depth = 1.50 ft Critical slope = 0.00362
 Road top width => 168.00 ft. Road pavement type => asphalt
 Computed weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 177.03 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW ft	Control	Veloc. ft/s	Out.depth ft

3 28.00 3.00 0.00 285.00 206.00 180.42 2.82 Outlet 6.72 1.71

Inlet control depth = 2.58 ft
Outlet control depth = 2.82 ft

Normal depth = 2.56 ft Culvert slope = 0.00140
Critical depth = 1.71 ft Critical slope = 0.00389
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 177.06 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
3	33.00	3.00	0.00	285.00	206.00	180.75	3.15	Outlet	4.67	3.00

Inlet control depth = 2.87 ft
Outlet control depth = 3.15 ft

Normal depth = 3.00 ft Culvert slope = 0.00140
Critical depth = 1.86 ft Critical slope = 0.00415
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 177.10 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
3	38.67	3.00	0.00	285.00	206.00	181.16	3.56	Outlet	5.47	3.00

Inlet control depth = 3.22 ft
Outlet control depth = 3.56 ft

Normal depth = 3.00 ft Culvert slope = 0.00140
Critical depth = 2.02 ft Critical slope = 0.00451
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:00:55 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1270+85 (DA 6) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 52.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 66.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 78.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 90.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.5000

CULVERT DIAM. = 2.50 ft BARRELS = 2

INLET station: 0.00 elevation: 200.64 ft
 OUTLET station: 385.00 elevation: 186.66 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	195.17	32.32	186.58	59.76	193.58

Road profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	206.70	100.00	206.70		

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 187.50 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW ft	Control	Veloc. ft/s	Out.depth ft
2	26.00	2.50	0.00	385.00	206.00	203.40	2.76	Inlet	15.23	0.95

Inlet control depth = 2.76 ft
 Outlet control depth = 2.14 ft

Normal depth = 0.95 ft Culvert slope = 0.03634
 Critical depth = 1.74 ft Critical slope = 0.00497
 Road top width => 168.00 ft. Road pavement type => asphalt
 Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 187.58 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW ft	Control	Veloc. ft/s	Out.depth ft

2 33.00 2.50 0.00 385.00 206.00 204.06 3.42 Inlet 16.35 1.08

Inlet control depth = 3.42 ft
Outlet control depth = 2.58 ft

Normal depth = 1.08 ft Culvert slope = 0.03634
Critical depth = 1.96 ft Critical slope = 0.00604
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 187.65 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc. ft/s	Out.depth ft
2	39.00	2.50	0.00	385.00	206.00	204.76	4.12	Inlet	16.98	1.19

Inlet control depth = 4.12 ft
Outlet control depth = 3.01 ft

Normal depth = 1.19 ft Culvert slope = 0.03634
Critical depth = 2.11 ft Critical slope = 0.00735
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 187.71 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc. ft/s	Out.depth ft
2	45.00	2.50	0.00	385.00	206.00	205.58	4.94	Inlet	17.52	1.30

Inlet control depth = 4.94 ft
Outlet control depth = 3.51 ft

Normal depth = 1.30 ft Culvert slope = 0.03634
Critical depth = 2.23 ft Critical slope = 0.00912
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

*Computation: Hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on tailwater conditions.
*Computation: Hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on tailwater conditions.
*Computation: Hydraulic jump occurs within culvert.

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:01:13 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1275+43 (DA 7) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 27.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 35.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 41.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 47.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.5000

CULVERT DIAM. = 2.00 ft BARRELS = 2

INLET station: 0.00 elevation: 192.92 ft
 OUTLET station: 252.00 elevation: 185.80 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	191.01	37.91	189.04	78.97	190.68

Road profile (XY Coordinates) ft

X	Y	X	Y
0.00	199.99	1.40	195.69

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 189.43 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
2	13.50	2.00	0.00	252.00	206.00	194.98	2.06	Inlet	4.30	2.00

Inlet control depth = 2.06 ft
 Outlet control depth = 1.66 ft

Normal depth = 0.79 ft Culvert slope = 0.02827
 Critical depth = 1.32 ft Critical slope = 0.00505
 Road top width => 168.00 ft. Road pavement type => asphalt
 Computed weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 189.47 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft

2 17.50 2.00 0.00 252.00 206.00 195.47 2.55 Inlet 5.57 2.00

Inlet control depth = 2.55 ft
Outlet control depth = 2.02 ft

Normal depth = 0.91 ft Culvert slope = 0.02827
Critical depth = 1.51 ft Critical slope = 0.00606
Road top width => 168.00 ft. Road pavement type => asphalt
Computed weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 189.50 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	veloc.	Out.depth
	cfs	ft	ft	ft	ft	ft	ft		ft/s	ft
2	20.18	2.00	0.00	252.00	206.00	195.88	2.96	Inlet	6.42	2.00

Inlet control depth = 2.96 ft
Outlet control depth = 2.29 ft

Normal depth = 0.99 ft Culvert slope = 0.02827
Critical depth = 1.61 ft Critical slope = 0.00699
Road top width => 168.00 ft. Road pavement type => asphalt
Computed weir Coefficient => 2.96.

Total Discharge => 41.00 cfs
Discharge per barrel => 20.18 cfs
Discharge over the road => 0.64 cfs
Average velocity over the road => 0.91 ft/sec

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 189.52 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	ft	ft	ft		ft/s	ft
2	21.85	2.00	0.00	252.00	206.00	196.15	3.23	Inlet	6.95	2.00

Inlet control depth = 3.23 ft
Outlet control depth = 2.46 ft

Normal depth = 1.04 ft Culvert slope = 0.02827
Critical depth = 1.67 ft Critical slope = 0.00769
Road top width => 168.00 ft. Road pavement type => asphalt
Computed weir Coefficient => 3.02.

Total Discharge => 47.00 cfs
Discharge per barrel => 21.85 cfs
Discharge over the road => 3.30 cfs
Average velocity over the road => 1.45 ft/sec

RUNNING MESSAGES LIST:

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:08:57 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1285+14 (DA 8) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 69.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 87.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 103.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 119.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.5000

CULVERT DIAM. = 3.00 ft BARRELS = 3

INLET station: 0.00 elevation: 181.37 ft
 OUTLET station: 303.00 elevation: 177.00 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	177.63	71.00	176.59	97.11	177.50

Road profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	190.62	3.50	189.38		

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 177.03 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW	Calc.HW	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	elev	elev	ft		ft/s	ft
3	23.00	3.00	0.00	267.00	206.00	183.38	2.27	Inlet	10.38	1.05

Inlet control depth = 2.27 ft
 Outlet control depth = 1.97 ft

Normal depth = 1.05 ft Culvert slope = 0.01442
 Critical depth = 1.54 ft Critical slope = 0.00367
 Road top width => 168.00 ft. Road pavement type => asphalt
 Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 177.08 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW	Calc.HW	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	elev	elev	ft		ft/s	ft

3 29.00 3.00 0.00 267.00 206.00 183.73 2.62 Inlet 11.07 1.19

Inlet control depth = 2.62 ft
Outlet control depth = 2.27 ft

Normal depth = 1.19 ft Culvert slope = 0.01442
Critical depth = 1.74 ft Critical slope = 0.00394
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 177.11 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
3	34.33	3.00	0.00	267.00	206.00	184.04	2.93	Inlet	11.53	1.31

Inlet control depth = 2.93 ft
Outlet control depth = 2.54 ft

Normal depth = 1.31 ft Culvert slope = 0.01442
Critical depth = 1.90 ft Critical slope = 0.00423
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 177.14 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
3	39.67	3.00	0.00	267.00	206.00	184.37	3.26	Inlet	11.92	1.43

Inlet control depth = 3.26 ft
Outlet control depth = 2.81 ft

Normal depth = 1.42 ft Culvert slope = 0.01442
Critical depth = 2.05 ft Critical slope = 0.00458
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

*Computation: Hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on tailwater conditions.
*Computation: Hydraulic jump occurs within culvert.

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:09:27 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1296+03 (DA 9) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 112.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 138.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 165.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 187.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.5000

CULVERT DIAM. = 3.00 ft BARRELS = 4

INLET station: 0.00 elevation: 183.77 ft
 OUTLET station: 276.00 elevation: 182.61 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	185.07	37.00	184.61	97.00	185.23

Road profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	194.54	15.00	189.38		

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 185.16 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW ft	Control	Veloc. ft/s	Out.depth ft
4	28.00	3.00	0.00	240.00	206.00	186.41	2.71	outlet	4.50	2.47

Inlet control depth = 2.58 ft
 Outlet control depth = 2.71 ft

Normal depth = 1.67 ft Culvert slope = 0.00420
 Critical depth = 1.71 ft Critical slope = 0.00389
 Road top width => 168.00 ft. Road pavement type => asphalt
 Computed weir coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 185.20 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW ft	Control	Veloc. ft/s	Out.depth ft

4 34.50 3.00 0.00 240.00 206.00 186.83 3.14 Outlet 5.45 2.52

Inlet control depth = 2.96 ft
Outlet control depth = 3.14 ft

Normal depth = 1.91 ft Culvert slope = 0.00420
Critical depth = 1.91 ft Critical slope = 0.00424
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 185.24 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft			ft		ft/s	ft
4	41.25	3.00	0.00	240.00	206.00	187.18	3.49	Outlet	6.43	2.56

Inlet control depth = 3.38 ft
Outlet control depth = 3.49 ft

Normal depth = 2.18 ft Culvert slope = 0.00420
Critical depth = 2.09 ft Critical slope = 0.00470
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 185.27 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft			ft		ft/s	ft
4	46.75	3.00	0.00	240.00	206.00	187.48	3.78	Outlet	7.22	2.58

Inlet control depth = 3.75 ft
Outlet control depth = 3.78 ft

Normal depth = 2.45 ft Culvert slope = 0.00420
Critical depth = 2.23 ft Critical slope = 0.00516
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

*Computation: No hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on supercritical depth at end of culvert.

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:10:16 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1308+20 (DA9A) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 21.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 26.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 31.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 35.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.5000

CULVERT DIAM. = 2.00 ft BARRELS = 2

INLET station: 0.00 elevation: 187.34 ft
 OUTLET station: 285.00 elevation: 180.72 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	185.30	35.29	180.01	83.87	183.07

Road profile (XY Coordinates) ft

X	Y	X	Y
0.00	194.38	9.50	197.52

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 180.47 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
2	10.50	2.00	0.00	261.00	206.00	188.80	1.74	Inlet	10.29	0.72

Inlet control depth = 1.74 ft
 Outlet control depth = 1.44 ft

Normal depth = 0.73 ft Culvert slope = 0.02323
 Critical depth = 1.16 ft Critical slope = 0.00451
 Road top width => 168.00 ft. Road pavement type => asphalt
 Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 180.51 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft

2 13.00 2.00 0.00 261.00 206.00 189.07 2.01 Inlet 10.94 0.81

Inlet control depth = 2.01 ft
Outlet control depth = 1.66 ft

Normal depth = 0.81 ft Culvert slope = 0.02323
Critical depth = 1.30 ft Critical slope = 0.00495
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 180.54 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	ft	ft	ft		ft/s	ft
2	15.50	2.00	0.00	261.00	206.00	189.36	2.30	Inlet	11.48	0.89

Inlet control depth = 2.30 ft
Outlet control depth = 1.88 ft

Normal depth = 0.90 ft Culvert slope = 0.02323
Critical depth = 1.42 ft Critical slope = 0.00551
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 180.57 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	ft	ft	ft		ft/s	ft
2	17.50	2.00	0.00	261.00	206.00	189.62	2.55	Inlet	11.78	0.96

Inlet control depth = 2.55 ft
Outlet control depth = 2.07 ft

Normal depth = 0.96 ft Culvert slope = 0.02323
Critical depth = 1.51 ft Critical slope = 0.00606
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

*Computation: Hydraulic jump occurs within culvert.

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:11:12 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1335+15 (DA 11) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 36.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 46.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 54.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 63.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.5000

CULVERT DIAM. = 3.00 ft BARRELS = 2

INLET station: 0.00 elevation: 193.75 ft
 OUTLET station: 321.00 elevation: 187.79 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	190.20	150.00	189.53	228.00	190.12

Road profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	200.96	5.00	199.22		

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 189.75 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	ft	ft	ft		ft/s	ft
2	18.00	3.00	0.00	285.00	206.00	195.36	1.94	Inlet	10.78	0.86

Inlet control depth = 1.94 ft

Outlet control depth = 1.65 ft

Normal depth = 0.87 ft Culvert slope = 0.01857
 Critical depth = 1.36 ft Critical slope = 0.00350
 Road top width => 168.00 ft. Road pavement type => asphalt
 Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 189.77 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	veloc.	Out.depth
	cfs	ft	ft	ft	ft	ft	ft		ft/s	ft

2 23.00 3.00 0.00 285.00 206.00 195.68 2.26 Inlet 11.40 0.98

Inlet control depth = 2.26 ft
Outlet control depth = 1.90 ft

Normal depth = 0.99 ft Culvert slope = 0.01857
Critical depth = 1.54 ft Critical slope = 0.00367
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 189.78 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
2	27.00	3.00	0.00	285.00	206.00	195.91	2.50	Inlet	11.94	1.07

Inlet control depth = 2.50 ft
Outlet control depth = 2.10 ft

Normal depth = 1.07 ft Culvert slope = 0.01857
Critical depth = 1.68 ft Critical slope = 0.00384
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 189.80 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
2	31.50	3.00	0.00	285.00	206.00	196.18	2.76	Inlet	12.34	1.17

Inlet control depth = 2.76 ft
Outlet control depth = 2.31 ft

Normal depth = 1.17 ft Culvert slope = 0.01857
Critical depth = 1.82 ft Critical slope = 0.00407
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

*Computation: Hydraulic jump occurs within culvert.

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:11:37 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1371+00 (DA 13) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 78.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 101.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 118.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 139.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.5000

CULVERT DIAM. = 3.00 ft BARRELS = 3

INLET station: 0.00 elevation: 198.74 ft
 OUTLET station: 276.00 elevation: 195.07 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	199.97	44.81	198.22	69.34	201.42

Road profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	205.23	8.00	207.68		

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 198.98 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW	Calc.HW	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	elev ft	elev ft	ft		ft/s	ft
3	26.00	3.00	0.00	240.00	206.00	200.95	2.45	Inlet	3.68	3.00

Inlet control depth = 2.45 ft
 Outlet control depth = 2.18 ft

Normal depth = 1.15 ft Culvert slope = 0.01330
 Critical depth = 1.65 ft Critical slope = 0.00380
 Road top width => 168.00 ft. Road pavement type => asphalt
 Computed weir coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 199.06 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW	Calc.HW	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	elev ft	elev ft	ft		ft/s	ft

3 33.67 3.00 0.00 240.00 206.00 201.40 2.90 Inlet 4.76 3.00

Inlet control depth = 2.90 ft
Outlet control depth = 2.58 ft

Normal depth = 1.33 ft Culvert slope = 0.01330
Critical depth = 1.88 ft Critical slope = 0.00419
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 199.11 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	ft	ft	ft		ft/s	ft
3	39.33	3.00	0.00	240.00	206.00	201.74	3.24	Inlet	5.56	3.00

Inlet control depth = 3.24 ft
Outlet control depth = 2.88 ft

Normal depth = 1.45 ft Culvert slope = 0.01330
Critical depth = 2.04 ft Critical slope = 0.00456
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 199.17 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	ft	ft	ft		ft/s	ft
3	46.33	3.00	0.00	240.00	206.00	202.21	3.71	Inlet	6.55	3.00

Inlet control depth = 3.71 ft
Outlet control depth = 3.27 ft

Normal depth = 1.60 ft Culvert slope = 0.01330
Critical depth = 2.22 ft Critical slope = 0.00512
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:12:27 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1492+47 (DA 15) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 43.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 53.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 64.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 72.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.5000

CULVERT DIAM. = 2.50 ft BARRELS = 2

INLET station: 0.00 elevation: 245.79 ft
 OUTLET station: 500.00 elevation: 238.20 ft

Cross section profile (XY coordinates) ft

X	Y	X	Y	X	Y
0.00	240.11	35.00	238.09	87.91	240.02

Road profile (XY coordinates) ft

X	Y	X	Y	X	Y
0.00	258.61	2.25	255.98		

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 239.35 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW	Calc.HW	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	elev	elev	ft		ft/s	ft
2	21.50	2.50	0.00	485.00	0.00	248.10	2.42	Inlet	10.48	1.09

Inlet control depth = 2.42 ft

Outlet control depth = 2.10 ft

Normal depth = 1.09 ft Culvert slope = 0.01518

Critical depth = 1.58 ft Critical slope = 0.00447

Road top width => 168.00 ft. Road pavement type => asphalt

Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 239.45 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW	Calc.HW	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	elev	elev	ft		ft/s	ft

2 26.50 2.50 0.00 485.00 0.00 248.51 2.83 Inlet 11.07 1.23

Inlet control depth = 2.83 ft
Outlet control depth = 2.43 ft

Normal depth = 1.23 ft Culvert slope = 0.01518
Critical depth = 1.76 ft Critical slope = 0.00504
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 239.55 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft			ft		ft/s	ft
2	32.00	2.50	0.00	485.00	0.00	249.02	3.35	Inlet	11.65	1.37

Inlet control depth = 3.35 ft
Outlet control depth = 2.82 ft

Normal depth = 1.37 ft Culvert slope = 0.01518
Critical depth = 1.93 ft Critical slope = 0.00587
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 239.61 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft			ft		ft/s	ft
2	36.00	2.50	0.00	485.00	0.00	249.46	3.78	Inlet	11.95	1.47

Inlet control depth = 3.78 ft
Outlet control depth = 3.13 ft

Normal depth = 1.48 ft Culvert slope = 0.01518
Critical depth = 2.03 ft Critical slope = 0.00665
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

*Computation: Hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on tailwater conditions.
*Computation: Hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on tailwater conditions.
*Computation: Hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on tailwater conditions.
*Computation: Hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on tailwater conditions.

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:15:55 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1513+14 (DA 16) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: CONCRETE BOX.
 ENTRANCE: FLARED 30:75
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 245.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 346.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 465.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 611.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.4000

CULVERT RISE = 5.00 ft CULVERT SPAN = 8.00 ft BARRELS = 4

INLET station: 0.00 elevation: 214.48 ft
 OUTLET station: 357.00 elevation: 210.75 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	211.31	23.00	210.61	55.00	211.11

Road profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	226.78	3.00	224.23		

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 212.97 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
4	61.25	5.00	8.00	297.00	0.00	215.82	1.65	Outlet	4.02	1.90

Inlet control depth = 0.47 ft
 Outlet control depth = 1.65 ft

Normal depth = 0.80 ft Culvert slope = 0.01045
 Critical depth = 1.22 ft Critical slope = 0.00280
 Road top width => 168.00 ft. Road pavement type => asphalt
 Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 213.46 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft

4 86.50 5.00 8.00 297.00 0.00 216.24 2.08 Outlet 4.51 2.40

Inlet control depth = 0.47 ft
Outlet control depth = 2.08 ft

Normal depth = 0.99 ft Culvert slope = 0.01045
Critical depth = 1.54 ft Critical slope = 0.00280
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 213.98 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	ft	ft	ft		ft/s	ft
4	116.25	5.00	8.00	297.00	0.00	217.03	2.86	Inlet	4.98	2.92

Inlet control depth = 2.86 ft
Outlet control depth = 2.54 ft

Normal depth = 1.21 ft Culvert slope = 0.01045
Critical depth = 1.87 ft Critical slope = 0.00284
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 214.56 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	ft	ft	ft		ft/s	ft
4	152.75	5.00	8.00	297.00	0.00	217.61	3.44	Inlet	5.47	3.49

Inlet control depth = 3.44 ft
Outlet control depth = 3.07 ft

Normal depth = 1.45 ft Culvert slope = 0.01045
Critical depth = 2.25 ft Critical slope = 0.00290
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

*Computation: No hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on supercritical depth at end of culvert.
*Computation: No hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on supercritical depth at end of culvert.
*Computation: No hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on supercritical depth at end of culvert.
*Computation: No hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on supercritical depth at end of culvert.

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:16:28 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1820+50 (DA17A) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 18.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 22.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 26.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 30.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.5000

CULVERT DIAM. = 2.00 ft BARRELS = 2

INLET station: 0.00 elevation: 300.48 ft
 OUTLET station: 269.00 elevation: 299.94 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	300.93	7.70	299.87	17.35	299.92
23.75	301.04				

Road profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	308.14	2.00	307.12		

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 300.74 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	ft	ft	ft		ft/s	ft
2	9.00	2.00	0.00	245.00	0.00	302.18	1.73	outlet	5.25	1.07

Inlet control depth = 1.60 ft
 Outlet control depth = 1.73 ft

Normal depth = 1.38 ft Culvert slope = 0.00201
 Critical depth = 1.07 ft Critical slope = 0.00429
 Road top width => 168.00 ft. Road pavement type => asphalt
 Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 300.83 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	ft	ft	ft		ft/s	ft

2 11.00 2.00 0.00 245.00 0.00 302.42 1.97 Outlet 5.65 1.19

Inlet control depth = 1.81 ft
Outlet control depth = 1.97 ft

Normal depth = 1.64 ft Culvert slope = 0.00201
Critical depth = 1.19 ft Critical slope = 0.00459
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 300.92 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
2	13.00	2.00	0.00	245.00	0.00	302.69	2.23	Outlet	4.14	2.00

Inlet control depth = 2.03 ft
Outlet control depth = 2.23 ft

Normal depth = 2.00 ft Culvert slope = 0.00201
Critical depth = 1.30 ft Critical slope = 0.00495
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 300.99 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
2	15.00	2.00	0.00	245.00	0.00	302.99	2.53	Outlet	4.77	2.00

Inlet control depth = 2.26 ft
Outlet control depth = 2.53 ft

Normal depth = 2.00 ft Culvert slope = 0.00201
Critical depth = 1.40 ft Critical slope = 0.00538
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:16:50 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1753+00 (DA17B) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 25.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 31.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 37.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 42.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.5000

CULVERT DIAM. = 2.00 ft BARRELS = 2

INLET station: 0.00 elevation: 286.45 ft
 OUTLET station: 228.00 elevation: 278.96 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	277.98	31.45	276.80	90.04	276.85
142.72	277.91				

Road profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	293.28	2.50	294.42		

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 277.15 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	ft	ft	ft		ft/s	ft
2	12.50	2.00	0.00	204.00	0.00	288.00	1.94	Inlet	12.25	0.72

Inlet control depth = 1.94 ft
 Outlet control depth = 1.55 ft

Normal depth = 0.73 ft Culvert slope = 0.03287
 Critical depth = 1.27 ft Critical slope = 0.00485
 Road top width => 168.00 ft. Road pavement type => asphalt
 Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 277.20 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	veloc.	Out.depth
	cfs	ft	ft	ft	ft	ft	ft		ft/s	ft

2 15.50 2.00 0.00 204.00 0.00 288.34 2.29 Inlet 13.00 0.81

Inlet control depth = 2.29 ft
Outlet control depth = 1.80 ft

Normal depth = 0.82 ft Culvert slope = 0.03287
Critical depth = 1.42 ft Critical slope = 0.00551
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 277.24 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
2	18.50	2.00	0.00	204.00	0.00	288.74	2.68	Inlet	13.52	0.90

Inlet control depth = 2.68 ft
Outlet control depth = 2.07 ft

Normal depth = 0.90 ft Culvert slope = 0.03287
Critical depth = 1.55 ft Critical slope = 0.00638
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 277.27 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
2	21.00	2.00	0.00	204.00	0.00	289.13	3.07	Inlet	13.87	0.97

Inlet control depth = 3.07 ft
Outlet control depth = 2.32 ft

Normal depth = 0.97 ft Culvert slope = 0.03287
Critical depth = 1.64 ft Critical slope = 0.00732
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

*Computation: Hydraulic jump occurs within culvert.

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:17:21 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1766+70 (DA17C) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 20.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 24.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 29.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 32.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.5000

CULVERT DIAM. = 2.50 ft BARRELS = 2

INLET station: 0.00 elevation: 301.37 ft
 OUTLET station: 270.00 elevation: 293.40 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	295.01	123.50	293.40	185.81	293.50
243.83	295.00				

Road profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	308.48	3.00	307.27		

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 294.04 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW	Calc.HW	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	elev ft	elev ft	ft		ft/s	ft
2	10.00	2.50	0.00	240.00	0.00	302.40	1.48	Inlet	10.87	0.61

Inlet control depth = 1.48 ft

Outlet control depth = 1.21 ft

Normal depth = 0.61 ft Culvert slope = 0.02953

Critical depth = 1.06 ft Critical slope = 0.00365

Road top width => 168.00 ft. Road pavement type => asphalt

Computed weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 294.09 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW	Calc.HW	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	elev ft	elev ft	ft		ft/s	ft

2 12.00 2.50 0.00 240.00 0.00 302.58 1.66 Inlet 11.53 0.66

Inlet control depth = 1.66 ft
Outlet control depth = 1.34 ft

Normal depth = 0.67 ft Culvert slope = 0.02953
Critical depth = 1.16 ft Critical slope = 0.00375
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 294.16 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft			ft		ft/s	ft
2	14.50	2.50	0.00	240.00	0.00	302.79	1.86	Inlet	12.09	0.73

Inlet control depth = 1.86 ft
Outlet control depth = 1.50 ft

Normal depth = 0.74 ft Culvert slope = 0.02953
Critical depth = 1.28 ft Critical slope = 0.00390
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 294.20 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft			ft		ft/s	ft
2	16.00	2.50	0.00	240.00	0.00	302.91	1.98	Inlet	12.43	0.77

Inlet control depth = 1.98 ft
Outlet control depth = 1.59 ft

Normal depth = 0.78 ft Culvert slope = 0.02953
Critical depth = 1.35 ft Critical slope = 0.00400
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

*Computation: Hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on tailwater conditions.
*Computation: Hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on tailwater conditions.
*Computation: Hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on tailwater conditions.
*Computation: Hydraulic jump occurs within culvert.

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:17:54 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1568+48 (DA 19) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 23.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 29.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 34.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 40.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.5000

CULVERT DIAM. = 2.00 ft BARRELS = 3

INLET station: 0.00 elevation: 222.18 ft
 OUTLET station: 368.00 elevation: 220.03 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	221.03	76.00	220.00	153.00	221.02

Road profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	231.20	100.00	231.20		

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 220.75 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW ft	Control	Veloc.	Out.depth
	cfs	ft	ft	ft					ft/s	ft
3	7.67	2.00	0.00	344.00	0.00	223.58	1.47	outlet	5.66	0.89

Inlet control depth = 1.44 ft
 Outlet control depth = 1.47 ft

Normal depth = 0.89 ft Culvert slope = 0.00584
 Critical depth = 0.98 ft Critical slope = 0.00413
 Road top width => 168.00 ft. Road pavement type => asphalt
 Computed weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 220.82 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW ft	Control	veloc.	out.depth
	cfs	ft	ft	ft					ft/s	ft

3 9.67 2.00 0.00 344.00 0.00 223.81 1.70 Outlet 6.01 1.02

Inlet control depth = 1.66 ft
Outlet control depth = 1.70 ft

Normal depth = 1.02 ft Culvert slope = 0.00584
Critical depth = 1.11 ft Critical slope = 0.00438
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 220.87 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW ft	Control	Veloc. ft/s	Out.depth ft
3	11.33	2.00	0.00	344.00	0.00	223.99	1.88	Outlet	6.25	1.12

Inlet control depth = 1.84 ft
Outlet control depth = 1.88 ft

Normal depth = 1.12 ft Culvert slope = 0.00584
Critical depth = 1.21 ft Critical slope = 0.00464
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 220.92 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW ft	Control	Veloc. ft/s	Out.depth ft
3	13.33	2.00	0.00	344.00	0.00	224.22	2.11	Outlet	6.47	1.25

Inlet control depth = 2.06 ft
Outlet control depth = 2.11 ft

Normal depth = 1.25 ft Culvert slope = 0.00584
Critical depth = 1.31 ft Critical slope = 0.00501
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

*Computation: Hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on tailwater conditions.
*Computation: Hydraulic jump occurs within culvert.

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:18:20 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1587+50 (DA 20) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 59.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 75.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 89.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 103.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.5000

CULVERT DIAM. = 2.50 ft BARRELS = 2

INLET station: 0.00 elevation: 238.00 ft
 OUTLET station: 334.00 elevation: 234.13 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	234.96	36.45	233.81	91.69	235.05

Road profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	247.70	5.50	244.08		

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 234.94 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
2	29.50	2.50	0.00	304.00	0.00	240.93	3.10	Inlet	10.32	1.41

Inlet control depth = 3.10 ft
 Outlet control depth = 2.75 ft

Normal depth = 1.42 ft Culvert slope = 0.01159
 Critical depth = 1.85 ft Critical slope = 0.00546
 Road top width => 168.00 ft. Road pavement type => asphalt
 Computed weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 235.04 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft

2 37.50 2.50 0.00 304.00 0.00 241.79 3.96 Inlet 10.82 1.66

Inlet control depth = 3.96 ft
Outlet control depth = 3.40 ft

Normal depth = 1.67 ft Culvert slope = 0.01159
Critical depth = 2.07 ft Critical slope = 0.00698
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 235.11 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
2	44.50	2.50	0.00	304.00	0.00	242.73	4.90	Inlet	11.08	1.91

Inlet control depth = 4.90 ft
Outlet control depth = 4.09 ft

Normal depth = 1.91 ft Culvert slope = 0.01159
Critical depth = 2.22 ft Critical slope = 0.00895
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 235.17 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
2	51.50	2.50	0.00	304.00	0.00	242.86	5.04	Outlet	10.49	2.50

Inlet control depth = 6.02 ft
Outlet control depth = 5.04 ft

Normal depth = 2.50 ft Culvert slope = 0.01159
Critical depth = 2.32 ft Critical slope = 0.01163
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

*Computation: Hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on tailwater conditions.
*Computation: Hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on tailwater conditions.
*Computation: Hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on tailwater conditions.

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:18:43 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1595+50 (DA 21) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: CONCRETE BOX.
 ENTRANCE: FLARED 30:75
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 257.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 413.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 544.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 705.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.4000

CULVERT RISE = 5.00 ft CULVERT SPAN = 5.00 ft BARRELS = 4

INLET station: 0.00 elevation: 230.55 ft
 OUTLET station: 311.00 elevation: 229.21 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	230.05	24.31	229.14	54.46	229.97

Road profile (XY Coordinates) ft

X	Y	X	Y
0.00	241.57	4.00	243.75

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 232.39 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW	Calc.HW	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	elev	elev	ft		ft/s	ft
4	64.25	5.00	5.00	251.00	0.00	233.32	2.90	Outlet	4.21	3.05

Inlet control depth = 2.65 ft
 Outlet control depth = 2.90 ft

Normal depth = 1.60 ft Culvert slope = 0.00431
 Critical depth = 1.72 ft Critical slope = 0.00352
 Road top width => 168.00 ft. Road pavement type => asphalt
 Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 233.37 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW	Calc.HW	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	elev	elev	ft		ft/s	ft

4 103.25 5.00 5.00 251.00 0.00 234.44 4.02 Outlet 5.12 4.03

Inlet control depth = 3.65 ft
Outlet control depth = 4.02 ft

Normal depth = 2.27 ft Culvert slope = 0.00431
Critical depth = 2.37 ft Critical slope = 0.00383
Road top width => 168.00 ft. Road pavement type => asphalt
Computed weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 234.10 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft			ft		ft/s	ft
4	136.00	5.00	5.00	251.00	0.00	235.31	4.89	outlet	5.71	4.76

Inlet control depth = 4.40 ft
Outlet control depth = 4.89 ft

Normal depth = 2.79 ft Culvert slope = 0.00431
Critical depth = 2.84 ft Critical slope = 0.00408
Road top width => 168.00 ft. Road pavement type => asphalt
Computed weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 234.91 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft			ft		ft/s	ft
4	176.25	5.00	5.00	251.00	0.00	236.60	6.17	outlet	7.05	5.00

Inlet control depth = 5.30 ft
Outlet control depth = 6.17 ft

Normal depth = 3.40 ft Culvert slope = 0.00431
Critical depth = 3.38 ft Critical slope = 0.00437
Road top width => 168.00 ft. Road pavement type => asphalt
Computed weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

*Computation: No hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on supercritical depth at end of culvert.
*Computation: No hydraulic jump occurs within culvert.

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:19:16 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1603+15 (DA 22)
 PROJECT NAME: SH249 EXT - TM TO PH
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

Input Units: English
 Output Units: English

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: CONCRETE BOX.
 ENTRANCE: FLARED 30:75
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 228.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 356.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 473.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 618.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.4000

CULVERT RISE = 5.00 ft CULVERT SPAN = 5.00 ft BARRELS = 4

INLET station: 0.00 elevation: 232.85 ft
 OUTLET station: 353.00 elevation: 231.91 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	233.88	81.38	231.71	160.84	234.07

Road profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	245.06	9.50	243.75		

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 234.39 ft (computed).

ANALYSIS for discharge frequency of: 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW	Calc.HW	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	elev ft	elev ft	ft		ft/s	ft
4	57.00	5.00	5.00	293.00	0.00	235.45	2.68	outlet	4.76	2.40

Inlet control depth = 0.49 ft
 Outlet control depth = 2.68 ft

Normal depth = 1.75 ft Culvert slope = 0.00266
 Critical depth = 1.59 ft Critical slope = 0.00347
 Road top width => 168.00 ft. Road pavement type => asphalt
 Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 234.87 ft (computed).

ANALYSIS for discharge frequency of: 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW	Calc.HW	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	elev ft	elev ft	ft		ft/s	ft

4 89.00 5.00 5.00 293.00 0.00 236.38 3.61 Outlet 6.19 2.88

Inlet control depth = 3.31 ft
Outlet control depth = 3.61 ft

Normal depth = 2.42 ft Culvert slope = 0.00266
Critical depth = 2.14 ft Critical slope = 0.00372
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 235.25 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	veloc.	Out.depth
	cfs	ft	ft	ft			ft		ft/s	ft
4	118.25	5.00	5.00	293.00	0.00	237.13	4.36	Outlet	7.26	3.26

Inlet control depth = 4.00 ft
Outlet control depth = 4.36 ft

Normal depth = 3.01 ft Culvert slope = 0.00266
Critical depth = 2.59 ft Critical slope = 0.00394
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 235.67 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	veloc.	Out.depth
	cfs	ft	ft	ft			ft		ft/s	ft
4	154.50	5.00	5.00	293.00	0.00	237.99	5.22	Outlet	8.40	3.68

Inlet control depth = 4.81 ft
Outlet control depth = 5.22 ft

Normal depth = 3.70 ft Culvert slope = 0.00266
Critical depth = 3.10 ft Critical slope = 0.00422
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNNING MESSAGES LIST:

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:19:43 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1611+50 (DA 23) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 41.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 51.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 61.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 69.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.5000

CULVERT DIAM. = 2.50 ft BARRELS = 2

INLET station: 0.00 elevation: 242.84 ft
 OUTLET station: 264.00 elevation: 239.55 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	240.02	49.90	239.48	76.38	240.09

Road profile (XY Coordinates) ft

X	Y	X	Y
0.00	250.66	2.50	249.64

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 240.23 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
2	20.50	2.50	0.00	234.00	248.32	245.00	2.35	Inlet	9.65	1.12

Inlet control depth = 2.35 ft
 Outlet control depth = 2.10 ft

Normal depth = 1.12 ft Culvert slope = 0.01246
 Critical depth = 1.54 ft Critical slope = 0.00437
 Road top width => 168.00 ft. Road pavement type => asphalt
 Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 240.30 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft

2 25.50 2.50 0.00 234.00 248.32 245.40 2.75 Inlet 10.17 1.27

Inlet control depth = 2.75 ft
Outlet control depth = 2.44 ft

Normal depth = 1.27 ft Culvert slope = 0.01246
Critical depth = 1.72 ft Critical slope = 0.00491
Road top width => 168.00 ft. Road pavement type => asphalt
Computed weir coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 240.36 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	veloc. ft/s	Out.depth ft
2	30.50	2.50	0.00	234.00	248.32	245.85	3.20	Inlet	10.58	1.42

Inlet control depth = 3.20 ft
Outlet control depth = 2.80 ft

Normal depth = 1.42 ft Culvert slope = 0.01246
Critical depth = 1.88 ft Critical slope = 0.00561
Road top width => 168.00 ft. Road pavement type => asphalt
Computed weir coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 240.40 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	veloc. ft/s	Out.depth ft
2	34.50	2.50	0.00	234.00	248.32	246.27	3.61	Inlet	10.91	1.54

Inlet control depth = 3.61 ft
Outlet control depth = 3.11 ft

Normal depth = 1.54 ft Culvert slope = 0.01246
Critical depth = 2.00 ft Critical slope = 0.00633
Road top width => 168.00 ft. Road pavement type => asphalt
Computed weir coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

*Computation: Hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on tailwater conditions.
*Computation: Hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on tailwater conditions.
*Computation: Hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on tailwater conditions.
*Computation: Hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on tailwater conditions.

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:20:02 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1620+44 (DA 24)
 PROJECT NAME: SH249 EXT - TM TO PH
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

Input Units: English
 Output Units: English

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 79.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 101.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 119.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 139.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.5000

CULVERT DIAM. = 2.50 ft BARRELS = 3

INLET station: 0.00 elevation: 239.84 ft
 OUTLET station: 294.00 elevation: 239.28 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	240.00	65.80	238.92	121.00	240.00

Road profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	249.86	9.00	246.67		

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 240.51 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW ft	Control	Veloc.	Out.depth
	cfs	ft	ft	ft					ft/s	ft
3	26.33	2.50	0.00	264.00	248.32	242.95	3.13	Outlet	5.36	2.50

Inlet control depth = 2.83 ft
 Outlet control depth = 3.13 ft

Normal depth = 2.50 ft Culvert slope = 0.00190
 Critical depth = 1.75 ft Critical slope = 0.00501
 Road top width => 168.00 ft. Road pavement type => asphalt
 Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 240.68 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW ft	Control	Veloc.	Out.depth
	cfs	ft	ft	ft					ft/s	ft

3 33.67 2.50 0.00 264.00 248.32 243.41 3.60 Outlet 6.86 2.50

Inlet control depth = 3.54 ft
Outlet control depth = 3.60 ft

Normal depth = 2.50 ft Culvert slope = 0.00190
Critical depth = 1.97 ft Critical slope = 0.00617
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 240.81 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
3	39.67	2.50	0.00	264.00	248.32	243.83	4.02	Outlet	8.08	2.50

Inlet control depth = 4.25 ft
Outlet control depth = 4.02 ft

Normal depth = 2.50 ft Culvert slope = 0.00190
Critical depth = 2.12 ft Critical slope = 0.00752
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 240.94 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
3	46.33	2.50	0.00	264.00	248.32	244.39	4.58	Outlet	9.44	2.50

Inlet control depth = 5.19 ft
Outlet control depth = 4.58 ft

Normal depth = 2.50 ft Culvert slope = 0.00190
Critical depth = 2.25 ft Critical slope = 0.00958
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:20:31 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1655+95 (DA 26) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 27.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 33.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 39.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 44.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.5000

CULVERT DIAM. = 2.00 ft BARRELS = 2

INLET station: 0.00 elevation: 254.00 ft
 OUTLET station: 350.00 elevation: 252.65 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	253.00	66.58	252.57	130.00	253.02

Road profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	276.00	100.00	276.00		

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 253.22 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW	Calc.HW	HW	Control	veloc.	Out.depth
cfs	ft	ft	ft	ft	elev	elev	ft		ft/s	ft
2	13.50	2.00	0.00	350.00	0.00	256.16	2.16	outlet	6.12	1.32

Inlet control depth = 2.08 ft
 Outlet control depth = 2.16 ft

Normal depth = 1.47 ft Culvert slope = 0.00386
 Critical depth = 1.32 ft Critical slope = 0.00505
 Road top width => 168.00 ft. Road pavement type => asphalt
 Computed weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 253.28 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW	Calc.HW	HW	Control	veloc.	Out.depth
cfs	ft	ft	ft	ft	elev	elev	ft		ft/s	ft

2 16.50 2.00 0.00 350.00 0.00 256.52 2.52 Outlet 5.25 2.00

Inlet control depth = 2.44 ft
Outlet control depth = 2.52 ft

Normal depth = 2.00 ft Culvert slope = 0.00386
Critical depth = 1.46 ft Critical slope = 0.00577
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 253.33 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	veloc.	out.depth
	cfs	ft	ft	ft			ft		ft/s	ft
2	19.50	2.00	0.00	350.00	0.00	256.90	2.90	outlet	6.21	2.00

Inlet control depth = 2.86 ft
Outlet control depth = 2.90 ft

Normal depth = 2.00 ft Culvert slope = 0.00386
Critical depth = 1.59 ft Critical slope = 0.00673
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 253.37 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	veloc.	Out.depth
	cfs	ft	ft	ft			ft		ft/s	ft
2	22.00	2.00	0.00	350.00	0.00	257.14	3.14	outlet	7.00	2.00

Inlet control depth = 3.27 ft
Outlet control depth = 3.14 ft

Normal depth = 2.00 ft Culvert slope = 0.00386
Critical depth = 1.68 ft Critical slope = 0.00776
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:20:50 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1664+92 (DA 27) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 58.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 75.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 88.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 103.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.5000

CULVERT DIAM. = 3.00 ft BARRELS = 2

INLET station: 0.00 elevation: 247.89 ft
 OUTLET station: 370.00 elevation: 243.85 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	245.76	20.40	245.09	36.08	246.18

Road profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	277.52	8.00	262.61		

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 246.61 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
2	29.00	3.00	0.00	370.00	0.00	250.52	2.63	Inlet	4.26	2.76

Inlet control depth = 2.63 ft
 Outlet control depth = 2.37 ft

Normal depth = 1.29 ft Culvert slope = 0.01092
 Critical depth = 1.74 ft Critical slope = 0.00394
 Road top width => 168.00 ft. Road pavement type => asphalt
 Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 246.80 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft

2 37.50 3.00 0.00 370.00 0.00 251.02 3.13 Inlet 5.33 2.95

Inlet control depth = 3.13 ft
Outlet control depth = 2.81 ft

Normal depth = 1.49 ft Culvert slope = 0.01092
Critical depth = 1.99 ft Critical slope = 0.00443
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 246.93 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	ft	ft	ft		ft/s	ft
2	44.00	3.00	0.00	370.00	0.00	251.44	3.55	Inlet	6.22	3.00

Inlet control depth = 3.55 ft
Outlet control depth = 3.16 ft

Normal depth = 1.64 ft Culvert slope = 0.01092
Critical depth = 2.16 ft Critical slope = 0.00492
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 247.08 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	ft	ft	ft		ft/s	ft
2	51.50	3.00	0.00	370.00	0.00	251.99	4.10	Inlet	7.29	3.00

Inlet control depth = 4.10 ft
Outlet control depth = 3.60 ft

Normal depth = 1.82 ft Culvert slope = 0.01092
Critical depth = 2.33 ft Critical slope = 0.00563
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNNING MESSAGES LIST:

*Computation: No hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on supercritical depth at end of culvert.
*Computation: No hydraulic jump occurs within culvert.

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:21:06 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1675+91 (DA 28) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 45.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 57.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 67.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 78.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.5000

CULVERT DIAM. = 2.50 ft BARRELS = 2

INLET station: 0.00 elevation: 256.19 ft
 OUTLET station: 332.00 elevation: 253.81 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	257.22	18.66	253.63	39.25	257.81

Road profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	263.63	4.00	262.73		

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 256.21 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	ft	ft	ft		ft/s	ft
2	22.50	2.50	0.00	302.00	0.00	258.59	2.51	Inlet	4.78	2.29

Inlet control depth = 2.51 ft
 Outlet control depth = 2.44 ft

Normal depth = 1.39 ft Culvert slope = 0.00717
 Critical depth = 1.61 ft Critical slope = 0.00457
 Road top width => 168.00 ft. Road pavement type => asphalt
 Computed weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 256.44 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	ft	ft	ft		ft/s	ft

2 28.50 2.50 0.00 302.00 0.00 259.10 3.02 Inlet 5.81 2.50

Inlet control depth = 3.02 ft
Outlet control depth = 2.91 ft

Normal depth = 1.63 ft Culvert slope = 0.00717
Critical depth = 1.82 ft Critical slope = 0.00531
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 256.62 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft			ft		ft/s	ft
2	33.50	2.50	0.00	302.00	0.00	259.59	3.51	Inlet	6.82	2.50

Inlet control depth = 3.51 ft
Outlet control depth = 3.36 ft

Normal depth = 1.84 ft Culvert slope = 0.00717
Critical depth = 1.97 ft Critical slope = 0.00614
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 256.80 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft			ft		ft/s	ft
2	39.00	2.50	0.00	302.00	0.00	260.26	4.18	outlet	7.95	2.50

Inlet control depth = 4.15 ft
Outlet control depth = 4.18 ft

Normal depth = 2.14 ft Culvert slope = 0.00717
Critical depth = 2.11 ft Critical slope = 0.00735
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

*Computation: No hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on supercritical depth at end of culvert.

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:21:24 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1691+10 (DA 29) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 87.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 111.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 131.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 153.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 ke value: 0.5000

CULVERT DIAM. = 4.00 ft BARRELS = 2

INLET station: 0.00 elevation: 251.91 ft
 OUTLET station: 277.00 elevation: 249.97 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	252.04	15.80	250.15	34.24	252.72

Road profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	259.09	1.00	258.90		

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 252.93 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW	Calc.HW	HW	Control	veloc.	Out.depth
cfs	ft	ft	ft	ft	elev	elev	ft		ft/s	ft
2	43.50	4.00	0.00	229.00	256.32	254.63	2.89	Inlet	4.64	2.79

Inlet control depth = 2.89 ft

Outlet control depth = 2.76 ft

Normal depth = 1.59 ft Culvert slope = 0.00700

Critical depth = 1.97 ft Critical slope = 0.00328

Road top width => 168.00 ft. Road pavement type => asphalt

Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 253.20 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW	Calc.HW	HW	Control	veloc.	Out.depth
cfs	ft	ft	ft	ft	elev	elev	ft		ft/s	ft

2 55.50 4.00 0.00 229.00 256.32 255.10 3.36 Inlet 5.37 3.06

Inlet control depth = 3.36 ft
Outlet control depth = 3.21 ft

Normal depth = 1.82 ft Culvert slope = 0.00700
Critical depth = 2.24 ft Critical slope = 0.00350
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 253.41 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	ft	ft	ft		ft/s	ft
2	65.50	4.00	0.00	229.00	256.32	255.48	3.74	Inlet	5.95	3.27

Inlet control depth = 3.74 ft
Outlet control depth = 3.58 ft

Normal depth = 2.01 ft Culvert slope = 0.00700
Critical depth = 2.44 ft Critical slope = 0.00372
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 253.63 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	ft	ft	ft		ft/s	ft
2	76.50	4.00	0.00	229.00	256.32	255.90	4.16	Inlet	6.57	3.49

Inlet control depth = 4.16 ft
Outlet control depth = 3.99 ft

Normal depth = 2.20 ft Culvert slope = 0.00700
Critical depth = 2.65 ft Critical slope = 0.00401
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

*Computation: No hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on supercritical depth at end of culvert.
*Computation: No hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on supercritical depth at end of culvert.
*Computation: No hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on supercritical depth at end of culvert.
*Computation: No hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on supercritical depth at end of culvert.

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:23:23 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1719+50 (DA29A) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 44.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 54.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 64.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 72.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.5000

CULVERT DIAM. = 2.50 ft BARRELS = 3

INLET station: 0.00 elevation: 285.95 ft
 OUTLET station: 288.00 elevation: 282.48 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	283.20	76.22	282.22	98.83	283.15

Road profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	293.13	8.50	291.56		

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 283.19 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW	Calc.HW	HW	Control	veloc.	Out.depth
	cfs	ft	ft	ft	elev	elev	ft		ft/s	ft
3	14.67	2.50	0.00	258.00	256.32	287.67	1.90	Inlet	8.81	0.93

Inlet control depth = 1.90 ft

Outlet control depth = 1.71 ft

Normal depth = 0.94 ft Culvert slope = 0.01205

Critical depth = 1.29 ft Critical slope = 0.00391

Road top width => 168.00 ft. Road pavement type => asphalt

Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 283.25 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW	Calc.HW	HW	Control	veloc.	Out.depth
	cfs	ft	ft	ft	elev	elev	ft		ft/s	ft

3 18.00 2.50 0.00 258.00 256.32 287.93 2.16 Inlet 9.24 1.05

Inlet control depth = 2.16 ft
Outlet control depth = 1.94 ft

Normal depth = 1.05 ft Culvert slope = 0.01205
Critical depth = 1.44 ft Critical slope = 0.00415
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 283.31 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
3	21.33	2.50	0.00	258.00	256.32	288.18	2.41	Inlet	9.68	1.15

Inlet control depth = 2.41 ft
Outlet control depth = 2.16 ft

Normal depth = 1.16 ft Culvert slope = 0.01205
Critical depth = 1.57 ft Critical slope = 0.00445
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 283.36 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
3	24.00	2.50	0.00	258.00	256.32	288.39	2.62	Inlet	9.89	1.24

Inlet control depth = 2.62 ft
Outlet control depth = 2.35 ft

Normal depth = 1.24 ft Culvert slope = 0.01205
Critical depth = 1.67 ft Critical slope = 0.00473
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

*Computation: Hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on tailwater conditions.
*Computation: Hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on tailwater conditions.
*Computation: Hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on tailwater conditions.
*Computation: Hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on tailwater conditions.

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:21:43 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1807+65 (DA 30) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: CONCRETE BOX.
 ENTRANCE: FLARED 30:75
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 175.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 337.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 445.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 576.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.4000

CULVERT RISE = 6.00 ft CULVERT SPAN = 6.00 ft BARRELS = 3

INLET station: 0.00 elevation: 279.58 ft
 OUTLET station: 432.00 elevation: 276.14 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	280.03	32.47	275.02	62.82	280.15

Road profile (XY Coordinates) ft

X	Y	X	Y
0.00	296.42	10.00	305.29

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 278.91 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW	Calc.HW	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	elev	elev	ft		ft/s	ft
3	58.33	6.00	6.00	360.00	256.32	281.34	2.05	outlet	3.92	2.48

Inlet control depth = 0.48 ft
 Outlet control depth = 2.05 ft

Normal depth = 1.04 ft Culvert slope = 0.00796
 Critical depth = 1.43 ft Critical slope = 0.00313
 Road top width => 168.00 ft. Road pavement type => asphalt
 Computed weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 279.99 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW	Calc.HW	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	elev	elev	ft		ft/s	ft

3 112.33 6.00 6.00 360.00 256.32 282.69 3.40 Inlet 5.25 3.57

Inlet control depth = 3.40 ft
Outlet control depth = 3.20 ft

Normal depth = 1.63 ft Culvert slope = 0.00796
Critical depth = 2.22 ft Critical slope = 0.00336
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 280.47 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
3	148.33	6.00	6.00	360.00	256.32	283.39	4.10	Inlet	6.11	4.05

Inlet control depth = 4.10 ft
Outlet control depth = 3.88 ft

Normal depth = 1.99 ft Culvert slope = 0.00796
Critical depth = 2.67 ft Critical slope = 0.00353
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 280.98 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
3	192.00	6.00	6.00	360.00	256.32	284.17	4.88	Inlet	7.02	4.56

Inlet control depth = 4.88 ft
Outlet control depth = 4.66 ft

Normal depth = 2.39 ft Culvert slope = 0.00796
Critical depth = 3.17 ft Critical slope = 0.00374
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

*Computation: No hydraulic jump occurs within culvert.

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:23:42 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1841+40 (DA 30A Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 48.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 61.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 72.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 84.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.5000

CULVERT DIAM. = 2.00 ft BARRELS = 4

INLET station: 0.00 elevation: 306.69 ft
 OUTLET station: 240.00 elevation: 305.68 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	307.01	164.77	304.86	271.62	304.48
381.06	306.98				

Road profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	312.25	9.00	311.59		

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 305.06 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW	Calc.HW	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	elev ft	elev ft	ft		ft/s	ft
4	12.00	2.00	0.00	216.00	256.32	308.66	2.02	outlet	5.84	1.24

Inlet control depth = 1.92 ft
 Outlet control depth = 2.02 ft

Normal depth = 1.30 ft Culvert slope = 0.00421
 Critical depth = 1.24 ft Critical slope = 0.00476
 Road top width => 168.00 ft. Road pavement type => asphalt
 Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 305.12 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW	Calc.HW	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	elev ft	elev ft	ft		ft/s	ft

4 15.25 2.00 0.00 216.00 256.32 308.98 2.34 Outlet 6.45 1.41

Inlet control depth = 2.28 ft
Outlet control depth = 2.34 ft

Normal depth = 1.57 ft Culvert slope = 0.00421
Critical depth = 1.41 ft Critical slope = 0.00545
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 305.16 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
4	18.00	2.00	0.00	216.00	256.32	309.33	2.69	outlet	5.73	2.00

Inlet control depth = 2.64 ft
Outlet control depth = 2.69 ft

Normal depth = 2.00 ft Culvert slope = 0.00421
Critical depth = 1.53 ft Critical slope = 0.00622
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 305.21 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
4	21.00	2.00	0.00	216.00	256.32	309.68	3.04	outlet	6.68	2.00

Inlet control depth = 3.10 ft
Outlet control depth = 3.04 ft

Normal depth = 2.00 ft Culvert slope = 0.00421
Critical depth = 1.64 ft Critical slope = 0.00732
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:22:00 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1870+50 (DA 31) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 49.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 62.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 74.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 84.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.5000

CULVERT DIAM. = 3.00 ft BARRELS = 2

INLET station: 0.00 elevation: 303.93 ft
 OUTLET station: 330.00 elevation: 298.48 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	298.98	13.68	298.76	35.38	299.31

Road profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	315.07	6.00	310.35		

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 299.86 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW	Calc.HW	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	elev	elev	ft		ft/s	ft
2	24.50	3.00	0.00	294.00	256.32	305.99	2.36	Inlet	11.17	1.05

Inlet control depth = 2.36 ft

Outlet control depth = 2.01 ft

Normal depth = 1.05 ft Culvert slope = 0.01652
 Critical depth = 1.60 ft Critical slope = 0.00373
 Road top width => 168.00 ft. Road pavement type => asphalt
 Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 300.00 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW	Calc.HW	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	elev	elev	ft		ft/s	ft

2 31.00 3.00 0.00 294.00 256.32 306.37 2.73 Inlet 11.80 1.20

Inlet control depth = 2.73 ft
outlet control depth = 2.32 ft

Normal depth = 1.19 ft Culvert slope = 0.01652
Critical depth = 1.81 ft Critical slope = 0.00404
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 300.11 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
2	37.00	3.00	0.00	294.00	256.32	306.72	3.09	Inlet	12.37	1.32

Inlet control depth = 3.09 ft
Outlet control depth = 2.61 ft

Normal depth = 1.32 ft Culvert slope = 0.01652
Critical depth = 1.98 ft Critical slope = 0.00440
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 300.21 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev ft	Calc.HW elev ft	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
2	42.00	3.00	0.00	294.00	256.32	307.04	3.41	Inlet	12.74	1.42

Inlet control depth = 3.41 ft
Outlet control depth = 2.87 ft

Normal depth = 1.41 ft Culvert slope = 0.01652
Critical depth = 2.11 ft Critical slope = 0.00475
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

*Computation: Hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on tailwater conditions.
*Computation: Hydraulic jump occurs within culvert.

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:22:19 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1876+12 (DA 32) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 74.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 94.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 113.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 130.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.5000

CULVERT DIAM. = 3.00 ft BARRELS = 3

INLET station: 0.00 elevation: 298.43 ft
 OUTLET station: 350.00 elevation: 294.09 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	298.49	20.18	294.87	34.02	298.88

Road profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	310.54	1.00	310.35		

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 297.80 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW	Calc.HW	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	elev ft	elev ft	ft		ft/s	ft
3	24.67	3.00	0.00	314.00	256.32	300.58	2.37	Inlet	3.49	3.00

Inlet control depth = 2.37 ft
 Outlet control depth = 2.11 ft

Normal depth = 1.14 ft Culvert slope = 0.01240
 Critical depth = 1.60 ft Critical slope = 0.00374
 Road top width => 168.00 ft. Road pavement type => asphalt
 Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 298.08 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW	Calc.HW	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	elev ft	elev ft	ft		ft/s	ft

3 31.33 3.00 0.00 314.00 256.32 300.97 2.76 Inlet 4.43 3.00

Inlet control depth = 2.76 ft
Outlet control depth = 2.46 ft

Normal depth = 1.30 ft Culvert slope = 0.01240
Critical depth = 1.82 ft Critical slope = 0.00406
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 298.31 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
3	37.67	3.00	0.00	314.00	256.32	301.34	3.14	Inlet	5.33	3.00

Inlet control depth = 3.14 ft
Outlet control depth = 2.80 ft

Normal depth = 1.44 ft Culvert slope = 0.01240
Critical depth = 2.00 ft Critical slope = 0.00444
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 298.49 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
3	43.33	3.00	0.00	314.00	256.32	301.71	3.50	Inlet	6.13	3.00

Inlet control depth = 3.50 ft
Outlet control depth = 3.12 ft

Normal depth = 1.57 ft Culvert slope = 0.01240
Critical depth = 2.14 ft Critical slope = 0.00486
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:22:40 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1897+40 (DA 33) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 71.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 91.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 109.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 126.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.5000

CULVERT DIAM. = 3.00 ft BARRELS = 3

INLET station: 0.00 elevation: 302.67 ft
 OUTLET station: 368.00 elevation: 300.63 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	302.68	20.32	300.63	51.41	302.95

Road profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	319.08	2.50	320.31		

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 302.95 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
3	23.67	3.00	0.00	332.00	256.32	304.89	2.32	Inlet	4.21	2.22

Inlet control depth = 2.32 ft
 Outlet control depth = 2.32 ft

Normal depth = 1.39 ft Culvert slope = 0.00554
 Critical depth = 1.57 ft Critical slope = 0.00370
 Road top width => 168.00 ft. Road pavement type => asphalt
 Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 303.15 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft

3 30.33 3.00 0.00 332.00 256.32 305.29 2.72 Outlet 4.96 2.42

Inlet control depth = 2.71 ft
Outlet control depth = 2.72 ft

Normal depth = 1.61 ft Culvert slope = 0.00554
Critical depth = 1.78 ft Critical slope = 0.00401
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 303.32 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
3	36.33	3.00	0.00	332.00	256.32	305.66	3.09	Outlet	5.60	2.59

Inlet control depth = 3.07 ft
Outlet control depth = 3.09 ft

Normal depth = 1.81 ft Culvert slope = 0.00554
Critical depth = 1.96 ft Critical slope = 0.00435
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 303.47 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	Veloc.	Out.depth
cfs	ft	ft	ft	ft	ft	ft	ft		ft/s	ft
3	42.00	3.00	0.00	332.00	256.32	306.01	3.44	Outlet	6.21	2.74

Inlet control depth = 3.42 ft
Outlet control depth = 3.44 ft

Normal depth = 1.99 ft Culvert slope = 0.00554
Critical depth = 2.11 ft Critical slope = 0.00475
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

*Computation: No hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on supercritical depth at end of culvert.
*Computation: No hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on supercritical depth at end of culvert.
*Computation: No hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on supercritical depth at end of culvert.
*Computation: No hydraulic jump occurs within culvert.

NORMAL TERMINATION OF THYSYS, CULVERT.

TEXAS HYDRAULIC SYSTEM,

CULVERT (ver. 1.1. Jan/1998)
Mon Aug 14 16:23:02 2006

CULVERT HYDRAULIC COMPUTATIONS

CULVERT NAME: 1924+50 (DA 34) Input Units: English
 PROJECT NAME: SH249 EXT - TM TO PH Output Units: English
 PROJECT CONTROL: CSJ: 0912-00-144
 COUNTY: MONTGOMERY
 DESCRIPTION: HYDRAULIC ANALYSIS OF CULVERTS

ANALYZE MULTIPLE OPENING CULVERT

MATERIAL: CONCRETE
 SHAPE: RCP CIRCULAR PIPE.
 ENTRANCE: HEADWALL
 PROFILE: STRAIGHT CULVERT

FREQUENCY: 10 YR DISCHARGE: 47.00 cfs
 FREQUENCY: 25 YR DISCHARGE: 60.00 cfs
 FREQUENCY: 50 YR DISCHARGE: 72.00 cfs
 FREQUENCY: 100 YR DISCHARGE: 82.00 cfs

TAILWATER ELEVATION (computed).

n value: 0.0120 Ke value: 0.5000

CULVERT DIAM. = 2.50 ft BARRELS = 3

INLET station: 0.00 elevation: 276.24 ft
 OUTLET station: 280.00 elevation: 274.83 ft

Cross section profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	276.04	80.14	274.83	141.01	275.94

Road profile (XY Coordinates) ft

X	Y	X	Y	X	Y
0.00	285.92	3.00	283.12		

CULVERT OUTPUT RUN NO => 1

TAILWATER ELEVATION: 275.76 ft (computed).

ANALYSIS for discharge frequency of : 10 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	ft	ft	ft		ft/s	ft
3	15.67	2.50	0.00	250.00	256.32	278.21	2.05	outlet	6.41	1.25

Inlet control depth = 1.99 ft

Outlet control depth = 2.05 ft

Normal depth = 1.25 ft Culvert slope = 0.00504
 Critical depth = 1.34 ft Critical slope = 0.00398
 Road top width => 168.00 ft. Road pavement type => asphalt
 Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 2

TAILWATER ELEVATION: 275.85 ft (computed).

ANALYSIS for discharge frequency of : 25 YR

Barls.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	ft	ft	ft		ft/s	ft

3 20.00 2.50 0.00 250.00 256.32 278.57 2.40 Outlet 6.80 1.45 DA_34.txt

Inlet control depth = 2.32 ft
Outlet control depth = 2.40 ft

Normal depth = 1.45 ft Culvert slope = 0.00504
Critical depth = 1.52 ft Critical slope = 0.00433
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 3

TAILWATER ELEVATION: 275.93 ft (computed).

ANALYSIS for discharge frequency of : 50 YR

Bar's.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	ft	ft	ft		ft/s	ft
3	24.00	2.50	0.00	250.00	256.32	278.91	2.74	Outlet	7.07	1.63

Inlet control depth = 2.63 ft
Outlet control depth = 2.74 ft

Normal depth = 1.63 ft Culvert slope = 0.00504
Critical depth = 1.67 ft Critical slope = 0.00473
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

CULVERT OUTPUT RUN NO => 4

TAILWATER ELEVATION: 275.98 ft (computed).

ANALYSIS for discharge frequency of : 100 YR

Bar's.	Qpb	Rise	Span	Length	Max.HW elev	Calc.HW elev	HW	Control	Veloc.	Out.depth
	cfs	ft	ft	ft	ft	ft	ft		ft/s	ft
3	27.33	2.50	0.00	250.00	256.32	279.18	3.02	Outlet	7.30	1.78

Inlet control depth = 2.92 ft
Outlet control depth = 3.02 ft

Normal depth = 1.80 ft Culvert slope = 0.00504
Critical depth = 1.78 ft Critical slope = 0.00515
Road top width => 168.00 ft. Road pavement type => asphalt
Computed Weir Coefficient => 3.00.

No discharge over the road.

RUNING MESSAGES LIST:

*Computation: Hydraulic jump occurs within culvert.
*Computation: Outlet velocity is based on tailwater conditions.
*Computation: Hydraulic jump occurs within culvert.

NORMAL TERMINATION OF THYSYS, CULVERT.