

**COTTONWOOD CREEK AND FISH CREEK WATERSHEDS
FLOOD PROTECTION PLAN**

Prepared for:

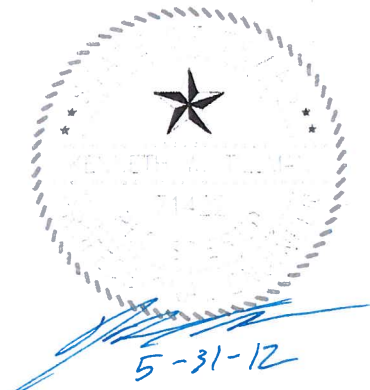
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Public Works & Transportation Department
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EC Project No. 10033.00

May 31, 2012

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EXECUTIVE SUMMARY

The Cottonwood and Fish Creek Watersheds Flood Protection Plan is an engineering analysis of the flooding risks facing both the Cottonwood and Fish Creek watersheds, as well as a planning analysis of mitigation of these flooding risks.

The hydrologic analysis of Cottonwood Creek encompassed a total drainage area of 14.4 square miles with 4.7 square miles within the City of Arlington which includes the headwaters of Cottonwood Creek, South Cottonwood Creek and four unnamed tributaries. The hydrologic analysis of Fish Creek includes a total drainage area of 28.2 square miles with 13.2 square miles in the City of Arlington. The headwaters of Fish Creek, North Fish Creek and eight unnamed tributaries are located in Arlington. An updated hydrologic model of the watersheds was developed using a georeferenced HEC-HMS model. The model included both existing and ultimate land use assumptions, utilizing existing City of Arlington's GIS data, and employing SSURGO soil information to generate runoff curve numbers using the NRCS (SCS) method. A Modified Puls stream routing was developed for the studied watersheds using recent digital topographic data and HEC-RAS. Times of concentration (T_c) and the corresponding lag times were computed using the TR-55 method.

Separate detailed hydraulic analyses were performed for the Cottonwood Creek and Fish Creek watersheds. These hydraulic analyses computed the water surface elevations for the 50%, 20%, 10%, 4%, 2%, 1% and 0.2% annual chance (2-, 5-, 10-, 25-, 50-, 100- and 500-YR, respectively) existing condition storm events and the ultimate conditions 1% annual chance event. Each of the hydraulic analyses includes the delineation of the existing conditions 1% and 0.2% annual chance floodplains, and the ultimate conditions 1% annual chance floodplains.

The HEC-RAS model of Cottonwood Creek begins at Mountain Creek Lake and extends to the upper limits of the watershed in the City of Arlington. This Flood Protection Planning analysis encompassed 3.9 miles of stream within Arlington including Cottonwood Creek, Unnamed Tributaries CC-1, CC-2, CC-3, CC-4 and South Cottonwood Creek.

The Fish Creek HEC-RAS model also began at Mountain Creek Lake and extended to the upper limits of the watershed in the City of Arlington. The Flood Protection Planning analysis consisted of 18 stream miles of Fish Creek, Unnamed Tributaries FC-1, FC-2, FC-3, FC-4, North Fish Creek, and its Unnamed Tributaries NF-1, NF-2, NF-3 and NF-4.

Overall maps showing the extents of the studied reaches are included in Exhibit 5 and 5A of **Appendix A**. The USACE HEC-RAS software version 4.1.0 was used for the hydraulic analyses. All modeling is one dimensional. Steady state analyses were performed for both the Cottonwood Creek and Fish Creek watersheds.

The analyses have identified eleven locations in the study area which experience flooding during a 1% chance event; six of these areas are located in in the Cottonwood Creek Basin, and five are located in the Fish Creek Basin.

The flooding concerns in the Cottonwood Creek Basin are:

1. Cottonwood Creek at Susan Drive – Apartments & street flooding.
2. Cottonwood Creek at Park Row – Apartments & street flooding.
3. Cottonwood Creek at Sherry – Street flooding affecting Fire Station #2 access.
4. Tributary CC-2 at Susan, Buena Vista & Plaza – Residential flooding.
5. Tributary CC-3 at Hillcrest – Residential flooding.
6. South Cottonwood Creek at S.H. 360 – Street and highway flooding.

The flooding concerns in the Fish Creek Basin are:

1. Fish Creek at Beckett – Residential & street flooding.
2. Tributary FC-3 at S.H. 360 – Street & highway flooding.
3. Tributary FC-4 at S.H. 360 – Street & highway flooding.
4. North Fish Creek between Allen & S.H. 360 – Apartments & commercial flooding.
5. Tributary NF-1 at Mayfield Road – Residential & street flooding.

Three alternatives for mitigation of the flooding were considered in this study – storage, buyout and structural modification. Storage normally consists of the construction of a large pond or series of small ponds designed to store a portion of the flood flow and release it slowly reducing the peak flow, which in turn lowers the flood levels. This approach provides benefits for the areas downstream of the storage, but can require the purchase of large areas of land. Buyout consists of purchasing structures located in the floodplain. The structures are removed and the property is converted to a use that is compatible with its location in the floodplain. Structural modification covers a wide variety of construction, the most common being widening of the stream channels and enlarging bridges or culverts. Each situation was examined to determine which of these alternatives were applicable. The availability of sufficient open area for the construction of storage ponds is a significant factor in determining if storage can be considered; converting developed property to storage would be prohibitively expensive. Buyouts were only considered if there were residential or commercial buildings which were flooded; some of the locations which are flooded do not have any home or commercial building flooding associated with them, and a buyout would not apply in these situations.

A benefit-cost analysis was performed for the various options affecting building flooding. The viability of the various options was measured through a comparison of the relative cost of each mitigation project versus the benefits derived from these projects. The benefits must exceed the cost in order for a project to be considered viable. The benefits are the damage costs which are avoided by removing at-risk properties from the floodplain (i.e. benefit = damage avoided). Benefits are determined from Tarrant County Appraisal District 2011 tax roll values. Construction costs are based on recent bid tabulations and unit prices for similar regional construction projects. It should be noted that FEMA considers a voluntary acquisition of property located in the floodplain to have a Benefit Cost Ratio (BCR) of 1.

The proposed projects were prioritized using goals set forth in the City's Stormwater Management Plan adopted in 2009. Ranking tables were developed based on the goals which were then used to develop priorities for each proposed project.

Factors to be taken into consideration in the implementation of any specific project within the City of Arlington include the following:

- Coordination of projects within a watershed
- Availability of funding
- City-wide prioritization

It is the City's plan to incorporate the completed Cottonwood and Fish Creek Watersheds Flood Protection Plan into its overall Stormwater Management Plan for implementation of capital improvements. The implementation of stormwater capital improvements is dependent upon overall prioritization criteria, which may differ from the prioritization criteria contained in this report. The City will periodically subject the overall ranking of all capital improvements to reprioritization. The prioritized list of proposed projects for the Cottonwood and Fish Creek Watersheds are listed in rank order and summarized in the project summary.

| Project Summary | | | |
|---|--|---------------------|-------------------------------|
| Project Name | Type of Improvement | Capital Cost | Priority Ranking Score |
| North Fish Creek between Allen & S.H. 360 Apartments & commercial flooding | Construct a 21 acre pond & a 10 acre pond | \$6,082,000 | 58 |
| Cottonwood Creek at Park Row Apartments & street flooding | Buyout | \$1,260,000 | 40 |
| Tributary CC-2 at Susan, Buena Vista & Plaza Residential flooding | Buyout | \$1,600,000 | 40 |
| Tributary CC-3 at Hillcrest Residential flooding | 10' wide by 5' high box culverts | \$93,000 | 23 |
| Cottonwood Creek at Susan Drive Apartments & street flooding | Two 8' wide by 8' high box culverts | \$124,000 | 11 |
| Tributary NF-1 at Mayfield Road Residential & street flooding | Verify residential flooding depth, 12' wide channel & two 8' wide by 6' high culverts. | \$1,437,000 | 8 |
| Cottonwood Creek at Sherry Street Street flooding | Construct two additional 10' wide by 5' high box culverts | \$775,000 | 0 |

ACKNOWLEDGEMENTS

Espey Consultants, Inc., has completed the Cottonwood Creek and Fish Creek Watersheds Flood Protection Plan for establishing an understanding of these watersheds, the potential impacts during flood events, and the viability of improvements to reduce this impact. The resources required to address this effort included not just site specific information gathered during the study but additionally resource materials from prior studies of upstream areas that had material effects on the outcome of the plan. Additionally, the value of the final plan was significantly enhanced with the review of plan elements as they were developed by the City of Arlington management and the Technical Advisory Committee established for review of significant milestones during the study. These added resources and the access to the individuals offering input through the Technical Advisory Committee have served to provide greater confidence in the reliability of the final Cottonwood and Fish Creek Watersheds Flood Protection Plan findings. Thus, the following staff of Espey Consultants, Inc. associated with the project appreciates the contributions from each of the resources and recognizes that there are many individuals who will go unnamed in recognizing the key contributors to the success of the project. However, Espey Consultants, Inc. gratefully acknowledges the key contributions made by the individuals listed below for their participative support with the Cottonwood and Fish Creek Watersheds Flood Protection Plan project.

Representatives of the City of Arlington, local sponsor for the Project

William Brown, Stormwater Executive Manager, City of Arlington
Audra Valamides, Stormwater Engineer, City of Arlington

Texas Water Development Board, state sponsoring agency for the Project

Gilbert Ward, P.G., Planning Division

Additional members of the Technical Advisory Committee for the Project

Mead Sams, USACE
Romin Khavari, P.E., CFM, City Engineer
Gabe Johnson, P.E., CFM, Flood Plain Administrator
Jack Tidwell, NCTCOG
Joe Trammel, Tarrant County
Ron Wanhanen, FEMA

Espey Consultants, Inc. primary staff involved on the Project

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Sandeep Chaudhari, EIT, CFM, Staff Engineer

Supporting subconsultants for the Project

Marshall Lancaster, R.P.L.S., Marshall Lancaster & Associates, Inc.

1.0 INTRODUCTION

The Cottonwood Creek and Fish Creek watersheds originate within the City of Arlington and continue downstream through the City of Grand Prairie and discharge into Mountain Creek Lake. Land use within these watersheds is a mix of older industrial, commercial, and residential developments. The Cottonwood Creek watershed within the City of Arlington is approaching build-out while the Fish Creek watershed is experiencing some in-fill development.

The City of Arlington has established flood limits based on HEC-2 models developed some two to three decades ago. A number of Letters of Map Revision (LOMR) have been approved, effectively establishing a need to update the hydrologic and hydraulic modeling for FEMA certification, complete with addressing LOMRs issued during the last fifteen years. The City of Arlington has conducted an analysis of its citizen reported drainage concerns throughout the City, determining that the Cottonwood and Fish Creek watersheds represent a large source of citizen concerns directly related to structural flooding and aging infrastructure (such as concrete channels).

The Cottonwood and Fish Creek Watersheds Flood Protection Plan is an engineering analysis of the flooding risks facing both the Cottonwood and Fish Creek watersheds, as well as a planning analysis of mitigation of these flooding risks. This project completes the analysis of the downstream portions both the Cottonwood Creek and Fish Creek watersheds in the City of Grand Prairie. That study of the lower portion of the watersheds was funded by the Texas Water Development Board (TWDB) and the City of Grand Prairie. This project was funded by the TWDB and the City of Arlington, with participation by the City of Grand Prairie, the Texas Department of Transportation, Tarrant County, and U.S. Army Corps of Engineers – Fort Worth District. The general project location is shown in **Figure 1**.

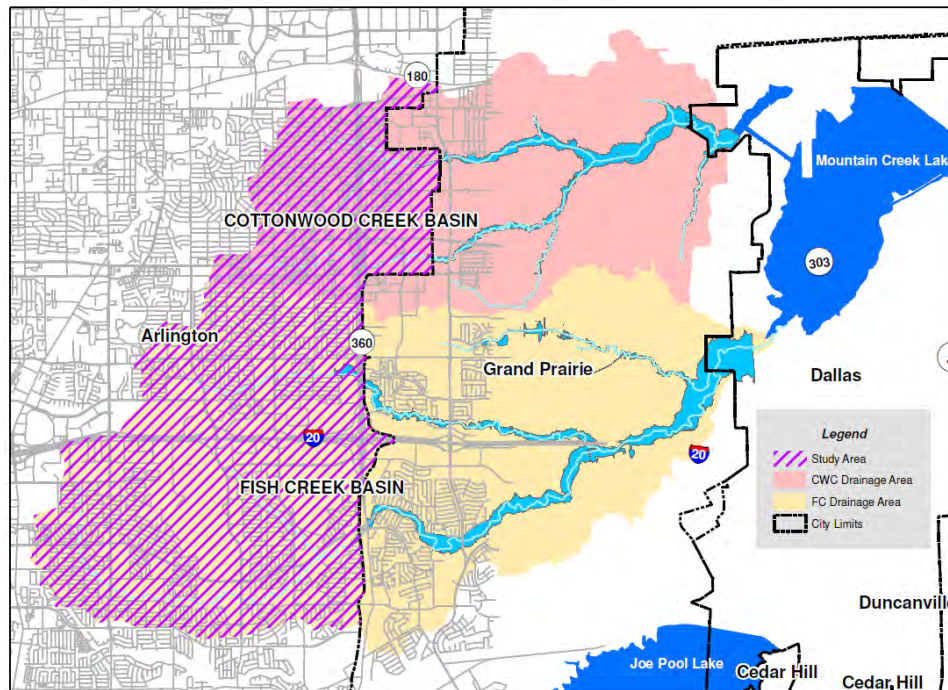


Figure 1: Location Map

The following sections of this report describe the methods, data, and assumptions used in the analyses, as well as the results and recommendations for improving flood protection within the portion of the City of Arlington within the Cottonwood Creek and Fish Creek watersheds.

1.1 SCOPE OF SERVICES

The objective of this flood protection planning effort was to conduct a comprehensive integration and update of the various hydrologic models that have been developed historically for both Cottonwood Creek and Fish Creek watersheds, and to extend a similar study of the downstream portions of the watersheds within the City of Grand Prairie into the upper reaches of the watersheds in the City of Arlington. This updating incorporated current watershed conditions inclusive of channel conditions, additional structures, new improvements, etc., and additional data reflected in approved and pending Letters of Map Revision (LOMRs). Future watershed conditions are also projected, particularly the fully developed watershed conditions and planned transportation improvements now being implemented. This study included the collection of baseline information, review of environmental constraints, and the identification of flood/drainage problem areas. Hydrologic and hydraulic modeling was performed to refine the understanding of flood impacts from which alternatives were developed and analyzed to reduce these impacts.

The hydrologic analysis of Cottonwood Creek encompassed a total drainage area of 14.4 square miles with 4.7 square miles within the City of Arlington which includes the headwaters of Cottonwood Creek, South Cottonwood Creek and four unnamed tributaries. The hydrologic analysis of Fish Creek includes a total drainage area of 28.2 square miles with 13.2 square miles in the City of Arlington. The headwaters of Fish Creek, North Fish Creek and eight unnamed tributaries are located in Arlington.

Utilizing and expanding existing hydrologic model data from FEMA and the City of Arlington, an updated hydrologic model of the watersheds was developed using a georeferenced HEC-HMS model. The model included both existing and ultimate land use assumptions, utilizing existing City of Arlington’s GIS data, and employing SSURGO soil information to generate runoff curve numbers using the NRCS (SCS) method. A Modified Puls stream routing was developed for the studied watersheds using recent digital topographic data and HEC-RAS. Times of concentration (Tc) and the corresponding lag times were computed using the TR-55 method.

1.2 ADVISORY COMMITTEE

The Cottonwood Creek and Fish Creek Watersheds Flood Protection Plan was implemented with the goal of disseminating information as the plan was developed and utilizing additional information gathered through both a technical advisory committee and public meetings. The Technical Advisory Committee was established to provide peer review from agencies or entities knowledgeable or affected by the subject matter for the project. These organizations participated during the performance of the project through attending technical meetings at five key milestones during the study:

1. Kickoff meeting
2. Data review meeting
3. Hydrologic and hydraulic modeling results meeting
4. Alternative solutions meeting
5. Final recommended improvements plan meeting

Representative agencies selected for this committee involvement included the following:

Table 1: Agency and Role on Technical Advisory Committee

| Agency or Organization | Role on Technical Advisory Committee |
|-------------------------------|--|
| City of Arlington | Co-sponsor for study; floodplain management responsibility throughout study area; operator of transportation, water, and wastewater infrastructure in study area |
| Espey Consultants | Facilitator for Advisory Committee Meetings; presented study progress |
| Texas Water Development Board | Co-sponsor for study; flood management planning agency for State |

| Agency or Organization (cont.) | Role on Technical Advisory Committee (cont.) |
|--|--|
| USACE | Flood management federal regulatory agency |
| North Central Texas Council of Governments | Regional flood management planning organization |
| City of Grand Prairie | Local city within the watershed |
| Texas Department of Transportation | State transportation infrastructure management with facilities in study area |

1.3 PUBLIC INVOLVEMENT

Three public meetings were held to inform the public of the flood protection planning effort and to solicit their comments and input. These meetings were advertised in the local newspaper of general circulation in the study area. Letters were also sent out to neighborhood groups and HOA's in the area. Attendance at these public meetings was light with no one attending the kick-off meeting. There were five citizens, and two representatives from the local fire station along with two City officials at the second meeting where the flooding locations were presented and some very useful information was obtained from the attendees. Only one citizen attended the final meeting where the proposed mitigation measures were presented. The attendance sign-up sheets for these meetings are included in **Appendix H**.

1.4 BASELINE DATA ACQUISITION

Information was obtained from a variety of sources for performance of the project. The following table lists general types of data obtained during the course of the study.

| Type of Data | Source of Data |
|---|---------------------------------------|
| Aerial Photography data | City of Arlington |
| 2-ft LiDAR contour data | NCTCOG |
| 1-ft LiDAR contour data | City of Grand Prairie |
| SSURGO (Soils) Data | USDA |
| Existing land use data | City of Arlington GIS |
| Existing land use data | City of Grand Prairie GIS |
| Future land use data | City of Arlington GIS |
| Drainage area boundaries for Cottonwood & Fish Creek Watersheds | Cities of Arlington and Grand Prairie |
| Drainage Complaints database | City of Arlington GIS |
| Comprehensive Stormwater Management Plan | City of Arlington |
| Tarrant County Digital Flood Insurance Rate Map | City of Arlington GIS |
| Letters of Map Revision (LOMRs) | City of Arlington |
| Drainage Design Manual | City of Arlington |
| Record drawings for various bridges, culverts and concrete lined drained channels | City of Arlington |
| Record drawings for various bridges and culverts | TxDOT |
| Property value database | City of Arlington GIS |
| 2010 Cottonwood & Fish Creek FPP for the City of Grand Prairie | Espey Consultants, Inc. |

In addition to these sources of data, field survey of channel cross sections, bridges and culverts was performed between February and March 2011 by Marshall Lancaster & Associates, Inc. The field survey data obtained was horizontally referenced to the NAD83, Texas State Plan, North Central Texas coordinate system and vertically referenced to North American Vertical Datum (NAVD88).

2.0 HYDROLOGIC ANALYSIS

The scope of this project included a hydrologic study of the Cottonwood Creek watershed and the Fish Creek watershed totaling approximately eighteen square miles within the City of Arlington. The Cottonwood Creek Basin has a total drainage area of 14.4 square miles with 4.7 square miles in the City of Arlington. The headwaters of Cottonwood Creek, South Cottonwood Creek and four unnamed tributaries are located in the City of Arlington.

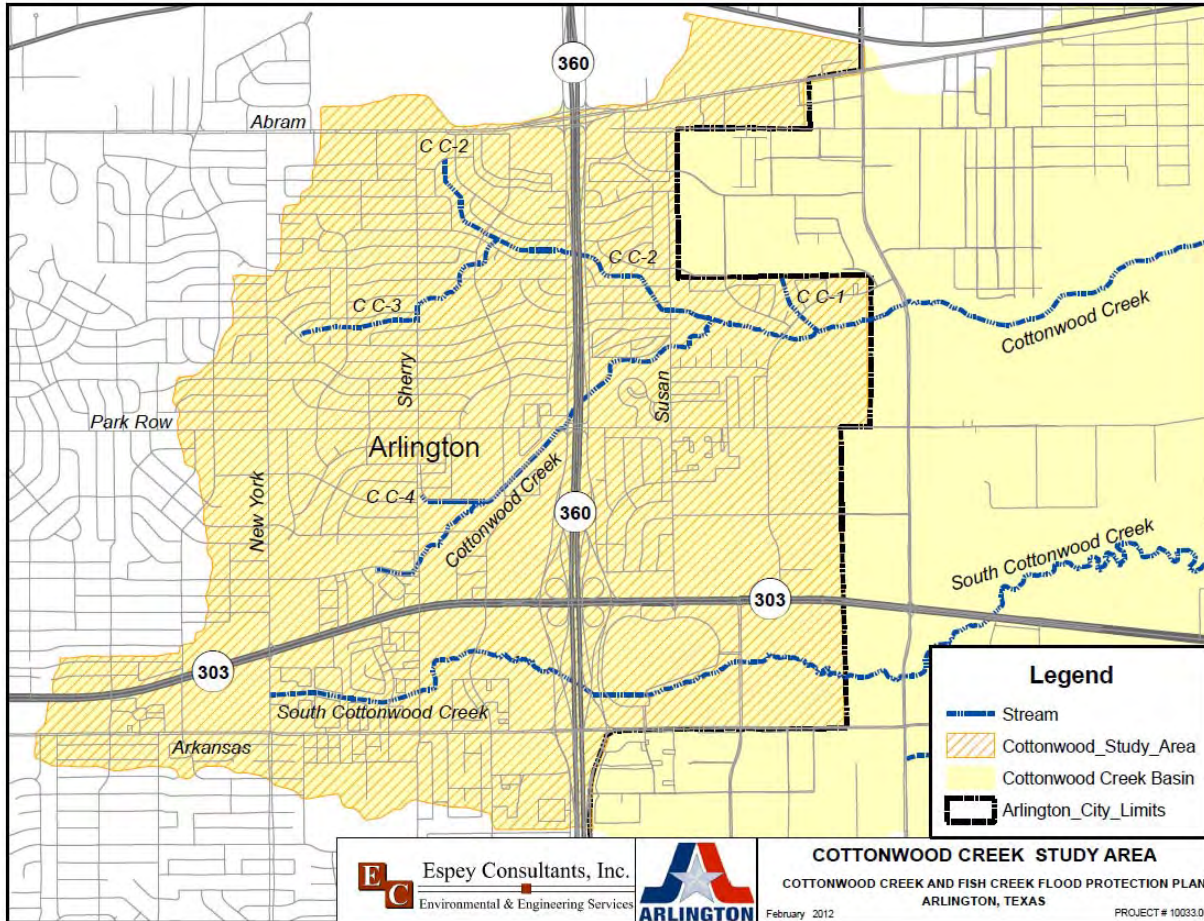


Figure 2: Cottonwood Creek and Tributaries

The Fish Creek Basin has a total drainage area of 28.2 square miles with 13.2 square miles in the City of Arlington. The headwaters of Fish Creek, North Fish Creek and eight unnamed tributaries are located in Arlington. The hydrologic analysis included the evaluation of the existing conditions 50%, 20%, 10%, 4%, 2%, and 1% (2-, 5-, 10-, 25-, 50- and 100-YR, respectively) annual chance storm events as well as the ultimate condition 1% annual chance storm event. Version 3.4 of the HEC-HMS computer program developed by the Hydrologic Engineering Center of the U. S. Army Corps of Engineers (USACE) was used in the hydrologic analysis to estimate peak flow rates and storm hydrographs for each reach. This section of the report describes the input parameters used in this analysis and the computed peak flow rates used in the floodplain delineation.

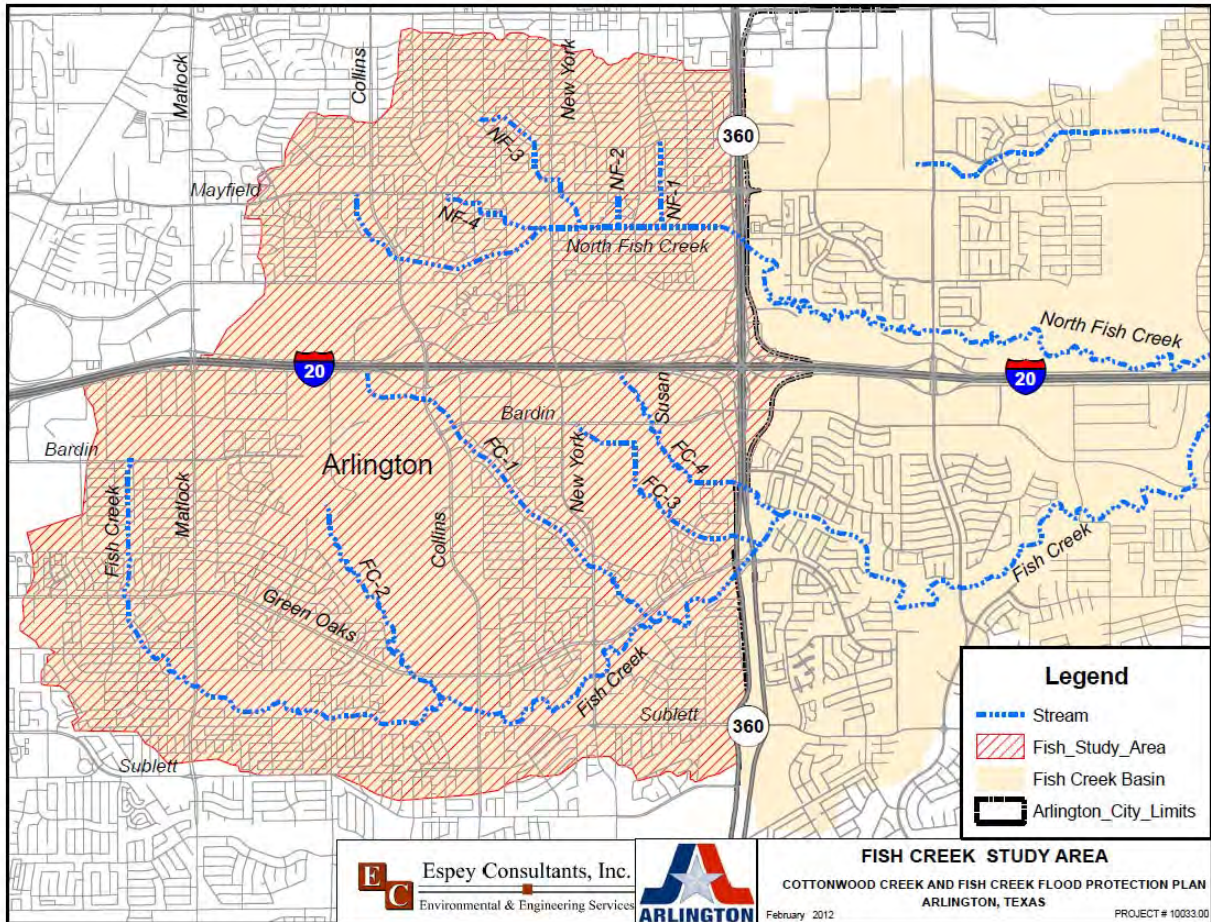


Figure 3: Fish Creek and Tributaries

2.1 DRAINAGE AREA DELINEATION

The watersheds were manually delineated using numerous sources including: United States Geological Survey (USGS) topographical survey data, NCTCOG LiDAR data, record drawings, storm drain GIS maps, and previous drainage studies. The watershed was further divided into sub-areas at points of critical interest (i.e., confluence of large tributaries, bridges, etc.).

A drainage area map showing the watershed delineation and sub-area names for both basins is included as Exhibit 1 of **Appendix A**.

2.2 PRECIPITATION

The precipitation values used in the hydrologic analysis are shown in **Table 2**. Data for storm durations of greater than one hour were obtained from *U.S. Department of Commerce, Technical Paper No. 40 (May, 1961)* and data for storms with a duration of one hour or less were obtained from *National Oceanic and Atmospheric Administration, Technical Memorandum Hydro-35 (June, 1977)*.

Table 2: Depth–Duration Rainfall Data

| Return Period (years) | Point Rainfall Depth (inches) | | | | | | | |
|-----------------------|-------------------------------|--------|------|------|------|------|-------|-------|
| | 5-min | 15-min | 1-hr | 2-hr | 3-hr | 6-hr | 12-hr | 24-hr |
| 2 | 0.49 | 1.04 | 1.85 | 2.22 | 2.45 | 2.91 | 3.45 | 3.95 |
| 5 | 0.57 | 1.22 | 2.45 | 3.00 | 3.30 | 3.90 | 4.70 | 5.40 |
| 10 | 0.63 | 1.36 | 2.86 | 3.55 | 3.85 | 4.65 | 5.50 | 6.40 |
| 25 | 0.73 | 1.56 | 3.35 | 4.15 | 4.55 | 5.45 | 6.50 | 7.50 |
| 50 | 0.80 | 1.71 | 3.82 | 4.65 | 5.15 | 6.2 | 7.35 | 8.52 |
| 100 | 0.87 | 1.87 | 4.25 | 5.2 | 5.7 | 6.92 | 8.4 | 9.55 |

2.3 INFILTRATION LOSSES

The U.S. Department of Agriculture Natural Resource Conservation Service (NRCS) has developed a rainfall-runoff index called the runoff curve number (CN) which takes into account such factors as soil characteristics, land use/land condition, and antecedent soil moisture to derive a generalized rainfall-runoff relationship for a given area. A description of these components and the equations for calculating runoff depth from rainfall are provided below.

The NRCS classifies soils into four hydrologic soil groups: A, B, C, and D which indicate the runoff potential of a soil, ranging from a low runoff potential (group A) to a high runoff potential (group D). Digital soil data is available from the Texas Natural Resource Information System (TNRIS) post-processed from the US Department of Agriculture Soil Survey Geographic (SSURGO) database into the Texas statewide mapping system. Exhibit 2 in **Appendix A** shows the soils map for the study area.

The NRCS provides runoff curve numbers for three Antecedent Moisture Conditions (AMC): I, II and III. AMC I represents dry soil conditions and AMC III represents saturated soil conditions. AMC II is normally considered to be the average soil condition; however, studies have indicated that the average condition ranges from AMC I in West Texas to between AMC II and III for east Texas. Runoff curve numbers vary from 0 to 100, with the smaller values representing soils with lower runoff potential and the larger values representing soils with higher runoff potential. This study assumes an AMC II to represent average conditions.

Curve numbers were evaluated independently of impervious cover (i.e., these curve numbers reflect fair condition open spaces) for this analysis. A composite CN is computed based on area weighting of each hydrologic soil group within each sub-area. Impervious cover values are entered separately from CN values into the HEC-HMS model. The assumed CN values are shown in **Table 3**. HEC-HMS computes 100 percent runoff from impervious areas, while runoff from pervious areas is computed using the selected CN value and the following equations:

$$Q = (P - 0.2 \times S)^2 / (P + 0.8 \times S) \quad \text{Equation 1}$$

And

$$CN = 1000 / (10 + S) \quad \text{Equation 2}$$

Where:

- Q = depth of runoff (in),
- P = depth of precipitation (in),
- S = potential maximum retention after runoff begins (in), and
- CN = runoff curve number.

Table 3: NRCS Curve Number Assumption

| Group | AMC I | AMC II | AMC III |
|-------|-------|--------|---------|
| A | 21 | 39 | 59 |
| B | 41 | 61 | 78 |
| C | 55 | 74 | 88 |
| D | 63 | 80 | 91 |

Key Assumption: Undeveloped grassland or range land.
Reference: National Engineering Handbook 4 (NEH-4)

The range of calculated existing conditions weighted CN values used in this analysis is 62.9 to 80.0. A summary of CN values for all sub-basins is included in **Appendix B**.

An existing conditions land use map provided by the City of Arlington GIS was analyzed in conjunction with 2009 aerial imagery in GIS to estimate existing conditions impervious cover percentages. The hydrologic model for existing conditions utilized percent impervious cover values calculated for each watershed sub-basin. The Existing Land Use Map is included as Exhibit 3 in **Appendix A**. The details of this analysis are included in **Appendix C**. The range of calculated impervious cover percentages for this analysis is 1.1% to 71.8%.

The ultimate development conditions (fully-developed conditions) analysis included modifications to the impervious cover percentages to represent full development. For the purposes of this analysis, full development was assumed to be equivalent to the estimated level by the year 2025 according to the City's future land use study. The Ultimate Land Use Map is included as Exhibit 4 in **Appendix A**.

The impervious cover for each sub-area is modified to reflect the projected land use based on the datasets provided by the City of Arlington. Land use impervious cover percentages were estimated based on previous studies and engineering judgment. The future land use maps provided by City of Arlington have more land use types than those for existing conditions. **Table 4** shows future land use types designated in the future land use studies and the modifications employed to maintain consistency. The weighted impervious cover value for each sub-area is included in **Appendix C**.

Table 4: Future Land Use Impervious Cover Assumptions

| Land Use Types in Future Land Use Map | Equivalent to Existing Land Use | IC% Equivalent to Existing Conditions |
|---------------------------------------|---------------------------------|---------------------------------------|
| Airport Industrial | Airports | 35% |
| Campus District | Institutional | 40% |
| Community Activity Center | Institutional | 40% |
| Connecting Corridors | Transportation | 35% |
| Drainage | Flood Control | 0% |
| Floodplain | Flood Control | 0% |
| Heavy Industrial | Industrial | 90% |
| High Density Residential | Multi-family | 70% |
| Light Industrial | Industrial | 90% |
| Low Density Residential | Single Family | 25% |
| Medium Density Residential | Single Family | 25% |
| Mixed Residential - 2 | Multi-family | 70% |
| Mixed Residential - 3 | Multi-family | 70% |

| Land Use Types in Future Land Use Map | Equivalent to Existing Land Use | IC% Equivalent to Existing Conditions |
|---------------------------------------|---------------------------------|---------------------------------------|
| Mixed Use | Retail | 95% |
| Parks and Recreation | Parks | 6% |
| Parks Outside Arlington | Parks | 6% |
| Regional Activity Center | Institutional | 40% |
| Regional Industrial Center | Industrial | 90% |
| Residential Neighborhood | Single Family | 38% |
| Roadway | Transportation | 35% |
| Urban Neighborhood | Multi-family | 70% |

2.4 UNIT HYDROGRAPH

2.4.1 Background

A rainfall-runoff transformation is required to convert excess rainfall (total rainfall minus infiltration losses) into runoff from a particular sub-basin. The NRCS unit hydrograph option in HEC-HMS was used in this analysis to generate runoff hydrographs for each defined sub-basin within the studied watersheds. The unit hydrograph method represents a hydrograph for one unit (one inch) of direct runoff, which is standard engineering practice.

The dimensionless unit hydrograph developed by the NRCS (see **Figure 4**) was developed by Victor Mockus and presented in *National Engineering Handbook, Section 4, Hydrology*. The dimensionless unit hydrograph has its ordinate values expressed in a dimensionless ratio, of discharge relative to peak discharge, q/q_p , and its abscissa values as time relative to time to peak, t/T_p . This unit hydrograph has a point of inflection approximately 1.7 times the time to peak (T_p), and the time-to-peak 0.2 of the time-of-base (T_b).

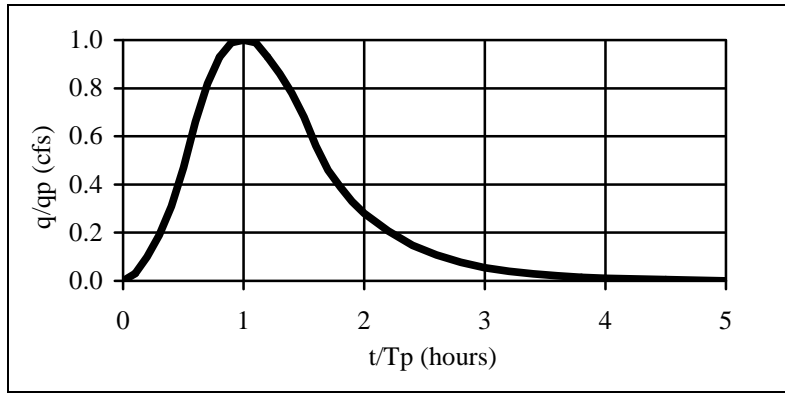


Figure 4: NRCS Unit Graph

In HEC-HMS, input data for this method consists of a single input parameter, T_{LAG} , which is equal to the time (hours) between the center of mass of excess rainfall and the peak of the unit hydrograph (NRCS 1985). In other words, there is a delay in time after a rain event begins before the runoff reaches its maximum peak. This delay is known as lag. The lag is determined based on the time of concentration, as discussed in **Section 2.4.2**.

The time to peak is computed using the following equation:

$$T_p = \Delta t/2 + T_{LAG} \quad \text{Equation 3}$$

Where:

- T_p = time to peak of the unit graph (hours),
- Δt = computation interval or duration of unit excess (hours), and
- T_{LAG} = watershed lag (hours).

The peak flow rate of the unit graph is computed using the following equation:

$$qp = 484A / T_p \quad \text{Equation 4}$$

Where:

- qp = peak flow rate of the unit graph (cubic feet per second [cfs] / inch) and
- A = watershed area (square miles).
- 484 = peak rate factor (dimensionless)

Note: The peak rate factor of 484 has been known to vary from 600 in steep terrain to 300 in very flat, swampy terrain. The 484 value is standard engineering practice and is used in this analysis.

2.4.2 Time of Concentration

The NRCS method assumes that the lag time of a watershed is 60 percent of the watershed's time of concentration. The time of concentration (T_c) is the time for runoff to travel from the hydraulically most distant point of the watershed to a point of interest within the watershed (NRCS, 1986). The time of concentration may be estimated by calculating and summing the travel time for each sub-reach defined by the flow type: sheet flow, shallow concentrated flow, and channelized flow (including roadways, storm sewers, and channels). The methods prescribed in NRCS Technical Release 55 (TR-55) are used to determine the times of concentration for each flow segment in this analysis. Adjustments are made to the time of concentration calculations in the ultimate conditions analysis to reflect faster watershed response times, typically in the uplands of the watershed if development is proposed in these areas. Time of concentration calculations can be found in **Appendix D**, utilizing each typical flow segment presented below.

2.4.2.1 Sheet Flow (≤ 100 feet)

Sheet flow is flow over plane surfaces. With sheet flow, the friction value (Manning's n) is an effective roughness coefficient that includes the effect of raindrop impact, of drag over the plane surface and obstacles such as litter, crop ridges, and rocks, and of erosion and transportation of sediment. These n values are for very shallow flow depths of approximately 0.1 feet. Sheet flow normally becomes shallow concentrated flow after no more than approximately 100 feet depending on surface conditions. The T_c calculations were performed using high resolution aerial photography and engineering judgment. Travel time was computed using the following equation.

$$T_t = (0.007 \times (n \times L)^{0.8}) / (P_2^{0.5} \times s^{0.4}) \quad \text{Equation 5}$$

Where:

- T_t = travel time (hr),
- n = Manning's roughness coefficient,
- L = flow length (ft),
- P_2 = 2-year, 24-hour rainfall (in), and
- s = slope of hydraulic grade line (land slope, ft/ft).

2.4.2.2 Shallow Concentrated Flow

Sheet flow usually becomes shallow concentrated flow when the depth of flow exceeds 0.1 feet, or flows in a shallow swale or gutter. The average velocity for this flow can be determined from the following figure in which average velocity is a function of watercourse slope and type of channel (TR-55).

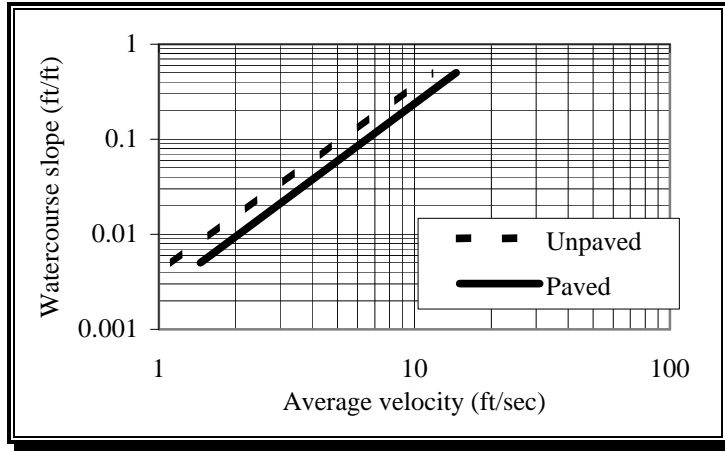


Figure 5: Average Velocities for Estimating Travel Time in Shallow Concentrated Flow Segments

After determining the average velocity, the following equation is used to compute travel time:

$$T_t = L / (3600 \times V) \quad \text{Equation 6}$$

Where:

- T_t = travel time (hr),
- L = flow length (ft),
- V = average velocity (ft/sec), and
- 3,600 = conversion factor from seconds to hours.

2.4.2.3 Channelized Flow

As the depth of concentrated flow increases, the shallow concentrated flow evolves into channelized flow. Open channels are assumed to begin where surveyed cross section information has been obtained, where channels are visible on aerial photographs, or where blue lines (indicating streams) appear on United States Geological Survey (USGS) quadrangle maps. In the case of this analysis, channel flow either involves flow in man-made storm sewer infrastructure or flow in the natural channel. Manning's equation or water surface profile information (available from HEC-2 or HEC-RAS) can be used to estimate average flow velocity. Average flow velocity is usually determined for bank-full elevations. Both open channel and closed conduit systems can be included.

Manning's equation is:

$$V = 1.49 \times r^{2/3} \times s^{0.5} / n \quad \text{Equation 7}$$

Where:

- V = average velocity (ft/sec),
- r = hydraulic radius (ft), equal to flow area divided by wetted perimeter,
- s = slope of the hydraulic grade line (channel slope, ft/ft), and
- n = Manning's roughness coefficient.

2.5 HYDROGRAPH ROUTING

Stream routing reaches were modeled using Modified Puls data derived from HEC-RAS models developed as part of this study. Modified Puls routing is also called storage routing or level pool routing. It uses conservation of mass and a relationship between storage and discharge to route flow through the stream. The flow through a reach was attenuated by the storage and delayed release of water in the reach.

In some of the upper drainage areas Modified Puls routing data was not available. Muskingum-Cunge routing was used for these locations.

2.6 DESIGN STORM ANALYSIS

The application of a design storm in the HEC-HMS model is used to generate runoff hydrographs and estimate peak flow rates along the watercourse for various storm frequencies. There are three major components to the design storm: depth, duration, and distribution. Precipitation depths selected for this impact study are included in **Section 2.2**. The following subsections describe the analysis and selection of storm duration and distribution.

2.6.1 Design Storm Duration

Design storm duration is a significant consideration for hydrologic modeling. A check must be performed to ensure that the peak flow of any given event has reached the mouth of the studied basin prior to the end of the rainfall duration. The time of concentration for all watersheds was less than 24 hours; therefore, a 24-hour duration was selected.

2.6.2 Design Storm Distribution

A balanced and nested distribution is assumed for this analysis due to its flexibility with regard to storm duration. The distribution is balanced in that the precipitation is centered at half the storm duration. The distribution is nested in that the precipitation depths are applied in an alternating block format (i.e., the 15-minute depth is applied as the hyetograph peak, the 30-minute depth is applied such that the peak 15-minute block and the adjacent 15-minute block sum to be the 30-minute depth).

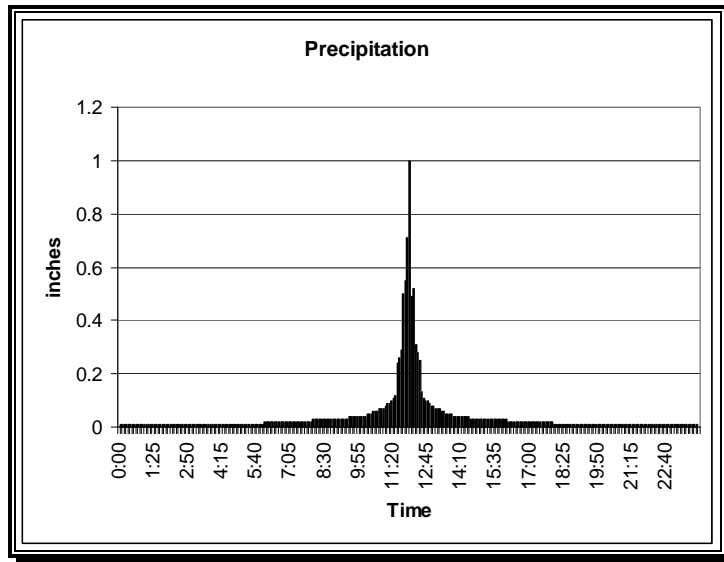


Figure 6: Precipitation Distribution

2.7 HYDROLOGIC ANALYSIS SUMMARY AND CONCLUSIONS

The hydrologic analysis was completed using prescribed methods by City of Arlington and the NRCS. The design storm distribution used was the nested and balanced distribution, with rainfall depths derived from Technical Paper No. 40 and Hydro-35. A 24-hour storm duration was assumed for all the watersheds. The ultimate conditions model was generated by revising the existing conditions hydrologic model to reflect future impervious cover projections. **Table 5** lists the computed peak flow rates for existing and ultimate conditions.

Table 5: Computed Peak Flow Rates Summary

| COTTONWOOD CREEK | | | | | | | | | |
|-------------------------------------|---------------|------------|------------|-------------|-------------|-------------|--------------|--------------|-----------------------|
| Location | XS River Sta. | 2-YR (cfs) | 5-YR (cfs) | 10-YR (cfs) | 25-YR (cfs) | 50-YR (cfs) | 100-YR (cfs) | 500-YR (cfs) | Ultimate 100-YR (cfs) |
| Upstream of Sherry Street | 2,607 | 313 | 479 | 591 | 715 | 819 | 920 | 1,166 | 932 |
| Upstream of Chicory Street | 1,016 | 392 | 610 | 737 | 885 | 1,043 | 1,167 | 1,482 | 1,182 |
| Confluence with CC-4 | 19,556 | 529 | 838 | 1,022 | 1,224 | 1,425 | 1,609 | 2,043 | 1,634 |
| Upstream of Highway 360 | 18,500 | 972 | 1,516 | 1,890 | 2,286 | 2,580 | 2,925 | 3,565 | 2,975 |
| Downstream of Highway 360 | 17,051 | 1,074 | 1,702 | 2,017 | 2,343 | 2,709 | 3,137 | 4,008 | 3,219 |
| Upstream of Susan Drive | 15,963 | 1,077 | 1,712 | 2,042 | 2,390 | 2,790 | 3,220 | 4,184 | 3,350 |
| Downstream of Susan Drive | 14,946 | 1,092 | 1,746 | 2,083 | 2,438 | 2,851 | 3,292 | 4,300 | 3,425 |
| Confluence with CC-2 | 13,950 | 2,188 | 3,623 | 4,382 | 5,145 | 5,779 | 6,535 | 7,865 | 6,685 |
| Upstream of Timber Lake Drive | 13,152 | 2,242 | 3,717 | 4,509 | 5,320 | 5,972 | 6,772 | 8,238 | 6,969 |
| Downstream of Timber Lake Drive | 12,678 | 2,473 | 4,064 | 4,929 | 5,877 | 6,581 | 7,467 | 9,253 | 7,721 |
| Confluence with CC-1 | 12,079 | 2,473 | 4,064 | 4,929 | 5,877 | 6,581 | 7,467 | 9,253 | 7,721 |
| Upstream of Great Southwest Parkway | 10,550 | 2,628 | 4,400 | 5,399 | 6,475 | 7,281 | 8,208 | 10,302 | 8,475 |

| CC-1 | | | | | | | | | |
|---|---------------|------------|------------|-------------|-------------|-------------|--------------|--------------|-----------------------|
| Location | XS River Sta. | 2-YR (cfs) | 5-YR (cfs) | 10-YR (cfs) | 25-YR (cfs) | 50-YR (cfs) | 100-YR (cfs) | 500-YR (cfs) | Ultimate 100-YR (cfs) |
| Start of Channel Upstream of Timberlake Drive | 1,166 | 252 | 390 | 482 | 585 | 668 | 750 | 940 | 803 |

| CC-2 | | | | | | | | | |
|--------------------------|---------------|------------|------------|-------------|-------------|-------------|--------------|--------------|-----------------------|
| Location | XS River Sta. | 2-YR (cfs) | 5-YR (cfs) | 10-YR (cfs) | 25-YR (cfs) | 50-YR (cfs) | 100-YR (cfs) | 500-YR (cfs) | Ultimate 100-YR (cfs) |
| Start of Channel | 1,883 | 61 | 92 | 112 | 135 | 154 | 172 | 215 | 174 |
| Upstream of Carter Drive | 408 | 344 | 523 | 643 | 775 | 886 | 993 | 1,257 | 996 |
| Confluence with CC-3 | 4,361 | 763 | 1,278 | 1,560 | 1,830 | 2,073 | 2,316 | 2,715 | 2,318 |
| Upstream of Highway 360 | 3,617 | 928 | 1,550 | 1,891 | 2,230 | 2,505 | 2,805 | 3,319 | 2,808 |
| Upstream of Plaza Street | 1,866 | 1,086 | 1,807 | 2,214 | 2,616 | 2,923 | 3,276 | 3,895 | 3,279 |
| Upstream of Buena Vista | 1,186 | 1,087 | 1,815 | 2,222 | 2,626 | 2,928 | 3,275 | 3,843 | 3,276 |
| Upstream of Susan Drive | 957 | 1,102 | 1,845 | 2,258 | 2,658 | 2,923 | 3,297 | 3,875 | 3,300 |

| CC-3 | | | | | | | | | |
|-----------------------------|---------------|------------|------------|-------------|-------------|-------------|--------------|--------------|-----------------------|
| Location | XS River Sta. | 2-YR (cfs) | 5-YR (cfs) | 10-YR (cfs) | 25-YR (cfs) | 50-YR (cfs) | 100-YR (cfs) | 500-YR (cfs) | Ultimate 100-YR (cfs) |
| Start of Channel | 4,368 | 221 | 341 | 421 | 510 | 584 | 656 | 832 | 656 |
| Upstream of Hillcrest Drive | 3,960 | 283 | 437 | 541 | 666 | 770 | 867 | 1,098 | 867 |
| Upstream of Sherry Street | 2,400 | 331 | 549 | 677 | 825 | 927 | 1,020 | 1,197 | 1,020 |
| Upstream of Greenway Street | 1,152 | 399 | 710 | 869 | 1,053 | 1,182 | 1,290 | 1,528 | 1,290 |
| Upstream of Carter Drive | 727 | 418 | 756 | 910 | 1,115 | 1,245 | 1,358 | 1,568 | 1,358 |

| CC-4 | | | | | | | | | |
|------------------|---------------|------------|------------|-------------|-------------|-------------|--------------|--------------|-----------------------|
| Location | XS River Sta. | 2-YR (cfs) | 5-YR (cfs) | 10-YR (cfs) | 25-YR (cfs) | 50-YR (cfs) | 100-YR (cfs) | 500-YR (cfs) | Ultimate 100-YR (cfs) |
| Start of Channel | 1,213 | 192 | 289 | 355 | 429 | 489 | 548 | 685 | 558 |

| SOUTH COTTONWOOD CREEK | | | | | | | | | |
|-------------------------------|---------------|------------|------------|-------------|-------------|-------------|--------------|--------------|-----------------------|
| Location | XS River Sta. | 2-YR (cfs) | 5-YR (cfs) | 10-YR (cfs) | 25-YR (cfs) | 50-YR (cfs) | 100-YR (cfs) | 500-YR (cfs) | Ultimate 100-YR (cfs) |
| Upstream of Parks Avenue | 29,775 | 363 | 534 | 649 | 779 | 882 | 984 | 1,224 | 997 |
| Upstream of Parks Avenue | 29,136 | 492 | 731 | 890 | 1,071 | 1,215 | 1,357 | 1,692 | 1,376 |
| Upstream of Springcrest Drive | 28,704 | 528 | 789 | 928 | 1,154 | 1,318 | 1,462 | 1,824 | 1,483 |
| Upstream of Brazos Drive | 28,092 | 727 | 1,108 | 1,291 | 1,625 | 1,873 | 2,044 | 2,542 | 2,058 |
| Upstream of Sherry Street | 27,233 | 743 | 1,156 | 1,364 | 1,679 | 1,942 | 2,149 | 2,665 | 2,167 |
| Upstream of Carter Street | 25,887 | 746 | 1,233 | 1,481 | 1,801 | 2,084 | 2,316 | 2,879 | 2,343 |
| Upstream of Highway 360 | 23,950 | 959 | 1,635 | 2,024 | 2,472 | 2,854 | 3,175 | 3,760 | 3,216 |
| Downstream of Highway 360 | 21,987 | 1,305 | 2,206 | 2,801 | 3,389 | 3,913 | 4,430 | 5,324 | 4,496 |
| Upstream of Forum Drive | 20,325 | 1,320 | 2,211 | 2,783 | 3,414 | 4,023 | 4,548 | 5,575 | 4,619 |
| FEMA Cross-section 'D' | 19,618 | 1,361 | 2,326 | 2,931 | 3,610 | 4,255 | 4,867 | 6,080 | 4,950 |
| FEMA Cross-section 'B' | 16,685 | 1,477 | 2,473 | 3,075 | 3,960 | 4,711 | 5,428 | 6,823 | 5,531 |
| Upstream of Pioneer Pkwy | 14,582 | 1,463 | 2,331 | 2,811 | 3,631 | 4,515 | 5,356 | 6,921 | 5,457 |
| Downstream of Pioneer Pkwy | 14,301 | 1,477 | 2,350 | 2,827 | 3,649 | 4,541 | 5,421 | 7,203 | 5,538 |
| Downstream of Pioneer Pkwy | 13,479 | 1,482 | 2,361 | 2,842 | 3,668 | 4,523 | 5,390 | 7,279 | 5,550 |

*Cottonwood Creek and Fish Creek Watersheds
Flood Protection Plan*

| | | | | | | | | | |
|-------------------------------|--------|-------|-------|-------|-------|-------|-------|--------|-------|
| Downstream of Pioneer Pkwy | 12,822 | 1,534 | 2,445 | 2,925 | 3,816 | 4,744 | 5,711 | 7,907 | 5,987 |
| Upstream of Highway S 161 | 9,022 | 1,617 | 2,662 | 3,183 | 4,189 | 5,182 | 6,268 | 9,074 | 6,716 |
| Downstream of Highway N 161 | 5,765 | 1,583 | 2,634 | 3,169 | 4,125 | 5,058 | 6,104 | 8,793 | 6,531 |
| Confluence with Warrior Creek | 5,157 | 1,818 | 3,109 | 4,056 | 5,252 | 6,379 | 7,529 | 11,366 | 8,102 |
| Upstream of Robinson Road | 2,852 | 1,844 | 3,141 | 4,132 | 5,358 | 6,488 | 7,540 | 11,387 | 8,134 |
| Downstream of Robinson Road | 2,723 | 1,871 | 3,171 | 4,190 | 5,439 | 6,568 | 7,585 | 11,460 | 8,194 |
| Upstream of Carrier Parkway | 905 | 1,883 | 3,186 | 4,219 | 5,472 | 6,581 | 7,549 | 11,399 | 8,180 |

FISH CREEK

| Location | XS River Sta. | 2-YR (cfs) | 5-YR (cfs) | 10-YR (cfs) | 25-YR (cfs) | 50-YR (cfs) | 100-YR (cfs) | 500-YR (cfs) | Ultimate 100-YR (cfs) |
|-------------------------------------|----------------------|-------------------|-------------------|--------------------|--------------------|--------------------|---------------------|---------------------|------------------------------|
| Upstream of Bardin Road | 72,934 | 142 | 213 | 261 | 314 | 358 | 401 | 504 | 401 |
| Upstream of Embercrest Drive | 72,120 | 183 | 292 | 364 | 443 | 510 | 573 | 726 | 589 |
| Upstream of Wimbleton Road | 70,212 | 349 | 596 | 763 | 942 | 1,084 | 1,229 | 1,558 | 1,291 |
| Upstream of Green Oaks Blvd. | 68,873 | 521 | 900 | 1,152 | 1,418 | 1,638 | 1,870 | 2,383 | 2,005 |
| Upstream of Nathan Lowe Road | 67,178 | 770 | 1,308 | 1,667 | 2,041 | 2,331 | 2,603 | 3,342 | 2,733 |
| Upstream of Matlock Road | 64,928 | 998 | 1,760 | 2,279 | 2,803 | 3,200 | 3,600 | 4,658 | 3,759 |
| Upstream of Silo Road | 60,063 | 1,121 | 2,213 | 2,979 | 3,734 | 4,333 | 4,889 | 6,286 | 5,073 |
| | 57,394 | 1,321 | 2,578 | 3,517 | 4,452 | 5,206 | 5,906 | 7,612 | 6,111 |
| FEMA XS LTR J | 55,630 | 2,360 | 4,298 | 5,699 | 7,145 | 8,374 | 9,544 | 12,511 | 9,811 |
| Upstream of Collins Street | 54,803 | 2,370 | 4,318 | 5,725 | 7,084 | 8,391 | 9,624 | 12,605 | 9,902 |
| Upstream of New York Ave | 49,983 | 2,266 | 4,190 | 5,596 | 7,005 | 8,232 | 9,479 | 12,637 | 9,748 |
| | 47,275 | 2,194 | 4,100 | 5,472 | 6,972 | 8,174 | 9,357 | 12,546 | 9,624 |
| Confluence with FC-1 and Fish Creek | 45,861 | 2,638 | 5,202 | 7,020 | 9,143 | 11,084 | 12,902 | 17,152 | 13,202 |
| Upstream of Hwy 360 | 42,574 | 2,651 | 5,178 | 7,005 | 9,081 | 10,936 | 12,776 | 17,132 | 13,081 |
| Confluence with FC-3 and Fish Creek | 41,093 | 2,783 | 5,365 | 7,290 | 9,477 | 11,396 | 13,269 | 17,852 | 13,573 |
| Confluence with FC-4 & Fish Creek | 40,008 | 3,278 | 6,163 | 7,943 | 10,146 | 12,191 | 14,225 | 19,276 | 14,561 |

| FC-1 | | | | | | | | | |
|-----------------------------|---------------|------------|------------|-------------|-------------|-------------|--------------|--------------|-----------------------|
| Location | XS River Sta. | 2-YR (cfs) | 5-YR (cfs) | 10-YR (cfs) | 25-YR (cfs) | 50-YR (cfs) | 100-YR (cfs) | 500-YR (cfs) | Ultimate 100-YR (cfs) |
| End of FC-1 | 12,040 | 955 | 1,568 | 1,984 | 2,433 | 2,820 | 3,193 | 4,130 | 3,193 |
| Upstream of Bardin Road | 8,785 | 955 | 1,568 | 1,984 | 2,433 | 2,820 | 3,193 | 4,130 | 3,193 |
| | 4,972 | 1,111 | 1,908 | 2,439 | 3,005 | 3,495 | 3,965 | 5,148 | 3,966 |
| Upstream of New York Avenue | 2,845 | 1,159 | 2,013 | 2,579 | 3,182 | 3,695 | 4,192 | 5,454 | 4,194 |
| | 1,181 | 1,503 | 2,609 | 3,330 | 4,099 | 4,724 | 5,369 | 7,033 | 5,385 |

| FC-2 | | | | | | | | | |
|-------------|---------------|------------|------------|-------------|-------------|-------------|--------------|--------------|-----------------------|
| Location | XS River Sta. | 2-YR (cfs) | 5-YR (cfs) | 10-YR (cfs) | 25-YR (cfs) | 50-YR (cfs) | 100-YR (cfs) | 500-YR (cfs) | Ultimate 100-YR (cfs) |
| End of FC-2 | 8,494 | 930 | 1,437 | 1,777 | 2,155 | 2,464 | 2,766 | 3,487 | 2,814 |
| | 3,954 | 1,260 | 2,100 | 2,682 | 3,298 | 3,812 | 4,308 | 5,537 | 4,371 |

| FC-3 | | | | | | | | | |
|---------------------------|---------------|------------|------------|-------------|-------------|-------------|--------------|--------------|-----------------------|
| Location | XS River Sta. | 2-YR (cfs) | 5-YR (cfs) | 10-YR (cfs) | 25-YR (cfs) | 50-YR (cfs) | 100-YR (cfs) | 500-YR (cfs) | Ultimate 100-YR (cfs) |
| Downstream of Bardin Road | 7,863 | 480 | 749 | 929 | 1,129 | 1,294 | 1,453 | 1,839 | 1,453 |
| | 3,164 | 542 | 932 | 1,196 | 1,466 | 1,688 | 1,905 | 2,414 | 1,905 |
| | 957 | 606 | 1,047 | 1,345 | 1,652 | 1,925 | 2,177 | 2,811 | 2,177 |

| FC-4 | | | | | | | | | |
|----------------------------|---------------|------------|------------|-------------|-------------|-------------|--------------|--------------|-----------------------|
| Location | XS River Sta. | 2-YR (cfs) | 5-YR (cfs) | 10-YR (cfs) | 25-YR (cfs) | 50-YR (cfs) | 100-YR (cfs) | 500-YR (cfs) | Ultimate 100-YR (cfs) |
| Downstream of I-20 | 8,063 | 403 | 633 | 787 | 959 | 1,099 | 1,236 | 1,567 | 1,278 |
| Upstream of Bardin Road | 6,077 | 403 | 633 | 787 | 959 | 1,099 | 1,236 | 1,567 | 1,278 |
| Upstream of Hwy 360 | 2,035 | 884 | 1,423 | 1,795 | 2,199 | 2,528 | 2,834 | 3,558 | 2,894 |
| Downstream of I-20 Hwy 360 | 1,238 | 868 | 1,315 | 1,709 | 2,152 | 2,517 | 2,860 | 3,633 | 2,927 |

| NORTH FISH CREEK | | | | | | | | | |
|---------------------------------------|----------------------|-------------------|-------------------|--------------------|--------------------|--------------------|---------------------|---------------------|------------------------------|
| Location | XS River Sta. | 2-YR (cfs) | 5-YR (cfs) | 10-YR (cfs) | 25-YR (cfs) | 50-YR (cfs) | 100-YR (cfs) | 500-YR (cfs) | Ultimate 100-YR (cfs) |
| End of North Fish Creek | 37,647 | 318 | 481 | 589 | 713 | 809 | 904 | 1,118 | 924 |
| Upstream of Collins Street | 35,330 | 610 | 957 | 1,182 | 1,427 | 1,624 | 1,805 | 2,275 | 1,841 |
| Upstream of Allen Avenue | 31,938 | 1,064 | 1,726 | 2,167 | 2,636 | 2,975 | 3,260 | 4,153 | 3,322 |
| Confluence of North Fish Creek & NF-4 | 31,362 | 1,338 | 2,195 | 2,739 | 3,342 | 3,748 | 4,207 | 5,320 | 4,289 |
| Confluence of North Fish Creek & NF-3 | 29,319 | 2,052 | 3,413 | 4,271 | 5,092 | 5,907 | 6,580 | 8,317 | 6,746 |
| Confluence of North Fish Creek & NF-2 | 28,248 | 2,403 | 3,992 | 4,997 | 5,963 | 6,888 | 7,697 | 9,748 | 7,885 |
| | 27,860 | 2,445 | 4,043 | 5,067 | 6,041 | 6,999 | 7,802 | 9,884 | 7,991 |
| Confluence of North Fish Creek & NF-1 | 26,747 | 2,805 | 4,662 | 5,847 | 6,994 | 8,071 | 8,989 | 11,328 | 9,199 |
| Upstream of Hwy 360 | 24,961 | 2,936 | 4,849 | 5,993 | 6,871 | 7,855 | 8,962 | 11,506 | 9,173 |

| NF-1 | | | | | | | | | |
|---------------------------|----------------------|-------------------|-------------------|--------------------|--------------------|--------------------|---------------------|---------------------|------------------------------|
| Location | XS River Sta. | 2-YR (cfs) | 5-YR (cfs) | 10-YR (cfs) | 25-YR (cfs) | 50-YR (cfs) | 100-YR (cfs) | 500-YR (cfs) | Ultimate 100-YR (cfs) |
| End of NF-1 | 2,516 | 260 | 380 | 460 | 553 | 623 | 693 | 851 | 706 |
| Upstream of Mayfield Road | 1,124 | 440 | 657 | 803 | 952 | 1,074 | 1,197 | 1,480 | 1,220 |

| NF-2 | | | | | | | | | |
|-----------------|----------------------|-------------------|-------------------|--------------------|--------------------|--------------------|---------------------|---------------------|------------------------------|
| Location | XS River Sta. | 2-YR (cfs) | 5-YR (cfs) | 10-YR (cfs) | 25-YR (cfs) | 50-YR (cfs) | 100-YR (cfs) | 500-YR (cfs) | Ultimate 100-YR (cfs) |
| End of NF-2 | 964 | 334 | 518 | 641 | 777 | 889 | 999 | 1,258 | 1,016 |

| NF-3 | | | | | | | | | |
|-----------------------------|----------------------|-------------------|-------------------|--------------------|--------------------|--------------------|---------------------|---------------------|------------------------------|
| Location | XS River Sta. | 2-YR (cfs) | 5-YR (cfs) | 10-YR (cfs) | 25-YR (cfs) | 50-YR (cfs) | 100-YR (cfs) | 500-YR (cfs) | Ultimate 100-YR (cfs) |
| End of NF-3 | 5,283 | 230 | 362 | 451 | 550 | 632 | 711 | 904 | 731 |
| Upstream of Overbrook Drive | 3,365 | 512 | 814 | 1,017 | 1,237 | 1,422 | 1,600 | 2,039 | 1,646 |
| Upstream of New York Drive | 2,023 | 597 | 999 | 1,261 | 1,544 | 1,776 | 1,997 | 2,495 | 2,055 |
| Upstream of Mayfield Drive | 1,380 | 639 | 1,054 | 1,332 | 1,626 | 1,877 | 2,114 | 2,652 | 2,168 |

| NF-4 | | | | | | | | | |
|-----------------------------------|------------------------------|-----------------------|-----------------------|------------------------|------------------------|------------------------|------------------------------|------------------------------|--------------------------------------|
| Location | XS River Sta. | 2-YR (cfs) | 5-YR (cfs) | 10-YR (cfs) | 25-YR (cfs) | 50-YR (cfs) | 100- YR (cfs) | 500- YR (cfs) | Ultimate 100-YR (cfs) |
| Downstream of Mayfield Road | 3,498 | 172 | 270 | 336 | 409 | 468 | 527 | 667 | 540 |
| Downstream of Chesapeake Drive | 3,200 | 196 | 307 | 382 | 465 | 533 | 598 | 757 | 613 |
| Upstream of Doolittle Drive | 2,604 | 199 | 314 | 391 | 476 | 542 | 607 | 769 | 621 |
| Upstream of Allen Avenue | 1,120 | 221 | 359 | 445 | 549 | 626 | 695 | 867 | 709 |

The ultimate conditions steady-state peak flows are very similar to existing conditions. The flow rates for the ultimate conditions 1% event are an average of 2.5% greater than existing. This is consistent with the fact that a large percentage of both basins have been “built-out.” Cottonwood Creek has the smallest increase of 2.0%. Fish Creek and North Fish Creek have increases of 2.2% and 2.3%, respectively. The Fish Creek Basin appears to have the largest undeveloped area; however, it is a small percentage of the entire basin. South Cottonwood Creek has the greatest percentage of undeveloped area, and the increase between the existing condition 1% event peak flows and the ultimate condition peak flows is 3.5%. The ultimate condition peak flows were used for analyzing the proposed mitigation options discussed in this report.

The results of this model were compared to the effective model prepared by Huitt Zollar, Inc., in 1996. The peak flows in this study are lower than the flows in the effective model. An additional comparison was made of the FPP study against the original FIS study in May of 1997. Along the main stem of Cottonwood Creek, the FPP study produces flows that are higher than the original FIS study but lower than the flows in the current effective model. In reviewing the previous flows, there seems to be a number of inconsistencies between the two previous models. It would normally be expected that continued urbanization would result in an increase in flows so in order to estimate the sensitivity of the model to development; a simulation was made assuming an increase of impervious cover by 50% from today’s conditions. The results from this sensitivity analysis indicate that an increase in impervious cover of 50% for the entire watershed resulted in a change in peak flow rate of only 12% at the downstream end of the study area. Indicating that the model is not very sensitive to changes in impervious cover, therefore more accurate terrain data would account for the difference in the various studies and would not be overshadowed by increases in impervious cover. This FPP utilized the most recent topographic and storm sewer data thereby producing the more detailed and accurate basin model.

3.0 HYDRAULIC ANALYSIS

Separate detailed hydraulic analyses were performed for the Cottonwood Creek and Fish Creek watersheds. These hydraulic analyses computed the water surface elevations for the 50%, 20%, 10%, 4%, 2%, 1% and 0.2% annual chance (2-, 5-, 10-, 25-, 50-, 100- and 500-year, respectively) existing condition storm events and the ultimate conditions 1% annual chance event. Each of the hydraulic analyses includes the delineation of the existing conditions 1% and 0.2% annual chance floodplains, and the ultimate conditions 1% annual chance floodplains.

The HEC-RAS model of Cottonwood Creek begins at Mountain Creek Lake and extends to the upper limits of the watershed in the City of Arlington. This Flood Protection Planning analysis encompassed 3.9 miles of stream within Arlington including Cottonwood Creek, Unnamed Tributaries CC-1, CC-2, CC-3, CC-4 and South Cottonwood Creek.

The Fish Creek HEC-RAS model also began at Mountain Creek Lake and extended to the upper limits of the watershed in the City of Arlington. The Flood Protection Planning analysis consisted of 18 stream miles of Fish Creek, Unnamed Tributaries FC-1, FC-2, FC-3, FC-4, North Fish Creek, and its Unnamed Tributaries NF-1, NF-2, NF-3 and NF-4.

Overall maps showing the extents of the studied reaches are included in Exhibit 5 and 5A of **Appendix A**. The USACE HEC-RAS software version 4.1.0 was used for the hydraulic analyses. All modeling is one dimensional. Steady state analyses were performed for both the Cottonwood Creek and Fish Creek watersheds. The sections that follow describe the development of the hydraulic models in both watersheds.

3.1 HYDRAULIC ANALYSIS

3.1.1 Processing

The detailed study methodology incorporated use of HEC-GeoRAS software as a preprocessor to HEC-RAS. HEC-GeoRAS utilizes geographically referenced data sets as well as a three-dimensional terrain model to create the input data files for HEC-RAS. The terrain model was developed using the 2-ft. NCTCOG and City of Grand Prairie LiDAR one-foot topography data. HEC-RAS was then executed to determine the flood elevation at each cross section of the modeled stream. The resulting elevations are then post-processed by HEC-GeoRAS for creation of the floodplain boundaries.

3.1.2 Cross Sections

Model cross sections were placed along the study streams using the available contour data (NCTCOG and Grand Prairie 2009 LiDAR). Where roads or other structures are encountered, additional cross sections were acquired through additional surveying to meet HEC-RAS data input needs. An extensive field survey of hydraulic structures was conducted to help enhance the accuracy of the hydraulic model. These detailed cross sections were then used to enhance the channel portions of the cross sections derived from the terrain model. The HEC-RAS model generated from HEC-GeoRAS then received an extensive quality check / quality assurance to ensure that LiDAR and field survey data were merged correctly.

3.1.3 Parameter Estimation

Tables 6 and **7** document the hydraulic parameters used in the analysis of Cottonwood and Fish Creek watersheds.

Table 6: Manning's n Values

| Type | Value |
|---|-------|
| Channel | |
| Natural channel, irregular cross section, meandering, brush | 0.055 |
| Overbank | |
| Natural channel, irregular cross section, meandering, heavier brush with medium trees | 0.08 |
| Tree/Brush coverage | 0.1 |
| Developed/Residential areas | 0.1 |

Table 7: Miscellaneous Hydraulic Coefficients

| Coefficient Type | Value or Range |
|--|----------------|
| Bridge pier drag coefficient for momentum equation applications, Cd | 2 |
| Pressure and weir flow coefficient (submerged inlet and outlet), Cd | 0.8 |
| Expansion coefficients for bridges / culverts / in-line structures | 0.3 to 0.5 |
| Expansion coefficients for channels | 0.3 |
| Contraction coefficients for bridges / culverts / in-line structures | 0.1 to 0.3 |
| Contraction coefficients for channels | 0.1 |
| Weir coefficients (road deck) | 2.6 to 3.0 |
| Culvert entrance loss coefficient | 0.4 |
| Culvert exit loss coefficient | 1 |

3.1.4 Modeling Considerations

Various considerations were taken into account when evaluating each hydraulic reach. These considerations include, but are not limited to, starting water surface elevations, structure crossings, islands and flow splits, ineffective flow areas, supercritical versus subcritical flow regimes, hydraulic calibration, etc. The sections below describe the various considerations taken into account for this study.

Ineffective flow areas are added to portions of various cross sections to accurately model any given section's ability to convey flow. Ineffective flow areas are typically modeled by:

- 1) applying an ineffective flow area boundary in HEC-RAS with a test elevation that, if exceeded, would offer some level of conveyance;
- 2) applying a permanent ineffective flow area boundary in HEC-RAS, which will permanently prevent that portion of the cross section from conveying flow;
- 3) applying a blocked obstruction boundary in HEC-RAS, which will permanently prevent that portion of the cross section from conveying flow and remove storage capacity of the stream.

Examples of temporary ineffective flow areas include: 1) minor swales parallel to the reach that eventually outfall into the reach; or 2) cross sections immediately upstream or downstream of an in-line structure. Examples of permanent ineffective flow areas include: 1) minor swales parallel to the reach, which do not outfall into the reach; or 2) off-line water quality / detention ponds.

The effective FEMA model assumed a known water surface elevation as its downstream boundary condition. Careful consideration was given to the downstream boundary condition for this study. A normal depth assumption was selected as the most appropriate methodology. The exception to this method is the fifty percent chance event for Cottonwood Creek; the normal depth method produced a water surface lower than the normal pool level of Mountain Creek Lake; therefore, the lake level was used as a known boundary condition.

3.2 DETAILED DESCRIPTION OF HYDRAULIC MODEL GENERATION

The Cottonwood and Fish Creek watersheds have a combined drainage area of 46.6 square miles within the Cities of Arlington and Grand Prairie. A total of 21.9 miles of stream within the City Limits of Arlington were modeled. This study required the production of four models an HMS and RAS model for the Cottonwood Creek watershed and an HMS and RAS model for the Fish Creek watershed. Peak flow data from the HMS models was transferred into each respective RAS model, and both creeks were modeled assuming a subcritical flow regime, which is consistent with FEMA’s *Guidelines and Specifications for Flood Hazard Mapping Partners*.

The ultimate conditions steady-state calculated water surface elevations are very similar to existing conditions. The flow rates for the ultimate conditions 1% event are an average of 2.5% greater than existing, but this does not translate to a significant increase in depth. The calculated water surface elevations in the Cottonwood Creek Basin are an average of 0.06 feet higher in the ultimate conditions, with the largest increase being 0.78 feet. The average difference in the Fish Creek Basin is 0.09 feet higher in the ultimate conditions, with the largest increase being 0.57 feet. The existing conditions floodplains are shown on Exhibits 6 and 6A in **Appendix A**. The areal extent of the ultimate floodplain is very similar to the existing floodplain. **Table 8** shows the water surface elevations for the various events at selected locations.

Table 8: Water Surface Elevations

| Cottonwood Creek | | | | | | | | | |
|---|---------------|-----------|-----------|------------|------------|------------|-------------|-------------|-----------------|
| Location | XS River Sta. | 2-YR (ft) | 5-YR (ft) | 10-YR (ft) | 25-YR (ft) | 50-YR (ft) | 100-YR (ft) | 500-YR (ft) | Ultimate 100-YR |
| Upstream end of study, Upstream of Sherry St. | 2,607 | 607.63 | 608.08 | 608.34 | 608.57 | 608.75 | 608.92 | 609.39 | 608.94 |
| Upstream of Chicory St. | 1,016 | 586.17 | 587.47 | 588.13 | 588.87 | 589.62 | 590.20 | 591.65 | 590.27 |
| Confluence with CC-4 | 19,566 | 580.15 | 580.82 | 581.19 | 581.55 | 581.91 | 582.21 | 582.91 | 582.26 |
| Upstream of S.H. 360 | 18,366 | 567.74 | 570.43 | 574.19 | 574.49 | 574.70 | 574.77 | 574.97 | 574.75 |
| Upstream of Susan Dr. | 15,341 | 543.80 | 546.64 | 548.32 | 549.06 | 549.54 | 550.00 | 550.50 | 549.97 |
| Confluence with CC-2 | 13,950 | 536.05 | 537.61 | 538.49 | 539.17 | 539.62 | 540.21 | 541.05 | 540.29 |
| Upstream of Timber Lake Dr. | 12,919 | 531.86 | 534.99 | 536.49 | 537.34 | 537.82 | 538.56 | 539.46 | 538.61 |
| Confluence with CC-1 | 12,079 | 526.29 | 528.26 | 529.14 | 530.00 | 530.56 | 531.18 | 532.33 | 531.35 |
| Upstream of Great southwest Pkwy. | 10,550 | 520.15 | 523.92 | 524.75 | 525.43 | 525.81 | 526.17 | 527.69 | 526.26 |
| Tributary CC-1 | | | | | | | | | |
| Location | XS River Sta. | 2-YR (ft) | 5-YR (ft) | 10-YR (ft) | 25-YR (ft) | 50-YR (ft) | 100-YR (ft) | 500-YR (ft) | Ultimate 100-YR |
| Upstream end of study | 1,166 | 540.99 | 541.51 | 541.81 | 542.09 | 542.3 | 542.49 | 542.91 | 542.62 |
| Upstream of Timber Lake Dr. | 505 | 531.22 | 532.27 | 533.37 | 534.4 | 535.1 | 537.11 | 539.43 | 537.89 |
| Tributary CC-2 | | | | | | | | | |
| Location | XS River Sta. | 2-YR (ft) | 5-YR (ft) | 10-YR (ft) | 25-YR (ft) | 50-YR (ft) | 100-YR (ft) | 500-YR (ft) | Ultimate 100-YR |
| Upstream end of study | 1,883 | 582.44 | 582.72 | 582.89 | 583.08 | 583.21 | 583.36 | 583.65 | 583.36 |
| Upstream of Carter Dr. | 278 | 566.92 | 568.41 | 569.11 | 569.68 | 570.2 | 572.12 | 572.16 | 572.12 |

*Cottonwood Creek and Fish Creek Watersheds
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| | | | | | | | | | |
|--------------------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|
| Confluence with CC-3 | 4,361 | 565.65 | 566.7 | 567.21 | 567.67 | 568.06 | 568.43 | 569 | 568.44 |
| Upstream of S.H. 360 | 3,175 | 559.7 | 560.85 | 561.42 | 561.94 | 562.33 | 562.77 | 563.46 | 562.76 |
| Upstream of Plaza Street | 1,564 | 543.22 | 544.78 | 545.51 | 546.18 | 546.64 | 547.2 | 548.81 | 547.2 |
| Upstream of Buena Vista | 1,186 | 542.5 | 544.28 | 544.92 | 545.55 | 545.94 | 547.7 | 548.89 | 547.71 |
| Upstream of Susan Dr. | 839 | 538.21 | 539.97 | 540.54 | 541.08 | 541.4 | 543.76 | 545.42 | 543.75 |

Tributary CC-3

| Location | XS River Sta. | 2-YR (ft) | 5-YR (ft) | 10-YR (ft) | 25-YR (ft) | 50-YR (ft) | 100-YR (ft) | 500-YR (ft) | Ultimate 100-YR |
|---------------------------|---------------|-----------|-----------|------------|------------|------------|-------------|-------------|-----------------|
| Upstream end of study | 4,368 | 601.57 | 602.39 | 602.87 | 603.37 | 603.73 | 604.08 | 604.88 | 604.08 |
| Upstream of Hillcrest Dr. | 3,666 | 601.07 | 602.21 | 602.32 | 602.32 | 602.31 | 602.22 | 601.91 | 602.22 |
| Upstream of Sherry St. | 2,400 | 589.86 | 589.57 | 589.45 | 589.16 | 588.74 | 588.12 | 588.69 | 588.12 |
| Upstream of Greenway St. | 1,152 | 574.83 | 576.27 | 579.12 | 579.15 | 579.3 | 579.34 | 579.5 | 579.34 |
| Upstream of Carter Dr. | 727 | 570.21 | 572.22 | 573.03 | 575.13 | 575.14 | 575.24 | 575.3 | 575.24 |

Tributary CC-4

| Location | XS River Sta. | 2-YR (ft) | 5-YR (ft) | 10-YR (ft) | 25-YR (ft) | 50-YR (ft) | 100-YR (ft) | 500-YR (ft) | Ultimate 100-YR |
|-----------------------|---------------|-----------|-----------|------------|------------|------------|-------------|-------------|-----------------|
| Upstream end of study | 1,213 | 594.86 | 595.3 | 595.57 | 595.92 | 596.1 | 596.29 | 596.69 | 596.3 |

South Cottonwood Creek

| Location | XS River Sta. | 2-YR (ft) | 5-YR (ft) | 10-YR (ft) | 25-YR (ft) | 50-YR (ft) | 100-YR (ft) | 500-YR (ft) | Ultimate 100-YR |
|---|---------------|-----------|-----------|------------|------------|------------|-------------|-------------|-----------------|
| Upstream end of study | 29,775 | 620.82 | 621.4 | 621.78 | 622.17 | 622.46 | 622.74 | 623.34 | 622.75 |
| Upstream of Parks Ave. | 29,136 | 616.11 | 617.04 | 619.51 | 619.64 | 619.61 | 619.77 | 620.22 | 620.03 |
| Upstream of Springcrest | 28,644 | 610.19 | 610.82 | 611.53 | 612.92 | 613.74 | 614.46 | 615.23 | 614.46 |
| Upstream of Brazos Dr. | 27,767 | 603.94 | 605.11 | 605.64 | 606.53 | 607.19 | 607.53 | 608.38 | 607.55 |
| Upstream of Sherry St. | 27,233 | 601.14 | 602.26 | 602.77 | 603.48 | 604.05 | 604.49 | 605.48 | 604.52 |
| Upstream of Carter Dr. | 25,709 | 591.23 | 592.76 | 593.33 | 593.99 | 594.57 | 595.02 | 596.07 | 595.07 |
| Upstream of State Hwy 360 | 23,950 | 580.77 | 583.49 | 584.89 | 586.43 | 589.38 | 590.19 | 591 | 590.16 |
| Upstream of Forum Dr. | 20,325 | 563.07 | 565.87 | 567.34 | 568.27 | 568.62 | 568.93 | 569.1 | 568.94 |
| FEMA Cross-section C, City limits | 17,739 | 549.99 | 551.39 | 552.61 | 553.36 | 553.91 | 554.24 | 555.02 | 554.33 |
| FEMA Cross-section B, Upstream of Great Southwest Pkwy. | 16,685 | 547.12 | 550.11 | 551.89 | 552.62 | 553.12 | 553.33 | 553.99 | 553.43 |

Fish Creek

| Location | XS River Sta. | 2-YR (ft) | 5-YR (ft) | 10-YR (ft) | 25-YR (ft) | 50-YR (ft) | 100-YR (ft) | 500-YR (ft) | Ultimate 100-YR |
|-------------------------|---------------|-----------|-----------|------------|------------|------------|-------------|-------------|-----------------|
| Upstream of Bardin Road | 72,934 | 655.18 | 655.97 | 656.45 | 656.95 | 657.35 | 657.72 | 658.88 | 657.72 |
| Upstream end of study | | | | | | | | | |
| Upstream of Embercrest | 72,120 | 646.06 | 646.59 | 646.89 | 647.18 | 647.60 | 648.22 | 649.84 | 648.36 |

*Cottonwood Creek and Fish Creek Watersheds
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| | | | | | | | | | |
|-------------------------------------|---------------|-----------|-----------|------------|------------|------------|-------------|-------------|-----------------|
| Upstream of Wimbledon Rd. | 70,212 | 635.34 | 636.80 | 638.04 | 639.38 | 639.60 | 640.06 | 640.90 | 640.22 |
| Upstream of Green Oaks Blvd. | 68,873 | 627.85 | 629.32 | 630.20 | 631.06 | 631.56 | 631.77 | 632.00 | 631.86 |
| Upstream of Nathan Lowe Rd. | 67,178 | 615.26 | 616.77 | 617.41 | 617.65 | 617.84 | 617.97 | 618.23 | 618.03 |
| Upstream of Matlock Rd. | 64,928 | 604.72 | 605.76 | 606.51 | 607.28 | 607.89 | 608.51 | 610.53 | 608.77 |
| Upstream of Silo Rd. | 60,063 | 582.81 | 584.38 | 585.46 | 586.39 | 586.91 | 587.12 | 587.17 | 587.14 |
| FEMA XS LTR J | 55,630 | 567.66 | 569.17 | 569.99 | 571.18 | 571.75 | 572.14 | 573.2 | 572.24 |
| Upstream of Collins Street | 54,803 | 564.56 | 566.35 | 567.37 | 569.51 | 569.99 | 570.56 | 571.54 | 570.67 |
| Upstream of New York Ave. | 49,983 | 553.18 | 554.75 | 555.97 | 556.5 | 557.08 | 558.08 | 559.76 | 558.3 |
| Confluence with FC-1 and Fish Creek | 45,861 | 542.77 | 544.47 | 545.33 | 546.27 | 547.07 | 547.82 | 549.46 | 547.94 |
| Upstream of State Hwy 360 | 42,574 | 533.27 | 535.77 | 537.14 | 538.47 | 539.55 | 540.55 | 542.84 | 540.71 |
| Confluence with FC-3 and Fish Creek | 41,093 | 531.27 | 532.94 | 533.79 | 534.6 | 535.24 | 535.84 | 537.2 | 535.94 |
| Confluence with FC-4 & Fish Creek | 40,008 | 525.66 | 527.96 | 529.05 | 530.24 | 531.19 | 532.04 | 533.83 | 532.17 |
| Tributary FC-1 | | | | | | | | | |
| Location | XS River Sta. | 2-YR (ft) | 5-YR (ft) | 10-YR (ft) | 25-YR (ft) | 50-YR (ft) | 100-YR (ft) | 500-YR (ft) | Ultimate 100-YR |
| Upstream end of study | 12,040 | 603.80 | 604.25 | 604.41 | 604.55 | 604.67 | 604.77 | 604.98 | 604.77 |
| Upstream of Bardin Road | 8,785 | 581.96 | 583.20 | 583.95 | 584.72 | 585.34 | 585.91 | 587.37 | 585.91 |
| Upstream of New York Ave. | 2,845 | 552.28 | 553.80 | 554.64 | 555.51 | 556.49 | 557.45 | 559.64 | 557.46 |
| Upstream of Green Oaks Blvd. | 399 | 544.30 | 545.89 | 547.50 | 549.45 | 550.94 | 551.65 | 552.64 | 551.69 |
| Tributary FC-2 | | | | | | | | | |
| Location | XS River Sta. | 2-YR (ft) | 5-YR (ft) | 10-YR (ft) | 25-YR (ft) | 50-YR (ft) | 100-YR (ft) | 500-YR (ft) | Ultimate 100-YR |
| Upstream end of study | 8,494 | 605.85 | 606.26 | 606.46 | 606.65 | 606.79 | 606.93 | 607.22 | 606.95 |
| Engelside Dr. | 3,164 | 585.09 | 585.68 | 585.97 | 586.23 | 586.42 | 586.59 | 586.93 | 586.6 |
| Upstream of Green Oaks Blvd. | 1,463 | 572.28 | 573.41 | 574.18 | 574.94 | 575.5 | 575.97 | 576.82 | 576.54 |
| Tributary FC-3 | | | | | | | | | |
| Location | XS River Sta. | 2-YR (ft) | 5-YR (ft) | 10-YR (ft) | 25-YR (ft) | 50-YR (ft) | 100-YR (ft) | 500-YR (ft) | Ultimate 100-YR |
| Upstream end of study | 7,863 | 576.45 | 577.10 | 577.43 | 577.71 | 577.91 | 578.08 | 578.38 | 578.08 |
| Upstream of Creek Crossing Lane | 2,865 | 550.64 | 552.52 | 553.82 | 554.51 | 554.82 | 555.00 | 555.22 | 555.00 |
| Upstream of State Hwy 360 | 822 | 537.11 | 539.23 | 540.85 | 542.38 | 542.90 | 543.27 | 543.98 | 543.29 |
| Tributary FC-4 | | | | | | | | | |

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| Location | XS River Sta. | 2-YR (ft) | 5-YR (ft) | 10-YR (ft) | 25-YR (ft) | 50-YR (ft) | 100-YR (ft) | 500-YR (ft) | Ultimate 100-YR |
|---|---------------|-----------|-----------|------------|------------|------------|-------------|-------------|-----------------|
| Upstream end of study, downstream of I-20 | 8,063 | 581.72 | 582.16 | 582.38 | 582.58 | 582.73 | 582.85 | 583.11 | 582.89 |
| Upstream of Bardin Rd | 6,077 | 564.25 | 565.16 | 565.67 | 566.18 | 566.63 | 567.07 | 567.83 | 567.20 |
| Upstream of State Hwy 360 | 2,035 | 544.18 | 545.92 | 546.18 | 546.39 | 546.55 | 546.62 | 546.89 | 546.68 |
| North Fish Creek | | | | | | | | | |
| Location | XS River Sta. | 2-YR (ft) | 5-YR (ft) | 10-YR (ft) | 25-YR (ft) | 50-YR (ft) | 100-YR (ft) | 500-YR (ft) | Ultimate 100-YR |
| Upstream end of study | 37,647 | 629.47 | 630.28 | 630.70 | 631.15 | 631.45 | 631.73 | 632.31 | 631.79 |
| Upstream of Collins Street | 35,330 | 614.42 | 615.50 | 616.14 | 616.78 | 617.29 | 617.86 | 619.64 | 617.99 |
| Upstream of Allen Avenue | 31,938 | 594.52 | 595.42 | 595.93 | 596.45 | 596.80 | 599.17 | 599.40 | 599.23 |
| Confluence of North Fish Creek & NF-4 | 31,362 | 593.51 | 594.14 | 594.47 | 594.81 | 595.00 | 595.20 | 595.66 | 595.24 |
| Confluence of North Fish Creek & NF-3 | 29,319 | 577.65 | 579.06 | 579.83 | 580.52 | 581.15 | 581.64 | 582.78 | 581.76 |
| Confluence of North Fish Creek & NF-2 | 28,248 | 573.88 | 575.44 | 576.28 | 577.03 | 577.68 | 578.25 | 579.69 | 578.35 |
| Confluence of North Fish Creek & NF-1 | 26,747 | 567.70 | 569.40 | 570.35 | 571.40 | 572.05 | 572.61 | 574.88 | 572.88 |
| Upstream of State Hwy 360 | 24,961 | 562.85 | 566.58 | 569.48 | 572.35 | 573.18 | 573.61 | 574.33 | 573.70 |
| Tributary NF-1 | | | | | | | | | |
| Location | XS River Sta. | 2-YR (ft) | 5-YR (ft) | 10-YR (ft) | 25-YR (ft) | 50-YR (ft) | 100-YR (ft) | 500-YR (ft) | Ultimate 100-YR |
| Upstream end of Study | 2,516 | 587.71 | 588.73 | 589.11 | 589.44 | 589.69 | 589.92 | 590.39 | 589.97 |
| Upstream of Mayfield Rd. | 1,124 | 580.38 | 580.84 | 581.02 | 581.22 | 581.39 | 581.5 | 581.78 | 581.52 |
| Confluence with North Fish | 537 | 573.37 | 574.62 | 575.27 | 575.86 | 576.48 | 577.03 | 577.91 | 577.13 |
| Tributary NF-2 | | | | | | | | | |
| Location | XS River Sta. | 2-YR (ft) | 5-YR (ft) | 10-YR (ft) | 25-YR (ft) | 50-YR (ft) | 100-YR (ft) | 500-YR (ft) | Ultimate 100-YR |
| Upstream end of Study Mayfield Rd | 964 | 577.00 | 578.09 | 579.21 | 580.21 | 581.10 | 581.84 | 583.48 | 582.00 |
| Confluence with North Fish | 533 | 575.70 | 577.99 | 579.19 | 580.22 | 581.14 | 581.89 | 583.55 | 582.06 |
| Tributary NF-3 | | | | | | | | | |
| Location | XS River Sta. | 2-YR (ft) | 5-YR (ft) | 10-YR (ft) | 25-YR (ft) | 50-YR (ft) | 100-YR (ft) | 500-YR (ft) | Ultimate 100-YR |
| Upstream end of Study | 5,283 | 612.97 | 613.68 | 614.19 | 614.77 | 615.01 | 615.27 | 615.74 | 615.34 |
| Upstream of Overbrook Drive | 3,365 | 595.44 | 596.51 | 597.19 | 597.95 | 598.57 | 599.1 | 599.76 | 599.21 |
| Upstream of New York Avenue | 2,023 | 592.08 | 592.68 | 592.89 | 593.13 | 593.3 | 593.45 | 593.97 | 593.47 |

| | | | | | | | | | |
|--------------------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|
| Upstream of Mayfield Rd. | 1,380 | 587.74 | 588.87 | 589.38 | 589.87 | 590.18 | 590.34 | 590.68 | 590.38 |
|--------------------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|

| Tributary NF-4 | | | | | | | | | |
|--|---------------|-----------|-----------|------------|------------|------------|-------------|-------------|-----------------|
| Location | XS River Sta. | 2-YR (ft) | 5-YR (ft) | 10-YR (ft) | 25-YR (ft) | 50-YR (ft) | 100-YR (ft) | 500-YR (ft) | Ultimate 100-YR |
| Upstream end of Study Downstream of Mayfield Rd | 3,498 | 612.70 | 613.33 | 613.70 | 614.08 | 614.37 | 614.67 | 615.19 | 614.72 |
| Upstream of Chesapeake Drive | 3,287 | 610.44 | 611.06 | 611.43 | 611.80 | 612.08 | 612.34 | 612.91 | 612.40 |
| Upstream of Doolittle Drive | 2,604 | 606.45 | 607.11 | 607.51 | 607.89 | 608.17 | 608.45 | 609.09 | 608.50 |
| Upstream of Allen Avenue | 1,120 | 596.12 | 597.49 | 598.37 | 598.70 | 598.95 | 599.00 | 599.21 | 599.00 |

The 1% event water surface elevations were compared to the current DFIRM elevations in general base flood elevations from the FPP study vary between 2.79 feet higher to 5.7 feet lower than the current effective model, with the majority of the flood levels being lower. This can be attributed to the lower flow rates that have been previously discussed. A notable exception is the fact that Cottonwood Creek has experienced a number of major changes downstream of the study area which affect the hydraulic profile. The road shown in the effective model as West Freeway has been replaced with S.H. 161, and the box culvert has been replaced with bridges which greatly improve the hydraulic capacity of the creek in this area. There has also been a floodplain reclamation project located immediately upstream of the S.H. 161 bridges. See the Poly American LOMR dated August 7, 2009, for details. These two improvements have produced significant reductions in flood levels immediately downstream of the study area which translates to reductions of WSEL's in the study area. See FEMA lettered cross-sections A through G of Cottonwood Creek **Table 9** below. The results for Fish Creek are shown on **Table 10**.

Table 9: 1% Event Flood Elevation Comparison – Cottonwood Creek

| River | Reach | River Station | FPP 100YR WSEL | FEMA_LTR | FEMA 100YR WSEL | Difference FPP vs FEMA |
|------------------------|-------------|---------------|----------------|----------|-----------------|------------------------|
| Cottonwood Creek | | | | | | |
| NF CWC | SECTION_02A | 8,182 | 507.57 | A | 511.2 | -3.6 |
| NF CWC | SECTION_02A | 9,153 | 513.9 | B | 515.5 | -1.6 |
| NF CWC | SECTION_02A | 9,912 | 524.39 | C | 530.1 | -5.7 |
| NF CWC | SECTION_02A | 10,550 | 526.17 | D | 530.7 | -4.5 |
| NF CWC | SECTION_02A | 11,744 | 530.44 | E | 531.2 | -0.8 |
| NF CWC | SECTION_02 | 13,590 | 539.77 | F | 541.3 | -1.5 |
| NF CWC | SECTION_01 | 14,825 | 541.71 | G | 543.4 | -1.7 |
| NF CWC | SECTION_01 | 16,990 | 557.8 | H | 557.8 | 0.0 |
| South Cottonwood Creek | | | | | | |
| SF CWC | SECTION_01 | 16,685 | 553.33 | B | 552.5 | 0.8 |
| SF CWC | SECTION_01 | 17,739 | 554.24 | C | 554 | 0.2 |
| SF CWC | SECTION_01 | 19,618 | 560.49 | D | 559.7 | 0.8 |
| SF CWC | SECTION_01 | 21,173 | 571.15 | E | 571.4 | -0.3 |
| SF CWC | SECTION_01 | 24,914 | 592.99 | F | 593.3 | -0.3 |

Table 10: 1% Event Flood Elevation Comparison – Fish Creek

| River | Reach | River Station | FPP 100YR WSEL | FEMA_LTR | FEMA 100YR WSEL | Difference FPP vs FEMA |
|------------|---------------|---------------|-------------------|----------|--------------------|---------------------------|
| FISH CREEK | | | | | | |
| FISH CREEK | MAINSTEM US | 65,495 | 610.23 | R | 610.2 | 0.03 |
| FISH CREEK | MAINSTEM US | 64,679 | 606.02 | Q | 607.1 | -1.08 |
| FISH CREEK | MAINSTEM US | 63,158 | 599.57 | P | 599.3 | 0.27 |
| FISH CREEK | MAINSTEM US | 61,962 | 594.77 | O | 594.8 | -0.03 |
| FISH CREEK | MAINSTEM US | 60,628 | 588.92 | N | 587.8 | 1.12 |
| FISH CREEK | MAINSTEM US | 59,675 | 584.77 | M | 582.9 | 1.87 |
| FISH CREEK | MAINSTEM US | 58,212 | 579.98 | L | 580.3 | -0.32 |
| FISH CREEK | MAINSTEM US | 56,957 | 575.09 | K | 572.9 | 2.19 |
| FISH CREEK | MAINSTEM MID5 | 54,470 | 567.92 | I | 567.3 | 0.62 |
| FISH CREEK | MAINSTEM MID5 | 49,818 | 557.89 | G | 555.1 | 2.79 |
| FISH CREEK | MAINSTEM MID5 | 47,889 | 551.10 | F | 551.5 | -0.40 |
| FISH CREEK | MAINSTEM MID5 | 46,993 | 549.61 | E | 549.8 | -0.19 |
| FISH CREEK | MAINSTEM MID4 | 43,934 | 545.14 | D | 544.9 | 0.24 |
| FISH CREEK | MAINSTEM MID2 | 40,008 | 532.04 | C | 531.5 | 0.54 |

4.0 FLOODING AND MITIGATION ALTERNATIVES

This report will analyze eleven locations in the study area which experience flooding during a 1% chance event; six of these areas are located in the Cottonwood Creek Basin, and five are located in the Fish Creek Basin.

The northern areas of the Cottonwood Creek Basin are primarily fully developed residential with some multi-family residential and commercial areas. Cottonwood Creek and its tributaries are concrete-lined channels for much of their length. South Cottonwood Creek has more multi-family residential and commercial property along with several undeveloped areas. The upper reach of South Cottonwood Creek is a concrete-lined channel; however, the majority is a natural environment. The flooding concerns in the Cottonwood Creek Basin are:

1. Cottonwood Creek at Susan Drive – Apartments & street flooding.
2. Cottonwood Creek at Park Row – Apartments & street flooding.
3. Cottonwood Creek at Sherry – Street flooding affecting Fire Station #2 access.
4. Tributary CC-2 at Susan, Buena Vista & Plaza – Residential flooding.
5. Tributary CC-3 at Hillcrest – Residential flooding.
6. South Cottonwood Creek at S.H. 360 – Street and highway flooding.

The upper reach of Fish Creek and several sections of its tributaries are concrete-lined channels; however, a much larger portion of Fish Creek has been kept natural. The upper reach of Fish Creek is primarily residential; as Fish Creek flows east there are more commercial and undeveloped areas. Tributaries FC-3 & FC-4 have the largest amount of undeveloped property in their drainage areas. The land uses in the North Fish Creek drainage areas are primarily residential in the upper reaches with increasing amounts of multi-family and commercial as the stream flows east towards S.H. 360. The flooding concerns in the Fish Creek Basin are:

1. Fish Creek at Beckett – Residential & street flooding.
2. Tributary FC-3 at S.H. 360 – Street & highway flooding.
3. Tributary FC-4 at S.H. 360 – Street & highway flooding.
4. North Fish Creek between Allen & S.H. 360 – Apartments & commercial flooding.
5. Tributary NF-1 at Mayfield Road – Residential & street flooding.

4.1 MITIGATION ALTERNATIVES

Three alternatives for mitigation of the flooding will be considered in this study – storage, buyout and structural modification. Storage normally consists of the construction of a large pond or series of small ponds designed to store a portion of the flood flow and release it slowly reducing the peak flow, which in turn lowers the flood levels. This approach provides benefits for the areas downstream of the storage, but can require the purchase of large areas of land. Buyout consists of purchasing structures located in the floodplain. The structures are removed and the property is converted to a use that is compatible with its location in the floodplain. Structural modification covers a wide variety of construction, the most common being widening of the stream channels and enlarging bridges or culverts. Each situation will be examined to determine if each of these alternatives are applicable. The availability of sufficient open area for the construction of storage ponds is a significant factor in determining if storage can be considered; converting developed property to storage would be prohibitively expensive. Buyouts can only be considered if there are residential or commercial buildings which are flooded; some of the locations which are flooded do not have any home or commercial building flooding associated with them, and a buyout would not apply in these situations. The cost of each mitigation project must be considered against the benefits produced. A detailed discussion of the Benefit Cost analysis of the mitigation alternatives is contained in **Section 4.4** of this report. The effects of the ultimate condition 100-YR flooding will be used as the basis for each of the alternatives examined.

4.2 COTTONWOOD CREEK WATERSHED

4.2.1 Cottonwood Creek at Susan Drive

The Indian Creek apartment complex is adjacent to Cottonwood Creek and Susan Drive. Four buildings in this complex are located in the 100-YR floodplain. These buildings would experience flooding of less than a foot during the 1% chance event with the associated parking lot and driveway experiencing flooding of up to two feet deep. Floodwater over Susan Drive would be overtopped by the 10% chance event and the 1% chance event produces flooding of 1.7 feet deep. This area is shown on **Figure 7**.



Figure 7: 100-YR Flood Plain Cottonwood Creek at Susan Drive

Two mitigation options were considered for this site: increasing the size of the culvert under Susan Drive and buyout of the affected apartments; there were no suitable sites for a storage option. The crossing under Susan Drive consists of two 10' wide by 8' tall concrete box culverts. This existing structure will only pass the 20% chance event (5YR-storm), and Susan Drive is flooded 1.7' deep during the 1% chance event (100YR-strom). Constructing two additional 8' wide by 8' tall box culverts reduces the water surface elevation during the 1% chance event by 3.4' which mitigates the apartment and street flooding. Improving the culvert reduces valley storage in the areas immediately upstream of Susan Drive; this can result in negative impacts downstream. A check of the downstream areas showed no adverse impacts which make this a viable option. The estimated cost of the culvert improvements is \$124,000. A buyout would involve the purchase and demolition of the affected apartments as well as the relocation of the residents. The estimated value of the apartments is \$1,000,000. The more economical of the two options is the construction of the culvert improvements.

4.2.2 Cottonwood Creek at Park Row

The L'Atrium is an apartment complex which is located south east of the intersection of Park Row and Carter Drive. Cottonwood Creek flows under the bridge at Carter Drive, through the apartment complex in a concrete-lined trapezoidal channel, then enters two culverts which take it under Park Row and S.H. 360. Carter Drive begins to experience flooding with the 20% chance event. The 1% chance event

overtops Carter Drive by two feet, floods 17 apartment buildings up to two feet deep and floods the culvert which passes under Park Row and S.H. 360 which begins overtopping with the 10% chance event, and Park Row floods by up to two feet during the 1% chance event. This area is shown on **Figure 8**.



Figure 8: 100-YR Flood Plain Cottonwood Creek at Park Row

The mitigation options considered for this location were increasing the size of the culverts under Park Row and S.H. 360, increasing the size of the pond located near the Hugh Smith Recreation Center and a buyout of the structures subject to flooding. The existing culverts consist of two 5' wide by 7' tall and a 10' wide by 5' tall box culverts with improved entrances. These existing structures will only pass the 20% chance event. In order to pass the 1% chance event, the existing culverts will need to be replaced with three 10' wide by 7' tall box culverts at an estimated cost of \$2,977,000. The detention mitigation option considered for the upper reach of Cottonwood Creek was to expand the existing pond which is located just east of the Hugh Smith Recreation Center. The topography of the site limits the pond size to approximately 4.7 acres. The proposed pond reduces the depth flooding at Park Row by 0.7' but does not completely mitigate it. The detention improvements would reduce the size of the culvert improvements to the addition of a single 12' wide by 7' tall box. The estimated cost of the pond and culvert is \$1,457,000. A buyout would involve the purchase and demolition of the affected apartments as well as the relocation of the residents. The estimated value of the apartments is \$840,000; demolition and relocation would increase the cost of a buyout to \$1,260,000. The most economical option for this location is to buyout the affected structures.

4.2.3 Cottonwood Creek at Sherry Street

The existing 10' x 5' box culvert under Sherry overtops during the 20% chance event and is overtopped by 2.4' during the 1% chance event. No structures are flooded at this location, but the street flooding is especially significant as Fire Station # 2 is located 600 feet to the north. Sherry Street is the primary access route for this Fire Station, and during a flood event, the area south of the Fire Station #2 does not have a direct access route. **Figure 9** shows Sherry Street and Fire Station #2.



Figure 9: 100-YR Flood Plain Cottonwood Creek at Sherry Street

The mitigation options considered for this location were the expansion of the pond located near the Hugh Smith Recreation Center in conjunction with a culvert improvement or simply enlarging the culvert. A buyout option is not applicable to this location as there is no structural flooding. In order to pass the 1% chance event, two 10' wide by 5' high box culverts would have to be constructed next to the existing 10' wide by 5' high box culvert. If the pond near the Hugh Smith Recreation Center is enlarged, the culvert improvements could be reduced to the addition of a single 7' wide by 5' tall box. The culvert-only improvements have an estimated cost of \$500,000, and the combination of detention and culvert improvements are estimated to cost \$775,000, making the culvert-only option the most economical.

4.2.4 Tributary CC-2 at Susan, Buena Vista & Plaza

This tributary of Cottonwood Creek flows east from a culvert under S.H. 360 through Western Plains Estates in a concrete channel, crossing under Plaza Street, Buena Vista Street and Susan Drive before converging with Cottonwood Creek. The crossings at all three streets are single span bridges, the distance between these bridges is short enough that backwater from the bridge at Susan Drive negatively effects the capacity of the bridge at Buena Vista Street. This effect is noticeable in the fact that both the Susan Drive and Plaza Street bridges are capable of passing the 2% chance event (50YR-storm) while the Buena Vista bridge can only pass the 10% chance event (10YR-storm). The 1% chance event overtops Susan Drive by 2.5', Buena Vista Street by 5.8' and Plaza Street by 1'. There are 15 single family residences which will experience some flooding during the 1% chance event. This area is shown on **Figure 10**.



Figure 10: 100-YR Flood Plain Tributary CC-2 at Susan, Buena Vista & Plaza Drive

The mitigation options for this area are the widening the existing channel and all three bridges or a buyout of the affected homes. There is a potential detention pond site upstream near the intersection of Stonegate Street and Sherry Street. The small size of this potential detention pond did not provide enough storage to significantly reduce the peak flows and it was removed from further consideration. The existing channel is a trapezoidal in shape with a twenty foot wide bottom, 1:1 side slopes and a forty foot top width. The conveyance of this channel could be increased replacing the trapezoidal section with a forty foot wide bottom with vertical walls. This rectangular channel would have a footprint very similar in size to the existing channel. This channel improvement project has an estimated cost of \$2,413,000. A buyout would involve the purchase and demolition of the affected houses as well as the relocation of the residents. The estimated value of the homes is \$1,068,000; demolition and relocation would increase the cost of a buyout to \$1,600,000. The most economical option for this location is to buyout the affected homes.

4.2.5 Tributary CC-3 at Hillcrest

This stream is a tributary of CC-2 which in turn is a tributary of Cottonwood Creek. The existing double-barrel 5' wide by 3' tall culvert will only pass the 50% chance event, and Hillcrest Drive is overtopped by 2.6 feet during the 1% chance event, and two single family residents experience flooding. See **Figure 11**.



Figure 11: 100-YR Flood Plain Tributary CC-3 at Hillcrest Drive

Mitigation options consist of improving the culvert under Hillcrest or a buyout. There are no potential detention pond sites for this area. The culvert improvement would be the addition of a 10' wide by 5' high box culvert to the existing structure with an estimated cost of \$63,000. A buyout would involve the purchase and demolition of the affected houses as well as the relocation of the residents. The estimated value of the homes is \$118,000; demolition and relocation would increase the cost of a buyout to \$177,000. The most economical option for this location is to construct the culvert improvements.

4.2.6 South Cottonwood Creek at S.H. 360

South Cottonwood Creek crosses under State Highway 360 through a three-barrel 8' wide by 8' tall box culvert, which will pass the 4% chance event (25YR-storm). The 1% chance event overtops the frontage roads by 3.3' and the main lanes by up to 2.1', effectively shutting down a major transportation corridor.



Figure 12: 100-YR Flood Plain South Cottonwood at State Highway 360

The mitigation option considered for this location was the construction of a detention pond in an undeveloped area along South Cottonwood between Sherry Street and Carter Drive. This proposed detention pond reduces the 1% chance event peak flow through the culvert at S.H. 360 by 40%, which in turn reduces the water level 5.7' mitigating the flooding. This pond also reduces peak flow at the Forum Drive culvert 34% and reduces the flooding depth from 1.4' to 0.3'. The estimated cost of this project is \$2,608,000. **Figure 12** shows the potential flooding as well as the location of the proposed detention pond.

4.3 FISH CREEK WATERSHED

4.3.1 Fish Creek at Beckett

Fish Creek upstream of Nathan Lowe Road is a concrete channel for most of the reach; south (downstream) of Nathan Lowe Road, the creek and much of the floodplain remain natural. Beckett Drive runs parallel to Fish Creek south of Nathan Lowe Road. Beckett Drive floods up to 2' deep during the 1% chance event, and two residences appear to flood less than a foot deep. No structural or detention mitigation options have been identified for this location. It is recommended that the elevation of the structures in question be field verified to more precisely determine the extent of flooding and if necessary consider buying out these structures. The Tarrant County Appraisal District data shows the combined value of these structures to be \$262,000. This area is shown on **Figure 13**.



Figure 13: 100-YR Flood Plain Fish Creek at Beckett Drive

4.3.2 Tributary FC-3 at S.H. 360

FC-3 is a tributary of Fish Creek which flows south from the area of New York Avenue and I.H. 20. It converges with Fish Creek just east of S.H. 360. Land use in the drainage area of this tributary is predominantly commercial with some single-family residential and several large undeveloped tracts.



Figure 14: 100-YR Flood Plain Tributary FC-3 at S.H. 360

The one percent chance event produces street flooding of the southbound frontage road of S.H. 360 1.7' deep and in the Summer Creek cul-de-sac. See **Figure 14**. The three-barrel 8' high by 5' wide box culvert under S.H. 360 can only pass the 10% chance event. No mitigation options have been identified for this area. There is some flooding in this area now and the potential for continued commercial development in the area has the potential to increase this flooding. Structural mitigation options should be avoided as they would tend to increase flooding downstream; therefore, careful planning of all future development in this drainage basin will be required in order to prevent any increases in the flood levels. Future development should consider low impact and No Adverse Impact (NAI) design features such as:

- a. Provide more open space and dedicated green belts along the creek.
- b. Shared driveways to reduce impervious cover.
- c. Porous pavement.
- d. Disconnected downspouts.
- e. Infiltration basins, depression storage, long flow paths over landscaped areas.
- f. Detention ponds and water features.

Each development will have different requirements and NAI design elements will have to be tailored specifically for each site. The Association of State Floodplain Managers (ASEPM) has a number of tools that can assist developers in determining which NAI features are appropriate for their site.

4.3.3 Tributary FC-4 at S.H. 360

FC-4 is a tributary of Fish Creek that is very similar to FC-3; its confluence with the main stem of Fish Creek is only 500 feet downstream of FC-3. The culvert where FC-4 crosses under S.H. 360 will pass the 50% chance event and experiences flooding of up to 1.2 feet deep during the 1% chance event. Similarly to FC-3, no mitigation options have been identified for this location; however, future development could result in increased flooding. As previously discussed, future development in this drainage basin should consider low impact and No Adverse Impact (NAI) design features. This area is shown on **Figure 15**.



Figure 15: 100-YR Flood Plain Tributary FC-4 at S.H. 360

4.3.4 North Fish Creek between Allen & S.H. 360

The land uses in the North Fish Creek drainage basin are predominately residential with increasing amounts of multi-family and commercial uses as the stream flows east towards S.H. 360. The stream has also been heavily channelized. The culvert under S. H. 360 will pass the 10% chance event. The one percent chance event produces several areas of flooding: four apartment buildings near Rosemead, a school building south of Seaboard, a commercial warehouse near S.H. 360 and the southbound frontage road and main lanes of S.H. 360. See **Figure 16**. Mitigation options consist of three detention ponds and buyouts. Structural improvements of the culvert under S.H. 360 were not considered due to the potential of increasing flooding downstream. **Figure 17** shows the locations of the proposed detention ponds. Pond #1 is a 21-acre pond; the 1% chance event peak flow coming into the pond is 4,207 cfs; the peak outflow of this pond is 2,516 cfs which is a 40% reduction. Pond #2 is 10 acres with a peak incoming flow of 2,098 cfs and a peak outflow of 1,633 cfs, which is a 22% reduction in flow. The combined effect of these ponds is to mitigate the structural flooding and significantly reduce the depth of the flooding on S.H. 360. The estimated cost of the proposed detention ponds is \$6,082,000. A buyout would involve the purchase and demolition of the affected structures. The estimated value of these structures is \$13,100,000; demolition and relocation would increase the cost of a buyout to \$19,700,000.

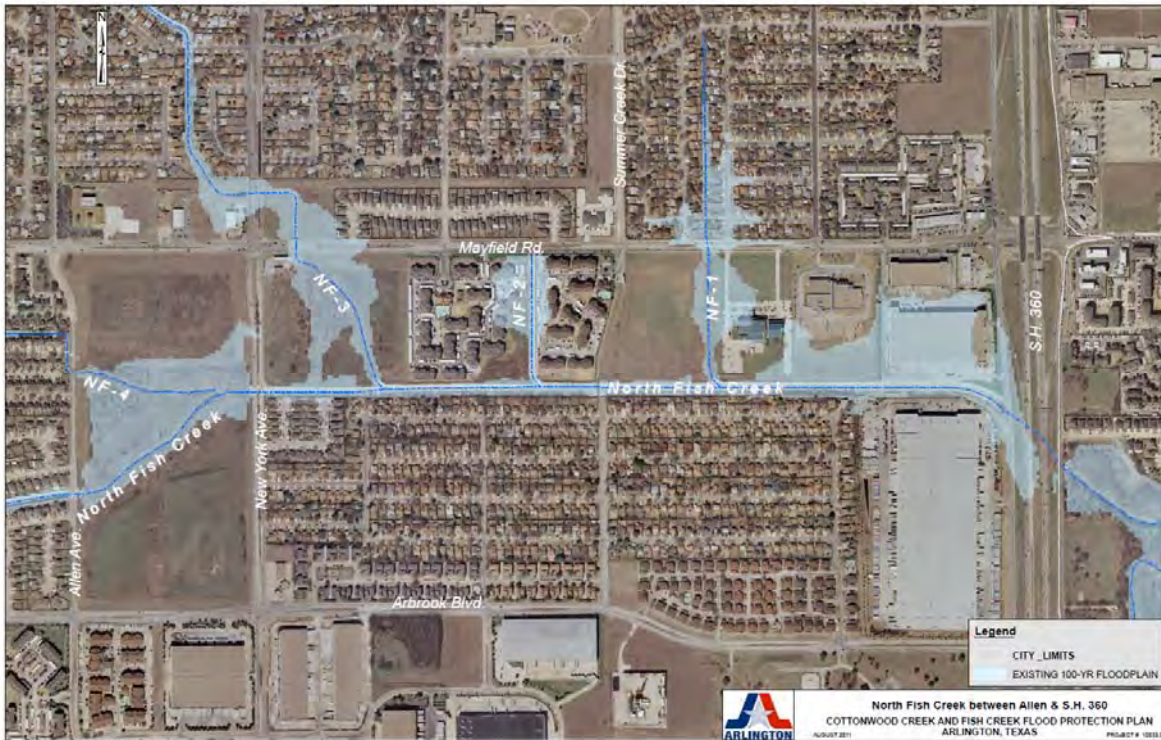


Figure 16: 100-YR Flood Plain North Fish between Allen Avenue & S.H. 360

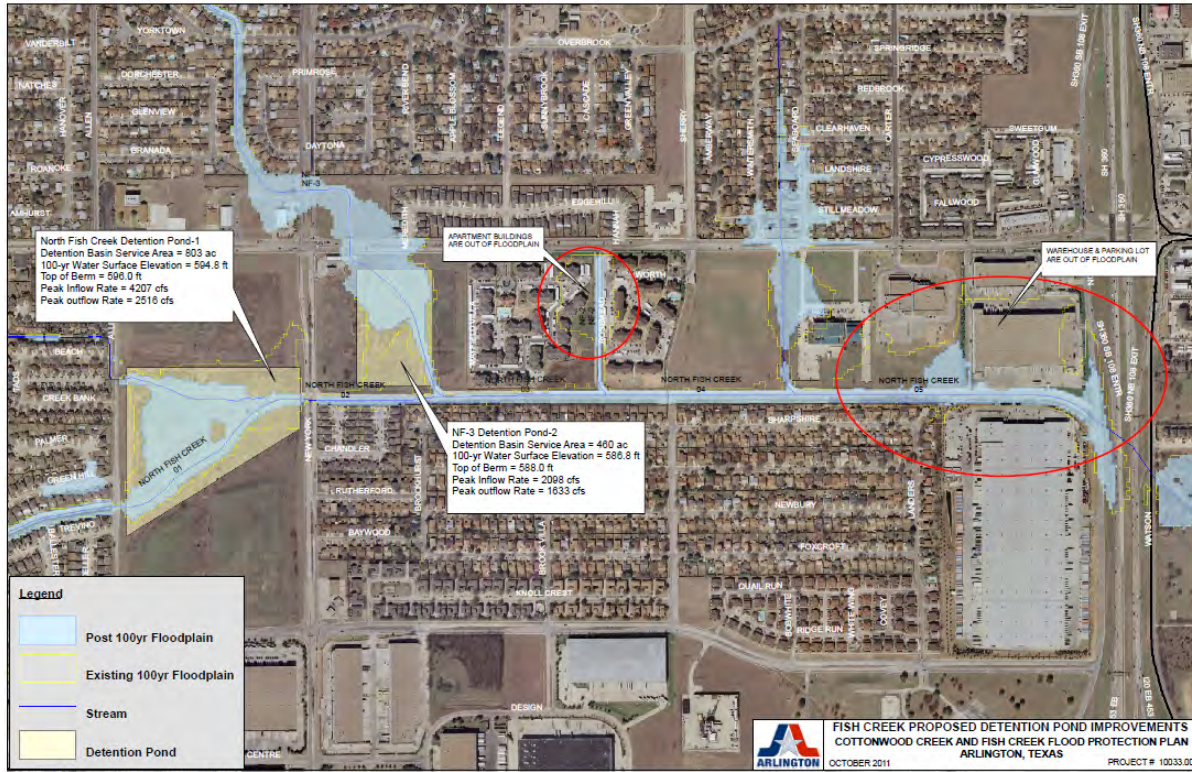


Figure 17: Detention Ponds - North Fish between Allen Avenue & S.H. 360

4.3.5 Tributary NF-1 at Mayfield Road

This tributary of North Fish flows south from Overbrook Street in a 4' flat-bottom trapezoidal concrete channel, then under Mayfield Road through an 8' wide by 6' tall box culvert and an earthen channel to its confluence with North Fish Creek. The existing culvert will pass the 50% chance event. The 1% chance event produces flooding in 13 single family homes, overtops Mayfield Road by 1.5 feet and flooding on Seabrook, Wintersmith, Amberway and Landshire Drives. This area of flooding is shown on **Figure 18**. The mitigation options for this area consist of a combination of channel and culvert improvements as well as buyouts. Backwater effects from North Fish Creek contribute to the depth of the flooding so the proposed mitigation options are contingent on the detention ponds, discussed for North Fish Creek above, being constructed. The proposed channel improvements consist of constructing a 12' flat-bottom earthen channel between Mayfield Road and North Fish Creek and then constructing a 12' wide by 4' deep rectangular channel north of Mayfield Road. The culvert improvements include the construction of two additional 8' wide by 6' tall box culverts. The estimated cost of the proposed channel and culvert improvements is \$465,000. The RAS model indicates flooding of 13 homes; however, as some of the flooding is less than 6" deep, EC recommends that the foundation elevations of the affected structures be verified prior to any buyouts. The estimated value of the homes is \$958,000.00; demolition and relocation would increase the cost of a buyout to \$1,437,000.



Figure 18: 100-YR Flood Plain Tributary NF-1 at Mayfield Road

4.4 BENEFIT COST ANALYSIS

A benefit-cost analysis was performed for the various options affecting building flooding discussed above. The viability of the various options was measured through a comparison of the relative cost of each mitigation project versus the benefits derived from these projects. The benefits must exceed the cost in order for a project to be considered viable. The benefits are the damage costs which are avoided by removing at-risk properties from the floodplain (i.e. benefit = damage avoided). Benefits are determined from Tarrant County Appraisal District 2011 tax roll values. Construction costs are based on recent bid tabulations and unit prices for similar regional construction projects. It should be noted that FEMA considers a voluntary acquisition of property located in the floodplain to have a Benefit Cost Ratio (BCR) of 1.

4.4.1 Cost Analysis

The estimated cost for each alternative includes materials and construction cost, which are based on recent bid tabulations for similar construction in this region, as well as soft cost for administration, engineering, surveying, geotechnical reports and legal. The allowance for soft cost was 22% of the construction cost. The construction cost were estimated using bid data from the Texas Department of Transportation, Tarrant District. A summary of the costs for each of the alternatives is provided in **Appendix G**.

4.4.2 Benefit Analysis

The benefit of the alternative is the relative monetary savings of a given improvement being in-place, compared to it “not being in-place”. This value is determined from the difference between estimated damages for existing condition and estimated damage with alternative in-place. To estimate the risk associated with a given magnitude flood event, HAZUS-MH software was employed. This software, developed by FEMA Hazard Mitigation Division under a contract with the National Institute of Building Sciences, integrates with ArcGIS 9.3 (the platform utilized for spatial data management and analysis in the overall study). HAZUS is a widely-accepted methodology for flood damage estimation. HAZUS

provides an estimate of damages by taking spatial information about the depth of flooding, and correlating that information in an “overlay” analysis to data about the built environment and regional assumptions about the relationship between depth of inundation and damages. In addition to this information, HAZUS provides other useful emergency management data such as estimates of displaced households, disrupted critical facilities, and business use loss.

For the City’s purposes, HAZUS was used to generate estimates of the relative benefit of the flood protection measures proposed. The results of the hydraulic analysis from HEC-RAS (see **Section 3.0**) are processed in HEC-GeoRAS into inundation depth grids for each event (“depth grid”). For each alternative, the resulting depth grid is evaluated in HAZUS to produce an estimate of damages. These damages “with the selected improvement in place” are then compared to an estimate of damages in the existing condition, for the same storm event. The difference in damages is then the relative benefit for that particular flood control measure.

4.4.3 Benefit Cost Results

Benefit Cost Analysis was performed for eight project locations which involved flooding of homes and or commercial buildings. These projects are as follows:

- Cottonwood Creek at Susan Drive – Apartments & street flooding.
- Cottonwood Creek at Park Row – Apartments & street flooding.
- Tributary CC-2 at Susan, Buena Vista & Plaza – Residential flooding.
- Tributary CC-3 at Hillcrest – Residential flooding.
- Fish Creek at Beckett – Residential & street flooding.
- North Fish Creek between Allen & S.H. 360 – Apartments & commercial flooding.
- Tributary NF-1 at Mayfield Road – Residential & street flooding.

4.4.3.1 Cottonwood Creek at Susan Drive

Two mitigation options were considered for this location, buyout with an estimated cost of \$1,503,000, and the construction of additional culverts under Susan Drive with an estimated cost of \$124,000. The non-economic impacts that were also considered are:

- a. The buyout does not provide any relief for flooding of Susan Drive. It also requires the relocation of the residents of the affected apartments and will result in the removal of these assets from the City’s tax base which would be a net increase in the cost of the project to the City. The buyout will increase green space which will enhance the recreational potential in the area and reduce runoff by decreasing the impervious cover.
- b. The culvert improvements will improve conveyance under Susan Drive at the expense of valley storage which has the potential to increase the flow and flooding downstream. Therefore water surface elevations (WSEs) produced by modeling this improvement were compared to the WSEs downstream of Susan Drive, without the improvements and no increase in flood levels were discovered.

The culvert improvements have a BCR greater than 1 and no adverse non-economic impacts; therefore, EC recommends the construction of the proposed culvert improvements as the preferred mitigation option for this location. See **Table 11**.

Table 11: Comparison of Mitigation Options at Cottonwood Creek & Susan Drive

| Cottonwood Creek at Susan Drive Apartments & Street Flooding | | |
|---|--|---|
| Benefits | Cost of 100 YR Flood Damages Avoided | \$820,000 |
| Buyout | Cost | \$1,503,000 |
| | Benefit Cost Ratio | 0.5 |
| | Results | Apartment flooding is mitigated. Additional green space is created. Street flooding remains unchanged. |
| Culvert Improvements | Cost | \$124,000 |
| | Benefit Cost Ratio | 6.6 |
| | Results | Apartment and street flooding are mitigated. Valley storage is lost, but no increases in downstream flood elevations were noted. |

4.4.3.2 Cottonwood Creek at Park Row

The three mitigation options considered for this area were increasing the size of the culverts under Park Row and S.H. 360, increasing the size of the pond located near the Hugh Smith Recreation Center and a buyout of the structures subject to flooding. The buyout option has an estimated cost of \$1,260,000, while the culvert only option has an estimated cost \$2,977,000. The combination of a detention pond and culvert improvements has an estimated cost of \$1,457,000. Non-economic considerations include the following:

- a. A buyout does not provide any relief for street flooding. It also requires the relocation of the residents of the affected apartments and will result in the removal of these assets from the City’s tax base which would be a net increase in the cost of the project to the City. The buyout will increase green space which will enhance the recreational potential in the area and reduce runoff by decreasing the impervious cover.
- b. The culvert improvements will improve conveyance under Park Row and S.H. 360 at the expense of valley storage which has the potential to increase the flow and flooding downstream, as this was the most expensive option no check was made of downstream water surface elevations with this option.
- c. The storage created by the construction of the proposed detention pond off-sets the loss of valley storage caused by the culvert improvements. This option mitigates the street flooding as well as the apartment flooding with minimal impacts to downstream flooding.

None of the proposed options have a BCR greater than 1. The buyout option is the least cost; and during a site visit, one apartment building appeared to have considerable structural damage. EC recommends that the City explore the possibility of a voluntary acquisition. See **Table 12**.

Table 12: Comparison of Mitigation Options at Cottonwood Creek & Park Row

| Cottonwood Creek at Park Row Apartments & Street Flooding | | |
|--|--|--|
| Benefits | Cost of 100 YR Flood Damages Avoided | \$840,000 |
| Buyout | Cost | \$1,260,000 |
| | Benefit Cost Ratio | 0.7 |
| | Results | Apartment flooding is mitigated. Additional green space is created. Street flooding remains unchanged. |
| Culvert Only Improvements | Cost | \$2,977,000 |
| | Benefit Cost Ratio | 0.3 |
| | Results | Apartment and street flooding are mitigated. Valley storage is lost, but no increases in downstream flood elevations were noted. |
| Detention & Culvert Improvements | Cost | \$1,457,000 |
| | Benefit Cost Ratio | 0.6 |
| | Results | Apartment and street flooding are mitigated. Detention pond increases storage. |

4.4.3.3 Tributary CC-2 at Susan, Buena Vista & Plaza

Two mitigation options were considered for this location, buyout with an estimated cost of \$1,600,000, and the widening of the existing channel with an estimated cost of \$2,413,000. The non-economic impacts that were also considered are:

- a. The buyout does not provide any relief for street flooding. It also requires the relocation of the residents of the affected homes and will result in the removal of these assets from the City’s tax base which would be a net increase in the cost of the project to the City. The buyout will increase green space which will enhance the recreational potential in the area and reduce runoff by decreasing the impervious cover. This option will also preserve the existing valley storage.
- b. The channel improvements will improve conveyance through the neighborhood at the expense of valley storage which has the potential to increase the flow and flooding downstream. Therefore, water surface elevations (WSEs) produced by modeling this improvement were compared to the WSEs downstream of Susan Drive without the improvements, and no increase in flood levels were discovered.

The channel improvements are more than twice the cost of the buyout. A mandatory buyout has a BCR of less than one; therefore, EC recommends that the City explore the possibility of a voluntary acquisition. If the area is converted to “Green Space” the City could also consider naturalizing the concrete channel in this area. The naturalization would enhance the environment, improve stormwater quality and increase the aesthetic value. See **Table 13**.

Table 13: Comparison of Mitigation Options at Tributary CC-2 at Susan, Buena Vista & Plaza

| Tributary CC-2 at Susan, Buena Vista & Plaza Residential & Street Flooding | | |
|---|--|--|
| Benefits | Cost of 100 YR Flood Damages Avoided | \$300,000 |
| Buyout | Cost | \$1,600,000 |
| | Benefit Cost Ratio | 0.2 |
| | Results | Residential flooding is mitigated. Additional green space is created. Street flooding remains unchanged. |
| Channel Improvements | Cost | \$2,413,000 |
| | Benefit Cost Ratio | 0.1 |
| | Results | Residential and street flooding are mitigated. Valley storage is lost, but no increases in downstream flood elevations were noted. |

4.4.3.4 Tributary CC-3 at Hillcrest

Two mitigation options were considered for this location, buyout with an estimated cost of \$177,000, and the construction of additional culvert under Hillcrest with an estimated cost of \$63,000. The non-economic impacts that were also considered are:

- a. The buyout does not provide any relief for flooding of Hillcrest. It also requires the relocation of the affected residents and will result in the removal of these assets from the City’s tax base which would be a net increase in the cost of the project to the City. The buyout will increase green space which will enhance the recreational potential in the area and reduce runoff by decreasing the impervious cover.
- b. The culvert improvements will improve conveyance under Hillcrest at the expense of valley storage which has the potential to increase the flow and flooding downstream. Therefore, water surface elevations (WSELs) produced by modeling this improvement were compared to the WSELs downstream of Hillcrest without the improvements, and no increase in flood levels were discovered. The culvert improvement has a BCR of 0.95 which is very close to one. EC recommends the culvert improvement. See **Table 14**.

Table 14: Comparison of Mitigation Options at Tributary CC-3 at Hillcrest

| Tributary CC-3 at Hillcrest Residential & Street Flooding | | |
|--|--|--|
| Benefits | Cost of 100 YR Flood Damages Avoided | \$60,000 |
| Buyout | Cost | \$177,000 |
| | Benefit Cost Ratio | 60,000.0 |
| | Results | Residential flooding is mitigated. Additional green space is created. Street flooding remains unchanged. |
| Culvert Improvements | Cost | \$63,000 |
| | Benefit Cost Ratio | 1.0 |

| | | |
|--|---------|--|
| | Results | Residential and street flooding are mitigated. Valley storage is lost, but no increase in downstream flood elevations was noted. |
|--|---------|--|

4.4.3.5 Fish Creek at Beckett

Beckett Drive floods up to 2' deep during the 1% chance event and two residences appear to flood less than a foot deep. A mandatory buyout has a BCR of less than one; therefore, EC recommends that the elevation of the structures in question be field verified to more precisely determine the extent of flooding and if necessary consider the possibility of a voluntary acquisition. See **Table 15**.

Table 15: Comparison of Mitigation Options at Fish Creek & Beckett

| Fish Creek at Beckett Residential & Street Flooding | | |
|--|--|--|
| Benefits | Cost of 100 YR Flood Damages Avoided | \$93,000 |
| Buyout | Cost | \$393,000 |
| | Benefit Cost Ratio | 0.2 |
| | Results | Residential flooding is mitigated. Additional green space is created. Street flooding remains unchanged. |

4.4.3.6 North Fish Creek between Allen & 360

North Fish Creek has been heavily channelized in the past resulting in a significant loss of valley storage. The proposed detention basins reverse some of this loss. Not only does this option mitigate the structural flooding, it also improves stormwater quality and reduces the peak flows downstream, which in turn reduces the potential for erosion. Despite the low BCR, EC recommends the detention pond option over doing nothing. See **Table 16**.

Table 16: Comparison of Mitigation Options at North Fish Creek between Allen & 360

| North Fish Creek between Allen & 360 Apartment & Commercial Bldg. Flooding | | |
|---|--|---|
| Benefits | Cost of 100 YR Flood Damages Avoided | \$1,000,000 |
| Buyout | Cost | \$19,700,000 |
| | Benefit Cost Ratio | 0.1 |
| | Results | Apartment & commercial flooding is mitigated. Additional green space is created. Street flooding remains unchanged. |
| Detention Ponds | Cost | \$6,082,000 |
| | Benefit Cost Ratio | 0.2 |
| | Results | Apartment & commercial flooding is mitigated. Street & highway flooding are reduced. The addition of storage reduces the peak flows downstream. |

4.4.3.7 Tributary NF-1 at Mayfield Road

Two mitigation options were considered for this location a buyout with an estimated cost of \$1,437,000, and the construction of additional culvert under Mayfield Road and channel improvements downstream of the culvert with an estimated cost of \$465,000. The RAS model indicates flooding in the 13 homes is less than 6” deep while street flooding is in excess of two feet. Neither option has a BCR of greater than one nor does a buyout do anything to mitigate the significant street flooding. EC recommends that the elevation of the structures in question be field verified to more precisely determine the extent of structure flooding and construction of the culvert and channel improvements to alleviate the street flooding. See **Table 17**.

Table 17: Comparison of Mitigation Options at Tributary NF-1 at Mayfield Road

| NF-1 at Mayfield Road Residential & Street Flooding | | |
|--|--|---|
| Benefits | Cost of 100 YR Flood Damages Avoided | \$190,000 |
| Buyout | Cost | \$1,437,000 |
| | Benefit Cost Ratio | 0.1 |
| | Results | Residential flooding is mitigated. Additional green space is created. Street flooding remains unchanged. |
| Channel & Culvert Improvements | Cost | \$465,000 |
| | Benefit Cost Ratio | 0.4 |
| | Results | Residential and street flooding are mitigated. |

5.0 PHASING AND IMPLEMENTATION

5.1 PRIORITIZATION OF ALTERNATIVES

The City of Arlington utilizes resources to plan for the implementation of stormwater improvements which include the City’s institutional guidelines for managing stormwater and the City’s ongoing assessment of customer reported drainage impacts. These two measures are presented in order to establish the basis for the prioritization of improvements recommended in this study.

5.1.1 Arlington Stormwater Management Plan

The City of Arlington operates under the City’s Stormwater Management Plan adopted in 2009. This plan recognizes that, as with most cities, the City’s management of stormwater is intended to achieve goals and that these goals are in the process of being implemented city-wide. The goals as established in the City’s plan are presented as follows and provide the basis for some degree of metrics as to the City’s intent in implementing improvements through its continuing assessment of its watersheds:

Table 18: Seven Goals of Arlington Stormwater Management Plan

| SEVEN GOALS OF ARLINGTON STORMWATER MANAGEMENT PLAN |
|---|
| 1. Reduce the existing potential for stormwater damage to public health, safety, life, property, and the environment. |
| 2. Control future increase in stormwater damage within the City of Arlington and in adjacent jurisdictions affected by City of Arlington drainage. |
| 3. Protect and enhance the quality, quantity, and availability of surface and groundwater resources. |
| 4. Preserve and enhance existing aquatic and riparian environments and encourage restoration of degraded areas. |
| 5. Control sediment and erosion in and from drainageways, developments, and construction sites. |
| 6. Establish comprehensive basin plans within each watershed that quantify, plan for, and manage stormwater flows within and among the jurisdictions in those watersheds. |
| 7. Promote equitable, acceptable, and legal measures for stormwater management. |

These goals can be summarized relative to the findings and recommendations in this study in the following manner:

Table 19: City Goals Applied to FPP

| Arlington Stormwater Management Goal Abridged | Types of Improvements that Achieve Goals | Applicability to Fish and Cottonwood Creeks FPP Proposed Improvements |
|---|--|--|
| 1. Reduce damage to health, safety, life, property, and environment | All types | Reduction of people centers and property in floodplain through structural and nonstructural improvements |
| 2. Control to future increase damage in Arlington and downstream jurisdictions | Storage, detention, reduced runoff, rapid infiltration | Reduction of increased downstream flood levels or loss of valley storage |
| 3. Protection and enhancement of quality, quantity of surface and groundwater resources | Erosion mitigation and maintenance | Reduction of velocity and erosion potential of improvements |
| 4. Preservation and enhancement of environment and restoration | Erosion mitigation, toxicity reduction, maintenance | Avoiding or enhancing green space with improvements |

| | | |
|--|--|--|
| 5. Control of erosion and sediment | Erosion mitigation, geomorphologic stream improvements, detention, maintenance | Reduction of velocity and erosion potential of improvements |
| 6. Establishment of comprehensive plans | All types | Addressing improvements that relate to flooding impacts |
| 7. Promotion of measures for stormwater management | All types | Providing guidance for specific watersheds where impacts occur |

The City’s Stormwater Management Plan essentially identifies four goals (Goals 1 through 5) that specifically are achieved with recommended improvements identified in this study. The remaining two goals (Goals 6 and 7) can be achieved to some degree in the design of the recommended improvements. In addition, within the City’s Stormwater Management Plan, Chapter 5, Section B.5, defines the manner in which all identified improvements are to be prioritized in each of the City’s watersheds, excerpted as follows:

Development and Evaluation of Alternatives Once problem areas are defined and potential damages quantified, then several alternatives to reduce the damages associated with the problems will be developed and evaluated for each problem area. For flooding problem areas, alternatives will provide a varying level of protection. Some alternatives will address lower recurrence interval storms such as the 25-year storm, and others will address higher recurrence interval storms such as the 100-year storm. Alternatives will be evaluated based on their benefit-to-cost (BC) ratio or net benefit. While the intent is to provide protection to the 100-year storm levels, it may be economically beneficial to provide protection only from a 25-year event and cost prohibitive to provide protection from a 100-year event.

Generally, the City will recommend the alternative for each problem area that provides the highest BC ratio or net benefit. The City will also decide whether to consider non-economic criteria in the selection of alternatives. Information about non-economic criteria will be summarized for each project so that it can be considered in the city-wide prioritization of stormwater improvement projects.

5.1.2 Complaints Database

The City of Arlington operates a Drainage Complaints database which is designed to document citizen and staff identification of presumed drainage or flooding related citizen concerns, and to allow staff investigation of these concerns and staff referencing these findings in a historical georeferenced database for present or future consideration during the City’s ongoing assessment of each of the City’s watersheds. This database is organized to segregate the concerns or complaints into discreet categories which allow for city-wide analysis for city metrics in stormwater management and provide useful tools for determining the types of concerns which continue to occur and the places where these occur. The following table reflects current drainage complaints within these two watersheds:

Table 20: Arlington Drainage Complaints

| Drainage Complaints/Concerns from Citizens in Planning Area | |
|--|-----------------------------|
| Type | Number of Complaints |
| Structure Flooding | 44 |
| Property Flooding | 64 |
| Street Flooding | 40 |
| Erosion Problems | 47 |
| System Maintenance | 34 |
| Creek/Channel System Maintenance | 43 |

5.1.3 Summary of Existing City of Arlington Prioritization Guidance

The City of Arlington manages a continuous program for assessing its individual watersheds under the City's existing Stormwater Management Program. As part of this program, the City has established five goals which directly relate to its program. These goals carry five collective characteristics that can then be measured for the recommended improvements for this study, listed as follows:

1. Improving safety;
2. Reducing property damage;
3. Reducing future damage in Arlington and future damage downstream;
4. Improving stream quality; and
5. Environmental enhancement.

The City of Arlington also necessarily must prioritize capital improvements given that the need for improvements exceeds the available funding in any given year, thus cost must be considered in the implementation of improvements. The City's Stormwater Management Plan specifically prioritizes capital improvements through a ranking using the most favorable benefit cost ratio as the most desirable improvements to initiate first. This establishes two additional criteria, listed as follows:

1. Least cost is most favorable; and
2. Most favorable benefit cost ratio is to be considered.

The final information available from the City of Arlington that relates to the City's management of its system is the complaint database which defines categories of impacts experienced by the citizens of Arlington. The City's drainage complaint database identifies the types of drainage impacts that have occurred and the extent to which each of these areas has registered complaints. This provides five more additional measures that can be used as criteria for prioritizing improvements that might minimize these types of impacts, listed as follows:

1. Structure flooding;
2. Property flooding;
3. Street flooding;
4. Erosion problems; and
5. Creek/Channel system maintenance.

5.2 APPLICABILITY OF CRITERIA TO IMPROVEMENT

The improvements recommended from this study are intended to reduce the impact of flooding in different ways. There were eleven project locations which involved flooding of homes and or commercial buildings and/or streets. These projects are listed as follows:

- Cottonwood Creek at Susan Drive – Apartments & street flooding.
- Cottonwood Creek at Park Row – Apartments & street flooding.
- Tributary CC-2 at Susan, Buena Vista & Plaza – Residential flooding.
- Tributary CC-3 at Hillcrest – Residential flooding.
- Fish Creek at Beckett – Residential & street flooding.
- North Fish Creek between Allen & S.H. 360 – Apartments & commercial flooding.
- Tributary NF-1 at Mayfield Road – Residential & street flooding.
- Cottonwood Creek at Sherry Street – Street flooding which interferes with emergency services.
- South Cottonwood Creek at S.H. 360 – Street flooding.
- Tributary FC-3 at S.H. 360 – Street flooding.
- Tributary FC-4 at S.H. 360 – Street flooding.

The ability to apply the criteria from the City’s existing Stormwater Management Plan and drainage complaints database is essential in order for the improvements to be prioritized, just as prioritization is essential for the process of implementation. Accordingly, each set of criteria that has been established has been utilized in three sets of evaluations in the following section.

5.2.1 Application of Arlington Stormwater Management Plan Goals

The criteria developed for application of the City’s established goals for its stormwater program are presented below with the basis for measuring how each can be applied to the recommended improvements from this study.

Table 21: Arlington Stormwater Management Goal Metrics

| Criterion | Source | Measurement |
|---|------------------------|---|
| Improving safety | Goal 1 of City SWMP | Number of people centers removed from floodplain |
| Reducing property damage | Goal 1 of City SWMP | Number of properties removed from floodplain |
| Reducing future Arlington & downstream damage | Goal 2 of City SWMP | Extent project improves valley storage |
| Improving stream quality | Goal 3 of City SWMP | Velocity reductions, higher rank |
| Environmental enhancement | Goal 4 of City SWMP | Natural improvements, higher rank |
| Lowest cost | Section 5 of City SWMP | Lowest cost, higher rank |
| Highest BC Ratio | Section 5 of City SWMP | Highest BC, highest rank |
| Reduces structural flooding | Complaint Database | Number of structures removed from floodplain |
| Reduces property flooding | Complaint Database | Properties w/o structures removed from floodplain |
| Reduces street flooding | Complaint Database | Depth of street overtopping removed |
| Reduces erosion potential | Complaint Database | Improved potential to reduce erosion |
| Reduces maintenance | Complaint Database | Improved potential to reduce erosion |

On the basis of the recommended improvements, the Arlington Stormwater Management Goals for the City can be applied to the recommended improvements in the following manner using a ranking of 1 to 10, 10 being best for meeting criteria:

Table 22: Measurement Criteria Table Set

| Improving Safety | |
|--------------------------|---------|
| Number of People Centers | Ranking |
| Greater than Ten | 10 |
| Five to Ten | 5 |
| One to Five | 3 |
| No People Centers | 0 |

* Add 10 for Emergency Response

| Reducing Property Flooding | |
|--|---------|
| Description | Ranking |
| Project Eliminates Property Flooding | 10 |
| Project Reduces Number of Properties flooded | 5 |
| Project has no effect on property flooding | 0 |

| Reducing Future & Downstream Damage | |
|--|----------------|
| Description | Ranking |
| Project increases valley storage | 10 |
| Project has no effect on valley storage | 5 |
| Project decreases valley storage | 0 |

| Improving Stream Quality | |
|--|----------------|
| Description | Ranking |
| Project increases stream quality (detention ponds) | 10 |
| Project has no effect on stream quality (culvert) | 5 |
| Project decreases stream quality (channelization) | 0 |

| Environmental Enhancement | |
|---|----------------|
| Description | Ranking |
| Project enhances the environment (Increase in green space Decrease in impervious cover) | 10 |
| Project has no effect on environment | 5 |
| Project decreases the environment (Decrease in green space Increase in impervious cover) | 0 |

| Reducing Structure Flooding | |
|--|----------------|
| Description | Ranking |
| Project Eliminates Structural Flooding | 10 |
| Project Reduces Number of structures flooded | 5 |
| Project has no effect on structural flooding | 0 |

| Reducing Property Flooding | |
|--|----------------|
| Description | Ranking |
| Project Eliminates Property Flooding | 10 |
| Project Reduces Number of Properties flooded | 5 |
| Project has no effect on property flooding | 0 |

| Reducing Street Flooding | |
|--|----------------|
| Description | Ranking |
| Project Eliminates Street Flooding greater than 2' deep | 10 |
| Project Eliminates Street Flooding greater than 1' but less than 2' deep | 8 |
| Project Eliminates Street Flooding greater than 6" but less than 1' deep | 5 |
| Project Eliminates Street Flooding 6" or less deep | 3 |
| Project has no effect on street flooding | 0 |

| Reducing Erosion Potential | |
|-------------------------------------|----------------|
| Description | Ranking |
| Project reduces stream velocities | 10 |
| Project has no effect on velocities | 5 |
| Project increases velocities | 0 |

The ranking criteria shown above have been applied to the recommended projects, which then establishes the priorities for each project. This ranking is shown on **Table 23** below.

Table 23: Recommended Project Ranking

| Recommended Project Rankings | | | | | | | | | |
|--|----------------------------|---|---------------------------|--------------------------|----------------------------|--------------------------|-----------------------------|---------------------------|---------------------|
| Ranking Context Highest ranking equals highest recommendation. | Reducing Property Flooding | Reducing Future Arlington & Downstream Damage | Environmental Enhancement | Reducing Street Flooding | Reducing Erosion Potential | Improving Stream Quality | Reducing Structure Flooding | Additional Ranking Points | Total Ranking Score |
| North Fish Creek between Allen & S.H. 360 Apartments & commercial flooding | 3 | 10 | 5 | 8 | 10 | 5 | 15 | 2 | 58 |
| Cottonwood Creek at Park Row Apartments & street flooding | 5 | 0 | 5 | 0 | 0 | 5 | 20 | 5 | 40 |
| Tributary CC-2 at Susan, Buena Vista & Plaza Residential flooding | 5 | 0 | 5 | 0 | 0 | 5 | 20 | 5 | 40 |
| Tributary CC-3 at Hillcrest Residential flooding | 3 | -10 | 0 | 15 | 0 | 0 | 10 | 5 | 23 |
| Cottonwood Creek at Susan Drive Apartments & street flooding | 3 | -10 | 0 | 13 | -10 | 0 | 10 | 5 | 11 |
| Tributary NF-1 at Mayfield Road Residential & street flooding | 5 | -10 | 0 | 13 | -10 | -5 | 15 | 0 | 8 |
| Cottonwood Creek at Sherry Street Street flooding | 5 | -10 | 0 | 15 | -10 | 0 | 0 | 0 | 0 |

5.3 POTENTIAL FUNDING SOURCES

An important aspect of implementing any of the recommended alternatives is the funding mechanism. The summary below provides a description of the potential available funding sources for the City to construct a project.

5.3.1 Municipal Funding Sources

Capital Improvements Plan (CIP) – a long-range plan, usually four to six years, which identifies capital projects and equipment purchases, provides a planning schedule and identifies options for financing the plan.

Drainage Utility Fees – Municipal Stormwater projects are funded by the assessment of a drainage utility fee for all developed projects based on amount of impervious cover, number of living units, or site area.

Regional Storm Water Program Impact Fee – An impact fee could be established to pass the cost of alternative implementation to upstream developers who would benefit from reduced detention requirements. Since the reduction of detention requirements would require the modification of local drainage and development policies, further investigation is required to quantify this potential funding source.

General Fund – The primary operating fund of a governmental entity.

General Obligation Bond (GO) – A municipal bond that is backed by the credit and "taxing power" of the issuing jurisdiction, rather than the revenue from a given project. General obligation bonds are issued with the belief that a municipality will be able to repay its debt obligation through taxation or revenue from projects. No assets are used as collateral. These bonds are typically considered the most secure type of municipal bond, and therefore carry the lowest interest rate.

Revenue Bond – A municipal bond supported by a specified stream of future income, such as income generated by a water utility from payments by customers. This differs from general-obligation bonds, which can be repaid through a variety of tax sources. Revenue bonds are only payable from specified revenues. A main reason for using revenue bonds is that they allow the municipality to avoid reaching legislated debt limits.

Special Assessment Bond – A special type of municipal bond used to fund a development project based on property tax assessments of properties located within the issuer's boundaries.

Tax Increment Bond – A bond (also known as a "tax allocation bond") payable from the incremental increase in tax revenues realized from any increase in property value resulting from capital improvements benefiting the properties that are financed with bond proceeds. Tax increment bonds often are used to finance the redevelopment of blighted areas.

5.3.2 State Assistance

TRA (Trinity River Authority) – The river authority for the watershed that includes Cottonwood Creek and Fish Creek. Many State and Federal agencies stipulate that river authorities must be the arbiters for the pass-through of funds.

TWDB (Texas Water Development Board) – Clean Water State Revolving Fund – Provides perpetual funds to provide low interest loan assistance for the planning, design, and construction of stormwater pollution control projects.

- Research and Planning Fund Grants – The purpose is to provide financial assistance for research and feasibility studies into practical solutions to water-related problems.
- State Participation and Storage Acquisition Program – The purpose is to help finance regional water projects including water storage facilities and flood retention basins; and to allow for "right sizing" of projects in consideration of future growth.
- Texas Water Development Fund – The purpose is to provide loans for the planning, design, and construction of water supply, wastewater, and flood control projects.

TCEQ (Texas Commission on Environmental Quality) – Texas Clean Rivers Program (CRP) – The purpose of these funds are to maintain and improve the quality of surface water resources within each river basin in Texas.

5.3.3 Federal Assistance

FEMA (Federal Emergency Management Agency)

- Flood Hazard Mapping Program – Department of Homeland Security (DHS) funds are administered through FEMA to identify, publish, and update information on all flood-prone areas

of the U.S. in order to inform the public on flooding risks, support sound floodplain management, and set flood insurance premium rates.

- Flood Mitigation Assistance Grants (FMA) – The purpose is to assist states and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insured through the National Flood Insurance Program (NFIP).
- Hazard Mitigation Grant Program (HMGP) – The purpose is to provide states and local governments financial assistance to permanently reduce or eliminate future damages and losses from natural hazards through safer building practices and improving existing structures and supporting infrastructure.
- Pre-Disaster Mitigation Grant Program (PDM) – The purpose is to provide funding for states and communities for cost-effective hazard mitigation activities that complement a comprehensive hazard mitigation program and reduce injuries, loss of life, and damage and destruction of property.

HUD (U.S. Department of Housing and Urban Development)

- Disaster Relief/Urgent Needs Fund of Texas – To rebuild viable communities impacted by a natural disaster or urgent, unanticipated needs posing serious threats to health and safety by providing decent housing, suitable living environments and economic opportunities.
- Texas Community Development Program – The purpose is to build viable communities that meet “basic human needs” such as safe and sanitary sewer systems, clean drinking water, disaster relief and urgent needs, housing, drainage and flood control, passable streets, and economic development.

NRCS (Natural Resources Conservation Service)

- Watershed Protection and Flood Prevention Program – To protect, develop, and utilize the land and water resources in small watersheds of 250,000 acres or less. The program is federally assisted and locally led.
- Watershed Surveys and Planning – Provides planning assistance to Federal, State, and local agencies for the development of coordinated water and related land resources programs in watersheds and river basins. Emphasis on flood damage reduction, erosion control, water conservation, preservation of wetlands, and water quality improvements.
- Wetlands Reserve Program – To protect and restore wetlands by enabling landowners to sell easements which take wetlands out of production.
- Emergency Watershed Protection Program – The purpose is to provide relief from imminent hazards and reduce the threat to life and property by severe natural events. Hazards include floods and the results of erosion created by floods, fire, windstorms, earthquakes, drought, or other natural disasters.

USACE (United States Army Corps of Engineers)

- Emergency Advance Measures for Flood Prevention – The purpose is to protect against the loss of life or damages to property given an immediate threat of unusual flooding.
- Emergency Rehabilitation of Flood Control Works – The purpose of this program is to assist in the repair or restoration of flood control works damaged by flood.
- Emergency Streambank and Shoreline Protection – The purpose is to prevent erosion damages to public facilities by the emergency construction or repair of streambank and shoreline protection works.
- Floodplain Management Services – The purpose is to promote appropriate recognition of flood hazards in land and water use planning and development through the provision of flood and floodplain related data, technical services, and guidance.

- Nonstructural Alternatives to Structural Rehabilitation of Damaged Flood Control Works – This program provides a nonstructural alternative to the structural rehabilitation of flood control works damaged in floods or coastal storms.
- Planning Assistance to States – The purpose is to assist states, local governments and other non-Federal entities in the preparation of comprehensive plans for the development, utilization, and conservation of water and related land resources.
- Small Flood Control Projects – The purpose is to reduce flood damages through small flood control projects not specifically authorized by Congress.

5.4 REGULATORY COMPLIANCE

Prior to commencement of construction, it will be necessary to submit the project and appropriate permit applications to regulatory agencies. A detailed review and acquisition of the necessary permits for the construction of these projects exceeds the scope of this contract; however, a partial list and brief discussion of permits is included in the following subsections. This following list of agencies and corresponding permit activities is intended to be general in nature and is not intended to represent a definitive list of required permit acquisitions and agency coordination.

5.4.1 Federal Emergency Management Agency (FEMA)

The National Flood Insurance Act of 1968 was enacted by Title XIII of the Housing and Urban Development Act of 1968 (Public Law 90-448, August 1, 1968) to provide previously unavailable flood insurance protection to property owners in flood prone areas. FEMA administers the National Flood Insurance Program (NFIP); however, if a local community elects to participate in the NFIP, the local government is primarily responsible for enforcement. Participating communities are typically covered by a Flood Insurance Study which defines water surface profiles and floodplain boundaries through their communities.

The recommended drainage improvement projects are intended to reduce floodplain limits. If changes to the current effective FEMA floodplain map are desired as a result of improvements, a request for a Letter of Map Revision (LOMR) from FEMA will be required.

5.4.2 U. S. Army Corps of Engineers (USACE)

Pursuant to Section 404 of the Clean Water Act and the Rules and Regulations promulgated there under by the United States Environmental Protection Agency (USEPA) and the United States Army Corps of Engineers (USACE), the filling or excavation of waters of the United States, including wetlands, with dredged or fill material, requires the issuance of a permit from the USACE (33 CFR Parts 320-330). For purposes of administering the Section 404 permit program, the USACE defines wetlands as follows:

Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas. (33 CFR 328.3)

The *Corps of Engineers Wetlands Delineation Manual (Technical Report Y-87-1)* issued by the USACE in 1987 states that wetlands must possess three essential characteristics. These characteristics include, under normal circumstances: 1) the presence of hydrophytic vegetation, 2) hydric soils, and 3) wetland hydrology. If all three of these criteria are present on a particular property in areas larger than one-third acre in size, then a permit (general permit or nationwide permit) must be issued by the USACE in order to fill all or a portion of those areas.

Section 404 (b)(1) guidelines (40 CFR Part 230), established by the USEPA, constitute the substantive environmental criteria used in the evaluating activities regulated under Section 404 of the Clean Water Act. The purpose of these guidelines is to restore and maintain the chemical physical and biological integrity of waters of the United States through the control of discharge of dredged or fill material.

All property owners within the United States and its territories must adhere to the provisions of the Clean Water Act. If any contemplated activity might impact waters of the United States, including adjacent or isolated wetlands a permit application must be made. If jurisdictional waters and/or wetlands are found to exist, then any activity which would involve filling, excavating, or dredging these wetlands would require the issuance of a permit. The final authority to determine whether or not jurisdictional waters exist lies with USACE.

There is a strong likelihood that Waters of the U.S. jurisdictional areas exist along the main stem and secondary channels of Cottonwood and Fish Creeks. It is recommended that the City engage the USACE early in its design process for any structural improvements on channels.

5.4.3 U.S. Fish and Wildlife Service (USFWS)

The U.S. Fish and Wildlife Service (USFWS), in the Department of the Interior, and the National Marine Fisheries Service (NMFS), in the Department of Commerce, share responsibility for administration of the Endangered Species Act (ESA). Generally, the USFWS is responsible for terrestrial and freshwater species and migratory birds, while the NMFS deals with those species occurring in marine environments and anadromous fish.

Section 9 of the ESA prohibits take of federally listed endangered or threatened species without appropriate authorization. Take is defined in the ESA, in part as “killing, harming, or harassment” of a federally listed species, while incidental take is take that is “incidental to, and not the purpose of, otherwise lawful activities.”

Section 10 of the ESA provides a means for non-Federal projects resulting in take of listed species to be permitted subject to carefully prescribed conditions. Application for an incidental take permit is subject to a number of requirements, including preparation of a Habitat Conservation Plan by the applicant. In processing an incidental take permit application, the USFWS must comply with appropriate environmental laws, including the National Environmental Policy Act. Review of the application under Section 7 of the ESA is also required to ensure that permit issuance is not likely to jeopardize listed species. Section 10 issuance criteria require the USFWS to issue an incidental take permit if, after opportunity for public comment, it finds that:

1. the taking will be incidental;
2. the applicant will, to the maximum extent practicable, minimize and mitigate the impacts of the taking;
3. the applicant will ensure that adequate funding and means to deal with unforeseen circumstances will be provided;
4. the taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild; and
5. the applicant will ensure that other measures that the USFWS may require as being necessary or appropriate will be provided.

The U.S. Fish and Wildlife Service should be contacted to determine the potential occurrence of and consequent impacts to any federal threatened and endangered species. In addition, the Corps of Engineers will require USFWS review of the project to ensure the project is in compliance with the Endangered Species Act prior to the issuance of a Section 404 permit.

5.4.4 Texas Commission on Environmental Quality (TCEQ)

The Texas Commission on Environmental Quality (TCEQ) has regulatory authority over: dam safety, water rights, Texas Pollutant Discharge Elimination System and Section 404(b)(1) guidelines for specification of disposal sites for dredged or fill material. The following sections briefly describe these regulations.

- Texas Pollutant Discharge Elimination System (TPDES)

On September 14, 1998, the USEPA authorized Texas to implement its Texas Pollutant Discharge Elimination System (TPDES) program. TPDES is the state program to carry out the National Pollutant Discharge Elimination System (NPDES), a federal regulatory program to control discharges of pollutants to surface waters of the United States. The TCEQ administers the program, and a permit is required for any construction activity that disturbs one acre or more.

- Section 401 Water Quality Certification

Any activity requiring authorization under Section 404 of the Clean Water Act will also require a Section 401 water quality certification from the TCEQ. In Texas, these regulations are administered by the TCEQ.

- Texas Water Code Section 11.121 Water Right Permit

Use of surface water, including the diversion or storage of water, in the State of Texas requires a water right permit through the State of Texas, pursuant to Texas Water Code Section 11.121. TCEQ requires the submission of the Water Rights Permit Package Application, TCEQ-10214 form. This application must be notarized and submitted with the water use permit application fees. Supplemental information may be required with the application.

5.4.5 Texas Historical Commission

The Division of Antiquities Protection of the Texas Historical Commission coordinates the program by identifying and protecting important archeological and historic sites that may be threatened by public construction projects. This department coordinates the nomination of numerous sites as State Archeological Landmarks or for listing in the *National Register of Historic Places*. Designation is often sought by interested parties as the most effective way to protect archeological sites threatened by new development or vandalism. Applicable rules are found in the Texas Administrative Code, Title 13-Cultural Resources, Part II-Texas Historical Commission, Chapters 24-28.

The Corps of Engineers will require that the State Historical Preservation Officer (SHPO) review the project to ensure the project is in compliance with the National Historic Act prior to issuance of a Section 404 permit.

5.5 ENVIRONMENTAL CONSTRAINTS

5.5.1 Rare, Threatened and Endangered Species

In addition, plant and animal habitats must be carefully considered. The Texas Parks and Wildlife (TPWD) list for Tarrant County includes: vertebrates, invertebrates, and vascular plants identified as being of conservation concern by TPWD within Texas. This special species list is comprised of species, subspecies, and varieties that are federally listed; proposed to be federally listed; have federal candidate status; are state listed; or carry a global conservation status indicating a species is critically imperiled, very rare, vulnerable to extirpation, or uncommon.

Table 24: Rare, Threatened, and Endangered Species of Tarrant County

| Taxon | Common Name | Scientific Name | Federal Status | State Status |
|----------|------------------------------|--------------------------------------|----------------|--------------|
| Birds | American Peregrine Falcon | <i>Falco peregrinus anatum</i> | DL | T |
| Birds | Arctic Peregrine Falcon | <i>Falco peregrinus tundrius</i> | DL | |
| Birds | Bald Eagle | <i>Haliaeetus leucocephalus</i> | DL | T |
| Birds | Henslow's Sparrow | <i>Ammodramus henslowii</i> | | |
| Birds | Interior Least Tern | <i>Sterna antillarum athalassos</i> | LE | E |
| Birds | Peregrine Falcon | <i>Falco peregrinus</i> | DL | T |
| Birds | Sprague's Pipit | <i>Anthus spragueii</i> | C | |
| Birds | Western Burrowing Owl | <i>Athene cunicularia hypugaea</i> | | |
| Birds | Whooping Crane | <i>Grus americana</i> | LE | E |
| Fish | Shovelnose sturgeon | <i>Scaphirhynchus platyrhynchus</i> | | T |
| Mamals | Gray wolf | <i>Canis lupus</i> | LE | E |
| Mamals | Plains spotted skunk | <i>Spilogale putorius interrupta</i> | | |
| Mamals | Red wolf | <i>Canis rufus</i> | LE | E |
| Mollusks | Fawnsfoot | <i>Truncilla donaciformis</i> | | |
| Mollusks | Little spectaclecase | <i>Villosa liosoma</i> | | |
| Mollusks | Louisiana pigtoe | <i>Pleurobema riddellii</i> | | T |
| Mollusks | Texas heelsplitter | <i>Potamilus amphichaenus</i> | | T |
| Reptiles | Texas garter snake | <i>Thamnophis sirtalis annectens</i> | | |
| Reptiles | Texas horned lizard | <i>Phrynosoma cornutum</i> | | T |
| Reptiles | Timber/Canebrake rattlesnake | <i>Crotalus horridus</i> | | T |
| Plants | Glen Rose yucca | <i>Yucca necopina</i> | | |

Status Key: LE, LT -Federally Listed Endangered/Threatened
 C -Federal Candidate for Listing
 DL -Federally Delisted
 NL -Not Federally Listed
 E, T -State Listed Endangered/Threatened
 NT -Not tracked or no longer tracked by the State
 "blank" -Rare, but with no regulatory listing status

Source: Texas Parks and Wildlife Department, 2011.

5.5.2 Wetlands

The National Wetlands Inventory (NWI) provides reconnaissance level information on the location, type and size of wetlands in the project area. For most of Tarrant County, the NWI maps are scanned vector graphics based on the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A review of the NWI indicates that the study area does not contain significant amounts of wetlands outside the immediate vicinity of streams. Detailed on-the-ground inspection of any particular site should be used during the project design phase to define the wetland boundaries and classification through on site analysis.

5.6 IMPLEMENTATION

A number of factors must be taken into consideration in the implementation of any specific project. These include:

- Coordination of projects within a watershed
 - Availability of funding
 - City-wide prioritization
- a. Coordination of projects within a watershed.** A flood mitigation project can affect peak flows and flood levels both upstream and downstream of the project. The magnitude of these effects can vary considerably and are very project specific. The details of a specific project and its relationship with other projects within a watershed should be carefully considered.

Construction of multiple projects or phasing of a large project should be planned so as to minimize these effects. In general, projects which improve the conveyance or capacity of a stream, such as a channel improvement or enlarging a culvert, tend to reduce flood level along the project as well as upstream of the project while tending to increase peak flow rates downstream of the project; therefore, the normal practice for these types of projects is to begin downstream and work upstream. Detention or storage projects tend to reduce peak flows downstream and should be constructed before any channel improvements which may be located downstream of the storage project.

- b. Availability of funding.** The availability of funding will also be an important factor in the determination of which projects are constructed and the timing of the construction. Projects which will benefit other governmental entities as well as the City of Arlington may qualify for joint funding; an obvious example would be an improvement to a roadway owned and operated by the Texas Department of Transportation could possibly be funded in part by TxDOT. The City may also be eligible for funds from FEMA’s Flood Mitigation Assistance Program.
- c. City-wide prioritization.** The methodologies for project rankings and priorities, discussed in **Section 5.1**, have been applied to the projects within the Cottonwood and Fish Creek watersheds. The City of Arlington has developed a Stormwater Management Plan which provides a strategy for implementing drainage projects across the entire City. The projects in the Cottonwood and Fish Creek watersheds will be included in this Management Plan. All of the projects from the various watersheds will be ranked using the same criteria, and a city-wide priority list will be created. In this city-wide approach, the projects which provide the most benefits for the least cost will tend to be highest on the priority list. Final implementation will be based on these priorities.

The prioritized list of proposed projects are listed in rank order and summarized in **Table 25 Project Summary**.

Table 25: Project Summary

| Project Summary | | | |
|---|--|---------------------|-------------------------------|
| Project Name | Type of Improvement | Capital Cost | Priority Ranking Score |
| North Fish Creek between Allen & S.H. 360 Apartments & Commercial flooding | Construct a 21 acre pond & a 10 acre pond | \$6,082,000 | 58 |
| Cottonwood Creek at Park Row Apartments & street flooding | Buyout | \$1,260,000 | 40 |
| Tributary CC-2 at Susan, Buena Vista & Plaza Residential flooding | Buyout | \$1,600,000 | 40 |
| Tributary CC-3 at Hillcrest Residential flooding | 10’ wide by 5’ high box culverts | \$93,000 | 23 |
| Cottonwood Creek at Susan Drive Apartments & street flooding | Two 8’ wide by 8’ high box culverts | \$124,000 | 11 |
| Tributary NF-1 at Mayfield Road Residential & street flooding | Verify residential flooding depth, 12’ wide channel & two 8’ wide by 6’ high culverts. | \$1,437,000 | 8 |
| Cottonwood Creek at Sherry Street Street flooding | Construct two additional 10’ wide by 5’ high box culverts | \$775,000 | 0 |

6.0 REFERENCES

- The City of Arlington
Comprehensive Stormwater Management Plan
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- Federal Emergency Management Agency, Federal Insurance Administration
Flood Insurance Study, City of Grand Prairie and Dallas County, Texas
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Revised June 16, 2005
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- Graham Associates, Inc.
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- Halff Associates
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Central Park Drainage Design Analysis
Warrior Creek, Grand Prairie, Texas
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- Halff Associates
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February 2006
- Halff Associates
Letter of Map Revision on Kirby Creek
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Cottonwood Creek Drainage Master Plan
City of Grand Prairie
April 1995
- National Oceanic and Atmospheric Administration
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North Central Texas Council of Governments
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Aerial Photography

Texas Parks and Wildlife Department, Wildlife Division, Diversity and Habitat Assessment Programs.
County Lists of Texas' Special Species. [Tarrant County, revised 02/28/11]

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User Manual and Technical Reference Manual
August 2009

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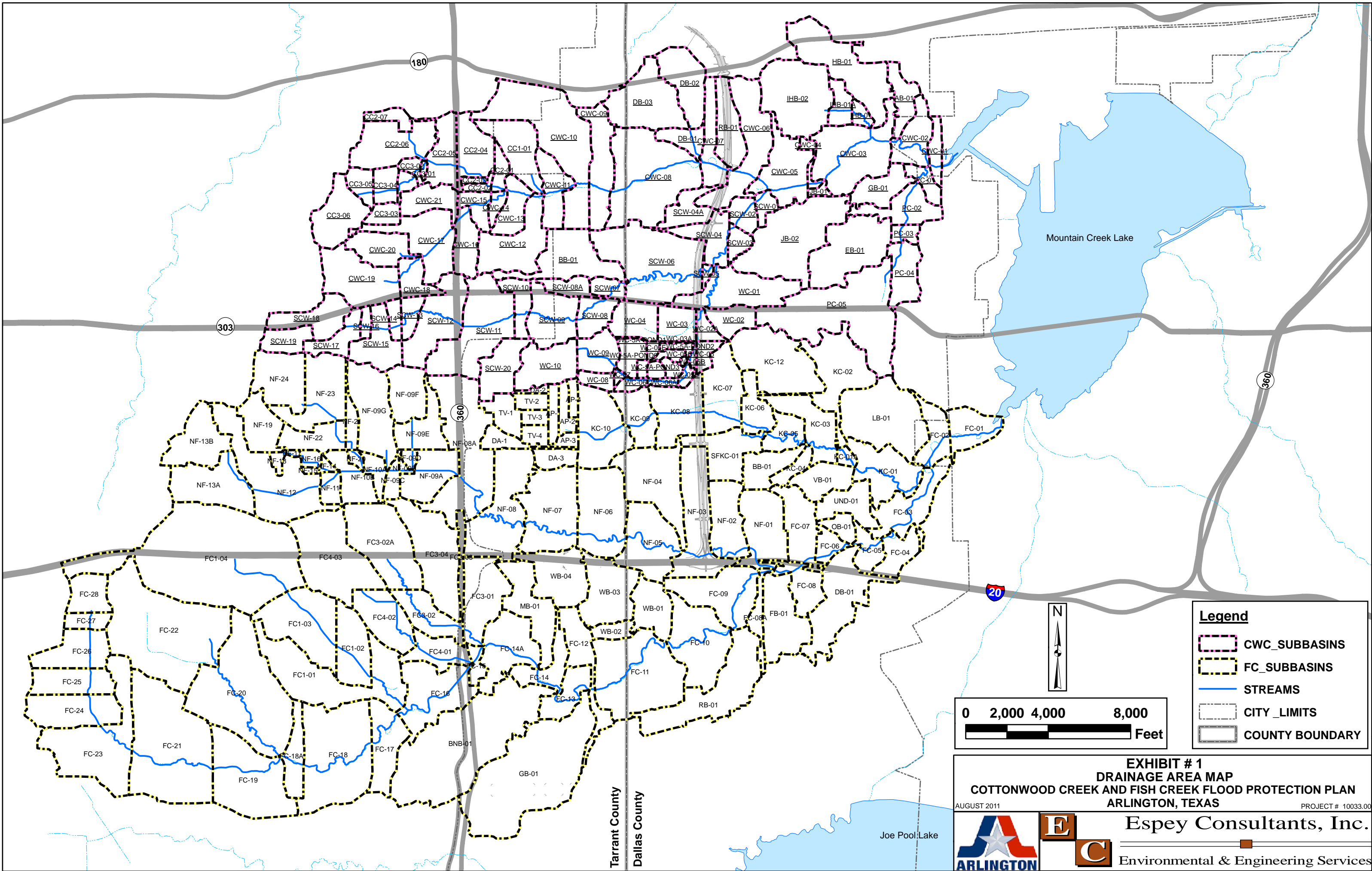
US Department of Agriculture, Natural Resources Conservation Service
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US Department of Commerce
Technical Paper No. 40 – Rainfall Frequency Atlas of the United States
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US Fish and Wildlife Service, Division of Habitat and Resource Conservation
National Spatial Data Infrastructure, Wetlands Mapper. Accessed August 1, 2011.

Appendix **A**
Exhibits

- Exhibit 1 – Drainage Area Map
- Exhibit 2 – Soils Map
- Exhibit 3 – Existing Land Use Map
- Exhibit 4 – Ultimate Land Use Map
- Exhibit 5 – Cottonwood Creek HEC-RAS Cross-Section Location Map
- Exhibit 5A – Fish Creek HEC-RAS Cross-Section Location Map
- Exhibit 6 – Cottonwood Creek Flood Plain Map
- Exhibit 6A – Fish Creek Flood Plain Map



Legend

- CWC_SUBBASINS
- FC_SUBBASINS
- STREAMS
- CITY_LIMITS
- COUNTY_BOUNDARY

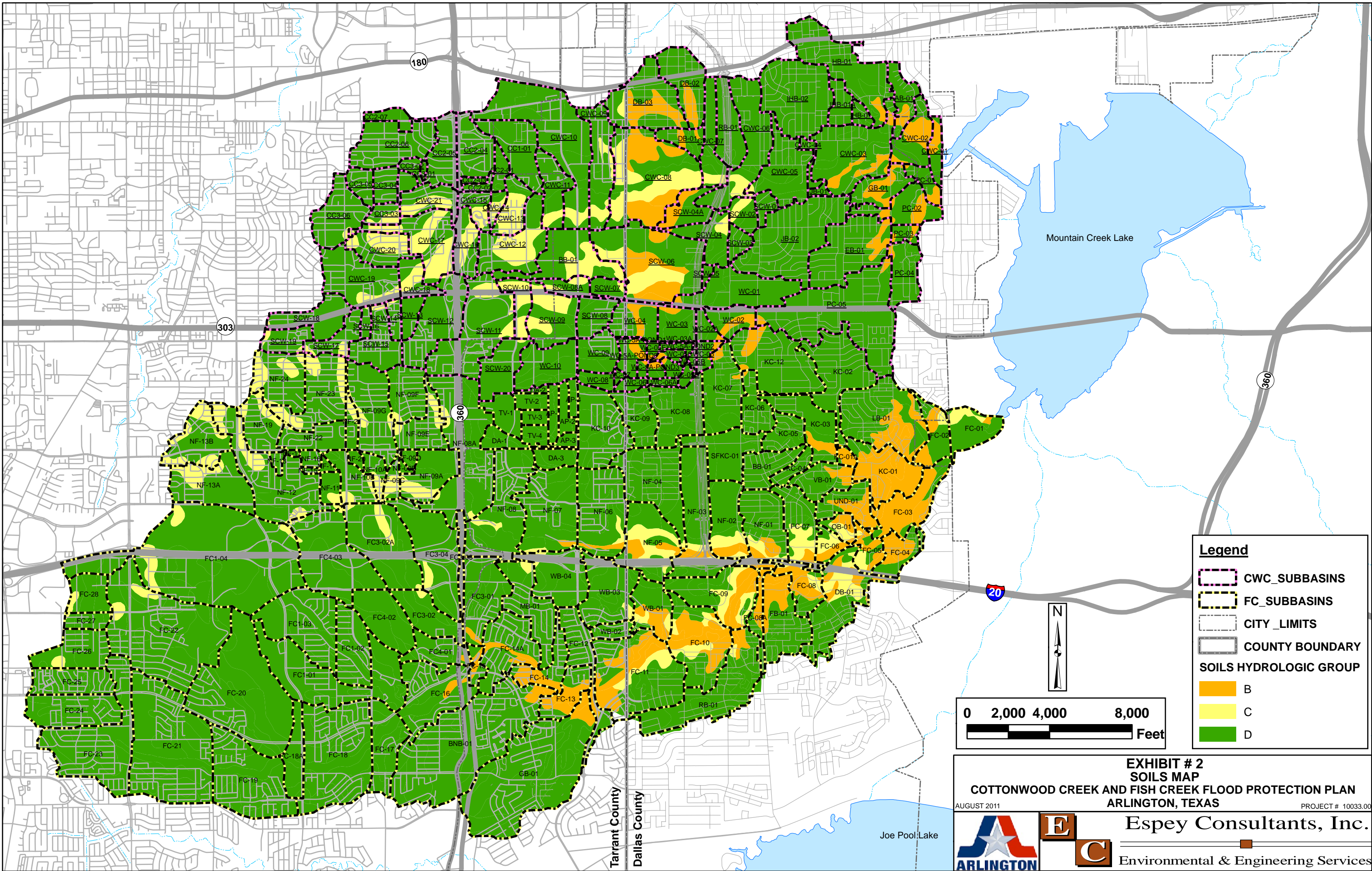
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EXHIBIT # 1
DRAINAGE AREA MAP
COTTONWOOD CREEK AND FISH CREEK FLOOD PROTECTION PLAN
ARLINGTON, TEXAS

AUGUST 2011 PROJECT # 10033.00

Espey Consultants, Inc.
 Environmental & Engineering Services



Legend

- CWC_SUBBASINS
- FC_SUBBASINS
- CITY_LIMITS
- COUNTY_BOUNDARY

SOILS HYDROLOGIC GROUP

- B
- C
- D

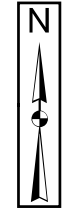
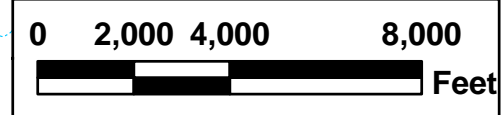
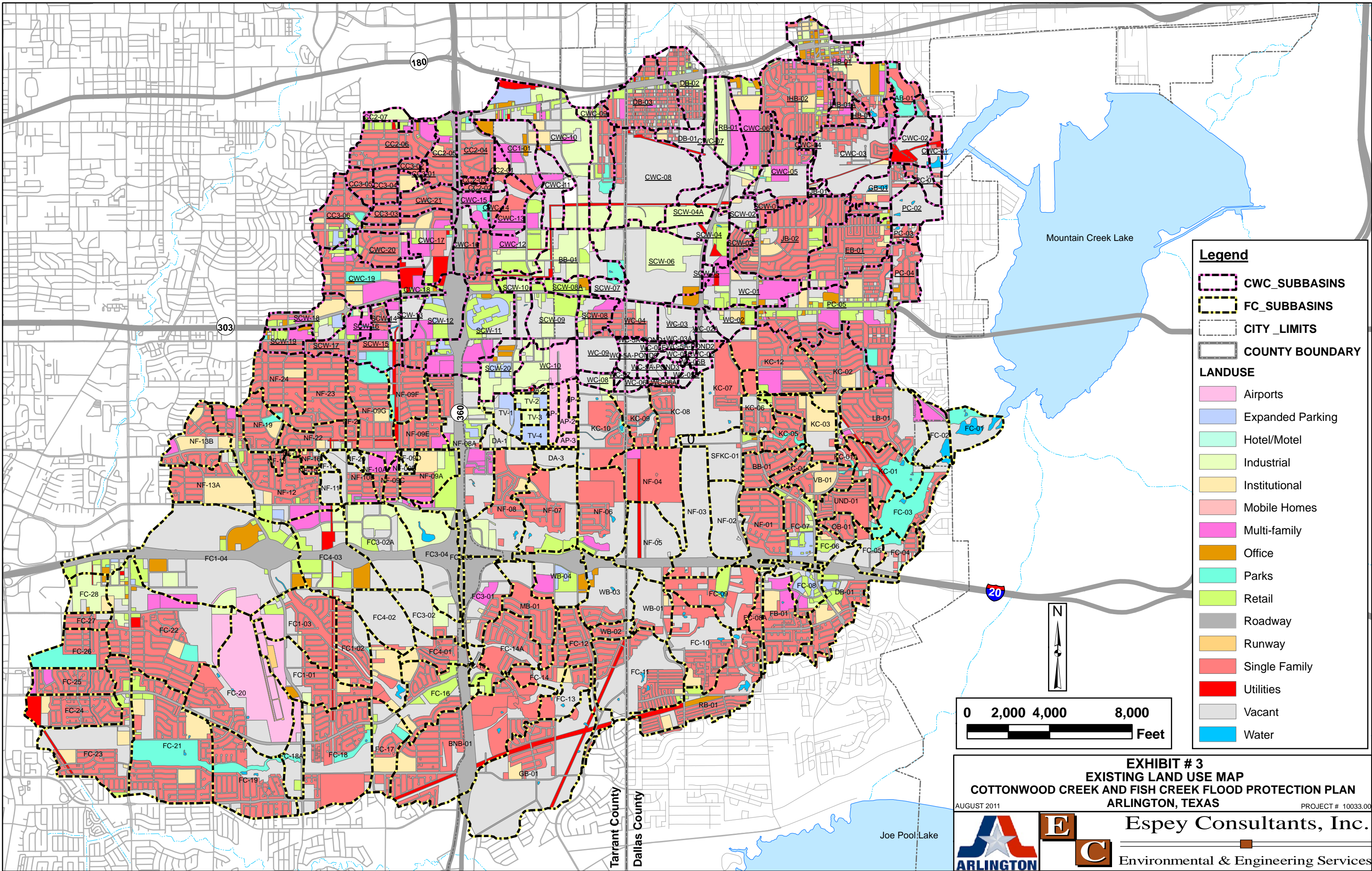


EXHIBIT # 2
SOILS MAP
COTTONWOOD CREEK AND FISH CREEK FLOOD PROTECTION PLAN
ARLINGTON, TEXAS

AUGUST 2011 PROJECT # 10033.00

Espey Consultants, Inc.
 Environmental & Engineering Services



Legend

- CWC_SUBBASINS
- FC_SUBBASINS
- CITY_LIMITS
- COUNTY_BOUNDARY

LANDUSE

- Airports
- Expanded Parking
- Hotel/Motel
- Industrial
- Institutional
- Mobile Homes
- Multi-family
- Office
- Parks
- Retail
- Roadway
- Runway
- Single Family
- Utilities
- Vacant
- Water

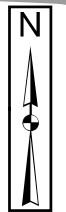
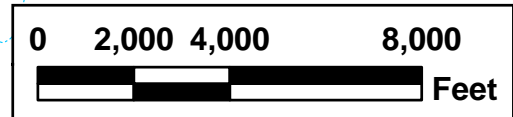
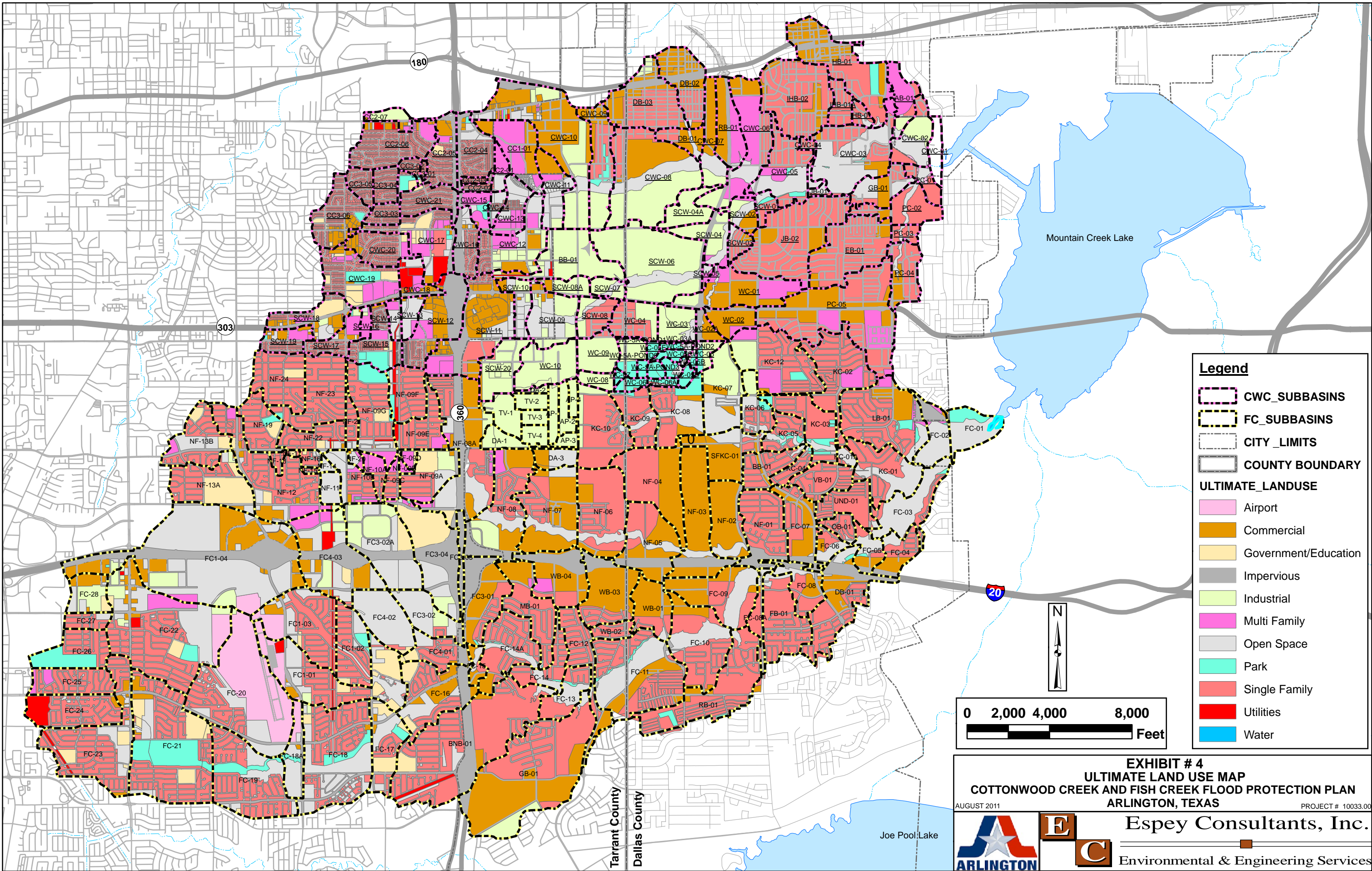


EXHIBIT # 3
EXISTING LAND USE MAP
COTTONWOOD CREEK AND FISH CREEK FLOOD PROTECTION PLAN
ARLINGTON, TEXAS

PROJECT # 10033.00

AUGUST 2011

Espey Consultants, Inc.
 Environmental & Engineering Services



Legend

- CWC_SUBBASINS
- FC_SUBBASINS
- CITY_LIMITS
- COUNTY_BOUNDARY

ULTIMATE_LANDUSE

- Airport
- Commercial
- Government/Education
- Impervious
- Industrial
- Multi Family
- Open Space
- Park
- Single Family
- Utilities
- Water

N

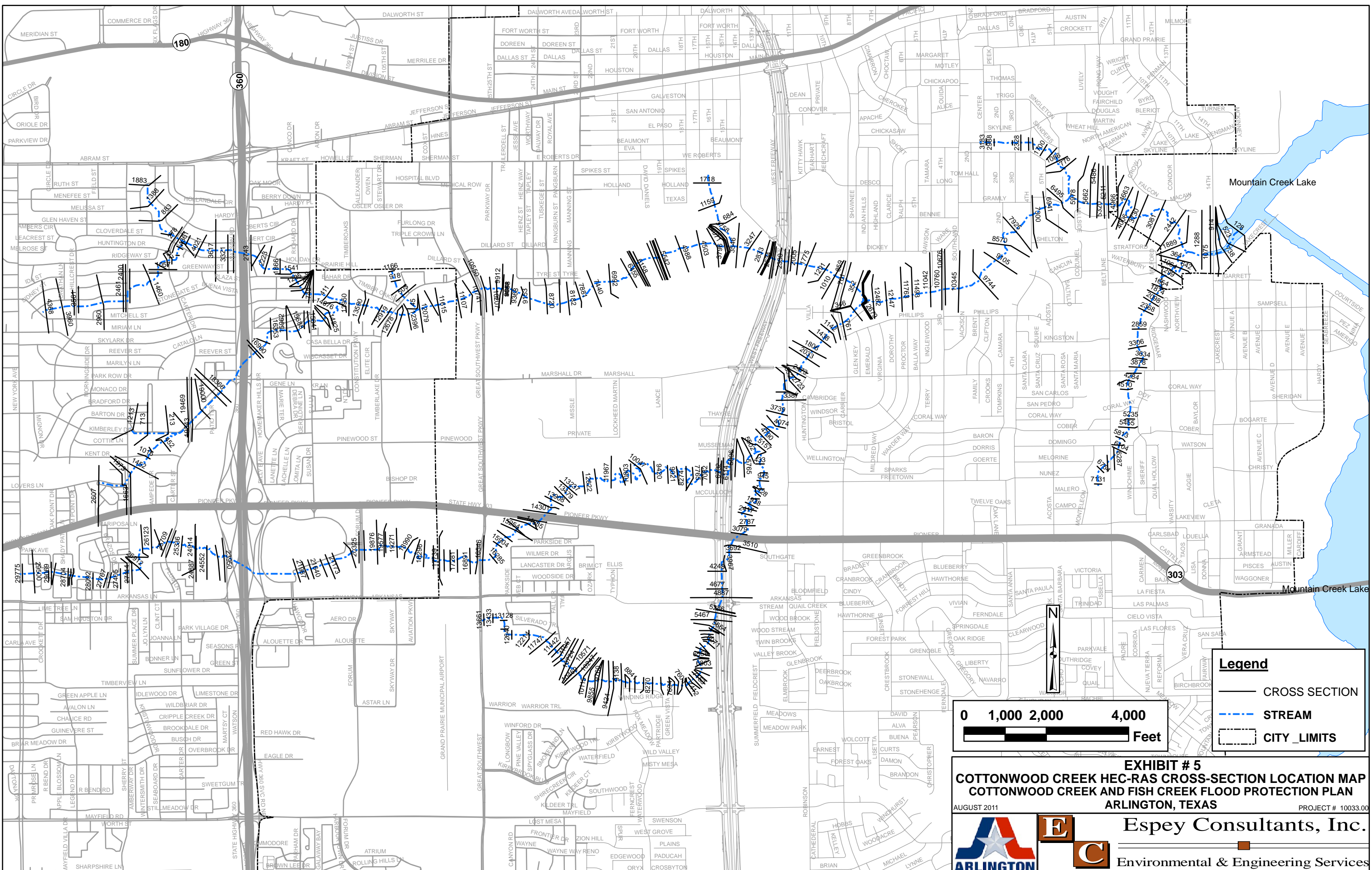
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EXHIBIT # 4
ULTIMATE LAND USE MAP
COTTONWOOD CREEK AND FISH CREEK FLOOD PROTECTION PLAN
ARLINGTON, TEXAS

AUGUST 2011 PROJECT # 10033.00

Espey Consultants, Inc.

Environmental & Engineering Services



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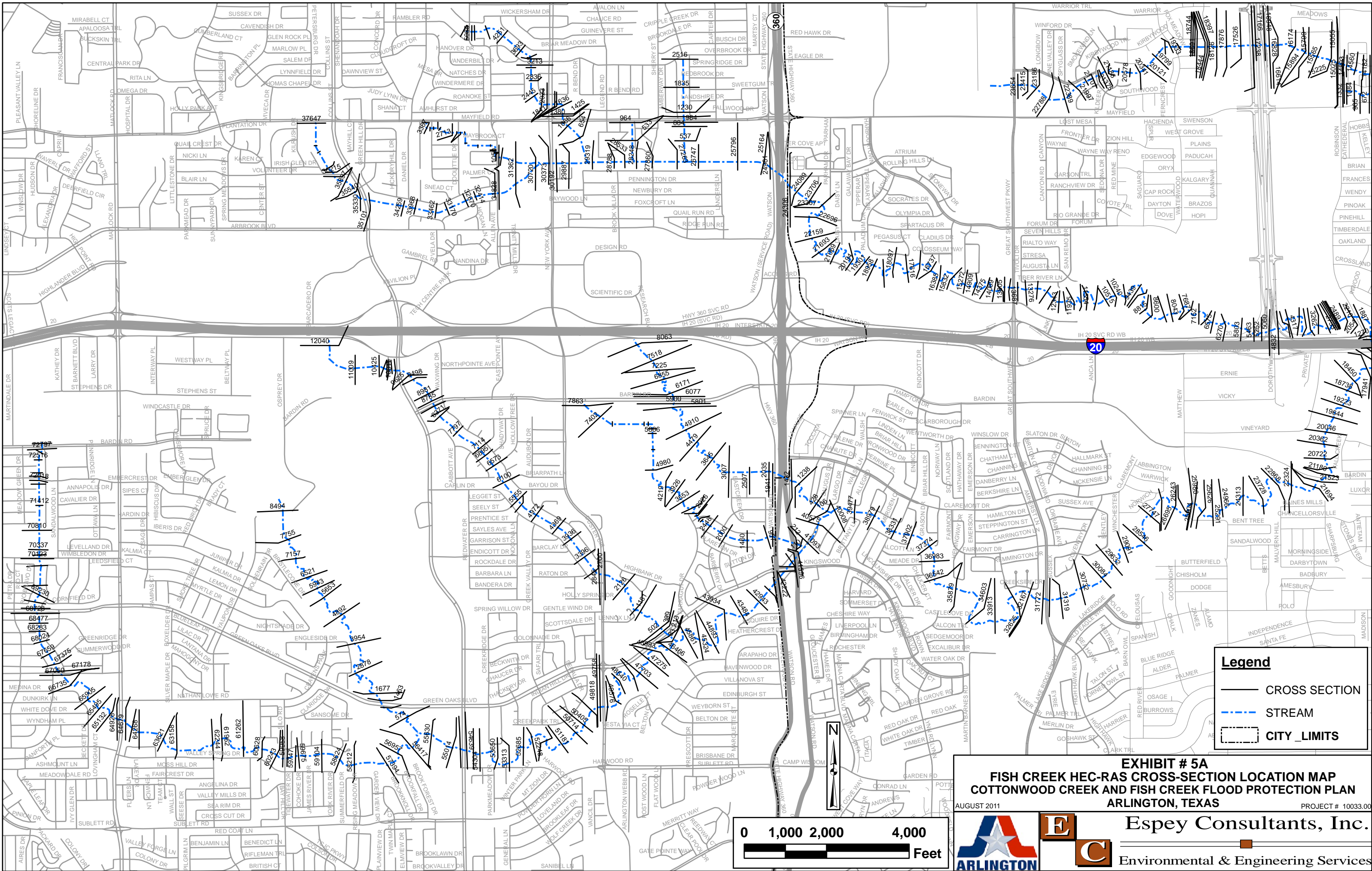
- CROSS SECTION
- STREAM
- CITY LIMITS

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EXHIBIT # 5
COTTONWOOD CREEK HEC-RAS CROSS-SECTION LOCATION MAP
COTTONWOOD CREEK AND FISH CREEK FLOOD PROTECTION PLAN
ARLINGTON, TEXAS

AUGUST 2011 PROJECT # 10033.00

Espey Consultants, Inc.
 Environmental & Engineering Services



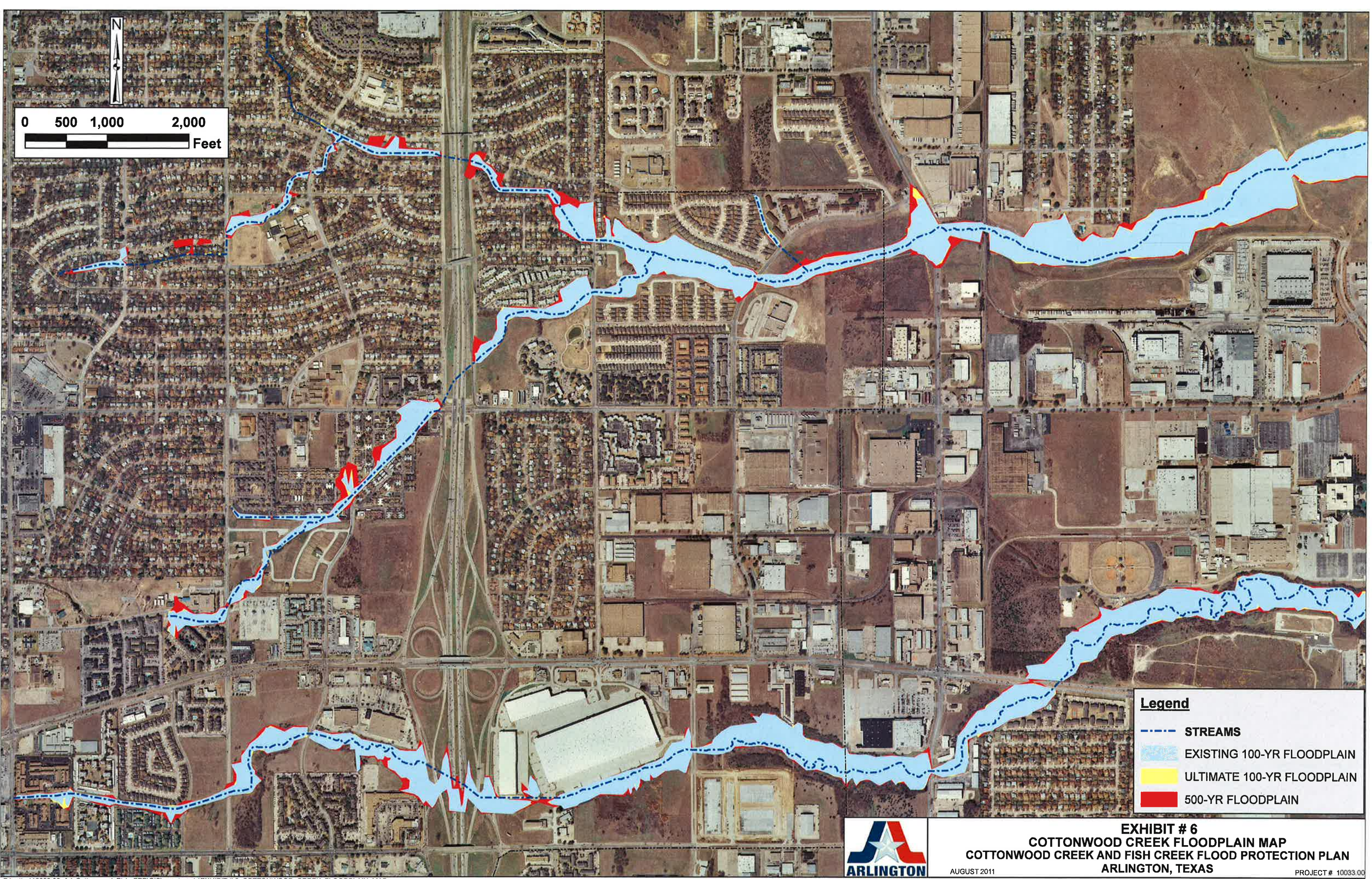
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- CROSS SECTION
- - - - - STREAM
- - - - - CITY LIMITS

EXHIBIT # 5A
FISH CREEK HEC-RAS CROSS-SECTION LOCATION MAP
COTTONWOOD CREEK AND FISH CREEK FLOOD PROTECTION PLAN
ARLINGTON, TEXAS

AUGUST 2011 PROJECT # 10033.00

Espey Consultants, Inc.
 Environmental & Engineering Services



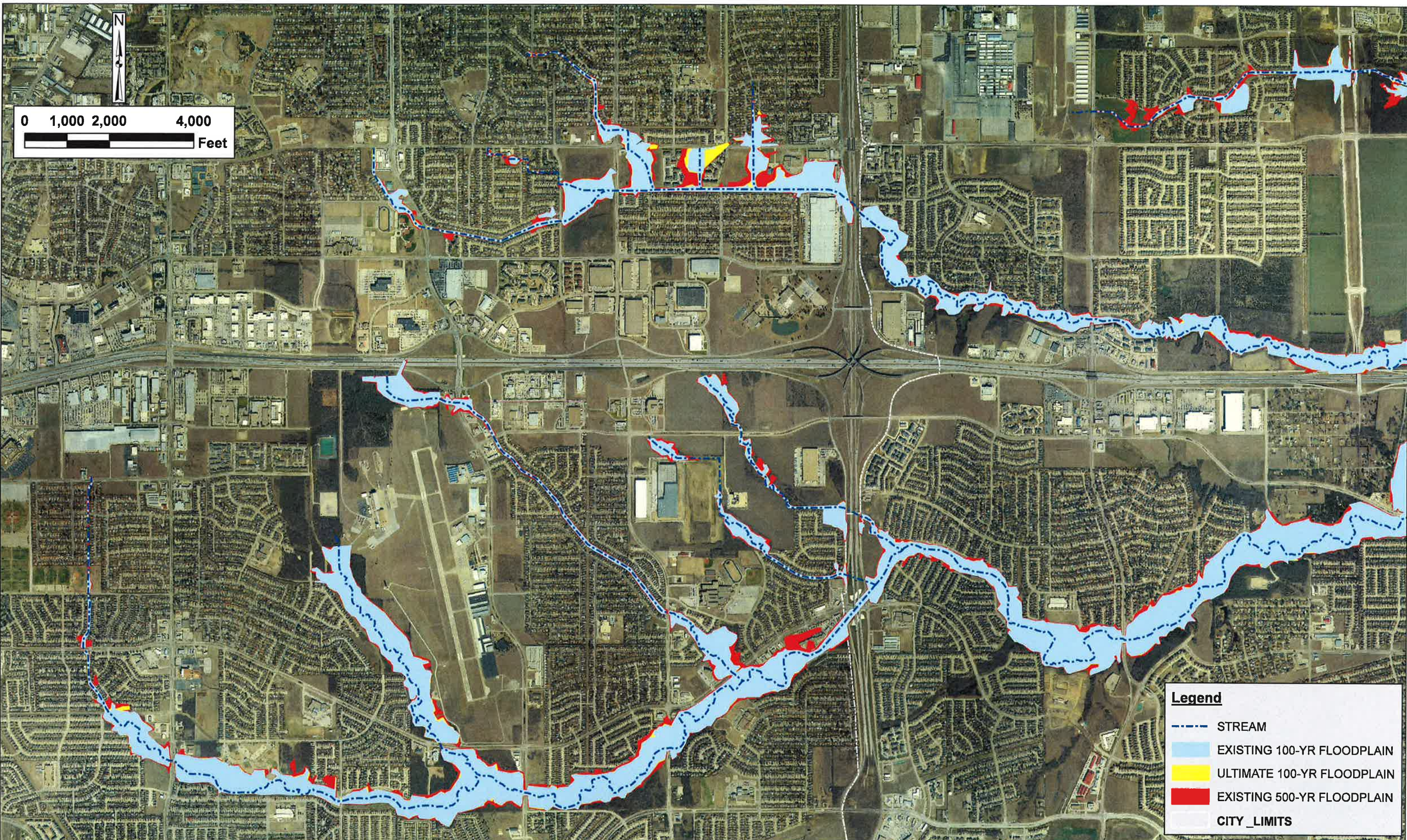
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- Legend**
- - - STREAMS
 - EXISTING 100-YR FLOODPLAIN
 - ULTIMATE 100-YR FLOODPLAIN
 - 500-YR FLOODPLAIN



EXHIBIT # 6
COTTONWOOD CREEK FLOODPLAIN MAP
COTTONWOOD CREEK AND FISH CREEK FLOOD PROTECTION PLAN
ARLINGTON, TEXAS

AUGUST 2011 PROJECT # 10033.00



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Legend

- STREAM
- EXISTING 100-YR FLOODPLAIN
- ULTIMATE 100-YR FLOODPLAIN
- EXISTING 500-YR FLOODPLAIN
- CITY_LIMITS



E Espey Consultants, Inc.
C Environmental & Engineering Services

EXHIBIT # 6A
FISH CREEK FLOODPLAIN MAP
COTTONWOOD CREEK AND FISH CREEK FLOOD PROTECTION PLAN
ARLINGTON, TEXAS
AUGUST 2011 PROJECT # 10033.00

Appendix **B**
Weighted Curve Number Table

**Cottonwood Creek
Weighted Curve Number**

| Subbasin | Area (sm) | Curve Number | Subbasin | Area (sm) | Curve Number | Subbasin | Area (sm) | Curve Number |
|----------|-----------|--------------|----------|-----------|--------------|-------------|-----------|--------------|
| AB-01 | 0.11 | 76.6 | IHB-01 | 0.035 | 80.1 | WC-05E | 0.021 | 76.0 |
| BB-01 | 0.290 | 78.1 | IHB-02 | 0.076 | 79.9 | WC-06 | 0.033 | 80.0 |
| CC1-01 | 0.210 | 80.0 | IHB-03 | 0.390 | 80.0 | WC-06A | 0.017 | 80.0 |
| CC2-01 | 0.050 | 80.0 | JB-01 | 0.020 | 79.8 | WC-07 | 0.011 | 80.0 |
| CC2-02 | 0.020 | 80.0 | JB-02 | 0.490 | 80.0 | WC-08 | 0.050 | 80.0 |
| CC2-03 | 0.010 | 80.0 | PC-01 | 0.060 | 74.4 | WC-09 | 0.130 | 79.7 |
| CC2-04 | 0.170 | 80.0 | PC-02 | 0.170 | 74.9 | WC-10 | 0.190 | 80.0 |
| CC2-05 | 0.160 | 80.0 | PC-03 | 0.040 | 75.7 | WC-5A-POND1 | 0.023 | 80.0 |
| CC2-06 | 0.270 | 80.0 | PC-04 | 0.150 | 79.0 | WC-5A-POND2 | 0.024 | 75.0 |
| CC2-07 | 0.050 | 80.0 | PC-05 | 0.660 | 79.5 | WC-5A-POND3 | 0.026 | 78.0 |
| CC3-01 | 0.010 | 78.9 | RB-01 | 0.160 | 80.0 | WC-5A-POND4 | 0.024 | 74.0 |
| CC3-02 | 0.030 | 78.9 | SCW-01 | 0.050 | 80.0 | WC-5A-POND5 | 0.016 | 77.0 |
| CC3-03 | 0.090 | 79.9 | SCW-02 | 0.080 | 78.4 | WC-5A-POND6 | 0.075 | 76.0 |
| CC3-04 | 0.070 | 78.9 | SCW-03 | 0.050 | 80.0 | | | |
| CC3-05 | 0.070 | 79.9 | SCW-04 | 0.140 | 78.7 | | | |
| CC3-06 | 0.210 | 79.9 | SCW-04A | 0.120 | 72.7 | | | |
| CWC-01 | 0.060 | 72.1 | SCW-05 | 0.020 | 80.0 | | | |
| CWC-02 | 0.160 | 72.3 | SCW-06 | 0.540 | 73.4 | | | |
| CWC-03 | 0.400 | 77.3 | SCW-07 | 0.050 | 79.3 | | | |
| CWC-04 | 0.030 | 80.0 | SCW-08 | 0.110 | 80.1 | | | |
| CWC-05 | 0.250 | 79.9 | SCW-08A | 0.072 | 79.4 | | | |
| CWC-06 | 0.330 | 79.4 | SCW-09 | 0.220 | 77.6 | | | |
| CWC-07 | 0.140 | 79.2 | SCW-10 | 0.090 | 75.5 | | | |
| CWC-08 | 0.570 | 71.6 | SCW-11 | 0.420 | 79.3 | | | |
| CWC-09 | 0.230 | 78.9 | SCW-12 | 0.280 | 79.7 | | | |
| CWC-10 | 0.570 | 79.7 | SCW-13 | 0.060 | 79.7 | | | |
| CWC-11 | 0.150 | 79.2 | SCW-14 | 0.040 | 79.7 | | | |
| CWC-12 | 0.270 | 77.7 | SCW-15 | 0.170 | 79.7 | | | |
| CWC-13 | 0.120 | 76.1 | SCW-16 | 0.030 | 79.7 | | | |
| CWC-14 | 0.040 | 76.5 | SCW-17 | 0.110 | 79.7 | | | |
| CWC-15 | 0.080 | 77.8 | SCW-18 | 0.170 | 79.9 | | | |
| CWC-16 | 0.130 | 77.2 | SCW-19 | 0.100 | 79.3 | | | |
| CWC-17 | 0.270 | 76.4 | SCW-20 | 0.170 | 79.9 | | | |
| CWC-18 | 0.090 | 78.8 | WC-01 | 0.290 | 79.3 | | | |
| CWC-19 | 0.290 | 78.8 | WC-02 | 0.100 | 75.5 | | | |
| CWC-20 | 0.150 | 76.9 | WC-02A | 0.056 | 76.1 | | | |
| CWC-21 | 0.130 | 77.9 | WC-03 | 0.115 | 78.0 | | | |
| DB-01 | 0.080 | 76.4 | WC-03A | 0.004 | 80.0 | | | |
| DB-02 | 0.210 | 76.6 | WC-04 | 0.147 | 76.0 | | | |
| DB-03 | 0.320 | 74.4 | WC-05 | 0.044 | 77.0 | | | |
| EB-01 | 0.350 | 78.0 | WC-05B | 0.016 | 80.0 | | | |
| GB-01 | 0.140 | 72.9 | WC-05C | 0.006 | 80.0 | | | |
| HB-01 | 0.380 | 79.2 | WC-05D | 0.024 | 80.0 | | | |

**Fish Creek
Weighted Curve Number**

| Subbasin | Area (sm) | Curve Number |
|----------|-----------|--------------|
| AP-1 | 0.052 | 80 |
| AP-2 | 0.054 | 80 |
| AP-3 | 0.025 | 80 |
| AP-4 | 0.032 | 80 |
| BB-01 | 0.133 | 80 |
| BNB-01 | 0.873 | 79.3 |
| DA-1 | 0.067 | 80 |
| DA-2 | 0.015 | 80 |
| DA-3 | 0.075 | 80 |
| DB-01 | 0.344 | 75.8 |
| FB-01 | 0.256 | 73.9 |
| FC-01 | 0.15 | 78.4 |
| FC-02 | 0.134 | 72.7 |
| FC-03 | 0.233 | 65.2 |
| FC-04 | 0.116 | 69.7 |
| FC-05 | 0.088 | 68.8 |
| FC-06 | 0.064 | 70.4 |
| FC-07 | 0.205 | 76.5 |
| FC-08 | 0.138 | 68.6 |
| FC-08A | 0.072 | 70.6 |
| FC-09 | 0.295 | 73.4 |
| FC-10 | 0.347 | 70.5 |
| FC1-01 | 0.497 | 80 |
| FC1-02 | 0.209 | 80 |
| FC1-03 | 0.369 | 80 |
| FC1-04 | 1.258 | 79.6 |
| FC-11 | 0.523 | 73.5 |
| FC-12 | 0.191 | 78 |
| FC-13 | 0.134 | 70 |
| FC-14 | 0.134 | 72.2 |
| FC-14A | 0.264 | 77.4 |
| FC-15 | 0.044 | 73.1 |
| FC-16 | 0.322 | 79 |
| FC-17 | 0.209 | 80 |
| FC-18 | 0.58 | 80 |
| FC-18A | 0.127 | 80 |
| FC-19 | 0.447 | 80 |
| FC-20 | 0.728 | 80 |
| FC-21 | 0.736 | 80 |
| FC-22 | 0.819 | 79.7 |
| FC-23 | 0.491 | 80 |
| FC-24 | 0.247 | 79.7 |
| FC-25 | 0.18 | 79.7 |

| Subbasin | Area (sm) | Curve Number |
|----------|-----------|--------------|
| FC-26 | 0.197 | 79.7 |
| FC-27 | 0.063 | 79.7 |
| FC-28 | 0.125 | 79.7 |
| FC3-01 | 0.141 | 79.2 |
| FC3-02 | 0.216 | 79.9 |
| FC3-03 | 0.441 | 79.9 |
| FC4-01 | 0.258 | 79.2 |
| FC4-02 | 0.167 | 79.5 |
| FC4-02A | 0.378 | 79.5 |
| FC4-03 | 0.05 | 80 |
| FC4-04 | 0.367 | 79.7 |
| GB-01 | 0.841 | 79.1 |
| KC-01 | 0.25 | 62.9 |
| KC-01A | 0.027 | 63.6 |
| KC-02 | 0.317 | 79.9 |
| KC-03 | 0.205 | 77.6 |
| KC-04 | 0.056 | 79.9 |
| KC-05 | 0.108 | 80 |
| KC-06 | 0.122 | 79.6 |
| KC-07 | 0.248 | 78.9 |
| KC-08 | 0.238 | 80 |
| KC-09 | 0.152 | 80 |
| KC-10 | 0.294 | 80 |
| KC-12 | 0.367 | 78 |
| LB-01 | 0.422 | 73.9 |
| MB-01 | 0.242 | 79.7 |
| NF-01 | 0.269 | 75.8 |
| NF-02 | 0.214 | 76.3 |
| NF-03 | 0.348 | 78 |
| NF-04 | 0.336 | 79.9 |
| NF-05 | 0.294 | 75.6 |
| NF-06 | 0.35 | 78.9 |
| NF-07 | 0.377 | 79.5 |
| NF-08 | 0.4 | 79.8 |
| NF-08A | 0.545 | 79.8 |
| NF-09A | 0.186 | 79 |
| NF-09B | 0.011 | 79 |
| NF-09C | 0.048 | 79 |
| NF-09D | 0.022 | 79 |
| NF-09E | 0.161 | 79 |
| NF-09F | 0.164 | 79 |
| NF-09G | 0.292 | 79.5 |
| NF-10A | 0.059 | 78.5 |

| Subbasin | Area (sm) | Curve Number |
|----------|-----------|--------------|
| NF-10B | 0.189 | 78.5 |
| NF-11 | 0.055 | 78.5 |
| NF-12 | 0.452 | 79.1 |
| NF-13A | 0.283 | 78 |
| NF-13B | 0.223 | 78 |
| NF-14 | 0.016 | 78.9 |
| NF-15 | 0.009 | 78.9 |
| NF-16 | 0.03 | 78.9 |
| NF-17 | 0.006 | 78.9 |
| NF-18 | 0.022 | 79.1 |
| NF-19 | 0.158 | 78.9 |
| NF-20 | 0.019 | 78.5 |
| NF-21 | 0.055 | 78.5 |
| NF-22 | 0.138 | 78.5 |
| NF-23 | 0.284 | 78.5 |
| NF-24 | 0.223 | 78.5 |
| OB-01 | 0.059 | 69.7 |
| RB-01 | 0.425 | 78.7 |
| SFKC-01 | 0.208 | 80 |
| TV-1 | 0.096 | 80 |
| TV-2 | 0.047 | 80 |
| TV-3 | 0.034 | 80 |
| TV-4 | 0.046 | 80 |
| UNK-F | 0.148 | 70.9 |
| VB-01 | 0.139 | 75.9 |
| WB-01 | 0.164 | 73.2 |
| WB-02 | 0.056 | 79.9 |
| WB-03 | 0.268 | 79.8 |
| WB-04 | 0.244 | 79.5 |

Appendix **C**
Weighted Land Use Table

Cottonwood Creek
Impervious Cover

| Subbasin | Existing Impervious Cover | Ultimate Impervious Cover | Subbasin | Existing Impervious Cover | Ultimate Impervious Cover | Subbasin | Existing Impervious Cover | Ultimate Impervious Cover |
|----------|---------------------------|---------------------------|----------|---------------------------|---------------------------|-------------|---------------------------|---------------------------|
| AB-01 | 22.9 | 38 | GB-01 | 21.3 | 38 | WC-05 | 29.0 | 50 |
| BB-01 | 56.8 | 84.7 | HB-01 | 50.3 | 60.2 | WC-05B | 43.0 | 43 |
| CC1-01 | 31.5 | 75.3 | IHB-01 | 33.5 | 35.1 | WC-05C | 48.0 | 48 |
| CC2-01 | 39.6 | 46.4 | IHB-02 | 35.0 | 43.9 | WC-05D | 30.0 | 30 |
| CC2-02 | 39.6 | 39.6 | IHB-03 | 41.0 | 41 | WC-05E | 33.0 | 33 |
| CC2-03 | 39.6 | 39.6 | JB-01 | 11.5 | 14.7 | WC-06 | 4.0 | 50 |
| CC2-04 | 39.6 | 39.6 | JB-02 | 39.9 | 46.9 | WC-06A | 18.0 | 50 |
| CC2-05 | 39.6 | 39.6 | PC-01 | 9.4 | 35.9 | WC-07 | 0.0 | 50 |
| CC2-06 | 49.9 | 49.9 | PC-02 | 13.4 | 56.9 | WC-08 | 20.0 | 63 |
| CC2-07 | 49.9 | 59.1 | PC-03 | 30.0 | 56 | WC-09 | 8.0 | 63 |
| CC3-01 | 37.7 | 37.7 | PC-04 | 35.2 | 53.7 | WC-10 | 60.0 | 80 |
| CC3-02 | 37.7 | 37.7 | PC-05 | 45.5 | 60.9 | WC-5A-POND1 | 62.0 | 62 |
| CC3-03 | 43.3 | 43.3 | RB-01 | 70.7 | 83.7 | WC-5A-POND2 | 43.0 | 43 |
| CC3-04 | 37.7 | 37.7 | SCW-01 | 25.3 | 25.3 | WC-5A-POND3 | 38.0 | 38 |
| CC3-05 | 43.3 | 43.3 | SCW-02 | 19.2 | 31.2 | WC-5A-POND4 | 28.0 | 28 |
| CC3-06 | 43.3 | 43.3 | SCW-03 | 37.1 | 42 | WC-5A-POND5 | 16.0 | 16 |
| CWC-01 | 25.5 | 52.3 | SCW-04 | 43.9 | 87.1 | WC-5A-POND6 | 49.0 | 49 |
| CWC-02 | 18.6 | 25.9 | SCW-04A | 61.1 | 61.1 | | | |
| CWC-03 | 15.5 | 26.5 | SCW-05 | 29.5 | 71 | | | |
| CWC-04 | 26.4 | 26.4 | SCW-06 | 33.6 | 90 | | | |
| CWC-05 | 30.2 | 32.3 | SCW-07 | 1.1 | 90 | | | |
| CWC-06 | 46.5 | 62.4 | SCW-08 | 53.5 | 64.7 | | | |
| CWC-07 | 37.9 | 75 | SCW-08A | 58.5 | 90.5 | | | |
| CWC-08 | 21.1 | 75 | SCW-09 | 44.8 | 49.9 | | | |
| CWC-09 | 48.1 | 65.5 | SCW-10 | 33.7 | 46.6 | | | |
| CWC-10 | 58.2 | 84.9 | SCW-11 | 63.1 | 75.1 | | | |
| CWC-11 | 17.8 | 48 | SCW-12 | 43.3 | 53.5 | | | |
| CWC-12 | 64.7 | 67.3 | SCW-13 | 17.7 | 43.3 | | | |
| CWC-13 | 44.2 | 44.2 | SCW-14 | 29.5 | 43.3 | | | |
| CWC-14 | 26.4 | 26.4 | SCW-15 | 33.6 | 43.3 | | | |
| CWC-15 | 49.4 | 56.8 | SCW-16 | 43.3 | 63.8 | | | |
| CWC-16 | 32.3 | 63.9 | SCW-17 | 43.3 | 51.2 | | | |
| CWC-17 | 45.4 | 56.2 | SCW-18 | 49.5 | 64.1 | | | |
| CWC-18 | 46.2 | 52.8 | SCW-19 | 56.3 | 65.2 | | | |
| CWC-19 | 46.2 | 53.7 | SCW-20 | 71.8 | 88.9 | | | |
| CWC-20 | 45.9 | 55.7 | WC-01 | 48.7 | 83.9 | | | |
| CWC-21 | 37.5 | 38 | WC-02 | 19.1 | 87.9 | | | |
| DB-01 | 11.6 | 75.4 | WC-02A | 18.5 | 94.7 | | | |
| DB-02 | 41.1 | 41.1 | WC-03 | 25.0 | 74 | | | |
| DB-03 | 38.6 | 38.6 | WC-03A | 39.0 | 39 | | | |
| EB-01 | 39.2 | 46.7 | WC-04 | 58.0 | 74 | | | |

**Fish Creek
Impervious Cover**

| Subbasin | Existing Impervious Cover (%) | Ultimate Impervious Cover (%) |
|----------|-------------------------------|-------------------------------|
| AP-1 | 7 | 7 |
| AP-2 | 54 | 54 |
| AP-3 | 31 | 31 |
| AP-4 | 90 | 90 |
| BB-01 | 36.68 | 36.7 |
| BNB-01 | 32.14 | 51.6 |
| DA-1 | 90 | 90 |
| DA-2 | 90 | 90 |
| DA-3 | 12 | 12 |
| DB-01 | 39.2 | 39.2 |
| FB-01 | 40.93 | 40.93 |
| FC-01 | 25.32 | 25.32 |
| FC-02 | 27.24 | 27.24 |
| FC-03 | 16.82 | 16.82 |
| FC-04 | 21.15 | 43.4 |
| FC-05 | 13.19 | 45.5 |
| FC-06 | 38.38 | 41.1 |
| FC-07 | 53.71 | 71.4 |
| FC-08 | 58.74 | 58.74 |
| FC-08A | 38.08 | 47.7 |
| FC-09 | 34.05 | 54.9 |
| FC-10 | 24.6 | 37.9 |
| FC1-01 | 34.71 | 41.7 |
| FC1-02 | 41.8 | 43 |
| FC1-03 | 49 | 50 |
| FC1-04 | 29.33 | 29.33 |
| FC-11 | 21.73 | 25 |
| FC-12 | 31.38 | 36 |
| FC-13 | 22.17 | 28.2 |
| FC-14 | 31.09 | 31.1 |
| FC-14A | 37.2 | 37.2 |
| FC-15 | 28.06 | 56.4 |
| FC-16 | 43.32 | 43.32 |
| FC-17 | 25.39 | 39.5 |
| FC-18 | 27.34 | 39 |
| FC-18A | 17.82 | 28.2 |
| FC-19 | 28.4 | 41.3 |
| FC-20 | 31.66 | 37.3 |
| FC-21 | 30.86 | 42.1 |
| FC-22 | 37.08 | 47.5 |
| FC-23 | 26.85 | 48.7 |
| FC-24 | 43.6 | 52.8 |
| FC-25 | 0 | 52.8 |

| Subbasin | Existing Impervious Cover (%) | Ultimate Impervious Cover (%) |
|----------|-------------------------------|-------------------------------|
| FC-26 | 0 | 33.1 |
| FC-27 | 0 | 52.1 |
| FC-28 | 54.6 | 54.6 |
| FC3-01 | 33.05 | 33.1 |
| FC3-02 | 34.29 | 34.3 |
| FC3-03 | 34.29 | 34.3 |
| FC4-01 | 26.59 | 74.6 |
| FC4-02 | 32.95 | 44.7 |
| FC4-02A | 32.9 | 52.3 |
| FC4-03 | 35 | 52.3 |
| FC4-04 | 50.33 | 58.7 |
| GB-01 | 14.01 | 50.3 |
| KC-01 | 25.5 | 25.5 |
| KC-01A | 28.8 | 28.8 |
| KC-02 | 36.42 | 42.4 |
| KC-03 | 32.28 | 32.3 |
| KC-04 | 35.11 | 35.11 |
| KC-05 | 33.34 | 33.34 |
| KC-06 | 34.98 | 45.5 |
| KC-07 | 21.3 | 50.8 |
| KC-08 | 15.73 | 55.7 |
| KC-09 | 21.19 | 35.5 |
| KC-10 | 25.13 | 55.7 |
| KC-12 | 40.21 | 47.4 |
| LB-01 | 29.16 | 46.1 |
| MB-01 | 28.93 | 53.3 |
| NF-01 | 36.26 | 40.5 |
| NF-02 | 3.62 | 80.9 |
| NF-03 | 8.15 | 84.4 |
| NF-04 | 32.82 | 47.7 |
| NF-05 | 9.89 | 51 |
| NF-06 | 29.73 | 47 |
| NF-07 | 26.02 | 59.3 |
| NF-08 | 32.1 | 60.4 |
| NF-08A | 43.14 | 66.9 |
| NF-09A | 43.44 | 54.5 |
| NF-09B | 43.44 | 54.5 |
| NF-09C | 43.4 | 54.5 |
| NF-09D | 43.44 | 54.5 |
| NF-09E | 43.44 | 54.5 |
| NF-09F | 43.44 | 54.5 |
| NF-09G | 35.27 | 45.4 |
| NF-10A | 33.8 | 51 |

| Subbasin | Existing Impervious Cover (%) | Ultimate Impervious Cover (%) |
|----------|-------------------------------|-------------------------------|
| NF-10B | 33.8 | 51 |
| NF-11 | 33.8 | 52.1 |
| NF-12 | 38.72 | 52.1 |
| NF-13A | 36.98 | 48.5 |
| NF-13B | 36.9 | 48.5 |
| NF-14 | 33.73 | 48 |
| NF-15 | 33.73 | 48 |
| NF-16 | 33.73 | 48 |
| NF-17 | 33.73 | 48 |
| NF-18 | 38.72 | 48 |
| NF-19 | 33.73 | 48 |
| NF-20 | 35.45 | 50.6 |
| NF-21 | 35.45 | 51 |
| NF-22 | 35.45 | 51 |
| NF-23 | 35.45 | 51 |
| NF-24 | 35.45 | 51 |
| OB-01 | 35.86 | 36.3 |
| RB-01 | 37.22 | 39.7 |
| SFKC-01 | 9.38 | 68 |
| TV-1 | 95 | 95 |
| TV-2 | 95 | 95 |
| TV-3 | 95 | 95 |
| TV-4 | 95 | 95 |
| UNK-F | 36.29 | 36.3 |
| VB-01 | 38.69 | 40.1 |
| WB-01 | 11.55 | 76.7 |
| WB-02 | 32.7 | 38 |
| WB-03 | 17.19 | 79.1 |
| WB-04 | 47.77 | 47.8 |

Appendix **D**
Time of Concentration Spreadsheets

| EXISTING CONDITIONS | | | | | | | | | | | | | |
|--|-------|--------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|--------|--------|
| TR-55 Method of Computing the Time of Concentration | | | | | | | | | | | | | |
| | | | AB_01 | BB_01 | CC1_01 | CC2_01 | CC2_02 | CC2_03 | CC2_04 | CC2_05 | CC2_06 | | |
| Sheet Flow | | | variable | units | | | | | | | | | |
| Manning's roughness coef. | n | n/a | 0.240 | 0.013 | 0.011 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | | |
| Flow Length | L | feet | 50 | 20 | 20 | 45 | 112 | 52 | 109 | 45 | 125 | | |
| 2-year, 24-hour rainfall | P2 | inches | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | | |
| Slope | s | ft/ft | 0.0020 | 0.0050 | 0.0129 | 0.0090 | 0.0100 | 0.0090 | 0.0090 | 0.0090 | 0.0090 | | |
| Travel time | Tt | hours | 0.333 | 0.011 | 0.006 | 0.168 | 0.333 | 0.188 | 0.340 | 0.168 | 0.380 | | |
| Shallow Concentrated Flow | | | min. | 20.0 | 0.6 | 0.4 | 10.1 | 20.0 | 11.3 | 20.4 | 10.1 | 22.8 | |
| Flow Length | L | feet | 665 | 1,820 | 1,730 | 1,725 | 1,093 | 958 | 256 | 1,779 | 1,881 | | |
| Slope | s | ft/ft | 0.007 | 0.010 | 0.012 | 0.024 | 0.026 | 0.023 | 0.000 | 0.010 | 0.011 | | |
| Surface (1=paved or 2=unpaved) | | n/a | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Velocity | V | ft/sec | 1.36 | 2.06 | 2.29 | 3.18 | 3.30 | 3.12 | 0.30 | 2.01 | 2.12 | | |
| Travel time | Tt | hours | 0.136 | 0.246 | 0.210 | 0.150 | 0.092 | 0.085 | 0.236 | 0.246 | 0.246 | | |
| Manning's Equation | | | min. | 8.2 | 14.7 | 12.6 | 9.0 | 5.5 | 5.1 | 14.2 | 14.7 | 14.8 | |
| 1 Flow Length | L | feet | 2,520 | 2,230 | 1,350 | 314 | 263 | 295 | 2,249 | 2,100 | 1,712 | | |
| Slope | S | ft/ft | 0.0135 | 0.0110 | 0.0114 | 0.0409 | 0.0380 | 0.0270 | 0.0178 | 0.0153 | 0.0169 | | |
| roughness | n | n/a | 0.04 | 0.04 | 0.04 | 0.013 | 0.04 | 0.04 | 0.013 | 0.013 | 0.013 | | |
| Open Channel | | | | | | | | | | | | | |
| Bottom Width | BW | feet | 20 | 10 | 10 | 0 | 10 | 10 | 0 | 0 | 0 | | |
| Side Slopes (H:1) | H | feet | 20 | 15 | 15 | 0 | 5 | 5 | 0 | 0 | 0 | | |
| Depth | d | feet | 1.5 | 3 | 3 | 0 | 5 | 5 | 0 | 0 | 0 | | |
| ...or Closed Conduit | | | | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 3.50 | 0.00 | 0.00 | 3.50 | 3.50 | 3.50 | | |
| Span (0 if circular) | S | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Cross-Sectional Area | X-A | feet^2 | 75.00 | 165.00 | 165.00 | 9.62 | 175.00 | 175.00 | 9.62 | 9.62 | 9.62 | | |
| Flow Rate | Q | cfs | 310.78 | 898.22 | 914.53 | 203.94 | 2567.30 | 2163.32 | 134.50 | 124.66 | 130.96 | | |
| Velocity | V | ft/sec | 4.14 | 5.44 | 5.54 | 21.20 | 14.67 | 12.36 | 13.98 | 12.96 | 13.61 | | |
| Travel time | Tt | hours | 0.169 | 0.114 | 0.068 | 0.004 | 0.005 | 0.007 | 0.045 | 0.045 | 0.035 | | |
| 2 Flow Length | L | feet | 753 | 1,420 | 2,790 | 849 | - | - | 1,289 | 1,300 | 693 | | |
| Slope | S | ft/ft | 0.0125 | 0.0094 | 0.0169 | 0.0131 | 0.0000 | 0.0000 | 0.0155 | 0.0038 | 0.0190 | | |
| roughness | n | n/a | 0.05 | 0.013 | 0.05 | 0.05 | 0 | 0 | 0.05 | 0.05 | 0.05 | | |
| Open Channel | | | | | | | | | | | | | |
| Bottom Width | BW | feet | 25 | 0 | 20 | 10 | 0 | 0 | 10 | 10 | 10 | | |
| Side Slopes (H:1) | H | feet | 12 | 0 | 15 | 5 | 0 | 0 | 5 | 5 | 5 | | |
| Depth | d | feet | 2 | 0 | 2.5 | 5 | 0 | 0 | 5 | 5 | 5 | | |
| ...or Closed Conduit | | | | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 3.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | |
| Span (0 if circular) | S | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Cross-Sectional Area | X-A | feet^2 | 98.00 | 9.62 | 143.75 | 175.00 | 0.00 | 0.00 | 175.00 | 175.00 | 175.00 | | |
| Flow Rate | Q | cfs | 395.97 | 98.02 | 732.53 | 1205.60 | 0.00 | 0.00 | 1312.37 | 650.92 | 1450.30 | | |
| Velocity | V | ft/sec | 4.04 | 10.19 | 5.10 | 6.89 | 0.00 | 0.00 | 7.50 | 3.72 | 8.29 | | |
| Travel time | Tt | hours | 0.052 | 0.039 | 0.152 | 0.034 | - | - | 0.048 | 0.097 | 0.023 | | |
| 3 Flow Length | L | feet | - | 1,953 | - | - | - | - | - | - | - | | |
| Slope | S | ft/ft | 0.0000 | 0.0131 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | |
| roughness | n | n/a | 0 | 0.05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Open Channel | | | | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Side Slopes (H:1) | H | feet | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Depth | d | feet | 0 | 3.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| ...or Closed Conduit | | | | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | |
| Span (0 if circular) | S | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Cross-Sectional Area | X-A | feet^2 | 0.00 | 148.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | |
| Flow Rate | Q | cfs | 0.00 | 923.14 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | |
| Velocity | V | ft/sec | 0.00 | 6.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | |
| Travel time | Tt | hours | - | 0.087 | - | - | - | - | - | - | - | | |
| Total Travel Time | | | TC | hours | 0.690 | 0.496 | 0.436 | 0.356 | 0.430 | 0.280 | 0.669 | 0.555 | 0.684 |
| | | | TC | min. | 41.4 | 29.8 | 26.2 | 21.4 | 25.8 | 16.8 | 40.1 | 33.3 | 41.0 |
| Lag Time | | | TL | hours | 0.4139 | 0.2978 | 0.2618 | 0.2139 | 0.2583 | 0.1681 | 0.4013 | 0.3332 | 0.4103 |
| | | | TL | min. | 24.8 | 17.9 | 15.7 | 12.8 | 15.5 | 10.1 | 24.1 | 20.0 | 24.6 |

| EXISTING CONDITIONS | | | | | | | | | | | |
|---|----------|--------|--------|---------|---------|--------|---------|---------|--------|--------|--------|
| TR-55 Method of Computing the Time of Concentration | | | | | | | | | | | |
| | | | CC2_07 | CC3_01 | CC3_02 | CC3_03 | CC3_04 | CC3_05 | CC3_06 | CWC_01 | CWC_02 |
| Sheet Flow | variable | units | | | | | | | | | |
| Manning's roughness coef. | n | n/a | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.013 | 0.240 |
| Flow Length | L | feet | 60 | 40 | 60 | 50 | 50 | 40 | 100 | 60 | 60 |
| 2-year, 24-hour rainfall | P2 | inches | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| Slope | s | ft/ft | 0.0090 | 0.0092 | 0.0090 | 0.0048 | 0.0038 | 0.0058 | 0.0090 | 0.0050 | 0.0382 |
| Travel time | Tt | hours | 0.211 | 0.151 | 0.211 | 0.235 | 0.258 | 0.182 | 0.318 | 0.026 | 0.119 |
| Shallow Concentrated Flow | | | 12.7 | 9.1 | 12.7 | 14.1 | 15.5 | 10.9 | 19.1 | 1.6 | 7.1 |
| Flow Length | L | feet | 1,979 | 518 | 789 | 1,675 | 530 | 1,389 | 2,313 | 1,450 | 140 |
| Slope | s | ft/ft | 0.008 | 0.028 | 0.022 | 0.014 | 0.030 | 0.017 | 0.013 | 0.018 | 0.027 |
| Surface (1=paved or 2=unpaved) | | n/a | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| Velocity | V | ft/sec | 1.83 | 3.42 | 3.05 | 2.47 | 3.56 | 2.71 | 2.31 | 2.16 | 2.69 |
| Travel time | Tt | hours | 0.301 | 0.042 | 0.072 | 0.189 | 0.041 | 0.142 | 0.278 | 0.186 | 0.014 |
| Manning's Equation | | | 18.0 | 2.5 | 4.3 | 11.3 | 2.5 | 8.5 | 16.7 | 11.2 | 0.9 |
| 1 Flow Length | L | feet | 610 | 530 | 172 | 1,703 | 1,154 | 831 | 1,553 | 830 | 1,250 |
| Slope | S | ft/ft | 0.0204 | 0.0183 | 0.0458 | 0.0117 | 0.0121 | 0.0119 | 0.0092 | 0.0156 | 0.0232 |
| roughness | n | n/a | 0.013 | 0.04 | 0.04 | 0.013 | 0.04 | 0.04 | 0.013 | 0.05 | 0.013 |
| Open Channel | | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 10 | 10 | 0 | 10 | 10 | 0 | 3 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 5 | 5 | 0 | 5 | 5 | 0 | 5 | 0 |
| Depth | d | feet | 0 | 5 | 5 | 0 | 5 | 5 | 0 | 2 | 0 |
| ...or Closed Conduit | | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 3.50 | 0.00 | 0.00 | 3.50 | 0.00 | 0.00 | 3.50 | 0.00 | 2.00 |
| Span (0 if circular) | S | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cross-Sectional Area | X-A | feet^2 | 9.62 | 175.00 | 175.00 | 9.62 | 175.00 | 175.00 | 9.62 | 26.00 | 3.14 |
| Flow Rate | Q | cfs | 143.97 | 1782.25 | 2815.64 | 109.32 | 1449.33 | 1438.85 | 96.76 | 103.67 | 34.51 |
| Velocity | V | ft/sec | 14.96 | 10.18 | 16.09 | 11.36 | 8.28 | 8.22 | 10.06 | 3.99 | 10.99 |
| Travel time | Tt | hours | 0.011 | 0.014 | 0.003 | 0.042 | 0.039 | 0.028 | 0.043 | 0.058 | 0.032 |
| 2 Flow Length | L | feet | - | - | - | 1,147 | - | - | - | 640 | 2,854 |
| Slope | S | ft/ft | 0.0000 | 0.0000 | 0.0000 | 0.0157 | 0.0000 | 0.0000 | 0.0000 | 0.0064 | 0.0011 |
| roughness | n | n/a | 0 | 0 | 0 | 0.05 | 0 | 0 | 0 | 0.06 | 0.06 |
| Open Channel | | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 100 | 100 |
| Side Slopes (H:1) | H | feet | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 25 | 25 |
| Depth | d | feet | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 2 | 2.5 |
| ...or Closed Conduit | | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cross-Sectional Area | X-A | feet^2 | 0.00 | 0.00 | 0.00 | 75.00 | 0.00 | 0.00 | 0.00 | 300.00 | 406.25 |
| Flow Rate | Q | cfs | 0.00 | 0.00 | 0.00 | 421.56 | 0.00 | 0.00 | 0.00 | 782.49 | 503.24 |
| Velocity | V | ft/sec | 0.00 | 0.00 | 0.00 | 5.62 | 0.00 | 0.00 | 0.00 | 2.61 | 1.24 |
| Travel time | Tt | hours | - | - | - | 0.057 | - | - | - | 0.068 | 0.640 |
| 3 Flow Length | L | feet | - | - | - | - | - | - | - | - | - |
| Slope | S | ft/ft | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| roughness | n | n/a | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Open Channel | | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Depth | d | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ...or Closed Conduit | | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cross-Sectional Area | X-A | feet^2 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Flow Rate | Q | cfs | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Velocity | V | ft/sec | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Travel time | Tt | hours | - | - | - | - | - | - | - | - | - |
| Total Travel Time | | | 0.523 | 0.208 | 0.286 | 0.522 | 0.338 | 0.353 | 0.638 | 0.338 | 0.804 |
| | TC | min. | 31.4 | 12.5 | 17.2 | 31.3 | 20.3 | 21.2 | 38.3 | 20.3 | 48.3 |
| Lag Time | | | 0.3139 | 0.1248 | 0.1715 | 0.3132 | 0.2030 | 0.2115 | 0.3831 | 0.2029 | 0.4827 |
| | TL | min. | 18.8 | 7.5 | 10.3 | 18.8 | 12.2 | 12.7 | 23.0 | 12.2 | 29.0 |

| EXISTING CONDITIONS | | | | | | | | | | | |
|---|----------|--------|---------|--------|---------|--------|--------|---------|---------|--------|--------|
| TR-55 Method of Computing the Time of Concentration | | | | | | | | | | | |
| | | | CWC_03 | CWC_04 | CWC_05 | CWC_06 | CWC_07 | CWC_08 | CWC_09 | CWC_10 | CWC_11 |
| Sheet Flow | variable | units | | | | | | | | | |
| Manning's roughness coef. | n | n/a | 0.240 | 0.240 | 0.240 | 0.013 | 0.240 | 0.013 | 0.240 | 0.240 | 0.240 |
| Flow Length | L | feet | 60 | 60 | 50 | 20 | 60 | 50 | 20 | 20 | 60 |
| 2-year, 24-hour rainfall | P2 | inches | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| Slope | s | ft/ft | 0.0189 | 0.0100 | 0.0100 | 0.0050 | 0.0412 | 0.0050 | 0.0103 | 0.0090 | 0.0054 |
| Travel time | Tt | hours | 0.157 | 0.202 | 0.175 | 0.011 | 0.115 | 0.022 | 0.083 | 0.088 | 0.258 |
| Shallow Concentrated Flow | | min. | 9.4 | 12.1 | 10.5 | 0.6 | 6.9 | 1.3 | 5.0 | 5.3 | 15.5 |
| Flow Length | L | feet | 390 | 1,105 | 670 | 620 | 600 | 320 | 1,557 | 390 | 1,676 |
| Slope | s | ft/ft | 0.074 | 0.005 | 0.005 | 0.016 | 0.048 | 0.016 | 0.015 | 0.006 | 0.030 |
| Surface (1=paved or 2=unpaved) | | n/a | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 |
| Velocity | V | ft/sec | 4.41 | 1.42 | 1.46 | 2.59 | 3.56 | 2.63 | 2.53 | 1.21 | 2.79 |
| Travel time | Tt | hours | 0.025 | 0.216 | 0.128 | 0.066 | 0.047 | 0.034 | 0.171 | 0.090 | 0.167 |
| Manning's Equation | | min. | 1.5 | 13.0 | 7.7 | 4.0 | 2.8 | 2.0 | 10.2 | 5.4 | 10.0 |
| 1 Flow Length | L | feet | 4,560 | 1,375 | 1,848 | 1,583 | 740 | 2,590 | 2,890 | 3,955 | 1,537 |
| Slope | S | ft/ft | 0.0029 | 0.0240 | 0.0029 | 0.0061 | 0.0392 | 0.0232 | 0.0201 | 0.0047 | 0.0054 |
| roughness | n | n/a | 0.06 | 0.04 | 0.04 | 0.013 | 0.06 | 0.04 | 0.013 | 0.04 | 0.05 |
| Open Channel | | | | | | | | | | | |
| Bottom Width | BW | feet | 25 | 3 | 2 | 0 | 6 | 3 | 0 | 3 | 35 |
| Side Slopes (H:1) | H | feet | 15 | 5 | 3 | 0 | 5 | 5 | 0 | 5 | 10 |
| Depth | d | feet | 4.5 | 1.5 | 1.5 | 0 | 3 | 3 | 0 | 1.5 | 2.5 |
| ...or Closed Conduit | | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 3.00 | 0.00 | 0.00 | 2.75 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cross-Sectional Area | X-A | feet^2 | 416.25 | 15.75 | 9.75 | 7.07 | 63.00 | 54.00 | 5.94 | 15.75 | 150.00 |
| Flow Rate | Q | cfs | 1059.16 | 82.24 | 17.57 | 52.05 | 445.02 | 420.38 | 75.12 | 36.23 | 480.94 |
| Velocity | V | ft/sec | 2.54 | 5.22 | 1.80 | 7.36 | 7.06 | 7.78 | 12.65 | 2.30 | 3.21 |
| Travel time | Tt | hours | 0.498 | 0.073 | 0.285 | 0.060 | 0.029 | 0.092 | 0.063 | 0.478 | 0.133 |
| 2 Flow Length | L | feet | - | 801 | 1,579 | 894 | 1,100 | 4,528 | 555 | 1,995 | - |
| Slope | S | ft/ft | 0.0000 | 0.0041 | 0.0177 | 0.0023 | 0.0209 | 0.0042 | 0.0039 | 0.0113 | 0.0000 |
| roughness | n | n/a | 0 | 0.05 | 0.013 | 0.013 | 0.06 | 0.06 | 0.05 | 0.013 | 0 |
| Open Channel | | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 25 | 0 | 0 | 6 | 35 | 25 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 15 | 0 | 0 | 5 | 15 | 10 | 0 | 0 |
| Depth | d | feet | 0 | 1.5 | 0 | 0 | 4 | 4.5 | 4.25 | 0 | 0 |
| ...or Closed Conduit | | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 4.50 | 4.00 | 0.00 | 0.00 | 0.00 | 3.50 | 0.00 |
| Span (0 if circular) | S | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cross-Sectional Area | X-A | feet^2 | 0.00 | 71.25 | 15.90 | 12.57 | 104.00 | 461.25 | 286.88 | 9.62 | 0.00 |
| Flow Rate | Q | cfs | 0.00 | 136.71 | 238.56 | 69.09 | 636.54 | 1438.77 | 1007.49 | 107.41 | 0.00 |
| Velocity | V | ft/sec | 0.00 | 1.92 | 15.00 | 5.50 | 6.12 | 3.12 | 3.51 | 11.16 | 0.00 |
| Travel time | Tt | hours | - | 0.116 | 0.029 | 0.045 | 0.050 | 0.403 | 0.044 | 0.050 | - |
| 3 Flow Length | L | feet | - | - | 866 | 3,169 | 1,007 | - | - | 2,889 | - |
| Slope | S | ft/ft | 0.0000 | 0.0000 | 0.0126 | 0.0110 | 0.0157 | 0.0000 | 0.0000 | 0.0181 | 0.0000 |
| roughness | n | n/a | 0 | 0 | 0.06 | 0.013 | 0.06 | 0 | 0 | 0.013 | 0 |
| Open Channel | | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 0 | 20 | 0 | 6 | 0 | 0 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 0 | 15 | 0 | 6 | 0 | 0 | 0 | 0 |
| Depth | d | feet | 0 | 0 | 4 | 0 | 4 | 0 | 0 | 0 | 0 |
| ...or Closed Conduit | | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 7.00 | 0.00 | 0.00 | 0.00 | 5.00 | 0.00 |
| Span (0 if circular) | S | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cross-Sectional Area | X-A | feet^2 | 0.00 | 0.00 | 320.00 | 38.48 | 120.00 | 0.00 | 0.00 | 19.63 | 0.00 |
| Flow Rate | Q | cfs | 0.00 | 0.00 | 1545.64 | 577.27 | 630.55 | 0.00 | 0.00 | 294.52 | 0.00 |
| Velocity | V | ft/sec | 0.00 | 0.00 | 4.83 | 15.00 | 5.25 | 0.00 | 0.00 | 15.00 | 0.00 |
| Travel time | Tt | hours | - | - | 0.050 | 0.059 | 0.053 | - | - | 0.053 | - |
| Total Travel Time | TC | hours | 0.679 | 0.608 | 0.667 | 0.241 | 0.294 | 0.552 | 0.361 | 0.758 | 0.558 |
| | TC | min. | 40.8 | 36.5 | 40.0 | 14.4 | 17.6 | 33.1 | 21.7 | 45.5 | 33.5 |
| Lag Time | TL | hours | 0.4076 | 0.3646 | 0.4000 | 0.1444 | 0.1763 | 0.3311 | 0.2166 | 0.4548 | 0.3348 |
| | TL | min. | 24.5 | 21.9 | 24.0 | 8.7 | 10.6 | 19.9 | 13.0 | 27.3 | 20.1 |

| EXISTING CONDITIONS | | | | | | | | | | | |
|---|----------|--------|---------|--------|--------|--------|--------|---------|--------|--------|--------|
| TR-55 Method of Computing the Time of Concentration | | | | | | | | | | | |
| | | | CWC_12 | CWC_13 | CWC_14 | CWC_15 | CWC_16 | CWC_17 | CWC_18 | CWC_19 | CWC_20 |
| Sheet Flow | variable | units | | | | | | | | | |
| Manning's roughness coef. | n | n/a | 0.240 | 0.240 | 0.240 | 0.013 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 |
| Flow Length | L | feet | 50 | 60 | 20 | 20 | 20 | 20 | 50 | 50 | 20 |
| 2-year, 24-hour rainfall | P2 | inches | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| Slope | s | ft/ft | 0.0100 | 0.0100 | 0.0181 | 0.0050 | 0.0210 | 0.0150 | 0.0100 | 0.0029 | 0.0038 |
| Travel time | Tt | hours | 0.175 | 0.202 | 0.066 | 0.011 | 0.062 | 0.071 | 0.175 | 0.286 | 0.123 |
| Shallow Concentrated Flow | | min. | 10.5 | 12.1 | 4.0 | 0.6 | 3.7 | 4.3 | 10.5 | 17.2 | 7.4 |
| Flow Length | L | feet | 1,110 | 1,100 | 1,061 | 1,168 | 1,098 | 1,480 | 724 | 161 | 780 |
| Slope | s | ft/ft | 0.006 | 0.025 | 0.039 | 0.028 | 0.018 | 0.015 | 0.005 | 0.003 | 0.011 |
| Surface (1=paved or 2=unpaved) | | n/a | 1 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 1 |
| Velocity | V | ft/sec | 1.61 | 2.58 | 4.07 | 2.71 | 2.15 | 2.01 | 1.46 | 1.11 | 2.21 |
| Travel time | Tt | hours | 0.192 | 0.118 | 0.072 | 0.120 | 0.142 | 0.205 | 0.138 | 0.040 | 0.098 |
| Manning's Equation | | min. | 11.5 | 7.1 | 4.3 | 7.2 | 8.5 | 12.3 | 8.3 | 2.4 | 5.9 |
| 1 Flow Length | L | feet | 4,880 | 1,350 | 1,160 | 1,066 | 2,070 | 2,184 | 1,729 | 4,811 | 2,138 |
| Slope | S | ft/ft | 0.0137 | 0.0242 | 0.0179 | 0.0184 | 0.0206 | 0.0096 | 0.0094 | 0.0088 | 0.0190 |
| roughness | n | n/a | 0.04 | 0.04 | 0.06 | 0.05 | 0.04 | 0.05 | 0.04 | 0.04 | 0.04 |
| Open Channel | | | | | | | | | | | |
| Bottom Width | BW | feet | 3 | 3 | 30 | 30 | 2 | 10 | 10 | 2 | 2 |
| Side Slopes (H:1) | H | feet | 5 | 5 | 10 | 10 | 3 | 15 | 5 | 5 | 3 |
| Depth | d | feet | 3 | 2 | 1.5 | 1.5 | 1.5 | 3.75 | 3 | 3 | 1.5 |
| ...or Closed Conduit | | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cross-Sectional Area | X-A | feet^2 | 54.00 | 26.00 | 67.50 | 67.50 | 9.75 | 248.44 | 75.00 | 51.00 | 9.75 |
| Flow Rate | Q | cfs | 322.50 | 161.59 | 242.17 | 294.80 | 46.69 | 1161.27 | 407.40 | 240.22 | 44.93 |
| Velocity | V | ft/sec | 5.97 | 6.22 | 3.59 | 4.37 | 4.79 | 4.67 | 5.43 | 4.71 | 4.61 |
| Travel time | Tt | hours | 0.227 | 0.060 | 0.090 | 0.068 | 0.120 | 0.130 | 0.088 | 0.284 | 0.129 |
| 2 Flow Length | L | feet | 643 | 466 | - | - | 607 | - | - | - | 926 |
| Slope | S | ft/ft | 0.0238 | 0.0165 | 0.0000 | 0.0000 | 0.0060 | 0.0000 | 0.0000 | 0.0000 | 0.0130 |
| roughness | n | n/a | 0.05 | 0.04 | 0 | 0 | 0.05 | 0 | 0 | 0.013 | 0.05 |
| Open Channel | | | | | | | | | | | |
| Bottom Width | BW | feet | 35 | 5 | 0 | 0 | 30 | 0 | 0 | 0 | 15 |
| Side Slopes (H:1) | H | feet | 10 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 15 |
| Depth | d | feet | 2.5 | 2 | 0 | 0 | 2.75 | 0 | 0 | 0 | 2.5 |
| ...or Closed Conduit | | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cross-Sectional Area | X-A | feet^2 | 150.00 | 30.00 | 0.00 | 0.00 | 120.31 | 0.00 | 0.00 | 0.00 | 131.25 |
| Flow Rate | Q | cfs | 1005.45 | 160.64 | 0.00 | 0.00 | 450.85 | 0.00 | 0.00 | 0.00 | 572.10 |
| Velocity | V | ft/sec | 6.70 | 5.35 | 0.00 | 0.00 | 3.75 | 0.00 | 0.00 | 0.00 | 4.36 |
| Travel time | Tt | hours | 0.027 | 0.024 | - | - | 0.045 | - | - | - | 0.059 |
| 3 Flow Length | L | feet | - | 235 | - | - | - | - | - | - | - |
| Slope | S | ft/ft | 0.0000 | 0.0190 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| roughness | n | n/a | 0 | 0.05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Open Channel | | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Depth | d | feet | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ...or Closed Conduit | | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cross-Sectional Area | X-A | feet^2 | 0.00 | 130.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Flow Rate | Q | cfs | 0.00 | 656.95 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Velocity | V | ft/sec | 0.00 | 5.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Travel time | Tt | hours | - | 0.013 | - | - | - | - | - | - | - |
| Total Travel Time | TC | hours | 0.621 | 0.418 | 0.228 | 0.198 | 0.369 | 0.406 | 0.401 | 0.610 | 0.409 |
| | TC | min. | 37.2 | 25.1 | 13.7 | 11.9 | 22.2 | 24.4 | 24.1 | 36.6 | 24.6 |
| Lag Time | TL | hours | 0.3723 | 0.2509 | 0.1371 | 0.1189 | 0.2216 | 0.2436 | 0.2408 | 0.3660 | 0.2457 |
| | TL | min. | 22.3 | 15.1 | 8.2 | 7.1 | 13.3 | 14.6 | 14.4 | 22.0 | 14.7 |

| EXISTING CONDITIONS | | | | | | | | | | | |
|---|----------|--------|--------|--------|---------|--------|---------|--------|---------|--------|--------|
| TR-55 Method of Computing the Time of Concentration | | | | | | | | | | | |
| | | | DB_01 | DB_02 | DB_03 | EB_01 | GB_01 | HB_01 | IHB_01 | IHB_02 | JB_01 |
| Sheet Flow | variable | units | | | | | | | | | |
| Manning's roughness coef. | n | n/a | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 |
| Flow Length | L | feet | 60 | 50 | 50 | 60 | 50 | 60 | 50 | 60 | 50 |
| 2-year, 24-hour rainfall | P2 | inches | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| Slope | s | ft/ft | 0.0035 | 0.0112 | 0.0060 | 0.0040 | 0.0068 | 0.0013 | 0.0211 | 0.0017 | 0.0080 |
| Travel time | Tt | hours | 0.308 | 0.167 | 0.215 | 0.292 | 0.204 | 0.453 | 0.130 | 0.412 | 0.191 |
| Shallow Concentrated Flow | | min. | 18.5 | 10.0 | 12.9 | 17.5 | 12.3 | 27.2 | 7.8 | 24.7 | 11.5 |
| Flow Length | L | feet | 1,427 | 691 | 400 | 1,440 | 1,861 | 110 | 1,050 | 303 | 450 |
| Slope | s | ft/ft | 0.028 | 0.009 | 0.015 | 0.004 | 0.006 | 0.001 | 0.032 | 0.009 | 0.003 |
| Surface (1=paved or 2=unpaved) | | n/a | 2 | 1 | 1 | 2 | 2 | 1 | 2 | 2 | 2 |
| Velocity | V | ft/sec | 2.72 | 1.92 | 2.51 | 1.04 | 1.24 | 0.65 | 2.92 | 1.56 | 0.89 |
| Travel time | Tt | hours | 0.146 | 0.100 | 0.044 | 0.386 | 0.418 | 0.047 | 0.100 | 0.054 | 0.141 |
| Manning's Equation | | min. | 8.7 | 6.0 | 2.7 | 23.1 | 25.1 | 2.8 | 6.0 | 3.2 | 8.5 |
| 1 Flow Length | L | feet | 1,695 | 2,068 | 1,882 | 3,402 | 851 | 3,436 | 682 | 1,507 | 732 |
| Slope | S | ft/ft | 0.0106 | 0.0118 | 0.0165 | 0.0041 | 0.0277 | 0.0084 | 0.0079 | 0.0062 | 0.0075 |
| roughness | n | n/a | 0.05 | 0.013 | 0.013 | 0.013 | 0.04 | 0.013 | 0.04 | 0.013 | 0.05 |
| Open Channel | | | | | | | | | | | |
| Bottom Width | BW | feet | 30 | 0 | 0 | 0 | 130 | 0 | 20 | 0 | 30 |
| Side Slopes (H:1) | H | feet | 15 | 0 | 0 | 0 | 50 | 0 | 10 | 0 | 20 |
| Depth | d | feet | 2 | 0 | 0 | 0 | 1.5 | 0 | 5 | 0 | 1.5 |
| ...or Closed Conduit | | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 3.00 | 3.00 | 5.50 | 0.00 | 4.50 | 0.00 | 2.00 | 0.00 |
| Span (0 if circular) | S | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cross-Sectional Area | X-A | feet^2 | 120.00 | 7.07 | 7.07 | 23.76 | 307.50 | 15.90 | 350.00 | 3.14 | 90.00 |
| Flow Rate | Q | cfs | 444.98 | 72.65 | 86.02 | 214.69 | 2029.92 | 180.33 | 2360.04 | 17.93 | 231.96 |
| Velocity | V | ft/sec | 3.71 | 10.28 | 12.17 | 9.04 | 6.60 | 11.34 | 6.74 | 5.71 | 2.58 |
| Travel time | Tt | hours | 0.127 | 0.056 | 0.043 | 0.105 | 0.036 | 0.084 | 0.028 | 0.073 | 0.079 |
| 2 Flow Length | L | feet | - | 1,587 | 2,059 | 1,174 | 441 | 4,600 | - | 1,334 | - |
| Slope | S | ft/ft | 0.0000 | 0.0130 | 0.0117 | 0.0102 | 0.0127 | 0.0109 | 0.0000 | 0.0084 | 0.0000 |
| roughness | n | n/a | 0 | 0.013 | 0.013 | 0.013 | 0.013 | 0.05 | 0.05 | 0.013 | 0 |
| Open Channel | | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 0 | 0 | 0 | 0 | 35 | 0 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 |
| Depth | d | feet | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| ...or Closed Conduit | | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 5.00 | 5.00 | 6.50 | 2.00 | 0.00 | 0.00 | 4.50 | 0.00 |
| Span (0 if circular) | S | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cross-Sectional Area | X-A | feet^2 | 0.00 | 19.63 | 19.63 | 33.18 | 3.14 | 195.00 | 0.00 | 15.90 | 0.00 |
| Flow Rate | Q | cfs | 0.00 | 294.52 | 281.91 | 497.75 | 25.58 | 979.21 | 0.00 | 180.20 | 0.00 |
| Velocity | V | ft/sec | 0.00 | 15.00 | 14.36 | 15.00 | 8.14 | 5.02 | 0.00 | 11.33 | 0.00 |
| Travel time | Tt | hours | - | 0.029 | 0.040 | 0.022 | 0.015 | 0.254 | - | 0.033 | - |
| 3 Flow Length | L | feet | - | 483 | 349 | - | 546 | - | - | 1,404 | - |
| Slope | S | ft/ft | 0.0000 | 0.0147 | 0.0156 | 0.0000 | 0.0054 | 0.0000 | 0.0000 | 0.0103 | 0.0000 |
| roughness | n | n/a | 0 | 0.04 | 0.05 | 0 | 0.05 | 0 | 0 | 0.013 | 0 |
| Open Channel | | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 20 | 20 | 0 | 35 | 0 | 0 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 15 | 20 | 0 | 20 | 0 | 0 | 0 | 0 |
| Depth | d | feet | 0 | 2.5 | 3 | 0 | 2 | 0 | 0 | 0 | 0 |
| ...or Closed Conduit | | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.50 | 0.00 |
| Span (0 if circular) | S | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cross-Sectional Area | X-A | feet^2 | 0.00 | 143.75 | 240.00 | 0.00 | 150.00 | 0.00 | 0.00 | 23.76 | 0.00 |
| Flow Rate | Q | cfs | 0.00 | 856.12 | 1280.21 | 0.00 | 393.10 | 0.00 | 0.00 | 342.01 | 0.00 |
| Velocity | V | ft/sec | 0.00 | 5.96 | 5.33 | 0.00 | 2.62 | 0.00 | 0.00 | 14.40 | 0.00 |
| Travel time | Tt | hours | - | 0.023 | 0.018 | - | 0.058 | - | - | 0.027 | - |
| Total Travel Time | TC | hours | 0.580 | 0.375 | 0.360 | 0.804 | 0.731 | 0.839 | 0.258 | 0.599 | 0.411 |
| | TC | min. | 34.8 | 22.5 | 21.6 | 48.2 | 43.9 | 50.3 | 15.5 | 35.9 | 24.7 |
| Lag Time | TL | hours | 0.3480 | 0.2250 | 0.2159 | 0.4823 | 0.4387 | 0.5033 | 0.1547 | 0.3592 | 0.2466 |
| | TL | min. | 20.9 | 13.5 | 13.0 | 28.9 | 26.3 | 30.2 | 9.3 | 21.6 | 14.8 |

| EXISTING CONDITIONS | | | | | | | | | | | |
|---|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| TR-55 Method of Computing the Time of Concentration | | | | | | | | | | | |
| | | | JB_02 | PC_01 | PC_02 | PC_03 | PC_04 | PC_05 | RB_01 | SCW_01 | SCW_02 |
| Sheet Flow | variable | units | | | | | | | | | |
| Manning's roughness coef. | n | n/a | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 |
| Flow Length | L | feet | 50 | 100 | 50 | 50 | 50 | 50 | 20 | 20 | 60 |
| 2-year, 24-hour rainfall | P2 | inches | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| Slope | s | ft/ft | 0.0017 | 0.0007 | 0.0004 | 0.0029 | 0.0020 | 0.0026 | 0.0214 | 0.0091 | 0.0045 |
| Travel time | Tt | hours | 0.354 | 0.882 | 0.612 | 0.286 | 0.333 | 0.300 | 0.062 | 0.087 | 0.278 |
| Shallow Concentrated Flow | | | 21.2 | 52.9 | 36.7 | 17.1 | 20.0 | 18.0 | 3.7 | 5.2 | 16.7 |
| Flow Length | L | feet | 1,363 | 257 | 1,210 | 396 | 376 | 822 | 300 | 1,222 | 874 |
| Slope | s | ft/ft | 0.009 | 0.008 | 0.001 | 0.009 | 0.002 | 0.014 | 0.016 | 0.050 | 0.035 |
| Surface (1=paved or 2=unpaved) | | n/a | 1 | 2 | 1 | 1 | 2 | 1 | 2 | 1 | 2 |
| Velocity | V | ft/sec | 1.94 | 1.46 | 0.61 | 1.93 | 0.72 | 2.44 | 2.02 | 4.58 | 3.03 |
| Travel time | Tt | hours | 0.195 | 0.049 | 0.552 | 0.057 | 0.144 | 0.094 | 0.041 | 0.074 | 0.080 |
| Manning's Equation | | | 11.7 | 2.9 | 33.1 | 3.4 | 8.6 | 5.6 | 2.5 | 4.4 | 4.8 |
| 1 Flow Length | L | feet | 2,613 | 1,300 | 1,367 | 550 | 2,357 | 3,769 | 4,466 | 873 | 1,410 |
| Slope | S | ft/ft | 0.0034 | 0.0278 | 0.0149 | 0.0522 | 0.0102 | 0.0021 | 0.0136 | 0.0054 | 0.0083 |
| roughness | n | n/a | 0.04 | 0.013 | 0.013 | 0.05 | 0.013 | 0.013 | 0.04 | 0.05 | 0.05 |
| Open Channel | | | | | | | | | | | |
| Bottom Width | BW | feet | 3 | 0 | 0 | 10 | 0 | 0 | 5 | 20 | 15 |
| Side Slopes (H:1) | H | feet | 5 | 0 | 0 | 10 | 0 | 0 | 8 | 25 | 5 |
| Depth | d | feet | 1.5 | 0 | 0 | 1.5 | 0 | 0 | 3.5 | 1.5 | 2.75 |
| ...or Closed Conduit | | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 3.50 | 2.25 | 0.00 | 3.00 | 3.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cross-Sectional Area | X-A | feet^2 | 15.75 | 9.62 | 3.98 | 37.50 | 7.07 | 7.07 | 115.50 | 86.25 | 79.06 |
| Flow Rate | Q | cfs | 30.92 | 144.32 | 37.91 | 244.00 | 67.44 | 30.45 | 763.98 | 176.47 | 321.14 |
| Velocity | V | ft/sec | 1.96 | 15.00 | 9.53 | 6.51 | 9.54 | 4.31 | 6.61 | 2.05 | 4.06 |
| Travel time | Tt | hours | 0.370 | 0.024 | 0.040 | 0.023 | 0.069 | 0.243 | 0.188 | 0.119 | 0.096 |
| 2 Flow Length | L | feet | 2,312 | 420 | 2,468 | 531 | 717 | 2,087 | - | - | - |
| Slope | S | ft/ft | 0.0074 | 0.0142 | 0.0097 | 0.0125 | 0.0076 | 0.0032 | 0.0000 | 0.0000 | 0.0000 |
| roughness | n | n/a | 0.013 | 0.04 | 0.05 | 0.05 | 0.05 | 0.013 | 0 | 0 | 0 |
| Open Channel | | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 10 | 20 | 15 | 10 | 0 | 0 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 12 | 25 | 7 | 7 | 0 | 0 | 0 | 0 |
| Depth | d | feet | 0 | 2 | 2.5 | 2 | 3.5 | 0 | 0 | 0 | 0 |
| ...or Closed Conduit | | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 4.50 | 0.00 | 0.00 | 0.00 | 0.00 | 8.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 |
| Cross-Sectional Area | X-A | feet^2 | 15.90 | 68.00 | 206.25 | 58.00 | 120.75 | 40.00 | 0.00 | 0.00 | 0.00 |
| Flow Rate | Q | cfs | 169.80 | 335.26 | 766.59 | 235.32 | 504.33 | 344.19 | 0.00 | 0.00 | 0.00 |
| Velocity | V | ft/sec | 10.68 | 4.93 | 3.72 | 4.06 | 4.18 | 8.60 | 0.00 | 0.00 | 0.00 |
| Travel time | Tt | hours | 0.060 | 0.024 | 0.184 | 0.036 | 0.048 | 0.067 | - | - | - |
| 3 Flow Length | L | feet | 1,443 | 1,084 | - | - | 648 | 2,035 | - | - | - |
| Slope | S | ft/ft | 0.0130 | 0.0021 | 0.0000 | 0.0000 | 0.0060 | 0.0118 | 0.0000 | 0.0000 | 0.0000 |
| roughness | n | n/a | 0.013 | 0.05 | 0 | 0 | 0.06 | 0.013 | 0 | 0 | 0 |
| Open Channel | | | | | | | | | | | |
| Bottom Width | BW | feet | 3 | 20 | 0 | 0 | 6 | 0 | 0 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 5 | 30 | 0 | 0 | 6 | 0 | 0 | 0 | 0 |
| Depth | d | feet | 3 | 2 | 0 | 0 | 4 | 0 | 0 | 0 | 0 |
| ...or Closed Conduit | | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 8.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cross-Sectional Area | X-A | feet^2 | 54.00 | 160.00 | 0.00 | 0.00 | 120.00 | 50.27 | 0.00 | 0.00 | 0.00 |
| Flow Rate | Q | cfs | 810.00 | 240.84 | 0.00 | 0.00 | 391.41 | 753.98 | 0.00 | 0.00 | 0.00 |
| Velocity | V | ft/sec | 15.00 | 1.51 | 0.00 | 0.00 | 3.26 | 15.00 | 0.00 | 0.00 | 0.00 |
| Travel time | Tt | hours | 0.027 | 0.200 | - | - | 0.055 | 0.038 | - | - | - |
| Total Travel Time | | | TC | hours | 1.005 | 1.179 | 1.389 | 0.402 | 0.649 | 0.741 | 0.291 |
| | | | TC | min. | 60.3 | 70.7 | 83.3 | 24.1 | 38.9 | 44.5 | 17.4 |
| Lag Time | | | TL | hours | 0.6032 | 0.7074 | 0.8333 | 0.2415 | 0.3891 | 0.4447 | 0.1744 |
| | | | TL | min. | 36.2 | 42.4 | 50.0 | 14.5 | 23.3 | 26.7 | 10.5 |

| EXISTING CONDITIONS | | | | | | | | | | |
|---|----------|--------|--------|--------|---------|--------|---------|--------|---------|---------|
| TR-55 Method of Computing the Time of Concentration | | | | | | | | | | |
| | | | SCW_03 | SCW_04 | SCW_04A | SCW_05 | SCW_06 | SCW_07 | SCW_08 | SCW_08A |
| Sheet Flow | variable | units | | | | | | | | |
| Manning's roughness coef. | n | n/a | 0.240 | 0.011 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 |
| Flow Length | L | feet | 50 | 20 | 20 | 60 | 20 | 300 | 60 | 20 |
| 2-year, 24-hour rainfall | P2 | inches | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| Slope | s | ft/ft | 0.0164 | 0.0117 | 0.0129 | 0.0398 | 0.0070 | 0.0316 | 0.0050 | 0.0050 |
| Travel time | Tt | hours | 0.144 | 0.007 | 0.076 | 0.116 | 0.097 | 0.463 | 0.267 | 0.111 |
| Shallow Concentrated Flow | | min. | 8.6 | 0.4 | 4.5 | 7.0 | 5.8 | 27.8 | 16.0 | 6.7 |
| Flow Length | L | feet | 990 | 650 | 145 | 650 | 1,344 | 100 | 590 | 780 |
| Slope | s | ft/ft | 0.036 | 0.012 | 0.012 | 0.035 | 0.007 | 0.034 | 0.005 | 0.011 |
| Surface (1=paved or 2=unpaved) | | n/a | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 |
| Velocity | V | ft/sec | 3.89 | 2.28 | 2.23 | 3.03 | 1.32 | 2.98 | 1.19 | 1.70 |
| Travel time | Tt | hours | 0.071 | 0.079 | 0.018 | 0.060 | 0.282 | 0.009 | 0.138 | 0.128 |
| Manning's Equation | | min. | 4.2 | 4.8 | 1.1 | 3.6 | 16.9 | 0.6 | 8.3 | 7.7 |
| 1 Flow Length | L | feet | 710 | 3,160 | 1,495 | 696 | 2,325 | 750 | 1,084 | 1,185 |
| Slope | S | ft/ft | 0.0183 | 0.0145 | 0.0123 | 0.0042 | 0.0167 | 0.0093 | 0.0301 | 0.0157 |
| roughness | n | n/a | 0.013 | 0.04 | 0.013 | 0.05 | 0.04 | 0.05 | 0.013 | 0.04 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 2 | 0 | 20 | 3 | 15 | 0 | 3 |
| Side Slopes (H:1) | H | feet | 0 | 3 | 0 | 15 | 5 | 20 | 0 | 5 |
| Depth | d | feet | 0 | 1.5 | 0 | 1.5 | 2 | 2 | 0 | 2 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 3.00 | 0.00 | 2.50 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 |
| Span (0 if circular) | S | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cross-Sectional Area | X-A | feet^2 | 7.07 | 9.75 | 4.91 | 63.75 | 26.00 | 110.00 | 3.14 | 26.00 |
| Flow Rate | Q | cfs | 90.48 | 39.16 | 45.66 | 121.71 | 134.39 | 348.39 | 39.36 | 130.18 |
| Velocity | V | ft/sec | 12.80 | 4.02 | 9.30 | 1.91 | 5.17 | 3.17 | 12.53 | 5.01 |
| Travel time | Tt | hours | 0.015 | 0.219 | 0.045 | 0.101 | 0.125 | 0.066 | 0.024 | 0.066 |
| 2 Flow Length | L | feet | 255 | 2,632 | 587 | - | 5,925 | 1,386 | 1,791 | 1,775 |
| Slope | S | ft/ft | 0.0080 | 0.0061 | 0.0088 | 0.0000 | 0.0038 | 0.0059 | 0.0045 | 0.0195 |
| roughness | n | n/a | 0.05 | 0.05 | 0.013 | 0 | 0.05 | 0.05 | 0.05 | 0.013 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 15 | 25 | 0 | 0 | 20 | 30 | 20 | 0 |
| Side Slopes (H:1) | H | feet | 5 | 11 | 0 | 0 | 15 | 15 | 15 | 0 |
| Depth | d | feet | 2.5 | 3 | 0 | 0 | 4 | 2 | 4 | 0 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.00 |
| Span (0 if circular) | S | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cross-Sectional Area | X-A | feet^2 | 68.75 | 174.00 | 19.63 | 0.00 | 320.00 | 120.00 | 320.00 | 7.07 |
| Flow Rate | Q | cfs | 260.79 | 623.16 | 245.41 | 0.00 | 1023.42 | 332.91 | 1106.56 | 93.37 |
| Velocity | V | ft/sec | 3.79 | 3.58 | 12.50 | 0.00 | 3.20 | 2.77 | 3.46 | 13.21 |
| Travel time | Tt | hours | 0.013 | 0.204 | 0.013 | - | 0.515 | 0.139 | 0.144 | 0.037 |
| 3 Flow Length | L | feet | - | - | 464 | - | - | - | - | - |
| Slope | S | ft/ft | 0.0000 | 0.0000 | 0.0176 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| roughness | n | n/a | 0 | 0 | 0.013 | 0 | 0 | 0 | 0 | 0 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Depth | d | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 6.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cross-Sectional Area | X-A | feet^2 | 0.00 | 0.00 | 31.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Flow Rate | Q | cfs | 0.00 | 0.00 | 472.55 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Velocity | V | ft/sec | 0.00 | 0.00 | 15.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Travel time | Tt | hours | - | - | 0.009 | - | - | - | - | - |
| Total Travel Time | TC | hours | 0.248 | 0.509 | 0.160 | 0.277 | 1.019 | 0.677 | 0.573 | 0.341 |
| | TC | min. | 14.9 | 30.5 | 9.6 | 16.6 | 61.1 | 40.6 | 34.4 | 20.5 |
| Lag Time | TL | hours | 0.1490 | 0.3051 | 0.0961 | 0.1664 | 0.6112 | 0.4060 | 0.3439 | 0.2049 |
| | TL | min. | 8.9 | 18.3 | 5.8 | 10.0 | 36.7 | 24.4 | 20.6 | 12.3 |

| EXISTING CONDITIONS | | | | | | | | | | | |
|---|-------|--------|----------|--------|---------|--------|--------|---------|---------|--------|---------|
| TR-55 Method of Computing the Time of Concentration | | | | | | | | | | | |
| | | | SCW_09 | SCW_10 | SCW_11 | SCW_12 | SCW_13 | SCW_14 | SCW_15 | SCW_16 | SCW_17 |
| Sheet Flow | | | variable | units | | | | | | | |
| Manning's roughness coef. | n | n/a | 0.240 | 0.240 | 0.011 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 |
| Flow Length | L | feet | 60 | 20 | 20 | 50 | 50 | 50 | 20 | 50 | 50 |
| 2-year, 24-hour rainfall | P2 | inches | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| Slope | s | ft/ft | 0.0027 | 0.0060 | 0.0010 | 0.0042 | 0.0079 | 0.0311 | 0.0055 | 0.0051 | 0.0018 |
| Travel time | Tt | hours | 0.342 | 0.103 | 0.018 | 0.246 | 0.193 | 0.111 | 0.107 | 0.229 | 0.349 |
| Shallow Concentrated Flow | | | min. | 20.5 | 6.2 | 1.1 | 14.8 | 11.6 | 6.7 | 6.4 | 13.7 |
| Flow Length | L | feet | 460 | 564 | 911 | 1,100 | 685 | 69 | 610 | 651 | 768 |
| Slope | s | ft/ft | 0.007 | 0.018 | 0.008 | 0.013 | 0.033 | 0.035 | 0.016 | 0.015 | 0.014 |
| Surface (1=paved or 2=unpaved) | | n/a | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Velocity | V | ft/sec | 1.70 | 2.76 | 1.90 | 2.32 | 3.74 | 3.87 | 2.64 | 2.55 | 2.47 |
| Travel time | Tt | hours | 0.075 | 0.057 | 0.133 | 0.131 | 0.051 | 0.005 | 0.064 | 0.071 | 0.086 |
| Manning's Equation | | | min. | 4.5 | 3.4 | 8.0 | 7.9 | 3.1 | 0.3 | 3.8 | 4.3 |
| 1 Flow Length | L | feet | 1,650 | 1,020 | 1,440 | 2,205 | 1,380 | 1,215 | 2,103 | 461 | 2,227 |
| Slope | S | ft/ft | 0.0227 | 0.0111 | 0.0247 | 0.0127 | 0.0043 | 0.0115 | 0.0126 | 0.0088 | 0.0104 |
| roughness | n | n/a | 0.04 | 0.013 | 0.013 | 0.013 | 0.04 | 0.013 | 0.013 | 0.04 | 0.013 |
| Open Channel | | | | | | | | | | | |
| Bottom Width | BW | feet | 3 | 0 | 0 | 0 | 10 | 0 | 0 | 3 | 0 |
| Side Slopes (H:1) | H | feet | 5 | 0 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Depth | d | feet | 2 | 0 | 0 | 0 | 5 | 0 | 0 | 1.5 | 0 |
| ...or Closed Conduit | | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 3.00 | 4.50 | 4.50 | 0.00 | 4.00 | 3.50 | 0.00 | 3.00 |
| Span (0 if circular) | S | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cross-Sectional Area | X-A | feet^2 | 26.00 | 7.07 | 15.90 | 15.90 | 175.00 | 12.57 | 9.62 | 15.75 | 7.07 |
| Flow Rate | Q | cfs | 156.56 | 70.35 | 238.56 | 222.10 | 867.84 | 154.68 | 113.35 | 49.71 | 68.29 |
| Velocity | V | ft/sec | 6.02 | 9.95 | 15.00 | 13.96 | 4.96 | 12.31 | 11.78 | 3.16 | 9.66 |
| Travel time | Tt | hours | 0.076 | 0.028 | 0.079 | 0.044 | 0.077 | 0.027 | 0.050 | 0.041 | 0.064 |
| 2 Flow Length | L | feet | 2,462 | 522 | 1,407 | 1,373 | - | 474 | 839 | - | 282 |
| Slope | S | ft/ft | 0.0032 | 0.0295 | 0.0077 | 0.0087 | 0.0000 | 0.0084 | 0.0061 | 0.0000 | 0.0074 |
| roughness | n | n/a | 0.06 | 0.04 | 0.04 | 0.05 | 0 | 0.04 | 0.04 | 0 | 0.013 |
| Open Channel | | | | | | | | | | | |
| Bottom Width | BW | feet | 30 | 2 | 10 | 10 | 0 | 10 | 10 | 0 | 10 |
| Side Slopes (H:1) | H | feet | 30 | 3 | 5 | 5 | 0 | 5 | 5 | 0 | 5 |
| Depth | d | feet | 3 | 1.5 | 3 | 5 | 0 | 5 | 5 | 0 | 4 |
| ...or Closed Conduit | | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.50 | 0.00 | 3.50 |
| Span (0 if circular) | S | feet | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 |
| Cross-Sectional Area | X-A | feet^2 | 360.00 | 9.75 | 75.00 | 175.00 | 0.00 | 175.00 | 175.00 | 0.00 | 120.00 |
| Flow Rate | Q | cfs | 723.07 | 55.94 | 369.10 | 983.22 | 0.00 | 1208.75 | 1031.80 | 0.00 | 2094.08 |
| Velocity | V | ft/sec | 2.01 | 5.74 | 4.92 | 5.62 | 0.00 | 6.91 | 5.90 | 0.00 | 17.45 |
| Travel time | Tt | hours | 0.340 | 0.025 | 0.079 | 0.068 | - | 0.019 | 0.040 | - | 0.004 |
| 3 Flow Length | L | feet | - | 366 | 2,463 | 846 | - | 91 | 70 | - | - |
| Slope | S | ft/ft | 0.0000 | 0.0070 | 0.0055 | 0.0048 | 0.0000 | 0.0208 | 0.0006 | 0.0000 | 0.0000 |
| roughness | n | n/a | 0 | 0.05 | 0.05 | 0.013 | 0 | 0.01 | 0.013 | 0 | 0 |
| Open Channel | | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 20 | 15 | 0 | 0 | 0 | 0 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 10 | 15 | 0 | 0 | 0 | 0 | 0 | 0 |
| Depth | d | feet | 0 | 2.75 | 4.5 | 0 | 0 | 0 | 0 | 0 | 0 |
| ...or Closed Conduit | | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 8.00 | 0.00 | 10.00 | 8.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0 | 0 | 0 | 8 | 0 | 6 | 5 | 0 | 0 |
| Cross-Sectional Area | X-A | feet^2 | 0.00 | 130.63 | 371.25 | 64.00 | 0.00 | 60.00 | 40.00 | 0.00 | 0.00 |
| Flow Rate | Q | cfs | 0.00 | 469.70 | 1494.89 | 806.23 | 0.00 | 1961.01 | 149.66 | 0.00 | 0.00 |
| Velocity | V | ft/sec | 0.00 | 3.60 | 4.03 | 12.60 | 0.00 | 32.68 | 3.74 | 0.00 | 0.00 |
| Travel time | Tt | hours | - | 0.028 | 0.170 | 0.019 | - | 0.001 | 0.005 | - | - |
| Total Travel Time | | | TC | hours | 0.833 | 0.242 | 0.427 | 0.508 | 0.321 | 0.163 | 0.265 |
| | TC | min. | 50.0 | 14.5 | 25.6 | 30.5 | 19.2 | 9.8 | 15.9 | 20.4 | 30.2 |
| Lag Time | | | TL | hours | 0.5000 | 0.1451 | 0.2564 | 0.3050 | 0.1924 | 0.0980 | 0.1591 |
| | TL | min. | 30.0 | 8.7 | 15.4 | 18.3 | 11.5 | 5.9 | 9.5 | 12.3 | 18.1 |

| EXISTING CONDITIONS | | | | | | | | | | | |
|---|-------|--------|----------|--------|--------|---------|--------|---------|--------|--------|--------|
| TR-55 Method of Computing the Time of Concentration | | | | | | | | | | | |
| | | | SCW_18 | SCW_19 | SCW_20 | WC_01 | WC_02 | WC_03 | WC_04 | WC_05 | WC_06 |
| Sheet Flow | | | variable | units | | | | | | | |
| Manning's roughness coef. | n | n/a | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.011 | 0.240 |
| Flow Length | L | feet | 50 | 50 | 20 | 20 | 60 | 300 | 50 | 20 | 50 |
| 2-year, 24-hour rainfall | P2 | inches | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| Slope | s | ft/ft | 0.0100 | 0.0040 | 0.0045 | 0.0010 | 0.0010 | 0.0040 | 0.0045 | 0.0070 | 0.0178 |
| Travel time | Tt | hours | 0.175 | 0.251 | 0.115 | 0.211 | 0.508 | 1.058 | 0.241 | 0.008 | 0.139 |
| Shallow Concentrated Flow | | | min. | 10.5 | 15.1 | 6.9 | 12.7 | 30.5 | 63.5 | 14.4 | 8.3 |
| Flow Length | L | feet | 700 | 1,378 | 136 | 100 | 180 | 544 | 390 | 820 | 1,070 |
| Slope | s | ft/ft | 0.015 | 0.010 | 0.014 | 0.001 | 0.017 | 0.014 | 0.005 | 0.007 | 0.011 |
| Surface (1=paved or 2=unpaved) | | n/a | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 2 |
| Velocity | V | ft/sec | 2.50 | 2.03 | 1.89 | 0.53 | 2.13 | 1.89 | 1.09 | 1.32 | 1.70 |
| Travel time | Tt | hours | 0.078 | 0.188 | 0.020 | 0.053 | 0.023 | 0.080 | 0.100 | 0.173 | 0.175 |
| Manning's Equation | | | min. | 4.7 | 11.3 | 1.2 | 3.2 | 1.4 | 4.8 | 6.0 | 10.4 |
| 1 Flow Length | L | feet | 2,794 | 1,373 | 2,412 | 2,080 | 988 | 2,317 | 2,105 | 1,923 | 1,860 |
| Slope | S | ft/ft | 0.0090 | 0.0077 | 0.0030 | 0.0220 | 0.0091 | 0.0049 | 0.0048 | 0.0045 | 0.0040 |
| roughness | n | n/a | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 | 0.05 | 0.04 | 0.013 | 0.013 |
| Open Channel | | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 0 | 0 | 0 | 0 | 15 | 3 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 0 | 0 | 0 | 0 | 15 | 5 | 0 | 0 |
| Depth | d | feet | 0 | 0 | 0 | 0 | 0 | 4 | 1.5 | 0 | 0 |
| ...or Closed Conduit | | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 2.50 | 3.50 | 3.00 | 2.50 | 2.00 | 0.00 | 0.00 | 3.00 | 7.00 |
| Span (0 if circular) | S | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| Cross-Sectional Area | X-A | feet^2 | 4.91 | 9.62 | 7.07 | 4.91 | 3.14 | 300.00 | 15.75 | 7.07 | 42.00 |
| Flow Rate | Q | cfs | 39.02 | 88.46 | 36.76 | 61.00 | 21.61 | 1067.89 | 36.66 | 44.65 | 417.26 |
| Velocity | V | ft/sec | 7.95 | 9.19 | 5.20 | 12.43 | 6.88 | 3.56 | 2.33 | 6.32 | 9.93 |
| Travel time | Tt | hours | 0.098 | 0.041 | 0.129 | 0.046 | 0.040 | 0.181 | 0.251 | 0.085 | 0.052 |
| 2 Flow Length | L | feet | 654 | - | 1,466 | 2,725 | 880 | - | 2,425 | 1,579 | 1,600 |
| Slope | S | ft/ft | 0.0058 | 0.0000 | 0.0081 | 0.0064 | 0.0020 | 0.0000 | 0.0041 | 0.0083 | 0.0111 |
| roughness | n | n/a | 0.013 | 0 | 0.013 | 0.05 | 0.013 | 0 | 0.05 | 0.013 | 0.013 |
| Open Channel | | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 0 | 0 | 20 | 0 | 0 | 10 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 0 | 0 | 7 | 0 | 0 | 15 | 0 | 0 |
| Depth | d | feet | 0 | 0 | 0 | 4.5 | 0 | 0 | 3.5 | 0 | 0 |
| ...or Closed Conduit | | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 3.50 | 0.00 | 6.50 | 0.00 | 4.00 | 0.00 | 0.00 | 3.50 | 9.00 |
| Span (0 if circular) | S | feet | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 6 |
| Cross-Sectional Area | X-A | feet^2 | 9.62 | 0.00 | 26.00 | 231.75 | 12.57 | 0.00 | 218.75 | 9.62 | 54.00 |
| Flow Rate | Q | cfs | 76.72 | 0.00 | 308.84 | 1088.56 | 64.41 | 0.00 | 641.76 | 91.71 | 810.00 |
| Velocity | V | ft/sec | 7.97 | 0.00 | 11.88 | 4.70 | 5.13 | 0.00 | 2.93 | 9.53 | 15.00 |
| Travel time | Tt | hours | 0.023 | - | 0.034 | 0.161 | 0.048 | - | 0.230 | 0.046 | 0.030 |
| 3 Flow Length | L | feet | - | - | 1,008 | - | 1,303 | - | 3,142 | - | 590 |
| Slope | S | ft/ft | 0.0000 | 0.0000 | 0.0045 | 0.0000 | 0.0074 | 0.0000 | 0.0055 | 0.0000 | 0.0101 |
| roughness | n | n/a | 0 | 0 | 0.013 | 0 | 0.013 | 0 | 0.05 | 0 | 0.05 |
| Open Channel | | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 0 | 5 | 0 | 0 | 0 | 15 | 0 | 15 |
| Side Slopes (H:1) | H | feet | 0 | 0 | 5 | 0 | 0 | 0 | 20 | 0 | 20 |
| Depth | d | feet | 0 | 0 | 3.5 | 0 | 0 | 0 | 3 | 0 | 3 |
| ...or Closed Conduit | | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 0.00 | 8.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cross-Sectional Area | X-A | feet^2 | 0.00 | 0.00 | 78.75 | 0.00 | 50.27 | 0.00 | 225.00 | 0.00 | 225.00 |
| Flow Rate | Q | cfs | 0.00 | 0.00 | 940.06 | 0.00 | 785.48 | 0.00 | 695.32 | 0.00 | 945.76 |
| Velocity | V | ft/sec | 0.00 | 0.00 | 11.94 | 0.00 | 15.63 | 0.00 | 3.09 | 0.00 | 4.20 |
| Travel time | Tt | hours | - | - | 0.023 | - | 0.023 | - | 0.282 | - | 0.039 |
| Total Travel Time | | | TC | hours | 0.373 | 0.481 | 0.322 | 0.471 | 0.642 | 1.319 | 1.104 |
| | | | TC | min. | 22.4 | 28.8 | 19.3 | 28.3 | 38.5 | 79.1 | 66.2 |
| Lag Time | | | TL | hours | 0.2235 | 0.2884 | 0.1932 | 0.2829 | 0.3854 | 0.7911 | 0.6621 |
| | | | TL | min. | 13.4 | 17.3 | 11.6 | 17.0 | 23.1 | 47.5 | 39.7 |

| EXISTING CONDITIONS | | | | | | | | | | |
|--|-------|--------|----------|---------|---------|---------|---------|---------|---------|---------|
| TR-55 Method of Computing the Time of Concentration | | | | | | | | | | |
| | | | BB_01 | BNB_01 | DB_01 | FB_01 | FC_01 | FC_02 | FC_03 | FC_04 |
| Sheet Flow | | | variable | units | | | | | | |
| Manning's roughness coef. | n | n/a | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.011 | 0.240 | 0.013 |
| Flow Length | L | feet | 50.00 | 50.00 | 50.00 | 50.00 | 60.00 | 20.00 | 50.00 | 20.00 |
| 2-year, 24-hour rainfall | P2 | inches | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 |
| Slope | s | ft/ft | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 | 0.023 | 0.018 | 0.005 |
| Travel time | Tt | hours | 0.175 | 0.175 | 0.175 | 0.175 | 0.202 | 0.005 | 0.139 | 0.011 |
| Shallow Concentrated Flow | | | | | | | | | | |
| | | min. | 10.5 | 10.5 | 10.5 | 10.5 | 12.1 | 0.3 | 8.4 | 0.6 |
| Flow Length | L | feet | 1140.00 | 1610.00 | 860.00 | 340.00 | 300.00 | 100.00 | 810.00 | 260.00 |
| Slope | s | ft/ft | 0.005 | 0.005 | 0.005 | 0.006 | 0.003 | 0.021 | 0.024 | 0.001 |
| Surface (1=paved or 2=unpaved) | | n/a | 1.000 | 1.000 | 1.000 | 1.000 | 2.000 | 1.000 | 1.000 | 1.000 |
| Velocity | V | ft/sec | 1.445 | 1.506 | 1.500 | 1.596 | 0.887 | 3.010 | 3.198 | 0.651 |
| Travel time | Tt | hours | 0.219 | 0.297 | 0.159 | 0.059 | 0.094 | 0.009 | 0.070 | 0.111 |
| Manning's Equation | | | | | | | | | | |
| | | min. | 13.1 | 17.8 | 9.6 | 3.6 | 5.6 | 0.6 | 4.2 | 6.7 |
| ## Flow Length | L | feet | 1091.00 | 1580.00 | 1965.00 | 2500.00 | 4333.00 | 1705.00 | 400.00 | 1050.00 |
| Slope | S | ft/ft | 0.001 | 0.007 | 0.004 | 0.005 | 0.001 | 0.011 | 0.028 | 0.025 |
| roughness | n | n/a | 0.013 | 0.013 | 0.013 | 0.013 | 0.060 | 0.013 | 0.013 | 0.013 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 0 | 0 | 0 | 50 | 0 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 0 | 0 | 0 | 20 | 0 | 0 | 0 |
| Depth | d | feet | 0.00 | 0.00 | 0.00 | 0.00 | 2.50 | 0.00 | 0.00 | 0.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 3.50 | 4.50 | 4.25 | 4.50 | 0.00 | 2.00 | 1.50 | 2.13 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 9.62 | 15.90 | 14.19 | 15.90 | 250.00 | 3.14 | 1.77 | 3.55 |
| Flow Rate | Q | cfs | 28.64 | 169.58 | 102.67 | 136.63 | 265.04 | 23.82 | 17.54 | 41.98 |
| Velocity | V | ft/sec | 3.0 | 10.7 | 7.2 | 8.6 | 1.1 | 7.6 | 9.9 | 11.8 |
| Travel time | Tt | hours | 0.102 | 0.041 | 0.075 | 0.081 | 1.135 | 0.062 | 0.011 | 0.025 |
| 2 Flow Length | L | feet | 1809.00 | 2500.00 | 1500.00 | 800.00 | 0.00 | 1400.00 | 4890.00 | 850.00 |
| Slope | S | ft/ft | 0.013 | 0.010 | 0.008 | 0.016 | 0.000 | 0.008 | 0.003 | 0.027 |
| roughness | n | n/a | 0.013 | 0.040 | 0.013 | 0.013 | 0.000 | 0.050 | 0.060 | 0.013 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 10 | 25 | 0 | 10 | 0 | 20 | 50 | 0 |
| Side Slopes (H:1) | H | feet | 5 | 20 | 0 | 3 | 0 | 10 | 20 | 0 |
| Depth | d | feet | 2.00 | 3.00 | 0.00 | 2.00 | 0.00 | 2.00 | 2.50 | 0.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 10.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 40.00 | 255.00 | 78.54 | 32.00 | 0.00 | 80.00 | 250.00 | 19.63 |
| Flow Rate | Q | cfs | 600.00 | 1358.34 | 1178.10 | 480.00 | 0.00 | 263.43 | 486.41 | 294.52 |
| Velocity | V | ft/sec | 15.0 | 5.3 | 15.0 | 15.0 | 0.0 | 3.3 | 1.9 | 15.0 |
| Travel time | Tt | hours | 0.034 | 0.130 | 0.028 | 0.015 | 0.000 | 0.118 | 0.698 | 0.016 |
| 3 Flow Length | L | feet | 727.94 | 6558.37 | 3859.10 | 3020.87 | 0.00 | 796.69 | 0.00 | 519.52 |
| Slope | S | ft/ft | 0.020 | 0.007 | 0.011 | 0.011 | 0.000 | 0.003 | 0.000 | 0.004 |
| roughness | n | n/a | 0.060 | 0.050 | 0.050 | 0.050 | 0.000 | 0.060 | 0.000 | 0.050 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 25 | 45 | 65 | 50 | 0 | 50 | 0 | 50 |
| Side Slopes (H:1) | H | feet | 4 | 10 | 20 | 15 | 0 | 20 | 0 | 20 |
| Depth | d | feet | 2.50 | 4.00 | 2.00 | 2.50 | 0.00 | 2.75 | 0.00 | 2.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 87.50 | 340.00 | 210.00 | 218.75 | 0.00 | 288.75 | 0.00 | 180.00 |
| Flow Rate | Q | cfs | 474.58 | 1609.88 | 823.77 | 982.12 | 0.00 | 558.10 | 0.00 | 431.22 |
| Velocity | V | ft/sec | 5.4 | 4.7 | 3.9 | 4.5 | 0.0 | 1.9 | 0.0 | 2.4 |
| Travel time | Tt | hours | 0.037 | 0.385 | 0.273 | 0.187 | 0.000 | 0.114 | 0.000 | 0.060 |
| Total Travel Time | | | | | | | | | | |
| | TC | hours | 0.57 | 1.03 | 0.71 | 0.52 | 1.43 | 0.31 | 0.92 | 0.22 |
| | TC | min. | 33.99 | 61.69 | 42.63 | 31.00 | 85.89 | 18.57 | 55.14 | 13.33 |
| Lag Time | | | | | | | | | | |
| | TL | hours | 0.3 | 0.6 | 0.4 | 0.3 | 0.9 | 0.2 | 0.6 | 0.1 |
| | TL | min. | 20.4 | 37.0 | 25.6 | 18.6 | 51.5 | 11.1 | 33.1 | 8.0 |

| EXISTING CONDITIONS | | | | | | | | | | |
|---|-------|--------|----------|---------|---------|---------|---------|---------|---------|---------|
| TR-55 Method of Computing the Time of Concentration | | | | | | | | | | |
| | | | FC_05 | FC_06 | FC_07 | FC_08 | FC_08A | FC_09 | FC_10 | FC_11 |
| Sheet Flow | | | variable | units | | | | | | |
| Manning's roughness coef. | n | n/a | 0.013 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 |
| Flow Length | L | feet | 20.00 | 50.00 | 50.00 | 50.00 | 50.00 | 50.00 | 20.00 | 50.00 |
| 2-year, 24-hour rainfall | P2 | inches | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 |
| Slope | s | ft/ft | 0.005 | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 |
| Travel time | Tt | hours | 0.011 | 0.175 | 0.175 | 0.175 | 0.175 | 0.175 | 0.083 | 0.175 |
| Shallow Concentrated Flow | | | | | | | | | | |
| | | min. | 0.6 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 5.0 | 10.5 |
| Flow Length | L | feet | 250.00 | 455.00 | 140.00 | 310.00 | 350.00 | 350.00 | 850.00 | 420.00 |
| Slope | s | ft/ft | 0.003 | 0.019 | 0.004 | 0.008 | 0.008 | 0.011 | 0.060 | 0.016 |
| Surface (1=paved or 2=unpaved) | | n/a | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| Velocity | V | ft/sec | 1.128 | 2.840 | 1.303 | 1.843 | 1.843 | 2.157 | 5.060 | 2.631 |
| Travel time | Tt | hours | 0.062 | 0.045 | 0.030 | 0.047 | 0.053 | 0.045 | 0.047 | 0.044 |
| Manning's Equation | | | | | | | | | | |
| | | min. | 3.7 | 2.7 | 1.8 | 2.8 | 3.2 | 2.7 | 2.8 | 2.7 |
| ## Flow Length | L | feet | 950.00 | 890.00 | 1400.00 | 1539.00 | 2820.00 | 2450.00 | 2100.00 | 650.00 |
| Slope | S | ft/ft | 0.025 | 0.023 | 0.004 | 0.020 | 0.007 | 0.011 | 0.003 | 0.051 |
| roughness | n | n/a | 0.040 | 0.013 | 0.013 | 0.013 | 0.013 | 0.040 | 0.050 | 0.013 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 45 | 0 | 0 | 0 | 0 | 3 | 35 | 0 |
| Side Slopes (H:1) | H | feet | 10 | 0 | 0 | 0 | 0 | 5 | 7 | 0 |
| Depth | d | feet | 1.25 | 0.00 | 0.00 | 0.00 | 0.00 | 3.00 | 3.00 | 0.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 3.00 | 3.00 | 3.00 | 3.00 | 0.00 | 0.00 | 2.75 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 71.88 | 7.07 | 7.07 | 7.07 | 7.07 | 54.00 | 168.00 | 5.94 |
| Flow Rate | Q | cfs | 432.01 | 101.42 | 39.97 | 94.52 | 55.03 | 294.00 | 427.10 | 119.38 |
| Velocity | V | ft/sec | 6.0 | 14.3 | 5.7 | 13.4 | 7.8 | 5.4 | 2.5 | 20.1 |
| Travel time | Tt | hours | 0.044 | 0.017 | 0.069 | 0.032 | 0.101 | 0.125 | 0.229 | 0.009 |
| 2 Flow Length | L | feet | 897.69 | 1625.00 | 600.00 | 1007.00 | 1930.00 | 1500.00 | 1843.00 | 600.00 |
| Slope | S | ft/ft | 0.006 | 0.007 | 0.003 | 0.027 | 0.022 | 0.025 | 0.002 | 0.044 |
| roughness | n | n/a | 0.050 | 0.050 | 0.013 | 0.013 | 0.013 | 0.040 | 0.060 | 0.040 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 50 | 70 | 0 | 0 | 0 | 110 | 35 | 15 |
| Side Slopes (H:1) | H | feet | 20 | 30 | 0 | 0 | 0 | 15 | 7 | 12 |
| Depth | d | feet | 2.00 | 1.25 | 0.00 | 0.00 | 0.00 | 1.50 | 5.00 | 2.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 3.50 | 6.00 | 5.50 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 180.00 | 134.38 | 9.62 | 28.27 | 23.76 | 198.75 | 350.00 | 78.00 |
| Flow Rate | Q | cfs | 508.70 | 318.40 | 51.11 | 424.12 | 356.37 | 1393.22 | 915.00 | 701.73 |
| Velocity | V | ft/sec | 2.8 | 2.4 | 5.3 | 15.0 | 15.0 | 7.0 | 2.6 | 9.0 |
| Travel time | Tt | hours | 0.088 | 0.191 | 0.031 | 0.019 | 0.036 | 0.059 | 0.196 | 0.019 |
| 3 Flow Length | L | feet | 0.00 | 0.00 | 2604.40 | 714.91 | 750.00 | 1704.23 | 0.00 | 4628.54 |
| Slope | S | ft/ft | 0.000 | 0.000 | 0.019 | 0.006 | 0.002 | 0.002 | 0.000 | 0.001 |
| roughness | n | n/a | 0.000 | 0.000 | 0.013 | 0.050 | 0.050 | 0.050 | 0.000 | 0.060 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 0 | 0 | 20 | 20 | 30 | 0 | 40 |
| Side Slopes (H:1) | H | feet | 0 | 0 | 0 | 8 | 8 | 5 | 0 | 10 |
| Depth | d | feet | 0.00 | 0.00 | 0.00 | 3.00 | 3.00 | 5.25 | 0.00 | 5.75 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 4.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 0.00 | 0.00 | 15.90 | 132.00 | 132.00 | 295.31 | 0.00 | 560.63 |
| Flow Rate | Q | cfs | 0.00 | 0.00 | 238.56 | 485.75 | 258.31 | 815.18 | 0.00 | 1224.96 |
| Velocity | V | ft/sec | 0.0 | 0.0 | 15.0 | 3.7 | 2.0 | 2.8 | 0.0 | 2.2 |
| Travel time | Tt | hours | 0.000 | 0.000 | 0.048 | 0.054 | 0.106 | 0.171 | 0.000 | 0.588 |
| Total Travel Time | | | | | | | | | | |
| | TC | hours | 0.20 | 0.43 | 0.35 | 0.33 | 0.47 | 0.58 | 0.55 | 0.84 |
| | TC | min. | 12.27 | 25.63 | 21.19 | 19.57 | 28.23 | 34.55 | 33.28 | 50.11 |
| Lag Time | | | | | | | | | | |
| | TL | hours | 0.1 | 0.3 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.5 |
| | TL | min. | 7.4 | 15.4 | 12.7 | 11.7 | 16.9 | 20.7 | 20.0 | 30.1 |

| EXISTING CONDITIONS | | | | | | | | | | |
|--|----------|--------|---------|---------|---------|---------|---------|---------|---------|---------|
| TR-55 Method of Computing the Time of Concentration | | | | | | | | | | |
| | | | FC_12 | FC_13 | FC_14 | FC_14A | FC_15 | FC_16 | FC_17 | FC_18 |
| Sheet Flow | | | | | | | | | | |
| | variable | units | | | | | | | | |
| Manning's roughness coef. | n | n/a | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 |
| Flow Length | L | feet | 50.00 | 50.00 | 50.00 | 50.00 | 20.00 | 60.00 | 50.00 | 50.00 |
| 2-year, 24-hour rainfall | P2 | inches | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 |
| Slope | s | ft/ft | 0.010 | 0.010 | 0.010 | 0.011 | 0.028 | 0.031 | 0.010 | 0.012 |
| Travel time | Tt | hours | 0.175 | 0.175 | 0.175 | 0.168 | 0.056 | 0.129 | 0.175 | 0.163 |
| Shallow Concentrated Flow | | | | | | | | | | |
| | | min. | 10.5 | 10.5 | 10.5 | 10.1 | 3.3 | 7.7 | 10.5 | 9.8 |
| Flow Length | L | feet | 1150.00 | 630.00 | 1166.00 | 630.00 | 1400.00 | 760.00 | 510.00 | 375.00 |
| Slope | s | ft/ft | 0.009 | 0.010 | 0.012 | 0.017 | 0.027 | 0.018 | 0.005 | 0.021 |
| Surface (1=paved or 2=unpaved) | | n/a | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 2.000 | 1.000 | 1.000 |
| Velocity | V | ft/sec | 2.005 | 2.009 | 2.289 | 2.655 | 2.000 | 2.158 | 1.435 | 2.952 |
| Travel time | Tt | hours | 0.159 | 0.087 | 0.141 | 0.066 | 0.194 | 0.098 | 0.099 | 0.035 |
| Manning's Equation | | | | | | | | | | |
| | | min. | 9.6 | 5.2 | 8.5 | 4.0 | 11.7 | 5.9 | 5.9 | 2.1 |
| ## Flow Length | L | feet | 730.00 | 950.00 | 2305.00 | 1185.00 | 823.00 | 2300.00 | 890.00 | 2500.00 |
| Slope | S | ft/ft | 0.005 | 0.043 | 0.011 | 0.025 | 0.001 | 0.010 | 0.021 | 0.010 |
| roughness | n | n/a | 0.013 | 0.013 | 0.013 | 0.013 | 0.050 | 0.013 | 0.013 | 0.013 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 0 | 0 | 0 | 30 | 0 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 |
| Depth | d | feet | 0.00 | 0.00 | 0.00 | 0.00 | 2.25 | 0.00 | 0.00 | 0.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 2.00 | 2.75 | 3.00 | 2.50 | 0.00 | 3.00 | 3.50 | 4.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 3.14 | 5.94 | 7.07 | 4.91 | 118.13 | 7.07 | 9.62 | 12.57 |
| Flow Rate | Q | cfs | 16.16 | 89.09 | 71.33 | 65.49 | 164.16 | 67.38 | 144.32 | 142.41 |
| Velocity | V | ft/sec | 5.1 | 15.0 | 10.1 | 13.3 | 1.4 | 9.5 | 15.0 | 11.3 |
| Travel time | Tt | hours | 0.039 | 0.018 | 0.063 | 0.025 | 0.165 | 0.067 | 0.016 | 0.061 |
| 2 Flow Length | L | feet | 1950.00 | 2578.00 | 303.00 | 2329.00 | 0.00 | 1970.00 | 1470.00 | 3420.00 |
| Slope | S | ft/ft | 0.007 | 0.003 | 0.042 | 0.007 | 0.000 | 0.005 | 0.020 | 0.006 |
| roughness | n | n/a | 0.013 | 0.050 | 0.050 | 0.050 | 0.000 | 0.050 | 0.050 | 0.060 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 30 | 15 | 35 | 0 | 40 | 55 | 110 |
| Side Slopes (H:1) | H | feet | 0 | 20 | 20 | 10 | 0 | 15 | 10 | 30 |
| Depth | d | feet | 0.00 | 2.50 | 2.00 | 4.00 | 0.00 | 3.00 | 2.00 | 3.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 4.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 15.90 | 200.00 | 110.00 | 300.00 | 0.00 | 255.00 | 150.00 | 600.00 |
| Flow Rate | Q | cfs | 159.86 | 427.69 | 744.22 | 1382.65 | 0.00 | 812.20 | 855.16 | 1838.87 |
| Velocity | V | ft/sec | 10.1 | 2.1 | 6.8 | 4.6 | 0.0 | 3.2 | 5.7 | 3.1 |
| Travel time | Tt | hours | 0.054 | 0.335 | 0.012 | 0.140 | 0.000 | 0.172 | 0.072 | 0.310 |
| 3 Flow Length | L | feet | 1238.45 | 0.00 | 632.17 | 0.00 | 0.00 | 2403.96 | 2471.60 | 0.00 |
| Slope | S | ft/ft | 0.031 | 0.000 | 0.004 | 0.000 | 0.000 | 0.001 | 0.003 | 0.000 |
| roughness | n | n/a | 0.013 | 0.000 | 0.050 | 0.000 | 0.000 | 0.050 | 0.060 | 0.000 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 0 | 35 | 0 | 0 | 50 | 110 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 0 | 10 | 0 | 0 | 10 | 25 | 0 |
| Depth | d | feet | 0.00 | 0.00 | 2.50 | 0.00 | 0.00 | 4.00 | 2.00 | 0.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 6.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 28.27 | 0.00 | 150.00 | 0.00 | 0.00 | 360.00 | 320.00 | 0.00 |
| Flow Rate | Q | cfs | 424.12 | 0.00 | 422.39 | 0.00 | 0.00 | 728.79 | 537.04 | 0.00 |
| Velocity | V | ft/sec | 15.0 | 0.0 | 2.8 | 0.0 | 0.0 | 2.0 | 1.7 | 0.0 |
| Travel time | Tt | hours | 0.023 | 0.000 | 0.062 | 0.000 | 0.000 | 0.330 | 0.409 | 0.000 |
| Total Travel Time | | | | | | | | | | |
| | TC | hours | 0.45 | 0.61 | 0.45 | 0.40 | 0.41 | 0.80 | 0.77 | 0.57 |
| | TC | min. | 27.03 | 36.87 | 27.28 | 23.96 | 24.88 | 47.71 | 46.25 | 34.20 |
| Lag Time | | | | | | | | | | |
| | TL | hours | 0.3 | 0.4 | 0.3 | 0.2 | 0.2 | 0.5 | 0.5 | 0.3 |
| | TL | min. | 16.2 | 22.1 | 16.4 | 14.4 | 14.9 | 28.6 | 27.7 | 20.5 |

| EXISTING CONDITIONS | | | | | | | | | | |
|--|----------|--------|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| TR-55 Method of Computing the Time of Concentration | | | | | | | | | | |
| | | | FC_18A | FC_19 | FC_20 | FC_21 | FC_22 | FC_23 | FC_24 | FC_25 |
| Sheet Flow | variable | units | | | | | | | | |
| Manning's roughness coef. | n | n/a | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.016 | 0.240 |
| Flow Length | L | feet | 60.00 | 60.00 | 60.00 | 50.00 | 50.00 | 50.00 | 50.00 | 20.00 |
| 2-year, 24-hour rainfall | P2 | inches | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 |
| Slope | s | ft/ft | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 |
| Travel time | Tt | hours | 0.202 | 0.202 | 0.202 | 0.175 | 0.175 | 0.175 | 0.020 | 0.084 |
| Shallow Concentrated Flow | | min. | 12.1 | 12.1 | 12.1 | 10.5 | 10.5 | 10.5 | 1.2 | 5.0 |
| Flow Length | L | feet | 421.00 | 1110.00 | 1775.00 | 1290.00 | 935.00 | 1339.00 | 350.00 | 949.00 |
| Slope | s | ft/ft | 0.005 | 0.012 | 0.009 | 0.010 | 0.010 | 0.015 | 0.020 | 0.020 |
| Surface (1=paved or 2=unpaved) | | n/a | 1.000 | 1.000 | 2.000 | 2.000 | 1.000 | 2.000 | 1.000 | 1.000 |
| Velocity | V | ft/sec | 1.400 | 2.257 | 1.537 | 1.620 | 2.060 | 1.984 | 2.913 | 2.913 |
| Travel time | Tt | hours | 0.084 | 0.137 | 0.321 | 0.221 | 0.126 | 0.187 | 0.033 | 0.090 |
| Manning's Equation | | min. | 5.0 | 8.2 | 19.2 | 13.3 | 7.6 | 11.2 | 2.0 | 5.4 |
| ## Flow Length | L | feet | 1006.00 | 1482.00 | 6462.00 | 1865.00 | 2400.00 | 2100.00 | 2579.00 | 762.00 |
| Slope | S | ft/ft | 0.020 | 0.008 | 0.008 | 0.008 | 0.011 | 0.014 | 0.020 | 0.013 |
| roughness | n | n/a | 0.040 | 0.040 | 0.060 | 0.013 | 0.013 | 0.013 | 0.016 | 0.016 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 2 | 3 | 100 | 0 | 0 | 0 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 3 | 3 | 10 | 0 | 0 | 0 | 0 | 0 |
| Depth | d | feet | 1.50 | 1.50 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 4.00 | 0.00 | 0.00 | 3.50 | 5.00 | 5.00 | 2.00 | 2.50 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 9.75 | 11.25 | 390.00 | 9.62 | 19.63 | 19.63 | 3.14 | 4.91 |
| Flow Rate | Q | cfs | 46.16 | 34.18 | 1541.12 | 90.23 | 271.81 | 294.52 | 26.06 | 38.10 |
| Velocity | V | ft/sec | 4.7 | 3.0 | 4.0 | 9.4 | 13.8 | 15.0 | 8.3 | 7.8 |
| Travel time | Tt | hours | 0.059 | 0.136 | 0.454 | 0.055 | 0.048 | 0.039 | 0.086 | 0.027 |
| 2 Flow Length | L | feet | 2055.25 | 4279.00 | 0.00 | 1172.00 | 5460.00 | 3275.00 | 1627.00 | 316.00 |
| Slope | S | ft/ft | 0.013 | 0.007 | 0.000 | 0.007 | 0.008 | 0.006 | 0.007 | 0.015 |
| roughness | n | n/a | 0.013 | 0.060 | 0.000 | 0.013 | 0.013 | 0.050 | 0.013 | 0.013 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 35 | 0 | 0 | 10 | 10 | 10 | 15 |
| Side Slopes (H:1) | H | feet | 0 | 15 | 0 | 0 | 5 | 7 | 5 | 3 |
| Depth | d | feet | 0.00 | 3.50 | 0.00 | 0.00 | 4.00 | 5.00 | 6.00 | 5.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 5.50 | 0.00 | 0.00 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 23.76 | 306.25 | 0.00 | 19.63 | 120.00 | 225.00 | 240.00 | 150.00 |
| Flow Rate | Q | cfs | 356.37 | 1035.57 | 0.00 | 218.49 | 1200.00 | 1028.78 | 2880.00 | 1800.00 |
| Velocity | V | ft/sec | 15.0 | 3.4 | 0.0 | 11.1 | 10.0 | 4.6 | 12.0 | 12.0 |
| Travel time | Tt | hours | 0.038 | 0.352 | 0.000 | 0.029 | 0.152 | 0.199 | 0.038 | 0.007 |
| 3 Flow Length | L | feet | 0.00 | 0.00 | 0.00 | 3705.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Slope | S | ft/ft | 0.000 | 0.000 | 0.000 | 0.007 | 0.000 | 0.000 | 0.000 | 0.000 |
| roughness | n | n/a | 0.000 | 0.000 | 0.000 | 0.050 | 0.000 | 0.000 | 0.000 | 0.000 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 |
| Depth | d | feet | 0.00 | 0.00 | 0.00 | 6.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 0.00 | 0.00 | 0.00 | 335.94 | 0.00 | 0.00 | 0.00 | 0.00 |
| Flow Rate | Q | cfs | 0.00 | 0.00 | 0.00 | 1830.17 | 0.00 | 0.00 | 0.00 | 0.00 |
| Velocity | V | ft/sec | 0.0 | 0.0 | 0.0 | 5.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| Travel time | Tt | hours | 0.000 | 0.000 | 0.000 | 0.189 | 0.000 | 0.000 | 0.000 | 0.000 |
| Total Travel Time | TC | hours | 0.38 | 0.83 | 0.98 | 0.67 | 0.50 | 0.60 | 0.18 | 0.21 |
| | TC | min. | 22.98 | 49.56 | 58.64 | 40.17 | 30.05 | 36.01 | 10.65 | 12.55 |
| Lag Time | TL | hours | 0.2 | 0.5 | 0.6 | 0.4 | 0.3 | 0.4 | 0.1 | 0.1 |
| | TL | min. | 13.8 | 29.7 | 35.2 | 24.1 | 18.0 | 21.6 | 6.4 | 7.5 |

| EXISTING CONDITIONS | | | | | | | | | | |
|--|----------|--------|---------|----------|---------|---------|---------|----------|---------|---------|
| TR-55 Method of Computing the Time of Concentration | | | | | | | | | | |
| | | | FC_26 | FC_27 | FC_28 | FC1_01 | FC1_02 | FC1_03 | FC1_04 | FC3_01 |
| Sheet Flow | variable | units | | | | | | | | |
| Manning's roughness coef. | n | n/a | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 |
| Flow Length | L | feet | 30.00 | 50.00 | 200.00 | 20.00 | 25.00 | 50.00 | 20.00 | 60.00 |
| 2-year, 24-hour rainfall | P2 | inches | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 |
| Slope | s | ft/ft | 0.010 | 0.010 | 0.010 | 0.028 | 0.010 | 0.010 | 0.010 | 0.010 |
| Travel time | Tt | hours | 0.116 | 0.175 | 0.530 | 0.056 | 0.100 | 0.175 | 0.084 | 0.202 |
| Shallow Concentrated Flow | | min. | 7.0 | 10.5 | 31.8 | 3.3 | 6.0 | 10.5 | 5.0 | 12.1 |
| Flow Length | L | feet | 798.00 | 790.00 | 530.00 | 1100.00 | 212.00 | 1964.00 | 2500.00 | 560.00 |
| Slope | s | ft/ft | 0.020 | 0.020 | 0.020 | 0.006 | 0.010 | 0.010 | 0.010 | 0.008 |
| Surface (1=paved or 2=unpaved) | | n/a | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 2.000 |
| Velocity | V | ft/sec | 2.913 | 2.913 | 2.913 | 1.590 | 2.060 | 2.060 | 2.060 | 1.481 |
| Travel time | Tt | hours | 0.076 | 0.075 | 0.051 | 0.192 | 0.029 | 0.265 | 0.337 | 0.105 |
| Manning's Equation | | min. | 4.6 | 4.5 | 3.0 | 11.5 | 1.7 | 15.9 | 20.2 | 6.3 |
| ## Flow Length | L | feet | 473.00 | 607.00 | 1773.00 | 1065.00 | 317.00 | 2982.00 | 7900.00 | 4100.00 |
| Slope | S | ft/ft | 0.013 | 0.013 | 0.013 | 0.010 | 0.015 | 0.015 | 0.015 | 0.009 |
| roughness | n | n/a | 0.016 | 0.016 | 0.016 | 0.013 | 0.040 | 0.040 | 0.040 | 0.040 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 0 | 0 | 0 | 0 | 70 | 2 | 20 |
| Side Slopes (H:1) | H | feet | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 15 |
| Depth | d | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 9.00 | 2.00 | 2.50 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 1.75 | 1.75 | 5.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 2.41 | 2.41 | 19.63 | 3.14 | 3.14 | 873.00 | 16.00 | 143.75 |
| Flow Rate | Q | cfs | 14.72 | 14.72 | 241.92 | 22.47 | 9.03 | 14405.71 | 77.42 | 684.95 |
| Velocity | V | ft/sec | 6.1 | 6.1 | 12.3 | 7.2 | 2.9 | 16.5 | 4.8 | 4.8 |
| Travel time | Tt | hours | 0.021 | 0.028 | 0.040 | 0.041 | 0.031 | 0.050 | 0.454 | 0.239 |
| 2 Flow Length | L | feet | 1603.00 | 193.00 | 26.00 | 5960.00 | 2027.00 | 0.00 | 1825.00 | 1416.00 |
| Slope | S | ft/ft | 0.015 | 0.015 | 0.015 | 0.006 | 0.040 | 0.040 | 0.014 | 0.012 |
| roughness | n | n/a | 0.013 | 0.013 | 0.013 | 0.050 | 0.013 | 0.013 | 0.013 | 0.050 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 15 | 30 | 25 | 20 | 70 | 0 | 10 | 30 |
| Side Slopes (H:1) | H | feet | 3 | 1 | 2 | 5 | 3 | 0 | 5 | 15 |
| Depth | d | feet | 5.00 | 45.00 | 7.00 | 4.00 | 9.00 | 0.00 | 6.00 | 2.25 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 150.00 | 3375.00 | 273.00 | 160.00 | 873.00 | 0.00 | 240.00 | 143.44 |
| Flow Rate | Q | cfs | 1800.00 | 40500.00 | 3276.00 | 704.06 | 8730.00 | 0.00 | 2400.00 | 610.69 |
| Velocity | V | ft/sec | 12.0 | 12.0 | 12.0 | 4.4 | 10.0 | 10.0 | 10.0 | 4.3 |
| Travel time | Tt | hours | 0.037 | 0.004 | 0.001 | 0.376 | 0.056 | 0.000 | 0.051 | 0.092 |
| 3 Flow Length | L | feet | 0.00 | 0.00 | 0.00 | 2800.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Slope | S | ft/ft | 0.000 | 0.000 | 0.000 | 0.004 | 0.000 | 0.000 | 0.000 | 0.000 |
| roughness | n | n/a | 0.000 | 0.000 | 0.000 | 0.050 | 0.000 | 0.000 | 0.000 | 0.000 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 0 | 0 | 30 | 0 | 0 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 |
| Depth | d | feet | 0.00 | 0.00 | 0.00 | 4.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 0.00 | 0.00 | 0.00 | 308.13 | 0.00 | 0.00 | 0.00 | 0.00 |
| Flow Rate | Q | cfs | 0.00 | 0.00 | 0.00 | 1117.57 | 0.00 | 0.00 | 0.00 | 0.00 |
| Velocity | V | ft/sec | 0.0 | 0.0 | 0.0 | 3.6 | 0.0 | 0.0 | 0.0 | 0.0 |
| Travel time | Tt | hours | 0.000 | 0.000 | 0.000 | 0.214 | 0.000 | 0.000 | 0.000 | 0.000 |
| Total Travel Time | TC | hours | 0.25 | 0.28 | 0.62 | 0.88 | 0.22 | 0.49 | 0.93 | 0.64 |
| | TC | min. | 15.05 | 16.93 | 37.27 | 52.79 | 12.96 | 29.39 | 55.52 | 38.32 |
| Lag Time | TL | hours | 0.2 | 0.2 | 0.4 | 0.5 | 0.1 | 0.3 | 0.6 | 0.4 |
| | TL | min. | 9.0 | 10.2 | 22.4 | 31.7 | 7.8 | 17.6 | 33.3 | 23.0 |

| EXISTING CONDITIONS | | | | | | | | | | |
|---|-------|--------|----------|---------|---------|---------|---------|---------|---------|---------|
| TR-55 Method of Computing the Time of Concentration | | | | | | | | | | |
| | | | FC3_02 | FC3_02A | FC3_03 | FC3_04 | FC4_01 | FC4_02 | FC4_03 | GB_01 |
| Sheet Flow | | | variable | units | | | | | | |
| Manning's roughness coef. | n | n/a | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.011 |
| Flow Length | L | feet | 50.00 | 50.00 | 20.00 | 20.00 | 60.00 | 50.00 | 20.00 | 20.00 |
| 2-year, 24-hour rainfall | P2 | inches | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 |
| Slope | s | ft/ft | 0.009 | 0.008 | 0.010 | 0.010 | 0.011 | 0.010 | 0.010 | 0.005 |
| Travel time | Tt | hours | 0.185 | 0.196 | 0.084 | 0.084 | 0.193 | 0.175 | 0.084 | 0.009 |
| Shallow Concentrated Flow | | | | | | | | | | |
| | | min. | 11.1 | 11.7 | 5.0 | 5.0 | 11.6 | 10.5 | 5.0 | 0.6 |
| Flow Length | L | feet | 797.00 | 1266.00 | 60.00 | 660.00 | 160.00 | 434.00 | 650.00 | 160.00 |
| Slope | s | ft/ft | 0.030 | 0.017 | 0.149 | 0.011 | 0.045 | 0.023 | 0.013 | 0.005 |
| Surface (1=paved or 2=unpaved) | | n/a | 2.000 | 2.000 | 2.000 | 1.000 | 2.000 | 1.000 | 1.000 | 1.000 |
| Velocity | V | ft/sec | 2.813 | 2.134 | 2.000 | 2.166 | 3.437 | 3.128 | 2.361 | 1.440 |
| Travel time | Tt | hours | 0.079 | 0.165 | 0.008 | 0.085 | 0.013 | 0.039 | 0.076 | 0.031 |
| Manning's Equation | | | | | | | | | | |
| | | min. | 4.7 | 9.9 | 0.5 | 5.1 | 0.8 | 2.3 | 4.6 | 1.9 |
| ## Flow Length | L | feet | 3787.00 | 1371.00 | 930.00 | 900.00 | 1029.00 | 3874.00 | 1011.00 | 2064.00 |
| Slope | S | ft/ft | 0.006 | 0.010 | 0.008 | 0.013 | 0.025 | 0.005 | 0.012 | 0.003 |
| roughness | n | n/a | 0.040 | 0.040 | 0.013 | 0.013 | 0.013 | 0.050 | 0.013 | 0.013 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 10 | 0 | 0 | 0 | 0 | 30 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 10 | 0 | 0 | 0 | 0 | 15 | 0 | 0 |
| Depth | d | feet | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.00 | 0.00 | 0.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 4.00 | 2.50 | 3.00 | 2.25 | 0.00 | 3.00 | 3.50 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 120.00 | 12.57 | 4.91 | 7.07 | 3.98 | 360.00 | 7.07 | 9.62 |
| Flow Rate | Q | cfs | 476.10 | 47.33 | 36.95 | 77.25 | 48.78 | 1343.48 | 72.50 | 53.21 |
| Velocity | V | ft/sec | 4.0 | 3.8 | 7.5 | 10.9 | 12.3 | 3.7 | 10.3 | 5.5 |
| Travel time | Tt | hours | 0.265 | 0.101 | 0.034 | 0.023 | 0.023 | 0.288 | 0.027 | 0.104 |
| 2 Flow Length | L | feet | 0.00 | 2976.00 | 4450.00 | 2088.00 | 2742.00 | 0.00 | 4519.00 | 1950.00 |
| Slope | S | ft/ft | 0.000 | 0.010 | 0.005 | 0.013 | 0.008 | 0.000 | 0.005 | 0.006 |
| roughness | n | n/a | 0.050 | 0.050 | 0.013 | 0.040 | 0.050 | 0.040 | 0.040 | 0.013 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 10 | 0 | 100 | 15 | 0 | 10 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 3 | 0 | 40 | 6 | 0 | 15 | 0 |
| Depth | d | feet | 0.00 | 3.00 | 0.00 | 2.00 | 3.25 | 0.00 | 3.00 | 0.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 4.000 |
| Cross-Sectional Area | X-A | feet^2 | 0.00 | 57.00 | 19.63 | 360.00 | 112.13 | 0.00 | 165.00 | 24.00 |
| Flow Rate | Q | cfs | 0.00 | 262.53 | 188.31 | 1892.57 | 486.13 | 0.00 | 631.27 | 249.64 |
| Velocity | V | ft/sec | 0.0 | 4.6 | 9.6 | 5.3 | 4.3 | 0.0 | 3.8 | 10.4 |
| Travel time | Tt | hours | 0.000 | 0.179 | 0.129 | 0.110 | 0.176 | 0.000 | 0.328 | 0.052 |
| 3 Flow Length | L | feet | 0.00 | 0.00 | 0.00 | 4324.07 | 0.00 | 0.00 | 0.00 | 7152.53 |
| Slope | S | ft/ft | 0.000 | 0.000 | 0.000 | 0.008 | 0.000 | 0.000 | 0.000 | 0.007 |
| roughness | n | n/a | 0.013 | 0.013 | 0.000 | 0.040 | 0.000 | 0.050 | 0.050 | 0.050 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 0 | 0 | 30 | 0 | 0 | 0 | 55 |
| Side Slopes (H:1) | H | feet | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 10 |
| Depth | d | feet | 0.00 | 0.00 | 0.00 | 3.75 | 0.00 | 0.00 | 0.00 | 4.50 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 0.00 | 0.00 | 0.00 | 182.81 | 0.00 | 0.00 | 0.00 | 450.00 |
| Flow Rate | Q | cfs | 0.00 | 0.00 | 0.00 | 1139.21 | 0.00 | 0.00 | 0.00 | 2434.93 |
| Velocity | V | ft/sec | 0.0 | 0.0 | 0.0 | 6.2 | 0.0 | 0.0 | 0.0 | 5.4 |
| Travel time | Tt | hours | 0.000 | 0.000 | 0.000 | 0.193 | 0.000 | 0.000 | 0.000 | 0.367 |
| Total Travel Time | | | | | | | | | | |
| | TC | hours | 0.53 | 0.64 | 0.26 | 0.49 | 0.40 | 0.50 | 0.52 | 0.56 |
| | TC | min. | 31.71 | 38.46 | 15.33 | 29.68 | 24.30 | 30.11 | 30.96 | 33.80 |
| Lag Time | | | | | | | | | | |
| | TL | hours | 0.3 | 0.4 | 0.2 | 0.3 | 0.2 | 0.3 | 0.3 | 0.3 |
| | TL | min. | 19.0 | 23.1 | 9.2 | 17.8 | 14.6 | 18.1 | 18.6 | 20.3 |

| EXISTING CONDITIONS | | | | | | | | | | |
|---|----------|--------|---------|---------|---------|---------|---------|---------|---------|---------|
| TR-55 Method of Computing the Time of Concentration | | | | | | | | | | |
| | variable | units | KC_01 | KC_01A | KC_02 | KC_03 | KC_04 | KC_05 | KC_06 | KC_07 |
| Sheet Flow | | | | | | | | | | |
| Manning's roughness coef. | n | n/a | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.011 |
| Flow Length | L | feet | 50.00 | 20.00 | 50.00 | 50.00 | 50.00 | 50.00 | 50.00 | 20.00 |
| 2-year, 24-hour rainfall | P2 | inches | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 |
| Slope | s | ft/ft | 0.010 | 0.020 | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 | 0.005 |
| Travel time | Tt | hours | 0.175 | 0.063 | 0.175 | 0.175 | 0.175 | 0.175 | 0.175 | 0.009 |
| Shallow Concentrated Flow | | | | | | | | | | |
| Flow Length | L | feet | 1577.00 | 435.00 | 650.00 | 1920.00 | 1650.00 | 350.00 | 440.00 | 419.00 |
| Slope | s | ft/ft | 0.012 | 0.082 | 0.002 | 0.004 | 0.002 | 0.003 | 0.011 | 0.005 |
| Surface (1=paved or 2=unpaved) | | n/a | 1.000 | 1.000 | 1.000 | 2.000 | 1.000 | 1.000 | 1.000 | 2.000 |
| Velocity | V | ft/sec | 2.247 | 2.000 | 1.003 | 1.025 | 0.988 | 1.124 | 2.203 | 1.146 |
| Travel time | Tt | hours | 0.195 | 0.060 | 0.180 | 0.521 | 0.464 | 0.087 | 0.055 | 0.102 |
| Manning's Equation | | | | | | | | | | |
| Flow Length | L | feet | 11.7 | 3.6 | 10.8 | 31.2 | 27.8 | 5.2 | 3.3 | 6.1 |
| ## Flow Length | L | feet | 315.00 | 1429.80 | 1950.00 | 1400.00 | 675.00 | 660.00 | 960.00 | 1395.00 |
| Slope | S | ft/ft | 0.082 | 0.001 | 0.001 | 0.002 | 0.014 | 0.012 | 0.001 | 0.008 |
| roughness | n | n/a | 0.013 | 0.050 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| Depth | d | feet | 0.00 | 1.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 1.50 | 0.00 | 3.00 | 3.00 | 2.70 | 2.25 | 3.00 | 3.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 1.77 | 75.00 | 7.07 | 7.07 | 5.73 | 3.98 | 7.07 | 7.07 |
| Flow Rate | Q | cfs | 26.51 | 90.35 | 15.61 | 29.91 | 58.94 | 34.63 | 16.16 | 61.02 |
| Velocity | V | ft/sec | 15.0 | 1.2 | 2.2 | 4.2 | 10.3 | 8.7 | 2.3 | 8.6 |
| Travel time | Tt | hours | 0.006 | 0.330 | 0.245 | 0.092 | 0.018 | 0.021 | 0.117 | 0.045 |
| 2 Flow Length | L | feet | 1870.00 | 0.00 | 3729.00 | 1300.00 | 576.00 | 2749.00 | 2070.00 | 575.00 |
| Slope | S | ft/ft | 0.004 | 0.000 | 0.004 | 0.022 | 0.048 | 0.008 | 0.008 | 0.002 |
| roughness | n | n/a | 0.050 | 0.000 | 0.013 | 0.013 | 0.040 | 0.050 | 0.013 | 0.013 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 60 | 0 | 0 | 0 | 30 | 30 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 10 | 0 | 0 | 0 | 5 | 10 | 0 | 0 |
| Depth | d | feet | 2.50 | 0.00 | 0.00 | 0.00 | 1.00 | 2.00 | 0.00 | 0.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 5.00 | 8.00 | 0.00 | 0.00 | 6.00 | 6.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 4.000 |
| Cross-Sectional Area | X-A | feet^2 | 212.50 | 0.00 | 19.63 | 50.27 | 35.00 | 100.00 | 28.27 | 24.00 |
| Flow Rate | Q | cfs | 619.68 | 0.00 | 169.38 | 753.98 | 261.48 | 330.77 | 385.24 | 146.76 |
| Velocity | V | ft/sec | 2.9 | 0.0 | 8.6 | 15.0 | 7.5 | 3.3 | 13.6 | 6.1 |
| Travel time | Tt | hours | 0.178 | 0.000 | 0.120 | 0.024 | 0.021 | 0.231 | 0.042 | 0.026 |
| 3 Flow Length | L | feet | 2781.87 | 0.00 | 0.00 | 2800.00 | 0.00 | 0.00 | 581.73 | 2686.49 |
| Slope | S | ft/ft | 0.002 | 0.000 | 0.000 | 0.006 | 0.000 | 0.000 | 0.006 | 0.004 |
| roughness | n | n/a | 0.050 | 0.000 | 0.000 | 0.050 | 0.000 | 0.000 | 0.040 | 0.013 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 80 | 0 | 0 | 35 | 0 | 0 | 30 | 0 |
| Side Slopes (H:1) | H | feet | 20 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Depth | d | feet | 2.50 | 0.00 | 0.00 | 2.25 | 0.00 | 0.00 | 2.25 | 0.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 8.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 6.000 |
| Cross-Sectional Area | X-A | feet^2 | 325.00 | 0.00 | 0.00 | 129.38 | 0.00 | 0.00 | 118.13 | 48.00 |
| Flow Rate | Q | cfs | 573.01 | 0.00 | 0.00 | 410.69 | 0.00 | 0.00 | 459.00 | 518.86 |
| Velocity | V | ft/sec | 1.8 | 0.0 | 0.0 | 3.2 | 0.0 | 0.0 | 3.9 | 10.8 |
| Travel time | Tt | hours | 0.438 | 0.000 | 0.000 | 0.245 | 0.000 | 0.000 | 0.042 | 0.069 |
| Total Travel Time | | | | | | | | | | |
| TC | TC | hours | 0.99 | 0.45 | 0.72 | 1.06 | 0.68 | 0.51 | 0.43 | 0.25 |
| min. | TC | min. | 59.52 | 27.21 | 43.22 | 63.38 | 40.71 | 30.80 | 25.85 | 15.07 |
| Lag Time | | | | | | | | | | |
| TL | TL | hours | 0.6 | 0.3 | 0.4 | 0.6 | 0.4 | 0.3 | 0.3 | 0.2 |
| min. | TL | min. | 35.7 | 16.3 | 25.9 | 38.0 | 24.4 | 18.5 | 15.5 | 9.0 |

| EXISTING CONDITIONS | | | | | | | | | | |
|--|----------|--------|---------|--------|---------|---------|---------|---------|---------|---------|
| TR-55 Method of Computing the Time of Concentration | | | | | | | | | | |
| | | | KC_08 | KC_09 | KC_10 | KC_11 | KC_12 | LB_01 | MB_01 | NF_01 |
| Sheet Flow | | | | | | | | | | |
| | variable | units | | | | | | | | |
| Manning's roughness coef. | n | n/a | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 |
| Flow Length | L | feet | 50.00 | 50.00 | 20.00 | 20.00 | 50.00 | 40.00 | 20.00 | 50.00 |
| 2-year, 24-hour rainfall | P2 | inches | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 |
| Slope | s | ft/ft | 0.016 | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 |
| Travel time | Tt | hours | 0.145 | 0.175 | 0.084 | 0.084 | 0.175 | 0.146 | 0.084 | 0.175 |
| Shallow Concentrated Flow | | | | | | | | | | |
| | | min. | 8.7 | 10.5 | 5.0 | 5.0 | 10.5 | 8.8 | 5.0 | 10.5 |
| Flow Length | L | feet | 750.00 | 641.00 | 1200.00 | 1950.00 | 1200.00 | 620.00 | 1925.00 | 1150.00 |
| Slope | s | ft/ft | 0.009 | 0.007 | 0.009 | 0.011 | 0.011 | 0.004 | 0.008 | 0.004 |
| Surface (1=paved or 2=unpaved) | | n/a | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 2.000 | 1.000 |
| Velocity | V | ft/sec | 1.949 | 1.679 | 1.907 | 2.131 | 2.111 | 1.269 | 1.452 | 1.352 |
| Travel time | Tt | hours | 0.107 | 0.106 | 0.175 | 0.254 | 0.158 | 0.136 | 0.368 | 0.236 |
| Manning's Equation | | | | | | | | | | |
| | | min. | 6.4 | 6.4 | 10.5 | 15.3 | 9.5 | 8.1 | 22.1 | 14.2 |
| ## Flow Length | L | feet | 1155.00 | 950.00 | 550.00 | 1500.00 | 1020.00 | 1100.00 | 900.00 | 2315.00 |
| Slope | S | ft/ft | 0.003 | 0.015 | 0.008 | 0.009 | 0.008 | 0.001 | 0.008 | 0.007 |
| roughness | n | n/a | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Depth | d | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 2.00 | 2.00 | 2.00 | 6.00 | 3.00 | 3.50 | 5.00 | 5.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 4.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 3.14 | 3.14 | 3.14 | 24.00 | 7.07 | 9.62 | 19.63 | 19.63 |
| Flow Rate | Q | cfs | 11.78 | 27.89 | 20.65 | 298.39 | 59.41 | 36.64 | 230.25 | 225.35 |
| Velocity | V | ft/sec | 3.7 | 8.9 | 6.6 | 12.4 | 8.4 | 3.8 | 11.7 | 11.5 |
| Travel time | Tt | hours | 0.086 | 0.030 | 0.023 | 0.034 | 0.034 | 0.080 | 0.021 | 0.056 |
| 2 Flow Length | L | feet | 360.00 | 860.00 | 2100.00 | 840.00 | 2400.00 | 2950.00 | 3000.00 | 2261.00 |
| Slope | S | ft/ft | 0.017 | 0.009 | 0.008 | 0.008 | 0.003 | 0.010 | 0.012 | 0.016 |
| roughness | n | n/a | 0.013 | 0.013 | 0.013 | 0.040 | 0.013 | 0.013 | 0.013 | 0.013 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 10 |
| Side Slopes (H:1) | H | feet | 8 | 0 | 0 | 8 | 0 | 0 | 0 | 5 |
| Depth | d | feet | 2.00 | 0.00 | 0.00 | 3.00 | 0.00 | 0.00 | 0.00 | 2.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 3.50 | 4.00 | 0.00 | 5.50 | 4.50 | 7.00 | 0.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 42.00 | 9.62 | 12.57 | 87.00 | 23.76 | 15.90 | 38.48 | 40.00 |
| Flow Rate | Q | cfs | 420.00 | 95.90 | 132.50 | 394.64 | 183.93 | 194.98 | 577.27 | 400.00 |
| Velocity | V | ft/sec | 10.0 | 10.0 | 10.5 | 4.5 | 7.7 | 12.3 | 15.0 | 10.0 |
| Travel time | Tt | hours | 0.010 | 0.024 | 0.055 | 0.051 | 0.086 | 0.067 | 0.056 | 0.063 |
| 3 Flow Length | L | feet | 1495.12 | 612.72 | 823.77 | 646.79 | 1435.18 | 2305.95 | 1113.09 | 0.00 |
| Slope | S | ft/ft | 0.005 | 0.008 | 0.005 | 0.011 | 0.003 | 0.010 | 0.015 | 0.000 |
| roughness | n | n/a | 0.040 | 0.013 | 0.013 | 0.050 | 0.013 | 0.050 | 0.050 | 0.000 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 10 | 5 | 5 | 30 | 0 | 75 | 15 | 0 |
| Side Slopes (H:1) | H | feet | 10 | 8 | 8 | 8 | 0 | 15 | 5 | 0 |
| Depth | d | feet | 4.00 | 2.25 | 3.00 | 4.25 | 0.00 | 2.50 | 3.50 | 0.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 0.00 | 8.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 200.00 | 51.75 | 87.00 | 272.00 | 50.27 | 281.25 | 113.75 | 0.00 |
| Flow Rate | Q | cfs | 849.58 | 628.60 | 1010.69 | 1665.81 | 500.92 | 1293.39 | 715.88 | 0.00 |
| Velocity | V | ft/sec | 4.2 | 12.1 | 11.6 | 6.1 | 10.0 | 4.6 | 6.3 | 0.0 |
| Travel time | Tt | hours | 0.098 | 0.014 | 0.020 | 0.029 | 0.040 | 0.139 | 0.049 | 0.000 |
| Total Travel Time | | | | | | | | | | |
| | TC | hours | 0.44 | 0.35 | 0.36 | 0.45 | 0.49 | 0.57 | 0.58 | 0.53 |
| | TC | min. | 26.69 | 20.92 | 21.43 | 27.15 | 29.55 | 34.10 | 34.70 | 31.80 |
| Lag Time | | | | | | | | | | |
| | TL | hours | 0.3 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| | TL | min. | 16.0 | 12.5 | 12.9 | 16.3 | 17.7 | 20.5 | 20.8 | 19.1 |

| EXISTING CONDITIONS | | | | | | | | | | |
|--|----------|--------|---------|---------|---------|---------|---------|---------|---------|---------|
| TR-55 Method of Computing the Time of Concentration | | | | | | | | | | |
| | | | NF_02 | NF_03 | NF_04 | NF_05 | NF_06 | NF_07 | NF_08 | NF_08A |
| Sheet Flow | | | | | | | | | | |
| | variable | units | | | | | | | | |
| Manning's roughness coef. | n | n/a | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 |
| Flow Length | L | feet | 20.00 | 60.00 | 50.00 | 20.00 | 20.00 | 50.00 | 50.00 | 50.00 |
| 2-year, 24-hour rainfall | P2 | inches | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 |
| Slope | s | ft/ft | 0.010 | 0.010 | 0.010 | 0.010 | 0.013 | 0.010 | 0.010 | 0.012 |
| Travel time | Tt | hours | 0.084 | 0.202 | 0.175 | 0.084 | 0.076 | 0.175 | 0.175 | 0.162 |
| Shallow Concentrated Flow | | | | | | | | | | |
| | | min. | 5.0 | 12.1 | 10.5 | 5.0 | 4.5 | 10.5 | 10.5 | 9.7 |
| Flow Length | L | feet | 1500.00 | 600.00 | 715.00 | 1240.00 | 2080.00 | 1100.00 | 1066.00 | 1577.00 |
| Slope | s | ft/ft | 0.002 | 0.003 | 0.006 | 0.017 | 0.009 | 0.009 | 0.017 | 0.010 |
| Surface (1=paved or 2=unpaved) | | n/a | 1.000 | 2.000 | 1.000 | 1.000 | 2.000 | 1.000 | 1.000 | 1.000 |
| Velocity | V | ft/sec | 1.015 | 0.852 | 1.641 | 2.650 | 1.551 | 1.960 | 2.671 | 2.073 |
| Travel time | Tt | hours | 0.411 | 0.196 | 0.121 | 0.130 | 0.373 | 0.156 | 0.111 | 0.211 |
| Manning's Equation | | | | | | | | | | |
| | | min. | 24.6 | 11.7 | 7.3 | 7.8 | 22.4 | 9.4 | 6.7 | 12.7 |
| ## Flow Length | L | feet | 800.00 | 740.00 | 2800.00 | 626.00 | 2379.00 | 2575.00 | 1529.00 | 3075.00 |
| Slope | S | ft/ft | 0.002 | 0.002 | 0.010 | 0.064 | 0.013 | 0.017 | 0.008 | 0.009 |
| roughness | n | n/a | 0.013 | 0.060 | 0.013 | 0.050 | 0.013 | 0.013 | 0.013 | 0.040 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 6 | 0 | 10 | 0 | 0 | 0 | 15 |
| Side Slopes (H:1) | H | feet | 0 | 5 | 0 | 5 | 0 | 0 | 0 | 7 |
| Depth | d | feet | 0.00 | 3.00 | 0.00 | 1.50 | 0.00 | 0.00 | 0.00 | 3.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 4.00 | 0.00 | 4.00 | 0.00 | 4.50 | 3.50 | 3.50 | 0.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 12.57 | 63.00 | 12.57 | 26.25 | 15.90 | 9.62 | 9.62 | 108.00 |
| Flow Rate | Q | cfs | 64.41 | 106.30 | 145.41 | 202.71 | 224.27 | 131.06 | 92.84 | 589.49 |
| Velocity | V | ft/sec | 5.1 | 1.7 | 11.6 | 7.7 | 14.1 | 13.6 | 9.6 | 5.5 |
| Travel time | Tt | hours | 0.043 | 0.122 | 0.067 | 0.023 | 0.047 | 0.053 | 0.044 | 0.156 |
| 2 Flow Length | L | feet | 2313.00 | 2051.00 | 1990.00 | 2947.00 | 1914.00 | 2364.00 | 998.00 | 2030.00 |
| Slope | S | ft/ft | 0.022 | 0.001 | 0.003 | 0.003 | 0.009 | 0.007 | 0.028 | 0.011 |
| roughness | n | n/a | 0.013 | 0.060 | 0.013 | 0.050 | 0.050 | 0.050 | 0.013 | 0.013 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 6 | 0 | 25 | 30 | 20 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 5 | 0 | 7 | 5 | 20 | 0 | 0 |
| Depth | d | feet | 0.00 | 4.00 | 0.00 | 4.25 | 3.75 | 3.50 | 0.00 | 0.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 5.00 | 0.00 | 9.00 | 0.00 | 0.00 | 0.00 | 6.00 | 10.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 5.000 | 0.000 | 0.000 | 0.000 | 6.000 | 6.000 |
| Cross-Sectional Area | X-A | feet^2 | 19.63 | 104.00 | 45.00 | 232.69 | 182.81 | 315.00 | 36.00 | 60.00 |
| Flow Rate | Q | cfs | 294.52 | 161.12 | 363.20 | 693.86 | 1005.11 | 1231.87 | 540.00 | 900.00 |
| Velocity | V | ft/sec | 15.0 | 1.5 | 8.1 | 3.0 | 5.5 | 3.9 | 15.0 | 15.0 |
| Travel time | Tt | hours | 0.043 | 0.368 | 0.068 | 0.275 | 0.097 | 0.168 | 0.018 | 0.038 |
| 3 Flow Length | L | feet | 0.00 | 1181.86 | 2444.59 | 0.00 | 0.00 | 0.00 | 1939.07 | 2337.57 |
| Slope | S | ft/ft | 0.000 | 0.040 | 0.019 | 0.000 | 0.000 | 0.000 | 0.003 | 0.006 |
| roughness | n | n/a | 0.000 | 0.060 | 0.040 | 0.000 | 0.000 | 0.000 | 0.060 | 0.060 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 6 | 10 | 0 | 0 | 0 | 35 | 35 |
| Side Slopes (H:1) | H | feet | 0 | 6 | 10 | 0 | 0 | 0 | 10 | 10 |
| Depth | d | feet | 0.00 | 4.00 | 3.00 | 0.00 | 0.00 | 0.00 | 5.00 | 4.50 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 0.00 | 120.00 | 120.00 | 0.00 | 0.00 | 0.00 | 425.00 | 360.00 |
| Flow Rate | Q | cfs | 0.00 | 1002.29 | 884.81 | 0.00 | 0.00 | 0.00 | 1161.23 | 1398.54 |
| Velocity | V | ft/sec | 0.0 | 8.4 | 7.4 | 0.0 | 0.0 | 0.0 | 2.7 | 3.9 |
| Travel time | Tt | hours | 0.000 | 0.039 | 0.092 | 0.000 | 0.000 | 0.000 | 0.197 | 0.167 |
| Total Travel Time | | | | | | | | | | |
| | TC | hours | 0.58 | 0.93 | 0.52 | 0.51 | 0.59 | 0.55 | 0.55 | 0.73 |
| | TC | min. | 34.85 | 55.61 | 31.42 | 30.66 | 35.51 | 33.07 | 32.72 | 44.06 |
| Lag Time | | | | | | | | | | |
| | TL | hours | 0.3 | 0.6 | 0.3 | 0.3 | 0.4 | 0.3 | 0.3 | 0.4 |
| | TL | min. | 20.9 | 33.4 | 18.9 | 18.4 | 21.3 | 19.8 | 19.6 | 26.4 |

| EXISTING CONDITIONS | | | | | | | | | | |
|--|-------|--------|----------|---------|---------|---------|---------|---------|---------|---------|
| TR-55 Method of Computing the Time of Concentration | | | | | | | | | | |
| | | | NF_09A | NF_09B | NF_09C | NF_09D | NF_09E | NF_09F | NF_09G | NF_10A |
| Sheet Flow | | | variable | units | | | | | | |
| Manning's roughness coef. | n | n/a | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 |
| Flow Length | L | feet | 50.00 | 50.00 | 50.00 | 50.00 | 50.00 | 50.00 | 50.00 | 50.00 |
| 2-year, 24-hour rainfall | P2 | inches | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 |
| Slope | s | ft/ft | 0.010 | 0.010 | 0.000 | 0.003 | 0.005 | 0.019 | 0.011 | 0.001 |
| Travel time | Tt | hours | 0.175 | 0.176 | 0.692 | 0.276 | 0.235 | 0.135 | 0.166 | 0.446 |
| Shallow Concentrated Flow | | | | | | | | | | |
| | | min. | 10.5 | 10.5 | 41.5 | 16.5 | 14.1 | 8.1 | 10.0 | 26.8 |
| Flow Length | L | feet | 1400.00 | 826.00 | 1646.00 | 456.00 | 943.00 | 895.00 | 1665.00 | 1494.00 |
| Slope | s | ft/ft | 0.018 | 0.016 | 0.021 | 0.006 | 0.049 | 0.018 | 0.012 | 0.037 |
| Surface (1=paved or 2=unpaved) | | n/a | 1.000 | 2.000 | 2.000 | 2.000 | 1.000 | 1.000 | 1.000 | 2.000 |
| Velocity | V | ft/sec | 2.799 | 2.058 | 2.324 | 1.238 | 4.566 | 2.797 | 2.298 | 3.118 |
| Travel time | Tt | hours | 0.139 | 0.111 | 0.197 | 0.102 | 0.057 | 0.089 | 0.201 | 0.133 |
| Manning's Equation | | | | | | | | | | |
| | | min. | 8.3 | 6.7 | 11.8 | 6.1 | 3.4 | 5.3 | 12.1 | 8.0 |
| ## Flow Length | L | feet | 1087.00 | 636.00 | 436.00 | 1012.00 | 1193.00 | 1781.00 | 3500.00 | 413.00 |
| Slope | S | ft/ft | 0.023 | 0.005 | 0.044 | 0.013 | 0.001 | 0.018 | 0.012 | 0.005 |
| roughness | n | n/a | 0.015 | 0.015 | 0.015 | 0.060 | 0.015 | 0.013 | 0.013 | 0.015 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 40 | 0 | 5 | 0 | 0 | 0 | 5 |
| Side Slopes (H:1) | H | feet | 0 | 5 | 0 | 5 | 0 | 0 | 0 | 5 |
| Depth | d | feet | 0.00 | 3.00 | 0.00 | 3.00 | 0.00 | 0.00 | 0.00 | 2.50 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 3.75 | 4.33 | 2.50 | 0.00 | 3.00 | 3.50 | 4.33 | 0.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 11.04 | 165.00 | 4.91 | 60.00 | 7.07 | 9.62 | 14.75 | 43.75 |
| Flow Rate | Q | cfs | 159.70 | 2133.69 | 75.00 | 244.48 | 19.52 | 135.17 | 192.30 | 384.63 |
| Velocity | V | ft/sec | 14.5 | 12.9 | 15.3 | 4.1 | 2.8 | 14.0 | 13.0 | 8.8 |
| Travel time | Tt | hours | 0.021 | 0.014 | 0.008 | 0.069 | 0.120 | 0.035 | 0.075 | 0.013 |
| 2 Flow Length | L | feet | 1276.00 | 0.00 | 136.00 | 0.00 | 1455.00 | 0.00 | 985.00 | 0.00 |
| Slope | S | ft/ft | 0.008 | 0.000 | 0.049 | 0.000 | 0.008 | 0.000 | 0.007 | 0.000 |
| roughness | n | n/a | 0.050 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 | 0.000 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 40 | 0 | 40 | 0 | 5 | 0 | 5 | 0 |
| Side Slopes (H:1) | H | feet | 5 | 0 | 5 | 0 | 5 | 0 | 5 | 0 |
| Depth | d | feet | 3.00 | 0.00 | 3.25 | 0.00 | 3.25 | 0.00 | 3.25 | 0.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 165.00 | 0.00 | 182.81 | 0.00 | 69.06 | 0.00 | 69.06 | 0.00 |
| Flow Rate | Q | cfs | 777.07 | 0.00 | 1828.13 | 0.00 | 690.63 | 0.00 | 690.63 | 0.00 |
| Velocity | V | ft/sec | 4.7 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 0.0 |
| Travel time | Tt | hours | 0.075 | 0.000 | 0.004 | 0.000 | 0.040 | 0.000 | 0.027 | 0.000 |
| 3 Flow Length | L | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Slope | S | ft/ft | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.160 | 0.000 |
| roughness | n | n/a | 0.013 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Depth | d | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Flow Rate | Q | cfs | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Velocity | V | ft/sec | 10.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Travel time | Tt | hours | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Total Travel Time | | | | | | | | | | |
| | TC | hours | 0.33 | 0.30 | 0.90 | 0.45 | 0.45 | 0.26 | 0.47 | 0.59 |
| | TC | min. | 20.08 | 18.04 | 54.01 | 26.81 | 27.19 | 15.56 | 28.17 | 35.55 |
| Lag Time | | | | | | | | | | |
| | TL | hours | 0.2 | 0.2 | 0.5 | 0.3 | 0.3 | 0.2 | 0.3 | 0.4 |
| | TL | min. | 12.0 | 10.8 | 32.4 | 16.1 | 16.3 | 9.3 | 16.9 | 21.3 |

| EXISTING CONDITIONS | | | | | | | | | | |
|--|-------|--------|----------|---------|---------|---------|---------|--------|--------|---------|
| TR-55 Method of Computing the Time of Concentration | | | | | | | | | | |
| | | | NF_10B | NF_11 | NF_12 | NF_13A | NF_13B | NF_14 | NF_15 | NF_16 |
| Sheet Flow | | | variable | units | | | | | | |
| Manning's roughness coef. | n | n/a | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 |
| Flow Length | L | feet | 60.00 | 50.00 | 20.00 | 50.00 | 50.00 | 50.00 | 50.00 | 50.00 |
| 2-year, 24-hour rainfall | P2 | inches | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 |
| Slope | s | ft/ft | 0.010 | 0.010 | 0.010 | 0.007 | 0.010 | 0.002 | 0.018 | 0.008 |
| Travel time | Tt | hours | 0.200 | 0.175 | 0.084 | 0.207 | 0.175 | 0.344 | 0.139 | 0.190 |
| Shallow Concentrated Flow | | | | | | | | | | |
| | | min. | 12.0 | 10.5 | 5.0 | 12.4 | 10.5 | 20.7 | 8.4 | 11.4 |
| Flow Length | L | feet | 1190.00 | 806.00 | 740.00 | 573.00 | 406.00 | 686.00 | 827.00 | 230.00 |
| Slope | s | ft/ft | 0.013 | 0.019 | 0.012 | 0.007 | 0.013 | 0.022 | 0.008 | 0.027 |
| Surface (1=paved or 2=unpaved) | | n/a | 2.000 | 2.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 2.000 |
| Velocity | V | ft/sec | 1.849 | 2.259 | 2.257 | 1.734 | 2.349 | 3.058 | 1.861 | 2.672 |
| Travel time | Tt | hours | 0.179 | 0.099 | 0.091 | 0.092 | 0.048 | 0.062 | 0.123 | 0.024 |
| Manning's Equation | | | | | | | | | | |
| | | min. | 10.7 | 5.9 | 5.5 | 5.5 | 2.9 | 3.7 | 7.4 | 1.4 |
| ## Flow Length | L | feet | 981.00 | 1206.00 | 3630.00 | 3125.00 | 2774.00 | 692.00 | 0.00 | 1357.00 |
| Slope | S | ft/ft | 0.010 | 0.003 | 0.008 | 0.016 | 0.014 | 0.003 | 0.000 | 0.003 |
| roughness | n | n/a | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 5 | 10 | 0 | 0 | 0 | 5 | 0 | 10 |
| Side Slopes (H:1) | H | feet | 5 | 5 | 0 | 0 | 0 | 5 | 0 | 3 |
| Depth | d | feet | 2.50 | 3.00 | 0.00 | 0.00 | 0.00 | 3.00 | 0.00 | 5.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 4.00 | 5.00 | 3.00 | 4.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 43.75 | 75.00 | 19.63 | 7.07 | 12.57 | 60.00 | 0.00 | 112.50 |
| Flow Rate | Q | cfs | 629.62 | 756.68 | 237.41 | 83.29 | 170.42 | 518.12 | 0.00 | 1580.00 |
| Velocity | V | ft/sec | 14.4 | 10.1 | 12.1 | 11.8 | 13.6 | 8.6 | 0.0 | 14.0 |
| Travel time | Tt | hours | 0.019 | 0.033 | 0.083 | 0.074 | 0.057 | 0.022 | 0.000 | 0.027 |
| 2 Flow Length | L | feet | 0.00 | 0.00 | 3180.00 | 946.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Slope | S | ft/ft | 0.000 | 0.000 | 0.009 | 0.007 | 0.000 | 0.000 | 0.000 | 0.000 |
| roughness | n | n/a | 0.000 | 0.013 | 0.013 | 0.013 | 0.050 | 0.013 | 0.013 | 0.013 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 0 | 10 | 20 | 0 | 0 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 0 | 5 | 15 | 0 | 0 | 0 | 0 |
| Depth | d | feet | 0.00 | 0.00 | 5.00 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 0.00 | 0.00 | 175.00 | 475.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Flow Rate | Q | cfs | 0.00 | 0.00 | 1750.00 | 4750.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Velocity | V | ft/sec | 0.0 | 0.0 | 10.0 | 10.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Travel time | Tt | hours | 0.000 | 0.000 | 0.088 | 0.026 | 0.000 | 0.000 | 0.000 | 0.000 |
| 3 Flow Length | L | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Slope | S | ft/ft | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| roughness | n | n/a | 0.000 | 0.040 | 0.000 | 0.050 | 0.000 | 0.050 | 0.050 | 0.050 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Depth | d | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Flow Rate | Q | cfs | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Velocity | V | ft/sec | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Travel time | Tt | hours | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Total Travel Time | | | | | | | | | | |
| | TC | hours | 0.40 | 0.31 | 0.35 | 0.40 | 0.28 | 0.43 | 0.26 | 0.24 |
| | TC | min. | 23.84 | 18.43 | 20.81 | 23.93 | 16.78 | 25.73 | 15.77 | 14.46 |
| Lag Time | | | | | | | | | | |
| | TL | hours | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.2 | 0.1 |
| | TL | min. | 14.3 | 11.1 | 12.5 | 14.4 | 10.1 | 15.4 | 9.5 | 8.7 |

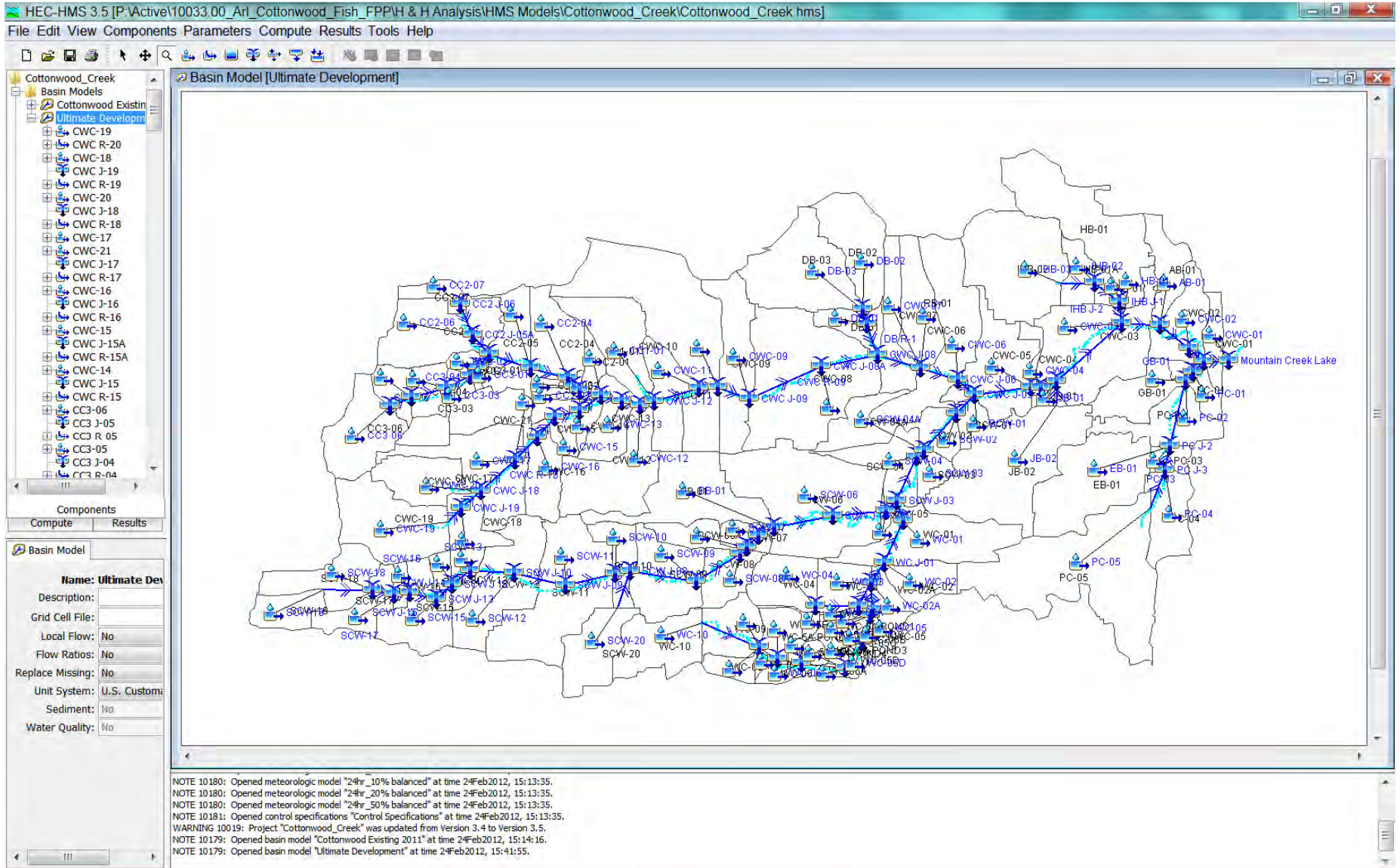
| EXISTING CONDITIONS | | | | | | | | | | |
|--|-------|--------|----------|---------|---------|---------|---------|---------|---------|---------|
| TR-55 Method of Computing the Time of Concentration | | | | | | | | | | |
| | | | NF_17 | NF_18 | NF_19 | NF_20 | NF_21 | NF_22 | NF_23 | NF_24 |
| Sheet Flow | | | variable | units | | | | | | |
| Manning's roughness coef. | n | n/a | 0.240 | 0.030 | 0.030 | 0.240 | 0.240 | 0.240 | 0.240 | 0.240 |
| Flow Length | L | feet | 50.00 | 50.00 | 50.00 | 50.00 | 50.00 | 50.00 | 50.00 | 50.00 |
| 2-year, 24-hour rainfall | P2 | inches | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 |
| Slope | s | ft/ft | 0.007 | 0.002 | 0.001 | 0.014 | 0.006 | 0.274 | 0.003 | 0.018 |
| Travel time | Tt | hours | 0.205 | 0.061 | 0.106 | 0.153 | 0.209 | 0.047 | 0.287 | 0.137 |
| Shallow Concentrated Flow | | | | | | | | | | |
| | | min. | 12.3 | 3.6 | 6.3 | 9.2 | 12.5 | 2.8 | 17.2 | 8.2 |
| Flow Length | L | feet | 90.00 | 657.00 | 1127.00 | 130.00 | 3071.00 | 1818.00 | 982.00 | 2248.00 |
| Slope | s | ft/ft | 0.031 | 0.001 | 0.003 | 0.047 | 0.014 | 0.019 | 0.022 | 0.011 |
| Surface (1=paved or 2=unpaved) | | n/a | 2.000 | 1.000 | 1.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 |
| Velocity | V | ft/sec | 2.853 | 0.463 | 1.063 | 3.500 | 1.914 | 2.222 | 2.391 | 1.682 |
| Travel time | Tt | hours | 0.009 | 0.394 | 0.295 | 0.010 | 0.446 | 0.227 | 0.114 | 0.371 |
| Manning's Equation | | | | | | | | | | |
| | | min. | 0.5 | 23.7 | 17.7 | 0.6 | 26.7 | 13.6 | 6.8 | 22.3 |
| ## Flow Length | L | feet | 628.00 | 476.00 | 3737.00 | 1188.00 | 897.00 | 191.00 | 2482.00 | 1788.00 |
| Slope | S | ft/ft | 0.003 | 0.007 | 0.010 | 0.006 | 0.013 | 0.014 | 0.011 | 0.012 |
| roughness | n | n/a | 0.013 | 0.013 | 0.013 | 0.050 | 0.050 | 0.050 | 0.013 | 0.013 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 20 | 0 | 0 | 5 | 0 | 0 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 3 | 0 | 0 | 5 | 0 | 0 | 0 | 0 |
| Depth | d | feet | 5.00 | 0.00 | 0.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 2.50 | 3.00 | 0.00 | 3.00 | 3.50 | 3.50 | 4.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 162.50 | 4.91 | 7.07 | 60.00 | 7.07 | 9.62 | 9.62 | 12.57 |
| Flow Rate | Q | cfs | 2424.35 | 34.74 | 67.37 | 188.27 | 19.93 | 30.57 | 108.17 | 155.13 |
| Velocity | V | ft/sec | 14.9 | 7.1 | 9.5 | 3.1 | 2.8 | 3.2 | 11.2 | 12.3 |
| Travel time | Tt | hours | 0.012 | 0.019 | 0.109 | 0.105 | 0.088 | 0.017 | 0.061 | 0.040 |
| 2 Flow Length | L | feet | 0.00 | 89.00 | 0.00 | 0.00 | 515.00 | 735.00 | 727.00 | 128.00 |
| Slope | S | ft/ft | 0.000 | 0.023 | 0.000 | 0.000 | 0.015 | 0.015 | 0.015 | 0.015 |
| roughness | n | n/a | 0.013 | 0.015 | 0.013 | 0.013 | 0.013 | 0.013 | 0.015 | 0.015 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 15 | 0 | 0 | 20 | 20 | 44 | 10 |
| Side Slopes (H:1) | H | feet | 0 | 1 | 0 | 0 | 6 | 6 | 6 | 3 |
| Depth | d | feet | 0.00 | 5.00 | 0.00 | 0.00 | 5.00 | 5.00 | 3.00 | 3.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 0.00 | 100.00 | 0.00 | 0.00 | 250.00 | 250.00 | 186.00 | 57.00 |
| Flow Rate | Q | cfs | 0.00 | 3458.50 | 0.00 | 0.00 | 7450.15 | 7450.15 | 3955.09 | 1088.78 |
| Velocity | V | ft/sec | 0.0 | 34.6 | 0.0 | 0.0 | 29.8 | 29.8 | 21.3 | 19.1 |
| Travel time | Tt | hours | 0.000 | 0.001 | 0.000 | 0.000 | 0.005 | 0.007 | 0.009 | 0.002 |
| 3 Flow Length | L | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Slope | S | ft/ft | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| roughness | n | n/a | 0.050 | 0.050 | 0.050 | 0.050 | 0.050 | 0.050 | 0.050 | 0.050 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Depth | d | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Flow Rate | Q | cfs | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Velocity | V | ft/sec | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Travel time | Tt | hours | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Total Travel Time | | | | | | | | | | |
| | TC | hours | 0.23 | 0.47 | 0.51 | 0.27 | 0.75 | 0.30 | 0.47 | 0.55 |
| | TC | min. | 13.52 | 28.47 | 30.54 | 16.13 | 44.87 | 17.84 | 28.33 | 33.03 |
| Lag Time | | | | | | | | | | |
| | TL | hours | 0.1 | 0.3 | 0.3 | 0.2 | 0.4 | 0.2 | 0.3 | 0.3 |
| | TL | min. | 8.1 | 17.1 | 18.3 | 9.7 | 26.9 | 10.7 | 17.0 | 19.8 |

| EXISTING CONDITIONS | | | | | | | | | | |
|---|-------|--------|----------|---------|---------|---------|---------|---------|---------|---------|
| TR-55 Method of Computing the Time of Concentration | | | | | | | | | | |
| | | | OB_01 | RB_01 | SFKC_01 | UKN_CA | UKN_CB | UKN_F | VB_01 | WB_01 |
| Sheet Flow | | | variable | units | | | | | | |
| Manning's roughness coef. | n | n/a | 0.240 | 0.240 | 0.240 | 0.016 | 0.040 | 0.240 | 0.240 | 0.240 |
| Flow Length | L | feet | 50.00 | 50.00 | 20.00 | 20.00 | 100.00 | 50.00 | 50.00 | 20.00 |
| 2-year, 24-hour rainfall | P2 | inches | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 | 3.400 |
| Slope | s | ft/ft | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 | 0.013 | 0.010 | 0.010 |
| Travel time | Tt | hours | 0.175 | 0.175 | 0.084 | 0.010 | 0.073 | 0.158 | 0.175 | 0.084 |
| Shallow Concentrated Flow | | | | | | | | | | |
| Flow Length | L | feet | 1100.00 | 2000.00 | 1523.00 | 2458.00 | 1980.00 | 1150.00 | 1150.00 | 70.00 |
| Slope | s | ft/ft | 0.024 | 0.010 | 0.003 | 0.014 | 0.020 | 0.004 | 0.002 | 0.006 |
| Surface (1=paved or 2=unpaved) | | n/a | 1.000 | 1.000 | 1.000 | 1.000 | 2.000 | 1.000 | 1.000 | 1.000 |
| Velocity | V | ft/sec | 3.219 | 2.073 | 1.068 | 2.401 | 2.307 | 1.339 | 0.977 | 1.596 |
| Travel time | Tt | hours | 0.095 | 0.268 | 0.396 | 0.284 | 0.238 | 0.239 | 0.327 | 0.012 |
| Manning's Equation | | | | | | | | | | |
| Flow Length | L | feet | 5.7 | 16.1 | 23.8 | 17.1 | 14.3 | 14.3 | 19.6 | 0.7 |
| ## Flow Length | L | feet | 1242.00 | 4355.00 | 1211.00 | 2126.47 | 3627.73 | 1250.00 | 1050.00 | 1130.00 |
| Slope | S | ft/ft | 0.016 | 0.003 | 0.001 | 0.004 | 0.010 | 0.018 | 0.004 | 0.009 |
| roughness | n | n/a | 0.050 | 0.013 | 0.013 | 0.035 | 0.035 | 0.013 | 0.013 | 0.013 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 30 | 0 | 0 | 10 | 10 | 0 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 10 | 0 | 0 | 5 | 5 | 0 | 0 | 0 |
| Depth | d | feet | 2.00 | 0.00 | 0.00 | 6.00 | 6.00 | 0.00 | 0.00 | 0.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 7.00 | 4.50 | 0.00 | 0.00 | 3.50 | 3.00 | 2.00 |
| Span (0 if circular) | S | feet | 0.000 | 4.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 100.00 | 28.00 | 15.90 | 240.00 | 240.00 | 9.62 | 7.07 | 3.14 |
| Flow Rate | Q | cfs | 476.90 | 210.20 | 68.45 | 1529.98 | 2285.43 | 133.68 | 41.94 | 21.01 |
| Velocity | V | ft/sec | 4.8 | 7.5 | 4.3 | 6.4 | 9.5 | 13.9 | 5.9 | 6.7 |
| Travel time | Tt | hours | 0.072 | 0.161 | 0.078 | 0.093 | 0.106 | 0.025 | 0.049 | 0.047 |
| 2 Flow Length | L | feet | 0.00 | 3505.00 | 1100.00 | 0.00 | 0.00 | 1824.00 | 1300.00 | 950.00 |
| Slope | S | ft/ft | 0.000 | 0.013 | 0.001 | 0.000 | 0.000 | 0.011 | 0.017 | 0.030 |
| roughness | n | n/a | 0.060 | 0.050 | 0.013 | 0.000 | 0.000 | 0.013 | 0.013 | 0.013 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| Depth | d | feet | 0.00 | 3.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 10.00 | 0.00 | 0.00 | 7.00 | 3.75 | 3.50 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 8.000 | 0.000 | 0.000 | 4.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 0.00 | 166.56 | 80.00 | 0.00 | 0.00 | 28.00 | 11.04 | 9.62 |
| Flow Rate | Q | cfs | 0.00 | 1021.13 | 492.51 | 0.00 | 0.00 | 402.25 | 156.63 | 144.32 |
| Velocity | V | ft/sec | 0.0 | 6.1 | 6.2 | 0.0 | 0.0 | 14.4 | 14.2 | 15.0 |
| Travel time | Tt | hours | 0.000 | 0.159 | 0.050 | 0.000 | 0.000 | 0.035 | 0.025 | 0.018 |
| 3 Flow Length | L | feet | 0.00 | 0.00 | 1319.99 | 0.00 | 0.00 | 0.00 | 802.08 | 2331.26 |
| Slope | S | ft/ft | 0.000 | 0.000 | 0.013 | 0.000 | 0.000 | 0.000 | 0.014 | 0.010 |
| roughness | n | n/a | 0.060 | 0.000 | 0.050 | 0.000 | 0.000 | 0.000 | 0.040 | 0.050 |
| Open Channel | | | | | | | | | | |
| Bottom Width | BW | feet | 0 | 0 | 25 | 0 | 0 | 0 | 40 | 30 |
| Side Slopes (H:1) | H | feet | 0 | 0 | 5 | 0 | 0 | 0 | 10 | 6 |
| Depth | d | feet | 0.00 | 0.00 | 2.50 | 0.00 | 0.00 | 0.00 | 1.50 | 3.00 |
| ...or Closed Conduit | | | | | | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 0.00 | 0.00 | 93.75 | 0.00 | 0.00 | 0.00 | 82.50 | 144.00 |
| Flow Rate | Q | cfs | 0.00 | 0.00 | 487.18 | 0.00 | 0.00 | 0.00 | 401.80 | 728.52 |
| Velocity | V | ft/sec | 0.0 | 0.0 | 5.2 | 0.0 | 0.0 | 0.0 | 4.9 | 5.1 |
| Travel time | Tt | hours | 0.000 | 0.000 | 0.071 | 0.000 | 0.000 | 0.000 | 0.046 | 0.128 |
| Total Travel Time | | | | | | | | | | |
| TC | TC | hours | 0.34 | 0.76 | 0.68 | 0.39 | 0.42 | 0.46 | 0.62 | 0.29 |
| min. | TC | min. | 20.53 | 45.77 | 40.71 | 23.20 | 25.01 | 27.42 | 37.34 | 17.32 |
| Lag Time | | | | | | | | | | |
| TL | TL | hours | 0.2 | 0.5 | 0.4 | 0.2 | 0.3 | 0.3 | 0.4 | 0.2 |
| min. | TL | min. | 12.3 | 27.5 | 24.4 | 13.9 | 15.0 | 16.5 | 22.4 | 10.4 |

| EXISTING CONDITIONS | | | | | |
|--|----------|--------|--------------|--------------|--------------|
| TR-55 Method of Computing the Time of Concentration | | | | | |
| | | | WB_02 | WB_03 | WB_04 |
| Sheet Flow | variable | units | | | |
| Manning's roughness coef. | n | n/a | 0.240 | 0.240 | 0.240 |
| Flow Length | L | feet | 50.00 | 60.00 | 60.00 |
| 2-year, 24-hour rainfall | P2 | inches | 3.400 | 3.400 | 3.400 |
| Slope | s | ft/ft | 0.010 | 0.010 | 0.010 |
| Travel time | Tt | hours | 0.175 | 0.202 | 0.202 |
| Shallow Concentrated Flow | | min. | 10.5 | 12.1 | 12.1 |
| Flow Length | L | feet | 1809.00 | 1560.00 | 1790.00 |
| Slope | s | ft/ft | 0.006 | 0.006 | 0.005 |
| Surface (1=paved or 2=unpaved) | | n/a | 1.000 | 1.000 | 2.000 |
| Velocity | V | ft/sec | 1.549 | 1.549 | 1.150 |
| Travel time | Tt | hours | 0.324 | 0.280 | 0.432 |
| Manning's Equation | | min. | 19.5 | 16.8 | 25.9 |
| ## Flow Length | L | feet | 200.00 | 2500.00 | 1730.00 |
| Slope | S | ft/ft | 0.006 | 0.007 | 0.009 |
| roughness | n | n/a | 0.013 | 0.013 | 0.013 |
| Open Channel | | | | | |
| Bottom Width | BW | feet | 0 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 0 | 0 |
| Depth | d | feet | 0.00 | 0.00 | 0.00 |
| ...or Closed Conduit | | | | | |
| Rise / Diameter | R / D | feet | 3.00 | 3.50 | 4.50 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 7.07 | 9.62 | 15.90 |
| Flow Rate | Q | cfs | 51.80 | 86.99 | 182.82 |
| Velocity | V | ft/sec | 7.3 | 9.0 | 11.5 |
| Travel time | Tt | hours | 0.008 | 0.077 | 0.042 |
| 2 Flow Length | L | feet | 467.00 | 3282.00 | 1647.00 |
| Slope | S | ft/ft | 0.044 | 0.008 | 0.011 |
| roughness | n | n/a | 0.050 | 0.050 | 0.013 |
| Open Channel | | | | | |
| Bottom Width | BW | feet | 10 | 30 | 0 |
| Side Slopes (H:1) | H | feet | 5 | 15 | 0 |
| Depth | d | feet | 2.00 | 2.50 | 0.00 |
| ...or Closed Conduit | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 5.50 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 40.00 | 168.75 | 23.76 |
| Flow Rate | Q | cfs | 299.35 | 612.25 | 345.26 |
| Velocity | V | ft/sec | 7.5 | 3.6 | 14.5 |
| Travel time | Tt | hours | 0.017 | 0.251 | 0.031 |
| 3 Flow Length | L | feet | 0.00 | 0.00 | 0.00 |
| Slope | S | ft/ft | 0.000 | 0.000 | 0.000 |
| roughness | n | n/a | 0.000 | 0.000 | 0.000 |
| Open Channel | | | | | |
| Bottom Width | BW | feet | 0 | 0 | 0 |
| Side Slopes (H:1) | H | feet | 0 | 0 | 0 |
| Depth | d | feet | 0.00 | 0.00 | 0.00 |
| ...or Closed Conduit | | | | | |
| Rise / Diameter | R / D | feet | 0.00 | 0.00 | 0.00 |
| Span (0 if circular) | S | feet | 0.000 | 0.000 | 0.000 |
| Cross-Sectional Area | X-A | feet^2 | 0.00 | 0.00 | 0.00 |
| Flow Rate | Q | cfs | 0.00 | 0.00 | 0.00 |
| Velocity | V | ft/sec | 0.0 | 0.0 | 0.0 |
| Travel time | Tt | hours | 0.000 | 0.000 | 0.000 |
| Total Travel Time | TC | hours | 0.52 | 0.81 | 0.71 |
| | TC | min. | 31.45 | 48.61 | 42.47 |
| Lag Time | TL | hours | 0.3 | 0.5 | 0.4 |
| | TL | min. | 18.9 | 29.2 | 25.5 |

Appendix **E**
HEC-HMS Output Report

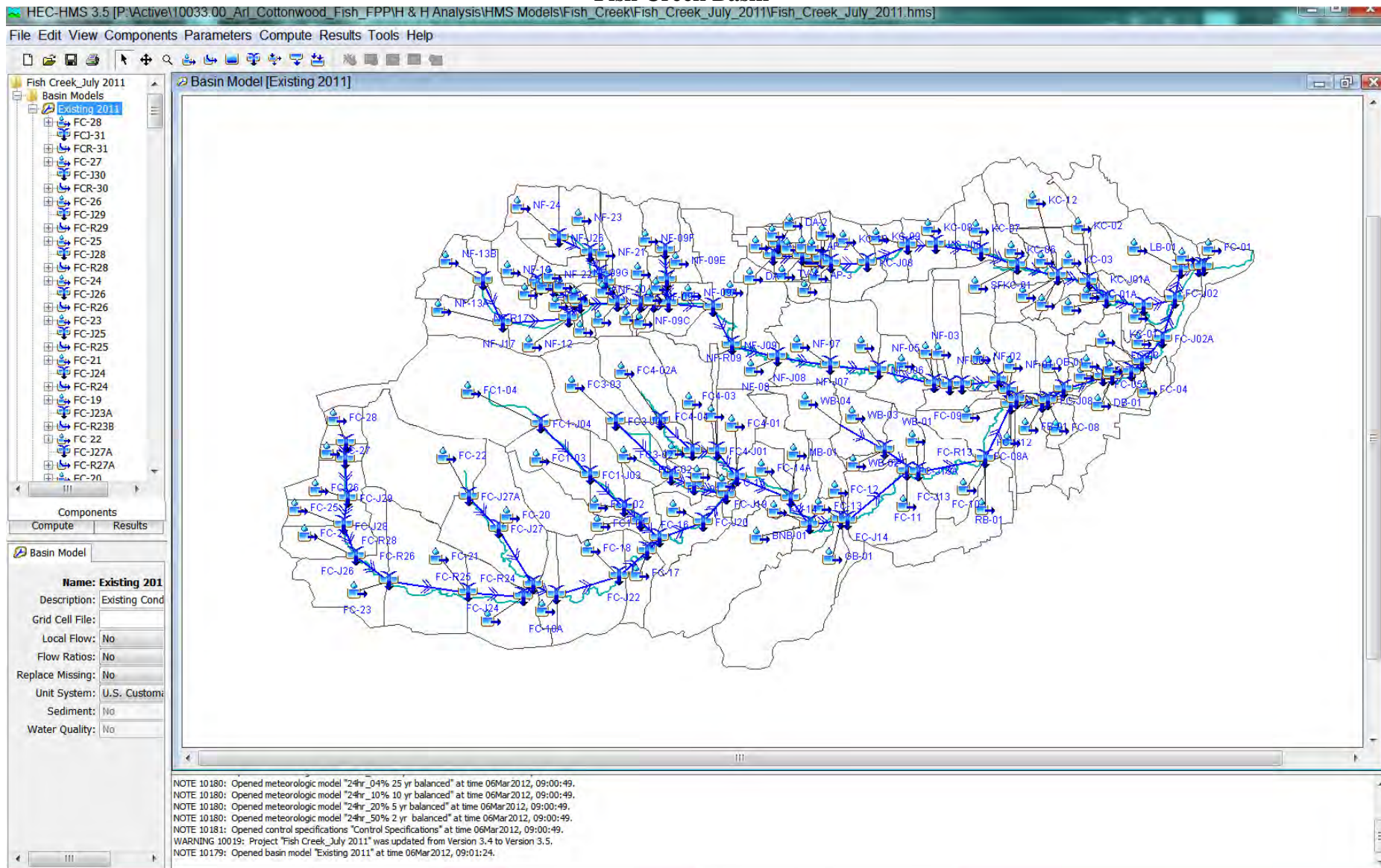
Cottonwood Creek Basin



| HMS Node | Existing Condition Flows | | | | | | | Ultimate |
|---------------------|--------------------------|------|-------|-------|-------|--------|--------|----------|
| | 2 yr | 5 yr | 10 yr | 25 yr | 50 yr | 100 yr | 500 yr | 100 yr |
| CC1-01 | 252 | 390 | 482 | 585 | 668 | 750 | 940 | 803 |
| CC2-07 | 61 | 92 | 112 | 135 | 154 | 172 | 215 | 174 |
| CC2 J-05A | 344 | 523 | 643 | 775 | 886 | 993 | 1257 | 996 |
| CC2 J-05 | 763 | 1278 | 1560 | 1830 | 2073 | 2316 | 2715 | 2318 |
| CC2 J-04 | 928 | 1550 | 1891 | 2230 | 2505 | 2805 | 3319 | 2808 |
| CC2 J-03 | 1086 | 1807 | 2214 | 2616 | 2923 | 3276 | 3895 | 3279 |
| CC2 J-02 | 1087 | 1815 | 2222 | 2626 | 2928 | 3275 | 3843 | 3276 |
| CC2 J-01 | 1102 | 1845 | 2258 | 2658 | 2923 | 3297 | 3875 | 3300 |
| CC3-06 | 221 | 341 | 421 | 510 | 584 | 656 | 832 | 656 |
| CC3 J-04 | 283 | 437 | 541 | 666 | 770 | 867 | 1098 | 867 |
| CC3 J-03 | 331 | 549 | 677 | 825 | 927 | 1020 | 1197 | 1020 |
| CC3 J-02 | 399 | 710 | 869 | 1053 | 1182 | 1290 | 1528 | 1290 |
| CC3 J-01 | 418 | 756 | 910 | 1115 | 1245 | 1358 | 1568 | 1358 |
| CWC-20 | 192 | 289 | 355 | 429 | 489 | 548 | 685 | 558 |
| CWC J-05 | 4923 | 8826 | 11473 | 14205 | 16649 | 19034 | 25436 | 20130 |
| CWC J-04 | 4901 | 8782 | 11549 | 14305 | 16791 | 19231 | 25730 | 20426 |
| CWC J-03A | 4896 | 8762 | 11561 | 14314 | 16798 | 19252 | 25764 | 20479 |
| CWC J-03 | 5028 | 9090 | 12069 | 14979 | 17617 | 20194 | 27013 | 21415 |
| CWC J-02A | 5022 | 9145 | 12232 | 15402 | 18341 | 21077 | 28594 | 22285 |
| CWC J-02 | 4990 | 9065 | 12120 | 15327 | 18289 | 21003 | 28578 | 22227 |
| CWC J-01A | 4974 | 9045 | 12113 | 15336 | 18313 | 21077 | 28702 | 22280 |
| CWC J-01 | 5095 | 9414 | 13006 | 16653 | 20035 | 23324 | 32168 | 24449 |
| Mountain Creek Lake | 5092 | 9388 | 13007 | 16639 | 20033 | 23332 | 32137 | 24440 |
| DB J-2 | 657 | 1010 | 1250 | 1522 | 1738 | 1954 | 2447 | 1954 |
| DB J-1 | 697 | 1100 | 1369 | 1672 | 1916 | 2158 | 2720 | 2195 |
| IHB-03 | 461 | 703 | 865 | 1046 | 1193 | 1337 | 1682 | 1337 |
| IHB J-2 | 534 | 823 | 1016 | 1229 | 1404 | 1575 | 1983 | 1575 |
| IHB J-1 | 528 | 848 | 1040 | 1255 | 1437 | 1596 | 1983 | 1596 |
| CWC-19 | 313 | 479 | 591 | 715 | 819 | 920 | 1166 | 932 |
| CWC J-19 | 392 | 610 | 737 | 885 | 1043 | 1167 | 1482 | 1182 |
| CWC J-18 | 529 | 838 | 1022 | 1224 | 1425 | 1609 | 2043 | 1634 |
| CWC J-17 | 972 | 1516 | 1890 | 2286 | 2580 | 2925 | 3565 | 2975 |
| CWC J-16 | 1074 | 1702 | 2017 | 2343 | 2709 | 3137 | 4008 | 3219 |
| CWC J-15A | 1077 | 1712 | 2042 | 2390 | 2790 | 3220 | 4184 | 3350 |
| CWC J-15 | 1092 | 1746 | 2083 | 2438 | 2851 | 3292 | 4300 | 3425 |
| CWC J-14 | 2188 | 3623 | 4382 | 5145 | 5779 | 6535 | 7865 | 6685 |
| CWC J-13 | 2242 | 3717 | 4509 | 5320 | 5972 | 6772 | 8238 | 6969 |
| CWC J-12A | 2473 | 4064 | 4929 | 5877 | 6581 | 7467 | 9253 | 7721 |
| CWC J-12A | 2473 | 4064 | 4929 | 5877 | 6581 | 7467 | 9253 | 7721 |
| CWC J-11 | 2628 | 4400 | 5399 | 6475 | 7281 | 8208 | 10302 | 8475 |
| CWC J-10 | 3103 | 5106 | 6323 | 7616 | 8634 | 9691 | 12220 | 9984 |
| CWC J-09 | 3152 | 5249 | 6525 | 7868 | 8943 | 10037 | 12733 | 10314 |
| CWC J-08A | 3270 | 5569 | 6876 | 8248 | 9490 | 10728 | 13783 | 11298 |
| CWC J-08 | 3187 | 5682 | 7106 | 8575 | 9932 | 11270 | 14621 | 11826 |
| CWC J-07 | 3132 | 5687 | 7201 | 8703 | 10068 | 11447 | 14892 | 11994 |
| CWC J-06 | 3115 | 5685 | 7267 | 8805 | 10167 | 11579 | 15104 | 12121 |

| HMS Node | Existing Condition Flows | | | | | | | Ultimate 100 yr |
|-----------|--------------------------|------|-------|-------|-------|--------|--------|--------------------|
| | 2 yr | 5 yr | 10 yr | 25 yr | 50 yr | 100 yr | 500 yr | |
| PC-05 | 642 | 996 | 1235 | 1496 | 1717 | 1930 | 2461 | 1981 |
| PC J-3 | 758 | 1199 | 1487 | 1789 | 2042 | 2282 | 2856 | 2341 |
| PC J-2 | 1079 | 1721 | 2140 | 2577 | 2933 | 3283 | 4135 | 3358 |
| PC J-1 | 1164 | 1917 | 2418 | 2933 | 3356 | 3762 | 4754 | 3886 |
| PC J-1A | 1155 | 1811 | 2392 | 2911 | 3374 | 3815 | 4799 | 3947 |
| SCW J-16 | 363 | 534 | 649 | 779 | 882 | 984 | 1224 | 997 |
| SCW J-15 | 492 | 731 | 890 | 1071 | 1215 | 1357 | 1692 | 1376 |
| SCW J-14 | 528 | 789 | 928 | 1154 | 1318 | 1462 | 1824 | 1483 |
| SCW J-13 | 727 | 1108 | 1291 | 1625 | 1873 | 2044 | 2542 | 2058 |
| SCW J-12 | 743 | 1156 | 1364 | 1679 | 1942 | 2149 | 2665 | 2167 |
| SCW J-11 | 746 | 1233 | 1481 | 1801 | 2084 | 2316 | 2879 | 2343 |
| SCW J-10 | 959 | 1635 | 2024 | 2472 | 2854 | 3175 | 3760 | 3216 |
| SCW J-09 | 1305 | 2206 | 2801 | 3389 | 3913 | 4430 | 5324 | 4496 |
| SCW J-08A | 1320 | 2211 | 2783 | 3414 | 4023 | 4548 | 5575 | 4619 |
| SCW J-08 | 1361 | 2326 | 2931 | 3610 | 4255 | 4867 | 6080 | 4950 |
| SCW J-07 | 1477 | 2473 | 3075 | 3960 | 4711 | 5428 | 6823 | 5531 |
| SCW J-06A | 1463 | 2331 | 2811 | 3631 | 4515 | 5356 | 6921 | 5457 |
| SCW J-06 | 1477 | 2350 | 2827 | 3649 | 4541 | 5421 | 7203 | 5538 |
| SCW J-05A | 1482 | 2361 | 2842 | 3668 | 4523 | 5390 | 7279 | 5550 |
| SCW J-05 | 1534 | 2445 | 2925 | 3816 | 4744 | 5711 | 7907 | 5987 |
| SCW J-04 | 1617 | 2662 | 3183 | 4189 | 5182 | 6268 | 9074 | 6716 |
| SCW J-03A | 1583 | 2634 | 3169 | 4125 | 5058 | 6104 | 8793 | 6531 |
| SCW J-03 | 1818 | 3109 | 4056 | 5252 | 6379 | 7529 | 11366 | 8102 |
| SCW J-02A | 1844 | 3141 | 4132 | 5358 | 6488 | 7540 | 11387 | 8134 |
| SCW J-02 | 1871 | 3171 | 4190 | 5439 | 6568 | 7585 | 11460 | 8194 |
| SCW J-01 | 1883 | 3186 | 4219 | 5472 | 6581 | 7549 | 11399 | 8180 |
| WC-10 | 316 | 448 | 536 | 637 | 715 | 794 | 968 | 819 |
| WC J-08 | 361 | 560 | 695 | 845 | 967 | 1087 | 1375 | 1148 |
| WC J-07 | 410 | 653 | 819 | 1001 | 1153 | 1302 | 1670 | 1368 |
| WC J-06 | 443 | 716 | 904 | 1111 | 1284 | 1452 | 1866 | 1524 |
| WC J-05 | 469 | 768 | 974 | 1197 | 1386 | 1570 | 2027 | 1646 |
| WC J-04 | 533 | 866 | 1099 | 1354 | 1568 | 1775 | 2285 | 1850 |
| WC J-03 | 623 | 978 | 1240 | 1526 | 1765 | 1996 | 2561 | 2072 |
| WC J-02 | 665 | 1054 | 1334 | 1642 | 1898 | 2146 | 2754 | 2210 |
| WC J-01A | 988 | 1560 | 1955 | 2386 | 2748 | 3106 | 3964 | 3238 |
| WC J-01 | 1049 | 1661 | 2077 | 2450 | 2840 | 3308 | 4267 | 3514 |
| WC J-00 | 1228 | 2042 | 2564 | 3033 | 3419 | 3949 | 5184 | 4244 |

Fish Creek Basin



| HMS-Node | Peak Flows (cfs) | | | | | | | |
|----------|------------------|------------------|-------------------|-------------------|-------------------|--------------------|--------------------|--------------------|
| | Existing 2 yr | Existing 5 yr | Existing 10 yr | Existing 25 yr | Existing 50 yr | Existing 100 yr | Existing 500 yr | Ultimate 100 yr |
| BB-01 | 143 | 222 | 276 | 335 | 383 | 431 | 545 | 431 |
| FC1-04 | 955 | 1568 | 1984 | 2433 | 2820 | 3193 | 4130 | 3193 |
| FC1-J04 | 955 | 1568 | 1984 | 2433 | 2820 | 3193 | 4130 | 3193 |
| FC1-J03 | 1111 | 1908 | 2439 | 3005 | 3495 | 3965 | 5148 | 3966 |
| FC1-J02 | 1159 | 2013 | 2579 | 3182 | 3695 | 4192 | 5454 | 4194 |
| FC1-J01 | 1503 | 2609 | 3330 | 4099 | 4724 | 5369 | 7033 | 5385 |
| FC-J27A | 930 | 1437 | 1777 | 2155 | 2464 | 2766 | 3487 | 2814 |
| FC-J27 | 1260 | 2100 | 2682 | 3298 | 3812 | 4308 | 5537 | 4371 |
| FC3-J03 | 480 | 749 | 929 | 1129 | 1294 | 1453 | 1839 | 1453 |
| FC3-J02 | 542 | 932 | 1196 | 1466 | 1688 | 1905 | 2414 | 1905 |
| FC3-J01 | 606 | 1047 | 1345 | 1652 | 1925 | 2177 | 2811 | 2177 |
| FC4-02A | 403 | 633 | 787 | 959 | 1099 | 1236 | 1567 | 1278 |
| FC4-J03 | 403 | 633 | 787 | 959 | 1099 | 1236 | 1567 | 1278 |
| FC4-J02 | 884 | 1423 | 1795 | 2199 | 2528 | 2834 | 3558 | 2894 |
| FC4-J01 | 868 | 1315 | 1709 | 2152 | 2517 | 2860 | 3633 | 2927 |
| FCJ-31 | 142 | 213 | 261 | 314 | 358 | 401 | 504 | 401 |
| FC-J30 | 183 | 292 | 364 | 443 | 510 | 573 | 726 | 589 |
| FC-J29 | 349 | 596 | 763 | 942 | 1084 | 1229 | 1558 | 1291 |
| FC-J28 | 521 | 900 | 1152 | 1418 | 1638 | 1870 | 2383 | 2005 |
| FC-J26 | 770 | 1308 | 1667 | 2041 | 2331 | 2603 | 3342 | 2733 |
| FC-J25 | 998 | 1760 | 2279 | 2803 | 3200 | 3600 | 4658 | 3759 |
| FC-J24 | 1121 | 2213 | 2979 | 3734 | 4333 | 4889 | 6286 | 5073 |
| FC-J23A | 1321 | 2578 | 3517 | 4452 | 5206 | 5906 | 7612 | 6111 |
| FC-J23 | 2360 | 4298 | 5699 | 7145 | 8374 | 9544 | 12511 | 9811 |
| FC-J22A | 2370 | 4318 | 5725 | 7084 | 8391 | 9624 | 12605 | 9902 |
| FC-J22 | 2266 | 4190 | 5596 | 7005 | 8232 | 9479 | 12637 | 9748 |
| FC-J21A | 2194 | 4100 | 5472 | 6972 | 8174 | 9357 | 12546 | 9624 |
| FC-J21 | 2638 | 5202 | 7020 | 9143 | 11084 | 12902 | 17152 | 13202 |
| FC-J20 | 2651 | 5178 | 7005 | 9081 | 10936 | 12776 | 17132 | 13081 |
| FC-J19 | 2783 | 5365 | 7290 | 9477 | 11396 | 13269 | 17852 | 13573 |
| FC-J18 | 3278 | 6163 | 7943 | 10146 | 12191 | 14225 | 19276 | 14561 |
| FC-J17 | 3308 | 6229 | 8125 | 10274 | 12328 | 14362 | 19552 | 14702 |
| FC-J16 | 3629 | 6942 | 9131 | 11425 | 13365 | 15257 | 20948 | 15602 |
| FC-J15 | 3678 | 7052 | 9308 | 11724 | 13743 | 15591 | 21567 | 15896 |
| FC-J14 | 3699 | 7091 | 9366 | 11794 | 13825 | 15669 | 21687 | 15963 |
| FC-J13A | 3671 | 6991 | 9343 | 11860 | 13979 | 15925 | 22011 | 16215 |
| FC-J13 | 3760 | 7176 | 9620 | 12301 | 14625 | 16669 | 22835 | 16963 |
| FC-J12 | 3784 | 7163 | 9670 | 12355 | 14663 | 16822 | 23121 | 17168 |
| FC-J11 | 3767 | 7106 | 9590 | 12281 | 14572 | 16740 | 23116 | 17120 |
| FC-J10 | 6011 | 10705 | 14524 | 18898 | 22452 | 25988 | 35086 | 26816 |
| FC-J09 | 6022 | 10729 | 14556 | 18932 | 22480 | 26008 | 35156 | 26848 |
| FC-J08 | 6032 | 10748 | 14575 | 18951 | 22517 | 26033 | 35209 | 26878 |
| FC-J07 | 6016 | 10769 | 14609 | 18986 | 22545 | 26069 | 35230 | 26914 |
| FC-J06 | 5961 | 10720 | 14520 | 18856 | 22418 | 25938 | 35130 | 26785 |
| FC-J05 | 5981 | 10767 | 14583 | 18935 | 22524 | 26052 | 35302 | 26908 |
| FC-J04 | 5931 | 10756 | 14560 | 18911 | 22505 | 26029 | 35272 | 26882 |

| HMS-Node | Peak Flows (cfs) | | | | | | | |
|---------------------|------------------|------------------|-------------------|-------------------|-------------------|--------------------|--------------------|--------------------|
| | Existing 2 yr | Existing 5 yr | Existing 10 yr | Existing 25 yr | Existing 50 yr | Existing 100 yr | Existing 500 yr | Ultimate 100 yr |
| FC-J03 | 5943 | 10782 | 14603 | 18951 | 22553 | 26079 | 35345 | 26945 |
| FC-J02A | 5918 | 10778 | 14576 | 18917 | 22489 | 25959 | 35077 | 26815 |
| FC-J02 | 6520 | 11870 | 15941 | 20567 | 24333 | 28031 | 37858 | 28926 |
| FC-J01 | 6493 | 11866 | 15948 | 20596 | 24330 | 28015 | 37844 | 28915 |
| FC-J0 | 6393 | 11787 | 15861 | 20541 | 24212 | 27833 | 37630 | 28731 |
| Mountain Creek Lake | 6314 | 11769 | 15849 | 20561 | 24208 | 27801 | 37587 | 28685 |
| SFKC-01 | 166 | 285 | 365 | 452 | 526 | 597 | 771 | 657 |
| Great Southwest | 276 | 385 | 456 | 533 | 598 | 663 | 1399 | 663 |
| KC-J08 | 612 | 918 | 1119 | 1337 | 1513 | 1686 | 2230 | 1740 |
| KC-J07 | 502 | 799 | 1060 | 1330 | 1561 | 1783 | 2321 | 1845 |
| KC-J06 | 694 | 1147 | 1488 | 1877 | 2202 | 2512 | 3145 | 2612 |
| KC-J05 | 514 | 940 | 1272 | 1642 | 1988 | 2354 | 3247 | 2485 |
| KC-J04 | 640 | 1066 | 1451 | 1900 | 2324 | 2783 | 3895 | 2960 |
| KC-J03 | 1251 | 2088 | 2652 | 3262 | 3778 | 4302 | 5601 | 4478 |
| KC-J02 | 1510 | 2536 | 3230 | 3991 | 4649 | 5321 | 6925 | 5512 |
| KC-J01A | 1520 | 2638 | 3383 | 4210 | 4925 | 5649 | 7321 | 5842 |
| KC-J01 | 1500 | 2663 | 3471 | 4355 | 5085 | 5875 | 7884 | 6082 |
| NF-J11F | 260 | 380 | 460 | 553 | 623 | 693 | 851 | 706 |
| NF-J11E | 440 | 657 | 803 | 952 | 1074 | 1197 | 1480 | 1220 |
| NF-09G | 334 | 518 | 641 | 777 | 889 | 999 | 1258 | 1016 |
| NF-J26 | 230 | 362 | 451 | 550 | 632 | 711 | 904 | 731 |
| NF-J25 | 512 | 814 | 1017 | 1237 | 1422 | 1600 | 2039 | 1646 |
| NF-J24 | 597 | 999 | 1261 | 1544 | 1776 | 1997 | 2495 | 2055 |
| NF-J23 | 639 | 1054 | 1332 | 1626 | 1877 | 2114 | 2652 | 2168 |
| NF-J22 | 172 | 270 | 336 | 409 | 468 | 527 | 667 | 540 |
| NF-J21 | 196 | 307 | 382 | 465 | 533 | 598 | 757 | 613 |
| NF-J20 | 199 | 314 | 391 | 476 | 542 | 607 | 769 | 621 |
| NF-J19 | 221 | 359 | 445 | 549 | 626 | 695 | 867 | 709 |
| NF-J18 | 318 | 481 | 589 | 713 | 809 | 904 | 1118 | 924 |
| NF-J17 | 610 | 957 | 1182 | 1427 | 1624 | 1805 | 2275 | 1841 |
| NF-J16 | 1064 | 1726 | 2167 | 2636 | 2975 | 3260 | 4153 | 3322 |
| NF-J15 | 1338 | 2195 | 2739 | 3342 | 3748 | 4207 | 5320 | 4289 |
| NF-J14 | 2052 | 3413 | 4271 | 5092 | 5907 | 6580 | 8317 | 6746 |
| NF-J13 | 2403 | 3992 | 4997 | 5963 | 6888 | 7697 | 9748 | 7885 |
| NF-J12 | 2445 | 4043 | 5067 | 6041 | 6999 | 7802 | 9884 | 7991 |
| NF-J11 | 2805 | 4662 | 5847 | 6994 | 8071 | 8989 | 11328 | 9199 |
| NF-J10 | 2936 | 4849 | 5993 | 6871 | 7855 | 8962 | 11506 | 9173 |
| NF-J09 | 3086 | 5291 | 6643 | 7684 | 8661 | 9894 | 12800 | 10166 |
| NF-J08 | 2899 | 5163 | 6639 | 7922 | 8959 | 10191 | 13226 | 10481 |
| NF-J07 | 2843 | 4924 | 6222 | 7481 | 8502 | 9746 | 13269 | 10130 |
| NF-J06 | 2787 | 4856 | 6183 | 7518 | 8601 | 9862 | 13485 | 10203 |
| NF-J05 | 2765 | 4842 | 6217 | 7586 | 8701 | 9956 | 13656 | 10294 |
| NF-J04 | 2808 | 4955 | 6384 | 7796 | 8952 | 10247 | 14105 | 10647 |
| NF-J03 | 2802 | 4941 | 6372 | 7786 | 8940 | 10239 | 14104 | 10630 |
| NF-J02 | 2754 | 4903 | 6364 | 7788 | 8961 | 10232 | 14070 | 10622 |
| NF-J01 | 2780 | 4954 | 6426 | 7873 | 9018 | 10227 | 14180 | 10605 |

Appendix **F**
HEC-RAS Output Report

HEC-RAS Plan: FPP1 Locations: User Defined

| River | 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) | |
| NF CWC | SECTION_00 | 2607 | 2 yr | 313.00 | 605.84 | 607.63 | 607.63 | 608.22 | 0.003090 | 6.19 | 50.56 | 42.17 | 1.00 |
| NF CWC | SECTION_00 | 2607 | 5 yr | 479.00 | 605.84 | 608.08 | 608.08 | 608.77 | 0.002982 | 6.68 | 71.74 | 52.03 | 1.00 |
| NF CWC | SECTION_00 | 2607 | 10 yr | 591.00 | 605.84 | 608.34 | 608.34 | 609.07 | 0.002885 | 6.88 | 85.95 | 58.19 | 1.00 |
| NF CWC | SECTION_00 | 2607 | 25 yr | 715.00 | 605.84 | 608.57 | 608.57 | 609.36 | 0.002857 | 7.13 | 100.26 | 63.80 | 1.00 |
| NF CWC | SECTION_00 | 2607 | 50 yr | 819.00 | 605.84 | 608.75 | 608.75 | 609.58 | 0.002831 | 7.32 | 111.89 | 68.02 | 1.01 |
| NF CWC | SECTION_00 | 2607 | 100 yr | 920.00 | 605.84 | 608.92 | 608.92 | 609.78 | 0.002716 | 7.42 | 124.01 | 75.37 | 0.99 |
| NF CWC | SECTION_00 | 2607 | Ultimate 100 yr | 932.00 | 605.84 | 608.94 | 608.94 | 609.80 | 0.002684 | 7.43 | 125.68 | 77.34 | 0.99 |
| NF CWC | SECTION_00 | 2607 | 500 yr | 1166.00 | 605.84 | 609.39 | 609.39 | 610.16 | 0.001887 | 7.13 | 196.34 | 193.27 | 0.86 |
| | | | | | | | | | | | | | |
| NF CWC | SECTION_00 | 1973 | 2 yr | 313.00 | 594.26 | 599.43 | 596.68 | 599.55 | 0.000166 | 2.84 | 110.18 | 30.36 | 0.26 |
| NF CWC | SECTION_00 | 1973 | 5 yr | 479.00 | 594.26 | 601.23 | 597.38 | 601.34 | 0.000221 | 2.76 | 173.91 | 68.60 | 0.29 |
| NF CWC | SECTION_00 | 1973 | 10 yr | 591.00 | 594.26 | 601.85 | 597.77 | 601.96 | 0.000166 | 2.74 | 238.23 | 161.26 | 0.26 |
| NF CWC | SECTION_00 | 1973 | 25 yr | 715.00 | 594.26 | 602.26 | 598.17 | 602.37 | 0.000153 | 2.84 | 310.53 | 189.88 | 0.26 |
| NF CWC | SECTION_00 | 1973 | 50 yr | 819.00 | 594.26 | 602.43 | 598.46 | 602.57 | 0.000165 | 3.04 | 345.02 | 200.03 | 0.27 |
| NF CWC | SECTION_00 | 1973 | 100 yr | 920.00 | 594.26 | 602.62 | 598.75 | 602.77 | 0.000169 | 3.18 | 384.03 | 209.01 | 0.28 |
| NF CWC | SECTION_00 | 1973 | Ultimate 100 yr | 932.00 | 594.26 | 602.64 | 598.78 | 602.79 | 0.000170 | 3.19 | 388.45 | 210.00 | 0.28 |
| NF CWC | SECTION_00 | 1973 | 500 yr | 1166.00 | 594.26 | 602.87 | 599.37 | 603.05 | 0.000210 | 3.68 | 436.82 | 227.22 | 0.31 |
| | | | | | | | | | | | | | |
| NF CWC | SECTION_00 | 1818 | | Culvert | | | | | | | | | |
| | | | | | | | | | | | | | |
| NF CWC | SECTION_00 | 1663 | 2 yr | 313.00 | 591.97 | 595.35 | 593.38 | 595.42 | 0.002083 | 2.17 | 144.32 | 53.09 | 0.23 |
| NF CWC | SECTION_00 | 1663 | 5 yr | 479.00 | 591.97 | 595.92 | 593.79 | 596.03 | 0.002748 | 2.73 | 175.53 | 56.19 | 0.27 |
| NF CWC | SECTION_00 | 1663 | 10 yr | 591.00 | 591.97 | 596.22 | 594.03 | 596.37 | 0.003196 | 3.06 | 192.90 | 58.06 | 0.30 |
| NF CWC | SECTION_00 | 1663 | 25 yr | 715.00 | 591.97 | 596.41 | 594.28 | 596.60 | 0.004120 | 3.50 | 204.12 | 60.82 | 0.34 |
| NF CWC | SECTION_00 | 1663 | 50 yr | 819.00 | 591.97 | 596.67 | 594.48 | 596.89 | 0.004501 | 3.72 | 220.59 | 67.49 | 0.35 |
| NF CWC | SECTION_00 | 1663 | 100 yr | 920.00 | 591.97 | 596.86 | 594.67 | 597.10 | 0.004972 | 3.96 | 233.54 | 73.14 | 0.37 |
| NF CWC | SECTION_00 | 1663 | Ultimate 100 yr | 932.00 | 591.97 | 596.87 | 594.68 | 597.12 | 0.005035 | 3.99 | 234.90 | 73.71 | 0.38 |
| NF CWC | SECTION_00 | 1663 | 500 yr | 1166.00 | 591.97 | 597.19 | 595.07 | 597.51 | 0.006249 | 4.54 | 260.01 | 83.50 | 0.42 |
| | | | | | | | | | | | | | |
| NF CWC | SECTION_00 | 1452 | 2 yr | 313.00 | 591.83 | 594.11 | 593.98 | 594.50 | 0.029142 | 5.11 | 63.76 | 74.89 | 0.78 |
| NF CWC | SECTION_00 | 1452 | 5 yr | 479.00 | 591.83 | 594.43 | 594.43 | 594.88 | 0.027360 | 5.61 | 92.49 | 133.59 | 0.78 |
| NF CWC | SECTION_00 | 1452 | 10 yr | 591.00 | 591.83 | 594.61 | 594.61 | 595.08 | 0.025572 | 5.75 | 111.87 | 157.59 | 0.76 |
| NF CWC | SECTION_00 | 1452 | 25 yr | 715.00 | 591.83 | 594.82 | 594.82 | 595.15 | 0.017524 | 5.06 | 161.33 | 187.87 | 0.64 |
| NF CWC | SECTION_00 | 1452 | 50 yr | 819.00 | 591.83 | 594.84 | 594.84 | 595.25 | 0.021591 | 5.65 | 165.36 | 188.39 | 0.71 |
| NF CWC | SECTION_00 | 1452 | 100 yr | 920.00 | 591.83 | 594.94 | 594.91 | 595.35 | 0.020701 | 5.68 | 183.44 | 190.87 | 0.70 |
| NF CWC | SECTION_00 | 1452 | Ultimate 100 yr | 932.00 | 591.83 | 594.95 | 594.93 | 595.36 | 0.020480 | 5.66 | 185.92 | 191.22 | 0.70 |
| NF CWC | SECTION_00 | 1452 | 500 yr | 1166.00 | 591.83 | 595.22 | 595.07 | 595.60 | 0.015810 | 5.32 | 238.42 | 199.15 | 0.62 |
| | | | | | | | | | | | | | |
| NF CWC | SECTION_00 | 1016 | 2 yr | 392.00 | 582.49 | 586.17 | 585.68 | 586.62 | 0.006953 | 5.92 | 77.04 | 39.83 | 0.63 |
| NF CWC | SECTION_00 | 1016 | 5 yr | 610.00 | 582.49 | 587.47 | 586.27 | 587.83 | 0.003465 | 5.40 | 134.45 | 48.70 | 0.47 |
| NF CWC | SECTION_00 | 1016 | 10 yr | 737.00 | 582.49 | 588.13 | 586.56 | 588.47 | 0.002694 | 5.27 | 168.38 | 53.26 | 0.43 |
| NF CWC | SECTION_00 | 1016 | 25 yr | 885.00 | 582.49 | 588.87 | 586.87 | 589.18 | 0.002120 | 5.15 | 209.41 | 58.30 | 0.39 |
| NF CWC | SECTION_00 | 1016 | 50 yr | 1043.00 | 582.49 | 589.62 | 587.18 | 589.91 | 0.001707 | 5.04 | 255.24 | 63.45 | 0.36 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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) | |
| NF CWC | SECTION_01 | 19343 | 2 yr | 529.00 | 574.18 | 577.23 | 577.23 | 578.17 | 0.009780 | 7.78 | 68.00 | 37.05 | 1.01 |
| NF CWC | SECTION_01 | 19343 | 5 yr | 838.00 | 574.18 | 577.99 | 577.99 | 579.11 | 0.010228 | 8.50 | 98.57 | 43.76 | 1.00 |
| NF CWC | SECTION_01 | 19343 | 10 yr | 1022.00 | 574.18 | 578.36 | 578.36 | 579.58 | 0.010438 | 8.86 | 115.32 | 47.03 | 1.00 |
| NF CWC | SECTION_01 | 19343 | 25 yr | 1224.00 | 574.18 | 578.72 | 578.72 | 580.04 | 0.010642 | 9.22 | 132.77 | 50.22 | 1.00 |
| NF CWC | SECTION_01 | 19343 | 50 yr | 1425.00 | 574.18 | 579.05 | 579.05 | 580.45 | 0.010681 | 9.49 | 150.17 | 53.21 | 1.00 |
| NF CWC | SECTION_01 | 19343 | 100 yr | 1609.00 | 574.18 | 579.31 | 579.31 | 580.80 | 0.010873 | 9.80 | 164.16 | 56.24 | 1.00 |
| NF CWC | SECTION_01 | 19343 | Ultimate 100 yr | 1634.00 | 574.18 | 579.36 | 579.36 | 580.85 | 0.010693 | 9.80 | 166.88 | 57.56 | 1.00 |
| NF CWC | SECTION_01 | 19343 | 500 yr | 2043.00 | 574.18 | 580.79 | 580.79 | 581.54 | 0.004108 | 7.32 | 384.15 | 334.24 | 0.64 |
| NF CWC | SECTION_01 | 19000 | 2 yr | 529.00 | 570.20 | 574.05 | 574.05 | 575.18 | 0.002283 | 8.55 | 61.88 | 27.35 | 1.00 |
| NF CWC | SECTION_01 | 19000 | 5 yr | 838.00 | 570.20 | 575.07 | 575.07 | 576.23 | 0.001856 | 8.65 | 96.88 | 41.26 | 0.99 |
| NF CWC | SECTION_01 | 19000 | 10 yr | 1022.00 | 570.20 | 575.48 | 575.48 | 576.71 | 0.001882 | 8.88 | 115.12 | 46.90 | 1.00 |
| NF CWC | SECTION_01 | 19000 | 25 yr | 1224.00 | 570.20 | 575.88 | 575.88 | 577.16 | 0.001929 | 9.09 | 134.63 | 52.26 | 1.00 |
| NF CWC | SECTION_01 | 19000 | 50 yr | 1425.00 | 570.20 | 576.20 | 576.20 | 577.56 | 0.002014 | 9.38 | 152.17 | 56.75 | 0.99 |
| NF CWC | SECTION_01 | 19000 | 100 yr | 1609.00 | 570.20 | 576.46 | 576.46 | 577.91 | 0.002099 | 9.66 | 167.41 | 60.42 | 0.99 |
| NF CWC | SECTION_01 | 19000 | Ultimate 100 yr | 1634.00 | 570.20 | 576.48 | 576.48 | 577.95 | 0.002129 | 9.74 | 168.75 | 60.73 | 1.00 |
| NF CWC | SECTION_01 | 19000 | 500 yr | 2043.00 | 570.20 | 577.02 | 577.02 | 578.64 | 0.002245 | 10.20 | 203.87 | 68.39 | 0.99 |
| NF CWC | SECTION_01 | 18500 | 2 yr | 972.00 | 564.35 | 569.92 | 569.92 | 571.73 | 0.012919 | 10.79 | 90.10 | 24.78 | 1.00 |
| NF CWC | SECTION_01 | 18500 | 5 yr | 1516.00 | 564.35 | 571.52 | 571.52 | 573.37 | 0.013575 | 10.93 | 139.08 | 40.23 | 0.99 |
| NF CWC | SECTION_01 | 18500 | 10 yr | 1890.00 | 564.35 | 574.12 | 572.24 | 574.90 | 0.003064 | 7.37 | 292.41 | 82.31 | 0.51 |
| NF CWC | SECTION_01 | 18500 | 25 yr | 2286.00 | 564.35 | 574.40 | 573.00 | 575.41 | 0.003757 | 8.41 | 316.75 | 89.91 | 0.57 |
| NF CWC | SECTION_01 | 18500 | 50 yr | 2580.00 | 564.35 | 574.60 | 573.42 | 575.77 | 0.004246 | 9.11 | 334.91 | 94.89 | 0.61 |
| NF CWC | SECTION_01 | 18500 | 100 yr | 2925.00 | 564.35 | 574.64 | 573.89 | 576.12 | 0.005337 | 10.25 | 338.46 | 96.26 | 0.69 |
| NF CWC | SECTION_01 | 18500 | Ultimate 100 yr | 2975.00 | 564.35 | 574.61 | 573.95 | 576.16 | 0.005615 | 10.49 | 335.78 | 95.11 | 0.71 |
| NF CWC | SECTION_01 | 18500 | 500 yr | 3565.00 | 564.35 | 574.79 | 574.64 | 576.84 | 0.007242 | 12.12 | 353.61 | 103.56 | 0.80 |
| NF CWC | SECTION_01 | 18366 | 2 yr | 972.00 | 562.80 | 567.74 | 567.74 | 569.25 | 0.002437 | 9.86 | 98.56 | 32.58 | 1.00 |
| NF CWC | SECTION_01 | 18366 | 5 yr | 1516.00 | 562.80 | 570.43 | 568.89 | 571.31 | 0.000730 | 7.54 | 207.89 | 50.99 | 0.59 |
| NF CWC | SECTION_01 | 18366 | 10 yr | 1890.00 | 562.80 | 574.19 | 569.53 | 574.57 | 0.000156 | 5.06 | 502.85 | 223.45 | 0.30 |
| NF CWC | SECTION_01 | 18366 | 25 yr | 2286.00 | 562.80 | 574.49 | 570.12 | 574.99 | 0.000200 | 5.87 | 698.35 | 242.10 | 0.34 |
| NF CWC | SECTION_01 | 18366 | 50 yr | 2580.00 | 562.80 | 574.70 | 570.56 | 575.30 | 0.000234 | 6.44 | 749.99 | 258.55 | 0.37 |
| NF CWC | SECTION_01 | 18366 | 100 yr | 2925.00 | 562.80 | 574.77 | 571.03 | 575.52 | 0.000293 | 7.24 | 767.47 | 264.43 | 0.42 |
| NF CWC | SECTION_01 | 18366 | Ultimate 100 yr | 2975.00 | 562.80 | 574.75 | 571.10 | 575.53 | 0.000306 | 7.38 | 762.39 | 262.92 | 0.43 |
| NF CWC | SECTION_01 | 18366 | 500 yr | 3565.00 | 562.80 | 574.97 | 571.85 | 576.03 | 0.000402 | 8.60 | 822.65 | 275.93 | 0.49 |
| NF CWC | SECTION_01 | 17708 | | Culvert | | | | | | | | | |
| NF CWC | SECTION_01 | 17051 | 2 yr | 1074.00 | 550.00 | 554.39 | 553.11 | 554.85 | 0.000659 | 5.44 | 197.27 | 61.88 | 0.54 |
| NF CWC | SECTION_01 | 17051 | 5 yr | 1702.00 | 550.00 | 555.57 | 554.02 | 556.16 | 0.000645 | 6.18 | 275.52 | 70.16 | 0.55 |
| NF CWC | SECTION_01 | 17051 | 10 yr | 2017.00 | 550.00 | 556.08 | 554.42 | 556.73 | 0.000630 | 6.45 | 312.52 | 74.37 | 0.55 |
| NF CWC | SECTION_01 | 17051 | 25 yr | 2343.00 | 550.00 | 556.58 | 554.77 | 557.28 | 0.000590 | 6.72 | 351.02 | 82.23 | 0.54 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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) | |
| NF CWC | SECTION_01 | 17051 | 50 yr | 2709.00 | 550.00 | 557.07 | 555.19 | 557.84 | 0.000567 | 7.03 | 393.52 | 90.39 | 0.54 |
| NF CWC | SECTION_01 | 17051 | 100 yr | 3137.00 | 550.00 | 557.59 | 555.61 | 558.43 | 0.000552 | 7.39 | 440.60 | 100.79 | 0.54 |
| NF CWC | SECTION_01 | 17051 | Ultimate 100 yr | 3219.00 | 550.00 | 557.68 | 555.67 | 558.54 | 0.000550 | 7.45 | 449.39 | 103.09 | 0.54 |
| NF CWC | SECTION_01 | 17051 | 500 yr | 4008.00 | 550.00 | 558.34 | 556.35 | 559.40 | 0.000593 | 8.31 | 510.18 | 178.40 | 0.57 |
| NF CWC | SECTION_01 | 16990 | 2 yr | 1074.00 | 550.00 | 554.47 | | 554.63 | 0.003324 | 3.27 | 328.52 | 93.88 | 0.31 |
| NF CWC | SECTION_01 | 16990 | 5 yr | 1702.00 | 550.00 | 555.69 | | 555.91 | 0.003441 | 3.77 | 451.33 | 106.74 | 0.32 |
| NF CWC | SECTION_01 | 16990 | 10 yr | 2017.00 | 550.00 | 556.22 | | 556.46 | 0.003534 | 3.96 | 509.73 | 114.41 | 0.33 |
| NF CWC | SECTION_01 | 16990 | 25 yr | 2343.00 | 550.00 | 556.73 | | 557.00 | 0.003658 | 4.10 | 571.15 | 124.68 | 0.34 |
| NF CWC | SECTION_01 | 16990 | 50 yr | 2709.00 | 550.00 | 557.25 | | 557.53 | 0.003752 | 4.24 | 638.43 | 135.05 | 0.34 |
| NF CWC | SECTION_01 | 16990 | 100 yr | 3137.00 | 550.00 | 557.80 | | 558.10 | 0.003818 | 4.39 | 715.39 | 146.00 | 0.35 |
| NF CWC | SECTION_01 | 16990 | Ultimate 100 yr | 3219.00 | 550.00 | 557.90 | | 558.20 | 0.003823 | 4.41 | 730.28 | 148.02 | 0.35 |
| NF CWC | SECTION_01 | 16990 | 500 yr | 4008.00 | 550.00 | 558.65 | | 558.97 | 0.003521 | 4.61 | 901.42 | 252.04 | 0.34 |
| NF CWC | SECTION_01 | 16678 | 2 yr | 1074.00 | 548.52 | 552.97 | | 553.26 | 0.006356 | 4.28 | 251.06 | 77.76 | 0.42 |
| NF CWC | SECTION_01 | 16678 | 5 yr | 1702.00 | 548.52 | 554.13 | | 554.51 | 0.006298 | 4.92 | 345.63 | 85.83 | 0.43 |
| NF CWC | SECTION_01 | 16678 | 10 yr | 2017.00 | 548.52 | 554.59 | | 555.02 | 0.006464 | 5.22 | 386.44 | 89.61 | 0.44 |
| NF CWC | SECTION_01 | 16678 | 25 yr | 2343.00 | 548.52 | 555.04 | | 555.50 | 0.006597 | 5.49 | 426.75 | 93.07 | 0.45 |
| NF CWC | SECTION_01 | 16678 | 50 yr | 2709.00 | 548.52 | 555.48 | | 556.00 | 0.006767 | 5.78 | 469.00 | 96.55 | 0.46 |
| NF CWC | SECTION_01 | 16678 | 100 yr | 3137.00 | 548.52 | 555.96 | | 556.53 | 0.006949 | 6.08 | 516.01 | 100.28 | 0.47 |
| NF CWC | SECTION_01 | 16678 | Ultimate 100 yr | 3219.00 | 548.52 | 556.04 | | 556.63 | 0.006978 | 6.14 | 524.50 | 101.54 | 0.47 |
| NF CWC | SECTION_01 | 16678 | 500 yr | 4008.00 | 548.52 | 556.75 | | 557.45 | 0.007307 | 6.70 | 601.57 | 116.80 | 0.49 |
| NF CWC | SECTION_01 | 16353 | 2 yr | 1074.00 | 546.00 | 551.00 | | 551.27 | 0.005809 | 4.18 | 256.95 | 77.02 | 0.40 |
| NF CWC | SECTION_01 | 16353 | 5 yr | 1702.00 | 546.00 | 552.04 | | 552.42 | 0.006526 | 4.98 | 342.01 | 86.57 | 0.44 |
| NF CWC | SECTION_01 | 16353 | 10 yr | 2017.00 | 546.00 | 552.39 | | 552.85 | 0.006895 | 5.41 | 373.54 | 91.84 | 0.46 |
| NF CWC | SECTION_01 | 16353 | 25 yr | 2343.00 | 546.00 | 552.80 | | 553.31 | 0.006853 | 5.73 | 412.52 | 97.95 | 0.46 |
| NF CWC | SECTION_01 | 16353 | 50 yr | 2709.00 | 546.00 | 553.26 | | 553.82 | 0.006672 | 6.01 | 458.81 | 105.19 | 0.46 |
| NF CWC | SECTION_01 | 16353 | 100 yr | 3137.00 | 546.00 | 553.72 | | 554.33 | 0.006572 | 6.32 | 509.22 | 112.54 | 0.47 |
| NF CWC | SECTION_01 | 16353 | Ultimate 100 yr | 3219.00 | 546.00 | 553.85 | | 554.45 | 0.006388 | 6.32 | 523.13 | 114.49 | 0.46 |
| NF CWC | SECTION_01 | 16353 | 500 yr | 4008.00 | 546.00 | 554.60 | | 555.27 | 0.006003 | 6.65 | 617.26 | 140.55 | 0.46 |
| NF CWC | SECTION_01 | 15963 | 2 yr | 1077.00 | 544.00 | 547.44 | | 547.96 | 0.015085 | 5.78 | 187.24 | 74.68 | 0.63 |
| NF CWC | SECTION_01 | 15963 | 5 yr | 1712.00 | 544.00 | 548.64 | | 549.23 | 0.010733 | 6.25 | 282.26 | 84.81 | 0.56 |
| NF CWC | SECTION_01 | 15963 | 10 yr | 2042.00 | 544.00 | 549.53 | | 550.07 | 0.007333 | 5.95 | 361.84 | 92.85 | 0.48 |
| NF CWC | SECTION_01 | 15963 | 25 yr | 2390.00 | 544.00 | 550.12 | | 550.68 | 0.006622 | 6.11 | 418.09 | 98.95 | 0.47 |
| NF CWC | SECTION_01 | 15963 | 50 yr | 2790.00 | 544.00 | 550.59 | | 551.21 | 0.006646 | 6.48 | 466.44 | 106.31 | 0.47 |
| NF CWC | SECTION_01 | 15963 | 100 yr | 3220.00 | 544.00 | 551.04 | | 551.73 | 0.006746 | 6.86 | 515.49 | 113.43 | 0.48 |
| NF CWC | SECTION_01 | 15963 | Ultimate 100 yr | 3350.00 | 544.00 | 551.08 | | 551.82 | 0.007109 | 7.07 | 520.63 | 114.13 | 0.50 |
| NF CWC | SECTION_01 | 15963 | 500 yr | 4184.00 | 544.00 | 551.69 | | 552.60 | 0.007846 | 7.90 | 593.40 | 124.34 | 0.53 |
| NF CWC | SECTION_01 | 15689 | 2 yr | 1077.00 | 540.00 | 544.76 | | 545.04 | 0.005671 | 4.21 | 256.68 | 77.84 | 0.40 |
| NF CWC | SECTION_01 | 15689 | 5 yr | 1712.00 | 540.00 | 547.09 | | 547.32 | 0.002429 | 3.88 | 465.74 | 103.52 | 0.29 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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) | |
| NF CWC | SECTION_01 | 15689 | 10 yr | 2042.00 | 540.00 | 548.57 | | 548.75 | 0.001499 | 3.55 | 634.07 | 127.92 | 0.23 |
| NF CWC | SECTION_01 | 15689 | 25 yr | 2390.00 | 540.00 | 549.27 | | 549.47 | 0.001444 | 3.71 | 729.73 | 146.03 | 0.23 |
| NF CWC | SECTION_01 | 15689 | 50 yr | 2790.00 | 540.00 | 549.74 | | 549.97 | 0.001556 | 4.00 | 803.95 | 165.94 | 0.24 |
| NF CWC | SECTION_01 | 15689 | 100 yr | 3220.00 | 540.00 | 550.20 | | 550.45 | 0.001639 | 4.25 | 884.03 | 190.91 | 0.25 |
| NF CWC | SECTION_01 | 15689 | Ultimate 100 yr | 3350.00 | 540.00 | 550.19 | | 550.46 | 0.001782 | 4.43 | 882.29 | 190.25 | 0.26 |
| NF CWC | SECTION_01 | 15689 | 500 yr | 4184.00 | 540.00 | 550.75 | | 551.08 | 0.002029 | 4.93 | 1003.76 | 245.41 | 0.28 |
| NF CWC | SECTION_01 | 15467 | 2 yr | 1077.00 | 538.00 | 544.03 | | 544.17 | 0.001868 | 3.11 | 378.33 | 92.29 | 0.25 |
| NF CWC | SECTION_01 | 15467 | 5 yr | 1712.00 | 538.00 | 546.79 | | 546.91 | 0.000940 | 2.96 | 669.25 | 124.57 | 0.19 |
| NF CWC | SECTION_01 | 15467 | 10 yr | 2042.00 | 538.00 | 548.40 | | 548.50 | 0.000582 | 2.65 | 913.63 | 178.59 | 0.15 |
| NF CWC | SECTION_01 | 15467 | 25 yr | 2390.00 | 538.00 | 549.13 | | 549.22 | 0.000530 | 2.65 | 1049.95 | 198.34 | 0.15 |
| NF CWC | SECTION_01 | 15467 | 50 yr | 2790.00 | 538.00 | 549.60 | | 549.70 | 0.000550 | 2.79 | 1146.84 | 211.26 | 0.15 |
| NF CWC | SECTION_01 | 15467 | 100 yr | 3220.00 | 538.00 | 550.05 | | 550.17 | 0.000565 | 2.90 | 1245.39 | 228.46 | 0.15 |
| NF CWC | SECTION_01 | 15467 | Ultimate 100 yr | 3350.00 | 538.00 | 550.03 | | 550.16 | 0.000619 | 3.04 | 1240.10 | 228.11 | 0.16 |
| NF CWC | SECTION_01 | 15467 | 500 yr | 4184.00 | 538.00 | 550.56 | | 550.73 | 0.000709 | 3.35 | 1363.60 | 235.68 | 0.17 |
| NF CWC | SECTION_01 | 15341 | 2 yr | 1077.00 | 535.49 | 543.80 | 539.31 | 543.94 | 0.001742 | 3.01 | 357.56 | 68.85 | 0.23 |
| NF CWC | SECTION_01 | 15341 | 5 yr | 1712.00 | 535.49 | 546.64 | 540.40 | 546.78 | 0.001108 | 3.03 | 564.85 | 112.43 | 0.20 |
| NF CWC | SECTION_01 | 15341 | 10 yr | 2042.00 | 535.49 | 548.32 | 540.89 | 548.41 | 0.000698 | 2.57 | 831.15 | 215.20 | 0.16 |
| NF CWC | SECTION_01 | 15341 | 25 yr | 2390.00 | 535.49 | 549.06 | 541.37 | 549.15 | 0.000564 | 2.44 | 1033.30 | 296.81 | 0.14 |
| NF CWC | SECTION_01 | 15341 | 50 yr | 2790.00 | 535.49 | 549.54 | 541.86 | 549.63 | 0.000525 | 2.44 | 1179.63 | 312.98 | 0.14 |
| NF CWC | SECTION_01 | 15341 | 100 yr | 3220.00 | 535.49 | 550.00 | 542.42 | 550.09 | 0.000487 | 2.43 | 1325.89 | 329.37 | 0.14 |
| NF CWC | SECTION_01 | 15341 | Ultimate 100 yr | 3350.00 | 535.49 | 549.97 | 542.55 | 550.07 | 0.000539 | 2.55 | 1316.32 | 328.30 | 0.14 |
| NF CWC | SECTION_01 | 15341 | 500 yr | 4184.00 | 535.49 | 550.50 | 543.38 | 550.63 | 0.000558 | 2.69 | 1497.36 | 351.87 | 0.15 |
| NF CWC | SECTION_01 | 15275 | | Culvert | | | | | | | | | |
| NF CWC | SECTION_01 | 15214 | 2 yr | 1077.00 | 532.13 | 539.45 | 535.61 | 539.62 | 0.001726 | 3.31 | 325.46 | 70.57 | 0.24 |
| NF CWC | SECTION_01 | 15214 | 5 yr | 1712.00 | 532.13 | 540.72 | 536.62 | 541.01 | 0.002284 | 4.33 | 395.20 | 75.48 | 0.28 |
| NF CWC | SECTION_01 | 15214 | 10 yr | 2042.00 | 532.13 | 541.31 | 537.03 | 541.67 | 0.002490 | 4.77 | 428.05 | 77.81 | 0.30 |
| NF CWC | SECTION_01 | 15214 | 25 yr | 2390.00 | 532.13 | 541.87 | 537.42 | 542.29 | 0.002709 | 5.21 | 458.67 | 80.06 | 0.32 |
| NF CWC | SECTION_01 | 15214 | 50 yr | 2790.00 | 532.13 | 542.23 | 537.83 | 542.76 | 0.003207 | 5.83 | 478.47 | 81.44 | 0.35 |
| NF CWC | SECTION_01 | 15214 | 100 yr | 3220.00 | 532.13 | 542.66 | 538.28 | 543.30 | 0.003634 | 6.41 | 502.25 | 83.24 | 0.37 |
| NF CWC | SECTION_01 | 15214 | Ultimate 100 yr | 3350.00 | 532.13 | 542.77 | 538.39 | 543.45 | 0.003780 | 6.59 | 508.24 | 83.69 | 0.38 |
| NF CWC | SECTION_01 | 15214 | 500 yr | 4184.00 | 532.13 | 543.46 | 539.18 | 544.37 | 0.004635 | 7.66 | 546.32 | 86.68 | 0.43 |
| NF CWC | SECTION_01 | 14946 | 2 yr | 1092.00 | 532.00 | 539.08 | | 539.16 | 0.001365 | 2.35 | 480.11 | 126.15 | 0.20 |
| NF CWC | SECTION_01 | 14946 | 5 yr | 1746.00 | 532.00 | 540.31 | | 540.43 | 0.001416 | 2.85 | 646.88 | 147.33 | 0.22 |
| NF CWC | SECTION_01 | 14946 | 10 yr | 2083.00 | 532.00 | 540.90 | | 541.04 | 0.001380 | 3.01 | 739.39 | 161.70 | 0.22 |
| NF CWC | SECTION_01 | 14946 | 25 yr | 2438.00 | 532.00 | 541.46 | | 541.61 | 0.001360 | 3.18 | 833.73 | 176.93 | 0.22 |
| NF CWC | SECTION_01 | 14946 | 50 yr | 2851.00 | 532.00 | 541.76 | | 541.94 | 0.001567 | 3.51 | 888.59 | 185.41 | 0.24 |
| NF CWC | SECTION_01 | 14946 | 100 yr | 3292.00 | 532.00 | 542.17 | | 542.37 | 0.001678 | 3.78 | 965.18 | 193.17 | 0.25 |
| NF CWC | SECTION_01 | 14946 | Ultimate 100 yr | 3425.00 | 532.00 | 542.26 | | 542.48 | 0.001725 | 3.86 | 983.92 | 193.85 | 0.25 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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) | |
| NF CWC | SECTION_01 | 14946 | 500 yr | 4300.00 | 532.00 | 542.90 | | 543.17 | 0.001959 | 4.35 | 1108.99 | 198.31 | 0.27 |
| NF CWC | SECTION_01 | 14825 | 2 yr | 1092.00 | 532.00 | 538.65 | 536.09 | 538.90 | 0.004058 | 3.97 | 275.17 | 65.91 | 0.34 |
| NF CWC | SECTION_01 | 14825 | 5 yr | 1746.00 | 532.00 | 539.74 | 537.03 | 540.13 | 0.005403 | 4.97 | 351.65 | 74.70 | 0.40 |
| NF CWC | SECTION_01 | 14825 | 10 yr | 2083.00 | 532.00 | 540.31 | 537.45 | 540.74 | 0.005788 | 5.27 | 395.19 | 170.74 | 0.42 |
| NF CWC | SECTION_01 | 14825 | 25 yr | 2438.00 | 532.00 | 540.83 | 537.86 | 541.31 | 0.006193 | 5.55 | 439.09 | 207.69 | 0.44 |
| NF CWC | SECTION_01 | 14825 | 50 yr | 2851.00 | 532.00 | 541.26 | 538.29 | 541.63 | 0.005003 | 5.18 | 614.82 | 233.15 | 0.40 |
| NF CWC | SECTION_01 | 14825 | 100 yr | 3292.00 | 532.00 | 541.71 | 538.74 | 542.06 | 0.004397 | 5.11 | 721.32 | 242.11 | 0.38 |
| NF CWC | SECTION_01 | 14825 | Ultimate 100 yr | 3425.00 | 532.00 | 541.80 | 538.88 | 542.16 | 0.004356 | 5.14 | 745.27 | 244.08 | 0.37 |
| NF CWC | SECTION_01 | 14825 | 500 yr | 4300.00 | 532.00 | 542.48 | 539.73 | 542.84 | 0.003837 | 5.19 | 913.53 | 249.93 | 0.36 |
| NF CWC | SECTION_01 | 14676 | 2 yr | 1092.00 | 530.50 | 538.22 | | 538.38 | 0.002560 | 3.16 | 345.41 | 83.58 | 0.27 |
| NF CWC | SECTION_01 | 14676 | 5 yr | 1746.00 | 530.50 | 539.17 | | 539.43 | 0.003518 | 4.08 | 428.64 | 103.19 | 0.33 |
| NF CWC | SECTION_01 | 14676 | 10 yr | 2083.00 | 530.50 | 539.72 | | 540.01 | 0.003470 | 4.34 | 498.22 | 140.86 | 0.33 |
| NF CWC | SECTION_01 | 14676 | 25 yr | 2438.00 | 530.50 | 540.23 | | 540.54 | 0.003377 | 4.55 | 589.19 | 232.30 | 0.33 |
| NF CWC | SECTION_01 | 14676 | 50 yr | 2851.00 | 530.50 | 540.65 | | 540.99 | 0.003467 | 4.83 | 688.84 | 243.87 | 0.34 |
| NF CWC | SECTION_01 | 14676 | 100 yr | 3292.00 | 530.50 | 541.14 | | 541.49 | 0.003308 | 4.96 | 812.07 | 259.27 | 0.34 |
| NF CWC | SECTION_01 | 14676 | Ultimate 100 yr | 3425.00 | 530.50 | 541.23 | | 541.59 | 0.003367 | 5.05 | 835.65 | 263.23 | 0.34 |
| NF CWC | SECTION_01 | 14676 | 500 yr | 4300.00 | 530.50 | 541.93 | | 542.31 | 0.003305 | 5.34 | 1041.23 | 322.31 | 0.34 |
| NF CWC | SECTION_01 | 14239 | 2 yr | 1092.00 | 530.00 | 537.06 | | 537.23 | 0.003144 | 3.65 | 481.57 | 361.23 | 0.31 |
| NF CWC | SECTION_01 | 14239 | 5 yr | 1746.00 | 530.00 | 538.31 | | 538.40 | 0.001637 | 3.11 | 993.54 | 440.26 | 0.23 |
| NF CWC | SECTION_01 | 14239 | 10 yr | 2083.00 | 530.00 | 539.03 | | 539.10 | 0.001114 | 2.78 | 1313.11 | 449.90 | 0.19 |
| NF CWC | SECTION_01 | 14239 | 25 yr | 2438.00 | 530.00 | 539.64 | | 539.70 | 0.000891 | 2.64 | 1590.80 | 458.13 | 0.18 |
| NF CWC | SECTION_01 | 14239 | 50 yr | 2851.00 | 530.00 | 540.09 | | 540.14 | 0.000860 | 2.70 | 1795.68 | 466.94 | 0.17 |
| NF CWC | SECTION_01 | 14239 | 100 yr | 3292.00 | 530.00 | 540.64 | | 540.70 | 0.000768 | 2.68 | 2059.77 | 477.21 | 0.17 |
| NF CWC | SECTION_01 | 14239 | Ultimate 100 yr | 3425.00 | 530.00 | 540.73 | | 540.79 | 0.000786 | 2.73 | 2100.18 | 479.24 | 0.17 |
| NF CWC | SECTION_01 | 14239 | 500 yr | 4300.00 | 530.00 | 541.48 | | 541.54 | 0.000770 | 2.87 | 2474.24 | 528.71 | 0.17 |
| NF CWC | SECTION_02 | 13950 | 2 yr | 2188.00 | 527.65 | 536.05 | 533.04 | 536.30 | 0.003199 | 4.36 | 696.20 | 338.87 | 0.32 |
| NF CWC | SECTION_02 | 13950 | 5 yr | 3623.00 | 527.65 | 537.61 | 534.54 | 537.83 | 0.002372 | 4.42 | 1261.46 | 378.74 | 0.29 |
| NF CWC | SECTION_02 | 13950 | 10 yr | 4382.00 | 527.65 | 538.49 | 535.20 | 538.68 | 0.001878 | 4.25 | 1602.05 | 395.99 | 0.26 |
| NF CWC | SECTION_02 | 13950 | 25 yr | 5145.00 | 527.65 | 539.17 | 536.19 | 539.35 | 0.001703 | 4.27 | 1872.94 | 408.70 | 0.25 |
| NF CWC | SECTION_02 | 13950 | 50 yr | 5779.00 | 527.65 | 539.62 | 536.46 | 539.80 | 0.001657 | 4.35 | 2060.98 | 422.37 | 0.25 |
| NF CWC | SECTION_02 | 13950 | 100 yr | 6535.00 | 527.65 | 540.21 | 536.73 | 540.39 | 0.001542 | 4.38 | 2314.72 | 436.61 | 0.25 |
| NF CWC | SECTION_02 | 13950 | Ultimate 100 yr | 6685.00 | 527.65 | 540.29 | 536.77 | 540.47 | 0.001549 | 4.41 | 2349.44 | 438.52 | 0.25 |
| NF CWC | SECTION_02 | 13950 | 500 yr | 7865.00 | 527.65 | 541.05 | 537.14 | 541.24 | 0.001476 | 4.53 | 2688.25 | 452.00 | 0.24 |
| NF CWC | SECTION_02 | 13590 | 2 yr | 2188.00 | 526.00 | 535.22 | | 535.36 | 0.001814 | 3.55 | 903.87 | 294.52 | 0.25 |
| NF CWC | SECTION_02 | 13590 | 5 yr | 3623.00 | 526.00 | 536.99 | | 537.12 | 0.001431 | 3.71 | 1455.72 | 324.84 | 0.23 |
| NF CWC | SECTION_02 | 13590 | 10 yr | 4382.00 | 526.00 | 537.99 | | 538.12 | 0.001164 | 3.61 | 1786.21 | 332.92 | 0.21 |
| NF CWC | SECTION_02 | 13590 | 25 yr | 5145.00 | 526.00 | 538.70 | | 538.83 | 0.001110 | 3.71 | 2023.89 | 337.89 | 0.21 |
| NF CWC | SECTION_02 | 13590 | 50 yr | 5779.00 | 526.00 | 539.15 | | 539.29 | 0.001123 | 3.84 | 2178.18 | 340.92 | 0.21 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|--------|------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NF CWC | SECTION_02 | 13590 | 100 yr | 6535.00 | 526.00 | 539.77 | | 539.91 | 0.001087 | 3.93 | 2388.18 | 344.60 | 0.21 |
| NF CWC | SECTION_02 | 13590 | Ultimate 100 yr | 6685.00 | 526.00 | 539.84 | | 539.99 | 0.001101 | 3.97 | 2414.06 | 345.05 | 0.21 |
| NF CWC | SECTION_02 | 13590 | 500 yr | 7865.00 | 526.00 | 540.61 | | 540.77 | 0.001107 | 4.16 | 2680.52 | 350.86 | 0.21 |
| NF CWC | SECTION_02 | 13510 | 2 yr | 2188.00 | 526.00 | 534.88 | | 535.17 | 0.003024 | 4.99 | 651.56 | 201.40 | 0.32 |
| NF CWC | SECTION_02 | 13510 | 5 yr | 3623.00 | 526.00 | 536.70 | | 536.97 | 0.002453 | 5.20 | 1130.53 | 316.51 | 0.30 |
| NF CWC | SECTION_02 | 13510 | 10 yr | 4382.00 | 526.00 | 537.77 | | 537.99 | 0.001889 | 4.91 | 1484.12 | 334.51 | 0.27 |
| NF CWC | SECTION_02 | 13510 | 25 yr | 5145.00 | 526.00 | 538.50 | | 538.71 | 0.001758 | 4.96 | 1727.92 | 337.85 | 0.26 |
| NF CWC | SECTION_02 | 13510 | 50 yr | 5779.00 | 526.00 | 538.95 | | 539.18 | 0.001763 | 5.10 | 1881.94 | 339.83 | 0.27 |
| NF CWC | SECTION_02 | 13510 | 100 yr | 6535.00 | 526.00 | 539.58 | | 539.80 | 0.001677 | 5.15 | 2094.52 | 342.52 | 0.26 |
| NF CWC | SECTION_02 | 13510 | Ultimate 100 yr | 6685.00 | 526.00 | 539.65 | | 539.88 | 0.001698 | 5.20 | 2119.45 | 342.84 | 0.26 |
| NF CWC | SECTION_02 | 13510 | 500 yr | 7865.00 | 526.00 | 540.42 | | 540.66 | 0.001683 | 5.40 | 2384.05 | 345.90 | 0.26 |
| NF CWC | SECTION_02 | 13152 | 2 yr | 2242.00 | 527.40 | 533.80 | | 533.99 | 0.003745 | 4.64 | 777.11 | 256.69 | 0.35 |
| NF CWC | SECTION_02 | 13152 | 5 yr | 3717.00 | 527.40 | 536.07 | | 536.21 | 0.001815 | 4.06 | 1377.66 | 273.18 | 0.26 |
| NF CWC | SECTION_02 | 13152 | 10 yr | 4509.00 | 527.40 | 537.29 | | 537.42 | 0.001342 | 3.85 | 1719.36 | 282.94 | 0.23 |
| NF CWC | SECTION_02 | 13152 | 25 yr | 5320.00 | 527.40 | 538.04 | | 538.18 | 0.001298 | 4.00 | 1933.45 | 291.07 | 0.23 |
| NF CWC | SECTION_02 | 13152 | 50 yr | 5972.00 | 527.40 | 538.48 | | 538.64 | 0.001336 | 4.18 | 2063.93 | 295.79 | 0.23 |
| NF CWC | SECTION_02 | 13152 | 100 yr | 6772.00 | 527.40 | 539.12 | | 539.28 | 0.001306 | 4.30 | 2254.33 | 303.25 | 0.23 |
| NF CWC | SECTION_02 | 13152 | Ultimate 100 yr | 6969.00 | 527.40 | 539.18 | | 539.35 | 0.001349 | 4.39 | 2272.72 | 304.24 | 0.23 |
| NF CWC | SECTION_02 | 13152 | 500 yr | 8238.00 | 527.40 | 539.94 | | 540.13 | 0.001392 | 4.66 | 2507.79 | 316.50 | 0.24 |
| NF CWC | SECTION_02 | 12919 | 2 yr | 2242.00 | 522.09 | 531.86 | 530.21 | 532.61 | 0.013954 | 6.95 | 322.70 | 81.76 | 0.62 |
| NF CWC | SECTION_02 | 12919 | 5 yr | 3717.00 | 522.09 | 534.99 | 531.93 | 535.55 | 0.005731 | 5.99 | 621.04 | 121.21 | 0.43 |
| NF CWC | SECTION_02 | 12919 | 10 yr | 4509.00 | 522.09 | 536.49 | 532.56 | 536.95 | 0.003817 | 5.53 | 867.18 | 269.69 | 0.36 |
| NF CWC | SECTION_02 | 12919 | 25 yr | 5320.00 | 522.09 | 537.34 | 533.15 | 537.75 | 0.003112 | 5.37 | 1115.57 | 329.32 | 0.33 |
| NF CWC | SECTION_02 | 12919 | 50 yr | 5972.00 | 522.09 | 537.82 | 533.59 | 538.21 | 0.002874 | 5.36 | 1272.44 | 349.88 | 0.32 |
| NF CWC | SECTION_02 | 12919 | 100 yr | 6772.00 | 522.09 | 538.56 | 534.03 | 538.90 | 0.002305 | 5.07 | 1533.51 | 388.49 | 0.29 |
| NF CWC | SECTION_02 | 12919 | Ultimate 100 yr | 6969.00 | 522.09 | 538.61 | 534.11 | 538.96 | 0.002377 | 5.17 | 1549.24 | 390.76 | 0.30 |
| NF CWC | SECTION_02 | 12919 | 500 yr | 8238.00 | 522.09 | 539.46 | 534.78 | 539.76 | 0.002000 | 4.78 | 1933.61 | 417.34 | 0.27 |
| NF CWC | SECTION_02 | 12809 | | Culvert | | | | | | | | | |
| NF CWC | SECTION_02 | 12678 | 2 yr | 2473.00 | 521.25 | 529.78 | 525.67 | 530.06 | 0.001716 | 4.24 | 582.84 | 94.27 | 0.29 |
| NF CWC | SECTION_02 | 12678 | 5 yr | 4064.00 | 521.25 | 531.38 | 527.01 | 531.87 | 0.002240 | 5.61 | 724.87 | 102.14 | 0.35 |
| NF CWC | SECTION_02 | 12678 | 10 yr | 4929.00 | 521.25 | 532.09 | 527.64 | 532.70 | 0.002497 | 6.26 | 787.69 | 105.63 | 0.37 |
| NF CWC | SECTION_02 | 12678 | 25 yr | 5877.00 | 521.25 | 532.77 | 528.28 | 533.51 | 0.002778 | 6.93 | 847.83 | 108.96 | 0.40 |
| NF CWC | SECTION_02 | 12678 | 50 yr | 6581.00 | 521.25 | 533.21 | 528.69 | 534.06 | 0.002996 | 7.42 | 887.06 | 111.61 | 0.41 |
| NF CWC | SECTION_02 | 12678 | 100 yr | 7467.00 | 521.25 | 533.71 | 529.23 | 534.71 | 0.003273 | 8.01 | 931.83 | 117.71 | 0.44 |
| NF CWC | SECTION_02 | 12678 | Ultimate 100 yr | 7721.00 | 521.25 | 533.85 | 529.38 | 534.89 | 0.003354 | 8.18 | 943.79 | 120.13 | 0.44 |
| NF CWC | SECTION_02 | 12678 | 500 yr | 9253.00 | 521.25 | 534.66 | 530.18 | 535.95 | 0.003771 | 9.11 | 1015.74 | 135.50 | 0.47 |
| NF CWC | SECTION_02 | 12556 | 2 yr | 2473.00 | 523.00 | 529.10 | | 529.64 | 0.006599 | 5.94 | 416.01 | 106.64 | 0.53 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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) | |
| NF CWC | SECTION_02 | 12556 | 5 yr | 4064.00 | 523.00 | 530.67 | | 531.39 | 0.006419 | 6.83 | 594.90 | 121.05 | 0.54 |
| NF CWC | SECTION_02 | 12556 | 10 yr | 4929.00 | 523.00 | 531.40 | | 532.20 | 0.006312 | 7.18 | 686.15 | 127.77 | 0.55 |
| NF CWC | SECTION_02 | 12556 | 25 yr | 5877.00 | 523.00 | 532.13 | | 533.01 | 0.006005 | 7.52 | 781.87 | 134.32 | 0.54 |
| NF CWC | SECTION_02 | 12556 | 50 yr | 6581.00 | 523.00 | 532.62 | | 533.56 | 0.005798 | 7.79 | 847.98 | 138.64 | 0.54 |
| NF CWC | SECTION_02 | 12556 | 100 yr | 7467.00 | 523.00 | 533.18 | | 534.20 | 0.005609 | 8.10 | 928.63 | 145.41 | 0.54 |
| NF CWC | SECTION_02 | 12556 | Ultimate 100 yr | 7721.00 | 523.00 | 533.34 | | 534.38 | 0.005569 | 8.19 | 951.20 | 147.58 | 0.54 |
| NF CWC | SECTION_02 | 12556 | 500 yr | 9253.00 | 523.00 | 534.17 | | 535.34 | 0.005457 | 8.73 | 1080.35 | 162.13 | 0.54 |
| | | | | | | | | | | | | | |
| NF CWC | SECTION_02 | 12396 | 2 yr | 2473.00 | 522.00 | 527.65 | | 528.38 | 0.009526 | 6.86 | 360.26 | 98.03 | 0.63 |
| NF CWC | SECTION_02 | 12396 | 5 yr | 4064.00 | 522.00 | 529.37 | | 530.24 | 0.008038 | 7.49 | 542.89 | 113.97 | 0.60 |
| NF CWC | SECTION_02 | 12396 | 10 yr | 4929.00 | 522.00 | 530.16 | | 531.09 | 0.007510 | 7.75 | 635.68 | 120.18 | 0.59 |
| NF CWC | SECTION_02 | 12396 | 25 yr | 5877.00 | 522.00 | 530.97 | | 531.96 | 0.007136 | 7.99 | 735.61 | 127.90 | 0.59 |
| NF CWC | SECTION_02 | 12396 | 50 yr | 6581.00 | 522.00 | 531.50 | | 532.54 | 0.006964 | 8.18 | 804.92 | 132.68 | 0.58 |
| NF CWC | SECTION_02 | 12396 | 100 yr | 7467.00 | 522.00 | 532.11 | | 533.21 | 0.006864 | 8.41 | 887.59 | 138.62 | 0.59 |
| NF CWC | SECTION_02 | 12396 | Ultimate 100 yr | 7721.00 | 522.00 | 532.27 | | 533.39 | 0.006850 | 8.48 | 910.28 | 141.65 | 0.59 |
| NF CWC | SECTION_02 | 12396 | 500 yr | 9253.00 | 522.00 | 533.18 | | 534.40 | 0.006414 | 8.87 | 1056.37 | 178.86 | 0.58 |
| | | | | | | | | | | | | | |
| NF CWC | SECTION_02A | 12079 | 2 yr | 2473.00 | 519.00 | 526.29 | | 526.54 | 0.001202 | 3.95 | 625.96 | 114.28 | 0.30 |
| NF CWC | SECTION_02A | 12079 | 5 yr | 4064.00 | 519.00 | 528.26 | | 528.60 | 0.001273 | 4.72 | 861.51 | 125.39 | 0.32 |
| NF CWC | SECTION_02A | 12079 | 10 yr | 4929.00 | 519.00 | 529.14 | | 529.54 | 0.001312 | 5.06 | 974.10 | 130.40 | 0.33 |
| NF CWC | SECTION_02A | 12079 | 25 yr | 5877.00 | 519.00 | 530.00 | | 530.45 | 0.001358 | 5.40 | 1088.01 | 135.64 | 0.34 |
| NF CWC | SECTION_02A | 12079 | 50 yr | 6581.00 | 519.00 | 530.56 | | 531.05 | 0.001359 | 5.65 | 1166.65 | 144.15 | 0.34 |
| NF CWC | SECTION_02A | 12079 | 100 yr | 7467.00 | 519.00 | 531.18 | | 531.74 | 0.001381 | 5.97 | 1259.71 | 155.98 | 0.35 |
| NF CWC | SECTION_02A | 12079 | Ultimate 100 yr | 7721.00 | 519.00 | 531.35 | | 531.92 | 0.001390 | 6.06 | 1285.76 | 159.99 | 0.35 |
| NF CWC | SECTION_02A | 12079 | 500 yr | 9253.00 | 519.00 | 532.33 | | 532.99 | 0.001408 | 6.52 | 1463.61 | 208.44 | 0.36 |
| | | | | | | | | | | | | | |
| NF CWC | SECTION_02A | 11744 | 2 yr | 2473.00 | 518.00 | 525.57 | | 525.89 | 0.004452 | 4.56 | 542.24 | 116.57 | 0.37 |
| NF CWC | SECTION_02A | 11744 | 5 yr | 4064.00 | 518.00 | 527.53 | | 527.95 | 0.004117 | 5.17 | 786.04 | 131.72 | 0.37 |
| NF CWC | SECTION_02A | 11744 | 10 yr | 4929.00 | 518.00 | 528.40 | | 528.87 | 0.004060 | 5.45 | 903.81 | 138.24 | 0.38 |
| NF CWC | SECTION_02A | 11744 | 25 yr | 5877.00 | 518.00 | 529.25 | | 529.76 | 0.004085 | 5.74 | 1023.50 | 145.50 | 0.38 |
| NF CWC | SECTION_02A | 11744 | 50 yr | 6581.00 | 518.00 | 529.82 | | 530.36 | 0.004144 | 5.94 | 1107.44 | 151.15 | 0.39 |
| NF CWC | SECTION_02A | 11744 | 100 yr | 7467.00 | 518.00 | 530.44 | | 531.04 | 0.004109 | 6.20 | 1207.48 | 172.46 | 0.39 |
| NF CWC | SECTION_02A | 11744 | Ultimate 100 yr | 7721.00 | 518.00 | 530.61 | | 531.22 | 0.004095 | 6.28 | 1236.47 | 179.71 | 0.39 |
| NF CWC | SECTION_02A | 11744 | 500 yr | 9253.00 | 518.00 | 531.64 | | 532.30 | 0.003822 | 6.57 | 1450.78 | 242.92 | 0.38 |
| | | | | | | | | | | | | | |
| NF CWC | SECTION_02A | 11615 | 2 yr | 2473.00 | 517.45 | 525.04 | | 525.35 | 0.003813 | 4.47 | 553.39 | 108.84 | 0.35 |
| NF CWC | SECTION_02A | 11615 | 5 yr | 4064.00 | 517.45 | 527.01 | | 527.43 | 0.003822 | 5.21 | 779.94 | 121.70 | 0.36 |
| NF CWC | SECTION_02A | 11615 | 10 yr | 4929.00 | 517.45 | 527.87 | | 528.35 | 0.003896 | 5.56 | 887.02 | 127.38 | 0.37 |
| NF CWC | SECTION_02A | 11615 | 25 yr | 5877.00 | 517.45 | 528.69 | | 529.23 | 0.004011 | 5.91 | 993.92 | 132.75 | 0.38 |
| NF CWC | SECTION_02A | 11615 | 50 yr | 6581.00 | 517.45 | 529.23 | | 529.82 | 0.004115 | 6.17 | 1066.88 | 136.26 | 0.39 |
| NF CWC | SECTION_02A | 11615 | 100 yr | 7467.00 | 517.45 | 529.84 | | 530.49 | 0.004235 | 6.49 | 1153.06 | 153.80 | 0.40 |
| NF CWC | SECTION_02A | 11615 | Ultimate 100 yr | 7721.00 | 517.45 | 530.00 | | 530.67 | 0.004254 | 6.58 | 1178.24 | 160.89 | 0.40 |
| NF CWC | SECTION_02A | 11615 | 500 yr | 9253.00 | 517.45 | 531.05 | | 531.78 | 0.004020 | 6.92 | 1376.27 | 243.38 | 0.40 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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) | |
| NF CWC | SECTION_02A | 11107 | 2 yr | 2473.00 | 516.00 | 523.12 | | 523.43 | 0.003763 | 4.46 | 554.94 | 108.56 | 0.35 |
| NF CWC | SECTION_02A | 11107 | 5 yr | 4064.00 | 516.00 | 525.08 | | 525.51 | 0.003758 | 5.22 | 779.27 | 119.80 | 0.36 |
| NF CWC | SECTION_02A | 11107 | 10 yr | 4929.00 | 516.00 | 525.85 | | 526.34 | 0.003994 | 5.65 | 872.55 | 124.42 | 0.38 |
| NF CWC | SECTION_02A | 11107 | 25 yr | 5877.00 | 516.00 | 526.53 | | 527.11 | 0.004335 | 6.13 | 958.88 | 128.52 | 0.40 |
| NF CWC | SECTION_02A | 11107 | 50 yr | 6581.00 | 516.00 | 526.94 | | 527.60 | 0.004650 | 6.50 | 1012.59 | 130.93 | 0.41 |
| NF CWC | SECTION_02A | 11107 | 100 yr | 7467.00 | 516.00 | 527.37 | | 528.13 | 0.005111 | 6.98 | 1069.25 | 133.14 | 0.43 |
| NF CWC | SECTION_02A | 11107 | Ultimate 100 yr | 7721.00 | 516.00 | 527.49 | | 528.28 | 0.005243 | 7.12 | 1084.54 | 133.71 | 0.44 |
| NF CWC | SECTION_02A | 11107 | 500 yr | 9253.00 | 516.00 | 528.63 | | 529.49 | 0.005078 | 7.46 | 1240.81 | 150.30 | 0.44 |
| NF CWC | SECTION_02A | 10741 | 2 yr | 2473.00 | 516.00 | 521.00 | 519.80 | 521.42 | 0.010634 | 5.17 | 478.65 | 165.56 | 0.54 |
| NF CWC | SECTION_02A | 10741 | 5 yr | 4064.00 | 516.00 | 524.09 | 520.72 | 524.31 | 0.002555 | 3.79 | 1079.02 | 223.76 | 0.29 |
| NF CWC | SECTION_02A | 10741 | 10 yr | 4929.00 | 516.00 | 524.90 | 521.13 | 525.14 | 0.002295 | 3.95 | 1262.63 | 242.29 | 0.28 |
| NF CWC | SECTION_02A | 10741 | 25 yr | 5877.00 | 516.00 | 525.57 | 521.57 | 525.84 | 0.002248 | 4.19 | 1426.86 | 261.38 | 0.28 |
| NF CWC | SECTION_02A | 10741 | 50 yr | 6581.00 | 516.00 | 525.95 | 521.85 | 526.24 | 0.002312 | 4.41 | 1524.16 | 271.35 | 0.29 |
| NF CWC | SECTION_02A | 10741 | 100 yr | 7467.00 | 516.00 | 526.30 | 522.18 | 526.64 | 0.002483 | 4.72 | 1620.99 | 292.85 | 0.30 |
| NF CWC | SECTION_02A | 10741 | Ultimate 100 yr | 7721.00 | 516.00 | 526.40 | 522.29 | 526.75 | 0.002533 | 4.81 | 1648.89 | 318.85 | 0.31 |
| NF CWC | SECTION_02A | 10741 | 500 yr | 9253.00 | 516.00 | 527.79 | 522.80 | 528.09 | 0.001819 | 4.56 | 2139.36 | 353.77 | 0.27 |
| NF CWC | SECTION_02A | 10550 | 2 yr | 2628.00 | 510.20 | 520.15 | 514.10 | 520.32 | 0.000077 | 3.28 | 801.58 | 212.26 | 0.21 |
| NF CWC | SECTION_02A | 10550 | 5 yr | 4400.00 | 510.20 | 523.92 | 515.62 | 524.03 | 0.000051 | 2.78 | 2140.51 | 504.38 | 0.16 |
| NF CWC | SECTION_02A | 10550 | 10 yr | 5399.00 | 510.20 | 524.75 | 516.59 | 524.88 | 0.000057 | 3.03 | 2596.61 | 590.53 | 0.17 |
| NF CWC | SECTION_02A | 10550 | 25 yr | 6475.00 | 510.20 | 525.43 | 517.28 | 525.58 | 0.000064 | 3.29 | 3037.20 | 674.04 | 0.17 |
| NF CWC | SECTION_02A | 10550 | 50 yr | 7281.00 | 510.20 | 525.81 | 517.78 | 525.97 | 0.000071 | 3.51 | 3296.08 | 692.70 | 0.18 |
| NF CWC | SECTION_02A | 10550 | 100 yr | 8208.00 | 510.20 | 526.17 | 518.30 | 526.35 | 0.000080 | 3.76 | 3544.73 | 708.64 | 0.19 |
| NF CWC | SECTION_02A | 10550 | Ultimate 100 yr | 8475.00 | 510.20 | 526.26 | 518.42 | 526.45 | 0.000082 | 3.84 | 3611.14 | 712.64 | 0.20 |
| NF CWC | SECTION_02A | 10550 | 500 yr | 10302.00 | 510.20 | 527.69 | 519.32 | 527.87 | 0.000075 | 3.84 | 4744.58 | 859.29 | 0.18 |
| NF CWC | SECTION_02A | 10464 | | Culvert | | | | | | | | | |
| NF CWC | SECTION_02A | 10386 | 2 yr | 3103.00 | 508.30 | 519.16 | 512.76 | 519.38 | 0.000803 | 3.77 | 823.91 | 113.23 | 0.21 |
| NF CWC | SECTION_02A | 10386 | 5 yr | 5106.00 | 508.30 | 521.42 | 514.21 | 521.82 | 0.001081 | 5.03 | 1016.01 | 138.58 | 0.26 |
| NF CWC | SECTION_02A | 10386 | 10 yr | 6323.00 | 508.30 | 522.56 | 515.00 | 523.07 | 0.001223 | 5.68 | 1113.03 | 184.02 | 0.28 |
| NF CWC | SECTION_02A | 10386 | 25 yr | 7616.00 | 508.30 | 523.86 | 515.77 | 524.27 | 0.001003 | 5.32 | 1502.32 | 336.36 | 0.25 |
| NF CWC | SECTION_02A | 10386 | 50 yr | 8634.00 | 508.30 | 524.80 | 516.31 | 525.16 | 0.000855 | 5.13 | 2024.32 | 386.94 | 0.24 |
| NF CWC | SECTION_02A | 10386 | 100 yr | 9691.00 | 508.30 | 525.58 | 516.85 | 525.92 | 0.000804 | 5.14 | 2333.19 | 407.58 | 0.23 |
| NF CWC | SECTION_02A | 10386 | Ultimate 100 yr | 9984.00 | 508.30 | 525.77 | 517.02 | 526.11 | 0.000794 | 5.15 | 2411.17 | 412.69 | 0.23 |
| NF CWC | SECTION_02A | 10386 | 500 yr | 12220.00 | 508.30 | 527.57 | 518.11 | 527.85 | 0.000607 | 4.85 | 3250.94 | 498.74 | 0.20 |
| NF CWC | SECTION_02A | 10207 | 2 yr | 3103.00 | 509.42 | 517.54 | | 518.81 | 0.008618 | 9.77 | 380.96 | 95.36 | 0.65 |
| NF CWC | SECTION_02A | 10207 | 5 yr | 5106.00 | 509.42 | 520.11 | | 521.27 | 0.005761 | 9.85 | 674.33 | 123.65 | 0.56 |
| NF CWC | SECTION_02A | 10207 | 10 yr | 6323.00 | 509.42 | 521.42 | | 522.54 | 0.004853 | 9.86 | 842.15 | 132.08 | 0.53 |
| NF CWC | SECTION_02A | 10207 | 25 yr | 7616.00 | 509.42 | 522.71 | | 523.80 | 0.004168 | 9.85 | 1019.40 | 143.98 | 0.50 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|--------|-------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NF CWC | SECTION_02A | 9769 | 2 yr | 3103.00 | 507.00 | 513.57 | | 515.05 | 0.011597 | 10.35 | 333.14 | 69.27 | 0.75 |
| NF CWC | SECTION_02A | 9769 | 5 yr | 5106.00 | 507.00 | 514.71 | 514.51 | 517.32 | 0.016345 | 13.84 | 414.41 | 73.22 | 0.92 |
| NF CWC | SECTION_02A | 9769 | 10 yr | 6323.00 | 507.00 | 515.44 | 515.44 | 518.59 | 0.017390 | 15.26 | 468.75 | 75.87 | 0.97 |
| NF CWC | SECTION_02A | 9769 | 25 yr | 7616.00 | 507.00 | 516.34 | 516.34 | 519.82 | 0.016737 | 16.11 | 538.93 | 79.35 | 0.97 |
| NF CWC | SECTION_02A | 9769 | 50 yr | 8634.00 | 507.00 | 517.04 | 517.04 | 520.72 | 0.016112 | 16.65 | 595.38 | 82.98 | 0.96 |
| NF CWC | SECTION_02A | 9769 | 100 yr | 9691.00 | 507.00 | 517.68 | 517.68 | 521.59 | 0.015805 | 17.24 | 649.89 | 86.38 | 0.96 |
| NF CWC | SECTION_02A | 9769 | Ultimate 100 yr | 9984.00 | 507.00 | 517.87 | 517.87 | 521.83 | 0.015595 | 17.35 | 666.84 | 87.48 | 0.96 |
| NF CWC | SECTION_02A | 9769 | 500 yr | 12220.00 | 507.00 | 519.18 | 519.18 | 523.50 | 0.014780 | 18.30 | 784.38 | 92.94 | 0.95 |
| | | | | | | | | | | | | | |
| NF CWC | SECTION_02A | 9658 | 2 yr | 3103.00 | 505.02 | 513.28 | | 513.70 | 0.003242 | 5.17 | 599.76 | 109.22 | 0.39 |
| NF CWC | SECTION_02A | 9658 | 5 yr | 5106.00 | 505.02 | 514.48 | | 515.23 | 0.004690 | 6.94 | 740.91 | 132.59 | 0.48 |
| NF CWC | SECTION_02A | 9658 | 10 yr | 6323.00 | 505.02 | 515.04 | | 515.99 | 0.005421 | 7.85 | 829.51 | 179.68 | 0.52 |
| NF CWC | SECTION_02A | 9658 | 25 yr | 7616.00 | 505.02 | 515.55 | | 516.68 | 0.006045 | 8.65 | 935.30 | 233.68 | 0.56 |
| NF CWC | SECTION_02A | 9658 | 50 yr | 8634.00 | 505.02 | 515.91 | | 517.16 | 0.006420 | 9.17 | 1022.68 | 250.93 | 0.58 |
| NF CWC | SECTION_02A | 9658 | 100 yr | 9691.00 | 505.02 | 516.25 | | 517.61 | 0.006723 | 9.65 | 1110.87 | 272.00 | 0.60 |
| NF CWC | SECTION_02A | 9658 | Ultimate 100 yr | 9984.00 | 505.02 | 516.34 | | 517.73 | 0.006795 | 9.77 | 1135.29 | 277.54 | 0.60 |
| NF CWC | SECTION_02A | 9658 | 500 yr | 12220.00 | 505.02 | 516.96 | | 518.54 | 0.007231 | 10.58 | 1316.69 | 300.52 | 0.63 |
| | | | | | | | | | | | | | |
| NF CWC | SECTION_02A | 9368 | 2 yr | 3103.00 | 504.00 | 512.72 | 508.61 | 512.97 | 0.001473 | 4.10 | 793.30 | 175.57 | 0.28 |
| NF CWC | SECTION_02A | 9368 | 5 yr | 5106.00 | 504.00 | 513.69 | 510.04 | 514.13 | 0.002288 | 5.57 | 1019.45 | 260.60 | 0.35 |
| NF CWC | SECTION_02A | 9368 | 10 yr | 6323.00 | 504.00 | 514.15 | 510.81 | 514.70 | 0.002685 | 6.27 | 1143.37 | 272.75 | 0.38 |
| NF CWC | SECTION_02A | 9368 | 25 yr | 7616.00 | 504.00 | 514.58 | 511.51 | 515.23 | 0.003063 | 6.93 | 1260.46 | 276.88 | 0.41 |
| NF CWC | SECTION_02A | 9368 | 50 yr | 8634.00 | 504.00 | 514.87 | 512.06 | 515.61 | 0.003352 | 7.41 | 1341.89 | 280.93 | 0.43 |
| NF CWC | SECTION_02A | 9368 | 100 yr | 9691.00 | 504.00 | 515.13 | 512.58 | 515.97 | 0.003660 | 7.89 | 1417.24 | 285.20 | 0.46 |
| NF CWC | SECTION_02A | 9368 | Ultimate 100 yr | 9984.00 | 504.00 | 515.20 | 512.88 | 516.06 | 0.003746 | 8.02 | 1436.86 | 286.31 | 0.46 |
| NF CWC | SECTION_02A | 9368 | 500 yr | 12220.00 | 504.00 | 515.65 | 514.06 | 516.73 | 0.004448 | 9.02 | 1567.14 | 293.40 | 0.51 |
| | | | | | | | | | | | | | |
| NF CWC | SECTION_02A | 9153 | 2 yr | 3103.00 | 505.00 | 512.07 | | 512.53 | 0.002818 | 5.58 | 631.72 | 323.81 | 0.45 |
| NF CWC | SECTION_02A | 9153 | 5 yr | 5106.00 | 505.00 | 512.73 | 511.67 | 513.47 | 0.004123 | 7.35 | 861.01 | 369.40 | 0.55 |
| NF CWC | SECTION_02A | 9153 | 10 yr | 6323.00 | 505.00 | 513.08 | 512.60 | 513.94 | 0.004613 | 8.10 | 993.47 | 391.81 | 0.59 |
| NF CWC | SECTION_02A | 9153 | 25 yr | 7616.00 | 505.00 | 513.35 | 513.05 | 514.37 | 0.005276 | 8.93 | 1100.95 | 405.12 | 0.64 |
| NF CWC | SECTION_02A | 9153 | 50 yr | 8634.00 | 505.00 | 513.61 | 513.34 | 514.69 | 0.005432 | 9.32 | 1207.90 | 418.23 | 0.65 |
| NF CWC | SECTION_02A | 9153 | 100 yr | 9691.00 | 505.00 | 513.90 | 513.59 | 515.01 | 0.005390 | 9.56 | 1331.09 | 430.76 | 0.65 |
| NF CWC | SECTION_02A | 9153 | Ultimate 100 yr | 9984.00 | 505.00 | 513.98 | 513.66 | 515.10 | 0.005369 | 9.62 | 1365.32 | 434.01 | 0.65 |
| NF CWC | SECTION_02A | 9153 | 500 yr | 12220.00 | 505.00 | 514.62 | | 515.73 | 0.004913 | 9.78 | 1654.70 | 465.72 | 0.64 |
| | | | | | | | | | | | | | |
| NF CWC | SECTION_02A | 8720 | 2 yr | 3103.00 | 505.00 | 510.02 | 510.02 | 510.79 | 0.006846 | 7.90 | 517.08 | 422.50 | 0.68 |
| NF CWC | SECTION_02A | 8720 | 5 yr | 5106.00 | 505.00 | 510.63 | 510.63 | 511.34 | 0.006341 | 8.33 | 889.36 | 476.07 | 0.67 |
| NF CWC | SECTION_02A | 8720 | 10 yr | 6323.00 | 505.00 | 511.08 | 510.80 | 511.75 | 0.005527 | 8.26 | 1108.62 | 491.16 | 0.64 |
| NF CWC | SECTION_02A | 8720 | 25 yr | 7616.00 | 505.00 | 511.72 | 511.06 | 512.27 | 0.004008 | 7.59 | 1431.74 | 525.89 | 0.55 |
| NF CWC | SECTION_02A | 8720 | 50 yr | 8634.00 | 505.00 | 512.18 | 511.25 | 512.67 | 0.003298 | 7.24 | 1681.92 | 553.83 | 0.51 |
| NF CWC | SECTION_02A | 8720 | 100 yr | 9691.00 | 505.00 | 512.65 | 511.44 | 513.10 | 0.002756 | 6.94 | 1944.06 | 568.34 | 0.47 |
| NF CWC | SECTION_02A | 8720 | Ultimate 100 yr | 9984.00 | 505.00 | 512.75 | 511.49 | 513.20 | 0.002682 | 6.92 | 2003.61 | 570.50 | 0.46 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|--------|-------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NF CWC | SECTION_02A | 8720 | 500 yr | 12220.00 | 505.00 | 513.65 | 511.85 | 514.06 | 0.002037 | 6.54 | 2529.92 | 608.37 | 0.41 |
| NF CWC | SECTION_02A | 8394 | 2 yr | 3152.00 | 502.00 | 506.01 | 506.01 | 507.83 | 0.002207 | 10.82 | 291.24 | 125.13 | 1.00 |
| NF CWC | SECTION_02A | 8394 | 5 yr | 5249.00 | 502.00 | 507.57 | 507.57 | 509.56 | 0.001748 | 11.67 | 550.86 | 174.02 | 0.93 |
| NF CWC | SECTION_02A | 8394 | 10 yr | 6525.00 | 502.00 | 508.39 | 508.39 | 510.45 | 0.001599 | 12.04 | 712.27 | 219.87 | 0.91 |
| NF CWC | SECTION_02A | 8394 | 25 yr | 7868.00 | 502.00 | 509.23 | 509.23 | 511.22 | 0.001459 | 12.07 | 914.74 | 265.55 | 0.88 |
| NF CWC | SECTION_02A | 8394 | 50 yr | 8943.00 | 502.00 | 509.74 | 509.74 | 511.74 | 0.001485 | 12.23 | 1059.02 | 298.31 | 0.88 |
| NF CWC | SECTION_02A | 8394 | 100 yr | 10037.00 | 502.00 | 510.04 | 510.04 | 512.21 | 0.001611 | 12.84 | 1152.82 | 354.37 | 0.92 |
| NF CWC | SECTION_02A | 8394 | Ultimate 100 yr | 10314.00 | 502.00 | 510.16 | 510.16 | 512.33 | 0.001578 | 12.88 | 1194.66 | 358.48 | 0.92 |
| NF CWC | SECTION_02A | 8394 | 500 yr | 12733.00 | 502.00 | 510.93 | 510.93 | 513.28 | 0.001506 | 13.62 | 1482.75 | 385.58 | 0.91 |
| NF CWC | SECTION_02A | 8182 | 2 yr | 3152.00 | 500.00 | 503.94 | 503.77 | 505.31 | 0.001589 | 9.62 | 392.90 | 143.40 | 0.86 |
| NF CWC | SECTION_02A | 8182 | 5 yr | 5249.00 | 500.00 | 505.23 | 505.06 | 507.12 | 0.001549 | 11.52 | 581.59 | 149.15 | 0.90 |
| NF CWC | SECTION_02A | 8182 | 10 yr | 6525.00 | 500.00 | 505.74 | 505.73 | 508.07 | 0.001702 | 12.86 | 658.00 | 151.69 | 0.95 |
| NF CWC | SECTION_02A | 8182 | 25 yr | 7868.00 | 500.00 | 506.55 | 506.55 | 508.96 | 0.001506 | 13.23 | 825.76 | 237.58 | 0.92 |
| NF CWC | SECTION_02A | 8182 | 50 yr | 8943.00 | 500.00 | 507.10 | 507.10 | 509.59 | 0.001426 | 13.58 | 958.49 | 248.36 | 0.90 |
| NF CWC | SECTION_02A | 8182 | 100 yr | 10037.00 | 500.00 | 507.57 | 507.57 | 510.18 | 0.001391 | 14.02 | 1077.63 | 254.98 | 0.90 |
| NF CWC | SECTION_02A | 8182 | Ultimate 100 yr | 10314.00 | 500.00 | 507.69 | 507.69 | 510.32 | 0.001384 | 14.12 | 1107.04 | 256.59 | 0.90 |
| NF CWC | SECTION_02A | 8182 | 500 yr | 12733.00 | 500.00 | 508.59 | 508.59 | 511.49 | 0.001352 | 15.05 | 1344.46 | 268.07 | 0.91 |
| NF CWC | SECTION_02A | 7881 | 2 yr | 3152.00 | 497.00 | 503.90 | | 504.42 | 0.003178 | 5.80 | 554.18 | 137.09 | 0.47 |
| NF CWC | SECTION_02A | 7881 | 5 yr | 5249.00 | 497.00 | 505.39 | | 506.15 | 0.003288 | 7.10 | 774.82 | 162.94 | 0.51 |
| NF CWC | SECTION_02A | 7881 | 10 yr | 6525.00 | 497.00 | 506.03 | | 506.95 | 0.003508 | 7.84 | 885.46 | 182.13 | 0.53 |
| NF CWC | SECTION_02A | 7881 | 25 yr | 7868.00 | 497.00 | 506.58 | | 507.66 | 0.003780 | 8.57 | 998.81 | 232.66 | 0.56 |
| NF CWC | SECTION_02A | 7881 | 50 yr | 8943.00 | 497.00 | 506.97 | | 508.16 | 0.003966 | 9.09 | 1097.79 | 306.12 | 0.58 |
| NF CWC | SECTION_02A | 7881 | 100 yr | 10037.00 | 497.00 | 507.33 | 505.59 | 508.60 | 0.004089 | 9.51 | 1223.45 | 382.51 | 0.59 |
| NF CWC | SECTION_02A | 7881 | Ultimate 100 yr | 10314.00 | 497.00 | 507.42 | 505.71 | 508.71 | 0.004092 | 9.59 | 1260.28 | 391.80 | 0.59 |
| NF CWC | SECTION_02A | 7881 | 500 yr | 12733.00 | 497.00 | 508.13 | 507.09 | 509.52 | 0.004152 | 10.21 | 1564.69 | 472.13 | 0.60 |
| NF CWC | SECTION_02A | 7440 | 2 yr | 3152.00 | 496.66 | 502.56 | | 503.06 | 0.002988 | 5.81 | 580.24 | 167.44 | 0.46 |
| NF CWC | SECTION_02A | 7440 | 5 yr | 5249.00 | 496.66 | 504.22 | | 504.82 | 0.002579 | 6.56 | 910.66 | 318.73 | 0.45 |
| NF CWC | SECTION_02A | 7440 | 10 yr | 6525.00 | 496.66 | 505.00 | | 505.58 | 0.002300 | 6.69 | 1238.37 | 466.26 | 0.44 |
| NF CWC | SECTION_02A | 7440 | 25 yr | 7868.00 | 496.66 | 505.69 | | 506.23 | 0.002034 | 6.68 | 1578.02 | 514.65 | 0.42 |
| NF CWC | SECTION_02A | 7440 | 50 yr | 8943.00 | 496.66 | 506.17 | | 506.69 | 0.001887 | 6.69 | 1830.90 | 547.55 | 0.41 |
| NF CWC | SECTION_02A | 7440 | 100 yr | 10037.00 | 496.66 | 506.60 | | 507.11 | 0.001779 | 6.71 | 2072.94 | 573.03 | 0.40 |
| NF CWC | SECTION_02A | 7440 | Ultimate 100 yr | 10314.00 | 496.66 | 506.72 | | 507.22 | 0.001741 | 6.70 | 2140.33 | 579.92 | 0.39 |
| NF CWC | SECTION_02A | 7440 | 500 yr | 12733.00 | 496.66 | 507.52 | | 508.02 | 0.001604 | 6.81 | 2618.77 | 604.60 | 0.38 |
| NF CWC | SECTION_02A | 6992 | 2 yr | 3152.00 | 494.00 | 501.15 | | 501.72 | 0.002995 | 6.06 | 529.06 | 118.93 | 0.47 |
| NF CWC | SECTION_02A | 6992 | 5 yr | 5249.00 | 494.00 | 502.61 | | 503.48 | 0.003417 | 7.63 | 737.48 | 193.53 | 0.52 |
| NF CWC | SECTION_02A | 6992 | 10 yr | 6525.00 | 494.00 | 503.34 | | 504.32 | 0.003452 | 8.22 | 896.88 | 243.54 | 0.53 |
| NF CWC | SECTION_02A | 6992 | 25 yr | 7868.00 | 494.00 | 504.06 | | 505.08 | 0.003294 | 8.55 | 1096.56 | 305.17 | 0.53 |
| NF CWC | SECTION_02A | 6992 | 50 yr | 8943.00 | 494.00 | 504.59 | | 505.61 | 0.003134 | 8.70 | 1270.13 | 352.93 | 0.52 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|--------|-------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NF CWC | SECTION_02A | 6992 | 100 yr | 10037.00 | 494.00 | 505.09 | | 506.09 | 0.002959 | 8.78 | 1460.98 | 409.30 | 0.51 |
| NF CWC | SECTION_02A | 6992 | Ultimate 100 yr | 10314.00 | 494.00 | 505.28 | | 506.24 | 0.002807 | 8.66 | 1538.43 | 424.85 | 0.50 |
| NF CWC | SECTION_02A | 6992 | 500 yr | 12733.00 | 494.00 | 506.22 | | 507.13 | 0.002520 | 8.75 | 1963.25 | 477.39 | 0.48 |
| NF CWC | SECTION_02A | 6455 | 2 yr | 3152.00 | 493.00 | 499.21 | | 499.90 | 0.003901 | 7.14 | 499.02 | 142.26 | 0.54 |
| NF CWC | SECTION_02A | 6455 | 5 yr | 5249.00 | 493.00 | 500.84 | | 501.63 | 0.003434 | 7.98 | 795.75 | 236.51 | 0.53 |
| NF CWC | SECTION_02A | 6455 | 10 yr | 6525.00 | 493.00 | 501.98 | | 502.63 | 0.002509 | 7.54 | 1122.17 | 348.29 | 0.46 |
| NF CWC | SECTION_02A | 6455 | 25 yr | 7868.00 | 493.00 | 503.09 | | 503.58 | 0.001759 | 6.87 | 1609.61 | 476.20 | 0.40 |
| NF CWC | SECTION_02A | 6455 | 50 yr | 8943.00 | 493.00 | 503.78 | | 504.20 | 0.001470 | 6.59 | 1944.09 | 497.88 | 0.37 |
| NF CWC | SECTION_02A | 6455 | 100 yr | 10037.00 | 493.00 | 504.38 | | 504.78 | 0.001291 | 6.42 | 2251.70 | 519.76 | 0.35 |
| NF CWC | SECTION_02A | 6455 | Ultimate 100 yr | 10314.00 | 493.00 | 504.62 | | 504.99 | 0.001186 | 6.25 | 2379.56 | 528.19 | 0.33 |
| NF CWC | SECTION_02A | 6455 | 500 yr | 12733.00 | 493.00 | 505.65 | | 506.01 | 0.001041 | 6.22 | 2943.12 | 568.95 | 0.32 |
| NF CWC | SECTION_02A | 6201 | 2 yr | 3152.00 | 491.91 | 498.66 | 496.97 | 499.34 | 0.000510 | 6.79 | 577.55 | 192.52 | 0.52 |
| NF CWC | SECTION_02A | 6201 | 5 yr | 5249.00 | 491.91 | 500.21 | 498.51 | 501.13 | 0.000524 | 8.16 | 967.79 | 314.22 | 0.55 |
| NF CWC | SECTION_02A | 6201 | 10 yr | 6525.00 | 491.91 | 501.47 | 499.30 | 502.26 | 0.000391 | 7.88 | 1485.97 | 472.98 | 0.49 |
| NF CWC | SECTION_02A | 6201 | 25 yr | 7868.00 | 491.91 | 502.62 | 500.09 | 503.31 | 0.000307 | 7.63 | 2068.54 | 534.08 | 0.44 |
| NF CWC | SECTION_02A | 6201 | 50 yr | 8943.00 | 491.91 | 503.31 | 500.61 | 503.97 | 0.000282 | 7.67 | 2446.62 | 563.80 | 0.43 |
| NF CWC | SECTION_02A | 6201 | 100 yr | 10037.00 | 491.91 | 503.91 | 501.19 | 504.56 | 0.000269 | 7.79 | 2791.48 | 588.10 | 0.42 |
| NF CWC | SECTION_02A | 6201 | Ultimate 100 yr | 10314.00 | 491.91 | 504.18 | 501.30 | 504.80 | 0.000252 | 7.66 | 2949.14 | 598.32 | 0.41 |
| NF CWC | SECTION_02A | 6201 | 500 yr | 12733.00 | 491.91 | 505.16 | 502.13 | 505.82 | 0.000252 | 8.13 | 3557.34 | 634.78 | 0.42 |
| NF CWC | SECTION_02A | 6158 | 2 yr | 3152.00 | 494.30 | 498.10 | 498.10 | 499.26 | 0.002216 | 8.80 | 401.84 | 197.71 | 0.96 |
| NF CWC | SECTION_02A | 6158 | 5 yr | 5249.00 | 494.30 | 500.33 | 499.14 | 501.04 | 0.000643 | 7.17 | 1043.96 | 421.81 | 0.58 |
| NF CWC | SECTION_02A | 6158 | 10 yr | 6525.00 | 494.30 | 501.63 | 499.68 | 502.17 | 0.000382 | 6.48 | 1658.18 | 504.31 | 0.46 |
| NF CWC | SECTION_02A | 6158 | 25 yr | 7868.00 | 494.30 | 502.77 | 500.25 | 503.22 | 0.000275 | 6.16 | 2259.76 | 548.48 | 0.40 |
| NF CWC | SECTION_02A | 6158 | 50 yr | 8943.00 | 494.30 | 503.45 | 500.62 | 503.89 | 0.000245 | 6.17 | 2641.51 | 571.37 | 0.39 |
| NF CWC | SECTION_02A | 6158 | 100 yr | 10037.00 | 494.30 | 504.05 | 500.96 | 504.49 | 0.000228 | 6.25 | 2987.63 | 592.05 | 0.38 |
| NF CWC | SECTION_02A | 6158 | Ultimate 100 yr | 10314.00 | 494.30 | 504.30 | 501.05 | 504.73 | 0.000213 | 6.16 | 3140.84 | 600.36 | 0.37 |
| NF CWC | SECTION_02A | 6158 | 500 yr | 12733.00 | 494.30 | 505.29 | 501.69 | 505.75 | 0.000208 | 6.54 | 3750.97 | 631.55 | 0.37 |
| NF CWC | SECTION_02A | 6144 | 2 yr | 3152.00 | 494.52 | 497.76 | 497.76 | 498.90 | 0.002280 | 8.64 | 399.46 | 195.79 | 0.97 |
| NF CWC | SECTION_02A | 6144 | 5 yr | 5249.00 | 494.52 | 500.43 | | 500.98 | 0.000458 | 6.31 | 1158.83 | 408.82 | 0.49 |
| NF CWC | SECTION_02A | 6144 | 10 yr | 6525.00 | 494.52 | 501.68 | | 502.14 | 0.000300 | 5.90 | 1750.67 | 511.60 | 0.41 |
| NF CWC | SECTION_02A | 6144 | 25 yr | 7868.00 | 494.52 | 502.80 | | 503.21 | 0.000226 | 5.70 | 2349.09 | 551.62 | 0.37 |
| NF CWC | SECTION_02A | 6144 | 50 yr | 8943.00 | 494.52 | 503.48 | | 503.88 | 0.000204 | 5.75 | 2730.18 | 574.56 | 0.35 |
| NF CWC | SECTION_02A | 6144 | 100 yr | 10037.00 | 494.52 | 504.07 | | 504.47 | 0.000193 | 5.86 | 3075.63 | 594.73 | 0.35 |
| NF CWC | SECTION_02A | 6144 | Ultimate 100 yr | 10314.00 | 494.52 | 504.33 | | 504.71 | 0.000181 | 5.78 | 3228.32 | 602.83 | 0.34 |
| NF CWC | SECTION_02A | 6144 | 500 yr | 12733.00 | 494.52 | 505.31 | | 505.74 | 0.000180 | 6.18 | 3839.78 | 634.23 | 0.34 |
| NF CWC | SECTION_02A | 6085 | 2 yr | 3152.00 | 488.57 | 498.06 | | 498.17 | 0.000347 | 2.77 | 1251.01 | 242.57 | 0.17 |
| NF CWC | SECTION_02A | 6085 | 5 yr | 5249.00 | 488.57 | 500.72 | | 500.83 | 0.000271 | 2.96 | 2212.08 | 481.39 | 0.16 |
| NF CWC | SECTION_02A | 6085 | 10 yr | 6525.00 | 488.57 | 501.91 | | 502.02 | 0.000243 | 3.00 | 2812.68 | 525.31 | 0.15 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|--------|-------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NF CWC | SECTION_02A | 6085 | 25 yr | 7868.00 | 488.57 | 503.00 | | 503.10 | 0.000222 | 3.04 | 3405.46 | 564.76 | 0.15 |
| NF CWC | SECTION_02A | 6085 | 50 yr | 8943.00 | 488.57 | 503.67 | | 503.78 | 0.000218 | 3.12 | 3792.06 | 585.43 | 0.15 |
| NF CWC | SECTION_02A | 6085 | 100 yr | 10037.00 | 488.57 | 504.26 | | 504.37 | 0.000219 | 3.22 | 4143.81 | 605.09 | 0.15 |
| NF CWC | SECTION_02A | 6085 | Ultimate 100 yr | 10314.00 | 488.57 | 504.51 | | 504.62 | 0.000211 | 3.19 | 4294.84 | 614.31 | 0.15 |
| NF CWC | SECTION_02A | 6085 | 500 yr | 12733.00 | 488.57 | 505.51 | | 505.64 | 0.000224 | 3.44 | 4930.62 | 650.12 | 0.15 |
| NF CWC | SECTION_02A | 5702 | 2 yr | 3270.00 | 490.00 | 498.04 | 491.90 | 498.06 | 0.000079 | 1.29 | 2654.79 | 465.57 | 0.08 |
| NF CWC | SECTION_02A | 5702 | 5 yr | 5569.00 | 490.00 | 500.71 | 492.56 | 500.74 | 0.000070 | 1.47 | 4300.23 | 661.25 | 0.08 |
| NF CWC | SECTION_02A | 5702 | 10 yr | 6876.00 | 490.00 | 501.90 | 492.90 | 501.94 | 0.000067 | 1.55 | 5104.85 | 687.53 | 0.08 |
| NF CWC | SECTION_02A | 5702 | 25 yr | 8248.00 | 490.00 | 502.99 | 493.22 | 503.03 | 0.000065 | 1.63 | 5865.64 | 709.95 | 0.08 |
| NF CWC | SECTION_02A | 5702 | 50 yr | 9490.00 | 490.00 | 503.66 | 493.50 | 503.70 | 0.000069 | 1.74 | 6347.36 | 725.61 | 0.08 |
| NF CWC | SECTION_02A | 5702 | 100 yr | 10728.00 | 490.00 | 504.25 | 493.76 | 504.30 | 0.000073 | 1.84 | 6780.05 | 739.13 | 0.09 |
| NF CWC | SECTION_02A | 5702 | Ultimate 100 yr | 11298.00 | 490.00 | 504.50 | 493.87 | 504.55 | 0.000076 | 1.89 | 6962.26 | 744.61 | 0.09 |
| NF CWC | SECTION_02A | 5702 | 500 yr | 13783.00 | 490.00 | 505.51 | 494.34 | 505.56 | 0.000084 | 2.08 | 7721.91 | 766.95 | 0.09 |
| NF CWC | SECTION_02A | 5621 | 2 yr | 3270.00 | 490.00 | 497.97 | 492.65 | 498.05 | 0.000045 | 2.44 | 1668.23 | 331.13 | 0.16 |
| NF CWC | SECTION_02A | 5621 | 5 yr | 5569.00 | 490.00 | 500.61 | 493.72 | 500.73 | 0.000041 | 2.89 | 2638.66 | 526.61 | 0.16 |
| NF CWC | SECTION_02A | 5621 | 10 yr | 6876.00 | 490.00 | 501.80 | 494.25 | 501.92 | 0.000040 | 3.05 | 3442.63 | 584.50 | 0.16 |
| NF CWC | SECTION_02A | 5621 | 25 yr | 8248.00 | 490.00 | 502.88 | 494.76 | 503.01 | 0.000039 | 3.23 | 4106.98 | 640.77 | 0.16 |
| NF CWC | SECTION_02A | 5621 | 50 yr | 9490.00 | 490.00 | 503.54 | 495.19 | 503.69 | 0.000042 | 3.45 | 4531.99 | 652.42 | 0.17 |
| NF CWC | SECTION_02A | 5621 | 100 yr | 10728.00 | 490.00 | 504.11 | 495.60 | 504.28 | 0.000044 | 3.67 | 4911.46 | 664.10 | 0.18 |
| NF CWC | SECTION_02A | 5621 | Ultimate 100 yr | 11298.00 | 490.00 | 504.35 | 495.78 | 504.53 | 0.000046 | 3.77 | 5070.63 | 669.05 | 0.18 |
| NF CWC | SECTION_02A | 5621 | 500 yr | 13783.00 | 490.00 | 505.33 | 496.54 | 505.54 | 0.000051 | 4.18 | 5737.27 | 700.22 | 0.19 |
| NF CWC | SECTION_02A | 5570 | 2 yr | 3270.00 | 489.00 | 495.67 | 495.67 | 497.84 | 0.002089 | 11.82 | 276.58 | 63.68 | 1.00 |
| NF CWC | SECTION_02A | 5570 | 5 yr | 5569.00 | 489.00 | 497.74 | 497.74 | 500.46 | 0.001943 | 13.24 | 420.63 | 77.12 | 1.00 |
| NF CWC | SECTION_02A | 5570 | 10 yr | 6876.00 | 489.00 | 498.77 | 498.77 | 501.64 | 0.001906 | 13.61 | 505.25 | 87.71 | 1.00 |
| NF CWC | SECTION_02A | 5570 | 25 yr | 8248.00 | 489.00 | 499.68 | 499.68 | 502.72 | 0.001875 | 13.99 | 589.71 | 97.13 | 1.00 |
| NF CWC | SECTION_02A | 5570 | 50 yr | 9490.00 | 489.00 | 501.18 | 501.18 | 503.47 | 0.002020 | 12.14 | 781.91 | 171.09 | 1.00 |
| NF CWC | SECTION_02A | 5570 | 100 yr | 10728.00 | 489.00 | 501.61 | 501.61 | 504.05 | 0.001967 | 12.52 | 857.99 | 181.13 | 1.00 |
| NF CWC | SECTION_02A | 5570 | Ultimate 100 yr | 11298.00 | 489.00 | 501.91 | 501.91 | 504.30 | 0.001979 | 12.40 | 914.64 | 200.07 | 1.00 |
| NF CWC | SECTION_02A | 5570 | 500 yr | 13783.00 | 489.00 | 502.66 | 502.66 | 505.29 | 0.001865 | 13.03 | 1074.72 | 226.70 | 0.99 |
| NF CWC | SECTION_02A | 5542 | 2 yr | 3270.00 | 488.66 | 495.29 | 495.29 | 497.46 | 0.002093 | 11.81 | 276.79 | 63.90 | 1.00 |
| NF CWC | SECTION_02A | 5542 | 5 yr | 5569.00 | 488.66 | 497.33 | 497.33 | 500.06 | 0.001940 | 13.25 | 420.22 | 76.91 | 1.00 |
| NF CWC | SECTION_02A | 5542 | 10 yr | 6876.00 | 488.66 | 498.33 | 498.33 | 501.26 | 0.001901 | 13.73 | 500.70 | 85.53 | 1.00 |
| NF CWC | SECTION_02A | 5542 | 25 yr | 8248.00 | 488.66 | 499.34 | 499.34 | 502.34 | 0.001876 | 13.89 | 593.84 | 99.00 | 1.00 |
| NF CWC | SECTION_02A | 5542 | 50 yr | 9490.00 | 488.66 | 500.52 | 500.52 | 503.16 | 0.001932 | 13.04 | 727.53 | 137.20 | 1.00 |
| NF CWC | SECTION_02A | 5542 | 100 yr | 10728.00 | 488.66 | 501.29 | 501.29 | 503.79 | 0.001960 | 12.68 | 846.20 | 169.02 | 1.00 |
| NF CWC | SECTION_02A | 5542 | Ultimate 100 yr | 11298.00 | 488.66 | 501.60 | 501.60 | 504.04 | 0.001970 | 12.53 | 901.66 | 184.22 | 1.00 |
| NF CWC | SECTION_02A | 5542 | 500 yr | 13783.00 | 488.66 | 502.37 | 502.37 | 505.06 | 0.001855 | 13.16 | 1057.04 | 227.62 | 0.99 |
| NF CWC | SECTION_02A | 5480 | 2 yr | 3270.00 | 487.40 | 493.66 | | 493.96 | 0.000230 | 4.51 | 835.87 | 203.45 | 0.35 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|--------|-------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NF CWC | SECTION_02A | 5480 | 5 yr | 5569.00 | 487.40 | 494.91 | | 495.44 | 0.000313 | 6.08 | 1106.32 | 228.40 | 0.42 |
| NF CWC | SECTION_02A | 5480 | 10 yr | 6876.00 | 487.40 | 495.45 | | 496.13 | 0.000358 | 6.86 | 1233.61 | 239.23 | 0.46 |
| NF CWC | SECTION_02A | 5480 | 25 yr | 8248.00 | 487.40 | 495.94 | | 496.77 | 0.000406 | 7.63 | 1352.01 | 250.36 | 0.49 |
| NF CWC | SECTION_02A | 5480 | 50 yr | 9490.00 | 487.40 | 496.32 | | 497.30 | 0.000449 | 8.30 | 1449.64 | 259.45 | 0.52 |
| NF CWC | SECTION_02A | 5480 | 100 yr | 10728.00 | 487.40 | 496.66 | | 497.79 | 0.000492 | 8.94 | 1539.96 | 270.13 | 0.55 |
| NF CWC | SECTION_02A | 5480 | Ultimate 100 yr | 11298.00 | 487.40 | 496.81 | | 498.01 | 0.000512 | 9.23 | 1580.81 | 275.12 | 0.56 |
| NF CWC | SECTION_02A | 5480 | 500 yr | 13783.00 | 487.40 | 497.39 | | 498.91 | 0.000595 | 10.41 | 1764.22 | 345.59 | 0.61 |
| NF CWC | SECTION_02A | 4988 | 2 yr | 3270.00 | 487.00 | 493.71 | | 493.77 | 0.000235 | 1.92 | 1769.02 | 342.70 | 0.14 |
| NF CWC | SECTION_02A | 4988 | 5 yr | 5569.00 | 487.00 | 495.05 | | 495.15 | 0.000332 | 2.60 | 2290.80 | 438.66 | 0.17 |
| NF CWC | SECTION_02A | 4988 | 10 yr | 6876.00 | 487.00 | 495.66 | | 495.78 | 0.000376 | 2.91 | 2565.78 | 470.17 | 0.18 |
| NF CWC | SECTION_02A | 4988 | 25 yr | 8248.00 | 487.00 | 496.21 | | 496.36 | 0.000417 | 3.21 | 2833.68 | 495.32 | 0.19 |
| NF CWC | SECTION_02A | 4988 | 50 yr | 9490.00 | 487.00 | 496.67 | | 496.83 | 0.000450 | 3.45 | 3061.31 | 512.78 | 0.20 |
| NF CWC | SECTION_02A | 4988 | 100 yr | 10728.00 | 487.00 | 497.08 | | 497.27 | 0.000480 | 3.67 | 3277.27 | 527.45 | 0.21 |
| NF CWC | SECTION_02A | 4988 | Ultimate 100 yr | 11298.00 | 487.00 | 497.26 | | 497.46 | 0.000493 | 3.76 | 3375.08 | 533.25 | 0.21 |
| NF CWC | SECTION_02A | 4988 | 500 yr | 13783.00 | 487.00 | 498.01 | | 498.24 | 0.000540 | 4.14 | 3781.05 | 556.65 | 0.23 |
| NF CWC | SECTION_02A | 4503 | 2 yr | 3270.00 | 488.00 | 493.31 | | 493.55 | 0.001429 | 4.01 | 852.97 | 216.92 | 0.32 |
| NF CWC | SECTION_02A | 4503 | 5 yr | 5569.00 | 488.00 | 494.45 | | 494.85 | 0.001866 | 5.27 | 1172.29 | 400.98 | 0.38 |
| NF CWC | SECTION_02A | 4503 | 10 yr | 6876.00 | 488.00 | 494.99 | | 495.44 | 0.001951 | 5.71 | 1405.90 | 459.65 | 0.39 |
| NF CWC | SECTION_02A | 4503 | 25 yr | 8248.00 | 488.00 | 495.51 | | 495.99 | 0.001964 | 6.03 | 1661.09 | 512.11 | 0.40 |
| NF CWC | SECTION_02A | 4503 | 50 yr | 9490.00 | 488.00 | 495.94 | | 496.45 | 0.001939 | 6.24 | 1889.95 | 539.58 | 0.40 |
| NF CWC | SECTION_02A | 4503 | 100 yr | 10728.00 | 488.00 | 496.35 | | 496.87 | 0.001901 | 6.40 | 2112.98 | 555.45 | 0.40 |
| NF CWC | SECTION_02A | 4503 | Ultimate 100 yr | 11298.00 | 488.00 | 496.54 | | 497.05 | 0.001876 | 6.46 | 2215.96 | 561.61 | 0.40 |
| NF CWC | SECTION_02A | 4503 | 500 yr | 13783.00 | 488.00 | 497.28 | | 497.82 | 0.001779 | 6.67 | 2645.35 | 584.40 | 0.40 |
| NF CWC | SECTION_02A | 4071 | 2 yr | 3270.00 | 487.00 | 493.12 | | 493.15 | 0.000169 | 1.44 | 2319.99 | 523.40 | 0.11 |
| NF CWC | SECTION_02A | 4071 | 5 yr | 5569.00 | 487.00 | 494.24 | | 494.30 | 0.000241 | 1.96 | 2990.16 | 646.81 | 0.14 |
| NF CWC | SECTION_02A | 4071 | 10 yr | 6876.00 | 487.00 | 494.79 | | 494.86 | 0.000269 | 2.19 | 3354.16 | 686.98 | 0.15 |
| NF CWC | SECTION_02A | 4071 | 25 yr | 8248.00 | 487.00 | 495.31 | | 495.39 | 0.000292 | 2.40 | 3722.17 | 711.21 | 0.16 |
| NF CWC | SECTION_02A | 4071 | 50 yr | 9490.00 | 487.00 | 495.75 | | 495.85 | 0.000308 | 2.56 | 4039.58 | 722.32 | 0.16 |
| NF CWC | SECTION_02A | 4071 | 100 yr | 10728.00 | 487.00 | 496.17 | | 496.27 | 0.000321 | 2.70 | 4340.72 | 730.82 | 0.17 |
| NF CWC | SECTION_02A | 4071 | Ultimate 100 yr | 11298.00 | 487.00 | 496.35 | | 496.46 | 0.000326 | 2.77 | 4478.57 | 733.40 | 0.17 |
| NF CWC | SECTION_02A | 4071 | 500 yr | 13783.00 | 487.00 | 497.12 | | 497.25 | 0.000344 | 3.01 | 5042.22 | 743.82 | 0.18 |
| NF CWC | SECTION_02A | 3856 | 2 yr | 3270.00 | 488.00 | 492.74 | 490.84 | 493.07 | 0.000325 | 4.72 | 834.67 | 385.30 | 0.40 |
| NF CWC | SECTION_02A | 3856 | 5 yr | 5569.00 | 488.00 | 493.62 | 491.95 | 494.18 | 0.000453 | 6.31 | 1299.20 | 592.71 | 0.49 |
| NF CWC | SECTION_02A | 3856 | 10 yr | 6876.00 | 488.00 | 494.08 | 492.53 | 494.73 | 0.000483 | 6.90 | 1579.33 | 624.30 | 0.51 |
| NF CWC | SECTION_02A | 3856 | 25 yr | 8248.00 | 488.00 | 494.54 | 493.04 | 495.25 | 0.000497 | 7.37 | 1870.94 | 641.61 | 0.53 |
| NF CWC | SECTION_02A | 3856 | 50 yr | 9490.00 | 488.00 | 494.94 | 493.63 | 495.70 | 0.000500 | 7.71 | 2132.64 | 655.92 | 0.53 |
| NF CWC | SECTION_02A | 3856 | 100 yr | 10728.00 | 488.00 | 495.32 | 493.99 | 496.12 | 0.000499 | 8.00 | 2385.21 | 666.92 | 0.54 |
| NF CWC | SECTION_02A | 3856 | Ultimate 100 yr | 11298.00 | 488.00 | 495.50 | 494.14 | 496.31 | 0.000495 | 8.11 | 2505.46 | 672.67 | 0.54 |
| NF CWC | SECTION_02A | 3856 | 500 yr | 13783.00 | 488.00 | 496.23 | 494.71 | 497.09 | 0.000483 | 8.55 | 3003.02 | 699.55 | 0.54 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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) | |
| NF CWC | SECTION_02A | 3818 | 2 yr | 3270.00 | 489.20 | 492.13 | 492.13 | 493.00 | 0.002625 | 7.48 | 447.63 | 273.99 | 0.99 |
| NF CWC | SECTION_02A | 3818 | 5 yr | 5569.00 | 489.20 | 492.89 | 492.89 | 494.09 | 0.002298 | 8.86 | 669.49 | 311.30 | 0.98 |
| NF CWC | SECTION_02A | 3818 | 10 yr | 6876.00 | 489.20 | 493.27 | 493.27 | 494.62 | 0.002159 | 9.43 | 792.91 | 327.45 | 0.97 |
| NF CWC | SECTION_02A | 3818 | 25 yr | 8248.00 | 489.20 | 493.65 | 493.65 | 495.14 | 0.002058 | 9.97 | 917.11 | 341.14 | 0.97 |
| NF CWC | SECTION_02A | 3818 | 50 yr | 9490.00 | 489.20 | 493.95 | 493.95 | 495.58 | 0.002012 | 10.45 | 1021.75 | 352.98 | 0.97 |
| NF CWC | SECTION_02A | 3818 | 100 yr | 10728.00 | 489.20 | 494.25 | 494.25 | 496.00 | 0.001937 | 10.82 | 1130.98 | 362.35 | 0.96 |
| NF CWC | SECTION_02A | 3818 | Ultimate 100 yr | 11298.00 | 489.20 | 494.38 | 494.38 | 496.18 | 0.001915 | 11.00 | 1178.66 | 365.79 | 0.96 |
| NF CWC | SECTION_02A | 3818 | 500 yr | 13783.00 | 489.20 | 494.92 | 494.92 | 496.94 | 0.001847 | 11.73 | 1377.57 | 380.82 | 0.97 |
| NF CWC | SECTION_02A | 3796 | 2 yr | 3270.00 | 488.43 | 491.88 | 491.88 | 492.76 | 0.002815 | 7.79 | 483.68 | 288.38 | 1.02 |
| NF CWC | SECTION_02A | 3796 | 5 yr | 5569.00 | 488.43 | 492.65 | 492.65 | 493.86 | 0.002443 | 9.19 | 723.36 | 338.13 | 1.01 |
| NF CWC | SECTION_02A | 3796 | 10 yr | 6876.00 | 488.43 | 493.05 | 493.05 | 494.39 | 0.002275 | 9.75 | 860.83 | 355.14 | 1.00 |
| NF CWC | SECTION_02A | 3796 | 25 yr | 8248.00 | 488.43 | 493.41 | 493.41 | 494.91 | 0.002181 | 10.32 | 994.11 | 368.42 | 0.99 |
| NF CWC | SECTION_02A | 3796 | 50 yr | 9490.00 | 488.43 | 493.71 | 493.71 | 495.35 | 0.002144 | 10.83 | 1104.68 | 376.07 | 1.00 |
| NF CWC | SECTION_02A | 3796 | 100 yr | 10728.00 | 488.43 | 494.02 | 494.02 | 495.76 | 0.002056 | 11.20 | 1222.69 | 383.42 | 0.99 |
| NF CWC | SECTION_02A | 3796 | Ultimate 100 yr | 11298.00 | 488.43 | 494.15 | 494.15 | 495.94 | 0.002034 | 11.39 | 1272.91 | 387.06 | 0.99 |
| NF CWC | SECTION_02A | 3796 | 500 yr | 13783.00 | 488.43 | 494.68 | 494.68 | 496.70 | 0.001979 | 12.17 | 1479.50 | 401.66 | 1.00 |
| NF CWC | SECTION_02A | 3758 | 2 yr | 3270.00 | 481.00 | 487.79 | | 487.88 | 0.000057 | 2.49 | 1503.14 | 301.56 | 0.18 |
| NF CWC | SECTION_02A | 3758 | 5 yr | 5569.00 | 481.00 | 489.75 | | 489.89 | 0.000062 | 3.14 | 2134.47 | 342.37 | 0.20 |
| NF CWC | SECTION_02A | 3758 | 10 yr | 6876.00 | 481.00 | 490.52 | | 490.69 | 0.000069 | 3.51 | 2402.67 | 371.78 | 0.21 |
| NF CWC | SECTION_02A | 3758 | 25 yr | 8248.00 | 481.00 | 491.17 | | 491.38 | 0.000077 | 3.89 | 2664.75 | 433.66 | 0.22 |
| NF CWC | SECTION_02A | 3758 | 50 yr | 9490.00 | 481.00 | 491.71 | | 491.96 | 0.000084 | 4.20 | 2909.49 | 485.59 | 0.23 |
| NF CWC | SECTION_02A | 3758 | 100 yr | 10728.00 | 481.00 | 492.21 | | 492.49 | 0.000089 | 4.49 | 3165.86 | 535.01 | 0.24 |
| NF CWC | SECTION_02A | 3758 | Ultimate 100 yr | 11298.00 | 481.00 | 492.40 | | 492.70 | 0.000093 | 4.62 | 3268.33 | 545.93 | 0.25 |
| NF CWC | SECTION_02A | 3758 | 500 yr | 13783.00 | 481.00 | 493.33 | | 493.69 | 0.000100 | 5.09 | 3822.22 | 648.14 | 0.26 |
| NF CWC | SECTION_03 | 3546 | 2 yr | 3187.00 | 481.67 | 487.82 | | 487.85 | 0.000110 | 1.25 | 2641.32 | 534.36 | 0.09 |
| NF CWC | SECTION_03 | 3546 | 5 yr | 5682.00 | 481.67 | 489.81 | | 489.85 | 0.000120 | 1.59 | 3758.23 | 602.91 | 0.10 |
| NF CWC | SECTION_03 | 3546 | 10 yr | 7106.00 | 481.67 | 490.59 | | 490.63 | 0.000132 | 1.78 | 4246.87 | 650.49 | 0.11 |
| NF CWC | SECTION_03 | 3546 | 25 yr | 8575.00 | 481.67 | 491.26 | | 491.31 | 0.000144 | 1.96 | 4696.68 | 689.35 | 0.11 |
| NF CWC | SECTION_03 | 3546 | 50 yr | 9932.00 | 481.67 | 491.81 | | 491.88 | 0.000155 | 2.11 | 5087.47 | 720.09 | 0.12 |
| NF CWC | SECTION_03 | 3546 | 100 yr | 11270.00 | 481.67 | 492.33 | | 492.40 | 0.000163 | 2.24 | 5469.14 | 757.14 | 0.12 |
| NF CWC | SECTION_03 | 3546 | Ultimate 100 yr | 11826.00 | 481.67 | 492.53 | | 492.60 | 0.000167 | 2.29 | 5620.32 | 767.93 | 0.13 |
| NF CWC | SECTION_03 | 3546 | 500 yr | 14621.00 | 481.67 | 493.49 | | 493.58 | 0.000180 | 2.53 | 6383.37 | 815.04 | 0.13 |
| NF CWC | SECTION_03 | 3247 | 2 yr | 3187.00 | 481.00 | 487.80 | | 487.82 | 0.000059 | 0.99 | 3297.34 | 565.61 | 0.07 |
| NF CWC | SECTION_03 | 3247 | 5 yr | 5682.00 | 481.00 | 489.79 | | 489.81 | 0.000073 | 1.32 | 4458.39 | 605.55 | 0.08 |
| NF CWC | SECTION_03 | 3247 | 10 yr | 7106.00 | 481.00 | 490.56 | | 490.60 | 0.000084 | 1.50 | 4935.80 | 622.63 | 0.09 |
| NF CWC | SECTION_03 | 3247 | 25 yr | 8575.00 | 481.00 | 491.23 | | 491.27 | 0.000095 | 1.67 | 5356.11 | 636.16 | 0.09 |
| NF CWC | SECTION_03 | 3247 | 50 yr | 9932.00 | 481.00 | 491.78 | | 491.83 | 0.000105 | 1.82 | 5710.59 | 647.64 | 0.10 |
| NF CWC | SECTION_03 | 3247 | 100 yr | 11270.00 | 481.00 | 492.30 | | 492.35 | 0.000114 | 1.96 | 6046.42 | 658.45 | 0.10 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|--------|------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NF CWC | SECTION_03 | 3247 | Ultimate 100 yr | 11826.00 | 481.00 | 492.50 | | 492.55 | 0.000117 | 2.01 | 6176.61 | 662.30 | 0.11 |
| NF CWC | SECTION_03 | 3247 | 500 yr | 14621.00 | 481.00 | 493.45 | | 493.53 | 0.000133 | 2.26 | 6819.03 | 678.05 | 0.11 |
| NF CWC | SECTION_03 | 2833 | 2 yr | 3187.00 | 481.00 | 487.71 | | 487.77 | 0.000277 | 2.10 | 1740.64 | 442.64 | 0.15 |
| NF CWC | SECTION_03 | 2833 | 5 yr | 5682.00 | 481.00 | 489.68 | | 489.76 | 0.000271 | 2.49 | 2668.00 | 493.37 | 0.15 |
| NF CWC | SECTION_03 | 2833 | 10 yr | 7106.00 | 481.00 | 490.44 | | 490.54 | 0.000289 | 2.73 | 3048.79 | 504.12 | 0.16 |
| NF CWC | SECTION_03 | 2833 | 25 yr | 8575.00 | 481.00 | 491.09 | | 491.21 | 0.000311 | 2.96 | 3380.19 | 512.42 | 0.17 |
| NF CWC | SECTION_03 | 2833 | 50 yr | 9932.00 | 481.00 | 491.63 | | 491.76 | 0.000330 | 3.17 | 3657.90 | 519.48 | 0.17 |
| NF CWC | SECTION_03 | 2833 | 100 yr | 11270.00 | 481.00 | 492.13 | | 492.27 | 0.000346 | 3.35 | 3919.98 | 526.04 | 0.18 |
| NF CWC | SECTION_03 | 2833 | Ultimate 100 yr | 11826.00 | 481.00 | 492.33 | | 492.47 | 0.000353 | 3.42 | 4021.04 | 528.55 | 0.18 |
| NF CWC | SECTION_03 | 2833 | 500 yr | 14621.00 | 481.00 | 493.26 | | 493.43 | 0.000380 | 3.75 | 4520.15 | 540.82 | 0.19 |
| NF CWC | SECTION_03 | 2724 | 2 yr | 3187.00 | 481.00 | 487.58 | | 487.74 | 0.000121 | 3.59 | 1441.81 | 430.34 | 0.26 |
| NF CWC | SECTION_03 | 2724 | 5 yr | 5682.00 | 481.00 | 489.50 | | 489.72 | 0.000123 | 4.35 | 2363.07 | 517.55 | 0.27 |
| NF CWC | SECTION_03 | 2724 | 10 yr | 7106.00 | 481.00 | 490.24 | | 490.50 | 0.000133 | 4.80 | 2752.51 | 540.26 | 0.29 |
| NF CWC | SECTION_03 | 2724 | 25 yr | 8575.00 | 481.00 | 490.86 | | 491.16 | 0.000145 | 5.25 | 3090.36 | 549.51 | 0.30 |
| NF CWC | SECTION_03 | 2724 | 50 yr | 9932.00 | 481.00 | 491.37 | | 491.71 | 0.000156 | 5.65 | 3372.47 | 558.67 | 0.32 |
| NF CWC | SECTION_03 | 2724 | 100 yr | 11270.00 | 481.00 | 491.84 | | 492.22 | 0.000165 | 5.99 | 3639.40 | 566.21 | 0.33 |
| NF CWC | SECTION_03 | 2724 | Ultimate 100 yr | 11826.00 | 481.00 | 492.02 | | 492.42 | 0.000169 | 6.14 | 3741.59 | 569.05 | 0.33 |
| NF CWC | SECTION_03 | 2724 | 500 yr | 14621.00 | 481.00 | 492.90 | | 493.38 | 0.000185 | 6.78 | 4248.83 | 581.66 | 0.36 |
| NF CWC | SECTION_03 | 2714 | 2 yr | 3187.00 | 481.94 | 487.49 | | 487.73 | 0.000254 | 4.59 | 1209.64 | 375.79 | 0.36 |
| NF CWC | SECTION_03 | 2714 | 5 yr | 5682.00 | 481.94 | 489.43 | | 489.72 | 0.000216 | 5.27 | 2067.83 | 497.36 | 0.35 |
| NF CWC | SECTION_03 | 2714 | 10 yr | 7106.00 | 481.94 | 490.16 | | 490.49 | 0.000224 | 5.74 | 2441.81 | 524.81 | 0.37 |
| NF CWC | SECTION_03 | 2714 | 25 yr | 8575.00 | 481.94 | 490.77 | | 491.15 | 0.000238 | 6.22 | 2769.53 | 541.62 | 0.38 |
| NF CWC | SECTION_03 | 2714 | 50 yr | 9932.00 | 481.94 | 491.27 | | 491.70 | 0.000250 | 6.64 | 3045.87 | 553.36 | 0.40 |
| NF CWC | SECTION_03 | 2714 | 100 yr | 11270.00 | 481.94 | 491.75 | | 492.21 | 0.000259 | 7.00 | 3309.82 | 566.14 | 0.41 |
| NF CWC | SECTION_03 | 2714 | Ultimate 100 yr | 11826.00 | 481.94 | 491.92 | | 492.41 | 0.000264 | 7.16 | 3411.34 | 570.99 | 0.41 |
| NF CWC | SECTION_03 | 2714 | 500 yr | 14621.00 | 481.94 | 492.80 | | 493.36 | 0.000280 | 7.82 | 3919.77 | 586.50 | 0.43 |
| NF CWC | SECTION_03 | 2701 | 2 yr | 3187.00 | 483.57 | 487.44 | 485.96 | 487.72 | 0.000472 | 5.02 | 1023.54 | 359.46 | 0.47 |
| NF CWC | SECTION_03 | 2701 | 5 yr | 5682.00 | 483.57 | 489.39 | 486.89 | 489.71 | 0.000311 | 5.45 | 1800.57 | 447.19 | 0.41 |
| NF CWC | SECTION_03 | 2701 | 10 yr | 7106.00 | 483.57 | 490.12 | 487.35 | 490.48 | 0.000307 | 5.89 | 2140.30 | 497.34 | 0.42 |
| NF CWC | SECTION_03 | 2701 | 25 yr | 8575.00 | 483.57 | 490.73 | 487.79 | 491.15 | 0.000315 | 6.34 | 2451.00 | 520.72 | 0.43 |
| NF CWC | SECTION_03 | 2701 | 50 yr | 9932.00 | 483.57 | 491.23 | 488.15 | 491.69 | 0.000324 | 6.74 | 2716.26 | 535.50 | 0.44 |
| NF CWC | SECTION_03 | 2701 | 100 yr | 11270.00 | 483.57 | 491.70 | 488.49 | 492.21 | 0.000330 | 7.08 | 2970.48 | 547.79 | 0.45 |
| NF CWC | SECTION_03 | 2701 | Ultimate 100 yr | 11826.00 | 483.57 | 491.88 | 488.62 | 492.40 | 0.000333 | 7.23 | 3068.09 | 551.68 | 0.45 |
| NF CWC | SECTION_03 | 2701 | 500 yr | 14621.00 | 483.57 | 492.75 | 489.30 | 493.36 | 0.000342 | 7.85 | 3559.41 | 579.33 | 0.46 |
| NF CWC | SECTION_03 | 2689 | 2 yr | 3187.00 | 482.46 | 487.35 | 486.14 | 487.71 | 0.000609 | 6.03 | 1002.65 | 360.09 | 0.54 |
| NF CWC | SECTION_03 | 2689 | 5 yr | 5682.00 | 482.46 | 489.33 | 487.12 | 489.70 | 0.000392 | 6.37 | 1806.84 | 454.15 | 0.46 |
| NF CWC | SECTION_03 | 2689 | 10 yr | 7106.00 | 482.46 | 490.06 | 487.60 | 490.47 | 0.000386 | 6.84 | 2159.92 | 498.30 | 0.47 |
| NF CWC | SECTION_03 | 2689 | 25 yr | 8575.00 | 482.46 | 490.67 | 488.05 | 491.14 | 0.000396 | 7.34 | 2467.74 | 512.39 | 0.48 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|--------|------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NF CWC | SECTION_03 | 2689 | 50 yr | 9932.00 | 482.46 | 491.17 | 488.42 | 491.68 | 0.000406 | 7.78 | 2728.16 | 534.08 | 0.49 |
| NF CWC | SECTION_03 | 2689 | 100 yr | 11270.00 | 482.46 | 491.64 | 488.77 | 492.20 | 0.000413 | 8.16 | 2984.78 | 559.81 | 0.50 |
| NF CWC | SECTION_03 | 2689 | Ultimate 100 yr | 11826.00 | 482.46 | 491.82 | 488.92 | 492.39 | 0.000417 | 8.32 | 3084.69 | 565.61 | 0.51 |
| NF CWC | SECTION_03 | 2689 | 500 yr | 14621.00 | 482.46 | 492.70 | 489.67 | 493.35 | 0.000426 | 8.99 | 3591.29 | 588.99 | 0.52 |
| NF CWC | SECTION_03 | 2634 | 2 yr | 3132.00 | 481.00 | 487.45 | | 487.60 | 0.001210 | 4.08 | 1091.62 | 427.63 | 0.30 |
| NF CWC | SECTION_03 | 2634 | 5 yr | 5687.00 | 481.00 | 489.47 | | 489.60 | 0.000694 | 3.78 | 2056.64 | 527.93 | 0.24 |
| NF CWC | SECTION_03 | 2634 | 10 yr | 7201.00 | 481.00 | 490.22 | | 490.36 | 0.000667 | 3.94 | 2464.01 | 555.39 | 0.24 |
| NF CWC | SECTION_03 | 2634 | 25 yr | 8703.00 | 481.00 | 490.86 | | 491.02 | 0.000658 | 4.11 | 2824.82 | 578.06 | 0.24 |
| NF CWC | SECTION_03 | 2634 | 50 yr | 10068.00 | 481.00 | 491.38 | | 491.55 | 0.000654 | 4.26 | 3133.40 | 599.98 | 0.24 |
| NF CWC | SECTION_03 | 2634 | 100 yr | 11447.00 | 481.00 | 491.87 | | 492.05 | 0.000652 | 4.39 | 3433.02 | 623.07 | 0.24 |
| NF CWC | SECTION_03 | 2634 | Ultimate 100 yr | 11994.00 | 481.00 | 492.06 | | 492.25 | 0.000650 | 4.44 | 3550.31 | 630.68 | 0.24 |
| NF CWC | SECTION_03 | 2634 | 500 yr | 14892.00 | 481.00 | 492.97 | | 493.18 | 0.000645 | 4.68 | 4138.15 | 654.10 | 0.25 |
| NF CWC | SECTION_03 | 2587 | 2 yr | 3132.00 | 479.80 | 487.40 | 485.67 | 487.55 | 0.001019 | 3.92 | 1121.61 | 388.49 | 0.28 |
| NF CWC | SECTION_03 | 2587 | 5 yr | 5687.00 | 479.80 | 489.42 | 486.54 | 489.57 | 0.000687 | 3.89 | 1944.02 | 425.15 | 0.24 |
| NF CWC | SECTION_03 | 2587 | 10 yr | 7201.00 | 479.80 | 490.16 | 486.93 | 490.33 | 0.000699 | 4.16 | 2262.96 | 436.21 | 0.25 |
| NF CWC | SECTION_03 | 2587 | 25 yr | 8703.00 | 479.80 | 490.78 | 487.28 | 490.98 | 0.000722 | 4.42 | 2537.98 | 444.61 | 0.25 |
| NF CWC | SECTION_03 | 2587 | 50 yr | 10068.00 | 479.80 | 491.30 | 487.56 | 491.52 | 0.000743 | 4.65 | 2768.43 | 453.77 | 0.26 |
| NF CWC | SECTION_03 | 2587 | 100 yr | 11447.00 | 479.80 | 491.78 | 487.82 | 492.02 | 0.000763 | 4.86 | 2987.76 | 463.81 | 0.26 |
| NF CWC | SECTION_03 | 2587 | Ultimate 100 yr | 11994.00 | 479.80 | 491.96 | 487.92 | 492.21 | 0.000770 | 4.93 | 3072.73 | 467.86 | 0.27 |
| NF CWC | SECTION_03 | 2587 | 500 yr | 14892.00 | 479.80 | 492.85 | 488.41 | 493.14 | 0.000804 | 5.32 | 3507.27 | 517.98 | 0.28 |
| NF CWC | SECTION_03 | 2543 | | Bridge | | | | | | | | | |
| NF CWC | SECTION_03 | 2464 | 2 yr | 3132.00 | 479.09 | 487.36 | | 487.42 | 0.000246 | 2.25 | 1779.25 | 386.63 | 0.14 |
| NF CWC | SECTION_03 | 2464 | 5 yr | 5687.00 | 479.09 | 489.39 | | 489.47 | 0.000260 | 2.70 | 2584.67 | 413.01 | 0.15 |
| NF CWC | SECTION_03 | 2464 | 10 yr | 7201.00 | 479.09 | 490.12 | | 490.22 | 0.000295 | 3.02 | 2895.19 | 429.99 | 0.16 |
| NF CWC | SECTION_03 | 2464 | 25 yr | 8703.00 | 479.09 | 490.74 | | 490.87 | 0.000329 | 3.31 | 3170.49 | 463.78 | 0.18 |
| NF CWC | SECTION_03 | 2464 | 50 yr | 10068.00 | 479.09 | 491.26 | | 491.40 | 0.000356 | 3.55 | 3408.94 | 469.28 | 0.18 |
| NF CWC | SECTION_03 | 2464 | 100 yr | 11447.00 | 479.09 | 491.73 | | 491.89 | 0.000380 | 3.77 | 3633.11 | 473.29 | 0.19 |
| NF CWC | SECTION_03 | 2464 | Ultimate 100 yr | 11994.00 | 479.09 | 491.91 | | 492.08 | 0.000389 | 3.85 | 3719.17 | 474.80 | 0.19 |
| NF CWC | SECTION_03 | 2464 | 500 yr | 14892.00 | 479.09 | 492.80 | | 493.01 | 0.000433 | 4.26 | 4143.16 | 482.23 | 0.21 |
| NF CWC | SECTION_03 | 2330 | 2 yr | 3132.00 | 480.00 | 486.65 | | 487.21 | 0.003173 | 6.27 | 558.23 | 202.06 | 0.48 |
| NF CWC | SECTION_03 | 2330 | 5 yr | 5687.00 | 480.00 | 488.81 | | 489.29 | 0.001995 | 6.26 | 1161.22 | 311.59 | 0.41 |
| NF CWC | SECTION_03 | 2330 | 10 yr | 7201.00 | 480.00 | 489.50 | | 490.03 | 0.002026 | 6.70 | 1381.64 | 326.04 | 0.41 |
| NF CWC | SECTION_03 | 2330 | 25 yr | 8703.00 | 480.00 | 490.07 | | 490.65 | 0.002094 | 7.12 | 1569.69 | 336.89 | 0.43 |
| NF CWC | SECTION_03 | 2330 | 50 yr | 10068.00 | 480.00 | 490.54 | | 491.17 | 0.002149 | 7.47 | 1727.69 | 343.50 | 0.44 |
| NF CWC | SECTION_03 | 2330 | 100 yr | 11447.00 | 480.00 | 490.97 | | 491.65 | 0.002201 | 7.80 | 1876.82 | 349.63 | 0.44 |
| NF CWC | SECTION_03 | 2330 | Ultimate 100 yr | 11994.00 | 480.00 | 491.13 | | 491.83 | 0.002216 | 7.91 | 1934.76 | 352.27 | 0.45 |
| NF CWC | SECTION_03 | 2330 | 500 yr | 14892.00 | 480.00 | 491.93 | | 492.73 | 0.002297 | 8.49 | 2221.47 | 363.53 | 0.46 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|--------|------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NF CWC | SECTION_03 | 2239 | 2 yr | 3132.00 | 477.30 | 486.81 | 482.72 | 486.90 | 0.000340 | 2.89 | 1415.75 | 280.94 | 0.17 |
| NF CWC | SECTION_03 | 2239 | 5 yr | 5687.00 | 477.30 | 488.94 | 484.25 | 489.08 | 0.000382 | 3.53 | 2026.17 | 293.16 | 0.19 |
| NF CWC | SECTION_03 | 2239 | 10 yr | 7201.00 | 477.30 | 489.63 | 484.77 | 489.81 | 0.000456 | 4.02 | 2230.82 | 297.10 | 0.21 |
| NF CWC | SECTION_03 | 2239 | 25 yr | 8703.00 | 477.30 | 490.20 | 485.21 | 490.42 | 0.000531 | 4.48 | 2401.22 | 300.37 | 0.23 |
| NF CWC | SECTION_03 | 2239 | 50 yr | 10068.00 | 477.30 | 490.67 | 485.57 | 490.93 | 0.000597 | 4.87 | 2541.58 | 303.02 | 0.24 |
| NF CWC | SECTION_03 | 2239 | 100 yr | 11447.00 | 477.30 | 491.10 | 485.90 | 491.40 | 0.000660 | 5.24 | 2672.49 | 305.48 | 0.25 |
| NF CWC | SECTION_03 | 2239 | Ultimate 100 yr | 11994.00 | 477.30 | 491.26 | 486.02 | 491.59 | 0.000684 | 5.37 | 2722.85 | 306.41 | 0.26 |
| NF CWC | SECTION_03 | 2239 | 500 yr | 14892.00 | 477.30 | 492.06 | 486.65 | 492.47 | 0.000807 | 6.06 | 2968.57 | 311.07 | 0.28 |
| | | | | | | | | | | | | | |
| NF CWC | SECTION_03 | 2204 | | Bridge | | | | | | | | | |
| | | | | | | | | | | | | | |
| NF CWC | SECTION_03 | 2170 | 2 yr | 3132.00 | 474.45 | 486.78 | | 486.86 | 0.000246 | 2.85 | 1531.71 | 280.74 | 0.14 |
| NF CWC | SECTION_03 | 2170 | 5 yr | 5687.00 | 474.45 | 488.89 | | 489.02 | 0.000312 | 3.56 | 2137.08 | 292.88 | 0.17 |
| NF CWC | SECTION_03 | 2170 | 10 yr | 7201.00 | 474.45 | 489.57 | | 489.74 | 0.000384 | 4.08 | 2337.34 | 296.73 | 0.19 |
| NF CWC | SECTION_03 | 2170 | 25 yr | 8703.00 | 474.45 | 490.13 | | 490.34 | 0.000457 | 4.56 | 2503.10 | 299.92 | 0.20 |
| NF CWC | SECTION_03 | 2170 | 50 yr | 10068.00 | 474.45 | 490.58 | | 490.83 | 0.000522 | 4.96 | 2639.18 | 302.50 | 0.22 |
| NF CWC | SECTION_03 | 2170 | 100 yr | 11447.00 | 474.45 | 490.99 | | 491.29 | 0.000586 | 5.35 | 2765.74 | 304.87 | 0.23 |
| NF CWC | SECTION_03 | 2170 | Ultimate 100 yr | 11994.00 | 474.45 | 491.15 | | 491.46 | 0.000611 | 5.50 | 2814.34 | 305.78 | 0.24 |
| NF CWC | SECTION_03 | 2170 | 500 yr | 14892.00 | 474.45 | 491.92 | | 492.32 | 0.000738 | 6.23 | 3050.61 | 310.24 | 0.26 |
| | | | | | | | | | | | | | |
| NF CWC | SECTION_03 | 2005 | 2 yr | 3132.00 | 478.77 | 485.62 | 484.20 | 486.54 | 0.004594 | 7.89 | 432.85 | 155.86 | 0.58 |
| NF CWC | SECTION_03 | 2005 | 5 yr | 5687.00 | 478.77 | 486.79 | 486.44 | 488.46 | 0.006931 | 10.97 | 598.63 | 206.12 | 0.74 |
| NF CWC | SECTION_03 | 2005 | 10 yr | 7201.00 | 478.77 | 487.74 | 487.74 | 489.23 | 0.005650 | 10.81 | 886.30 | 403.40 | 0.68 |
| NF CWC | SECTION_03 | 2005 | 25 yr | 8703.00 | 478.77 | 488.25 | 488.25 | 489.80 | 0.005712 | 11.33 | 1053.52 | 424.87 | 0.69 |
| NF CWC | SECTION_03 | 2005 | 50 yr | 10068.00 | 478.77 | 488.63 | 488.63 | 490.26 | 0.005874 | 11.83 | 1180.03 | 442.59 | 0.71 |
| NF CWC | SECTION_03 | 2005 | 100 yr | 11447.00 | 478.77 | 488.97 | 488.97 | 490.69 | 0.006026 | 12.30 | 1297.27 | 461.74 | 0.72 |
| NF CWC | SECTION_03 | 2005 | Ultimate 100 yr | 11994.00 | 478.77 | 489.09 | 489.09 | 490.85 | 0.006114 | 12.50 | 1338.66 | 466.24 | 0.73 |
| NF CWC | SECTION_03 | 2005 | 500 yr | 14892.00 | 478.77 | 489.71 | 489.71 | 491.64 | 0.006419 | 13.37 | 1552.87 | 487.44 | 0.75 |
| | | | | | | | | | | | | | |
| NF CWC | SECTION_03 | 1775 | 2 yr | 3132.00 | 477.00 | 485.05 | 482.72 | 485.60 | 0.002613 | 6.37 | 616.50 | 270.33 | 0.44 |
| NF CWC | SECTION_03 | 1775 | 5 yr | 5687.00 | 477.00 | 486.37 | 485.47 | 487.03 | 0.002859 | 7.55 | 1082.94 | 433.66 | 0.48 |
| NF CWC | SECTION_03 | 1775 | 10 yr | 7201.00 | 477.00 | 487.00 | 486.17 | 487.65 | 0.002756 | 7.81 | 1352.42 | 456.99 | 0.48 |
| NF CWC | SECTION_03 | 1775 | 25 yr | 8703.00 | 477.00 | 487.52 | 486.59 | 488.18 | 0.002709 | 8.06 | 1584.31 | 545.70 | 0.48 |
| NF CWC | SECTION_03 | 1775 | 50 yr | 10068.00 | 477.00 | 487.94 | 486.90 | 488.62 | 0.002694 | 8.29 | 1775.57 | 594.32 | 0.48 |
| NF CWC | SECTION_03 | 1775 | 100 yr | 11447.00 | 477.00 | 488.34 | 487.19 | 488.98 | 0.002530 | 8.27 | 2104.12 | 614.74 | 0.47 |
| NF CWC | SECTION_03 | 1775 | Ultimate 100 yr | 11994.00 | 477.00 | 488.48 | 487.29 | 489.13 | 0.002509 | 8.31 | 2193.12 | 619.78 | 0.47 |
| NF CWC | SECTION_03 | 1775 | 500 yr | 14892.00 | 477.00 | 489.20 | 487.81 | 489.86 | 0.002391 | 8.51 | 2647.85 | 642.28 | 0.46 |
| | | | | | | | | | | | | | |
| NF CWC | SECTION_03 | 1291 | 2 yr | 3115.00 | 477.00 | 483.80 | 483.08 | 484.24 | 0.003110 | 6.66 | 840.58 | 382.22 | 0.48 |
| NF CWC | SECTION_03 | 1291 | 5 yr | 5685.00 | 477.00 | 485.12 | 484.10 | 485.60 | 0.003070 | 7.56 | 1414.54 | 469.97 | 0.49 |
| NF CWC | SECTION_03 | 1291 | 10 yr | 7267.00 | 477.00 | 485.76 | 484.55 | 486.26 | 0.003060 | 7.98 | 1718.19 | 498.38 | 0.50 |
| NF CWC | SECTION_03 | 1291 | 25 yr | 8805.00 | 477.00 | 486.29 | 484.92 | 486.81 | 0.003082 | 8.35 | 2000.05 | 541.84 | 0.50 |
| NF CWC | SECTION_03 | 1291 | 50 yr | 10167.00 | 477.00 | 486.71 | 485.25 | 487.25 | 0.003105 | 8.66 | 2227.24 | 543.19 | 0.51 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|--------|------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NF CWC | SECTION_03 | 1291 | 100 yr | 11579.00 | 477.00 | 487.10 | 485.53 | 487.67 | 0.003138 | 8.96 | 2442.94 | 547.99 | 0.52 |
| NF CWC | SECTION_03 | 1291 | Ultimate 100 yr | 12121.00 | 477.00 | 487.24 | 485.64 | 487.82 | 0.003161 | 9.08 | 2519.43 | 553.17 | 0.52 |
| NF CWC | SECTION_03 | 1291 | 500 yr | 15104.00 | 477.00 | 487.93 | 486.20 | 488.58 | 0.003302 | 9.73 | 2910.51 | 572.09 | 0.54 |
| NF CWC | SECTION_03 | 1010 | 2 yr | 3115.00 | 476.54 | 482.64 | | 483.12 | 0.005181 | 7.10 | 674.50 | 269.89 | 0.60 |
| NF CWC | SECTION_03 | 1010 | 5 yr | 5685.00 | 476.54 | 483.71 | | 484.41 | 0.006022 | 8.84 | 992.52 | 333.36 | 0.67 |
| NF CWC | SECTION_03 | 1010 | 10 yr | 7267.00 | 476.54 | 484.29 | | 485.07 | 0.005987 | 9.44 | 1201.77 | 381.74 | 0.68 |
| NF CWC | SECTION_03 | 1010 | 25 yr | 8805.00 | 476.54 | 484.66 | | 485.56 | 0.006609 | 10.31 | 1346.78 | 415.95 | 0.72 |
| NF CWC | SECTION_03 | 1010 | 50 yr | 10167.00 | 476.54 | 485.02 | | 485.99 | 0.006706 | 10.77 | 1503.89 | 454.58 | 0.73 |
| NF CWC | SECTION_03 | 1010 | 100 yr | 11579.00 | 476.54 | 485.44 | | 486.42 | 0.006429 | 10.97 | 1706.48 | 519.89 | 0.72 |
| NF CWC | SECTION_03 | 1010 | Ultimate 100 yr | 12121.00 | 476.54 | 485.54 | | 486.55 | 0.006562 | 11.19 | 1759.69 | 536.25 | 0.73 |
| NF CWC | SECTION_03 | 1010 | 500 yr | 15104.00 | 476.54 | 486.15 | | 487.27 | 0.006678 | 11.92 | 2120.57 | 648.17 | 0.75 |
| NF CWC | SECTION_03 | 859 | 2 yr | 3115.00 | 473.60 | 482.34 | 478.16 | 482.51 | 0.000873 | 3.79 | 1200.48 | 459.02 | 0.25 |
| NF CWC | SECTION_03 | 859 | 5 yr | 5685.00 | 473.60 | 483.37 | 481.53 | 483.63 | 0.001267 | 5.01 | 1689.85 | 495.20 | 0.31 |
| NF CWC | SECTION_03 | 859 | 10 yr | 7267.00 | 473.60 | 483.97 | 482.02 | 484.27 | 0.001354 | 5.43 | 1991.87 | 508.19 | 0.33 |
| NF CWC | SECTION_03 | 859 | 25 yr | 8805.00 | 473.60 | 484.30 | 482.40 | 484.67 | 0.001605 | 6.07 | 2159.89 | 528.01 | 0.36 |
| NF CWC | SECTION_03 | 859 | 50 yr | 10167.00 | 473.60 | 484.66 | 482.68 | 485.06 | 0.001713 | 6.43 | 2349.68 | 539.20 | 0.37 |
| NF CWC | SECTION_03 | 859 | 100 yr | 11579.00 | 473.60 | 485.09 | 482.96 | 485.51 | 0.001718 | 6.64 | 2590.28 | 575.40 | 0.38 |
| NF CWC | SECTION_03 | 859 | Ultimate 100 yr | 12121.00 | 473.60 | 485.18 | 483.06 | 485.63 | 0.001788 | 6.82 | 2641.99 | 579.25 | 0.38 |
| NF CWC | SECTION_03 | 859 | 500 yr | 15104.00 | 473.60 | 485.77 | 483.58 | 486.30 | 0.001982 | 7.47 | 3046.50 | 722.07 | 0.41 |
| NF CWC | SECTION_03 | 776 | | Culvert | | | | | | | | | |
| NF CWC | SECTION_03 | 701 | 2 yr | 3115.00 | 473.50 | 481.20 | 478.01 | 481.74 | 0.002359 | 6.00 | 619.04 | 621.71 | 0.42 |
| NF CWC | SECTION_03 | 701 | 5 yr | 5685.00 | 473.50 | 482.42 | 481.87 | 482.88 | 0.002140 | 6.42 | 1474.75 | 933.64 | 0.41 |
| NF CWC | SECTION_03 | 701 | 10 yr | 7267.00 | 473.50 | 483.08 | 482.41 | 483.43 | 0.001719 | 6.08 | 2069.55 | 977.51 | 0.37 |
| NF CWC | SECTION_03 | 701 | 25 yr | 8805.00 | 473.50 | 483.66 | 482.63 | 483.95 | 0.001399 | 5.74 | 2650.26 | 1002.61 | 0.34 |
| NF CWC | SECTION_03 | 701 | 50 yr | 10167.00 | 473.50 | 484.13 | 482.85 | 484.38 | 0.001213 | 5.54 | 3126.96 | 1029.46 | 0.32 |
| NF CWC | SECTION_03 | 701 | 100 yr | 11579.00 | 473.50 | 484.58 | 483.06 | 484.81 | 0.001082 | 5.39 | 3589.67 | 1047.32 | 0.30 |
| NF CWC | SECTION_03 | 701 | Ultimate 100 yr | 12121.00 | 473.50 | 484.75 | 483.13 | 484.97 | 0.001036 | 5.34 | 3768.41 | 1053.47 | 0.30 |
| NF CWC | SECTION_03 | 701 | 500 yr | 15104.00 | 473.50 | 485.62 | 483.47 | 485.83 | 0.000854 | 5.13 | 4703.69 | 1084.61 | 0.27 |
| NF CWC | SECTION_03 | 352 | 2 yr | 3115.00 | 476.00 | 480.86 | 479.33 | 480.96 | 0.000915 | 3.13 | 1374.72 | 608.55 | 0.26 |
| NF CWC | SECTION_03 | 352 | 5 yr | 5685.00 | 476.00 | 482.08 | 480.02 | 482.20 | 0.000881 | 3.59 | 2163.69 | 675.94 | 0.26 |
| NF CWC | SECTION_03 | 352 | 10 yr | 7267.00 | 476.00 | 482.76 | 480.34 | 482.90 | 0.000829 | 3.74 | 2630.84 | 698.97 | 0.26 |
| NF CWC | SECTION_03 | 352 | 25 yr | 8805.00 | 476.00 | 483.37 | 480.61 | 483.52 | 0.000788 | 3.87 | 3063.01 | 720.00 | 0.25 |
| NF CWC | SECTION_03 | 352 | 50 yr | 10167.00 | 476.00 | 483.85 | 480.82 | 484.01 | 0.000769 | 4.00 | 3414.23 | 732.64 | 0.25 |
| NF CWC | SECTION_03 | 352 | 100 yr | 11579.00 | 476.00 | 484.31 | 481.03 | 484.47 | 0.000760 | 4.13 | 3753.80 | 754.42 | 0.26 |
| NF CWC | SECTION_03 | 352 | Ultimate 100 yr | 12121.00 | 476.00 | 484.48 | 481.11 | 484.65 | 0.000755 | 4.17 | 3884.87 | 755.77 | 0.26 |
| NF CWC | SECTION_03 | 352 | 500 yr | 15104.00 | 476.00 | 485.37 | 481.50 | 485.56 | 0.000733 | 4.40 | 4559.61 | 762.19 | 0.26 |
| CC-1 | CC-1 | 1166 | 2 yr | 252.00 | 539.00 | 540.99 | 540.99 | 541.68 | 0.002996 | 6.70 | 37.62 | 26.89 | 1.00 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| CC-1 | CC-1 | 1166 | 5 yr | 390.00 | 539.00 | 541.51 | 541.51 | 542.36 | 0.002808 | 7.38 | 52.87 | 31.09 | 1.00 |
| CC-1 | CC-1 | 1166 | 10 yr | 482.00 | 539.00 | 541.81 | 541.81 | 542.73 | 0.002723 | 7.72 | 62.41 | 33.46 | 1.00 |
| CC-1 | CC-1 | 1166 | 25 yr | 585.00 | 539.00 | 542.09 | 542.09 | 543.11 | 0.002674 | 8.10 | 72.18 | 35.45 | 1.00 |
| CC-1 | CC-1 | 1166 | 50 yr | 668.00 | 539.00 | 542.30 | 542.30 | 543.39 | 0.002621 | 8.39 | 79.62 | 36.48 | 1.00 |
| CC-1 | CC-1 | 1166 | 100 yr | 750.00 | 539.00 | 542.49 | 542.49 | 543.65 | 0.002566 | 8.63 | 86.87 | 37.47 | 1.00 |
| CC-1 | CC-1 | 1166 | Ultimate 100 yr | 803.00 | 539.00 | 542.62 | 542.62 | 543.81 | 0.002519 | 8.76 | 91.67 | 38.10 | 1.00 |
| CC-1 | CC-1 | 1166 | 500 yr | 940.00 | 539.00 | 542.91 | 542.91 | 544.21 | 0.002479 | 9.14 | 102.88 | 39.55 | 1.00 |
| CC-1 | CC-1 | 918 | 2 yr | 252.00 | 536.00 | 538.55 | 538.55 | 539.34 | 0.002934 | 7.13 | 35.32 | 22.29 | 1.00 |
| CC-1 | CC-1 | 918 | 5 yr | 390.00 | 536.00 | 539.15 | 539.15 | 540.10 | 0.002756 | 7.83 | 49.83 | 26.05 | 1.00 |
| CC-1 | CC-1 | 918 | 10 yr | 482.00 | 536.00 | 539.48 | 539.48 | 540.52 | 0.002710 | 8.19 | 58.85 | 28.37 | 1.00 |
| CC-1 | CC-1 | 918 | 25 yr | 585.00 | 536.00 | 539.82 | 539.82 | 540.94 | 0.002635 | 8.50 | 68.84 | 30.74 | 1.00 |
| CC-1 | CC-1 | 918 | 50 yr | 668.00 | 536.00 | 540.07 | 540.07 | 541.25 | 0.002582 | 8.71 | 76.67 | 32.47 | 1.00 |
| CC-1 | CC-1 | 918 | 100 yr | 750.00 | 536.00 | 540.29 | 540.29 | 541.53 | 0.002548 | 8.92 | 84.09 | 34.03 | 1.00 |
| CC-1 | CC-1 | 918 | Ultimate 100 yr | 803.00 | 536.00 | 540.43 | 540.43 | 541.70 | 0.002511 | 9.02 | 89.02 | 35.03 | 1.00 |
| CC-1 | CC-1 | 918 | 500 yr | 940.00 | 536.00 | 540.76 | 540.76 | 542.11 | 0.002464 | 9.31 | 100.96 | 37.34 | 1.00 |
| CC-1 | CC-1 | 680 | 2 yr | 252.00 | 533.00 | 535.39 | 535.39 | 536.12 | 0.003012 | 6.84 | 36.83 | 25.53 | 1.00 |
| CC-1 | CC-1 | 680 | 5 yr | 390.00 | 533.00 | 535.96 | 535.96 | 536.81 | 0.002793 | 7.41 | 52.65 | 30.61 | 1.00 |
| CC-1 | CC-1 | 680 | 10 yr | 482.00 | 533.00 | 536.25 | 536.25 | 537.19 | 0.002729 | 7.79 | 61.87 | 32.73 | 1.00 |
| CC-1 | CC-1 | 680 | 25 yr | 585.00 | 533.00 | 536.55 | 536.55 | 537.57 | 0.002634 | 8.12 | 72.06 | 34.84 | 0.99 |
| CC-1 | CC-1 | 680 | 50 yr | 668.00 | 533.00 | 536.76 | 536.76 | 537.85 | 0.002621 | 8.41 | 79.47 | 36.30 | 1.00 |
| CC-1 | CC-1 | 680 | 100 yr | 750.00 | 533.00 | 536.96 | 536.96 | 538.11 | 0.002573 | 8.62 | 87.03 | 37.73 | 1.00 |
| CC-1 | CC-1 | 680 | Ultimate 100 yr | 803.00 | 533.00 | 537.56 | | 538.38 | 0.001511 | 7.23 | 111.06 | 41.95 | 0.78 |
| CC-1 | CC-1 | 680 | 500 yr | 940.00 | 533.00 | 539.30 | | 539.66 | 0.000449 | 4.86 | 193.33 | 52.77 | 0.45 |
| CC-1 | CC-1 | 505 | 2 yr | 252.00 | 528.28 | 531.22 | 531.22 | 532.11 | 0.002900 | 7.56 | 33.35 | 18.71 | 1.00 |
| CC-1 | CC-1 | 505 | 5 yr | 390.00 | 528.28 | 532.27 | 531.89 | 533.03 | 0.001748 | 7.00 | 55.68 | 23.82 | 0.81 |
| CC-1 | CC-1 | 505 | 10 yr | 482.00 | 528.28 | 533.37 | 532.26 | 533.87 | 0.000867 | 5.69 | 84.70 | 29.15 | 0.59 |
| CC-1 | CC-1 | 505 | 25 yr | 585.00 | 528.28 | 534.40 | 532.64 | 534.79 | 0.000533 | 4.98 | 117.44 | 34.18 | 0.47 |
| CC-1 | CC-1 | 505 | 50 yr | 668.00 | 528.28 | 535.10 | 532.91 | 535.44 | 0.000406 | 4.69 | 142.31 | 36.58 | 0.42 |
| CC-1 | CC-1 | 505 | 100 yr | 750.00 | 528.28 | 537.11 | 533.18 | 537.28 | 0.000161 | 3.32 | 226.12 | 47.97 | 0.27 |
| CC-1 | CC-1 | 505 | Ultimate 100 yr | 803.00 | 528.28 | 537.89 | 533.32 | 538.03 | 0.000126 | 3.02 | 265.77 | 53.99 | 0.24 |
| CC-1 | CC-1 | 505 | 500 yr | 940.00 | 528.28 | 539.43 | 533.69 | 539.54 | 0.000081 | 2.61 | 376.35 | 106.87 | 0.20 |
| CC-1 | CC-1 | 230 | | Culvert | | | | | | | | | |
| CC-1 | CC-1 | 45 | 2 yr | 252.00 | 522.31 | 526.28 | | 526.71 | 0.000838 | 5.26 | 47.91 | 15.48 | 0.53 |
| CC-1 | CC-1 | 45 | 5 yr | 390.00 | 522.31 | 528.32 | | 528.66 | 0.000449 | 4.72 | 82.65 | 18.70 | 0.40 |
| CC-1 | CC-1 | 45 | 10 yr | 482.00 | 522.31 | 529.25 | | 529.60 | 0.000402 | 4.78 | 100.74 | 20.17 | 0.38 |
| CC-1 | CC-1 | 45 | 25 yr | 585.00 | 522.31 | 530.15 | | 530.52 | 0.000370 | 4.89 | 119.76 | 24.16 | 0.37 |
| CC-1 | CC-1 | 45 | 50 yr | 668.00 | 522.31 | 530.74 | | 531.13 | 0.000352 | 5.02 | 140.48 | 46.02 | 0.36 |
| CC-1 | CC-1 | 45 | 100 yr | 750.00 | 522.31 | 531.48 | | 531.84 | 0.000288 | 4.88 | 201.04 | 127.77 | 0.33 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|-------|------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| CC-1 | CC-1 | 45 | Ultimate 100 yr | 803.00 | 522.31 | 531.65 | | 532.02 | 0.000295 | 5.02 | 223.23 | 138.41 | 0.34 |
| CC-1 | CC-1 | 45 | 500 yr | 940.00 | 522.31 | 532.93 | | 533.15 | 0.000160 | 4.14 | 482.72 | 286.94 | 0.25 |
| CC-2 | SECTION_01 | 1883 | 2 yr | 61.00 | 581.50 | 582.44 | 582.44 | 582.89 | 0.003953 | 5.42 | 11.26 | 12.01 | 0.99 |
| CC-2 | SECTION_01 | 1883 | 5 yr | 92.00 | 581.50 | 582.72 | 582.72 | 583.33 | 0.003960 | 6.29 | 14.63 | 12.01 | 1.00 |
| CC-2 | SECTION_01 | 1883 | 10 yr | 112.00 | 581.50 | 582.89 | 582.89 | 583.59 | 0.003893 | 6.71 | 16.70 | 12.02 | 1.00 |
| CC-2 | SECTION_01 | 1883 | 25 yr | 135.00 | 581.50 | 583.08 | 583.08 | 583.87 | 0.003861 | 7.14 | 18.91 | 12.02 | 1.00 |
| CC-2 | SECTION_01 | 1883 | 50 yr | 154.00 | 581.50 | 583.21 | 583.21 | 584.08 | 0.003912 | 7.50 | 20.54 | 12.02 | 1.01 |
| CC-2 | SECTION_01 | 1883 | 100 yr | 172.00 | 581.50 | 583.36 | 583.36 | 584.28 | 0.003773 | 7.70 | 22.35 | 12.02 | 0.99 |
| CC-2 | SECTION_01 | 1883 | Ultimate 100 yr | 174.00 | 581.50 | 583.36 | 583.36 | 584.30 | 0.003836 | 7.77 | 22.40 | 12.02 | 1.00 |
| CC-2 | SECTION_01 | 1883 | 500 yr | 215.00 | 581.50 | 583.65 | 583.65 | 584.73 | 0.003818 | 8.32 | 25.84 | 12.03 | 1.00 |
| CC-2 | SECTION_01 | 1383 | 2 yr | 61.00 | 576.38 | 577.30 | 577.30 | 577.77 | 0.004196 | 5.52 | 11.05 | 12.00 | 1.01 |
| CC-2 | SECTION_01 | 1383 | 5 yr | 92.00 | 576.38 | 577.60 | 577.60 | 578.21 | 0.003928 | 6.27 | 14.67 | 12.01 | 1.00 |
| CC-2 | SECTION_01 | 1383 | 10 yr | 112.00 | 576.38 | 577.77 | 577.77 | 578.47 | 0.003881 | 6.70 | 16.72 | 12.01 | 1.00 |
| CC-2 | SECTION_01 | 1383 | 25 yr | 135.00 | 576.38 | 577.96 | 577.96 | 578.75 | 0.003829 | 7.12 | 18.97 | 12.01 | 1.00 |
| CC-2 | SECTION_01 | 1383 | 50 yr | 154.00 | 576.38 | 578.10 | 578.10 | 578.96 | 0.003838 | 7.45 | 20.66 | 12.01 | 1.00 |
| CC-2 | SECTION_01 | 1383 | 100 yr | 172.00 | 576.38 | 578.24 | 578.24 | 579.16 | 0.003805 | 7.72 | 22.29 | 12.01 | 1.00 |
| CC-2 | SECTION_01 | 1383 | Ultimate 100 yr | 174.00 | 576.38 | 578.25 | 578.25 | 579.18 | 0.003820 | 7.76 | 22.44 | 12.01 | 1.00 |
| CC-2 | SECTION_01 | 1383 | 500 yr | 215.00 | 576.38 | 578.53 | 578.53 | 579.61 | 0.003808 | 8.31 | 25.86 | 12.01 | 1.00 |
| CC-2 | SECTION_01 | 883 | 2 yr | 61.00 | 571.00 | 571.93 | 571.93 | 572.39 | 0.004088 | 5.48 | 11.14 | 12.02 | 1.00 |
| CC-2 | SECTION_01 | 883 | 5 yr | 92.00 | 571.00 | 572.23 | 572.23 | 572.83 | 0.003876 | 6.25 | 14.73 | 12.03 | 0.99 |
| CC-2 | SECTION_01 | 883 | 10 yr | 112.00 | 571.00 | 572.58 | | 573.12 | 0.002601 | 5.88 | 19.05 | 12.04 | 0.82 |
| CC-2 | SECTION_01 | 883 | 25 yr | 135.00 | 571.00 | 573.09 | | 573.54 | 0.001631 | 5.37 | 25.15 | 12.05 | 0.65 |
| CC-2 | SECTION_01 | 883 | 50 yr | 154.00 | 571.00 | 573.55 | | 573.94 | 0.001181 | 5.02 | 30.65 | 12.06 | 0.56 |
| CC-2 | SECTION_01 | 883 | 100 yr | 172.00 | 571.00 | 574.01 | | 574.36 | 0.000909 | 4.75 | 36.18 | 12.07 | 0.48 |
| CC-2 | SECTION_01 | 883 | Ultimate 100 yr | 174.00 | 571.00 | 574.02 | | 574.37 | 0.000919 | 4.79 | 36.34 | 12.07 | 0.49 |
| CC-2 | SECTION_01 | 883 | 500 yr | 215.00 | 571.00 | 575.16 | | 575.44 | 0.000563 | 4.29 | 50.11 | 12.10 | 0.37 |
| CC-2 | SECTION_01 | 408 | 2 yr | 344.00 | 565.92 | 568.42 | 568.42 | 569.65 | 0.003442 | 8.90 | 38.65 | 15.57 | 1.00 |
| CC-2 | SECTION_01 | 408 | 5 yr | 523.00 | 565.92 | 569.19 | 569.19 | 570.84 | 0.003541 | 10.31 | 50.74 | 15.62 | 1.01 |
| CC-2 | SECTION_01 | 408 | 10 yr | 643.00 | 565.92 | 569.69 | 569.69 | 571.56 | 0.003524 | 10.98 | 58.56 | 15.65 | 1.00 |
| CC-2 | SECTION_01 | 408 | 25 yr | 775.00 | 565.92 | 570.19 | 570.19 | 572.31 | 0.003576 | 11.69 | 66.32 | 15.69 | 1.00 |
| CC-2 | SECTION_01 | 408 | 50 yr | 886.00 | 565.92 | 570.57 | 570.57 | 572.90 | 0.003641 | 12.24 | 72.40 | 15.71 | 1.00 |
| CC-2 | SECTION_01 | 408 | 100 yr | 993.00 | 565.92 | 571.63 | | 573.56 | 0.002562 | 11.16 | 89.01 | 15.78 | 0.83 |
| CC-2 | SECTION_01 | 408 | Ultimate 100 yr | 996.00 | 565.92 | 571.62 | | 573.57 | 0.002584 | 11.20 | 88.93 | 15.78 | 0.83 |
| CC-2 | SECTION_01 | 408 | 500 yr | 1257.00 | 565.92 | 571.81 | 571.81 | 574.72 | 0.003763 | 13.68 | 91.86 | 15.79 | 1.00 |
| CC-2 | SECTION_01 | 278 | 2 yr | 344.00 | 563.82 | 566.92 | 566.32 | 567.72 | 0.001816 | 7.18 | 47.89 | 15.61 | 0.72 |
| CC-2 | SECTION_01 | 278 | 5 yr | 523.00 | 563.82 | 568.41 | 567.13 | 569.25 | 0.001327 | 7.34 | 71.25 | 15.70 | 0.61 |
| CC-2 | SECTION_01 | 278 | 10 yr | 643.00 | 563.82 | 569.11 | 567.60 | 570.06 | 0.001341 | 7.82 | 82.17 | 15.75 | 0.60 |
| CC-2 | SECTION_01 | 278 | 25 yr | 775.00 | 563.82 | 569.68 | 568.11 | 570.80 | 0.001457 | 8.50 | 91.23 | 15.79 | 0.62 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|-------|------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| CC-2 | SECTION_01 | 278 | 50 yr | 886.00 | 563.82 | 570.20 | 568.49 | 571.43 | 0.001504 | 8.91 | 99.40 | 15.82 | 0.63 |
| CC-2 | SECTION_01 | 278 | 100 yr | 993.00 | 563.82 | 572.12 | 568.88 | 573.03 | 0.000918 | 7.64 | 129.90 | 15.95 | 0.47 |
| CC-2 | SECTION_01 | 278 | Ultimate 100 yr | 996.00 | 563.82 | 572.12 | 568.89 | 573.03 | 0.000924 | 7.67 | 129.91 | 15.95 | 0.47 |
| CC-2 | SECTION_01 | 278 | 500 yr | 1257.00 | 563.82 | 572.16 | 569.73 | 573.60 | 0.001452 | 9.63 | 130.57 | 15.95 | 0.59 |
| CC-2 | SECTION_01 | 233 | Bridge | | | | | | | | | | |
| CC-2 | SECTION_01 | 180 | 2 yr | 344.00 | 563.43 | 566.67 | 566.04 | 567.45 | 0.001765 | 7.11 | 48.38 | 15.65 | 0.71 |
| CC-2 | SECTION_01 | 180 | 5 yr | 523.00 | 563.43 | 568.30 | 566.83 | 569.08 | 0.001188 | 7.06 | 74.12 | 15.78 | 0.57 |
| CC-2 | SECTION_01 | 180 | 10 yr | 643.00 | 563.43 | 568.99 | 567.32 | 569.88 | 0.001219 | 7.56 | 85.06 | 15.84 | 0.57 |
| CC-2 | SECTION_01 | 180 | 25 yr | 775.00 | 563.43 | 569.55 | 567.82 | 570.61 | 0.001350 | 8.26 | 93.81 | 15.88 | 0.60 |
| CC-2 | SECTION_01 | 180 | 50 yr | 886.00 | 563.43 | 570.06 | 568.21 | 571.23 | 0.001405 | 8.69 | 101.93 | 15.92 | 0.61 |
| CC-2 | SECTION_01 | 180 | 100 yr | 993.00 | 563.43 | 570.57 | 568.59 | 571.83 | 0.001431 | 9.02 | 110.08 | 15.96 | 0.61 |
| CC-2 | SECTION_01 | 180 | Ultimate 100 yr | 996.00 | 563.43 | 570.56 | 568.59 | 571.83 | 0.001445 | 9.06 | 109.93 | 15.96 | 0.61 |
| CC-2 | SECTION_01 | 180 | 500 yr | 1257.00 | 563.43 | 570.85 | 569.44 | 572.72 | 0.002056 | 10.97 | 114.62 | 15.99 | 0.72 |
| CC-2 | SECTION_02 | 4361 | 2 yr | 763.00 | 562.92 | 565.65 | 565.65 | 566.92 | 0.002839 | 9.02 | 84.57 | 33.27 | 1.00 |
| CC-2 | SECTION_02 | 4361 | 5 yr | 1278.00 | 562.92 | 566.70 | 566.70 | 568.48 | 0.002714 | 10.71 | 119.34 | 33.35 | 1.00 |
| CC-2 | SECTION_02 | 4361 | 10 yr | 1560.00 | 562.92 | 567.21 | 567.21 | 569.24 | 0.002681 | 11.44 | 136.38 | 33.39 | 1.00 |
| CC-2 | SECTION_02 | 4361 | 25 yr | 1830.00 | 562.92 | 567.67 | 567.67 | 569.93 | 0.002657 | 12.05 | 151.84 | 33.42 | 1.00 |
| CC-2 | SECTION_02 | 4361 | 50 yr | 2073.00 | 562.92 | 568.06 | 568.06 | 570.51 | 0.002658 | 12.58 | 164.83 | 33.45 | 1.00 |
| CC-2 | SECTION_02 | 4361 | 100 yr | 2316.00 | 562.92 | 568.43 | 568.43 | 571.08 | 0.002663 | 13.06 | 177.28 | 33.48 | 1.00 |
| CC-2 | SECTION_02 | 4361 | Ultimate 100 yr | 2318.00 | 562.92 | 568.44 | 568.44 | 571.08 | 0.002655 | 13.05 | 177.57 | 33.48 | 1.00 |
| CC-2 | SECTION_02 | 4361 | 500 yr | 2715.00 | 562.92 | 569.00 | 569.00 | 571.97 | 0.002690 | 13.82 | 196.47 | 33.53 | 1.01 |
| CC-2 | SECTION_02 | 4021 | 2 yr | 763.00 | 560.30 | 563.88 | | 564.59 | 0.001140 | 6.76 | 112.83 | 33.51 | 0.65 |
| CC-2 | SECTION_02 | 4021 | 5 yr | 1278.00 | 560.30 | 565.31 | | 566.29 | 0.001078 | 7.95 | 160.85 | 33.86 | 0.64 |
| CC-2 | SECTION_02 | 4021 | 10 yr | 1560.00 | 560.30 | 566.01 | | 567.12 | 0.001048 | 8.44 | 185.09 | 36.21 | 0.64 |
| CC-2 | SECTION_02 | 4021 | 25 yr | 1830.00 | 560.30 | 566.68 | | 567.88 | 0.001001 | 8.82 | 211.08 | 41.92 | 0.63 |
| CC-2 | SECTION_02 | 4021 | 50 yr | 2073.00 | 560.30 | 567.16 | | 568.49 | 0.001010 | 9.25 | 232.38 | 46.08 | 0.64 |
| CC-2 | SECTION_02 | 4021 | 100 yr | 2316.00 | 560.30 | 567.69 | | 569.11 | 0.000974 | 9.56 | 260.33 | 60.87 | 0.63 |
| CC-2 | SECTION_02 | 4021 | Ultimate 100 yr | 2318.00 | 560.30 | 567.70 | | 569.12 | 0.000974 | 9.56 | 260.61 | 61.02 | 0.63 |
| CC-2 | SECTION_02 | 4021 | 500 yr | 2715.00 | 560.30 | 568.58 | 566.41 | 570.12 | 0.000901 | 9.95 | 326.85 | 87.93 | 0.62 |
| CC-2 | SECTION_02 | 3617 | 2 yr | 928.00 | 559.52 | 562.48 | 562.48 | 563.87 | 0.002784 | 9.45 | 98.20 | 35.25 | 1.00 |
| CC-2 | SECTION_02 | 3617 | 5 yr | 1550.00 | 559.52 | 563.62 | 563.62 | 565.57 | 0.002660 | 11.20 | 138.45 | 35.28 | 1.00 |
| CC-2 | SECTION_02 | 3617 | 10 yr | 1891.00 | 559.52 | 564.17 | 564.17 | 566.40 | 0.002610 | 11.99 | 160.82 | 47.54 | 1.00 |
| CC-2 | SECTION_02 | 3617 | 25 yr | 2230.00 | 559.52 | 564.70 | 564.70 | 567.18 | 0.002540 | 12.64 | 188.90 | 58.13 | 1.00 |
| CC-2 | SECTION_02 | 3617 | 50 yr | 2505.00 | 559.52 | 565.11 | 565.11 | 567.78 | 0.002486 | 13.10 | 214.75 | 67.56 | 0.99 |
| CC-2 | SECTION_02 | 3617 | 100 yr | 2805.00 | 559.52 | 565.53 | 565.53 | 568.41 | 0.002457 | 13.61 | 244.61 | 74.42 | 0.99 |
| CC-2 | SECTION_02 | 3617 | Ultimate 100 yr | 2808.00 | 559.52 | 565.54 | 565.54 | 568.41 | 0.002450 | 13.60 | 245.28 | 74.56 | 0.99 |
| CC-2 | SECTION_02 | 3617 | 500 yr | 3319.00 | 559.52 | 566.23 | 566.23 | 569.43 | 0.002360 | 14.37 | 303.93 | 97.38 | 0.99 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|-------|------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| CC-2 | SECTION_02 | 3321 | 2 yr | 928.00 | 557.48 | 560.40 | 560.40 | 561.76 | 0.002794 | 9.38 | 98.98 | 36.19 | 1.00 |
| CC-2 | SECTION_02 | 3321 | 5 yr | 1550.00 | 557.48 | 561.52 | 561.52 | 563.43 | 0.002662 | 11.11 | 139.53 | 36.19 | 1.00 |
| CC-2 | SECTION_02 | 3321 | 10 yr | 1891.00 | 557.48 | 562.04 | 562.04 | 564.25 | 0.002676 | 11.93 | 158.46 | 36.19 | 1.00 |
| CC-2 | SECTION_02 | 3321 | 25 yr | 2230.00 | 557.48 | 562.57 | 562.57 | 565.02 | 0.002625 | 12.55 | 177.62 | 36.19 | 1.00 |
| CC-2 | SECTION_02 | 3321 | 50 yr | 2505.00 | 557.48 | 562.96 | 562.96 | 565.61 | 0.002584 | 13.06 | 193.39 | 48.84 | 1.00 |
| CC-2 | SECTION_02 | 3321 | 100 yr | 2805.00 | 557.48 | 563.37 | 563.37 | 566.23 | 0.002534 | 13.58 | 216.98 | 64.88 | 1.00 |
| CC-2 | SECTION_02 | 3321 | Ultimate 100 yr | 2808.00 | 557.48 | 563.39 | 563.39 | 566.24 | 0.002506 | 13.54 | 218.45 | 65.52 | 1.00 |
| CC-2 | SECTION_02 | 3321 | 500 yr | 3319.00 | 557.48 | 564.07 | 564.07 | 567.24 | 0.002404 | 14.30 | 268.75 | 83.63 | 1.00 |
| CC-2 | SECTION_02 | 3175 | 2 yr | 928.00 | 556.81 | 559.70 | 559.70 | 561.11 | 0.002891 | 9.52 | 97.44 | 35.12 | 1.01 |
| CC-2 | SECTION_02 | 3175 | 5 yr | 1550.00 | 556.81 | 560.85 | 560.85 | 562.82 | 0.002730 | 11.24 | 137.85 | 35.17 | 1.00 |
| CC-2 | SECTION_02 | 3175 | 10 yr | 1891.00 | 556.81 | 561.42 | 561.42 | 563.65 | 0.002683 | 11.99 | 157.75 | 35.19 | 1.00 |
| CC-2 | SECTION_02 | 3175 | 25 yr | 2230.00 | 556.81 | 561.94 | 561.94 | 564.43 | 0.002665 | 12.66 | 176.16 | 35.21 | 1.00 |
| CC-2 | SECTION_02 | 3175 | 50 yr | 2505.00 | 556.81 | 562.33 | 562.33 | 565.03 | 0.002679 | 13.19 | 189.87 | 35.23 | 1.00 |
| CC-2 | SECTION_02 | 3175 | 100 yr | 2805.00 | 556.81 | 562.77 | 562.77 | 565.67 | 0.002657 | 13.67 | 205.26 | 35.25 | 1.00 |
| CC-2 | SECTION_02 | 3175 | Ultimate 100 yr | 2808.00 | 556.81 | 562.76 | 562.76 | 565.67 | 0.002675 | 13.70 | 204.96 | 35.25 | 1.00 |
| CC-2 | SECTION_02 | 3175 | 500 yr | 3319.00 | 556.81 | 563.46 | 563.46 | 566.70 | 0.002642 | 14.45 | 230.37 | 46.42 | 1.00 |
| CC-2 | SECTION_02 | 2958 | | Culvert | | | | | | | | | |
| CC-2 | SECTION_02 | 2743 | 2 yr | 928.00 | 552.41 | 554.91 | 554.91 | 556.12 | 0.002732 | 8.84 | 105.02 | 42.98 | 1.00 |
| CC-2 | SECTION_02 | 2743 | 5 yr | 1550.00 | 552.41 | 555.93 | 555.93 | 557.59 | 0.002533 | 10.35 | 149.83 | 44.70 | 1.00 |
| CC-2 | SECTION_02 | 2743 | 10 yr | 1891.00 | 552.41 | 556.45 | 556.45 | 558.30 | 0.002459 | 10.91 | 173.30 | 46.67 | 1.00 |
| CC-2 | SECTION_02 | 2743 | 25 yr | 2230.00 | 552.41 | 556.92 | 556.92 | 558.93 | 0.002397 | 11.39 | 195.79 | 48.48 | 1.00 |
| CC-2 | SECTION_02 | 2743 | 50 yr | 2505.00 | 552.41 | 557.28 | 557.28 | 559.42 | 0.002359 | 11.74 | 213.32 | 49.85 | 1.00 |
| CC-2 | SECTION_02 | 2743 | 100 yr | 2805.00 | 552.41 | 558.45 | 557.66 | 560.07 | 0.001434 | 10.22 | 274.45 | 54.36 | 0.80 |
| CC-2 | SECTION_02 | 2743 | Ultimate 100 yr | 2808.00 | 552.41 | 558.47 | 557.65 | 560.08 | 0.001424 | 10.20 | 275.34 | 54.42 | 0.80 |
| CC-2 | SECTION_02 | 2743 | 500 yr | 3319.00 | 552.41 | 560.21 | 558.26 | 561.42 | 0.000805 | 8.81 | 381.27 | 224.09 | 0.62 |
| CC-2 | SECTION_02 | 2580 | 2 yr | 928.00 | 547.75 | 552.22 | 552.22 | 553.94 | 0.002528 | 10.51 | 88.33 | 25.94 | 1.00 |
| CC-2 | SECTION_02 | 2580 | 5 yr | 1550.00 | 547.75 | 553.67 | 553.67 | 555.95 | 0.002295 | 12.14 | 135.08 | 39.75 | 1.00 |
| CC-2 | SECTION_02 | 2580 | 10 yr | 1891.00 | 547.75 | 554.33 | 554.33 | 556.93 | 0.002176 | 12.94 | 163.38 | 45.81 | 0.99 |
| CC-2 | SECTION_02 | 2580 | 25 yr | 2230.00 | 547.75 | 554.93 | 554.93 | 557.83 | 0.002106 | 13.68 | 192.74 | 51.80 | 1.00 |
| CC-2 | SECTION_02 | 2580 | 50 yr | 2505.00 | 547.75 | 555.40 | 555.40 | 558.54 | 0.002052 | 14.22 | 218.25 | 56.52 | 1.00 |
| CC-2 | SECTION_02 | 2580 | 100 yr | 2805.00 | 547.75 | 555.91 | 555.91 | 559.27 | 0.001990 | 14.74 | 248.04 | 61.57 | 0.99 |
| CC-2 | SECTION_02 | 2580 | Ultimate 100 yr | 2808.00 | 547.75 | 555.91 | 555.91 | 559.28 | 0.001992 | 14.75 | 248.19 | 61.60 | 0.99 |
| CC-2 | SECTION_02 | 2580 | 500 yr | 3319.00 | 547.75 | 556.71 | 556.71 | 560.47 | 0.001919 | 15.58 | 304.37 | 80.11 | 0.99 |
| CC-2 | SECTION_02 | 2223 | 2 yr | 928.00 | 545.05 | 549.57 | 549.57 | 551.15 | 0.002507 | 10.10 | 91.84 | 28.94 | 1.00 |
| CC-2 | SECTION_02 | 2223 | 5 yr | 1550.00 | 545.05 | 550.90 | 550.90 | 552.99 | 0.002263 | 11.60 | 136.33 | 37.84 | 1.00 |
| CC-2 | SECTION_02 | 2223 | 10 yr | 1891.00 | 545.05 | 551.50 | 551.50 | 553.88 | 0.002164 | 12.39 | 160.11 | 41.93 | 1.00 |
| CC-2 | SECTION_02 | 2223 | 25 yr | 2230.00 | 545.05 | 552.05 | 552.05 | 554.71 | 0.002085 | 13.09 | 184.54 | 45.91 | 1.00 |
| CC-2 | SECTION_02 | 2223 | 50 yr | 2505.00 | 545.05 | 552.50 | 552.50 | 555.36 | 0.002020 | 13.58 | 205.84 | 50.85 | 0.99 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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) | |
| CC-2 | SECTION_02 | 2223 | 100 yr | 2805.00 | 545.05 | 552.94 | 552.94 | 556.03 | 0.001979 | 14.12 | 229.53 | 55.78 | 1.00 |
| CC-2 | SECTION_02 | 2223 | Ultimate 100 yr | 2808.00 | 545.05 | 552.95 | 552.95 | 556.04 | 0.001971 | 14.11 | 230.22 | 55.92 | 0.99 |
| CC-2 | SECTION_02 | 2223 | 500 yr | 3319.00 | 545.05 | 553.69 | 553.69 | 557.13 | 0.001893 | 14.90 | 275.88 | 68.04 | 0.99 |
| CC-2 | SECTION_02 | 1866 | 2 yr | 1086.00 | 543.14 | 548.12 | 548.12 | 549.60 | 0.002481 | 9.77 | 111.20 | 37.44 | 1.00 |
| CC-2 | SECTION_02 | 1866 | 5 yr | 1807.00 | 543.14 | 549.39 | 549.39 | 551.26 | 0.002300 | 10.98 | 165.51 | 48.22 | 1.00 |
| CC-2 | SECTION_02 | 1866 | 10 yr | 2214.00 | 543.14 | 549.93 | 549.93 | 552.07 | 0.002201 | 11.75 | 192.66 | 52.48 | 1.00 |
| CC-2 | SECTION_02 | 1866 | 25 yr | 2616.00 | 543.14 | 550.45 | 550.45 | 552.83 | 0.002098 | 12.39 | 220.87 | 56.59 | 1.00 |
| CC-2 | SECTION_02 | 1866 | 50 yr | 2923.00 | 543.14 | 550.80 | 550.80 | 553.38 | 0.002060 | 12.88 | 241.58 | 59.48 | 1.00 |
| CC-2 | SECTION_02 | 1866 | 100 yr | 3276.00 | 543.14 | 551.22 | 551.22 | 553.99 | 0.001998 | 13.35 | 267.04 | 63.55 | 1.00 |
| CC-2 | SECTION_02 | 1866 | Ultimate 100 yr | 3279.00 | 543.14 | 551.20 | 551.20 | 553.99 | 0.002021 | 13.40 | 265.99 | 63.38 | 1.00 |
| CC-2 | SECTION_02 | 1866 | 500 yr | 3895.00 | 543.14 | 551.90 | 551.90 | 555.00 | 0.001915 | 14.13 | 313.89 | 74.54 | 1.00 |
| CC-2 | SECTION_02 | 1762 | 2 yr | 1086.00 | 542.61 | 546.51 | 546.51 | 547.82 | 0.002411 | 9.20 | 118.83 | 46.22 | 1.00 |
| CC-2 | SECTION_02 | 1762 | 5 yr | 1807.00 | 542.61 | 547.58 | 547.58 | 549.38 | 0.002211 | 10.78 | 171.86 | 52.94 | 1.00 |
| CC-2 | SECTION_02 | 1762 | 10 yr | 2214.00 | 542.61 | 548.12 | 548.12 | 550.16 | 0.002078 | 11.48 | 201.36 | 56.31 | 1.00 |
| CC-2 | SECTION_02 | 1762 | 25 yr | 2616.00 | 542.61 | 548.59 | 548.59 | 550.89 | 0.002024 | 12.17 | 228.45 | 59.28 | 1.00 |
| CC-2 | SECTION_02 | 1762 | 50 yr | 2923.00 | 542.61 | 548.94 | 548.94 | 551.42 | 0.001973 | 12.62 | 249.90 | 62.03 | 1.00 |
| CC-2 | SECTION_02 | 1762 | 100 yr | 3276.00 | 542.61 | 549.35 | 549.35 | 552.00 | 0.001905 | 13.08 | 275.65 | 65.30 | 1.00 |
| CC-2 | SECTION_02 | 1762 | Ultimate 100 yr | 3279.00 | 542.61 | 549.35 | 549.35 | 552.01 | 0.001902 | 13.07 | 276.03 | 65.35 | 1.00 |
| CC-2 | SECTION_02 | 1762 | 500 yr | 3895.00 | 542.61 | 549.99 | 549.99 | 552.98 | 0.001840 | 13.87 | 319.91 | 71.62 | 1.00 |
| CC-2 | SECTION_02 | 1729 | 2 yr | 1086.00 | 540.30 | 545.14 | 545.14 | 546.59 | 0.002477 | 9.65 | 112.53 | 38.80 | 1.00 |
| CC-2 | SECTION_02 | 1729 | 5 yr | 1807.00 | 540.30 | 546.37 | 546.37 | 548.24 | 0.002270 | 10.96 | 165.75 | 47.48 | 1.00 |
| CC-2 | SECTION_02 | 1729 | 10 yr | 2214.00 | 540.30 | 546.91 | 546.91 | 549.05 | 0.002178 | 11.74 | 192.26 | 51.20 | 1.00 |
| CC-2 | SECTION_02 | 1729 | 25 yr | 2616.00 | 540.30 | 547.42 | 547.42 | 549.80 | 0.002087 | 12.39 | 219.33 | 54.85 | 1.00 |
| CC-2 | SECTION_02 | 1729 | 50 yr | 2923.00 | 540.30 | 547.80 | 547.80 | 550.35 | 0.002025 | 12.83 | 240.45 | 57.58 | 1.00 |
| CC-2 | SECTION_02 | 1729 | 100 yr | 3276.00 | 540.30 | 548.20 | 548.20 | 550.96 | 0.001979 | 13.34 | 264.25 | 60.56 | 1.00 |
| CC-2 | SECTION_02 | 1729 | Ultimate 100 yr | 3279.00 | 540.30 | 548.20 | 548.20 | 550.97 | 0.001986 | 13.36 | 264.12 | 60.53 | 1.00 |
| CC-2 | SECTION_02 | 1729 | 500 yr | 3895.00 | 540.30 | 549.39 | 548.87 | 552.03 | 0.001468 | 13.07 | 346.73 | 79.15 | 0.89 |
| CC-2 | SECTION_02 | 1564 | 2 yr | 1086.00 | 538.94 | 543.22 | 543.22 | 545.03 | 0.002512 | 10.79 | 100.69 | 27.93 | 1.00 |
| CC-2 | SECTION_02 | 1564 | 5 yr | 1807.00 | 538.94 | 544.78 | 544.78 | 547.14 | 0.002370 | 12.33 | 146.53 | 31.03 | 1.00 |
| CC-2 | SECTION_02 | 1564 | 10 yr | 2214.00 | 538.94 | 545.51 | 545.51 | 548.15 | 0.002309 | 13.05 | 170.95 | 39.57 | 1.00 |
| CC-2 | SECTION_02 | 1564 | 25 yr | 2616.00 | 538.94 | 546.18 | 546.18 | 549.08 | 0.002230 | 13.67 | 202.57 | 56.14 | 1.00 |
| CC-2 | SECTION_02 | 1564 | 50 yr | 2923.00 | 538.94 | 546.64 | 546.64 | 549.74 | 0.002202 | 14.14 | 231.94 | 70.76 | 1.00 |
| CC-2 | SECTION_02 | 1564 | 100 yr | 3276.00 | 538.94 | 547.20 | 547.20 | 550.47 | 0.002127 | 14.53 | 276.17 | 88.56 | 0.99 |
| CC-2 | SECTION_02 | 1564 | Ultimate 100 yr | 3279.00 | 538.94 | 547.20 | 547.20 | 550.48 | 0.002131 | 14.54 | 276.17 | 88.56 | 0.99 |
| CC-2 | SECTION_02 | 1564 | 500 yr | 3895.00 | 538.94 | 548.81 | 548.05 | 551.76 | 0.001489 | 13.82 | 522.86 | 236.17 | 0.85 |
| CC-2 | SECTION_02 | 1472 | | Bridge | | | | | | | | | |
| CC-2 | SECTION_02 | 1404 | 2 yr | 1086.00 | 537.74 | 542.26 | 541.86 | 543.63 | 0.001792 | 9.39 | 115.71 | 31.24 | 0.86 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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) | |
| CC-2 | SECTION_02 | 1404 | 5 yr | 1807.00 | 537.74 | 543.98 | 543.40 | 545.65 | 0.001644 | 10.36 | 174.50 | 37.72 | 0.85 |
| CC-2 | SECTION_02 | 1404 | 10 yr | 2214.00 | 537.74 | 544.56 | 544.13 | 546.52 | 0.001783 | 11.23 | 197.21 | 40.08 | 0.89 |
| CC-2 | SECTION_02 | 1404 | 25 yr | 2616.00 | 537.74 | 545.18 | 544.83 | 547.30 | 0.001970 | 11.71 | 223.47 | 46.56 | 0.94 |
| CC-2 | SECTION_02 | 1404 | 50 yr | 2923.00 | 537.74 | 545.57 | 545.48 | 547.82 | 0.002127 | 12.04 | 242.87 | 51.85 | 0.98 |
| CC-2 | SECTION_02 | 1404 | 100 yr | 3276.00 | 537.74 | 547.62 | 546.04 | 548.84 | 0.000859 | 8.89 | 517.86 | 376.88 | 0.65 |
| CC-2 | SECTION_02 | 1404 | Ultimate 100 yr | 3279.00 | 537.74 | 547.62 | 546.05 | 548.85 | 0.000860 | 8.90 | 518.16 | 377.03 | 0.65 |
| CC-2 | SECTION_02 | 1404 | 500 yr | 3895.00 | 537.74 | 548.83 | 546.72 | 549.99 | 0.000634 | 8.67 | 1113.17 | 465.95 | 0.58 |
| CC-2 | SECTION_02 | 1295 | 2 yr | 1086.00 | 536.92 | 542.44 | | 543.16 | 0.000822 | 6.81 | 159.43 | 39.78 | 0.60 |
| CC-2 | SECTION_02 | 1295 | 5 yr | 1807.00 | 536.92 | 544.23 | | 545.13 | 0.000739 | 7.63 | 244.25 | 62.53 | 0.59 |
| CC-2 | SECTION_02 | 1295 | 10 yr | 2214.00 | 536.92 | 544.87 | | 545.94 | 0.000769 | 8.30 | 288.94 | 81.29 | 0.61 |
| CC-2 | SECTION_02 | 1295 | 25 yr | 2616.00 | 536.92 | 545.48 | | 546.70 | 0.000761 | 8.85 | 346.30 | 103.06 | 0.62 |
| CC-2 | SECTION_02 | 1295 | 50 yr | 2923.00 | 536.92 | 545.86 | 544.08 | 547.21 | 0.000782 | 9.32 | 387.37 | 114.89 | 0.64 |
| CC-2 | SECTION_02 | 1295 | 100 yr | 3276.00 | 536.92 | 547.64 | 544.50 | 548.68 | 0.000443 | 8.21 | 846.96 | 419.07 | 0.50 |
| CC-2 | SECTION_02 | 1295 | Ultimate 100 yr | 3279.00 | 536.92 | 547.64 | 544.52 | 548.68 | 0.000443 | 8.22 | 847.49 | 419.13 | 0.50 |
| CC-2 | SECTION_02 | 1295 | 500 yr | 3895.00 | 536.92 | 548.80 | 545.15 | 549.91 | 0.000403 | 8.53 | 1356.92 | 462.33 | 0.48 |
| CC-2 | SECTION_02 | 1186 | 2 yr | 1087.00 | 536.12 | 542.50 | 540.25 | 543.03 | 0.000518 | 5.84 | 186.03 | 40.52 | 0.48 |
| CC-2 | SECTION_02 | 1186 | 5 yr | 1815.00 | 536.12 | 544.28 | 541.74 | 545.02 | 0.000536 | 6.88 | 272.24 | 74.24 | 0.51 |
| CC-2 | SECTION_02 | 1186 | 10 yr | 2222.00 | 536.12 | 544.92 | 542.42 | 545.81 | 0.000572 | 7.56 | 334.75 | 127.53 | 0.53 |
| CC-2 | SECTION_02 | 1186 | 25 yr | 2626.00 | 536.12 | 545.55 | 543.05 | 546.57 | 0.000581 | 8.11 | 477.04 | 269.79 | 0.54 |
| CC-2 | SECTION_02 | 1186 | 50 yr | 2928.00 | 536.12 | 545.94 | 543.49 | 547.07 | 0.000599 | 8.55 | 585.08 | 281.23 | 0.56 |
| CC-2 | SECTION_02 | 1186 | 100 yr | 3275.00 | 536.12 | 547.70 | 543.91 | 548.59 | 0.000356 | 7.61 | 1350.31 | 490.43 | 0.45 |
| CC-2 | SECTION_02 | 1186 | Ultimate 100 yr | 3276.00 | 536.12 | 547.71 | 543.91 | 548.59 | 0.000356 | 7.61 | 1351.41 | 490.51 | 0.45 |
| CC-2 | SECTION_02 | 1186 | 500 yr | 3843.00 | 536.12 | 548.89 | 544.59 | 549.81 | 0.000320 | 7.83 | 1953.88 | 531.63 | 0.43 |
| CC-2 | SECTION_02 | 1132 | | Bridge | | | | | | | | | |
| CC-2 | SECTION_02 | 1071 | 2 yr | 1087.00 | 535.12 | 542.10 | | 542.74 | 0.000641 | 6.38 | 170.31 | 35.67 | 0.51 |
| CC-2 | SECTION_02 | 1071 | 5 yr | 1815.00 | 535.12 | 544.10 | 541.44 | 544.90 | 0.000661 | 7.16 | 262.45 | 131.14 | 0.54 |
| CC-2 | SECTION_02 | 1071 | 10 yr | 2222.00 | 535.12 | 544.87 | 542.32 | 545.78 | 0.000652 | 7.65 | 382.37 | 223.17 | 0.55 |
| CC-2 | SECTION_02 | 1071 | 25 yr | 2626.00 | 535.12 | 545.54 | 543.06 | 546.56 | 0.000636 | 8.10 | 587.05 | 331.17 | 0.55 |
| CC-2 | SECTION_02 | 1071 | 50 yr | 2928.00 | 535.12 | 545.95 | 543.53 | 547.06 | 0.000647 | 8.50 | 724.15 | 347.16 | 0.56 |
| CC-2 | SECTION_02 | 1071 | 100 yr | 3275.00 | 535.12 | 546.76 | 544.02 | 547.86 | 0.000556 | 8.48 | 1101.78 | 503.18 | 0.53 |
| CC-2 | SECTION_02 | 1071 | Ultimate 100 yr | 3276.00 | 535.12 | 546.76 | 544.03 | 547.87 | 0.000556 | 8.48 | 1102.91 | 503.35 | 0.53 |
| CC-2 | SECTION_02 | 1071 | 500 yr | 3843.00 | 535.12 | 547.92 | 544.71 | 549.04 | 0.000476 | 8.59 | 1717.85 | 556.07 | 0.50 |
| CC-2 | SECTION_02 | 957 | 2 yr | 1102.00 | 534.43 | 542.19 | 538.03 | 542.36 | 0.034142 | 3.38 | 346.75 | 65.78 | 0.24 |
| CC-2 | SECTION_02 | 957 | 5 yr | 1845.00 | 534.43 | 544.22 | 539.19 | 544.49 | 0.037332 | 4.25 | 491.83 | 240.76 | 0.26 |
| CC-2 | SECTION_02 | 957 | 10 yr | 2258.00 | 534.43 | 545.03 | 539.73 | 545.32 | 0.036391 | 4.46 | 888.46 | 420.23 | 0.26 |
| CC-2 | SECTION_02 | 957 | 25 yr | 2658.00 | 534.43 | 545.76 | 540.20 | 546.05 | 0.035201 | 4.61 | 1216.07 | 467.59 | 0.26 |
| CC-2 | SECTION_02 | 957 | 50 yr | 2923.00 | 534.43 | 546.22 | 540.50 | 546.50 | 0.034099 | 4.68 | 1431.72 | 482.30 | 0.25 |
| CC-2 | SECTION_02 | 957 | 100 yr | 3297.00 | 534.43 | 547.06 | 540.89 | 547.32 | 0.029072 | 4.55 | 1848.75 | 501.82 | 0.24 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|-------|------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| CC-2 | SECTION_02 | 957 | Ultimate 100 yr | 3300.00 | 534.43 | 547.06 | 540.90 | 547.32 | 0.029095 | 4.55 | 1849.89 | 501.86 | 0.24 |
| CC-2 | SECTION_02 | 957 | 500 yr | 3875.00 | 534.43 | 548.27 | 541.50 | 548.48 | 0.023686 | 4.39 | 2464.39 | 519.92 | 0.22 |
| CC-2 | SECTION_02 | 839 | 2 yr | 1102.00 | 533.70 | 538.21 | 538.21 | 540.03 | 0.002598 | 10.84 | 101.64 | 28.05 | 1.00 |
| CC-2 | SECTION_02 | 839 | 5 yr | 1845.00 | 533.70 | 539.97 | 539.97 | 541.97 | 0.002399 | 11.35 | 163.06 | 42.78 | 1.00 |
| CC-2 | SECTION_02 | 839 | 10 yr | 2258.00 | 533.70 | 540.54 | 540.54 | 542.84 | 0.002311 | 12.17 | 188.55 | 46.83 | 1.00 |
| CC-2 | SECTION_02 | 839 | 25 yr | 2658.00 | 533.70 | 541.08 | 541.08 | 543.63 | 0.002207 | 12.81 | 215.02 | 50.69 | 1.00 |
| CC-2 | SECTION_02 | 839 | 50 yr | 2923.00 | 533.70 | 541.40 | 541.40 | 544.13 | 0.002187 | 13.27 | 231.37 | 52.94 | 1.00 |
| CC-2 | SECTION_02 | 839 | 100 yr | 3297.00 | 533.70 | 543.76 | 541.88 | 545.43 | 0.000831 | 10.40 | 609.89 | 311.38 | 0.66 |
| CC-2 | SECTION_02 | 839 | Ultimate 100 yr | 3300.00 | 533.70 | 543.75 | 541.88 | 545.43 | 0.000835 | 10.41 | 608.41 | 310.71 | 0.66 |
| CC-2 | SECTION_02 | 839 | 500 yr | 3875.00 | 533.70 | 545.42 | 542.55 | 546.94 | 0.000589 | 9.96 | 1300.53 | 459.87 | 0.57 |
| CC-2 | SECTION_02 | 792 | Bridge | | | | | | | | | | |
| CC-2 | SECTION_02 | 745 | 2 yr | 1102.00 | 532.47 | 538.44 | 536.47 | 539.03 | 0.000489 | 6.15 | 187.26 | 46.19 | 0.48 |
| CC-2 | SECTION_02 | 745 | 5 yr | 1845.00 | 532.47 | 539.72 | 537.78 | 540.76 | 0.000643 | 8.20 | 251.26 | 53.75 | 0.58 |
| CC-2 | SECTION_02 | 745 | 10 yr | 2258.00 | 532.47 | 540.24 | 538.42 | 541.57 | 0.000740 | 9.27 | 279.87 | 56.74 | 0.63 |
| CC-2 | SECTION_02 | 745 | 25 yr | 2658.00 | 532.47 | 540.65 | 538.99 | 542.29 | 0.000841 | 10.28 | 303.94 | 59.49 | 0.67 |
| CC-2 | SECTION_02 | 745 | 50 yr | 2923.00 | 532.47 | 540.93 | 539.36 | 542.77 | 0.000898 | 10.89 | 320.11 | 62.25 | 0.70 |
| CC-2 | SECTION_02 | 745 | 100 yr | 3297.00 | 532.47 | 541.27 | 539.84 | 543.41 | 0.000986 | 11.76 | 340.30 | 65.66 | 0.74 |
| CC-2 | SECTION_02 | 745 | Ultimate 100 yr | 3300.00 | 532.47 | 541.31 | 539.85 | 543.43 | 0.000968 | 11.69 | 343.15 | 66.14 | 0.73 |
| CC-2 | SECTION_02 | 745 | 500 yr | 3875.00 | 532.47 | 541.75 | 540.56 | 544.37 | 0.001114 | 13.01 | 369.52 | 70.98 | 0.79 |
| CC-2 | SECTION_02 | 411 | 2 yr | 1102.00 | 530.59 | 538.23 | | 538.65 | 0.004490 | 5.30 | 224.68 | 67.97 | 0.38 |
| CC-2 | SECTION_02 | 411 | 5 yr | 1845.00 | 530.59 | 539.59 | | 540.13 | 0.005004 | 6.38 | 395.44 | 180.72 | 0.41 |
| CC-2 | SECTION_02 | 411 | 10 yr | 2258.00 | 530.59 | 540.21 | | 540.74 | 0.004668 | 6.50 | 518.16 | 206.94 | 0.40 |
| CC-2 | SECTION_02 | 411 | 25 yr | 2658.00 | 530.59 | 540.75 | | 541.25 | 0.004331 | 6.54 | 632.00 | 215.93 | 0.39 |
| CC-2 | SECTION_02 | 411 | 50 yr | 2923.00 | 530.59 | 541.12 | | 541.59 | 0.004022 | 6.48 | 712.59 | 222.57 | 0.38 |
| CC-2 | SECTION_02 | 411 | 100 yr | 3297.00 | 530.59 | 541.60 | | 542.03 | 0.003688 | 6.41 | 820.40 | 230.90 | 0.37 |
| CC-2 | SECTION_02 | 411 | Ultimate 100 yr | 3300.00 | 530.59 | 541.65 | | 542.07 | 0.003561 | 6.33 | 833.07 | 231.76 | 0.36 |
| CC-2 | SECTION_02 | 411 | 500 yr | 3875.00 | 530.59 | 542.31 | | 542.70 | 0.003214 | 6.28 | 988.38 | 240.88 | 0.35 |
| CC-3 | CC-3 | 4368 | 2 yr | 221.00 | 599.03 | 601.57 | 601.57 | 602.74 | 0.003586 | 8.65 | 25.54 | 11.08 | 1.00 |
| CC-3 | CC-3 | 4368 | 5 yr | 341.00 | 599.03 | 602.39 | 602.39 | 603.88 | 0.003521 | 9.78 | 34.88 | 11.75 | 1.00 |
| CC-3 | CC-3 | 4368 | 10 yr | 421.00 | 599.03 | 602.87 | 602.87 | 604.54 | 0.003519 | 10.38 | 40.58 | 12.14 | 1.00 |
| CC-3 | CC-3 | 4368 | 25 yr | 510.00 | 599.03 | 603.37 | 603.37 | 605.22 | 0.003485 | 10.90 | 46.78 | 13.88 | 1.00 |
| CC-3 | CC-3 | 4368 | 50 yr | 584.00 | 599.03 | 603.73 | 603.73 | 605.74 | 0.003532 | 11.36 | 51.39 | 20.12 | 1.00 |
| CC-3 | CC-3 | 4368 | 100 yr | 656.00 | 599.03 | 604.08 | 604.08 | 606.22 | 0.003539 | 11.73 | 55.93 | 26.13 | 1.00 |
| CC-3 | CC-3 | 4368 | Ultimate 100 yr | 656.00 | 599.03 | 604.08 | 604.08 | 606.22 | 0.003539 | 11.73 | 55.93 | 26.13 | 1.00 |
| CC-3 | CC-3 | 4368 | 500 yr | 832.00 | 599.03 | 604.88 | 604.88 | 607.30 | 0.003534 | 12.47 | 66.72 | 46.73 | 1.00 |
| CC-3 | CC-3 | 3960 | 2 yr | 283.00 | 595.61 | 601.16 | 598.64 | 601.41 | 0.000437 | 4.20 | 78.39 | 38.10 | 0.34 |
| CC-3 | CC-3 | 3960 | 5 yr | 437.00 | 595.61 | 602.39 | 599.60 | 602.58 | 0.000300 | 3.89 | 132.08 | 49.86 | 0.28 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| CC-3 | CC-3 | 3960 | 10 yr | 541.00 | 595.61 | 602.60 | 601.03 | 602.84 | 0.000375 | 4.44 | 142.80 | 52.51 | 0.32 |
| CC-3 | CC-3 | 3960 | 25 yr | 666.00 | 595.61 | 602.78 | 601.44 | 603.10 | 0.000477 | 5.11 | 152.65 | 55.56 | 0.36 |
| CC-3 | CC-3 | 3960 | 50 yr | 770.00 | 595.61 | 602.97 | 601.72 | 603.34 | 0.000536 | 5.52 | 163.23 | 58.67 | 0.38 |
| CC-3 | CC-3 | 3960 | 100 yr | 867.00 | 595.61 | 603.14 | 601.95 | 603.56 | 0.000580 | 5.85 | 173.51 | 61.53 | 0.40 |
| CC-3 | CC-3 | 3960 | Ultimate 100 yr | 867.00 | 595.61 | 603.14 | 601.95 | 603.56 | 0.000580 | 5.85 | 173.51 | 61.53 | 0.40 |
| CC-3 | CC-3 | 3960 | 500 yr | 1098.00 | 595.61 | 603.84 | 602.38 | 604.25 | 0.000499 | 5.80 | 221.92 | 79.38 | 0.38 |
| CC-3 | CC-3 | 3666 | 2 yr | 283.00 | 595.57 | 601.07 | 598.79 | 601.28 | 0.000368 | 3.63 | 77.87 | 23.33 | 0.35 |
| CC-3 | CC-3 | 3666 | 5 yr | 437.00 | 595.57 | 602.21 | 599.77 | 602.47 | 0.000363 | 4.13 | 118.39 | 90.71 | 0.36 |
| CC-3 | CC-3 | 3666 | 10 yr | 541.00 | 595.57 | 602.32 | 600.18 | 602.70 | 0.000512 | 4.98 | 129.86 | 128.76 | 0.43 |
| CC-3 | CC-3 | 3666 | 25 yr | 666.00 | 595.57 | 602.32 | 600.62 | 602.90 | 0.000775 | 6.12 | 130.28 | 129.82 | 0.52 |
| CC-3 | CC-3 | 3666 | 50 yr | 770.00 | 595.57 | 602.31 | 600.96 | 603.09 | 0.001043 | 7.10 | 129.03 | 126.65 | 0.61 |
| CC-3 | CC-3 | 3666 | 100 yr | 867.00 | 595.57 | 602.22 | 601.26 | 603.26 | 0.001418 | 8.17 | 119.27 | 91.20 | 0.71 |
| CC-3 | CC-3 | 3666 | Ultimate 100 yr | 867.00 | 595.57 | 602.22 | 601.26 | 603.26 | 0.001418 | 8.17 | 119.27 | 91.20 | 0.71 |
| CC-3 | CC-3 | 3666 | 500 yr | 1098.00 | 595.57 | 601.91 | 601.91 | 603.85 | 0.002885 | 11.19 | 98.13 | 25.21 | 1.00 |
| CC-3 | CC-3 | 3584 | | Culvert | | | | | | | | | |
| CC-3 | CC-3 | 3561 | 2 yr | 283.00 | 594.40 | 596.63 | 596.63 | 597.74 | 0.003560 | 8.47 | 33.40 | 15.00 | 1.00 |
| CC-3 | CC-3 | 3561 | 5 yr | 437.00 | 594.40 | 597.36 | 597.36 | 598.86 | 0.003611 | 9.83 | 44.44 | 15.00 | 1.01 |
| CC-3 | CC-3 | 3561 | 10 yr | 541.00 | 594.40 | 597.83 | 597.83 | 599.55 | 0.003593 | 10.51 | 51.48 | 15.00 | 1.00 |
| CC-3 | CC-3 | 3561 | 25 yr | 666.00 | 594.40 | 598.35 | 598.35 | 600.31 | 0.003621 | 11.24 | 59.27 | 15.00 | 1.00 |
| CC-3 | CC-3 | 3561 | 50 yr | 770.00 | 594.40 | 598.72 | 598.72 | 600.91 | 0.003762 | 11.90 | 64.73 | 15.00 | 1.01 |
| CC-3 | CC-3 | 3561 | 100 yr | 867.00 | 594.40 | 599.09 | 599.09 | 601.45 | 0.003758 | 12.31 | 70.41 | 15.00 | 1.00 |
| CC-3 | CC-3 | 3561 | Ultimate 100 yr | 867.00 | 594.40 | 599.09 | 599.09 | 601.45 | 0.003758 | 12.31 | 70.41 | 15.00 | 1.00 |
| CC-3 | CC-3 | 3561 | 500 yr | 1098.00 | 594.40 | 599.91 | 599.91 | 602.65 | 0.003841 | 13.29 | 82.71 | 17.41 | 1.00 |
| CC-3 | CC-3 | 2960 | 2 yr | 283.00 | 588.45 | 590.67 | 590.67 | 591.79 | 0.003608 | 8.51 | 33.25 | 15.00 | 1.01 |
| CC-3 | CC-3 | 2960 | 5 yr | 437.00 | 588.45 | 591.41 | 591.41 | 592.91 | 0.003623 | 9.85 | 44.38 | 15.00 | 1.01 |
| CC-3 | CC-3 | 2960 | 10 yr | 541.00 | 588.45 | 591.89 | 591.89 | 593.60 | 0.003581 | 10.50 | 51.54 | 15.00 | 1.00 |
| CC-3 | CC-3 | 2960 | 25 yr | 666.00 | 588.45 | 592.39 | 592.39 | 594.36 | 0.003639 | 11.26 | 59.17 | 15.00 | 1.00 |
| CC-3 | CC-3 | 2960 | 50 yr | 770.00 | 588.45 | 592.78 | 592.78 | 594.96 | 0.003720 | 11.85 | 64.99 | 15.00 | 1.00 |
| CC-3 | CC-3 | 2960 | 100 yr | 867.00 | 588.45 | 593.15 | 593.15 | 595.50 | 0.003740 | 12.29 | 70.53 | 15.00 | 1.00 |
| CC-3 | CC-3 | 2960 | Ultimate 100 yr | 867.00 | 588.45 | 593.15 | 593.15 | 595.50 | 0.003740 | 12.29 | 70.53 | 15.00 | 1.00 |
| CC-3 | CC-3 | 2960 | 500 yr | 1098.00 | 588.45 | 593.96 | 593.96 | 596.70 | 0.003591 | 13.28 | 89.91 | 33.56 | 1.00 |
| CC-3 | CC-3 | 2461 | 2 yr | 283.00 | 583.51 | 589.89 | | 590.02 | 0.000171 | 2.96 | 95.64 | 15.00 | 0.21 |
| CC-3 | CC-3 | 2461 | 5 yr | 437.00 | 583.51 | 589.71 | 586.49 | 590.05 | 0.000441 | 4.70 | 92.99 | 15.00 | 0.33 |
| CC-3 | CC-3 | 2461 | 10 yr | 541.00 | 583.51 | 589.69 | 586.94 | 590.22 | 0.000683 | 5.84 | 92.64 | 15.00 | 0.41 |
| CC-3 | CC-3 | 2461 | 25 yr | 666.00 | 583.51 | 589.58 | | 590.41 | 0.001086 | 7.31 | 91.05 | 15.00 | 0.52 |
| CC-3 | CC-3 | 2461 | 50 yr | 770.00 | 583.51 | 589.38 | | 590.57 | 0.001591 | 8.75 | 88.04 | 15.00 | 0.64 |
| CC-3 | CC-3 | 2461 | 100 yr | 867.00 | 583.51 | 589.45 | | 590.92 | 0.001948 | 9.72 | 89.17 | 15.00 | 0.70 |
| CC-3 | CC-3 | 2461 | Ultimate 100 yr | 867.00 | 583.51 | 589.45 | | 590.92 | 0.001948 | 9.72 | 89.17 | 15.00 | 0.70 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| CC-3 | CC-3 | 2461 | 500 yr | 1098.00 | 583.51 | 589.28 | 589.02 | 591.78 | 0.003390 | 12.68 | 86.56 | 15.00 | 0.93 |
| CC-3 | CC-3 | 2400 | 2 yr | 331.00 | 582.91 | 589.86 | 585.36 | 590.01 | 0.000170 | 3.09 | 107.09 | 263.41 | 0.21 |
| CC-3 | CC-3 | 2400 | 5 yr | 549.00 | 582.91 | 589.57 | 586.37 | 590.01 | 0.000528 | 5.36 | 102.42 | 164.81 | 0.37 |
| CC-3 | CC-3 | 2400 | 10 yr | 677.00 | 582.91 | 589.45 | 586.89 | 590.15 | 0.000844 | 6.73 | 100.55 | 122.34 | 0.47 |
| CC-3 | CC-3 | 2400 | 25 yr | 825.00 | 582.91 | 589.16 | 587.42 | 590.30 | 0.001425 | 8.60 | 95.96 | 19.40 | 0.61 |
| CC-3 | CC-3 | 2400 | 50 yr | 927.00 | 582.91 | 588.74 | 587.79 | 590.41 | 0.002179 | 10.36 | 89.50 | 15.68 | 0.76 |
| CC-3 | CC-3 | 2400 | 100 yr | 1020.00 | 582.91 | 588.12 | 588.12 | 590.66 | 0.003630 | 12.78 | 79.79 | 15.61 | 1.00 |
| CC-3 | CC-3 | 2400 | Ultimate 100 yr | 1020.00 | 582.91 | 588.12 | 588.12 | 590.66 | 0.003630 | 12.78 | 79.79 | 15.61 | 1.00 |
| CC-3 | CC-3 | 2400 | 500 yr | 1197.00 | 582.91 | 588.69 | 588.69 | 591.52 | 0.003732 | 13.50 | 88.63 | 15.67 | 1.00 |
| CC-3 | CC-3 | 2210 | | Culvert | | | | | | | | | |
| CC-3 | CC-3 | 2030 | 2 yr | 331.00 | 578.46 | 585.04 | | 585.31 | 0.003834 | 4.16 | 79.64 | 16.65 | 0.33 |
| CC-3 | CC-3 | 2030 | 5 yr | 549.00 | 578.46 | 586.68 | | 587.08 | 0.004592 | 5.05 | 108.78 | 18.86 | 0.37 |
| CC-3 | CC-3 | 2030 | 10 yr | 677.00 | 578.46 | 587.29 | | 587.78 | 0.005331 | 5.62 | 120.43 | 19.68 | 0.40 |
| CC-3 | CC-3 | 2030 | 25 yr | 825.00 | 578.46 | 587.93 | 584.41 | 588.50 | 0.005632 | 6.10 | 148.55 | 94.62 | 0.42 |
| CC-3 | CC-3 | 2030 | 50 yr | 927.00 | 578.46 | 588.22 | 584.80 | 588.80 | 0.005638 | 6.28 | 183.05 | 135.07 | 0.42 |
| CC-3 | CC-3 | 2030 | 100 yr | 1020.00 | 578.46 | 588.44 | 585.16 | 589.00 | 0.005540 | 6.35 | 213.52 | 150.29 | 0.42 |
| CC-3 | CC-3 | 2030 | Ultimate 100 yr | 1020.00 | 578.46 | 588.44 | 585.16 | 589.00 | 0.005540 | 6.35 | 213.52 | 150.29 | 0.42 |
| CC-3 | CC-3 | 2030 | 500 yr | 1197.00 | 578.46 | 588.77 | 585.79 | 589.30 | 0.005371 | 6.45 | 267.20 | 182.41 | 0.41 |
| CC-3 | CC-3 | 1460 | 2 yr | 331.00 | 576.40 | 580.19 | 580.19 | 581.19 | 0.031633 | 8.02 | 41.26 | 20.67 | 1.00 |
| CC-3 | CC-3 | 1460 | 5 yr | 549.00 | 576.40 | 581.12 | 581.12 | 582.31 | 0.029856 | 8.75 | 62.74 | 26.48 | 1.00 |
| CC-3 | CC-3 | 1460 | 10 yr | 677.00 | 576.40 | 582.05 | 581.62 | 582.87 | 0.020124 | 7.28 | 92.98 | 50.68 | 0.83 |
| CC-3 | CC-3 | 1460 | 25 yr | 825.00 | 576.40 | 582.39 | 582.08 | 583.31 | 0.021428 | 7.70 | 107.15 | 88.23 | 0.86 |
| CC-3 | CC-3 | 1460 | 50 yr | 927.00 | 576.40 | 582.62 | 582.34 | 583.59 | 0.021537 | 7.89 | 117.48 | 135.03 | 0.87 |
| CC-3 | CC-3 | 1460 | 100 yr | 1020.00 | 576.40 | 582.79 | 582.53 | 583.82 | 0.021945 | 8.14 | 125.32 | 174.97 | 0.89 |
| CC-3 | CC-3 | 1460 | Ultimate 100 yr | 1020.00 | 576.40 | 582.79 | 582.53 | 583.82 | 0.021945 | 8.14 | 125.32 | 174.97 | 0.89 |
| CC-3 | CC-3 | 1460 | 500 yr | 1197.00 | 576.40 | 583.12 | 582.89 | 584.22 | 0.021613 | 8.45 | 142.29 | 250.66 | 0.89 |
| CC-3 | CC-3 | 1152 | 2 yr | 399.00 | 571.64 | 574.83 | 574.18 | 575.62 | 0.001634 | 7.11 | 56.14 | 17.84 | 0.71 |
| CC-3 | CC-3 | 1152 | 5 yr | 710.00 | 571.64 | 576.27 | 575.35 | 577.43 | 0.001701 | 8.67 | 82.00 | 19.62 | 0.72 |
| CC-3 | CC-3 | 1152 | 10 yr | 869.00 | 571.64 | 579.12 | 575.89 | 579.61 | 0.000417 | 5.89 | 209.24 | 104.17 | 0.38 |
| CC-3 | CC-3 | 1152 | 25 yr | 1053.00 | 571.64 | 579.15 | 576.49 | 579.86 | 0.000601 | 7.09 | 212.35 | 107.64 | 0.46 |
| CC-3 | CC-3 | 1152 | 50 yr | 1182.00 | 571.64 | 579.30 | 577.07 | 580.12 | 0.000689 | 7.70 | 229.90 | 122.41 | 0.49 |
| CC-3 | CC-3 | 1152 | 100 yr | 1290.00 | 571.64 | 579.34 | 577.53 | 580.30 | 0.000803 | 8.33 | 234.23 | 125.32 | 0.53 |
| CC-3 | CC-3 | 1152 | Ultimate 100 yr | 1290.00 | 571.64 | 579.34 | 577.53 | 580.30 | 0.000803 | 8.33 | 234.23 | 125.32 | 0.53 |
| CC-3 | CC-3 | 1152 | 500 yr | 1528.00 | 571.64 | 579.50 | 578.19 | 580.73 | 0.001013 | 9.50 | 256.28 | 139.24 | 0.60 |
| CC-3 | CC-3 | 1110 | | Bridge | | | | | | | | | |
| CC-3 | CC-3 | 1067 | 2 yr | 399.00 | 571.47 | 574.05 | 574.05 | 575.30 | 0.003311 | 8.98 | 44.42 | 17.68 | 1.00 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| CC-3 | CC-3 | 1067 | 5 yr | 710.00 | 571.47 | 575.23 | 575.23 | 577.06 | 0.003312 | 10.87 | 65.33 | 17.76 | 1.00 |
| CC-3 | CC-3 | 1067 | 10 yr | 869.00 | 571.47 | 575.76 | 575.76 | 577.85 | 0.003326 | 11.60 | 74.92 | 17.80 | 1.00 |
| CC-3 | CC-3 | 1067 | 25 yr | 1053.00 | 571.47 | 576.33 | 576.33 | 578.71 | 0.003390 | 12.38 | 85.04 | 17.84 | 1.00 |
| CC-3 | CC-3 | 1067 | 50 yr | 1182.00 | 571.47 | 576.72 | 576.72 | 579.29 | 0.003408 | 12.84 | 92.04 | 17.87 | 1.00 |
| CC-3 | CC-3 | 1067 | 100 yr | 1290.00 | 571.47 | 577.03 | 577.03 | 579.75 | 0.003441 | 13.22 | 97.58 | 17.89 | 1.00 |
| CC-3 | CC-3 | 1067 | Ultimate 100 yr | 1290.00 | 571.47 | 577.03 | 577.03 | 579.75 | 0.003441 | 13.22 | 97.58 | 17.89 | 1.00 |
| CC-3 | CC-3 | 1067 | 500 yr | 1528.00 | 571.47 | 577.70 | 577.70 | 580.72 | 0.003413 | 13.96 | 113.26 | 44.93 | 1.00 |
| CC-3 | CC-3 | 960 | 2 yr | 399.00 | 571.17 | 573.65 | 573.65 | 574.88 | 0.003328 | 8.92 | 44.74 | 18.15 | 1.00 |
| CC-3 | CC-3 | 960 | 5 yr | 710.00 | 571.17 | 574.81 | 574.81 | 576.61 | 0.003292 | 10.77 | 65.94 | 18.22 | 1.00 |
| CC-3 | CC-3 | 960 | 10 yr | 869.00 | 571.17 | 575.33 | 575.33 | 577.39 | 0.003324 | 11.52 | 75.43 | 18.26 | 1.00 |
| CC-3 | CC-3 | 960 | 25 yr | 1053.00 | 571.17 | 575.90 | 575.90 | 578.24 | 0.003367 | 12.28 | 85.74 | 18.29 | 1.00 |
| CC-3 | CC-3 | 960 | 50 yr | 1182.00 | 571.17 | 576.28 | 576.28 | 578.80 | 0.003380 | 12.73 | 92.82 | 18.31 | 1.00 |
| CC-3 | CC-3 | 960 | 100 yr | 1290.00 | 571.17 | 576.58 | 576.58 | 579.26 | 0.003428 | 13.13 | 98.21 | 18.33 | 1.00 |
| CC-3 | CC-3 | 960 | Ultimate 100 yr | 1290.00 | 571.17 | 576.58 | 576.58 | 579.26 | 0.003428 | 13.13 | 98.21 | 18.33 | 1.00 |
| CC-3 | CC-3 | 960 | 500 yr | 1528.00 | 571.17 | 577.23 | 577.23 | 580.21 | 0.003476 | 13.87 | 110.19 | 18.37 | 1.00 |
| CC-3 | CC-3 | 727 | 2 yr | 418.00 | 566.39 | 570.21 | 569.03 | 570.81 | 0.001057 | 6.21 | 67.35 | 18.09 | 0.57 |
| CC-3 | CC-3 | 727 | 5 yr | 756.00 | 566.39 | 572.22 | 570.28 | 573.04 | 0.000991 | 7.27 | 103.97 | 18.27 | 0.54 |
| CC-3 | CC-3 | 727 | 10 yr | 910.00 | 566.39 | 573.03 | 570.78 | 573.94 | 0.000991 | 7.66 | 118.75 | 18.34 | 0.53 |
| CC-3 | CC-3 | 727 | 25 yr | 1115.00 | 566.39 | 575.13 | 571.41 | 575.91 | 0.000688 | 7.08 | 157.54 | 18.53 | 0.43 |
| CC-3 | CC-3 | 727 | 50 yr | 1245.00 | 566.39 | 575.14 | 571.77 | 576.11 | 0.000856 | 7.90 | 157.62 | 18.53 | 0.48 |
| CC-3 | CC-3 | 727 | 100 yr | 1358.00 | 566.39 | 575.24 | 572.10 | 576.36 | 0.000984 | 8.51 | 159.59 | 24.08 | 0.51 |
| CC-3 | CC-3 | 727 | Ultimate 100 yr | 1358.00 | 566.39 | 575.24 | 572.10 | 576.36 | 0.000984 | 8.51 | 159.59 | 24.08 | 0.51 |
| CC-3 | CC-3 | 727 | 500 yr | 1568.00 | 566.39 | 575.30 | 572.67 | 576.78 | 0.001283 | 9.77 | 161.30 | 36.02 | 0.58 |
| CC-3 | CC-3 | 662 | | Bridge | | | | | | | | | |
| CC-3 | CC-3 | 604 | 2 yr | 418.00 | 566.03 | 568.95 | 568.94 | 570.38 | 0.003468 | 9.59 | 43.60 | 15.09 | 0.99 |
| CC-3 | CC-3 | 604 | 5 yr | 756.00 | 566.03 | 570.34 | 570.34 | 572.47 | 0.003621 | 11.71 | 64.58 | 15.17 | 1.00 |
| CC-3 | CC-3 | 604 | 10 yr | 910.00 | 566.03 | 570.90 | 570.90 | 573.31 | 0.003692 | 12.45 | 73.12 | 15.21 | 1.00 |
| CC-3 | CC-3 | 604 | 25 yr | 1115.00 | 566.03 | 571.64 | 571.61 | 574.35 | 0.003714 | 13.21 | 84.40 | 15.25 | 0.99 |
| CC-3 | CC-3 | 604 | 50 yr | 1245.00 | 566.03 | 572.03 | 572.03 | 574.98 | 0.003849 | 13.79 | 90.26 | 15.28 | 1.00 |
| CC-3 | CC-3 | 604 | 100 yr | 1358.00 | 566.03 | 572.39 | 572.39 | 575.51 | 0.003890 | 14.18 | 95.80 | 15.30 | 1.00 |
| CC-3 | CC-3 | 604 | Ultimate 100 yr | 1358.00 | 566.03 | 572.39 | 572.39 | 575.51 | 0.003890 | 14.18 | 95.80 | 15.30 | 1.00 |
| CC-3 | CC-3 | 604 | 500 yr | 1568.00 | 566.03 | 573.02 | 573.02 | 576.45 | 0.003990 | 14.86 | 105.53 | 15.34 | 1.00 |
| CC-3 | CC-3 | 398 | 2 yr | 418.00 | 565.39 | 568.26 | 568.26 | 569.65 | 0.003461 | 9.48 | 44.07 | 15.86 | 1.00 |
| CC-3 | CC-3 | 398 | 5 yr | 756.00 | 565.39 | 569.62 | 569.62 | 571.67 | 0.003507 | 11.50 | 65.74 | 15.95 | 1.00 |
| CC-3 | CC-3 | 398 | 10 yr | 910.00 | 565.39 | 570.17 | 570.17 | 572.48 | 0.003546 | 12.20 | 74.56 | 15.98 | 1.00 |
| CC-3 | CC-3 | 398 | 25 yr | 1115.00 | 565.39 | 571.05 | 570.85 | 573.51 | 0.003273 | 12.58 | 88.66 | 16.04 | 0.94 |
| CC-3 | CC-3 | 398 | 50 yr | 1245.00 | 565.39 | 571.24 | 571.24 | 574.10 | 0.003715 | 13.58 | 91.71 | 16.05 | 1.00 |
| CC-3 | CC-3 | 398 | 100 yr | 1358.00 | 565.39 | 571.59 | 571.59 | 574.61 | 0.003753 | 13.96 | 97.29 | 16.07 | 1.00 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| CC-3 | CC-3 | 398 | Ultimate 100 yr | 1358.00 | 565.39 | 571.59 | 571.59 | 574.61 | 0.003753 | 13.96 | 97.29 | 16.07 | 1.00 |
| CC-3 | CC-3 | 398 | 500 yr | 1568.00 | 565.39 | 572.21 | 572.21 | 575.53 | 0.003830 | 14.62 | 107.27 | 16.11 | 1.00 |
| CC-3 | CC-3 | 198 | 2 yr | 418.00 | 563.89 | 566.94 | 566.39 | 567.76 | 0.001777 | 7.28 | 57.42 | 19.09 | 0.74 |
| CC-3 | CC-3 | 198 | 5 yr | 756.00 | 563.89 | 568.42 | 567.58 | 569.63 | 0.001781 | 8.83 | 85.62 | 19.14 | 0.74 |
| CC-3 | CC-3 | 198 | 10 yr | 910.00 | 563.89 | 569.02 | 568.07 | 570.38 | 0.001794 | 9.37 | 97.11 | 19.17 | 0.73 |
| CC-3 | CC-3 | 198 | 25 yr | 1115.00 | 563.89 | 571.77 | 568.67 | 572.62 | 0.000763 | 7.40 | 159.04 | 50.62 | 0.47 |
| CC-3 | CC-3 | 198 | 50 yr | 1245.00 | 563.89 | 572.10 | 569.03 | 573.05 | 0.000816 | 7.86 | 178.13 | 67.06 | 0.49 |
| CC-3 | CC-3 | 198 | 100 yr | 1358.00 | 563.89 | 572.14 | 569.33 | 573.25 | 0.000949 | 8.51 | 181.31 | 68.60 | 0.52 |
| CC-3 | CC-3 | 198 | Ultimate 100 yr | 1358.00 | 563.89 | 572.14 | 569.33 | 573.25 | 0.000949 | 8.51 | 181.31 | 68.60 | 0.52 |
| CC-3 | CC-3 | 198 | 500 yr | 1568.00 | 563.89 | 572.29 | 569.87 | 573.69 | 0.001179 | 9.60 | 191.61 | 73.35 | 0.59 |
| CC-3 | CC-3 | 158 | Bridge | | | | | | | | | | |
| CC-3 | CC-3 | 115 | 2 yr | 418.00 | 563.61 | 566.61 | 566.18 | 567.52 | 0.002026 | 7.68 | 54.46 | 18.57 | 0.79 |
| CC-3 | CC-3 | 115 | 5 yr | 756.00 | 563.61 | 567.44 | 567.40 | 569.25 | 0.003141 | 10.80 | 69.98 | 18.66 | 0.98 |
| CC-3 | CC-3 | 115 | 10 yr | 910.00 | 563.61 | 567.92 | 567.88 | 569.98 | 0.003194 | 11.52 | 78.97 | 18.72 | 0.99 |
| CC-3 | CC-3 | 115 | 25 yr | 1115.00 | 563.61 | 568.51 | 568.51 | 570.89 | 0.003288 | 12.39 | 89.98 | 18.78 | 1.00 |
| CC-3 | CC-3 | 115 | 50 yr | 1245.00 | 563.61 | 568.88 | 568.88 | 571.44 | 0.003315 | 12.85 | 96.90 | 18.82 | 1.00 |
| CC-3 | CC-3 | 115 | 100 yr | 1358.00 | 563.61 | 569.18 | 569.18 | 571.90 | 0.003355 | 13.24 | 102.56 | 18.85 | 1.00 |
| CC-3 | CC-3 | 115 | Ultimate 100 yr | 1358.00 | 563.61 | 569.18 | 569.18 | 571.90 | 0.003355 | 13.24 | 102.56 | 18.85 | 1.00 |
| CC-3 | CC-3 | 115 | 500 yr | 1568.00 | 563.61 | 569.73 | 569.73 | 572.72 | 0.003402 | 13.87 | 113.01 | 18.91 | 1.00 |
| CC-3 | CC-3 | 50 | 2 yr | 418.00 | 563.51 | 566.04 | 566.04 | 567.27 | 0.003161 | 8.90 | 46.96 | 19.01 | 1.00 |
| CC-3 | CC-3 | 50 | 5 yr | 756.00 | 563.51 | 567.24 | 567.24 | 569.05 | 0.003117 | 10.79 | 70.03 | 19.44 | 1.00 |
| CC-3 | CC-3 | 50 | 10 yr | 910.00 | 563.51 | 567.73 | 567.73 | 569.76 | 0.003095 | 11.42 | 79.65 | 19.62 | 1.00 |
| CC-3 | CC-3 | 50 | 25 yr | 1115.00 | 563.51 | 568.33 | 568.33 | 570.64 | 0.003106 | 12.19 | 91.50 | 19.83 | 1.00 |
| CC-3 | CC-3 | 50 | 50 yr | 1245.00 | 563.51 | 568.69 | 568.69 | 571.17 | 0.003120 | 12.62 | 98.64 | 19.96 | 1.00 |
| CC-3 | CC-3 | 50 | 100 yr | 1358.00 | 563.51 | 569.00 | 569.00 | 571.61 | 0.003126 | 12.96 | 104.75 | 20.07 | 1.00 |
| CC-3 | CC-3 | 50 | Ultimate 100 yr | 1358.00 | 563.51 | 569.00 | 569.00 | 571.61 | 0.003126 | 12.96 | 104.75 | 20.07 | 1.00 |
| CC-3 | CC-3 | 50 | 500 yr | 1568.00 | 563.51 | 569.55 | 569.55 | 572.39 | 0.003131 | 13.53 | 115.87 | 20.27 | 1.00 |
| CC-4 | CC-4 | 1213 | 2 yr | 192.00 | 592.60 | 594.86 | 594.86 | 595.53 | 0.003005 | 6.83 | 34.67 | 28.97 | 1.01 |
| CC-4 | CC-4 | 1213 | 5 yr | 289.00 | 592.60 | 595.30 | 595.30 | 596.14 | 0.002708 | 7.74 | 48.32 | 33.70 | 1.00 |
| CC-4 | CC-4 | 1213 | 10 yr | 355.00 | 592.60 | 595.57 | 595.57 | 596.51 | 0.002529 | 8.20 | 57.92 | 36.67 | 0.99 |
| CC-4 | CC-4 | 1213 | 25 yr | 429.00 | 592.60 | 595.92 | 595.92 | 596.88 | 0.002170 | 8.39 | 71.16 | 40.44 | 0.94 |
| CC-4 | CC-4 | 1213 | 50 yr | 489.00 | 592.60 | 596.10 | 596.10 | 597.14 | 0.002158 | 8.77 | 78.86 | 42.50 | 0.95 |
| CC-4 | CC-4 | 1213 | 100 yr | 548.00 | 592.60 | 596.29 | 596.29 | 597.39 | 0.002112 | 9.08 | 86.90 | 44.61 | 0.95 |
| CC-4 | CC-4 | 1213 | Ultimate 100 yr | 558.00 | 592.60 | 596.30 | 596.30 | 597.43 | 0.002143 | 9.18 | 87.65 | 44.83 | 0.96 |
| CC-4 | CC-4 | 1213 | 500 yr | 685.00 | 592.60 | 596.69 | 596.69 | 597.91 | 0.001997 | 9.65 | 106.21 | 50.11 | 0.94 |
| CC-4 | CC-4 | 713 | 2 yr | 192.00 | 589.37 | 590.86 | 590.86 | 591.34 | 0.004539 | 5.56 | 34.53 | 36.28 | 1.00 |
| CC-4 | CC-4 | 713 | 5 yr | 289.00 | 589.37 | 591.19 | 591.19 | 591.77 | 0.004488 | 6.09 | 47.44 | 41.21 | 1.00 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|--------|------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| CC-4 | CC-4 | 713 | 10 yr | 355.00 | 589.37 | 591.38 | 591.38 | 592.02 | 0.004500 | 6.39 | 55.58 | 44.17 | 1.00 |
| CC-4 | CC-4 | 713 | 25 yr | 429.00 | 589.37 | 591.56 | 591.56 | 592.27 | 0.004606 | 6.79 | 63.71 | 48.76 | 0.99 |
| CC-4 | CC-4 | 713 | 50 yr | 489.00 | 589.37 | 591.68 | 591.68 | 592.47 | 0.004726 | 7.11 | 70.07 | 52.07 | 1.00 |
| CC-4 | CC-4 | 713 | 100 yr | 548.00 | 589.37 | 591.82 | 591.82 | 592.65 | 0.004710 | 7.35 | 77.16 | 55.53 | 0.99 |
| CC-4 | CC-4 | 713 | Ultimate 100 yr | 558.00 | 589.37 | 591.84 | 591.84 | 592.69 | 0.004700 | 7.39 | 78.42 | 56.12 | 0.99 |
| CC-4 | CC-4 | 713 | 500 yr | 685.00 | 589.37 | 592.09 | 592.09 | 593.06 | 0.004723 | 7.89 | 93.51 | 62.25 | 0.99 |
| CC-4 | CC-4 | 213 | 2 yr | 192.00 | 582.86 | 584.31 | 584.31 | 584.82 | 0.002938 | 5.87 | 39.28 | 46.10 | 0.97 |
| CC-4 | CC-4 | 213 | 5 yr | 289.00 | 582.86 | 584.67 | 584.67 | 585.28 | 0.002548 | 6.54 | 57.02 | 54.99 | 0.94 |
| CC-4 | CC-4 | 213 | 10 yr | 355.00 | 582.86 | 584.87 | 584.87 | 585.55 | 0.002429 | 6.95 | 68.88 | 63.27 | 0.94 |
| CC-4 | CC-4 | 213 | 25 yr | 429.00 | 582.86 | 585.09 | 585.09 | 585.81 | 0.002226 | 7.22 | 84.18 | 72.86 | 0.92 |
| CC-4 | CC-4 | 213 | 50 yr | 489.00 | 582.86 | 585.26 | 585.26 | 586.00 | 0.002094 | 7.41 | 97.03 | 78.53 | 0.90 |
| CC-4 | CC-4 | 213 | 100 yr | 548.00 | 582.86 | 585.40 | 585.40 | 586.18 | 0.002056 | 7.66 | 108.05 | 82.63 | 0.90 |
| CC-4 | CC-4 | 213 | Ultimate 100 yr | 558.00 | 582.86 | 585.42 | 585.42 | 586.21 | 0.002072 | 7.73 | 109.40 | 83.12 | 0.91 |
| CC-4 | CC-4 | 213 | 500 yr | 685.00 | 582.86 | 585.68 | 585.68 | 586.55 | 0.002013 | 8.21 | 132.51 | 91.08 | 0.91 |
| SF CWC | SECTION_01 | 29775 | 2 yr | 363.00 | 618.72 | 620.82 | 620.82 | 621.83 | 0.003118 | 8.06 | 45.02 | 22.23 | 1.00 |
| SF CWC | SECTION_01 | 29775 | 5 yr | 534.00 | 618.72 | 621.40 | 621.40 | 622.71 | 0.003057 | 9.19 | 58.14 | 22.39 | 1.00 |
| SF CWC | SECTION_01 | 29775 | 10 yr | 649.00 | 618.72 | 621.78 | 621.78 | 623.26 | 0.002992 | 9.76 | 66.51 | 22.50 | 1.00 |
| SF CWC | SECTION_01 | 29775 | 25 yr | 779.00 | 618.72 | 622.17 | 622.17 | 623.83 | 0.002966 | 10.35 | 75.24 | 22.60 | 1.00 |
| SF CWC | SECTION_01 | 29775 | 50 yr | 882.00 | 618.72 | 622.46 | 622.46 | 624.26 | 0.002940 | 10.76 | 81.96 | 22.69 | 1.00 |
| SF CWC | SECTION_01 | 29775 | 100 yr | 984.00 | 618.72 | 622.74 | 622.74 | 624.67 | 0.002929 | 11.14 | 88.31 | 22.77 | 1.00 |
| SF CWC | SECTION_01 | 29775 | Ultimate 100 yr | 997.00 | 618.72 | 622.75 | 622.75 | 624.72 | 0.002981 | 11.26 | 88.56 | 22.77 | 1.01 |
| SF CWC | SECTION_01 | 29775 | 500 yr | 1224.00 | 618.72 | 623.34 | 623.34 | 625.58 | 0.002932 | 12.01 | 102.08 | 25.37 | 1.00 |
| SF CWC | SECTION_01 | 29500 | 2 yr | 363.00 | 616.76 | 618.94 | 618.94 | 619.99 | 0.003185 | 8.21 | 44.19 | 21.01 | 1.00 |
| SF CWC | SECTION_01 | 29500 | 5 yr | 534.00 | 616.76 | 619.55 | 619.55 | 620.91 | 0.003121 | 9.34 | 57.15 | 21.09 | 1.00 |
| SF CWC | SECTION_01 | 29500 | 10 yr | 649.00 | 616.76 | 619.94 | 619.94 | 621.47 | 0.003082 | 9.95 | 65.23 | 21.14 | 1.00 |
| SF CWC | SECTION_01 | 29500 | 25 yr | 779.00 | 616.76 | 620.37 | 620.37 | 622.07 | 0.002885 | 10.48 | 75.21 | 25.84 | 0.99 |
| SF CWC | SECTION_01 | 29500 | 50 yr | 882.00 | 616.76 | 620.70 | 620.70 | 622.51 | 0.002712 | 10.80 | 84.59 | 29.94 | 0.97 |
| SF CWC | SECTION_01 | 29500 | 100 yr | 984.00 | 616.76 | 621.04 | 621.04 | 622.91 | 0.002528 | 11.02 | 95.34 | 34.02 | 0.95 |
| SF CWC | SECTION_01 | 29500 | Ultimate 100 yr | 997.00 | 616.76 | 621.07 | 621.07 | 622.96 | 0.002522 | 11.07 | 96.53 | 34.45 | 0.95 |
| SF CWC | SECTION_01 | 29500 | 500 yr | 1224.00 | 616.76 | 621.75 | 621.75 | 623.76 | 0.002239 | 11.52 | 122.69 | 42.70 | 0.92 |
| SF CWC | SECTION_01 | 29136 | 2 yr | 492.00 | 612.81 | 616.11 | 615.57 | 617.02 | 0.001798 | 7.64 | 64.43 | 20.23 | 0.75 |
| SF CWC | SECTION_01 | 29136 | 5 yr | 731.00 | 612.81 | 617.04 | 616.36 | 618.24 | 0.001793 | 8.76 | 83.70 | 22.92 | 0.76 |
| SF CWC | SECTION_01 | 29136 | 10 yr | 890.00 | 612.81 | 619.51 | 616.85 | 619.83 | 0.000327 | 5.12 | 253.62 | 190.32 | 0.35 |
| SF CWC | SECTION_01 | 29136 | 25 yr | 1071.00 | 612.81 | 619.64 | 617.52 | 620.04 | 0.000401 | 5.75 | 279.65 | 197.32 | 0.39 |
| SF CWC | SECTION_01 | 29136 | 50 yr | 1215.00 | 612.81 | 619.61 | 618.20 | 620.14 | 0.000537 | 6.63 | 273.26 | 195.62 | 0.45 |
| SF CWC | SECTION_01 | 29136 | 100 yr | 1357.00 | 612.81 | 619.77 | 619.50 | 620.30 | 0.000554 | 6.84 | 303.79 | 203.59 | 0.46 |
| SF CWC | SECTION_01 | 29136 | Ultimate 100 yr | 1376.00 | 612.81 | 620.03 | 619.53 | 620.42 | 0.000412 | 6.05 | 359.43 | 216.71 | 0.40 |
| SF CWC | SECTION_01 | 29136 | 500 yr | 1692.00 | 612.81 | 620.22 | 619.84 | 620.69 | 0.000495 | 6.75 | 402.14 | 225.91 | 0.44 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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) | |
| SF CWC | SECTION_01 | 29103 | | Bridge | | | | | | | | | |
| SF CWC | SECTION_01 | 29069 | 2 yr | 492.00 | 612.63 | 614.99 | 614.99 | 615.92 | 0.002752 | 7.73 | 63.66 | 34.26 | 1.00 |
| SF CWC | SECTION_01 | 29069 | 5 yr | 731.00 | 612.63 | 615.59 | 615.59 | 616.73 | 0.002600 | 8.56 | 85.43 | 37.69 | 1.00 |
| SF CWC | SECTION_01 | 29069 | 10 yr | 890.00 | 612.63 | 615.94 | 615.94 | 617.20 | 0.002534 | 8.99 | 98.96 | 39.68 | 1.00 |
| SF CWC | SECTION_01 | 29069 | 25 yr | 1071.00 | 612.63 | 616.32 | 616.32 | 617.68 | 0.002436 | 9.37 | 114.36 | 41.82 | 1.00 |
| SF CWC | SECTION_01 | 29069 | 50 yr | 1215.00 | 612.63 | 616.60 | 616.60 | 618.04 | 0.002355 | 9.64 | 126.07 | 43.89 | 1.00 |
| SF CWC | SECTION_01 | 29069 | 100 yr | 1357.00 | 612.63 | 616.88 | 616.88 | 618.36 | 0.002198 | 9.77 | 138.92 | 46.87 | 1.00 |
| SF CWC | SECTION_01 | 29069 | Ultimate 100 yr | 1376.00 | 612.63 | 616.93 | 616.93 | 618.40 | 0.002144 | 9.74 | 141.31 | 47.90 | 1.00 |
| SF CWC | SECTION_01 | 29069 | 500 yr | 1692.00 | 612.63 | 617.52 | 617.52 | 619.01 | 0.001841 | 9.80 | 172.68 | 59.91 | 1.00 |
| SF CWC | SECTION_01 | 29000 | 2 yr | 492.00 | 611.00 | 613.59 | 613.59 | 614.61 | 0.002723 | 8.08 | 60.92 | 30.23 | 1.00 |
| SF CWC | SECTION_01 | 29000 | 5 yr | 731.00 | 611.00 | 614.27 | 614.27 | 615.49 | 0.002541 | 8.85 | 82.56 | 33.75 | 1.00 |
| SF CWC | SECTION_01 | 29000 | 10 yr | 890.00 | 611.00 | 614.69 | 614.69 | 615.98 | 0.002509 | 9.11 | 97.65 | 37.89 | 1.00 |
| SF CWC | SECTION_01 | 29000 | 25 yr | 1071.00 | 611.00 | 615.10 | 615.10 | 616.47 | 0.002468 | 9.41 | 113.95 | 43.24 | 1.00 |
| SF CWC | SECTION_01 | 29000 | 50 yr | 1215.00 | 611.00 | 615.39 | 615.39 | 616.82 | 0.002303 | 9.60 | 127.40 | 47.38 | 0.98 |
| SF CWC | SECTION_01 | 29000 | 100 yr | 1357.00 | 611.00 | 615.66 | 615.66 | 617.15 | 0.002151 | 9.82 | 140.40 | 51.63 | 0.96 |
| SF CWC | SECTION_01 | 29000 | Ultimate 100 yr | 1376.00 | 611.00 | 615.68 | 615.68 | 617.19 | 0.002162 | 9.89 | 141.50 | 51.94 | 0.97 |
| SF CWC | SECTION_01 | 29000 | 500 yr | 1692.00 | 611.00 | 616.21 | 616.21 | 617.83 | 0.001916 | 10.30 | 171.95 | 62.35 | 0.93 |
| SF CWC | SECTION_01 | 28704 | 2 yr | 528.00 | 610.00 | 612.22 | 612.22 | 613.02 | 0.002842 | 7.18 | 73.56 | 45.85 | 1.00 |
| SF CWC | SECTION_01 | 28704 | 5 yr | 789.00 | 610.00 | 612.76 | 612.76 | 613.73 | 0.002717 | 7.89 | 99.94 | 52.20 | 1.01 |
| SF CWC | SECTION_01 | 28704 | 10 yr | 928.00 | 610.00 | 613.02 | 613.02 | 614.05 | 0.002631 | 8.16 | 113.79 | 55.26 | 1.00 |
| SF CWC | SECTION_01 | 28704 | 25 yr | 1154.00 | 610.00 | 613.40 | 613.40 | 614.52 | 0.002525 | 8.52 | 135.50 | 59.77 | 1.00 |
| SF CWC | SECTION_01 | 28704 | 50 yr | 1318.00 | 610.00 | 613.65 | 613.65 | 614.83 | 0.002474 | 8.75 | 150.68 | 62.89 | 1.00 |
| SF CWC | SECTION_01 | 28704 | 100 yr | 1462.00 | 610.00 | 614.26 | 613.85 | 615.16 | 0.001504 | 7.64 | 193.55 | 85.33 | 0.80 |
| SF CWC | SECTION_01 | 28704 | Ultimate 100 yr | 1483.00 | 610.00 | 614.26 | 613.87 | 615.19 | 0.001541 | 7.74 | 193.84 | 85.56 | 0.81 |
| SF CWC | SECTION_01 | 28704 | 500 yr | 1824.00 | 610.00 | 615.11 | 614.30 | 615.86 | 0.000909 | 7.07 | 290.61 | 143.73 | 0.65 |
| SF CWC | SECTION_01 | 28644 | 2 yr | 528.00 | 607.85 | 610.19 | 610.19 | 611.16 | 0.002718 | 7.92 | 66.65 | 34.04 | 1.00 |
| SF CWC | SECTION_01 | 28644 | 5 yr | 789.00 | 607.85 | 610.82 | 610.82 | 612.04 | 0.002563 | 8.86 | 89.04 | 36.57 | 1.00 |
| SF CWC | SECTION_01 | 28644 | 10 yr | 928.00 | 607.85 | 611.53 | 611.13 | 612.52 | 0.001637 | 8.01 | 115.92 | 39.39 | 0.82 |
| SF CWC | SECTION_01 | 28644 | 25 yr | 1154.00 | 607.85 | 612.92 | 611.58 | 613.60 | 0.000783 | 6.62 | 174.31 | 44.91 | 0.59 |
| SF CWC | SECTION_01 | 28644 | 50 yr | 1318.00 | 607.85 | 613.74 | 611.88 | 614.34 | 0.000582 | 6.20 | 212.66 | 48.19 | 0.52 |
| SF CWC | SECTION_01 | 28644 | 100 yr | 1462.00 | 607.85 | 614.46 | 612.14 | 614.99 | 0.000464 | 5.89 | 248.21 | 85.37 | 0.47 |
| SF CWC | SECTION_01 | 28644 | Ultimate 100 yr | 1483.00 | 607.85 | 614.46 | 612.16 | 615.02 | 0.000475 | 5.96 | 248.68 | 85.71 | 0.48 |
| SF CWC | SECTION_01 | 28644 | 500 yr | 1824.00 | 607.85 | 615.23 | 612.74 | 615.74 | 0.000414 | 5.88 | 361.28 | 170.48 | 0.45 |
| SF CWC | SECTION_01 | 28643 | | Culvert | | | | | | | | | |
| SF CWC | SECTION_01 | 28593 | 2 yr | 528.00 | 607.12 | 609.37 | 609.25 | 610.17 | 0.002268 | 7.18 | 73.50 | 37.98 | 0.91 |
| SF CWC | SECTION_01 | 28593 | 5 yr | 789.00 | 607.12 | 610.11 | 609.82 | 611.03 | 0.001823 | 7.68 | 102.76 | 40.46 | 0.85 |
| SF CWC | SECTION_01 | 28593 | 10 yr | 928.00 | 607.12 | 610.46 | 610.12 | 611.44 | 0.001718 | 7.95 | 116.74 | 41.59 | 0.84 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|--------|------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| SF CWC | SECTION_01 | 28593 | 25 yr | 1154.00 | 607.12 | 611.14 | 610.54 | 612.11 | 0.001366 | 7.91 | 145.94 | 43.85 | 0.76 |
| SF CWC | SECTION_01 | 28593 | 50 yr | 1318.00 | 607.12 | 611.65 | 610.82 | 612.60 | 0.001165 | 7.82 | 168.57 | 45.53 | 0.72 |
| SF CWC | SECTION_01 | 28593 | 100 yr | 1462.00 | 607.12 | 611.94 | 611.06 | 612.94 | 0.001143 | 8.03 | 182.15 | 46.51 | 0.71 |
| SF CWC | SECTION_01 | 28593 | Ultimate 100 yr | 1483.00 | 607.12 | 611.95 | 611.10 | 612.97 | 0.001167 | 8.12 | 182.62 | 46.54 | 0.72 |
| SF CWC | SECTION_01 | 28593 | 500 yr | 1824.00 | 607.12 | 612.88 | 611.63 | 613.88 | 0.000957 | 8.01 | 227.66 | 52.69 | 0.67 |
| SF CWC | SECTION_01 | 28092 | 2 yr | 727.00 | 604.75 | 607.77 | 607.77 | 608.85 | 0.002721 | 8.34 | 87.18 | 40.38 | 1.00 |
| SF CWC | SECTION_01 | 28092 | 5 yr | 1108.00 | 604.75 | 608.50 | 608.50 | 609.85 | 0.002492 | 9.30 | 121.35 | 52.92 | 1.00 |
| SF CWC | SECTION_01 | 28092 | 10 yr | 1291.00 | 604.75 | 608.80 | 608.80 | 610.28 | 0.002405 | 9.78 | 137.55 | 58.10 | 1.00 |
| SF CWC | SECTION_01 | 28092 | 25 yr | 1625.00 | 604.75 | 609.29 | 609.29 | 611.02 | 0.002293 | 10.57 | 168.32 | 66.76 | 1.00 |
| SF CWC | SECTION_01 | 28092 | 50 yr | 1873.00 | 604.75 | 609.63 | 609.63 | 611.54 | 0.002222 | 11.09 | 192.47 | 72.73 | 1.00 |
| SF CWC | SECTION_01 | 28092 | 100 yr | 2044.00 | 604.75 | 609.87 | 609.87 | 611.88 | 0.002177 | 11.41 | 209.71 | 76.72 | 1.00 |
| SF CWC | SECTION_01 | 28092 | Ultimate 100 yr | 2058.00 | 604.75 | 609.88 | 609.88 | 611.91 | 0.002175 | 11.44 | 211.09 | 77.03 | 1.00 |
| SF CWC | SECTION_01 | 28092 | 500 yr | 2542.00 | 604.75 | 610.51 | 610.51 | 612.83 | 0.002054 | 12.23 | 271.92 | 122.59 | 0.99 |
| SF CWC | SECTION_01 | 27767 | 2 yr | 727.00 | 600.57 | 603.94 | 602.83 | 604.30 | 0.000615 | 4.80 | 151.58 | 53.87 | 0.50 |
| SF CWC | SECTION_01 | 27767 | 5 yr | 1108.00 | 600.57 | 605.11 | 603.45 | 605.52 | 0.000482 | 5.10 | 217.15 | 58.09 | 0.47 |
| SF CWC | SECTION_01 | 27767 | 10 yr | 1291.00 | 600.57 | 605.64 | 603.73 | 606.06 | 0.000441 | 5.21 | 247.89 | 59.97 | 0.45 |
| SF CWC | SECTION_01 | 27767 | 25 yr | 1625.00 | 600.57 | 606.53 | 604.20 | 606.98 | 0.000385 | 5.36 | 303.27 | 63.22 | 0.43 |
| SF CWC | SECTION_01 | 27767 | 50 yr | 1873.00 | 600.57 | 607.19 | 604.50 | 607.65 | 0.000337 | 5.42 | 351.59 | 89.79 | 0.41 |
| SF CWC | SECTION_01 | 27767 | 100 yr | 2044.00 | 600.57 | 607.53 | 604.73 | 608.01 | 0.000328 | 5.58 | 384.51 | 106.22 | 0.41 |
| SF CWC | SECTION_01 | 27767 | Ultimate 100 yr | 2058.00 | 600.57 | 607.55 | 604.73 | 608.04 | 0.000328 | 5.59 | 387.21 | 107.23 | 0.41 |
| SF CWC | SECTION_01 | 27767 | 500 yr | 2542.00 | 600.57 | 608.38 | 605.29 | 608.94 | 0.000320 | 6.03 | 494.02 | 152.70 | 0.41 |
| SF CWC | SECTION_01 | 27716 | | Culvert | | | | | | | | | |
| SF CWC | SECTION_01 | 27664 | 2 yr | 727.00 | 600.23 | 603.12 | | 603.62 | 0.001002 | 5.71 | 127.42 | 50.59 | 0.63 |
| SF CWC | SECTION_01 | 27664 | 5 yr | 1108.00 | 600.23 | 603.81 | 603.05 | 604.52 | 0.001099 | 6.78 | 163.37 | 53.40 | 0.68 |
| SF CWC | SECTION_01 | 27664 | 10 yr | 1291.00 | 600.23 | 604.10 | 603.35 | 604.91 | 0.001131 | 7.20 | 179.20 | 54.59 | 0.70 |
| SF CWC | SECTION_01 | 27664 | 25 yr | 1625.00 | 600.23 | 604.60 | 603.82 | 605.56 | 0.001175 | 7.87 | 206.57 | 56.59 | 0.73 |
| SF CWC | SECTION_01 | 27664 | 50 yr | 1873.00 | 600.23 | 604.93 | 604.15 | 606.00 | 0.001202 | 8.30 | 225.75 | 57.95 | 0.74 |
| SF CWC | SECTION_01 | 27664 | 100 yr | 2044.00 | 600.23 | 605.15 | 604.37 | 606.29 | 0.001221 | 8.58 | 238.27 | 58.82 | 0.75 |
| SF CWC | SECTION_01 | 27664 | Ultimate 100 yr | 2058.00 | 600.23 | 605.16 | 604.38 | 606.31 | 0.001224 | 8.60 | 239.22 | 58.89 | 0.75 |
| SF CWC | SECTION_01 | 27664 | 500 yr | 2542.00 | 600.23 | 605.75 | 604.95 | 607.08 | 0.001250 | 9.25 | 275.10 | 63.96 | 0.77 |
| SF CWC | SECTION_01 | 27405 | 2 yr | 727.00 | 600.00 | 602.22 | 602.22 | 603.13 | 0.002699 | 7.63 | 95.35 | 53.26 | 1.00 |
| SF CWC | SECTION_01 | 27405 | 5 yr | 1108.00 | 600.00 | 602.83 | 602.83 | 604.00 | 0.002422 | 8.68 | 129.38 | 58.86 | 0.99 |
| SF CWC | SECTION_01 | 27405 | 10 yr | 1291.00 | 600.00 | 603.09 | 603.09 | 604.37 | 0.002331 | 9.12 | 144.87 | 61.28 | 0.99 |
| SF CWC | SECTION_01 | 27405 | 25 yr | 1625.00 | 600.00 | 603.54 | 603.54 | 605.01 | 0.002171 | 9.77 | 173.47 | 65.49 | 0.98 |
| SF CWC | SECTION_01 | 27405 | 50 yr | 1873.00 | 600.00 | 603.85 | 603.85 | 605.45 | 0.002080 | 10.19 | 194.43 | 68.41 | 0.97 |
| SF CWC | SECTION_01 | 27405 | 100 yr | 2044.00 | 600.00 | 604.05 | 604.05 | 605.73 | 0.002038 | 10.48 | 208.34 | 70.53 | 0.97 |
| SF CWC | SECTION_01 | 27405 | Ultimate 100 yr | 2058.00 | 600.00 | 604.07 | 604.07 | 605.76 | 0.002035 | 10.50 | 209.48 | 70.76 | 0.97 |
| SF CWC | SECTION_01 | 27405 | 500 yr | 2542.00 | 600.00 | 604.60 | 604.60 | 606.51 | 0.001934 | 11.22 | 249.26 | 78.31 | 0.97 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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) | |
| SF CWC | SECTION_01 | 27233 | 2 yr | 743.00 | 595.00 | 601.14 | 596.67 | 601.19 | 0.000037 | 1.78 | 417.54 | 77.08 | 0.13 |
| SF CWC | SECTION_01 | 27233 | 5 yr | 1156.00 | 595.00 | 602.26 | 597.24 | 602.34 | 0.000050 | 2.29 | 506.16 | 81.56 | 0.16 |
| SF CWC | SECTION_01 | 27233 | 10 yr | 1364.00 | 595.00 | 602.77 | 597.50 | 602.86 | 0.000054 | 2.50 | 548.11 | 84.57 | 0.17 |
| SF CWC | SECTION_01 | 27233 | 25 yr | 1679.00 | 595.00 | 603.48 | 597.86 | 603.60 | 0.000059 | 2.78 | 608.66 | 88.84 | 0.18 |
| SF CWC | SECTION_01 | 27233 | 50 yr | 1942.00 | 595.00 | 604.05 | 598.15 | 604.19 | 0.000062 | 2.99 | 657.59 | 94.19 | 0.18 |
| SF CWC | SECTION_01 | 27233 | 100 yr | 2149.00 | 595.00 | 604.49 | 598.36 | 604.64 | 0.000064 | 3.14 | 695.54 | 101.44 | 0.19 |
| SF CWC | SECTION_01 | 27233 | Ultimate 100 yr | 2167.00 | 595.00 | 604.52 | 598.38 | 604.68 | 0.000064 | 3.15 | 698.73 | 102.01 | 0.19 |
| SF CWC | SECTION_01 | 27233 | 500 yr | 2665.00 | 595.00 | 605.48 | 598.87 | 605.66 | 0.000068 | 3.48 | 786.90 | 121.88 | 0.20 |
| SF CWC | SECTION_01 | 27178 | | Culvert | | | | | | | | | |
| SF CWC | SECTION_01 | 27114 | 2 yr | 743.00 | 591.08 | 601.07 | | 601.09 | 0.000097 | 1.24 | 600.47 | 87.29 | 0.08 |
| SF CWC | SECTION_01 | 27114 | 5 yr | 1156.00 | 591.08 | 602.05 | | 602.09 | 0.000161 | 1.68 | 688.68 | 93.94 | 0.11 |
| SF CWC | SECTION_01 | 27114 | 10 yr | 1364.00 | 591.08 | 602.45 | | 602.51 | 0.000192 | 1.88 | 727.92 | 99.73 | 0.12 |
| SF CWC | SECTION_01 | 27114 | 25 yr | 1679.00 | 591.08 | 602.98 | | 603.06 | 0.000239 | 2.17 | 782.59 | 107.65 | 0.13 |
| SF CWC | SECTION_01 | 27114 | 50 yr | 1942.00 | 591.08 | 603.36 | | 603.45 | 0.000280 | 2.40 | 824.71 | 113.19 | 0.14 |
| SF CWC | SECTION_01 | 27114 | 100 yr | 2149.00 | 591.08 | 603.62 | | 603.73 | 0.000314 | 2.58 | 854.77 | 123.37 | 0.15 |
| SF CWC | SECTION_01 | 27114 | Ultimate 100 yr | 2167.00 | 591.08 | 603.64 | | 603.75 | 0.000317 | 2.59 | 857.22 | 125.24 | 0.15 |
| SF CWC | SECTION_01 | 27114 | 500 yr | 2665.00 | 591.08 | 604.10 | | 604.24 | 0.000407 | 3.03 | 926.21 | 222.03 | 0.18 |
| SF CWC | SECTION_01 | 26912 | 2 yr | 743.00 | 596.00 | 600.93 | | 601.03 | 0.001646 | 2.57 | 289.76 | 96.82 | 0.26 |
| SF CWC | SECTION_01 | 26912 | 5 yr | 1156.00 | 596.00 | 601.86 | | 602.00 | 0.001628 | 3.04 | 388.68 | 116.03 | 0.27 |
| SF CWC | SECTION_01 | 26912 | 10 yr | 1364.00 | 596.00 | 602.25 | | 602.41 | 0.001621 | 3.22 | 444.38 | 163.44 | 0.27 |
| SF CWC | SECTION_01 | 26912 | 25 yr | 1679.00 | 596.00 | 602.77 | | 602.94 | 0.001573 | 3.42 | 536.81 | 196.26 | 0.27 |
| SF CWC | SECTION_01 | 26912 | 50 yr | 1942.00 | 596.00 | 603.15 | | 603.33 | 0.001517 | 3.53 | 618.46 | 231.72 | 0.27 |
| SF CWC | SECTION_01 | 26912 | 100 yr | 2149.00 | 596.00 | 603.42 | | 603.60 | 0.001484 | 3.60 | 683.55 | 260.50 | 0.27 |
| SF CWC | SECTION_01 | 26912 | Ultimate 100 yr | 2167.00 | 596.00 | 603.44 | | 603.62 | 0.001484 | 3.61 | 688.75 | 261.88 | 0.27 |
| SF CWC | SECTION_01 | 26912 | 500 yr | 2665.00 | 596.00 | 603.90 | | 604.10 | 0.001516 | 3.84 | 818.26 | 299.82 | 0.27 |
| SF CWC | SECTION_01 | 26612 | 2 yr | 743.00 | 596.00 | 599.89 | | 600.22 | 0.006461 | 4.65 | 159.85 | 57.98 | 0.49 |
| SF CWC | SECTION_01 | 26612 | 5 yr | 1156.00 | 596.00 | 600.72 | | 601.19 | 0.006673 | 5.48 | 212.68 | 69.52 | 0.52 |
| SF CWC | SECTION_01 | 26612 | 10 yr | 1364.00 | 596.00 | 601.06 | | 601.59 | 0.006698 | 5.85 | 237.41 | 74.98 | 0.53 |
| SF CWC | SECTION_01 | 26612 | 25 yr | 1679.00 | 596.00 | 601.53 | | 602.14 | 0.006726 | 6.33 | 274.07 | 83.70 | 0.54 |
| SF CWC | SECTION_01 | 26612 | 50 yr | 1942.00 | 596.00 | 601.88 | | 602.55 | 0.006715 | 6.67 | 305.06 | 94.22 | 0.55 |
| SF CWC | SECTION_01 | 26612 | 100 yr | 2149.00 | 596.00 | 602.15 | 600.71 | 602.83 | 0.006517 | 6.82 | 348.90 | 214.81 | 0.54 |
| SF CWC | SECTION_01 | 26612 | Ultimate 100 yr | 2167.00 | 596.00 | 602.17 | 600.73 | 602.86 | 0.006485 | 6.83 | 353.82 | 215.23 | 0.54 |
| SF CWC | SECTION_01 | 26612 | 500 yr | 2665.00 | 596.00 | 602.74 | | 603.37 | 0.005533 | 6.79 | 479.40 | 225.41 | 0.51 |
| SF CWC | SECTION_01 | 26355 | 2 yr | 743.00 | 594.00 | 598.67 | | 598.90 | 0.003536 | 3.84 | 193.97 | 63.02 | 0.37 |
| SF CWC | SECTION_01 | 26355 | 5 yr | 1156.00 | 594.00 | 599.34 | | 599.72 | 0.004529 | 4.92 | 239.21 | 72.00 | 0.44 |
| SF CWC | SECTION_01 | 26355 | 10 yr | 1364.00 | 594.00 | 599.60 | | 600.05 | 0.005059 | 5.42 | 258.08 | 76.57 | 0.47 |
| SF CWC | SECTION_01 | 26355 | 25 yr | 1679.00 | 594.00 | 599.92 | | 600.50 | 0.005873 | 6.14 | 283.81 | 82.89 | 0.51 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|--------|------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| SF CWC | SECTION_01 | 26355 | 50 yr | 1942.00 | 594.00 | 600.15 | | 600.83 | 0.006521 | 6.69 | 305.30 | 104.53 | 0.54 |
| SF CWC | SECTION_01 | 26355 | 100 yr | 2149.00 | 594.00 | 600.32 | | 601.07 | 0.006979 | 7.08 | 324.02 | 120.26 | 0.56 |
| SF CWC | SECTION_01 | 26355 | Ultimate 100 yr | 2167.00 | 594.00 | 600.33 | | 601.09 | 0.007013 | 7.12 | 325.78 | 121.60 | 0.57 |
| SF CWC | SECTION_01 | 26355 | 500 yr | 2665.00 | 594.00 | 600.69 | 599.52 | 601.60 | 0.007938 | 7.93 | 374.05 | 153.96 | 0.61 |
| SF CWC | SECTION_01 | 26123 | 2 yr | 743.00 | 594.00 | 597.97 | | 598.13 | 0.002961 | 3.23 | 243.94 | 120.27 | 0.34 |
| SF CWC | SECTION_01 | 26123 | 5 yr | 1156.00 | 594.00 | 598.61 | | 598.79 | 0.002948 | 3.68 | 366.98 | 222.90 | 0.35 |
| SF CWC | SECTION_01 | 26123 | 10 yr | 1364.00 | 594.00 | 598.85 | | 599.05 | 0.002937 | 3.85 | 423.43 | 243.22 | 0.35 |
| SF CWC | SECTION_01 | 26123 | 25 yr | 1679.00 | 594.00 | 599.15 | | 599.36 | 0.002991 | 4.09 | 499.24 | 268.25 | 0.36 |
| SF CWC | SECTION_01 | 26123 | 50 yr | 1942.00 | 594.00 | 599.36 | | 599.59 | 0.003021 | 4.25 | 559.63 | 286.61 | 0.36 |
| SF CWC | SECTION_01 | 26123 | 100 yr | 2149.00 | 594.00 | 599.52 | | 599.76 | 0.003028 | 4.37 | 606.45 | 300.02 | 0.37 |
| SF CWC | SECTION_01 | 26123 | Ultimate 100 yr | 2167.00 | 594.00 | 599.54 | | 599.77 | 0.003019 | 4.37 | 611.22 | 301.33 | 0.37 |
| SF CWC | SECTION_01 | 26123 | 500 yr | 2665.00 | 594.00 | 599.88 | | 600.13 | 0.003023 | 4.60 | 719.26 | 329.48 | 0.37 |
| SF CWC | SECTION_01 | 25887 | 2 yr | 746.00 | 594.00 | 596.11 | 596.11 | 596.80 | 0.030033 | 6.69 | 112.69 | 86.95 | 0.97 |
| SF CWC | SECTION_01 | 25887 | 5 yr | 1233.00 | 594.00 | 596.79 | 596.79 | 597.54 | 0.020582 | 7.12 | 186.77 | 134.06 | 0.85 |
| SF CWC | SECTION_01 | 25887 | 10 yr | 1481.00 | 594.00 | 597.05 | 597.05 | 597.82 | 0.018583 | 7.30 | 224.65 | 154.39 | 0.83 |
| SF CWC | SECTION_01 | 25887 | 25 yr | 1801.00 | 594.00 | 597.31 | 597.31 | 598.12 | 0.017836 | 7.65 | 266.65 | 172.75 | 0.82 |
| SF CWC | SECTION_01 | 25887 | 50 yr | 2084.00 | 594.00 | 597.53 | 597.53 | 598.36 | 0.016724 | 7.81 | 306.83 | 187.73 | 0.81 |
| SF CWC | SECTION_01 | 25887 | 100 yr | 2316.00 | 594.00 | 597.68 | 597.68 | 598.54 | 0.016417 | 8.01 | 335.68 | 197.38 | 0.81 |
| SF CWC | SECTION_01 | 25887 | Ultimate 100 yr | 2343.00 | 594.00 | 597.70 | 597.70 | 598.56 | 0.016312 | 8.01 | 339.57 | 198.62 | 0.81 |
| SF CWC | SECTION_01 | 25887 | 500 yr | 2879.00 | 594.00 | 598.01 | 598.01 | 598.92 | 0.015781 | 8.40 | 403.42 | 217.65 | 0.80 |
| SF CWC | SECTION_01 | 25709 | 2 yr | 746.00 | 585.60 | 591.23 | 587.72 | 591.30 | 0.000828 | 2.18 | 342.71 | 81.85 | 0.19 |
| SF CWC | SECTION_01 | 25709 | 5 yr | 1233.00 | 585.60 | 592.76 | 588.39 | 592.86 | 0.000969 | 2.54 | 484.78 | 103.61 | 0.21 |
| SF CWC | SECTION_01 | 25709 | 10 yr | 1481.00 | 585.60 | 593.33 | 588.69 | 593.45 | 0.001005 | 2.71 | 546.14 | 111.76 | 0.21 |
| SF CWC | SECTION_01 | 25709 | 25 yr | 1801.00 | 585.60 | 593.99 | 589.07 | 594.12 | 0.001027 | 2.91 | 618.98 | 121.07 | 0.22 |
| SF CWC | SECTION_01 | 25709 | 50 yr | 2084.00 | 585.60 | 594.57 | 589.38 | 594.71 | 0.001003 | 3.04 | 685.76 | 128.30 | 0.22 |
| SF CWC | SECTION_01 | 25709 | 100 yr | 2316.00 | 585.60 | 595.02 | 589.62 | 595.17 | 0.000972 | 3.14 | 737.43 | 135.35 | 0.22 |
| SF CWC | SECTION_01 | 25709 | Ultimate 100 yr | 2343.00 | 585.60 | 595.07 | 589.65 | 595.22 | 0.000969 | 3.15 | 743.23 | 136.15 | 0.22 |
| SF CWC | SECTION_01 | 25709 | 500 yr | 2879.00 | 585.60 | 596.07 | 590.16 | 596.24 | 0.000905 | 3.35 | 858.59 | 154.08 | 0.22 |
| SF CWC | SECTION_01 | 25646 | | Culvert | | | | | | | | | |
| SF CWC | SECTION_01 | 25593 | 2 yr | 746.00 | 584.61 | 591.12 | 586.79 | 591.16 | 0.000421 | 1.76 | 423.64 | 88.23 | 0.14 |
| SF CWC | SECTION_01 | 25593 | 5 yr | 1233.00 | 584.61 | 592.55 | 587.47 | 592.63 | 0.000503 | 2.26 | 546.21 | 102.32 | 0.16 |
| SF CWC | SECTION_01 | 25593 | 10 yr | 1481.00 | 584.61 | 593.07 | 587.78 | 593.16 | 0.000561 | 2.51 | 590.16 | 108.11 | 0.17 |
| SF CWC | SECTION_01 | 25593 | 25 yr | 1801.00 | 584.61 | 593.64 | 588.14 | 593.76 | 0.000637 | 2.82 | 639.04 | 115.40 | 0.18 |
| SF CWC | SECTION_01 | 25593 | 50 yr | 2084.00 | 584.61 | 594.07 | 588.46 | 594.22 | 0.000705 | 3.08 | 676.52 | 120.99 | 0.19 |
| SF CWC | SECTION_01 | 25593 | 100 yr | 2316.00 | 584.61 | 594.38 | 588.68 | 594.55 | 0.000767 | 3.30 | 702.81 | 124.91 | 0.20 |
| SF CWC | SECTION_01 | 25593 | Ultimate 100 yr | 2343.00 | 584.61 | 594.41 | 588.71 | 594.59 | 0.000774 | 3.32 | 705.62 | 125.33 | 0.20 |
| SF CWC | SECTION_01 | 25593 | 500 yr | 2879.00 | 584.61 | 595.02 | 589.21 | 595.25 | 0.000922 | 3.80 | 757.62 | 138.17 | 0.23 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|--------|------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| SF CWC | SECTION_01 | 25336 | 2 yr | 746.00 | 585.34 | 590.85 | 588.54 | 590.97 | 0.001825 | 3.58 | 319.28 | 102.94 | 0.29 |
| SF CWC | SECTION_01 | 25336 | 5 yr | 1233.00 | 585.34 | 592.29 | 589.24 | 592.42 | 0.001595 | 3.99 | 495.03 | 143.41 | 0.28 |
| SF CWC | SECTION_01 | 25336 | 10 yr | 1481.00 | 585.34 | 592.79 | 589.56 | 592.93 | 0.001611 | 4.22 | 571.19 | 156.76 | 0.29 |
| SF CWC | SECTION_01 | 25336 | 25 yr | 1801.00 | 585.34 | 593.36 | 589.92 | 593.51 | 0.001635 | 4.48 | 663.96 | 172.54 | 0.29 |
| SF CWC | SECTION_01 | 25336 | 50 yr | 2084.00 | 585.34 | 593.79 | 590.22 | 593.96 | 0.001662 | 4.70 | 741.84 | 185.28 | 0.30 |
| SF CWC | SECTION_01 | 25336 | 100 yr | 2316.00 | 585.34 | 594.10 | 590.44 | 594.27 | 0.001705 | 4.88 | 799.43 | 193.67 | 0.30 |
| SF CWC | SECTION_01 | 25336 | Ultimate 100 yr | 2343.00 | 585.34 | 594.13 | 590.48 | 594.30 | 0.001711 | 4.90 | 805.70 | 194.48 | 0.30 |
| SF CWC | SECTION_01 | 25336 | 500 yr | 2879.00 | 585.34 | 594.71 | 590.95 | 594.91 | 0.001834 | 5.32 | 923.43 | 209.09 | 0.32 |
| SF CWC | SECTION_01 | 24914 | 2 yr | 746.00 | 583.00 | 589.86 | 586.92 | 590.08 | 0.002758 | 3.82 | 195.52 | 50.41 | 0.33 |
| SF CWC | SECTION_01 | 24914 | 5 yr | 1233.00 | 583.00 | 591.32 | 587.99 | 591.62 | 0.002604 | 4.49 | 302.51 | 99.38 | 0.34 |
| SF CWC | SECTION_01 | 24914 | 10 yr | 1481.00 | 583.00 | 591.75 | 588.46 | 592.10 | 0.002810 | 4.90 | 347.55 | 121.90 | 0.36 |
| SF CWC | SECTION_01 | 24914 | 25 yr | 1801.00 | 583.00 | 592.29 | 589.05 | 592.68 | 0.002816 | 5.21 | 444.58 | 186.88 | 0.36 |
| SF CWC | SECTION_01 | 24914 | 50 yr | 2084.00 | 583.00 | 592.72 | 589.57 | 593.12 | 0.002817 | 5.43 | 525.28 | 195.33 | 0.37 |
| SF CWC | SECTION_01 | 24914 | 100 yr | 2316.00 | 583.00 | 592.99 | 589.96 | 593.42 | 0.002894 | 5.65 | 579.17 | 200.77 | 0.37 |
| SF CWC | SECTION_01 | 24914 | Ultimate 100 yr | 2343.00 | 583.00 | 593.02 | 590.07 | 593.45 | 0.002908 | 5.68 | 584.63 | 245.14 | 0.37 |
| SF CWC | SECTION_01 | 24914 | 500 yr | 2879.00 | 583.00 | 593.49 | 590.84 | 593.99 | 0.003205 | 6.23 | 683.82 | 279.97 | 0.40 |
| SF CWC | SECTION_01 | 24887 | 2 yr | 746.00 | 585.00 | 588.58 | 588.53 | 589.85 | 0.026623 | 9.02 | 82.70 | 31.00 | 0.97 |
| SF CWC | SECTION_01 | 24887 | 5 yr | 1233.00 | 585.00 | 589.66 | 589.66 | 591.36 | 0.024735 | 10.46 | 119.23 | 54.69 | 0.98 |
| SF CWC | SECTION_01 | 24887 | 10 yr | 1481.00 | 585.00 | 590.40 | 590.40 | 591.87 | 0.017261 | 9.93 | 173.99 | 75.35 | 0.84 |
| SF CWC | SECTION_01 | 24887 | 25 yr | 1801.00 | 585.00 | 590.96 | 590.96 | 592.44 | 0.015534 | 10.21 | 219.89 | 88.87 | 0.82 |
| SF CWC | SECTION_01 | 24887 | 50 yr | 2084.00 | 585.00 | 591.37 | 591.37 | 592.89 | 0.014694 | 10.49 | 259.21 | 106.18 | 0.81 |
| SF CWC | SECTION_01 | 24887 | 100 yr | 2316.00 | 585.00 | 591.81 | 591.81 | 593.20 | 0.012606 | 10.25 | 320.01 | 164.98 | 0.76 |
| SF CWC | SECTION_01 | 24887 | Ultimate 100 yr | 2343.00 | 585.00 | 591.85 | 591.85 | 593.23 | 0.012414 | 10.22 | 327.62 | 168.12 | 0.75 |
| SF CWC | SECTION_01 | 24887 | 500 yr | 2879.00 | 585.00 | 592.44 | 592.44 | 593.77 | 0.011378 | 10.45 | 435.54 | 194.92 | 0.73 |
| SF CWC | SECTION_01 | 24552 | 2 yr | 746.00 | 579.00 | 584.97 | 582.57 | 585.08 | 0.001031 | 2.76 | 291.25 | 75.35 | 0.22 |
| SF CWC | SECTION_01 | 24552 | 5 yr | 1233.00 | 579.00 | 586.09 | 583.16 | 586.26 | 0.001242 | 3.47 | 377.68 | 79.92 | 0.25 |
| SF CWC | SECTION_01 | 24552 | 10 yr | 1481.00 | 579.00 | 586.66 | 583.43 | 586.87 | 0.001248 | 3.69 | 424.49 | 82.32 | 0.25 |
| SF CWC | SECTION_01 | 24552 | 25 yr | 1801.00 | 579.00 | 587.57 | 583.76 | 587.79 | 0.001114 | 3.80 | 501.02 | 86.67 | 0.24 |
| SF CWC | SECTION_01 | 24552 | 50 yr | 2084.00 | 579.00 | 589.65 | 584.03 | 589.81 | 0.000573 | 3.20 | 693.24 | 102.21 | 0.18 |
| SF CWC | SECTION_01 | 24552 | 100 yr | 2316.00 | 579.00 | 590.38 | 584.25 | 590.54 | 0.000530 | 3.23 | 774.40 | 127.97 | 0.18 |
| SF CWC | SECTION_01 | 24552 | Ultimate 100 yr | 2343.00 | 579.00 | 590.36 | 584.27 | 590.53 | 0.000546 | 3.27 | 771.99 | 126.97 | 0.18 |
| SF CWC | SECTION_01 | 24552 | 500 yr | 2879.00 | 579.00 | 591.17 | 584.74 | 591.34 | 0.000594 | 3.59 | 922.47 | 239.72 | 0.19 |
| SF CWC | SECTION_01 | 24127 | 2 yr | 746.00 | 579.30 | 583.30 | 583.30 | 584.25 | 0.017831 | 8.20 | 110.83 | 66.60 | 0.83 |
| SF CWC | SECTION_01 | 24127 | 5 yr | 1233.00 | 579.30 | 584.29 | 584.14 | 585.33 | 0.014545 | 8.94 | 181.75 | 74.92 | 0.78 |
| SF CWC | SECTION_01 | 24127 | 10 yr | 1481.00 | 579.30 | 585.31 | 584.48 | 586.03 | 0.007954 | 7.68 | 260.82 | 80.73 | 0.60 |
| SF CWC | SECTION_01 | 24127 | 25 yr | 1801.00 | 579.30 | 586.68 | 584.87 | 587.14 | 0.004096 | 6.46 | 393.24 | 118.01 | 0.45 |
| SF CWC | SECTION_01 | 24127 | 50 yr | 2084.00 | 579.30 | 589.45 | 585.20 | 589.57 | 0.000836 | 3.71 | 916.90 | 278.13 | 0.22 |
| SF CWC | SECTION_01 | 24127 | 100 yr | 2316.00 | 579.30 | 590.24 | 585.43 | 590.33 | 0.000602 | 3.32 | 1156.11 | 329.95 | 0.19 |
| SF CWC | SECTION_01 | 24127 | Ultimate 100 yr | 2343.00 | 579.30 | 590.21 | 585.47 | 590.31 | 0.000627 | 3.39 | 1147.92 | 327.88 | 0.19 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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) | |
| SF CWC | SECTION_01 | 24127 | 500 yr | 2879.00 | 579.30 | 591.05 | 586.00 | 591.13 | 0.000530 | 3.29 | 1509.11 | 557.89 | 0.18 |
| SF CWC | SECTION_01 | 23950 | 2 yr | 959.00 | 574.29 | 580.77 | 577.36 | 580.93 | 0.001524 | 3.19 | 300.47 | 67.57 | 0.26 |
| SF CWC | SECTION_01 | 23950 | 5 yr | 1635.00 | 574.29 | 583.49 | 578.47 | 583.67 | 0.001036 | 3.39 | 482.25 | 85.19 | 0.23 |
| SF CWC | SECTION_01 | 23950 | 10 yr | 2024.00 | 574.29 | 584.89 | 578.99 | 585.08 | 0.000906 | 3.48 | 581.28 | 94.38 | 0.22 |
| SF CWC | SECTION_01 | 23950 | 25 yr | 2472.00 | 574.29 | 586.43 | 579.55 | 586.63 | 0.000754 | 3.56 | 693.74 | 150.51 | 0.20 |
| SF CWC | SECTION_01 | 23950 | 50 yr | 2854.00 | 574.29 | 589.38 | 579.97 | 589.45 | 0.000244 | 2.43 | 1555.15 | 515.30 | 0.12 |
| SF CWC | SECTION_01 | 23950 | 100 yr | 3175.00 | 574.29 | 590.19 | 580.29 | 590.25 | 0.000193 | 2.25 | 1922.08 | 575.72 | 0.11 |
| SF CWC | SECTION_01 | 23950 | Ultimate 100 yr | 3216.00 | 574.29 | 590.16 | 580.32 | 590.22 | 0.000201 | 2.30 | 1909.46 | 573.20 | 0.11 |
| SF CWC | SECTION_01 | 23950 | 500 yr | 3760.00 | 574.29 | 591.00 | 580.82 | 591.05 | 0.000176 | 2.23 | 2311.31 | 624.49 | 0.11 |
| SF CWC | SECTION_01 | 23325 | | Culvert | | | | | | | | | |
| SF CWC | SECTION_01 | 21987 | 2 yr | 1305.00 | 560.00 | 570.22 | 563.99 | 570.38 | 0.000981 | 3.29 | 401.80 | 62.73 | 0.21 |
| SF CWC | SECTION_01 | 21987 | 5 yr | 2206.00 | 560.00 | 571.89 | 565.53 | 572.18 | 0.001427 | 4.40 | 519.08 | 148.76 | 0.26 |
| SF CWC | SECTION_01 | 21987 | 10 yr | 2801.00 | 560.00 | 572.65 | 566.40 | 573.04 | 0.001689 | 5.06 | 575.22 | 162.21 | 0.28 |
| SF CWC | SECTION_01 | 21987 | 25 yr | 3389.00 | 560.00 | 573.29 | 567.16 | 573.77 | 0.001945 | 5.66 | 621.65 | 168.93 | 0.31 |
| SF CWC | SECTION_01 | 21987 | 50 yr | 3913.00 | 560.00 | 573.77 | 567.81 | 574.34 | 0.002180 | 6.18 | 657.00 | 174.01 | 0.33 |
| SF CWC | SECTION_01 | 21987 | 100 yr | 4430.00 | 560.00 | 574.20 | 568.40 | 574.86 | 0.002416 | 6.67 | 687.91 | 178.18 | 0.35 |
| SF CWC | SECTION_01 | 21987 | Ultimate 100 yr | 4496.00 | 560.00 | 574.25 | 568.48 | 574.92 | 0.002446 | 6.73 | 691.59 | 178.64 | 0.35 |
| SF CWC | SECTION_01 | 21987 | 500 yr | 5324.00 | 560.00 | 574.83 | 569.40 | 575.67 | 0.002832 | 7.49 | 734.35 | 183.80 | 0.38 |
| SF CWC | SECTION_01 | 21781 | 2 yr | 1305.00 | 562.00 | 569.14 | 567.32 | 569.87 | 0.005999 | 7.03 | 200.65 | 58.34 | 0.52 |
| SF CWC | SECTION_01 | 21781 | 5 yr | 2206.00 | 562.00 | 570.64 | 569.36 | 571.53 | 0.005863 | 8.12 | 319.88 | 95.09 | 0.53 |
| SF CWC | SECTION_01 | 21781 | 10 yr | 2801.00 | 562.00 | 571.43 | 570.38 | 572.34 | 0.005536 | 8.45 | 396.87 | 121.90 | 0.53 |
| SF CWC | SECTION_01 | 21781 | 25 yr | 3389.00 | 562.00 | 572.06 | 570.94 | 573.03 | 0.005414 | 8.79 | 463.89 | 138.60 | 0.53 |
| SF CWC | SECTION_01 | 21781 | 50 yr | 3913.00 | 562.00 | 572.52 | 571.36 | 573.56 | 0.005451 | 9.13 | 515.17 | 148.67 | 0.53 |
| SF CWC | SECTION_01 | 21781 | 100 yr | 4430.00 | 562.00 | 572.91 | 571.73 | 574.03 | 0.005556 | 9.49 | 559.94 | 157.28 | 0.54 |
| SF CWC | SECTION_01 | 21781 | Ultimate 100 yr | 4496.00 | 562.00 | 572.96 | 571.79 | 574.08 | 0.005577 | 9.53 | 565.18 | 158.30 | 0.54 |
| SF CWC | SECTION_01 | 21781 | 500 yr | 5324.00 | 562.00 | 573.49 | 572.33 | 574.75 | 0.005838 | 10.11 | 627.06 | 170.58 | 0.56 |
| SF CWC | SECTION_01 | 21640 | 2 yr | 1305.00 | 561.00 | 568.32 | | 568.99 | 0.006210 | 6.71 | 211.89 | 66.85 | 0.52 |
| SF CWC | SECTION_01 | 21640 | 5 yr | 2206.00 | 561.00 | 569.90 | | 570.69 | 0.005657 | 7.66 | 350.30 | 107.89 | 0.52 |
| SF CWC | SECTION_01 | 21640 | 10 yr | 2801.00 | 561.00 | 570.79 | | 571.57 | 0.005019 | 7.83 | 454.46 | 128.11 | 0.50 |
| SF CWC | SECTION_01 | 21640 | 25 yr | 3389.00 | 561.00 | 571.49 | | 572.27 | 0.004658 | 8.00 | 550.42 | 142.47 | 0.49 |
| SF CWC | SECTION_01 | 21640 | 50 yr | 3913.00 | 561.00 | 572.00 | | 572.79 | 0.004547 | 8.22 | 624.30 | 151.67 | 0.49 |
| SF CWC | SECTION_01 | 21640 | 100 yr | 4430.00 | 561.00 | 572.42 | | 573.24 | 0.004510 | 8.44 | 690.20 | 158.20 | 0.49 |
| SF CWC | SECTION_01 | 21640 | Ultimate 100 yr | 4496.00 | 561.00 | 572.47 | | 573.29 | 0.004515 | 8.48 | 697.84 | 158.75 | 0.49 |
| SF CWC | SECTION_01 | 21640 | 500 yr | 5324.00 | 561.00 | 573.03 | | 573.92 | 0.004579 | 8.88 | 788.71 | 163.96 | 0.50 |
| SF CWC | SECTION_01 | 21337 | 2 yr | 1305.00 | 559.41 | 567.11 | | 567.49 | 0.003125 | 5.38 | 286.12 | 77.20 | 0.38 |
| SF CWC | SECTION_01 | 21337 | 5 yr | 2206.00 | 559.41 | 568.81 | | 569.29 | 0.003030 | 6.22 | 432.55 | 95.77 | 0.39 |
| SF CWC | SECTION_01 | 21337 | 10 yr | 2801.00 | 559.41 | 569.79 | | 570.30 | 0.002816 | 6.48 | 538.47 | 121.11 | 0.38 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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) | |
| SF CWC | SECTION_01 | 20197 | 2 yr | 1320.00 | 553.67 | 559.90 | 557.73 | 560.42 | 0.000459 | 5.80 | 228.00 | 49.45 | 0.46 |
| SF CWC | SECTION_01 | 20197 | 5 yr | 2211.00 | 553.67 | 560.91 | 559.09 | 561.90 | 0.000679 | 8.01 | 285.47 | 63.63 | 0.58 |
| SF CWC | SECTION_01 | 20197 | 10 yr | 2783.00 | 553.67 | 561.40 | 559.84 | 562.72 | 0.000820 | 9.27 | 314.66 | 68.33 | 0.65 |
| SF CWC | SECTION_01 | 20197 | 25 yr | 3414.00 | 553.67 | 561.86 | 560.60 | 563.57 | 0.000969 | 10.57 | 342.36 | 72.79 | 0.71 |
| SF CWC | SECTION_01 | 20197 | 50 yr | 4023.00 | 553.67 | 562.23 | 561.27 | 564.35 | 0.001121 | 11.77 | 364.69 | 76.38 | 0.77 |
| SF CWC | SECTION_01 | 20197 | 100 yr | 4548.00 | 553.67 | 562.25 | 561.79 | 564.95 | 0.001415 | 13.26 | 366.14 | 76.62 | 0.87 |
| SF CWC | SECTION_01 | 20197 | Ultimate 100 yr | 4619.00 | 553.67 | 562.28 | 561.85 | 565.04 | 0.001443 | 13.42 | 367.59 | 76.85 | 0.88 |
| SF CWC | SECTION_01 | 20197 | 500 yr | 5575.00 | 553.67 | 562.71 | 562.71 | 566.25 | 0.001723 | 15.24 | 393.42 | 81.01 | 0.97 |
| SF CWC | SECTION_01 | 19876 | 2 yr | 1320.00 | 552.22 | 559.66 | 558.08 | 560.11 | 0.006517 | 5.39 | 244.71 | 69.50 | 0.51 |
| SF CWC | SECTION_01 | 19876 | 5 yr | 2211.00 | 552.22 | 560.62 | 559.22 | 561.38 | 0.009034 | 7.01 | 315.23 | 113.60 | 0.61 |
| SF CWC | SECTION_01 | 19876 | 10 yr | 2783.00 | 552.22 | 561.09 | 559.84 | 562.06 | 0.010403 | 7.90 | 352.17 | 135.52 | 0.66 |
| SF CWC | SECTION_01 | 19876 | 25 yr | 3414.00 | 552.22 | 561.54 | 560.45 | 562.74 | 0.011853 | 8.76 | 389.57 | 165.18 | 0.72 |
| SF CWC | SECTION_01 | 19876 | 50 yr | 4023.00 | 552.22 | 561.92 | 560.96 | 563.33 | 0.013114 | 9.53 | 423.21 | 203.56 | 0.76 |
| SF CWC | SECTION_01 | 19876 | 100 yr | 4548.00 | 552.22 | 562.19 | 561.38 | 563.39 | 0.011543 | 9.20 | 581.95 | 218.67 | 0.72 |
| SF CWC | SECTION_01 | 19876 | Ultimate 100 yr | 4619.00 | 552.22 | 562.23 | 561.43 | 563.43 | 0.011550 | 9.24 | 590.42 | 219.66 | 0.72 |
| SF CWC | SECTION_01 | 19876 | 500 yr | 5575.00 | 552.22 | 562.72 | 562.44 | 563.99 | 0.011528 | 9.68 | 701.30 | 232.25 | 0.73 |
| SF CWC | SECTION_01 | 19618 | 2 yr | 1361.00 | 552.27 | 558.56 | 557.49 | 558.79 | 0.003799 | 4.59 | 426.84 | 228.68 | 0.40 |
| SF CWC | SECTION_01 | 19618 | 5 yr | 2326.00 | 552.27 | 559.20 | 558.31 | 559.55 | 0.005208 | 5.91 | 573.99 | 233.92 | 0.48 |
| SF CWC | SECTION_01 | 19618 | 10 yr | 2931.00 | 552.27 | 559.55 | 558.65 | 559.96 | 0.005731 | 6.50 | 656.26 | 238.56 | 0.50 |
| SF CWC | SECTION_01 | 19618 | 25 yr | 3610.00 | 552.27 | 559.90 | 558.95 | 560.38 | 0.006170 | 7.05 | 742.18 | 245.86 | 0.53 |
| SF CWC | SECTION_01 | 19618 | 50 yr | 4255.00 | 552.27 | 560.21 | 559.22 | 560.75 | 0.006480 | 7.49 | 819.29 | 250.21 | 0.55 |
| SF CWC | SECTION_01 | 19618 | 100 yr | 4867.00 | 552.27 | 560.49 | 559.46 | 561.07 | 0.006699 | 7.86 | 889.45 | 254.00 | 0.56 |
| SF CWC | SECTION_01 | 19618 | Ultimate 100 yr | 4950.00 | 552.27 | 560.53 | 559.48 | 561.12 | 0.006724 | 7.90 | 898.78 | 254.50 | 0.56 |
| SF CWC | SECTION_01 | 19618 | 500 yr | 6080.00 | 552.27 | 561.01 | 559.88 | 561.68 | 0.006984 | 8.47 | 1026.70 | 281.04 | 0.58 |
| SF CWC | SECTION_01 | 19577 | 2 yr | 1361.00 | 553.00 | 558.22 | 558.01 | 558.55 | 0.009985 | 5.86 | 337.13 | 232.38 | 0.60 |
| SF CWC | SECTION_01 | 19577 | 5 yr | 2326.00 | 553.00 | 558.71 | 558.40 | 559.22 | 0.012966 | 7.41 | 454.69 | 239.16 | 0.70 |
| SF CWC | SECTION_01 | 19577 | 10 yr | 2931.00 | 553.00 | 559.05 | 558.66 | 559.61 | 0.012861 | 7.85 | 535.01 | 240.85 | 0.71 |
| SF CWC | SECTION_01 | 19577 | 25 yr | 3610.00 | 553.00 | 559.39 | 558.94 | 560.02 | 0.012708 | 8.26 | 617.88 | 242.88 | 0.72 |
| SF CWC | SECTION_01 | 19577 | 50 yr | 4255.00 | 553.00 | 559.69 | 559.17 | 560.38 | 0.012564 | 8.61 | 691.34 | 244.65 | 0.72 |
| SF CWC | SECTION_01 | 19577 | 100 yr | 4867.00 | 553.00 | 559.96 | 559.36 | 560.70 | 0.012390 | 8.90 | 758.24 | 246.17 | 0.72 |
| SF CWC | SECTION_01 | 19577 | Ultimate 100 yr | 4950.00 | 553.00 | 560.00 | 559.41 | 560.74 | 0.012367 | 8.94 | 767.08 | 246.35 | 0.72 |
| SF CWC | SECTION_01 | 19577 | 500 yr | 6080.00 | 553.00 | 560.47 | 559.76 | 561.29 | 0.012020 | 9.39 | 888.16 | 267.80 | 0.73 |
| SF CWC | SECTION_01 | 19271 | 2 yr | 1361.00 | 552.00 | 555.81 | 554.88 | 556.05 | 0.006585 | 4.51 | 364.74 | 342.89 | 0.43 |
| SF CWC | SECTION_01 | 19271 | 5 yr | 2326.00 | 552.00 | 556.43 | 555.56 | 556.59 | 0.004170 | 4.02 | 786.92 | 362.20 | 0.35 |
| SF CWC | SECTION_01 | 19271 | 10 yr | 2931.00 | 552.00 | 556.86 | 555.90 | 557.03 | 0.003878 | 4.15 | 941.18 | 366.81 | 0.35 |
| SF CWC | SECTION_01 | 19271 | 25 yr | 3610.00 | 552.00 | 557.29 | 556.00 | 557.48 | 0.003629 | 4.27 | 1102.49 | 372.77 | 0.34 |
| SF CWC | SECTION_01 | 19271 | 50 yr | 4255.00 | 552.00 | 557.68 | 556.05 | 557.88 | 0.003428 | 4.37 | 1249.57 | 378.85 | 0.34 |
| SF CWC | SECTION_01 | 19271 | 100 yr | 4867.00 | 552.00 | 558.03 | 556.20 | 558.23 | 0.003295 | 4.47 | 1380.66 | 384.61 | 0.33 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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) | |
| SF CWC | SECTION_01 | 19271 | Ultimate 100 yr | 4950.00 | 552.00 | 558.08 | 556.23 | 558.28 | 0.003270 | 4.48 | 1399.16 | 385.42 | 0.33 |
| SF CWC | SECTION_01 | 19271 | 500 yr | 6080.00 | 552.00 | 558.67 | 556.49 | 558.90 | 0.003061 | 4.63 | 1632.30 | 395.18 | 0.33 |
| SF CWC | SECTION_01 | 18990 | 2 yr | 1361.00 | 548.16 | 554.20 | 553.00 | 554.32 | 0.003485 | 3.91 | 601.89 | 347.47 | 0.32 |
| SF CWC | SECTION_01 | 18990 | 5 yr | 2326.00 | 548.16 | 555.06 | 553.49 | 555.20 | 0.003622 | 4.46 | 906.09 | 356.16 | 0.33 |
| SF CWC | SECTION_01 | 18990 | 10 yr | 2931.00 | 548.16 | 555.55 | 553.85 | 555.70 | 0.003512 | 4.65 | 1080.41 | 358.92 | 0.33 |
| SF CWC | SECTION_01 | 18990 | 25 yr | 3610.00 | 548.16 | 556.04 | 554.20 | 556.21 | 0.003410 | 4.83 | 1259.71 | 363.64 | 0.33 |
| SF CWC | SECTION_01 | 18990 | 50 yr | 4255.00 | 548.16 | 556.48 | 554.43 | 556.65 | 0.003326 | 4.98 | 1419.38 | 368.13 | 0.33 |
| SF CWC | SECTION_01 | 18990 | 100 yr | 4867.00 | 548.16 | 556.85 | 554.61 | 557.03 | 0.003312 | 5.14 | 1554.71 | 371.40 | 0.33 |
| SF CWC | SECTION_01 | 18990 | Ultimate 100 yr | 4950.00 | 548.16 | 556.90 | 554.64 | 557.09 | 0.003291 | 5.15 | 1575.53 | 371.97 | 0.33 |
| SF CWC | SECTION_01 | 18990 | 500 yr | 6080.00 | 548.16 | 557.55 | 554.95 | 557.75 | 0.003217 | 5.38 | 1819.73 | 385.93 | 0.33 |
| SF CWC | SECTION_01 | 18722 | 2 yr | 1361.00 | 547.87 | 553.12 | 552.16 | 553.26 | 0.007377 | 3.87 | 490.34 | 255.11 | 0.34 |
| SF CWC | SECTION_01 | 18722 | 5 yr | 2326.00 | 547.87 | 553.98 | 552.66 | 554.16 | 0.007002 | 4.27 | 715.01 | 269.96 | 0.34 |
| SF CWC | SECTION_01 | 18722 | 10 yr | 2931.00 | 547.87 | 554.54 | 552.92 | 554.72 | 0.006147 | 4.30 | 867.92 | 280.83 | 0.32 |
| SF CWC | SECTION_01 | 18722 | 25 yr | 3610.00 | 547.87 | 555.09 | 553.19 | 555.28 | 0.005590 | 4.37 | 1026.17 | 293.14 | 0.31 |
| SF CWC | SECTION_01 | 18722 | 50 yr | 4255.00 | 547.87 | 555.56 | 553.40 | 555.77 | 0.005254 | 4.45 | 1166.27 | 302.96 | 0.31 |
| SF CWC | SECTION_01 | 18722 | 100 yr | 4867.00 | 547.87 | 555.92 | 553.60 | 556.15 | 0.005185 | 4.58 | 1279.36 | 311.08 | 0.31 |
| SF CWC | SECTION_01 | 18722 | Ultimate 100 yr | 4950.00 | 547.87 | 555.99 | 553.63 | 556.22 | 0.005115 | 4.58 | 1299.47 | 312.48 | 0.31 |
| SF CWC | SECTION_01 | 18722 | 500 yr | 6080.00 | 547.87 | 556.66 | 553.96 | 556.91 | 0.004855 | 4.74 | 1513.79 | 326.96 | 0.30 |
| SF CWC | SECTION_01 | 18296 | 2 yr | 1361.00 | 546.00 | 551.54 | 550.14 | 551.65 | 0.004625 | 3.38 | 570.18 | 275.39 | 0.27 |
| SF CWC | SECTION_01 | 18296 | 5 yr | 2326.00 | 546.00 | 552.59 | 550.74 | 552.71 | 0.004083 | 3.62 | 870.01 | 297.14 | 0.26 |
| SF CWC | SECTION_01 | 18296 | 10 yr | 2931.00 | 546.00 | 553.42 | 551.08 | 553.54 | 0.003039 | 3.42 | 1124.85 | 312.71 | 0.23 |
| SF CWC | SECTION_01 | 18296 | 25 yr | 3610.00 | 546.00 | 554.10 | 551.36 | 554.22 | 0.002737 | 3.46 | 1339.08 | 322.86 | 0.22 |
| SF CWC | SECTION_01 | 18296 | 50 yr | 4255.00 | 546.00 | 554.63 | 551.58 | 554.76 | 0.002625 | 3.55 | 1514.49 | 331.52 | 0.22 |
| SF CWC | SECTION_01 | 18296 | 100 yr | 4867.00 | 546.00 | 555.01 | 551.78 | 555.15 | 0.002705 | 3.71 | 1639.32 | 337.59 | 0.23 |
| SF CWC | SECTION_01 | 18296 | Ultimate 100 yr | 4950.00 | 546.00 | 555.09 | 551.79 | 555.23 | 0.002665 | 3.71 | 1666.11 | 338.89 | 0.23 |
| SF CWC | SECTION_01 | 18296 | 500 yr | 6080.00 | 546.00 | 555.80 | 552.14 | 555.96 | 0.002656 | 3.91 | 1911.57 | 350.07 | 0.23 |
| SF CWC | SECTION_01 | 17917 | 2 yr | 1361.00 | 545.36 | 550.61 | 549.06 | 550.67 | 0.002910 | 2.66 | 711.07 | 318.82 | 0.22 |
| SF CWC | SECTION_01 | 17917 | 5 yr | 2326.00 | 545.36 | 551.83 | 549.52 | 551.90 | 0.002243 | 2.74 | 1117.55 | 344.70 | 0.20 |
| SF CWC | SECTION_01 | 17917 | 10 yr | 2931.00 | 545.36 | 552.90 | 549.75 | 552.96 | 0.001474 | 2.48 | 1495.46 | 362.11 | 0.17 |
| SF CWC | SECTION_01 | 17917 | 25 yr | 3610.00 | 545.36 | 553.63 | 550.00 | 553.70 | 0.001351 | 2.54 | 1763.20 | 371.02 | 0.16 |
| SF CWC | SECTION_01 | 17917 | 50 yr | 4255.00 | 545.36 | 554.19 | 550.19 | 554.26 | 0.001332 | 2.65 | 1970.89 | 377.11 | 0.16 |
| SF CWC | SECTION_01 | 17917 | 100 yr | 4867.00 | 545.36 | 554.54 | 550.37 | 554.63 | 0.001421 | 2.81 | 2106.00 | 381.23 | 0.17 |
| SF CWC | SECTION_01 | 17917 | Ultimate 100 yr | 4950.00 | 545.36 | 554.63 | 550.40 | 554.72 | 0.001400 | 2.81 | 2139.16 | 382.24 | 0.17 |
| SF CWC | SECTION_01 | 17917 | 500 yr | 6080.00 | 545.36 | 555.34 | 550.70 | 555.44 | 0.001454 | 3.02 | 2414.12 | 390.83 | 0.17 |
| SF CWC | SECTION_01 | 17739 | 2 yr | 1361.00 | 546.00 | 549.99 | | 550.09 | 0.006006 | 2.66 | 537.67 | 242.88 | 0.29 |
| SF CWC | SECTION_01 | 17739 | 5 yr | 2326.00 | 546.00 | 551.39 | | 551.50 | 0.003578 | 2.75 | 884.80 | 255.42 | 0.24 |
| SF CWC | SECTION_01 | 17739 | 10 yr | 2931.00 | 546.00 | 552.61 | | 552.71 | 0.002132 | 2.54 | 1207.75 | 269.52 | 0.20 |
| SF CWC | SECTION_01 | 17739 | 25 yr | 3610.00 | 546.00 | 553.36 | | 553.46 | 0.001984 | 2.68 | 1410.87 | 275.87 | 0.19 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|--------|------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| SF CWC | SECTION_01 | 17739 | 50 yr | 4255.00 | 546.00 | 553.91 | | 554.02 | 0.001996 | 2.86 | 1563.74 | 280.27 | 0.20 |
| SF CWC | SECTION_01 | 17739 | 100 yr | 4867.00 | 546.00 | 554.24 | | 554.37 | 0.002179 | 3.08 | 1657.62 | 292.64 | 0.21 |
| SF CWC | SECTION_01 | 17739 | Ultimate 100 yr | 4950.00 | 546.00 | 554.33 | | 554.46 | 0.002148 | 3.09 | 1684.20 | 297.05 | 0.21 |
| SF CWC | SECTION_01 | 17739 | 500 yr | 6080.00 | 546.00 | 555.02 | | 555.18 | 0.002283 | 3.39 | 1900.24 | 346.36 | 0.22 |
| SF CWC | SECTION_01 | 17616 | 2 yr | 1361.00 | 546.00 | 549.21 | | 549.31 | 0.006766 | 2.64 | 542.53 | 286.47 | 0.31 |
| SF CWC | SECTION_01 | 17616 | 5 yr | 2326.00 | 546.00 | 551.05 | | 551.13 | 0.002259 | 2.26 | 1083.88 | 301.54 | 0.20 |
| SF CWC | SECTION_01 | 17616 | 10 yr | 2931.00 | 546.00 | 552.43 | | 552.49 | 0.001260 | 2.04 | 1507.77 | 314.86 | 0.15 |
| SF CWC | SECTION_01 | 17616 | 25 yr | 3610.00 | 546.00 | 553.19 | | 553.26 | 0.001195 | 2.17 | 1749.62 | 322.45 | 0.15 |
| SF CWC | SECTION_01 | 17616 | 50 yr | 4255.00 | 546.00 | 553.74 | | 553.81 | 0.001223 | 2.32 | 1928.97 | 329.60 | 0.16 |
| SF CWC | SECTION_01 | 17616 | 100 yr | 4867.00 | 546.00 | 554.05 | | 554.14 | 0.001358 | 2.52 | 2033.03 | 335.05 | 0.17 |
| SF CWC | SECTION_01 | 17616 | Ultimate 100 yr | 4950.00 | 546.00 | 554.15 | | 554.24 | 0.001339 | 2.52 | 2064.43 | 338.68 | 0.17 |
| SF CWC | SECTION_01 | 17616 | 500 yr | 6080.00 | 546.00 | 554.82 | | 554.93 | 0.001455 | 2.79 | 2302.72 | 365.09 | 0.17 |
| SF CWC | SECTION_01 | 17467 | 2 yr | 1361.00 | 544.00 | 548.53 | 546.85 | 548.59 | 0.002399 | 2.22 | 727.64 | 263.63 | 0.20 |
| SF CWC | SECTION_01 | 17467 | 5 yr | 2326.00 | 544.00 | 550.82 | 547.11 | 550.87 | 0.000987 | 1.94 | 1354.03 | 282.88 | 0.14 |
| SF CWC | SECTION_01 | 17467 | 10 yr | 2931.00 | 544.00 | 552.29 | 547.35 | 552.33 | 0.000663 | 1.84 | 1777.00 | 291.95 | 0.12 |
| SF CWC | SECTION_01 | 17467 | 25 yr | 3610.00 | 544.00 | 553.05 | 547.58 | 553.10 | 0.000690 | 2.00 | 2001.16 | 296.35 | 0.12 |
| SF CWC | SECTION_01 | 17467 | 50 yr | 4255.00 | 544.00 | 553.60 | 547.81 | 553.66 | 0.000750 | 2.17 | 2163.03 | 300.09 | 0.13 |
| SF CWC | SECTION_01 | 17467 | 100 yr | 4867.00 | 544.00 | 553.89 | 548.00 | 553.96 | 0.000864 | 2.38 | 2251.87 | 302.40 | 0.14 |
| SF CWC | SECTION_01 | 17467 | Ultimate 100 yr | 4950.00 | 544.00 | 553.99 | 548.02 | 554.06 | 0.000858 | 2.39 | 2280.59 | 303.14 | 0.14 |
| SF CWC | SECTION_01 | 17467 | 500 yr | 6080.00 | 544.00 | 554.64 | 548.37 | 554.74 | 0.000993 | 2.69 | 2481.78 | 309.72 | 0.15 |
| SF CWC | SECTION_01 | 17281 | 2 yr | 1361.00 | 542.00 | 548.05 | | 548.13 | 0.002442 | 2.84 | 626.97 | 190.61 | 0.21 |
| SF CWC | SECTION_01 | 17281 | 5 yr | 2326.00 | 542.00 | 550.60 | | 550.66 | 0.001127 | 2.47 | 1161.63 | 235.76 | 0.15 |
| SF CWC | SECTION_01 | 17281 | 10 yr | 2931.00 | 542.00 | 552.14 | | 552.20 | 0.000786 | 2.32 | 1557.31 | 278.55 | 0.13 |
| SF CWC | SECTION_01 | 17281 | 25 yr | 3610.00 | 542.00 | 552.89 | | 552.96 | 0.000833 | 2.51 | 1774.46 | 298.13 | 0.14 |
| SF CWC | SECTION_01 | 17281 | 50 yr | 4255.00 | 542.00 | 553.42 | | 553.50 | 0.000913 | 2.71 | 1935.18 | 311.01 | 0.14 |
| SF CWC | SECTION_01 | 17281 | 100 yr | 4867.00 | 542.00 | 553.68 | | 553.78 | 0.001064 | 2.97 | 2018.73 | 317.40 | 0.16 |
| SF CWC | SECTION_01 | 17281 | Ultimate 100 yr | 4950.00 | 542.00 | 553.78 | | 553.88 | 0.001057 | 2.98 | 2049.38 | 319.70 | 0.16 |
| SF CWC | SECTION_01 | 17281 | 500 yr | 6080.00 | 542.00 | 554.40 | | 554.53 | 0.001231 | 3.33 | 2253.10 | 333.06 | 0.17 |
| SF CWC | SECTION_01 | 16891 | 2 yr | 1361.00 | 541.40 | 547.37 | 544.97 | 547.43 | 0.001612 | 2.98 | 714.23 | 216.84 | 0.23 |
| SF CWC | SECTION_01 | 16891 | 5 yr | 2326.00 | 541.40 | 550.32 | 545.53 | 550.37 | 0.000616 | 2.47 | 1457.38 | 297.68 | 0.15 |
| SF CWC | SECTION_01 | 16891 | 10 yr | 2931.00 | 541.40 | 551.95 | 545.84 | 551.99 | 0.000425 | 2.32 | 1976.82 | 341.72 | 0.13 |
| SF CWC | SECTION_01 | 16891 | 25 yr | 3610.00 | 541.40 | 552.69 | 546.15 | 552.74 | 0.000459 | 2.52 | 2234.03 | 350.75 | 0.14 |
| SF CWC | SECTION_01 | 16891 | 50 yr | 4255.00 | 541.40 | 553.20 | 546.43 | 553.25 | 0.000511 | 2.75 | 2418.93 | 374.95 | 0.15 |
| SF CWC | SECTION_01 | 16891 | 100 yr | 4867.00 | 541.40 | 553.43 | 546.70 | 553.49 | 0.000607 | 3.04 | 2504.68 | 377.73 | 0.16 |
| SF CWC | SECTION_01 | 16891 | Ultimate 100 yr | 4950.00 | 541.40 | 553.52 | 546.74 | 553.59 | 0.000603 | 3.04 | 2541.88 | 378.94 | 0.16 |
| SF CWC | SECTION_01 | 16891 | 500 yr | 6080.00 | 541.40 | 554.10 | 547.18 | 554.19 | 0.000719 | 3.43 | 2766.05 | 395.87 | 0.17 |
| SF CWC | SECTION_01 | 16685 | 2 yr | 1477.00 | 538.68 | 547.12 | 541.18 | 547.19 | 0.000854 | 2.18 | 677.46 | 216.62 | 0.14 |
| SF CWC | SECTION_01 | 16685 | 5 yr | 2473.00 | 538.68 | 550.11 | 542.05 | 550.22 | 0.000836 | 2.66 | 928.91 | 289.08 | 0.14 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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) | |
| SF CWC | SECTION_01 | 16685 | 10 yr | 3075.00 | 538.68 | 551.89 | 542.52 | 551.91 | 0.000280 | 1.27 | 2466.25 | 368.69 | 0.08 |
| SF CWC | SECTION_01 | 16685 | 25 yr | 3960.00 | 538.68 | 552.62 | 543.14 | 552.65 | 0.000336 | 1.47 | 2746.90 | 399.89 | 0.09 |
| SF CWC | SECTION_01 | 16685 | 50 yr | 4711.00 | 538.68 | 553.12 | 543.66 | 553.16 | 0.000385 | 1.63 | 2952.85 | 427.57 | 0.09 |
| SF CWC | SECTION_01 | 16685 | 100 yr | 5428.00 | 538.68 | 553.33 | 544.11 | 553.38 | 0.000467 | 1.82 | 3044.62 | 441.56 | 0.10 |
| SF CWC | SECTION_01 | 16685 | Ultimate 100 yr | 5531.00 | 538.68 | 553.43 | 544.18 | 553.48 | 0.000466 | 1.83 | 3088.57 | 448.10 | 0.10 |
| SF CWC | SECTION_01 | 16685 | 500 yr | 6823.00 | 538.68 | 553.99 | 544.95 | 554.05 | 0.000562 | 2.09 | 3345.13 | 467.45 | 0.11 |
| SF CWC | SECTION_01 | 16615 | | Culvert | | | | | | | | | |
| SF CWC | SECTION_01 | 16546 | 2 yr | 1477.00 | 539.03 | 543.95 | 542.69 | 544.63 | 0.005638 | 6.62 | 223.26 | 59.44 | 0.60 |
| SF CWC | SECTION_01 | 16546 | 5 yr | 2473.00 | 539.03 | 545.09 | 543.97 | 546.19 | 0.007000 | 8.41 | 293.89 | 65.84 | 0.69 |
| SF CWC | SECTION_01 | 16546 | 10 yr | 3075.00 | 539.03 | 545.73 | 544.61 | 547.04 | 0.006997 | 9.18 | 334.98 | 69.45 | 0.71 |
| SF CWC | SECTION_01 | 16546 | 25 yr | 3960.00 | 539.03 | 546.59 | 545.42 | 548.19 | 0.006999 | 10.16 | 389.85 | 74.28 | 0.73 |
| SF CWC | SECTION_01 | 16546 | 50 yr | 4711.00 | 539.03 | 547.24 | 546.03 | 549.09 | 0.007071 | 10.92 | 431.34 | 77.93 | 0.74 |
| SF CWC | SECTION_01 | 16546 | 100 yr | 5428.00 | 539.03 | 547.77 | 546.57 | 549.88 | 0.007270 | 11.66 | 465.70 | 82.22 | 0.76 |
| SF CWC | SECTION_01 | 16546 | Ultimate 100 yr | 5531.00 | 539.03 | 547.85 | 546.66 | 549.99 | 0.007300 | 11.76 | 470.40 | 83.39 | 0.76 |
| SF CWC | SECTION_01 | 16546 | 500 yr | 6823.00 | 539.03 | 548.67 | 547.58 | 551.31 | 0.007797 | 13.04 | 523.11 | 96.50 | 0.80 |
| SF CWC | SECTION_01 | 16285 | 2 yr | 1477.00 | 537.34 | 542.27 | | 542.62 | 0.008796 | 7.64 | 385.97 | 156.94 | 0.63 |
| SF CWC | SECTION_01 | 16285 | 5 yr | 2473.00 | 537.34 | 543.69 | | 544.02 | 0.006246 | 7.70 | 620.48 | 172.82 | 0.55 |
| SF CWC | SECTION_01 | 16285 | 10 yr | 3075.00 | 537.34 | 544.66 | | 544.96 | 0.004692 | 7.37 | 791.79 | 181.34 | 0.49 |
| SF CWC | SECTION_01 | 16285 | 25 yr | 3960.00 | 537.34 | 545.77 | | 546.07 | 0.003901 | 7.41 | 998.14 | 189.90 | 0.46 |
| SF CWC | SECTION_01 | 16285 | 50 yr | 4711.00 | 537.34 | 546.56 | | 546.88 | 0.003587 | 7.57 | 1151.86 | 195.04 | 0.45 |
| SF CWC | SECTION_01 | 16285 | 100 yr | 5428.00 | 537.34 | 547.21 | | 547.55 | 0.003475 | 7.81 | 1278.59 | 199.26 | 0.45 |
| SF CWC | SECTION_01 | 16285 | Ultimate 100 yr | 5531.00 | 537.34 | 547.30 | | 547.64 | 0.003463 | 7.84 | 1296.19 | 199.82 | 0.45 |
| SF CWC | SECTION_01 | 16285 | 500 yr | 6823.00 | 537.34 | 548.29 | | 548.67 | 0.003382 | 8.27 | 1503.26 | 218.59 | 0.45 |
| SF CWC | SECTION_01 | 15904 | 2 yr | 1477.00 | 531.00 | 539.61 | | 540.06 | 0.004756 | 5.88 | 318.71 | 91.03 | 0.40 |
| SF CWC | SECTION_01 | 15904 | 5 yr | 2473.00 | 531.00 | 541.50 | | 542.02 | 0.004325 | 6.63 | 508.60 | 106.67 | 0.40 |
| SF CWC | SECTION_01 | 15904 | 10 yr | 3075.00 | 531.00 | 543.04 | | 543.48 | 0.003142 | 6.31 | 676.22 | 111.45 | 0.35 |
| SF CWC | SECTION_01 | 15904 | 25 yr | 3960.00 | 531.00 | 544.24 | | 544.74 | 0.003131 | 6.79 | 814.17 | 118.28 | 0.36 |
| SF CWC | SECTION_01 | 15904 | 50 yr | 4711.00 | 531.00 | 545.01 | | 545.58 | 0.003287 | 7.27 | 908.05 | 123.54 | 0.37 |
| SF CWC | SECTION_01 | 15904 | 100 yr | 5428.00 | 531.00 | 545.56 | | 546.20 | 0.003582 | 7.81 | 976.37 | 128.42 | 0.39 |
| SF CWC | SECTION_01 | 15904 | Ultimate 100 yr | 5531.00 | 531.00 | 545.63 | | 546.29 | 0.003623 | 7.89 | 985.88 | 129.09 | 0.39 |
| SF CWC | SECTION_01 | 15904 | 500 yr | 6823.00 | 531.00 | 546.42 | | 547.23 | 0.004198 | 8.84 | 1092.56 | 141.32 | 0.42 |
| SF CWC | SECTION_01 | 15583 | 2 yr | 1477.00 | 531.00 | 538.46 | | 538.79 | 0.003230 | 6.05 | 443.23 | 146.58 | 0.40 |
| SF CWC | SECTION_01 | 15583 | 5 yr | 2473.00 | 531.00 | 540.65 | | 540.94 | 0.002290 | 6.11 | 795.74 | 173.62 | 0.36 |
| SF CWC | SECTION_01 | 15583 | 10 yr | 3075.00 | 531.00 | 542.50 | | 542.72 | 0.001438 | 5.48 | 1137.55 | 204.42 | 0.29 |
| SF CWC | SECTION_01 | 15583 | 25 yr | 3960.00 | 531.00 | 543.74 | | 543.97 | 0.001425 | 5.85 | 1408.72 | 233.64 | 0.29 |
| SF CWC | SECTION_01 | 15583 | 50 yr | 4711.00 | 531.00 | 544.51 | | 544.77 | 0.001500 | 6.25 | 1595.57 | 253.00 | 0.31 |
| SF CWC | SECTION_01 | 15583 | 100 yr | 5428.00 | 531.00 | 545.02 | | 545.31 | 0.001652 | 6.73 | 1727.10 | 265.17 | 0.32 |
| SF CWC | SECTION_01 | 15583 | Ultimate 100 yr | 5531.00 | 531.00 | 545.08 | | 545.38 | 0.001673 | 6.80 | 1745.52 | 266.92 | 0.32 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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) | |
| SF CWC | SECTION_01 | 15583 | 500 yr | 6823.00 | 531.00 | 545.80 | | 546.18 | 0.001977 | 7.65 | 1944.45 | 285.63 | 0.36 |
| SF CWC | SECTION_01 | 15254 | 2 yr | 1477.00 | 528.00 | 537.45 | | 537.74 | 0.003301 | 4.58 | 403.29 | 141.56 | 0.32 |
| SF CWC | SECTION_01 | 15254 | 5 yr | 2473.00 | 528.00 | 540.12 | | 540.31 | 0.001598 | 4.04 | 898.23 | 227.71 | 0.24 |
| SF CWC | SECTION_01 | 15254 | 10 yr | 3075.00 | 528.00 | 542.24 | | 542.34 | 0.000789 | 3.28 | 1461.22 | 297.75 | 0.17 |
| SF CWC | SECTION_01 | 15254 | 25 yr | 3960.00 | 528.00 | 543.50 | | 543.60 | 0.000725 | 3.37 | 1852.79 | 323.48 | 0.17 |
| SF CWC | SECTION_01 | 15254 | 50 yr | 4711.00 | 528.00 | 544.27 | | 544.38 | 0.000736 | 3.54 | 2108.15 | 342.05 | 0.17 |
| SF CWC | SECTION_01 | 15254 | 100 yr | 5428.00 | 528.00 | 544.76 | | 544.89 | 0.000798 | 3.78 | 2279.66 | 356.77 | 0.18 |
| SF CWC | SECTION_01 | 15254 | Ultimate 100 yr | 5531.00 | 528.00 | 544.83 | | 544.95 | 0.000806 | 3.81 | 2303.64 | 358.78 | 0.18 |
| SF CWC | SECTION_01 | 15254 | 500 yr | 6823.00 | 528.00 | 545.51 | | 545.67 | 0.000934 | 4.24 | 2554.79 | 372.69 | 0.20 |
| SF CWC | SECTION_01 | 15193 | 2 yr | 1477.00 | 528.15 | 536.99 | | 537.47 | 0.005290 | 6.16 | 328.88 | 116.31 | 0.42 |
| SF CWC | SECTION_01 | 15193 | 5 yr | 2473.00 | 528.15 | 539.95 | | 540.19 | 0.002104 | 4.95 | 804.22 | 204.62 | 0.28 |
| SF CWC | SECTION_01 | 15193 | 10 yr | 3075.00 | 528.15 | 542.16 | | 542.29 | 0.000991 | 3.89 | 1333.80 | 290.20 | 0.20 |
| SF CWC | SECTION_01 | 15193 | 25 yr | 3960.00 | 528.15 | 543.43 | | 543.55 | 0.000894 | 3.95 | 1716.68 | 312.08 | 0.19 |
| SF CWC | SECTION_01 | 15193 | 50 yr | 4711.00 | 528.15 | 544.20 | | 544.33 | 0.000898 | 4.12 | 1961.79 | 325.39 | 0.19 |
| SF CWC | SECTION_01 | 15193 | 100 yr | 5428.00 | 528.15 | 544.68 | | 544.83 | 0.000970 | 4.38 | 2121.93 | 334.93 | 0.20 |
| SF CWC | SECTION_01 | 15193 | Ultimate 100 yr | 5531.00 | 528.15 | 544.75 | | 544.90 | 0.000980 | 4.41 | 2144.18 | 336.34 | 0.20 |
| SF CWC | SECTION_01 | 15193 | 500 yr | 6823.00 | 528.15 | 545.42 | | 545.60 | 0.001135 | 4.89 | 2375.36 | 351.78 | 0.22 |
| SF CWC | SECTION_01 | 14885 | 2 yr | 1477.00 | 528.10 | 536.26 | | 536.36 | 0.001329 | 3.20 | 753.22 | 241.52 | 0.21 |
| SF CWC | SECTION_01 | 14885 | 5 yr | 2473.00 | 528.10 | 539.71 | | 539.76 | 0.000397 | 2.29 | 1796.58 | 358.71 | 0.12 |
| SF CWC | SECTION_01 | 14885 | 10 yr | 3075.00 | 528.10 | 542.05 | | 542.08 | 0.000205 | 1.88 | 2713.41 | 425.24 | 0.09 |
| SF CWC | SECTION_01 | 14885 | 25 yr | 3960.00 | 528.10 | 543.33 | | 543.36 | 0.000204 | 2.00 | 3283.69 | 468.57 | 0.09 |
| SF CWC | SECTION_01 | 14885 | 50 yr | 4711.00 | 528.10 | 544.10 | | 544.14 | 0.000217 | 2.14 | 3656.13 | 497.90 | 0.10 |
| SF CWC | SECTION_01 | 14885 | 100 yr | 5428.00 | 528.10 | 544.58 | | 544.62 | 0.000243 | 2.31 | 3898.14 | 514.37 | 0.10 |
| SF CWC | SECTION_01 | 14885 | Ultimate 100 yr | 5531.00 | 528.10 | 544.65 | | 544.69 | 0.000246 | 2.33 | 3931.80 | 516.22 | 0.10 |
| SF CWC | SECTION_01 | 14885 | 500 yr | 6823.00 | 528.10 | 545.30 | | 545.35 | 0.000299 | 2.64 | 4276.83 | 533.70 | 0.12 |
| SF CWC | SECTION_01 | 14701 | 2 yr | 1477.00 | 528.31 | 535.83 | | 536.07 | 0.002482 | 4.49 | 531.19 | 275.82 | 0.34 |
| SF CWC | SECTION_01 | 14701 | 5 yr | 2473.00 | 528.31 | 539.66 | | 539.71 | 0.000329 | 2.32 | 1849.86 | 401.54 | 0.13 |
| SF CWC | SECTION_01 | 14701 | 10 yr | 3075.00 | 528.31 | 542.03 | | 542.06 | 0.000146 | 1.80 | 2872.10 | 459.77 | 0.09 |
| SF CWC | SECTION_01 | 14701 | 25 yr | 3960.00 | 528.31 | 543.31 | | 543.34 | 0.000137 | 1.87 | 3481.50 | 489.79 | 0.09 |
| SF CWC | SECTION_01 | 14701 | 50 yr | 4711.00 | 528.31 | 544.08 | | 544.11 | 0.000143 | 1.98 | 3865.20 | 508.78 | 0.09 |
| SF CWC | SECTION_01 | 14701 | 100 yr | 5428.00 | 528.31 | 544.56 | | 544.59 | 0.000158 | 2.13 | 4110.27 | 522.05 | 0.10 |
| SF CWC | SECTION_01 | 14701 | Ultimate 100 yr | 5531.00 | 528.31 | 544.62 | | 544.66 | 0.000160 | 2.15 | 4144.26 | 523.93 | 0.10 |
| SF CWC | SECTION_01 | 14701 | 500 yr | 6823.00 | 528.31 | 545.27 | | 545.32 | 0.000191 | 2.42 | 4491.75 | 542.13 | 0.11 |
| SF CWC | SECTION_01 | 14582 | 2 yr | 1463.00 | 523.97 | 535.81 | 528.28 | 535.86 | 0.000257 | 1.91 | 793.04 | 301.40 | 0.12 |
| SF CWC | SECTION_01 | 14582 | 5 yr | 2331.00 | 523.97 | 539.61 | 529.40 | 539.68 | 0.000194 | 2.04 | 1187.28 | 390.93 | 0.11 |
| SF CWC | SECTION_01 | 14582 | 10 yr | 2811.00 | 523.97 | 542.03 | 529.92 | 542.04 | 0.000041 | 1.06 | 3638.81 | 452.63 | 0.05 |
| SF CWC | SECTION_01 | 14582 | 25 yr | 3631.00 | 523.97 | 543.31 | 530.71 | 543.33 | 0.000044 | 1.17 | 4231.76 | 494.35 | 0.05 |
| SF CWC | SECTION_01 | 14582 | 50 yr | 4515.00 | 523.97 | 544.08 | 531.45 | 544.10 | 0.000053 | 1.33 | 4603.74 | 519.34 | 0.06 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|--------|------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| SF CWC | SECTION_01 | 14582 | 100 yr | 5356.00 | 523.97 | 544.56 | 532.07 | 544.58 | 0.000065 | 1.49 | 4841.58 | 541.67 | 0.07 |
| SF CWC | SECTION_01 | 14582 | Ultimate 100 yr | 5457.00 | 523.97 | 544.62 | 532.15 | 544.65 | 0.000066 | 1.51 | 4874.77 | 544.73 | 0.07 |
| SF CWC | SECTION_01 | 14582 | 500 yr | 6921.00 | 523.97 | 545.27 | 533.05 | 545.30 | 0.000087 | 1.78 | 5214.20 | 572.77 | 0.08 |
| SF CWC | SECTION_01 | 14444 | | Culvert | | | | | | | | | |
| SF CWC | SECTION_01 | 14301 | 2 yr | 1477.00 | 524.70 | 533.99 | 527.84 | 534.09 | 0.000730 | 2.56 | 597.56 | 437.07 | 0.16 |
| SF CWC | SECTION_01 | 14301 | 5 yr | 2350.00 | 524.70 | 534.93 | 528.98 | 535.13 | 0.001250 | 3.61 | 677.95 | 447.17 | 0.21 |
| SF CWC | SECTION_01 | 14301 | 10 yr | 2827.00 | 524.70 | 535.36 | 529.54 | 535.61 | 0.001538 | 4.13 | 714.47 | 451.01 | 0.24 |
| SF CWC | SECTION_01 | 14301 | 25 yr | 3649.00 | 524.70 | 535.98 | 530.32 | 536.35 | 0.002040 | 4.97 | 769.10 | 468.10 | 0.28 |
| SF CWC | SECTION_01 | 14301 | 50 yr | 4541.00 | 524.70 | 536.51 | 531.05 | 537.03 | 0.002631 | 5.84 | 816.10 | 489.09 | 0.32 |
| SF CWC | SECTION_01 | 14301 | 100 yr | 5421.00 | 524.70 | 536.98 | 531.82 | 537.64 | 0.003216 | 6.65 | 857.68 | 494.39 | 0.35 |
| SF CWC | SECTION_01 | 14301 | Ultimate 100 yr | 5538.00 | 524.70 | 537.04 | 531.90 | 537.73 | 0.003292 | 6.75 | 863.09 | 495.12 | 0.36 |
| SF CWC | SECTION_01 | 14301 | 500 yr | 7203.00 | 524.70 | 537.77 | 533.00 | 538.77 | 0.004440 | 8.18 | 930.40 | 506.29 | 0.42 |
| SF CWC | SECTION_01 | 14120 | 2 yr | 1477.00 | 527.00 | 533.72 | | 533.86 | 0.002651 | 4.01 | 612.81 | 249.08 | 0.29 |
| SF CWC | SECTION_01 | 14120 | 5 yr | 2350.00 | 527.00 | 534.61 | | 534.78 | 0.002942 | 4.64 | 866.36 | 302.05 | 0.32 |
| SF CWC | SECTION_01 | 14120 | 10 yr | 2827.00 | 527.00 | 535.00 | | 535.18 | 0.003072 | 4.93 | 984.65 | 309.69 | 0.33 |
| SF CWC | SECTION_01 | 14120 | 25 yr | 3649.00 | 527.00 | 535.58 | | 535.79 | 0.003261 | 5.35 | 1167.17 | 320.61 | 0.34 |
| SF CWC | SECTION_01 | 14120 | 50 yr | 4541.00 | 527.00 | 536.06 | | 536.31 | 0.003579 | 5.84 | 1324.40 | 331.74 | 0.36 |
| SF CWC | SECTION_01 | 14120 | 100 yr | 5421.00 | 527.00 | 536.50 | | 536.78 | 0.003816 | 6.24 | 1474.00 | 354.52 | 0.38 |
| SF CWC | SECTION_01 | 14120 | Ultimate 100 yr | 5538.00 | 527.00 | 536.55 | | 536.84 | 0.003836 | 6.29 | 1494.80 | 357.69 | 0.38 |
| SF CWC | SECTION_01 | 14120 | 500 yr | 7203.00 | 527.00 | 537.27 | | 537.61 | 0.004195 | 6.93 | 1762.91 | 397.37 | 0.40 |
| SF CWC | SECTION_01 | 13908 | 2 yr | 1477.00 | 529.00 | 533.03 | 531.37 | 533.20 | 0.004657 | 3.95 | 491.66 | 213.58 | 0.37 |
| SF CWC | SECTION_01 | 13908 | 5 yr | 2350.00 | 529.00 | 533.82 | 532.06 | 534.05 | 0.005203 | 4.77 | 685.22 | 268.84 | 0.40 |
| SF CWC | SECTION_01 | 13908 | 10 yr | 2827.00 | 529.00 | 534.16 | 532.35 | 534.42 | 0.005461 | 5.14 | 777.28 | 317.41 | 0.42 |
| SF CWC | SECTION_01 | 13908 | 25 yr | 3649.00 | 529.00 | 534.67 | 532.82 | 534.98 | 0.005786 | 5.67 | 927.56 | 386.90 | 0.44 |
| SF CWC | SECTION_01 | 13908 | 50 yr | 4541.00 | 529.00 | 535.11 | 533.32 | 535.45 | 0.005981 | 6.08 | 1137.90 | 399.70 | 0.45 |
| SF CWC | SECTION_01 | 13908 | 100 yr | 5421.00 | 529.00 | 535.52 | 533.70 | 535.88 | 0.006129 | 6.44 | 1300.08 | 410.43 | 0.46 |
| SF CWC | SECTION_01 | 13908 | Ultimate 100 yr | 5538.00 | 529.00 | 535.58 | 533.75 | 535.94 | 0.006095 | 6.47 | 1324.98 | 412.05 | 0.46 |
| SF CWC | SECTION_01 | 13908 | 500 yr | 7203.00 | 529.00 | 536.24 | 534.37 | 536.65 | 0.006255 | 7.02 | 1604.91 | 429.57 | 0.47 |
| SF CWC | SECTION_01 | 13479 | 2 yr | 1482.00 | 527.00 | 530.15 | | 530.44 | 0.016336 | 5.36 | 385.47 | 258.40 | 0.63 |
| SF CWC | SECTION_01 | 13479 | 5 yr | 2361.00 | 527.00 | 530.85 | | 531.16 | 0.013660 | 5.88 | 576.38 | 288.42 | 0.61 |
| SF CWC | SECTION_01 | 13479 | 10 yr | 2842.00 | 527.00 | 531.19 | | 531.52 | 0.012588 | 6.07 | 676.43 | 301.32 | 0.59 |
| SF CWC | SECTION_01 | 13479 | 25 yr | 3668.00 | 527.00 | 531.70 | | 532.05 | 0.011330 | 6.35 | 837.24 | 318.95 | 0.58 |
| SF CWC | SECTION_01 | 13479 | 50 yr | 4523.00 | 527.00 | 532.17 | | 532.54 | 0.010583 | 6.63 | 988.14 | 335.80 | 0.57 |
| SF CWC | SECTION_01 | 13479 | 100 yr | 5390.00 | 527.00 | 532.58 | | 532.98 | 0.010078 | 6.89 | 1130.18 | 352.72 | 0.56 |
| SF CWC | SECTION_01 | 13479 | Ultimate 100 yr | 5550.00 | 527.00 | 532.65 | | 533.05 | 0.010013 | 6.93 | 1155.09 | 355.60 | 0.56 |
| SF CWC | SECTION_01 | 13479 | 500 yr | 7279.00 | 527.00 | 533.35 | | 533.81 | 0.009372 | 7.36 | 1414.05 | 378.78 | 0.56 |
| SF CWC | SECTION_01 | 13237 | 2 yr | 1482.00 | 521.00 | 527.04 | | 527.41 | 0.008401 | 6.07 | 356.26 | 141.42 | 0.50 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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) | |
| SF CWC | SECTION_01 | 13237 | 5 yr | 2361.00 | 521.00 | 528.02 | | 528.47 | 0.008458 | 6.93 | 505.65 | 165.97 | 0.52 |
| SF CWC | SECTION_01 | 13237 | 10 yr | 2842.00 | 521.00 | 528.45 | | 528.95 | 0.008530 | 7.32 | 581.49 | 185.80 | 0.53 |
| SF CWC | SECTION_01 | 13237 | 25 yr | 3668.00 | 521.00 | 529.12 | | 529.66 | 0.008344 | 7.78 | 722.48 | 232.75 | 0.53 |
| SF CWC | SECTION_01 | 13237 | 50 yr | 4523.00 | 521.00 | 529.72 | | 530.28 | 0.008041 | 8.09 | 870.92 | 263.27 | 0.53 |
| SF CWC | SECTION_01 | 13237 | 100 yr | 5390.00 | 521.00 | 530.26 | | 530.83 | 0.007640 | 8.27 | 1020.59 | 289.82 | 0.52 |
| SF CWC | SECTION_01 | 13237 | Ultimate 100 yr | 5550.00 | 521.00 | 530.39 | | 530.95 | 0.007393 | 8.23 | 1057.40 | 295.38 | 0.52 |
| SF CWC | SECTION_01 | 13237 | 500 yr | 7279.00 | 521.00 | 531.30 | | 531.87 | 0.006714 | 8.44 | 1345.09 | 333.31 | 0.50 |
| | | | | | | | | | | | | | |
| SF CWC | SECTION_01 | 12822 | 2 yr | 1534.00 | 518.00 | 525.17 | | 525.24 | 0.001952 | 2.53 | 842.39 | 304.56 | 0.19 |
| SF CWC | SECTION_01 | 12822 | 5 yr | 2445.00 | 518.00 | 526.16 | | 526.24 | 0.001993 | 2.85 | 1148.91 | 314.52 | 0.20 |
| SF CWC | SECTION_01 | 12822 | 10 yr | 2925.00 | 518.00 | 526.60 | | 526.69 | 0.002018 | 3.00 | 1288.23 | 317.58 | 0.20 |
| SF CWC | SECTION_01 | 12822 | 25 yr | 3816.00 | 518.00 | 527.32 | | 527.43 | 0.002079 | 3.25 | 1517.05 | 322.05 | 0.21 |
| SF CWC | SECTION_01 | 12822 | 50 yr | 4744.00 | 518.00 | 527.96 | | 528.09 | 0.002161 | 3.49 | 1723.94 | 325.81 | 0.21 |
| SF CWC | SECTION_01 | 12822 | 100 yr | 5711.00 | 518.00 | 528.55 | | 528.69 | 0.002249 | 3.73 | 1916.76 | 329.28 | 0.22 |
| SF CWC | SECTION_01 | 12822 | Ultimate 100 yr | 5987.00 | 518.00 | 528.70 | | 528.86 | 0.002274 | 3.79 | 1968.46 | 330.21 | 0.22 |
| SF CWC | SECTION_01 | 12822 | 500 yr | 7907.00 | 518.00 | 529.68 | | 529.88 | 0.002448 | 4.21 | 2295.58 | 336.33 | 0.23 |
| | | | | | | | | | | | | | |
| SF CWC | SECTION_01 | 12421 | 2 yr | 1534.00 | 518.00 | 524.14 | 522.54 | 524.28 | 0.003724 | 3.89 | 572.61 | 192.67 | 0.33 |
| SF CWC | SECTION_01 | 12421 | 5 yr | 2445.00 | 518.00 | 525.05 | 523.05 | 525.24 | 0.004112 | 4.64 | 755.18 | 210.78 | 0.36 |
| SF CWC | SECTION_01 | 12421 | 10 yr | 2925.00 | 518.00 | 525.45 | 523.29 | 525.67 | 0.004282 | 4.97 | 841.30 | 225.35 | 0.37 |
| SF CWC | SECTION_01 | 12421 | 25 yr | 3816.00 | 518.00 | 526.10 | 523.70 | 526.37 | 0.004533 | 5.50 | 1008.29 | 284.99 | 0.39 |
| SF CWC | SECTION_01 | 12421 | 50 yr | 4744.00 | 518.00 | 526.67 | 524.07 | 526.99 | 0.004707 | 5.94 | 1178.73 | 303.34 | 0.40 |
| SF CWC | SECTION_01 | 12421 | 100 yr | 5711.00 | 518.00 | 527.21 | 524.46 | 527.56 | 0.004841 | 6.34 | 1343.00 | 313.52 | 0.41 |
| SF CWC | SECTION_01 | 12421 | Ultimate 100 yr | 5987.00 | 518.00 | 527.35 | 524.56 | 527.71 | 0.004876 | 6.44 | 1387.67 | 316.53 | 0.41 |
| SF CWC | SECTION_01 | 12421 | 500 yr | 7907.00 | 518.00 | 528.23 | 525.24 | 528.66 | 0.005108 | 7.10 | 1675.30 | 336.78 | 0.43 |
| | | | | | | | | | | | | | |
| SF CWC | SECTION_01 | 11967 | 2 yr | 1534.00 | 519.00 | 522.18 | 520.92 | 522.34 | 0.006530 | 4.13 | 504.44 | 219.28 | 0.42 |
| SF CWC | SECTION_01 | 11967 | 5 yr | 2445.00 | 519.00 | 523.05 | 521.44 | 523.25 | 0.006113 | 4.74 | 704.53 | 244.31 | 0.43 |
| SF CWC | SECTION_01 | 11967 | 10 yr | 2925.00 | 519.00 | 523.44 | 521.67 | 523.67 | 0.005912 | 4.97 | 802.28 | 255.65 | 0.43 |
| SF CWC | SECTION_01 | 11967 | 25 yr | 3816.00 | 519.00 | 524.08 | 522.08 | 524.34 | 0.005626 | 5.33 | 972.73 | 274.07 | 0.43 |
| SF CWC | SECTION_01 | 11967 | 50 yr | 4744.00 | 519.00 | 524.67 | 522.44 | 524.96 | 0.005381 | 5.62 | 1138.81 | 289.40 | 0.42 |
| SF CWC | SECTION_01 | 11967 | 100 yr | 5711.00 | 519.00 | 525.22 | 522.80 | 525.54 | 0.005181 | 5.88 | 1302.97 | 308.80 | 0.42 |
| SF CWC | SECTION_01 | 11967 | Ultimate 100 yr | 5987.00 | 519.00 | 525.37 | 522.91 | 525.70 | 0.005129 | 5.95 | 1348.81 | 313.37 | 0.42 |
| SF CWC | SECTION_01 | 11967 | 500 yr | 7907.00 | 519.00 | 526.28 | 523.54 | 526.66 | 0.004860 | 6.35 | 1669.51 | 416.51 | 0.42 |
| | | | | | | | | | | | | | |
| SF CWC | SECTION_01 | 11238 | 2 yr | 1534.00 | 511.46 | 519.27 | 517.95 | 519.46 | 0.004096 | 4.88 | 529.30 | 192.03 | 0.35 |
| SF CWC | SECTION_01 | 11238 | 5 yr | 2445.00 | 511.46 | 520.27 | 518.58 | 520.51 | 0.004265 | 5.53 | 730.52 | 211.99 | 0.37 |
| SF CWC | SECTION_01 | 11238 | 10 yr | 2925.00 | 511.46 | 520.71 | 518.85 | 520.97 | 0.004320 | 5.81 | 827.92 | 224.08 | 0.38 |
| SF CWC | SECTION_01 | 11238 | 25 yr | 3816.00 | 511.46 | 521.45 | 519.30 | 521.74 | 0.004385 | 6.24 | 1000.42 | 254.64 | 0.39 |
| SF CWC | SECTION_01 | 11238 | 50 yr | 4744.00 | 511.46 | 522.11 | 519.71 | 522.43 | 0.004433 | 6.61 | 1172.25 | 283.21 | 0.39 |
| SF CWC | SECTION_01 | 11238 | 100 yr | 5711.00 | 511.46 | 522.71 | 520.08 | 523.06 | 0.004487 | 6.95 | 1340.10 | 301.84 | 0.40 |
| SF CWC | SECTION_01 | 11238 | Ultimate 100 yr | 5987.00 | 511.46 | 522.87 | 520.20 | 523.23 | 0.004501 | 7.04 | 1386.15 | 306.24 | 0.40 |
| SF CWC | SECTION_01 | 11238 | 500 yr | 7907.00 | 511.46 | 523.88 | 520.89 | 524.28 | 0.004501 | 7.53 | 1728.54 | 331.42 | 0.41 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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) | |
| SF CWC | SECTION_01 | 10803 | 2 yr | 1534.00 | 514.00 | 517.63 | 516.00 | 517.79 | 0.006480 | 3.29 | 485.66 | 170.69 | 0.32 |
| SF CWC | SECTION_01 | 10803 | 5 yr | 2445.00 | 514.00 | 518.59 | 516.55 | 518.81 | 0.006525 | 3.92 | 654.81 | 182.59 | 0.34 |
| SF CWC | SECTION_01 | 10803 | 10 yr | 2925.00 | 514.00 | 519.02 | 516.82 | 519.27 | 0.006579 | 4.20 | 734.25 | 188.34 | 0.34 |
| SF CWC | SECTION_01 | 10803 | 25 yr | 3816.00 | 514.00 | 519.72 | 517.26 | 520.02 | 0.006671 | 4.65 | 874.47 | 208.97 | 0.35 |
| SF CWC | SECTION_01 | 10803 | 50 yr | 4744.00 | 514.00 | 520.35 | 517.67 | 520.69 | 0.006821 | 5.06 | 1009.83 | 223.71 | 0.36 |
| SF CWC | SECTION_01 | 10803 | 100 yr | 5711.00 | 514.00 | 520.90 | 518.09 | 521.30 | 0.007042 | 5.45 | 1137.24 | 233.97 | 0.38 |
| SF CWC | SECTION_01 | 10803 | Ultimate 100 yr | 5987.00 | 514.00 | 521.05 | 518.19 | 521.46 | 0.007105 | 5.56 | 1171.80 | 236.49 | 0.38 |
| SF CWC | SECTION_01 | 10803 | 500 yr | 7907.00 | 514.00 | 521.98 | 518.91 | 522.48 | 0.007459 | 6.21 | 1400.15 | 253.06 | 0.40 |
| SF CWC | SECTION_01 | 10047 | 2 yr | 1534.00 | 506.00 | 514.32 | 512.82 | 514.48 | 0.005657 | 3.95 | 505.23 | 179.36 | 0.30 |
| SF CWC | SECTION_01 | 10047 | 5 yr | 2445.00 | 506.00 | 515.30 | 513.39 | 515.51 | 0.005802 | 4.48 | 689.89 | 202.04 | 0.31 |
| SF CWC | SECTION_01 | 10047 | 10 yr | 2925.00 | 506.00 | 515.74 | 513.64 | 515.97 | 0.005814 | 4.69 | 782.77 | 218.56 | 0.32 |
| SF CWC | SECTION_01 | 10047 | 25 yr | 3816.00 | 506.00 | 516.48 | 514.07 | 516.74 | 0.005734 | 4.99 | 960.78 | 273.56 | 0.32 |
| SF CWC | SECTION_01 | 10047 | 50 yr | 4744.00 | 506.00 | 517.14 | 514.47 | 517.42 | 0.005596 | 5.22 | 1158.15 | 345.29 | 0.32 |
| SF CWC | SECTION_01 | 10047 | 100 yr | 5711.00 | 506.00 | 517.76 | 514.86 | 518.04 | 0.005358 | 5.36 | 1389.04 | 388.63 | 0.32 |
| SF CWC | SECTION_01 | 10047 | Ultimate 100 yr | 5987.00 | 506.00 | 517.95 | 514.97 | 518.23 | 0.005202 | 5.36 | 1463.50 | 397.14 | 0.32 |
| SF CWC | SECTION_01 | 10047 | 500 yr | 7907.00 | 506.00 | 519.05 | 515.70 | 519.32 | 0.004599 | 5.44 | 1936.73 | 486.47 | 0.30 |
| SF CWC | SECTION_01 | 9420 | 2 yr | 1534.00 | 506.00 | 512.32 | 510.88 | 512.42 | 0.002258 | 3.55 | 839.86 | 342.51 | 0.27 |
| SF CWC | SECTION_01 | 9420 | 5 yr | 2445.00 | 506.00 | 513.40 | 511.40 | 513.50 | 0.001998 | 3.77 | 1216.40 | 355.20 | 0.26 |
| SF CWC | SECTION_01 | 9420 | 10 yr | 2925.00 | 506.00 | 513.88 | 511.61 | 513.98 | 0.001944 | 3.89 | 1386.44 | 359.33 | 0.26 |
| SF CWC | SECTION_01 | 9420 | 25 yr | 3816.00 | 506.00 | 514.68 | 511.94 | 514.80 | 0.001865 | 4.10 | 1679.20 | 366.00 | 0.26 |
| SF CWC | SECTION_01 | 9420 | 50 yr | 4744.00 | 506.00 | 515.39 | 512.23 | 515.52 | 0.001859 | 4.34 | 1941.30 | 371.30 | 0.26 |
| SF CWC | SECTION_01 | 9420 | 100 yr | 5711.00 | 506.00 | 516.08 | 512.51 | 516.22 | 0.001853 | 4.57 | 2195.73 | 376.22 | 0.27 |
| SF CWC | SECTION_01 | 9420 | Ultimate 100 yr | 5987.00 | 506.00 | 516.32 | 512.58 | 516.46 | 0.001800 | 4.58 | 2286.74 | 378.50 | 0.26 |
| SF CWC | SECTION_01 | 9420 | 500 yr | 7907.00 | 506.00 | 517.56 | 513.07 | 517.73 | 0.001763 | 4.92 | 2765.65 | 389.39 | 0.27 |
| SF CWC | SECTION_01 | 9022 | 2 yr | 1617.00 | 504.00 | 510.94 | 509.71 | 511.21 | 0.005629 | 5.72 | 468.60 | 161.50 | 0.42 |
| SF CWC | SECTION_01 | 9022 | 5 yr | 2662.00 | 504.00 | 512.03 | 510.45 | 512.38 | 0.005978 | 6.62 | 651.72 | 173.22 | 0.45 |
| SF CWC | SECTION_01 | 9022 | 10 yr | 3183.00 | 504.00 | 512.50 | 510.76 | 512.87 | 0.006083 | 6.97 | 734.96 | 186.41 | 0.45 |
| SF CWC | SECTION_01 | 9022 | 25 yr | 4189.00 | 504.00 | 513.28 | 511.26 | 513.72 | 0.006228 | 7.55 | 890.09 | 209.13 | 0.47 |
| SF CWC | SECTION_01 | 9022 | 50 yr | 5182.00 | 504.00 | 513.96 | 511.73 | 514.44 | 0.006294 | 8.01 | 1042.40 | 239.11 | 0.48 |
| SF CWC | SECTION_01 | 9022 | 100 yr | 6268.00 | 504.00 | 514.62 | 512.20 | 515.14 | 0.006325 | 8.43 | 1207.60 | 264.03 | 0.48 |
| SF CWC | SECTION_01 | 9022 | Ultimate 100 yr | 6716.00 | 504.00 | 514.87 | 512.39 | 515.40 | 0.006328 | 8.58 | 1274.60 | 269.51 | 0.49 |
| SF CWC | SECTION_01 | 9022 | 500 yr | 9074.00 | 504.00 | 516.11 | 513.30 | 516.70 | 0.006119 | 9.14 | 1629.85 | 301.54 | 0.49 |
| SF CWC | SECTION_01 | 8667 | 2 yr | 1617.00 | 503.00 | 509.26 | 508.06 | 509.47 | 0.005034 | 4.92 | 528.13 | 212.50 | 0.39 |
| SF CWC | SECTION_01 | 8667 | 5 yr | 2662.00 | 503.00 | 510.47 | 508.74 | 510.70 | 0.004327 | 5.28 | 796.97 | 232.00 | 0.38 |
| SF CWC | SECTION_01 | 8667 | 10 yr | 3183.00 | 503.00 | 510.95 | 509.01 | 511.20 | 0.004243 | 5.50 | 909.82 | 240.32 | 0.38 |
| SF CWC | SECTION_01 | 8667 | 25 yr | 4189.00 | 503.00 | 511.75 | 509.46 | 512.03 | 0.004175 | 5.88 | 1108.71 | 255.60 | 0.38 |
| SF CWC | SECTION_01 | 8667 | 50 yr | 5182.00 | 503.00 | 512.43 | 509.85 | 512.75 | 0.004166 | 6.23 | 1287.77 | 269.52 | 0.39 |
| SF CWC | SECTION_01 | 8667 | 100 yr | 6268.00 | 503.00 | 513.09 | 510.24 | 513.43 | 0.004194 | 6.58 | 1468.83 | 281.92 | 0.39 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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) | |
| SF CWC | SECTION_01 | 8667 | Ultimate 100 yr | 6716.00 | 503.00 | 513.34 | 510.40 | 513.70 | 0.004209 | 6.72 | 1539.72 | 285.13 | 0.39 |
| SF CWC | SECTION_01 | 8667 | 500 yr | 9074.00 | 503.00 | 514.65 | 511.13 | 515.06 | 0.004046 | 7.21 | 1925.12 | 303.08 | 0.40 |
| SF CWC | SECTION_01 | 8274 | 2 yr | 1617.00 | 502.00 | 508.47 | 506.08 | 508.50 | 0.000751 | 1.90 | 1262.94 | 362.07 | 0.15 |
| SF CWC | SECTION_01 | 8274 | 5 yr | 2662.00 | 502.00 | 509.82 | 506.22 | 509.86 | 0.000721 | 2.19 | 1755.87 | 369.92 | 0.15 |
| SF CWC | SECTION_01 | 8274 | 10 yr | 3183.00 | 502.00 | 510.31 | 506.40 | 510.36 | 0.000751 | 2.35 | 1940.06 | 372.32 | 0.16 |
| SF CWC | SECTION_01 | 8274 | 25 yr | 4189.00 | 502.00 | 511.13 | 506.71 | 511.19 | 0.000813 | 2.64 | 2247.53 | 376.66 | 0.17 |
| SF CWC | SECTION_01 | 8274 | 50 yr | 5182.00 | 502.00 | 511.82 | 506.97 | 511.90 | 0.000876 | 2.90 | 2509.48 | 381.60 | 0.18 |
| SF CWC | SECTION_01 | 8274 | 100 yr | 6268.00 | 502.00 | 512.48 | 507.25 | 512.57 | 0.000946 | 3.17 | 2762.46 | 388.64 | 0.19 |
| SF CWC | SECTION_01 | 8274 | Ultimate 100 yr | 6716.00 | 502.00 | 512.73 | 507.34 | 512.82 | 0.000973 | 3.28 | 2859.99 | 391.48 | 0.19 |
| SF CWC | SECTION_01 | 8274 | 500 yr | 9074.00 | 502.00 | 514.08 | 507.86 | 514.20 | 0.001037 | 3.71 | 3395.91 | 404.93 | 0.20 |
| SF CWC | SECTION_01 | 7765 | 2 yr | 1617.00 | 501.00 | 507.17 | 506.24 | 507.88 | 0.009817 | 7.63 | 286.05 | 94.57 | 0.57 |
| SF CWC | SECTION_01 | 7765 | 5 yr | 2662.00 | 501.00 | 508.52 | 507.45 | 509.27 | 0.009026 | 8.44 | 500.39 | 211.58 | 0.56 |
| SF CWC | SECTION_01 | 7765 | 10 yr | 3183.00 | 501.00 | 509.03 | 508.29 | 509.77 | 0.008532 | 8.61 | 611.47 | 224.59 | 0.55 |
| SF CWC | SECTION_01 | 7765 | 25 yr | 4189.00 | 501.00 | 509.87 | 508.95 | 510.58 | 0.007864 | 8.86 | 811.54 | 250.17 | 0.54 |
| SF CWC | SECTION_01 | 7765 | 50 yr | 5182.00 | 501.00 | 510.55 | 509.46 | 511.25 | 0.007506 | 9.13 | 992.00 | 289.69 | 0.54 |
| SF CWC | SECTION_01 | 7765 | 100 yr | 6268.00 | 501.00 | 511.19 | 509.92 | 511.89 | 0.007222 | 9.37 | 1186.73 | 322.25 | 0.53 |
| SF CWC | SECTION_01 | 7765 | Ultimate 100 yr | 6716.00 | 501.00 | 511.43 | 510.10 | 512.14 | 0.007105 | 9.45 | 1268.02 | 335.97 | 0.53 |
| SF CWC | SECTION_01 | 7765 | 500 yr | 9074.00 | 501.00 | 512.91 | 510.96 | 513.52 | 0.005528 | 9.15 | 1784.01 | 359.09 | 0.48 |
| SF CWC | SECTION_01 | 7345 | 2 yr | 1617.00 | 497.00 | 505.15 | 501.70 | 505.33 | 0.001989 | 3.79 | 574.46 | 172.19 | 0.26 |
| SF CWC | SECTION_01 | 7345 | 5 yr | 2662.00 | 497.00 | 506.73 | 503.33 | 506.95 | 0.001947 | 4.33 | 863.59 | 195.40 | 0.27 |
| SF CWC | SECTION_01 | 7345 | 10 yr | 3183.00 | 497.00 | 507.31 | 503.94 | 507.55 | 0.002008 | 4.61 | 979.86 | 204.39 | 0.28 |
| SF CWC | SECTION_01 | 7345 | 25 yr | 4189.00 | 497.00 | 508.21 | 504.69 | 508.49 | 0.002189 | 5.13 | 1169.14 | 219.72 | 0.29 |
| SF CWC | SECTION_01 | 7345 | 50 yr | 5182.00 | 497.00 | 508.88 | 505.29 | 509.22 | 0.002431 | 5.66 | 1322.22 | 234.27 | 0.31 |
| SF CWC | SECTION_01 | 7345 | 100 yr | 6268.00 | 497.00 | 509.49 | 505.82 | 509.89 | 0.002703 | 6.20 | 1469.57 | 247.56 | 0.33 |
| SF CWC | SECTION_01 | 7345 | Ultimate 100 yr | 6716.00 | 497.00 | 509.73 | 506.03 | 510.15 | 0.002803 | 6.41 | 1528.81 | 256.02 | 0.34 |
| SF CWC | SECTION_01 | 7345 | 500 yr | 9074.00 | 497.00 | 511.51 | 507.01 | 511.94 | 0.002508 | 6.69 | 2021.08 | 292.26 | 0.33 |
| SF CWC | SECTION_01 | 7082 | 2 yr | 1617.00 | 496.64 | 504.72 | | 504.87 | 0.001558 | 3.39 | 563.42 | 121.43 | 0.23 |
| SF CWC | SECTION_01 | 7082 | 5 yr | 2662.00 | 496.64 | 506.24 | | 506.47 | 0.001810 | 4.20 | 798.17 | 181.13 | 0.26 |
| SF CWC | SECTION_01 | 7082 | 10 yr | 3183.00 | 496.64 | 506.79 | | 507.05 | 0.001959 | 4.56 | 902.08 | 202.21 | 0.27 |
| SF CWC | SECTION_01 | 7082 | 25 yr | 4189.00 | 496.64 | 507.60 | | 507.93 | 0.002269 | 5.21 | 1079.01 | 229.79 | 0.30 |
| SF CWC | SECTION_01 | 7082 | 50 yr | 5182.00 | 496.64 | 508.18 | | 508.58 | 0.002644 | 5.85 | 1216.79 | 248.98 | 0.32 |
| SF CWC | SECTION_01 | 7082 | 100 yr | 6268.00 | 496.64 | 508.68 | | 509.17 | 0.003079 | 6.52 | 1347.23 | 273.48 | 0.35 |
| SF CWC | SECTION_01 | 7082 | Ultimate 100 yr | 6716.00 | 496.64 | 508.87 | | 509.40 | 0.003240 | 6.77 | 1401.30 | 283.15 | 0.36 |
| SF CWC | SECTION_01 | 7082 | 500 yr | 9074.00 | 496.64 | 510.84 | | 511.32 | 0.002575 | 6.75 | 2010.41 | 335.30 | 0.33 |
| SF CWC | SECTION_01 | 6876 | 2 yr | 1617.00 | 497.00 | 503.65 | 502.43 | 504.32 | 0.005481 | 6.63 | 250.66 | 90.66 | 0.60 |
| SF CWC | SECTION_01 | 6876 | 5 yr | 2662.00 | 497.00 | 505.26 | 503.85 | 505.93 | 0.003677 | 6.87 | 444.19 | 149.57 | 0.52 |
| SF CWC | SECTION_01 | 6876 | 10 yr | 3183.00 | 497.00 | 505.86 | 504.46 | 506.51 | 0.003277 | 6.95 | 554.42 | 215.90 | 0.50 |
| SF CWC | SECTION_01 | 6876 | 25 yr | 4189.00 | 497.00 | 506.80 | 505.29 | 507.40 | 0.002696 | 6.95 | 778.58 | 253.41 | 0.46 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|--------|------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| SF CWC | SECTION_01 | 6876 | 50 yr | 5182.00 | 497.00 | 507.37 | 506.08 | 508.01 | 0.002709 | 7.34 | 927.88 | 270.03 | 0.47 |
| SF CWC | SECTION_01 | 6876 | 100 yr | 6268.00 | 497.00 | 507.81 | 506.61 | 508.53 | 0.002927 | 7.92 | 1048.82 | 287.64 | 0.49 |
| SF CWC | SECTION_01 | 6876 | Ultimate 100 yr | 6716.00 | 497.00 | 507.99 | 506.80 | 508.74 | 0.002972 | 8.10 | 1101.97 | 296.74 | 0.50 |
| SF CWC | SECTION_01 | 6876 | 500 yr | 9074.00 | 497.00 | 510.49 | 507.61 | 510.91 | 0.001259 | 6.30 | 1919.22 | 350.21 | 0.34 |
| SF CWC | SECTION_01 | 6835 | Bridge | | | | | | | | | | |
| SF CWC | SECTION_01 | 6783 | 2 yr | 1617.00 | 497.00 | 502.45 | 501.04 | 503.03 | 0.004865 | 6.11 | 264.74 | 73.08 | 0.56 |
| SF CWC | SECTION_01 | 6783 | 5 yr | 2662.00 | 497.00 | 503.79 | 502.26 | 504.61 | 0.004606 | 7.29 | 375.24 | 96.43 | 0.57 |
| SF CWC | SECTION_01 | 6783 | 10 yr | 3183.00 | 497.00 | 504.34 | 502.72 | 505.26 | 0.004526 | 7.75 | 431.36 | 106.78 | 0.58 |
| SF CWC | SECTION_01 | 6783 | 25 yr | 4189.00 | 497.00 | 505.22 | 503.64 | 506.29 | 0.004500 | 8.52 | 533.44 | 152.03 | 0.59 |
| SF CWC | SECTION_01 | 6783 | 50 yr | 5182.00 | 497.00 | 505.95 | 504.51 | 507.09 | 0.004333 | 8.97 | 668.85 | 183.96 | 0.59 |
| SF CWC | SECTION_01 | 6783 | 100 yr | 6268.00 | 497.00 | 506.67 | 505.55 | 507.83 | 0.004061 | 9.26 | 818.93 | 221.36 | 0.58 |
| SF CWC | SECTION_01 | 6783 | Ultimate 100 yr | 6716.00 | 497.00 | 507.08 | 505.84 | 508.17 | 0.003665 | 9.10 | 911.20 | 239.41 | 0.56 |
| SF CWC | SECTION_01 | 6783 | 500 yr | 9074.00 | 497.00 | 508.91 | 507.04 | 509.74 | 0.002364 | 8.35 | 1436.53 | 322.01 | 0.46 |
| SF CWC | SECTION_01 | 6732 | 2 yr | 1617.00 | 495.09 | 502.37 | | 502.74 | 0.002406 | 4.85 | 333.69 | 75.15 | 0.41 |
| SF CWC | SECTION_01 | 6732 | 5 yr | 2662.00 | 495.09 | 503.72 | | 504.29 | 0.003064 | 6.02 | 442.31 | 86.22 | 0.47 |
| SF CWC | SECTION_01 | 6732 | 10 yr | 3183.00 | 495.09 | 504.27 | | 504.92 | 0.003344 | 6.49 | 490.71 | 91.28 | 0.49 |
| SF CWC | SECTION_01 | 6732 | 25 yr | 4189.00 | 495.09 | 505.12 | | 505.95 | 0.003985 | 7.30 | 573.57 | 103.06 | 0.54 |
| SF CWC | SECTION_01 | 6732 | 50 yr | 5182.00 | 495.09 | 505.79 | | 506.79 | 0.004452 | 8.05 | 645.14 | 112.23 | 0.58 |
| SF CWC | SECTION_01 | 6732 | 100 yr | 6268.00 | 495.09 | 506.37 | | 507.59 | 0.004852 | 8.85 | 714.42 | 127.94 | 0.61 |
| SF CWC | SECTION_01 | 6732 | Ultimate 100 yr | 6716.00 | 495.09 | 506.58 | | 507.88 | 0.005008 | 9.18 | 741.42 | 135.30 | 0.63 |
| SF CWC | SECTION_01 | 6732 | 500 yr | 9074.00 | 495.09 | 507.59 | | 509.30 | 0.005527 | 10.59 | 899.29 | 177.12 | 0.67 |
| SF CWC | SECTION_01 | 6114 | 2 yr | 1617.00 | 493.00 | 501.62 | 496.97 | 501.77 | 0.000574 | 3.28 | 579.46 | 204.86 | 0.21 |
| SF CWC | SECTION_01 | 6114 | 5 yr | 2662.00 | 493.00 | 502.88 | 498.21 | 503.08 | 0.000677 | 3.97 | 887.02 | 277.58 | 0.24 |
| SF CWC | SECTION_01 | 6114 | 10 yr | 3183.00 | 493.00 | 503.41 | 498.71 | 503.62 | 0.000683 | 4.15 | 1044.86 | 307.59 | 0.24 |
| SF CWC | SECTION_01 | 6114 | 25 yr | 4189.00 | 493.00 | 504.20 | 499.69 | 504.43 | 0.000721 | 4.51 | 1296.59 | 332.63 | 0.25 |
| SF CWC | SECTION_01 | 6114 | 50 yr | 5182.00 | 493.00 | 504.86 | 500.80 | 505.11 | 0.000750 | 4.80 | 1522.53 | 364.34 | 0.26 |
| SF CWC | SECTION_01 | 6114 | 100 yr | 6268.00 | 493.00 | 505.47 | 502.17 | 505.74 | 0.000777 | 5.07 | 1752.32 | 384.62 | 0.27 |
| SF CWC | SECTION_01 | 6114 | Ultimate 100 yr | 6716.00 | 493.00 | 505.70 | 502.43 | 505.97 | 0.000792 | 5.19 | 1838.55 | 393.10 | 0.27 |
| SF CWC | SECTION_01 | 6114 | 500 yr | 9074.00 | 493.00 | 506.86 | 503.42 | 507.17 | 0.000798 | 5.56 | 2320.98 | 424.86 | 0.28 |
| SF CWC | SECTION_01 | 6060 | Bridge | | | | | | | | | | |
| SF CWC | SECTION_01 | 5996 | 2 yr | 1617.00 | 492.75 | 501.32 | 497.36 | 501.58 | 0.001483 | 4.23 | 429.04 | 114.92 | 0.28 |
| SF CWC | SECTION_01 | 5996 | 5 yr | 2662.00 | 492.75 | 502.41 | 498.78 | 502.80 | 0.002057 | 5.46 | 592.57 | 185.17 | 0.33 |
| SF CWC | SECTION_01 | 5996 | 10 yr | 3183.00 | 492.75 | 502.89 | 499.45 | 503.32 | 0.002161 | 5.81 | 686.97 | 206.13 | 0.34 |
| SF CWC | SECTION_01 | 5996 | 25 yr | 4189.00 | 492.75 | 503.56 | 500.79 | 504.06 | 0.002438 | 6.48 | 844.62 | 266.84 | 0.37 |
| SF CWC | SECTION_01 | 5996 | 50 yr | 5182.00 | 492.75 | 504.14 | 501.95 | 504.68 | 0.002576 | 6.93 | 1010.71 | 321.62 | 0.38 |
| SF CWC | SECTION_01 | 5996 | 100 yr | 6268.00 | 492.75 | 504.70 | 502.79 | 505.26 | 0.002613 | 7.23 | 1216.04 | 418.44 | 0.39 |
| SF CWC | SECTION_01 | 5996 | Ultimate 100 yr | 6716.00 | 492.75 | 504.94 | 503.04 | 505.49 | 0.002544 | 7.24 | 1322.12 | 438.83 | 0.39 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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) | |
| SF CWC | SECTION_01 | 5996 | 500 yr | 9074.00 | 492.75 | 506.24 | 504.15 | 506.69 | 0.001996 | 6.91 | 1935.02 | 513.23 | 0.35 |
| SF CWC | SECTION_01 | 5765 | 2 yr | 1583.00 | 492.00 | 500.99 | | 501.15 | 0.001987 | 3.81 | 570.26 | 249.34 | 0.29 |
| SF CWC | SECTION_01 | 5765 | 5 yr | 2634.00 | 492.00 | 502.09 | | 502.27 | 0.001830 | 4.16 | 881.39 | 318.20 | 0.29 |
| SF CWC | SECTION_01 | 5765 | 10 yr | 3169.00 | 492.00 | 502.60 | | 502.77 | 0.001689 | 4.20 | 1055.24 | 365.97 | 0.28 |
| SF CWC | SECTION_01 | 5765 | 25 yr | 4125.00 | 492.00 | 503.28 | | 503.47 | 0.001619 | 4.39 | 1341.26 | 468.68 | 0.28 |
| SF CWC | SECTION_01 | 5765 | 50 yr | 5058.00 | 492.00 | 503.87 | | 504.06 | 0.001525 | 4.48 | 1627.12 | 495.37 | 0.28 |
| SF CWC | SECTION_01 | 5765 | 100 yr | 6104.00 | 492.00 | 504.45 | | 504.64 | 0.001457 | 4.59 | 1919.21 | 526.92 | 0.27 |
| SF CWC | SECTION_01 | 5765 | Ultimate 100 yr | 6531.00 | 492.00 | 504.70 | | 504.89 | 0.001394 | 4.57 | 2056.78 | 541.85 | 0.27 |
| SF CWC | SECTION_01 | 5765 | 500 yr | 8793.00 | 492.00 | 506.06 | | 506.23 | 0.001075 | 4.41 | 2832.25 | 600.63 | 0.24 |
| SF CWC | SECTION_01 | 5502 | 2 yr | 1583.00 | 493.00 | 500.19 | | 500.53 | 0.003037 | 5.34 | 417.45 | 231.26 | 0.38 |
| SF CWC | SECTION_01 | 5502 | 5 yr | 2634.00 | 493.00 | 501.40 | | 501.72 | 0.002761 | 5.73 | 773.68 | 371.30 | 0.37 |
| SF CWC | SECTION_01 | 5502 | 10 yr | 3169.00 | 493.00 | 502.05 | | 502.32 | 0.002195 | 5.40 | 1025.43 | 395.23 | 0.33 |
| SF CWC | SECTION_01 | 5502 | 25 yr | 4125.00 | 493.00 | 502.81 | | 503.05 | 0.001981 | 5.44 | 1334.65 | 426.10 | 0.32 |
| SF CWC | SECTION_01 | 5502 | 50 yr | 5058.00 | 493.00 | 503.44 | | 503.68 | 0.001841 | 5.49 | 1612.94 | 448.18 | 0.31 |
| SF CWC | SECTION_01 | 5502 | 100 yr | 6104.00 | 493.00 | 504.04 | | 504.28 | 0.001778 | 5.62 | 1884.83 | 466.41 | 0.31 |
| SF CWC | SECTION_01 | 5502 | Ultimate 100 yr | 6531.00 | 493.00 | 504.31 | | 504.55 | 0.001699 | 5.59 | 2014.81 | 469.46 | 0.31 |
| SF CWC | SECTION_01 | 5502 | 500 yr | 8793.00 | 493.00 | 505.75 | | 505.96 | 0.001345 | 5.42 | 2703.22 | 491.29 | 0.28 |
| SF CWC | SECTION_02 | 5157 | 2 yr | 1818.00 | 492.00 | 499.54 | 497.95 | 499.68 | 0.001534 | 3.77 | 643.33 | 276.26 | 0.27 |
| SF CWC | SECTION_02 | 5157 | 5 yr | 3109.00 | 492.00 | 500.83 | 498.80 | 500.98 | 0.001258 | 3.87 | 1037.75 | 333.62 | 0.25 |
| SF CWC | SECTION_02 | 5157 | 10 yr | 4056.00 | 492.00 | 501.54 | 499.25 | 501.70 | 0.001191 | 4.01 | 1293.87 | 371.43 | 0.25 |
| SF CWC | SECTION_02 | 5157 | 25 yr | 5252.00 | 492.00 | 502.32 | 499.70 | 502.49 | 0.001136 | 4.16 | 1591.12 | 394.16 | 0.24 |
| SF CWC | SECTION_02 | 5157 | 50 yr | 6379.00 | 492.00 | 502.97 | 500.01 | 503.16 | 0.001097 | 4.28 | 1853.93 | 413.03 | 0.24 |
| SF CWC | SECTION_02 | 5157 | 100 yr | 7529.00 | 492.00 | 503.57 | 500.32 | 503.77 | 0.001068 | 4.40 | 2107.96 | 430.49 | 0.24 |
| SF CWC | SECTION_02 | 5157 | Ultimate 100 yr | 8102.00 | 492.00 | 503.86 | 500.45 | 504.07 | 0.001053 | 4.45 | 2232.20 | 438.78 | 0.24 |
| SF CWC | SECTION_02 | 5157 | 500 yr | 11366.00 | 492.00 | 505.31 | 501.24 | 505.56 | 0.000996 | 4.72 | 2894.96 | 474.68 | 0.24 |
| SF CWC | SECTION_02 | 4790 | 2 yr | 1818.00 | 490.00 | 498.67 | | 498.98 | 0.003214 | 5.06 | 515.84 | 145.63 | 0.33 |
| SF CWC | SECTION_02 | 4790 | 5 yr | 3109.00 | 490.00 | 499.95 | | 500.35 | 0.003835 | 6.17 | 779.64 | 246.29 | 0.38 |
| SF CWC | SECTION_02 | 4790 | 10 yr | 4056.00 | 490.00 | 500.68 | | 501.10 | 0.003930 | 6.60 | 966.32 | 267.59 | 0.39 |
| SF CWC | SECTION_02 | 4790 | 25 yr | 5252.00 | 490.00 | 501.47 | | 501.92 | 0.003964 | 7.01 | 1186.84 | 288.24 | 0.39 |
| SF CWC | SECTION_02 | 4790 | 50 yr | 6379.00 | 490.00 | 502.13 | | 502.60 | 0.003973 | 7.33 | 1383.32 | 315.04 | 0.40 |
| SF CWC | SECTION_02 | 4790 | 100 yr | 7529.00 | 490.00 | 502.74 | | 503.24 | 0.003978 | 7.61 | 1581.35 | 334.75 | 0.40 |
| SF CWC | SECTION_02 | 4790 | Ultimate 100 yr | 8102.00 | 490.00 | 503.03 | | 503.53 | 0.003968 | 7.73 | 1679.95 | 343.77 | 0.40 |
| SF CWC | SECTION_02 | 4790 | 500 yr | 11366.00 | 490.00 | 504.50 | | 505.06 | 0.003921 | 8.33 | 2213.16 | 382.31 | 0.41 |
| SF CWC | SECTION_02 | 4435 | 2 yr | 1818.00 | 489.29 | 497.80 | | 498.00 | 0.002575 | 4.43 | 637.05 | 219.94 | 0.29 |
| SF CWC | SECTION_02 | 4435 | 5 yr | 3109.00 | 489.29 | 498.99 | | 499.24 | 0.002890 | 5.19 | 913.52 | 244.45 | 0.32 |
| SF CWC | SECTION_02 | 4435 | 10 yr | 4056.00 | 489.29 | 499.69 | | 499.98 | 0.003023 | 5.60 | 1093.82 | 265.43 | 0.33 |
| SF CWC | SECTION_02 | 4435 | 25 yr | 5252.00 | 489.29 | 500.47 | | 500.79 | 0.003141 | 6.03 | 1316.76 | 301.45 | 0.34 |
| SF CWC | SECTION_02 | 4435 | 50 yr | 6379.00 | 489.29 | 501.12 | | 501.48 | 0.003211 | 6.36 | 1521.60 | 328.10 | 0.35 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|--------|------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| SF CWC | SECTION_02 | 4435 | 100 yr | 7529.00 | 489.29 | 501.72 | | 502.11 | 0.003268 | 6.66 | 1723.10 | 341.69 | 0.35 |
| SF CWC | SECTION_02 | 4435 | Ultimate 100 yr | 8102.00 | 489.29 | 502.02 | | 502.41 | 0.003272 | 6.78 | 1824.61 | 351.82 | 0.35 |
| SF CWC | SECTION_02 | 4435 | 500 yr | 11366.00 | 489.29 | 503.51 | | 503.95 | 0.003285 | 7.37 | 2414.40 | 429.56 | 0.36 |
| SF CWC | SECTION_02 | 4074 | 2 yr | 1818.00 | 488.77 | 496.78 | | 497.02 | 0.003873 | 5.13 | 548.05 | 225.71 | 0.35 |
| SF CWC | SECTION_02 | 4074 | 5 yr | 3109.00 | 488.77 | 498.11 | | 498.35 | 0.002958 | 5.05 | 853.95 | 235.62 | 0.31 |
| SF CWC | SECTION_02 | 4074 | 10 yr | 4056.00 | 488.77 | 498.83 | | 499.10 | 0.002812 | 5.22 | 1026.05 | 240.80 | 0.31 |
| SF CWC | SECTION_02 | 4074 | 25 yr | 5252.00 | 488.77 | 499.60 | | 499.91 | 0.002753 | 5.46 | 1213.71 | 246.33 | 0.31 |
| SF CWC | SECTION_02 | 4074 | 50 yr | 6379.00 | 488.77 | 500.25 | | 500.60 | 0.002729 | 5.68 | 1373.84 | 250.59 | 0.31 |
| SF CWC | SECTION_02 | 4074 | 100 yr | 7529.00 | 488.77 | 500.82 | | 501.22 | 0.002749 | 5.92 | 1519.38 | 253.98 | 0.32 |
| SF CWC | SECTION_02 | 4074 | Ultimate 100 yr | 8102.00 | 488.77 | 501.11 | | 501.53 | 0.002738 | 6.01 | 1592.30 | 255.74 | 0.32 |
| SF CWC | SECTION_02 | 4074 | 500 yr | 11366.00 | 488.77 | 502.52 | | 503.07 | 0.002763 | 6.54 | 1960.35 | 264.39 | 0.33 |
| SF CWC | SECTION_02 | 3740 | 2 yr | 1818.00 | 488.00 | 495.14 | 493.91 | 495.53 | 0.006502 | 5.83 | 449.93 | 175.33 | 0.45 |
| SF CWC | SECTION_02 | 3740 | 5 yr | 3109.00 | 488.00 | 496.95 | 495.06 | 497.29 | 0.004383 | 5.84 | 782.11 | 191.61 | 0.39 |
| SF CWC | SECTION_02 | 3740 | 10 yr | 4056.00 | 488.00 | 497.64 | 495.59 | 498.05 | 0.004760 | 6.48 | 916.44 | 197.10 | 0.41 |
| SF CWC | SECTION_02 | 3740 | 25 yr | 5252.00 | 488.00 | 498.33 | 496.15 | 498.84 | 0.005310 | 7.26 | 1055.78 | 203.76 | 0.44 |
| SF CWC | SECTION_02 | 3740 | 50 yr | 6379.00 | 488.00 | 498.92 | 496.64 | 499.51 | 0.005731 | 7.88 | 1175.98 | 208.67 | 0.46 |
| SF CWC | SECTION_02 | 3740 | 100 yr | 7529.00 | 488.00 | 499.41 | 497.07 | 500.10 | 0.006241 | 8.53 | 1279.66 | 213.60 | 0.49 |
| SF CWC | SECTION_02 | 3740 | Ultimate 100 yr | 8102.00 | 488.00 | 499.68 | 497.28 | 500.40 | 0.006357 | 8.77 | 1337.20 | 216.08 | 0.50 |
| SF CWC | SECTION_02 | 3740 | 500 yr | 11366.00 | 488.00 | 500.94 | 498.33 | 501.89 | 0.007148 | 10.09 | 1617.45 | 225.28 | 0.54 |
| SF CWC | SECTION_02 | 3387 | 2 yr | 1818.00 | 485.00 | 493.68 | | 493.91 | 0.002473 | 4.30 | 581.71 | 177.49 | 0.29 |
| SF CWC | SECTION_02 | 3387 | 5 yr | 3109.00 | 485.00 | 496.11 | | 496.26 | 0.001267 | 3.76 | 1106.98 | 258.86 | 0.22 |
| SF CWC | SECTION_02 | 3387 | 10 yr | 4056.00 | 485.00 | 496.74 | | 496.92 | 0.001389 | 4.11 | 1276.23 | 276.29 | 0.23 |
| SF CWC | SECTION_02 | 3387 | 25 yr | 5252.00 | 485.00 | 497.34 | | 497.57 | 0.001577 | 4.55 | 1447.24 | 290.60 | 0.25 |
| SF CWC | SECTION_02 | 3387 | 50 yr | 6379.00 | 485.00 | 497.86 | | 498.13 | 0.001705 | 4.89 | 1601.63 | 303.70 | 0.26 |
| SF CWC | SECTION_02 | 3387 | 100 yr | 7529.00 | 485.00 | 498.26 | | 498.58 | 0.001893 | 5.27 | 1725.97 | 313.34 | 0.27 |
| SF CWC | SECTION_02 | 3387 | Ultimate 100 yr | 8102.00 | 485.00 | 498.53 | | 498.86 | 0.001905 | 5.37 | 1808.56 | 319.20 | 0.28 |
| SF CWC | SECTION_02 | 3387 | 500 yr | 11366.00 | 485.00 | 499.72 | | 500.14 | 0.002088 | 5.99 | 2221.23 | 391.47 | 0.29 |
| SF CWC | SECTION_02 | 3120 | 2 yr | 1818.00 | 485.86 | 493.04 | | 493.36 | 0.001662 | 5.00 | 452.18 | 131.75 | 0.36 |
| SF CWC | SECTION_02 | 3120 | 5 yr | 3109.00 | 485.86 | 495.74 | | 495.98 | 0.000839 | 4.54 | 896.75 | 218.01 | 0.27 |
| SF CWC | SECTION_02 | 3120 | 10 yr | 4056.00 | 485.86 | 496.29 | | 496.59 | 0.001027 | 5.22 | 1021.35 | 236.22 | 0.30 |
| SF CWC | SECTION_02 | 3120 | 25 yr | 5252.00 | 485.86 | 496.78 | | 497.18 | 0.001301 | 6.08 | 1139.85 | 252.56 | 0.34 |
| SF CWC | SECTION_02 | 3120 | 50 yr | 6379.00 | 485.86 | 497.20 | | 497.69 | 0.001514 | 6.75 | 1250.73 | 269.48 | 0.37 |
| SF CWC | SECTION_02 | 3120 | 100 yr | 7529.00 | 485.86 | 497.47 | | 498.07 | 0.001829 | 7.54 | 1323.90 | 282.75 | 0.41 |
| SF CWC | SECTION_02 | 3120 | Ultimate 100 yr | 8102.00 | 485.86 | 497.71 | | 498.34 | 0.001862 | 7.73 | 1395.38 | 299.51 | 0.41 |
| SF CWC | SECTION_02 | 3120 | 500 yr | 11366.00 | 485.86 | 498.79 | | 499.56 | 0.002165 | 8.88 | 1783.37 | 398.20 | 0.45 |
| SF CWC | SECTION_02 | 2852 | 2 yr | 1844.00 | 484.90 | 492.80 | 488.60 | 492.99 | 0.000728 | 3.62 | 526.21 | 354.44 | 0.24 |
| SF CWC | SECTION_02 | 2852 | 5 yr | 3141.00 | 484.90 | 495.75 | 489.94 | 495.78 | 0.000106 | 1.75 | 2626.18 | 603.26 | 0.10 |
| SF CWC | SECTION_02 | 2852 | 10 yr | 4132.00 | 484.90 | 496.32 | 490.68 | 496.35 | 0.000135 | 2.04 | 2973.11 | 631.46 | 0.11 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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 |
|--------|------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| SF CWC | SECTION_02 | 2852 | 25 yr | 5358.00 | 484.90 | 496.82 | 491.52 | 496.87 | 0.000175 | 2.40 | 3295.30 | 652.88 | 0.13 |
| SF CWC | SECTION_02 | 2852 | 50 yr | 6488.00 | 484.90 | 497.26 | 492.23 | 497.32 | 0.000205 | 2.67 | 3590.84 | 675.68 | 0.14 |
| SF CWC | SECTION_02 | 2852 | 100 yr | 7540.00 | 484.90 | 497.55 | 492.84 | 497.63 | 0.000241 | 2.94 | 3787.97 | 690.86 | 0.15 |
| SF CWC | SECTION_02 | 2852 | Ultimate 100 yr | 8134.00 | 484.90 | 497.81 | 493.17 | 497.88 | 0.000249 | 3.03 | 3965.68 | 704.74 | 0.15 |
| SF CWC | SECTION_02 | 2852 | 500 yr | 11387.00 | 484.90 | 498.92 | 494.87 | 499.02 | 0.000295 | 3.50 | 4850.92 | 825.58 | 0.17 |
| SF CWC | SECTION_02 | 2797 | | Culvert | | | | | | | | | |
| SF CWC | SECTION_02 | 2723 | 2 yr | 1871.00 | 483.67 | 491.51 | 488.22 | 491.81 | 0.001495 | 4.41 | 425.74 | 144.61 | 0.33 |
| SF CWC | SECTION_02 | 2723 | 5 yr | 3171.00 | 483.67 | 494.12 | 489.63 | 494.50 | 0.001140 | 4.97 | 653.10 | 307.55 | 0.31 |
| SF CWC | SECTION_02 | 2723 | 10 yr | 4190.00 | 483.67 | 495.47 | 490.47 | 495.62 | 0.000528 | 3.54 | 1574.71 | 451.04 | 0.21 |
| SF CWC | SECTION_02 | 2723 | 25 yr | 5439.00 | 483.67 | 496.36 | 491.37 | 496.52 | 0.000510 | 3.71 | 2012.81 | 542.71 | 0.21 |
| SF CWC | SECTION_02 | 2723 | 50 yr | 6568.00 | 483.67 | 496.97 | 492.19 | 497.14 | 0.000516 | 3.89 | 2349.16 | 559.23 | 0.21 |
| SF CWC | SECTION_02 | 2723 | 100 yr | 7585.00 | 483.67 | 497.34 | 492.84 | 497.52 | 0.000559 | 4.14 | 2557.76 | 578.77 | 0.22 |
| SF CWC | SECTION_02 | 2723 | Ultimate 100 yr | 8194.00 | 483.67 | 497.59 | 493.18 | 497.77 | 0.000567 | 4.24 | 2703.86 | 586.28 | 0.23 |
| SF CWC | SECTION_02 | 2723 | 500 yr | 11460.00 | 483.67 | 498.68 | 495.01 | 498.91 | 0.000631 | 4.76 | 3362.31 | 619.12 | 0.24 |
| SF CWC | SECTION_02 | 2586 | 2 yr | 1871.00 | 484.95 | 490.75 | 489.64 | 491.39 | 0.005956 | 6.38 | 293.31 | 86.28 | 0.61 |
| SF CWC | SECTION_02 | 2586 | 5 yr | 3171.00 | 484.95 | 493.96 | 490.83 | 494.30 | 0.001632 | 4.82 | 718.32 | 230.35 | 0.35 |
| SF CWC | SECTION_02 | 2586 | 10 yr | 4190.00 | 484.95 | 495.21 | 491.68 | 495.49 | 0.001147 | 4.60 | 1128.98 | 351.49 | 0.30 |
| SF CWC | SECTION_02 | 2586 | 25 yr | 5439.00 | 484.95 | 496.10 | 492.67 | 496.39 | 0.001055 | 4.77 | 1463.48 | 431.63 | 0.30 |
| SF CWC | SECTION_02 | 2586 | 50 yr | 6568.00 | 484.95 | 496.71 | 493.40 | 497.00 | 0.001041 | 4.98 | 1735.03 | 453.84 | 0.30 |
| SF CWC | SECTION_02 | 2586 | 100 yr | 7585.00 | 484.95 | 497.05 | 493.86 | 497.37 | 0.001129 | 5.31 | 1889.46 | 476.50 | 0.31 |
| SF CWC | SECTION_02 | 2586 | Ultimate 100 yr | 8194.00 | 484.95 | 497.29 | 494.12 | 497.63 | 0.001137 | 5.43 | 2007.30 | 481.81 | 0.32 |
| SF CWC | SECTION_02 | 2586 | 500 yr | 11460.00 | 484.95 | 498.34 | 495.54 | 498.75 | 0.001235 | 6.08 | 2525.72 | 504.08 | 0.33 |
| SF CWC | SECTION_02 | 2473 | 2 yr | 1871.00 | 483.20 | 490.52 | 487.24 | 490.86 | 0.001789 | 4.67 | 401.05 | 80.65 | 0.36 |
| SF CWC | SECTION_02 | 2473 | 5 yr | 3171.00 | 483.20 | 493.79 | 488.82 | 494.15 | 0.001050 | 4.84 | 659.63 | 245.47 | 0.29 |
| SF CWC | SECTION_02 | 2473 | 10 yr | 4190.00 | 483.20 | 495.12 | 489.74 | 495.37 | 0.000781 | 4.33 | 1200.21 | 343.34 | 0.26 |
| SF CWC | SECTION_02 | 2473 | 25 yr | 5439.00 | 483.20 | 496.01 | 490.66 | 496.29 | 0.000804 | 4.69 | 1485.09 | 402.81 | 0.26 |
| SF CWC | SECTION_02 | 2473 | 50 yr | 6568.00 | 483.20 | 496.62 | 491.42 | 496.91 | 0.000795 | 4.86 | 1821.47 | 446.97 | 0.27 |
| SF CWC | SECTION_02 | 2473 | 100 yr | 7585.00 | 483.20 | 496.95 | 492.03 | 497.27 | 0.000888 | 5.24 | 1967.41 | 454.14 | 0.28 |
| SF CWC | SECTION_02 | 2473 | Ultimate 100 yr | 8194.00 | 483.20 | 497.19 | 492.41 | 497.52 | 0.000909 | 5.38 | 2081.57 | 476.68 | 0.29 |
| SF CWC | SECTION_02 | 2473 | 500 yr | 11460.00 | 483.20 | 498.22 | 494.99 | 498.63 | 0.001048 | 6.13 | 2585.08 | 499.66 | 0.31 |
| SF CWC | SECTION_02 | 2413 | | Culvert | | | | | | | | | |
| SF CWC | SECTION_02 | 2341 | 2 yr | 1871.00 | 481.13 | 486.88 | 485.22 | 487.57 | 0.004059 | 6.68 | 280.00 | 68.74 | 0.54 |
| SF CWC | SECTION_02 | 2341 | 5 yr | 3171.00 | 481.13 | 488.75 | 486.59 | 489.63 | 0.003991 | 7.51 | 422.41 | 78.37 | 0.55 |
| SF CWC | SECTION_02 | 2341 | 10 yr | 4190.00 | 481.13 | 489.93 | 487.51 | 490.97 | 0.004289 | 8.19 | 511.76 | 91.06 | 0.57 |
| SF CWC | SECTION_02 | 2341 | 25 yr | 5439.00 | 481.13 | 491.12 | 488.47 | 492.35 | 0.004079 | 8.91 | 616.37 | 112.26 | 0.58 |
| SF CWC | SECTION_02 | 2341 | 50 yr | 6568.00 | 481.13 | 491.97 | 489.34 | 493.38 | 0.004100 | 9.60 | 702.41 | 161.95 | 0.59 |
| SF CWC | SECTION_02 | 2341 | 100 yr | 7585.00 | 481.13 | 492.67 | 490.11 | 493.95 | 0.003737 | 9.27 | 920.01 | 256.37 | 0.56 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

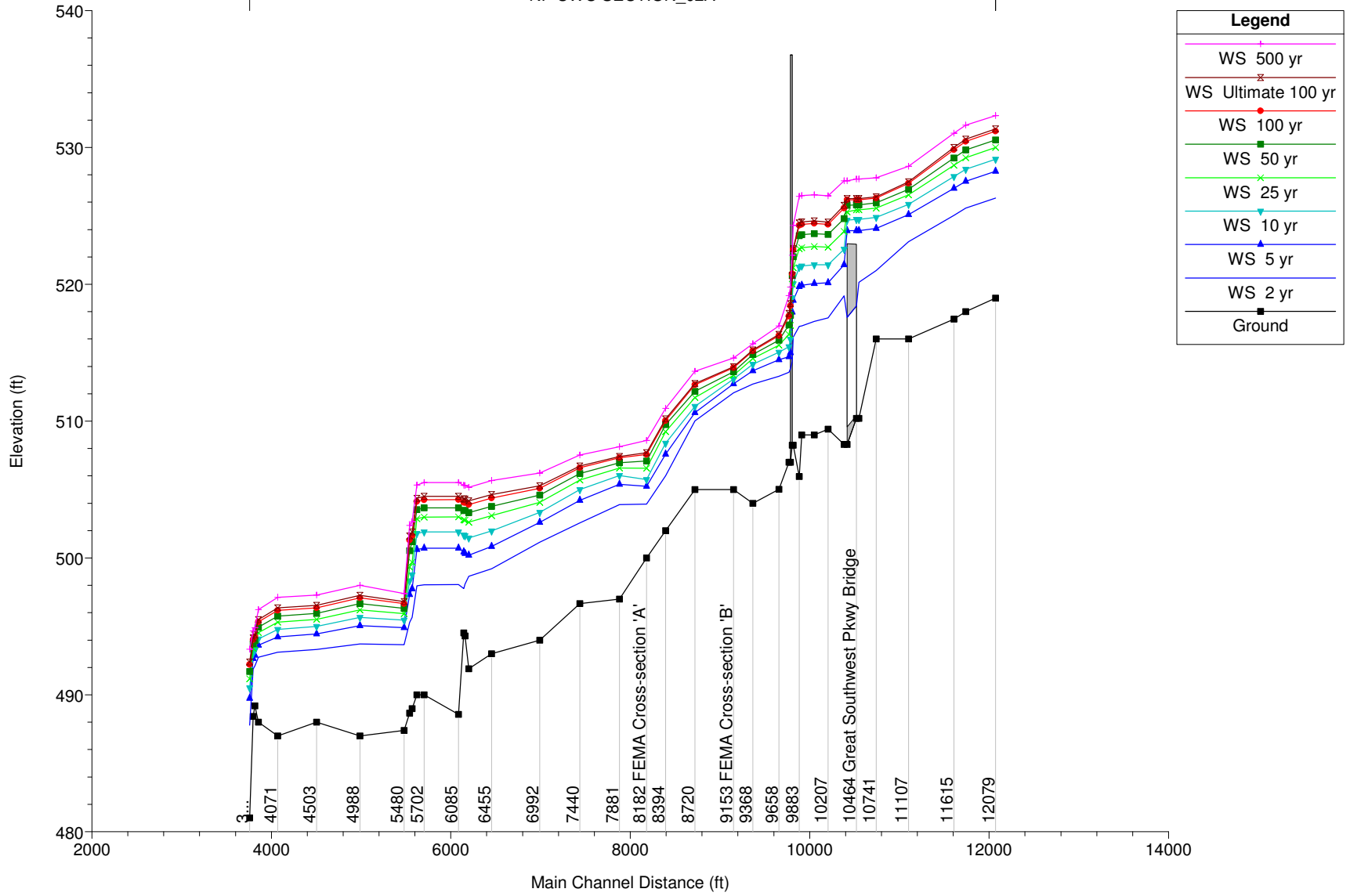
| River | Reach | River Sta | Profile | Q Total (cfs) | Min Ch El (ft) | W.S. Elev (ft) | Crit W.S. (ft) | E.G. Elev (ft) | E.G. Slope (ft/ft) | Vel Chnl (ft/s) | Flow Area (sq ft) | Top Width (ft) | Froude # Chl |
|--------|------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| SF CWC | SECTION_02 | 2341 | Ultimate 100 yr | 8194.00 | 481.13 | 493.01 | 490.48 | 494.30 | 0.003660 | 9.42 | 1010.44 | 278.05 | 0.56 |
| SF CWC | SECTION_02 | 2341 | 500 yr | 11460.00 | 481.13 | 494.51 | 493.28 | 495.79 | 0.003270 | 9.88 | 1490.07 | 363.42 | 0.54 |
| SF CWC | SECTION_02 | 2033 | 2 yr | 1871.00 | 476.41 | 486.13 | | 486.54 | 0.001734 | 5.16 | 362.27 | 53.65 | 0.35 |
| SF CWC | SECTION_02 | 2033 | 5 yr | 3171.00 | 476.41 | 487.84 | | 488.59 | 0.002344 | 6.94 | 470.72 | 80.22 | 0.42 |
| SF CWC | SECTION_02 | 2033 | 10 yr | 4190.00 | 476.41 | 488.88 | | 489.87 | 0.002706 | 8.06 | 570.67 | 120.84 | 0.46 |
| SF CWC | SECTION_02 | 2033 | 25 yr | 5439.00 | 476.41 | 490.07 | 486.22 | 491.26 | 0.002857 | 8.97 | 768.36 | 280.69 | 0.48 |
| SF CWC | SECTION_02 | 2033 | 50 yr | 6568.00 | 476.41 | 491.00 | 487.22 | 492.23 | 0.002791 | 9.37 | 1081.43 | 379.68 | 0.49 |
| SF CWC | SECTION_02 | 2033 | 100 yr | 7585.00 | 476.41 | 491.72 | 488.24 | 492.92 | 0.002682 | 9.57 | 1368.04 | 416.38 | 0.48 |
| SF CWC | SECTION_02 | 2033 | Ultimate 100 yr | 8194.00 | 476.41 | 492.09 | 488.94 | 493.28 | 0.002648 | 9.69 | 1523.30 | 433.11 | 0.48 |
| SF CWC | SECTION_02 | 2033 | 500 yr | 11460.00 | 476.41 | 493.66 | 492.15 | 494.84 | 0.002566 | 10.32 | 2287.02 | 529.07 | 0.48 |
| SF CWC | SECTION_02 | 1806 | 2 yr | 1871.00 | 476.19 | 485.41 | 482.59 | 486.01 | 0.003181 | 6.21 | 301.15 | 54.98 | 0.47 |
| SF CWC | SECTION_02 | 1806 | 5 yr | 3171.00 | 476.19 | 486.75 | 484.46 | 487.84 | 0.004763 | 8.38 | 379.09 | 72.05 | 0.59 |
| SF CWC | SECTION_02 | 1806 | 10 yr | 4190.00 | 476.19 | 487.42 | 485.61 | 488.97 | 0.005917 | 9.99 | 423.54 | 92.77 | 0.66 |
| SF CWC | SECTION_02 | 1806 | 25 yr | 5439.00 | 476.19 | 488.05 | 486.78 | 490.22 | 0.007426 | 11.85 | 471.13 | 121.29 | 0.76 |
| SF CWC | SECTION_02 | 1806 | 50 yr | 6568.00 | 476.19 | 488.53 | 487.75 | 491.13 | 0.008413 | 13.14 | 583.11 | 186.26 | 0.81 |
| SF CWC | SECTION_02 | 1806 | 100 yr | 7585.00 | 476.19 | 489.35 | 489.35 | 491.89 | 0.007511 | 13.23 | 747.07 | 216.49 | 0.78 |
| SF CWC | SECTION_02 | 1806 | Ultimate 100 yr | 8194.00 | 476.19 | 489.80 | 489.80 | 492.28 | 0.007046 | 13.24 | 849.32 | 238.96 | 0.76 |
| SF CWC | SECTION_02 | 1806 | 500 yr | 11460.00 | 476.19 | 491.60 | 491.60 | 493.91 | 0.005879 | 13.60 | 1394.90 | 391.43 | 0.72 |
| SF CWC | SECTION_02 | 1438 | 2 yr | 1871.00 | 477.00 | 484.14 | 482.40 | 484.80 | 0.003413 | 6.86 | 343.61 | 179.95 | 0.50 |
| SF CWC | SECTION_02 | 1438 | 5 yr | 3171.00 | 477.00 | 485.65 | 483.90 | 486.28 | 0.002953 | 7.45 | 790.03 | 297.20 | 0.49 |
| SF CWC | SECTION_02 | 1438 | 10 yr | 4190.00 | 477.00 | 486.37 | 485.27 | 487.06 | 0.003098 | 8.12 | 1008.17 | 312.31 | 0.51 |
| SF CWC | SECTION_02 | 1438 | 25 yr | 5439.00 | 477.00 | 487.08 | 485.94 | 487.84 | 0.003302 | 8.86 | 1232.42 | 324.58 | 0.53 |
| SF CWC | SECTION_02 | 1438 | 50 yr | 6568.00 | 477.00 | 487.56 | 486.44 | 488.41 | 0.003596 | 9.59 | 1391.75 | 336.13 | 0.56 |
| SF CWC | SECTION_02 | 1438 | 100 yr | 7585.00 | 477.00 | 487.96 | 486.82 | 488.89 | 0.003821 | 10.17 | 1528.12 | 349.68 | 0.58 |
| SF CWC | SECTION_02 | 1438 | Ultimate 100 yr | 8194.00 | 477.00 | 488.19 | 487.04 | 489.15 | 0.003926 | 10.47 | 1609.62 | 357.82 | 0.59 |
| SF CWC | SECTION_02 | 1438 | 500 yr | 11460.00 | 477.00 | 489.25 | 488.05 | 490.41 | 0.004446 | 11.93 | 2008.91 | 398.38 | 0.64 |
| SF CWC | SECTION_02 | 1142 | 2 yr | 1871.00 | 476.62 | 483.38 | | 483.80 | 0.002849 | 5.16 | 371.70 | 129.34 | 0.44 |
| SF CWC | SECTION_02 | 1142 | 5 yr | 3171.00 | 476.62 | 485.09 | | 485.48 | 0.001983 | 5.38 | 715.45 | 243.46 | 0.39 |
| SF CWC | SECTION_02 | 1142 | 10 yr | 4190.00 | 476.62 | 485.79 | | 486.23 | 0.002024 | 5.85 | 890.87 | 259.12 | 0.40 |
| SF CWC | SECTION_02 | 1142 | 25 yr | 5439.00 | 476.62 | 486.45 | | 486.96 | 0.002131 | 6.39 | 1072.16 | 290.36 | 0.42 |
| SF CWC | SECTION_02 | 1142 | 50 yr | 6568.00 | 476.62 | 486.86 | | 487.45 | 0.002360 | 6.98 | 1197.15 | 314.73 | 0.44 |
| SF CWC | SECTION_02 | 1142 | 100 yr | 7585.00 | 476.62 | 487.21 | | 487.87 | 0.002515 | 7.42 | 1310.39 | 334.25 | 0.46 |
| SF CWC | SECTION_02 | 1142 | Ultimate 100 yr | 8194.00 | 476.62 | 487.43 | | 488.11 | 0.002568 | 7.63 | 1383.03 | 344.93 | 0.47 |
| SF CWC | SECTION_02 | 1142 | 500 yr | 11460.00 | 476.62 | 488.40 | | 489.24 | 0.002828 | 8.61 | 1737.65 | 385.88 | 0.50 |
| SF CWC | SECTION_02 | 905 | 2 yr | 1883.00 | 473.85 | 483.17 | 477.40 | 483.32 | 0.000523 | 3.08 | 613.45 | 163.95 | 0.20 |
| SF CWC | SECTION_02 | 905 | 5 yr | 3186.00 | 473.85 | 484.96 | 479.03 | 485.12 | 0.000536 | 3.32 | 1131.83 | 299.36 | 0.21 |
| SF CWC | SECTION_02 | 905 | 10 yr | 4219.00 | 473.85 | 485.65 | 479.99 | 485.85 | 0.000631 | 3.81 | 1360.12 | 359.98 | 0.23 |
| SF CWC | SECTION_02 | 905 | 25 yr | 5472.00 | 473.85 | 486.31 | 480.85 | 486.55 | 0.000731 | 4.30 | 1608.14 | 391.93 | 0.25 |

HEC-RAS Plan: FPP1 Locations: User Defined (Continued)

| River | 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) | |
| SF CWC | SECTION_02 | 905 | 50 yr | 6581.00 | 473.85 | 486.71 | 481.55 | 487.00 | 0.000849 | 4.77 | 1768.52 | 410.65 | 0.27 |
| SF CWC | SECTION_02 | 905 | 100 yr | 7549.00 | 473.85 | 487.05 | 482.13 | 487.37 | 0.000928 | 5.10 | 1912.24 | 424.02 | 0.28 |
| SF CWC | SECTION_02 | 905 | Ultimate 100 yr | 8180.00 | 473.85 | 487.26 | 482.49 | 487.60 | 0.000977 | 5.30 | 2001.21 | 432.27 | 0.29 |
| SF CWC | SECTION_02 | 905 | 500 yr | 11399.00 | 473.85 | 488.23 | 484.88 | 488.67 | 0.001162 | 6.14 | 2454.93 | 510.23 | 0.32 |
| SF CWC | SECTION_02 | 825 | | Culvert | | | | | | | | | |
| SF CWC | SECTION_02 | 761 | 2 yr | 1883.00 | 473.30 | 481.40 | 477.15 | 481.69 | 0.001254 | 4.34 | 433.41 | 102.72 | 0.30 |
| SF CWC | SECTION_02 | 761 | 5 yr | 3186.00 | 473.30 | 482.53 | 478.73 | 483.13 | 0.002090 | 6.25 | 509.82 | 313.36 | 0.40 |
| SF CWC | SECTION_02 | 761 | 10 yr | 4219.00 | 473.30 | 483.32 | 479.80 | 483.76 | 0.002306 | 5.62 | 933.41 | 523.37 | 0.41 |
| SF CWC | SECTION_02 | 761 | 25 yr | 5472.00 | 473.30 | 483.94 | 480.90 | 484.39 | 0.002253 | 5.95 | 1201.98 | 533.52 | 0.41 |
| SF CWC | SECTION_02 | 761 | 50 yr | 6581.00 | 473.30 | 484.42 | 483.09 | 484.89 | 0.002188 | 6.15 | 1416.16 | 546.97 | 0.41 |
| SF CWC | SECTION_02 | 761 | 100 yr | 7549.00 | 473.30 | 484.86 | 483.48 | 485.32 | 0.002047 | 6.20 | 1615.60 | 560.32 | 0.40 |
| SF CWC | SECTION_02 | 761 | Ultimate 100 yr | 8180.00 | 473.30 | 485.08 | 483.66 | 485.55 | 0.002047 | 6.32 | 1716.52 | 567.63 | 0.40 |
| SF CWC | SECTION_02 | 761 | 500 yr | 11399.00 | 473.30 | 486.24 | 484.38 | 486.59 | 0.001457 | 5.73 | 2669.04 | 651.06 | 0.35 |
| SF CWC | SECTION_02 | 346 | 2 yr | 1883.00 | 476.79 | 480.83 | 480.04 | 481.09 | 0.001636 | 3.25 | 479.71 | 260.21 | 0.32 |
| SF CWC | SECTION_02 | 346 | 5 yr | 3186.00 | 476.79 | 481.99 | 480.59 | 482.27 | 0.001293 | 3.55 | 805.46 | 295.51 | 0.30 |
| SF CWC | SECTION_02 | 346 | 10 yr | 4219.00 | 476.79 | 482.65 | 481.03 | 482.97 | 0.001259 | 3.85 | 1003.97 | 307.74 | 0.30 |
| SF CWC | SECTION_02 | 346 | 25 yr | 5472.00 | 476.79 | 483.24 | 481.48 | 483.63 | 0.001338 | 4.27 | 1187.59 | 318.36 | 0.32 |
| SF CWC | SECTION_02 | 346 | 50 yr | 6581.00 | 476.79 | 483.70 | 481.83 | 484.14 | 0.001397 | 4.60 | 1335.99 | 326.02 | 0.33 |
| SF CWC | SECTION_02 | 346 | 100 yr | 7549.00 | 476.79 | 484.13 | 482.11 | 484.61 | 0.001382 | 4.79 | 1481.67 | 350.99 | 0.33 |
| SF CWC | SECTION_02 | 346 | Ultimate 100 yr | 8180.00 | 476.79 | 484.29 | 482.29 | 484.81 | 0.001468 | 5.02 | 1537.53 | 351.95 | 0.34 |
| SF CWC | SECTION_02 | 346 | 500 yr | 11399.00 | 476.79 | 485.11 | 483.10 | 485.83 | 0.001764 | 5.94 | 1828.66 | 357.18 | 0.38 |

Cottonwood Creek May 2012 Plan: FPP_May2012 5/30/2012
 Geom: CWC_CoA_FPP_May2012

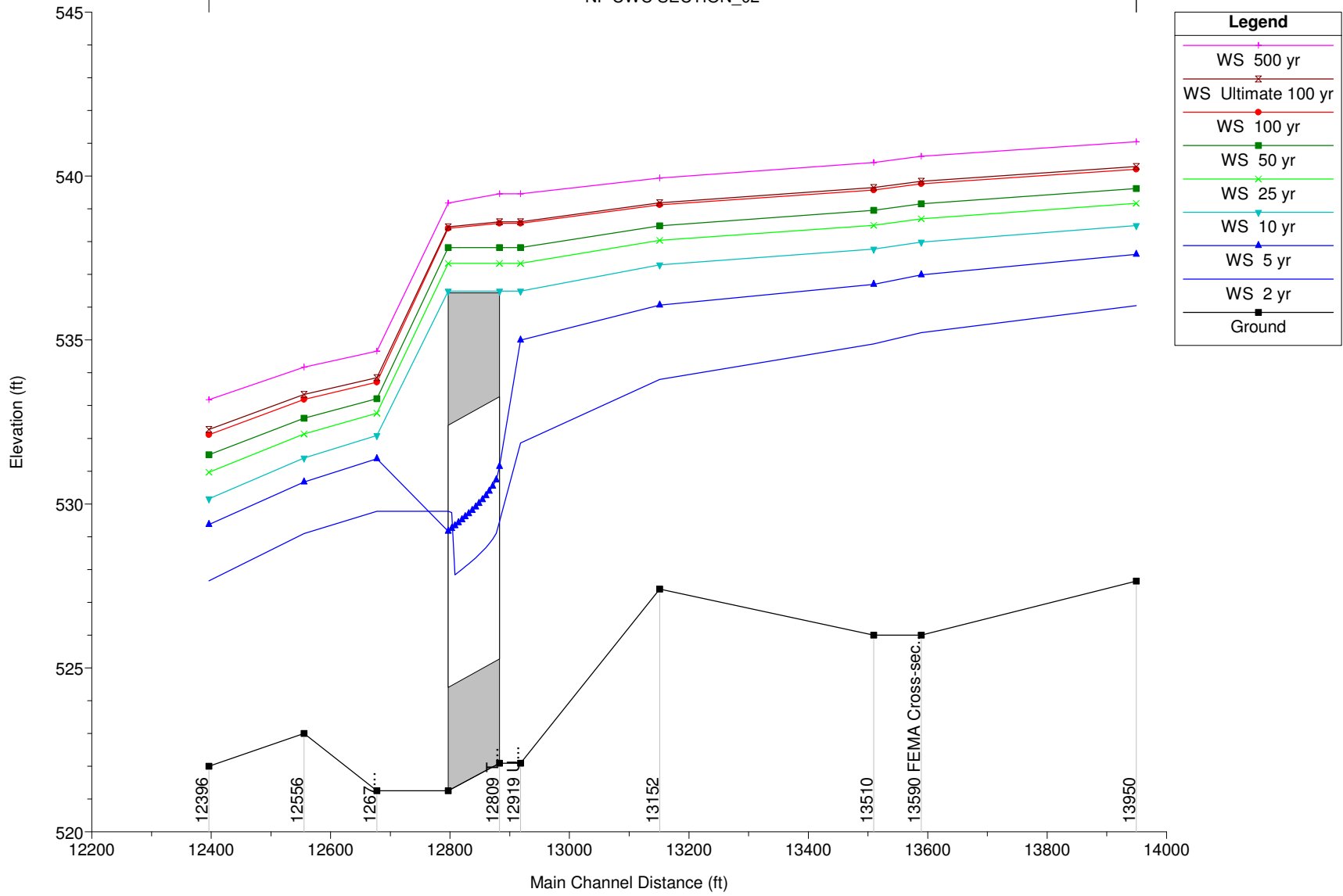
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Cottonwood Creek May 2012 Plan: FPP_May2012 5/30/2012

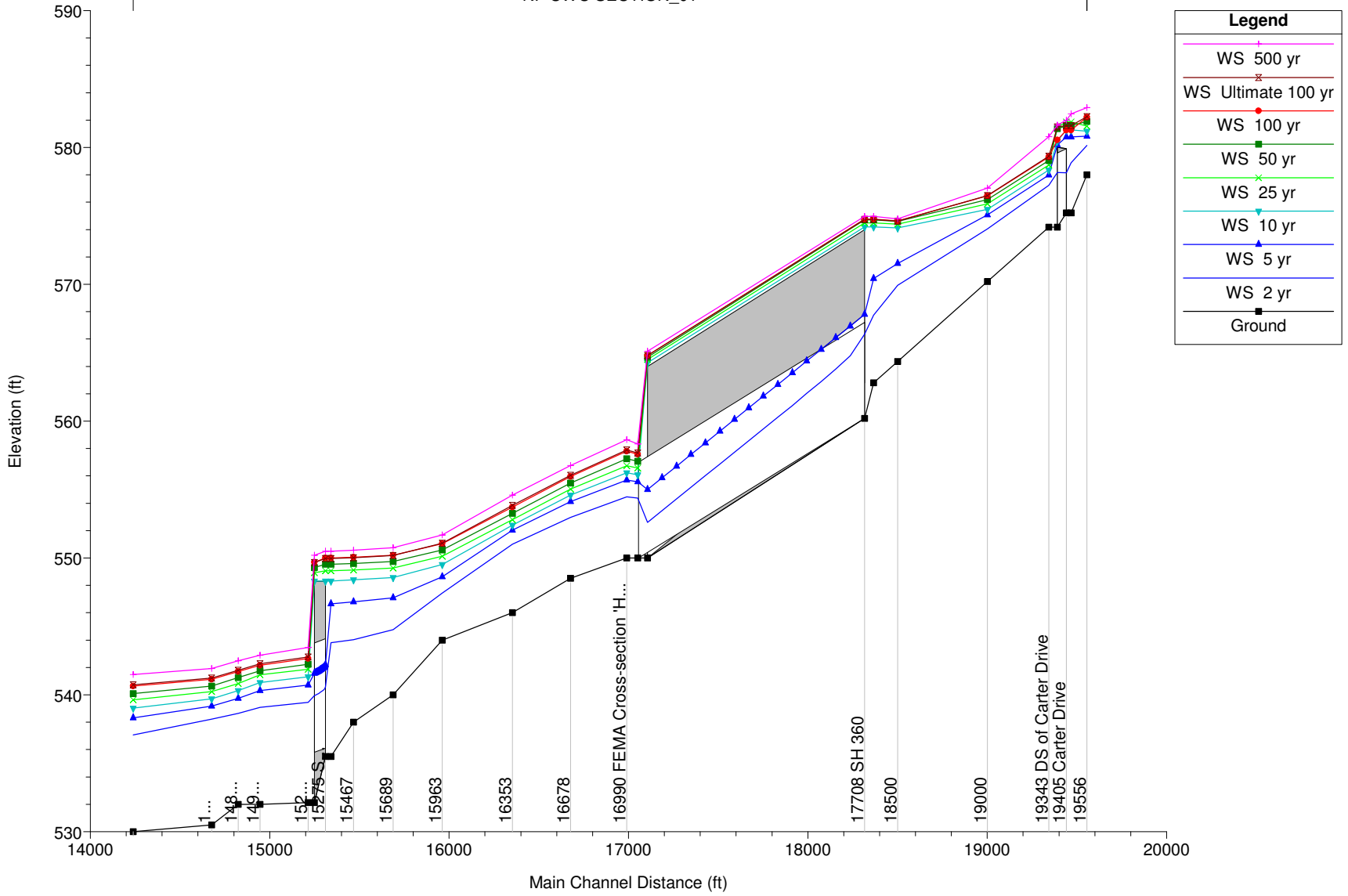
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NF CWC SECTION_02



Cottonwood Creek May 2012 Plan: FPP_May2012 5/30/2012
 Geom: CWC_CoA_FPP_May2012

NF CWC SECTION_01

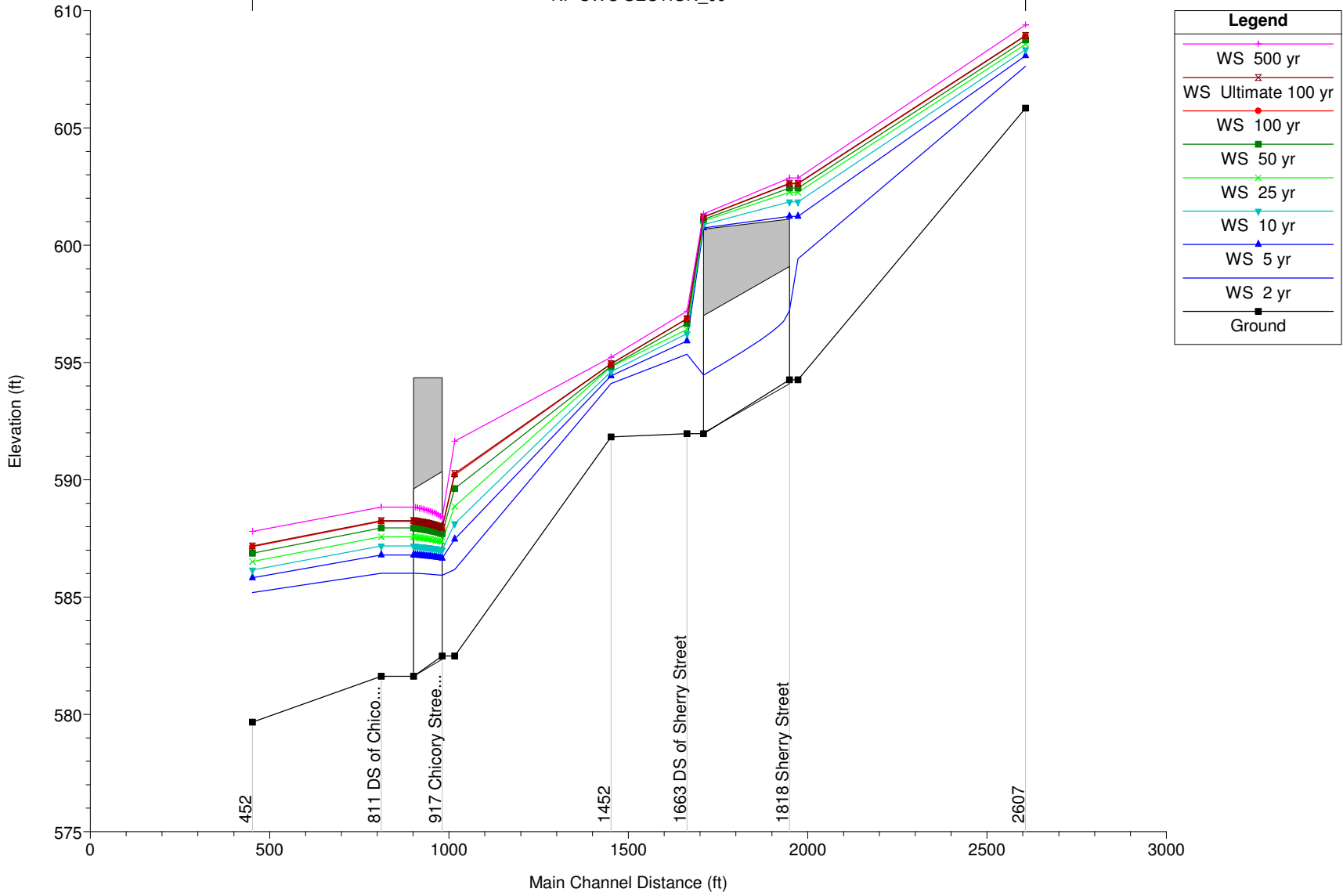


| Legend | |
|--------------------|--|
| WS 500 yr | (Pink line with '+' markers) |
| WS Ultimate 100 yr | (Red line with 'x' markers) |
| WS 100 yr | (Red line with circle markers) |
| WS 50 yr | (Green line with square markers) |
| WS 25 yr | (Green line with 'x' markers) |
| WS 10 yr | (Cyan line with inverted triangle markers) |
| WS 5 yr | (Blue line with triangle markers) |
| WS 2 yr | (Blue line with square markers) |
| Ground | (Black line with square markers) |

Cottonwood Creek May 2012 Plan: FPP_May2012 5/30/2012

Geom: CWC_CoA_FPP_May2012

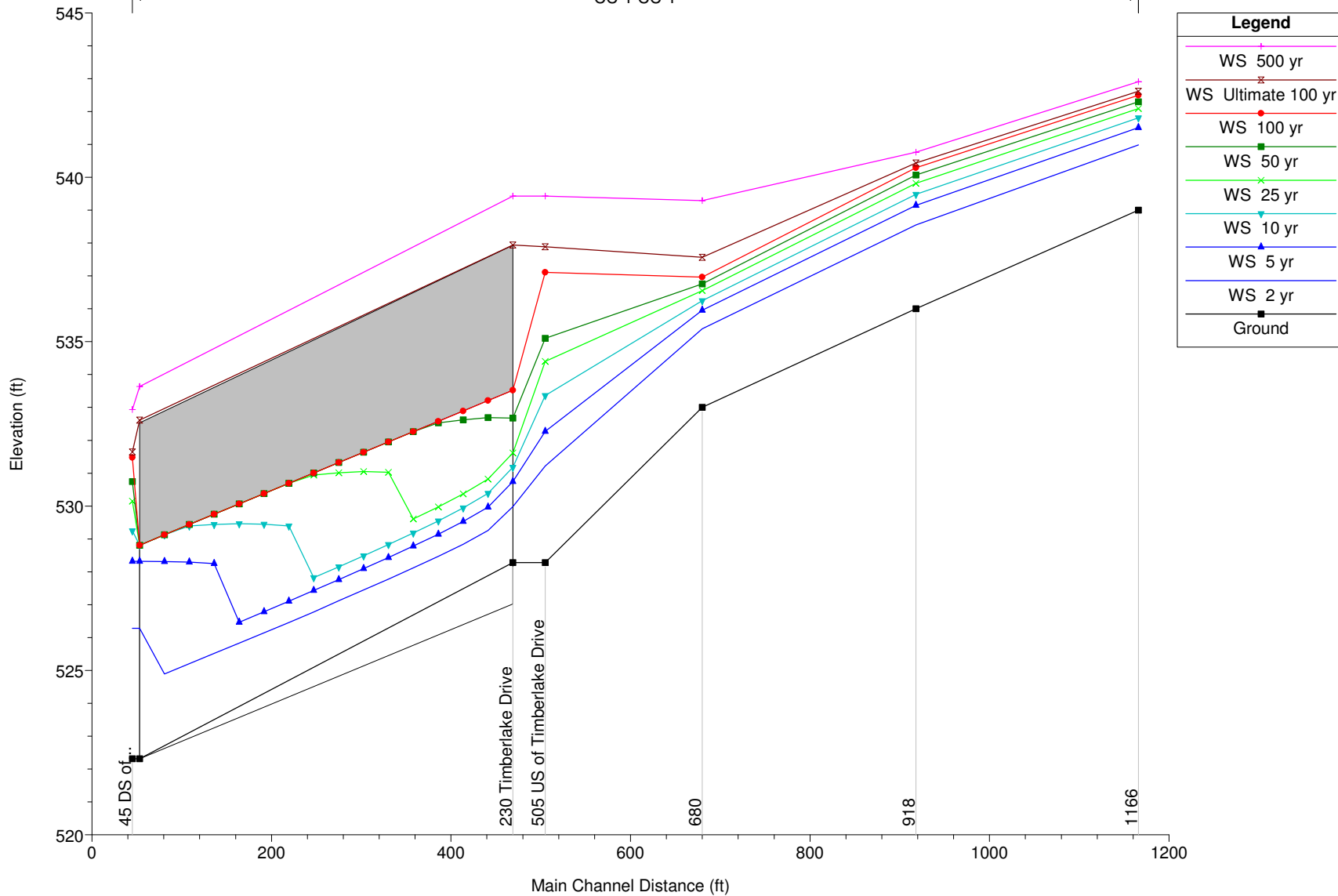
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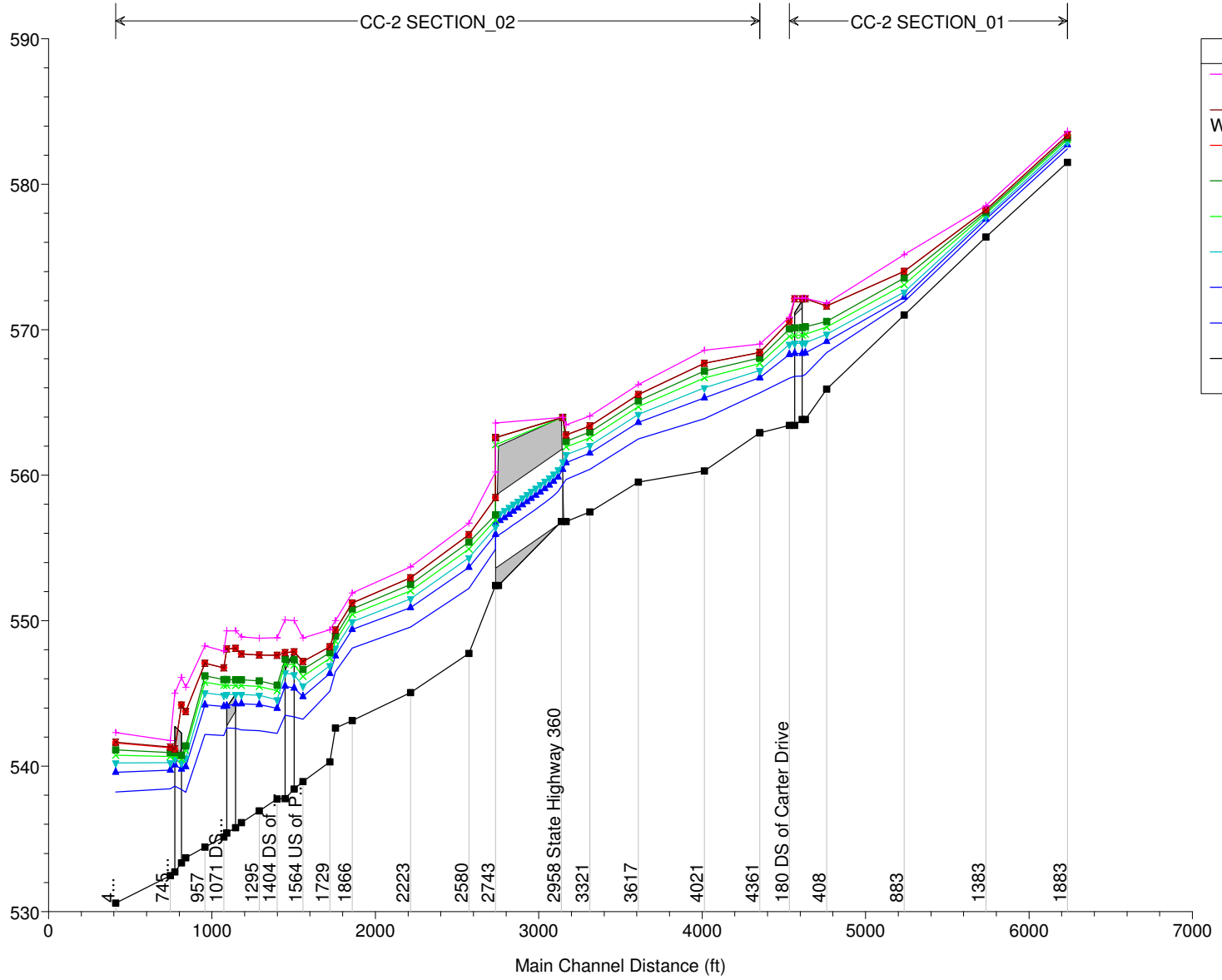
Cottonwood Creek May 2012 Plan: FPP_May2012 5/30/2012

Geom: CWC_CoA_FPP_May2012

CC-1 CC-1



Cottonwood Creek May 2012 Plan: FPP_May2012 5/30/2012
 Geom: CWC_CoA_FPP_May2012

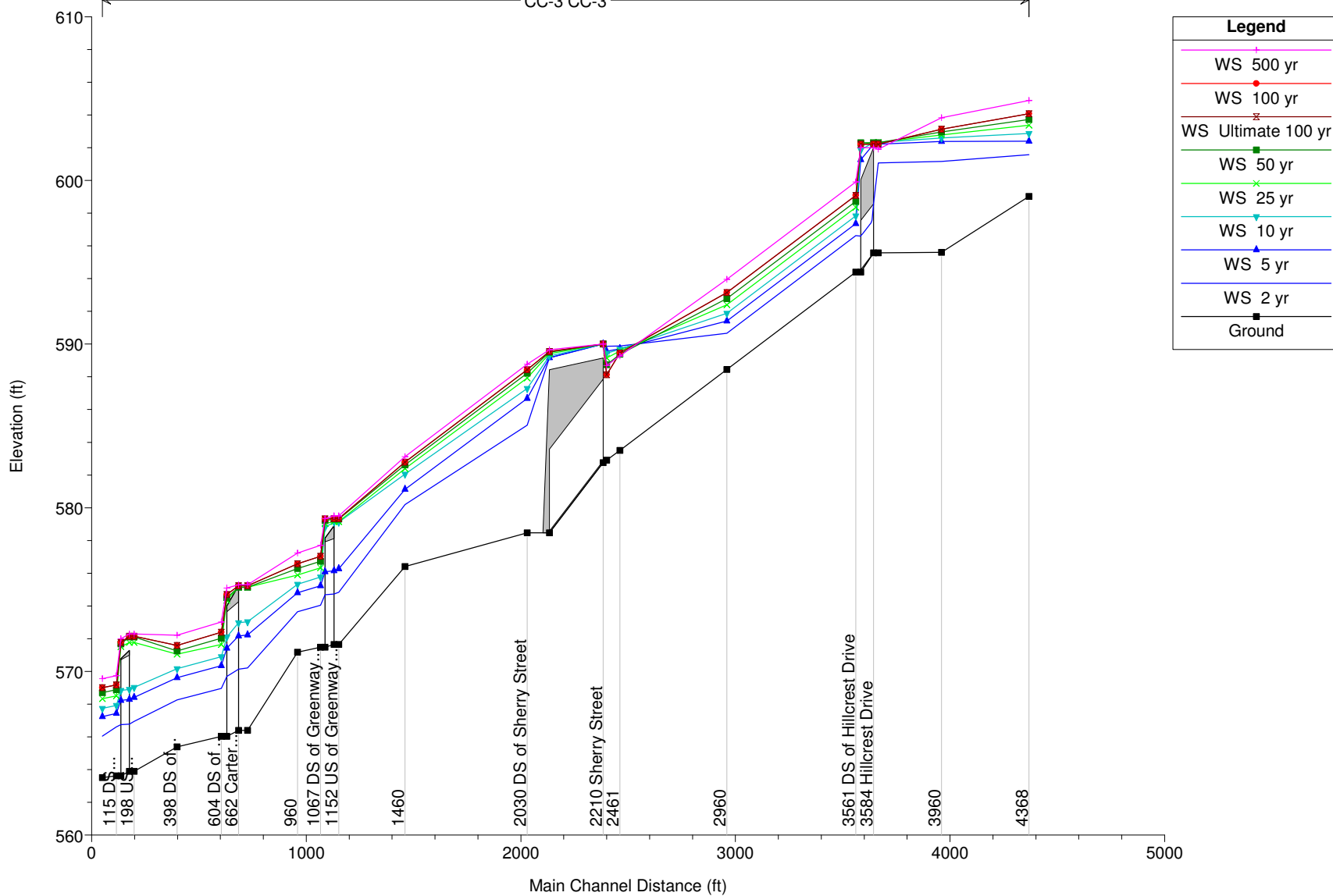


| Legend | |
|--------------------|-------------------------------------|
| WS 500 yr | (magenta line with '+' markers) |
| WS Ultimate 100 yr | (red line with 'x' markers) |
| WS 100 yr | (red line with 'o' markers) |
| WS 50 yr | (green line with '■' markers) |
| WS 25 yr | (light green line with 'x' markers) |
| WS 10 yr | (cyan line with '▼' markers) |
| WS 5 yr | (blue line with '▲' markers) |
| WS 2 yr | (blue line with '▲' markers) |
| Ground | (black line with '■' markers) |

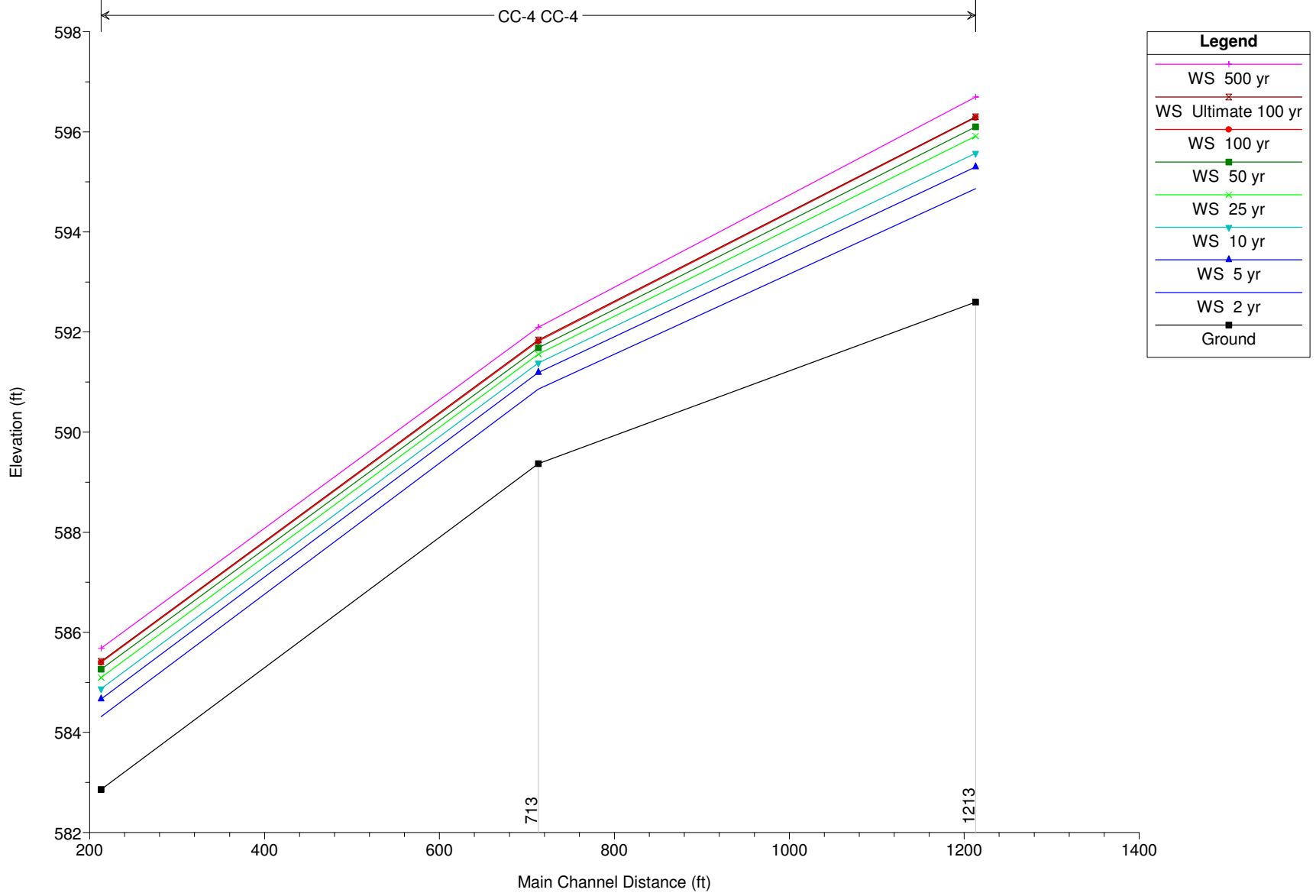
Cottonwood Creek May 2012 Plan: FPP_May2012 5/30/2012

Geom: CWC_CoA_FPP_May2012

CC-3 CC-3



Cottonwood Creek May 2012 Plan: FPP_May2012 5/30/2012
Geom: CWC_CoA_FPP_May2012



HEC-RAS Plan: P12 Locations: User Defined

| River | 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 |
|------------|-------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FISH CREEK | MAINSTEM US | 72934 | 2 yr | 142.00 | 652.96 | 655.18 | 654.02 | 655.26 | 0.000272 | 2.27 | 62.55 | 33.57 | 0.29 |
| FISH CREEK | MAINSTEM US | 72934 | 5 yr | 213.00 | 652.96 | 655.97 | 654.31 | 656.05 | 0.000205 | 2.36 | 90.24 | 36.65 | 0.27 |
| FISH CREEK | MAINSTEM US | 72934 | 10 yr | 261.00 | 652.96 | 656.45 | 654.48 | 656.54 | 0.000179 | 2.41 | 108.42 | 38.54 | 0.25 |
| FISH CREEK | MAINSTEM US | 72934 | 25 yr | 314.00 | 652.96 | 656.95 | 654.66 | 657.04 | 0.000159 | 2.45 | 128.21 | 40.49 | 0.24 |
| FISH CREEK | MAINSTEM US | 72934 | 50 yr | 358.00 | 652.96 | 657.35 | 654.80 | 657.44 | 0.000146 | 2.48 | 144.52 | 42.04 | 0.24 |
| FISH CREEK | MAINSTEM US | 72934 | 100 yr | 401.00 | 652.96 | 657.72 | 654.93 | 657.81 | 0.000136 | 2.50 | 160.37 | 43.48 | 0.23 |
| FISH CREEK | MAINSTEM US | 72934 | 500 yr | 504.00 | 652.96 | 658.88 | 655.22 | 658.96 | 0.000096 | 2.36 | 213.35 | 48.00 | 0.20 |
| FISH CREEK | MAINSTEM US | 72934 | Ultimate 100 yr | 401.00 | 652.96 | 657.72 | 654.93 | 657.81 | 0.000136 | 2.50 | 160.37 | 43.48 | 0.23 |
| FISH CREEK | MAINSTEM US | 72890 | | Culvert | | | | | | | | | |
| FISH CREEK | MAINSTEM US | 72797 | 2 yr | 142.00 | 651.86 | 653.40 | 653.40 | 654.01 | 0.003250 | 6.29 | 22.58 | 18.64 | 1.01 |
| FISH CREEK | MAINSTEM US | 72797 | 5 yr | 213.00 | 651.86 | 653.81 | 653.81 | 654.56 | 0.003031 | 6.94 | 30.71 | 20.66 | 1.00 |
| FISH CREEK | MAINSTEM US | 72797 | 10 yr | 261.00 | 651.86 | 654.05 | 654.05 | 654.88 | 0.002964 | 7.31 | 35.73 | 21.82 | 1.01 |
| FISH CREEK | MAINSTEM US | 72797 | 25 yr | 314.00 | 651.86 | 654.29 | 654.29 | 655.20 | 0.002887 | 7.64 | 41.13 | 23.00 | 1.01 |
| FISH CREEK | MAINSTEM US | 72797 | 50 yr | 358.00 | 651.86 | 654.47 | 654.47 | 655.44 | 0.002835 | 7.88 | 45.45 | 23.91 | 1.01 |
| FISH CREEK | MAINSTEM US | 72797 | 100 yr | 401.00 | 651.86 | 654.64 | 654.64 | 655.66 | 0.002792 | 8.09 | 49.58 | 24.74 | 1.01 |
| FISH CREEK | MAINSTEM US | 72797 | 500 yr | 504.00 | 651.86 | 655.02 | 655.02 | 656.15 | 0.002705 | 8.52 | 59.12 | 26.56 | 1.01 |
| FISH CREEK | MAINSTEM US | 72797 | Ultimate 100 yr | 401.00 | 651.86 | 654.64 | 654.64 | 655.66 | 0.002792 | 8.09 | 49.58 | 24.74 | 1.01 |
| FISH CREEK | MAINSTEM US | 72706 | 2 yr | 142.00 | 650.61 | 652.15 | 652.15 | 652.73 | 0.003233 | 6.14 | 23.14 | 19.87 | 1.00 |
| FISH CREEK | MAINSTEM US | 72706 | 5 yr | 213.00 | 650.61 | 652.54 | 652.54 | 653.25 | 0.003072 | 6.79 | 31.38 | 22.22 | 1.01 |
| FISH CREEK | MAINSTEM US | 72706 | 10 yr | 261.00 | 650.61 | 652.77 | 652.77 | 653.56 | 0.002983 | 7.12 | 36.66 | 23.60 | 1.01 |
| FISH CREEK | MAINSTEM US | 72706 | 25 yr | 314.00 | 650.61 | 653.00 | 653.00 | 653.86 | 0.002903 | 7.43 | 42.27 | 24.98 | 1.01 |
| FISH CREEK | MAINSTEM US | 72706 | 50 yr | 358.00 | 650.61 | 653.18 | 653.18 | 654.09 | 0.002851 | 7.66 | 46.76 | 26.04 | 1.01 |
| FISH CREEK | MAINSTEM US | 72706 | 100 yr | 401.00 | 650.61 | 653.34 | 653.34 | 654.30 | 0.002808 | 7.86 | 51.04 | 27.01 | 1.01 |
| FISH CREEK | MAINSTEM US | 72706 | 500 yr | 504.00 | 650.61 | 653.69 | 653.69 | 654.75 | 0.002721 | 8.27 | 60.95 | 29.13 | 1.01 |
| FISH CREEK | MAINSTEM US | 72706 | Ultimate 100 yr | 401.00 | 650.61 | 653.34 | 653.34 | 654.30 | 0.002810 | 7.86 | 51.03 | 27.01 | 1.01 |
| FISH CREEK | MAINSTEM US | 72516 | 2 yr | 142.00 | 648.70 | 650.27 | 650.27 | 650.89 | 0.003237 | 6.33 | 22.44 | 18.26 | 1.01 |
| FISH CREEK | MAINSTEM US | 72516 | 5 yr | 213.00 | 648.70 | 650.69 | 650.69 | 651.45 | 0.003057 | 7.01 | 30.40 | 20.24 | 1.01 |
| FISH CREEK | MAINSTEM US | 72516 | 10 yr | 261.00 | 648.70 | 650.93 | 650.93 | 651.77 | 0.002968 | 7.36 | 35.47 | 21.41 | 1.01 |
| FISH CREEK | MAINSTEM US | 72516 | 25 yr | 314.00 | 648.70 | 651.17 | 651.17 | 652.09 | 0.002894 | 7.69 | 40.82 | 22.58 | 1.01 |
| FISH CREEK | MAINSTEM US | 72516 | 50 yr | 358.00 | 648.70 | 651.36 | 651.36 | 652.34 | 0.002839 | 7.93 | 45.15 | 23.48 | 1.01 |
| FISH CREEK | MAINSTEM US | 72516 | 100 yr | 401.00 | 648.70 | 651.53 | 651.53 | 652.56 | 0.002795 | 8.14 | 49.25 | 24.30 | 1.01 |
| FISH CREEK | MAINSTEM US | 72516 | 500 yr | 504.00 | 648.70 | 651.91 | 651.91 | 653.05 | 0.002710 | 8.58 | 58.74 | 26.11 | 1.01 |
| FISH CREEK | MAINSTEM US | 72516 | Ultimate 100 yr | 401.00 | 648.70 | 651.53 | 651.53 | 652.56 | 0.002793 | 8.14 | 49.27 | 24.31 | 1.01 |
| FISH CREEK | MAINSTEM US | 72204 | 2 yr | 142.00 | 644.50 | 646.79 | | 646.99 | 0.000700 | 3.56 | 39.84 | 24.39 | 0.49 |
| FISH CREEK | MAINSTEM US | 72204 | 5 yr | 213.00 | 644.50 | 647.51 | | 647.71 | 0.000537 | 3.62 | 58.79 | 28.68 | 0.45 |
| FISH CREEK | MAINSTEM US | 72204 | 10 yr | 261.00 | 644.50 | 647.90 | | 648.11 | 0.000491 | 3.70 | 70.45 | 31.02 | 0.43 |
| FISH CREEK | MAINSTEM US | 72204 | 25 yr | 314.00 | 644.50 | 648.28 | | 648.50 | 0.000457 | 3.79 | 82.76 | 33.32 | 0.42 |
| FISH CREEK | MAINSTEM US | 72204 | 50 yr | 358.00 | 644.50 | 648.55 | | 648.78 | 0.000447 | 3.90 | 91.89 | 34.92 | 0.42 |
| FISH CREEK | MAINSTEM US | 72204 | 100 yr | 401.00 | 644.50 | 648.90 | | 649.13 | 0.000368 | 3.84 | 104.66 | 37.07 | 0.39 |
| FISH CREEK | MAINSTEM US | 72204 | 500 yr | 504.00 | 644.50 | 650.21 | | 650.38 | 0.000170 | 3.33 | 159.13 | 46.58 | 0.28 |
| FISH CREEK | MAINSTEM US | 72204 | Ultimate 100 yr | 401.00 | 644.50 | 649.02 | | 649.23 | 0.000324 | 3.70 | 109.01 | 37.91 | 0.37 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------|-------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FISH CREEK | MAINSTEM US | 72120 | 2 yr | 183.00 | 644.23 | 646.06 | 646.06 | 646.73 | 0.003130 | 6.60 | 27.75 | 20.79 | 1.01 |
| FISH CREEK | MAINSTEM US | 72120 | 5 yr | 292.00 | 644.23 | 646.59 | 646.59 | 647.43 | 0.002933 | 7.35 | 39.75 | 24.05 | 1.01 |
| FISH CREEK | MAINSTEM US | 72120 | 10 yr | 364.00 | 644.23 | 646.89 | 646.89 | 647.81 | 0.002839 | 7.71 | 47.19 | 25.86 | 1.01 |
| FISH CREEK | MAINSTEM US | 72120 | 25 yr | 443.00 | 644.23 | 647.18 | 647.18 | 648.19 | 0.002751 | 8.07 | 54.92 | 27.44 | 1.00 |
| FISH CREEK | MAINSTEM US | 72120 | 50 yr | 510.00 | 644.23 | 647.60 | 647.38 | 648.51 | 0.002024 | 7.64 | 66.72 | 28.43 | 0.88 |
| FISH CREEK | MAINSTEM US | 72120 | 100 yr | 573.00 | 644.23 | 648.22 | 647.58 | 648.93 | 0.001249 | 6.76 | 84.76 | 29.85 | 0.71 |
| FISH CREEK | MAINSTEM US | 72120 | 500 yr | 726.00 | 644.23 | 649.84 | 647.99 | 650.28 | 0.000504 | 5.34 | 135.94 | 33.56 | 0.47 |
| FISH CREEK | MAINSTEM US | 72120 | Ultimate 100 yr | 589.00 | 644.23 | 648.36 | 647.63 | 649.04 | 0.001147 | 6.63 | 88.86 | 30.16 | 0.68 |
| FISH CREEK | MAINSTEM US | 72065 | | Culvert | | | | | | | | | |
| FISH CREEK | MAINSTEM US | 72018 | 2 yr | 183.00 | 643.65 | 645.44 | 645.44 | 646.12 | 0.003111 | 6.61 | 27.67 | 20.51 | 1.00 |
| FISH CREEK | MAINSTEM US | 72018 | 5 yr | 292.00 | 643.65 | 645.98 | 645.98 | 646.83 | 0.002925 | 7.40 | 39.45 | 23.48 | 1.01 |
| FISH CREEK | MAINSTEM US | 72018 | 10 yr | 364.00 | 643.65 | 646.28 | 646.28 | 647.22 | 0.002834 | 7.79 | 46.75 | 25.15 | 1.01 |
| FISH CREEK | MAINSTEM US | 72018 | 25 yr | 443.00 | 643.65 | 646.57 | 646.57 | 647.60 | 0.002759 | 8.14 | 54.41 | 26.79 | 1.01 |
| FISH CREEK | MAINSTEM US | 72018 | 50 yr | 510.00 | 643.65 | 646.80 | 646.80 | 647.90 | 0.002708 | 8.40 | 60.68 | 28.06 | 1.01 |
| FISH CREEK | MAINSTEM US | 72018 | 100 yr | 573.00 | 643.65 | 647.00 | 647.00 | 648.16 | 0.002667 | 8.63 | 66.42 | 29.18 | 1.01 |
| FISH CREEK | MAINSTEM US | 72018 | 500 yr | 726.00 | 643.65 | 647.44 | 647.44 | 648.72 | 0.002582 | 9.09 | 79.91 | 31.64 | 1.01 |
| FISH CREEK | MAINSTEM US | 72018 | Ultimate 100 yr | 589.00 | 643.65 | 647.05 | 647.05 | 648.22 | 0.002657 | 8.68 | 67.87 | 29.45 | 1.01 |
| FISH CREEK | MAINSTEM US | 71930 | 2 yr | 183.00 | 643.25 | 645.02 | 645.02 | 645.69 | 0.003147 | 6.55 | 27.93 | 21.27 | 1.01 |
| FISH CREEK | MAINSTEM US | 71930 | 5 yr | 292.00 | 643.25 | 645.55 | 645.55 | 646.38 | 0.002939 | 7.31 | 39.94 | 24.42 | 1.01 |
| FISH CREEK | MAINSTEM US | 71930 | 10 yr | 364.00 | 643.25 | 645.84 | 645.84 | 646.76 | 0.002851 | 7.69 | 47.33 | 26.17 | 1.01 |
| FISH CREEK | MAINSTEM US | 71930 | 25 yr | 443.00 | 643.25 | 646.13 | 646.13 | 647.13 | 0.002774 | 8.04 | 55.11 | 27.90 | 1.01 |
| FISH CREEK | MAINSTEM US | 71930 | 50 yr | 510.00 | 643.25 | 646.35 | 646.35 | 647.42 | 0.002722 | 8.30 | 61.47 | 29.23 | 1.01 |
| FISH CREEK | MAINSTEM US | 71930 | 100 yr | 573.00 | 643.25 | 646.55 | 646.55 | 647.67 | 0.002677 | 8.51 | 67.32 | 30.41 | 1.01 |
| FISH CREEK | MAINSTEM US | 71930 | 500 yr | 726.00 | 643.25 | 646.98 | 646.98 | 648.22 | 0.002592 | 8.96 | 81.01 | 33.00 | 1.01 |
| FISH CREEK | MAINSTEM US | 71930 | Ultimate 100 yr | 589.00 | 643.25 | 646.59 | 646.59 | 647.73 | 0.002667 | 8.56 | 68.78 | 30.70 | 1.01 |
| FISH CREEK | MAINSTEM US | 71412 | 2 yr | 183.00 | 640.92 | 642.62 | 642.62 | 643.28 | 0.003152 | 6.49 | 28.22 | 21.87 | 1.01 |
| FISH CREEK | MAINSTEM US | 71412 | 5 yr | 292.00 | 640.92 | 643.14 | 643.14 | 643.96 | 0.002945 | 7.26 | 40.24 | 24.95 | 1.01 |
| FISH CREEK | MAINSTEM US | 71412 | 10 yr | 364.00 | 640.92 | 643.43 | 643.43 | 644.33 | 0.002849 | 7.64 | 47.67 | 26.68 | 1.01 |
| FISH CREEK | MAINSTEM US | 71412 | 25 yr | 443.00 | 640.92 | 643.71 | 643.71 | 644.70 | 0.002776 | 7.99 | 55.43 | 28.37 | 1.01 |
| FISH CREEK | MAINSTEM US | 71412 | 50 yr | 510.00 | 640.92 | 643.93 | 643.93 | 644.99 | 0.002721 | 8.25 | 61.83 | 29.69 | 1.01 |
| FISH CREEK | MAINSTEM US | 71412 | 100 yr | 573.00 | 640.92 | 644.12 | 644.12 | 645.24 | 0.002681 | 8.47 | 67.63 | 30.84 | 1.01 |
| FISH CREEK | MAINSTEM US | 71412 | 500 yr | 726.00 | 640.92 | 644.55 | 644.55 | 645.78 | 0.002593 | 8.93 | 81.34 | 33.40 | 1.01 |
| FISH CREEK | MAINSTEM US | 71412 | Ultimate 100 yr | 589.00 | 640.92 | 644.17 | 644.17 | 645.30 | 0.002672 | 8.53 | 69.09 | 31.12 | 1.01 |
| FISH CREEK | MAINSTEM US | 70810 | 2 yr | 183.00 | 638.20 | 640.19 | | 640.49 | 0.001145 | 4.40 | 41.64 | 27.10 | 0.62 |
| FISH CREEK | MAINSTEM US | 70810 | 5 yr | 292.00 | 638.20 | 640.69 | | 641.11 | 0.001267 | 5.23 | 55.80 | 30.07 | 0.68 |
| FISH CREEK | MAINSTEM US | 70810 | 10 yr | 364.00 | 638.20 | 640.98 | | 641.47 | 0.001298 | 5.63 | 64.69 | 31.79 | 0.70 |
| FISH CREEK | MAINSTEM US | 70810 | 25 yr | 443.00 | 638.20 | 641.35 | | 641.86 | 0.001187 | 5.76 | 76.85 | 34.01 | 0.68 |
| FISH CREEK | MAINSTEM US | 70810 | 50 yr | 510.00 | 638.20 | 641.55 | | 642.13 | 0.001226 | 6.07 | 84.05 | 35.26 | 0.69 |
| FISH CREEK | MAINSTEM US | 70810 | 100 yr | 573.00 | 638.20 | 641.77 | | 642.37 | 0.001210 | 6.24 | 91.84 | 36.56 | 0.69 |
| FISH CREEK | MAINSTEM US | 70810 | 500 yr | 726.00 | 638.20 | 642.22 | | 642.91 | 0.001215 | 6.67 | 108.84 | 39.25 | 0.71 |
| FISH CREEK | MAINSTEM US | 70810 | Ultimate 100 yr | 589.00 | 638.20 | 641.83 | | 642.44 | 0.001194 | 6.26 | 94.15 | 36.94 | 0.69 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------|-------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FISH CREEK | MAINSTEM US | 70337 | 2 yr | 183.00 | 637.44 | 638.90 | 638.90 | 639.41 | 0.053820 | 5.72 | 31.99 | 32.01 | 1.01 |
| FISH CREEK | MAINSTEM US | 70337 | 5 yr | 292.00 | 637.44 | 639.41 | 639.30 | 639.94 | 0.039489 | 5.88 | 49.64 | 37.69 | 0.90 |
| FISH CREEK | MAINSTEM US | 70337 | 10 yr | 364.00 | 637.44 | 639.82 | | 640.29 | 0.027349 | 5.50 | 66.20 | 42.18 | 0.77 |
| FISH CREEK | MAINSTEM US | 70337 | 25 yr | 443.00 | 637.44 | 640.44 | | 640.76 | 0.015937 | 4.58 | 96.99 | 57.80 | 0.60 |
| FISH CREEK | MAINSTEM US | 70337 | 50 yr | 510.00 | 637.44 | 640.64 | | 640.99 | 0.014956 | 4.71 | 109.28 | 63.71 | 0.59 |
| FISH CREEK | MAINSTEM US | 70337 | 100 yr | 573.00 | 637.44 | 640.93 | | 641.25 | 0.011925 | 4.54 | 129.89 | 79.21 | 0.54 |
| FISH CREEK | MAINSTEM US | 70337 | 500 yr | 726.00 | 637.44 | 641.54 | | 641.79 | 0.007405 | 4.14 | 189.65 | 112.70 | 0.44 |
| FISH CREEK | MAINSTEM US | 70337 | Ultimate 100 yr | 589.00 | 637.44 | 641.03 | | 641.33 | 0.010807 | 4.43 | 138.20 | 86.39 | 0.52 |
| FISH CREEK | MAINSTEM US | 70212 | 2 yr | 349.00 | 631.86 | 635.34 | 633.75 | 635.54 | 0.005297 | 3.55 | 98.37 | 34.55 | 0.37 |
| FISH CREEK | MAINSTEM US | 70212 | 5 yr | 596.00 | 631.86 | 636.80 | 634.47 | 637.04 | 0.004246 | 3.96 | 150.45 | 43.01 | 0.35 |
| FISH CREEK | MAINSTEM US | 70212 | 10 yr | 763.00 | 631.86 | 638.04 | 634.92 | 638.28 | 0.002858 | 3.88 | 196.49 | 50.60 | 0.30 |
| FISH CREEK | MAINSTEM US | 70212 | 25 yr | 942.00 | 631.86 | 639.38 | 635.32 | 639.54 | 0.002313 | 3.30 | 285.88 | 58.73 | 0.26 |
| FISH CREEK | MAINSTEM US | 70212 | 50 yr | 1084.00 | 631.86 | 639.60 | 635.63 | 639.80 | 0.002713 | 3.62 | 299.20 | 60.10 | 0.29 |
| FISH CREEK | MAINSTEM US | 70212 | 100 yr | 1229.00 | 631.86 | 640.06 | 635.93 | 640.28 | 0.002743 | 3.75 | 327.48 | 62.91 | 0.29 |
| FISH CREEK | MAINSTEM US | 70212 | 500 yr | 1558.00 | 631.86 | 640.90 | 636.53 | 641.15 | 0.002746 | 4.07 | 388.66 | 92.76 | 0.30 |
| FISH CREEK | MAINSTEM US | 70212 | Ultimate 100 yr | 1291.00 | 631.86 | 640.22 | 636.04 | 640.45 | 0.002789 | 3.82 | 337.69 | 63.91 | 0.29 |
| FISH CREEK | MAINSTEM US | 70155 | | Culvert | | | | | | | | | |
| FISH CREEK | MAINSTEM US | 70123 | 2 yr | 349.00 | 631.68 | 634.08 | 633.49 | 634.47 | 0.000978 | 5.07 | 68.83 | 36.62 | 0.61 |
| FISH CREEK | MAINSTEM US | 70123 | 5 yr | 596.00 | 631.68 | 634.91 | 634.14 | 635.51 | 0.000947 | 6.22 | 95.82 | 41.58 | 0.64 |
| FISH CREEK | MAINSTEM US | 70123 | 10 yr | 763.00 | 631.68 | 635.32 | 634.52 | 636.08 | 0.001010 | 7.00 | 108.99 | 44.00 | 0.67 |
| FISH CREEK | MAINSTEM US | 70123 | 25 yr | 942.00 | 631.68 | 635.66 | 634.93 | 636.62 | 0.001113 | 7.84 | 120.14 | 46.44 | 0.72 |
| FISH CREEK | MAINSTEM US | 70123 | 50 yr | 1084.00 | 631.68 | 635.84 | 635.21 | 636.99 | 0.001257 | 8.60 | 126.01 | 48.08 | 0.77 |
| FISH CREEK | MAINSTEM US | 70123 | 100 yr | 1229.00 | 631.68 | 635.93 | 635.51 | 637.34 | 0.001506 | 9.55 | 128.70 | 48.83 | 0.84 |
| FISH CREEK | MAINSTEM US | 70123 | 500 yr | 1558.00 | 631.68 | 636.28 | 636.11 | 638.20 | 0.001818 | 11.11 | 140.24 | 52.06 | 0.94 |
| FISH CREEK | MAINSTEM US | 70123 | Ultimate 100 yr | 1291.00 | 631.68 | 635.92 | 635.62 | 637.49 | 0.001675 | 10.06 | 128.38 | 48.74 | 0.89 |
| FISH CREEK | MAINSTEM US | 69947 | 2 yr | 349.00 | 630.90 | 633.24 | 633.24 | 634.08 | 0.002835 | 7.39 | 47.26 | 27.82 | 1.00 |
| FISH CREEK | MAINSTEM US | 69947 | 5 yr | 596.00 | 630.90 | 634.03 | 634.03 | 635.12 | 0.002632 | 8.39 | 71.05 | 32.55 | 1.00 |
| FISH CREEK | MAINSTEM US | 69947 | 10 yr | 763.00 | 630.90 | 634.48 | 634.48 | 635.69 | 0.002515 | 8.84 | 86.31 | 35.25 | 1.00 |
| FISH CREEK | MAINSTEM US | 69947 | 25 yr | 942.00 | 630.90 | 634.89 | 634.89 | 636.23 | 0.002461 | 9.30 | 101.34 | 37.72 | 1.00 |
| FISH CREEK | MAINSTEM US | 69947 | 50 yr | 1084.00 | 630.90 | 635.19 | 635.19 | 636.62 | 0.002408 | 9.58 | 113.13 | 39.56 | 1.00 |
| FISH CREEK | MAINSTEM US | 69947 | 100 yr | 1229.00 | 630.90 | 635.47 | 635.47 | 636.99 | 0.002338 | 9.89 | 124.40 | 42.69 | 0.99 |
| FISH CREEK | MAINSTEM US | 69947 | 500 yr | 1558.00 | 630.90 | 636.03 | 636.03 | 637.76 | 0.002131 | 10.57 | 151.39 | 52.85 | 0.98 |
| FISH CREEK | MAINSTEM US | 69947 | Ultimate 100 yr | 1291.00 | 630.90 | 635.58 | 635.58 | 637.14 | 0.002303 | 10.04 | 129.02 | 44.63 | 0.99 |
| FISH CREEK | MAINSTEM US | 69463 | 2 yr | 349.00 | 628.14 | 630.48 | 630.48 | 631.32 | 0.002822 | 7.37 | 47.33 | 27.84 | 1.00 |
| FISH CREEK | MAINSTEM US | 69463 | 5 yr | 596.00 | 628.14 | 631.27 | 631.27 | 632.36 | 0.002616 | 8.37 | 71.20 | 32.58 | 1.00 |
| FISH CREEK | MAINSTEM US | 69463 | 10 yr | 763.00 | 628.14 | 631.71 | 631.71 | 632.93 | 0.002523 | 8.85 | 86.21 | 35.23 | 1.00 |
| FISH CREEK | MAINSTEM US | 69463 | 25 yr | 942.00 | 628.14 | 632.12 | 632.12 | 633.47 | 0.002469 | 9.31 | 101.23 | 37.71 | 1.00 |
| FISH CREEK | MAINSTEM US | 69463 | 50 yr | 1084.00 | 628.14 | 632.42 | 632.42 | 633.86 | 0.002434 | 9.62 | 112.70 | 39.49 | 1.00 |
| FISH CREEK | MAINSTEM US | 69463 | 100 yr | 1229.00 | 628.14 | 632.70 | 632.70 | 634.23 | 0.002362 | 9.92 | 124.27 | 47.37 | 1.00 |
| FISH CREEK | MAINSTEM US | 69463 | 500 yr | 1558.00 | 628.14 | 633.23 | 633.23 | 635.01 | 0.002223 | 10.71 | 155.12 | 63.56 | 1.00 |
| FISH CREEK | MAINSTEM US | 69463 | Ultimate 100 yr | 1291.00 | 628.14 | 632.80 | 632.80 | 634.38 | 0.002330 | 10.08 | 129.55 | 53.89 | 1.00 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------|-------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FISH CREEK | MAINSTEM US | 69230 | 2 yr | 349.00 | 626.81 | 629.15 | 629.15 | 629.99 | 0.002843 | 7.39 | 47.21 | 27.81 | 1.00 |
| FISH CREEK | MAINSTEM US | 69230 | 5 yr | 596.00 | 626.81 | 629.94 | 629.94 | 631.03 | 0.002625 | 8.38 | 71.12 | 32.56 | 1.00 |
| FISH CREEK | MAINSTEM US | 69230 | 10 yr | 763.00 | 626.81 | 630.38 | 630.38 | 631.60 | 0.002518 | 8.84 | 86.27 | 35.25 | 1.00 |
| FISH CREEK | MAINSTEM US | 69230 | 25 yr | 942.00 | 626.81 | 630.85 | 630.80 | 632.14 | 0.002324 | 9.10 | 103.47 | 38.06 | 0.97 |
| FISH CREEK | MAINSTEM US | 69230 | 50 yr | 1084.00 | 626.81 | 631.37 | 631.10 | 632.56 | 0.001836 | 8.75 | 124.09 | 43.78 | 0.88 |
| FISH CREEK | MAINSTEM US | 69230 | 100 yr | 1229.00 | 626.81 | 631.55 | 631.36 | 632.91 | 0.001957 | 9.38 | 132.31 | 49.04 | 0.92 |
| FISH CREEK | MAINSTEM US | 69230 | 500 yr | 1558.00 | 626.81 | 631.90 | 631.90 | 633.68 | 0.002236 | 10.73 | 151.12 | 58.27 | 1.00 |
| FISH CREEK | MAINSTEM US | 69230 | Ultimate 100 yr | 1291.00 | 626.81 | 631.62 | 631.48 | 633.06 | 0.002004 | 9.63 | 135.96 | 51.21 | 0.93 |
| FISH CREEK | MAINSTEM US | 69026 | 2 yr | 349.00 | 625.65 | 627.98 | 627.98 | 628.83 | 0.002888 | 7.43 | 46.95 | 27.76 | 1.01 |
| FISH CREEK | MAINSTEM US | 69026 | 5 yr | 596.00 | 625.65 | 629.30 | | 630.00 | 0.001410 | 6.70 | 88.98 | 35.70 | 0.75 |
| FISH CREEK | MAINSTEM US | 69026 | 10 yr | 763.00 | 625.65 | 630.21 | | 630.80 | 0.000912 | 6.16 | 124.38 | 50.93 | 0.62 |
| FISH CREEK | MAINSTEM US | 69026 | 25 yr | 942.00 | 625.65 | 631.09 | | 631.61 | 0.000588 | 5.85 | 198.05 | 112.24 | 0.52 |
| FISH CREEK | MAINSTEM US | 69026 | 50 yr | 1084.00 | 625.65 | 631.59 | | 632.12 | 0.000514 | 5.93 | 261.93 | 142.69 | 0.50 |
| FISH CREEK | MAINSTEM US | 69026 | 100 yr | 1229.00 | 625.65 | 631.81 | 630.21 | 632.43 | 0.000556 | 6.37 | 295.77 | 156.44 | 0.52 |
| FISH CREEK | MAINSTEM US | 69026 | 500 yr | 1558.00 | 625.65 | 632.06 | 630.78 | 632.94 | 0.000748 | 7.65 | 338.91 | 280.58 | 0.61 |
| FISH CREEK | MAINSTEM US | 69026 | Ultimate 100 yr | 1291.00 | 625.65 | 631.91 | 630.34 | 632.56 | 0.000572 | 6.55 | 310.86 | 162.20 | 0.53 |
| FISH CREEK | MAINSTEM US | 68873 | 2 yr | 521.00 | 624.61 | 627.85 | 626.51 | 628.14 | 0.000489 | 4.35 | 119.78 | 39.97 | 0.44 |
| FISH CREEK | MAINSTEM US | 68873 | 5 yr | 900.00 | 624.61 | 629.32 | 627.32 | 629.70 | 0.000465 | 4.95 | 181.98 | 48.19 | 0.45 |
| FISH CREEK | MAINSTEM US | 68873 | 10 yr | 1152.00 | 624.61 | 630.20 | 627.80 | 630.61 | 0.000385 | 5.12 | 225.19 | 61.95 | 0.42 |
| FISH CREEK | MAINSTEM US | 68873 | 25 yr | 1418.00 | 624.61 | 631.06 | 628.27 | 631.50 | 0.000330 | 5.31 | 267.28 | 84.96 | 0.40 |
| FISH CREEK | MAINSTEM US | 68873 | 50 yr | 1638.00 | 624.61 | 631.56 | 628.63 | 632.02 | 0.000333 | 5.46 | 314.35 | 123.99 | 0.41 |
| FISH CREEK | MAINSTEM US | 68873 | 100 yr | 1870.00 | 624.61 | 631.77 | 629.04 | 632.33 | 0.000384 | 6.01 | 333.25 | 138.10 | 0.44 |
| FISH CREEK | MAINSTEM US | 68873 | 500 yr | 2383.00 | 624.61 | 632.00 | 629.79 | 632.80 | 0.000545 | 7.16 | 423.31 | 332.37 | 0.52 |
| FISH CREEK | MAINSTEM US | 68873 | Ultimate 100 yr | 2005.00 | 624.61 | 631.86 | 629.31 | 632.45 | 0.000419 | 6.17 | 385.38 | 217.93 | 0.46 |
| FISH CREEK | MAINSTEM US | 68810 | | Culvert | | | | | | | | | |
| FISH CREEK | MAINSTEM US | 68728 | 2 yr | 521.00 | 618.40 | 621.43 | | 621.50 | 0.000140 | 2.12 | 246.13 | 100.84 | 0.24 |
| FISH CREEK | MAINSTEM US | 68728 | 5 yr | 900.00 | 618.40 | 623.23 | | 623.29 | 0.000075 | 2.01 | 447.91 | 124.01 | 0.19 |
| FISH CREEK | MAINSTEM US | 68728 | 10 yr | 1152.00 | 618.40 | 624.20 | | 624.27 | 0.000061 | 2.00 | 574.94 | 136.61 | 0.17 |
| FISH CREEK | MAINSTEM US | 68728 | 25 yr | 1418.00 | 618.40 | 625.14 | | 625.20 | 0.000052 | 2.00 | 708.12 | 148.66 | 0.16 |
| FISH CREEK | MAINSTEM US | 68728 | 50 yr | 1638.00 | 618.40 | 625.85 | | 625.91 | 0.000047 | 2.01 | 816.94 | 157.83 | 0.16 |
| FISH CREEK | MAINSTEM US | 68728 | 100 yr | 1870.00 | 618.40 | 626.56 | | 626.62 | 0.000042 | 2.00 | 932.75 | 167.04 | 0.15 |
| FISH CREEK | MAINSTEM US | 68728 | 500 yr | 2383.00 | 618.40 | 627.98 | | 628.04 | 0.000036 | 2.01 | 1183.00 | 185.38 | 0.14 |
| FISH CREEK | MAINSTEM US | 68728 | Ultimate 100 yr | 2005.00 | 618.40 | 626.96 | | 627.02 | 0.000040 | 2.00 | 1000.02 | 172.16 | 0.15 |
| FISH CREEK | MAINSTEM US | 68477 | 2 yr | 521.00 | 616.12 | 619.69 | 619.69 | 621.05 | 0.002741 | 9.37 | 55.61 | 20.65 | 1.01 |
| FISH CREEK | MAINSTEM US | 68477 | 5 yr | 900.00 | 616.12 | 620.96 | 620.96 | 622.74 | 0.002574 | 10.69 | 84.16 | 23.98 | 1.01 |
| FISH CREEK | MAINSTEM US | 68477 | 10 yr | 1152.00 | 616.12 | 621.68 | 621.68 | 623.66 | 0.002476 | 11.28 | 102.09 | 25.86 | 1.00 |
| FISH CREEK | MAINSTEM US | 68477 | 25 yr | 1418.00 | 616.12 | 622.30 | 622.30 | 624.52 | 0.002438 | 11.98 | 118.51 | 28.12 | 1.01 |
| FISH CREEK | MAINSTEM US | 68477 | 50 yr | 1638.00 | 616.12 | 622.79 | 622.79 | 625.19 | 0.002277 | 12.42 | 133.16 | 31.23 | 0.99 |
| FISH CREEK | MAINSTEM US | 68477 | 100 yr | 1870.00 | 616.12 | 623.26 | 623.26 | 625.84 | 0.002179 | 12.92 | 148.47 | 34.19 | 0.98 |
| FISH CREEK | MAINSTEM US | 68477 | 500 yr | 2383.00 | 616.12 | 624.26 | 624.26 | 627.17 | 0.001963 | 13.75 | 186.00 | 40.53 | 0.96 |
| FISH CREEK | MAINSTEM US | 68477 | Ultimate 100 yr | 2005.00 | 616.12 | 623.52 | 623.52 | 626.21 | 0.002135 | 13.20 | 157.48 | 35.81 | 0.98 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------|-------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FISH CREEK | MAINSTEM US | 67050 | 2 yr | 770.00 | 607.07 | 614.99 | 609.69 | 615.03 | 0.000570 | 1.74 | 466.81 | 266.12 | 0.13 |
| FISH CREEK | MAINSTEM US | 67050 | 5 yr | 1308.00 | 607.07 | 615.97 | 610.67 | 616.04 | 0.000736 | 2.22 | 820.80 | 401.48 | 0.16 |
| FISH CREEK | MAINSTEM US | 67050 | 10 yr | 1667.00 | 607.07 | 616.44 | 611.22 | 616.52 | 0.000821 | 2.46 | 1051.46 | 488.85 | 0.17 |
| FISH CREEK | MAINSTEM US | 67050 | 25 yr | 2041.00 | 607.07 | 616.86 | 611.82 | 616.94 | 0.000885 | 2.66 | 1270.84 | 567.11 | 0.18 |
| FISH CREEK | MAINSTEM US | 67050 | 50 yr | 2331.00 | 607.07 | 617.12 | 612.23 | 617.21 | 0.000929 | 2.79 | 1427.40 | 605.58 | 0.18 |
| FISH CREEK | MAINSTEM US | 67050 | 100 yr | 2603.00 | 607.07 | 617.34 | 612.58 | 617.43 | 0.000978 | 2.92 | 1561.16 | 639.32 | 0.19 |
| FISH CREEK | MAINSTEM US | 67050 | 500 yr | 3342.00 | 607.07 | 617.84 | 613.40 | 617.95 | 0.001079 | 3.20 | 1898.37 | 694.53 | 0.20 |
| FISH CREEK | MAINSTEM US | 67050 | Ultimate 100 yr | 2733.00 | 607.07 | 617.43 | 612.74 | 617.53 | 0.000999 | 2.98 | 1623.59 | 652.28 | 0.19 |
| FISH CREEK | MAINSTEM US | 66735 | 2 yr | 770.00 | 609.50 | 613.83 | 612.54 | 613.94 | 0.003090 | 3.03 | 386.15 | 255.28 | 0.29 |
| FISH CREEK | MAINSTEM US | 66735 | 5 yr | 1308.00 | 609.50 | 614.54 | 613.15 | 614.68 | 0.003577 | 3.71 | 599.90 | 358.34 | 0.33 |
| FISH CREEK | MAINSTEM US | 66735 | 10 yr | 1667.00 | 609.50 | 614.87 | 613.43 | 615.03 | 0.003790 | 4.03 | 725.67 | 398.65 | 0.34 |
| FISH CREEK | MAINSTEM US | 66735 | 25 yr | 2041.00 | 609.50 | 615.19 | 613.70 | 615.36 | 0.003947 | 4.32 | 866.33 | 535.29 | 0.35 |
| FISH CREEK | MAINSTEM US | 66735 | 50 yr | 2331.00 | 609.50 | 615.40 | 613.94 | 615.58 | 0.004020 | 4.48 | 995.64 | 561.35 | 0.36 |
| FISH CREEK | MAINSTEM US | 66735 | 100 yr | 2603.00 | 609.50 | 615.55 | 614.13 | 615.74 | 0.004051 | 4.60 | 1085.17 | 568.91 | 0.36 |
| FISH CREEK | MAINSTEM US | 66735 | 500 yr | 3342.00 | 609.50 | 615.92 | 614.61 | 616.12 | 0.004261 | 4.94 | 1294.52 | 586.45 | 0.38 |
| FISH CREEK | MAINSTEM US | 66735 | Ultimate 100 yr | 2733.00 | 609.50 | 615.63 | 614.19 | 615.81 | 0.004065 | 4.65 | 1126.22 | 571.85 | 0.36 |
| FISH CREEK | MAINSTEM US | 65905 | 2 yr | 770.00 | 608.78 | 610.63 | 609.90 | 610.72 | 0.007139 | 3.01 | 369.33 | 304.63 | 0.40 |
| FISH CREEK | MAINSTEM US | 65905 | 5 yr | 1308.00 | 608.78 | 611.16 | 610.33 | 611.27 | 0.006685 | 3.48 | 533.06 | 323.54 | 0.41 |
| FISH CREEK | MAINSTEM US | 65905 | 10 yr | 1667.00 | 608.78 | 611.44 | 610.50 | 611.57 | 0.006506 | 3.71 | 626.78 | 336.32 | 0.41 |
| FISH CREEK | MAINSTEM US | 65905 | 25 yr | 2041.00 | 608.78 | 611.71 | 610.65 | 611.85 | 0.006359 | 3.93 | 719.18 | 348.88 | 0.41 |
| FISH CREEK | MAINSTEM US | 65905 | 50 yr | 2331.00 | 608.78 | 611.90 | 610.77 | 612.05 | 0.006314 | 4.09 | 785.89 | 358.31 | 0.42 |
| FISH CREEK | MAINSTEM US | 65905 | 100 yr | 2603.00 | 608.78 | 612.06 | 610.86 | 612.23 | 0.006298 | 4.23 | 846.82 | 376.65 | 0.42 |
| FISH CREEK | MAINSTEM US | 65905 | 500 yr | 3342.00 | 608.78 | 612.61 | 611.13 | 612.78 | 0.005326 | 4.33 | 1069.15 | 433.36 | 0.40 |
| FISH CREEK | MAINSTEM US | 65905 | Ultimate 100 yr | 2733.00 | 608.78 | 612.15 | 610.91 | 612.32 | 0.006240 | 4.28 | 877.95 | 383.05 | 0.42 |
| FISH CREEK | MAINSTEM US | 65495 | 2 yr | 770.00 | 606.20 | 608.69 | 607.57 | 608.75 | 0.003881 | 2.25 | 438.85 | 336.62 | 0.30 |
| FISH CREEK | MAINSTEM US | 65495 | 5 yr | 1308.00 | 606.20 | 609.24 | 607.89 | 609.32 | 0.004291 | 2.83 | 612.28 | 389.36 | 0.33 |
| FISH CREEK | MAINSTEM US | 65495 | 10 yr | 1667.00 | 606.20 | 609.52 | 608.08 | 609.62 | 0.004516 | 3.14 | 713.40 | 424.84 | 0.34 |
| FISH CREEK | MAINSTEM US | 65495 | 25 yr | 2041.00 | 606.20 | 609.77 | 608.27 | 609.89 | 0.004755 | 3.42 | 807.92 | 448.66 | 0.36 |
| FISH CREEK | MAINSTEM US | 65495 | 50 yr | 2331.00 | 606.20 | 609.97 | 608.34 | 610.10 | 0.004759 | 3.58 | 886.84 | 463.82 | 0.36 |
| FISH CREEK | MAINSTEM US | 65495 | 100 yr | 2603.00 | 606.20 | 610.23 | 608.59 | 610.36 | 0.004279 | 3.59 | 994.69 | 487.77 | 0.35 |
| FISH CREEK | MAINSTEM US | 65495 | 500 yr | 3342.00 | 606.20 | 611.43 | 608.87 | 611.50 | 0.001759 | 2.83 | 1707.17 | 525.82 | 0.24 |
| FISH CREEK | MAINSTEM US | 65495 | Ultimate 100 yr | 2733.00 | 606.20 | 610.37 | 608.64 | 610.50 | 0.004028 | 3.58 | 1051.39 | 500.70 | 0.34 |
| FISH CREEK | MAINSTEM US | 65132 | 2 yr | 770.00 | 604.00 | 606.37 | 606.11 | 606.64 | 0.016352 | 4.60 | 230.03 | 237.31 | 0.61 |
| FISH CREEK | MAINSTEM US | 65132 | 5 yr | 1308.00 | 604.00 | 607.02 | | 607.27 | 0.011440 | 4.74 | 399.51 | 280.97 | 0.54 |
| FISH CREEK | MAINSTEM US | 65132 | 10 yr | 1667.00 | 604.00 | 607.50 | | 607.71 | 0.008312 | 4.56 | 540.30 | 309.64 | 0.47 |
| FISH CREEK | MAINSTEM US | 65132 | 25 yr | 2041.00 | 604.00 | 608.09 | | 608.26 | 0.005436 | 4.18 | 733.37 | 340.52 | 0.40 |
| FISH CREEK | MAINSTEM US | 65132 | 50 yr | 2331.00 | 604.00 | 608.59 | | 608.73 | 0.003802 | 3.83 | 907.84 | 351.80 | 0.34 |
| FISH CREEK | MAINSTEM US | 65132 | 100 yr | 2603.00 | 604.00 | 609.14 | | 609.26 | 0.002650 | 3.48 | 1105.22 | 364.04 | 0.29 |
| FISH CREEK | MAINSTEM US | 65132 | 500 yr | 3342.00 | 604.00 | 611.01 | | 611.07 | 0.000968 | 2.65 | 1875.93 | 466.97 | 0.18 |
| FISH CREEK | MAINSTEM US | 65132 | Ultimate 100 yr | 2733.00 | 604.00 | 609.37 | | 609.48 | 0.002350 | 3.39 | 1189.25 | 369.06 | 0.27 |
| FISH CREEK | MAINSTEM US | 64928 | 2 yr | 998.00 | 598.20 | 604.72 | 600.68 | 604.79 | 0.000753 | 2.22 | 450.53 | 101.11 | 0.18 |
| FISH CREEK | MAINSTEM US | 64928 | 5 yr | 1760.00 | 598.20 | 605.76 | 601.62 | 605.92 | 0.001210 | 3.19 | 552.39 | 150.17 | 0.24 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------|-------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FISH CREEK | MAINSTEM US | 64928 | 10 yr | 2279.00 | 598.20 | 606.51 | 602.23 | 606.71 | 0.001348 | 3.64 | 626.80 | 197.92 | 0.25 |
| FISH CREEK | MAINSTEM US | 64928 | 25 yr | 2803.00 | 598.20 | 607.28 | 602.73 | 607.53 | 0.001376 | 3.97 | 714.88 | 250.19 | 0.26 |
| FISH CREEK | MAINSTEM US | 64928 | 50 yr | 3200.00 | 598.20 | 607.89 | 603.09 | 608.15 | 0.001342 | 4.14 | 792.27 | 369.88 | 0.26 |
| FISH CREEK | MAINSTEM US | 64928 | 100 yr | 3600.00 | 598.20 | 608.51 | 603.41 | 608.79 | 0.001280 | 4.26 | 872.72 | 452.66 | 0.26 |
| FISH CREEK | MAINSTEM US | 64928 | 500 yr | 4658.00 | 598.20 | 610.53 | 604.20 | 610.80 | 0.000960 | 4.26 | 1132.56 | 740.16 | 0.23 |
| FISH CREEK | MAINSTEM US | 64928 | Ultimate 100 yr | 3759.00 | 598.20 | 608.77 | 603.54 | 609.05 | 0.001251 | 4.30 | 905.05 | 466.41 | 0.26 |
| FISH CREEK | MAINSTEM US | 64824 | | Culvert | | | | | | | | | |
| FISH CREEK | MAINSTEM US | 64679 | 2 yr | 998.00 | 599.45 | 604.42 | 602.02 | 604.48 | 0.001082 | 1.93 | 545.95 | 336.78 | 0.20 |
| FISH CREEK | MAINSTEM US | 64679 | 5 yr | 1760.00 | 599.45 | 604.98 | 602.73 | 605.09 | 0.001782 | 2.80 | 671.03 | 377.55 | 0.27 |
| FISH CREEK | MAINSTEM US | 64679 | 10 yr | 2279.00 | 599.45 | 605.31 | 603.23 | 605.47 | 0.002136 | 3.27 | 746.88 | 427.84 | 0.30 |
| FISH CREEK | MAINSTEM US | 64679 | 25 yr | 2803.00 | 599.45 | 605.62 | 603.57 | 605.82 | 0.002452 | 3.69 | 815.17 | 501.15 | 0.33 |
| FISH CREEK | MAINSTEM US | 64679 | 50 yr | 3200.00 | 599.45 | 605.82 | 603.78 | 606.06 | 0.002676 | 3.99 | 861.99 | 526.26 | 0.34 |
| FISH CREEK | MAINSTEM US | 64679 | 100 yr | 3600.00 | 599.45 | 606.02 | 603.98 | 606.29 | 0.002889 | 4.28 | 906.13 | 537.58 | 0.36 |
| FISH CREEK | MAINSTEM US | 64679 | 500 yr | 4658.00 | 599.45 | 606.48 | 604.40 | 606.84 | 0.003426 | 4.97 | 1009.29 | 635.68 | 0.40 |
| FISH CREEK | MAINSTEM US | 64679 | Ultimate 100 yr | 3759.00 | 599.45 | 606.10 | 604.06 | 606.38 | 0.002971 | 4.38 | 922.91 | 541.09 | 0.37 |
| FISH CREEK | MAINSTEM US | 64475 | 2 yr | 998.00 | 600.68 | 604.07 | 603.24 | 604.14 | 0.003596 | 3.03 | 626.35 | 508.90 | 0.36 |
| FISH CREEK | MAINSTEM US | 64475 | 5 yr | 1760.00 | 600.68 | 604.42 | 603.81 | 604.55 | 0.005590 | 4.18 | 821.37 | 577.93 | 0.46 |
| FISH CREEK | MAINSTEM US | 64475 | 10 yr | 2279.00 | 600.68 | 604.72 | 603.94 | 604.86 | 0.005435 | 4.42 | 992.36 | 593.47 | 0.46 |
| FISH CREEK | MAINSTEM US | 64475 | 25 yr | 2803.00 | 600.68 | 604.98 | 603.95 | 605.13 | 0.005330 | 4.64 | 1149.70 | 603.91 | 0.46 |
| FISH CREEK | MAINSTEM US | 64475 | 50 yr | 3200.00 | 600.68 | 605.16 | 604.19 | 605.32 | 0.005284 | 4.80 | 1260.74 | 610.93 | 0.46 |
| FISH CREEK | MAINSTEM US | 64475 | 100 yr | 3600.00 | 600.68 | 605.34 | 604.27 | 605.50 | 0.005235 | 4.94 | 1368.84 | 617.68 | 0.47 |
| FISH CREEK | MAINSTEM US | 64475 | 500 yr | 4658.00 | 600.68 | 605.75 | 604.60 | 605.94 | 0.005163 | 5.29 | 1631.08 | 637.46 | 0.47 |
| FISH CREEK | MAINSTEM US | 64475 | Ultimate 100 yr | 3759.00 | 600.68 | 605.40 | 604.27 | 605.57 | 0.005230 | 5.00 | 1410.28 | 621.22 | 0.47 |
| FISH CREEK | MAINSTEM US | 64268 | 2 yr | 998.00 | 601.51 | 603.11 | 602.44 | 603.14 | 0.002357 | 1.41 | 723.14 | 527.82 | 0.25 |
| FISH CREEK | MAINSTEM US | 64268 | 5 yr | 1760.00 | 601.51 | 603.67 | 602.88 | 603.72 | 0.002479 | 1.97 | 1033.08 | 587.17 | 0.28 |
| FISH CREEK | MAINSTEM US | 64268 | 10 yr | 2279.00 | 601.51 | 603.97 | 602.88 | 604.03 | 0.002554 | 2.25 | 1212.73 | 603.48 | 0.29 |
| FISH CREEK | MAINSTEM US | 64268 | 25 yr | 2803.00 | 601.51 | 604.24 | 602.88 | 604.31 | 0.002626 | 2.50 | 1375.29 | 612.18 | 0.30 |
| FISH CREEK | MAINSTEM US | 64268 | 50 yr | 3200.00 | 601.51 | 604.42 | 602.89 | 604.50 | 0.002692 | 2.67 | 1487.11 | 618.17 | 0.31 |
| FISH CREEK | MAINSTEM US | 64268 | 100 yr | 3600.00 | 601.51 | 604.60 | 602.89 | 604.68 | 0.002734 | 2.83 | 1597.53 | 623.61 | 0.32 |
| FISH CREEK | MAINSTEM US | 64268 | 500 yr | 4658.00 | 601.51 | 605.01 | 603.09 | 605.12 | 0.002872 | 3.22 | 1856.26 | 632.58 | 0.33 |
| FISH CREEK | MAINSTEM US | 64268 | Ultimate 100 yr | 3759.00 | 601.51 | 604.67 | 602.91 | 604.75 | 0.002755 | 2.89 | 1638.57 | 625.05 | 0.32 |
| FISH CREEK | MAINSTEM US | 63621 | 2 yr | 998.00 | 600.17 | 600.51 | | 600.67 | 0.008551 | 1.08 | 314.09 | 369.54 | 0.38 |
| FISH CREEK | MAINSTEM US | 63621 | 5 yr | 1760.00 | 600.17 | 600.89 | | 601.12 | 0.008930 | 1.83 | 461.04 | 411.17 | 0.44 |
| FISH CREEK | MAINSTEM US | 63621 | 10 yr | 2279.00 | 600.17 | 601.10 | | 601.37 | 0.009055 | 2.16 | 560.77 | 513.09 | 0.47 |
| FISH CREEK | MAINSTEM US | 63621 | 25 yr | 2803.00 | 600.17 | 601.28 | | 601.58 | 0.009087 | 2.40 | 656.75 | 541.57 | 0.48 |
| FISH CREEK | MAINSTEM US | 63621 | 50 yr | 3200.00 | 600.17 | 601.42 | | 601.73 | 0.008976 | 2.54 | 729.10 | 562.64 | 0.48 |
| FISH CREEK | MAINSTEM US | 63621 | 100 yr | 3600.00 | 600.17 | 601.54 | | 601.87 | 0.009048 | 2.68 | 800.30 | 576.21 | 0.49 |
| FISH CREEK | MAINSTEM US | 63621 | 500 yr | 4658.00 | 600.17 | 601.82 | | 602.19 | 0.008914 | 3.03 | 967.91 | 610.28 | 0.50 |
| FISH CREEK | MAINSTEM US | 63621 | Ultimate 100 yr | 3759.00 | 600.17 | 601.59 | | 601.92 | 0.009026 | 2.72 | 825.99 | 580.31 | 0.49 |
| FISH CREEK | MAINSTEM US | 63158 | 2 yr | 998.00 | 597.27 | 598.41 | 597.94 | 598.49 | 0.007755 | 1.71 | 443.53 | 520.45 | 0.41 |
| FISH CREEK | MAINSTEM US | 63158 | 5 yr | 1760.00 | 597.27 | 598.81 | 598.24 | 598.92 | 0.007022 | 2.19 | 666.83 | 571.59 | 0.42 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------|-------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FISH CREEK | MAINSTEM US | 63158 | 10 yr | 2279.00 | 597.27 | 599.05 | | 599.17 | 0.006643 | 2.44 | 802.03 | 590.15 | 0.43 |
| FISH CREEK | MAINSTEM US | 63158 | 25 yr | 2803.00 | 597.27 | 599.27 | | 599.41 | 0.006309 | 2.64 | 935.37 | 611.41 | 0.43 |
| FISH CREEK | MAINSTEM US | 63158 | 50 yr | 3200.00 | 597.27 | 599.43 | | 599.58 | 0.006098 | 2.77 | 1037.69 | 632.62 | 0.43 |
| FISH CREEK | MAINSTEM US | 63158 | 100 yr | 3600.00 | 597.27 | 599.57 | | 599.73 | 0.005917 | 2.91 | 1126.38 | 636.75 | 0.43 |
| FISH CREEK | MAINSTEM US | 63158 | 500 yr | 4658.00 | 597.27 | 599.92 | | 600.11 | 0.005485 | 3.21 | 1350.47 | 645.02 | 0.43 |
| FISH CREEK | MAINSTEM US | 63158 | Ultimate 100 yr | 3759.00 | 597.27 | 599.63 | | 599.79 | 0.005853 | 2.96 | 1160.49 | 638.02 | 0.43 |
| FISH CREEK | MAINSTEM US | 62244 | 2 yr | 998.00 | 591.61 | 594.09 | 592.95 | 594.14 | 0.001906 | 1.96 | 532.32 | 341.06 | 0.25 |
| FISH CREEK | MAINSTEM US | 62244 | 5 yr | 1760.00 | 591.61 | 594.74 | 593.32 | 594.83 | 0.002071 | 2.50 | 760.69 | 358.54 | 0.28 |
| FISH CREEK | MAINSTEM US | 62244 | 10 yr | 2279.00 | 591.61 | 595.09 | 593.53 | 595.20 | 0.002194 | 2.81 | 887.90 | 367.77 | 0.29 |
| FISH CREEK | MAINSTEM US | 62244 | 25 yr | 2803.00 | 591.61 | 595.40 | 593.75 | 595.54 | 0.002296 | 3.08 | 1004.88 | 424.71 | 0.30 |
| FISH CREEK | MAINSTEM US | 62244 | 50 yr | 3200.00 | 591.61 | 595.61 | 593.89 | 595.77 | 0.002398 | 3.28 | 1082.46 | 453.35 | 0.31 |
| FISH CREEK | MAINSTEM US | 62244 | 100 yr | 3600.00 | 591.61 | 595.80 | 594.03 | 595.97 | 0.002465 | 3.45 | 1191.51 | 477.62 | 0.32 |
| FISH CREEK | MAINSTEM US | 62244 | 500 yr | 4658.00 | 591.61 | 596.24 | 594.35 | 596.45 | 0.002657 | 3.87 | 1412.76 | 521.33 | 0.34 |
| FISH CREEK | MAINSTEM US | 62244 | Ultimate 100 yr | 3759.00 | 591.61 | 595.87 | 594.08 | 596.05 | 0.002497 | 3.52 | 1225.90 | 485.47 | 0.32 |
| FISH CREEK | MAINSTEM US | 61962 | 2 yr | 998.00 | 589.92 | 593.07 | 592.73 | 593.28 | 0.009616 | 4.71 | 379.36 | 335.93 | 0.58 |
| FISH CREEK | MAINSTEM US | 61962 | 5 yr | 1760.00 | 589.92 | 593.73 | 593.17 | 593.95 | 0.007884 | 5.13 | 607.61 | 407.66 | 0.55 |
| FISH CREEK | MAINSTEM US | 61962 | 10 yr | 2279.00 | 589.92 | 594.08 | 593.38 | 594.30 | 0.007271 | 5.34 | 765.72 | 445.85 | 0.54 |
| FISH CREEK | MAINSTEM US | 61962 | 25 yr | 2803.00 | 589.92 | 594.39 | 593.57 | 594.62 | 0.006869 | 5.53 | 909.36 | 480.98 | 0.53 |
| FISH CREEK | MAINSTEM US | 61962 | 50 yr | 3200.00 | 589.92 | 594.59 | 593.70 | 594.83 | 0.006696 | 5.68 | 1007.23 | 496.09 | 0.53 |
| FISH CREEK | MAINSTEM US | 61962 | 100 yr | 3600.00 | 589.92 | 594.77 | 593.83 | 595.02 | 0.006592 | 5.82 | 1099.77 | 510.31 | 0.53 |
| FISH CREEK | MAINSTEM US | 61962 | 500 yr | 4658.00 | 589.92 | 595.17 | 594.20 | 595.45 | 0.006713 | 6.28 | 1308.93 | 547.22 | 0.54 |
| FISH CREEK | MAINSTEM US | 61962 | Ultimate 100 yr | 3759.00 | 589.92 | 594.84 | 593.89 | 595.09 | 0.006616 | 5.90 | 1132.35 | 516.09 | 0.53 |
| FISH CREEK | MAINSTEM US | 61262 | 2 yr | 998.00 | 584.10 | 588.77 | 587.31 | 588.94 | 0.003665 | 3.35 | 314.04 | 134.82 | 0.37 |
| FISH CREEK | MAINSTEM US | 61262 | 5 yr | 1760.00 | 584.10 | 589.77 | 588.06 | 590.01 | 0.004347 | 4.05 | 474.45 | 214.14 | 0.41 |
| FISH CREEK | MAINSTEM US | 61262 | 10 yr | 2279.00 | 584.10 | 590.15 | 588.49 | 590.46 | 0.004740 | 4.59 | 563.11 | 271.31 | 0.44 |
| FISH CREEK | MAINSTEM US | 61262 | 25 yr | 2803.00 | 584.10 | 590.50 | 588.87 | 590.86 | 0.004955 | 5.01 | 665.67 | 304.69 | 0.46 |
| FISH CREEK | MAINSTEM US | 61262 | 50 yr | 3200.00 | 584.10 | 590.77 | 589.14 | 591.16 | 0.004906 | 5.22 | 772.78 | 500.39 | 0.46 |
| FISH CREEK | MAINSTEM US | 61262 | 100 yr | 3600.00 | 584.10 | 591.03 | 589.45 | 591.43 | 0.004800 | 5.38 | 919.20 | 606.56 | 0.46 |
| FISH CREEK | MAINSTEM US | 61262 | 500 yr | 4658.00 | 584.10 | 591.60 | 590.05 | 592.00 | 0.004359 | 5.59 | 1264.36 | 669.78 | 0.45 |
| FISH CREEK | MAINSTEM US | 61262 | Ultimate 100 yr | 3759.00 | 584.10 | 591.12 | 589.54 | 591.52 | 0.004721 | 5.42 | 975.37 | 618.51 | 0.46 |
| FISH CREEK | MAINSTEM US | 60628 | 2 yr | 998.00 | 583.77 | 586.33 | 585.50 | 586.47 | 0.004431 | 2.95 | 343.91 | 203.36 | 0.39 |
| FISH CREEK | MAINSTEM US | 60628 | 5 yr | 1760.00 | 583.77 | 586.96 | 585.96 | 587.18 | 0.004951 | 3.80 | 474.55 | 214.60 | 0.43 |
| FISH CREEK | MAINSTEM US | 60628 | 10 yr | 2279.00 | 583.77 | 587.49 | 586.21 | 587.73 | 0.004161 | 3.97 | 591.60 | 225.22 | 0.41 |
| FISH CREEK | MAINSTEM US | 60628 | 25 yr | 2803.00 | 583.77 | 588.11 | 586.46 | 588.34 | 0.003218 | 3.96 | 734.83 | 238.00 | 0.37 |
| FISH CREEK | MAINSTEM US | 60628 | 50 yr | 3200.00 | 583.77 | 588.57 | 586.63 | 588.80 | 0.002710 | 3.94 | 847.30 | 247.43 | 0.34 |
| FISH CREEK | MAINSTEM US | 60628 | 100 yr | 3600.00 | 583.77 | 588.92 | 586.80 | 589.16 | 0.002546 | 4.03 | 934.84 | 255.53 | 0.34 |
| FISH CREEK | MAINSTEM US | 60628 | 500 yr | 4658.00 | 583.77 | 589.66 | 587.21 | 589.93 | 0.002420 | 4.36 | 1132.43 | 282.92 | 0.34 |
| FISH CREEK | MAINSTEM US | 60628 | Ultimate 100 yr | 3759.00 | 583.77 | 589.03 | 586.87 | 589.27 | 0.002554 | 4.10 | 961.67 | 258.99 | 0.34 |
| FISH CREEK | MAINSTEM US | 60243 | 2 yr | 998.00 | 581.67 | 583.76 | 583.18 | 584.01 | 0.009634 | 4.02 | 248.24 | 153.25 | 0.56 |
| FISH CREEK | MAINSTEM US | 60243 | 5 yr | 1760.00 | 581.67 | 585.13 | 583.73 | 585.34 | 0.004187 | 3.72 | 473.66 | 176.01 | 0.40 |
| FISH CREEK | MAINSTEM US | 60243 | 10 yr | 2279.00 | 581.67 | 586.21 | 584.06 | 586.38 | 0.002461 | 3.39 | 672.64 | 192.59 | 0.32 |
| FISH CREEK | MAINSTEM US | 60243 | 25 yr | 2803.00 | 581.67 | 587.20 | 584.35 | 587.35 | 0.001622 | 3.20 | 896.72 | 257.61 | 0.27 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------|-------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FISH CREEK | MAINSTEM US | 60243 | 50 yr | 3200.00 | 581.67 | 587.83 | 584.57 | 587.98 | 0.001296 | 3.13 | 1064.24 | 272.01 | 0.25 |
| FISH CREEK | MAINSTEM US | 60243 | 100 yr | 3600.00 | 581.67 | 588.22 | 584.76 | 588.38 | 0.001240 | 3.22 | 1173.14 | 282.87 | 0.24 |
| FISH CREEK | MAINSTEM US | 60243 | 500 yr | 4658.00 | 581.67 | 588.99 | 585.24 | 589.17 | 0.001250 | 3.53 | 1764.83 | 696.29 | 0.25 |
| FISH CREEK | MAINSTEM US | 60243 | Ultimate 100 yr | 3759.00 | 581.67 | 588.32 | 584.84 | 588.48 | 0.001264 | 3.29 | 1201.22 | 286.15 | 0.25 |
| FISH CREEK | MAINSTEM US | 60063 | 2 yr | 1121.00 | 579.60 | 582.81 | 581.49 | 583.09 | 0.000446 | 4.24 | 264.70 | 87.55 | 0.43 |
| FISH CREEK | MAINSTEM US | 60063 | 5 yr | 2213.00 | 579.60 | 584.38 | 582.48 | 584.85 | 0.000448 | 5.49 | 402.98 | 88.50 | 0.45 |
| FISH CREEK | MAINSTEM US | 60063 | 10 yr | 2979.00 | 579.60 | 585.46 | 583.08 | 586.01 | 0.000412 | 5.97 | 498.69 | 89.15 | 0.45 |
| FISH CREEK | MAINSTEM US | 60063 | 25 yr | 3734.00 | 579.60 | 586.39 | 583.63 | 587.03 | 0.000398 | 6.42 | 581.76 | 89.71 | 0.44 |
| FISH CREEK | MAINSTEM US | 60063 | 50 yr | 4333.00 | 579.60 | 586.91 | 584.01 | 587.65 | 0.000417 | 6.89 | 632.12 | 113.78 | 0.46 |
| FISH CREEK | MAINSTEM US | 60063 | 100 yr | 4889.00 | 579.60 | 587.12 | 584.37 | 588.00 | 0.000480 | 7.54 | 658.42 | 132.95 | 0.50 |
| FISH CREEK | MAINSTEM US | 60063 | 500 yr | 6286.00 | 579.60 | 587.17 | 585.21 | 588.61 | 0.000775 | 9.63 | 665.16 | 137.43 | 0.63 |
| FISH CREEK | MAINSTEM US | 60063 | Ultimate 100 yr | 5073.00 | 579.60 | 587.14 | 584.49 | 588.09 | 0.000512 | 7.80 | 661.36 | 134.92 | 0.51 |
| FISH CREEK | MAINSTEM US | 60009 | | Culvert | | | | | | | | | |
| FISH CREEK | MAINSTEM US | 59958 | 2 yr | 1121.00 | 579.44 | 582.31 | | 582.65 | 0.000623 | 4.69 | 238.95 | 87.61 | 0.50 |
| FISH CREEK | MAINSTEM US | 59958 | 5 yr | 2213.00 | 579.44 | 583.24 | | 583.98 | 0.000935 | 6.90 | 320.87 | 88.24 | 0.64 |
| FISH CREEK | MAINSTEM US | 59958 | 10 yr | 2979.00 | 579.44 | 583.73 | | 584.77 | 0.001128 | 8.18 | 364.09 | 88.57 | 0.71 |
| FISH CREEK | MAINSTEM US | 59958 | 25 yr | 3734.00 | 579.44 | 584.13 | | 585.49 | 0.001316 | 9.35 | 399.52 | 88.85 | 0.78 |
| FISH CREEK | MAINSTEM US | 59958 | 50 yr | 4333.00 | 579.44 | 584.41 | | 586.03 | 0.001463 | 10.21 | 424.19 | 89.04 | 0.82 |
| FISH CREEK | MAINSTEM US | 59958 | 100 yr | 4889.00 | 579.44 | 584.63 | 584.17 | 586.51 | 0.001614 | 11.02 | 443.65 | 89.18 | 0.87 |
| FISH CREEK | MAINSTEM US | 59958 | 500 yr | 6286.00 | 579.44 | 585.04 | 585.02 | 587.70 | 0.002073 | 13.09 | 480.29 | 89.46 | 1.00 |
| FISH CREEK | MAINSTEM US | 59958 | Ultimate 100 yr | 5073.00 | 579.44 | 584.69 | 584.28 | 586.67 | 0.001667 | 11.29 | 449.44 | 89.23 | 0.89 |
| FISH CREEK | MAINSTEM US | 59747 | 2 yr | 1121.00 | 579.29 | 582.24 | | 582.33 | 0.002002 | 2.41 | 477.32 | 213.54 | 0.27 |
| FISH CREEK | MAINSTEM US | 59747 | 5 yr | 2213.00 | 579.29 | 583.25 | | 583.41 | 0.002340 | 3.28 | 701.53 | 228.98 | 0.31 |
| FISH CREEK | MAINSTEM US | 59747 | 10 yr | 2979.00 | 579.29 | 583.82 | | 584.03 | 0.002477 | 3.74 | 834.40 | 237.21 | 0.33 |
| FISH CREEK | MAINSTEM US | 59747 | 25 yr | 3734.00 | 579.29 | 584.32 | | 584.57 | 0.002581 | 4.12 | 953.43 | 244.05 | 0.34 |
| FISH CREEK | MAINSTEM US | 59747 | 50 yr | 4333.00 | 579.29 | 584.68 | | 584.96 | 0.002638 | 4.39 | 1043.39 | 249.09 | 0.35 |
| FISH CREEK | MAINSTEM US | 59747 | 100 yr | 4889.00 | 579.29 | 584.99 | | 585.30 | 0.002706 | 4.63 | 1120.34 | 254.02 | 0.36 |
| FISH CREEK | MAINSTEM US | 59747 | 500 yr | 6286.00 | 579.29 | 585.66 | | 586.05 | 0.002907 | 5.21 | 1298.22 | 296.13 | 0.38 |
| FISH CREEK | MAINSTEM US | 59747 | Ultimate 100 yr | 5073.00 | 579.29 | 585.08 | | 585.41 | 0.002734 | 4.71 | 1144.69 | 256.59 | 0.36 |
| FISH CREEK | MAINSTEM US | 59675 | 2 yr | 1121.00 | 578.85 | 582.06 | | 582.16 | 0.002509 | 2.61 | 446.07 | 224.00 | 0.31 |
| FISH CREEK | MAINSTEM US | 59675 | 5 yr | 2213.00 | 578.85 | 583.05 | | 583.23 | 0.002689 | 3.44 | 676.49 | 240.06 | 0.34 |
| FISH CREEK | MAINSTEM US | 59675 | 10 yr | 2979.00 | 578.85 | 583.62 | | 583.84 | 0.002751 | 3.87 | 814.63 | 248.92 | 0.35 |
| FISH CREEK | MAINSTEM US | 59675 | 25 yr | 3734.00 | 578.85 | 584.11 | | 584.37 | 0.002826 | 4.26 | 938.60 | 261.17 | 0.37 |
| FISH CREEK | MAINSTEM US | 59675 | 50 yr | 4333.00 | 578.85 | 584.47 | | 584.76 | 0.002890 | 4.54 | 1035.81 | 282.45 | 0.37 |
| FISH CREEK | MAINSTEM US | 59675 | 100 yr | 4889.00 | 578.85 | 584.77 | | 585.10 | 0.002934 | 4.77 | 1124.27 | 300.11 | 0.38 |
| FISH CREEK | MAINSTEM US | 59675 | 500 yr | 6286.00 | 578.85 | 585.45 | | 585.84 | 0.003016 | 5.27 | 1341.00 | 340.04 | 0.39 |
| FISH CREEK | MAINSTEM US | 59675 | Ultimate 100 yr | 5073.00 | 578.85 | 584.86 | | 585.20 | 0.002947 | 4.84 | 1153.18 | 305.67 | 0.38 |
| FISH CREEK | MAINSTEM US | 59104 | 2 yr | 1121.00 | 578.11 | 580.67 | 579.64 | 580.77 | 0.002382 | 2.53 | 454.10 | 250.01 | 0.32 |
| FISH CREEK | MAINSTEM US | 59104 | 5 yr | 2213.00 | 578.11 | 581.64 | 580.18 | 581.80 | 0.002327 | 3.27 | 703.91 | 266.30 | 0.34 |
| FISH CREEK | MAINSTEM US | 59104 | 10 yr | 2979.00 | 578.11 | 582.17 | 580.50 | 582.37 | 0.002348 | 3.67 | 848.27 | 273.91 | 0.35 |
| FISH CREEK | MAINSTEM US | 59104 | 25 yr | 3734.00 | 578.11 | 582.64 | 580.78 | 582.88 | 0.002371 | 4.01 | 977.37 | 280.59 | 0.36 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------|-------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FISH CREEK | MAINSTEM US | 59104 | 50 yr | 4333.00 | 578.11 | 582.98 | 580.99 | 583.25 | 0.002383 | 4.25 | 1073.81 | 285.49 | 0.36 |
| FISH CREEK | MAINSTEM US | 59104 | 100 yr | 4889.00 | 578.11 | 583.27 | 581.18 | 583.56 | 0.002413 | 4.46 | 1155.90 | 290.36 | 0.37 |
| FISH CREEK | MAINSTEM US | 59104 | 500 yr | 6286.00 | 578.11 | 583.90 | 581.60 | 584.26 | 0.002487 | 4.94 | 1345.57 | 306.10 | 0.38 |
| FISH CREEK | MAINSTEM US | 59104 | Ultimate 100 yr | 5073.00 | 578.11 | 583.36 | 581.24 | 583.66 | 0.002421 | 4.53 | 1182.19 | 292.62 | 0.37 |
| FISH CREEK | MAINSTEM US | 58624 | 2 yr | 1121.00 | 577.09 | 579.43 | 578.35 | 579.52 | 0.002870 | 2.38 | 470.30 | 256.55 | 0.31 |
| FISH CREEK | MAINSTEM US | 58624 | 5 yr | 2213.00 | 577.09 | 580.47 | 578.90 | 580.61 | 0.002598 | 2.97 | 745.75 | 271.64 | 0.32 |
| FISH CREEK | MAINSTEM US | 58624 | 10 yr | 2979.00 | 577.09 | 580.95 | 579.20 | 581.12 | 0.002870 | 3.40 | 875.53 | 279.86 | 0.34 |
| FISH CREEK | MAINSTEM US | 58624 | 25 yr | 3734.00 | 577.09 | 581.37 | 579.47 | 581.59 | 0.003061 | 3.75 | 995.17 | 288.21 | 0.36 |
| FISH CREEK | MAINSTEM US | 58624 | 50 yr | 4333.00 | 577.09 | 581.67 | 579.68 | 581.92 | 0.003220 | 3.99 | 1085.53 | 297.55 | 0.37 |
| FISH CREEK | MAINSTEM US | 58624 | 100 yr | 4889.00 | 577.09 | 581.93 | 579.86 | 582.21 | 0.003314 | 4.20 | 1164.47 | 316.39 | 0.38 |
| FISH CREEK | MAINSTEM US | 58624 | 500 yr | 6286.00 | 577.09 | 582.54 | 580.28 | 582.87 | 0.003380 | 4.65 | 1391.75 | 386.50 | 0.39 |
| FISH CREEK | MAINSTEM US | 58624 | Ultimate 100 yr | 5073.00 | 577.09 | 582.01 | 579.91 | 582.29 | 0.003344 | 4.27 | 1189.01 | 319.91 | 0.38 |
| FISH CREEK | MAINSTEM US | 58212 | 2 yr | 1121.00 | 572.07 | 577.65 | 576.51 | 577.92 | 0.005727 | 4.54 | 334.75 | 196.92 | 0.47 |
| FISH CREEK | MAINSTEM US | 58212 | 5 yr | 2213.00 | 572.07 | 578.63 | 577.80 | 579.02 | 0.007071 | 5.68 | 568.67 | 362.61 | 0.54 |
| FISH CREEK | MAINSTEM US | 58212 | 10 yr | 2979.00 | 572.07 | 579.04 | 578.28 | 579.44 | 0.006935 | 6.06 | 823.21 | 461.43 | 0.54 |
| FISH CREEK | MAINSTEM US | 58212 | 25 yr | 3734.00 | 572.07 | 579.43 | 578.72 | 579.84 | 0.006755 | 6.37 | 1004.64 | 470.26 | 0.54 |
| FISH CREEK | MAINSTEM US | 58212 | 50 yr | 4333.00 | 572.07 | 579.72 | 578.99 | 580.15 | 0.006580 | 6.57 | 1143.92 | 479.52 | 0.54 |
| FISH CREEK | MAINSTEM US | 58212 | 100 yr | 4889.00 | 572.07 | 579.98 | 579.10 | 580.41 | 0.006435 | 6.74 | 1267.03 | 486.97 | 0.54 |
| FISH CREEK | MAINSTEM US | 58212 | 500 yr | 6286.00 | 572.07 | 580.59 | 579.52 | 581.07 | 0.006334 | 7.25 | 1591.41 | 562.29 | 0.55 |
| FISH CREEK | MAINSTEM US | 58212 | Ultimate 100 yr | 5073.00 | 572.07 | 580.05 | 579.22 | 580.49 | 0.006418 | 6.80 | 1304.07 | 488.70 | 0.54 |
| FISH CREEK | MAINSTEM US | 57394 | 2 yr | 1321.00 | 570.82 | 573.44 | 573.07 | 573.53 | 0.004558 | 2.98 | 628.69 | 391.70 | 0.39 |
| FISH CREEK | MAINSTEM US | 57394 | 5 yr | 2578.00 | 570.82 | 574.63 | 573.36 | 574.73 | 0.002871 | 3.31 | 1157.56 | 471.02 | 0.34 |
| FISH CREEK | MAINSTEM US | 57394 | 10 yr | 3517.00 | 570.82 | 575.21 | 573.37 | 575.32 | 0.002679 | 3.60 | 1521.35 | 563.17 | 0.34 |
| FISH CREEK | MAINSTEM US | 57394 | 25 yr | 4452.00 | 570.82 | 575.71 | 573.47 | 575.84 | 0.002604 | 3.87 | 1808.02 | 580.83 | 0.34 |
| FISH CREEK | MAINSTEM US | 57394 | 50 yr | 5206.00 | 570.82 | 576.09 | 573.77 | 576.23 | 0.002601 | 4.10 | 2033.19 | 622.30 | 0.34 |
| FISH CREEK | MAINSTEM US | 57394 | 100 yr | 5906.00 | 570.82 | 576.42 | 573.96 | 576.57 | 0.002589 | 4.29 | 2243.94 | 663.18 | 0.35 |
| FISH CREEK | MAINSTEM US | 57394 | 500 yr | 7612.00 | 570.82 | 577.13 | 574.34 | 577.31 | 0.002530 | 4.65 | 2740.40 | 735.62 | 0.35 |
| FISH CREEK | MAINSTEM US | 57394 | Ultimate 100 yr | 6111.00 | 570.82 | 576.50 | 574.01 | 576.66 | 0.002588 | 4.34 | 2301.58 | 670.38 | 0.35 |
| FISH CREEK | MAINSTEM US | 56957 | 2 yr | 1321.00 | 567.26 | 571.30 | 569.59 | 571.46 | 0.004632 | 3.28 | 402.59 | 147.84 | 0.35 |
| FISH CREEK | MAINSTEM US | 56957 | 5 yr | 2578.00 | 567.26 | 573.05 | 570.57 | 573.26 | 0.003821 | 3.69 | 717.01 | 387.31 | 0.34 |
| FISH CREEK | MAINSTEM US | 56957 | 10 yr | 3517.00 | 567.26 | 573.71 | 571.16 | 573.94 | 0.003637 | 3.98 | 1078.89 | 504.48 | 0.34 |
| FISH CREEK | MAINSTEM US | 56957 | 25 yr | 4452.00 | 567.26 | 574.30 | 571.65 | 574.54 | 0.003342 | 4.15 | 1387.99 | 551.33 | 0.33 |
| FISH CREEK | MAINSTEM US | 56957 | 50 yr | 5206.00 | 567.26 | 574.71 | 572.03 | 574.95 | 0.003187 | 4.27 | 1624.54 | 592.77 | 0.33 |
| FISH CREEK | MAINSTEM US | 56957 | 100 yr | 5906.00 | 567.26 | 575.09 | 572.36 | 575.33 | 0.003014 | 4.35 | 1849.04 | 609.89 | 0.32 |
| FISH CREEK | MAINSTEM US | 56957 | 500 yr | 7612.00 | 567.26 | 575.87 | 573.41 | 576.13 | 0.002790 | 4.56 | 2362.00 | 701.26 | 0.31 |
| FISH CREEK | MAINSTEM US | 56957 | Ultimate 100 yr | 6111.00 | 567.26 | 575.17 | 572.45 | 575.42 | 0.003010 | 4.39 | 1902.99 | 614.41 | 0.32 |
| FISH CREEK | MAINSTEM US | 56417 | 2 yr | 1321.00 | 563.38 | 569.63 | 566.35 | 569.74 | 0.001685 | 2.57 | 513.73 | 158.93 | 0.23 |
| FISH CREEK | MAINSTEM US | 56417 | 5 yr | 2578.00 | 563.38 | 571.55 | 567.56 | 571.69 | 0.001962 | 3.13 | 922.90 | 483.51 | 0.25 |
| FISH CREEK | MAINSTEM US | 56417 | 10 yr | 3517.00 | 563.38 | 572.31 | 568.25 | 572.46 | 0.001861 | 3.27 | 1450.44 | 622.77 | 0.25 |
| FISH CREEK | MAINSTEM US | 56417 | 25 yr | 4452.00 | 563.38 | 573.06 | 568.84 | 573.20 | 0.001642 | 3.35 | 1958.99 | 726.64 | 0.24 |
| FISH CREEK | MAINSTEM US | 56417 | 50 yr | 5206.00 | 563.38 | 573.55 | 569.26 | 573.69 | 0.001539 | 3.41 | 2333.46 | 822.42 | 0.23 |
| FISH CREEK | MAINSTEM US | 56417 | 100 yr | 5906.00 | 563.38 | 573.98 | 569.66 | 574.13 | 0.001492 | 3.50 | 2719.32 | 949.55 | 0.23 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------|---------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FISH CREEK | MAINSTEM US | 56417 | 500 yr | 7612.00 | 563.38 | 574.93 | 570.51 | 575.05 | 0.001232 | 3.46 | 3644.90 | 1010.04 | 0.22 |
| FISH CREEK | MAINSTEM US | 56417 | Ultimate 100 yr | 6111.00 | 563.38 | 574.08 | 569.76 | 574.22 | 0.001479 | 3.52 | 2811.17 | 954.21 | 0.23 |
| FISH CREEK | MAINSTEM MID5 | 55630 | 2 yr | 2360.00 | 562.42 | 567.66 | | 567.91 | 0.003661 | 4.57 | 721.30 | 248.22 | 0.40 |
| FISH CREEK | MAINSTEM MID5 | 55630 | 5 yr | 4298.00 | 562.42 | 569.17 | | 569.57 | 0.004142 | 6.00 | 1149.31 | 393.78 | 0.45 |
| FISH CREEK | MAINSTEM MID5 | 55630 | 10 yr | 5699.00 | 562.42 | 569.99 | | 570.44 | 0.003981 | 6.45 | 1511.69 | 478.66 | 0.45 |
| FISH CREEK | MAINSTEM MID5 | 55630 | 25 yr | 7145.00 | 562.42 | 571.18 | | 571.54 | 0.002833 | 6.10 | 2151.23 | 588.67 | 0.39 |
| FISH CREEK | MAINSTEM MID5 | 55630 | 50 yr | 8374.00 | 562.42 | 571.75 | | 572.12 | 0.002742 | 6.29 | 2494.56 | 629.19 | 0.39 |
| FISH CREEK | MAINSTEM MID5 | 55630 | 100 yr | 9544.00 | 562.42 | 572.14 | | 572.55 | 0.002911 | 6.69 | 2755.24 | 692.72 | 0.40 |
| FISH CREEK | MAINSTEM MID5 | 55630 | 500 yr | 12511.00 | 562.42 | 573.20 | | 573.65 | 0.002964 | 7.30 | 3601.75 | 900.62 | 0.42 |
| FISH CREEK | MAINSTEM MID5 | 55630 | Ultimate 100 yr | 9811.00 | 562.42 | 572.24 | | 572.65 | 0.002899 | 6.73 | 2828.77 | 702.87 | 0.40 |
| FISH CREEK | MAINSTEM MID5 | 55014 | 2 yr | 2360.00 | 559.07 | 565.10 | 563.27 | 565.37 | 0.004902 | 5.39 | 715.46 | 281.11 | 0.46 |
| FISH CREEK | MAINSTEM MID5 | 55014 | 5 yr | 4298.00 | 559.07 | 566.90 | 564.35 | 567.19 | 0.003657 | 5.90 | 1307.56 | 366.28 | 0.42 |
| FISH CREEK | MAINSTEM MID5 | 55014 | 10 yr | 5699.00 | 559.07 | 567.96 | 565.23 | 568.25 | 0.003150 | 6.10 | 1713.06 | 444.80 | 0.40 |
| FISH CREEK | MAINSTEM MID5 | 55014 | 25 yr | 7145.00 | 559.07 | 569.93 | 565.69 | 570.13 | 0.001725 | 5.32 | 2787.90 | 603.80 | 0.31 |
| FISH CREEK | MAINSTEM MID5 | 55014 | 50 yr | 8374.00 | 559.07 | 570.51 | 566.31 | 570.72 | 0.001770 | 5.62 | 3150.31 | 653.01 | 0.32 |
| FISH CREEK | MAINSTEM MID5 | 55014 | 100 yr | 9544.00 | 559.07 | 570.80 | 566.64 | 571.04 | 0.001957 | 6.03 | 3343.67 | 664.46 | 0.34 |
| FISH CREEK | MAINSTEM MID5 | 55014 | 500 yr | 12511.00 | 559.07 | 571.76 | 567.37 | 572.05 | 0.002219 | 6.83 | 4016.49 | 759.66 | 0.37 |
| FISH CREEK | MAINSTEM MID5 | 55014 | Ultimate 100 yr | 9811.00 | 559.07 | 570.91 | 566.74 | 571.15 | 0.001949 | 6.06 | 3418.50 | 669.30 | 0.34 |
| FISH CREEK | MAINSTEM MID5 | 54803 | 2 yr | 2370.00 | 556.36 | 564.56 | 560.60 | 564.77 | 0.000804 | 3.88 | 685.55 | 145.75 | 0.25 |
| FISH CREEK | MAINSTEM MID5 | 54803 | 5 yr | 4318.00 | 556.36 | 566.35 | 562.24 | 566.70 | 0.001056 | 5.16 | 977.72 | 377.73 | 0.30 |
| FISH CREEK | MAINSTEM MID5 | 54803 | 10 yr | 5725.00 | 556.36 | 567.37 | 563.19 | 567.79 | 0.001119 | 5.70 | 1161.22 | 424.68 | 0.32 |
| FISH CREEK | MAINSTEM MID5 | 54803 | 25 yr | 7084.00 | 556.36 | 569.51 | 563.98 | 569.86 | 0.000709 | 5.17 | 1544.56 | 578.00 | 0.26 |
| FISH CREEK | MAINSTEM MID5 | 54803 | 50 yr | 8391.00 | 556.36 | 569.99 | 564.59 | 570.43 | 0.000838 | 5.76 | 1630.33 | 671.10 | 0.29 |
| FISH CREEK | MAINSTEM MID5 | 54803 | 100 yr | 9624.00 | 556.36 | 570.56 | 565.41 | 570.79 | 0.000527 | 4.71 | 2911.35 | 753.24 | 0.23 |
| FISH CREEK | MAINSTEM MID5 | 54803 | 500 yr | 12605.00 | 556.36 | 571.54 | 566.70 | 571.76 | 0.000544 | 5.02 | 4038.47 | 847.29 | 0.23 |
| FISH CREEK | MAINSTEM MID5 | 54803 | Ultimate 100 yr | 9902.00 | 556.36 | 570.67 | 565.51 | 570.90 | 0.000529 | 4.74 | 2972.29 | 764.29 | 0.23 |
| FISH CREEK | MAINSTEM MID5 | 54754 | | Bridge | | | | | | | | | |
| FISH CREEK | MAINSTEM MID5 | 54639 | 2 yr | 2370.00 | 553.59 | 564.32 | 558.07 | 564.45 | 0.000409 | 2.86 | 843.70 | 140.17 | 0.18 |
| FISH CREEK | MAINSTEM MID5 | 54639 | 5 yr | 4318.00 | 553.59 | 565.82 | 559.73 | 566.10 | 0.000744 | 4.26 | 1041.66 | 207.92 | 0.25 |
| FISH CREEK | MAINSTEM MID5 | 54639 | 10 yr | 5725.00 | 553.59 | 566.58 | 560.82 | 566.98 | 0.000996 | 5.16 | 1142.50 | 242.88 | 0.29 |
| FISH CREEK | MAINSTEM MID5 | 54639 | 25 yr | 7084.00 | 553.59 | 567.21 | 561.60 | 567.74 | 0.001231 | 5.94 | 1227.87 | 398.99 | 0.33 |
| FISH CREEK | MAINSTEM MID5 | 54639 | 50 yr | 8391.00 | 553.59 | 567.73 | 562.30 | 568.39 | 0.001447 | 6.64 | 1300.24 | 513.54 | 0.36 |
| FISH CREEK | MAINSTEM MID5 | 54639 | 100 yr | 9624.00 | 553.59 | 568.14 | 562.91 | 568.94 | 0.001662 | 7.30 | 1359.09 | 582.03 | 0.39 |
| FISH CREEK | MAINSTEM MID5 | 54639 | 500 yr | 12605.00 | 553.59 | 568.96 | 564.46 | 570.12 | 0.002195 | 8.80 | 1483.21 | 693.02 | 0.45 |
| FISH CREEK | MAINSTEM MID5 | 54639 | Ultimate 100 yr | 9902.00 | 553.59 | 568.26 | 563.06 | 569.09 | 0.001690 | 7.41 | 1377.32 | 600.07 | 0.39 |
| FISH CREEK | MAINSTEM MID5 | 54470 | 2 yr | 2370.00 | 555.98 | 564.10 | | 564.32 | 0.001569 | 4.37 | 710.00 | 184.23 | 0.29 |
| FISH CREEK | MAINSTEM MID5 | 54470 | 5 yr | 4318.00 | 555.98 | 565.56 | | 565.90 | 0.002162 | 5.80 | 1037.75 | 255.58 | 0.35 |
| FISH CREEK | MAINSTEM MID5 | 54470 | 10 yr | 5725.00 | 555.98 | 566.31 | | 566.74 | 0.002492 | 6.58 | 1261.83 | 374.40 | 0.38 |
| FISH CREEK | MAINSTEM MID5 | 54470 | 25 yr | 7084.00 | 555.98 | 566.93 | | 567.44 | 0.002850 | 7.34 | 1519.55 | 440.25 | 0.41 |
| FISH CREEK | MAINSTEM MID5 | 54470 | 50 yr | 8391.00 | 555.98 | 567.49 | | 568.00 | 0.002754 | 7.48 | 1774.10 | 468.84 | 0.41 |
| FISH CREEK | MAINSTEM MID5 | 54470 | 100 yr | 9624.00 | 555.98 | 567.92 | | 568.46 | 0.002769 | 7.71 | 1983.62 | 494.01 | 0.41 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------|---------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FISH CREEK | MAINSTEM MID5 | 54470 | 500 yr | 12605.00 | 555.98 | 568.83 | | 569.41 | 0.002867 | 8.27 | 2454.89 | 547.37 | 0.42 |
| FISH CREEK | MAINSTEM MID5 | 54470 | Ultimate 100 yr | 9902.00 | 555.98 | 568.06 | | 568.59 | 0.002704 | 7.68 | 2052.87 | 502.21 | 0.41 |
| FISH CREEK | MAINSTEM MID5 | 54304 | 2 yr | 2370.00 | 556.78 | 563.79 | | 564.00 | 0.002501 | 4.15 | 706.80 | 269.73 | 0.34 |
| FISH CREEK | MAINSTEM MID5 | 54304 | 5 yr | 4318.00 | 556.78 | 565.25 | | 565.51 | 0.002321 | 4.79 | 1174.47 | 376.36 | 0.34 |
| FISH CREEK | MAINSTEM MID5 | 54304 | 10 yr | 5725.00 | 556.78 | 566.03 | | 566.31 | 0.002241 | 5.09 | 1483.41 | 416.51 | 0.34 |
| FISH CREEK | MAINSTEM MID5 | 54304 | 25 yr | 7084.00 | 556.78 | 566.67 | | 566.98 | 0.002161 | 5.31 | 1760.92 | 447.62 | 0.34 |
| FISH CREEK | MAINSTEM MID5 | 54304 | 50 yr | 8391.00 | 556.78 | 567.24 | | 567.56 | 0.002094 | 5.48 | 2023.36 | 485.93 | 0.34 |
| FISH CREEK | MAINSTEM MID5 | 54304 | 100 yr | 9624.00 | 556.78 | 567.67 | | 568.01 | 0.002111 | 5.69 | 2240.83 | 523.88 | 0.34 |
| FISH CREEK | MAINSTEM MID5 | 54304 | 500 yr | 12605.00 | 556.78 | 568.57 | | 568.96 | 0.002139 | 6.12 | 2726.02 | 555.71 | 0.35 |
| FISH CREEK | MAINSTEM MID5 | 54304 | Ultimate 100 yr | 9902.00 | 556.78 | 567.81 | | 568.16 | 0.002037 | 5.66 | 2318.75 | 528.27 | 0.34 |
| FISH CREEK | MAINSTEM MID5 | 53650 | 2 yr | 2370.00 | 555.84 | 561.86 | | 562.19 | 0.003513 | 4.94 | 597.87 | 215.25 | 0.40 |
| FISH CREEK | MAINSTEM MID5 | 53650 | 5 yr | 4318.00 | 555.84 | 563.29 | | 563.75 | 0.003842 | 6.16 | 948.88 | 284.20 | 0.44 |
| FISH CREEK | MAINSTEM MID5 | 53650 | 10 yr | 5725.00 | 555.84 | 564.00 | | 564.56 | 0.004173 | 6.91 | 1163.57 | 322.79 | 0.46 |
| FISH CREEK | MAINSTEM MID5 | 53650 | 25 yr | 7084.00 | 555.84 | 564.60 | | 565.24 | 0.004417 | 7.52 | 1370.59 | 375.57 | 0.49 |
| FISH CREEK | MAINSTEM MID5 | 53650 | 50 yr | 8391.00 | 555.84 | 565.12 | | 565.84 | 0.004646 | 8.07 | 1593.91 | 454.71 | 0.50 |
| FISH CREEK | MAINSTEM MID5 | 53650 | 100 yr | 9624.00 | 555.84 | 565.59 | | 566.32 | 0.004499 | 8.25 | 1820.96 | 516.04 | 0.50 |
| FISH CREEK | MAINSTEM MID5 | 53650 | 500 yr | 12605.00 | 555.84 | 566.58 | | 567.31 | 0.004247 | 8.62 | 2350.14 | 547.55 | 0.49 |
| FISH CREEK | MAINSTEM MID5 | 53650 | Ultimate 100 yr | 9902.00 | 555.84 | 565.70 | | 566.47 | 0.004725 | 8.52 | 1874.54 | 530.58 | 0.51 |
| FISH CREEK | MAINSTEM MID5 | 53313 | 2 yr | 2370.00 | 554.93 | 560.89 | | 561.09 | 0.002910 | 3.93 | 747.14 | 296.86 | 0.35 |
| FISH CREEK | MAINSTEM MID5 | 53313 | 5 yr | 4318.00 | 554.93 | 562.40 | | 562.64 | 0.002631 | 4.50 | 1353.63 | 508.97 | 0.35 |
| FISH CREEK | MAINSTEM MID5 | 53313 | 10 yr | 5725.00 | 554.93 | 563.19 | | 563.42 | 0.002296 | 4.57 | 1764.49 | 526.88 | 0.33 |
| FISH CREEK | MAINSTEM MID5 | 53313 | 25 yr | 7084.00 | 554.93 | 563.83 | | 564.07 | 0.002164 | 4.69 | 2109.91 | 545.24 | 0.33 |
| FISH CREEK | MAINSTEM MID5 | 53313 | 50 yr | 8391.00 | 554.93 | 564.38 | | 564.63 | 0.002090 | 4.80 | 2413.53 | 557.62 | 0.33 |
| FISH CREEK | MAINSTEM MID5 | 53313 | 100 yr | 9624.00 | 554.93 | 564.90 | | 565.15 | 0.001990 | 4.87 | 2702.45 | 567.73 | 0.32 |
| FISH CREEK | MAINSTEM MID5 | 53313 | 500 yr | 12605.00 | 554.93 | 565.93 | | 566.21 | 0.001905 | 5.11 | 3306.75 | 622.31 | 0.32 |
| FISH CREEK | MAINSTEM MID5 | 53313 | Ultimate 100 yr | 9902.00 | 554.93 | 565.00 | | 565.25 | 0.001983 | 4.90 | 2759.27 | 569.51 | 0.32 |
| FISH CREEK | MAINSTEM MID5 | 52685 | 2 yr | 2370.00 | 554.25 | 559.65 | | 559.75 | 0.001583 | 3.25 | 1048.09 | 360.66 | 0.27 |
| FISH CREEK | MAINSTEM MID5 | 52685 | 5 yr | 4318.00 | 554.25 | 561.32 | | 561.44 | 0.001411 | 3.77 | 1739.06 | 473.98 | 0.27 |
| FISH CREEK | MAINSTEM MID5 | 52685 | 10 yr | 5725.00 | 554.25 | 562.20 | | 562.34 | 0.001395 | 4.10 | 2196.75 | 570.45 | 0.27 |
| FISH CREEK | MAINSTEM MID5 | 52685 | 25 yr | 7084.00 | 554.25 | 562.91 | | 563.06 | 0.001332 | 4.27 | 2615.35 | 613.02 | 0.27 |
| FISH CREEK | MAINSTEM MID5 | 52685 | 50 yr | 8391.00 | 554.25 | 563.49 | | 563.65 | 0.001309 | 4.44 | 2981.42 | 645.43 | 0.27 |
| FISH CREEK | MAINSTEM MID5 | 52685 | 100 yr | 9624.00 | 554.25 | 564.05 | | 564.22 | 0.001258 | 4.54 | 3351.32 | 671.97 | 0.27 |
| FISH CREEK | MAINSTEM MID5 | 52685 | 500 yr | 12605.00 | 554.25 | 565.10 | | 565.29 | 0.001318 | 5.01 | 4092.70 | 744.34 | 0.28 |
| FISH CREEK | MAINSTEM MID5 | 52685 | Ultimate 100 yr | 9902.00 | 554.25 | 564.15 | | 564.32 | 0.001260 | 4.58 | 3420.07 | 676.28 | 0.27 |
| FISH CREEK | MAINSTEM MID5 | 52248 | 2 yr | 2370.00 | 551.12 | 558.72 | | 558.98 | 0.002926 | 4.77 | 762.55 | 243.33 | 0.37 |
| FISH CREEK | MAINSTEM MID5 | 52248 | 5 yr | 4318.00 | 551.12 | 560.40 | | 560.72 | 0.003187 | 5.64 | 1314.01 | 386.52 | 0.40 |
| FISH CREEK | MAINSTEM MID5 | 52248 | 10 yr | 5725.00 | 551.12 | 561.29 | | 561.63 | 0.003267 | 6.00 | 1682.67 | 454.41 | 0.41 |
| FISH CREEK | MAINSTEM MID5 | 52248 | 25 yr | 7084.00 | 551.12 | 562.05 | | 562.38 | 0.003163 | 6.14 | 2039.60 | 494.04 | 0.40 |
| FISH CREEK | MAINSTEM MID5 | 52248 | 50 yr | 8391.00 | 551.12 | 562.64 | | 562.99 | 0.003187 | 6.34 | 2341.85 | 527.72 | 0.41 |
| FISH CREEK | MAINSTEM MID5 | 52248 | 100 yr | 9624.00 | 551.12 | 563.19 | | 563.56 | 0.003475 | 6.53 | 2668.79 | 630.76 | 0.42 |
| FISH CREEK | MAINSTEM MID5 | 52248 | 500 yr | 12605.00 | 551.12 | 564.30 | | 564.64 | 0.003104 | 6.42 | 3412.09 | 763.23 | 0.41 |
| FISH CREEK | MAINSTEM MID5 | 52248 | Ultimate 100 yr | 9902.00 | 551.12 | 563.31 | | 563.66 | 0.003447 | 6.48 | 2741.08 | 633.95 | 0.42 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------|---------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FISH CREEK | MAINSTEM MID5 | 51784 | 2 yr | 2370.00 | 551.11 | 558.17 | | 558.24 | 0.001054 | 2.73 | 1404.18 | 384.13 | 0.22 |
| FISH CREEK | MAINSTEM MID5 | 51784 | 5 yr | 4318.00 | 551.11 | 559.87 | | 559.94 | 0.001137 | 3.01 | 2202.25 | 625.57 | 0.23 |
| FISH CREEK | MAINSTEM MID5 | 51784 | 10 yr | 5725.00 | 551.11 | 560.76 | | 560.85 | 0.001133 | 3.33 | 2782.14 | 689.97 | 0.24 |
| FISH CREEK | MAINSTEM MID5 | 51784 | 25 yr | 7084.00 | 551.11 | 561.50 | | 561.61 | 0.001211 | 3.72 | 3352.56 | 808.67 | 0.25 |
| FISH CREEK | MAINSTEM MID5 | 51784 | 50 yr | 8391.00 | 551.11 | 562.10 | | 562.21 | 0.001188 | 3.89 | 3848.12 | 847.89 | 0.25 |
| FISH CREEK | MAINSTEM MID5 | 51784 | 100 yr | 9624.00 | 551.11 | 562.62 | | 562.74 | 0.001166 | 4.03 | 4295.73 | 872.14 | 0.25 |
| FISH CREEK | MAINSTEM MID5 | 51784 | 500 yr | 12605.00 | 551.11 | 563.76 | | 563.90 | 0.001178 | 4.43 | 5340.70 | 972.08 | 0.26 |
| FISH CREEK | MAINSTEM MID5 | 51784 | Ultimate 100 yr | 9902.00 | 551.11 | 562.74 | | 562.86 | 0.001162 | 4.06 | 4396.17 | 879.74 | 0.25 |
| FISH CREEK | MAINSTEM MID5 | 51181 | 2 yr | 2370.00 | 550.98 | 557.19 | | 557.37 | 0.002087 | 4.17 | 909.68 | 292.46 | 0.32 |
| FISH CREEK | MAINSTEM MID5 | 51181 | 5 yr | 4318.00 | 550.98 | 558.74 | | 559.01 | 0.002390 | 5.28 | 1422.54 | 390.42 | 0.35 |
| FISH CREEK | MAINSTEM MID5 | 51181 | 10 yr | 5725.00 | 550.98 | 559.62 | | 559.92 | 0.002470 | 5.81 | 1794.86 | 455.67 | 0.37 |
| FISH CREEK | MAINSTEM MID5 | 51181 | 25 yr | 7084.00 | 550.98 | 560.32 | | 560.65 | 0.002564 | 6.26 | 2125.28 | 506.09 | 0.38 |
| FISH CREEK | MAINSTEM MID5 | 51181 | 50 yr | 8391.00 | 550.98 | 560.91 | | 561.27 | 0.002636 | 6.64 | 2447.19 | 563.09 | 0.39 |
| FISH CREEK | MAINSTEM MID5 | 51181 | 100 yr | 9624.00 | 550.98 | 561.47 | | 561.84 | 0.002551 | 6.80 | 2770.26 | 582.88 | 0.39 |
| FISH CREEK | MAINSTEM MID5 | 51181 | 500 yr | 12605.00 | 550.98 | 562.67 | | 563.05 | 0.002427 | 7.17 | 3496.58 | 638.93 | 0.38 |
| FISH CREEK | MAINSTEM MID5 | 51181 | Ultimate 100 yr | 9902.00 | 550.98 | 561.60 | | 561.97 | 0.002527 | 6.83 | 2843.29 | 586.80 | 0.38 |
| FISH CREEK | MAINSTEM MID5 | 50714 | 2 yr | 2370.00 | 550.50 | 556.12 | | 556.27 | 0.002866 | 3.99 | 917.58 | 293.42 | 0.31 |
| FISH CREEK | MAINSTEM MID5 | 50714 | 5 yr | 4318.00 | 550.50 | 557.63 | | 557.82 | 0.002836 | 4.70 | 1431.46 | 383.03 | 0.32 |
| FISH CREEK | MAINSTEM MID5 | 50714 | 10 yr | 5725.00 | 550.50 | 558.52 | | 558.73 | 0.002746 | 5.03 | 1794.90 | 428.52 | 0.32 |
| FISH CREEK | MAINSTEM MID5 | 50714 | 25 yr | 7084.00 | 550.50 | 559.19 | | 559.43 | 0.002793 | 5.36 | 2092.26 | 455.38 | 0.33 |
| FISH CREEK | MAINSTEM MID5 | 50714 | 50 yr | 8391.00 | 550.50 | 559.77 | | 560.02 | 0.002837 | 5.65 | 2361.18 | 480.44 | 0.33 |
| FISH CREEK | MAINSTEM MID5 | 50714 | 100 yr | 9624.00 | 550.50 | 560.37 | | 560.63 | 0.002740 | 5.80 | 2660.07 | 515.44 | 0.33 |
| FISH CREEK | MAINSTEM MID5 | 50714 | 500 yr | 12605.00 | 550.50 | 561.62 | | 561.90 | 0.002619 | 6.16 | 3359.50 | 606.36 | 0.33 |
| FISH CREEK | MAINSTEM MID5 | 50714 | Ultimate 100 yr | 9902.00 | 550.50 | 560.50 | | 560.77 | 0.002720 | 5.83 | 2729.60 | 525.35 | 0.33 |
| FISH CREEK | MAINSTEM MID5 | 50405 | 2 yr | 2370.00 | 550.00 | 554.90 | | 555.18 | 0.004979 | 4.50 | 632.18 | 230.73 | 0.39 |
| FISH CREEK | MAINSTEM MID5 | 50405 | 5 yr | 4318.00 | 550.00 | 556.35 | | 556.75 | 0.005054 | 5.53 | 992.58 | 271.01 | 0.41 |
| FISH CREEK | MAINSTEM MID5 | 50405 | 10 yr | 5725.00 | 550.00 | 557.30 | | 557.73 | 0.004577 | 5.85 | 1279.27 | 335.59 | 0.40 |
| FISH CREEK | MAINSTEM MID5 | 50405 | 25 yr | 7084.00 | 550.00 | 557.92 | | 558.40 | 0.004712 | 6.31 | 1503.28 | 382.77 | 0.42 |
| FISH CREEK | MAINSTEM MID5 | 50405 | 50 yr | 8391.00 | 550.00 | 558.49 | | 559.00 | 0.004675 | 6.61 | 1731.27 | 422.57 | 0.42 |
| FISH CREEK | MAINSTEM MID5 | 50405 | 100 yr | 9624.00 | 550.00 | 559.23 | | 559.70 | 0.003979 | 6.48 | 2059.51 | 464.20 | 0.39 |
| FISH CREEK | MAINSTEM MID5 | 50405 | 500 yr | 12605.00 | 550.00 | 560.64 | | 561.08 | 0.003217 | 6.46 | 2779.74 | 560.81 | 0.36 |
| FISH CREEK | MAINSTEM MID5 | 50405 | Ultimate 100 yr | 9902.00 | 550.00 | 559.39 | | 559.85 | 0.003843 | 6.45 | 2135.58 | 473.23 | 0.39 |
| FISH CREEK | MAINSTEM MID5 | 49983 | 2 yr | 2266.00 | 548.07 | 553.18 | | 553.38 | 0.003555 | 4.40 | 796.47 | 309.64 | 0.39 |
| FISH CREEK | MAINSTEM MID5 | 49983 | 5 yr | 4190.00 | 548.07 | 554.75 | | 555.00 | 0.003107 | 5.15 | 1326.20 | 374.57 | 0.39 |
| FISH CREEK | MAINSTEM MID5 | 49983 | 10 yr | 5596.00 | 548.07 | 555.97 | | 556.22 | 0.002421 | 5.20 | 1828.17 | 447.27 | 0.35 |
| FISH CREEK | MAINSTEM MID5 | 49983 | 25 yr | 7005.00 | 548.07 | 556.50 | | 556.80 | 0.002752 | 5.83 | 2073.87 | 482.20 | 0.38 |
| FISH CREEK | MAINSTEM MID5 | 49983 | 50 yr | 8232.00 | 548.07 | 557.08 | | 557.40 | 0.002746 | 6.13 | 2363.49 | 519.12 | 0.39 |
| FISH CREEK | MAINSTEM MID5 | 49983 | 100 yr | 9479.00 | 548.07 | 558.08 | | 558.36 | 0.002193 | 5.93 | 2918.12 | 608.05 | 0.35 |
| FISH CREEK | MAINSTEM MID5 | 49983 | 500 yr | 12637.00 | 548.07 | 559.76 | | 560.01 | 0.001693 | 5.86 | 4108.68 | 829.64 | 0.32 |
| FISH CREEK | MAINSTEM MID5 | 49983 | Ultimate 100 yr | 9748.00 | 548.07 | 558.30 | | 558.57 | 0.002061 | 5.85 | 3055.14 | 635.17 | 0.34 |
| FISH CREEK | MAINSTEM MID5 | 49818 | 2 yr | 2266.00 | 546.80 | 552.75 | | 552.91 | 0.002127 | 3.67 | 835.83 | 314.70 | 0.31 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------|---------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FISH CREEK | MAINSTEM MID5 | 49818 | 5 yr | 4190.00 | 546.80 | 554.35 | | 554.57 | 0.002062 | 4.45 | 1474.87 | 610.39 | 0.32 |
| FISH CREEK | MAINSTEM MID5 | 49818 | 10 yr | 5596.00 | 546.80 | 555.73 | | 555.87 | 0.001163 | 3.84 | 2353.06 | 662.53 | 0.25 |
| FISH CREEK | MAINSTEM MID5 | 49818 | 25 yr | 7005.00 | 546.80 | 556.23 | | 556.40 | 0.001273 | 4.19 | 2692.58 | 681.37 | 0.26 |
| FISH CREEK | MAINSTEM MID5 | 49818 | 50 yr | 8232.00 | 546.80 | 556.82 | | 556.99 | 0.001211 | 4.29 | 3104.42 | 714.17 | 0.26 |
| FISH CREEK | MAINSTEM MID5 | 49818 | 100 yr | 9479.00 | 546.80 | 557.89 | | 558.03 | 0.000868 | 3.93 | 3897.40 | 768.02 | 0.22 |
| FISH CREEK | MAINSTEM MID5 | 49818 | 500 yr | 12637.00 | 546.80 | 559.62 | | 559.75 | 0.000702 | 3.95 | 5386.83 | 951.04 | 0.21 |
| FISH CREEK | MAINSTEM MID5 | 49818 | Ultimate 100 yr | 9748.00 | 546.80 | 558.12 | | 558.26 | 0.000831 | 3.91 | 4077.53 | 802.34 | 0.22 |
| FISH CREEK | MAINSTEM MID5 | 49758 | 2 yr | 2266.00 | 546.00 | 552.57 | 549.98 | 552.77 | 0.002585 | 3.61 | 626.89 | 168.83 | 0.33 |
| FISH CREEK | MAINSTEM MID5 | 49758 | 5 yr | 4190.00 | 546.00 | 554.10 | 551.22 | 554.42 | 0.002718 | 4.55 | 1016.94 | 539.63 | 0.36 |
| FISH CREEK | MAINSTEM MID5 | 49758 | 10 yr | 5596.00 | 546.00 | 555.57 | 551.95 | 555.78 | 0.001514 | 4.03 | 1843.04 | 587.44 | 0.28 |
| FISH CREEK | MAINSTEM MID5 | 49758 | 25 yr | 7005.00 | 546.00 | 556.05 | 552.63 | 556.30 | 0.001694 | 4.46 | 2128.60 | 617.70 | 0.30 |
| FISH CREEK | MAINSTEM MID5 | 49758 | 50 yr | 8232.00 | 546.00 | 556.65 | 553.09 | 556.90 | 0.001556 | 4.52 | 2517.29 | 664.96 | 0.29 |
| FISH CREEK | MAINSTEM MID5 | 49758 | 100 yr | 9479.00 | 546.00 | 557.78 | 553.73 | 557.97 | 0.001029 | 4.03 | 3316.77 | 763.79 | 0.24 |
| FISH CREEK | MAINSTEM MID5 | 49758 | 500 yr | 12637.00 | 546.00 | 559.56 | 555.05 | 559.70 | 0.000689 | 3.73 | 4862.35 | 983.52 | 0.20 |
| FISH CREEK | MAINSTEM MID5 | 49758 | Ultimate 100 yr | 9748.00 | 546.00 | 558.02 | 554.27 | 558.20 | 0.000947 | 3.94 | 3504.97 | 797.53 | 0.23 |
| FISH CREEK | MAINSTEM MID5 | 49696 | | Bridge | | | | | | | | | |
| FISH CREEK | MAINSTEM MID5 | 49576 | 2 yr | 2266.00 | 546.06 | 551.96 | 550.24 | 552.16 | 0.003107 | 3.54 | 639.61 | 532.47 | 0.35 |
| FISH CREEK | MAINSTEM MID5 | 49576 | 5 yr | 4190.00 | 546.06 | 553.19 | 551.14 | 553.54 | 0.003520 | 4.70 | 890.90 | 629.03 | 0.40 |
| FISH CREEK | MAINSTEM MID5 | 49576 | 10 yr | 5596.00 | 546.06 | 553.92 | 551.69 | 554.37 | 0.003758 | 5.38 | 1039.19 | 655.91 | 0.42 |
| FISH CREEK | MAINSTEM MID5 | 49576 | 25 yr | 7005.00 | 546.06 | 554.55 | 552.15 | 555.11 | 0.003990 | 6.00 | 1168.00 | 683.71 | 0.44 |
| FISH CREEK | MAINSTEM MID5 | 49576 | 50 yr | 8232.00 | 546.06 | 555.05 | 552.53 | 555.70 | 0.004170 | 6.48 | 1269.77 | 714.92 | 0.46 |
| FISH CREEK | MAINSTEM MID5 | 49576 | 100 yr | 9479.00 | 546.06 | 555.51 | 552.89 | 556.26 | 0.004353 | 6.95 | 1364.23 | 737.03 | 0.47 |
| FISH CREEK | MAINSTEM MID5 | 49576 | 500 yr | 12637.00 | 546.06 | 556.57 | 553.75 | 557.56 | 0.004733 | 7.99 | 1581.00 | 816.44 | 0.51 |
| FISH CREEK | MAINSTEM MID5 | 49576 | Ultimate 100 yr | 9748.00 | 546.06 | 555.61 | 552.97 | 556.38 | 0.004389 | 7.04 | 1383.93 | 743.06 | 0.48 |
| FISH CREEK | MAINSTEM MID5 | 49283 | 2 yr | 2266.00 | 548.00 | 551.30 | | 551.34 | 0.001930 | 1.68 | 1374.54 | 499.73 | 0.17 |
| FISH CREEK | MAINSTEM MID5 | 49283 | 5 yr | 4190.00 | 548.00 | 552.52 | | 552.59 | 0.002009 | 2.16 | 2011.71 | 544.93 | 0.19 |
| FISH CREEK | MAINSTEM MID5 | 49283 | 10 yr | 5596.00 | 548.00 | 553.25 | | 553.34 | 0.002027 | 2.42 | 2417.74 | 560.91 | 0.19 |
| FISH CREEK | MAINSTEM MID5 | 49283 | 25 yr | 7005.00 | 548.00 | 553.89 | | 553.99 | 0.002062 | 2.65 | 2779.48 | 573.50 | 0.20 |
| FISH CREEK | MAINSTEM MID5 | 49283 | 50 yr | 8232.00 | 548.00 | 554.39 | | 554.51 | 0.002101 | 2.83 | 3072.65 | 592.30 | 0.20 |
| FISH CREEK | MAINSTEM MID5 | 49283 | 100 yr | 9479.00 | 548.00 | 554.86 | | 555.00 | 0.002138 | 3.00 | 3356.37 | 610.98 | 0.21 |
| FISH CREEK | MAINSTEM MID5 | 49283 | 500 yr | 12637.00 | 548.00 | 555.97 | | 556.13 | 0.002161 | 3.35 | 4055.63 | 647.68 | 0.21 |
| FISH CREEK | MAINSTEM MID5 | 49283 | Ultimate 100 yr | 9748.00 | 548.00 | 554.96 | | 555.10 | 0.002143 | 3.04 | 3417.28 | 615.08 | 0.21 |
| FISH CREEK | MAINSTEM MID5 | 48540 | 2 yr | 2266.00 | 546.49 | 549.67 | | 549.76 | 0.002888 | 3.16 | 1064.65 | 429.47 | 0.33 |
| FISH CREEK | MAINSTEM MID5 | 48540 | 5 yr | 4190.00 | 546.49 | 550.85 | | 550.99 | 0.002838 | 3.96 | 1586.68 | 454.52 | 0.35 |
| FISH CREEK | MAINSTEM MID5 | 48540 | 10 yr | 5596.00 | 546.49 | 551.56 | | 551.73 | 0.002845 | 4.43 | 1916.98 | 472.68 | 0.36 |
| FISH CREEK | MAINSTEM MID5 | 48540 | 25 yr | 7005.00 | 546.49 | 552.16 | | 552.36 | 0.002916 | 4.86 | 2201.81 | 485.16 | 0.37 |
| FISH CREEK | MAINSTEM MID5 | 48540 | 50 yr | 8232.00 | 546.49 | 552.61 | | 552.84 | 0.003006 | 5.21 | 2423.19 | 494.41 | 0.38 |
| FISH CREEK | MAINSTEM MID5 | 48540 | 100 yr | 9479.00 | 546.49 | 553.04 | | 553.29 | 0.003087 | 5.54 | 2635.84 | 503.20 | 0.39 |
| FISH CREEK | MAINSTEM MID5 | 48540 | 500 yr | 12637.00 | 546.49 | 554.07 | | 554.39 | 0.003256 | 6.31 | 3169.57 | 539.52 | 0.41 |
| FISH CREEK | MAINSTEM MID5 | 48540 | Ultimate 100 yr | 9748.00 | 546.49 | 553.13 | | 553.39 | 0.003107 | 5.61 | 2681.05 | 505.87 | 0.40 |
| FISH CREEK | MAINSTEM MID5 | 47889 | 2 yr | 2266.00 | 543.43 | 547.42 | | 547.57 | 0.006361 | 3.15 | 721.75 | 282.55 | 0.34 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------|---------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FISH CREEK | MAINSTEM MID5 | 47889 | 5 yr | 4190.00 | 543.43 | 548.67 | | 548.89 | 0.005834 | 3.84 | 1131.84 | 386.09 | 0.35 |
| FISH CREEK | MAINSTEM MID5 | 47889 | 10 yr | 5596.00 | 543.43 | 549.43 | | 549.69 | 0.005477 | 4.13 | 1468.82 | 500.56 | 0.35 |
| FISH CREEK | MAINSTEM MID5 | 47889 | 25 yr | 7005.00 | 543.43 | 550.13 | | 550.40 | 0.004825 | 4.27 | 1848.64 | 562.04 | 0.34 |
| FISH CREEK | MAINSTEM MID5 | 47889 | 50 yr | 8232.00 | 543.43 | 550.62 | | 550.90 | 0.004550 | 4.43 | 2123.66 | 568.48 | 0.34 |
| FISH CREEK | MAINSTEM MID5 | 47889 | 100 yr | 9479.00 | 543.43 | 551.10 | | 551.39 | 0.004273 | 4.56 | 2398.03 | 574.46 | 0.33 |
| FISH CREEK | MAINSTEM MID5 | 47889 | 500 yr | 12637.00 | 543.43 | 552.27 | | 552.58 | 0.003659 | 4.79 | 3080.34 | 590.81 | 0.32 |
| FISH CREEK | MAINSTEM MID5 | 47889 | Ultimate 100 yr | 9748.00 | 543.43 | 551.19 | | 551.49 | 0.004231 | 4.59 | 2453.56 | 575.66 | 0.33 |
| FISH CREEK | MAINSTEM MID5 | 47703 | 2 yr | 2266.00 | 541.00 | 546.22 | | 546.47 | 0.004113 | 4.60 | 646.11 | 325.26 | 0.42 |
| FISH CREEK | MAINSTEM MID5 | 47703 | 5 yr | 4190.00 | 541.00 | 547.72 | | 547.96 | 0.002957 | 4.70 | 1196.56 | 405.67 | 0.37 |
| FISH CREEK | MAINSTEM MID5 | 47703 | 10 yr | 5596.00 | 541.00 | 548.58 | | 548.82 | 0.002648 | 4.65 | 1570.24 | 463.43 | 0.35 |
| FISH CREEK | MAINSTEM MID5 | 47703 | 25 yr | 7005.00 | 541.00 | 549.38 | | 549.61 | 0.002508 | 4.34 | 1982.05 | 563.89 | 0.34 |
| FISH CREEK | MAINSTEM MID5 | 47703 | 50 yr | 8232.00 | 541.00 | 549.95 | | 550.17 | 0.002224 | 4.39 | 2301.83 | 568.93 | 0.33 |
| FISH CREEK | MAINSTEM MID5 | 47703 | 100 yr | 9479.00 | 541.00 | 550.49 | | 550.72 | 0.002011 | 4.44 | 2612.92 | 573.25 | 0.32 |
| FISH CREEK | MAINSTEM MID5 | 47703 | 500 yr | 12637.00 | 541.00 | 551.78 | | 552.02 | 0.001655 | 4.57 | 3359.63 | 584.95 | 0.30 |
| FISH CREEK | MAINSTEM MID5 | 47703 | Ultimate 100 yr | 9748.00 | 541.00 | 550.60 | | 550.83 | 0.001983 | 4.46 | 2673.74 | 574.10 | 0.31 |
| FISH CREEK | MAINSTEM MID5 | 47275 | 2 yr | 2194.00 | 539.66 | 545.40 | | 545.44 | 0.000600 | 2.04 | 1519.00 | 483.60 | 0.17 |
| FISH CREEK | MAINSTEM MID5 | 47275 | 5 yr | 4100.00 | 539.66 | 547.14 | | 547.19 | 0.000525 | 2.35 | 2394.78 | 516.63 | 0.16 |
| FISH CREEK | MAINSTEM MID5 | 47275 | 10 yr | 5472.00 | 539.66 | 548.06 | | 548.12 | 0.000525 | 2.57 | 2876.03 | 531.20 | 0.17 |
| FISH CREEK | MAINSTEM MID5 | 47275 | 25 yr | 6972.00 | 539.66 | 548.87 | | 548.94 | 0.000548 | 2.81 | 3309.02 | 543.00 | 0.17 |
| FISH CREEK | MAINSTEM MID5 | 47275 | 50 yr | 8174.00 | 539.66 | 549.48 | | 549.57 | 0.000556 | 2.98 | 3646.93 | 556.15 | 0.18 |
| FISH CREEK | MAINSTEM MID5 | 47275 | 100 yr | 9357.00 | 539.66 | 550.06 | | 550.16 | 0.000558 | 3.11 | 3975.78 | 569.78 | 0.18 |
| FISH CREEK | MAINSTEM MID5 | 47275 | 500 yr | 12546.00 | 539.66 | 551.41 | | 551.54 | 0.000576 | 3.46 | 4768.64 | 624.65 | 0.19 |
| FISH CREEK | MAINSTEM MID5 | 47275 | Ultimate 100 yr | 9624.00 | 539.66 | 550.17 | | 550.27 | 0.000562 | 3.15 | 4038.84 | 572.49 | 0.18 |
| FISH CREEK | MAINSTEM MID5 | 46993 | 2 yr | 2194.00 | 539.56 | 544.97 | | 545.15 | 0.002698 | 4.08 | 803.74 | 266.68 | 0.35 |
| FISH CREEK | MAINSTEM MID5 | 46993 | 5 yr | 4100.00 | 539.56 | 546.69 | | 546.93 | 0.002550 | 4.96 | 1322.82 | 362.91 | 0.36 |
| FISH CREEK | MAINSTEM MID5 | 46993 | 10 yr | 5472.00 | 539.56 | 547.58 | | 547.86 | 0.002601 | 5.49 | 1702.90 | 457.74 | 0.37 |
| FISH CREEK | MAINSTEM MID5 | 46993 | 25 yr | 6972.00 | 539.56 | 548.39 | | 548.68 | 0.002420 | 5.70 | 2082.59 | 482.13 | 0.36 |
| FISH CREEK | MAINSTEM MID5 | 46993 | 50 yr | 8174.00 | 539.56 | 549.01 | | 549.30 | 0.002260 | 5.80 | 2391.61 | 507.93 | 0.35 |
| FISH CREEK | MAINSTEM MID5 | 46993 | 100 yr | 9357.00 | 539.56 | 549.61 | | 549.90 | 0.002107 | 5.86 | 2705.63 | 543.05 | 0.35 |
| FISH CREEK | MAINSTEM MID5 | 46993 | 500 yr | 12546.00 | 539.56 | 550.98 | | 551.28 | 0.001838 | 6.02 | 3498.01 | 604.25 | 0.33 |
| FISH CREEK | MAINSTEM MID5 | 46993 | Ultimate 100 yr | 9624.00 | 539.56 | 549.72 | | 550.01 | 0.002099 | 5.90 | 2765.28 | 549.24 | 0.35 |
| FISH CREEK | MAINSTEM MID5 | 46466 | 2 yr | 2194.00 | 539.59 | 543.88 | | 543.95 | 0.002112 | 2.03 | 1101.80 | 330.06 | 0.19 |
| FISH CREEK | MAINSTEM MID5 | 46466 | 5 yr | 4100.00 | 539.59 | 545.77 | | 545.86 | 0.001723 | 2.42 | 1790.32 | 412.24 | 0.18 |
| FISH CREEK | MAINSTEM MID5 | 46466 | 10 yr | 5472.00 | 539.59 | 546.66 | | 546.76 | 0.001780 | 2.71 | 2189.87 | 500.80 | 0.19 |
| FISH CREEK | MAINSTEM MID5 | 46466 | 25 yr | 6972.00 | 539.59 | 547.54 | | 547.66 | 0.001715 | 2.90 | 2713.68 | 639.53 | 0.19 |
| FISH CREEK | MAINSTEM MID5 | 46466 | 50 yr | 8174.00 | 539.59 | 548.25 | | 548.37 | 0.001546 | 2.93 | 3180.27 | 660.96 | 0.18 |
| FISH CREEK | MAINSTEM MID5 | 46466 | 100 yr | 9357.00 | 539.59 | 548.93 | | 549.05 | 0.001415 | 2.96 | 3634.33 | 694.80 | 0.18 |
| FISH CREEK | MAINSTEM MID5 | 46466 | 500 yr | 12546.00 | 539.59 | 550.42 | | 550.54 | 0.001236 | 3.07 | 4734.41 | 768.23 | 0.17 |
| FISH CREEK | MAINSTEM MID5 | 46466 | Ultimate 100 yr | 9624.00 | 539.59 | 549.04 | | 549.16 | 0.001414 | 2.98 | 3713.66 | 702.80 | 0.18 |
| FISH CREEK | MAINSTEM MID4 | 45861 | 2 yr | 2638.00 | 536.00 | 542.77 | | 542.85 | 0.001517 | 3.20 | 1362.83 | 370.29 | 0.23 |
| FISH CREEK | MAINSTEM MID4 | 45861 | 5 yr | 5202.00 | 536.00 | 544.47 | | 544.63 | 0.002475 | 4.82 | 2073.89 | 568.61 | 0.30 |
| FISH CREEK | MAINSTEM MID4 | 45861 | 10 yr | 7020.00 | 536.00 | 545.33 | | 545.51 | 0.002468 | 5.16 | 2597.39 | 615.64 | 0.31 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------|---------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FISH CREEK | MAINSTEM MID4 | 45861 | 25 yr | 9143.00 | 536.00 | 546.27 | | 546.46 | 0.002316 | 5.36 | 3188.02 | 642.07 | 0.30 |
| FISH CREEK | MAINSTEM MID4 | 45861 | 50 yr | 11084.00 | 536.00 | 547.07 | | 547.26 | 0.002229 | 5.54 | 3711.94 | 678.88 | 0.30 |
| FISH CREEK | MAINSTEM MID4 | 45861 | 100 yr | 12902.00 | 536.00 | 547.82 | | 548.02 | 0.002086 | 5.62 | 4235.73 | 711.88 | 0.30 |
| FISH CREEK | MAINSTEM MID4 | 45861 | 500 yr | 17152.00 | 536.00 | 549.46 | | 549.66 | 0.001763 | 5.66 | 5455.29 | 792.58 | 0.28 |
| FISH CREEK | MAINSTEM MID4 | 45861 | Ultimate 100 yr | 13202.00 | 536.00 | 547.94 | | 548.14 | 0.002066 | 5.63 | 4320.68 | 717.09 | 0.30 |
| FISH CREEK | MAINSTEM MID4 | 45324 | 2 yr | 2638.00 | 537.05 | 541.80 | | 541.99 | 0.002528 | 3.88 | 948.34 | 358.18 | 0.33 |
| FISH CREEK | MAINSTEM MID4 | 45324 | 5 yr | 5202.00 | 537.05 | 542.98 | | 543.32 | 0.003574 | 5.44 | 1397.42 | 405.47 | 0.41 |
| FISH CREEK | MAINSTEM MID4 | 45324 | 10 yr | 7020.00 | 537.05 | 543.80 | | 544.21 | 0.003636 | 6.03 | 1747.49 | 444.85 | 0.43 |
| FISH CREEK | MAINSTEM MID4 | 45324 | 25 yr | 9143.00 | 537.05 | 544.83 | | 545.27 | 0.003317 | 6.39 | 2295.14 | 564.57 | 0.42 |
| FISH CREEK | MAINSTEM MID4 | 45324 | 50 yr | 11084.00 | 537.05 | 545.76 | | 546.18 | 0.002859 | 6.43 | 2834.00 | 601.81 | 0.40 |
| FISH CREEK | MAINSTEM MID4 | 45324 | 100 yr | 12902.00 | 537.05 | 546.64 | | 547.05 | 0.002475 | 6.41 | 3387.64 | 647.93 | 0.38 |
| FISH CREEK | MAINSTEM MID4 | 45324 | 500 yr | 17152.00 | 537.05 | 548.52 | | 548.89 | 0.001882 | 6.34 | 4677.36 | 726.22 | 0.34 |
| FISH CREEK | MAINSTEM MID4 | 45324 | Ultimate 100 yr | 13202.00 | 537.05 | 546.78 | | 547.18 | 0.002425 | 6.41 | 3476.82 | 653.91 | 0.37 |
| FISH CREEK | MAINSTEM MID4 | 44893 | 2 yr | 2638.00 | 531.00 | 540.54 | 538.76 | 540.88 | 0.003169 | 6.22 | 977.63 | 585.18 | 0.40 |
| FISH CREEK | MAINSTEM MID4 | 44893 | 5 yr | 5202.00 | 531.00 | 541.88 | 540.74 | 542.13 | 0.002732 | 6.43 | 2164.02 | 756.24 | 0.38 |
| FISH CREEK | MAINSTEM MID4 | 44893 | 10 yr | 7020.00 | 531.00 | 542.94 | 541.33 | 543.12 | 0.002024 | 5.96 | 2964.15 | 766.00 | 0.33 |
| FISH CREEK | MAINSTEM MID4 | 44893 | 25 yr | 9143.00 | 531.00 | 544.18 | 541.50 | 544.33 | 0.001480 | 5.51 | 3925.08 | 776.38 | 0.29 |
| FISH CREEK | MAINSTEM MID4 | 44893 | 50 yr | 11084.00 | 531.00 | 545.25 | 541.97 | 545.38 | 0.001206 | 5.28 | 4757.35 | 784.58 | 0.26 |
| FISH CREEK | MAINSTEM MID4 | 44893 | 100 yr | 12902.00 | 531.00 | 546.23 | 542.21 | 546.36 | 0.001024 | 5.12 | 5533.92 | 792.65 | 0.25 |
| FISH CREEK | MAINSTEM MID4 | 44893 | 500 yr | 17152.00 | 531.00 | 548.23 | 542.71 | 548.35 | 0.000826 | 5.05 | 7137.17 | 815.05 | 0.23 |
| FISH CREEK | MAINSTEM MID4 | 44893 | Ultimate 100 yr | 13202.00 | 531.00 | 546.38 | 542.25 | 546.50 | 0.001004 | 5.11 | 5651.73 | 794.06 | 0.24 |
| FISH CREEK | MAINSTEM MID4 | 43934 | 2 yr | 2638.00 | 533.26 | 537.31 | 535.94 | 537.45 | 0.004093 | 4.11 | 986.83 | 368.97 | 0.41 |
| FISH CREEK | MAINSTEM MID4 | 43934 | 5 yr | 5202.00 | 533.26 | 539.84 | 536.67 | 539.97 | 0.001781 | 4.00 | 1948.50 | 389.63 | 0.30 |
| FISH CREEK | MAINSTEM MID4 | 43934 | 10 yr | 7020.00 | 533.26 | 541.34 | 537.11 | 541.48 | 0.001422 | 4.18 | 2540.80 | 410.38 | 0.27 |
| FISH CREEK | MAINSTEM MID4 | 43934 | 25 yr | 9143.00 | 533.26 | 542.86 | 537.57 | 543.03 | 0.001267 | 4.48 | 3196.26 | 458.36 | 0.27 |
| FISH CREEK | MAINSTEM MID4 | 43934 | 50 yr | 11084.00 | 533.26 | 544.08 | 537.96 | 544.25 | 0.001166 | 4.69 | 3771.79 | 492.53 | 0.26 |
| FISH CREEK | MAINSTEM MID4 | 43934 | 100 yr | 12902.00 | 533.26 | 545.14 | 538.30 | 545.33 | 0.001139 | 4.96 | 4333.27 | 554.14 | 0.26 |
| FISH CREEK | MAINSTEM MID4 | 43934 | 500 yr | 17152.00 | 533.26 | 547.28 | 539.05 | 547.49 | 0.001003 | 5.24 | 5601.62 | 770.42 | 0.25 |
| FISH CREEK | MAINSTEM MID4 | 43934 | Ultimate 100 yr | 13202.00 | 533.26 | 545.30 | 538.36 | 545.49 | 0.001127 | 4.98 | 4423.44 | 559.57 | 0.26 |
| FISH CREEK | MAINSTEM MID4 | 43484 | 2 yr | 2638.00 | 527.00 | 535.39 | 532.00 | 535.81 | 0.003052 | 5.21 | 507.65 | 92.82 | 0.38 |
| FISH CREEK | MAINSTEM MID4 | 43484 | 5 yr | 5202.00 | 527.00 | 538.18 | 534.24 | 538.86 | 0.003349 | 6.70 | 819.96 | 128.62 | 0.42 |
| FISH CREEK | MAINSTEM MID4 | 43484 | 10 yr | 7020.00 | 527.00 | 539.66 | 535.47 | 540.49 | 0.003509 | 7.46 | 1022.02 | 143.16 | 0.44 |
| FISH CREEK | MAINSTEM MID4 | 43484 | 25 yr | 9143.00 | 527.00 | 541.10 | 536.77 | 542.09 | 0.003680 | 8.19 | 1236.97 | 154.95 | 0.46 |
| FISH CREEK | MAINSTEM MID4 | 43484 | 50 yr | 11084.00 | 527.00 | 542.22 | 537.83 | 543.35 | 0.003840 | 8.78 | 1415.48 | 163.91 | 0.47 |
| FISH CREEK | MAINSTEM MID4 | 43484 | 100 yr | 12902.00 | 527.00 | 543.18 | 538.71 | 544.43 | 0.003942 | 9.25 | 1577.01 | 170.46 | 0.48 |
| FISH CREEK | MAINSTEM MID4 | 43484 | 500 yr | 17152.00 | 527.00 | 545.15 | 540.49 | 546.64 | 0.003920 | 10.23 | 1967.04 | 251.12 | 0.49 |
| FISH CREEK | MAINSTEM MID4 | 43484 | Ultimate 100 yr | 13202.00 | 527.00 | 543.34 | 538.83 | 544.59 | 0.003955 | 9.32 | 1602.74 | 171.03 | 0.48 |
| FISH CREEK | MAINSTEM MID4 | 42943 | 2 yr | 2638.00 | 526.00 | 534.06 | | 534.35 | 0.002177 | 4.35 | 606.29 | 107.20 | 0.32 |
| FISH CREEK | MAINSTEM MID4 | 42943 | 5 yr | 5202.00 | 526.00 | 536.72 | | 537.22 | 0.002517 | 5.72 | 917.56 | 128.90 | 0.36 |
| FISH CREEK | MAINSTEM MID4 | 42943 | 10 yr | 7020.00 | 526.00 | 538.10 | | 538.75 | 0.002721 | 6.49 | 1105.23 | 142.00 | 0.39 |
| FISH CREEK | MAINSTEM MID4 | 42943 | 25 yr | 9143.00 | 526.00 | 539.41 | | 540.23 | 0.003003 | 7.32 | 1307.90 | 196.86 | 0.41 |
| FISH CREEK | MAINSTEM MID4 | 42943 | 50 yr | 11084.00 | 526.00 | 540.45 | | 541.40 | 0.003166 | 7.91 | 1534.06 | 234.67 | 0.43 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------|---------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FISH CREEK | MAINSTEM MID4 | 42943 | 100 yr | 12902.00 | 526.00 | 541.40 | | 542.43 | 0.003188 | 8.28 | 1768.69 | 254.38 | 0.44 |
| FISH CREEK | MAINSTEM MID4 | 42943 | 500 yr | 17152.00 | 526.00 | 543.53 | | 544.65 | 0.002998 | 8.81 | 2366.72 | 440.11 | 0.43 |
| FISH CREEK | MAINSTEM MID4 | 42943 | Ultimate 100 yr | 13202.00 | 526.00 | 541.55 | | 542.59 | 0.003188 | 8.34 | 1807.37 | 256.84 | 0.44 |
| FISH CREEK | MAINSTEM MID4 | 42574 | 2 yr | 2651.00 | 524.19 | 533.27 | | 533.55 | 0.002137 | 4.28 | 619.42 | 110.90 | 0.32 |
| FISH CREEK | MAINSTEM MID4 | 42574 | 5 yr | 5178.00 | 524.19 | 535.77 | | 536.26 | 0.002667 | 5.60 | 929.20 | 155.81 | 0.37 |
| FISH CREEK | MAINSTEM MID4 | 42574 | 10 yr | 7005.00 | 524.19 | 537.14 | | 537.74 | 0.002661 | 6.27 | 1198.39 | 231.86 | 0.38 |
| FISH CREEK | MAINSTEM MID4 | 42574 | 25 yr | 9081.00 | 524.19 | 538.47 | | 539.16 | 0.002597 | 6.83 | 1538.21 | 284.07 | 0.39 |
| FISH CREEK | MAINSTEM MID4 | 42574 | 50 yr | 10936.00 | 524.19 | 539.55 | | 540.29 | 0.002493 | 7.18 | 1864.30 | 320.48 | 0.38 |
| FISH CREEK | MAINSTEM MID4 | 42574 | 100 yr | 12776.00 | 524.19 | 540.55 | | 541.33 | 0.002381 | 7.44 | 2204.21 | 358.95 | 0.38 |
| FISH CREEK | MAINSTEM MID4 | 42574 | 500 yr | 17132.00 | 524.19 | 542.84 | | 543.62 | 0.002013 | 7.70 | 3140.67 | 451.78 | 0.36 |
| FISH CREEK | MAINSTEM MID4 | 42574 | Ultimate 100 yr | 13081.00 | 524.19 | 540.71 | | 541.49 | 0.002363 | 7.48 | 2261.71 | 365.38 | 0.38 |
| FISH CREEK | MAINSTEM MID4 | 42368 | 2 yr | 2651.00 | 524.00 | 533.06 | 527.84 | 533.21 | 0.000790 | 3.06 | 865.81 | 141.81 | 0.22 |
| FISH CREEK | MAINSTEM MID4 | 42368 | 5 yr | 5178.00 | 524.00 | 535.56 | 529.64 | 535.81 | 0.000990 | 4.08 | 1374.17 | 288.03 | 0.26 |
| FISH CREEK | MAINSTEM MID4 | 42368 | 10 yr | 7005.00 | 524.00 | 536.99 | 530.67 | 537.28 | 0.001001 | 4.44 | 1768.18 | 338.64 | 0.26 |
| FISH CREEK | MAINSTEM MID4 | 42368 | 25 yr | 9081.00 | 524.00 | 538.37 | 531.69 | 538.69 | 0.001007 | 4.76 | 2158.28 | 383.03 | 0.27 |
| FISH CREEK | MAINSTEM MID4 | 42368 | 50 yr | 10936.00 | 524.00 | 539.48 | 532.54 | 539.83 | 0.001002 | 4.99 | 2481.91 | 427.07 | 0.27 |
| FISH CREEK | MAINSTEM MID4 | 42368 | 100 yr | 12776.00 | 524.00 | 540.50 | 533.32 | 540.87 | 0.000993 | 5.17 | 2785.69 | 480.77 | 0.27 |
| FISH CREEK | MAINSTEM MID4 | 42368 | 500 yr | 17132.00 | 524.00 | 542.81 | 535.01 | 543.23 | 0.000893 | 5.52 | 3497.43 | 567.26 | 0.27 |
| FISH CREEK | MAINSTEM MID4 | 42368 | Ultimate 100 yr | 13081.00 | 524.00 | 540.66 | 533.47 | 541.04 | 0.000992 | 5.20 | 2834.16 | 489.99 | 0.27 |
| FISH CREEK | MAINSTEM MID4 | 42268 | | Bridge | | | | | | | | | |
| FISH CREEK | MAINSTEM MID4 | 42222 | 2 yr | 2651.00 | 524.52 | 532.84 | | 533.02 | 0.001254 | 3.39 | 781.27 | 156.31 | 0.27 |
| FISH CREEK | MAINSTEM MID4 | 42222 | 5 yr | 5178.00 | 524.52 | 535.28 | | 535.57 | 0.001384 | 4.37 | 1185.44 | 174.43 | 0.30 |
| FISH CREEK | MAINSTEM MID4 | 42222 | 10 yr | 7005.00 | 524.52 | 536.63 | | 537.01 | 0.001455 | 4.90 | 1428.14 | 183.02 | 0.31 |
| FISH CREEK | MAINSTEM MID4 | 42222 | 25 yr | 9081.00 | 524.52 | 537.92 | | 538.38 | 0.001538 | 5.44 | 1668.21 | 190.20 | 0.32 |
| FISH CREEK | MAINSTEM MID4 | 42222 | 50 yr | 10936.00 | 524.52 | 538.96 | | 539.49 | 0.001587 | 5.85 | 1869.06 | 195.43 | 0.33 |
| FISH CREEK | MAINSTEM MID4 | 42222 | 100 yr | 12776.00 | 524.52 | 539.92 | | 540.52 | 0.001623 | 6.21 | 2058.15 | 199.91 | 0.34 |
| FISH CREEK | MAINSTEM MID4 | 42222 | 500 yr | 17132.00 | 524.52 | 541.96 | | 542.70 | 0.001687 | 6.92 | 2476.17 | 209.40 | 0.35 |
| FISH CREEK | MAINSTEM MID4 | 42222 | Ultimate 100 yr | 13081.00 | 524.52 | 540.07 | | 540.68 | 0.001629 | 6.26 | 2088.33 | 200.63 | 0.34 |
| FISH CREEK | MAINSTEM MID4 | 42145 | 2 yr | 2651.00 | 523.71 | 532.63 | | 532.89 | 0.001655 | 4.06 | 652.54 | 121.19 | 0.31 |
| FISH CREEK | MAINSTEM MID4 | 42145 | 5 yr | 5178.00 | 523.71 | 534.94 | | 535.39 | 0.002169 | 5.43 | 953.75 | 140.32 | 0.37 |
| FISH CREEK | MAINSTEM MID4 | 42145 | 10 yr | 7005.00 | 523.71 | 536.21 | | 536.80 | 0.002375 | 6.15 | 1138.16 | 148.28 | 0.39 |
| FISH CREEK | MAINSTEM MID4 | 42145 | 25 yr | 9081.00 | 523.71 | 537.41 | | 538.15 | 0.002585 | 6.88 | 1319.92 | 154.79 | 0.42 |
| FISH CREEK | MAINSTEM MID4 | 42145 | 50 yr | 10936.00 | 523.71 | 538.38 | | 539.24 | 0.002732 | 7.43 | 1472.65 | 160.34 | 0.43 |
| FISH CREEK | MAINSTEM MID4 | 42145 | 100 yr | 12776.00 | 523.71 | 539.28 | | 540.25 | 0.002853 | 7.89 | 1618.66 | 166.06 | 0.45 |
| FISH CREEK | MAINSTEM MID4 | 42145 | 500 yr | 17132.00 | 523.71 | 541.20 | | 542.40 | 0.003046 | 8.78 | 1950.82 | 179.73 | 0.47 |
| FISH CREEK | MAINSTEM MID4 | 42145 | Ultimate 100 yr | 13081.00 | 523.71 | 539.42 | | 540.40 | 0.002872 | 7.97 | 1642.09 | 166.94 | 0.45 |
| FISH CREEK | MAINSTEM MID4 | 41987 | 2 yr | 2651.00 | 523.69 | 532.55 | 527.60 | 532.68 | 0.000560 | 2.84 | 917.34 | 160.63 | 0.19 |
| FISH CREEK | MAINSTEM MID4 | 41987 | 5 yr | 5178.00 | 523.69 | 534.85 | 529.20 | 535.11 | 0.000669 | 3.75 | 1306.66 | 178.00 | 0.22 |
| FISH CREEK | MAINSTEM MID4 | 41987 | 10 yr | 7005.00 | 523.69 | 536.14 | 530.14 | 536.49 | 0.000707 | 4.20 | 1541.88 | 188.29 | 0.23 |
| FISH CREEK | MAINSTEM MID4 | 41987 | 25 yr | 9081.00 | 523.69 | 537.34 | 531.04 | 537.80 | 0.000745 | 4.63 | 1775.29 | 198.18 | 0.24 |
| FISH CREEK | MAINSTEM MID4 | 41987 | 50 yr | 10936.00 | 523.69 | 538.32 | 531.96 | 538.87 | 0.000761 | 4.94 | 1973.05 | 205.95 | 0.24 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------|---------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FISH CREEK | MAINSTEM MID4 | 41987 | 100 yr | 12776.00 | 523.69 | 539.23 | 532.65 | 539.86 | 0.000768 | 5.19 | 2162.25 | 213.11 | 0.25 |
| FISH CREEK | MAINSTEM MID4 | 41987 | 500 yr | 17132.00 | 523.69 | 541.17 | 533.97 | 541.98 | 0.000760 | 5.64 | 2591.44 | 228.47 | 0.25 |
| FISH CREEK | MAINSTEM MID4 | 41987 | Ultimate 100 yr | 13081.00 | 523.69 | 539.37 | 532.75 | 540.01 | 0.000769 | 5.23 | 2192.61 | 214.24 | 0.25 |
| FISH CREEK | MAINSTEM MID4 | 41940 | Bridge | | | | | | | | | | |
| FISH CREEK | MAINSTEM MID4 | 41832 | 2 yr | 2651.00 | 523.00 | 532.42 | | 532.54 | 0.000597 | 2.86 | 938.89 | 159.65 | 0.19 |
| FISH CREEK | MAINSTEM MID4 | 41832 | 5 yr | 5178.00 | 523.00 | 534.65 | | 534.90 | 0.000840 | 4.10 | 1311.85 | 175.97 | 0.24 |
| FISH CREEK | MAINSTEM MID4 | 41832 | 10 yr | 7005.00 | 523.00 | 535.88 | | 536.22 | 0.000968 | 4.79 | 1534.73 | 184.61 | 0.26 |
| FISH CREEK | MAINSTEM MID4 | 41832 | 25 yr | 9081.00 | 523.00 | 537.02 | | 537.47 | 0.001104 | 5.49 | 1749.72 | 190.95 | 0.29 |
| FISH CREEK | MAINSTEM MID4 | 41832 | 50 yr | 10936.00 | 523.00 | 537.95 | | 538.48 | 0.001202 | 6.03 | 1928.13 | 196.17 | 0.30 |
| FISH CREEK | MAINSTEM MID4 | 41832 | 100 yr | 12776.00 | 523.00 | 538.79 | | 539.41 | 0.001282 | 6.51 | 2096.58 | 201.39 | 0.32 |
| FISH CREEK | MAINSTEM MID4 | 41832 | 500 yr | 17132.00 | 523.00 | 540.61 | | 541.41 | 0.001423 | 7.48 | 2470.83 | 211.44 | 0.34 |
| FISH CREEK | MAINSTEM MID4 | 41832 | Ultimate 100 yr | 13081.00 | 523.00 | 538.93 | | 539.56 | 0.001295 | 6.59 | 2123.35 | 202.12 | 0.32 |
| FISH CREEK | MAINSTEM MID4 | 41696 | 2 yr | 2651.00 | 523.00 | 532.04 | | 532.36 | 0.002135 | 4.50 | 588.79 | 114.27 | 0.35 |
| FISH CREEK | MAINSTEM MID4 | 41696 | 5 yr | 5178.00 | 523.00 | 534.01 | | 534.62 | 0.003079 | 6.25 | 828.41 | 129.11 | 0.43 |
| FISH CREEK | MAINSTEM MID4 | 41696 | 10 yr | 7005.00 | 523.00 | 535.06 | | 535.87 | 0.003642 | 7.23 | 968.87 | 137.56 | 0.48 |
| FISH CREEK | MAINSTEM MID4 | 41696 | 25 yr | 9081.00 | 523.00 | 535.99 | | 537.05 | 0.004287 | 8.26 | 1099.46 | 144.35 | 0.53 |
| FISH CREEK | MAINSTEM MID4 | 41696 | 50 yr | 10936.00 | 523.00 | 536.72 | | 538.00 | 0.004759 | 9.06 | 1207.47 | 149.20 | 0.56 |
| FISH CREEK | MAINSTEM MID4 | 41696 | 100 yr | 12776.00 | 523.00 | 537.39 | | 538.87 | 0.005164 | 9.76 | 1309.01 | 153.61 | 0.59 |
| FISH CREEK | MAINSTEM MID4 | 41696 | 500 yr | 17132.00 | 523.00 | 538.82 | | 540.76 | 0.005920 | 11.16 | 1535.38 | 163.06 | 0.64 |
| FISH CREEK | MAINSTEM MID4 | 41696 | Ultimate 100 yr | 13081.00 | 523.00 | 537.50 | | 539.01 | 0.005233 | 9.87 | 1324.78 | 154.28 | 0.59 |
| FISH CREEK | MAINSTEM MID4 | 41596 | 2 yr | 2651.00 | 523.00 | 532.02 | 527.36 | 532.16 | 0.000802 | 3.00 | 883.94 | 152.03 | 0.22 |
| FISH CREEK | MAINSTEM MID4 | 41596 | 5 yr | 5178.00 | 523.00 | 534.02 | 529.00 | 534.30 | 0.001265 | 4.30 | 1205.48 | 170.10 | 0.28 |
| FISH CREEK | MAINSTEM MID4 | 41596 | 10 yr | 7005.00 | 523.00 | 535.10 | 529.94 | 535.49 | 0.001536 | 5.02 | 1394.77 | 179.89 | 0.32 |
| FISH CREEK | MAINSTEM MID4 | 41596 | 25 yr | 9081.00 | 523.00 | 536.06 | 530.86 | 536.58 | 0.001855 | 5.78 | 1572.34 | 189.38 | 0.35 |
| FISH CREEK | MAINSTEM MID4 | 41596 | 50 yr | 10936.00 | 523.00 | 536.83 | 531.60 | 537.46 | 0.002091 | 6.35 | 1721.94 | 196.72 | 0.38 |
| FISH CREEK | MAINSTEM MID4 | 41596 | 100 yr | 12776.00 | 523.00 | 537.55 | 532.27 | 538.28 | 0.002278 | 6.85 | 1864.24 | 202.50 | 0.40 |
| FISH CREEK | MAINSTEM MID4 | 41596 | 500 yr | 17132.00 | 523.00 | 539.08 | 533.70 | 540.04 | 0.002567 | 7.84 | 2185.06 | 214.80 | 0.43 |
| FISH CREEK | MAINSTEM MID4 | 41596 | Ultimate 100 yr | 13081.00 | 523.00 | 537.66 | 532.36 | 538.40 | 0.002309 | 6.93 | 1886.51 | 203.40 | 0.40 |
| FISH CREEK | MAINSTEM MID4 | 41555 | Bridge | | | | | | | | | | |
| FISH CREEK | MAINSTEM MID4 | 41446 | 2 yr | 2651.00 | 522.45 | 531.82 | 527.49 | 531.99 | 0.000894 | 3.31 | 828.15 | 159.32 | 0.23 |
| FISH CREEK | MAINSTEM MID4 | 41446 | 5 yr | 5178.00 | 522.45 | 533.69 | 529.14 | 534.03 | 0.001395 | 4.76 | 1142.60 | 178.81 | 0.30 |
| FISH CREEK | MAINSTEM MID4 | 41446 | 10 yr | 7005.00 | 522.45 | 534.66 | 530.10 | 535.15 | 0.001747 | 5.73 | 1351.30 | 289.07 | 0.34 |
| FISH CREEK | MAINSTEM MID4 | 41446 | 25 yr | 9081.00 | 522.45 | 535.64 | 531.07 | 536.20 | 0.001838 | 6.31 | 1643.73 | 406.06 | 0.36 |
| FISH CREEK | MAINSTEM MID4 | 41446 | 50 yr | 10936.00 | 522.45 | 536.41 | 531.95 | 537.03 | 0.001856 | 6.68 | 1906.72 | 434.54 | 0.37 |
| FISH CREEK | MAINSTEM MID4 | 41446 | 100 yr | 12776.00 | 522.45 | 537.13 | 532.64 | 537.78 | 0.001843 | 6.96 | 2150.36 | 446.84 | 0.37 |
| FISH CREEK | MAINSTEM MID4 | 41446 | 500 yr | 17132.00 | 522.45 | 538.70 | 533.72 | 539.42 | 0.001771 | 7.46 | 2682.15 | 464.60 | 0.37 |
| FISH CREEK | MAINSTEM MID4 | 41446 | Ultimate 100 yr | 13081.00 | 522.45 | 537.24 | 532.74 | 537.90 | 0.001843 | 7.01 | 2188.01 | 448.14 | 0.37 |
| FISH CREEK | MAINSTEM MID3 | 41093 | 2 yr | 2783.00 | 522.00 | 531.27 | | 531.54 | 0.001750 | 4.33 | 744.26 | 212.69 | 0.32 |
| FISH CREEK | MAINSTEM MID3 | 41093 | 5 yr | 5365.00 | 522.00 | 532.94 | | 533.39 | 0.002219 | 5.79 | 1115.72 | 231.97 | 0.38 |
| FISH CREEK | MAINSTEM MID3 | 41093 | 10 yr | 7290.00 | 522.00 | 533.79 | | 534.38 | 0.002586 | 6.73 | 1317.62 | 241.67 | 0.41 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------|---------------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FISH CREEK | MAINSTEM MID3 | 41093 | 25 yr | 9477.00 | 522.00 | 534.60 | | 535.35 | 0.002947 | 7.65 | 1517.24 | 250.96 | 0.45 |
| FISH CREEK | MAINSTEM MID3 | 41093 | 50 yr | 11396.00 | 522.00 | 535.24 | | 536.12 | 0.003213 | 8.35 | 1679.42 | 259.91 | 0.47 |
| FISH CREEK | MAINSTEM MID3 | 41093 | 100 yr | 13269.00 | 522.00 | 535.84 | | 536.84 | 0.003394 | 8.94 | 1839.92 | 271.00 | 0.49 |
| FISH CREEK | MAINSTEM MID3 | 41093 | 500 yr | 17852.00 | 522.00 | 537.20 | | 538.43 | 0.003664 | 10.09 | 2222.67 | 294.06 | 0.52 |
| FISH CREEK | MAINSTEM MID3 | 41093 | Ultimate 100 yr | 13573.00 | 522.00 | 535.94 | | 536.95 | 0.003419 | 9.03 | 1865.76 | 272.79 | 0.50 |
| FISH CREEK | MAINSTEM MID3 | 40575 | 2 yr | 2783.00 | 521.00 | 529.13 | 528.48 | 529.99 | 0.007842 | 7.80 | 425.82 | 201.98 | 0.65 |
| FISH CREEK | MAINSTEM MID3 | 40575 | 5 yr | 5365.00 | 521.00 | 530.89 | 530.31 | 531.71 | 0.005697 | 8.30 | 885.45 | 307.47 | 0.59 |
| FISH CREEK | MAINSTEM MID3 | 40575 | 10 yr | 7290.00 | 521.00 | 531.72 | 531.06 | 532.56 | 0.005317 | 8.71 | 1146.76 | 322.46 | 0.58 |
| FISH CREEK | MAINSTEM MID3 | 40575 | 25 yr | 9477.00 | 521.00 | 532.60 | 531.61 | 533.46 | 0.004778 | 8.94 | 1437.87 | 334.88 | 0.56 |
| FISH CREEK | MAINSTEM MID3 | 40575 | 50 yr | 11396.00 | 521.00 | 533.35 | 532.04 | 534.22 | 0.004335 | 9.04 | 1692.33 | 345.22 | 0.54 |
| FISH CREEK | MAINSTEM MID3 | 40575 | 100 yr | 13269.00 | 521.00 | 534.04 | 532.42 | 534.92 | 0.003987 | 9.13 | 1934.73 | 354.43 | 0.53 |
| FISH CREEK | MAINSTEM MID3 | 40575 | 500 yr | 17852.00 | 521.00 | 535.60 | 533.29 | 536.52 | 0.003439 | 9.39 | 2504.11 | 379.81 | 0.50 |
| FISH CREEK | MAINSTEM MID3 | 40575 | Ultimate 100 yr | 13573.00 | 521.00 | 534.15 | 532.49 | 535.03 | 0.003938 | 9.14 | 1973.62 | 356.02 | 0.52 |
| FC-1 | FC-1 | 12040 | 2 yr | 955.00 | 601.35 | 603.80 | 603.34 | 603.88 | 0.003899 | 2.68 | 441.72 | 462.35 | 0.36 |
| FC-1 | FC-1 | 12040 | 5 yr | 1568.00 | 601.35 | 604.25 | 603.57 | 604.34 | 0.003973 | 3.16 | 726.29 | 940.36 | 0.38 |
| FC-1 | FC-1 | 12040 | 10 yr | 1984.00 | 601.35 | 604.41 | 603.71 | 604.52 | 0.004048 | 3.34 | 859.38 | 1024.54 | 0.38 |
| FC-1 | FC-1 | 12040 | 25 yr | 2433.00 | 601.35 | 604.55 | 603.85 | 604.67 | 0.004178 | 3.53 | 983.93 | 1095.34 | 0.39 |
| FC-1 | FC-1 | 12040 | 50 yr | 2820.00 | 601.35 | 604.67 | 603.96 | 604.80 | 0.004234 | 3.66 | 1089.16 | 1153.94 | 0.40 |
| FC-1 | FC-1 | 12040 | 100 yr | 3193.00 | 601.35 | 604.77 | 603.99 | 604.92 | 0.004260 | 3.77 | 1188.20 | 1206.52 | 0.40 |
| FC-1 | FC-1 | 12040 | 500 yr | 4130.00 | 601.35 | 604.98 | 603.99 | 605.13 | 0.004202 | 3.94 | 1583.34 | 1273.25 | 0.41 |
| FC-1 | FC-1 | 12040 | Ultimate 100 yr | 3193.00 | 601.35 | 604.77 | 603.99 | 604.92 | 0.004260 | 3.77 | 1188.20 | 1206.52 | 0.40 |
| FC-1 | FC-1 | 11009 | 2 yr | 955.00 | 595.10 | 596.71 | 596.71 | 597.07 | 0.025358 | 4.88 | 243.36 | 357.49 | 0.84 |
| FC-1 | FC-1 | 11009 | 5 yr | 1568.00 | 595.10 | 597.00 | 597.00 | 597.47 | 0.026085 | 5.81 | 346.10 | 368.84 | 0.89 |
| FC-1 | FC-1 | 11009 | 10 yr | 1984.00 | 595.10 | 597.21 | 597.17 | 597.70 | 0.023167 | 6.04 | 425.35 | 376.72 | 0.86 |
| FC-1 | FC-1 | 11009 | 25 yr | 2433.00 | 595.10 | 597.47 | 597.33 | 597.95 | 0.019190 | 6.09 | 523.02 | 388.84 | 0.80 |
| FC-1 | FC-1 | 11009 | 50 yr | 2820.00 | 595.10 | 597.65 | 597.45 | 598.15 | 0.017423 | 6.20 | 597.57 | 395.99 | 0.78 |
| FC-1 | FC-1 | 11009 | 100 yr | 3193.00 | 595.10 | 597.82 | 597.57 | 598.33 | 0.016367 | 6.34 | 664.24 | 403.41 | 0.76 |
| FC-1 | FC-1 | 11009 | 500 yr | 4130.00 | 595.10 | 598.22 | 597.83 | 598.77 | 0.014426 | 6.67 | 829.51 | 427.66 | 0.74 |
| FC-1 | FC-1 | 11009 | Ultimate 100 yr | 3193.00 | 595.10 | 597.82 | 597.57 | 598.33 | 0.016367 | 6.34 | 664.24 | 403.41 | 0.76 |
| FC-1 | FC-1 | 10425 | 2 yr | 955.00 | 585.16 | 587.50 | | 587.86 | 0.000808 | 4.80 | 199.09 | 87.89 | 0.56 |
| FC-1 | FC-1 | 10425 | 5 yr | 1568.00 | 585.16 | 589.42 | | 589.69 | 0.000297 | 4.22 | 371.71 | 93.60 | 0.37 |
| FC-1 | FC-1 | 10425 | 10 yr | 1984.00 | 585.16 | 590.51 | | 590.78 | 0.000215 | 4.18 | 501.80 | 153.11 | 0.33 |
| FC-1 | FC-1 | 10425 | 25 yr | 2433.00 | 585.16 | 591.98 | | 592.22 | 0.000137 | 3.90 | 761.28 | 192.53 | 0.27 |
| FC-1 | FC-1 | 10425 | 50 yr | 2820.00 | 585.16 | 592.70 | | 592.95 | 0.000127 | 4.02 | 906.92 | 214.44 | 0.27 |
| FC-1 | FC-1 | 10425 | 100 yr | 3193.00 | 585.16 | 593.16 | | 593.43 | 0.000130 | 4.25 | 1009.59 | 242.68 | 0.27 |
| FC-1 | FC-1 | 10425 | 500 yr | 4130.00 | 585.16 | 594.10 | | 594.44 | 0.000144 | 4.82 | 1276.26 | 325.11 | 0.29 |
| FC-1 | FC-1 | 10425 | Ultimate 100 yr | 3193.00 | 585.16 | 593.16 | | 593.43 | 0.000130 | 4.25 | 1009.59 | 242.68 | 0.27 |
| FC-1 | FC-1 | 10304 | 2 yr | 955.00 | 582.78 | 587.09 | | 587.73 | 0.000818 | 6.42 | 148.70 | 40.94 | 0.59 |
| FC-1 | FC-1 | 10304 | 5 yr | 1568.00 | 582.78 | 588.84 | | 589.59 | 0.000667 | 6.98 | 224.64 | 46.17 | 0.56 |
| FC-1 | FC-1 | 10304 | 10 yr | 1984.00 | 582.78 | 589.88 | | 590.69 | 0.000599 | 7.23 | 274.32 | 49.90 | 0.54 |
| FC-1 | FC-1 | 10304 | 25 yr | 2433.00 | 582.78 | 591.40 | | 592.14 | 0.000400 | 6.94 | 360.70 | 63.87 | 0.46 |
| FC-1 | FC-1 | 10304 | 50 yr | 2820.00 | 582.78 | 592.04 | | 592.86 | 0.000398 | 7.33 | 403.59 | 69.35 | 0.46 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FC-1 | FC-1 | 10304 | 100 yr | 3193.00 | 582.78 | 592.38 | | 593.34 | 0.000438 | 7.91 | 427.97 | 72.17 | 0.49 |
| FC-1 | FC-1 | 10304 | 500 yr | 4130.00 | 582.78 | 592.94 | | 594.31 | 0.000578 | 9.50 | 469.96 | 78.23 | 0.57 |
| FC-1 | FC-1 | 10304 | Ultimate 100 yr | 3193.00 | 582.78 | 592.38 | | 593.34 | 0.000438 | 7.91 | 427.97 | 72.17 | 0.49 |
| FC-1 | FC-1 | 10217 | 2 yr | 955.00 | 582.47 | 587.27 | 585.11 | 587.58 | 0.000336 | 4.50 | 212.17 | 51.40 | 0.39 |
| FC-1 | FC-1 | 10217 | 5 yr | 1568.00 | 582.47 | 589.04 | 586.09 | 589.44 | 0.000303 | 5.09 | 307.94 | 56.72 | 0.39 |
| FC-1 | FC-1 | 10217 | 10 yr | 1984.00 | 582.47 | 590.09 | 586.68 | 590.54 | 0.000287 | 5.37 | 369.21 | 59.87 | 0.38 |
| FC-1 | FC-1 | 10217 | 25 yr | 2433.00 | 582.47 | 591.59 | 587.24 | 592.02 | 0.000219 | 5.27 | 465.40 | 86.08 | 0.34 |
| FC-1 | FC-1 | 10217 | 50 yr | 2820.00 | 582.47 | 592.25 | 587.71 | 592.73 | 0.000217 | 5.57 | 540.64 | 178.50 | 0.35 |
| FC-1 | FC-1 | 10217 | 100 yr | 3193.00 | 582.47 | 592.65 | 588.11 | 593.18 | 0.000229 | 5.90 | 618.25 | 213.24 | 0.36 |
| FC-1 | FC-1 | 10217 | 500 yr | 4130.00 | 582.47 | 593.43 | 589.08 | 594.05 | 0.000255 | 6.61 | 824.68 | 363.10 | 0.38 |
| FC-1 | FC-1 | 10217 | Ultimate 100 yr | 3193.00 | 582.47 | 592.65 | 588.11 | 593.18 | 0.000229 | 5.90 | 618.25 | 213.24 | 0.36 |
| FC-1 | FC-1 | 10191 | | Culvert | | | | | | | | | |
| FC-1 | FC-1 | 10172 | 2 yr | 955.00 | 582.31 | 586.79 | | 587.08 | 0.000319 | 4.29 | 222.81 | 56.44 | 0.38 |
| FC-1 | FC-1 | 10172 | 5 yr | 1568.00 | 582.31 | 588.30 | | 588.69 | 0.000317 | 5.03 | 311.44 | 60.97 | 0.39 |
| FC-1 | FC-1 | 10172 | 10 yr | 1984.00 | 582.31 | 589.17 | | 589.63 | 0.000317 | 5.43 | 365.39 | 63.57 | 0.40 |
| FC-1 | FC-1 | 10172 | 25 yr | 2433.00 | 582.31 | 590.34 | | 590.81 | 0.000274 | 5.50 | 442.20 | 67.10 | 0.38 |
| FC-1 | FC-1 | 10172 | 50 yr | 2820.00 | 582.31 | 590.98 | | 591.51 | 0.000278 | 5.81 | 485.66 | 106.55 | 0.38 |
| FC-1 | FC-1 | 10172 | 100 yr | 3193.00 | 582.31 | 591.41 | | 592.00 | 0.000293 | 6.20 | 518.96 | 157.15 | 0.40 |
| FC-1 | FC-1 | 10172 | 500 yr | 4130.00 | 582.31 | 592.69 | | 593.29 | 0.000255 | 6.43 | 827.28 | 344.06 | 0.38 |
| FC-1 | FC-1 | 10172 | Ultimate 100 yr | 3193.00 | 582.31 | 591.41 | | 592.00 | 0.000293 | 6.20 | 518.96 | 157.15 | 0.40 |
| FC-1 | FC-1 | 10096 | 2 yr | 955.00 | 582.31 | 585.51 | 585.51 | 586.92 | 0.002535 | 9.52 | 100.33 | 36.11 | 1.01 |
| FC-1 | FC-1 | 10096 | 5 yr | 1568.00 | 582.31 | 586.68 | 586.68 | 588.51 | 0.002326 | 10.85 | 144.58 | 39.62 | 1.00 |
| FC-1 | FC-1 | 10096 | 10 yr | 1984.00 | 582.31 | 587.37 | 587.36 | 589.42 | 0.002232 | 11.50 | 172.45 | 41.68 | 1.00 |
| FC-1 | FC-1 | 10096 | 25 yr | 2433.00 | 582.31 | 589.33 | | 590.69 | 0.001036 | 9.36 | 260.03 | 48.58 | 0.70 |
| FC-1 | FC-1 | 10096 | 50 yr | 2820.00 | 582.31 | 589.87 | | 591.37 | 0.001011 | 9.84 | 293.12 | 69.70 | 0.71 |
| FC-1 | FC-1 | 10096 | 100 yr | 3193.00 | 582.31 | 590.03 | 588.99 | 591.85 | 0.001188 | 10.85 | 303.91 | 73.20 | 0.77 |
| FC-1 | FC-1 | 10096 | 500 yr | 4130.00 | 582.31 | 590.39 | 590.39 | 593.05 | 0.001616 | 13.15 | 332.50 | 81.75 | 0.91 |
| FC-1 | FC-1 | 10096 | Ultimate 100 yr | 3193.00 | 582.31 | 590.03 | 588.99 | 591.85 | 0.001188 | 10.85 | 303.91 | 73.20 | 0.77 |
| FC-1 | FC-1 | 10011 | 2 yr | 955.00 | 582.01 | 585.42 | 584.04 | 585.73 | 0.000465 | 4.45 | 214.41 | 69.65 | 0.45 |
| FC-1 | FC-1 | 10011 | 5 yr | 1568.00 | 582.01 | 586.97 | 584.80 | 587.33 | 0.000348 | 4.80 | 326.83 | 75.83 | 0.41 |
| FC-1 | FC-1 | 10011 | 10 yr | 1984.00 | 582.01 | 588.49 | 585.26 | 588.80 | 0.000203 | 4.48 | 453.65 | 91.46 | 0.33 |
| FC-1 | FC-1 | 10011 | 25 yr | 2433.00 | 582.01 | 590.03 | 585.71 | 590.32 | 0.000137 | 4.30 | 614.77 | 119.15 | 0.28 |
| FC-1 | FC-1 | 10011 | 50 yr | 2820.00 | 582.01 | 590.65 | 586.08 | 590.97 | 0.000139 | 4.58 | 700.19 | 216.93 | 0.29 |
| FC-1 | FC-1 | 10011 | 100 yr | 3193.00 | 582.01 | 590.98 | 586.40 | 591.35 | 0.000155 | 4.96 | 794.00 | 369.82 | 0.30 |
| FC-1 | FC-1 | 10011 | 500 yr | 4130.00 | 582.01 | 591.46 | 587.16 | 591.99 | 0.000207 | 5.95 | 1007.66 | 521.51 | 0.35 |
| FC-1 | FC-1 | 10011 | Ultimate 100 yr | 3193.00 | 582.01 | 590.98 | 586.40 | 591.35 | 0.000155 | 4.96 | 794.00 | 369.82 | 0.30 |
| FC-1 | FC-1 | 9977 | | Culvert | | | | | | | | | |
| FC-1 | FC-1 | 9625 | 2 yr | 955.00 | 581.05 | 584.47 | | 584.58 | 0.000154 | 2.68 | 356.79 | 108.88 | 0.26 |
| FC-1 | FC-1 | 9625 | 5 yr | 1568.00 | 581.05 | 585.90 | | 586.05 | 0.000129 | 3.04 | 516.04 | 112.62 | 0.25 |
| FC-1 | FC-1 | 9625 | 10 yr | 1984.00 | 581.05 | 586.75 | | 586.91 | 0.000120 | 3.24 | 612.05 | 114.82 | 0.25 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FC-1 | FC-1 | 9625 | 25 yr | 2433.00 | 581.05 | 587.57 | | 587.75 | 0.000115 | 3.44 | 707.35 | 116.95 | 0.25 |
| FC-1 | FC-1 | 9625 | 50 yr | 2820.00 | 581.05 | 588.22 | | 588.43 | 0.000112 | 3.60 | 784.36 | 118.65 | 0.25 |
| FC-1 | FC-1 | 9625 | 100 yr | 3193.00 | 581.05 | 588.82 | | 589.03 | 0.000110 | 3.73 | 855.01 | 120.19 | 0.25 |
| FC-1 | FC-1 | 9625 | 500 yr | 4130.00 | 581.05 | 590.16 | | 590.42 | 0.000107 | 4.05 | 1027.95 | 236.23 | 0.25 |
| FC-1 | FC-1 | 9625 | Ultimate 100 yr | 3193.00 | 581.05 | 588.82 | | 589.03 | 0.000110 | 3.73 | 855.01 | 120.19 | 0.25 |
| FC-1 | FC-1 | 9498 | 2 yr | 955.00 | 580.42 | 583.72 | | 584.48 | 0.001252 | 6.98 | 136.88 | 46.90 | 0.72 |
| FC-1 | FC-1 | 9498 | 5 yr | 1568.00 | 580.42 | 584.95 | | 585.93 | 0.001136 | 7.96 | 196.92 | 50.95 | 0.71 |
| FC-1 | FC-1 | 9498 | 10 yr | 1984.00 | 580.42 | 585.69 | | 586.79 | 0.001075 | 8.43 | 235.40 | 53.39 | 0.71 |
| FC-1 | FC-1 | 9498 | 25 yr | 2433.00 | 580.42 | 586.41 | | 587.62 | 0.001032 | 8.86 | 274.63 | 55.76 | 0.70 |
| FC-1 | FC-1 | 9498 | 50 yr | 2820.00 | 580.42 | 586.98 | | 588.29 | 0.000990 | 9.18 | 307.39 | 59.29 | 0.70 |
| FC-1 | FC-1 | 9498 | 100 yr | 3193.00 | 580.42 | 587.50 | | 588.89 | 0.000952 | 9.47 | 339.23 | 63.73 | 0.69 |
| FC-1 | FC-1 | 9498 | 500 yr | 4130.00 | 580.42 | 588.68 | 587.06 | 590.26 | 0.000887 | 10.12 | 421.09 | 110.08 | 0.69 |
| FC-1 | FC-1 | 9498 | Ultimate 100 yr | 3193.00 | 580.42 | 587.50 | | 588.89 | 0.000952 | 9.47 | 339.23 | 63.73 | 0.69 |
| FC-1 | FC-1 | 8981 | 2 yr | 955.00 | 579.23 | 582.22 | 582.22 | 583.55 | 0.002552 | 9.28 | 102.93 | 38.96 | 1.01 |
| FC-1 | FC-1 | 8981 | 5 yr | 1568.00 | 579.23 | 583.32 | 583.32 | 585.07 | 0.002334 | 10.61 | 147.76 | 42.27 | 1.00 |
| FC-1 | FC-1 | 8981 | 10 yr | 1984.00 | 579.23 | 583.95 | 583.95 | 585.95 | 0.002278 | 11.35 | 174.80 | 44.15 | 1.01 |
| FC-1 | FC-1 | 8981 | 25 yr | 2433.00 | 579.23 | 584.59 | 584.59 | 586.80 | 0.002190 | 11.94 | 203.82 | 46.07 | 1.00 |
| FC-1 | FC-1 | 8981 | 50 yr | 2820.00 | 579.23 | 585.08 | 585.08 | 587.48 | 0.002152 | 12.42 | 227.05 | 47.56 | 1.00 |
| FC-1 | FC-1 | 8981 | 100 yr | 3193.00 | 579.23 | 585.53 | 585.53 | 588.09 | 0.002132 | 12.86 | 248.36 | 48.89 | 1.01 |
| FC-1 | FC-1 | 8981 | 500 yr | 4130.00 | 579.23 | 586.59 | 586.59 | 589.49 | 0.002038 | 13.67 | 302.14 | 52.08 | 1.00 |
| FC-1 | FC-1 | 8981 | Ultimate 100 yr | 3193.00 | 579.23 | 585.53 | 585.53 | 588.09 | 0.002132 | 12.86 | 248.36 | 48.89 | 1.01 |
| FC-1 | FC-1 | 8785 | 2 yr | 955.00 | 578.80 | 581.96 | 580.70 | 582.27 | 0.000496 | 4.46 | 213.94 | 72.47 | 0.46 |
| FC-1 | FC-1 | 8785 | 5 yr | 1568.00 | 578.80 | 583.20 | 581.42 | 583.61 | 0.000438 | 5.12 | 306.21 | 76.20 | 0.45 |
| FC-1 | FC-1 | 8785 | 10 yr | 1984.00 | 578.80 | 583.95 | 581.86 | 584.41 | 0.000410 | 5.44 | 364.61 | 78.46 | 0.44 |
| FC-1 | FC-1 | 8785 | 25 yr | 2433.00 | 578.80 | 584.72 | 582.30 | 585.22 | 0.000386 | 5.72 | 425.26 | 80.75 | 0.44 |
| FC-1 | FC-1 | 8785 | 50 yr | 2820.00 | 578.80 | 585.34 | 582.64 | 585.88 | 0.000368 | 5.92 | 476.09 | 82.62 | 0.43 |
| FC-1 | FC-1 | 8785 | 100 yr | 3193.00 | 578.80 | 585.91 | 582.96 | 586.49 | 0.000354 | 6.09 | 524.14 | 84.34 | 0.43 |
| FC-1 | FC-1 | 8785 | 500 yr | 4130.00 | 578.80 | 587.37 | 583.72 | 587.99 | 0.000312 | 6.35 | 649.88 | 88.70 | 0.41 |
| FC-1 | FC-1 | 8785 | Ultimate 100 yr | 3193.00 | 578.80 | 585.91 | 582.96 | 586.49 | 0.000354 | 6.09 | 524.14 | 84.34 | 0.43 |
| FC-1 | FC-1 | 8697 | | Culvert | | | | | | | | | |
| FC-1 | FC-1 | 8648 | 2 yr | 955.00 | 576.14 | 579.20 | 578.93 | 579.89 | 0.004568 | 6.65 | 143.51 | 69.97 | 0.82 |
| FC-1 | FC-1 | 8648 | 5 yr | 1568.00 | 576.14 | 580.02 | 579.68 | 580.95 | 0.004578 | 7.74 | 202.54 | 74.86 | 0.83 |
| FC-1 | FC-1 | 8648 | 10 yr | 1984.00 | 576.14 | 580.49 | 580.11 | 581.57 | 0.004580 | 8.31 | 238.73 | 77.70 | 0.84 |
| FC-1 | FC-1 | 8648 | 25 yr | 2433.00 | 576.14 | 580.96 | 580.53 | 582.17 | 0.004581 | 8.83 | 275.48 | 80.49 | 0.84 |
| FC-1 | FC-1 | 8648 | 50 yr | 2820.00 | 576.14 | 581.33 | 580.90 | 582.65 | 0.004583 | 9.23 | 305.69 | 82.71 | 0.85 |
| FC-1 | FC-1 | 8648 | 100 yr | 3193.00 | 576.14 | 581.66 | 581.21 | 583.08 | 0.004584 | 9.57 | 333.78 | 84.72 | 0.85 |
| FC-1 | FC-1 | 8648 | 500 yr | 4130.00 | 576.14 | 582.43 | 581.95 | 584.08 | 0.004587 | 10.30 | 400.89 | 89.34 | 0.86 |
| FC-1 | FC-1 | 8648 | Ultimate 100 yr | 3193.00 | 576.14 | 581.66 | 581.21 | 583.08 | 0.004584 | 9.57 | 333.78 | 84.72 | 0.85 |
| FC-1 | FC-1 | 8467 | 2 yr | 955.00 | 575.31 | 578.37 | | 579.06 | 0.004615 | 6.68 | 143.00 | 69.93 | 0.82 |
| FC-1 | FC-1 | 8467 | 5 yr | 1568.00 | 575.31 | 579.18 | | 580.12 | 0.004605 | 7.76 | 202.12 | 74.82 | 0.83 |
| FC-1 | FC-1 | 8467 | 10 yr | 1984.00 | 575.31 | 579.66 | | 580.73 | 0.004607 | 8.33 | 238.24 | 77.66 | 0.84 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FC-1 | FC-1 | 8467 | 25 yr | 2433.00 | 575.31 | 580.12 | | 581.34 | 0.004609 | 8.85 | 274.90 | 80.45 | 0.84 |
| FC-1 | FC-1 | 8467 | 50 yr | 2820.00 | 575.31 | 580.49 | | 581.82 | 0.004612 | 9.25 | 305.01 | 82.66 | 0.85 |
| FC-1 | FC-1 | 8467 | 100 yr | 3193.00 | 575.31 | 580.82 | | 582.25 | 0.004612 | 9.59 | 333.06 | 84.67 | 0.85 |
| FC-1 | FC-1 | 8467 | 500 yr | 4130.00 | 575.31 | 581.60 | | 583.25 | 0.004610 | 10.32 | 400.17 | 89.29 | 0.86 |
| FC-1 | FC-1 | 8467 | Ultimate 100 yr | 3193.00 | 575.31 | 580.82 | | 582.25 | 0.004612 | 9.59 | 333.06 | 84.67 | 0.85 |
| FC-1 | FC-1 | 8371 | 2 yr | 955.00 | 574.87 | 577.92 | | 578.62 | 0.004628 | 6.68 | 142.86 | 69.92 | 0.82 |
| FC-1 | FC-1 | 8371 | 5 yr | 1568.00 | 574.87 | 578.74 | | 579.68 | 0.004602 | 7.76 | 202.16 | 74.83 | 0.83 |
| FC-1 | FC-1 | 8371 | 10 yr | 1984.00 | 574.87 | 579.22 | | 580.29 | 0.004606 | 8.33 | 238.25 | 77.67 | 0.84 |
| FC-1 | FC-1 | 8371 | 25 yr | 2433.00 | 574.87 | 579.68 | | 580.90 | 0.004610 | 8.85 | 274.89 | 80.44 | 0.84 |
| FC-1 | FC-1 | 8371 | 50 yr | 2820.00 | 574.87 | 580.05 | | 581.38 | 0.004614 | 9.25 | 304.97 | 82.66 | 0.85 |
| FC-1 | FC-1 | 8371 | 100 yr | 3193.00 | 574.87 | 580.38 | | 581.81 | 0.004614 | 9.59 | 333.02 | 84.67 | 0.85 |
| FC-1 | FC-1 | 8371 | 500 yr | 4130.00 | 574.87 | 581.16 | 580.67 | 582.81 | 0.004611 | 10.32 | 400.14 | 89.29 | 0.86 |
| FC-1 | FC-1 | 8371 | Ultimate 100 yr | 3193.00 | 574.87 | 580.38 | | 581.81 | 0.004614 | 9.59 | 333.02 | 84.67 | 0.85 |
| FC-1 | FC-1 | 7797 | 2 yr | 955.00 | 572.23 | 575.29 | | 575.98 | 0.004593 | 6.67 | 143.24 | 69.95 | 0.82 |
| FC-1 | FC-1 | 7797 | 5 yr | 1568.00 | 572.23 | 576.11 | | 577.04 | 0.004576 | 7.74 | 202.57 | 74.86 | 0.83 |
| FC-1 | FC-1 | 7797 | 10 yr | 1984.00 | 572.23 | 576.58 | | 577.66 | 0.004581 | 8.31 | 238.70 | 77.70 | 0.84 |
| FC-1 | FC-1 | 7797 | 25 yr | 2433.00 | 572.23 | 577.04 | | 578.26 | 0.004597 | 8.84 | 275.16 | 80.46 | 0.84 |
| FC-1 | FC-1 | 7797 | 50 yr | 2820.00 | 572.23 | 577.42 | | 578.74 | 0.004591 | 9.23 | 305.50 | 82.69 | 0.85 |
| FC-1 | FC-1 | 7797 | 100 yr | 3193.00 | 572.23 | 577.75 | | 579.17 | 0.004589 | 9.57 | 333.66 | 84.71 | 0.85 |
| FC-1 | FC-1 | 7797 | 500 yr | 4130.00 | 572.23 | 578.52 | | 580.17 | 0.004588 | 10.30 | 400.85 | 89.34 | 0.86 |
| FC-1 | FC-1 | 7797 | Ultimate 100 yr | 3193.00 | 572.23 | 577.75 | | 579.17 | 0.004589 | 9.57 | 333.66 | 84.71 | 0.85 |
| FC-1 | FC-1 | 7114 | 2 yr | 955.00 | 569.09 | 572.15 | | 572.84 | 0.004604 | 6.67 | 143.12 | 69.94 | 0.82 |
| FC-1 | FC-1 | 7114 | 5 yr | 1568.00 | 569.09 | 572.96 | | 573.90 | 0.004609 | 7.76 | 202.06 | 74.82 | 0.83 |
| FC-1 | FC-1 | 7114 | 10 yr | 1984.00 | 569.09 | 573.44 | | 574.51 | 0.004610 | 8.33 | 238.17 | 77.66 | 0.84 |
| FC-1 | FC-1 | 7114 | 25 yr | 2433.00 | 569.09 | 573.90 | | 575.12 | 0.004611 | 8.85 | 274.86 | 80.44 | 0.84 |
| FC-1 | FC-1 | 7114 | 50 yr | 2820.00 | 569.09 | 574.27 | | 575.60 | 0.004610 | 9.24 | 305.06 | 82.66 | 0.85 |
| FC-1 | FC-1 | 7114 | 100 yr | 3193.00 | 569.09 | 574.61 | 574.14 | 576.03 | 0.004609 | 9.58 | 333.14 | 84.67 | 0.85 |
| FC-1 | FC-1 | 7114 | 500 yr | 4130.00 | 569.09 | 575.38 | 574.89 | 577.03 | 0.004607 | 10.32 | 400.27 | 89.30 | 0.86 |
| FC-1 | FC-1 | 7114 | Ultimate 100 yr | 3193.00 | 569.09 | 574.61 | 574.14 | 576.03 | 0.004609 | 9.58 | 333.14 | 84.67 | 0.85 |
| FC-1 | FC-1 | 6895 | 2 yr | 955.00 | 568.08 | 571.13 | | 571.83 | 0.004624 | 6.68 | 142.90 | 69.92 | 0.82 |
| FC-1 | FC-1 | 6895 | 5 yr | 1568.00 | 568.08 | 571.95 | | 572.89 | 0.004618 | 7.77 | 201.93 | 74.81 | 0.83 |
| FC-1 | FC-1 | 6895 | 10 yr | 1984.00 | 568.08 | 572.42 | | 573.50 | 0.004621 | 8.34 | 237.98 | 77.65 | 0.84 |
| FC-1 | FC-1 | 6895 | 25 yr | 2433.00 | 568.08 | 572.89 | | 574.11 | 0.004617 | 8.86 | 274.73 | 80.43 | 0.84 |
| FC-1 | FC-1 | 6895 | 50 yr | 2820.00 | 568.08 | 573.26 | | 574.59 | 0.004610 | 9.24 | 305.05 | 82.66 | 0.85 |
| FC-1 | FC-1 | 6895 | 100 yr | 3193.00 | 568.08 | 573.60 | | 575.02 | 0.004607 | 9.58 | 333.19 | 84.68 | 0.85 |
| FC-1 | FC-1 | 6895 | 500 yr | 4130.00 | 568.08 | 574.37 | 573.88 | 576.02 | 0.004602 | 10.31 | 400.43 | 89.31 | 0.86 |
| FC-1 | FC-1 | 6895 | Ultimate 100 yr | 3193.00 | 568.08 | 573.60 | | 575.02 | 0.004607 | 9.58 | 333.19 | 84.68 | 0.85 |
| FC-1 | FC-1 | 6573 | 2 yr | 955.00 | 566.60 | 569.67 | | 570.35 | 0.004528 | 6.63 | 143.95 | 70.01 | 0.82 |
| FC-1 | FC-1 | 6573 | 5 yr | 1568.00 | 566.60 | 570.48 | | 571.41 | 0.004550 | 7.73 | 202.97 | 74.89 | 0.83 |
| FC-1 | FC-1 | 6573 | 10 yr | 1984.00 | 566.60 | 570.97 | | 572.03 | 0.004514 | 8.27 | 239.94 | 77.80 | 0.83 |
| FC-1 | FC-1 | 6573 | 25 yr | 2433.00 | 566.60 | 571.44 | | 572.63 | 0.004506 | 8.78 | 277.10 | 80.61 | 0.83 |
| FC-1 | FC-1 | 6573 | 50 yr | 2820.00 | 566.60 | 571.81 | | 573.12 | 0.004501 | 9.17 | 307.64 | 82.85 | 0.84 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FC-1 | FC-1 | 6573 | 100 yr | 3193.00 | 566.60 | 572.15 | | 573.55 | 0.004504 | 9.51 | 335.88 | 84.87 | 0.84 |
| FC-1 | FC-1 | 6573 | 500 yr | 4130.00 | 566.60 | 572.92 | 572.40 | 574.55 | 0.004517 | 10.25 | 403.10 | 89.49 | 0.85 |
| FC-1 | FC-1 | 6573 | Ultimate 100 yr | 3193.00 | 566.60 | 572.15 | | 573.55 | 0.004504 | 9.51 | 335.88 | 84.87 | 0.84 |
| FC-1 | FC-1 | 6100 | 2 yr | 955.00 | 564.43 | 567.48 | | 568.18 | 0.004638 | 6.69 | 142.75 | 69.91 | 0.83 |
| FC-1 | FC-1 | 6100 | 5 yr | 1568.00 | 564.43 | 568.29 | | 569.23 | 0.004646 | 7.78 | 201.49 | 74.77 | 0.84 |
| FC-1 | FC-1 | 6100 | 10 yr | 1984.00 | 564.43 | 568.75 | | 569.85 | 0.004700 | 8.39 | 236.56 | 77.54 | 0.85 |
| FC-1 | FC-1 | 6100 | 25 yr | 2433.00 | 564.43 | 569.21 | 568.82 | 570.45 | 0.004728 | 8.93 | 272.44 | 80.26 | 0.85 |
| FC-1 | FC-1 | 6100 | 50 yr | 2820.00 | 564.43 | 569.57 | 569.17 | 570.93 | 0.004739 | 9.34 | 302.08 | 82.45 | 0.86 |
| FC-1 | FC-1 | 6100 | 100 yr | 3193.00 | 564.43 | 569.91 | 569.48 | 571.36 | 0.004738 | 9.68 | 329.89 | 84.44 | 0.86 |
| FC-1 | FC-1 | 6100 | 500 yr | 4130.00 | 564.43 | 570.68 | 570.23 | 572.36 | 0.004718 | 10.41 | 396.86 | 89.07 | 0.87 |
| FC-1 | FC-1 | 6100 | Ultimate 100 yr | 3193.00 | 564.43 | 569.91 | 569.48 | 571.36 | 0.004738 | 9.68 | 329.89 | 84.44 | 0.86 |
| FC-1 | FC-1 | 5555 | 2 yr | 955.00 | 561.92 | 564.98 | | 565.67 | 0.004573 | 6.66 | 143.46 | 69.97 | 0.82 |
| FC-1 | FC-1 | 5555 | 5 yr | 1568.00 | 561.92 | 565.81 | | 566.73 | 0.004499 | 7.69 | 203.78 | 74.96 | 0.82 |
| FC-1 | FC-1 | 5555 | 10 yr | 1984.00 | 561.92 | 566.33 | | 567.36 | 0.004339 | 8.15 | 243.30 | 78.05 | 0.81 |
| FC-1 | FC-1 | 5555 | 25 yr | 2433.00 | 561.92 | 566.84 | | 567.98 | 0.004204 | 8.57 | 283.96 | 81.12 | 0.81 |
| FC-1 | FC-1 | 5555 | 50 yr | 2820.00 | 561.92 | 567.26 | | 568.48 | 0.004098 | 8.87 | 318.02 | 83.60 | 0.80 |
| FC-1 | FC-1 | 5555 | 100 yr | 3193.00 | 561.92 | 567.63 | | 568.92 | 0.004022 | 9.13 | 349.65 | 85.84 | 0.80 |
| FC-1 | FC-1 | 5555 | 500 yr | 4130.00 | 561.92 | 568.53 | | 569.97 | 0.003789 | 9.62 | 429.33 | 91.23 | 0.78 |
| FC-1 | FC-1 | 5555 | Ultimate 100 yr | 3193.00 | 561.92 | 567.63 | | 568.92 | 0.004021 | 9.13 | 349.69 | 85.84 | 0.80 |
| FC-1 | FC-1 | 5414 | 2 yr | 955.00 | 561.27 | 564.29 | 564.05 | 565.01 | 0.004848 | 6.79 | 140.57 | 69.72 | 0.84 |
| FC-1 | FC-1 | 5414 | 5 yr | 1568.00 | 561.27 | 565.24 | | 566.11 | 0.004142 | 7.48 | 209.75 | 75.43 | 0.79 |
| FC-1 | FC-1 | 5414 | 10 yr | 1984.00 | 561.27 | 565.82 | | 566.76 | 0.003847 | 7.82 | 253.78 | 78.86 | 0.77 |
| FC-1 | FC-1 | 5414 | 25 yr | 2433.00 | 561.27 | 566.36 | | 567.40 | 0.003676 | 8.17 | 297.73 | 82.13 | 0.76 |
| FC-1 | FC-1 | 5414 | 50 yr | 2820.00 | 561.27 | 566.80 | | 567.90 | 0.003561 | 8.44 | 334.27 | 84.75 | 0.75 |
| FC-1 | FC-1 | 5414 | 100 yr | 3193.00 | 561.27 | 567.19 | | 568.36 | 0.003492 | 8.68 | 367.72 | 87.09 | 0.74 |
| FC-1 | FC-1 | 5414 | 500 yr | 4130.00 | 561.27 | 568.14 | | 569.43 | 0.003266 | 9.12 | 452.89 | 92.77 | 0.73 |
| FC-1 | FC-1 | 5414 | Ultimate 100 yr | 3193.00 | 561.27 | 567.19 | | 568.36 | 0.003490 | 8.68 | 367.79 | 87.09 | 0.74 |
| FC-1 | FC-1 | 4972 | 2 yr | 1111.00 | 559.24 | 561.86 | 561.86 | 562.83 | 0.004948 | 7.88 | 140.98 | 72.24 | 0.99 |
| FC-1 | FC-1 | 4972 | 5 yr | 1908.00 | 559.24 | 562.78 | 562.72 | 564.06 | 0.005016 | 9.08 | 210.03 | 77.76 | 0.97 |
| FC-1 | FC-1 | 4972 | 10 yr | 2439.00 | 559.24 | 563.29 | 563.24 | 564.77 | 0.005157 | 9.73 | 250.62 | 80.83 | 0.97 |
| FC-1 | FC-1 | 4972 | 25 yr | 3005.00 | 559.24 | 563.82 | 563.73 | 565.44 | 0.005159 | 10.21 | 294.31 | 84.01 | 0.96 |
| FC-1 | FC-1 | 4972 | 50 yr | 3495.00 | 559.24 | 564.27 | 564.09 | 565.99 | 0.005119 | 10.53 | 331.97 | 86.66 | 0.95 |
| FC-1 | FC-1 | 4972 | 100 yr | 3965.00 | 559.24 | 564.70 | 564.48 | 566.48 | 0.004998 | 10.72 | 369.81 | 89.24 | 0.93 |
| FC-1 | FC-1 | 4972 | 500 yr | 5148.00 | 559.24 | 565.60 | 565.30 | 567.61 | 0.005022 | 11.36 | 453.20 | 94.67 | 0.91 |
| FC-1 | FC-1 | 4972 | Ultimate 100 yr | 3966.00 | 559.24 | 564.70 | 564.48 | 566.48 | 0.004997 | 10.72 | 369.91 | 89.24 | 0.93 |
| FC-1 | FC-1 | 4369 | 2 yr | 1111.00 | 556.22 | 558.83 | 558.82 | 559.81 | 0.005025 | 7.93 | 140.18 | 72.18 | 1.00 |
| FC-1 | FC-1 | 4369 | 5 yr | 1908.00 | 556.22 | 559.77 | 559.70 | 561.05 | 0.004961 | 9.05 | 210.91 | 77.83 | 0.97 |
| FC-1 | FC-1 | 4369 | 10 yr | 2439.00 | 556.22 | 560.38 | 560.20 | 561.76 | 0.004724 | 9.41 | 259.19 | 81.47 | 0.93 |
| FC-1 | FC-1 | 4369 | 25 yr | 3005.00 | 556.22 | 560.94 | 560.69 | 562.44 | 0.004661 | 9.82 | 306.13 | 84.85 | 0.91 |
| FC-1 | FC-1 | 4369 | 50 yr | 3495.00 | 556.22 | 561.36 | 561.10 | 562.98 | 0.004747 | 10.22 | 341.89 | 87.34 | 0.91 |
| FC-1 | FC-1 | 4369 | 100 yr | 3965.00 | 556.22 | 561.67 | 561.45 | 563.46 | 0.005012 | 10.73 | 369.40 | 89.40 | 0.93 |
| FC-1 | FC-1 | 4369 | 500 yr | 5148.00 | 556.22 | 562.61 | 562.26 | 564.59 | 0.004955 | 11.30 | 455.59 | 94.82 | 0.91 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FC-1 | FC-1 | 4369 | Ultimate 100 yr | 3966.00 | 556.22 | 561.67 | 561.45 | 563.46 | 0.005013 | 10.74 | 369.43 | 89.21 | 0.93 |
| FC-1 | FC-1 | 3936 | 2 yr | 1111.00 | 554.06 | 556.69 | 556.66 | 557.65 | 0.004905 | 7.86 | 141.43 | 72.28 | 0.99 |
| FC-1 | FC-1 | 3936 | 5 yr | 1908.00 | 554.06 | 557.60 | 557.54 | 558.88 | 0.005019 | 9.09 | 209.98 | 77.76 | 0.97 |
| FC-1 | FC-1 | 3936 | 10 yr | 2439.00 | 554.06 | 558.09 | 558.04 | 559.58 | 0.005283 | 9.82 | 248.31 | 80.66 | 0.99 |
| FC-1 | FC-1 | 3936 | 25 yr | 3005.00 | 554.06 | 558.59 | 558.53 | 560.26 | 0.005384 | 10.38 | 289.49 | 83.67 | 0.98 |
| FC-1 | FC-1 | 3936 | 50 yr | 3495.00 | 554.06 | 559.04 | 558.94 | 560.80 | 0.005287 | 10.66 | 327.81 | 86.37 | 0.96 |
| FC-1 | FC-1 | 3936 | 100 yr | 3965.00 | 554.06 | 559.54 | 559.29 | 561.31 | 0.004912 | 10.65 | 372.31 | 89.40 | 0.92 |
| FC-1 | FC-1 | 3936 | 500 yr | 5148.00 | 554.06 | 561.00 | | 562.59 | 0.003739 | 10.11 | 509.19 | 98.15 | 0.78 |
| FC-1 | FC-1 | 3936 | Ultimate 100 yr | 3966.00 | 554.06 | 559.55 | 559.29 | 561.31 | 0.004907 | 10.65 | 372.53 | 89.42 | 0.92 |
| FC-1 | FC-1 | 3396 | 2 yr | 1111.00 | 551.36 | 553.96 | 553.96 | 554.95 | 0.005080 | 7.96 | 139.62 | 72.13 | 1.01 |
| FC-1 | FC-1 | 3396 | 5 yr | 1908.00 | 551.36 | 554.91 | 554.84 | 556.18 | 0.004981 | 9.06 | 210.59 | 77.81 | 0.97 |
| FC-1 | FC-1 | 3396 | 10 yr | 2439.00 | 551.36 | 555.62 | 555.35 | 556.91 | 0.004366 | 9.13 | 267.19 | 82.05 | 0.89 |
| FC-1 | FC-1 | 3396 | 25 yr | 3005.00 | 551.36 | 556.37 | | 557.65 | 0.003815 | 9.08 | 330.92 | 86.58 | 0.82 |
| FC-1 | FC-1 | 3396 | 50 yr | 3495.00 | 551.36 | 557.19 | | 558.35 | 0.003112 | 8.66 | 403.35 | 91.46 | 0.73 |
| FC-1 | FC-1 | 3396 | 100 yr | 3965.00 | 551.36 | 558.03 | | 559.08 | 0.002545 | 8.22 | 482.22 | 96.49 | 0.65 |
| FC-1 | FC-1 | 3396 | 500 yr | 5148.00 | 551.36 | 560.02 | | 560.89 | 0.001765 | 7.51 | 685.92 | 108.41 | 0.53 |
| FC-1 | FC-1 | 3396 | Ultimate 100 yr | 3966.00 | 551.36 | 558.03 | | 559.08 | 0.002539 | 8.21 | 482.82 | 96.53 | 0.65 |
| FC-1 | FC-1 | 2969 | 2 yr | 1111.00 | 549.23 | 552.32 | 551.85 | 552.94 | 0.002757 | 6.35 | 175.10 | 75.02 | 0.73 |
| FC-1 | FC-1 | 2969 | 5 yr | 1908.00 | 549.23 | 553.88 | 552.72 | 554.51 | 0.001983 | 6.36 | 299.80 | 84.40 | 0.60 |
| FC-1 | FC-1 | 2969 | 10 yr | 2439.00 | 549.23 | 554.74 | 553.23 | 555.40 | 0.001825 | 6.50 | 374.98 | 89.58 | 0.56 |
| FC-1 | FC-1 | 2969 | 25 yr | 3005.00 | 549.23 | 555.63 | 553.72 | 556.30 | 0.001681 | 6.58 | 456.42 | 94.88 | 0.53 |
| FC-1 | FC-1 | 2969 | 50 yr | 3495.00 | 549.23 | 556.60 | 554.12 | 557.23 | 0.001406 | 6.33 | 552.01 | 100.74 | 0.48 |
| FC-1 | FC-1 | 2969 | 100 yr | 3965.00 | 549.23 | 557.56 | 554.47 | 558.14 | 0.001193 | 6.09 | 651.15 | 106.47 | 0.43 |
| FC-1 | FC-1 | 2969 | 500 yr | 5148.00 | 549.23 | 559.73 | 555.28 | 560.24 | 0.000763 | 5.77 | 910.66 | 128.36 | 0.36 |
| FC-1 | FC-1 | 2969 | Ultimate 100 yr | 3966.00 | 549.23 | 557.57 | 554.47 | 558.14 | 0.001190 | 6.08 | 651.96 | 106.52 | 0.43 |
| FC-1 | FC-1 | 2845 | 2 yr | 1159.00 | 548.04 | 552.28 | 550.87 | 552.64 | 0.000753 | 4.82 | 240.56 | 74.34 | 0.47 |
| FC-1 | FC-1 | 2845 | 5 yr | 2013.00 | 548.04 | 553.80 | 551.85 | 554.29 | 0.000837 | 5.59 | 360.08 | 82.97 | 0.47 |
| FC-1 | FC-1 | 2845 | 10 yr | 2579.00 | 548.04 | 554.64 | 552.40 | 555.20 | 0.000934 | 5.97 | 431.94 | 88.17 | 0.48 |
| FC-1 | FC-1 | 2845 | 25 yr | 3182.00 | 548.04 | 555.51 | 552.95 | 556.11 | 0.000989 | 6.23 | 510.59 | 93.52 | 0.47 |
| FC-1 | FC-1 | 2845 | 50 yr | 3695.00 | 548.04 | 556.49 | 553.37 | 557.07 | 0.000916 | 6.11 | 605.22 | 99.58 | 0.44 |
| FC-1 | FC-1 | 2845 | 100 yr | 4192.00 | 548.04 | 557.45 | 553.76 | 558.00 | 0.000842 | 5.96 | 703.81 | 105.63 | 0.41 |
| FC-1 | FC-1 | 2845 | 500 yr | 5454.00 | 548.04 | 559.64 | 554.67 | 560.15 | 0.000644 | 5.75 | 962.57 | 140.90 | 0.35 |
| FC-1 | FC-1 | 2845 | Ultimate 100 yr | 4194.00 | 548.04 | 557.46 | 553.75 | 558.01 | 0.000840 | 5.95 | 704.61 | 105.68 | 0.41 |
| FC-1 | FC-1 | 2772 | | Culvert | | | | | | | | | |
| FC-1 | FC-1 | 2700 | 2 yr | 1159.00 | 544.52 | 552.30 | | 552.40 | 0.000728 | 2.60 | 446.27 | 87.80 | 0.20 |
| FC-1 | FC-1 | 2700 | 5 yr | 2013.00 | 544.52 | 553.63 | | 553.83 | 0.001107 | 3.54 | 569.35 | 96.31 | 0.26 |
| FC-1 | FC-1 | 2700 | 10 yr | 2579.00 | 544.52 | 554.32 | | 554.57 | 0.001329 | 4.05 | 636.79 | 100.66 | 0.28 |
| FC-1 | FC-1 | 2700 | 25 yr | 3182.00 | 544.52 | 554.97 | | 555.29 | 0.001506 | 4.52 | 704.96 | 109.14 | 0.31 |
| FC-1 | FC-1 | 2700 | 50 yr | 3695.00 | 544.52 | 555.50 | | 555.87 | 0.001610 | 4.86 | 764.89 | 115.59 | 0.32 |
| FC-1 | FC-1 | 2700 | 100 yr | 4192.00 | 544.52 | 555.98 | | 556.40 | 0.001694 | 5.16 | 821.22 | 117.63 | 0.33 |
| FC-1 | FC-1 | 2700 | 500 yr | 5454.00 | 544.52 | 556.96 | | 557.50 | 0.001952 | 5.92 | 937.59 | 169.39 | 0.36 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FC-1 | FC-1 | 2700 | Ultimate 100 yr | 4194.00 | 544.52 | 555.99 | | 556.40 | 0.001692 | 5.16 | 821.80 | 117.66 | 0.33 |
| FC-1 | FC-1 | 2126 | 2 yr | 1159.00 | 546.22 | 551.41 | | 551.69 | 0.003895 | 4.70 | 329.07 | 130.52 | 0.41 |
| FC-1 | FC-1 | 2126 | 5 yr | 2013.00 | 546.22 | 552.31 | | 552.77 | 0.005138 | 6.18 | 457.08 | 152.31 | 0.49 |
| FC-1 | FC-1 | 2126 | 10 yr | 2579.00 | 546.22 | 552.72 | | 553.31 | 0.006081 | 7.08 | 520.92 | 162.35 | 0.54 |
| FC-1 | FC-1 | 2126 | 25 yr | 3182.00 | 546.22 | 553.20 | | 553.88 | 0.006440 | 7.71 | 601.48 | 172.97 | 0.56 |
| FC-1 | FC-1 | 2126 | 50 yr | 3695.00 | 546.22 | 553.70 | | 554.40 | 0.006116 | 7.94 | 691.16 | 184.37 | 0.55 |
| FC-1 | FC-1 | 2126 | 100 yr | 4192.00 | 546.22 | 554.16 | | 554.89 | 0.005927 | 8.18 | 778.92 | 200.69 | 0.55 |
| FC-1 | FC-1 | 2126 | 500 yr | 5454.00 | 546.22 | 555.03 | | 555.84 | 0.005812 | 8.78 | 965.82 | 227.61 | 0.56 |
| FC-1 | FC-1 | 2126 | Ultimate 100 yr | 4194.00 | 546.22 | 554.17 | | 554.90 | 0.005884 | 8.16 | 781.45 | 201.14 | 0.55 |
| FC-1 | FC-1 | 1327 | 2 yr | 1159.00 | 544.00 | 548.07 | | 548.28 | 0.004981 | 3.66 | 330.82 | 344.72 | 0.42 |
| FC-1 | FC-1 | 1327 | 5 yr | 2013.00 | 544.00 | 548.94 | | 549.18 | 0.004199 | 4.10 | 636.54 | 359.76 | 0.41 |
| FC-1 | FC-1 | 1327 | 10 yr | 2579.00 | 544.00 | 549.67 | | 549.86 | 0.002865 | 3.89 | 901.44 | 373.97 | 0.35 |
| FC-1 | FC-1 | 1327 | 25 yr | 3182.00 | 544.00 | 550.51 | | 550.67 | 0.001898 | 3.62 | 1224.29 | 391.69 | 0.29 |
| FC-1 | FC-1 | 1327 | 50 yr | 3695.00 | 544.00 | 551.45 | | 551.58 | 0.001205 | 3.26 | 1603.83 | 410.65 | 0.24 |
| FC-1 | FC-1 | 1327 | 100 yr | 4192.00 | 544.00 | 552.09 | | 552.21 | 0.001006 | 3.20 | 1870.67 | 422.87 | 0.22 |
| FC-1 | FC-1 | 1327 | 500 yr | 5454.00 | 544.00 | 553.10 | | 553.23 | 0.000947 | 3.42 | 2302.78 | 439.59 | 0.22 |
| FC-1 | FC-1 | 1327 | Ultimate 100 yr | 4194.00 | 544.00 | 552.13 | | 552.25 | 0.000984 | 3.17 | 1886.40 | 423.46 | 0.22 |
| FC-1 | FC-1 | 1181 | 2 yr | 1503.00 | 540.29 | 547.23 | 546.65 | 547.49 | 0.006407 | 4.68 | 466.94 | 400.09 | 0.49 |
| FC-1 | FC-1 | 1181 | 5 yr | 2609.00 | 540.29 | 548.32 | 547.25 | 548.58 | 0.004563 | 4.91 | 790.46 | 509.46 | 0.44 |
| FC-1 | FC-1 | 1181 | 10 yr | 3330.00 | 540.29 | 549.24 | 547.55 | 549.46 | 0.003073 | 4.63 | 1077.72 | 553.36 | 0.37 |
| FC-1 | FC-1 | 1181 | 25 yr | 4099.00 | 540.29 | 550.39 | 547.83 | 550.46 | 0.000947 | 2.96 | 2236.84 | 634.99 | 0.21 |
| FC-1 | FC-1 | 1181 | 50 yr | 4724.00 | 540.29 | 551.39 | 548.04 | 551.44 | 0.000585 | 2.58 | 2885.41 | 658.69 | 0.17 |
| FC-1 | FC-1 | 1181 | 100 yr | 5369.00 | 540.29 | 552.05 | 548.24 | 552.10 | 0.000494 | 2.52 | 3323.21 | 676.71 | 0.16 |
| FC-1 | FC-1 | 1181 | 500 yr | 7033.00 | 540.29 | 553.06 | 548.74 | 553.12 | 0.000481 | 2.70 | 4026.83 | 711.33 | 0.16 |
| FC-1 | FC-1 | 1181 | Ultimate 100 yr | 5385.00 | 540.29 | 552.08 | 548.24 | 552.14 | 0.000486 | 2.51 | 3349.14 | 678.20 | 0.16 |
| FC-1 | FC-1 | 502 | 2 yr | 1503.00 | 536.47 | 544.57 | | 544.76 | 0.001583 | 3.66 | 530.35 | 167.66 | 0.27 |
| FC-1 | FC-1 | 502 | 5 yr | 2609.00 | 536.47 | 546.25 | | 546.49 | 0.001595 | 4.38 | 843.26 | 207.85 | 0.29 |
| FC-1 | FC-1 | 502 | 10 yr | 3330.00 | 536.47 | 547.83 | | 548.04 | 0.001118 | 4.18 | 1209.42 | 258.64 | 0.25 |
| FC-1 | FC-1 | 502 | 25 yr | 4099.00 | 536.47 | 549.77 | | 549.91 | 0.000660 | 3.66 | 1845.43 | 399.31 | 0.20 |
| FC-1 | FC-1 | 502 | 50 yr | 4724.00 | 536.47 | 550.96 | | 551.08 | 0.000493 | 3.40 | 2370.44 | 479.04 | 0.17 |
| FC-1 | FC-1 | 502 | 100 yr | 5369.00 | 536.47 | 551.67 | | 551.77 | 0.000453 | 3.38 | 2720.25 | 513.51 | 0.17 |
| FC-1 | FC-1 | 502 | 500 yr | 7033.00 | 536.47 | 552.67 | | 552.79 | 0.000474 | 3.64 | 3279.14 | 614.84 | 0.17 |
| FC-1 | FC-1 | 502 | Ultimate 100 yr | 5385.00 | 536.47 | 551.71 | | 551.82 | 0.000446 | 3.36 | 2743.10 | 515.38 | 0.17 |
| FC-1 | FC-1 | 399 | 2 yr | 1503.00 | 534.40 | 544.30 | 541.55 | 544.54 | 0.002806 | 3.95 | 381.47 | 95.55 | 0.34 |
| FC-1 | FC-1 | 399 | 5 yr | 2609.00 | 534.40 | 545.89 | 542.79 | 546.26 | 0.002885 | 4.94 | 530.60 | 173.80 | 0.36 |
| FC-1 | FC-1 | 399 | 10 yr | 3330.00 | 534.40 | 547.50 | 543.43 | 547.87 | 0.002040 | 4.89 | 682.35 | 288.51 | 0.32 |
| FC-1 | FC-1 | 399 | 25 yr | 4099.00 | 534.40 | 549.45 | 544.08 | 549.80 | 0.001400 | 4.73 | 865.41 | 353.12 | 0.27 |
| FC-1 | FC-1 | 399 | 50 yr | 4724.00 | 534.40 | 550.94 | 544.52 | 551.02 | 0.000331 | 2.54 | 2196.45 | 421.63 | 0.14 |
| FC-1 | FC-1 | 399 | 100 yr | 5369.00 | 534.40 | 551.65 | 544.92 | 551.73 | 0.000301 | 2.52 | 2502.35 | 459.90 | 0.13 |
| FC-1 | FC-1 | 399 | 500 yr | 7033.00 | 534.40 | 552.64 | 545.85 | 552.74 | 0.000390 | 3.04 | 3102.37 | 773.08 | 0.15 |
| FC-1 | FC-1 | 399 | Ultimate 100 yr | 5385.00 | 534.40 | 551.69 | 544.93 | 551.77 | 0.000301 | 2.53 | 2522.98 | 477.72 | 0.13 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FC-1 | FC-1 | 305 | | Bridge | | | | | | | | | |
| FC-1 | FC-1 | 213 | 2 yr | 1503.00 | 533.34 | 543.33 | 540.87 | 543.95 | 0.006893 | 6.81 | 295.04 | 101.87 | 0.45 |
| FC-1 | FC-1 | 213 | 5 yr | 2609.00 | 533.34 | 544.94 | 543.50 | 545.71 | 0.007400 | 8.07 | 453.63 | 147.95 | 0.48 |
| FC-1 | FC-1 | 213 | 10 yr | 3330.00 | 533.34 | 545.72 | 544.24 | 546.60 | 0.007850 | 8.79 | 530.62 | 187.06 | 0.50 |
| FC-1 | FC-1 | 213 | 25 yr | 4099.00 | 533.34 | 546.57 | 544.85 | 547.52 | 0.007824 | 9.28 | 614.37 | 316.31 | 0.51 |
| FC-1 | FC-1 | 213 | 50 yr | 4724.00 | 533.34 | 547.45 | 545.26 | 548.09 | 0.005815 | 8.45 | 1157.56 | 395.12 | 0.44 |
| FC-1 | FC-1 | 213 | 100 yr | 5369.00 | 533.34 | 548.22 | 545.67 | 548.69 | 0.004380 | 7.66 | 1477.68 | 431.84 | 0.39 |
| FC-1 | FC-1 | 213 | 500 yr | 7033.00 | 533.34 | 549.85 | 547.55 | 550.16 | 0.002886 | 6.77 | 2263.60 | 565.21 | 0.32 |
| FC-1 | FC-1 | 213 | Ultimate 100 yr | 5385.00 | 533.34 | 548.34 | 545.70 | 548.77 | 0.004086 | 7.45 | 1528.15 | 442.31 | 0.38 |
| FC-1 | FC-1 | 83 | 2 yr | 1503.00 | 539.00 | 543.33 | | 543.36 | 0.000873 | 1.89 | 1236.97 | 454.18 | 0.16 |
| FC-1 | FC-1 | 83 | 5 yr | 2609.00 | 539.00 | 545.05 | | 545.08 | 0.000604 | 1.98 | 2077.00 | 536.11 | 0.14 |
| FC-1 | FC-1 | 83 | 10 yr | 3330.00 | 539.00 | 545.89 | | 545.92 | 0.000544 | 2.05 | 2535.58 | 554.61 | 0.14 |
| FC-1 | FC-1 | 83 | 25 yr | 4099.00 | 539.00 | 546.80 | | 546.83 | 0.000479 | 2.10 | 3056.61 | 584.78 | 0.13 |
| FC-1 | FC-1 | 83 | 50 yr | 4724.00 | 539.00 | 547.57 | | 547.60 | 0.000429 | 2.12 | 3525.78 | 623.52 | 0.13 |
| FC-1 | FC-1 | 83 | 100 yr | 5369.00 | 539.00 | 548.30 | | 548.33 | 0.000394 | 2.15 | 3993.32 | 660.59 | 0.13 |
| FC-1 | FC-1 | 83 | 500 yr | 7033.00 | 539.00 | 549.90 | | 549.93 | 0.000340 | 2.22 | 5095.96 | 717.72 | 0.12 |
| FC-1 | FC-1 | 83 | Ultimate 100 yr | 5385.00 | 539.00 | 548.41 | | 548.44 | 0.000376 | 2.11 | 4065.34 | 662.98 | 0.12 |
| FC-2 | FC-2 | 8494 | 2 yr | 930.00 | 602.93 | 605.85 | 605.40 | 605.99 | 0.007125 | 3.11 | 329.27 | 300.82 | 0.41 |
| FC-2 | FC-2 | 8494 | 5 yr | 1437.00 | 602.93 | 606.26 | 605.68 | 606.42 | 0.006628 | 3.43 | 465.95 | 373.46 | 0.41 |
| FC-2 | FC-2 | 8494 | 10 yr | 1777.00 | 602.93 | 606.46 | 605.83 | 606.63 | 0.006575 | 3.61 | 537.60 | 398.88 | 0.41 |
| FC-2 | FC-2 | 8494 | 25 yr | 2155.00 | 602.93 | 606.65 | 605.96 | 606.85 | 0.006518 | 3.79 | 610.58 | 414.25 | 0.41 |
| FC-2 | FC-2 | 8494 | 50 yr | 2464.00 | 602.93 | 606.79 | 606.07 | 607.01 | 0.006520 | 3.93 | 666.08 | 429.90 | 0.42 |
| FC-2 | FC-2 | 8494 | 100 yr | 2766.00 | 602.93 | 606.93 | 606.25 | 607.17 | 0.006521 | 4.05 | 719.02 | 447.86 | 0.42 |
| FC-2 | FC-2 | 8494 | 500 yr | 3487.00 | 602.93 | 607.22 | 606.45 | 607.50 | 0.006543 | 4.33 | 840.10 | 500.29 | 0.43 |
| FC-2 | FC-2 | 8494 | Ultimate 100 yr | 2814.00 | 602.93 | 606.95 | 606.25 | 607.19 | 0.006525 | 4.07 | 727.21 | 451.39 | 0.42 |
| FC-2 | FC-2 | 7755 | 2 yr | 930.00 | 599.11 | 601.86 | | 601.95 | 0.003826 | 2.39 | 434.08 | 626.49 | 0.30 |
| FC-2 | FC-2 | 7755 | 5 yr | 1437.00 | 599.11 | 602.33 | | 602.45 | 0.004139 | 2.83 | 673.32 | 712.07 | 0.32 |
| FC-2 | FC-2 | 7755 | 10 yr | 1777.00 | 599.11 | 602.54 | | 602.66 | 0.004191 | 3.01 | 821.25 | 723.75 | 0.33 |
| FC-2 | FC-2 | 7755 | 25 yr | 2155.00 | 599.11 | 602.74 | | 602.87 | 0.004226 | 3.18 | 969.12 | 739.21 | 0.34 |
| FC-2 | FC-2 | 7755 | 50 yr | 2464.00 | 599.11 | 602.89 | | 603.03 | 0.004235 | 3.30 | 1083.36 | 755.48 | 0.34 |
| FC-2 | FC-2 | 7755 | 100 yr | 2766.00 | 599.11 | 603.03 | | 603.17 | 0.004250 | 3.41 | 1187.63 | 766.72 | 0.34 |
| FC-2 | FC-2 | 7755 | 500 yr | 3487.00 | 599.11 | 603.35 | | 603.50 | 0.004211 | 3.62 | 1437.63 | 816.46 | 0.35 |
| FC-2 | FC-2 | 7755 | Ultimate 100 yr | 2814.00 | 599.11 | 603.05 | | 603.19 | 0.004248 | 3.42 | 1204.21 | 768.42 | 0.34 |
| FC-2 | FC-2 | 7157 | 2 yr | 930.00 | 596.76 | 598.63 | | 598.86 | 0.008752 | 4.36 | 295.66 | 336.51 | 0.65 |
| FC-2 | FC-2 | 7157 | 5 yr | 1437.00 | 596.76 | 598.99 | | 599.28 | 0.008332 | 4.95 | 424.14 | 371.06 | 0.66 |
| FC-2 | FC-2 | 7157 | 10 yr | 1777.00 | 596.76 | 599.20 | | 599.52 | 0.008113 | 5.27 | 505.19 | 394.86 | 0.66 |
| FC-2 | FC-2 | 7157 | 25 yr | 2155.00 | 596.76 | 599.42 | | 599.76 | 0.007929 | 5.58 | 595.10 | 444.27 | 0.66 |
| FC-2 | FC-2 | 7157 | 50 yr | 2464.00 | 596.76 | 599.58 | | 599.94 | 0.007829 | 5.81 | 669.11 | 481.50 | 0.67 |
| FC-2 | FC-2 | 7157 | 100 yr | 2766.00 | 596.76 | 599.74 | | 600.11 | 0.007643 | 5.99 | 747.16 | 521.41 | 0.67 |
| FC-2 | FC-2 | 7157 | 500 yr | 3487.00 | 596.76 | 600.06 | | 600.48 | 0.007612 | 6.48 | 928.39 | 581.71 | 0.68 |
| FC-2 | FC-2 | 7157 | Ultimate 100 yr | 2814.00 | 596.76 | 599.76 | | 600.14 | 0.007642 | 6.03 | 758.76 | 528.17 | 0.67 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FC-2 | FC-2 | 6521 | 2 yr | 930.00 | 592.52 | 594.84 | | 594.91 | 0.003828 | 2.23 | 495.61 | 378.51 | 0.30 |
| FC-2 | FC-2 | 6521 | 5 yr | 1437.00 | 592.52 | 595.26 | | 595.36 | 0.004191 | 2.70 | 670.63 | 439.10 | 0.32 |
| FC-2 | FC-2 | 6521 | 10 yr | 1777.00 | 592.52 | 595.49 | | 595.60 | 0.004460 | 2.97 | 775.49 | 500.12 | 0.34 |
| FC-2 | FC-2 | 6521 | 25 yr | 2155.00 | 592.52 | 595.70 | | 595.83 | 0.004701 | 3.22 | 883.46 | 535.14 | 0.35 |
| FC-2 | FC-2 | 6521 | 50 yr | 2464.00 | 592.52 | 595.85 | | 595.99 | 0.004864 | 3.41 | 968.32 | 557.41 | 0.36 |
| FC-2 | FC-2 | 6521 | 100 yr | 2766.00 | 592.52 | 596.01 | | 596.17 | 0.005033 | 3.60 | 1061.91 | 607.77 | 0.37 |
| FC-2 | FC-2 | 6521 | 500 yr | 3487.00 | 592.52 | 596.31 | | 596.49 | 0.005279 | 3.93 | 1243.37 | 634.12 | 0.39 |
| FC-2 | FC-2 | 6521 | Ultimate 100 yr | 2814.00 | 592.52 | 596.04 | | 596.19 | 0.005046 | 3.62 | 1074.95 | 609.68 | 0.37 |
| FC-2 | FC-2 | 5943 | 2 yr | 930.00 | 590.48 | 592.72 | | 592.81 | 0.003937 | 2.48 | 414.38 | 420.44 | 0.35 |
| FC-2 | FC-2 | 5943 | 5 yr | 1437.00 | 590.48 | 593.09 | | 593.20 | 0.003986 | 2.85 | 583.42 | 494.06 | 0.37 |
| FC-2 | FC-2 | 5943 | 10 yr | 1777.00 | 590.48 | 593.30 | | 593.42 | 0.003927 | 3.01 | 687.08 | 510.74 | 0.37 |
| FC-2 | FC-2 | 5943 | 25 yr | 2155.00 | 590.48 | 593.50 | | 593.63 | 0.003848 | 3.17 | 794.57 | 541.20 | 0.37 |
| FC-2 | FC-2 | 5943 | 50 yr | 2464.00 | 590.48 | 593.66 | | 593.80 | 0.003781 | 3.28 | 880.85 | 571.98 | 0.37 |
| FC-2 | FC-2 | 5943 | 100 yr | 2766.00 | 590.48 | 593.79 | | 593.94 | 0.003746 | 3.39 | 962.24 | 594.92 | 0.37 |
| FC-2 | FC-2 | 5943 | 500 yr | 3487.00 | 590.48 | 594.11 | | 594.27 | 0.003613 | 3.60 | 1154.11 | 637.44 | 0.37 |
| FC-2 | FC-2 | 5943 | Ultimate 100 yr | 2814.00 | 590.48 | 593.82 | | 593.97 | 0.003739 | 3.41 | 975.28 | 598.82 | 0.37 |
| FC-2 | FC-2 | 5653 | 2 yr | 930.00 | 588.73 | 591.48 | 590.43 | 591.58 | 0.004840 | 2.77 | 419.50 | 391.01 | 0.34 |
| FC-2 | FC-2 | 5653 | 5 yr | 1437.00 | 588.73 | 591.90 | 591.14 | 592.01 | 0.004604 | 3.05 | 589.63 | 434.24 | 0.34 |
| FC-2 | FC-2 | 5653 | 10 yr | 1777.00 | 588.73 | 592.12 | 591.36 | 592.25 | 0.004597 | 3.23 | 685.85 | 480.45 | 0.35 |
| FC-2 | FC-2 | 5653 | 25 yr | 2155.00 | 588.73 | 592.35 | 591.51 | 592.49 | 0.004578 | 3.40 | 788.23 | 524.74 | 0.35 |
| FC-2 | FC-2 | 5653 | 50 yr | 2464.00 | 588.73 | 592.52 | 591.62 | 592.67 | 0.004559 | 3.53 | 870.18 | 562.94 | 0.35 |
| FC-2 | FC-2 | 5653 | 100 yr | 2766.00 | 588.73 | 592.68 | 591.72 | 592.83 | 0.004506 | 3.62 | 947.48 | 593.99 | 0.36 |
| FC-2 | FC-2 | 5653 | 500 yr | 3487.00 | 588.73 | 593.03 | 591.92 | 593.19 | 0.004393 | 3.83 | 1130.01 | 693.41 | 0.36 |
| FC-2 | FC-2 | 5653 | Ultimate 100 yr | 2814.00 | 588.73 | 592.70 | 591.73 | 592.86 | 0.004498 | 3.64 | 959.83 | 600.01 | 0.36 |
| FC-2 | FC-2 | 4892 | 2 yr | 930.00 | 586.18 | 588.73 | | 588.78 | 0.003115 | 2.36 | 604.64 | 470.84 | 0.28 |
| FC-2 | FC-2 | 4892 | 5 yr | 1437.00 | 586.18 | 589.13 | | 589.20 | 0.003502 | 2.79 | 803.78 | 508.33 | 0.30 |
| FC-2 | FC-2 | 4892 | 10 yr | 1777.00 | 586.18 | 589.38 | | 589.46 | 0.003518 | 2.97 | 930.85 | 519.31 | 0.31 |
| FC-2 | FC-2 | 4892 | 25 yr | 2155.00 | 586.18 | 589.63 | | 589.72 | 0.003524 | 3.15 | 1063.49 | 530.89 | 0.31 |
| FC-2 | FC-2 | 4892 | 50 yr | 2464.00 | 586.18 | 589.83 | | 589.92 | 0.003505 | 3.27 | 1170.48 | 542.63 | 0.32 |
| FC-2 | FC-2 | 4892 | 100 yr | 2766.00 | 586.18 | 590.02 | | 590.11 | 0.003502 | 3.39 | 1272.41 | 557.07 | 0.32 |
| FC-2 | FC-2 | 4892 | 500 yr | 3487.00 | 586.18 | 590.44 | | 590.55 | 0.003469 | 3.64 | 1520.69 | 602.83 | 0.32 |
| FC-2 | FC-2 | 4892 | Ultimate 100 yr | 2814.00 | 586.18 | 590.04 | | 590.14 | 0.003499 | 3.41 | 1289.05 | 559.79 | 0.32 |
| FC-2 | FC-2 | 3954 | 2 yr | 1260.00 | 582.65 | 585.09 | | 585.19 | 0.006093 | 2.73 | 517.83 | 446.60 | 0.37 |
| FC-2 | FC-2 | 3954 | 5 yr | 2100.00 | 582.65 | 585.68 | 584.79 | 585.79 | 0.004533 | 2.87 | 800.69 | 507.92 | 0.34 |
| FC-2 | FC-2 | 3954 | 10 yr | 2682.00 | 582.65 | 585.97 | 584.98 | 586.10 | 0.004391 | 3.06 | 950.31 | 533.90 | 0.34 |
| FC-2 | FC-2 | 3954 | 25 yr | 3298.00 | 582.65 | 586.23 | | 586.38 | 0.004336 | 3.25 | 1095.88 | 564.86 | 0.34 |
| FC-2 | FC-2 | 3954 | 50 yr | 3812.00 | 582.65 | 586.42 | | 586.58 | 0.004374 | 3.41 | 1204.34 | 587.18 | 0.35 |
| FC-2 | FC-2 | 3954 | 100 yr | 4308.00 | 582.65 | 586.59 | | 586.76 | 0.004429 | 3.55 | 1302.42 | 606.66 | 0.35 |
| FC-2 | FC-2 | 3954 | 500 yr | 5537.00 | 582.65 | 586.93 | | 587.14 | 0.004643 | 3.90 | 1519.71 | 647.74 | 0.37 |
| FC-2 | FC-2 | 3954 | Ultimate 100 yr | 4371.00 | 582.65 | 586.60 | | 586.78 | 0.004474 | 3.58 | 1310.77 | 608.29 | 0.35 |
| FC-2 | FC-2 | 2878 | 2 yr | 1260.00 | 575.50 | 579.99 | 578.84 | 580.16 | 0.005053 | 3.77 | 492.95 | 313.67 | 0.37 |
| FC-2 | FC-2 | 2878 | 5 yr | 2100.00 | 575.50 | 580.49 | | 580.78 | 0.007644 | 5.11 | 676.71 | 458.83 | 0.47 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FC-2 | FC-2 | 2878 | 10 yr | 2682.00 | 575.50 | 580.74 | 579.96 | 581.08 | 0.008552 | 5.65 | 797.70 | 500.32 | 0.51 |
| FC-2 | FC-2 | 2878 | 25 yr | 3298.00 | 575.50 | 580.99 | 580.23 | 581.36 | 0.009196 | 6.10 | 930.38 | 565.67 | 0.53 |
| FC-2 | FC-2 | 2878 | 50 yr | 3812.00 | 575.50 | 581.17 | 580.66 | 581.56 | 0.009402 | 6.35 | 1034.99 | 582.80 | 0.54 |
| FC-2 | FC-2 | 2878 | 100 yr | 4308.00 | 575.50 | 581.34 | 580.28 | 581.74 | 0.009417 | 6.53 | 1138.12 | 606.90 | 0.54 |
| FC-2 | FC-2 | 2878 | 500 yr | 5537.00 | 575.50 | 581.76 | 581.20 | 582.16 | 0.009010 | 6.77 | 1401.82 | 661.19 | 0.54 |
| FC-2 | FC-2 | 2878 | Ultimate 100 yr | 4371.00 | 575.50 | 581.38 | 580.29 | 581.77 | 0.009170 | 6.48 | 1163.13 | 614.58 | 0.54 |
| FC-2 | FC-2 | 1677 | 2 yr | 1260.00 | 571.81 | 574.04 | | 574.10 | 0.008452 | 2.58 | 649.62 | 588.47 | 0.41 |
| FC-2 | FC-2 | 1677 | 5 yr | 2100.00 | 571.81 | 574.70 | | 574.77 | 0.005012 | 2.59 | 1040.49 | 595.69 | 0.34 |
| FC-2 | FC-2 | 1677 | 10 yr | 2682.00 | 571.81 | 575.13 | | 575.20 | 0.003965 | 2.59 | 1303.35 | 627.80 | 0.31 |
| FC-2 | FC-2 | 1677 | 25 yr | 3298.00 | 571.81 | 575.64 | | 575.71 | 0.002947 | 2.49 | 1658.31 | 725.39 | 0.28 |
| FC-2 | FC-2 | 1677 | 50 yr | 3812.00 | 571.81 | 576.07 | | 576.14 | 0.002371 | 2.36 | 1974.36 | 745.92 | 0.25 |
| FC-2 | FC-2 | 1677 | 100 yr | 4308.00 | 571.81 | 576.47 | | 576.53 | 0.001968 | 2.35 | 2272.85 | 754.69 | 0.23 |
| FC-2 | FC-2 | 1677 | 500 yr | 5537.00 | 571.81 | 577.27 | | 577.33 | 0.001672 | 2.52 | 2892.07 | 816.57 | 0.22 |
| FC-2 | FC-2 | 1677 | Ultimate 100 yr | 4371.00 | 571.81 | 576.89 | | 576.94 | 0.001383 | 2.15 | 2590.89 | 775.70 | 0.20 |
| FC-2 | FC-2 | 1463 | 2 yr | 1260.00 | 567.56 | 572.28 | 570.42 | 572.49 | 0.004440 | 3.72 | 359.01 | 157.72 | 0.35 |
| FC-2 | FC-2 | 1463 | 5 yr | 2100.00 | 567.56 | 573.41 | 571.20 | 573.63 | 0.003814 | 4.06 | 742.44 | 480.69 | 0.34 |
| FC-2 | FC-2 | 1463 | 10 yr | 2682.00 | 567.56 | 574.18 | 571.69 | 574.34 | 0.002629 | 3.68 | 1117.55 | 493.71 | 0.29 |
| FC-2 | FC-2 | 1463 | 25 yr | 3298.00 | 567.56 | 574.94 | 572.29 | 575.07 | 0.001912 | 3.39 | 1498.53 | 504.93 | 0.25 |
| FC-2 | FC-2 | 1463 | 50 yr | 3812.00 | 567.56 | 575.50 | 572.65 | 575.60 | 0.001612 | 3.27 | 1779.71 | 513.65 | 0.23 |
| FC-2 | FC-2 | 1463 | 100 yr | 4308.00 | 567.56 | 575.97 | 573.46 | 576.08 | 0.001439 | 3.22 | 2027.28 | 521.78 | 0.22 |
| FC-2 | FC-2 | 1463 | 500 yr | 5537.00 | 567.56 | 576.82 | 573.84 | 576.93 | 0.001358 | 3.33 | 2474.33 | 537.76 | 0.22 |
| FC-2 | FC-2 | 1463 | Ultimate 100 yr | 4371.00 | 567.56 | 576.54 | 573.48 | 576.62 | 0.001008 | 2.81 | 2326.34 | 532.27 | 0.19 |
| FC-2 | FC-2 | 1383 | | Bridge | | | | | | | | | |
| FC-2 | FC-2 | 1272 | 2 yr | 1260.00 | 565.46 | 571.76 | | 571.89 | 0.002300 | 2.84 | 443.58 | 116.88 | 0.26 |
| FC-2 | FC-2 | 1272 | 5 yr | 2100.00 | 565.46 | 572.71 | | 572.93 | 0.003160 | 3.77 | 556.83 | 121.43 | 0.31 |
| FC-2 | FC-2 | 1272 | 10 yr | 2682.00 | 565.46 | 573.35 | | 573.62 | 0.003549 | 4.22 | 635.98 | 128.03 | 0.33 |
| FC-2 | FC-2 | 1272 | 25 yr | 3298.00 | 565.46 | 574.04 | | 574.36 | 0.003766 | 4.53 | 728.58 | 138.06 | 0.35 |
| FC-2 | FC-2 | 1272 | 50 yr | 3812.00 | 565.46 | 574.55 | | 574.90 | 0.003939 | 4.76 | 800.11 | 145.34 | 0.36 |
| FC-2 | FC-2 | 1272 | 100 yr | 4308.00 | 565.46 | 574.98 | | 575.36 | 0.004115 | 4.99 | 863.95 | 151.54 | 0.37 |
| FC-2 | FC-2 | 1272 | 500 yr | 5537.00 | 565.46 | 575.98 | | 576.43 | 0.004310 | 5.41 | 1028.85 | 182.36 | 0.38 |
| FC-2 | FC-2 | 1272 | Ultimate 100 yr | 4371.00 | 565.46 | 575.05 | | 575.44 | 0.004100 | 5.00 | 874.71 | 152.56 | 0.37 |
| FC-2 | FC-2 | 574 | 2 yr | 1260.00 | 568.00 | 570.28 | | 570.32 | 0.002104 | 1.65 | 765.79 | 445.84 | 0.22 |
| FC-2 | FC-2 | 574 | 5 yr | 2100.00 | 568.00 | 571.29 | | 571.34 | 0.001263 | 1.73 | 1226.46 | 466.16 | 0.18 |
| FC-2 | FC-2 | 574 | 10 yr | 2682.00 | 568.00 | 571.91 | | 571.96 | 0.001045 | 1.80 | 1517.94 | 484.61 | 0.17 |
| FC-2 | FC-2 | 574 | 25 yr | 3298.00 | 568.00 | 572.64 | | 572.69 | 0.000806 | 1.80 | 1885.00 | 509.28 | 0.16 |
| FC-2 | FC-2 | 574 | 50 yr | 3812.00 | 568.00 | 573.13 | | 573.18 | 0.000733 | 1.85 | 2138.45 | 530.31 | 0.15 |
| FC-2 | FC-2 | 574 | 100 yr | 4308.00 | 568.00 | 573.53 | | 573.59 | 0.000702 | 1.92 | 2355.84 | 549.49 | 0.15 |
| FC-2 | FC-2 | 574 | 500 yr | 5537.00 | 568.00 | 574.54 | | 574.60 | 0.000614 | 2.03 | 2946.47 | 637.56 | 0.15 |
| FC-2 | FC-2 | 574 | Ultimate 100 yr | 4371.00 | 568.00 | 573.62 | | 573.67 | 0.000682 | 1.91 | 2402.31 | 553.05 | 0.15 |
| FC-3 | FC-3 | 7863 | 2 yr | 480.00 | 572.24 | 576.45 | 574.47 | 576.53 | 0.001163 | 2.18 | 220.00 | 96.91 | 0.26 |
| FC-3 | FC-3 | 7863 | 5 yr | 749.00 | 572.24 | 577.10 | 574.99 | 577.21 | 0.001239 | 2.62 | 290.42 | 121.25 | 0.27 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FC-3 | FC-3 | 7863 | 10 yr | 929.00 | 572.24 | 577.43 | 575.28 | 577.56 | 0.001300 | 2.89 | 333.01 | 136.68 | 0.29 |
| FC-3 | FC-3 | 7863 | 25 yr | 1129.00 | 572.24 | 577.71 | 575.57 | 577.86 | 0.001426 | 3.20 | 372.57 | 150.24 | 0.30 |
| FC-3 | FC-3 | 7863 | 50 yr | 1294.00 | 572.24 | 577.91 | 575.78 | 578.08 | 0.001528 | 3.43 | 402.95 | 159.11 | 0.32 |
| FC-3 | FC-3 | 7863 | 100 yr | 1453.00 | 572.24 | 578.08 | 575.99 | 578.28 | 0.001624 | 3.65 | 431.83 | 228.10 | 0.33 |
| FC-3 | FC-3 | 7863 | 500 yr | 1839.00 | 572.24 | 578.38 | 576.42 | 578.64 | 0.001956 | 4.21 | 490.49 | 342.58 | 0.37 |
| FC-3 | FC-3 | 7863 | Ultimate 100 yr | 1453.00 | 572.24 | 578.08 | 575.99 | 578.28 | 0.001624 | 3.65 | 431.83 | 228.10 | 0.33 |
| FC-3 | FC-3 | 7402 | 2 yr | 480.00 | 572.35 | 574.80 | 574.80 | 575.46 | 0.021406 | 6.47 | 74.14 | 56.81 | 1.00 |
| FC-3 | FC-3 | 7402 | 5 yr | 749.00 | 572.35 | 575.36 | 575.36 | 576.07 | 0.020477 | 6.78 | 110.39 | 76.29 | 0.99 |
| FC-3 | FC-3 | 7402 | 10 yr | 929.00 | 572.35 | 575.66 | 575.66 | 576.38 | 0.020013 | 6.83 | 136.77 | 104.45 | 0.99 |
| FC-3 | FC-3 | 7402 | 25 yr | 1129.00 | 572.35 | 576.07 | 576.07 | 576.64 | 0.012524 | 6.19 | 203.34 | 254.41 | 0.81 |
| FC-3 | FC-3 | 7402 | 50 yr | 1294.00 | 572.35 | 576.23 | 576.23 | 576.80 | 0.011560 | 6.28 | 240.68 | 294.74 | 0.79 |
| FC-3 | FC-3 | 7402 | 100 yr | 1453.00 | 572.35 | 576.33 | 576.33 | 576.93 | 0.011585 | 6.51 | 267.77 | 330.29 | 0.79 |
| FC-3 | FC-3 | 7402 | 500 yr | 1839.00 | 572.35 | 576.65 | 576.65 | 577.14 | 0.008764 | 6.23 | 404.38 | 417.08 | 0.71 |
| FC-3 | FC-3 | 7402 | Ultimate 100 yr | 1453.00 | 572.35 | 576.33 | 576.33 | 576.93 | 0.011585 | 6.51 | 267.77 | 330.29 | 0.79 |
| FC-3 | FC-3 | 7057 | 2 yr | 480.00 | 565.53 | 569.76 | | 570.04 | 0.002549 | 4.19 | 114.46 | 40.58 | 0.44 |
| FC-3 | FC-3 | 7057 | 5 yr | 749.00 | 565.53 | 570.67 | | 571.04 | 0.002746 | 4.87 | 153.93 | 46.05 | 0.47 |
| FC-3 | FC-3 | 7057 | 10 yr | 929.00 | 565.53 | 571.18 | | 571.60 | 0.002842 | 5.22 | 177.93 | 49.08 | 0.48 |
| FC-3 | FC-3 | 7057 | 25 yr | 1129.00 | 565.53 | 571.70 | | 572.18 | 0.002875 | 5.52 | 204.42 | 52.21 | 0.49 |
| FC-3 | FC-3 | 7057 | 50 yr | 1294.00 | 565.53 | 572.11 | | 572.62 | 0.002865 | 5.72 | 226.26 | 54.67 | 0.50 |
| FC-3 | FC-3 | 7057 | 100 yr | 1453.00 | 565.53 | 572.51 | | 573.04 | 0.002802 | 5.85 | 248.47 | 57.05 | 0.49 |
| FC-3 | FC-3 | 7057 | 500 yr | 1839.00 | 565.53 | 573.55 | | 574.09 | 0.002439 | 5.91 | 311.25 | 63.31 | 0.47 |
| FC-3 | FC-3 | 7057 | Ultimate 100 yr | 1453.00 | 565.53 | 572.51 | | 573.04 | 0.002802 | 5.85 | 248.47 | 57.05 | 0.49 |
| FC-3 | FC-3 | 6285 | 2 yr | 480.00 | 563.99 | 567.25 | | 567.69 | 0.003692 | 5.31 | 90.40 | 37.52 | 0.60 |
| FC-3 | FC-3 | 6285 | 5 yr | 749.00 | 563.99 | 568.30 | | 568.80 | 0.003055 | 5.62 | 133.17 | 43.83 | 0.57 |
| FC-3 | FC-3 | 6285 | 10 yr | 929.00 | 563.99 | 568.96 | | 569.46 | 0.002689 | 5.70 | 163.06 | 47.75 | 0.54 |
| FC-3 | FC-3 | 6285 | 25 yr | 1129.00 | 563.99 | 569.65 | | 570.16 | 0.002348 | 5.72 | 197.50 | 51.89 | 0.52 |
| FC-3 | FC-3 | 6285 | 50 yr | 1294.00 | 563.99 | 570.20 | | 570.70 | 0.002113 | 5.70 | 226.82 | 55.18 | 0.50 |
| FC-3 | FC-3 | 6285 | 100 yr | 1453.00 | 563.99 | 570.71 | | 571.21 | 0.001920 | 5.68 | 255.79 | 58.24 | 0.48 |
| FC-3 | FC-3 | 6285 | 500 yr | 1839.00 | 563.99 | 572.17 | | 572.60 | 0.001344 | 5.30 | 347.15 | 67.00 | 0.41 |
| FC-3 | FC-3 | 6285 | Ultimate 100 yr | 1453.00 | 563.99 | 570.71 | | 571.21 | 0.001920 | 5.68 | 255.79 | 58.24 | 0.48 |
| FC-3 | FC-3 | 6185 | 2 yr | 480.00 | 563.79 | 566.96 | 565.44 | 567.11 | 0.001116 | 3.09 | 155.20 | 59.78 | 0.34 |
| FC-3 | FC-3 | 6185 | 5 yr | 749.00 | 563.79 | 568.13 | 565.95 | 568.30 | 0.000865 | 3.27 | 229.05 | 66.78 | 0.31 |
| FC-3 | FC-3 | 6185 | 10 yr | 929.00 | 563.79 | 568.83 | 566.24 | 569.01 | 0.000763 | 3.35 | 277.60 | 71.01 | 0.30 |
| FC-3 | FC-3 | 6185 | 25 yr | 1129.00 | 563.79 | 569.57 | 566.55 | 569.75 | 0.000679 | 3.41 | 331.25 | 75.41 | 0.29 |
| FC-3 | FC-3 | 6185 | 50 yr | 1294.00 | 563.79 | 570.14 | 566.79 | 570.33 | 0.000625 | 3.45 | 375.43 | 78.84 | 0.28 |
| FC-3 | FC-3 | 6185 | 100 yr | 1453.00 | 563.79 | 570.67 | 567.00 | 570.86 | 0.000581 | 3.48 | 418.06 | 82.02 | 0.27 |
| FC-3 | FC-3 | 6185 | 500 yr | 1839.00 | 563.79 | 572.17 | 567.48 | 572.34 | 0.000437 | 3.36 | 547.44 | 91.00 | 0.24 |
| FC-3 | FC-3 | 6185 | Ultimate 100 yr | 1453.00 | 563.79 | 570.67 | 567.00 | 570.86 | 0.000581 | 3.48 | 418.06 | 82.02 | 0.27 |
| FC-3 | FC-3 | 6080 | | Culvert | | | | | | | | | |
| FC-3 | FC-3 | 5980 | 2 yr | 480.00 | 563.00 | 565.72 | | 566.06 | 0.003776 | 4.71 | 101.88 | 52.29 | 0.59 |
| FC-3 | FC-3 | 5980 | 5 yr | 749.00 | 563.00 | 566.28 | | 566.78 | 0.004181 | 5.65 | 132.48 | 55.69 | 0.65 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FC-3 | FC-3 | 5980 | 10 yr | 929.00 | 563.00 | 566.62 | | 567.20 | 0.004301 | 6.12 | 151.72 | 57.73 | 0.67 |
| FC-3 | FC-3 | 5980 | 25 yr | 1129.00 | 563.00 | 566.98 | | 567.64 | 0.004347 | 6.54 | 172.59 | 59.86 | 0.68 |
| FC-3 | FC-3 | 5980 | 50 yr | 1294.00 | 563.00 | 567.25 | | 567.98 | 0.004344 | 6.83 | 189.49 | 61.53 | 0.69 |
| FC-3 | FC-3 | 5980 | 100 yr | 1453.00 | 563.00 | 567.51 | | 568.29 | 0.004318 | 7.07 | 205.61 | 63.08 | 0.69 |
| FC-3 | FC-3 | 5980 | 500 yr | 1839.00 | 563.00 | 568.10 | | 568.99 | 0.004220 | 7.54 | 243.93 | 66.63 | 0.69 |
| FC-3 | FC-3 | 5980 | Ultimate 100 yr | 1453.00 | 563.00 | 567.51 | | 568.29 | 0.004318 | 7.07 | 205.61 | 63.08 | 0.69 |
| FC-3 | FC-3 | 5866 | 2 yr | 480.00 | 563.00 | 565.20 | | 565.52 | 0.006206 | 4.52 | 106.21 | 67.19 | 0.63 |
| FC-3 | FC-3 | 5866 | 5 yr | 749.00 | 563.00 | 565.83 | | 566.22 | 0.005164 | 4.99 | 149.99 | 70.99 | 0.61 |
| FC-3 | FC-3 | 5866 | 10 yr | 929.00 | 563.00 | 566.22 | | 566.64 | 0.004683 | 5.21 | 178.16 | 73.33 | 0.59 |
| FC-3 | FC-3 | 5866 | 25 yr | 1129.00 | 563.00 | 566.63 | | 567.09 | 0.004272 | 5.41 | 208.71 | 75.79 | 0.57 |
| FC-3 | FC-3 | 5866 | 50 yr | 1294.00 | 563.00 | 566.95 | | 567.43 | 0.004018 | 5.55 | 233.11 | 77.70 | 0.56 |
| FC-3 | FC-3 | 5866 | 100 yr | 1453.00 | 563.00 | 567.24 | | 567.74 | 0.003820 | 5.67 | 256.10 | 79.46 | 0.56 |
| FC-3 | FC-3 | 5866 | 500 yr | 1839.00 | 563.00 | 567.90 | | 568.45 | 0.003475 | 5.94 | 309.63 | 83.40 | 0.54 |
| FC-3 | FC-3 | 5866 | Ultimate 100 yr | 1453.00 | 563.00 | 567.24 | | 567.74 | 0.003820 | 5.67 | 256.10 | 79.46 | 0.56 |
| FC-3 | FC-3 | 5473 | 2 yr | 480.00 | 558.65 | 562.34 | | 562.91 | 0.006908 | 6.06 | 79.15 | 34.14 | 0.70 |
| FC-3 | FC-3 | 5473 | 5 yr | 749.00 | 558.65 | 563.22 | | 563.92 | 0.006528 | 6.72 | 111.50 | 39.42 | 0.70 |
| FC-3 | FC-3 | 5473 | 10 yr | 929.00 | 558.65 | 563.69 | | 564.48 | 0.006487 | 7.10 | 130.78 | 42.25 | 0.71 |
| FC-3 | FC-3 | 5473 | 25 yr | 1129.00 | 558.65 | 564.15 | | 565.02 | 0.006479 | 7.48 | 150.92 | 45.02 | 0.72 |
| FC-3 | FC-3 | 5473 | 50 yr | 1294.00 | 558.65 | 564.49 | | 565.43 | 0.006509 | 7.77 | 166.53 | 47.06 | 0.73 |
| FC-3 | FC-3 | 5473 | 100 yr | 1453.00 | 558.65 | 564.78 | | 565.79 | 0.006622 | 8.06 | 180.21 | 48.77 | 0.74 |
| FC-3 | FC-3 | 5473 | 500 yr | 1839.00 | 558.65 | 565.38 | | 566.56 | 0.006935 | 8.73 | 210.77 | 52.39 | 0.77 |
| FC-3 | FC-3 | 5473 | Ultimate 100 yr | 1453.00 | 558.65 | 564.78 | | 565.79 | 0.006622 | 8.06 | 180.21 | 48.77 | 0.74 |
| FC-3 | FC-3 | 4980 | 2 yr | 480.00 | 555.47 | 560.41 | | 560.63 | 0.001902 | 3.79 | 126.50 | 41.64 | 0.38 |
| FC-3 | FC-3 | 4980 | 5 yr | 749.00 | 555.47 | 561.38 | | 561.68 | 0.002074 | 4.41 | 169.82 | 47.47 | 0.41 |
| FC-3 | FC-3 | 4980 | 10 yr | 929.00 | 555.47 | 561.81 | | 562.18 | 0.002333 | 4.87 | 190.57 | 50.03 | 0.44 |
| FC-3 | FC-3 | 4980 | 25 yr | 1129.00 | 555.47 | 562.21 | | 562.65 | 0.002608 | 5.35 | 211.21 | 52.45 | 0.47 |
| FC-3 | FC-3 | 4980 | 50 yr | 1294.00 | 555.47 | 562.49 | | 563.00 | 0.002838 | 5.72 | 226.18 | 58.20 | 0.49 |
| FC-3 | FC-3 | 4980 | 100 yr | 1453.00 | 555.47 | 562.70 | | 563.28 | 0.003034 | 6.11 | 241.82 | 85.04 | 0.51 |
| FC-3 | FC-3 | 4980 | 500 yr | 1839.00 | 555.47 | 563.12 | | 563.86 | 0.003476 | 6.95 | 283.14 | 106.97 | 0.56 |
| FC-3 | FC-3 | 4980 | Ultimate 100 yr | 1453.00 | 555.47 | 562.70 | | 563.28 | 0.003034 | 6.11 | 241.82 | 85.04 | 0.51 |
| FC-3 | FC-3 | 4219 | 2 yr | 480.00 | 554.96 | 558.61 | | 558.74 | 0.003428 | 2.88 | 166.51 | 77.68 | 0.35 |
| FC-3 | FC-3 | 4219 | 5 yr | 749.00 | 554.96 | 559.35 | | 559.51 | 0.004309 | 3.20 | 235.49 | 135.80 | 0.39 |
| FC-3 | FC-3 | 4219 | 10 yr | 929.00 | 554.96 | 559.62 | | 559.81 | 0.004424 | 3.48 | 276.83 | 168.79 | 0.40 |
| FC-3 | FC-3 | 4219 | 25 yr | 1129.00 | 554.96 | 559.87 | | 560.08 | 0.004481 | 3.75 | 330.01 | 269.14 | 0.41 |
| FC-3 | FC-3 | 4219 | 50 yr | 1294.00 | 554.96 | 560.05 | | 560.27 | 0.004495 | 3.93 | 379.24 | 301.05 | 0.42 |
| FC-3 | FC-3 | 4219 | 100 yr | 1453.00 | 554.96 | 560.21 | | 560.44 | 0.004468 | 4.06 | 434.67 | 387.38 | 0.42 |
| FC-3 | FC-3 | 4219 | 500 yr | 1839.00 | 554.96 | 560.52 | | 560.78 | 0.004449 | 4.34 | 571.70 | 466.57 | 0.42 |
| FC-3 | FC-3 | 4219 | Ultimate 100 yr | 1453.00 | 554.96 | 560.21 | | 560.44 | 0.004468 | 4.06 | 434.67 | 387.38 | 0.42 |
| FC-3 | FC-3 | 3926 | 2 yr | 480.00 | 554.05 | 557.31 | | 557.48 | 0.005724 | 3.33 | 146.77 | 113.35 | 0.44 |
| FC-3 | FC-3 | 3926 | 5 yr | 749.00 | 554.05 | 557.89 | | 558.09 | 0.005463 | 3.73 | 229.75 | 185.06 | 0.44 |
| FC-3 | FC-3 | 3926 | 10 yr | 929.00 | 554.05 | 558.17 | | 558.39 | 0.005413 | 3.93 | 287.61 | 220.34 | 0.45 |
| FC-3 | FC-3 | 3926 | 25 yr | 1129.00 | 554.05 | 558.44 | | 558.67 | 0.005293 | 4.08 | 352.06 | 251.20 | 0.45 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FC-3 | FC-3 | 3926 | 50 yr | 1294.00 | 554.05 | 558.65 | | 558.88 | 0.005178 | 4.17 | 406.44 | 277.30 | 0.44 |
| FC-3 | FC-3 | 3926 | 100 yr | 1453.00 | 554.05 | 558.83 | | 559.06 | 0.005065 | 4.24 | 457.64 | 295.38 | 0.44 |
| FC-3 | FC-3 | 3926 | 500 yr | 1839.00 | 554.05 | 559.19 | | 559.43 | 0.004830 | 4.40 | 570.87 | 319.70 | 0.44 |
| FC-3 | FC-3 | 3926 | Ultimate 100 yr | 1453.00 | 554.05 | 558.83 | | 559.06 | 0.005065 | 4.24 | 457.64 | 295.38 | 0.44 |
| FC-3 | FC-3 | 3553 | 2 yr | 480.00 | 552.09 | 555.70 | | 555.79 | 0.003218 | 2.52 | 190.73 | 104.26 | 0.33 |
| FC-3 | FC-3 | 3553 | 5 yr | 749.00 | 552.09 | 556.37 | | 556.49 | 0.003085 | 2.78 | 273.11 | 146.86 | 0.33 |
| FC-3 | FC-3 | 3553 | 10 yr | 929.00 | 552.09 | 556.68 | | 556.82 | 0.002995 | 2.99 | 323.35 | 176.20 | 0.33 |
| FC-3 | FC-3 | 3553 | 25 yr | 1129.00 | 552.09 | 556.99 | | 557.14 | 0.002920 | 3.19 | 382.94 | 212.79 | 0.34 |
| FC-3 | FC-3 | 3553 | 50 yr | 1294.00 | 552.09 | 557.24 | | 557.40 | 0.002802 | 3.31 | 440.05 | 249.73 | 0.33 |
| FC-3 | FC-3 | 3553 | 100 yr | 1453.00 | 552.09 | 557.46 | | 557.63 | 0.002678 | 3.39 | 500.55 | 281.00 | 0.33 |
| FC-3 | FC-3 | 3553 | 500 yr | 1839.00 | 552.09 | 557.89 | | 558.07 | 0.002613 | 3.63 | 629.72 | 328.51 | 0.33 |
| FC-3 | FC-3 | 3553 | Ultimate 100 yr | 1453.00 | 552.09 | 557.46 | | 557.63 | 0.002678 | 3.39 | 500.55 | 281.00 | 0.33 |
| FC-3 | FC-3 | 3164 | 2 yr | 542.00 | 550.46 | 553.07 | 552.84 | 553.59 | 0.020885 | 5.77 | 93.91 | 59.99 | 0.81 |
| FC-3 | FC-3 | 3164 | 5 yr | 932.00 | 550.46 | 554.06 | 553.66 | 554.51 | 0.012984 | 5.47 | 181.77 | 112.30 | 0.67 |
| FC-3 | FC-3 | 3164 | 10 yr | 1196.00 | 550.46 | 554.76 | 553.95 | 555.13 | 0.007510 | 5.05 | 269.77 | 147.59 | 0.54 |
| FC-3 | FC-3 | 3164 | 25 yr | 1466.00 | 550.46 | 555.30 | 554.22 | 555.64 | 0.005669 | 4.94 | 356.48 | 172.76 | 0.48 |
| FC-3 | FC-3 | 3164 | 50 yr | 1688.00 | 550.46 | 555.60 | 554.43 | 555.97 | 0.005416 | 5.13 | 414.26 | 210.16 | 0.48 |
| FC-3 | FC-3 | 3164 | 100 yr | 1905.00 | 550.46 | 555.84 | 554.51 | 556.23 | 0.005453 | 5.36 | 470.32 | 262.77 | 0.48 |
| FC-3 | FC-3 | 3164 | 500 yr | 2414.00 | 550.46 | 556.25 | 555.11 | 556.69 | 0.005572 | 5.80 | 591.41 | 339.03 | 0.50 |
| FC-3 | FC-3 | 3164 | Ultimate 100 yr | 1905.00 | 550.46 | 555.84 | 554.51 | 556.23 | 0.005453 | 5.36 | 470.32 | 262.77 | 0.48 |
| FC-3 | FC-3 | 2926 | 2 yr | 542.00 | 547.12 | 550.69 | | 550.97 | 0.000495 | 4.25 | 127.62 | 46.56 | 0.45 |
| FC-3 | FC-3 | 2926 | 5 yr | 932.00 | 547.12 | 552.63 | | 552.88 | 0.000297 | 3.96 | 235.41 | 65.17 | 0.37 |
| FC-3 | FC-3 | 2926 | 10 yr | 1196.00 | 547.12 | 553.97 | | 554.17 | 0.000219 | 3.57 | 334.69 | 86.15 | 0.32 |
| FC-3 | FC-3 | 2926 | 25 yr | 1466.00 | 547.12 | 554.71 | | 554.91 | 0.000214 | 3.63 | 404.74 | 123.02 | 0.32 |
| FC-3 | FC-3 | 2926 | 50 yr | 1688.00 | 547.12 | 555.04 | | 555.27 | 0.000217 | 3.86 | 458.69 | 224.52 | 0.33 |
| FC-3 | FC-3 | 2926 | 100 yr | 1905.00 | 547.12 | 555.26 | | 555.53 | 0.000235 | 4.14 | 514.49 | 309.72 | 0.34 |
| FC-3 | FC-3 | 2926 | 500 yr | 2414.00 | 547.12 | 555.62 | | 555.98 | 0.000292 | 4.86 | 645.54 | 423.96 | 0.39 |
| FC-3 | FC-3 | 2926 | Ultimate 100 yr | 1905.00 | 547.12 | 555.26 | | 555.53 | 0.000235 | 4.14 | 514.49 | 309.72 | 0.34 |
| FC-3 | FC-3 | 2865 | 2 yr | 542.00 | 546.63 | 550.64 | 548.97 | 550.92 | 0.000820 | 4.30 | 126.03 | 38.61 | 0.42 |
| FC-3 | FC-3 | 2865 | 5 yr | 932.00 | 546.63 | 552.52 | 549.90 | 552.84 | 0.000681 | 4.55 | 204.79 | 45.24 | 0.38 |
| FC-3 | FC-3 | 2865 | 10 yr | 1196.00 | 546.63 | 553.82 | 550.44 | 554.13 | 0.000575 | 4.48 | 268.87 | 59.11 | 0.34 |
| FC-3 | FC-3 | 2865 | 25 yr | 1466.00 | 546.63 | 554.51 | 550.95 | 554.87 | 0.000569 | 4.83 | 334.34 | 158.62 | 0.35 |
| FC-3 | FC-3 | 2865 | 50 yr | 1688.00 | 546.63 | 554.82 | 551.33 | 555.23 | 0.000623 | 5.22 | 386.62 | 185.83 | 0.36 |
| FC-3 | FC-3 | 2865 | 100 yr | 1905.00 | 546.63 | 555.00 | 551.68 | 555.48 | 0.000709 | 5.67 | 421.28 | 202.10 | 0.39 |
| FC-3 | FC-3 | 2865 | 500 yr | 2414.00 | 546.63 | 555.22 | 552.43 | 555.92 | 0.000986 | 6.84 | 470.42 | 229.42 | 0.46 |
| FC-3 | FC-3 | 2865 | Ultimate 100 yr | 1905.00 | 546.63 | 555.00 | 551.68 | 555.48 | 0.000709 | 5.67 | 421.28 | 202.10 | 0.39 |
| FC-3 | FC-3 | 2805 | | Culvert | | | | | | | | | |
| FC-3 | FC-3 | 2748 | 2 yr | 542.00 | 546.01 | 548.31 | 548.31 | 549.29 | 0.002764 | 7.93 | 68.32 | 35.42 | 1.01 |
| FC-3 | FC-3 | 2748 | 5 yr | 932.00 | 546.01 | 549.20 | 549.20 | 550.50 | 0.002819 | 9.13 | 102.04 | 39.99 | 1.01 |
| FC-3 | FC-3 | 2748 | 10 yr | 1196.00 | 546.01 | 549.71 | 549.71 | 551.19 | 0.002820 | 9.74 | 122.83 | 41.68 | 1.00 |
| FC-3 | FC-3 | 2748 | 25 yr | 1466.00 | 546.01 | 550.20 | 550.20 | 551.81 | 0.003087 | 10.20 | 143.74 | 44.51 | 1.00 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FC-3 | FC-3 | 2748 | 50 yr | 1688.00 | 546.01 | 550.56 | 550.56 | 552.28 | 0.003259 | 10.53 | 160.37 | 46.63 | 1.00 |
| FC-3 | FC-3 | 2748 | 100 yr | 1905.00 | 546.01 | 550.89 | 550.89 | 552.71 | 0.003400 | 10.81 | 176.16 | 48.56 | 1.00 |
| FC-3 | FC-3 | 2748 | 500 yr | 2414.00 | 546.01 | 551.60 | 551.60 | 553.62 | 0.003659 | 11.40 | 211.73 | 52.65 | 1.00 |
| FC-3 | FC-3 | 2748 | Ultimate 100 yr | 1905.00 | 546.01 | 550.89 | 550.89 | 552.71 | 0.003400 | 10.81 | 176.16 | 48.56 | 1.00 |
| FC-3 | FC-3 | 2690 | 2 yr | 542.00 | 545.68 | 547.90 | 547.90 | 548.82 | 0.002786 | 7.73 | 70.12 | 38.29 | 1.01 |
| FC-3 | FC-3 | 2690 | 5 yr | 932.00 | 545.68 | 548.75 | 548.75 | 549.97 | 0.002549 | 8.88 | 105.00 | 43.42 | 1.01 |
| FC-3 | FC-3 | 2690 | 10 yr | 1196.00 | 545.68 | 549.23 | 549.23 | 550.62 | 0.002456 | 9.44 | 126.64 | 46.31 | 1.01 |
| FC-3 | FC-3 | 2690 | 25 yr | 1466.00 | 545.68 | 549.66 | 549.66 | 551.20 | 0.002362 | 9.97 | 147.36 | 50.88 | 1.00 |
| FC-3 | FC-3 | 2690 | 50 yr | 1688.00 | 545.68 | 549.99 | 549.99 | 551.65 | 0.002233 | 10.37 | 164.20 | 52.82 | 0.99 |
| FC-3 | FC-3 | 2690 | 100 yr | 1905.00 | 545.68 | 550.26 | 550.26 | 552.07 | 0.002193 | 10.82 | 178.82 | 54.45 | 1.00 |
| FC-3 | FC-3 | 2690 | 500 yr | 2414.00 | 545.68 | 550.91 | 550.91 | 552.99 | 0.002022 | 11.59 | 215.64 | 58.34 | 0.98 |
| FC-3 | FC-3 | 2690 | Ultimate 100 yr | 1905.00 | 545.68 | 550.26 | 550.26 | 552.07 | 0.002193 | 10.82 | 178.82 | 54.45 | 1.00 |
| FC-3 | FC-3 | 2448 | 2 yr | 542.00 | 544.11 | 546.33 | 546.33 | 547.25 | 0.002781 | 7.72 | 70.17 | 38.30 | 1.01 |
| FC-3 | FC-3 | 2448 | 5 yr | 932.00 | 544.11 | 547.18 | 547.18 | 548.40 | 0.002553 | 8.88 | 104.95 | 43.41 | 1.01 |
| FC-3 | FC-3 | 2448 | 10 yr | 1196.00 | 544.11 | 547.66 | 547.66 | 549.05 | 0.002455 | 9.44 | 126.65 | 46.31 | 1.01 |
| FC-3 | FC-3 | 2448 | 25 yr | 1466.00 | 544.11 | 548.11 | 548.11 | 549.63 | 0.002374 | 9.91 | 147.95 | 48.99 | 1.00 |
| FC-3 | FC-3 | 2448 | 50 yr | 1688.00 | 544.11 | 548.43 | 548.43 | 550.08 | 0.002320 | 10.30 | 164.08 | 52.93 | 1.01 |
| FC-3 | FC-3 | 2448 | 100 yr | 1905.00 | 544.11 | 548.72 | 548.72 | 550.49 | 0.002207 | 10.65 | 180.08 | 54.79 | 1.00 |
| FC-3 | FC-3 | 2448 | 500 yr | 2414.00 | 544.11 | 549.33 | 549.33 | 551.38 | 0.002082 | 11.50 | 214.68 | 58.60 | 0.99 |
| FC-3 | FC-3 | 2448 | Ultimate 100 yr | 1905.00 | 544.11 | 548.72 | 548.72 | 550.49 | 0.002207 | 10.65 | 180.08 | 54.79 | 1.00 |
| FC-3 | FC-3 | 2000 | 2 yr | 542.00 | 541.20 | 543.41 | 543.41 | 544.33 | 0.002789 | 7.71 | 70.30 | 38.59 | 1.01 |
| FC-3 | FC-3 | 2000 | 5 yr | 932.00 | 541.20 | 544.27 | 544.27 | 545.48 | 0.002512 | 8.80 | 105.89 | 43.90 | 1.00 |
| FC-3 | FC-3 | 2000 | 10 yr | 1196.00 | 541.20 | 544.75 | 544.75 | 546.12 | 0.002424 | 9.37 | 127.69 | 46.85 | 1.00 |
| FC-3 | FC-3 | 2000 | 25 yr | 1466.00 | 541.20 | 545.20 | 545.20 | 546.70 | 0.002354 | 9.84 | 148.95 | 49.56 | 1.00 |
| FC-3 | FC-3 | 2000 | 50 yr | 1688.00 | 541.20 | 545.52 | 545.52 | 547.14 | 0.002331 | 10.22 | 165.20 | 51.54 | 1.01 |
| FC-3 | FC-3 | 2000 | 100 yr | 1905.00 | 541.20 | 545.84 | 545.84 | 547.54 | 0.002260 | 10.46 | 182.08 | 53.51 | 1.00 |
| FC-3 | FC-3 | 2000 | 500 yr | 2414.00 | 541.20 | 546.45 | 546.45 | 548.40 | 0.002149 | 11.20 | 216.56 | 59.21 | 1.00 |
| FC-3 | FC-3 | 2000 | Ultimate 100 yr | 1905.00 | 541.20 | 545.84 | 545.84 | 547.54 | 0.002260 | 10.46 | 182.08 | 53.51 | 1.00 |
| FC-3 | FC-3 | 1460 | 2 yr | 542.00 | 537.70 | 539.92 | 539.92 | 540.84 | 0.002786 | 7.73 | 70.12 | 38.29 | 1.01 |
| FC-3 | FC-3 | 1460 | 5 yr | 932.00 | 537.70 | 540.77 | 540.77 | 541.99 | 0.002545 | 8.87 | 105.06 | 43.42 | 1.01 |
| FC-3 | FC-3 | 1460 | 10 yr | 1196.00 | 537.70 | 541.25 | 541.25 | 542.64 | 0.002459 | 9.45 | 126.59 | 46.30 | 1.01 |
| FC-3 | FC-3 | 1460 | 25 yr | 1466.00 | 537.70 | 542.19 | | 543.31 | 0.001534 | 8.49 | 172.76 | 51.94 | 0.82 |
| FC-3 | FC-3 | 1460 | 50 yr | 1688.00 | 537.70 | 542.70 | | 543.81 | 0.001347 | 8.44 | 200.11 | 55.01 | 0.78 |
| FC-3 | FC-3 | 1460 | 100 yr | 1905.00 | 537.70 | 543.05 | | 544.22 | 0.001322 | 8.67 | 219.76 | 57.11 | 0.78 |
| FC-3 | FC-3 | 1460 | 500 yr | 2414.00 | 537.70 | 543.69 | | 545.06 | 0.001313 | 9.38 | 258.23 | 62.95 | 0.79 |
| FC-3 | FC-3 | 1460 | Ultimate 100 yr | 1905.00 | 537.70 | 543.07 | | 544.23 | 0.001305 | 8.63 | 220.79 | 57.22 | 0.77 |
| FC-3 | FC-3 | 957 | 2 yr | 606.00 | 534.42 | 536.90 | 536.79 | 537.78 | 0.002338 | 7.55 | 80.30 | 39.79 | 0.94 |
| FC-3 | FC-3 | 957 | 5 yr | 1047.00 | 534.42 | 539.13 | 537.72 | 539.63 | 0.000656 | 5.70 | 183.75 | 53.09 | 0.54 |
| FC-3 | FC-3 | 957 | 10 yr | 1345.00 | 534.42 | 540.79 | 538.24 | 541.15 | 0.000308 | 4.83 | 280.31 | 63.34 | 0.39 |
| FC-3 | FC-3 | 957 | 25 yr | 1652.00 | 534.42 | 542.33 | 538.72 | 542.63 | 0.000181 | 4.46 | 385.32 | 73.19 | 0.31 |
| FC-3 | FC-3 | 957 | 50 yr | 1925.00 | 534.42 | 542.84 | 539.11 | 543.19 | 0.000189 | 4.80 | 423.83 | 76.49 | 0.32 |
| FC-3 | FC-3 | 957 | 100 yr | 2177.00 | 534.42 | 543.20 | 539.44 | 543.61 | 0.000202 | 5.14 | 451.82 | 78.80 | 0.34 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FC-3 | FC-3 | 957 | 500 yr | 2811.00 | 534.42 | 543.86 | 540.19 | 544.42 | 0.000250 | 6.06 | 505.45 | 86.82 | 0.38 |
| FC-3 | FC-3 | 957 | Ultimate 100 yr | 2177.00 | 534.42 | 543.22 | 539.44 | 543.62 | 0.000201 | 5.13 | 453.12 | 78.90 | 0.34 |
| FC-3 | FC-3 | 822 | 2 yr | 606.00 | 533.54 | 537.11 | 535.81 | 537.41 | 0.000534 | 4.46 | 135.82 | 48.70 | 0.47 |
| FC-3 | FC-3 | 822 | 5 yr | 1047.00 | 533.54 | 539.23 | 536.68 | 539.50 | 0.000273 | 4.15 | 252.27 | 61.15 | 0.36 |
| FC-3 | FC-3 | 822 | 10 yr | 1345.00 | 533.54 | 540.85 | 537.19 | 541.08 | 0.000149 | 3.82 | 362.80 | 75.16 | 0.28 |
| FC-3 | FC-3 | 822 | 25 yr | 1652.00 | 533.54 | 542.38 | 537.65 | 542.58 | 0.000101 | 3.68 | 505.26 | 126.17 | 0.24 |
| FC-3 | FC-3 | 822 | 50 yr | 1925.00 | 533.54 | 542.90 | 538.03 | 543.14 | 0.000107 | 3.96 | 576.64 | 145.52 | 0.25 |
| FC-3 | FC-3 | 822 | 100 yr | 2177.00 | 533.54 | 543.27 | 538.35 | 543.54 | 0.000115 | 4.24 | 633.19 | 158.32 | 0.26 |
| FC-3 | FC-3 | 822 | 500 yr | 2811.00 | 533.54 | 543.98 | 539.11 | 544.34 | 0.000141 | 4.96 | 752.72 | 182.45 | 0.29 |
| FC-3 | FC-3 | 822 | Ultimate 100 yr | 2177.00 | 533.54 | 543.29 | 538.35 | 543.56 | 0.000115 | 4.23 | 635.75 | 158.88 | 0.26 |
| FC-3 | FC-3 | 505 | Culvert | | | | | | | | | | |
| FC-3 | FC-3 | 212 | 2 yr | 606.00 | 528.47 | 531.37 | | 531.74 | 0.000806 | 4.88 | 124.27 | 53.59 | 0.56 |
| FC-3 | FC-3 | 212 | 5 yr | 1047.00 | 528.47 | 533.24 | | 533.54 | 0.000373 | 4.43 | 236.65 | 68.14 | 0.41 |
| FC-3 | FC-3 | 212 | 10 yr | 1345.00 | 528.47 | 534.23 | | 534.53 | 0.000277 | 4.44 | 311.17 | 91.44 | 0.37 |
| FC-3 | FC-3 | 212 | 25 yr | 1652.00 | 528.47 | 535.21 | | 535.51 | 0.000212 | 4.42 | 422.14 | 143.18 | 0.33 |
| FC-3 | FC-3 | 212 | 50 yr | 1925.00 | 528.47 | 535.99 | | 536.28 | 0.000176 | 4.40 | 556.64 | 190.21 | 0.31 |
| FC-3 | FC-3 | 212 | 100 yr | 2177.00 | 528.47 | 536.73 | | 537.00 | 0.000146 | 4.32 | 706.34 | 214.18 | 0.29 |
| FC-3 | FC-3 | 212 | 500 yr | 2811.00 | 528.47 | 538.36 | | 538.60 | 0.000104 | 4.20 | 1105.05 | 270.93 | 0.25 |
| FC-3 | FC-3 | 212 | Ultimate 100 yr | 2177.00 | 528.47 | 536.85 | | 537.11 | 0.000136 | 4.22 | 733.17 | 218.32 | 0.28 |
| FC-3 | FC-3 | 110 | 2 yr | 606.00 | 526.51 | 531.51 | | 531.61 | 0.000140 | 2.57 | 235.52 | 71.51 | 0.25 |
| FC-3 | FC-3 | 110 | 5 yr | 1047.00 | 526.51 | 533.34 | | 533.46 | 0.000095 | 2.80 | 406.38 | 121.92 | 0.22 |
| FC-3 | FC-3 | 110 | 10 yr | 1345.00 | 526.51 | 534.33 | | 534.46 | 0.000083 | 2.95 | 547.02 | 163.68 | 0.21 |
| FC-3 | FC-3 | 110 | 25 yr | 1652.00 | 526.51 | 535.31 | | 535.44 | 0.000071 | 3.03 | 729.44 | 204.42 | 0.20 |
| FC-3 | FC-3 | 110 | 50 yr | 1925.00 | 526.51 | 536.08 | | 536.22 | 0.000064 | 3.08 | 894.79 | 220.47 | 0.19 |
| FC-3 | FC-3 | 110 | 100 yr | 2177.00 | 526.51 | 536.82 | | 536.95 | 0.000058 | 3.10 | 1061.47 | 235.62 | 0.19 |
| FC-3 | FC-3 | 110 | 500 yr | 2811.00 | 526.51 | 538.43 | | 538.56 | 0.000048 | 3.17 | 1468.76 | 269.43 | 0.18 |
| FC-3 | FC-3 | 110 | Ultimate 100 yr | 2177.00 | 526.51 | 536.93 | | 537.06 | 0.000054 | 3.04 | 1089.67 | 238.09 | 0.18 |
| FC-4 | FC-4 | 8063 | 2 yr | 403.00 | 579.13 | 581.72 | 581.09 | 581.93 | 0.008218 | 3.74 | 107.83 | 110.99 | 0.56 |
| FC-4 | FC-4 | 8063 | 5 yr | 633.00 | 579.13 | 582.16 | 581.56 | 582.46 | 0.008916 | 4.35 | 146.97 | 148.60 | 0.60 |
| FC-4 | FC-4 | 8063 | 10 yr | 787.00 | 579.13 | 582.38 | 581.82 | 582.72 | 0.009160 | 4.70 | 175.97 | 190.81 | 0.61 |
| FC-4 | FC-4 | 8063 | 25 yr | 959.00 | 579.13 | 582.58 | 582.06 | 582.96 | 0.009341 | 5.00 | 208.58 | 255.18 | 0.63 |
| FC-4 | FC-4 | 8063 | 50 yr | 1099.00 | 579.13 | 582.73 | 582.32 | 583.12 | 0.009484 | 5.21 | 234.32 | 287.12 | 0.64 |
| FC-4 | FC-4 | 8063 | 100 yr | 1236.00 | 579.13 | 582.85 | 582.52 | 583.27 | 0.009621 | 5.40 | 259.07 | 321.23 | 0.65 |
| FC-4 | FC-4 | 8063 | 500 yr | 1567.00 | 579.13 | 583.11 | 582.83 | 583.57 | 0.009855 | 5.77 | 316.94 | 385.56 | 0.66 |
| FC-4 | FC-4 | 8063 | Ultimate 100 yr | 1278.00 | 579.13 | 582.89 | 582.55 | 583.31 | 0.009621 | 5.45 | 267.07 | 331.09 | 0.65 |
| FC-4 | FC-4 | 7518 | 2 yr | 403.00 | 575.77 | 577.24 | | 577.36 | 0.008456 | 2.84 | 147.64 | 200.18 | 0.53 |
| FC-4 | FC-4 | 7518 | 5 yr | 633.00 | 575.77 | 577.51 | | 577.66 | 0.008500 | 3.26 | 204.08 | 219.50 | 0.55 |
| FC-4 | FC-4 | 7518 | 10 yr | 787.00 | 575.77 | 577.66 | | 577.84 | 0.008538 | 3.46 | 238.64 | 231.36 | 0.55 |
| FC-4 | FC-4 | 7518 | 25 yr | 959.00 | 575.77 | 577.81 | | 578.01 | 0.008602 | 3.66 | 274.77 | 247.60 | 0.56 |
| FC-4 | FC-4 | 7518 | 50 yr | 1099.00 | 575.77 | 577.91 | | 578.13 | 0.008596 | 3.84 | 301.34 | 280.22 | 0.57 |
| FC-4 | FC-4 | 7518 | 100 yr | 1236.00 | 575.77 | 578.01 | | 578.24 | 0.008571 | 4.01 | 328.17 | 294.06 | 0.58 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FC-4 | FC-4 | 7518 | 500 yr | 1567.00 | 575.77 | 578.21 | | 578.48 | 0.008551 | 4.35 | 390.50 | 323.10 | 0.59 |
| FC-4 | FC-4 | 7518 | Ultimate 100 yr | 1278.00 | 575.77 | 578.03 | | 578.27 | 0.008617 | 4.06 | 335.60 | 297.84 | 0.58 |
| FC-4 | FC-4 | 7225 | 2 yr | 403.00 | 573.97 | 575.40 | | 575.46 | 0.004389 | 1.98 | 204.35 | 256.60 | 0.38 |
| FC-4 | FC-4 | 7225 | 5 yr | 633.00 | 573.97 | 575.66 | | 575.74 | 0.004379 | 2.34 | 278.92 | 304.26 | 0.39 |
| FC-4 | FC-4 | 7225 | 10 yr | 787.00 | 573.97 | 575.80 | | 575.90 | 0.004440 | 2.54 | 323.39 | 320.74 | 0.40 |
| FC-4 | FC-4 | 7225 | 25 yr | 959.00 | 573.97 | 575.95 | | 576.06 | 0.004429 | 2.71 | 371.63 | 334.71 | 0.41 |
| FC-4 | FC-4 | 7225 | 50 yr | 1099.00 | 573.97 | 576.06 | | 576.18 | 0.004425 | 2.84 | 409.14 | 347.01 | 0.41 |
| FC-4 | FC-4 | 7225 | 100 yr | 1236.00 | 573.97 | 576.17 | | 576.29 | 0.004422 | 2.94 | 446.17 | 360.36 | 0.42 |
| FC-4 | FC-4 | 7225 | 500 yr | 1567.00 | 573.97 | 576.39 | | 576.53 | 0.004462 | 3.16 | 529.12 | 385.66 | 0.43 |
| FC-4 | FC-4 | 7225 | Ultimate 100 yr | 1278.00 | 573.97 | 576.20 | | 576.33 | 0.004418 | 2.97 | 457.42 | 364.10 | 0.42 |
| FC-4 | FC-4 | 6855 | 2 yr | 403.00 | 571.58 | 573.36 | | 573.50 | 0.006702 | 3.06 | 145.35 | 199.10 | 0.49 |
| FC-4 | FC-4 | 6855 | 5 yr | 633.00 | 571.58 | 573.66 | 573.30 | 573.83 | 0.006394 | 3.47 | 213.90 | 252.48 | 0.50 |
| FC-4 | FC-4 | 6855 | 10 yr | 787.00 | 571.58 | 573.83 | 573.44 | 574.00 | 0.006202 | 3.66 | 256.81 | 272.17 | 0.50 |
| FC-4 | FC-4 | 6855 | 25 yr | 959.00 | 571.58 | 573.98 | 573.60 | 574.17 | 0.006117 | 3.86 | 299.82 | 285.99 | 0.50 |
| FC-4 | FC-4 | 6855 | 50 yr | 1099.00 | 571.58 | 574.09 | 573.70 | 574.29 | 0.006144 | 4.02 | 331.19 | 295.09 | 0.51 |
| FC-4 | FC-4 | 6855 | 100 yr | 1236.00 | 571.58 | 574.18 | 573.80 | 574.40 | 0.006243 | 4.18 | 359.05 | 303.12 | 0.52 |
| FC-4 | FC-4 | 6855 | 500 yr | 1567.00 | 571.58 | 574.41 | 573.98 | 574.65 | 0.006103 | 4.44 | 431.46 | 325.54 | 0.52 |
| FC-4 | FC-4 | 6855 | Ultimate 100 yr | 1278.00 | 571.58 | 574.21 | 573.82 | 574.43 | 0.006267 | 4.22 | 367.54 | 305.82 | 0.52 |
| FC-4 | FC-4 | 6171 | 2 yr | 403.00 | 563.16 | 565.40 | 565.40 | 566.16 | 0.026719 | 6.99 | 57.64 | 38.60 | 1.01 |
| FC-4 | FC-4 | 6171 | 5 yr | 633.00 | 563.16 | 565.98 | 565.98 | 566.91 | 0.025036 | 7.75 | 81.73 | 44.68 | 1.01 |
| FC-4 | FC-4 | 6171 | 10 yr | 787.00 | 563.16 | 566.30 | 566.30 | 567.33 | 0.024260 | 8.13 | 96.82 | 48.07 | 1.01 |
| FC-4 | FC-4 | 6171 | 25 yr | 959.00 | 563.16 | 566.69 | 566.63 | 567.75 | 0.021775 | 8.24 | 116.33 | 52.13 | 0.97 |
| FC-4 | FC-4 | 6171 | 50 yr | 1099.00 | 563.16 | 567.04 | 566.87 | 568.07 | 0.018908 | 8.12 | 135.28 | 55.72 | 0.92 |
| FC-4 | FC-4 | 6171 | 100 yr | 1236.00 | 563.16 | 567.40 | 567.09 | 568.38 | 0.016207 | 7.94 | 155.70 | 59.12 | 0.86 |
| FC-4 | FC-4 | 6171 | 500 yr | 1567.00 | 563.16 | 568.12 | | 569.05 | 0.013664 | 7.76 | 201.88 | 69.81 | 0.80 |
| FC-4 | FC-4 | 6171 | Ultimate 100 yr | 1278.00 | 563.16 | 567.52 | | 568.47 | 0.015562 | 7.86 | 162.65 | 60.85 | 0.85 |
| FC-4 | FC-4 | 6077 | 2 yr | 403.00 | 560.20 | 564.25 | 561.94 | 564.35 | 0.001245 | 2.53 | 159.33 | 47.79 | 0.24 |
| FC-4 | FC-4 | 6077 | 5 yr | 633.00 | 560.20 | 565.16 | 562.48 | 565.31 | 0.001473 | 3.10 | 204.33 | 50.96 | 0.27 |
| FC-4 | FC-4 | 6077 | 10 yr | 787.00 | 560.20 | 565.67 | 562.80 | 565.85 | 0.001598 | 3.41 | 230.66 | 52.72 | 0.29 |
| FC-4 | FC-4 | 6077 | 25 yr | 959.00 | 560.20 | 566.18 | 563.12 | 566.39 | 0.001718 | 3.72 | 257.79 | 54.48 | 0.30 |
| FC-4 | FC-4 | 6077 | 50 yr | 1099.00 | 560.20 | 566.63 | 563.36 | 566.86 | 0.001727 | 3.89 | 282.81 | 56.05 | 0.30 |
| FC-4 | FC-4 | 6077 | 100 yr | 1236.00 | 560.20 | 567.07 | 563.60 | 567.32 | 0.001714 | 4.02 | 307.74 | 57.58 | 0.31 |
| FC-4 | FC-4 | 6077 | 500 yr | 1567.00 | 560.20 | 567.83 | 564.13 | 568.13 | 0.001872 | 4.45 | 352.38 | 60.21 | 0.32 |
| FC-4 | FC-4 | 6077 | Ultimate 100 yr | 1278.00 | 560.20 | 567.20 | 563.67 | 567.45 | 0.001712 | 4.05 | 315.17 | 58.02 | 0.31 |
| FC-4 | FC-4 | 5990 | | Culvert | | | | | | | | | |
| FC-4 | FC-4 | 5900 | 2 yr | 403.00 | 560.23 | 564.09 | | 564.28 | 0.003962 | 3.50 | 115.01 | 50.53 | 0.41 |
| FC-4 | FC-4 | 5900 | 5 yr | 633.00 | 560.23 | 564.96 | | 565.20 | 0.003548 | 3.95 | 160.29 | 53.90 | 0.40 |
| FC-4 | FC-4 | 5900 | 10 yr | 787.00 | 560.23 | 565.43 | | 565.71 | 0.003490 | 4.22 | 186.32 | 55.81 | 0.41 |
| FC-4 | FC-4 | 5900 | 25 yr | 959.00 | 560.23 | 565.90 | | 566.22 | 0.003499 | 4.50 | 213.31 | 58.23 | 0.41 |
| FC-4 | FC-4 | 5900 | 50 yr | 1099.00 | 560.23 | 566.25 | | 566.60 | 0.003519 | 4.70 | 233.95 | 60.01 | 0.42 |
| FC-4 | FC-4 | 5900 | 100 yr | 1236.00 | 560.23 | 566.57 | | 566.94 | 0.003554 | 4.89 | 253.01 | 61.61 | 0.42 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FC-4 | FC-4 | 5900 | 500 yr | 1567.00 | 560.23 | 566.91 | | 567.42 | 0.004516 | 5.71 | 274.67 | 63.38 | 0.48 |
| FC-4 | FC-4 | 5900 | Ultimate 100 yr | 1278.00 | 560.23 | 566.65 | | 567.03 | 0.003592 | 4.95 | 258.03 | 62.03 | 0.43 |
| FC-4 | FC-4 | 5801 | 2 yr | 403.00 | 559.99 | 563.76 | 562.22 | 563.93 | 0.003044 | 3.26 | 123.73 | 51.00 | 0.37 |
| FC-4 | FC-4 | 5801 | 5 yr | 633.00 | 559.99 | 564.65 | 562.82 | 564.86 | 0.003080 | 3.64 | 173.80 | 61.12 | 0.38 |
| FC-4 | FC-4 | 5801 | 10 yr | 787.00 | 559.99 | 565.14 | 563.17 | 565.37 | 0.003092 | 3.84 | 204.77 | 66.61 | 0.39 |
| FC-4 | FC-4 | 5801 | 25 yr | 959.00 | 559.99 | 565.62 | 563.52 | 565.87 | 0.003077 | 4.02 | 238.33 | 72.10 | 0.39 |
| FC-4 | FC-4 | 5801 | 50 yr | 1099.00 | 559.99 | 565.98 | 563.77 | 566.25 | 0.003072 | 4.15 | 264.85 | 133.44 | 0.39 |
| FC-4 | FC-4 | 5801 | 100 yr | 1236.00 | 559.99 | 566.30 | 564.01 | 566.58 | 0.003056 | 4.26 | 290.33 | 249.98 | 0.39 |
| FC-4 | FC-4 | 5801 | 500 yr | 1567.00 | 559.99 | 566.73 | 564.52 | 566.99 | 0.002717 | 4.25 | 451.49 | 277.08 | 0.38 |
| FC-4 | FC-4 | 5801 | Ultimate 100 yr | 1278.00 | 559.99 | 566.38 | 564.08 | 566.67 | 0.003049 | 4.30 | 298.13 | 265.56 | 0.40 |
| FC-4 | FC-4 | 4910 | 2 yr | 403.00 | 555.15 | 559.63 | 558.63 | 560.00 | 0.007834 | 4.88 | 82.57 | 36.61 | 0.57 |
| FC-4 | FC-4 | 4910 | 5 yr | 633.00 | 555.15 | 560.48 | 559.42 | 560.94 | 0.007530 | 5.41 | 116.98 | 43.19 | 0.58 |
| FC-4 | FC-4 | 4910 | 10 yr | 787.00 | 555.15 | 560.95 | 559.84 | 561.45 | 0.007428 | 5.72 | 137.71 | 46.37 | 0.58 |
| FC-4 | FC-4 | 4910 | 25 yr | 959.00 | 555.15 | 561.40 | 560.22 | 561.96 | 0.007417 | 6.01 | 159.61 | 69.88 | 0.59 |
| FC-4 | FC-4 | 4910 | 50 yr | 1099.00 | 555.15 | 561.72 | 560.51 | 562.33 | 0.007513 | 6.25 | 175.89 | 94.21 | 0.60 |
| FC-4 | FC-4 | 4910 | 100 yr | 1236.00 | 555.15 | 562.01 | 560.75 | 562.66 | 0.007610 | 6.47 | 191.12 | 105.55 | 0.61 |
| FC-4 | FC-4 | 4910 | 500 yr | 1567.00 | 555.15 | 562.56 | 561.32 | 563.33 | 0.008172 | 7.05 | 222.24 | 128.10 | 0.64 |
| FC-4 | FC-4 | 4910 | Ultimate 100 yr | 1278.00 | 555.15 | 562.08 | 560.82 | 562.75 | 0.007689 | 6.55 | 195.20 | 108.51 | 0.61 |
| FC-4 | FC-4 | 4479 | 2 yr | 403.00 | 551.75 | 557.10 | | 557.33 | 0.004370 | 3.87 | 104.07 | 42.23 | 0.43 |
| FC-4 | FC-4 | 4479 | 5 yr | 633.00 | 551.75 | 558.08 | | 558.36 | 0.004222 | 4.19 | 151.06 | 53.35 | 0.44 |
| FC-4 | FC-4 | 4479 | 10 yr | 787.00 | 551.75 | 558.60 | | 558.90 | 0.004145 | 4.37 | 180.30 | 59.20 | 0.44 |
| FC-4 | FC-4 | 4479 | 25 yr | 959.00 | 551.75 | 559.10 | | 559.42 | 0.004057 | 4.55 | 211.03 | 65.99 | 0.44 |
| FC-4 | FC-4 | 4479 | 50 yr | 1099.00 | 551.75 | 559.43 | | 559.77 | 0.003987 | 4.73 | 234.00 | 74.27 | 0.44 |
| FC-4 | FC-4 | 4479 | 100 yr | 1236.00 | 551.75 | 559.72 | | 560.09 | 0.003904 | 4.89 | 256.87 | 84.23 | 0.44 |
| FC-4 | FC-4 | 4479 | 500 yr | 1567.00 | 551.75 | 560.28 | | 560.68 | 0.003630 | 5.17 | 352.31 | 260.01 | 0.44 |
| FC-4 | FC-4 | 4479 | Ultimate 100 yr | 1278.00 | 551.75 | 559.80 | | 560.17 | 0.003879 | 4.94 | 263.78 | 88.20 | 0.44 |
| FC-4 | FC-4 | 3645 | 2 yr | 403.00 | 548.15 | 551.78 | 551.02 | 552.30 | 0.009945 | 5.79 | 69.65 | 28.37 | 0.65 |
| FC-4 | FC-4 | 3645 | 5 yr | 633.00 | 548.15 | 552.58 | 551.81 | 553.28 | 0.011031 | 6.71 | 94.35 | 33.21 | 0.70 |
| FC-4 | FC-4 | 3645 | 10 yr | 787.00 | 548.15 | 553.03 | 552.26 | 553.83 | 0.011456 | 7.17 | 109.83 | 36.02 | 0.72 |
| FC-4 | FC-4 | 3645 | 25 yr | 959.00 | 548.15 | 553.45 | 552.71 | 554.36 | 0.011961 | 7.63 | 125.62 | 38.68 | 0.75 |
| FC-4 | FC-4 | 3645 | 50 yr | 1099.00 | 548.15 | 553.77 | 553.05 | 554.75 | 0.012203 | 7.95 | 138.29 | 40.69 | 0.76 |
| FC-4 | FC-4 | 3645 | 100 yr | 1236.00 | 548.15 | 554.08 | 553.35 | 555.12 | 0.012449 | 8.18 | 151.03 | 43.20 | 0.77 |
| FC-4 | FC-4 | 3645 | 500 yr | 1567.00 | 548.15 | 554.87 | 554.01 | 555.93 | 0.013052 | 8.29 | 189.00 | 55.45 | 0.79 |
| FC-4 | FC-4 | 3645 | Ultimate 100 yr | 1278.00 | 548.15 | 554.17 | 553.44 | 555.22 | 0.012564 | 8.25 | 154.86 | 44.06 | 0.78 |
| FC-4 | FC-4 | 3007 | 2 yr | 403.00 | 544.64 | 547.45 | 547.45 | 548.14 | 0.003036 | 6.67 | 60.39 | 43.88 | 1.00 |
| FC-4 | FC-4 | 3007 | 5 yr | 633.00 | 544.64 | 547.96 | 547.96 | 548.85 | 0.002781 | 7.60 | 83.30 | 46.50 | 1.00 |
| FC-4 | FC-4 | 3007 | 10 yr | 787.00 | 544.64 | 548.24 | 548.24 | 549.27 | 0.002745 | 8.15 | 96.54 | 47.95 | 1.01 |
| FC-4 | FC-4 | 3007 | 25 yr | 959.00 | 544.64 | 548.56 | 548.56 | 549.69 | 0.002586 | 8.54 | 112.27 | 49.62 | 1.00 |
| FC-4 | FC-4 | 3007 | 50 yr | 1099.00 | 544.64 | 548.78 | 548.78 | 550.01 | 0.002572 | 8.92 | 123.17 | 50.75 | 1.01 |
| FC-4 | FC-4 | 3007 | 100 yr | 1236.00 | 544.64 | 548.99 | 548.99 | 550.31 | 0.002532 | 9.23 | 133.98 | 51.84 | 1.01 |
| FC-4 | FC-4 | 3007 | 500 yr | 1567.00 | 544.64 | 549.48 | 549.48 | 550.97 | 0.002389 | 9.77 | 160.42 | 54.42 | 1.00 |
| FC-4 | FC-4 | 3007 | Ultimate 100 yr | 1278.00 | 544.64 | 549.07 | 549.07 | 550.40 | 0.002476 | 9.26 | 138.06 | 52.25 | 1.00 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FC-4 | FC-4 | 2507 | 2 yr | 403.00 | 541.88 | 544.81 | | 545.09 | 0.000707 | 4.25 | 94.87 | 45.69 | 0.52 |
| FC-4 | FC-4 | 2507 | 5 yr | 633.00 | 541.88 | 545.91 | | 546.19 | 0.000474 | 4.27 | 148.42 | 52.41 | 0.45 |
| FC-4 | FC-4 | 2507 | 10 yr | 787.00 | 541.88 | 546.11 | | 546.49 | 0.000600 | 4.94 | 159.20 | 53.66 | 0.51 |
| FC-4 | FC-4 | 2507 | 25 yr | 959.00 | 541.88 | 546.27 | | 546.78 | 0.000765 | 5.71 | 167.87 | 54.64 | 0.57 |
| FC-4 | FC-4 | 2507 | 50 yr | 1099.00 | 541.88 | 546.39 | | 547.00 | 0.000902 | 6.30 | 174.35 | 55.37 | 0.63 |
| FC-4 | FC-4 | 2507 | 100 yr | 1236.00 | 541.88 | 546.44 | | 547.19 | 0.001090 | 6.98 | 177.15 | 55.68 | 0.69 |
| FC-4 | FC-4 | 2507 | 500 yr | 1567.00 | 541.88 | 546.66 | | 547.72 | 0.001440 | 8.26 | 189.75 | 57.05 | 0.80 |
| FC-4 | FC-4 | 2507 | Ultimate 100 yr | 1278.00 | 541.88 | 546.49 | | 547.27 | 0.001109 | 7.09 | 180.24 | 56.02 | 0.70 |
| FC-4 | FC-4 | 2035 | 2 yr | 884.00 | 539.28 | 544.30 | 542.65 | 544.51 | 0.003996 | 3.64 | 242.87 | 398.09 | 0.39 |
| FC-4 | FC-4 | 2035 | 5 yr | 1423.00 | 539.28 | 545.94 | 543.39 | 545.96 | 0.000173 | 0.96 | 1507.89 | 523.50 | 0.09 |
| FC-4 | FC-4 | 2035 | 10 yr | 1795.00 | 539.28 | 546.17 | 543.83 | 546.19 | 0.000216 | 1.11 | 1628.92 | 539.50 | 0.10 |
| FC-4 | FC-4 | 2035 | 25 yr | 2199.00 | 539.28 | 546.36 | 544.23 | 546.39 | 0.000265 | 1.27 | 1735.32 | 560.28 | 0.11 |
| FC-4 | FC-4 | 2035 | 50 yr | 2528.00 | 539.28 | 546.51 | 544.44 | 546.54 | 0.000302 | 1.39 | 1821.38 | 582.94 | 0.12 |
| FC-4 | FC-4 | 2035 | 100 yr | 2834.00 | 539.28 | 546.60 | 544.44 | 546.64 | 0.000349 | 1.51 | 1873.32 | 598.22 | 0.13 |
| FC-4 | FC-4 | 2035 | 500 yr | 3558.00 | 539.28 | 546.93 | 544.45 | 546.98 | 0.000405 | 1.70 | 2079.13 | 637.87 | 0.14 |
| FC-4 | FC-4 | 2035 | Ultimate 100 yr | 2894.00 | 539.28 | 546.67 | 544.44 | 546.71 | 0.000340 | 1.51 | 1915.75 | 610.51 | 0.12 |
| FC-4 | FC-4 | 1941 | 2 yr | 884.00 | 538.24 | 544.17 | 541.10 | 544.33 | 0.000160 | 3.20 | 276.39 | 453.26 | 0.27 |
| FC-4 | FC-4 | 1941 | 5 yr | 1423.00 | 538.24 | 545.91 | 542.00 | 545.95 | 0.000039 | 1.90 | 1777.05 | 588.12 | 0.14 |
| FC-4 | FC-4 | 1941 | 10 yr | 1795.00 | 538.24 | 546.13 | 542.52 | 546.18 | 0.000052 | 2.26 | 1914.45 | 659.80 | 0.16 |
| FC-4 | FC-4 | 1941 | 25 yr | 2199.00 | 538.24 | 546.31 | 543.04 | 546.37 | 0.000067 | 2.63 | 2037.04 | 683.69 | 0.19 |
| FC-4 | FC-4 | 1941 | 50 yr | 2528.00 | 538.24 | 546.45 | 543.43 | 546.52 | 0.000080 | 2.91 | 2134.30 | 700.11 | 0.21 |
| FC-4 | FC-4 | 1941 | 100 yr | 2834.00 | 538.24 | 546.53 | 543.77 | 546.62 | 0.000095 | 3.20 | 2188.43 | 714.20 | 0.23 |
| FC-4 | FC-4 | 1941 | 500 yr | 3558.00 | 538.24 | 546.84 | 544.50 | 546.95 | 0.000120 | 3.71 | 2418.81 | 760.44 | 0.26 |
| FC-4 | FC-4 | 1941 | Ultimate 100 yr | 2894.00 | 538.24 | 546.60 | 543.83 | 546.69 | 0.000094 | 3.21 | 2239.32 | 727.31 | 0.23 |
| FC-4 | FC-4 | 1685 | | Culvert | | | | | | | | | |
| FC-4 | FC-4 | 1432 | 2 yr | 884.00 | 532.84 | 538.60 | 537.08 | 538.87 | 0.004818 | 4.15 | 212.78 | 104.93 | 0.42 |
| FC-4 | FC-4 | 1432 | 5 yr | 1423.00 | 532.84 | 539.16 | 537.82 | 539.65 | 0.007429 | 5.62 | 253.38 | 254.08 | 0.53 |
| FC-4 | FC-4 | 1432 | 10 yr | 1795.00 | 532.84 | 539.47 | 538.27 | 540.12 | 0.009097 | 6.51 | 275.90 | 330.39 | 0.60 |
| FC-4 | FC-4 | 1432 | 25 yr | 2199.00 | 532.84 | 539.66 | 538.70 | 540.55 | 0.011618 | 7.58 | 290.13 | 353.63 | 0.68 |
| FC-4 | FC-4 | 1432 | 50 yr | 2528.00 | 532.84 | 539.84 | 539.04 | 540.32 | 0.007330 | 6.21 | 539.88 | 376.95 | 0.54 |
| FC-4 | FC-4 | 1432 | 100 yr | 2834.00 | 532.84 | 539.99 | 539.76 | 540.47 | 0.007384 | 6.38 | 595.84 | 396.98 | 0.55 |
| FC-4 | FC-4 | 1432 | 500 yr | 3558.00 | 532.84 | 540.28 | 540.03 | 540.80 | 0.007561 | 6.76 | 720.19 | 442.94 | 0.56 |
| FC-4 | FC-4 | 1432 | Ultimate 100 yr | 2894.00 | 532.84 | 540.01 | 539.79 | 540.50 | 0.007388 | 6.41 | 606.55 | 399.94 | 0.55 |
| FC-4 | FC-4 | 1238 | 2 yr | 868.00 | 532.99 | 537.85 | 536.29 | 538.01 | 0.003726 | 3.39 | 298.90 | 253.44 | 0.37 |
| FC-4 | FC-4 | 1238 | 5 yr | 1315.00 | 532.99 | 538.35 | 536.96 | 538.50 | 0.003709 | 3.48 | 482.24 | 445.22 | 0.37 |
| FC-4 | FC-4 | 1238 | 10 yr | 1709.00 | 532.99 | 538.65 | 537.86 | 538.79 | 0.003600 | 3.52 | 610.52 | 491.82 | 0.37 |
| FC-4 | FC-4 | 1238 | 25 yr | 2152.00 | 532.99 | 538.90 | 538.27 | 539.06 | 0.003647 | 3.71 | 730.67 | 549.91 | 0.38 |
| FC-4 | FC-4 | 1238 | 50 yr | 2517.00 | 532.99 | 539.08 | 538.40 | 539.25 | 0.003610 | 3.78 | 821.48 | 566.32 | 0.38 |
| FC-4 | FC-4 | 1238 | 100 yr | 2860.00 | 532.99 | 539.22 | 538.49 | 539.39 | 0.003739 | 3.90 | 891.45 | 612.36 | 0.39 |
| FC-4 | FC-4 | 1238 | 500 yr | 3633.00 | 532.99 | 539.48 | 538.65 | 539.68 | 0.004121 | 4.10 | 1039.32 | 668.95 | 0.41 |
| FC-4 | FC-4 | 1238 | Ultimate 100 yr | 2927.00 | 532.99 | 539.25 | 538.51 | 539.42 | 0.003748 | 3.91 | 906.51 | 619.79 | 0.39 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| FC-4 | FC-4 | 428 | 2 yr | 868.00 | 527.91 | 531.92 | 531.88 | 532.59 | 0.029511 | 6.90 | 150.05 | 110.19 | 0.84 |
| FC-4 | FC-4 | 428 | 5 yr | 1315.00 | 527.91 | 532.57 | 532.37 | 533.27 | 0.022730 | 7.26 | 228.08 | 128.28 | 0.77 |
| FC-4 | FC-4 | 428 | 10 yr | 1709.00 | 527.91 | 533.07 | 532.69 | 533.78 | 0.019722 | 7.55 | 326.93 | 219.88 | 0.74 |
| FC-4 | FC-4 | 428 | 25 yr | 2152.00 | 527.91 | 533.57 | 532.97 | 534.20 | 0.015780 | 7.43 | 441.07 | 239.78 | 0.68 |
| FC-4 | FC-4 | 428 | 50 yr | 2517.00 | 527.91 | 534.03 | 533.51 | 534.61 | 0.013030 | 7.30 | 562.12 | 296.05 | 0.63 |
| FC-4 | FC-4 | 428 | 100 yr | 2860.00 | 527.91 | 534.44 | 533.67 | 534.92 | 0.010136 | 6.85 | 686.52 | 308.18 | 0.56 |
| FC-4 | FC-4 | 428 | 500 yr | 3633.00 | 527.91 | 535.52 | 534.00 | 535.83 | 0.005525 | 5.82 | 1033.54 | 340.12 | 0.43 |
| FC-4 | FC-4 | 428 | Ultimate 100 yr | 2927.00 | 527.91 | 534.51 | 533.68 | 534.98 | 0.009767 | 6.79 | 708.54 | 309.61 | 0.55 |
| FC-4 | FC-4 | 106 | 2 yr | 868.00 | 521.26 | 526.93 | 524.82 | 527.09 | 0.002976 | 3.45 | 312.21 | 139.79 | 0.30 |
| FC-4 | FC-4 | 106 | 5 yr | 1315.00 | 521.26 | 529.01 | 525.71 | 529.10 | 0.001049 | 2.69 | 689.46 | 235.43 | 0.19 |
| FC-4 | FC-4 | 106 | 10 yr | 1709.00 | 521.26 | 530.03 | 526.32 | 530.11 | 0.000893 | 2.75 | 990.80 | 373.27 | 0.18 |
| FC-4 | FC-4 | 106 | 25 yr | 2152.00 | 521.26 | 531.15 | 526.76 | 531.21 | 0.000647 | 2.57 | 1471.23 | 510.86 | 0.16 |
| FC-4 | FC-4 | 106 | 50 yr | 2517.00 | 521.26 | 532.07 | 527.06 | 532.11 | 0.000473 | 2.36 | 1967.47 | 566.91 | 0.14 |
| FC-4 | FC-4 | 106 | 100 yr | 2860.00 | 521.26 | 532.90 | 527.33 | 532.94 | 0.000373 | 2.22 | 2480.20 | 650.72 | 0.12 |
| FC-4 | FC-4 | 106 | 500 yr | 3633.00 | 521.26 | 534.69 | 527.75 | 534.72 | 0.000200 | 1.81 | 3684.97 | 694.81 | 0.09 |
| FC-4 | FC-4 | 106 | Ultimate 100 yr | 2927.00 | 521.26 | 533.03 | 527.35 | 533.07 | 0.000358 | 2.19 | 2563.87 | 654.23 | 0.12 |
| NORTH FISH CREEK | 01 | 37647 | 2 yr | 318.00 | 625.76 | 629.47 | 629.47 | 630.59 | 0.002944 | 8.51 | 37.38 | 16.89 | 1.01 |
| NORTH FISH CREEK | 01 | 37647 | 5 yr | 481.00 | 625.76 | 630.28 | 630.28 | 631.60 | 0.002753 | 9.22 | 52.18 | 19.79 | 1.00 |
| NORTH FISH CREEK | 01 | 37647 | 10 yr | 589.00 | 625.76 | 630.70 | 630.70 | 632.15 | 0.002733 | 9.67 | 60.88 | 21.31 | 1.01 |
| NORTH FISH CREEK | 01 | 37647 | 25 yr | 713.00 | 625.76 | 631.15 | 631.15 | 632.72 | 0.002658 | 10.05 | 70.97 | 22.95 | 1.01 |
| NORTH FISH CREEK | 01 | 37647 | 50 yr | 809.00 | 625.76 | 631.45 | 631.45 | 633.13 | 0.002579 | 10.39 | 77.99 | 25.00 | 1.00 |
| NORTH FISH CREEK | 01 | 37647 | 100 yr | 904.00 | 625.76 | 631.73 | 631.73 | 633.51 | 0.002447 | 10.69 | 85.45 | 27.47 | 0.99 |
| NORTH FISH CREEK | 01 | 37647 | 500 yr | 1118.00 | 625.76 | 632.31 | 632.31 | 634.30 | 0.002274 | 11.37 | 102.60 | 32.44 | 0.98 |
| NORTH FISH CREEK | 01 | 37647 | Ultimate 100 yr | 924.00 | 625.76 | 631.79 | 631.79 | 633.59 | 0.002424 | 10.76 | 87.05 | 27.97 | 0.99 |
| NORTH FISH CREEK | 01 | 37100 | 2 yr | 318.00 | 623.33 | 628.41 | | 628.71 | 0.000478 | 4.39 | 72.49 | 22.33 | 0.43 |
| NORTH FISH CREEK | 01 | 37100 | 5 yr | 481.00 | 623.33 | 628.94 | | 629.44 | 0.000689 | 5.69 | 85.03 | 26.17 | 0.52 |
| NORTH FISH CREEK | 01 | 37100 | 10 yr | 589.00 | 623.33 | 629.19 | | 629.85 | 0.000827 | 6.51 | 91.97 | 28.94 | 0.58 |
| NORTH FISH CREEK | 01 | 37100 | 25 yr | 713.00 | 623.33 | 629.36 | | 630.24 | 0.001047 | 7.54 | 97.15 | 30.85 | 0.66 |
| NORTH FISH CREEK | 01 | 37100 | 50 yr | 809.00 | 623.33 | 629.49 | | 630.55 | 0.001219 | 8.30 | 101.01 | 32.19 | 0.71 |
| NORTH FISH CREEK | 01 | 37100 | 100 yr | 904.00 | 623.33 | 629.64 | 628.90 | 630.87 | 0.001350 | 8.94 | 106.00 | 33.85 | 0.76 |
| NORTH FISH CREEK | 01 | 37100 | 500 yr | 1118.00 | 623.33 | 629.93 | 629.49 | 631.58 | 0.001647 | 10.32 | 116.56 | 37.13 | 0.84 |
| NORTH FISH CREEK | 01 | 37100 | Ultimate 100 yr | 924.00 | 623.33 | 629.67 | 628.96 | 630.94 | 0.001376 | 9.07 | 107.09 | 34.21 | 0.76 |
| NORTH FISH CREEK | 01 | 36925 | 2 yr | 318.00 | 622.60 | 628.29 | | 628.54 | 0.006342 | 4.06 | 78.42 | 38.66 | 0.50 |
| NORTH FISH CREEK | 01 | 36925 | 5 yr | 481.00 | 622.60 | 628.82 | | 629.18 | 0.006737 | 4.82 | 100.91 | 45.90 | 0.54 |
| NORTH FISH CREEK | 01 | 36925 | 10 yr | 589.00 | 622.60 | 629.09 | 628.16 | 629.52 | 0.007135 | 5.31 | 113.78 | 50.07 | 0.56 |
| NORTH FISH CREEK | 01 | 36925 | 25 yr | 713.00 | 622.60 | 629.27 | 628.44 | 629.82 | 0.008401 | 6.01 | 123.05 | 52.86 | 0.62 |
| NORTH FISH CREEK | 01 | 36925 | 50 yr | 809.00 | 622.60 | 629.41 | 628.63 | 630.05 | 0.009181 | 6.48 | 130.64 | 55.05 | 0.65 |
| NORTH FISH CREEK | 01 | 36925 | 100 yr | 904.00 | 622.60 | 629.61 | 628.86 | 630.30 | 0.009175 | 6.75 | 141.92 | 58.14 | 0.65 |
| NORTH FISH CREEK | 01 | 36925 | 500 yr | 1118.00 | 622.60 | 630.05 | 629.30 | 630.83 | 0.008844 | 7.22 | 170.55 | 70.17 | 0.66 |
| NORTH FISH CREEK | 01 | 36925 | Ultimate 100 yr | 924.00 | 622.60 | 629.65 | 628.91 | 630.35 | 0.009132 | 6.80 | 144.53 | 58.85 | 0.65 |
| NORTH FISH CREEK | 01 | 36475 | 2 yr | 318.00 | 620.60 | 623.61 | 623.40 | 624.22 | 0.018904 | 6.29 | 50.55 | 30.34 | 0.86 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NORTH FISH CREEK | 01 | 36475 | 5 yr | 481.00 | 620.60 | 624.35 | | 624.98 | 0.014823 | 6.38 | 75.35 | 36.83 | 0.79 |
| NORTH FISH CREEK | 01 | 36475 | 10 yr | 589.00 | 620.60 | 624.82 | | 625.43 | 0.012318 | 6.29 | 93.62 | 40.68 | 0.73 |
| NORTH FISH CREEK | 01 | 36475 | 25 yr | 713.00 | 620.60 | 625.53 | | 626.04 | 0.008303 | 5.71 | 124.85 | 46.63 | 0.62 |
| NORTH FISH CREEK | 01 | 36475 | 50 yr | 809.00 | 620.60 | 626.20 | | 626.60 | 0.005814 | 5.07 | 160.99 | 69.28 | 0.52 |
| NORTH FISH CREEK | 01 | 36475 | 100 yr | 904.00 | 620.60 | 626.36 | | 626.80 | 0.006011 | 5.34 | 173.24 | 81.92 | 0.54 |
| NORTH FISH CREEK | 01 | 36475 | 500 yr | 1118.00 | 620.60 | 626.56 | | 627.14 | 0.007306 | 6.14 | 191.16 | 98.24 | 0.60 |
| NORTH FISH CREEK | 01 | 36475 | Ultimate 100 yr | 924.00 | 620.60 | 626.38 | | 626.83 | 0.006160 | 5.43 | 174.61 | 83.28 | 0.54 |
| NORTH FISH CREEK | 01 | 36333 | 2 yr | 318.00 | 619.11 | 622.37 | 620.89 | 622.54 | 0.003066 | 3.32 | 95.86 | 38.03 | 0.37 |
| NORTH FISH CREEK | 01 | 36333 | 5 yr | 481.00 | 619.11 | 623.44 | 621.40 | 623.63 | 0.002412 | 3.44 | 139.89 | 43.71 | 0.34 |
| NORTH FISH CREEK | 01 | 36333 | 10 yr | 589.00 | 619.11 | 624.09 | 621.70 | 624.28 | 0.002128 | 3.48 | 169.17 | 59.26 | 0.32 |
| NORTH FISH CREEK | 01 | 36333 | 25 yr | 713.00 | 619.11 | 625.09 | 622.01 | 625.24 | 0.001408 | 3.23 | 236.02 | 209.35 | 0.27 |
| NORTH FISH CREEK | 01 | 36333 | 50 yr | 809.00 | 619.11 | 625.90 | 622.23 | 626.04 | 0.000986 | 3.01 | 300.31 | 366.60 | 0.23 |
| NORTH FISH CREEK | 01 | 36333 | 100 yr | 904.00 | 619.11 | 626.04 | 622.44 | 626.21 | 0.001179 | 3.35 | 329.02 | 474.52 | 0.26 |
| NORTH FISH CREEK | 01 | 36333 | 500 yr | 1118.00 | 619.11 | 626.17 | 622.88 | 626.40 | 0.001600 | 3.97 | 388.95 | 479.26 | 0.30 |
| NORTH FISH CREEK | 01 | 36333 | Ultimate 100 yr | 924.00 | 619.11 | 626.05 | 622.49 | 626.23 | 0.001223 | 3.42 | 332.67 | 474.81 | 0.26 |
| NORTH FISH CREEK | 01 | 36274 | | Culvert | | | | | | | | | |
| NORTH FISH CREEK | 01 | 36215 | 2 yr | 318.00 | 617.57 | 620.87 | 619.93 | 621.10 | 0.005775 | 3.83 | 82.95 | 43.13 | 0.49 |
| NORTH FISH CREEK | 01 | 36215 | 5 yr | 481.00 | 617.57 | 621.55 | 620.43 | 621.83 | 0.005574 | 4.18 | 114.98 | 51.02 | 0.49 |
| NORTH FISH CREEK | 01 | 36215 | 10 yr | 589.00 | 617.57 | 622.09 | 620.73 | 622.35 | 0.004616 | 4.09 | 143.87 | 57.22 | 0.45 |
| NORTH FISH CREEK | 01 | 36215 | 25 yr | 713.00 | 617.57 | 622.41 | 621.02 | 622.71 | 0.004692 | 4.39 | 162.37 | 60.89 | 0.47 |
| NORTH FISH CREEK | 01 | 36215 | 50 yr | 809.00 | 617.57 | 622.59 | 621.23 | 622.93 | 0.004928 | 4.68 | 173.05 | 62.99 | 0.48 |
| NORTH FISH CREEK | 01 | 36215 | 100 yr | 904.00 | 617.57 | 622.73 | 621.41 | 623.12 | 0.005261 | 4.97 | 181.76 | 64.70 | 0.50 |
| NORTH FISH CREEK | 01 | 36215 | 500 yr | 1118.00 | 617.57 | 623.10 | 621.81 | 623.53 | 0.006165 | 5.31 | 222.90 | 147.64 | 0.54 |
| NORTH FISH CREEK | 01 | 36215 | Ultimate 100 yr | 924.00 | 617.57 | 622.76 | 621.46 | 623.16 | 0.005328 | 5.03 | 183.56 | 65.05 | 0.51 |
| NORTH FISH CREEK | 01 | 35897 | 2 yr | 318.00 | 615.40 | 619.39 | | 619.55 | 0.003726 | 3.17 | 100.33 | 50.25 | 0.40 |
| NORTH FISH CREEK | 01 | 35897 | 5 yr | 481.00 | 615.40 | 620.11 | | 620.29 | 0.003732 | 3.45 | 139.52 | 61.71 | 0.40 |
| NORTH FISH CREEK | 01 | 35897 | 10 yr | 589.00 | 615.40 | 620.74 | | 620.89 | 0.004119 | 3.03 | 194.57 | 113.22 | 0.41 |
| NORTH FISH CREEK | 01 | 35897 | 25 yr | 713.00 | 615.40 | 621.09 | | 621.23 | 0.003973 | 2.98 | 240.26 | 158.71 | 0.40 |
| NORTH FISH CREEK | 01 | 35897 | 50 yr | 809.00 | 615.40 | 621.29 | | 621.43 | 0.003741 | 3.01 | 275.39 | 196.29 | 0.39 |
| NORTH FISH CREEK | 01 | 35897 | 100 yr | 904.00 | 615.40 | 621.46 | | 621.60 | 0.003390 | 3.04 | 311.64 | 228.99 | 0.38 |
| NORTH FISH CREEK | 01 | 35897 | 500 yr | 1118.00 | 615.40 | 621.84 | | 621.98 | 0.002627 | 3.01 | 413.82 | 302.70 | 0.34 |
| NORTH FISH CREEK | 01 | 35897 | Ultimate 100 yr | 924.00 | 615.40 | 621.49 | | 621.63 | 0.003322 | 3.04 | 319.80 | 235.72 | 0.38 |
| NORTH FISH CREEK | 01 | 35540 | 2 yr | 318.00 | 612.90 | 616.45 | 616.35 | 617.21 | 0.021966 | 7.00 | 45.41 | 25.56 | 0.93 |
| NORTH FISH CREEK | 01 | 35540 | 5 yr | 481.00 | 612.90 | 617.18 | 616.96 | 618.01 | 0.018514 | 7.28 | 66.04 | 30.83 | 0.88 |
| NORTH FISH CREEK | 01 | 35540 | 10 yr | 589.00 | 612.90 | 617.62 | 617.30 | 618.46 | 0.016536 | 7.34 | 80.20 | 33.97 | 0.84 |
| NORTH FISH CREEK | 01 | 35540 | 25 yr | 713.00 | 612.90 | 618.10 | 617.66 | 618.93 | 0.014607 | 7.33 | 97.28 | 37.67 | 0.80 |
| NORTH FISH CREEK | 01 | 35540 | 50 yr | 809.00 | 612.90 | 618.48 | 617.89 | 619.29 | 0.013125 | 7.19 | 112.51 | 41.43 | 0.77 |
| NORTH FISH CREEK | 01 | 35540 | 100 yr | 904.00 | 612.90 | 618.99 | 618.13 | 619.67 | 0.011741 | 6.66 | 135.78 | 51.93 | 0.73 |
| NORTH FISH CREEK | 01 | 35540 | 500 yr | 1118.00 | 612.90 | 620.27 | 618.67 | 620.67 | 0.005696 | 5.09 | 221.31 | 166.75 | 0.52 |
| NORTH FISH CREEK | 01 | 35540 | Ultimate 100 yr | 924.00 | 612.90 | 619.09 | 618.20 | 619.75 | 0.011378 | 6.55 | 141.14 | 54.13 | 0.71 |
| NORTH FISH CREEK | 01 | 35330 | 2 yr | 610.00 | 611.33 | 614.42 | 613.16 | 614.71 | 0.000500 | 4.33 | 140.88 | 48.81 | 0.45 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NORTH FISH CREEK | 01 | 35330 | 5 yr | 957.00 | 611.33 | 615.50 | 613.78 | 615.88 | 0.000450 | 4.90 | 195.12 | 51.04 | 0.44 |
| NORTH FISH CREEK | 01 | 35330 | 10 yr | 1182.00 | 611.33 | 616.14 | 614.15 | 616.56 | 0.000427 | 5.18 | 228.01 | 52.34 | 0.44 |
| NORTH FISH CREEK | 01 | 35330 | 25 yr | 1427.00 | 611.33 | 616.78 | 614.52 | 617.24 | 0.000400 | 5.43 | 269.78 | 69.94 | 0.43 |
| NORTH FISH CREEK | 01 | 35330 | 50 yr | 1624.00 | 611.33 | 617.29 | 614.79 | 617.77 | 0.000379 | 5.58 | 305.97 | 75.49 | 0.43 |
| NORTH FISH CREEK | 01 | 35330 | 100 yr | 1805.00 | 611.33 | 617.86 | 615.05 | 618.33 | 0.000332 | 5.56 | 349.25 | 88.26 | 0.40 |
| NORTH FISH CREEK | 01 | 35330 | 500 yr | 2275.00 | 611.33 | 619.64 | 615.63 | 620.04 | 0.000207 | 5.23 | 504.65 | 220.19 | 0.33 |
| NORTH FISH CREEK | 01 | 35330 | Ultimate 100 yr | 1841.00 | 611.33 | 617.99 | 615.08 | 618.46 | 0.000321 | 5.54 | 359.75 | 93.54 | 0.40 |
| NORTH FISH CREEK | 01 | 35201 | | Culvert | | | | | | | | | |
| NORTH FISH CREEK | 01 | 35101 | 2 yr | 610.00 | 610.90 | 612.59 | 612.59 | 613.43 | 0.002925 | 7.32 | 83.34 | 50.64 | 1.01 |
| NORTH FISH CREEK | 01 | 35101 | 5 yr | 957.00 | 610.90 | 613.18 | 613.18 | 614.29 | 0.002694 | 8.45 | 113.24 | 51.65 | 1.01 |
| NORTH FISH CREEK | 01 | 35101 | 10 yr | 1182.00 | 610.90 | 613.52 | 613.52 | 614.79 | 0.002588 | 9.03 | 130.96 | 52.24 | 1.00 |
| NORTH FISH CREEK | 01 | 35101 | 25 yr | 1427.00 | 610.90 | 613.87 | 613.87 | 615.29 | 0.002501 | 9.57 | 149.13 | 52.84 | 1.00 |
| NORTH FISH CREEK | 01 | 35101 | 50 yr | 1624.00 | 610.90 | 614.13 | 614.13 | 615.67 | 0.002443 | 9.96 | 163.10 | 53.29 | 1.00 |
| NORTH FISH CREEK | 01 | 35101 | 100 yr | 1805.00 | 610.90 | 614.36 | 614.36 | 616.00 | 0.002410 | 10.30 | 175.23 | 53.68 | 1.00 |
| NORTH FISH CREEK | 01 | 35101 | 500 yr | 2275.00 | 610.90 | 614.92 | 614.92 | 616.82 | 0.002322 | 11.06 | 205.70 | 54.65 | 1.00 |
| NORTH FISH CREEK | 01 | 35101 | Ultimate 100 yr | 1841.00 | 610.90 | 614.40 | 614.40 | 616.07 | 0.002404 | 10.37 | 177.61 | 53.76 | 1.00 |
| NORTH FISH CREEK | 01 | 34259 | 2 yr | 610.00 | 603.74 | 607.01 | 607.01 | 608.34 | 0.002706 | 9.26 | 65.89 | 25.06 | 1.01 |
| NORTH FISH CREEK | 01 | 34259 | 5 yr | 957.00 | 603.74 | 607.98 | 607.98 | 609.69 | 0.002561 | 10.50 | 91.14 | 26.94 | 1.01 |
| NORTH FISH CREEK | 01 | 34259 | 10 yr | 1182.00 | 603.74 | 608.53 | 608.53 | 610.45 | 0.002501 | 11.12 | 106.27 | 28.00 | 1.01 |
| NORTH FISH CREEK | 01 | 34259 | 25 yr | 1427.00 | 603.74 | 609.08 | 609.08 | 611.21 | 0.002451 | 11.70 | 122.01 | 29.07 | 1.01 |
| NORTH FISH CREEK | 01 | 34259 | 50 yr | 1624.00 | 603.74 | 609.50 | 609.50 | 611.77 | 0.002422 | 12.11 | 134.13 | 29.86 | 1.01 |
| NORTH FISH CREEK | 01 | 34259 | 100 yr | 1805.00 | 603.74 | 609.87 | 609.87 | 612.26 | 0.002338 | 12.41 | 146.13 | 38.56 | 1.00 |
| NORTH FISH CREEK | 01 | 34259 | 500 yr | 2275.00 | 603.74 | 610.84 | 610.84 | 613.41 | 0.001986 | 12.92 | 201.11 | 73.40 | 0.95 |
| NORTH FISH CREEK | 01 | 34259 | Ultimate 100 yr | 1841.00 | 603.74 | 609.95 | 609.95 | 612.36 | 0.002310 | 12.46 | 149.18 | 43.78 | 0.99 |
| NORTH FISH CREEK | 01 | 33968 | 2 yr | 610.00 | 601.10 | 603.95 | 603.95 | 605.15 | 0.002708 | 8.77 | 69.57 | 29.35 | 1.00 |
| NORTH FISH CREEK | 01 | 33968 | 5 yr | 957.00 | 601.10 | 604.82 | 604.82 | 606.37 | 0.002546 | 10.01 | 95.62 | 30.98 | 1.00 |
| NORTH FISH CREEK | 01 | 33968 | 10 yr | 1182.00 | 601.10 | 605.31 | 605.31 | 607.07 | 0.002476 | 10.63 | 111.19 | 31.91 | 1.00 |
| NORTH FISH CREEK | 01 | 33968 | 25 yr | 1427.00 | 601.10 | 605.81 | 605.81 | 607.76 | 0.002421 | 11.21 | 127.27 | 32.85 | 1.00 |
| NORTH FISH CREEK | 01 | 33968 | 50 yr | 1624.00 | 601.10 | 606.18 | 606.18 | 608.28 | 0.002385 | 11.62 | 139.70 | 33.55 | 1.00 |
| NORTH FISH CREEK | 01 | 33968 | 100 yr | 1805.00 | 601.10 | 606.51 | 606.51 | 608.74 | 0.002365 | 11.98 | 150.61 | 34.16 | 1.01 |
| NORTH FISH CREEK | 01 | 33968 | 500 yr | 2275.00 | 601.10 | 607.29 | 607.29 | 609.83 | 0.002274 | 12.79 | 178.61 | 42.19 | 1.00 |
| NORTH FISH CREEK | 01 | 33968 | Ultimate 100 yr | 1841.00 | 601.10 | 606.58 | 606.58 | 608.82 | 0.002339 | 12.01 | 153.26 | 34.31 | 1.00 |
| NORTH FISH CREEK | 01 | 33462 | 2 yr | 610.00 | 596.52 | 599.41 | 599.41 | 600.62 | 0.002728 | 8.81 | 69.27 | 29.12 | 1.01 |
| NORTH FISH CREEK | 01 | 33462 | 5 yr | 957.00 | 596.52 | 600.28 | 600.28 | 601.85 | 0.002562 | 10.06 | 95.16 | 30.65 | 1.01 |
| NORTH FISH CREEK | 01 | 33462 | 10 yr | 1182.00 | 596.52 | 600.78 | 600.78 | 602.55 | 0.002493 | 10.69 | 110.61 | 31.53 | 1.01 |
| NORTH FISH CREEK | 01 | 33462 | 25 yr | 1427.00 | 596.52 | 601.27 | 601.27 | 603.25 | 0.002438 | 11.27 | 126.57 | 32.42 | 1.01 |
| NORTH FISH CREEK | 01 | 33462 | 50 yr | 1624.00 | 596.52 | 601.65 | 601.65 | 603.77 | 0.002402 | 11.69 | 138.91 | 33.09 | 1.01 |
| NORTH FISH CREEK | 01 | 33462 | 100 yr | 1805.00 | 596.52 | 601.98 | 601.98 | 604.23 | 0.002376 | 12.04 | 149.89 | 33.67 | 1.01 |
| NORTH FISH CREEK | 01 | 33462 | 500 yr | 2275.00 | 596.52 | 602.78 | 602.78 | 605.33 | 0.002306 | 12.82 | 177.54 | 37.32 | 1.00 |
| NORTH FISH CREEK | 01 | 33462 | Ultimate 100 yr | 1841.00 | 596.52 | 602.04 | 602.04 | 604.32 | 0.002372 | 12.11 | 152.01 | 33.78 | 1.01 |
| NORTH FISH CREEK | 01 | 33170 | 2 yr | 610.00 | 593.77 | 596.43 | 596.43 | 597.52 | 0.002746 | 8.39 | 72.71 | 33.70 | 1.01 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NORTH FISH CREEK | 01 | 33170 | 5 yr | 957.00 | 593.77 | 597.22 | 597.22 | 598.65 | 0.002527 | 9.56 | 100.06 | 35.23 | 1.00 |
| NORTH FISH CREEK | 01 | 33170 | 10 yr | 1182.00 | 593.77 | 597.66 | 597.66 | 599.28 | 0.002483 | 10.22 | 115.65 | 36.08 | 1.01 |
| NORTH FISH CREEK | 01 | 33170 | 25 yr | 1427.00 | 593.77 | 598.13 | 598.13 | 599.92 | 0.002389 | 10.75 | 132.72 | 36.98 | 1.00 |
| NORTH FISH CREEK | 01 | 33170 | 50 yr | 1624.00 | 593.77 | 598.46 | 598.46 | 600.41 | 0.002379 | 11.21 | 144.91 | 37.61 | 1.01 |
| NORTH FISH CREEK | 01 | 33170 | 100 yr | 1805.00 | 593.77 | 599.33 | | 600.92 | 0.001583 | 10.11 | 178.51 | 39.30 | 0.84 |
| NORTH FISH CREEK | 01 | 33170 | 500 yr | 2275.00 | 593.77 | 599.71 | 599.50 | 601.86 | 0.001977 | 11.74 | 193.77 | 40.04 | 0.94 |
| NORTH FISH CREEK | 01 | 33170 | Ultimate 100 yr | 1841.00 | 593.77 | 599.40 | | 601.00 | 0.001578 | 10.16 | 181.14 | 39.43 | 0.84 |
| NORTH FISH CREEK | 01 | 32670 | 2 yr | 610.00 | 589.93 | 594.80 | | 595.04 | 0.000275 | 3.93 | 155.21 | 38.33 | 0.34 |
| NORTH FISH CREEK | 01 | 32670 | 5 yr | 957.00 | 589.93 | 595.95 | | 596.30 | 0.000317 | 4.78 | 200.43 | 40.69 | 0.38 |
| NORTH FISH CREEK | 01 | 32670 | 10 yr | 1182.00 | 589.93 | 596.62 | | 597.04 | 0.000322 | 5.18 | 228.61 | 42.27 | 0.39 |
| NORTH FISH CREEK | 01 | 32670 | 25 yr | 1427.00 | 589.93 | 597.32 | | 597.80 | 0.000322 | 5.55 | 259.10 | 45.76 | 0.39 |
| NORTH FISH CREEK | 01 | 32670 | 50 yr | 1624.00 | 589.93 | 597.79 | | 598.33 | 0.000325 | 5.86 | 281.50 | 49.17 | 0.40 |
| NORTH FISH CREEK | 01 | 32670 | 100 yr | 1805.00 | 589.93 | 599.74 | | 600.12 | 0.000168 | 4.99 | 405.26 | 82.50 | 0.30 |
| NORTH FISH CREEK | 01 | 32670 | 500 yr | 2275.00 | 589.93 | 600.29 | | 600.82 | 0.000214 | 5.88 | 453.77 | 92.02 | 0.34 |
| NORTH FISH CREEK | 01 | 32670 | Ultimate 100 yr | 1841.00 | 589.93 | 599.81 | | 600.20 | 0.000169 | 5.04 | 411.38 | 83.59 | 0.30 |
| NORTH FISH CREEK | 01 | 32414 | 2 yr | 610.00 | 589.16 | 594.83 | | 594.96 | 0.000117 | 2.81 | 216.70 | 47.49 | 0.23 |
| NORTH FISH CREEK | 01 | 32414 | 5 yr | 957.00 | 589.16 | 596.00 | | 596.19 | 0.000146 | 3.49 | 274.02 | 50.54 | 0.26 |
| NORTH FISH CREEK | 01 | 32414 | 10 yr | 1182.00 | 589.16 | 596.70 | | 596.92 | 0.000156 | 3.82 | 309.80 | 52.36 | 0.28 |
| NORTH FISH CREEK | 01 | 32414 | 25 yr | 1427.00 | 589.16 | 597.41 | | 597.67 | 0.000163 | 4.10 | 347.90 | 54.22 | 0.29 |
| NORTH FISH CREEK | 01 | 32414 | 50 yr | 1624.00 | 589.16 | 597.90 | | 598.19 | 0.000171 | 4.33 | 374.63 | 55.50 | 0.29 |
| NORTH FISH CREEK | 01 | 32414 | 100 yr | 1805.00 | 589.16 | 599.82 | | 600.03 | 0.000093 | 3.73 | 515.33 | 98.44 | 0.22 |
| NORTH FISH CREEK | 01 | 32414 | 500 yr | 2275.00 | 589.16 | 600.41 | | 600.71 | 0.000118 | 4.38 | 580.89 | 128.07 | 0.26 |
| NORTH FISH CREEK | 01 | 32414 | Ultimate 100 yr | 1841.00 | 589.16 | 599.90 | | 600.11 | 0.000094 | 3.77 | 522.89 | 101.05 | 0.23 |
| NORTH FISH CREEK | 01 | 31938 | 2 yr | 1064.00 | 588.72 | 594.52 | 591.88 | 594.86 | 0.000295 | 4.63 | 229.92 | 46.95 | 0.37 |
| NORTH FISH CREEK | 01 | 31938 | 5 yr | 1726.00 | 588.72 | 595.42 | 592.96 | 596.04 | 0.000468 | 6.32 | 273.07 | 48.91 | 0.47 |
| NORTH FISH CREEK | 01 | 31938 | 10 yr | 2167.00 | 588.72 | 595.93 | 593.60 | 596.75 | 0.000571 | 7.27 | 298.01 | 50.01 | 0.52 |
| NORTH FISH CREEK | 01 | 31938 | 25 yr | 2636.00 | 588.72 | 596.45 | 594.21 | 597.47 | 0.000661 | 8.13 | 324.35 | 51.14 | 0.57 |
| NORTH FISH CREEK | 01 | 31938 | 50 yr | 2975.00 | 588.72 | 596.80 | 594.63 | 597.97 | 0.000719 | 8.68 | 342.60 | 51.91 | 0.60 |
| NORTH FISH CREEK | 01 | 31938 | 100 yr | 3260.00 | 588.72 | 599.17 | 594.96 | 599.91 | 0.000334 | 6.91 | 490.58 | 89.96 | 0.42 |
| NORTH FISH CREEK | 01 | 31938 | 500 yr | 4153.00 | 588.72 | 599.40 | 595.96 | 600.54 | 0.000496 | 8.57 | 511.39 | 95.62 | 0.51 |
| NORTH FISH CREEK | 01 | 31938 | Ultimate 100 yr | 3322.00 | 588.72 | 599.23 | 595.04 | 599.99 | 0.000339 | 6.99 | 496.12 | 91.50 | 0.42 |
| NORTH FISH CREEK | 01 | 31885 | Bridge | | | | | | | | | | |
| NORTH FISH CREEK | 01 | 31828 | 2 yr | 1064.00 | 588.72 | 594.40 | 591.86 | 594.75 | 0.002253 | 4.74 | 224.36 | 46.69 | 0.38 |
| NORTH FISH CREEK | 01 | 31828 | 5 yr | 1726.00 | 588.72 | 595.19 | 592.94 | 595.87 | 0.003756 | 6.59 | 261.93 | 48.41 | 0.50 |
| NORTH FISH CREEK | 01 | 31828 | 10 yr | 2167.00 | 588.72 | 595.61 | 593.60 | 596.52 | 0.004768 | 7.68 | 282.05 | 49.31 | 0.57 |
| NORTH FISH CREEK | 01 | 31828 | 25 yr | 2636.00 | 588.72 | 596.01 | 594.21 | 597.19 | 0.005760 | 8.72 | 302.40 | 50.20 | 0.63 |
| NORTH FISH CREEK | 01 | 31828 | 50 yr | 2975.00 | 588.72 | 596.27 | 594.63 | 597.65 | 0.006502 | 9.44 | 315.26 | 50.75 | 0.67 |
| NORTH FISH CREEK | 01 | 31828 | 100 yr | 3260.00 | 588.72 | 596.51 | 594.98 | 598.05 | 0.007005 | 9.96 | 327.28 | 51.27 | 0.69 |
| NORTH FISH CREEK | 01 | 31828 | 500 yr | 4153.00 | 588.72 | 597.09 | 595.96 | 599.18 | 0.008811 | 11.62 | 357.51 | 52.54 | 0.78 |
| NORTH FISH CREEK | 01 | 31828 | Ultimate 100 yr | 3322.00 | 588.72 | 596.55 | 595.04 | 598.13 | 0.007131 | 10.08 | 329.54 | 51.36 | 0.70 |
| NORTH FISH CREEK | 02 | 31362 | 2 yr | 1338.00 | 588.86 | 593.51 | | 593.57 | 0.002197 | 2.64 | 761.65 | 573.28 | 0.29 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NORTH FISH CREEK | 02 | 31362 | 5 yr | 2195.00 | 588.86 | 594.14 | 592.84 | 594.21 | 0.002047 | 2.71 | 1146.73 | 663.00 | 0.28 |
| NORTH FISH CREEK | 02 | 31362 | 10 yr | 2739.00 | 588.86 | 594.47 | | 594.54 | 0.001914 | 2.74 | 1369.68 | 699.41 | 0.28 |
| NORTH FISH CREEK | 02 | 31362 | 25 yr | 3342.00 | 588.86 | 594.81 | | 594.88 | 0.001785 | 2.76 | 1618.30 | 766.05 | 0.27 |
| NORTH FISH CREEK | 02 | 31362 | 50 yr | 3748.00 | 588.86 | 595.00 | | 595.08 | 0.001754 | 2.80 | 1767.24 | 788.09 | 0.27 |
| NORTH FISH CREEK | 02 | 31362 | 100 yr | 4207.00 | 588.86 | 595.20 | | 595.28 | 0.001716 | 2.88 | 1933.38 | 845.17 | 0.27 |
| NORTH FISH CREEK | 02 | 31362 | 500 yr | 5320.00 | 588.86 | 595.66 | | 595.75 | 0.001622 | 3.03 | 2343.27 | 918.13 | 0.27 |
| NORTH FISH CREEK | 02 | 31362 | Ultimate 100 yr | 4289.00 | 588.86 | 595.24 | | 595.32 | 0.001710 | 2.89 | 1962.89 | 848.51 | 0.27 |
| | | | | | | | | | | | | | |
| NORTH FISH CREEK | 02 | 30720 | 2 yr | 1338.00 | 587.72 | 590.65 | 590.40 | 591.14 | 0.019512 | 5.61 | 238.55 | 151.39 | 0.79 |
| NORTH FISH CREEK | 02 | 30720 | 5 yr | 2195.00 | 587.72 | 591.42 | 590.94 | 592.00 | 0.014887 | 6.10 | 359.65 | 178.11 | 0.73 |
| NORTH FISH CREEK | 02 | 30720 | 10 yr | 2739.00 | 587.72 | 591.90 | 591.27 | 592.50 | 0.012744 | 6.21 | 441.35 | 243.29 | 0.69 |
| NORTH FISH CREEK | 02 | 30720 | 25 yr | 3342.00 | 587.72 | 592.95 | 591.59 | 593.28 | 0.005211 | 4.80 | 819.29 | 413.52 | 0.46 |
| NORTH FISH CREEK | 02 | 30720 | 50 yr | 3748.00 | 587.72 | 593.20 | 591.79 | 593.53 | 0.004904 | 4.88 | 921.45 | 429.79 | 0.45 |
| NORTH FISH CREEK | 02 | 30720 | 100 yr | 4207.00 | 587.72 | 593.45 | 592.01 | 593.79 | 0.004622 | 4.96 | 1034.38 | 451.02 | 0.44 |
| NORTH FISH CREEK | 02 | 30720 | 500 yr | 5320.00 | 587.72 | 594.03 | 592.75 | 594.37 | 0.004088 | 5.11 | 1323.18 | 549.89 | 0.43 |
| NORTH FISH CREEK | 02 | 30720 | Ultimate 100 yr | 4289.00 | 587.72 | 593.50 | 592.05 | 593.83 | 0.004579 | 4.97 | 1054.29 | 455.20 | 0.44 |
| | | | | | | | | | | | | | |
| NORTH FISH CREEK | 02 | 30373 | 2 yr | 1338.00 | 581.00 | 586.65 | 585.86 | 587.52 | 0.001184 | 7.49 | 178.66 | 53.02 | 0.72 |
| NORTH FISH CREEK | 02 | 30373 | 5 yr | 2195.00 | 581.00 | 588.06 | 587.10 | 589.17 | 0.001125 | 8.44 | 260.01 | 61.91 | 0.73 |
| NORTH FISH CREEK | 02 | 30373 | 10 yr | 2739.00 | 581.00 | 588.81 | 587.76 | 590.04 | 0.001101 | 8.89 | 307.95 | 66.67 | 0.73 |
| NORTH FISH CREEK | 02 | 30373 | 25 yr | 3342.00 | 581.00 | 591.65 | 588.39 | 592.30 | 0.000343 | 6.43 | 536.47 | 114.21 | 0.43 |
| NORTH FISH CREEK | 02 | 30373 | 50 yr | 3748.00 | 581.00 | 591.80 | 588.81 | 592.57 | 0.000402 | 7.06 | 551.99 | 140.00 | 0.47 |
| NORTH FISH CREEK | 02 | 30373 | 100 yr | 4207.00 | 581.00 | 591.91 | 589.24 | 592.85 | 0.000479 | 7.79 | 564.68 | 149.31 | 0.52 |
| NORTH FISH CREEK | 02 | 30373 | 500 yr | 5320.00 | 581.00 | 591.92 | 590.16 | 593.42 | 0.000762 | 9.84 | 566.18 | 149.94 | 0.65 |
| NORTH FISH CREEK | 02 | 30373 | Ultimate 100 yr | 4289.00 | 581.00 | 591.92 | 589.32 | 592.90 | 0.000495 | 7.93 | 566.18 | 149.94 | 0.52 |
| | | | | | | | | | | | | | |
| NORTH FISH CREEK | 02 | 30329 | | Bridge | | | | | | | | | |
| | | | | | | | | | | | | | |
| NORTH FISH CREEK | 02 | 30192 | 2 yr | 1338.00 | 578.09 | 582.52 | 582.52 | 584.15 | 0.002332 | 10.22 | 130.86 | 40.07 | 1.00 |
| NORTH FISH CREEK | 02 | 30192 | 5 yr | 2195.00 | 578.09 | 583.90 | 583.90 | 585.98 | 0.002184 | 11.57 | 189.73 | 45.57 | 1.00 |
| NORTH FISH CREEK | 02 | 30192 | 10 yr | 2739.00 | 578.09 | 584.63 | 584.63 | 586.95 | 0.002132 | 12.22 | 224.09 | 48.50 | 1.00 |
| NORTH FISH CREEK | 02 | 30192 | 25 yr | 3342.00 | 578.09 | 585.37 | 585.37 | 587.91 | 0.002074 | 12.80 | 261.05 | 51.46 | 1.00 |
| NORTH FISH CREEK | 02 | 30192 | 50 yr | 3748.00 | 578.09 | 585.83 | 585.83 | 588.51 | 0.002039 | 13.14 | 285.29 | 53.31 | 1.00 |
| NORTH FISH CREEK | 02 | 30192 | 100 yr | 4207.00 | 578.09 | 586.33 | 586.33 | 589.15 | 0.001997 | 13.46 | 312.47 | 55.31 | 1.00 |
| NORTH FISH CREEK | 02 | 30192 | 500 yr | 5320.00 | 578.09 | 587.55 | 587.55 | 590.53 | 0.001677 | 13.89 | 407.44 | 104.47 | 0.94 |
| NORTH FISH CREEK | 02 | 30192 | Ultimate 100 yr | 4289.00 | 578.09 | 586.42 | 586.42 | 589.26 | 0.001993 | 13.53 | 317.10 | 55.65 | 1.00 |
| | | | | | | | | | | | | | |
| NORTH FISH CREEK | 02 | 29887 | 2 yr | 1338.00 | 576.87 | 581.30 | 581.30 | 582.93 | 0.002348 | 10.25 | 130.54 | 40.04 | 1.00 |
| NORTH FISH CREEK | 02 | 29887 | 5 yr | 2195.00 | 576.87 | 582.68 | 582.68 | 584.76 | 0.002190 | 11.58 | 189.55 | 45.56 | 1.00 |
| NORTH FISH CREEK | 02 | 29887 | 10 yr | 2739.00 | 576.87 | 583.41 | 583.41 | 585.73 | 0.002128 | 12.22 | 224.23 | 48.51 | 1.00 |
| NORTH FISH CREEK | 02 | 29887 | 25 yr | 3342.00 | 576.87 | 584.15 | 584.15 | 586.69 | 0.002071 | 12.80 | 261.20 | 51.47 | 1.00 |
| NORTH FISH CREEK | 02 | 29887 | 50 yr | 3748.00 | 576.87 | 584.61 | 584.61 | 587.29 | 0.002043 | 13.15 | 285.07 | 53.29 | 1.00 |
| NORTH FISH CREEK | 02 | 29887 | 100 yr | 4207.00 | 576.87 | 586.26 | 586.26 | 587.87 | 0.000941 | 10.52 | 645.48 | 412.16 | 0.71 |
| NORTH FISH CREEK | 02 | 29887 | 500 yr | 5320.00 | 576.87 | 587.01 | 587.01 | 588.61 | 0.000891 | 10.97 | 979.92 | 483.12 | 0.70 |
| NORTH FISH CREEK | 02 | 29887 | Ultimate 100 yr | 4289.00 | 576.87 | 586.33 | 586.33 | 587.93 | 0.000932 | 10.54 | 673.51 | 418.44 | 0.71 |
| | | | | | | | | | | | | | |
| NORTH FISH CREEK | 03 | 29319 | 2 yr | 2052.00 | 573.47 | 577.65 | 577.65 | 579.32 | 0.002272 | 10.37 | 197.79 | 59.05 | 1.00 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NORTH FISH CREEK | 03 | 29319 | 5 yr | 3413.00 | 573.47 | 579.06 | 579.06 | 581.29 | 0.002124 | 11.98 | 284.89 | 64.69 | 1.01 |
| NORTH FISH CREEK | 03 | 29319 | 10 yr | 4271.00 | 573.47 | 579.83 | 579.83 | 582.34 | 0.002052 | 12.71 | 336.01 | 67.78 | 1.01 |
| NORTH FISH CREEK | 03 | 29319 | 25 yr | 5092.00 | 573.47 | 580.52 | 580.52 | 583.26 | 0.001981 | 13.26 | 383.94 | 70.55 | 1.00 |
| NORTH FISH CREEK | 03 | 29319 | 50 yr | 5907.00 | 573.47 | 581.15 | 581.15 | 584.10 | 0.001935 | 13.77 | 429.03 | 73.06 | 1.00 |
| NORTH FISH CREEK | 03 | 29319 | 100 yr | 6580.00 | 573.47 | 581.64 | 581.64 | 584.75 | 0.001903 | 14.14 | 465.25 | 75.02 | 1.00 |
| NORTH FISH CREEK | 03 | 29319 | 500 yr | 8317.00 | 573.47 | 582.78 | 582.78 | 586.29 | 0.001859 | 15.04 | 552.90 | 79.56 | 1.01 |
| NORTH FISH CREEK | 03 | 29319 | Ultimate 100 yr | 6746.00 | 573.47 | 581.76 | 581.76 | 584.90 | 0.001896 | 14.23 | 474.00 | 75.49 | 1.00 |
| NORTH FISH CREEK | 03 | 28788 | 2 yr | 2052.00 | 571.43 | 575.61 | 575.61 | 577.28 | 0.002274 | 10.38 | 197.74 | 59.05 | 1.00 |
| NORTH FISH CREEK | 03 | 28788 | 5 yr | 3413.00 | 571.43 | 577.02 | 577.02 | 579.25 | 0.002123 | 11.98 | 284.97 | 64.70 | 1.01 |
| NORTH FISH CREEK | 03 | 28788 | 10 yr | 4271.00 | 571.43 | 577.79 | 577.79 | 580.30 | 0.002049 | 12.70 | 336.21 | 67.79 | 1.01 |
| NORTH FISH CREEK | 03 | 28788 | 25 yr | 5092.00 | 571.43 | 578.48 | 578.48 | 581.22 | 0.001983 | 13.27 | 383.82 | 70.55 | 1.00 |
| NORTH FISH CREEK | 03 | 28788 | 50 yr | 5907.00 | 571.43 | 579.17 | 579.11 | 582.06 | 0.001883 | 13.64 | 433.14 | 73.29 | 0.99 |
| NORTH FISH CREEK | 03 | 28788 | 100 yr | 6580.00 | 571.43 | 579.93 | 579.60 | 582.73 | 0.001641 | 13.43 | 490.02 | 76.33 | 0.93 |
| NORTH FISH CREEK | 03 | 28788 | 500 yr | 8317.00 | 571.43 | 581.39 | 580.81 | 584.30 | 0.001348 | 13.71 | 648.30 | 155.85 | 0.87 |
| NORTH FISH CREEK | 03 | 28788 | Ultimate 100 yr | 6746.00 | 571.43 | 580.10 | 579.72 | 582.89 | 0.001596 | 13.40 | 503.50 | 77.04 | 0.92 |
| NORTH FISH CREEK | 03 | 28533 | 2 yr | 2052.00 | 570.51 | 574.80 | 574.70 | 576.37 | 0.002066 | 10.05 | 204.15 | 59.48 | 0.96 |
| NORTH FISH CREEK | 03 | 28533 | 5 yr | 3413.00 | 570.51 | 576.68 | 576.12 | 578.41 | 0.001465 | 10.55 | 323.40 | 67.03 | 0.85 |
| NORTH FISH CREEK | 03 | 28533 | 10 yr | 4271.00 | 570.51 | 577.73 | 576.90 | 579.54 | 0.001278 | 10.80 | 395.59 | 71.21 | 0.81 |
| NORTH FISH CREEK | 03 | 28533 | 25 yr | 5092.00 | 570.51 | 578.64 | 577.57 | 580.52 | 0.001164 | 11.03 | 461.84 | 74.84 | 0.78 |
| NORTH FISH CREEK | 03 | 28533 | 50 yr | 5907.00 | 570.51 | 579.40 | 578.19 | 581.40 | 0.001114 | 11.35 | 520.43 | 77.91 | 0.77 |
| NORTH FISH CREEK | 03 | 28533 | 100 yr | 6580.00 | 570.51 | 580.14 | 578.69 | 582.13 | 0.001094 | 11.33 | 580.96 | 86.25 | 0.77 |
| NORTH FISH CREEK | 03 | 28533 | 500 yr | 8317.00 | 570.51 | 581.72 | 579.97 | 583.74 | 0.000926 | 11.44 | 806.33 | 405.54 | 0.72 |
| NORTH FISH CREEK | 03 | 28533 | Ultimate 100 yr | 6746.00 | 570.51 | 580.32 | 578.82 | 582.31 | 0.001087 | 11.31 | 596.52 | 88.39 | 0.77 |
| NORTH FISH CREEK | 04 | 28248 | 2 yr | 2403.00 | 569.32 | 573.88 | 573.88 | 575.73 | 0.002245 | 10.89 | 220.65 | 60.58 | 1.01 |
| NORTH FISH CREEK | 04 | 28248 | 5 yr | 3992.00 | 569.32 | 575.44 | 575.44 | 577.86 | 0.002072 | 12.48 | 319.77 | 66.81 | 1.01 |
| NORTH FISH CREEK | 04 | 28248 | 10 yr | 4997.00 | 569.32 | 576.28 | 576.28 | 579.00 | 0.002001 | 13.23 | 377.61 | 70.19 | 1.01 |
| NORTH FISH CREEK | 04 | 28248 | 25 yr | 5963.00 | 569.32 | 577.03 | 577.03 | 580.00 | 0.001946 | 13.83 | 431.05 | 73.18 | 1.00 |
| NORTH FISH CREEK | 04 | 28248 | 50 yr | 6888.00 | 569.32 | 577.68 | 577.68 | 580.88 | 0.001910 | 14.36 | 479.75 | 75.79 | 1.01 |
| NORTH FISH CREEK | 04 | 28248 | 100 yr | 7697.00 | 569.32 | 578.25 | 578.25 | 581.61 | 0.001864 | 14.72 | 523.03 | 78.04 | 1.00 |
| NORTH FISH CREEK | 04 | 28248 | 500 yr | 9748.00 | 569.32 | 579.69 | 579.69 | 583.23 | 0.001906 | 15.11 | 654.62 | 200.77 | 1.00 |
| NORTH FISH CREEK | 04 | 28248 | Ultimate 100 yr | 7885.00 | 569.32 | 578.35 | 578.35 | 581.77 | 0.001870 | 14.84 | 531.46 | 78.48 | 1.00 |
| NORTH FISH CREEK | 04 | 27860 | 2 yr | 2445.00 | 567.59 | 572.22 | 572.22 | 574.06 | 0.002211 | 10.90 | 224.41 | 60.83 | 1.00 |
| NORTH FISH CREEK | 04 | 27860 | 5 yr | 4043.00 | 567.59 | 573.77 | 573.77 | 576.19 | 0.002044 | 12.48 | 324.05 | 67.07 | 1.00 |
| NORTH FISH CREEK | 04 | 27860 | 10 yr | 5067.00 | 567.59 | 574.63 | 574.63 | 577.35 | 0.001976 | 13.23 | 382.94 | 70.49 | 1.00 |
| NORTH FISH CREEK | 04 | 27860 | 25 yr | 6041.00 | 567.59 | 575.35 | 575.35 | 578.35 | 0.001947 | 13.89 | 434.87 | 73.38 | 1.01 |
| NORTH FISH CREEK | 04 | 27860 | 50 yr | 6999.00 | 567.59 | 576.03 | 576.03 | 579.26 | 0.001908 | 14.42 | 485.36 | 76.09 | 1.01 |
| NORTH FISH CREEK | 04 | 27860 | 100 yr | 7802.00 | 567.59 | 576.55 | 576.55 | 579.97 | 0.001888 | 14.84 | 525.74 | 78.18 | 1.01 |
| NORTH FISH CREEK | 04 | 27860 | 500 yr | 9884.00 | 567.59 | 578.04 | 578.04 | 581.63 | 0.001837 | 15.20 | 650.06 | 91.44 | 1.00 |
| NORTH FISH CREEK | 04 | 27860 | Ultimate 100 yr | 7991.00 | 567.59 | 576.69 | 576.69 | 580.13 | 0.001871 | 14.90 | 536.38 | 78.73 | 1.01 |
| NORTH FISH CREEK | 04 | 27263 | 2 yr | 2445.00 | 565.20 | 569.82 | 569.82 | 571.67 | 0.002213 | 10.90 | 224.34 | 60.83 | 1.00 |
| NORTH FISH CREEK | 04 | 27263 | 5 yr | 4043.00 | 565.20 | 571.38 | 571.38 | 573.80 | 0.002043 | 12.48 | 324.09 | 67.07 | 1.00 |
| NORTH FISH CREEK | 04 | 27263 | 10 yr | 5067.00 | 565.20 | 572.24 | 572.24 | 574.96 | 0.001975 | 13.23 | 383.04 | 70.50 | 1.00 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NORTH FISH CREEK | 04 | 27263 | 25 yr | 6041.00 | 565.20 | 572.96 | 572.96 | 575.96 | 0.001949 | 13.90 | 434.68 | 73.37 | 1.01 |
| NORTH FISH CREEK | 04 | 27263 | 50 yr | 6999.00 | 565.20 | 573.65 | 573.65 | 576.87 | 0.001901 | 14.40 | 485.96 | 76.12 | 1.00 |
| NORTH FISH CREEK | 04 | 27263 | 100 yr | 7802.00 | 565.20 | 574.17 | 574.17 | 577.58 | 0.001871 | 14.82 | 526.91 | 92.23 | 1.00 |
| NORTH FISH CREEK | 04 | 27263 | 500 yr | 9884.00 | 565.20 | 576.30 | 576.30 | 579.03 | 0.001092 | 13.59 | 1025.97 | 341.15 | 0.80 |
| NORTH FISH CREEK | 04 | 27263 | Ultimate 100 yr | 7991.00 | 565.20 | 574.38 | 574.38 | 577.74 | 0.001767 | 14.71 | 550.81 | 131.07 | 0.98 |
| NORTH FISH CREEK | 05 | 26747 | 2 yr | 2805.00 | 562.71 | 567.70 | 567.70 | 569.71 | 0.002185 | 11.35 | 247.07 | 62.31 | 1.00 |
| NORTH FISH CREEK | 05 | 26747 | 5 yr | 4662.00 | 562.71 | 569.40 | 569.40 | 572.03 | 0.002024 | 13.00 | 358.57 | 69.10 | 1.01 |
| NORTH FISH CREEK | 05 | 26747 | 10 yr | 5847.00 | 562.71 | 570.35 | 570.35 | 573.28 | 0.001934 | 13.72 | 426.10 | 72.90 | 1.00 |
| NORTH FISH CREEK | 05 | 26747 | 25 yr | 6994.00 | 562.71 | 571.40 | 571.16 | 574.38 | 0.001706 | 13.86 | 504.53 | 77.09 | 0.95 |
| NORTH FISH CREEK | 05 | 26747 | 50 yr | 8071.00 | 562.71 | 572.05 | 571.84 | 575.33 | 0.001728 | 14.53 | 555.41 | 79.69 | 0.97 |
| NORTH FISH CREEK | 05 | 26747 | 100 yr | 8989.00 | 562.71 | 572.61 | 572.61 | 576.08 | 0.001838 | 14.95 | 601.25 | 86.75 | 1.00 |
| NORTH FISH CREEK | 05 | 26747 | 500 yr | 11328.00 | 562.71 | 574.88 | 574.88 | 577.35 | 0.001129 | 12.96 | 1226.05 | 399.46 | 0.81 |
| NORTH FISH CREEK | 05 | 26747 | Ultimate 100 yr | 9199.00 | 562.71 | 572.88 | 572.88 | 576.24 | 0.001856 | 14.70 | 625.83 | 93.60 | 1.00 |
| NORTH FISH CREEK | 05 | 25796 | 2 yr | 2805.00 | 559.00 | 563.54 | 563.54 | 565.43 | 0.002171 | 11.04 | 254.08 | 66.86 | 1.00 |
| NORTH FISH CREEK | 05 | 25796 | 5 yr | 4662.00 | 559.00 | 566.09 | 565.17 | 567.84 | 0.001212 | 10.62 | 439.11 | 78.37 | 0.79 |
| NORTH FISH CREEK | 05 | 25796 | 10 yr | 5847.00 | 559.00 | 569.10 | 566.05 | 570.20 | 0.000506 | 8.40 | 696.40 | 92.42 | 0.54 |
| NORTH FISH CREEK | 05 | 25796 | 25 yr | 6994.00 | 559.00 | 572.06 | 566.83 | 572.78 | 0.000227 | 6.94 | 1198.74 | 553.37 | 0.38 |
| NORTH FISH CREEK | 05 | 25796 | 50 yr | 8071.00 | 559.00 | 572.87 | 567.52 | 573.64 | 0.000227 | 7.29 | 1365.19 | 618.56 | 0.38 |
| NORTH FISH CREEK | 05 | 25796 | 100 yr | 8989.00 | 559.00 | 573.26 | 568.06 | 574.14 | 0.000246 | 7.77 | 1447.71 | 707.44 | 0.40 |
| NORTH FISH CREEK | 05 | 25796 | 500 yr | 11328.00 | 559.00 | 573.83 | 569.32 | 575.05 | 0.000324 | 9.20 | 1568.78 | 728.23 | 0.46 |
| NORTH FISH CREEK | 05 | 25796 | Ultimate 100 yr | 9199.00 | 559.00 | 573.33 | 568.19 | 574.23 | 0.000252 | 7.89 | 1462.24 | 709.87 | 0.41 |
| NORTH FISH CREEK | 05 | 25164 | 2 yr | 2805.00 | 557.14 | 562.09 | 561.64 | 563.58 | 0.001566 | 9.82 | 285.76 | 69.79 | 0.85 |
| NORTH FISH CREEK | 05 | 25164 | 5 yr | 4662.00 | 557.14 | 566.11 | 563.25 | 567.05 | 0.000494 | 7.78 | 599.17 | 85.89 | 0.52 |
| NORTH FISH CREEK | 05 | 25164 | 10 yr | 5847.00 | 557.14 | 569.14 | 564.12 | 569.83 | 0.000262 | 6.66 | 877.84 | 98.01 | 0.39 |
| NORTH FISH CREEK | 05 | 25164 | 25 yr | 6994.00 | 557.14 | 572.07 | 564.89 | 572.61 | 0.000148 | 5.90 | 1285.54 | 216.82 | 0.31 |
| NORTH FISH CREEK | 05 | 25164 | 50 yr | 8071.00 | 557.14 | 572.87 | 565.58 | 573.47 | 0.000154 | 6.29 | 1468.06 | 242.87 | 0.32 |
| NORTH FISH CREEK | 05 | 25164 | 100 yr | 8989.00 | 557.14 | 573.26 | 566.11 | 573.95 | 0.000169 | 6.74 | 1566.10 | 256.81 | 0.33 |
| NORTH FISH CREEK | 05 | 25164 | 500 yr | 11328.00 | 557.14 | 573.83 | 567.41 | 574.80 | 0.000227 | 8.04 | 1718.28 | 279.90 | 0.39 |
| NORTH FISH CREEK | 05 | 25164 | Ultimate 100 yr | 9199.00 | 557.14 | 573.33 | 566.24 | 574.04 | 0.000174 | 6.85 | 1583.86 | 259.24 | 0.34 |
| NORTH FISH CREEK | 05 | 24961 | 2 yr | 2936.00 | 553.85 | 562.85 | 557.26 | 563.02 | 0.000082 | 3.29 | 891.41 | 122.52 | 0.22 |
| NORTH FISH CREEK | 05 | 24961 | 5 yr | 4849.00 | 553.85 | 566.58 | 558.55 | 566.77 | 0.000063 | 3.50 | 1387.35 | 149.53 | 0.20 |
| NORTH FISH CREEK | 05 | 24961 | 10 yr | 5993.00 | 553.85 | 569.48 | 559.25 | 569.64 | 0.000039 | 3.28 | 2064.63 | 311.77 | 0.16 |
| NORTH FISH CREEK | 05 | 24961 | 25 yr | 6871.00 | 553.85 | 572.35 | 559.74 | 572.47 | 0.000023 | 2.89 | 3680.15 | 720.75 | 0.13 |
| NORTH FISH CREEK | 05 | 24961 | 50 yr | 7855.00 | 553.85 | 573.18 | 560.24 | 573.31 | 0.000024 | 3.04 | 4308.55 | 802.59 | 0.13 |
| NORTH FISH CREEK | 05 | 24961 | 100 yr | 8962.00 | 553.85 | 573.61 | 560.80 | 573.77 | 0.000028 | 3.34 | 4669.61 | 858.91 | 0.14 |
| NORTH FISH CREEK | 05 | 24961 | 500 yr | 11506.00 | 553.85 | 574.33 | 561.96 | 574.55 | 0.000038 | 4.00 | 5303.82 | 907.00 | 0.17 |
| NORTH FISH CREEK | 05 | 24961 | Ultimate 100 yr | 9173.00 | 553.85 | 573.70 | 560.90 | 573.85 | 0.000029 | 3.40 | 4739.15 | 866.20 | 0.15 |
| NORTH FISH CREEK | 05 | 24725 | | Culvert | | | | | | | | | |
| NORTH FISH CREEK | 05 | 24306 | 2 yr | 2936.00 | 548.23 | 559.23 | 553.26 | 559.46 | 0.000832 | 3.84 | 768.69 | 321.13 | 0.23 |
| NORTH FISH CREEK | 05 | 24306 | 5 yr | 4849.00 | 548.23 | 560.32 | 554.81 | 560.81 | 0.001507 | 5.60 | 877.95 | 349.13 | 0.32 |
| NORTH FISH CREEK | 05 | 24306 | 10 yr | 5993.00 | 548.23 | 560.85 | 555.61 | 561.51 | 0.001923 | 6.55 | 931.40 | 359.92 | 0.36 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NORTH FISH CREEK | 05 | 24306 | 25 yr | 6871.00 | 548.23 | 561.20 | 556.20 | 562.01 | 0.002248 | 7.25 | 967.56 | 366.86 | 0.40 |
| NORTH FISH CREEK | 05 | 24306 | 50 yr | 7855.00 | 548.23 | 561.53 | 556.79 | 562.53 | 0.002639 | 8.02 | 1001.90 | 373.21 | 0.43 |
| NORTH FISH CREEK | 05 | 24306 | 100 yr | 8962.00 | 548.23 | 561.88 | 557.47 | 563.09 | 0.003087 | 8.86 | 1037.00 | 378.47 | 0.47 |
| NORTH FISH CREEK | 05 | 24306 | 500 yr | 11506.00 | 548.23 | 562.54 | 558.75 | 564.30 | 0.004180 | 10.72 | 1104.58 | 388.11 | 0.55 |
| NORTH FISH CREEK | 05 | 24306 | Ultimate 100 yr | 9173.00 | 548.23 | 561.94 | 557.56 | 563.19 | 0.003175 | 9.02 | 1043.17 | 379.35 | 0.48 |
| NORTH FISH CREEK | 05 | 24089 | 2 yr | 2936.00 | 552.63 | 559.05 | | 559.16 | 0.001767 | 3.55 | 1445.90 | 493.80 | 0.31 |
| NORTH FISH CREEK | 05 | 24089 | 5 yr | 4849.00 | 552.63 | 560.19 | | 560.32 | 0.001875 | 3.97 | 2022.05 | 523.67 | 0.32 |
| NORTH FISH CREEK | 05 | 24089 | 10 yr | 5993.00 | 552.63 | 560.77 | | 560.91 | 0.001908 | 4.17 | 2330.68 | 540.55 | 0.33 |
| NORTH FISH CREEK | 05 | 24089 | 25 yr | 6871.00 | 552.63 | 561.18 | | 561.33 | 0.001939 | 4.30 | 2554.73 | 555.20 | 0.33 |
| NORTH FISH CREEK | 05 | 24089 | 50 yr | 7855.00 | 552.63 | 561.58 | | 561.75 | 0.001933 | 4.51 | 2781.67 | 558.57 | 0.34 |
| NORTH FISH CREEK | 05 | 24089 | 100 yr | 8962.00 | 552.63 | 562.02 | | 562.20 | 0.001925 | 4.73 | 3023.64 | 561.05 | 0.34 |
| NORTH FISH CREEK | 05 | 24089 | 500 yr | 11506.00 | 552.63 | 562.91 | | 563.13 | 0.001932 | 5.20 | 3528.12 | 566.19 | 0.35 |
| NORTH FISH CREEK | 05 | 24089 | Ultimate 100 yr | 9173.00 | 552.63 | 562.09 | | 562.28 | 0.001925 | 4.77 | 3067.46 | 561.49 | 0.34 |
| NORTH FISH CREEK | 05 | 23706 | 2 yr | 2936.00 | 555.35 | 557.92 | | 558.09 | 0.007636 | 4.29 | 888.03 | 326.53 | 0.56 |
| NORTH FISH CREEK | 05 | 23706 | 5 yr | 4849.00 | 555.35 | 558.95 | | 559.20 | 0.007201 | 5.29 | 1228.68 | 334.46 | 0.57 |
| NORTH FISH CREEK | 05 | 23706 | 10 yr | 5993.00 | 555.35 | 559.49 | | 559.78 | 0.007060 | 5.71 | 1409.08 | 339.11 | 0.58 |
| NORTH FISH CREEK | 05 | 23706 | 25 yr | 6871.00 | 555.35 | 559.86 | | 560.18 | 0.006998 | 6.07 | 1537.27 | 348.23 | 0.59 |
| NORTH FISH CREEK | 05 | 23706 | 50 yr | 7855.00 | 555.35 | 560.25 | | 560.61 | 0.006964 | 6.51 | 1673.78 | 357.62 | 0.60 |
| NORTH FISH CREEK | 05 | 23706 | 100 yr | 8962.00 | 555.35 | 560.66 | | 561.06 | 0.006930 | 6.97 | 1822.29 | 372.08 | 0.61 |
| NORTH FISH CREEK | 05 | 23706 | 500 yr | 11506.00 | 555.35 | 561.49 | | 561.98 | 0.006911 | 7.88 | 2156.59 | 407.06 | 0.62 |
| NORTH FISH CREEK | 05 | 23706 | Ultimate 100 yr | 9173.00 | 555.35 | 560.73 | | 561.14 | 0.006944 | 7.06 | 1849.53 | 386.67 | 0.61 |
| NORTH FISH CREEK | 05 | 23367 | 2 yr | 2936.00 | 549.91 | 556.04 | | 556.26 | 0.003253 | 4.83 | 934.15 | 323.32 | 0.42 |
| NORTH FISH CREEK | 05 | 23367 | 5 yr | 4849.00 | 549.91 | 557.02 | | 557.36 | 0.003834 | 6.04 | 1265.33 | 355.16 | 0.47 |
| NORTH FISH CREEK | 05 | 23367 | 10 yr | 5993.00 | 549.91 | 557.50 | | 557.90 | 0.004146 | 6.67 | 1438.87 | 373.58 | 0.50 |
| NORTH FISH CREEK | 05 | 23367 | 25 yr | 6871.00 | 549.91 | 557.83 | | 558.28 | 0.004364 | 7.11 | 1564.66 | 387.54 | 0.51 |
| NORTH FISH CREEK | 05 | 23367 | 50 yr | 7855.00 | 549.91 | 558.18 | | 558.68 | 0.004528 | 7.52 | 1703.73 | 400.45 | 0.53 |
| NORTH FISH CREEK | 05 | 23367 | 100 yr | 8962.00 | 549.91 | 558.56 | | 559.11 | 0.004701 | 7.97 | 1857.00 | 417.11 | 0.54 |
| NORTH FISH CREEK | 05 | 23367 | 500 yr | 11506.00 | 549.91 | 559.35 | | 560.00 | 0.004924 | 8.79 | 2200.47 | 448.68 | 0.57 |
| NORTH FISH CREEK | 05 | 23367 | Ultimate 100 yr | 9173.00 | 549.91 | 558.62 | | 559.18 | 0.004731 | 8.05 | 1885.44 | 420.05 | 0.55 |
| NORTH FISH CREEK | 05 | 22696 | 2 yr | 2936.00 | 546.00 | 552.71 | 552.51 | 553.23 | 0.009654 | 7.48 | 798.13 | 468.30 | 0.64 |
| NORTH FISH CREEK | 05 | 22696 | 5 yr | 4849.00 | 546.00 | 553.61 | | 554.10 | 0.008263 | 7.87 | 1223.58 | 476.25 | 0.61 |
| NORTH FISH CREEK | 05 | 22696 | 10 yr | 5993.00 | 546.00 | 554.13 | | 554.60 | 0.007393 | 7.94 | 1472.09 | 480.67 | 0.59 |
| NORTH FISH CREEK | 05 | 22696 | 25 yr | 6871.00 | 546.00 | 554.53 | | 554.99 | 0.006770 | 7.96 | 1665.23 | 485.40 | 0.57 |
| NORTH FISH CREEK | 05 | 22696 | 50 yr | 7855.00 | 546.00 | 554.95 | | 555.40 | 0.006304 | 8.03 | 1866.84 | 490.30 | 0.56 |
| NORTH FISH CREEK | 05 | 22696 | 100 yr | 8962.00 | 546.00 | 555.43 | | 555.88 | 0.005723 | 8.02 | 2105.97 | 496.04 | 0.54 |
| NORTH FISH CREEK | 05 | 22696 | 500 yr | 11506.00 | 546.00 | 556.58 | | 557.00 | 0.004549 | 7.92 | 2682.57 | 510.16 | 0.49 |
| NORTH FISH CREEK | 05 | 22696 | Ultimate 100 yr | 9173.00 | 546.00 | 555.53 | | 555.97 | 0.005590 | 8.01 | 2155.74 | 497.23 | 0.53 |
| NORTH FISH CREEK | 05 | 22159 | 2 yr | 2936.00 | 544.00 | 549.95 | | 550.05 | 0.002763 | 4.13 | 1374.39 | 469.60 | 0.34 |
| NORTH FISH CREEK | 05 | 22159 | 5 yr | 4849.00 | 544.00 | 551.34 | | 551.45 | 0.002162 | 4.34 | 2034.06 | 481.03 | 0.31 |
| NORTH FISH CREEK | 05 | 22159 | 10 yr | 5993.00 | 544.00 | 552.12 | | 552.24 | 0.001912 | 4.43 | 2412.95 | 485.90 | 0.30 |
| NORTH FISH CREEK | 05 | 22159 | 25 yr | 6871.00 | 544.00 | 552.70 | | 552.82 | 0.001764 | 4.49 | 2695.20 | 489.37 | 0.29 |
| NORTH FISH CREEK | 05 | 22159 | 50 yr | 7855.00 | 544.00 | 553.24 | | 553.36 | 0.001712 | 4.64 | 2958.04 | 492.68 | 0.29 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NORTH FISH CREEK | 05 | 22159 | 100 yr | 8962.00 | 544.00 | 553.88 | | 554.01 | 0.001609 | 4.73 | 3275.58 | 496.66 | 0.28 |
| NORTH FISH CREEK | 05 | 22159 | 500 yr | 11506.00 | 544.00 | 555.34 | | 555.48 | 0.001396 | 4.89 | 4006.89 | 505.83 | 0.27 |
| NORTH FISH CREEK | 05 | 22159 | Ultimate 100 yr | 9173.00 | 544.00 | 554.02 | | 554.15 | 0.001578 | 4.74 | 3344.00 | 497.53 | 0.28 |
| NORTH FISH CREEK | 05 | 21693 | 2 yr | 3086.00 | 542.00 | 549.05 | | 549.13 | 0.002232 | 3.98 | 1488.18 | 451.05 | 0.30 |
| NORTH FISH CREEK | 05 | 21693 | 5 yr | 5291.00 | 542.00 | 550.60 | | 550.71 | 0.001905 | 4.36 | 2199.60 | 464.53 | 0.29 |
| NORTH FISH CREEK | 05 | 21693 | 10 yr | 6643.00 | 542.00 | 551.45 | | 551.57 | 0.001768 | 4.54 | 2597.49 | 470.54 | 0.29 |
| NORTH FISH CREEK | 05 | 21693 | 25 yr | 7684.00 | 542.00 | 552.07 | | 552.20 | 0.001686 | 4.66 | 2889.46 | 474.93 | 0.28 |
| NORTH FISH CREEK | 05 | 21693 | 50 yr | 8661.00 | 542.00 | 552.63 | | 552.76 | 0.001618 | 4.77 | 3156.27 | 478.91 | 0.28 |
| NORTH FISH CREEK | 05 | 21693 | 100 yr | 9894.00 | 542.00 | 553.30 | | 553.44 | 0.001550 | 4.90 | 3479.20 | 483.69 | 0.28 |
| NORTH FISH CREEK | 05 | 21693 | 500 yr | 12800.00 | 542.00 | 554.82 | | 554.98 | 0.001410 | 5.15 | 4221.89 | 496.47 | 0.27 |
| NORTH FISH CREEK | 05 | 21693 | Ultimate 100 yr | 10166.00 | 542.00 | 553.45 | | 553.59 | 0.001537 | 4.93 | 3549.00 | 484.71 | 0.28 |
| NORTH FISH CREEK | 05 | 21069 | 2 yr | 3086.00 | 537.48 | 547.23 | | 547.85 | 0.006321 | 8.66 | 689.39 | 186.61 | 0.54 |
| NORTH FISH CREEK | 05 | 21069 | 5 yr | 5291.00 | 537.48 | 548.83 | | 549.59 | 0.006772 | 10.11 | 1000.36 | 202.38 | 0.57 |
| NORTH FISH CREEK | 05 | 21069 | 10 yr | 6643.00 | 537.48 | 549.71 | | 550.53 | 0.006692 | 10.66 | 1183.35 | 210.55 | 0.58 |
| NORTH FISH CREEK | 05 | 21069 | 25 yr | 7684.00 | 537.48 | 550.35 | | 551.20 | 0.006601 | 11.01 | 1319.72 | 216.43 | 0.58 |
| NORTH FISH CREEK | 05 | 21069 | 50 yr | 8661.00 | 537.48 | 550.92 | | 551.80 | 0.006504 | 11.29 | 1445.11 | 221.71 | 0.58 |
| NORTH FISH CREEK | 05 | 21069 | 100 yr | 9894.00 | 537.48 | 551.60 | | 552.52 | 0.006401 | 11.63 | 1597.39 | 227.71 | 0.58 |
| NORTH FISH CREEK | 05 | 21069 | 500 yr | 12800.00 | 537.48 | 553.15 | | 554.13 | 0.006039 | 12.21 | 1961.13 | 242.80 | 0.58 |
| NORTH FISH CREEK | 05 | 21069 | Ultimate 100 yr | 10166.00 | 537.48 | 551.75 | | 552.67 | 0.006378 | 11.70 | 1630.55 | 228.99 | 0.58 |
| NORTH FISH CREEK | 05 | 20194 | 2 yr | 3086.00 | 539.00 | 545.81 | | 545.86 | 0.001287 | 3.11 | 1813.28 | 476.50 | 0.24 |
| NORTH FISH CREEK | 05 | 20194 | 5 yr | 5291.00 | 539.00 | 547.52 | | 547.59 | 0.001134 | 3.52 | 2644.55 | 494.46 | 0.23 |
| NORTH FISH CREEK | 05 | 20194 | 10 yr | 6643.00 | 539.00 | 548.52 | | 548.60 | 0.001035 | 3.68 | 3140.98 | 503.80 | 0.23 |
| NORTH FISH CREEK | 05 | 20194 | 25 yr | 7684.00 | 539.00 | 549.23 | | 549.32 | 0.000979 | 3.79 | 3503.55 | 509.90 | 0.23 |
| NORTH FISH CREEK | 05 | 20194 | 50 yr | 8661.00 | 539.00 | 549.87 | | 549.95 | 0.000940 | 3.89 | 3827.86 | 515.33 | 0.22 |
| NORTH FISH CREEK | 05 | 20194 | 100 yr | 9894.00 | 539.00 | 550.61 | | 550.71 | 0.000908 | 4.02 | 4213.98 | 522.33 | 0.22 |
| NORTH FISH CREEK | 05 | 20194 | 500 yr | 12800.00 | 539.00 | 552.31 | | 552.42 | 0.000829 | 4.26 | 5117.83 | 538.30 | 0.22 |
| NORTH FISH CREEK | 05 | 20194 | Ultimate 100 yr | 10166.00 | 539.00 | 550.77 | | 550.87 | 0.000901 | 4.05 | 4297.14 | 523.80 | 0.22 |
| NORTH FISH CREEK | 05 | 19301 | 2 yr | 3086.00 | 533.00 | 543.84 | | 544.48 | 0.003868 | 7.26 | 625.26 | 136.60 | 0.45 |
| NORTH FISH CREEK | 05 | 19301 | 5 yr | 5291.00 | 533.00 | 544.91 | | 546.16 | 0.006690 | 10.36 | 779.67 | 150.99 | 0.60 |
| NORTH FISH CREEK | 05 | 19301 | 10 yr | 6643.00 | 533.00 | 545.76 | | 547.24 | 0.007286 | 11.46 | 915.79 | 168.21 | 0.63 |
| NORTH FISH CREEK | 05 | 19301 | 25 yr | 7684.00 | 533.00 | 546.46 | | 548.03 | 0.007250 | 11.96 | 1036.46 | 178.21 | 0.64 |
| NORTH FISH CREEK | 05 | 19301 | 50 yr | 8661.00 | 533.00 | 547.01 | | 548.70 | 0.007429 | 12.51 | 1139.24 | 190.39 | 0.65 |
| NORTH FISH CREEK | 05 | 19301 | 100 yr | 9894.00 | 533.00 | 547.68 | | 549.48 | 0.007538 | 13.09 | 1270.62 | 203.79 | 0.66 |
| NORTH FISH CREEK | 05 | 19301 | 500 yr | 12800.00 | 533.00 | 549.12 | | 551.25 | 0.007973 | 14.52 | 1592.09 | 263.99 | 0.70 |
| NORTH FISH CREEK | 05 | 19301 | Ultimate 100 yr | 10166.00 | 533.00 | 547.83 | | 549.64 | 0.007542 | 13.20 | 1300.71 | 206.87 | 0.67 |
| NORTH FISH CREEK | 05 | 18958 | 2 yr | 3086.00 | 532.00 | 541.61 | 539.76 | 542.78 | 0.007020 | 8.87 | 412.25 | 287.84 | 0.59 |
| NORTH FISH CREEK | 05 | 18958 | 5 yr | 5291.00 | 532.00 | 543.60 | 542.54 | 544.28 | 0.004128 | 8.02 | 1240.46 | 348.16 | 0.47 |
| NORTH FISH CREEK | 05 | 18958 | 10 yr | 6643.00 | 532.00 | 544.78 | 543.08 | 545.33 | 0.003217 | 7.67 | 1657.39 | 364.04 | 0.42 |
| NORTH FISH CREEK | 05 | 18958 | 25 yr | 7684.00 | 532.00 | 545.69 | 543.45 | 546.16 | 0.002674 | 7.40 | 1994.52 | 376.74 | 0.39 |
| NORTH FISH CREEK | 05 | 18958 | 50 yr | 8661.00 | 532.00 | 546.34 | 543.75 | 546.81 | 0.002481 | 7.41 | 2245.58 | 385.15 | 0.38 |
| NORTH FISH CREEK | 05 | 18958 | 100 yr | 9894.00 | 532.00 | 547.11 | 544.09 | 547.57 | 0.002339 | 7.50 | 2546.17 | 400.94 | 0.37 |
| NORTH FISH CREEK | 05 | 18958 | 500 yr | 12800.00 | 532.00 | 548.78 | 544.83 | 549.23 | 0.002058 | 7.64 | 3247.20 | 434.66 | 0.36 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NORTH FISH CREEK | 05 | 18958 | Ultimate 100 yr | 10166.00 | 532.00 | 547.28 | 544.17 | 547.73 | 0.002304 | 7.51 | 2614.08 | 404.21 | 0.37 |
| NORTH FISH CREEK | 05 | 18557 | 2 yr | 3086.00 | 530.59 | 540.78 | 537.07 | 540.93 | 0.001541 | 4.36 | 1290.68 | 280.41 | 0.27 |
| NORTH FISH CREEK | 05 | 18557 | 5 yr | 5291.00 | 530.59 | 542.99 | 539.05 | 543.16 | 0.001393 | 4.88 | 1923.79 | 293.91 | 0.27 |
| NORTH FISH CREEK | 05 | 18557 | 10 yr | 6643.00 | 530.59 | 544.25 | 539.48 | 544.43 | 0.001286 | 5.06 | 2299.72 | 311.23 | 0.26 |
| NORTH FISH CREEK | 05 | 18557 | 25 yr | 7684.00 | 530.59 | 545.19 | 539.82 | 545.39 | 0.001298 | 5.36 | 2608.07 | 335.25 | 0.27 |
| NORTH FISH CREEK | 05 | 18557 | 50 yr | 8661.00 | 530.59 | 545.87 | 540.10 | 546.08 | 0.001304 | 5.57 | 2836.87 | 345.08 | 0.27 |
| NORTH FISH CREEK | 05 | 18557 | 100 yr | 9894.00 | 530.59 | 546.62 | 540.43 | 546.86 | 0.001394 | 5.97 | 3106.89 | 377.56 | 0.28 |
| NORTH FISH CREEK | 05 | 18557 | 500 yr | 12800.00 | 530.59 | 548.29 | 541.14 | 548.57 | 0.001466 | 6.61 | 3823.65 | 459.11 | 0.30 |
| NORTH FISH CREEK | 05 | 18557 | Ultimate 100 yr | 10166.00 | 530.59 | 546.79 | 540.48 | 547.03 | 0.001409 | 6.05 | 3170.59 | 385.81 | 0.28 |
| NORTH FISH CREEK | 05 | 18097 | 2 yr | 3086.00 | 530.00 | 539.75 | | 540.11 | 0.002791 | 5.64 | 841.09 | 204.46 | 0.38 |
| NORTH FISH CREEK | 05 | 18097 | 5 yr | 5291.00 | 530.00 | 542.03 | | 542.44 | 0.002437 | 6.36 | 1341.98 | 237.99 | 0.37 |
| NORTH FISH CREEK | 05 | 18097 | 10 yr | 6643.00 | 530.00 | 543.35 | | 543.78 | 0.002221 | 6.64 | 1694.34 | 277.75 | 0.36 |
| NORTH FISH CREEK | 05 | 18097 | 25 yr | 7684.00 | 530.00 | 544.35 | | 544.77 | 0.001968 | 6.64 | 1979.30 | 290.37 | 0.34 |
| NORTH FISH CREEK | 05 | 18097 | 50 yr | 8661.00 | 530.00 | 545.03 | | 545.46 | 0.001915 | 6.80 | 2179.11 | 295.38 | 0.34 |
| NORTH FISH CREEK | 05 | 18097 | 100 yr | 9894.00 | 530.00 | 545.76 | | 546.22 | 0.001917 | 7.07 | 2396.92 | 301.28 | 0.35 |
| NORTH FISH CREEK | 05 | 18097 | 500 yr | 12800.00 | 530.00 | 547.42 | | 547.92 | 0.001870 | 7.57 | 2909.38 | 316.43 | 0.35 |
| NORTH FISH CREEK | 05 | 18097 | Ultimate 100 yr | 10166.00 | 530.00 | 545.93 | | 546.39 | 0.001911 | 7.12 | 2446.87 | 302.73 | 0.35 |
| NORTH FISH CREEK | 05 | 17616 | 2 yr | 2899.00 | 528.52 | 538.49 | 534.86 | 538.89 | 0.002705 | 6.38 | 810.00 | 184.52 | 0.37 |
| NORTH FISH CREEK | 05 | 17616 | 5 yr | 5163.00 | 528.52 | 540.88 | 537.87 | 541.35 | 0.002598 | 7.31 | 1277.73 | 206.53 | 0.38 |
| NORTH FISH CREEK | 05 | 17616 | 10 yr | 6639.00 | 528.52 | 542.23 | 538.60 | 542.74 | 0.002601 | 7.87 | 1570.92 | 232.44 | 0.39 |
| NORTH FISH CREEK | 05 | 17616 | 25 yr | 7922.00 | 528.52 | 543.22 | 539.12 | 543.78 | 0.002672 | 8.38 | 1815.75 | 274.11 | 0.40 |
| NORTH FISH CREEK | 05 | 17616 | 50 yr | 8959.00 | 528.52 | 543.89 | 539.55 | 544.48 | 0.002733 | 8.75 | 1993.40 | 301.40 | 0.40 |
| NORTH FISH CREEK | 05 | 17616 | 100 yr | 10191.00 | 528.52 | 544.62 | 540.00 | 545.24 | 0.002740 | 9.05 | 2199.14 | 323.60 | 0.41 |
| NORTH FISH CREEK | 05 | 17616 | 500 yr | 13226.00 | 528.52 | 546.40 | 541.00 | 547.01 | 0.002507 | 9.32 | 2861.84 | 361.28 | 0.40 |
| NORTH FISH CREEK | 05 | 17616 | Ultimate 100 yr | 10481.00 | 528.52 | 544.79 | 540.11 | 545.42 | 0.002737 | 9.11 | 2247.39 | 332.29 | 0.41 |
| NORTH FISH CREEK | 05 | 17216 | 2 yr | 2899.00 | 525.61 | 536.72 | | 537.52 | 0.004820 | 7.93 | 522.05 | 121.77 | 0.48 |
| NORTH FISH CREEK | 05 | 17216 | 5 yr | 5163.00 | 525.61 | 538.79 | | 539.93 | 0.005668 | 9.95 | 813.74 | 158.33 | 0.54 |
| NORTH FISH CREEK | 05 | 17216 | 10 yr | 6639.00 | 525.61 | 539.91 | | 541.27 | 0.006206 | 11.14 | 1008.25 | 195.25 | 0.58 |
| NORTH FISH CREEK | 05 | 17216 | 25 yr | 7922.00 | 525.61 | 540.86 | | 542.29 | 0.006164 | 11.69 | 1210.76 | 228.52 | 0.58 |
| NORTH FISH CREEK | 05 | 17216 | 50 yr | 8959.00 | 525.61 | 541.56 | | 542.99 | 0.005974 | 11.93 | 1376.57 | 245.93 | 0.58 |
| NORTH FISH CREEK | 05 | 17216 | 100 yr | 10191.00 | 525.61 | 542.35 | | 543.77 | 0.005729 | 12.15 | 1579.95 | 266.97 | 0.57 |
| NORTH FISH CREEK | 05 | 17216 | 500 yr | 13226.00 | 525.61 | 544.27 | | 545.67 | 0.005201 | 12.60 | 2175.33 | 363.07 | 0.56 |
| NORTH FISH CREEK | 05 | 17216 | Ultimate 100 yr | 10481.00 | 525.61 | 542.54 | | 543.95 | 0.005654 | 12.18 | 1631.01 | 272.25 | 0.57 |
| NORTH FISH CREEK | 05 | 16737 | 2 yr | 2899.00 | 525.00 | 535.05 | | 535.62 | 0.003560 | 7.03 | 631.00 | 147.86 | 0.43 |
| NORTH FISH CREEK | 05 | 16737 | 5 yr | 5163.00 | 525.00 | 536.79 | | 537.68 | 0.004702 | 9.17 | 908.63 | 166.49 | 0.51 |
| NORTH FISH CREEK | 05 | 16737 | 10 yr | 6639.00 | 525.00 | 537.87 | | 538.87 | 0.004866 | 9.99 | 1090.93 | 172.71 | 0.53 |
| NORTH FISH CREEK | 05 | 16737 | 25 yr | 7922.00 | 525.00 | 538.99 | | 540.00 | 0.004470 | 10.20 | 1287.76 | 178.74 | 0.51 |
| NORTH FISH CREEK | 05 | 16737 | 50 yr | 8959.00 | 525.00 | 539.75 | | 540.79 | 0.004371 | 10.50 | 1425.09 | 183.65 | 0.51 |
| NORTH FISH CREEK | 05 | 16737 | 100 yr | 10191.00 | 525.00 | 540.55 | | 541.67 | 0.004388 | 10.95 | 1576.15 | 194.50 | 0.52 |
| NORTH FISH CREEK | 05 | 16737 | 500 yr | 13226.00 | 525.00 | 542.25 | | 543.68 | 0.004935 | 12.55 | 1979.09 | 296.79 | 0.56 |
| NORTH FISH CREEK | 05 | 16737 | Ultimate 100 yr | 10481.00 | 525.00 | 540.73 | | 541.87 | 0.004416 | 11.08 | 1611.74 | 199.57 | 0.52 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NORTH FISH CREEK | 05 | 16385 | 2 yr | 2899.00 | 523.00 | 533.22 | | 534.07 | 0.006901 | 8.88 | 610.54 | 220.11 | 0.54 |
| NORTH FISH CREEK | 05 | 16385 | 5 yr | 5163.00 | 523.00 | 535.52 | | 536.13 | 0.004685 | 8.61 | 1149.69 | 247.54 | 0.47 |
| NORTH FISH CREEK | 05 | 16385 | 10 yr | 6639.00 | 523.00 | 536.85 | | 537.39 | 0.003821 | 8.42 | 1486.90 | 257.10 | 0.43 |
| NORTH FISH CREEK | 05 | 16385 | 25 yr | 7922.00 | 523.00 | 538.25 | | 538.71 | 0.002894 | 7.89 | 1853.77 | 267.19 | 0.38 |
| NORTH FISH CREEK | 05 | 16385 | 50 yr | 8959.00 | 523.00 | 539.10 | | 539.54 | 0.002637 | 7.85 | 2083.68 | 272.81 | 0.37 |
| NORTH FISH CREEK | 05 | 16385 | 100 yr | 10191.00 | 523.00 | 539.98 | | 540.42 | 0.002477 | 7.92 | 2325.90 | 278.80 | 0.36 |
| NORTH FISH CREEK | 05 | 16385 | 500 yr | 13226.00 | 523.00 | 541.81 | | 542.29 | 0.002329 | 8.29 | 2850.41 | 293.74 | 0.36 |
| NORTH FISH CREEK | 05 | 16385 | Ultimate 100 yr | 10481.00 | 523.00 | 540.17 | | 540.62 | 0.002447 | 7.94 | 2381.07 | 280.07 | 0.36 |
| NORTH FISH CREEK | 05 | 15832 | 2 yr | 2899.00 | 521.00 | 531.22 | | 531.62 | 0.001957 | 5.43 | 746.17 | 175.69 | 0.32 |
| NORTH FISH CREEK | 05 | 15832 | 5 yr | 5163.00 | 521.00 | 534.00 | | 534.45 | 0.001815 | 6.24 | 1314.51 | 228.32 | 0.32 |
| NORTH FISH CREEK | 05 | 15832 | 10 yr | 6639.00 | 521.00 | 535.56 | | 536.01 | 0.001640 | 6.44 | 1685.97 | 246.03 | 0.31 |
| NORTH FISH CREEK | 05 | 15832 | 25 yr | 7922.00 | 521.00 | 537.27 | | 537.66 | 0.001312 | 6.23 | 2122.33 | 266.74 | 0.28 |
| NORTH FISH CREEK | 05 | 15832 | 50 yr | 8959.00 | 521.00 | 538.17 | | 538.58 | 0.001298 | 6.44 | 2372.79 | 293.28 | 0.28 |
| NORTH FISH CREEK | 05 | 15832 | 100 yr | 10191.00 | 521.00 | 539.07 | | 539.51 | 0.001309 | 6.71 | 2657.76 | 336.82 | 0.29 |
| NORTH FISH CREEK | 05 | 15832 | 500 yr | 13226.00 | 521.00 | 540.89 | | 541.40 | 0.001407 | 7.44 | 3336.35 | 420.46 | 0.30 |
| NORTH FISH CREEK | 05 | 15832 | Ultimate 100 yr | 10481.00 | 521.00 | 539.27 | | 539.72 | 0.001309 | 6.76 | 2727.15 | 343.62 | 0.29 |
| NORTH FISH CREEK | 05 | 15272 | 2 yr | 2899.00 | 519.00 | 528.63 | | 529.84 | 0.007196 | 8.85 | 339.42 | 66.18 | 0.58 |
| NORTH FISH CREEK | 05 | 15272 | 5 yr | 5163.00 | 519.00 | 531.29 | | 532.82 | 0.006602 | 10.42 | 620.43 | 142.26 | 0.58 |
| NORTH FISH CREEK | 05 | 15272 | 10 yr | 6639.00 | 519.00 | 533.73 | | 534.76 | 0.003788 | 9.13 | 1022.33 | 184.44 | 0.46 |
| NORTH FISH CREEK | 05 | 15272 | 25 yr | 7922.00 | 519.00 | 536.09 | | 536.79 | 0.002226 | 7.86 | 1501.72 | 220.44 | 0.36 |
| NORTH FISH CREEK | 05 | 15272 | 50 yr | 8959.00 | 519.00 | 537.08 | | 537.75 | 0.002050 | 7.88 | 1725.48 | 235.55 | 0.35 |
| NORTH FISH CREEK | 05 | 15272 | 100 yr | 10191.00 | 519.00 | 538.01 | | 538.69 | 0.001969 | 8.02 | 1952.88 | 249.15 | 0.35 |
| NORTH FISH CREEK | 05 | 15272 | 500 yr | 13226.00 | 519.00 | 539.83 | | 540.56 | 0.001955 | 8.56 | 2429.01 | 276.78 | 0.35 |
| NORTH FISH CREEK | 05 | 15272 | Ultimate 100 yr | 10481.00 | 519.00 | 538.23 | | 538.90 | 0.001952 | 8.05 | 2005.91 | 252.19 | 0.35 |
| NORTH FISH CREEK | 05 | 14909 | 2 yr | 2899.00 | 517.00 | 526.33 | | 527.36 | 0.006166 | 8.17 | 367.13 | 73.53 | 0.53 |
| NORTH FISH CREEK | 05 | 14909 | 5 yr | 5163.00 | 517.00 | 529.69 | | 530.74 | 0.004344 | 8.78 | 805.90 | 163.17 | 0.47 |
| NORTH FISH CREEK | 05 | 14909 | 10 yr | 6639.00 | 517.00 | 533.01 | | 533.63 | 0.002096 | 7.29 | 1435.75 | 220.15 | 0.34 |
| NORTH FISH CREEK | 05 | 14909 | 25 yr | 7922.00 | 517.00 | 535.69 | | 536.13 | 0.001284 | 6.41 | 2115.43 | 277.61 | 0.28 |
| NORTH FISH CREEK | 05 | 14909 | 50 yr | 8959.00 | 517.00 | 536.71 | | 537.14 | 0.001221 | 6.50 | 2403.16 | 292.72 | 0.27 |
| NORTH FISH CREEK | 05 | 14909 | 100 yr | 10191.00 | 517.00 | 537.65 | | 538.10 | 0.001225 | 6.73 | 2689.18 | 312.30 | 0.27 |
| NORTH FISH CREEK | 05 | 14909 | 500 yr | 13226.00 | 517.00 | 539.46 | | 539.97 | 0.001294 | 7.36 | 3285.92 | 345.43 | 0.29 |
| NORTH FISH CREEK | 05 | 14909 | Ultimate 100 yr | 10481.00 | 517.00 | 537.86 | | 538.32 | 0.001225 | 6.78 | 2756.27 | 316.71 | 0.27 |
| NORTH FISH CREEK | 05 | 14375 | 2 yr | 2899.00 | 515.28 | 524.54 | | 525.08 | 0.001854 | 5.86 | 494.76 | 66.48 | 0.36 |
| NORTH FISH CREEK | 05 | 14375 | 5 yr | 5163.00 | 515.28 | 528.62 | | 529.17 | 0.001231 | 6.24 | 1194.54 | 239.02 | 0.31 |
| NORTH FISH CREEK | 05 | 14375 | 10 yr | 6639.00 | 515.28 | 532.62 | | 532.90 | 0.000530 | 4.94 | 2372.49 | 321.49 | 0.22 |
| NORTH FISH CREEK | 05 | 14375 | 25 yr | 7922.00 | 515.28 | 535.48 | | 535.68 | 0.000343 | 4.42 | 3346.47 | 359.29 | 0.18 |
| NORTH FISH CREEK | 05 | 14375 | 50 yr | 8959.00 | 515.28 | 536.50 | | 536.71 | 0.000340 | 4.56 | 3721.57 | 372.30 | 0.18 |
| NORTH FISH CREEK | 05 | 14375 | 100 yr | 10191.00 | 515.28 | 537.45 | | 537.68 | 0.000353 | 4.79 | 4080.02 | 385.04 | 0.18 |
| NORTH FISH CREEK | 05 | 14375 | 500 yr | 13226.00 | 515.28 | 539.25 | | 539.52 | 0.000404 | 5.41 | 4795.97 | 415.20 | 0.20 |
| NORTH FISH CREEK | 05 | 14375 | Ultimate 100 yr | 10481.00 | 515.28 | 537.66 | | 537.89 | 0.000356 | 4.84 | 4162.53 | 387.93 | 0.18 |
| NORTH FISH CREEK | 05 | 14089 | 2 yr | 2899.00 | 515.00 | 522.79 | | 524.17 | 0.006720 | 9.65 | 347.14 | 77.60 | 0.67 |
| NORTH FISH CREEK | 05 | 14089 | 5 yr | 5163.00 | 515.00 | 528.26 | | 528.80 | 0.001500 | 6.89 | 1305.13 | 228.49 | 0.35 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NORTH FISH CREEK | 05 | 14089 | 10 yr | 6639.00 | 515.00 | 532.51 | | 532.75 | 0.000536 | 5.05 | 2414.88 | 294.91 | 0.22 |
| NORTH FISH CREEK | 05 | 14089 | 25 yr | 7922.00 | 515.00 | 535.42 | | 535.58 | 0.000323 | 4.38 | 3327.26 | 332.24 | 0.18 |
| NORTH FISH CREEK | 05 | 14089 | 50 yr | 8959.00 | 515.00 | 536.45 | | 536.62 | 0.000316 | 4.49 | 3677.27 | 348.34 | 0.18 |
| NORTH FISH CREEK | 05 | 14089 | 100 yr | 10191.00 | 515.00 | 537.40 | | 537.58 | 0.000325 | 4.69 | 4015.68 | 368.84 | 0.18 |
| NORTH FISH CREEK | 05 | 14089 | 500 yr | 13226.00 | 515.00 | 539.19 | | 539.41 | 0.000362 | 5.23 | 4721.62 | 416.82 | 0.19 |
| NORTH FISH CREEK | 05 | 14089 | Ultimate 100 yr | 10481.00 | 515.00 | 537.61 | | 537.79 | 0.000327 | 4.74 | 4095.06 | 374.76 | 0.18 |
| NORTH FISH CREEK | 05 | 13910 | 2 yr | 2899.00 | 514.00 | 522.55 | | 523.06 | 0.002642 | 5.72 | 507.13 | 96.75 | 0.44 |
| NORTH FISH CREEK | 05 | 13910 | 5 yr | 5163.00 | 514.00 | 528.23 | | 528.52 | 0.000621 | 4.50 | 1317.02 | 218.59 | 0.24 |
| NORTH FISH CREEK | 05 | 13910 | 10 yr | 6639.00 | 514.00 | 532.50 | | 532.65 | 0.000233 | 3.43 | 2302.92 | 243.62 | 0.15 |
| NORTH FISH CREEK | 05 | 13910 | 25 yr | 7922.00 | 514.00 | 535.40 | | 535.53 | 0.000152 | 3.11 | 3037.91 | 265.93 | 0.13 |
| NORTH FISH CREEK | 05 | 13910 | 50 yr | 8959.00 | 514.00 | 536.43 | | 536.56 | 0.000153 | 3.24 | 3318.43 | 281.05 | 0.13 |
| NORTH FISH CREEK | 05 | 13910 | 100 yr | 10191.00 | 514.00 | 537.37 | | 537.52 | 0.000162 | 3.44 | 3594.86 | 305.12 | 0.13 |
| NORTH FISH CREEK | 05 | 13910 | 500 yr | 13226.00 | 514.00 | 539.16 | | 539.35 | 0.000187 | 3.91 | 4188.04 | 357.66 | 0.15 |
| NORTH FISH CREEK | 05 | 13910 | Ultimate 100 yr | 10481.00 | 514.00 | 537.59 | | 537.74 | 0.000163 | 3.48 | 3660.24 | 309.54 | 0.14 |
| NORTH FISH CREEK | 05 | 13805 | 2 yr | 2843.00 | 513.00 | 522.11 | | 522.76 | 0.002791 | 6.49 | 438.29 | 66.52 | 0.45 |
| NORTH FISH CREEK | 05 | 13805 | 5 yr | 4924.00 | 513.00 | 528.02 | | 528.44 | 0.000896 | 5.32 | 1046.90 | 193.37 | 0.28 |
| NORTH FISH CREEK | 05 | 13805 | 10 yr | 6222.00 | 513.00 | 532.44 | | 532.62 | 0.000293 | 3.77 | 1982.05 | 228.49 | 0.17 |
| NORTH FISH CREEK | 05 | 13805 | 25 yr | 7481.00 | 513.00 | 535.37 | | 535.51 | 0.000184 | 3.35 | 2681.76 | 250.10 | 0.14 |
| NORTH FISH CREEK | 05 | 13805 | 50 yr | 8502.00 | 513.00 | 536.40 | | 536.55 | 0.000185 | 3.47 | 2945.49 | 266.69 | 0.14 |
| NORTH FISH CREEK | 05 | 13805 | 100 yr | 9746.00 | 513.00 | 537.34 | | 537.50 | 0.000194 | 3.67 | 3206.42 | 288.36 | 0.14 |
| NORTH FISH CREEK | 05 | 13805 | 500 yr | 13269.00 | 513.00 | 539.10 | | 539.33 | 0.000243 | 4.33 | 3744.65 | 322.57 | 0.16 |
| NORTH FISH CREEK | 05 | 13805 | Ultimate 100 yr | 10130.00 | 513.00 | 537.55 | | 537.72 | 0.000200 | 3.75 | 3266.96 | 293.05 | 0.14 |
| NORTH FISH CREEK | 05 | 13687 | 2 yr | 2843.00 | 510.97 | 522.12 | 516.00 | 522.45 | 0.000753 | 4.71 | 646.91 | 79.51 | 0.26 |
| NORTH FISH CREEK | 05 | 13687 | 5 yr | 4924.00 | 510.97 | 528.00 | 518.06 | 528.33 | 0.000456 | 4.92 | 1214.59 | 155.53 | 0.21 |
| NORTH FISH CREEK | 05 | 13687 | 10 yr | 6222.00 | 510.97 | 532.40 | 519.17 | 532.59 | 0.000220 | 4.00 | 2076.69 | 225.02 | 0.15 |
| NORTH FISH CREEK | 05 | 13687 | 25 yr | 7481.00 | 510.97 | 535.34 | 520.16 | 535.49 | 0.000153 | 3.65 | 2787.58 | 270.67 | 0.13 |
| NORTH FISH CREEK | 05 | 13687 | 50 yr | 8502.00 | 510.97 | 536.36 | 520.84 | 536.53 | 0.000156 | 3.79 | 3078.00 | 293.12 | 0.13 |
| NORTH FISH CREEK | 05 | 13687 | 100 yr | 9746.00 | 510.97 | 537.30 | 521.79 | 537.48 | 0.000167 | 4.01 | 3365.66 | 318.16 | 0.14 |
| NORTH FISH CREEK | 05 | 13687 | 500 yr | 13269.00 | 510.97 | 539.05 | 523.92 | 539.30 | 0.000212 | 4.73 | 3964.10 | 361.11 | 0.16 |
| NORTH FISH CREEK | 05 | 13687 | Ultimate 100 yr | 10130.00 | 510.97 | 537.51 | 522.04 | 537.70 | 0.000172 | 4.10 | 3432.14 | 323.38 | 0.14 |
| NORTH FISH CREEK | 05 | 13587 | | Culvert | | | | | | | | | |
| NORTH FISH CREEK | 05 | 13486 | 2 yr | 2843.00 | 510.35 | 520.81 | 515.25 | 521.18 | 0.001017 | 4.99 | 604.47 | 111.06 | 0.28 |
| NORTH FISH CREEK | 05 | 13486 | 5 yr | 4924.00 | 510.35 | 523.37 | 517.43 | 524.02 | 0.001323 | 6.64 | 794.14 | 126.28 | 0.33 |
| NORTH FISH CREEK | 05 | 13486 | 10 yr | 6222.00 | 510.35 | 524.67 | 518.56 | 525.49 | 0.001472 | 7.49 | 893.57 | 133.94 | 0.36 |
| NORTH FISH CREEK | 05 | 13486 | 25 yr | 7481.00 | 510.35 | 525.79 | 519.45 | 526.77 | 0.001601 | 8.23 | 980.19 | 139.90 | 0.38 |
| NORTH FISH CREEK | 05 | 13486 | 50 yr | 8502.00 | 510.35 | 526.62 | 520.16 | 527.74 | 0.001691 | 8.78 | 1045.36 | 144.10 | 0.39 |
| NORTH FISH CREEK | 05 | 13486 | 100 yr | 9746.00 | 510.35 | 527.59 | 520.93 | 528.85 | 0.001786 | 9.39 | 1120.37 | 154.58 | 0.41 |
| NORTH FISH CREEK | 05 | 13486 | 500 yr | 13269.00 | 510.35 | 530.11 | 522.93 | 531.79 | 0.001977 | 10.86 | 1317.26 | 174.97 | 0.44 |
| NORTH FISH CREEK | 05 | 13486 | Ultimate 100 yr | 10130.00 | 510.35 | 527.84 | 521.15 | 529.16 | 0.001825 | 9.59 | 1140.17 | 157.55 | 0.41 |
| NORTH FISH CREEK | 05 | 13276 | 2 yr | 2843.00 | 511.00 | 520.52 | | 520.92 | 0.001498 | 5.89 | 601.46 | 104.12 | 0.35 |
| NORTH FISH CREEK | 05 | 13276 | 5 yr | 4924.00 | 511.00 | 523.13 | | 523.68 | 0.001466 | 6.95 | 892.56 | 118.67 | 0.36 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NORTH FISH CREEK | 05 | 13276 | 10 yr | 6222.00 | 511.00 | 524.47 | | 525.09 | 0.001448 | 7.44 | 1055.50 | 124.94 | 0.37 |
| NORTH FISH CREEK | 05 | 13276 | 25 yr | 7481.00 | 511.00 | 525.62 | | 526.31 | 0.001446 | 7.88 | 1202.13 | 130.52 | 0.37 |
| NORTH FISH CREEK | 05 | 13276 | 50 yr | 8502.00 | 511.00 | 526.48 | | 527.23 | 0.001444 | 8.20 | 1316.81 | 134.80 | 0.38 |
| NORTH FISH CREEK | 05 | 13276 | 100 yr | 9746.00 | 511.00 | 527.48 | | 528.29 | 0.001442 | 8.56 | 1454.18 | 140.21 | 0.38 |
| NORTH FISH CREEK | 05 | 13276 | 500 yr | 13269.00 | 511.00 | 530.13 | | 531.07 | 0.001433 | 9.48 | 1849.03 | 159.25 | 0.39 |
| NORTH FISH CREEK | 05 | 13276 | Ultimate 100 yr | 10130.00 | 511.00 | 527.75 | | 528.58 | 0.001453 | 8.69 | 1491.42 | 141.60 | 0.38 |
| NORTH FISH CREEK | 05 | 12994 | 2 yr | 2843.00 | 509.51 | 519.42 | | 520.31 | 0.002889 | 7.94 | 407.16 | 66.60 | 0.49 |
| NORTH FISH CREEK | 05 | 12994 | 5 yr | 4924.00 | 509.51 | 521.49 | | 522.99 | 0.003728 | 10.46 | 553.37 | 74.61 | 0.57 |
| NORTH FISH CREEK | 05 | 12994 | 10 yr | 6222.00 | 509.51 | 522.49 | | 524.36 | 0.004178 | 11.78 | 630.07 | 78.48 | 0.62 |
| NORTH FISH CREEK | 05 | 12994 | 25 yr | 7481.00 | 509.51 | 523.28 | | 525.53 | 0.004663 | 13.01 | 693.24 | 81.68 | 0.66 |
| NORTH FISH CREEK | 05 | 12994 | 50 yr | 8502.00 | 509.51 | 523.84 | | 526.41 | 0.005055 | 13.96 | 739.83 | 84.01 | 0.69 |
| NORTH FISH CREEK | 05 | 12994 | 100 yr | 9746.00 | 509.51 | 524.44 | | 527.43 | 0.005571 | 15.11 | 790.83 | 87.09 | 0.73 |
| NORTH FISH CREEK | 05 | 12994 | 500 yr | 13269.00 | 509.51 | 525.42 | 524.76 | 530.02 | 0.007922 | 18.89 | 879.52 | 95.10 | 0.88 |
| NORTH FISH CREEK | 05 | 12994 | Ultimate 100 yr | 10130.00 | 509.51 | 524.48 | | 527.68 | 0.005944 | 15.64 | 794.66 | 87.33 | 0.75 |
| NORTH FISH CREEK | 05 | 12743 | 2 yr | 2843.00 | 509.55 | 519.04 | | 519.60 | 0.002154 | 6.91 | 547.00 | 101.55 | 0.42 |
| NORTH FISH CREEK | 05 | 12743 | 5 yr | 4924.00 | 509.55 | 521.21 | | 522.03 | 0.002462 | 8.62 | 784.75 | 117.75 | 0.47 |
| NORTH FISH CREEK | 05 | 12743 | 10 yr | 6222.00 | 509.55 | 522.30 | | 523.27 | 0.002595 | 9.45 | 918.01 | 126.32 | 0.49 |
| NORTH FISH CREEK | 05 | 12743 | 25 yr | 7481.00 | 509.55 | 523.17 | | 524.29 | 0.002787 | 10.28 | 1031.51 | 136.43 | 0.51 |
| NORTH FISH CREEK | 05 | 12743 | 50 yr | 8502.00 | 509.55 | 523.80 | | 525.05 | 0.002951 | 10.93 | 1120.53 | 147.44 | 0.53 |
| NORTH FISH CREEK | 05 | 12743 | 100 yr | 9746.00 | 509.55 | 524.51 | | 525.89 | 0.003093 | 11.59 | 1229.77 | 158.46 | 0.55 |
| NORTH FISH CREEK | 05 | 12743 | 500 yr | 13269.00 | 509.55 | 525.97 | | 527.78 | 0.003667 | 13.49 | 1475.36 | 177.18 | 0.61 |
| NORTH FISH CREEK | 05 | 12743 | Ultimate 100 yr | 10130.00 | 509.55 | 524.57 | | 526.05 | 0.003279 | 11.97 | 1239.49 | 159.34 | 0.57 |
| NORTH FISH CREEK | 05 | 12502 | 2 yr | 2843.00 | 508.00 | 518.98 | | 519.15 | 0.000553 | 4.06 | 953.35 | 133.88 | 0.22 |
| NORTH FISH CREEK | 05 | 12502 | 5 yr | 4924.00 | 508.00 | 521.18 | | 521.48 | 0.000770 | 5.45 | 1267.43 | 155.81 | 0.27 |
| NORTH FISH CREEK | 05 | 12502 | 10 yr | 6222.00 | 508.00 | 522.28 | | 522.67 | 0.000894 | 6.21 | 1455.05 | 177.71 | 0.30 |
| NORTH FISH CREEK | 05 | 12502 | 25 yr | 7481.00 | 508.00 | 523.18 | | 523.63 | 0.000978 | 6.78 | 1617.07 | 183.40 | 0.31 |
| NORTH FISH CREEK | 05 | 12502 | 50 yr | 8502.00 | 508.00 | 523.83 | | 524.33 | 0.001046 | 7.22 | 1738.61 | 189.39 | 0.33 |
| NORTH FISH CREEK | 05 | 12502 | 100 yr | 9746.00 | 508.00 | 524.56 | | 525.13 | 0.001124 | 7.72 | 1880.55 | 196.92 | 0.34 |
| NORTH FISH CREEK | 05 | 12502 | 500 yr | 13269.00 | 508.00 | 526.06 | | 526.85 | 0.001426 | 9.24 | 2192.78 | 218.18 | 0.39 |
| NORTH FISH CREEK | 05 | 12502 | Ultimate 100 yr | 10130.00 | 508.00 | 524.63 | | 525.24 | 0.001193 | 7.98 | 1893.62 | 197.70 | 0.35 |
| NORTH FISH CREEK | 05 | 12343 | 2 yr | 2843.00 | 508.00 | 518.78 | | 519.04 | 0.000700 | 4.35 | 765.49 | 117.76 | 0.25 |
| NORTH FISH CREEK | 05 | 12343 | 5 yr | 4924.00 | 508.00 | 520.86 | | 521.33 | 0.000984 | 5.88 | 1047.39 | 152.28 | 0.30 |
| NORTH FISH CREEK | 05 | 12343 | 10 yr | 6222.00 | 508.00 | 521.92 | | 522.49 | 0.001094 | 6.57 | 1216.46 | 165.08 | 0.33 |
| NORTH FISH CREEK | 05 | 12343 | 25 yr | 7481.00 | 508.00 | 522.76 | | 523.43 | 0.001212 | 7.22 | 1359.99 | 176.66 | 0.35 |
| NORTH FISH CREEK | 05 | 12343 | 50 yr | 8502.00 | 508.00 | 523.37 | | 524.13 | 0.001300 | 7.70 | 1470.47 | 185.38 | 0.36 |
| NORTH FISH CREEK | 05 | 12343 | 100 yr | 9746.00 | 508.00 | 524.06 | | 524.91 | 0.001396 | 8.24 | 1601.69 | 195.69 | 0.38 |
| NORTH FISH CREEK | 05 | 12343 | 500 yr | 13269.00 | 508.00 | 525.37 | | 526.56 | 0.001807 | 9.92 | 1874.05 | 220.44 | 0.43 |
| NORTH FISH CREEK | 05 | 12343 | Ultimate 100 yr | 10130.00 | 508.00 | 524.09 | | 525.00 | 0.001498 | 8.54 | 1606.58 | 196.15 | 0.39 |
| NORTH FISH CREEK | 05 | 12200 | 2 yr | 2843.00 | 506.45 | 518.21 | 514.12 | 518.83 | 0.004601 | 6.50 | 518.34 | 184.11 | 0.39 |
| NORTH FISH CREEK | 05 | 12200 | 5 yr | 4924.00 | 506.45 | 520.31 | 516.59 | 521.06 | 0.004799 | 7.67 | 915.28 | 240.45 | 0.41 |
| NORTH FISH CREEK | 05 | 12200 | 10 yr | 6222.00 | 506.45 | 521.47 | 518.78 | 522.22 | 0.004481 | 7.93 | 1156.12 | 258.92 | 0.40 |
| NORTH FISH CREEK | 05 | 12200 | 25 yr | 7481.00 | 506.45 | 522.37 | 519.74 | 523.15 | 0.004438 | 8.29 | 1349.84 | 303.94 | 0.41 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NORTH FISH CREEK | 05 | 12200 | 50 yr | 8502.00 | 506.45 | 523.02 | 520.27 | 523.83 | 0.004433 | 8.56 | 1494.48 | 310.79 | 0.41 |
| NORTH FISH CREEK | 05 | 12200 | 100 yr | 9746.00 | 506.45 | 523.75 | 520.78 | 524.60 | 0.004482 | 8.92 | 1659.04 | 320.83 | 0.42 |
| NORTH FISH CREEK | 05 | 12200 | 500 yr | 13269.00 | 506.45 | 525.43 | 522.03 | 526.06 | 0.003397 | 8.36 | 2640.30 | 338.20 | 0.37 |
| NORTH FISH CREEK | 05 | 12200 | Ultimate 100 yr | 10130.00 | 506.45 | 524.02 | 520.94 | 524.61 | 0.003388 | 7.85 | 2167.46 | 331.24 | 0.36 |
| NORTH FISH CREEK | 05 | 11935 | 2 yr | 2843.00 | 506.00 | 517.50 | 512.87 | 517.82 | 0.002542 | 5.02 | 853.79 | 335.97 | 0.30 |
| NORTH FISH CREEK | 05 | 11935 | 5 yr | 4924.00 | 506.00 | 519.79 | 516.69 | 520.08 | 0.002045 | 5.24 | 1479.11 | 371.74 | 0.28 |
| NORTH FISH CREEK | 05 | 11935 | 10 yr | 6222.00 | 506.00 | 521.03 | 517.43 | 521.31 | 0.001837 | 5.33 | 1826.82 | 384.51 | 0.27 |
| NORTH FISH CREEK | 05 | 11935 | 25 yr | 7481.00 | 506.00 | 521.96 | 517.91 | 522.26 | 0.001820 | 5.57 | 2089.69 | 394.68 | 0.27 |
| NORTH FISH CREEK | 05 | 11935 | 50 yr | 8502.00 | 506.00 | 522.62 | 518.30 | 522.94 | 0.001856 | 5.81 | 2280.97 | 406.23 | 0.27 |
| NORTH FISH CREEK | 05 | 11935 | 100 yr | 9746.00 | 506.00 | 523.35 | 518.69 | 523.69 | 0.001905 | 6.09 | 2499.51 | 419.35 | 0.28 |
| NORTH FISH CREEK | 05 | 11935 | 500 yr | 13269.00 | 506.00 | 525.15 | 519.63 | 525.40 | 0.001389 | 5.62 | 4013.97 | 461.86 | 0.24 |
| NORTH FISH CREEK | 05 | 11935 | Ultimate 100 yr | 10130.00 | 506.00 | 523.56 | 518.80 | 523.91 | 0.001922 | 6.17 | 2564.02 | 423.28 | 0.28 |
| NORTH FISH CREEK | 05 | 11554 | 2 yr | 2843.00 | 505.00 | 516.57 | | 516.90 | 0.002915 | 5.31 | 830.22 | 221.84 | 0.31 |
| NORTH FISH CREEK | 05 | 11554 | 5 yr | 4924.00 | 505.00 | 519.14 | | 519.43 | 0.002166 | 5.42 | 1411.20 | 234.21 | 0.28 |
| NORTH FISH CREEK | 05 | 11554 | 10 yr | 6222.00 | 505.00 | 520.45 | | 520.74 | 0.001975 | 5.56 | 1730.78 | 252.08 | 0.27 |
| NORTH FISH CREEK | 05 | 11554 | 25 yr | 7481.00 | 505.00 | 521.37 | | 521.69 | 0.002000 | 5.86 | 1966.17 | 257.36 | 0.28 |
| NORTH FISH CREEK | 05 | 11554 | 50 yr | 8502.00 | 505.00 | 522.02 | | 522.36 | 0.002055 | 6.12 | 2133.86 | 261.23 | 0.28 |
| NORTH FISH CREEK | 05 | 11554 | 100 yr | 9746.00 | 505.00 | 522.73 | | 523.11 | 0.002122 | 6.43 | 2322.44 | 266.03 | 0.29 |
| NORTH FISH CREEK | 05 | 11554 | 500 yr | 13269.00 | 505.00 | 524.42 | | 524.89 | 0.002366 | 7.28 | 2780.44 | 277.69 | 0.31 |
| NORTH FISH CREEK | 05 | 11554 | Ultimate 100 yr | 10130.00 | 505.00 | 522.94 | | 523.32 | 0.002146 | 6.52 | 2377.40 | 267.68 | 0.29 |
| NORTH FISH CREEK | 05 | 11227 | 2 yr | 2843.00 | 503.50 | 516.00 | | 516.23 | 0.001402 | 4.31 | 991.62 | 225.37 | 0.23 |
| NORTH FISH CREEK | 05 | 11227 | 5 yr | 4924.00 | 503.50 | 518.69 | | 518.93 | 0.001311 | 4.83 | 1690.51 | 327.01 | 0.23 |
| NORTH FISH CREEK | 05 | 11227 | 10 yr | 6222.00 | 503.50 | 520.02 | | 520.28 | 0.001314 | 5.16 | 2170.05 | 385.10 | 0.24 |
| NORTH FISH CREEK | 05 | 11227 | 25 yr | 7481.00 | 503.50 | 520.98 | | 521.24 | 0.001271 | 5.29 | 2541.61 | 391.84 | 0.23 |
| NORTH FISH CREEK | 05 | 11227 | 50 yr | 8502.00 | 503.50 | 521.63 | | 521.90 | 0.001288 | 5.47 | 2801.31 | 403.64 | 0.24 |
| NORTH FISH CREEK | 05 | 11227 | 100 yr | 9746.00 | 503.50 | 522.35 | | 522.63 | 0.001311 | 5.68 | 3095.83 | 415.05 | 0.24 |
| NORTH FISH CREEK | 05 | 11227 | 500 yr | 13269.00 | 503.50 | 524.05 | | 524.36 | 0.001398 | 6.24 | 3824.18 | 439.99 | 0.25 |
| NORTH FISH CREEK | 05 | 11227 | Ultimate 100 yr | 10130.00 | 503.50 | 522.56 | | 522.84 | 0.001325 | 5.75 | 3181.74 | 420.30 | 0.24 |
| NORTH FISH CREEK | 05 | 10784 | 2 yr | 2843.00 | 502.00 | 515.30 | | 515.57 | 0.001757 | 4.73 | 910.83 | 246.07 | 0.25 |
| NORTH FISH CREEK | 05 | 10784 | 5 yr | 4924.00 | 502.00 | 518.16 | | 518.40 | 0.001351 | 4.85 | 1721.69 | 375.53 | 0.23 |
| NORTH FISH CREEK | 05 | 10784 | 10 yr | 6222.00 | 502.00 | 519.52 | | 519.76 | 0.001334 | 5.13 | 2258.05 | 410.38 | 0.23 |
| NORTH FISH CREEK | 05 | 10784 | 25 yr | 7481.00 | 502.00 | 520.51 | | 520.74 | 0.001255 | 5.19 | 2670.32 | 420.08 | 0.23 |
| NORTH FISH CREEK | 05 | 10784 | 50 yr | 8502.00 | 502.00 | 521.16 | | 521.40 | 0.001257 | 5.33 | 2948.77 | 430.83 | 0.23 |
| NORTH FISH CREEK | 05 | 10784 | 100 yr | 9746.00 | 502.00 | 521.87 | | 522.12 | 0.001306 | 5.59 | 3262.61 | 457.28 | 0.24 |
| NORTH FISH CREEK | 05 | 10784 | 500 yr | 13269.00 | 502.00 | 523.53 | | 523.82 | 0.001431 | 6.21 | 4063.03 | 514.40 | 0.25 |
| NORTH FISH CREEK | 05 | 10784 | Ultimate 100 yr | 10130.00 | 502.00 | 522.08 | | 522.33 | 0.001321 | 5.66 | 3355.60 | 464.82 | 0.24 |
| NORTH FISH CREEK | 05 | 10515 | 2 yr | 2843.00 | 501.00 | 514.40 | | 514.95 | 0.003170 | 6.27 | 550.34 | 92.64 | 0.33 |
| NORTH FISH CREEK | 05 | 10515 | 5 yr | 4924.00 | 501.00 | 516.98 | | 517.82 | 0.003940 | 8.03 | 844.72 | 140.37 | 0.38 |
| NORTH FISH CREEK | 05 | 10515 | 10 yr | 6222.00 | 501.00 | 518.15 | | 519.16 | 0.004383 | 8.95 | 1041.56 | 190.51 | 0.41 |
| NORTH FISH CREEK | 05 | 10515 | 25 yr | 7481.00 | 501.00 | 518.98 | | 520.14 | 0.004881 | 9.79 | 1215.84 | 232.97 | 0.43 |
| NORTH FISH CREEK | 05 | 10515 | 50 yr | 8502.00 | 501.00 | 519.52 | | 520.79 | 0.005242 | 10.38 | 1348.73 | 257.08 | 0.45 |
| NORTH FISH CREEK | 05 | 10515 | 100 yr | 9746.00 | 501.00 | 520.11 | | 521.48 | 0.005640 | 11.02 | 1505.87 | 283.06 | 0.47 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NORTH FISH CREEK | 05 | 10515 | 500 yr | 13269.00 | 501.00 | 521.57 | | 523.12 | 0.006267 | 12.28 | 1975.14 | 347.66 | 0.51 |
| NORTH FISH CREEK | 05 | 10515 | Ultimate 100 yr | 10130.00 | 501.00 | 520.26 | | 521.68 | 0.005777 | 11.22 | 1551.33 | 291.12 | 0.48 |
| NORTH FISH CREEK | 05 | 10240 | 2 yr | 2787.00 | 501.00 | 513.66 | 509.10 | 514.09 | 0.002866 | 5.73 | 647.68 | 133.65 | 0.32 |
| NORTH FISH CREEK | 05 | 10240 | 5 yr | 4856.00 | 501.00 | 516.24 | 511.94 | 516.79 | 0.002989 | 6.84 | 1040.44 | 245.28 | 0.34 |
| NORTH FISH CREEK | 05 | 10240 | 10 yr | 6183.00 | 501.00 | 517.33 | 513.00 | 518.00 | 0.003379 | 7.69 | 1247.27 | 321.71 | 0.37 |
| NORTH FISH CREEK | 05 | 10240 | 25 yr | 7518.00 | 501.00 | 518.16 | 514.16 | 518.86 | 0.003511 | 8.16 | 1732.70 | 414.44 | 0.38 |
| NORTH FISH CREEK | 05 | 10240 | 50 yr | 8601.00 | 501.00 | 518.74 | 514.74 | 519.43 | 0.003471 | 8.33 | 1978.06 | 429.37 | 0.38 |
| NORTH FISH CREEK | 05 | 10240 | 100 yr | 9862.00 | 501.00 | 519.37 | 515.24 | 520.04 | 0.003406 | 8.49 | 2251.81 | 443.11 | 0.38 |
| NORTH FISH CREEK | 05 | 10240 | 500 yr | 13485.00 | 501.00 | 520.88 | 516.53 | 521.56 | 0.003363 | 8.97 | 2947.79 | 480.54 | 0.38 |
| NORTH FISH CREEK | 05 | 10240 | Ultimate 100 yr | 10203.00 | 501.00 | 519.55 | 515.42 | 520.21 | 0.003362 | 8.50 | 2331.22 | 446.80 | 0.38 |
| NORTH FISH CREEK | 05 | 9960 | 2 yr | 2787.00 | 502.35 | 512.37 | | 513.04 | 0.005367 | 6.92 | 507.24 | 118.55 | 0.43 |
| NORTH FISH CREEK | 05 | 9960 | 5 yr | 4856.00 | 502.35 | 514.89 | | 515.72 | 0.005177 | 8.17 | 903.27 | 224.94 | 0.45 |
| NORTH FISH CREEK | 05 | 9960 | 10 yr | 6183.00 | 502.35 | 516.12 | | 516.92 | 0.004683 | 8.37 | 1221.07 | 281.57 | 0.43 |
| NORTH FISH CREEK | 05 | 9960 | 25 yr | 7518.00 | 502.35 | 516.98 | | 517.78 | 0.004570 | 8.66 | 1466.76 | 296.29 | 0.43 |
| NORTH FISH CREEK | 05 | 9960 | 50 yr | 8601.00 | 502.35 | 517.47 | | 518.33 | 0.004797 | 9.11 | 1616.43 | 308.82 | 0.44 |
| NORTH FISH CREEK | 05 | 9960 | 100 yr | 9862.00 | 502.35 | 518.06 | | 518.94 | 0.004864 | 9.44 | 1800.79 | 318.79 | 0.45 |
| NORTH FISH CREEK | 05 | 9960 | 500 yr | 13485.00 | 502.35 | 519.44 | | 520.43 | 0.005148 | 10.36 | 2255.64 | 344.04 | 0.47 |
| NORTH FISH CREEK | 05 | 9960 | Ultimate 100 yr | 10203.00 | 502.35 | 518.26 | | 519.13 | 0.004776 | 9.45 | 1863.83 | 321.27 | 0.45 |
| NORTH FISH CREEK | 05 | 9439 | 2 yr | 2787.00 | 498.26 | 510.76 | | 511.08 | 0.002151 | 4.78 | 637.14 | 113.75 | 0.27 |
| NORTH FISH CREEK | 05 | 9439 | 5 yr | 4856.00 | 498.26 | 513.44 | | 513.87 | 0.002197 | 5.68 | 977.72 | 162.69 | 0.29 |
| NORTH FISH CREEK | 05 | 9439 | 10 yr | 6183.00 | 498.26 | 514.74 | | 515.21 | 0.002304 | 6.22 | 1257.72 | 279.05 | 0.30 |
| NORTH FISH CREEK | 05 | 9439 | 25 yr | 7518.00 | 498.26 | 515.63 | | 516.13 | 0.002351 | 6.56 | 1567.01 | 391.55 | 0.30 |
| NORTH FISH CREEK | 05 | 9439 | 50 yr | 8601.00 | 498.26 | 516.21 | | 516.68 | 0.002189 | 6.50 | 1800.02 | 406.38 | 0.29 |
| NORTH FISH CREEK | 05 | 9439 | 100 yr | 9862.00 | 498.26 | 516.95 | | 517.37 | 0.001890 | 6.23 | 2103.29 | 413.76 | 0.28 |
| NORTH FISH CREEK | 05 | 9439 | 500 yr | 13485.00 | 498.26 | 518.44 | | 518.86 | 0.001767 | 6.40 | 2811.05 | 501.88 | 0.27 |
| NORTH FISH CREEK | 05 | 9439 | Ultimate 100 yr | 10203.00 | 498.26 | 517.13 | | 517.56 | 0.001989 | 6.44 | 2180.13 | 464.63 | 0.28 |
| NORTH FISH CREEK | 05 | 9231 | 2 yr | 2787.00 | 499.00 | 510.05 | | 510.55 | 0.003751 | 5.99 | 503.72 | 93.58 | 0.36 |
| NORTH FISH CREEK | 05 | 9231 | 5 yr | 4856.00 | 499.00 | 512.83 | | 513.40 | 0.003189 | 6.63 | 848.80 | 155.66 | 0.34 |
| NORTH FISH CREEK | 05 | 9231 | 10 yr | 6183.00 | 499.00 | 514.10 | | 514.73 | 0.003357 | 7.29 | 1091.45 | 244.36 | 0.36 |
| NORTH FISH CREEK | 05 | 9231 | 25 yr | 7518.00 | 499.00 | 515.08 | | 515.68 | 0.003096 | 7.35 | 1371.68 | 308.19 | 0.35 |
| NORTH FISH CREEK | 05 | 9231 | 50 yr | 8601.00 | 499.00 | 515.71 | | 516.28 | 0.002839 | 7.25 | 1568.17 | 317.92 | 0.34 |
| NORTH FISH CREEK | 05 | 9231 | 100 yr | 9862.00 | 499.00 | 516.43 | | 517.01 | 0.002847 | 7.50 | 1817.13 | 387.11 | 0.34 |
| NORTH FISH CREEK | 05 | 9231 | 500 yr | 13485.00 | 499.00 | 518.02 | | 518.56 | 0.002411 | 7.38 | 2522.66 | 473.30 | 0.32 |
| NORTH FISH CREEK | 05 | 9231 | Ultimate 100 yr | 10203.00 | 499.00 | 516.61 | | 517.19 | 0.002845 | 7.56 | 1889.64 | 409.79 | 0.34 |
| NORTH FISH CREEK | 05 | 8815 | 2 yr | 2787.00 | 495.79 | 508.62 | | 509.13 | 0.003146 | 5.79 | 521.21 | 93.23 | 0.33 |
| NORTH FISH CREEK | 05 | 8815 | 5 yr | 4856.00 | 495.79 | 511.26 | | 512.01 | 0.003609 | 7.29 | 865.65 | 176.80 | 0.37 |
| NORTH FISH CREEK | 05 | 8815 | 10 yr | 6183.00 | 495.79 | 512.39 | | 513.26 | 0.003898 | 8.03 | 1101.94 | 246.71 | 0.39 |
| NORTH FISH CREEK | 05 | 8815 | 25 yr | 7518.00 | 495.79 | 513.29 | | 514.23 | 0.004134 | 8.63 | 1336.88 | 287.32 | 0.40 |
| NORTH FISH CREEK | 05 | 8815 | 50 yr | 8601.00 | 495.79 | 513.91 | | 514.89 | 0.004239 | 8.99 | 1522.42 | 306.28 | 0.41 |
| NORTH FISH CREEK | 05 | 8815 | 100 yr | 9862.00 | 495.79 | 514.55 | | 515.60 | 0.004427 | 9.45 | 1729.91 | 339.92 | 0.42 |
| NORTH FISH CREEK | 05 | 8815 | 500 yr | 13485.00 | 495.79 | 516.13 | | 517.26 | 0.004686 | 10.37 | 2324.44 | 416.06 | 0.44 |
| NORTH FISH CREEK | 05 | 8815 | Ultimate 100 yr | 10203.00 | 495.79 | 514.71 | | 515.77 | 0.004492 | 9.58 | 1783.61 | 350.08 | 0.43 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NORTH FISH CREEK | 05 | 8600 | 2 yr | 2787.00 | 495.00 | 507.97 | | 508.46 | 0.003036 | 5.73 | 560.10 | 124.75 | 0.32 |
| NORTH FISH CREEK | 05 | 8600 | 5 yr | 4856.00 | 495.00 | 510.67 | | 511.26 | 0.003025 | 6.72 | 1075.05 | 267.07 | 0.33 |
| NORTH FISH CREEK | 05 | 8600 | 10 yr | 6183.00 | 495.00 | 511.86 | | 512.45 | 0.002955 | 7.06 | 1440.96 | 345.50 | 0.34 |
| NORTH FISH CREEK | 05 | 8600 | 25 yr | 7518.00 | 495.00 | 512.80 | | 513.38 | 0.002901 | 7.31 | 1788.22 | 396.76 | 0.34 |
| NORTH FISH CREEK | 05 | 8600 | 50 yr | 8601.00 | 495.00 | 513.44 | | 514.03 | 0.002866 | 7.47 | 2056.65 | 429.88 | 0.34 |
| NORTH FISH CREEK | 05 | 8600 | 100 yr | 9862.00 | 495.00 | 514.11 | | 514.69 | 0.002865 | 7.69 | 2355.34 | 471.25 | 0.34 |
| NORTH FISH CREEK | 05 | 8600 | 500 yr | 13485.00 | 495.00 | 515.76 | | 516.32 | 0.002712 | 7.98 | 3195.55 | 546.84 | 0.33 |
| NORTH FISH CREEK | 05 | 8600 | Ultimate 100 yr | 10203.00 | 495.00 | 514.28 | | 514.86 | 0.002848 | 7.72 | 2434.75 | 477.09 | 0.34 |
| NORTH FISH CREEK | 05 | 8218 | 2 yr | 2787.00 | 494.00 | 507.07 | | 507.44 | 0.002171 | 5.05 | 649.09 | 120.24 | 0.28 |
| NORTH FISH CREEK | 05 | 8218 | 5 yr | 4856.00 | 494.00 | 509.60 | | 510.19 | 0.002733 | 6.57 | 1043.62 | 256.55 | 0.32 |
| NORTH FISH CREEK | 05 | 8218 | 10 yr | 6183.00 | 494.00 | 510.77 | | 511.40 | 0.002791 | 7.04 | 1381.66 | 327.74 | 0.33 |
| NORTH FISH CREEK | 05 | 8218 | 25 yr | 7518.00 | 494.00 | 511.70 | | 512.35 | 0.002840 | 7.41 | 1714.41 | 383.62 | 0.34 |
| NORTH FISH CREEK | 05 | 8218 | 50 yr | 8601.00 | 494.00 | 512.37 | | 513.01 | 0.002809 | 7.59 | 1982.48 | 409.94 | 0.34 |
| NORTH FISH CREEK | 05 | 8218 | 100 yr | 9862.00 | 494.00 | 513.04 | | 513.69 | 0.002811 | 7.81 | 2267.40 | 435.14 | 0.34 |
| NORTH FISH CREEK | 05 | 8218 | 500 yr | 13485.00 | 494.00 | 514.68 | | 515.35 | 0.002868 | 8.42 | 3037.61 | 513.82 | 0.35 |
| NORTH FISH CREEK | 05 | 8218 | Ultimate 100 yr | 10203.00 | 494.00 | 513.21 | | 513.86 | 0.002808 | 7.86 | 2341.75 | 439.92 | 0.34 |
| NORTH FISH CREEK | 05 | 8043 | 2 yr | 2787.00 | 494.00 | 505.94 | | 506.83 | 0.006252 | 7.76 | 419.46 | 91.85 | 0.44 |
| NORTH FISH CREEK | 05 | 8043 | 5 yr | 4856.00 | 494.00 | 508.16 | | 509.42 | 0.007474 | 9.75 | 689.06 | 169.71 | 0.50 |
| NORTH FISH CREEK | 05 | 8043 | 10 yr | 6183.00 | 494.00 | 509.23 | | 510.61 | 0.007712 | 10.51 | 895.83 | 226.42 | 0.52 |
| NORTH FISH CREEK | 05 | 8043 | 25 yr | 7518.00 | 494.00 | 510.18 | | 511.55 | 0.007525 | 10.89 | 1125.89 | 264.45 | 0.52 |
| NORTH FISH CREEK | 05 | 8043 | 50 yr | 8601.00 | 494.00 | 510.88 | | 512.23 | 0.007299 | 11.09 | 1322.62 | 296.69 | 0.51 |
| NORTH FISH CREEK | 05 | 8043 | 100 yr | 9862.00 | 494.00 | 511.65 | | 512.93 | 0.006875 | 11.14 | 1561.03 | 322.94 | 0.50 |
| NORTH FISH CREEK | 05 | 8043 | 500 yr | 13485.00 | 494.00 | 513.39 | | 514.60 | 0.006352 | 11.51 | 2203.78 | 407.67 | 0.49 |
| NORTH FISH CREEK | 05 | 8043 | Ultimate 100 yr | 10203.00 | 494.00 | 511.84 | | 513.10 | 0.006783 | 11.15 | 1622.69 | 328.67 | 0.50 |
| NORTH FISH CREEK | 05 | 7687 | 2 yr | 2787.00 | 492.00 | 504.80 | | 505.16 | 0.002313 | 5.09 | 702.66 | 177.06 | 0.29 |
| NORTH FISH CREEK | 05 | 7687 | 5 yr | 4856.00 | 492.00 | 506.97 | | 507.45 | 0.002622 | 6.19 | 1109.78 | 196.70 | 0.32 |
| NORTH FISH CREEK | 05 | 7687 | 10 yr | 6183.00 | 492.00 | 508.02 | | 508.57 | 0.002824 | 6.79 | 1323.53 | 213.99 | 0.33 |
| NORTH FISH CREEK | 05 | 7687 | 25 yr | 7518.00 | 492.00 | 508.94 | | 509.55 | 0.002982 | 7.31 | 1531.79 | 235.14 | 0.35 |
| NORTH FISH CREEK | 05 | 7687 | 50 yr | 8601.00 | 492.00 | 509.63 | | 510.28 | 0.003069 | 7.66 | 1700.15 | 251.84 | 0.35 |
| NORTH FISH CREEK | 05 | 7687 | 100 yr | 9862.00 | 492.00 | 510.39 | | 511.09 | 0.003132 | 8.00 | 1899.77 | 273.89 | 0.36 |
| NORTH FISH CREEK | 05 | 7687 | 500 yr | 13485.00 | 492.00 | 512.03 | | 512.87 | 0.003507 | 9.06 | 2387.06 | 328.80 | 0.39 |
| NORTH FISH CREEK | 05 | 7687 | Ultimate 100 yr | 10203.00 | 492.00 | 510.57 | | 511.28 | 0.003156 | 8.09 | 1950.79 | 279.16 | 0.36 |
| NORTH FISH CREEK | 05 | 7462 | 2 yr | 2787.00 | 492.06 | 503.48 | | 504.37 | 0.006930 | 7.90 | 456.39 | 144.60 | 0.48 |
| NORTH FISH CREEK | 05 | 7462 | 5 yr | 4856.00 | 492.06 | 505.77 | | 506.69 | 0.006175 | 8.74 | 817.82 | 170.72 | 0.47 |
| NORTH FISH CREEK | 05 | 7462 | 10 yr | 6183.00 | 492.06 | 506.83 | | 507.79 | 0.006094 | 9.25 | 1005.84 | 181.76 | 0.47 |
| NORTH FISH CREEK | 05 | 7462 | 25 yr | 7518.00 | 492.06 | 507.74 | | 508.77 | 0.006132 | 9.74 | 1176.07 | 194.13 | 0.48 |
| NORTH FISH CREEK | 05 | 7462 | 50 yr | 8601.00 | 492.06 | 508.43 | | 509.50 | 0.006141 | 10.10 | 1312.91 | 204.34 | 0.49 |
| NORTH FISH CREEK | 05 | 7462 | 100 yr | 9862.00 | 492.06 | 509.13 | | 510.29 | 0.006330 | 10.61 | 1466.67 | 245.61 | 0.50 |
| NORTH FISH CREEK | 05 | 7462 | 500 yr | 13485.00 | 492.06 | 510.72 | | 512.02 | 0.006573 | 11.60 | 1927.67 | 320.73 | 0.52 |
| NORTH FISH CREEK | 05 | 7462 | Ultimate 100 yr | 10203.00 | 492.06 | 509.30 | | 510.48 | 0.006376 | 10.73 | 1510.08 | 260.69 | 0.50 |
| NORTH FISH CREEK | 05 | 7152 | 2 yr | 2787.00 | 491.00 | 502.39 | | 502.70 | 0.002618 | 4.99 | 844.33 | 246.80 | 0.30 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NORTH FISH CREEK | 05 | 7152 | 5 yr | 4856.00 | 491.00 | 504.95 | | 505.22 | 0.001906 | 5.08 | 1529.97 | 290.98 | 0.27 |
| NORTH FISH CREEK | 05 | 7152 | 10 yr | 6183.00 | 491.00 | 506.04 | | 506.33 | 0.001921 | 5.43 | 1877.02 | 328.52 | 0.28 |
| NORTH FISH CREEK | 05 | 7152 | 25 yr | 7518.00 | 491.00 | 506.99 | | 507.28 | 0.001895 | 5.67 | 2193.69 | 343.29 | 0.28 |
| NORTH FISH CREEK | 05 | 7152 | 50 yr | 8601.00 | 491.00 | 507.71 | | 508.01 | 0.001852 | 5.81 | 2443.15 | 350.84 | 0.28 |
| NORTH FISH CREEK | 05 | 7152 | 100 yr | 9862.00 | 491.00 | 508.43 | | 508.75 | 0.001852 | 6.01 | 2699.59 | 359.25 | 0.28 |
| NORTH FISH CREEK | 05 | 7152 | 500 yr | 13485.00 | 491.00 | 510.01 | | 510.40 | 0.002023 | 6.73 | 3293.83 | 395.65 | 0.30 |
| NORTH FISH CREEK | 05 | 7152 | Ultimate 100 yr | 10203.00 | 491.00 | 508.60 | | 508.93 | 0.001861 | 6.07 | 2762.16 | 361.45 | 0.28 |
| NORTH FISH CREEK | 05 | 6800 | 2 yr | 2787.00 | 489.00 | 501.62 | | 501.96 | 0.002032 | 5.18 | 758.25 | 150.71 | 0.28 |
| NORTH FISH CREEK | 05 | 6800 | 5 yr | 4856.00 | 489.00 | 504.05 | | 504.56 | 0.002504 | 6.60 | 1185.98 | 237.31 | 0.32 |
| NORTH FISH CREEK | 05 | 6800 | 10 yr | 6183.00 | 489.00 | 505.13 | | 505.67 | 0.002586 | 7.07 | 1449.81 | 251.33 | 0.33 |
| NORTH FISH CREEK | 05 | 6800 | 25 yr | 7518.00 | 489.00 | 506.04 | | 506.63 | 0.002731 | 7.57 | 1685.47 | 270.64 | 0.34 |
| NORTH FISH CREEK | 05 | 6800 | 50 yr | 8601.00 | 489.00 | 506.68 | | 507.34 | 0.002968 | 8.12 | 1866.17 | 304.88 | 0.36 |
| NORTH FISH CREEK | 05 | 6800 | 100 yr | 9862.00 | 489.00 | 507.35 | | 508.06 | 0.003133 | 8.58 | 2085.55 | 340.11 | 0.37 |
| NORTH FISH CREEK | 05 | 6800 | 500 yr | 13485.00 | 489.00 | 508.90 | | 509.68 | 0.003325 | 9.39 | 2634.83 | 365.00 | 0.39 |
| NORTH FISH CREEK | 05 | 6800 | Ultimate 100 yr | 10203.00 | 489.00 | 507.52 | | 508.24 | 0.003144 | 8.65 | 2144.70 | 344.58 | 0.38 |
| NORTH FISH CREEK | 05 | 6575 | 2 yr | 2787.00 | 488.48 | 500.89 | | 501.39 | 0.003431 | 6.03 | 588.69 | 132.68 | 0.33 |
| NORTH FISH CREEK | 05 | 6575 | 5 yr | 4856.00 | 488.48 | 503.20 | | 503.90 | 0.003993 | 7.47 | 960.00 | 200.18 | 0.37 |
| NORTH FISH CREEK | 05 | 6575 | 10 yr | 6183.00 | 488.48 | 504.24 | | 505.00 | 0.004174 | 8.06 | 1174.57 | 216.05 | 0.39 |
| NORTH FISH CREEK | 05 | 6575 | 25 yr | 7518.00 | 488.48 | 505.08 | | 505.92 | 0.004498 | 8.71 | 1364.14 | 239.96 | 0.41 |
| NORTH FISH CREEK | 05 | 6575 | 50 yr | 8601.00 | 488.48 | 505.67 | | 506.59 | 0.004747 | 9.19 | 1515.90 | 270.95 | 0.42 |
| NORTH FISH CREEK | 05 | 6575 | 100 yr | 9862.00 | 488.48 | 506.28 | | 507.28 | 0.005058 | 9.74 | 1694.36 | 333.32 | 0.44 |
| NORTH FISH CREEK | 05 | 6575 | 500 yr | 13485.00 | 488.48 | 507.81 | | 508.88 | 0.005251 | 10.57 | 2294.08 | 429.69 | 0.45 |
| NORTH FISH CREEK | 05 | 6575 | Ultimate 100 yr | 10203.00 | 488.48 | 506.44 | | 507.46 | 0.005112 | 9.86 | 1749.09 | 352.64 | 0.44 |
| NORTH FISH CREEK | 05 | 6270 | 2 yr | 2765.00 | 488.00 | 500.31 | | 500.56 | 0.001597 | 4.13 | 780.10 | 177.36 | 0.24 |
| NORTH FISH CREEK | 05 | 6270 | 5 yr | 4842.00 | 488.00 | 502.56 | | 502.92 | 0.001881 | 5.19 | 1244.06 | 249.31 | 0.27 |
| NORTH FISH CREEK | 05 | 6270 | 10 yr | 6217.00 | 488.00 | 503.52 | | 503.97 | 0.002154 | 5.87 | 1512.88 | 315.16 | 0.29 |
| NORTH FISH CREEK | 05 | 6270 | 25 yr | 7586.00 | 488.00 | 504.30 | | 504.81 | 0.002359 | 6.40 | 1771.76 | 356.35 | 0.31 |
| NORTH FISH CREEK | 05 | 6270 | 50 yr | 8701.00 | 488.00 | 504.86 | | 505.41 | 0.002495 | 6.77 | 1983.44 | 390.33 | 0.32 |
| NORTH FISH CREEK | 05 | 6270 | 100 yr | 9956.00 | 488.00 | 505.45 | | 506.03 | 0.002594 | 7.09 | 2218.03 | 414.80 | 0.33 |
| NORTH FISH CREEK | 05 | 6270 | 500 yr | 13656.00 | 488.00 | 506.93 | | 507.57 | 0.002768 | 7.83 | 2898.11 | 516.94 | 0.35 |
| NORTH FISH CREEK | 05 | 6270 | Ultimate 100 yr | 10294.00 | 488.00 | 505.60 | | 506.19 | 0.002613 | 7.17 | 2282.69 | 421.83 | 0.33 |
| NORTH FISH CREEK | 05 | 5803 | 2 yr | 2765.00 | 487.00 | 499.13 | | 499.57 | 0.002982 | 5.76 | 647.71 | 152.48 | 0.33 |
| NORTH FISH CREEK | 05 | 5803 | 5 yr | 4842.00 | 487.00 | 501.14 | | 501.76 | 0.003667 | 7.24 | 1114.36 | 304.37 | 0.37 |
| NORTH FISH CREEK | 05 | 5803 | 10 yr | 6217.00 | 487.00 | 502.01 | | 502.68 | 0.003925 | 7.85 | 1397.09 | 341.43 | 0.39 |
| NORTH FISH CREEK | 05 | 5803 | 25 yr | 7586.00 | 487.00 | 502.75 | | 503.44 | 0.004020 | 8.25 | 1655.65 | 356.06 | 0.40 |
| NORTH FISH CREEK | 05 | 5803 | 50 yr | 8701.00 | 487.00 | 503.29 | | 504.00 | 0.004076 | 8.54 | 1852.82 | 366.80 | 0.40 |
| NORTH FISH CREEK | 05 | 5803 | 100 yr | 9956.00 | 487.00 | 503.86 | | 504.58 | 0.004124 | 8.82 | 2063.98 | 378.09 | 0.41 |
| NORTH FISH CREEK | 05 | 5803 | 500 yr | 13656.00 | 487.00 | 505.30 | | 506.07 | 0.004208 | 9.49 | 2626.05 | 398.58 | 0.42 |
| NORTH FISH CREEK | 05 | 5803 | Ultimate 100 yr | 10294.00 | 487.00 | 504.02 | | 504.74 | 0.004108 | 8.87 | 2124.64 | 381.17 | 0.41 |
| NORTH FISH CREEK | 05 | 5463 | 2 yr | 2765.00 | 486.00 | 498.21 | | 498.58 | 0.002815 | 5.46 | 761.41 | 227.43 | 0.31 |
| NORTH FISH CREEK | 05 | 5463 | 5 yr | 4842.00 | 486.00 | 500.08 | | 500.56 | 0.003285 | 6.65 | 1287.07 | 357.96 | 0.35 |
| NORTH FISH CREEK | 05 | 5463 | 10 yr | 6217.00 | 486.00 | 500.90 | | 501.41 | 0.003468 | 7.16 | 1592.11 | 391.02 | 0.36 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NORTH FISH CREEK | 05 | 5463 | 25 yr | 7586.00 | 486.00 | 501.63 | | 502.15 | 0.003500 | 7.48 | 1887.01 | 411.76 | 0.37 |
| NORTH FISH CREEK | 05 | 5463 | 50 yr | 8701.00 | 486.00 | 502.18 | | 502.70 | 0.003507 | 7.69 | 2115.39 | 426.24 | 0.37 |
| NORTH FISH CREEK | 05 | 5463 | 100 yr | 9956.00 | 486.00 | 502.75 | | 503.28 | 0.003478 | 7.88 | 2364.53 | 438.11 | 0.37 |
| NORTH FISH CREEK | 05 | 5463 | 500 yr | 13656.00 | 486.00 | 504.17 | | 504.75 | 0.003583 | 8.53 | 3008.47 | 476.52 | 0.38 |
| NORTH FISH CREEK | 05 | 5463 | Ultimate 100 yr | 10294.00 | 486.00 | 502.93 | | 503.45 | 0.003429 | 7.89 | 2441.27 | 441.65 | 0.37 |
| NORTH FISH CREEK | 05 | 5252 | 2 yr | 2808.00 | 487.00 | 496.97 | | 497.74 | 0.006299 | 7.42 | 504.46 | 175.94 | 0.46 |
| NORTH FISH CREEK | 05 | 5252 | 5 yr | 4955.00 | 487.00 | 499.02 | | 499.70 | 0.005367 | 7.95 | 1110.28 | 358.32 | 0.44 |
| NORTH FISH CREEK | 05 | 5252 | 10 yr | 6384.00 | 487.00 | 499.96 | | 500.58 | 0.004798 | 7.98 | 1454.70 | 367.98 | 0.42 |
| NORTH FISH CREEK | 05 | 5252 | 25 yr | 7796.00 | 487.00 | 500.76 | | 501.35 | 0.004507 | 8.09 | 1750.64 | 376.69 | 0.41 |
| NORTH FISH CREEK | 05 | 5252 | 50 yr | 8952.00 | 487.00 | 501.32 | | 501.91 | 0.004397 | 8.24 | 1965.10 | 382.53 | 0.41 |
| NORTH FISH CREEK | 05 | 5252 | 100 yr | 10247.00 | 487.00 | 501.91 | | 502.50 | 0.004305 | 8.41 | 2192.38 | 388.98 | 0.41 |
| NORTH FISH CREEK | 05 | 5252 | 500 yr | 14105.00 | 487.00 | 503.26 | | 503.93 | 0.004603 | 9.28 | 2732.94 | 424.53 | 0.43 |
| NORTH FISH CREEK | 05 | 5252 | Ultimate 100 yr | 10647.00 | 487.00 | 502.08 | | 502.68 | 0.004306 | 8.48 | 2258.84 | 392.49 | 0.41 |
| NORTH FISH CREEK | 05 | 5060 | 2 yr | 2808.00 | 485.00 | 496.57 | 491.98 | 496.92 | 0.000844 | 4.88 | 658.18 | 164.88 | 0.30 |
| NORTH FISH CREEK | 05 | 5060 | 5 yr | 4955.00 | 485.00 | 498.57 | 493.99 | 499.03 | 0.000936 | 5.95 | 1191.91 | 380.34 | 0.33 |
| NORTH FISH CREEK | 05 | 5060 | 10 yr | 6384.00 | 485.00 | 499.55 | 495.32 | 499.98 | 0.000859 | 6.06 | 1586.29 | 415.25 | 0.32 |
| NORTH FISH CREEK | 05 | 5060 | 25 yr | 7796.00 | 485.00 | 500.38 | 496.60 | 500.78 | 0.000803 | 6.15 | 1935.98 | 434.71 | 0.31 |
| NORTH FISH CREEK | 05 | 5060 | 50 yr | 8952.00 | 485.00 | 500.95 | 497.59 | 501.36 | 0.000783 | 6.26 | 2191.17 | 450.95 | 0.31 |
| NORTH FISH CREEK | 05 | 5060 | 100 yr | 10247.00 | 485.00 | 501.56 | 498.78 | 501.96 | 0.000758 | 6.36 | 2467.96 | 464.28 | 0.31 |
| NORTH FISH CREEK | 05 | 5060 | 500 yr | 14105.00 | 485.00 | 502.90 | 499.75 | 503.34 | 0.000783 | 6.89 | 3108.38 | 492.89 | 0.32 |
| NORTH FISH CREEK | 05 | 5060 | Ultimate 100 yr | 10647.00 | 485.00 | 501.73 | 498.90 | 502.13 | 0.000752 | 6.39 | 2548.99 | 467.76 | 0.31 |
| NORTH FISH CREEK | 05 | 4985 | | Bridge | | | | | | | | | |
| NORTH FISH CREEK | 05 | 4832 | 2 yr | 2808.00 | 484.59 | 496.00 | | 496.48 | 0.003203 | 5.77 | 591.40 | 167.57 | 0.34 |
| NORTH FISH CREEK | 05 | 4832 | 5 yr | 4955.00 | 484.59 | 497.73 | | 498.45 | 0.004288 | 7.51 | 1003.91 | 283.29 | 0.41 |
| NORTH FISH CREEK | 05 | 4832 | 10 yr | 6384.00 | 484.59 | 498.53 | | 499.36 | 0.004793 | 8.33 | 1241.61 | 313.37 | 0.43 |
| NORTH FISH CREEK | 05 | 4832 | 25 yr | 7796.00 | 484.59 | 499.22 | | 500.13 | 0.005136 | 8.97 | 1468.86 | 345.48 | 0.45 |
| NORTH FISH CREEK | 05 | 4832 | 50 yr | 8952.00 | 484.59 | 499.72 | | 500.68 | 0.005357 | 9.41 | 1647.57 | 369.94 | 0.47 |
| NORTH FISH CREEK | 05 | 4832 | 100 yr | 10247.00 | 484.59 | 500.22 | | 501.26 | 0.005633 | 9.91 | 1843.55 | 410.07 | 0.48 |
| NORTH FISH CREEK | 05 | 4832 | 500 yr | 14105.00 | 484.59 | 501.46 | | 502.58 | 0.006011 | 10.87 | 2386.03 | 454.48 | 0.51 |
| NORTH FISH CREEK | 05 | 4832 | Ultimate 100 yr | 10647.00 | 484.59 | 500.37 | | 501.42 | 0.005727 | 10.07 | 1903.57 | 425.13 | 0.49 |
| NORTH FISH CREEK | 05 | 4462 | 2 yr | 2802.00 | 482.00 | 494.74 | 489.70 | 495.29 | 0.003272 | 6.11 | 544.16 | 260.07 | 0.34 |
| NORTH FISH CREEK | 05 | 4462 | 5 yr | 4941.00 | 482.00 | 496.37 | 492.44 | 497.03 | 0.003942 | 7.42 | 1162.08 | 379.24 | 0.38 |
| NORTH FISH CREEK | 05 | 4462 | 10 yr | 6372.00 | 482.00 | 497.13 | 494.00 | 497.83 | 0.004203 | 8.00 | 1460.29 | 406.51 | 0.40 |
| NORTH FISH CREEK | 05 | 4462 | 25 yr | 7786.00 | 482.00 | 497.84 | 496.40 | 498.54 | 0.004270 | 8.36 | 1755.99 | 437.26 | 0.41 |
| NORTH FISH CREEK | 05 | 4462 | 50 yr | 8940.00 | 482.00 | 498.27 | 496.82 | 499.04 | 0.004641 | 8.91 | 1953.12 | 481.69 | 0.43 |
| NORTH FISH CREEK | 05 | 4462 | 100 yr | 10239.00 | 482.00 | 498.72 | 497.20 | 499.54 | 0.004983 | 9.43 | 2179.02 | 527.67 | 0.44 |
| NORTH FISH CREEK | 05 | 4462 | 500 yr | 14104.00 | 482.00 | 500.05 | 497.82 | 500.85 | 0.004860 | 9.90 | 2933.19 | 594.99 | 0.45 |
| NORTH FISH CREEK | 05 | 4462 | Ultimate 100 yr | 10630.00 | 482.00 | 498.85 | 497.32 | 499.69 | 0.005060 | 9.56 | 2249.01 | 541.12 | 0.45 |
| NORTH FISH CREEK | 05 | 4317 | 2 yr | 2802.00 | 482.00 | 494.51 | 489.37 | 494.85 | 0.002175 | 5.04 | 714.98 | 240.47 | 0.29 |
| NORTH FISH CREEK | 05 | 4317 | 5 yr | 4941.00 | 482.00 | 496.01 | 491.85 | 496.55 | 0.003179 | 6.70 | 1185.29 | 329.87 | 0.35 |
| NORTH FISH CREEK | 05 | 4317 | 10 yr | 6372.00 | 482.00 | 496.70 | 493.47 | 497.35 | 0.003737 | 7.56 | 1399.96 | 369.29 | 0.39 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NORTH FISH CREEK | 05 | 4317 | 25 yr | 7786.00 | 482.00 | 497.27 | 494.46 | 498.04 | 0.004359 | 8.43 | 1657.35 | 414.76 | 0.42 |
| NORTH FISH CREEK | 05 | 4317 | 50 yr | 8940.00 | 482.00 | 497.70 | 495.13 | 498.51 | 0.004598 | 8.85 | 1837.97 | 430.92 | 0.44 |
| NORTH FISH CREEK | 05 | 4317 | 100 yr | 10239.00 | 482.00 | 498.14 | 495.13 | 499.00 | 0.004805 | 9.26 | 2035.33 | 447.95 | 0.45 |
| NORTH FISH CREEK | 05 | 4317 | 500 yr | 14104.00 | 482.00 | 499.36 | 497.73 | 500.31 | 0.005227 | 10.23 | 2615.38 | 515.66 | 0.47 |
| NORTH FISH CREEK | 05 | 4317 | Ultimate 100 yr | 10630.00 | 482.00 | 498.27 | 495.13 | 499.14 | 0.004860 | 9.37 | 2093.25 | 452.55 | 0.45 |
| NORTH FISH CREEK | 05 | 4008 | 2 yr | 2802.00 | 483.00 | 493.97 | 490.31 | 494.19 | 0.002223 | 4.51 | 1068.10 | 360.20 | 0.28 |
| NORTH FISH CREEK | 05 | 4008 | 5 yr | 4941.00 | 483.00 | 495.44 | 493.26 | 495.70 | 0.002530 | 5.37 | 1641.18 | 418.58 | 0.31 |
| NORTH FISH CREEK | 05 | 4008 | 10 yr | 6372.00 | 483.00 | 496.06 | 493.80 | 496.37 | 0.002886 | 5.98 | 1907.90 | 438.32 | 0.33 |
| NORTH FISH CREEK | 05 | 4008 | 25 yr | 7786.00 | 483.00 | 496.58 | 494.17 | 496.94 | 0.003160 | 6.47 | 2139.16 | 455.46 | 0.35 |
| NORTH FISH CREEK | 05 | 4008 | 50 yr | 8940.00 | 483.00 | 496.97 | 494.53 | 497.36 | 0.003353 | 6.82 | 2314.12 | 474.49 | 0.36 |
| NORTH FISH CREEK | 05 | 4008 | 100 yr | 10239.00 | 483.00 | 497.38 | 494.94 | 497.81 | 0.003559 | 7.20 | 2499.00 | 487.99 | 0.37 |
| NORTH FISH CREEK | 05 | 4008 | 500 yr | 14104.00 | 483.00 | 498.52 | 495.77 | 499.04 | 0.003952 | 8.08 | 3025.27 | 531.61 | 0.40 |
| NORTH FISH CREEK | 05 | 4008 | Ultimate 100 yr | 10630.00 | 483.00 | 497.50 | 495.00 | 497.93 | 0.003619 | 7.31 | 2552.34 | 494.85 | 0.38 |
| NORTH FISH CREEK | 05 | 3492 | 2 yr | 2802.00 | 481.98 | 492.81 | | 493.16 | 0.002926 | 5.52 | 858.74 | 334.73 | 0.32 |
| NORTH FISH CREEK | 05 | 3492 | 5 yr | 4941.00 | 481.98 | 494.17 | | 494.62 | 0.003770 | 6.86 | 1502.71 | 532.18 | 0.37 |
| NORTH FISH CREEK | 05 | 3492 | 10 yr | 6372.00 | 481.98 | 494.84 | | 495.27 | 0.003803 | 7.18 | 1864.94 | 552.31 | 0.38 |
| NORTH FISH CREEK | 05 | 3492 | 25 yr | 7786.00 | 481.98 | 495.41 | | 495.84 | 0.003828 | 7.44 | 2182.17 | 563.62 | 0.38 |
| NORTH FISH CREEK | 05 | 3492 | 50 yr | 8940.00 | 481.98 | 495.84 | | 496.27 | 0.003817 | 7.61 | 2426.74 | 570.26 | 0.38 |
| NORTH FISH CREEK | 05 | 3492 | 100 yr | 10239.00 | 481.98 | 496.29 | | 496.72 | 0.003791 | 7.76 | 2686.12 | 574.12 | 0.38 |
| NORTH FISH CREEK | 05 | 3492 | 500 yr | 14104.00 | 481.98 | 497.47 | | 497.94 | 0.003916 | 8.37 | 3382.46 | 611.79 | 0.39 |
| NORTH FISH CREEK | 05 | 3492 | Ultimate 100 yr | 10630.00 | 481.98 | 496.42 | | 496.85 | 0.003793 | 7.82 | 2758.78 | 575.15 | 0.38 |
| NORTH FISH CREEK | 05 | 3262 | 2 yr | 2802.00 | 481.00 | 492.18 | | 492.58 | 0.002768 | 5.73 | 884.48 | 391.12 | 0.32 |
| NORTH FISH CREEK | 05 | 3262 | 5 yr | 4941.00 | 481.00 | 493.46 | | 493.94 | 0.003488 | 6.99 | 1451.42 | 483.38 | 0.37 |
| NORTH FISH CREEK | 05 | 3262 | 10 yr | 6372.00 | 481.00 | 494.11 | | 494.60 | 0.003679 | 7.46 | 1771.90 | 496.45 | 0.38 |
| NORTH FISH CREEK | 05 | 3262 | 25 yr | 7786.00 | 481.00 | 494.66 | | 495.17 | 0.003857 | 7.87 | 2046.72 | 505.75 | 0.40 |
| NORTH FISH CREEK | 05 | 3262 | 50 yr | 8940.00 | 481.00 | 495.06 | | 495.60 | 0.004021 | 8.22 | 2255.11 | 520.28 | 0.41 |
| NORTH FISH CREEK | 05 | 3262 | 100 yr | 10239.00 | 481.00 | 495.52 | | 496.07 | 0.004060 | 8.45 | 2495.27 | 528.82 | 0.41 |
| NORTH FISH CREEK | 05 | 3262 | 500 yr | 14104.00 | 481.00 | 496.70 | | 497.28 | 0.004189 | 9.10 | 3132.97 | 549.81 | 0.42 |
| NORTH FISH CREEK | 05 | 3262 | Ultimate 100 yr | 10630.00 | 481.00 | 495.65 | | 496.20 | 0.004093 | 8.54 | 2560.42 | 531.59 | 0.41 |
| NORTH FISH CREEK | 05 | 3021 | 2 yr | 2802.00 | 479.80 | 491.34 | | 491.79 | 0.004104 | 5.99 | 807.68 | 430.48 | 0.38 |
| NORTH FISH CREEK | 05 | 3021 | 5 yr | 4941.00 | 479.80 | 492.41 | | 492.95 | 0.005089 | 7.26 | 1289.31 | 464.82 | 0.43 |
| NORTH FISH CREEK | 05 | 3021 | 10 yr | 6372.00 | 479.80 | 492.97 | | 493.55 | 0.005508 | 7.87 | 1553.56 | 480.74 | 0.45 |
| NORTH FISH CREEK | 05 | 3021 | 25 yr | 7786.00 | 479.80 | 493.44 | | 494.06 | 0.005859 | 8.38 | 1780.99 | 489.07 | 0.47 |
| NORTH FISH CREEK | 05 | 3021 | 50 yr | 8940.00 | 479.80 | 493.80 | | 494.44 | 0.006069 | 8.73 | 1957.04 | 495.91 | 0.48 |
| NORTH FISH CREEK | 05 | 3021 | 100 yr | 10239.00 | 479.80 | 494.27 | | 494.92 | 0.005928 | 8.89 | 2196.30 | 509.43 | 0.48 |
| NORTH FISH CREEK | 05 | 3021 | 500 yr | 14104.00 | 479.80 | 495.49 | | 496.14 | 0.005629 | 9.30 | 2826.75 | 527.32 | 0.47 |
| NORTH FISH CREEK | 05 | 3021 | Ultimate 100 yr | 10630.00 | 479.80 | 494.39 | | 495.04 | 0.005955 | 8.97 | 2254.86 | 511.25 | 0.48 |
| NORTH FISH CREEK | 05 | 2733 | 2 yr | 2802.00 | 478.40 | 490.74 | 486.77 | 490.94 | 0.001905 | 4.24 | 1233.94 | 553.07 | 0.26 |
| NORTH FISH CREEK | 05 | 2733 | 5 yr | 4941.00 | 478.40 | 491.67 | 489.67 | 491.95 | 0.002699 | 5.42 | 1759.38 | 576.22 | 0.32 |
| NORTH FISH CREEK | 05 | 2733 | 10 yr | 6372.00 | 478.40 | 492.18 | 490.73 | 492.49 | 0.003054 | 5.97 | 2053.82 | 584.62 | 0.34 |
| NORTH FISH CREEK | 05 | 2733 | 25 yr | 7786.00 | 478.40 | 492.60 | 491.10 | 492.95 | 0.003379 | 6.47 | 2300.43 | 588.09 | 0.36 |
| NORTH FISH CREEK | 05 | 2733 | 50 yr | 8940.00 | 478.40 | 492.93 | 491.36 | 493.31 | 0.003566 | 6.79 | 2497.74 | 591.49 | 0.37 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NORTH FISH CREEK | 05 | 2733 | 100 yr | 10239.00 | 478.40 | 493.48 | 491.62 | 493.84 | 0.003330 | 6.79 | 2821.95 | 595.79 | 0.36 |
| NORTH FISH CREEK | 05 | 2733 | 500 yr | 14104.00 | 478.40 | 494.79 | 492.28 | 495.16 | 0.003109 | 7.07 | 3608.89 | 634.97 | 0.36 |
| NORTH FISH CREEK | 05 | 2733 | Ultimate 100 yr | 10630.00 | 478.40 | 493.59 | 491.70 | 493.96 | 0.003354 | 6.86 | 2890.25 | 596.65 | 0.36 |
| NORTH FISH CREEK | 05 | 2575 | 2 yr | 2802.00 | 477.70 | 488.43 | 488.31 | 490.26 | 0.023764 | 11.41 | 301.21 | 94.11 | 0.83 |
| NORTH FISH CREEK | 05 | 2575 | 5 yr | 4941.00 | 477.70 | 490.41 | 490.41 | 491.28 | 0.011520 | 9.64 | 1044.41 | 483.69 | 0.61 |
| NORTH FISH CREEK | 05 | 2575 | 10 yr | 6372.00 | 477.70 | 490.78 | 490.78 | 491.75 | 0.013087 | 10.60 | 1224.29 | 488.83 | 0.65 |
| NORTH FISH CREEK | 05 | 2575 | 25 yr | 7786.00 | 477.70 | 491.35 | 491.08 | 492.20 | 0.011454 | 10.37 | 1508.97 | 513.30 | 0.62 |
| NORTH FISH CREEK | 05 | 2575 | 50 yr | 8940.00 | 477.70 | 491.70 | 491.32 | 492.54 | 0.011243 | 10.55 | 1685.44 | 532.69 | 0.62 |
| NORTH FISH CREEK | 05 | 2575 | 100 yr | 10239.00 | 477.70 | 492.63 | 491.56 | 493.21 | 0.007570 | 9.23 | 2205.89 | 564.44 | 0.51 |
| NORTH FISH CREEK | 05 | 2575 | 500 yr | 14104.00 | 477.70 | 494.17 | 492.29 | 494.64 | 0.005451 | 8.61 | 3098.54 | 594.38 | 0.45 |
| NORTH FISH CREEK | 05 | 2575 | Ultimate 100 yr | 10630.00 | 477.70 | 492.75 | 491.64 | 493.34 | 0.007474 | 9.25 | 2276.23 | 567.01 | 0.51 |
| NORTH FISH CREEK | 05 | 2527 | 2 yr | 2802.00 | 481.80 | 487.11 | 487.11 | 488.87 | 0.035024 | 10.65 | 263.11 | 74.39 | 1.00 |
| NORTH FISH CREEK | 05 | 2527 | 5 yr | 4941.00 | 481.80 | 489.57 | 489.57 | 490.57 | 0.012210 | 8.87 | 887.21 | 471.68 | 0.64 |
| NORTH FISH CREEK | 05 | 2527 | 10 yr | 6372.00 | 481.80 | 490.07 | 490.07 | 491.11 | 0.012549 | 9.49 | 1133.62 | 509.13 | 0.66 |
| NORTH FISH CREEK | 05 | 2527 | 25 yr | 7786.00 | 481.80 | 490.41 | 490.41 | 491.55 | 0.013530 | 10.20 | 1312.19 | 519.36 | 0.69 |
| NORTH FISH CREEK | 05 | 2527 | 50 yr | 8940.00 | 481.80 | 490.67 | 490.67 | 491.88 | 0.014218 | 10.72 | 1445.00 | 525.74 | 0.71 |
| NORTH FISH CREEK | 05 | 2527 | 100 yr | 10239.00 | 481.80 | 492.36 | 490.93 | 492.86 | 0.005225 | 7.50 | 2369.97 | 566.27 | 0.45 |
| NORTH FISH CREEK | 05 | 2527 | 500 yr | 14104.00 | 481.80 | 493.96 | 491.61 | 494.39 | 0.003922 | 7.27 | 3302.38 | 599.72 | 0.40 |
| NORTH FISH CREEK | 05 | 2527 | Ultimate 100 yr | 10630.00 | 481.80 | 492.49 | 491.01 | 492.99 | 0.005208 | 7.56 | 2439.38 | 569.44 | 0.45 |
| NORTH FISH CREEK | 05 | 2489 | 2 yr | 2802.00 | 480.06 | 484.92 | 484.92 | 486.79 | 0.003880 | 10.97 | 255.37 | 212.53 | 1.00 |
| NORTH FISH CREEK | 05 | 2489 | 5 yr | 4941.00 | 480.06 | 488.03 | 486.78 | 488.50 | 0.000752 | 6.65 | 1759.39 | 420.75 | 0.48 |
| NORTH FISH CREEK | 05 | 2489 | 10 yr | 6372.00 | 480.06 | 489.43 | 487.72 | 489.91 | 0.000601 | 6.83 | 2415.15 | 491.27 | 0.44 |
| NORTH FISH CREEK | 05 | 2489 | 25 yr | 7786.00 | 480.06 | 489.59 | 488.00 | 490.26 | 0.000827 | 8.12 | 2494.48 | 497.20 | 0.52 |
| NORTH FISH CREEK | 05 | 2489 | 50 yr | 8940.00 | 480.06 | 490.63 | 488.01 | 491.25 | 0.000663 | 7.92 | 3032.72 | 531.96 | 0.47 |
| NORTH FISH CREEK | 05 | 2489 | 100 yr | 10239.00 | 480.06 | 492.25 | 488.01 | 492.75 | 0.000441 | 7.24 | 3924.73 | 570.12 | 0.40 |
| NORTH FISH CREEK | 05 | 2489 | 500 yr | 14104.00 | 480.06 | 493.62 | 488.09 | 494.28 | 0.000511 | 8.48 | 4728.11 | 602.21 | 0.44 |
| NORTH FISH CREEK | 05 | 2489 | Ultimate 100 yr | 10630.00 | 480.06 | 492.35 | 488.38 | 492.87 | 0.000457 | 7.42 | 3982.78 | 572.34 | 0.41 |
| NORTH FISH CREEK | 05 | 2457 | 2 yr | 2802.00 | 479.00 | 483.91 | 483.91 | 485.77 | 0.003919 | 10.96 | 255.63 | 196.63 | 1.00 |
| NORTH FISH CREEK | 05 | 2457 | 5 yr | 4941.00 | 479.00 | 485.73 | 485.73 | 488.25 | 0.003557 | 12.75 | 387.44 | 322.53 | 1.00 |
| NORTH FISH CREEK | 05 | 2457 | 10 yr | 6372.00 | 479.00 | 486.75 | 486.75 | 489.63 | 0.003423 | 13.63 | 467.67 | 360.71 | 1.00 |
| NORTH FISH CREEK | 05 | 2457 | 25 yr | 7786.00 | 479.00 | 489.62 | 487.67 | 490.21 | 0.000641 | 7.45 | 2616.61 | 499.64 | 0.46 |
| NORTH FISH CREEK | 05 | 2457 | 50 yr | 8940.00 | 479.00 | 490.66 | 488.29 | 491.22 | 0.000529 | 7.33 | 3152.01 | 529.95 | 0.42 |
| NORTH FISH CREEK | 05 | 2457 | 100 yr | 10239.00 | 479.00 | 492.26 | 489.00 | 492.72 | 0.000368 | 6.80 | 4036.75 | 569.19 | 0.36 |
| NORTH FISH CREEK | 05 | 2457 | 500 yr | 14104.00 | 479.00 | 493.64 | 489.01 | 494.25 | 0.000434 | 8.00 | 4837.85 | 597.97 | 0.40 |
| NORTH FISH CREEK | 05 | 2457 | Ultimate 100 yr | 10630.00 | 479.00 | 492.37 | 489.00 | 492.85 | 0.000382 | 6.97 | 4094.98 | 571.06 | 0.37 |
| NORTH FISH CREEK | 05 | 2439 | 2 yr | 2802.00 | 477.00 | 482.48 | 482.48 | 484.48 | 0.002151 | 11.33 | 247.26 | 104.46 | 1.00 |
| NORTH FISH CREEK | 05 | 2439 | 5 yr | 4941.00 | 477.00 | 484.41 | 484.41 | 487.14 | 0.001977 | 13.25 | 372.98 | 160.55 | 1.00 |
| NORTH FISH CREEK | 05 | 2439 | 10 yr | 6372.00 | 477.00 | 485.52 | 485.52 | 488.62 | 0.001894 | 14.12 | 451.12 | 245.35 | 1.00 |
| NORTH FISH CREEK | 05 | 2439 | 25 yr | 7786.00 | 477.00 | 486.84 | 486.50 | 489.95 | 0.001621 | 14.15 | 550.38 | 346.53 | 0.94 |
| NORTH FISH CREEK | 05 | 2439 | 50 yr | 8940.00 | 477.00 | 487.74 | 487.28 | 490.94 | 0.001536 | 14.35 | 622.85 | 378.25 | 0.92 |
| NORTH FISH CREEK | 05 | 2439 | 100 yr | 10239.00 | 477.00 | 491.98 | 488.09 | 492.69 | 0.000256 | 7.77 | 3649.87 | 555.64 | 0.40 |
| NORTH FISH CREEK | 05 | 2439 | 500 yr | 14104.00 | 477.00 | 493.22 | 489.26 | 494.20 | 0.000321 | 9.32 | 4352.28 | 583.08 | 0.46 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NORTH FISH CREEK | 05 | 2439 | Ultimate 100 yr | 10630.00 | 477.00 | 492.07 | 488.31 | 492.81 | 0.000268 | 7.99 | 3696.96 | 556.75 | 0.41 |
| NORTH FISH CREEK | 05 | 2210 | 2 yr | 2754.00 | 475.20 | 481.94 | 480.91 | 483.41 | 0.001201 | 9.73 | 283.12 | 95.45 | 0.76 |
| NORTH FISH CREEK | 05 | 2210 | 5 yr | 4903.00 | 475.20 | 484.15 | 483.21 | 486.31 | 0.001324 | 11.79 | 415.89 | 115.82 | 0.82 |
| NORTH FISH CREEK | 05 | 2210 | 10 yr | 6364.00 | 475.20 | 485.58 | 484.49 | 487.96 | 0.001263 | 12.39 | 513.76 | 129.83 | 0.82 |
| NORTH FISH CREEK | 05 | 2210 | 25 yr | 7788.00 | 475.20 | 486.98 | 485.57 | 489.43 | 0.001147 | 12.57 | 619.34 | 153.68 | 0.79 |
| NORTH FISH CREEK | 05 | 2210 | 50 yr | 8961.00 | 475.20 | 487.83 | 486.41 | 490.46 | 0.001130 | 13.02 | 689.15 | 169.95 | 0.79 |
| NORTH FISH CREEK | 05 | 2210 | 100 yr | 10232.00 | 475.20 | 491.53 | 487.23 | 492.59 | 0.000323 | 8.86 | 2311.93 | 488.94 | 0.45 |
| NORTH FISH CREEK | 05 | 2210 | 500 yr | 14070.00 | 475.20 | 492.65 | 489.39 | 494.08 | 0.000409 | 10.58 | 2883.80 | 547.26 | 0.52 |
| NORTH FISH CREEK | 05 | 2210 | Ultimate 100 yr | 10622.00 | 475.20 | 491.59 | 487.47 | 492.71 | 0.000342 | 9.14 | 2337.44 | 490.95 | 0.46 |
| NORTH FISH CREEK | 05 | 2054 | 2 yr | 2754.00 | 474.00 | 482.61 | 478.58 | 482.97 | 0.000210 | 4.83 | 570.28 | 88.55 | 0.34 |
| NORTH FISH CREEK | 05 | 2054 | 5 yr | 4903.00 | 474.00 | 485.14 | 480.40 | 485.72 | 0.000227 | 6.09 | 811.08 | 120.31 | 0.37 |
| NORTH FISH CREEK | 05 | 2054 | 10 yr | 6364.00 | 474.00 | 486.64 | 481.42 | 487.34 | 0.000222 | 6.72 | 971.34 | 166.37 | 0.37 |
| NORTH FISH CREEK | 05 | 2054 | 25 yr | 7788.00 | 474.00 | 488.03 | 482.36 | 488.83 | 0.000215 | 7.20 | 1143.90 | 288.58 | 0.37 |
| NORTH FISH CREEK | 05 | 2054 | 50 yr | 8961.00 | 474.00 | 488.94 | 483.05 | 489.83 | 0.000219 | 7.64 | 1281.27 | 350.55 | 0.38 |
| NORTH FISH CREEK | 05 | 2054 | 100 yr | 10232.00 | 474.00 | 491.74 | 483.73 | 492.45 | 0.000137 | 6.92 | 1774.61 | 657.49 | 0.31 |
| NORTH FISH CREEK | 05 | 2054 | 500 yr | 14070.00 | 474.00 | 492.91 | 485.46 | 493.88 | 0.000181 | 8.35 | 2629.33 | 724.09 | 0.36 |
| NORTH FISH CREEK | 05 | 2054 | Ultimate 100 yr | 10622.00 | 474.00 | 491.80 | 483.91 | 492.56 | 0.000145 | 7.15 | 1786.45 | 661.93 | 0.32 |
| NORTH FISH CREEK | 05 | 1988 | Bridge | | | | | | | | | | |
| NORTH FISH CREEK | 05 | 1887 | 2 yr | 2754.00 | 473.00 | 482.33 | 478.60 | 482.72 | 0.000241 | 5.05 | 545.23 | 89.00 | 0.36 |
| NORTH FISH CREEK | 05 | 1887 | 5 yr | 4903.00 | 473.00 | 484.69 | 480.46 | 485.32 | 0.000291 | 6.36 | 770.94 | 102.20 | 0.41 |
| NORTH FISH CREEK | 05 | 1887 | 10 yr | 6364.00 | 473.00 | 486.11 | 481.51 | 486.86 | 0.000280 | 6.93 | 922.94 | 145.58 | 0.41 |
| NORTH FISH CREEK | 05 | 1887 | 25 yr | 7788.00 | 473.00 | 487.45 | 482.41 | 488.28 | 0.000261 | 7.35 | 1085.98 | 431.53 | 0.41 |
| NORTH FISH CREEK | 05 | 1887 | 50 yr | 8961.00 | 473.00 | 488.29 | 483.10 | 489.22 | 0.000263 | 7.78 | 1217.06 | 648.70 | 0.41 |
| NORTH FISH CREEK | 05 | 1887 | 100 yr | 10232.00 | 473.00 | 489.61 | 483.80 | 490.26 | 0.000179 | 6.92 | 2640.88 | 691.36 | 0.35 |
| NORTH FISH CREEK | 05 | 1887 | 500 yr | 14070.00 | 473.00 | 491.90 | 485.58 | 492.43 | 0.000137 | 6.78 | 4402.21 | 821.02 | 0.31 |
| NORTH FISH CREEK | 05 | 1887 | Ultimate 100 yr | 10622.00 | 473.00 | 489.70 | 484.00 | 490.37 | 0.000186 | 7.09 | 2698.85 | 693.12 | 0.35 |
| NORTH FISH CREEK | 05 | 1270 | 2 yr | 2780.00 | 471.89 | 481.99 | 478.72 | 482.57 | 0.000349 | 6.10 | 455.67 | 72.38 | 0.43 |
| NORTH FISH CREEK | 05 | 1270 | 5 yr | 4954.00 | 471.89 | 484.10 | 480.79 | 485.08 | 0.000500 | 7.95 | 623.39 | 87.32 | 0.52 |
| NORTH FISH CREEK | 05 | 1270 | 10 yr | 6426.00 | 471.89 | 485.48 | 481.94 | 486.61 | 0.000517 | 8.54 | 760.60 | 137.67 | 0.54 |
| NORTH FISH CREEK | 05 | 1270 | 25 yr | 7873.00 | 471.89 | 486.99 | 483.03 | 488.09 | 0.000407 | 8.53 | 1450.03 | 752.64 | 0.49 |
| NORTH FISH CREEK | 05 | 1270 | 50 yr | 9018.00 | 471.89 | 488.19 | 483.81 | 489.11 | 0.000311 | 8.09 | 2403.96 | 829.72 | 0.44 |
| NORTH FISH CREEK | 05 | 1270 | 100 yr | 10227.00 | 471.89 | 489.38 | 484.59 | 490.15 | 0.000241 | 7.66 | 3419.54 | 898.92 | 0.40 |
| NORTH FISH CREEK | 05 | 1270 | 500 yr | 14180.00 | 471.89 | 491.61 | 487.76 | 492.32 | 0.000200 | 7.83 | 5581.19 | 1014.86 | 0.37 |
| NORTH FISH CREEK | 05 | 1270 | Ultimate 100 yr | 10605.00 | 471.89 | 489.44 | 484.85 | 490.26 | 0.000253 | 7.87 | 3478.88 | 906.94 | 0.41 |
| NORTH FISH CREEK | 05 | 1188 | 2 yr | 2780.00 | 471.44 | 482.10 | 477.14 | 482.48 | 0.000189 | 4.95 | 561.66 | 76.72 | 0.32 |
| NORTH FISH CREEK | 05 | 1188 | 5 yr | 4954.00 | 471.44 | 484.26 | 479.33 | 484.96 | 0.000285 | 6.72 | 737.35 | 86.27 | 0.40 |
| NORTH FISH CREEK | 05 | 1188 | 10 yr | 6426.00 | 471.44 | 485.63 | 480.53 | 486.50 | 0.000309 | 7.48 | 861.30 | 100.09 | 0.43 |
| NORTH FISH CREEK | 05 | 1188 | 25 yr | 7873.00 | 471.44 | 487.05 | 481.56 | 488.02 | 0.000287 | 7.92 | 1058.54 | 170.14 | 0.42 |
| NORTH FISH CREEK | 05 | 1188 | 50 yr | 9018.00 | 471.44 | 488.05 | 482.33 | 489.08 | 0.000275 | 8.22 | 1235.33 | 182.04 | 0.42 |
| NORTH FISH CREEK | 05 | 1188 | 100 yr | 10227.00 | 471.44 | 489.01 | 483.07 | 490.10 | 0.000265 | 8.50 | 1413.88 | 188.08 | 0.42 |
| NORTH FISH CREEK | 05 | 1188 | 500 yr | 14180.00 | 471.44 | 490.71 | 485.25 | 492.22 | 0.000320 | 10.14 | 1742.03 | 197.78 | 0.47 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|------------------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NORTH FISH CREEK | 05 | 1188 | Ultimate 100 yr | 10605.00 | 471.44 | 489.04 | 483.30 | 490.20 | 0.000283 | 8.79 | 1418.58 | 188.22 | 0.43 |
| NORTH FISH CREEK | 05 | 1081 | Bridge | | | | | | | | | | |
| NORTH FISH CREEK | 05 | 971 | 2 yr | 2780.00 | 471.69 | 481.98 | | 482.37 | 0.000209 | 5.06 | 549.17 | 78.26 | 0.34 |
| NORTH FISH CREEK | 05 | 971 | 5 yr | 4954.00 | 471.69 | 484.05 | | 484.78 | 0.000315 | 6.86 | 721.95 | 88.50 | 0.42 |
| NORTH FISH CREEK | 05 | 971 | 10 yr | 6426.00 | 471.69 | 485.40 | | 486.30 | 0.000339 | 7.60 | 850.71 | 118.09 | 0.45 |
| NORTH FISH CREEK | 05 | 971 | 25 yr | 7873.00 | 471.69 | 486.84 | | 487.81 | 0.000304 | 7.94 | 1080.82 | 176.19 | 0.43 |
| NORTH FISH CREEK | 05 | 971 | 50 yr | 9018.00 | 471.69 | 487.85 | | 488.87 | 0.000285 | 8.18 | 1262.04 | 182.93 | 0.43 |
| NORTH FISH CREEK | 05 | 971 | 100 yr | 10227.00 | 471.69 | 488.83 | | 489.89 | 0.000271 | 8.42 | 1444.19 | 189.43 | 0.42 |
| NORTH FISH CREEK | 05 | 971 | 500 yr | 14180.00 | 471.69 | 490.48 | | 491.95 | 0.000327 | 10.05 | 1765.38 | 200.15 | 0.47 |
| NORTH FISH CREEK | 05 | 971 | Ultimate 100 yr | 10605.00 | 471.69 | 488.84 | | 489.97 | 0.000291 | 8.73 | 1445.34 | 189.47 | 0.44 |
| NF-1 | NF-1 | 2516 | 2 yr | 260.00 | 583.98 | 587.71 | 587.71 | 588.97 | 0.003327 | 9.02 | 28.84 | 11.46 | 1.00 |
| NF-1 | NF-1 | 2516 | 5 yr | 380.00 | 583.98 | 588.73 | 588.73 | 589.93 | 0.003091 | 8.78 | 43.29 | 18.02 | 1.00 |
| NF-1 | NF-1 | 2516 | 10 yr | 460.00 | 583.98 | 589.11 | 589.11 | 590.39 | 0.003022 | 9.08 | 51.52 | 30.49 | 1.00 |
| NF-1 | NF-1 | 2516 | 25 yr | 553.00 | 583.98 | 589.44 | 589.44 | 590.89 | 0.002906 | 9.65 | 62.53 | 35.30 | 1.01 |
| NF-1 | NF-1 | 2516 | 50 yr | 623.00 | 583.98 | 589.69 | 589.69 | 591.24 | 0.002785 | 10.00 | 71.67 | 37.58 | 1.00 |
| NF-1 | NF-1 | 2516 | 100 yr | 693.00 | 583.98 | 589.92 | 589.92 | 591.59 | 0.002713 | 10.35 | 80.58 | 39.63 | 1.00 |
| NF-1 | NF-1 | 2516 | 500 yr | 851.00 | 583.98 | 590.39 | 590.39 | 592.31 | 0.002654 | 11.15 | 99.81 | 43.71 | 1.01 |
| NF-1 | NF-1 | 2516 | Ultimate 100 yr | 706.00 | 583.98 | 589.97 | 589.97 | 591.65 | 0.002705 | 10.41 | 82.18 | 39.98 | 1.00 |
| NF-1 | NF-1 | 1835 | 2 yr | 260.00 | 580.34 | 584.07 | 584.07 | 585.34 | 0.003330 | 9.02 | 28.83 | 11.45 | 1.00 |
| NF-1 | NF-1 | 1835 | 5 yr | 380.00 | 580.34 | 585.15 | 585.15 | 586.26 | 0.003091 | 8.48 | 44.81 | 19.96 | 1.00 |
| NF-1 | NF-1 | 1835 | 10 yr | 460.00 | 580.34 | 585.50 | 585.50 | 586.70 | 0.003014 | 8.78 | 52.88 | 28.64 | 1.00 |
| NF-1 | NF-1 | 1835 | 25 yr | 553.00 | 580.34 | 585.83 | 585.83 | 587.16 | 0.002827 | 9.27 | 63.57 | 35.30 | 0.99 |
| NF-1 | NF-1 | 1835 | 50 yr | 623.00 | 580.34 | 586.05 | 586.05 | 587.50 | 0.002761 | 9.66 | 71.97 | 37.58 | 0.99 |
| NF-1 | NF-1 | 1835 | 100 yr | 693.00 | 580.34 | 586.26 | 586.26 | 587.82 | 0.002717 | 10.03 | 80.66 | 39.63 | 1.00 |
| NF-1 | NF-1 | 1835 | 500 yr | 851.00 | 580.34 | 586.72 | 586.72 | 588.50 | 0.002593 | 10.73 | 102.57 | 43.71 | 1.00 |
| NF-1 | NF-1 | 1835 | Ultimate 100 yr | 706.00 | 580.34 | 586.29 | 586.29 | 587.88 | 0.002715 | 10.10 | 82.23 | 39.98 | 1.00 |
| NF-1 | NF-1 | 1230 | 2 yr | 260.00 | 575.43 | 580.67 | 579.15 | 581.13 | 0.000697 | 5.51 | 62.31 | 65.43 | 0.49 |
| NF-1 | NF-1 | 1230 | 5 yr | 380.00 | 575.43 | 580.86 | 579.91 | 581.72 | 0.001233 | 7.57 | 76.24 | 82.27 | 0.66 |
| NF-1 | NF-1 | 1230 | 10 yr | 460.00 | 575.43 | 581.31 | 581.31 | 582.12 | 0.001078 | 7.59 | 136.18 | 177.79 | 0.63 |
| NF-1 | NF-1 | 1230 | 25 yr | 553.00 | 575.43 | 581.68 | 581.68 | 582.39 | 0.000952 | 7.51 | 213.05 | 238.94 | 0.60 |
| NF-1 | NF-1 | 1230 | 50 yr | 623.00 | 575.43 | 581.87 | 581.87 | 582.55 | 0.000939 | 7.65 | 260.61 | 279.06 | 0.60 |
| NF-1 | NF-1 | 1230 | 100 yr | 693.00 | 575.43 | 582.16 | 582.16 | 582.68 | 0.000745 | 7.07 | 402.09 | 644.58 | 0.54 |
| NF-1 | NF-1 | 1230 | 500 yr | 851.00 | 575.43 | 582.44 | 582.36 | 582.90 | 0.000711 | 7.15 | 588.41 | 673.91 | 0.53 |
| NF-1 | NF-1 | 1230 | Ultimate 100 yr | 706.00 | 575.43 | 582.18 | 582.18 | 582.69 | 0.000752 | 7.12 | 412.65 | 646.81 | 0.54 |
| NF-1 | NF-1 | 1124 | 2 yr | 440.00 | 574.55 | 580.38 | 580.38 | 581.00 | 0.001428 | 6.58 | 130.86 | 258.50 | 0.70 |
| NF-1 | NF-1 | 1124 | 5 yr | 657.00 | 574.55 | 580.84 | 580.84 | 581.49 | 0.001396 | 7.22 | 283.56 | 374.17 | 0.72 |
| NF-1 | NF-1 | 1124 | 10 yr | 803.00 | 574.55 | 581.02 | 581.02 | 581.75 | 0.001538 | 7.88 | 353.98 | 382.89 | 0.76 |
| NF-1 | NF-1 | 1124 | 25 yr | 952.00 | 574.55 | 581.22 | 581.22 | 581.99 | 0.001601 | 8.35 | 430.31 | 396.27 | 0.78 |
| NF-1 | NF-1 | 1124 | 50 yr | 1074.00 | 574.55 | 581.39 | 581.39 | 582.18 | 0.001586 | 8.58 | 500.32 | 408.65 | 0.78 |
| NF-1 | NF-1 | 1124 | 100 yr | 1197.00 | 574.55 | 581.50 | 581.50 | 582.35 | 0.001709 | 9.07 | 543.00 | 416.01 | 0.82 |
| NF-1 | NF-1 | 1124 | 500 yr | 1480.00 | 574.55 | 581.78 | 581.78 | 582.72 | 0.001812 | 9.79 | 664.38 | 436.21 | 0.85 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NF-1 | NF-1 | 1124 | Ultimate 100 yr | 1220.00 | 574.55 | 581.52 | 581.52 | 582.38 | 0.001719 | 9.13 | 552.98 | 418.25 | 0.82 |
| NF-1 | NF-1 | 1047 | Culvert | | | | | | | | | | |
| NF-1 | NF-1 | 984 | 2 yr | 440.00 | 570.07 | 577.11 | | 577.25 | 0.000139 | 2.96 | 148.90 | 33.35 | 0.25 |
| NF-1 | NF-1 | 984 | 5 yr | 657.00 | 570.07 | 577.67 | | 577.91 | 0.000224 | 3.91 | 168.03 | 35.26 | 0.32 |
| NF-1 | NF-1 | 984 | 10 yr | 803.00 | 570.07 | 577.95 | | 578.27 | 0.000287 | 4.51 | 178.08 | 36.22 | 0.36 |
| NF-1 | NF-1 | 984 | 25 yr | 952.00 | 570.07 | 578.18 | | 578.58 | 0.000357 | 5.11 | 186.31 | 37.05 | 0.40 |
| NF-1 | NF-1 | 984 | 50 yr | 1074.00 | 570.07 | 578.30 | | 578.79 | 0.000423 | 5.63 | 190.80 | 38.62 | 0.44 |
| NF-1 | NF-1 | 984 | 100 yr | 1197.00 | 570.07 | 578.41 | | 579.00 | 0.000490 | 6.13 | 195.47 | 40.27 | 0.47 |
| NF-1 | NF-1 | 984 | 500 yr | 1480.00 | 570.07 | 578.65 | | 579.47 | 0.000654 | 7.25 | 205.32 | 43.87 | 0.55 |
| NF-1 | NF-1 | 984 | Ultimate 100 yr | 1220.00 | 570.07 | 578.44 | | 579.04 | 0.000502 | 6.22 | 196.45 | 40.60 | 0.48 |
| NF-1 | NF-1 | 884 | 2 yr | 440.00 | 573.51 | 577.03 | | 577.22 | 0.009535 | 3.48 | 128.49 | 58.94 | 0.37 |
| NF-1 | NF-1 | 884 | 5 yr | 657.00 | 573.51 | 577.61 | | 577.86 | 0.010055 | 4.07 | 166.98 | 73.44 | 0.40 |
| NF-1 | NF-1 | 884 | 10 yr | 803.00 | 573.51 | 577.91 | | 578.20 | 0.010737 | 4.46 | 191.49 | 100.49 | 0.42 |
| NF-1 | NF-1 | 884 | 25 yr | 952.00 | 573.51 | 578.17 | | 578.48 | 0.010943 | 4.72 | 235.70 | 216.47 | 0.42 |
| NF-1 | NF-1 | 884 | 50 yr | 1074.00 | 573.51 | 578.36 | | 578.64 | 0.010061 | 4.67 | 278.48 | 249.53 | 0.41 |
| NF-1 | NF-1 | 884 | 100 yr | 1197.00 | 573.51 | 578.55 | | 578.80 | 0.008682 | 4.48 | 331.33 | 286.51 | 0.38 |
| NF-1 | NF-1 | 884 | 500 yr | 1480.00 | 573.51 | 578.97 | 577.65 | 579.16 | 0.006242 | 4.04 | 472.45 | 433.13 | 0.33 |
| NF-1 | NF-1 | 884 | Ultimate 100 yr | 1220.00 | 573.51 | 578.59 | | 578.84 | 0.008379 | 4.43 | 342.91 | 294.72 | 0.38 |
| NF-1 | NF-1 | 537 | 2 yr | 440.00 | 569.72 | 573.37 | 571.90 | 573.59 | 0.011582 | 3.77 | 116.81 | 44.03 | 0.41 |
| NF-1 | NF-1 | 537 | 5 yr | 657.00 | 569.72 | 574.62 | 572.48 | 574.81 | 0.007449 | 3.62 | 188.80 | 89.74 | 0.34 |
| NF-1 | NF-1 | 537 | 10 yr | 803.00 | 569.72 | 575.27 | 572.81 | 575.43 | 0.005040 | 3.34 | 263.08 | 137.79 | 0.29 |
| NF-1 | NF-1 | 537 | 25 yr | 952.00 | 569.72 | 575.86 | 573.13 | 575.98 | 0.003157 | 2.89 | 358.39 | 182.87 | 0.23 |
| NF-1 | NF-1 | 537 | 50 yr | 1074.00 | 569.72 | 576.48 | 573.37 | 576.55 | 0.001652 | 2.27 | 515.41 | 517.58 | 0.17 |
| NF-1 | NF-1 | 537 | 100 yr | 1197.00 | 569.72 | 577.03 | 573.58 | 577.08 | 0.000923 | 1.81 | 687.49 | 622.96 | 0.13 |
| NF-1 | NF-1 | 537 | 500 yr | 1480.00 | 569.72 | 577.91 | 574.14 | 577.95 | 0.000467 | 1.41 | 1017.38 | 797.34 | 0.10 |
| NF-1 | NF-1 | 537 | Ultimate 100 yr | 1220.00 | 569.72 | 577.13 | 573.62 | 577.18 | 0.000831 | 1.74 | 722.89 | 643.09 | 0.12 |
| NF-2 | NF-2 | 964 | 2 yr | 334.00 | 575.15 | 577.00 | 577.00 | 577.78 | 0.003374 | 7.05 | 47.38 | 31.12 | 1.01 |
| NF-2 | NF-2 | 964 | 5 yr | 518.00 | 575.15 | 578.09 | | 578.67 | 0.001512 | 6.10 | 84.87 | 37.66 | 0.72 |
| NF-2 | NF-2 | 964 | 10 yr | 641.00 | 575.15 | 579.21 | | 579.58 | 0.000689 | 4.91 | 130.55 | 44.35 | 0.50 |
| NF-2 | NF-2 | 964 | 25 yr | 777.00 | 575.15 | 580.21 | | 580.51 | 0.000424 | 4.36 | 178.14 | 53.07 | 0.41 |
| NF-2 | NF-2 | 964 | 50 yr | 889.00 | 575.15 | 581.10 | | 581.35 | 0.000263 | 3.99 | 266.17 | 159.26 | 0.33 |
| NF-2 | NF-2 | 964 | 100 yr | 999.00 | 575.15 | 581.84 | | 582.06 | 0.000199 | 3.84 | 548.80 | 572.61 | 0.30 |
| NF-2 | NF-2 | 964 | 500 yr | 1258.00 | 575.15 | 583.48 | | 583.67 | 0.000118 | 3.56 | 2226.83 | 1169.90 | 0.24 |
| NF-2 | NF-2 | 964 | Ultimate 100 yr | 1016.00 | 575.15 | 582.00 | | 582.22 | 0.000184 | 3.78 | 649.39 | 958.53 | 0.29 |
| NF-2 | NF-2 | 533 | 2 yr | 334.00 | 573.42 | 575.70 | | 576.16 | 0.001615 | 5.47 | 61.05 | 33.65 | 0.72 |
| NF-2 | NF-2 | 533 | 5 yr | 518.00 | 573.42 | 577.99 | | 578.16 | 0.000284 | 3.36 | 153.95 | 47.41 | 0.33 |
| NF-2 | NF-2 | 533 | 10 yr | 641.00 | 573.42 | 579.19 | | 579.32 | 0.000194 | 2.91 | 220.37 | 63.60 | 0.28 |
| NF-2 | NF-2 | 533 | 25 yr | 777.00 | 573.42 | 580.22 | | 580.33 | 0.000139 | 2.65 | 310.06 | 138.12 | 0.24 |
| NF-2 | NF-2 | 533 | 50 yr | 889.00 | 573.42 | 581.14 | | 581.22 | 0.000090 | 2.33 | 527.90 | 317.03 | 0.20 |
| NF-2 | NF-2 | 533 | 100 yr | 999.00 | 573.42 | 581.89 | | 581.96 | 0.000062 | 2.15 | 797.63 | 403.96 | 0.17 |
| NF-2 | NF-2 | 533 | 500 yr | 1258.00 | 573.42 | 583.55 | | 583.59 | 0.000033 | 1.88 | 2984.22 | 1511.50 | 0.13 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NF-2 | NF-2 | 533 | Ultimate 100 yr | 1016.00 | 573.42 | 582.06 | | 582.13 | 0.000057 | 2.10 | 922.10 | 1268.42 | 0.16 |
| NF-3 | NF-3 | 5283 | 2 yr | 230.00 | 610.42 | 612.97 | 612.84 | 613.66 | 0.026910 | 6.66 | 34.52 | 20.75 | 0.91 |
| NF-3 | NF-3 | 5283 | 5 yr | 362.00 | 610.42 | 613.68 | 613.46 | 614.47 | 0.023493 | 7.15 | 50.64 | 24.65 | 0.88 |
| NF-3 | NF-3 | 5283 | 10 yr | 451.00 | 610.42 | 614.19 | | 614.96 | 0.019322 | 7.04 | 64.04 | 27.48 | 0.81 |
| NF-3 | NF-3 | 5283 | 25 yr | 550.00 | 610.42 | 614.77 | | 615.49 | 0.013836 | 6.81 | 82.74 | 38.40 | 0.71 |
| NF-3 | NF-3 | 5283 | 50 yr | 632.00 | 610.42 | 615.01 | 614.43 | 615.80 | 0.013743 | 7.16 | 92.61 | 43.99 | 0.72 |
| NF-3 | NF-3 | 5283 | 100 yr | 711.00 | 610.42 | 615.27 | 614.67 | 616.09 | 0.012987 | 7.34 | 104.65 | 49.49 | 0.71 |
| NF-3 | NF-3 | 5283 | 500 yr | 904.00 | 610.42 | 615.74 | 615.32 | 616.66 | 0.012511 | 7.88 | 129.99 | 56.89 | 0.71 |
| NF-3 | NF-3 | 5283 | Ultimate 100 yr | 731.00 | 610.42 | 615.34 | 614.73 | 616.16 | 0.012698 | 7.36 | 108.16 | 50.63 | 0.70 |
| NF-3 | NF-3 | 5200 | 2 yr | 230.00 | 608.50 | 611.00 | 611.00 | 611.92 | 0.003482 | 7.72 | 29.78 | 16.29 | 1.01 |
| NF-3 | NF-3 | 5200 | 5 yr | 362.00 | 608.50 | 612.34 | 611.70 | 613.02 | 0.001665 | 6.62 | 54.71 | 21.52 | 0.73 |
| NF-3 | NF-3 | 5200 | 10 yr | 451.00 | 608.50 | 613.19 | 612.11 | 613.74 | 0.001198 | 5.96 | 75.64 | 27.50 | 0.63 |
| NF-3 | NF-3 | 5200 | 25 yr | 550.00 | 608.50 | 614.16 | 612.59 | 614.57 | 0.000882 | 5.11 | 107.56 | 39.92 | 0.55 |
| NF-3 | NF-3 | 5200 | 50 yr | 632.00 | 608.50 | 614.43 | 612.89 | 614.87 | 0.000946 | 5.32 | 118.72 | 43.93 | 0.57 |
| NF-3 | NF-3 | 5200 | 100 yr | 711.00 | 608.50 | 614.75 | 613.17 | 615.19 | 0.000902 | 5.32 | 133.83 | 52.50 | 0.56 |
| NF-3 | NF-3 | 5200 | 500 yr | 904.00 | 608.50 | 615.28 | 613.86 | 615.78 | 0.000822 | 5.66 | 179.21 | 128.63 | 0.55 |
| NF-3 | NF-3 | 5200 | Ultimate 100 yr | 731.00 | 608.50 | 614.84 | 613.24 | 615.28 | 0.000861 | 5.29 | 138.96 | 58.84 | 0.55 |
| NF-3 | NF-3 | 5142 | | Culvert | | | | | | | | | |
| NF-3 | NF-3 | 5085 | 2 yr | 230.00 | 607.39 | 610.02 | 610.02 | 610.90 | 0.003419 | 7.56 | 30.43 | 17.41 | 1.01 |
| NF-3 | NF-3 | 5085 | 5 yr | 362.00 | 607.39 | 610.71 | 610.71 | 611.78 | 0.003208 | 8.32 | 43.52 | 20.46 | 1.01 |
| NF-3 | NF-3 | 5085 | 10 yr | 451.00 | 607.39 | 611.09 | 611.09 | 612.27 | 0.003135 | 8.73 | 51.65 | 22.14 | 1.01 |
| NF-3 | NF-3 | 5085 | 25 yr | 550.00 | 607.39 | 611.47 | 611.47 | 612.76 | 0.003049 | 9.10 | 60.46 | 23.83 | 1.01 |
| NF-3 | NF-3 | 5085 | 50 yr | 632.00 | 607.39 | 611.75 | 611.75 | 613.12 | 0.002997 | 9.41 | 67.55 | 28.56 | 1.01 |
| NF-3 | NF-3 | 5085 | 100 yr | 711.00 | 607.39 | 612.00 | 612.00 | 613.45 | 0.002896 | 9.68 | 75.24 | 32.82 | 1.00 |
| NF-3 | NF-3 | 5085 | 500 yr | 904.00 | 607.39 | 612.49 | 612.49 | 614.21 | 0.002778 | 10.51 | 94.99 | 47.60 | 1.01 |
| NF-3 | NF-3 | 5085 | Ultimate 100 yr | 731.00 | 607.39 | 612.06 | 612.06 | 613.54 | 0.002872 | 9.76 | 77.16 | 34.54 | 1.00 |
| NF-3 | NF-3 | 5019 | 2 yr | 230.00 | 606.65 | 609.34 | 609.34 | 610.12 | 0.002992 | 7.10 | 32.41 | 20.81 | 1.00 |
| NF-3 | NF-3 | 5019 | 5 yr | 362.00 | 606.65 | 609.96 | 609.96 | 610.90 | 0.002797 | 7.77 | 46.60 | 24.82 | 1.00 |
| NF-3 | NF-3 | 5019 | 10 yr | 451.00 | 606.65 | 610.31 | 610.31 | 611.33 | 0.002732 | 8.12 | 55.54 | 27.18 | 1.00 |
| NF-3 | NF-3 | 5019 | 25 yr | 550.00 | 606.65 | 610.68 | 610.68 | 611.74 | 0.002668 | 8.28 | 66.45 | 31.11 | 1.00 |
| NF-3 | NF-3 | 5019 | 50 yr | 632.00 | 606.65 | 610.94 | 610.94 | 612.05 | 0.002636 | 8.43 | 74.95 | 33.86 | 1.00 |
| NF-3 | NF-3 | 5019 | 100 yr | 711.00 | 606.65 | 611.17 | 611.17 | 612.31 | 0.002595 | 8.57 | 82.98 | 36.38 | 1.00 |
| NF-3 | NF-3 | 5019 | 500 yr | 904.00 | 606.65 | 611.62 | 611.62 | 612.89 | 0.002544 | 9.05 | 100.78 | 43.73 | 1.00 |
| NF-3 | NF-3 | 5019 | Ultimate 100 yr | 731.00 | 606.65 | 611.22 | 611.22 | 612.37 | 0.002588 | 8.62 | 84.81 | 37.18 | 1.00 |
| NF-3 | NF-3 | 4715 | 2 yr | 230.00 | 602.12 | 604.85 | 604.85 | 605.71 | 0.002930 | 7.47 | 30.78 | 17.62 | 1.00 |
| NF-3 | NF-3 | 4715 | 5 yr | 362.00 | 602.12 | 605.52 | 605.52 | 606.59 | 0.002819 | 8.29 | 43.65 | 20.67 | 1.01 |
| NF-3 | NF-3 | 4715 | 10 yr | 451.00 | 602.12 | 605.90 | 605.90 | 607.07 | 0.002739 | 8.68 | 51.93 | 22.41 | 1.01 |
| NF-3 | NF-3 | 4715 | 25 yr | 550.00 | 602.12 | 606.28 | 606.28 | 607.56 | 0.002686 | 9.07 | 60.62 | 24.11 | 1.01 |
| NF-3 | NF-3 | 4715 | 50 yr | 632.00 | 602.12 | 606.58 | 606.58 | 607.91 | 0.002626 | 9.26 | 68.24 | 25.89 | 1.01 |
| NF-3 | NF-3 | 4715 | 100 yr | 711.00 | 602.12 | 606.86 | 606.86 | 608.23 | 0.002553 | 9.38 | 75.79 | 27.63 | 1.00 |
| NF-3 | NF-3 | 4715 | 500 yr | 904.00 | 602.12 | 607.45 | 607.45 | 608.91 | 0.002508 | 9.72 | 93.03 | 31.85 | 1.00 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NF-3 | NF-3 | 4715 | Ultimate 100 yr | 731.00 | 602.12 | 606.91 | 606.91 | 608.31 | 0.002587 | 9.49 | 77.06 | 27.91 | 1.01 |
| NF-3 | NF-3 | 4251 | 2 yr | 230.00 | 596.27 | 599.01 | 599.01 | 599.89 | 0.002934 | 7.55 | 30.46 | 17.07 | 1.00 |
| NF-3 | NF-3 | 4251 | 5 yr | 362.00 | 596.27 | 599.70 | 599.70 | 600.78 | 0.002784 | 8.34 | 43.38 | 20.03 | 1.00 |
| NF-3 | NF-3 | 4251 | 10 yr | 451.00 | 596.27 | 600.09 | 600.09 | 601.28 | 0.002718 | 8.76 | 51.51 | 21.68 | 1.00 |
| NF-3 | NF-3 | 4251 | 25 yr | 550.00 | 596.27 | 600.48 | 600.48 | 601.78 | 0.002641 | 9.12 | 60.32 | 23.34 | 1.00 |
| NF-3 | NF-3 | 4251 | 50 yr | 632.00 | 596.27 | 600.78 | 600.78 | 602.14 | 0.002584 | 9.37 | 67.43 | 24.60 | 1.00 |
| NF-3 | NF-3 | 4251 | 100 yr | 711.00 | 596.27 | 601.05 | 601.05 | 602.48 | 0.002540 | 9.60 | 74.09 | 25.72 | 1.00 |
| NF-3 | NF-3 | 4251 | 500 yr | 904.00 | 596.27 | 601.62 | 601.62 | 603.20 | 0.002471 | 10.10 | 89.52 | 28.15 | 1.00 |
| NF-3 | NF-3 | 4251 | Ultimate 100 yr | 731.00 | 596.27 | 601.10 | 601.10 | 602.56 | 0.002545 | 9.67 | 75.58 | 25.96 | 1.00 |
| NF-3 | NF-3 | 3693 | 2 yr | 230.00 | 593.55 | 596.12 | 595.25 | 596.37 | 0.000669 | 3.98 | 57.76 | 28.76 | 0.50 |
| NF-3 | NF-3 | 3693 | 5 yr | 362.00 | 593.55 | 597.31 | 595.78 | 597.54 | 0.000398 | 3.82 | 94.65 | 33.54 | 0.40 |
| NF-3 | NF-3 | 3693 | 10 yr | 451.00 | 593.55 | 598.03 | 596.09 | 598.25 | 0.000317 | 3.76 | 119.79 | 36.44 | 0.37 |
| NF-3 | NF-3 | 3693 | 25 yr | 550.00 | 593.55 | 598.78 | 596.39 | 598.99 | 0.000259 | 3.71 | 148.30 | 39.47 | 0.34 |
| NF-3 | NF-3 | 3693 | 50 yr | 632.00 | 593.55 | 599.39 | 596.63 | 599.60 | 0.000222 | 3.65 | 173.20 | 41.94 | 0.32 |
| NF-3 | NF-3 | 3693 | 100 yr | 711.00 | 593.55 | 599.92 | 596.84 | 600.13 | 0.000195 | 3.63 | 196.40 | 45.52 | 0.30 |
| NF-3 | NF-3 | 3693 | 500 yr | 904.00 | 593.55 | 600.80 | 597.32 | 601.03 | 0.000179 | 3.85 | 240.55 | 58.76 | 0.30 |
| NF-3 | NF-3 | 3693 | Ultimate 100 yr | 731.00 | 593.55 | 600.04 | 596.89 | 600.25 | 0.000190 | 3.63 | 201.93 | 46.51 | 0.30 |
| NF-3 | NF-3 | 3408 | 2 yr | 230.00 | 592.29 | 596.12 | | 596.21 | 0.000141 | 2.34 | 98.21 | 33.01 | 0.24 |
| NF-3 | NF-3 | 3408 | 5 yr | 362.00 | 592.29 | 597.32 | | 597.42 | 0.000127 | 2.58 | 140.30 | 37.23 | 0.23 |
| NF-3 | NF-3 | 3408 | 10 yr | 451.00 | 592.29 | 598.04 | | 598.15 | 0.000118 | 2.68 | 168.04 | 39.76 | 0.23 |
| NF-3 | NF-3 | 3408 | 25 yr | 550.00 | 592.29 | 598.79 | | 598.91 | 0.000110 | 2.77 | 198.91 | 42.41 | 0.22 |
| NF-3 | NF-3 | 3408 | 50 yr | 632.00 | 592.29 | 599.40 | | 599.53 | 0.000100 | 2.81 | 227.51 | 52.59 | 0.22 |
| NF-3 | NF-3 | 3408 | 100 yr | 711.00 | 592.29 | 599.94 | | 600.06 | 0.000092 | 2.86 | 259.10 | 68.72 | 0.21 |
| NF-3 | NF-3 | 3408 | 500 yr | 904.00 | 592.29 | 600.81 | | 600.97 | 0.000092 | 3.15 | 334.39 | 105.59 | 0.22 |
| NF-3 | NF-3 | 3408 | Ultimate 100 yr | 731.00 | 592.29 | 600.06 | | 600.19 | 0.000090 | 2.88 | 267.67 | 73.61 | 0.21 |
| NF-3 | NF-3 | 3365 | 2 yr | 512.00 | 592.29 | 595.44 | 594.93 | 596.13 | 0.001442 | 6.70 | 76.47 | 30.60 | 0.75 |
| NF-3 | NF-3 | 3365 | 5 yr | 814.00 | 592.29 | 596.51 | 595.76 | 597.34 | 0.001235 | 7.31 | 111.29 | 34.38 | 0.72 |
| NF-3 | NF-3 | 3365 | 10 yr | 1017.00 | 592.29 | 597.19 | 596.25 | 598.07 | 0.001099 | 7.50 | 135.63 | 36.78 | 0.69 |
| NF-3 | NF-3 | 3365 | 25 yr | 1237.00 | 592.29 | 597.95 | 596.72 | 598.83 | 0.000949 | 7.53 | 164.26 | 39.43 | 0.65 |
| NF-3 | NF-3 | 3365 | 50 yr | 1422.00 | 592.29 | 598.57 | 597.09 | 599.44 | 0.000841 | 7.50 | 189.49 | 41.62 | 0.62 |
| NF-3 | NF-3 | 3365 | 100 yr | 1600.00 | 592.29 | 599.10 | 597.42 | 599.98 | 0.000797 | 7.54 | 212.31 | 48.65 | 0.61 |
| NF-3 | NF-3 | 3365 | 500 yr | 2039.00 | 592.29 | 599.76 | 598.17 | 600.87 | 0.000853 | 8.42 | 260.73 | 95.29 | 0.64 |
| NF-3 | NF-3 | 3365 | Ultimate 100 yr | 1646.00 | 592.29 | 599.21 | 597.50 | 600.10 | 0.000785 | 7.58 | 218.26 | 56.98 | 0.61 |
| NF-3 | NF-3 | 3289 | | Culvert | | | | | | | | | |
| NF-3 | NF-3 | 3213 | 2 yr | 512.00 | 592.50 | 595.01 | 595.01 | 596.06 | 0.002746 | 8.19 | 62.49 | 30.36 | 1.01 |
| NF-3 | NF-3 | 3213 | 5 yr | 814.00 | 592.50 | 595.81 | 595.81 | 597.14 | 0.002557 | 9.25 | 88.04 | 33.57 | 1.01 |
| NF-3 | NF-3 | 3213 | 10 yr | 1017.00 | 592.50 | 596.29 | 596.29 | 597.76 | 0.002443 | 9.74 | 104.45 | 35.48 | 1.00 |
| NF-3 | NF-3 | 3213 | 25 yr | 1237.00 | 592.50 | 596.74 | 596.74 | 598.37 | 0.002375 | 10.22 | 121.03 | 37.32 | 1.00 |
| NF-3 | NF-3 | 3213 | 50 yr | 1422.00 | 592.50 | 597.09 | 597.09 | 598.83 | 0.002348 | 10.60 | 134.09 | 38.70 | 1.00 |
| NF-3 | NF-3 | 3213 | 100 yr | 1600.00 | 592.50 | 597.42 | 597.42 | 599.25 | 0.002292 | 10.88 | 147.04 | 40.02 | 1.00 |
| NF-3 | NF-3 | 3213 | 500 yr | 2039.00 | 592.50 | 598.13 | 598.13 | 600.20 | 0.002231 | 11.55 | 176.50 | 42.88 | 1.00 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NF-3 | NF-3 | 3213 | Ultimate 100 yr | 1646.00 | 592.50 | 597.49 | 597.49 | 599.36 | 0.002287 | 10.96 | 150.15 | 40.33 | 1.00 |
| NF-3 | NF-3 | 3151 | 2 yr | 512.00 | 590.53 | 594.60 | 594.60 | 595.73 | 0.002664 | 8.53 | 60.02 | 26.46 | 1.00 |
| NF-3 | NF-3 | 3151 | 5 yr | 814.00 | 590.53 | 595.61 | 595.61 | 596.72 | 0.002712 | 8.47 | 96.15 | 44.22 | 1.01 |
| NF-3 | NF-3 | 3151 | 10 yr | 1017.00 | 590.53 | 596.02 | 596.02 | 597.23 | 0.002578 | 8.83 | 115.61 | 50.26 | 1.00 |
| NF-3 | NF-3 | 3151 | 25 yr | 1237.00 | 590.53 | 596.38 | 596.38 | 597.73 | 0.002472 | 9.33 | 134.34 | 54.95 | 1.00 |
| NF-3 | NF-3 | 3151 | 50 yr | 1422.00 | 590.53 | 596.63 | 596.63 | 598.12 | 0.002418 | 9.80 | 148.69 | 58.04 | 1.01 |
| NF-3 | NF-3 | 3151 | 100 yr | 1600.00 | 590.53 | 596.88 | 596.88 | 598.49 | 0.002330 | 10.16 | 163.64 | 61.10 | 1.00 |
| NF-3 | NF-3 | 3151 | 500 yr | 2039.00 | 590.53 | 597.45 | 597.45 | 599.33 | 0.002203 | 11.01 | 200.31 | 71.28 | 1.00 |
| NF-3 | NF-3 | 3151 | Ultimate 100 yr | 1646.00 | 590.53 | 596.94 | 596.94 | 598.58 | 0.002320 | 10.27 | 167.27 | 61.81 | 1.00 |
| NF-3 | NF-3 | 2836 | 2 yr | 512.00 | 588.20 | 593.52 | | 593.87 | 0.003885 | 4.76 | 107.61 | 34.74 | 0.48 |
| NF-3 | NF-3 | 2836 | 5 yr | 814.00 | 588.20 | 594.38 | | 594.91 | 0.004353 | 5.87 | 140.84 | 43.05 | 0.52 |
| NF-3 | NF-3 | 2836 | 10 yr | 1017.00 | 588.20 | 594.82 | | 595.48 | 0.004676 | 6.54 | 160.96 | 48.16 | 0.55 |
| NF-3 | NF-3 | 2836 | 25 yr | 1237.00 | 588.20 | 595.25 | | 596.02 | 0.004946 | 7.15 | 182.45 | 53.13 | 0.58 |
| NF-3 | NF-3 | 2836 | 50 yr | 1422.00 | 588.20 | 595.57 | | 596.44 | 0.005122 | 7.60 | 200.12 | 56.83 | 0.59 |
| NF-3 | NF-3 | 2836 | 100 yr | 1600.00 | 588.20 | 595.86 | | 596.81 | 0.005267 | 8.00 | 216.99 | 60.83 | 0.61 |
| NF-3 | NF-3 | 2836 | 500 yr | 2039.00 | 588.20 | 596.51 | 595.41 | 597.63 | 0.005497 | 8.82 | 311.79 | 218.96 | 0.63 |
| NF-3 | NF-3 | 2836 | Ultimate 100 yr | 1646.00 | 588.20 | 595.93 | | 596.90 | 0.005304 | 8.10 | 221.32 | 61.95 | 0.61 |
| NF-3 | NF-3 | 2445 | 2 yr | 512.00 | 586.73 | 592.57 | | 592.70 | 0.001769 | 2.89 | 177.56 | 52.24 | 0.27 |
| NF-3 | NF-3 | 2445 | 5 yr | 814.00 | 586.73 | 593.26 | | 593.48 | 0.002472 | 3.84 | 217.78 | 64.55 | 0.32 |
| NF-3 | NF-3 | 2445 | 10 yr | 1017.00 | 586.73 | 593.56 | | 593.86 | 0.003032 | 4.44 | 238.15 | 70.24 | 0.36 |
| NF-3 | NF-3 | 2445 | 25 yr | 1237.00 | 586.73 | 593.86 | | 594.24 | 0.003563 | 5.02 | 260.21 | 77.66 | 0.40 |
| NF-3 | NF-3 | 2445 | 50 yr | 1422.00 | 586.73 | 594.07 | | 594.52 | 0.004014 | 5.48 | 278.11 | 92.53 | 0.43 |
| NF-3 | NF-3 | 2445 | 100 yr | 1600.00 | 586.73 | 594.26 | | 594.78 | 0.004449 | 5.91 | 296.03 | 102.15 | 0.45 |
| NF-3 | NF-3 | 2445 | 500 yr | 2039.00 | 586.73 | 594.72 | | 595.39 | 0.005245 | 6.78 | 349.90 | 130.90 | 0.50 |
| NF-3 | NF-3 | 2445 | Ultimate 100 yr | 1646.00 | 586.73 | 594.29 | | 594.83 | 0.004584 | 6.03 | 299.93 | 104.10 | 0.46 |
| NF-3 | NF-3 | 2159 | 2 yr | 512.00 | 585.70 | 592.26 | | 592.33 | 0.000656 | 2.27 | 230.48 | 93.20 | 0.20 |
| NF-3 | NF-3 | 2159 | 5 yr | 814.00 | 585.70 | 592.84 | | 592.97 | 0.000932 | 2.98 | 329.62 | 237.17 | 0.25 |
| NF-3 | NF-3 | 2159 | 10 yr | 1017.00 | 585.70 | 593.06 | | 593.22 | 0.001135 | 3.39 | 386.33 | 274.59 | 0.28 |
| NF-3 | NF-3 | 2159 | 25 yr | 1237.00 | 585.70 | 593.30 | | 593.49 | 0.001275 | 3.72 | 457.33 | 318.67 | 0.30 |
| NF-3 | NF-3 | 2159 | 50 yr | 1422.00 | 585.70 | 593.48 | | 593.68 | 0.001364 | 3.94 | 515.32 | 341.34 | 0.31 |
| NF-3 | NF-3 | 2159 | 100 yr | 1600.00 | 585.70 | 593.63 | | 593.84 | 0.001433 | 4.12 | 568.63 | 360.98 | 0.32 |
| NF-3 | NF-3 | 2159 | 500 yr | 2039.00 | 585.70 | 594.11 | | 594.31 | 0.001323 | 4.20 | 758.62 | 435.47 | 0.31 |
| NF-3 | NF-3 | 2159 | Ultimate 100 yr | 1646.00 | 585.70 | 593.65 | | 593.87 | 0.001478 | 4.20 | 576.32 | 363.73 | 0.32 |
| NF-3 | NF-3 | 2023 | 2 yr | 597.00 | 584.90 | 592.08 | 588.27 | 592.19 | 0.001379 | 2.77 | 217.33 | 295.17 | 0.24 |
| NF-3 | NF-3 | 2023 | 5 yr | 999.00 | 584.90 | 592.68 | 589.29 | 592.79 | 0.001415 | 2.95 | 487.74 | 415.01 | 0.24 |
| NF-3 | NF-3 | 2023 | 10 yr | 1261.00 | 584.90 | 592.89 | 589.87 | 593.01 | 0.001588 | 3.22 | 576.10 | 439.60 | 0.26 |
| NF-3 | NF-3 | 2023 | 25 yr | 1544.00 | 584.90 | 593.13 | 590.49 | 593.25 | 0.001599 | 3.34 | 684.77 | 459.18 | 0.26 |
| NF-3 | NF-3 | 2023 | 50 yr | 1776.00 | 584.90 | 593.30 | 590.96 | 593.42 | 0.001641 | 3.46 | 766.05 | 485.08 | 0.27 |
| NF-3 | NF-3 | 2023 | 100 yr | 1997.00 | 584.90 | 593.45 | 592.54 | 593.58 | 0.001658 | 3.54 | 840.04 | 499.34 | 0.27 |
| NF-3 | NF-3 | 2023 | 500 yr | 2495.00 | 584.90 | 593.97 | 592.75 | 594.08 | 0.001272 | 3.31 | 1113.48 | 553.06 | 0.24 |
| NF-3 | NF-3 | 2023 | Ultimate 100 yr | 2055.00 | 584.90 | 593.47 | 592.57 | 593.60 | 0.001718 | 3.61 | 847.40 | 500.73 | 0.28 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NF-3 | NF-3 | 1932 | | Culvert | | | | | | | | | |
| NF-3 | NF-3 | 1841 | 2 yr | 597.00 | 585.94 | 590.93 | 588.57 | 591.06 | 0.000755 | 2.98 | 200.64 | 92.99 | 0.28 |
| NF-3 | NF-3 | 1841 | 5 yr | 999.00 | 585.94 | 591.57 | 589.44 | 591.84 | 0.001213 | 4.21 | 237.06 | 124.21 | 0.36 |
| NF-3 | NF-3 | 1841 | 10 yr | 1261.00 | 585.94 | 591.96 | 589.83 | 592.26 | 0.001260 | 4.55 | 324.37 | 149.22 | 0.38 |
| NF-3 | NF-3 | 1841 | 25 yr | 1544.00 | 585.94 | 592.41 | 590.24 | 592.67 | 0.001359 | 4.33 | 539.81 | 496.15 | 0.37 |
| NF-3 | NF-3 | 1841 | 50 yr | 1776.00 | 585.94 | 592.77 | 590.52 | 592.97 | 0.001080 | 4.07 | 722.14 | 539.31 | 0.33 |
| NF-3 | NF-3 | 1841 | 100 yr | 1997.00 | 585.94 | 593.11 | 590.78 | 593.27 | 0.000843 | 3.77 | 916.81 | 578.38 | 0.30 |
| NF-3 | NF-3 | 1841 | 500 yr | 2495.00 | 585.94 | 593.92 | 592.38 | 594.01 | 0.000484 | 3.16 | 1416.89 | 664.77 | 0.23 |
| NF-3 | NF-3 | 1841 | Ultimate 100 yr | 2055.00 | 585.94 | 593.20 | 590.83 | 593.35 | 0.000795 | 3.70 | 967.17 | 587.06 | 0.29 |
| NF-3 | NF-3 | 1795 | 2 yr | 597.00 | 588.00 | 590.30 | 590.30 | 590.96 | 0.002690 | 6.56 | 98.27 | 97.17 | 0.96 |
| NF-3 | NF-3 | 1795 | 5 yr | 999.00 | 588.00 | 590.89 | 590.89 | 591.71 | 0.002243 | 7.47 | 164.97 | 126.92 | 0.93 |
| NF-3 | NF-3 | 1795 | 10 yr | 1261.00 | 588.00 | 591.18 | 591.18 | 592.12 | 0.002178 | 8.06 | 204.26 | 141.42 | 0.93 |
| NF-3 | NF-3 | 1795 | 25 yr | 1544.00 | 588.00 | 591.52 | 591.52 | 592.52 | 0.001966 | 8.39 | 255.36 | 158.63 | 0.91 |
| NF-3 | NF-3 | 1795 | 50 yr | 1776.00 | 588.00 | 591.72 | 591.72 | 592.81 | 0.001982 | 8.84 | 287.80 | 168.08 | 0.92 |
| NF-3 | NF-3 | 1795 | 100 yr | 1997.00 | 588.00 | 591.77 | 591.77 | 593.09 | 0.002346 | 9.74 | 296.89 | 173.47 | 1.01 |
| NF-3 | NF-3 | 1795 | 500 yr | 2495.00 | 588.00 | 591.89 | 591.89 | 593.79 | 0.003208 | 11.68 | 318.36 | 194.26 | 1.19 |
| NF-3 | NF-3 | 1795 | Ultimate 100 yr | 2055.00 | 588.00 | 591.80 | 591.80 | 593.17 | 0.002402 | 9.91 | 301.67 | 176.24 | 1.02 |
| NF-3 | NF-3 | 1636 | 2 yr | 597.00 | 586.60 | 589.25 | 589.23 | 590.04 | 0.002783 | 7.15 | 83.52 | 51.85 | 0.99 |
| NF-3 | NF-3 | 1636 | 5 yr | 999.00 | 586.60 | 590.10 | 590.10 | 590.86 | 0.002484 | 6.99 | 150.44 | 167.51 | 0.95 |
| NF-3 | NF-3 | 1636 | 10 yr | 1261.00 | 586.60 | 590.42 | 590.42 | 591.21 | 0.002148 | 7.24 | 206.58 | 184.07 | 0.90 |
| NF-3 | NF-3 | 1636 | 25 yr | 1544.00 | 586.60 | 590.67 | 590.67 | 591.55 | 0.002065 | 7.69 | 254.53 | 194.66 | 0.90 |
| NF-3 | NF-3 | 1636 | 50 yr | 1776.00 | 586.60 | 590.84 | 590.84 | 591.80 | 0.002072 | 8.09 | 288.46 | 201.70 | 0.92 |
| NF-3 | NF-3 | 1636 | 100 yr | 1997.00 | 586.60 | 591.03 | 591.03 | 592.02 | 0.001976 | 8.30 | 327.32 | 211.53 | 0.91 |
| NF-3 | NF-3 | 1636 | 500 yr | 2495.00 | 586.60 | 591.33 | 591.33 | 592.49 | 0.002041 | 9.07 | 393.15 | 227.33 | 0.94 |
| NF-3 | NF-3 | 1636 | Ultimate 100 yr | 2055.00 | 586.60 | 591.09 | 591.09 | 592.08 | 0.001919 | 8.31 | 340.24 | 214.72 | 0.90 |
| NF-3 | NF-3 | 1425 | 2 yr | 597.00 | 586.30 | 588.71 | 588.71 | 589.40 | 0.003023 | 6.66 | 89.65 | 66.09 | 1.01 |
| NF-3 | NF-3 | 1425 | 5 yr | 999.00 | 586.30 | 589.37 | 589.37 | 590.15 | 0.002232 | 7.16 | 163.90 | 168.05 | 0.92 |
| NF-3 | NF-3 | 1425 | 10 yr | 1261.00 | 586.30 | 589.64 | 589.64 | 590.52 | 0.002155 | 7.69 | 214.29 | 201.74 | 0.92 |
| NF-3 | NF-3 | 1425 | 25 yr | 1544.00 | 586.30 | 590.05 | 590.05 | 590.85 | 0.001644 | 7.53 | 321.38 | 302.78 | 0.83 |
| NF-3 | NF-3 | 1425 | 50 yr | 1776.00 | 586.30 | 590.28 | 590.28 | 591.08 | 0.001508 | 7.64 | 397.92 | 365.51 | 0.80 |
| NF-3 | NF-3 | 1425 | 100 yr | 1997.00 | 586.30 | 590.47 | 590.47 | 591.26 | 0.001420 | 7.75 | 470.06 | 388.04 | 0.79 |
| NF-3 | NF-3 | 1425 | 500 yr | 2495.00 | 586.30 | 590.80 | 590.80 | 591.61 | 0.001373 | 8.16 | 625.77 | 542.83 | 0.79 |
| NF-3 | NF-3 | 1425 | Ultimate 100 yr | 2055.00 | 586.30 | 590.49 | 590.49 | 591.30 | 0.001465 | 7.90 | 476.72 | 388.93 | 0.80 |
| NF-3 | NF-3 | 1380 | 2 yr | 639.00 | 584.60 | 587.74 | 587.74 | 588.86 | 0.002634 | 8.52 | 74.99 | 33.15 | 1.00 |
| NF-3 | NF-3 | 1380 | 5 yr | 1054.00 | 584.60 | 588.87 | 588.87 | 589.90 | 0.002656 | 8.11 | 129.93 | 63.37 | 1.00 |
| NF-3 | NF-3 | 1380 | 10 yr | 1332.00 | 584.60 | 589.38 | 589.38 | 590.36 | 0.002735 | 7.93 | 167.90 | 87.07 | 1.01 |
| NF-3 | NF-3 | 1380 | 25 yr | 1626.00 | 584.60 | 589.87 | 589.87 | 590.72 | 0.002157 | 7.42 | 251.76 | 292.71 | 0.91 |
| NF-3 | NF-3 | 1380 | 50 yr | 1877.00 | 584.60 | 590.18 | 590.18 | 590.94 | 0.001689 | 7.19 | 374.19 | 470.10 | 0.82 |
| NF-3 | NF-3 | 1380 | 100 yr | 2114.00 | 584.60 | 590.34 | 590.34 | 591.12 | 0.001621 | 7.36 | 454.51 | 519.34 | 0.81 |
| NF-3 | NF-3 | 1380 | 500 yr | 2652.00 | 584.60 | 590.68 | 590.68 | 591.47 | 0.001491 | 7.67 | 654.17 | 655.16 | 0.80 |
| NF-3 | NF-3 | 1380 | Ultimate 100 yr | 2168.00 | 584.60 | 590.38 | 590.38 | 591.16 | 0.001601 | 7.39 | 474.23 | 527.81 | 0.81 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NF-3 | NF-3 | 1282 | | Culvert | | | | | | | | | |
| NF-3 | NF-3 | 1215 | 2 yr | 639.00 | 581.73 | 586.85 | | 586.94 | 0.000093 | 2.47 | 258.21 | 58.69 | 0.21 |
| NF-3 | NF-3 | 1215 | 5 yr | 1054.00 | 581.73 | 587.66 | | 587.85 | 0.000150 | 3.43 | 307.17 | 61.22 | 0.27 |
| NF-3 | NF-3 | 1215 | 10 yr | 1332.00 | 581.73 | 588.01 | | 588.27 | 0.000197 | 4.05 | 328.60 | 62.29 | 0.31 |
| NF-3 | NF-3 | 1215 | 25 yr | 1626.00 | 581.73 | 588.23 | | 588.58 | 0.000260 | 4.75 | 342.36 | 62.96 | 0.36 |
| NF-3 | NF-3 | 1215 | 50 yr | 1877.00 | 581.73 | 588.33 | | 588.78 | 0.000328 | 5.38 | 348.77 | 63.28 | 0.40 |
| NF-3 | NF-3 | 1215 | 100 yr | 2114.00 | 581.73 | 588.40 | | 588.96 | 0.000402 | 5.99 | 353.15 | 63.49 | 0.45 |
| NF-3 | NF-3 | 1215 | 500 yr | 2652.00 | 581.73 | 588.51 | | 589.35 | 0.000632 | 7.36 | 360.43 | 66.99 | 0.56 |
| NF-3 | NF-3 | 1215 | Ultimate 100 yr | 2168.00 | 581.73 | 588.41 | | 589.00 | 0.000421 | 6.13 | 353.92 | 63.64 | 0.46 |
| NF-3 | NF-3 | 1066 | 2 yr | 639.00 | 582.00 | 586.79 | | 586.91 | 0.002105 | 2.88 | 238.96 | 119.30 | 0.29 |
| NF-3 | NF-3 | 1066 | 5 yr | 1054.00 | 582.00 | 587.63 | | 587.80 | 0.002257 | 3.50 | 364.23 | 190.03 | 0.31 |
| NF-3 | NF-3 | 1066 | 10 yr | 1332.00 | 582.00 | 587.99 | | 588.20 | 0.002443 | 3.87 | 438.10 | 216.17 | 0.33 |
| NF-3 | NF-3 | 1066 | 25 yr | 1626.00 | 582.00 | 588.23 | | 588.48 | 0.002786 | 4.28 | 551.74 | 495.05 | 0.35 |
| NF-3 | NF-3 | 1066 | 50 yr | 1877.00 | 582.00 | 588.37 | | 588.64 | 0.003030 | 4.56 | 621.98 | 513.17 | 0.37 |
| NF-3 | NF-3 | 1066 | 100 yr | 2114.00 | 582.00 | 588.49 | | 588.77 | 0.003260 | 4.80 | 680.15 | 527.75 | 0.39 |
| NF-3 | NF-3 | 1066 | 500 yr | 2652.00 | 582.00 | 588.72 | | 589.03 | 0.003630 | 5.23 | 808.68 | 558.63 | 0.41 |
| NF-3 | NF-3 | 1066 | Ultimate 100 yr | 2168.00 | 582.00 | 588.51 | | 588.79 | 0.003321 | 4.86 | 691.58 | 530.57 | 0.39 |
| NF-3 | NF-3 | 654 | 2 yr | 639.00 | 582.00 | 584.97 | 584.50 | 585.36 | 0.015797 | 5.00 | 127.70 | 82.00 | 0.71 |
| NF-3 | NF-3 | 654 | 5 yr | 1054.00 | 582.00 | 585.83 | 585.19 | 586.21 | 0.012373 | 4.96 | 212.46 | 115.15 | 0.64 |
| NF-3 | NF-3 | 654 | 10 yr | 1332.00 | 582.00 | 586.22 | 585.52 | 586.56 | 0.010177 | 4.79 | 333.52 | 470.75 | 0.59 |
| NF-3 | NF-3 | 654 | 25 yr | 1626.00 | 582.00 | 586.49 | 585.82 | 586.78 | 0.008020 | 4.62 | 465.61 | 524.98 | 0.54 |
| NF-3 | NF-3 | 654 | 50 yr | 1877.00 | 582.00 | 586.74 | 586.39 | 586.97 | 0.006031 | 4.30 | 605.71 | 668.57 | 0.47 |
| NF-3 | NF-3 | 654 | 100 yr | 2114.00 | 582.00 | 586.99 | 586.50 | 587.17 | 0.004594 | 3.99 | 754.99 | 741.02 | 0.42 |
| NF-3 | NF-3 | 654 | 500 yr | 2652.00 | 582.00 | 587.76 | 586.69 | 587.85 | 0.001846 | 2.97 | 1295.88 | 915.96 | 0.28 |
| NF-3 | NF-3 | 654 | Ultimate 100 yr | 2168.00 | 582.00 | 587.05 | 586.52 | 587.22 | 0.004298 | 3.91 | 792.58 | 755.38 | 0.41 |
| NF-4 | NF-4 | 3498 | 2 yr | 172.00 | 610.23 | 612.70 | 612.70 | 613.54 | 0.003217 | 7.33 | 23.47 | 14.33 | 1.01 |
| NF-4 | NF-4 | 3498 | 5 yr | 270.00 | 610.23 | 613.33 | 613.33 | 614.36 | 0.003025 | 8.11 | 33.36 | 18.07 | 1.01 |
| NF-4 | NF-4 | 3498 | 10 yr | 336.00 | 610.23 | 613.70 | 613.70 | 614.82 | 0.002662 | 8.51 | 41.32 | 25.49 | 0.97 |
| NF-4 | NF-4 | 3498 | 25 yr | 409.00 | 610.23 | 614.08 | 614.08 | 615.27 | 0.002338 | 8.81 | 52.54 | 33.25 | 0.93 |
| NF-4 | NF-4 | 3498 | 50 yr | 468.00 | 610.23 | 614.37 | 614.37 | 615.59 | 0.002130 | 8.98 | 63.03 | 39.14 | 0.91 |
| NF-4 | NF-4 | 3498 | 100 yr | 527.00 | 610.23 | 614.67 | 614.67 | 615.88 | 0.001906 | 9.04 | 75.62 | 46.29 | 0.87 |
| NF-4 | NF-4 | 3498 | 500 yr | 667.00 | 610.23 | 615.19 | 615.19 | 616.46 | 0.001730 | 9.48 | 104.76 | 68.23 | 0.85 |
| NF-4 | NF-4 | 3498 | Ultimate 100 yr | 540.00 | 610.23 | 614.72 | 614.72 | 615.94 | 0.001891 | 9.10 | 77.94 | 48.21 | 0.87 |
| NF-4 | NF-4 | 3367 | 2 yr | 172.00 | 609.06 | 612.05 | 612.05 | 612.63 | 0.002240 | 6.13 | 28.06 | 24.38 | 1.01 |
| NF-4 | NF-4 | 3367 | 5 yr | 270.00 | 609.06 | 612.54 | 612.54 | 613.17 | 0.002733 | 6.40 | 42.19 | 33.52 | 1.01 |
| NF-4 | NF-4 | 3367 | 10 yr | 336.00 | 609.06 | 612.78 | 612.78 | 613.46 | 0.003057 | 6.62 | 50.75 | 37.55 | 1.00 |
| NF-4 | NF-4 | 3367 | 25 yr | 409.00 | 609.06 | 613.01 | 613.01 | 613.73 | 0.003375 | 6.85 | 59.73 | 41.23 | 1.00 |
| NF-4 | NF-4 | 3367 | 50 yr | 468.00 | 609.06 | 613.16 | 613.16 | 613.93 | 0.003637 | 7.05 | 66.40 | 43.76 | 1.01 |
| NF-4 | NF-4 | 3367 | 100 yr | 527.00 | 609.06 | 613.67 | 613.30 | 614.19 | 0.002546 | 5.81 | 90.78 | 52.21 | 0.77 |
| NF-4 | NF-4 | 3367 | 500 yr | 667.00 | 609.06 | 614.58 | 613.62 | 614.94 | 0.001529 | 4.82 | 148.40 | 75.36 | 0.52 |
| NF-4 | NF-4 | 3367 | Ultimate 100 yr | 540.00 | 609.06 | 613.79 | 613.35 | 614.27 | 0.002336 | 5.58 | 96.99 | 54.89 | 0.72 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NF-4 | NF-4 | 3287 | 2 yr | 172.00 | 608.46 | 610.44 | 610.44 | 611.29 | 0.003251 | 7.41 | 23.22 | 13.78 | 1.01 |
| NF-4 | NF-4 | 3287 | 5 yr | 270.00 | 608.46 | 611.06 | 611.06 | 612.15 | 0.003089 | 8.37 | 32.24 | 14.98 | 1.01 |
| NF-4 | NF-4 | 3287 | 10 yr | 336.00 | 608.46 | 611.43 | 611.43 | 612.65 | 0.003021 | 8.87 | 37.86 | 15.68 | 1.01 |
| NF-4 | NF-4 | 3287 | 25 yr | 409.00 | 608.46 | 611.80 | 611.80 | 613.15 | 0.002960 | 9.33 | 43.82 | 16.38 | 1.01 |
| NF-4 | NF-4 | 3287 | 50 yr | 468.00 | 608.46 | 612.08 | 612.08 | 613.53 | 0.002924 | 9.66 | 48.43 | 16.91 | 1.01 |
| NF-4 | NF-4 | 3287 | 100 yr | 527.00 | 608.46 | 612.34 | 612.34 | 613.88 | 0.002893 | 9.96 | 52.92 | 17.41 | 1.01 |
| NF-4 | NF-4 | 3287 | 500 yr | 667.00 | 608.46 | 612.91 | 612.91 | 614.64 | 0.002829 | 10.55 | 63.20 | 18.50 | 1.01 |
| NF-4 | NF-4 | 3287 | Ultimate 100 yr | 540.00 | 608.46 | 612.40 | 612.40 | 613.96 | 0.002886 | 10.02 | 53.90 | 17.51 | 1.01 |
| NF-4 | NF-4 | 3240 | | Culvert | | | | | | | | | |
| NF-4 | NF-4 | 3200 | 2 yr | 196.00 | 607.07 | 609.13 | 609.13 | 610.03 | 0.003203 | 7.63 | 25.69 | 14.32 | 1.00 |
| NF-4 | NF-4 | 3200 | 5 yr | 307.00 | 607.07 | 609.78 | 609.78 | 610.95 | 0.003064 | 8.65 | 35.50 | 15.46 | 1.01 |
| NF-4 | NF-4 | 3200 | 10 yr | 382.00 | 607.07 | 610.18 | 610.18 | 611.48 | 0.002991 | 9.16 | 41.70 | 16.14 | 1.00 |
| NF-4 | NF-4 | 3200 | 25 yr | 465.00 | 607.07 | 610.57 | 610.57 | 612.02 | 0.002942 | 9.65 | 48.17 | 16.82 | 1.01 |
| NF-4 | NF-4 | 3200 | 50 yr | 533.00 | 607.07 | 610.87 | 610.87 | 612.42 | 0.002909 | 10.00 | 53.28 | 17.34 | 1.01 |
| NF-4 | NF-4 | 3200 | 100 yr | 598.00 | 607.07 | 611.14 | 611.14 | 612.79 | 0.002882 | 10.30 | 58.03 | 17.81 | 1.01 |
| NF-4 | NF-4 | 3200 | 500 yr | 757.00 | 607.07 | 611.75 | 611.75 | 613.61 | 0.002821 | 10.93 | 69.27 | 18.87 | 1.01 |
| NF-4 | NF-4 | 3200 | Ultimate 100 yr | 613.00 | 607.07 | 611.20 | 611.20 | 612.87 | 0.002877 | 10.37 | 59.11 | 17.91 | 1.01 |
| NF-4 | NF-4 | 3096 | 2 yr | 196.00 | 606.71 | 608.79 | 608.79 | 609.66 | 0.003150 | 7.49 | 26.17 | 15.16 | 1.00 |
| NF-4 | NF-4 | 3096 | 5 yr | 307.00 | 606.71 | 609.43 | 609.43 | 610.54 | 0.002992 | 8.45 | 36.31 | 16.55 | 1.01 |
| NF-4 | NF-4 | 3096 | 10 yr | 382.00 | 606.71 | 609.80 | 609.80 | 611.05 | 0.002916 | 8.95 | 42.70 | 17.38 | 1.01 |
| NF-4 | NF-4 | 3096 | 25 yr | 465.00 | 606.71 | 610.18 | 610.18 | 611.55 | 0.002856 | 9.41 | 49.43 | 18.20 | 1.01 |
| NF-4 | NF-4 | 3096 | 50 yr | 533.00 | 606.71 | 610.47 | 610.47 | 611.94 | 0.002819 | 9.74 | 54.72 | 18.83 | 1.01 |
| NF-4 | NF-4 | 3096 | 100 yr | 598.00 | 606.71 | 610.73 | 610.73 | 612.29 | 0.002731 | 10.02 | 60.05 | 23.29 | 1.00 |
| NF-4 | NF-4 | 3096 | 500 yr | 757.00 | 606.71 | 611.25 | 611.25 | 613.08 | 0.002616 | 10.86 | 76.43 | 39.08 | 1.00 |
| NF-4 | NF-4 | 3096 | Ultimate 100 yr | 613.00 | 606.71 | 610.78 | 610.78 | 612.36 | 0.002719 | 10.10 | 61.35 | 25.34 | 1.00 |
| NF-4 | NF-4 | 3046 | 2 yr | 196.00 | 606.58 | 608.45 | 608.45 | 609.12 | 0.003140 | 6.56 | 29.90 | 22.79 | 1.01 |
| NF-4 | NF-4 | 3046 | 5 yr | 307.00 | 606.58 | 608.96 | 608.96 | 609.77 | 0.002931 | 7.25 | 42.34 | 26.29 | 1.01 |
| NF-4 | NF-4 | 3046 | 10 yr | 382.00 | 606.58 | 609.25 | 609.25 | 610.14 | 0.002876 | 7.58 | 50.40 | 29.27 | 1.01 |
| NF-4 | NF-4 | 3046 | 25 yr | 465.00 | 606.58 | 609.51 | 609.51 | 610.51 | 0.002690 | 8.04 | 58.37 | 32.32 | 1.00 |
| NF-4 | NF-4 | 3046 | 50 yr | 533.00 | 606.58 | 609.69 | 609.69 | 610.80 | 0.002665 | 8.46 | 64.28 | 34.38 | 1.01 |
| NF-4 | NF-4 | 3046 | 100 yr | 598.00 | 606.58 | 609.88 | 609.86 | 611.06 | 0.002533 | 8.73 | 71.09 | 36.62 | 1.00 |
| NF-4 | NF-4 | 3046 | 500 yr | 757.00 | 606.58 | 610.51 | 610.28 | 611.69 | 0.001840 | 8.71 | 96.75 | 45.05 | 0.89 |
| NF-4 | NF-4 | 3046 | Ultimate 100 yr | 613.00 | 606.58 | 609.93 | 609.90 | 611.12 | 0.002462 | 8.74 | 73.16 | 37.27 | 0.99 |
| NF-4 | NF-4 | 2713 | 2 yr | 196.00 | 604.68 | 607.07 | | 607.65 | 0.001791 | 6.13 | 31.96 | 16.35 | 0.77 |
| NF-4 | NF-4 | 2713 | 5 yr | 307.00 | 604.68 | 607.87 | | 608.57 | 0.001572 | 6.70 | 45.80 | 18.23 | 0.75 |
| NF-4 | NF-4 | 2713 | 10 yr | 382.00 | 604.68 | 608.34 | 607.72 | 609.10 | 0.001463 | 7.00 | 55.10 | 26.22 | 0.73 |
| NF-4 | NF-4 | 2713 | 25 yr | 465.00 | 604.68 | 608.80 | 608.09 | 609.63 | 0.001344 | 7.32 | 74.11 | 67.12 | 0.71 |
| NF-4 | NF-4 | 2713 | 50 yr | 533.00 | 604.68 | 609.10 | 608.37 | 610.01 | 0.001311 | 7.67 | 110.26 | 168.51 | 0.72 |
| NF-4 | NF-4 | 2713 | 100 yr | 598.00 | 604.68 | 609.40 | 608.61 | 610.36 | 0.001257 | 7.92 | 167.22 | 217.12 | 0.71 |
| NF-4 | NF-4 | 2713 | 500 yr | 757.00 | 604.68 | 610.07 | 609.20 | 611.17 | 0.001154 | 8.45 | 350.41 | 397.83 | 0.70 |
| NF-4 | NF-4 | 2713 | Ultimate 100 yr | 613.00 | 604.68 | 609.46 | 608.66 | 610.44 | 0.001253 | 7.99 | 180.37 | 226.87 | 0.71 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

| River | 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 |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NF-4 | NF-4 | 2604 | 2 yr | 199.00 | 604.36 | 606.45 | 606.45 | 607.34 | 0.003141 | 7.57 | 26.28 | 14.67 | 1.00 |
| NF-4 | NF-4 | 2604 | 5 yr | 314.00 | 604.36 | 607.11 | 607.11 | 608.27 | 0.003025 | 8.62 | 36.42 | 15.86 | 1.00 |
| NF-4 | NF-4 | 2604 | 10 yr | 391.00 | 604.36 | 607.51 | 607.51 | 608.80 | 0.002945 | 9.13 | 42.83 | 16.57 | 1.00 |
| NF-4 | NF-4 | 2604 | 25 yr | 476.00 | 604.36 | 607.89 | 607.89 | 609.34 | 0.002936 | 9.67 | 49.24 | 17.25 | 1.01 |
| NF-4 | NF-4 | 2604 | 50 yr | 542.00 | 604.36 | 608.17 | 608.17 | 609.72 | 0.002902 | 10.00 | 54.21 | 17.78 | 1.01 |
| NF-4 | NF-4 | 2604 | 100 yr | 607.00 | 604.36 | 608.45 | 608.45 | 610.08 | 0.002790 | 10.27 | 59.49 | 20.84 | 1.00 |
| NF-4 | NF-4 | 2604 | 500 yr | 769.00 | 604.36 | 609.09 | 609.09 | 610.90 | 0.002468 | 10.82 | 144.45 | 193.87 | 0.97 |
| NF-4 | NF-4 | 2604 | Ultimate 100 yr | 621.00 | 604.36 | 608.50 | 608.50 | 610.16 | 0.002786 | 10.35 | 60.57 | 21.40 | 1.00 |
| NF-4 | NF-4 | 2558 | | Culvert | | | | | | | | | |
| NF-4 | NF-4 | 2513 | 2 yr | 199.00 | 602.46 | 604.65 | 604.65 | 605.59 | 0.003245 | 7.79 | 25.53 | 13.68 | 1.01 |
| NF-4 | NF-4 | 2513 | 5 yr | 314.00 | 602.46 | 605.35 | 605.35 | 606.56 | 0.003103 | 8.83 | 35.54 | 14.83 | 1.01 |
| NF-4 | NF-4 | 2513 | 10 yr | 391.00 | 602.46 | 605.76 | 605.76 | 607.12 | 0.003045 | 9.37 | 41.74 | 15.50 | 1.01 |
| NF-4 | NF-4 | 2513 | 25 yr | 476.00 | 602.46 | 606.17 | 606.17 | 607.68 | 0.002994 | 9.86 | 48.27 | 16.18 | 1.01 |
| NF-4 | NF-4 | 2513 | 50 yr | 542.00 | 602.46 | 606.47 | 606.47 | 608.08 | 0.002963 | 10.20 | 53.15 | 16.66 | 1.01 |
| NF-4 | NF-4 | 2513 | 100 yr | 607.00 | 602.46 | 606.75 | 606.75 | 608.46 | 0.002923 | 10.48 | 57.93 | 17.13 | 1.00 |
| NF-4 | NF-4 | 2513 | 500 yr | 769.00 | 602.46 | 607.36 | 607.36 | 609.32 | 0.002749 | 11.25 | 74.11 | 32.13 | 1.00 |
| NF-4 | NF-4 | 2513 | Ultimate 100 yr | 621.00 | 602.46 | 606.81 | 606.81 | 608.54 | 0.002917 | 10.54 | 58.92 | 17.70 | 1.00 |
| NF-4 | NF-4 | 2415 | 2 yr | 199.00 | 602.07 | 604.23 | 604.23 | 605.13 | 0.003211 | 7.60 | 26.17 | 14.78 | 1.01 |
| NF-4 | NF-4 | 2415 | 5 yr | 314.00 | 602.07 | 604.90 | 604.90 | 606.05 | 0.003047 | 8.61 | 36.45 | 16.03 | 1.01 |
| NF-4 | NF-4 | 2415 | 10 yr | 391.00 | 602.07 | 605.29 | 605.29 | 606.58 | 0.002976 | 9.13 | 42.82 | 16.76 | 1.01 |
| NF-4 | NF-4 | 2415 | 25 yr | 476.00 | 602.07 | 605.68 | 605.68 | 607.11 | 0.002916 | 9.61 | 49.53 | 17.49 | 1.01 |
| NF-4 | NF-4 | 2415 | 50 yr | 542.00 | 602.07 | 605.96 | 605.96 | 607.49 | 0.002879 | 9.94 | 54.55 | 18.02 | 1.01 |
| NF-4 | NF-4 | 2415 | 100 yr | 607.00 | 602.07 | 606.23 | 606.23 | 607.85 | 0.002838 | 10.21 | 59.44 | 18.52 | 1.00 |
| NF-4 | NF-4 | 2415 | 500 yr | 769.00 | 602.07 | 606.80 | 606.80 | 608.67 | 0.002650 | 10.95 | 79.50 | 44.34 | 1.00 |
| NF-4 | NF-4 | 2415 | Ultimate 100 yr | 621.00 | 602.07 | 606.28 | 606.28 | 607.92 | 0.002834 | 10.27 | 60.45 | 18.65 | 1.00 |
| NF-4 | NF-4 | 2155 | 2 yr | 199.00 | 600.12 | 602.22 | 602.22 | 603.11 | 0.003166 | 7.56 | 26.31 | 14.97 | 1.01 |
| NF-4 | NF-4 | 2155 | 5 yr | 314.00 | 600.12 | 602.88 | 602.88 | 604.02 | 0.003002 | 8.56 | 36.70 | 16.33 | 1.01 |
| NF-4 | NF-4 | 2155 | 10 yr | 391.00 | 600.12 | 603.27 | 603.27 | 604.54 | 0.002930 | 9.06 | 43.16 | 17.12 | 1.01 |
| NF-4 | NF-4 | 2155 | 25 yr | 476.00 | 600.12 | 603.66 | 603.66 | 605.07 | 0.002868 | 9.53 | 49.97 | 17.92 | 1.01 |
| NF-4 | NF-4 | 2155 | 50 yr | 542.00 | 600.12 | 603.94 | 603.94 | 605.44 | 0.002834 | 9.85 | 55.03 | 18.49 | 1.01 |
| NF-4 | NF-4 | 2155 | 100 yr | 607.00 | 600.12 | 604.20 | 604.20 | 605.79 | 0.002791 | 10.13 | 59.99 | 20.63 | 1.00 |
| NF-4 | NF-4 | 2155 | 500 yr | 769.00 | 600.12 | 604.78 | 604.78 | 606.59 | 0.002651 | 10.80 | 75.37 | 32.49 | 1.00 |
| NF-4 | NF-4 | 2155 | Ultimate 100 yr | 621.00 | 600.12 | 604.24 | 604.24 | 605.86 | 0.002792 | 10.21 | 60.98 | 21.44 | 1.01 |
| NF-4 | NF-4 | 1814 | 2 yr | 199.00 | 597.59 | 599.66 | 599.66 | 600.54 | 0.003160 | 7.53 | 26.42 | 15.16 | 1.01 |
| NF-4 | NF-4 | 1814 | 5 yr | 314.00 | 597.59 | 600.32 | 600.32 | 601.45 | 0.003000 | 8.53 | 36.82 | 16.52 | 1.01 |
| NF-4 | NF-4 | 1814 | 10 yr | 391.00 | 597.59 | 600.70 | 600.70 | 601.97 | 0.002919 | 9.02 | 43.33 | 17.32 | 1.01 |
| NF-4 | NF-4 | 1814 | 25 yr | 476.00 | 597.59 | 601.10 | 601.10 | 602.49 | 0.002823 | 9.45 | 50.37 | 18.14 | 1.00 |
| NF-4 | NF-4 | 1814 | 50 yr | 542.00 | 597.59 | 601.37 | 601.37 | 602.86 | 0.002817 | 9.81 | 55.27 | 18.69 | 1.00 |
| NF-4 | NF-4 | 1814 | 100 yr | 607.00 | 597.59 | 601.62 | 601.62 | 603.21 | 0.002779 | 10.11 | 60.20 | 20.49 | 1.01 |
| NF-4 | NF-4 | 1814 | 500 yr | 769.00 | 597.59 | 602.18 | 602.18 | 604.01 | 0.002602 | 10.85 | 77.71 | 44.54 | 1.00 |
| NF-4 | NF-4 | 1814 | Ultimate 100 yr | 621.00 | 597.59 | 601.67 | 601.67 | 603.28 | 0.002771 | 10.18 | 61.24 | 20.69 | 1.01 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

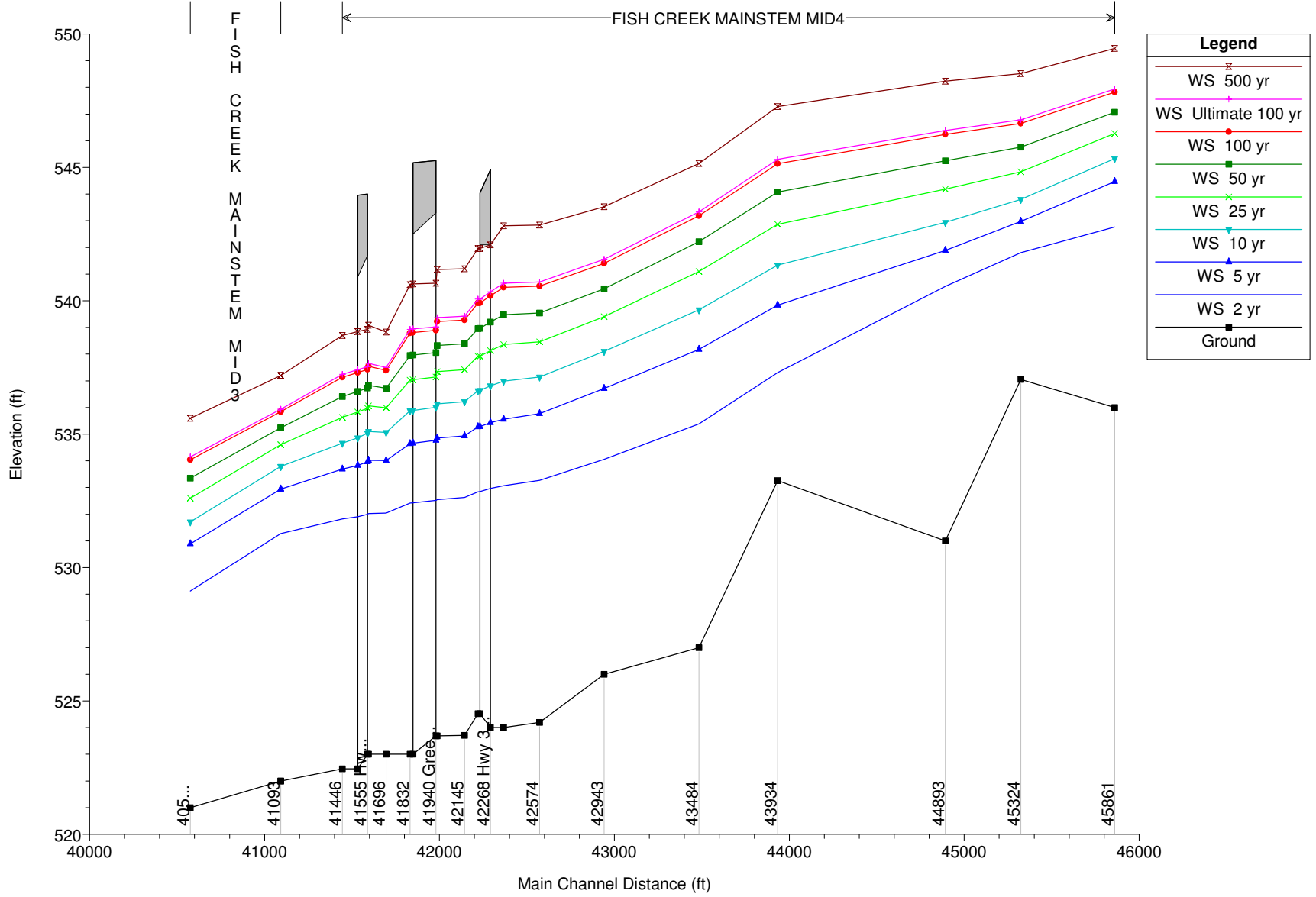
| River | Reach | River Sta | Profile | Q Total (cfs) | Min Ch El (ft) | W.S. Elev (ft) | Crit W.S. (ft) | E.G. Elev (ft) | E.G. Slope (ft/ft) | Vel Chnl (ft/s) | Flow Area (sq ft) | Top Width (ft) | Froude # Chl |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NF-4 | NF-4 | 1505 | 2 yr | 199.00 | 595.22 | 597.29 | 597.29 | 598.18 | 0.003163 | 7.58 | 26.26 | 14.90 | 1.01 |
| NF-4 | NF-4 | 1505 | 5 yr | 314.00 | 595.22 | 597.95 | 597.95 | 599.09 | 0.003001 | 8.57 | 36.65 | 16.26 | 1.01 |
| NF-4 | NF-4 | 1505 | 10 yr | 391.00 | 595.22 | 598.78 | | 599.70 | 0.001847 | 7.71 | 50.73 | 17.95 | 0.81 |
| NF-4 | NF-4 | 1505 | 25 yr | 476.00 | 595.22 | 599.06 | 598.73 | 600.19 | 0.002079 | 8.51 | 55.96 | 18.54 | 0.86 |
| NF-4 | NF-4 | 1505 | 50 yr | 542.00 | 595.22 | 599.11 | 599.01 | 600.52 | 0.002587 | 9.55 | 56.78 | 18.76 | 0.96 |
| NF-4 | NF-4 | 1505 | 100 yr | 607.00 | 595.22 | 599.27 | 599.27 | 600.87 | 0.002751 | 10.13 | 60.19 | 22.17 | 1.00 |
| NF-4 | NF-4 | 1505 | 500 yr | 769.00 | 595.22 | 599.85 | 599.85 | 601.66 | 0.002516 | 10.81 | 76.27 | 30.55 | 0.98 |
| NF-4 | NF-4 | 1505 | Ultimate 100 yr | 621.00 | 595.22 | 599.33 | 599.33 | 600.94 | 0.002731 | 10.19 | 61.45 | 23.61 | 1.00 |
| NF-4 | NF-4 | 1305 | 2 yr | 199.00 | 593.78 | 596.38 | 595.55 | 596.75 | 0.000947 | 4.87 | 40.86 | 17.16 | 0.56 |
| NF-4 | NF-4 | 1305 | 5 yr | 314.00 | 593.78 | 598.17 | 596.17 | 598.46 | 0.000411 | 4.28 | 74.03 | 22.94 | 0.38 |
| NF-4 | NF-4 | 1305 | 10 yr | 391.00 | 593.78 | 599.00 | 596.52 | 599.29 | 0.000332 | 4.37 | 97.87 | 34.96 | 0.35 |
| NF-4 | NF-4 | 1305 | 25 yr | 476.00 | 593.78 | 599.34 | 596.91 | 599.71 | 0.000385 | 4.93 | 111.18 | 45.84 | 0.39 |
| NF-4 | NF-4 | 1305 | 50 yr | 542.00 | 593.78 | 599.48 | 597.17 | 599.93 | 0.000454 | 5.45 | 117.91 | 52.86 | 0.42 |
| NF-4 | NF-4 | 1305 | 100 yr | 607.00 | 593.78 | 599.54 | 597.42 | 600.09 | 0.000545 | 6.02 | 121.31 | 55.89 | 0.46 |
| NF-4 | NF-4 | 1305 | 500 yr | 769.00 | 593.78 | 599.58 | 598.01 | 600.45 | 0.000850 | 7.55 | 123.75 | 58.59 | 0.58 |
| NF-4 | NF-4 | 1305 | Ultimate 100 yr | 621.00 | 593.78 | 599.54 | 597.48 | 600.12 | 0.000568 | 6.15 | 121.67 | 56.30 | 0.47 |
| NF-4 | NF-4 | 1287 | 2 yr | 199.00 | 593.78 | 596.43 | 595.38 | 596.70 | 0.000686 | 4.20 | 47.37 | 18.41 | 0.46 |
| NF-4 | NF-4 | 1287 | 5 yr | 314.00 | 593.78 | 598.20 | 595.93 | 598.44 | 0.000343 | 3.91 | 81.12 | 23.33 | 0.33 |
| NF-4 | NF-4 | 1287 | 10 yr | 391.00 | 593.78 | 599.02 | 596.27 | 599.27 | 0.000292 | 4.05 | 105.13 | 35.28 | 0.32 |
| NF-4 | NF-4 | 1287 | 25 yr | 476.00 | 593.78 | 599.37 | 596.59 | 599.69 | 0.000344 | 4.59 | 118.96 | 47.27 | 0.35 |
| NF-4 | NF-4 | 1287 | 50 yr | 542.00 | 593.78 | 599.51 | 596.86 | 599.90 | 0.000406 | 5.08 | 126.22 | 54.19 | 0.38 |
| NF-4 | NF-4 | 1287 | 100 yr | 607.00 | 593.78 | 599.58 | 597.10 | 600.06 | 0.000486 | 5.60 | 130.21 | 58.57 | 0.42 |
| NF-4 | NF-4 | 1287 | 500 yr | 769.00 | 593.78 | 599.65 | 597.66 | 600.40 | 0.000743 | 6.99 | 134.72 | 63.28 | 0.51 |
| NF-4 | NF-4 | 1287 | Ultimate 100 yr | 621.00 | 593.78 | 599.59 | 597.15 | 600.09 | 0.000506 | 5.72 | 130.72 | 59.12 | 0.42 |
| NF-4 | NF-4 | 1267 | | Culvert | | | | | | | | | |
| NF-4 | NF-4 | 1247 | 2 yr | 199.00 | 593.25 | 596.22 | 594.86 | 596.44 | 0.000487 | 3.75 | 53.02 | 18.45 | 0.39 |
| NF-4 | NF-4 | 1247 | 5 yr | 314.00 | 593.25 | 597.56 | 595.42 | 597.81 | 0.000387 | 4.03 | 77.85 | 20.77 | 0.35 |
| NF-4 | NF-4 | 1247 | 10 yr | 391.00 | 593.25 | 598.42 | 595.75 | 598.67 | 0.000308 | 4.08 | 111.34 | 49.52 | 0.32 |
| NF-4 | NF-4 | 1247 | 25 yr | 476.00 | 593.25 | 598.75 | 596.09 | 599.06 | 0.000353 | 4.56 | 128.82 | 55.65 | 0.35 |
| NF-4 | NF-4 | 1247 | 50 yr | 542.00 | 593.25 | 598.89 | 596.34 | 599.26 | 0.000414 | 5.02 | 136.60 | 58.96 | 0.38 |
| NF-4 | NF-4 | 1247 | 100 yr | 607.00 | 593.25 | 598.92 | 596.59 | 599.38 | 0.000506 | 5.57 | 138.64 | 59.62 | 0.42 |
| NF-4 | NF-4 | 1247 | 500 yr | 769.00 | 593.25 | 599.08 | 597.14 | 599.75 | 0.000723 | 6.79 | 147.94 | 62.53 | 0.50 |
| NF-4 | NF-4 | 1247 | Ultimate 100 yr | 621.00 | 593.25 | 598.92 | 596.63 | 599.40 | 0.000531 | 5.71 | 138.45 | 59.56 | 0.43 |
| NF-4 | NF-4 | 1229 | 2 yr | 199.00 | 593.25 | 596.15 | 594.99 | 596.42 | 0.000638 | 4.24 | 46.89 | 17.53 | 0.46 |
| NF-4 | NF-4 | 1229 | 5 yr | 314.00 | 593.25 | 597.49 | 595.60 | 597.80 | 0.000466 | 4.40 | 71.39 | 18.78 | 0.40 |
| NF-4 | NF-4 | 1229 | 10 yr | 391.00 | 593.25 | 598.37 | 595.95 | 598.66 | 0.000350 | 4.37 | 103.63 | 49.23 | 0.36 |
| NF-4 | NF-4 | 1229 | 25 yr | 476.00 | 593.25 | 598.70 | 596.32 | 599.05 | 0.000399 | 4.89 | 120.34 | 54.25 | 0.38 |
| NF-4 | NF-4 | 1229 | 50 yr | 542.00 | 593.25 | 598.82 | 596.59 | 599.25 | 0.000470 | 5.39 | 127.12 | 57.21 | 0.42 |
| NF-4 | NF-4 | 1229 | 100 yr | 607.00 | 593.25 | 598.83 | 596.83 | 599.36 | 0.000585 | 6.02 | 127.67 | 57.45 | 0.47 |
| NF-4 | NF-4 | 1229 | 500 yr | 769.00 | 593.25 | 598.88 | 597.43 | 599.72 | 0.000899 | 7.51 | 130.90 | 58.80 | 0.58 |
| NF-4 | NF-4 | 1229 | Ultimate 100 yr | 621.00 | 593.25 | 598.82 | 596.89 | 599.38 | 0.000618 | 6.17 | 127.04 | 57.18 | 0.48 |

HEC-RAS Plan: P12 Locations: User Defined (Continued)

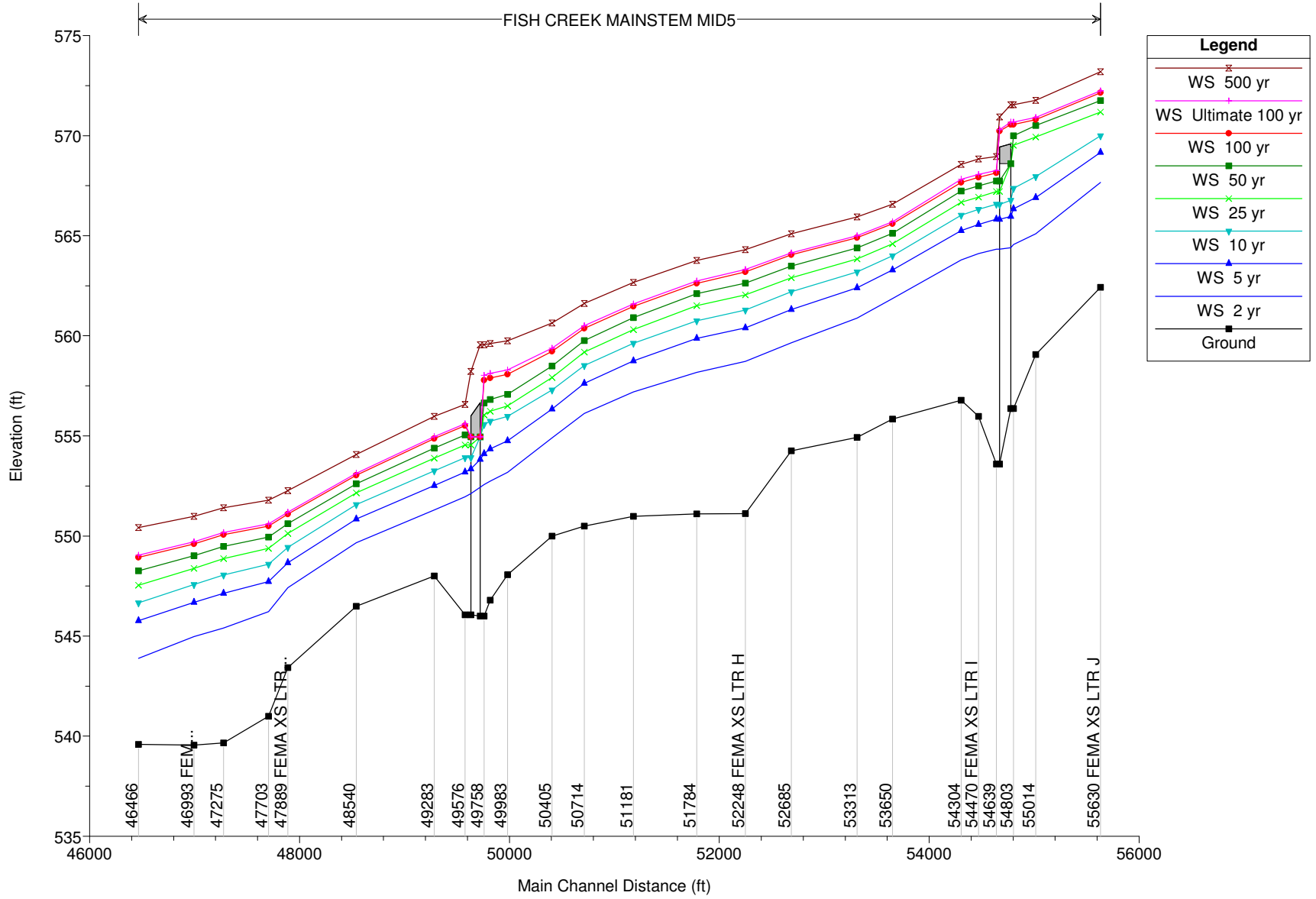
| River | Reach | River Sta | Profile | Q Total (cfs) | Min Ch El (ft) | W.S. Elev (ft) | Crit W.S. (ft) | E.G. Elev (ft) | E.G. Slope (ft/ft) | Vel Chnl (ft/s) | Flow Area (sq ft) | Top Width (ft) | Froude # Chl |
|-------|-------|-----------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| NF-4 | NF-4 | 1120 | 2 yr | 221.00 | 592.79 | 596.12 | 594.69 | 596.34 | 0.000431 | 3.74 | 59.15 | 21.62 | 0.40 |
| NF-4 | NF-4 | 1120 | 5 yr | 359.00 | 592.79 | 597.49 | 595.35 | 597.73 | 0.000323 | 3.96 | 93.21 | 37.96 | 0.36 |
| NF-4 | NF-4 | 1120 | 10 yr | 445.00 | 592.79 | 598.37 | 595.70 | 598.61 | 0.000253 | 3.91 | 122.60 | 172.05 | 0.33 |
| NF-4 | NF-4 | 1120 | 25 yr | 549.00 | 592.79 | 598.70 | 596.11 | 598.99 | 0.000296 | 4.41 | 157.68 | 256.43 | 0.36 |
| NF-4 | NF-4 | 1120 | 50 yr | 626.00 | 592.79 | 598.95 | 596.38 | 599.13 | 0.000214 | 3.88 | 356.51 | 269.86 | 0.31 |
| NF-4 | NF-4 | 1120 | 100 yr | 695.00 | 592.79 | 599.00 | 596.60 | 599.22 | 0.000247 | 4.20 | 371.33 | 272.81 | 0.33 |
| NF-4 | NF-4 | 1120 | 500 yr | 867.00 | 592.79 | 599.21 | 597.14 | 599.47 | 0.000300 | 4.75 | 430.05 | 285.35 | 0.36 |
| NF-4 | NF-4 | 1120 | Ultimate 100 yr | 709.00 | 592.79 | 599.00 | 596.66 | 599.23 | 0.000257 | 4.28 | 371.48 | 272.84 | 0.34 |
| NF-4 | NF-4 | 1085 | | Culvert | | | | | | | | | |
| NF-4 | NF-4 | 1050 | 2 yr | 221.00 | 589.45 | 594.86 | 592.08 | 594.92 | 0.000879 | 1.90 | 116.08 | 34.05 | 0.18 |
| NF-4 | NF-4 | 1050 | 5 yr | 359.00 | 589.45 | 595.54 | 592.62 | 595.64 | 0.001371 | 2.57 | 139.86 | 36.39 | 0.23 |
| NF-4 | NF-4 | 1050 | 10 yr | 445.00 | 589.45 | 595.84 | 592.91 | 595.98 | 0.001712 | 2.95 | 151.00 | 37.69 | 0.26 |
| NF-4 | NF-4 | 1050 | 25 yr | 549.00 | 589.45 | 596.15 | 593.22 | 596.33 | 0.002125 | 3.37 | 162.83 | 39.03 | 0.29 |
| NF-4 | NF-4 | 1050 | 50 yr | 626.00 | 589.45 | 596.34 | 593.45 | 596.55 | 0.002424 | 3.67 | 170.52 | 53.30 | 0.31 |
| NF-4 | NF-4 | 1050 | 100 yr | 695.00 | 589.45 | 596.51 | 593.62 | 596.75 | 0.002650 | 3.92 | 177.53 | 85.43 | 0.33 |
| NF-4 | NF-4 | 1050 | 500 yr | 867.00 | 589.45 | 596.88 | 594.09 | 597.20 | 0.003202 | 4.51 | 193.41 | 199.67 | 0.36 |
| NF-4 | NF-4 | 1050 | Ultimate 100 yr | 709.00 | 589.45 | 596.55 | 593.68 | 596.79 | 0.002700 | 3.97 | 178.83 | 91.29 | 0.33 |
| NF-4 | NF-4 | 987 | 2 yr | 221.00 | 591.87 | 594.70 | 593.65 | 594.82 | 0.004520 | 2.84 | 77.82 | 45.45 | 0.38 |
| NF-4 | NF-4 | 987 | 5 yr | 359.00 | 591.87 | 595.34 | 594.12 | 595.50 | 0.004919 | 3.25 | 110.61 | 57.54 | 0.41 |
| NF-4 | NF-4 | 987 | 10 yr | 445.00 | 591.87 | 595.62 | 594.36 | 595.81 | 0.004832 | 3.51 | 127.89 | 65.33 | 0.41 |
| NF-4 | NF-4 | 987 | 25 yr | 549.00 | 591.87 | 595.91 | 594.63 | 596.14 | 0.004832 | 3.81 | 148.21 | 73.90 | 0.42 |
| NF-4 | NF-4 | 987 | 50 yr | 626.00 | 591.87 | 596.10 | 594.80 | 596.35 | 0.004911 | 4.03 | 162.42 | 91.74 | 0.43 |
| NF-4 | NF-4 | 987 | 100 yr | 695.00 | 591.87 | 596.27 | 594.97 | 596.54 | 0.004890 | 4.19 | 177.24 | 142.18 | 0.43 |
| NF-4 | NF-4 | 987 | 500 yr | 867.00 | 591.87 | 596.66 | 595.33 | 596.95 | 0.004673 | 4.45 | 222.59 | 240.46 | 0.43 |
| NF-4 | NF-4 | 987 | Ultimate 100 yr | 709.00 | 591.87 | 596.30 | 595.00 | 596.57 | 0.004888 | 4.22 | 180.45 | 149.75 | 0.43 |

FISH CREEK_May_2012 Plan: Existing_2012 5/30/2012

Geom: Fish Creek_May_2012



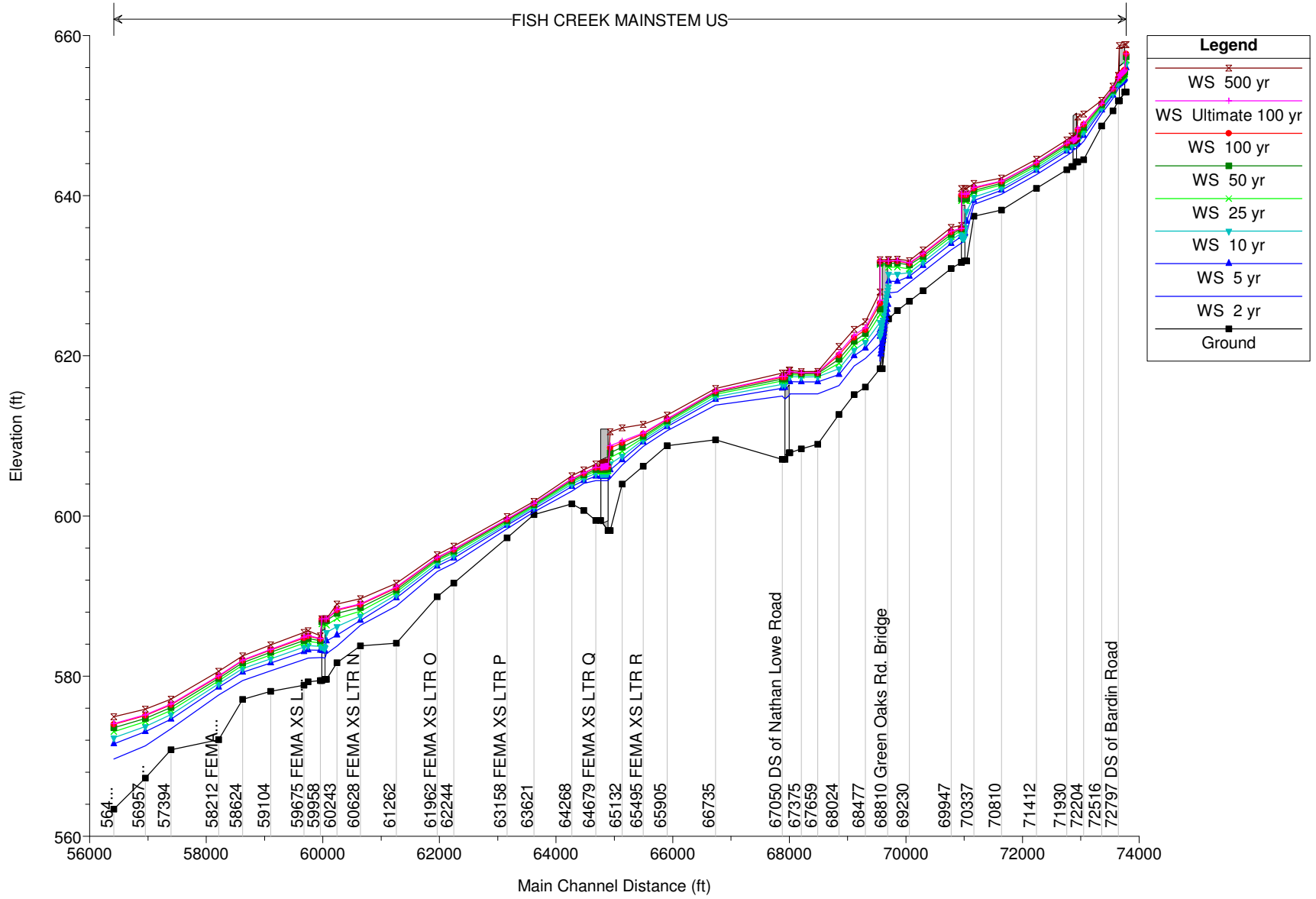
FISH CREEK_May_2012 Plan: Existing_2012 5/30/2012
 Geom: Fish Creek_May_2012



FISH CREEK_May_2012 Plan: Existing_2012 5/30/2012

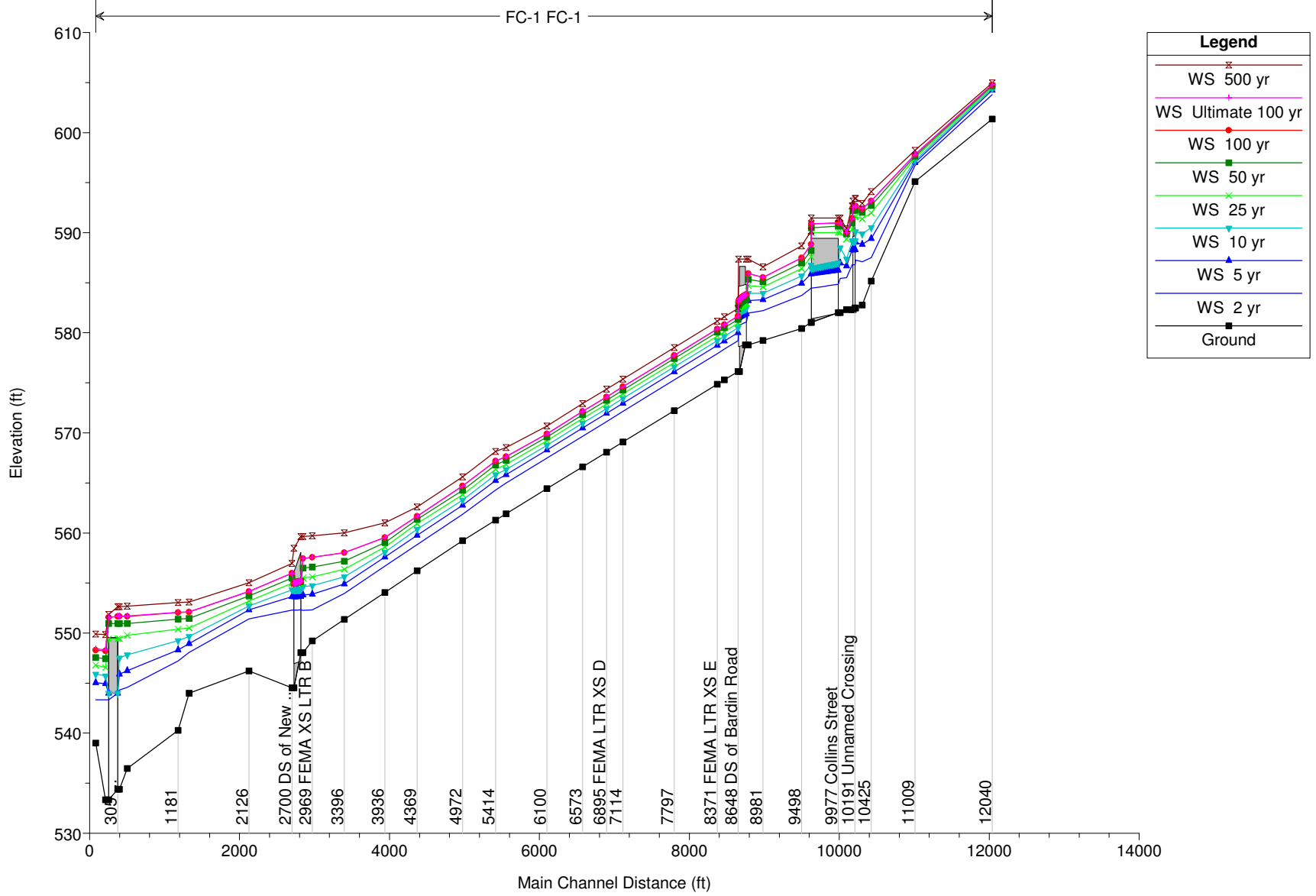
Geom: Fish Creek_May_2012

FISH CREEK MAINSTEM US



FISH CREEK_May_2012 Plan: Existing_2012 5/30/2012

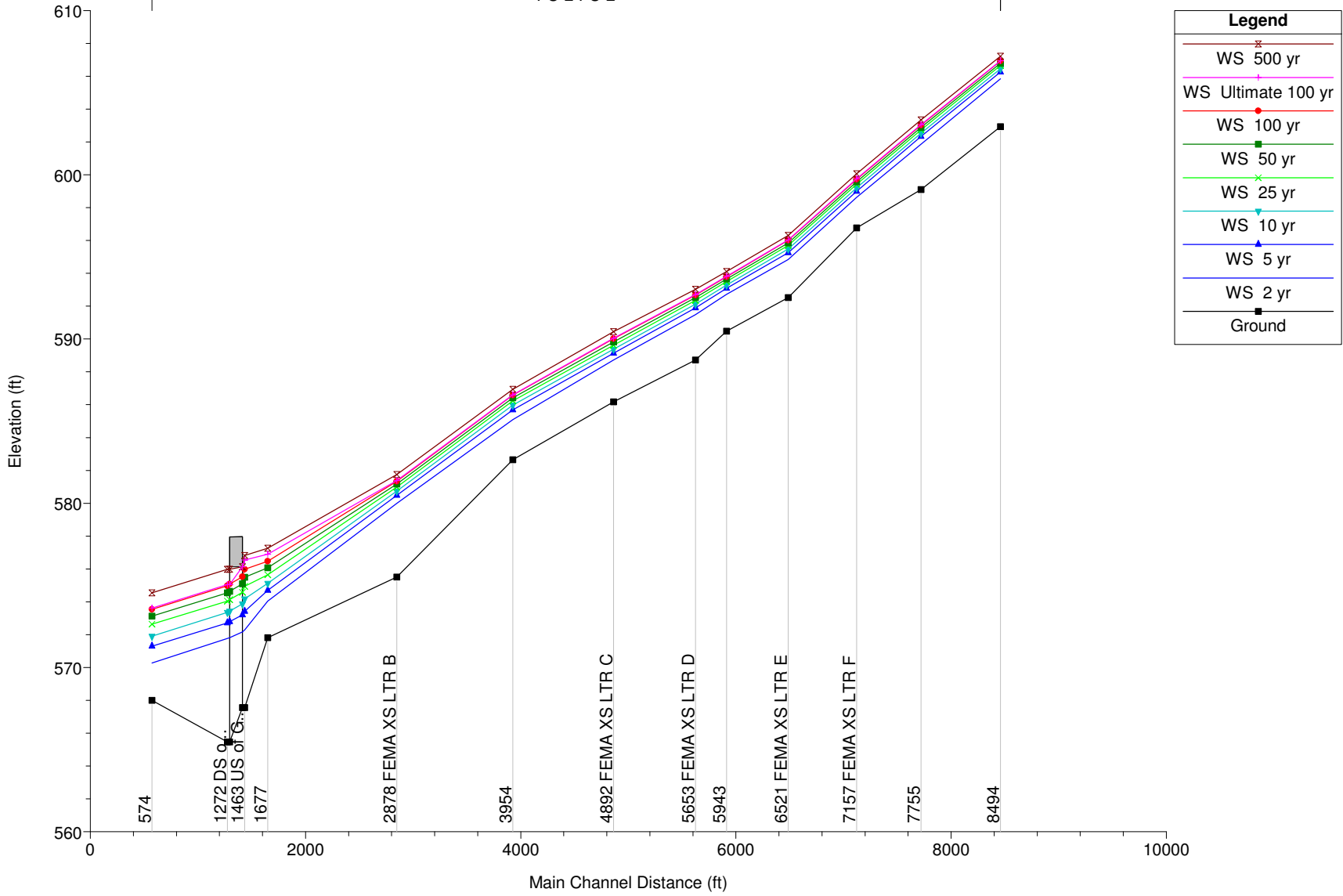
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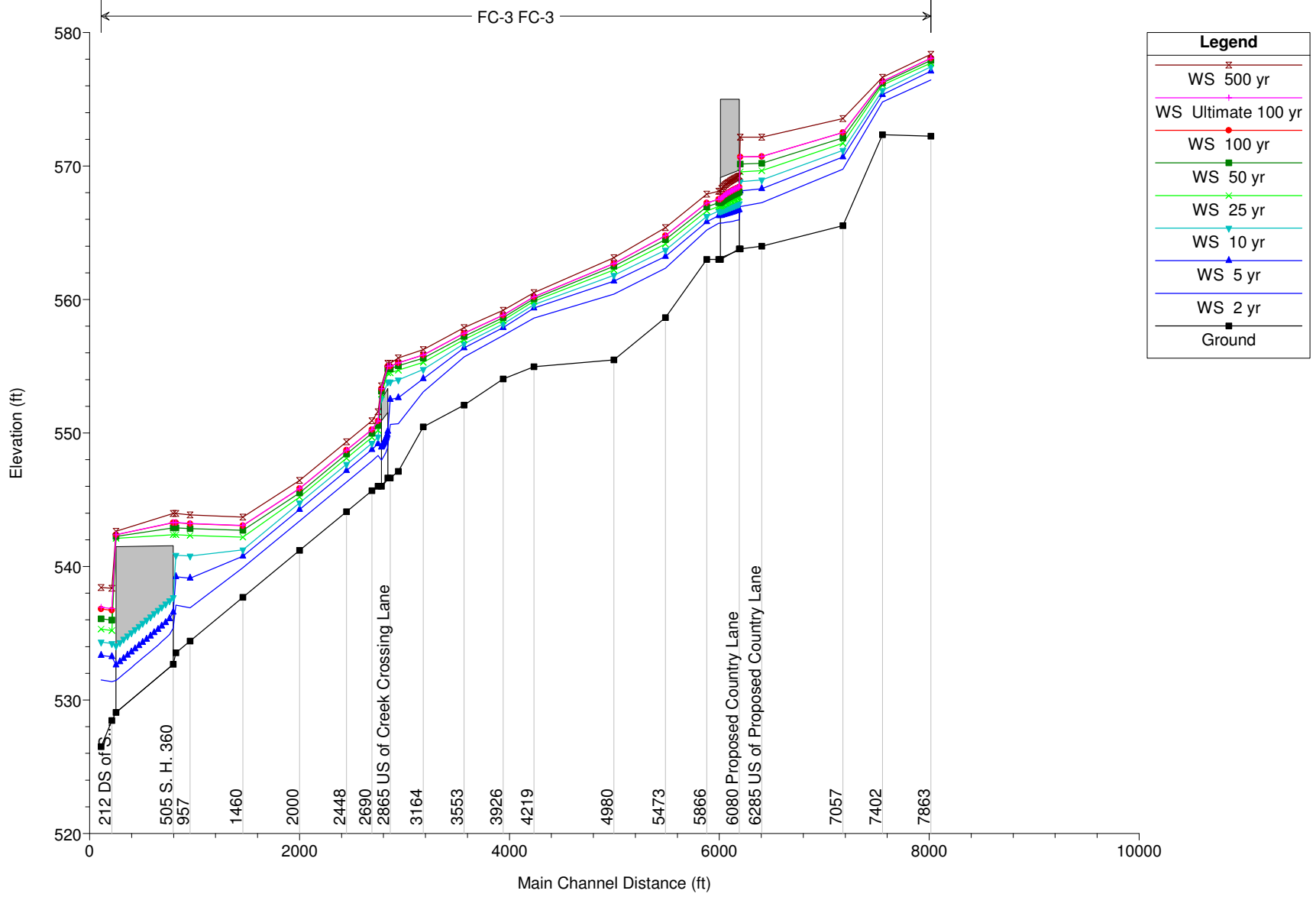
FISH CREEK_May_2012 Plan: Existing_2012 5/30/2012

Geom: Fish Creek_May_2012

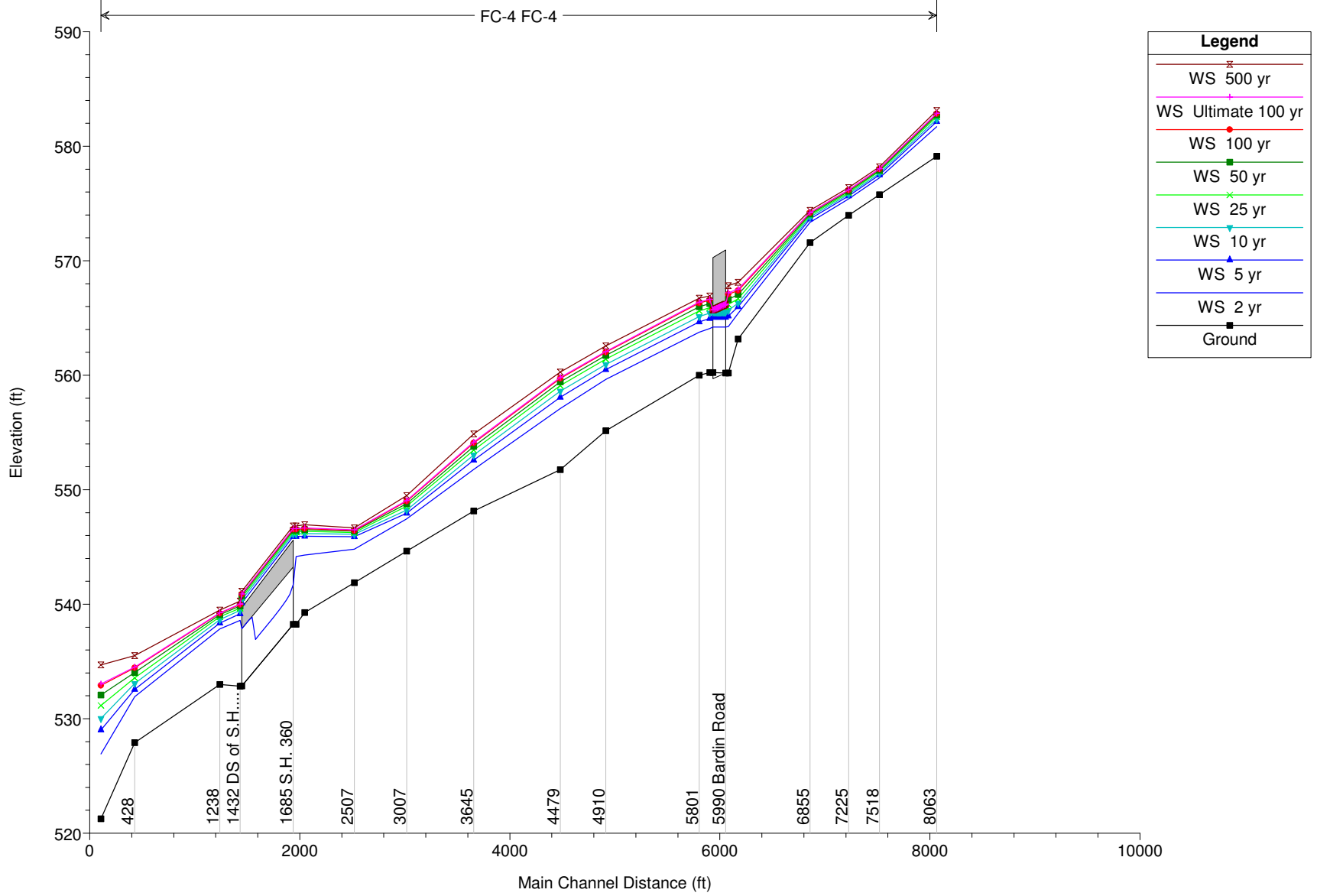
FC-2 FC-2



FISH CREEK_May_2012 Plan: Existing_2012 5/30/2012
 Geom: Fish Creek_May_2012



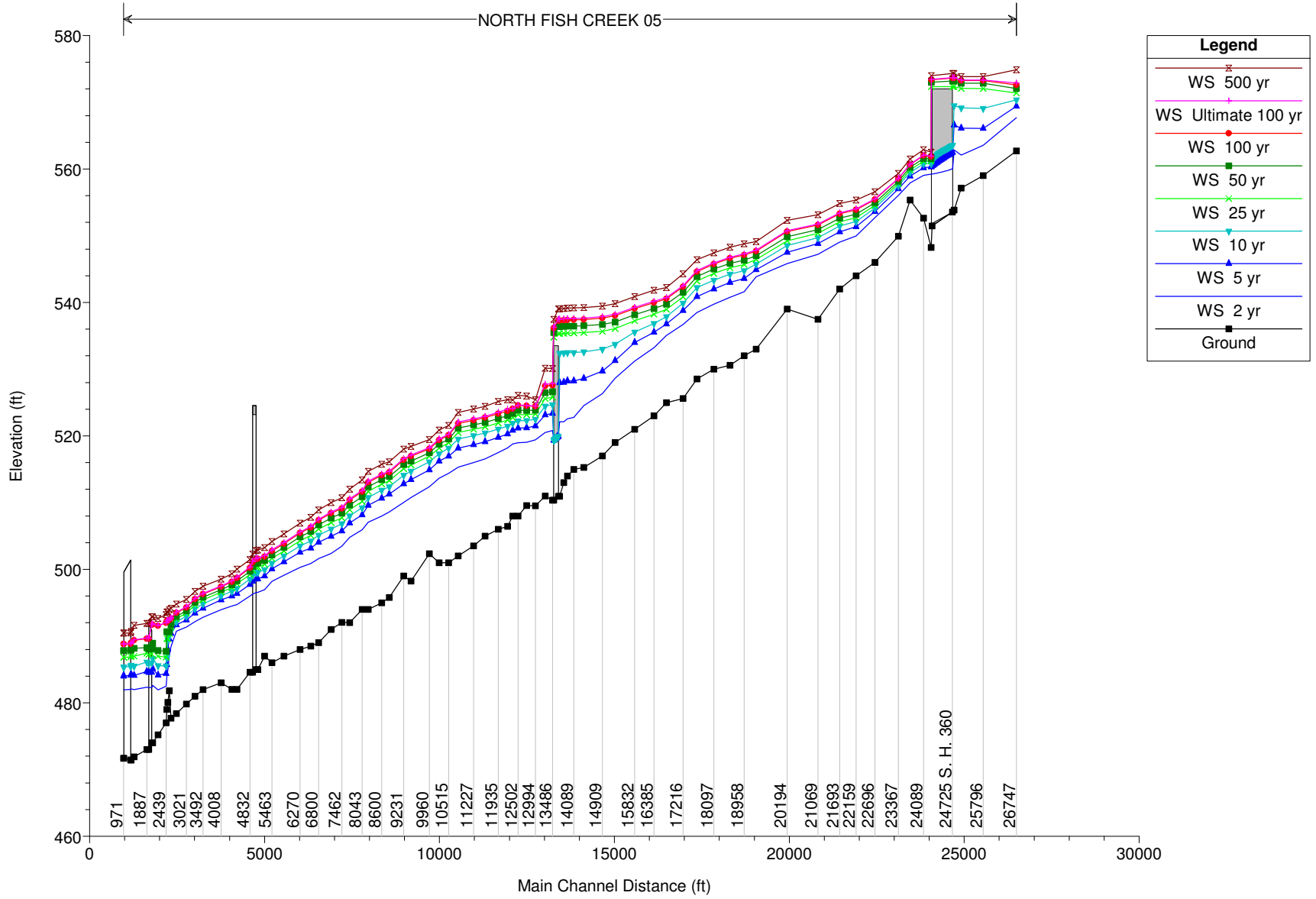
FISH CREEK_May_2012 Plan: Existing_2012 5/30/2012
 Geom: Fish Creek_May_2012



FISH CREEK_May_2012 Plan: Existing_2012 5/30/2012

Geom: Fish Creek_May_2012

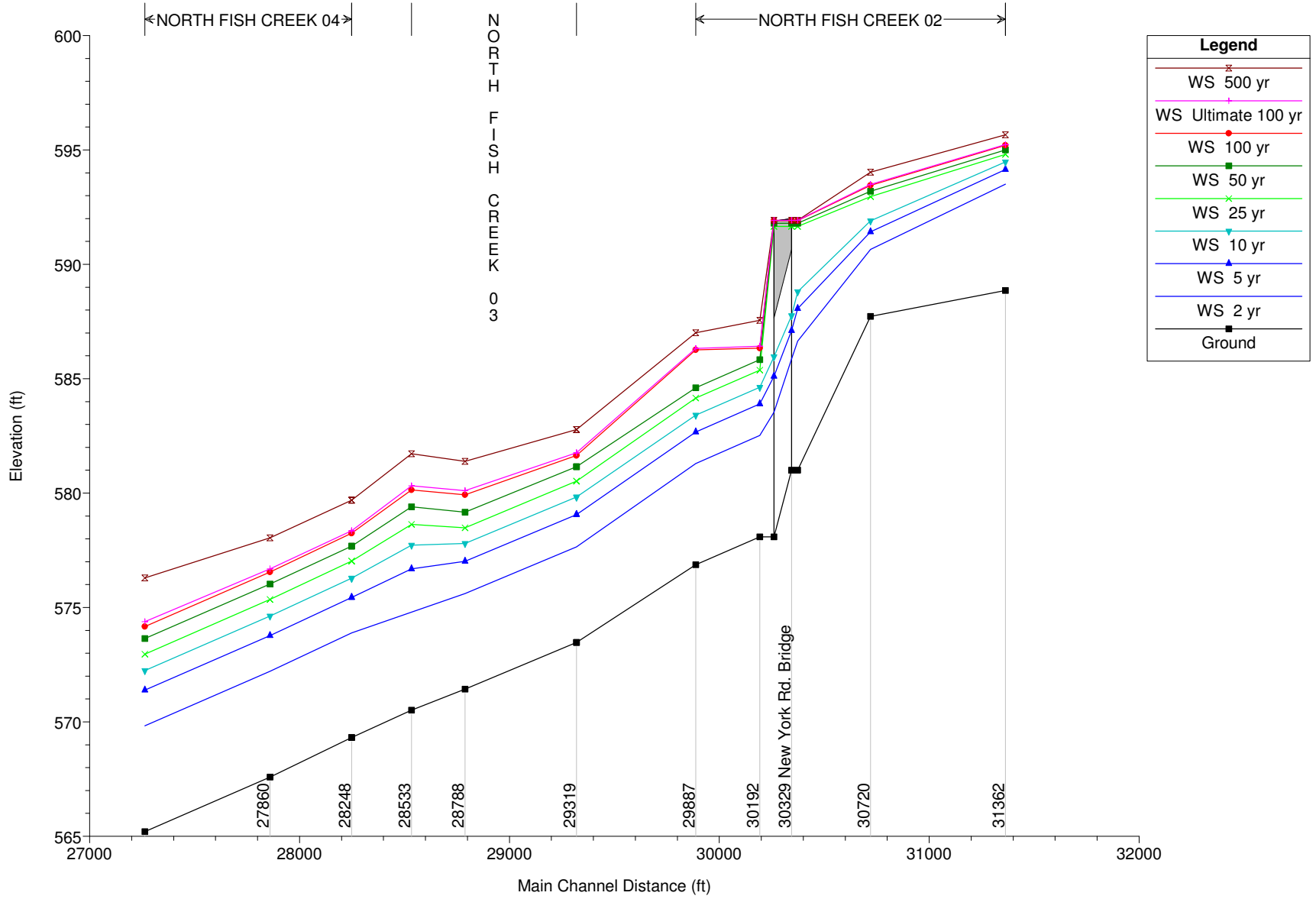
NORTH FISH CREEK 05



| Legend | |
|--------------------|-------------------------------------|
| WS 500 yr | (Red line with 'x' markers) |
| WS Ultimate 100 yr | (Magenta line with '+' markers) |
| WS 100 yr | (Red line with 'o' markers) |
| WS 50 yr | (Green line with '■' markers) |
| WS 25 yr | (Light green line with 'x' markers) |
| WS 10 yr | (Cyan line with '▼' markers) |
| WS 5 yr | (Blue line with '▲' markers) |
| WS 2 yr | (Dark blue line with '▲' markers) |
| Ground | (Black line with '■' markers) |

FISH CREEK_May_2012 Plan: Existing_2012 5/30/2012

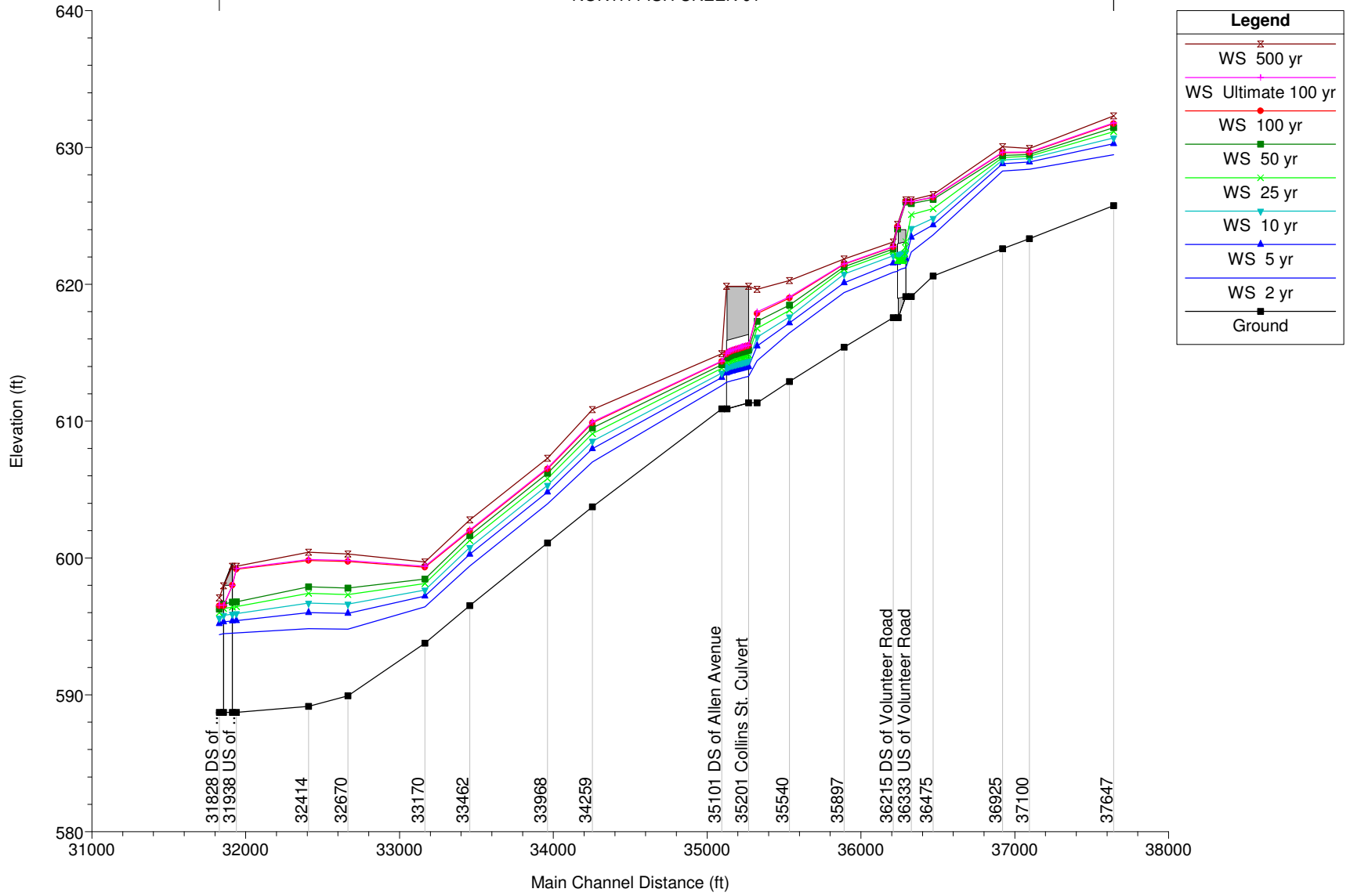
Geom: Fish Creek_May_2012



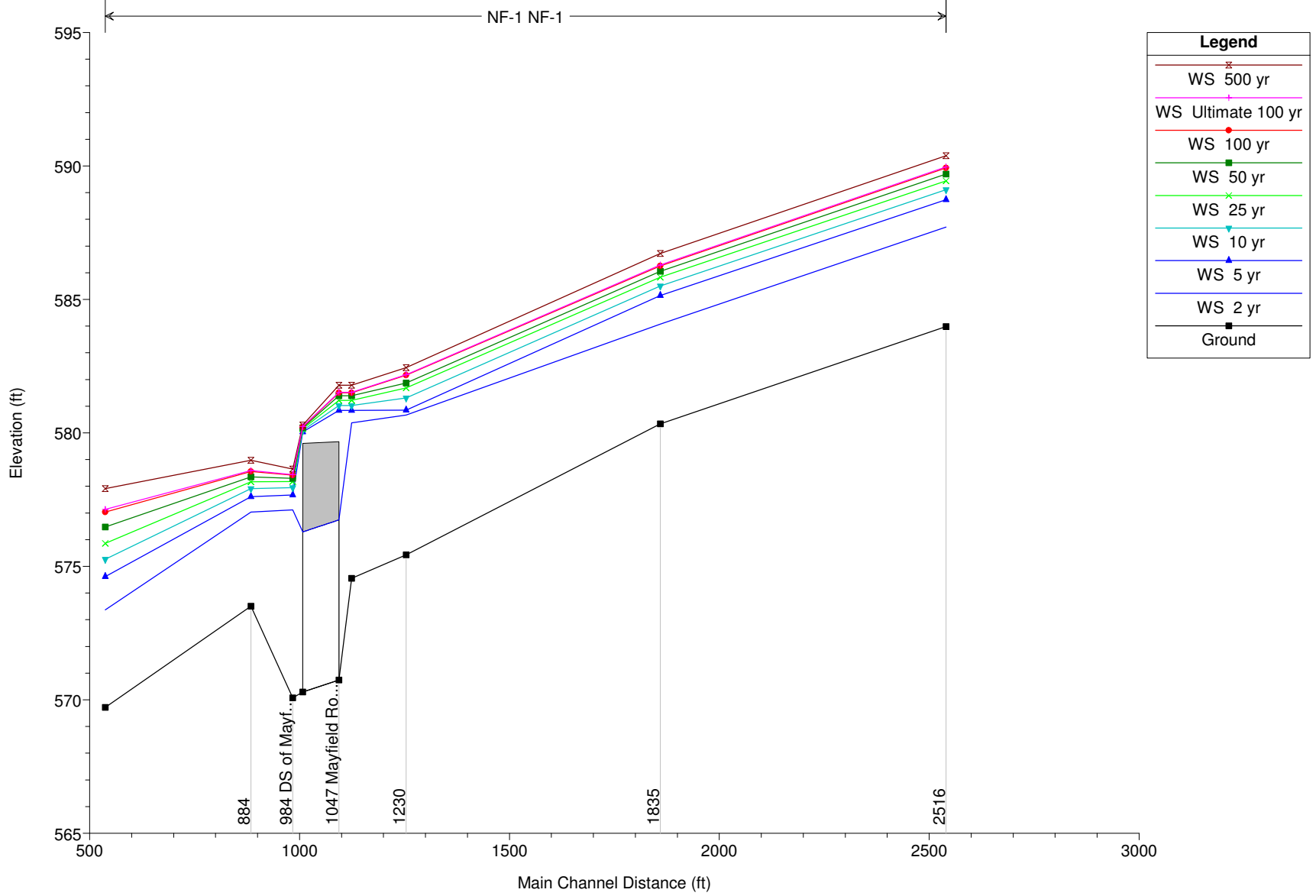
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Geom: Fish Creek_May_2012

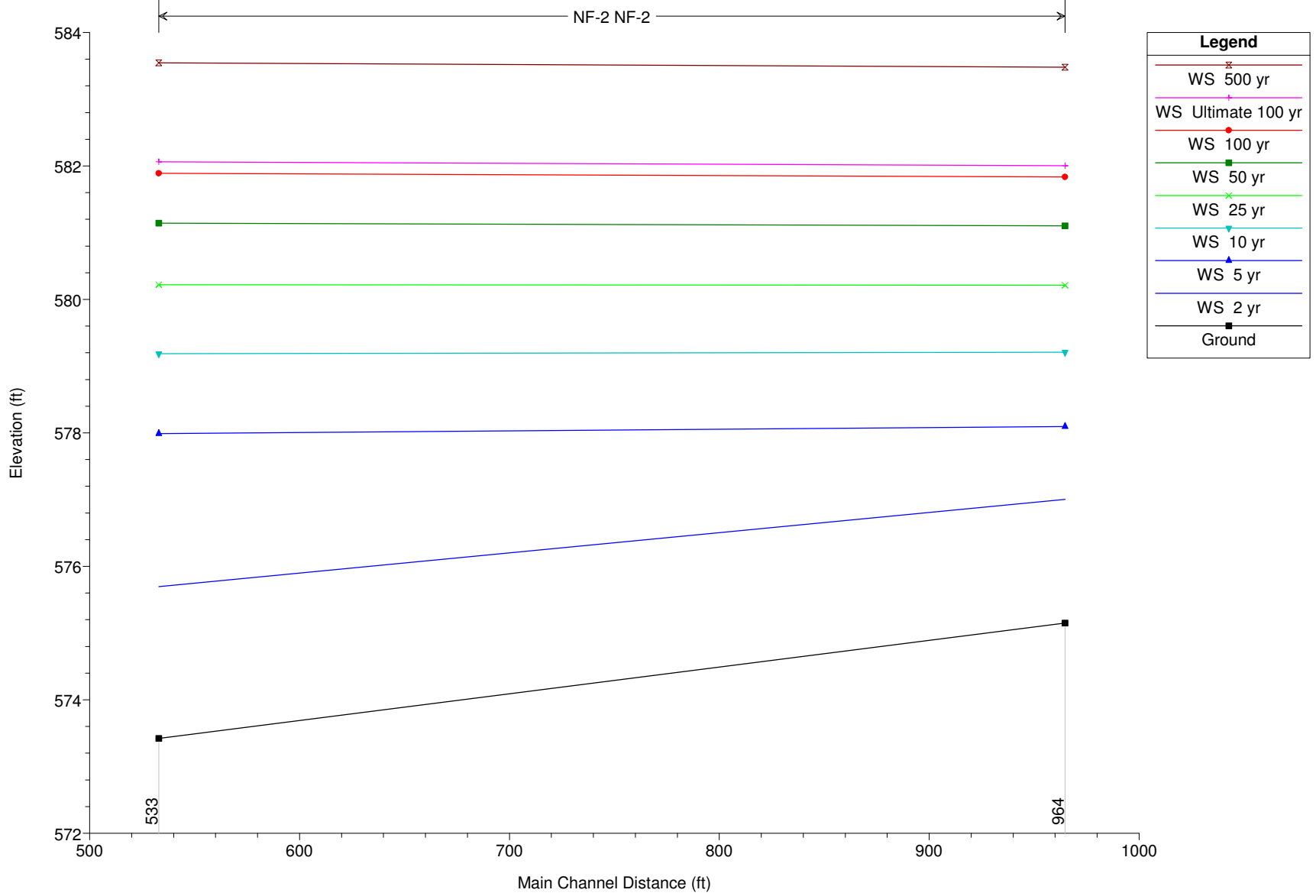
← NORTH FISH CREEK 01 →



FISH CREEK_May_2012 Plan: Existing_2012 5/30/2012
 Geom: Fish Creek_May_2012



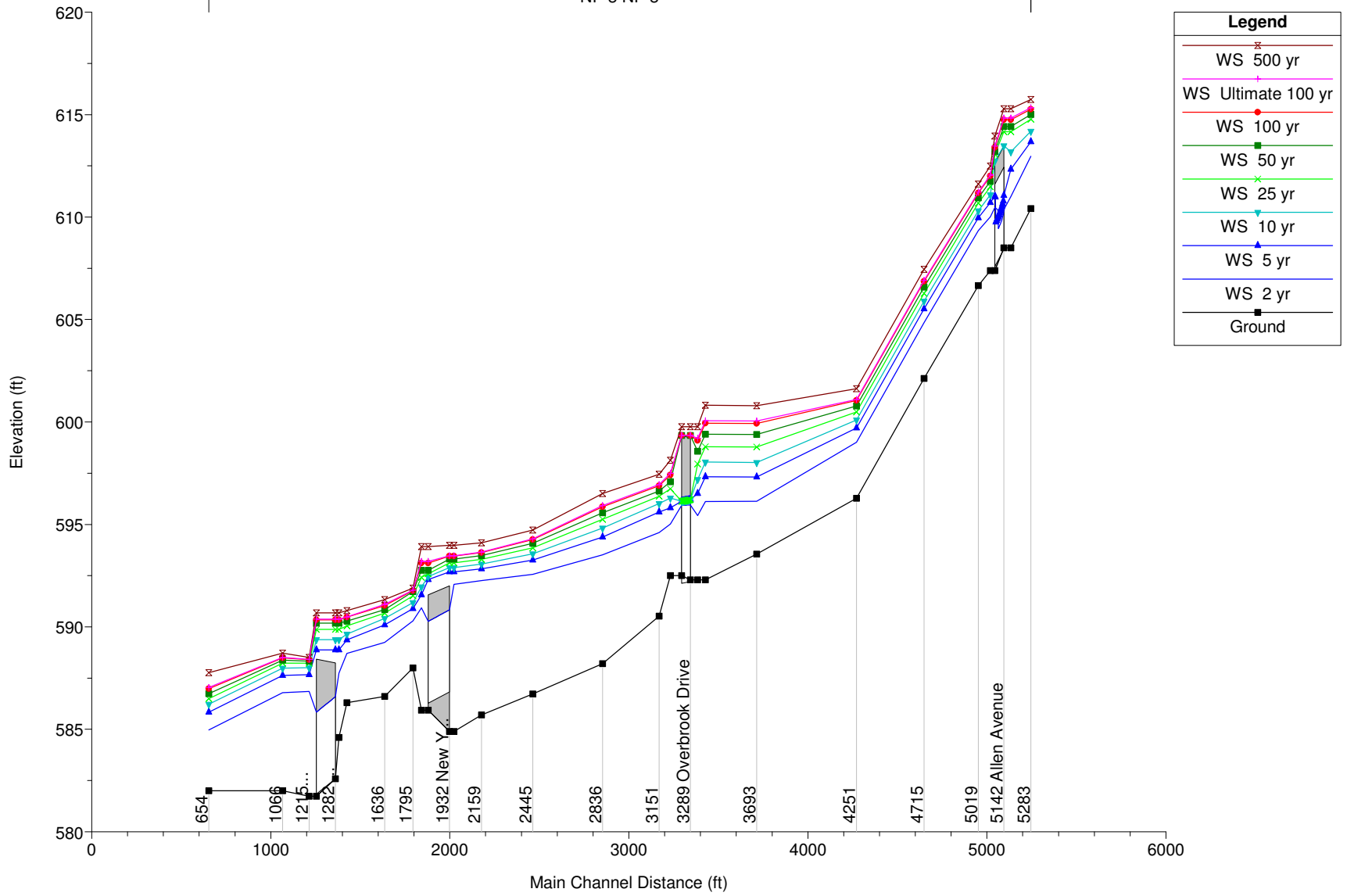
FISH CREEK_May_2012 Plan: Existing_2012 5/30/2012
Geom: Fish Creek_May_2012



FISH CREEK_May_2012 Plan: Existing_2012 5/30/2012

Geom: Fish Creek_May_2012

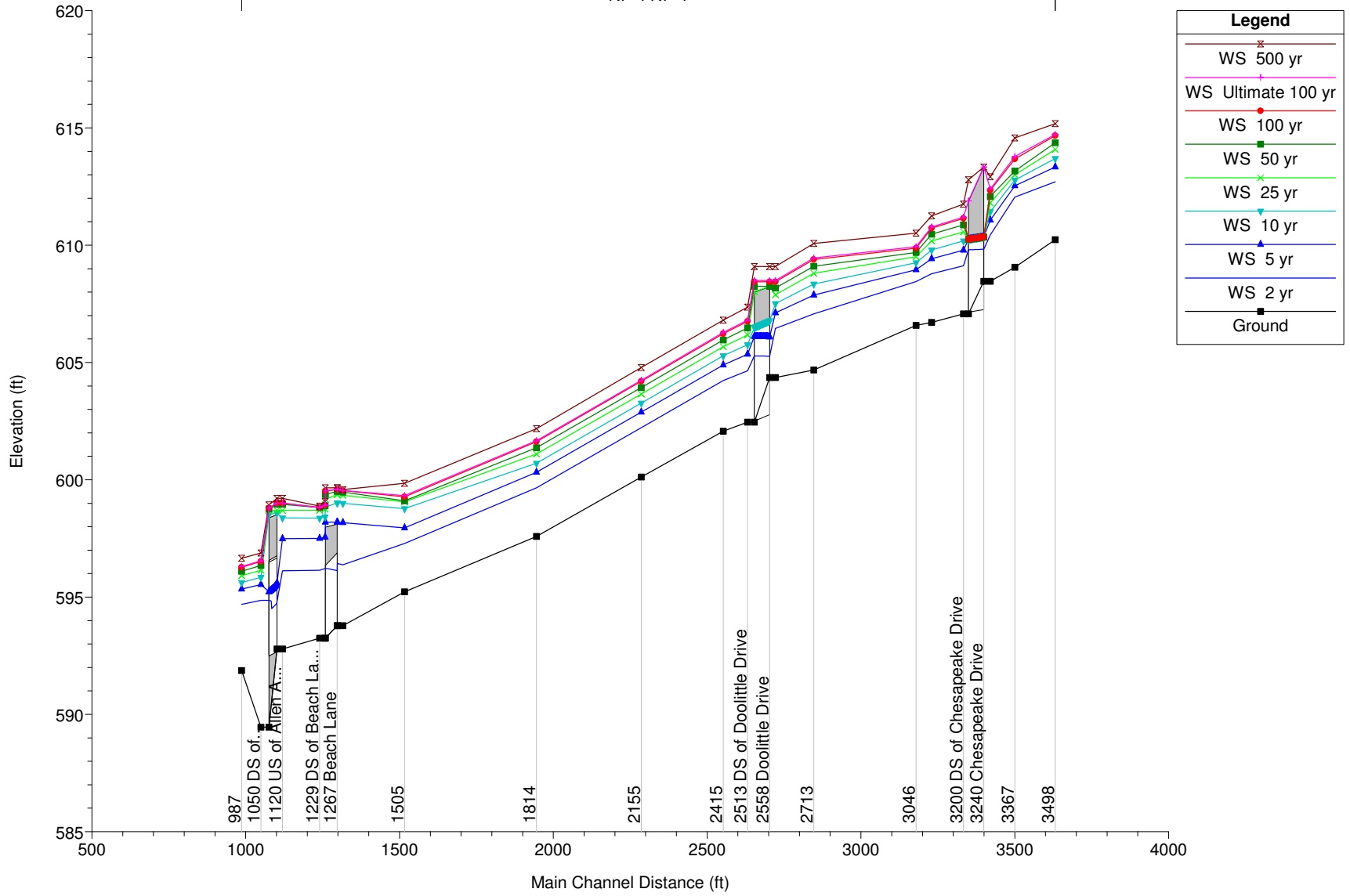
NF-3 NF-3



| Legend | |
|--------------------|-------------------------------------|
| WS 500 yr | (Dark Red line with 'x' markers) |
| WS Ultimate 100 yr | (Magenta line with '+' markers) |
| WS 100 yr | (Red line with 'o' markers) |
| WS 50 yr | (Green line with '■' markers) |
| WS 25 yr | (Light Green line with 'x' markers) |
| WS 10 yr | (Cyan line with 'v' markers) |
| WS 5 yr | (Dark Blue line with '▲' markers) |
| WS 2 yr | (Blue line with '▲' markers) |
| Ground | (Black line with '■' markers) |

FISH CREEK_May_2012 Plan: Existing_2012 5/30/2012
 Geom: Fish Creek_May_2012

← NF-4 NF-4 →



Appendix **G**
Cost Estimates

**Mitigation Construction Projects
Opinion of Probable Cost**

March 2012

| Susan Dr. at Cottonwood | | | | |
|--|----------|-------|-----------------------|---------------------|
| Construct additional 2-8'x8' box culvert | | | | |
| Description | Quantity | Units | Unit Price | Cost |
| Pavement | 100 | lf | \$115.00 | \$11,500.00 |
| 8'x8' Box Culvert | 120 | lf | \$450.00 | \$54,000.00 |
| Headwall | 2 | ea | \$18,000.00 | \$36,000.00 |
| | | | Construction Cost | \$101,500.00 |
| | | | Construction Cost | \$102,000.00 |
| | | | Non-Construction Cost | \$22,000.00 |
| | | | Total Project | \$124,000.00 |

| Park Row at Cottonwood - Culvert only | | | | |
|--|----------|-------|-----------------------|-----------------------|
| Replace existing culverts w/ 3-10' x 7' Box Culverts | | | | |
| Description | Quantity | Units | Unit Price | Cost |
| Pavement S.H. 360 | 200 | lf | \$400.00 | \$80,000.00 |
| Pavement Park Row | 100 | lf | \$145.00 | \$14,500.00 |
| 10' x 7' Box Culvert | 3,780 | lf | \$575.00 | \$2,173,500.00 |
| Headwall | 2 | ea | \$36,000.00 | \$72,000.00 |
| Demolision | 1 | ls | \$100,000.00 | \$100,000.00 |
| | | | Construction Cost | \$2,440,000.00 |
| | | | Construction Cost | \$2,440,000.00 |
| | | | Non-Construction Cost | \$537,000.00 |
| | | | Total Project | \$2,977,000.00 |

| Park Row at Cottonwood - Detention & Culvert | | | | |
|---|----------|-------|-----------------------|-----------------------|
| Construct 4.7 ac Detention Pond & 12' x 7' Culvert | | | | |
| Description | Quantity | Units | Unit Price | Cost |
| Pavement S.H. 360 | 200 | lf | \$400.00 | \$80,000.00 |
| Pavement Park Row | 100 | lf | \$145.00 | \$14,500.00 |
| 10' x 7' Box Culvert | 1,260 | lf | \$450.00 | \$567,000.00 |
| Headwall | 2 | ea | \$18,000.00 | \$36,000.00 |
| Land | 5 | ac | \$22,000.00 | \$110,000.00 |
| Excavation & Embankment | 38,000 | cy | \$10.00 | \$380,000.00 |
| Erosion Control | 2,000 | lf | \$3.00 | \$6,000.00 |
| | | | Construction Cost | \$1,193,500.00 |
| | | | Construction Cost | \$1,194,000.00 |
| | | | Non-Construction Cost | \$263,000.00 |
| | | | Total Project | \$1,457,000.00 |

**Mitigation Construction Projects
Opinion of Probable Cost**

March 2012

| Sherry Dr. at Cottonwood - Culvert only | | | | |
|--|----------|-------|--------------------------|---------------------|
| Construct additional 3-10' x 5' Box Culverts | | | | |
| Description | Quantity | Units | Unit Price | Cost |
| Pavement | 300 | lf | \$145.00 | \$43,500.00 |
| 10' x 5' Box Culvert | 810 | lf | \$400.00 | \$324,000.00 |
| Headwall | 2 | ea | \$21,000.00 | \$42,000.00 |
| | | | Construction Cost | \$409,500.00 |
| | | | Construction Cost | \$410,000.00 |
| | | | Non-Construction Cost | \$90,000.00 |
| | | | Total Project | \$500,000.00 |

| Sherry Dr. at Cottonwood - Detention & Culvert | | | | |
|---|----------|-------|--------------------------|---------------------|
| Construct 4.7 ac Detention Pond & 7' x 5' Culvert | | | | |
| Description | Quantity | Units | Unit Price | Cost |
| Pavement Park Row | 300 | lf | \$145.00 | \$43,500.00 |
| 7' x 5' Box Culvert | 270 | lf | \$300.00 | \$81,000.00 |
| Headwall | 2 | ea | \$7,000.00 | \$14,000.00 |
| Land | 5 | ac | \$22,000.00 | \$110,000.00 |
| Excavation & Embankment | 38,000 | cy | \$10.00 | \$380,000.00 |
| Erosion Control | 2,000 | lf | \$3.00 | \$6,000.00 |
| | | | Construction Cost | \$634,500.00 |
| | | | Construction Cost | \$635,000.00 |
| | | | Non-Construction Cost | \$140,000.00 |
| | | | Total Project | \$775,000.00 |

| Susan, Buena Vista & Plaza at Tributary CC-2 - Channel replacement | | | | |
|--|----------|-------|--------------------------|-----------------------|
| Construct 40' wide rectangular channel | | | | |
| Description | Quantity | Units | Unit Price | Cost |
| 40' wide channel | 1,100 | lf | \$1,700.00 | \$1,870,000.00 |
| Excavation | 1,100 | lf | \$30.00 | \$33,000.00 |
| Bridge abutment modification | 6 | ea | \$12,000.00 | \$72,000.00 |
| Erosion Control | 1,100 | lf | \$3.00 | \$3,300.00 |
| | | | Construction Cost | \$1,978,300.00 |
| | | | Construction Cost | \$1,978,000.00 |
| | | | Non-Construction Cost | \$435,000.00 |
| | | | Total Project | \$2,413,000.00 |

**Mitigation Construction Projects
Opinion of Probable Cost**

March 2012

| Hillcrest Dr. at CC-3 - Culvert | | | | |
|--|----------|-------|-----------------------|--------------------|
| Construct additional 3-10' x 5' Box Culverts | | | | |
| Description | Quantity | Units | Unit Price | Cost |
| Pavement | 100 | lf | \$115.00 | \$11,500.00 |
| 10' x 5' Box Culvert | 50 | lf | \$400.00 | \$20,000.00 |
| Headwall | 2 | ea | \$10,000.00 | \$20,000.00 |
| | | | Construction Cost | \$51,500.00 |
| | | | Construction Cost | \$52,000.00 |
| | | | Non-Construction Cost | \$11,000.00 |
| | | | Total Project | \$63,000.00 |

| S.H. 360 at South Cottonwood - Detention | | | | |
|---|----------|-------|-----------------------|-----------------------|
| Construct 11 ac Detention Pond | | | | |
| Description | Quantity | Units | Unit Price | Cost |
| Land | 15 | ac | \$22,000.00 | \$330,000.00 |
| Clearing | 30 | ac | \$5,000.00 | \$150,000.00 |
| Tree Planting | 30 | ac | \$1,000.00 | \$30,000.00 |
| Excavation & Embankment | 180,000 | cy | \$10.00 | \$1,800,000.00 |
| Erosion Control | 2,800 | lf | \$3.00 | \$8,400.00 |
| | | | Construction Cost | \$2,318,400.00 |
| | | | Construction Cost | \$2,318,000.00 |
| | | | Non-Construction Cost | \$510,000.00 |
| | | | Total Project | \$2,828,000.00 |

| North Fish between Allen Ave. & S.H. 360 - Detention | | | | |
|---|----------|-------|-----------------------|-----------------------|
| Construct a 21 ac & a 10 ac Detention Pond | | | | |
| Description | Quantity | Units | Unit Price | Cost |
| Pond #1 | | | | |
| Land | 25 | ac | \$22,000.00 | \$550,000.00 |
| Excavation & Embankment | 225,000 | cy | \$10.00 | \$2,250,000.00 |
| Erosion Control | 4,200 | lf | \$3.00 | \$12,600.00 |
| Pond #2 | | | | |
| Land | 12 | ac | \$22,000.00 | \$264,000.00 |
| Excavation & Embankment | 190,000 | cy | \$10.00 | \$1,900,000.00 |
| Erosion Control | 2,800 | lf | \$3.00 | \$8,400.00 |
| | | | Construction Cost | \$4,985,000.00 |
| | | | Construction Cost | \$4,985,000.00 |
| | | | Non-Construction Cost | \$1,097,000.00 |
| | | | Total Project | \$6,082,000.00 |

**Mitigation Construction Projects
Opinion of Probable Cost**

March 2012

| Tributary NF-1 at Mayfield Rd. - Channel & Culvert | | | | |
|---|----------|-------|--------------------------|---------------------|
| Construct 12' Earthen Channel, 12' Rectangular Concrete Channel & 2-8' x 6' Culvert | | | | |
| Description | Quantity | Units | Unit Price | Cost |
| Pavement | 100 | lf | \$145.00 | \$14,500.00 |
| 8' x 6' Box Culvert | 100 | lf | \$300.00 | \$30,000.00 |
| Headwall | 2 | ea | \$18,000.00 | \$36,000.00 |
| Concrete Channel | 700 | lf | \$350.00 | \$245,000.00 |
| Excavation & Embankment | 520 | cy | \$10.00 | \$5,200.00 |
| Earthen Channel | 900 | lf | \$50.00 | \$45,000.00 |
| Erosion Control | 1,800 | lf | \$3.00 | \$5,400.00 |
| | | | Construction Cost | \$381,100.00 |
| | | | Construction Cost | \$381,000.00 |
| | | | Non-Construction Cost | \$84,000.00 |
| | | | Total Project | \$465,000.00 |

Appendix **H**
Advisory and Public Meeting Notes

Cottonwood and Fish Creeks Flood Protection Plan Public Meeting



Presented February 21, 2012
City of Arlington and
Texas Water Development Board
with assistance from Espey Consultants, Inc.

Overview

- Welcome
- Project Location
- Study Process
- Identification of Flood Problems & Proposed Mitigation
- Benefit Cost Analysis
- Prioritization
- Recommendations
- Implementation

Study Sponsors and Support

Guidance and Funding



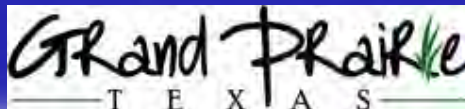
Study Sponsors



Technical Input



Study Stakeholders



Localized Input

Parties with Functional Interests

General Public



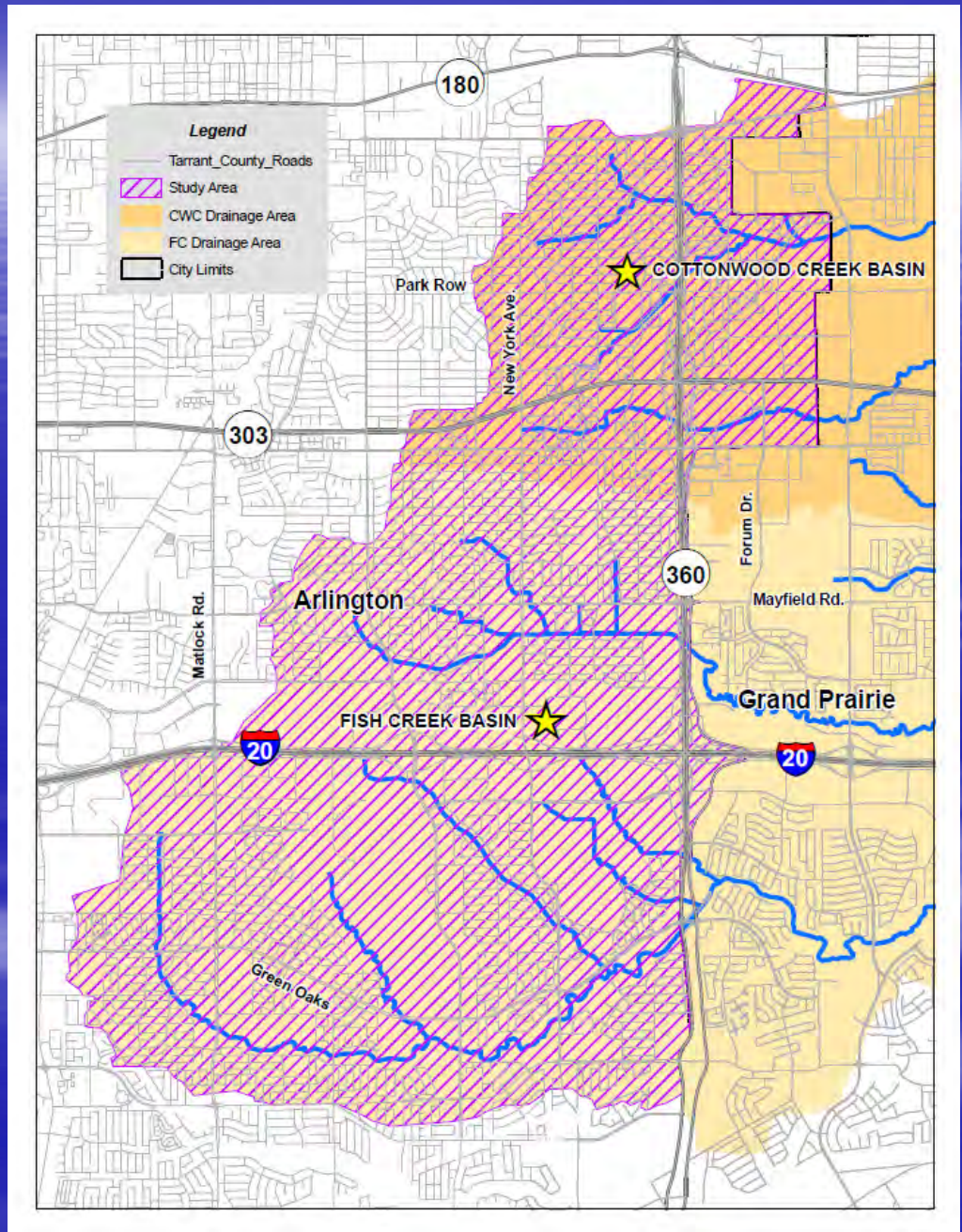
Study Area

Cottonwood Creek

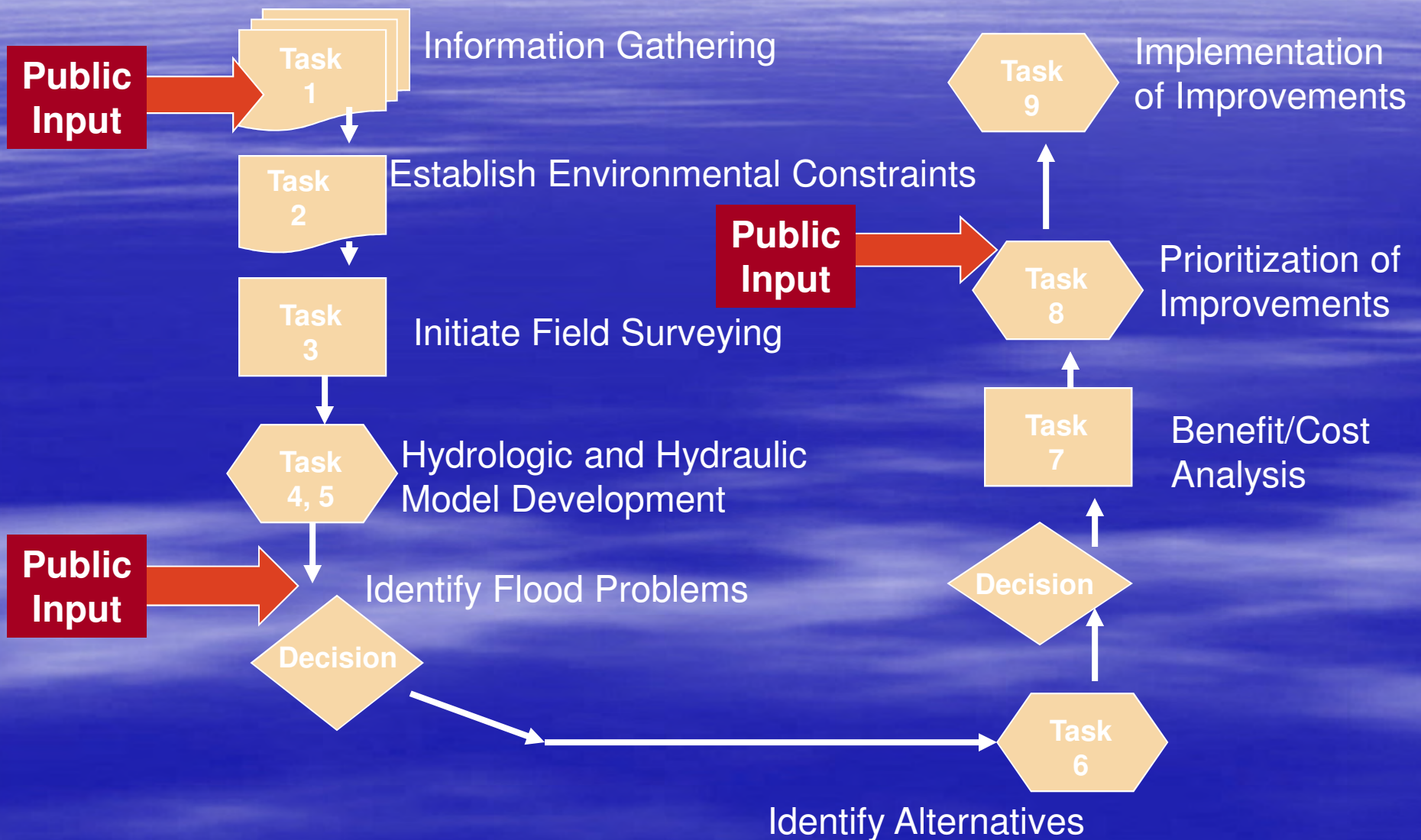
1. 6.5 Miles of stream
2. 4.7 sq. mi. drainage
3. 25 bridges/culverts

Fish Creek

1. 19.9 Miles of stream
2. 13.2 sq. mi. drainage
3. 32 bridges/culverts

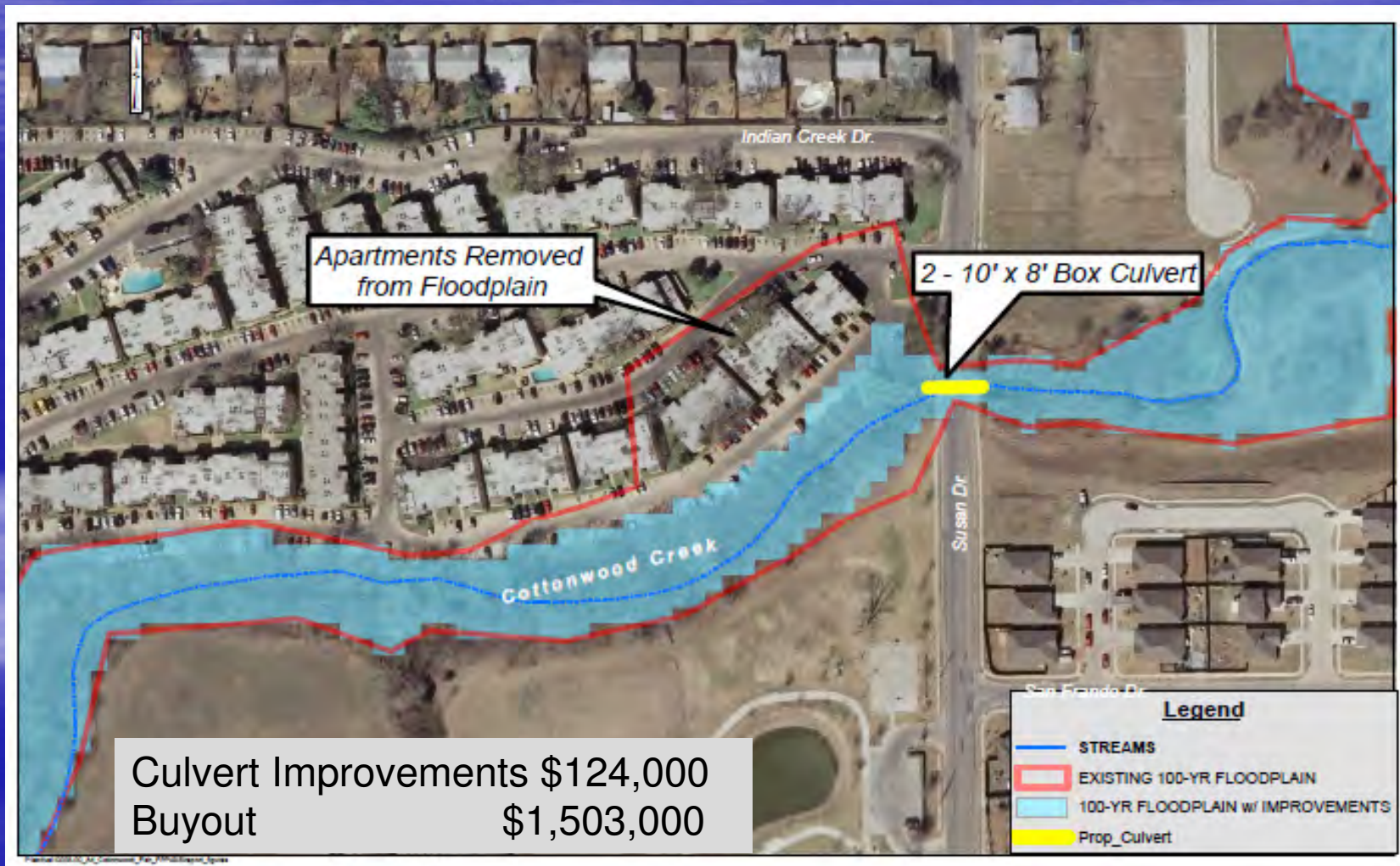


Study Process



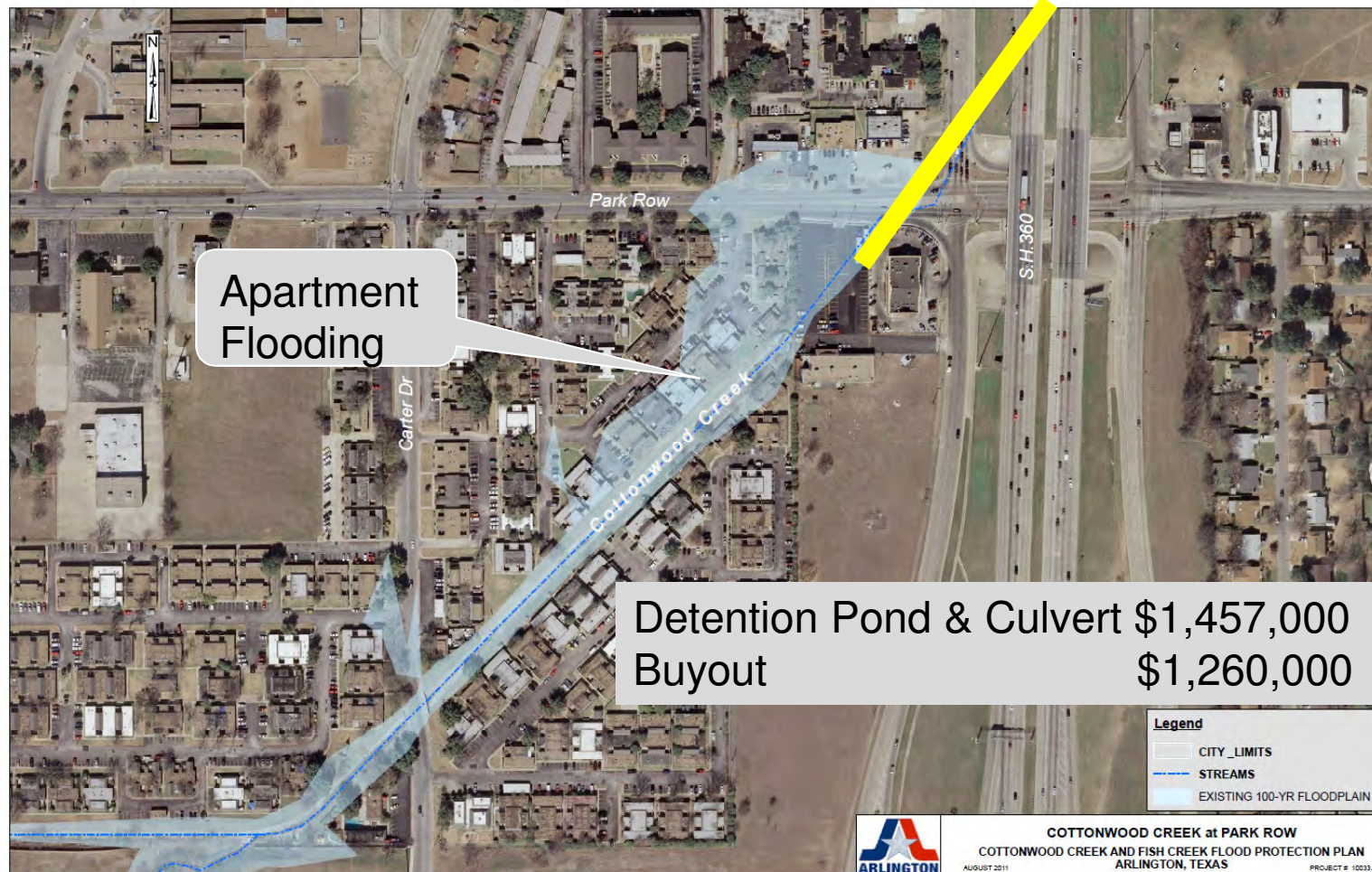
Identification of Flood Problems & Proposed Mitigation

- Cottonwood Creek at Susan Drive
Four Apartment Bldgs.



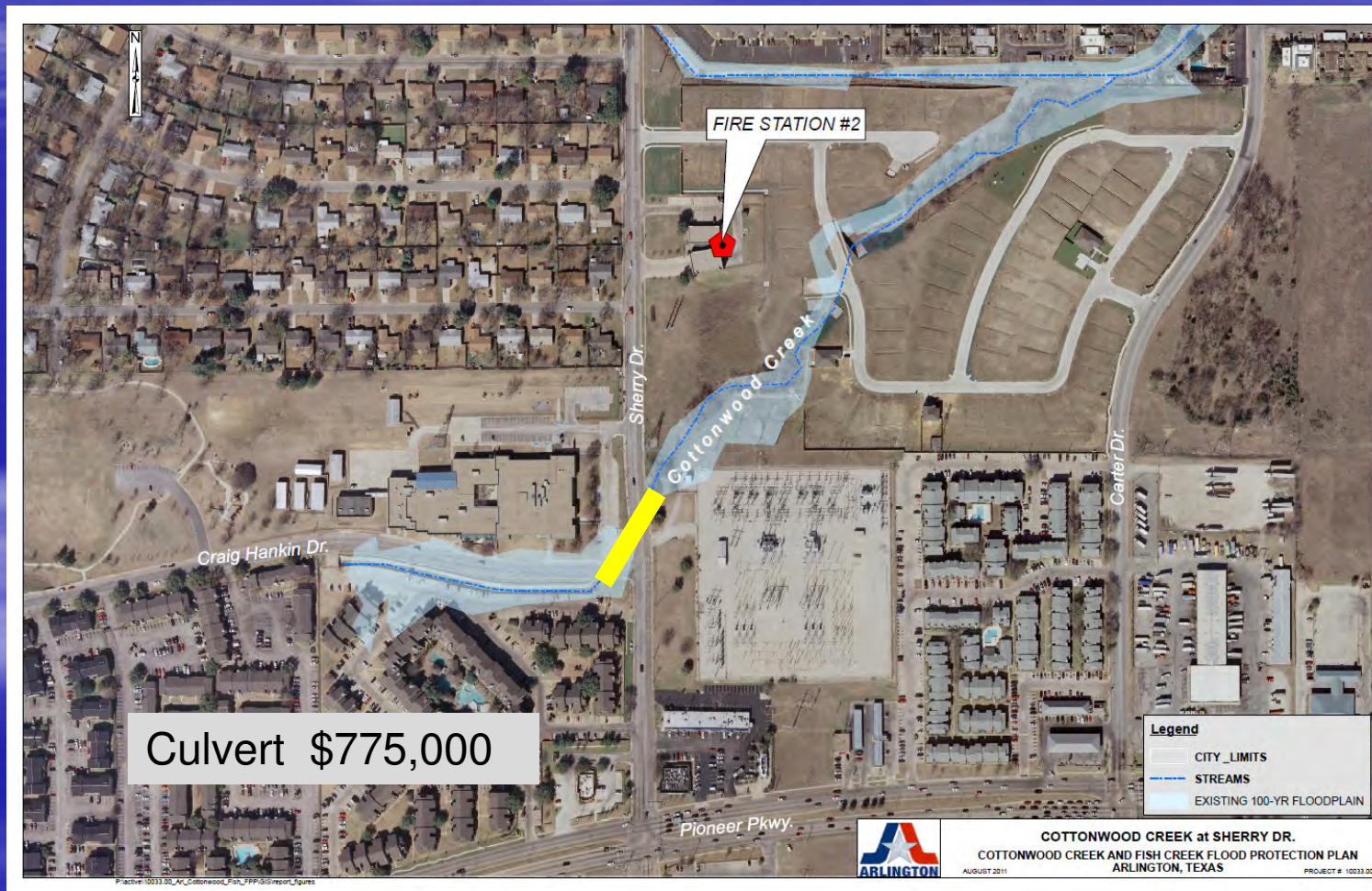
Identification of Flood Problems & Proposed Mitigation

- Cottonwood Creek at Park Row
Seventeen Apartment Bldgs.



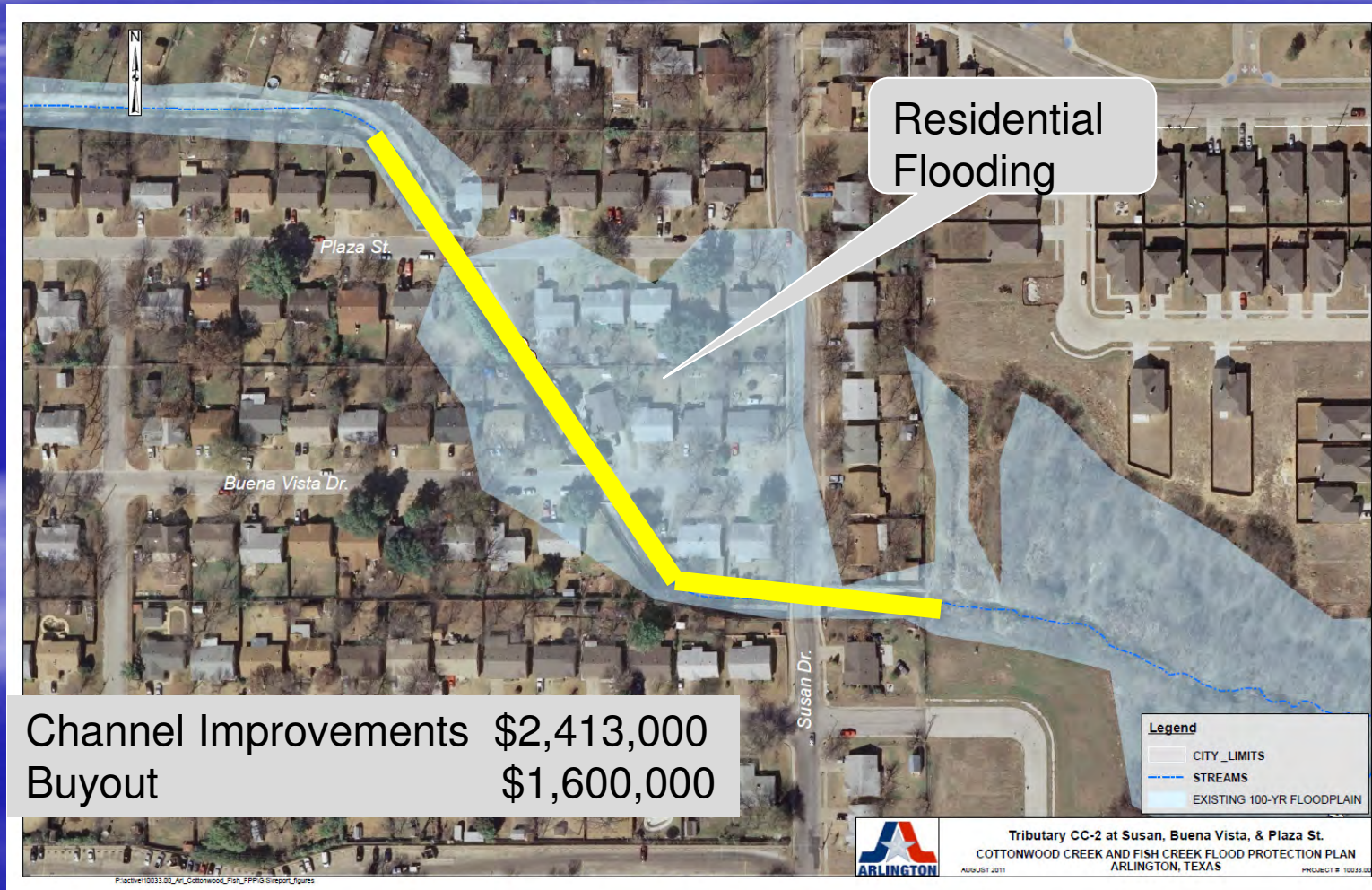
Identification of Flood Problems & Proposed Mitigation

- Cottonwood Creek at Sherry St.
Street flooding affecting Fire Station #2 access



Identification of Flood Problems & Proposed Mitigation

- Tributary CC-2 at Susan, Buena Vista & Plaza
Fifteen single family residences



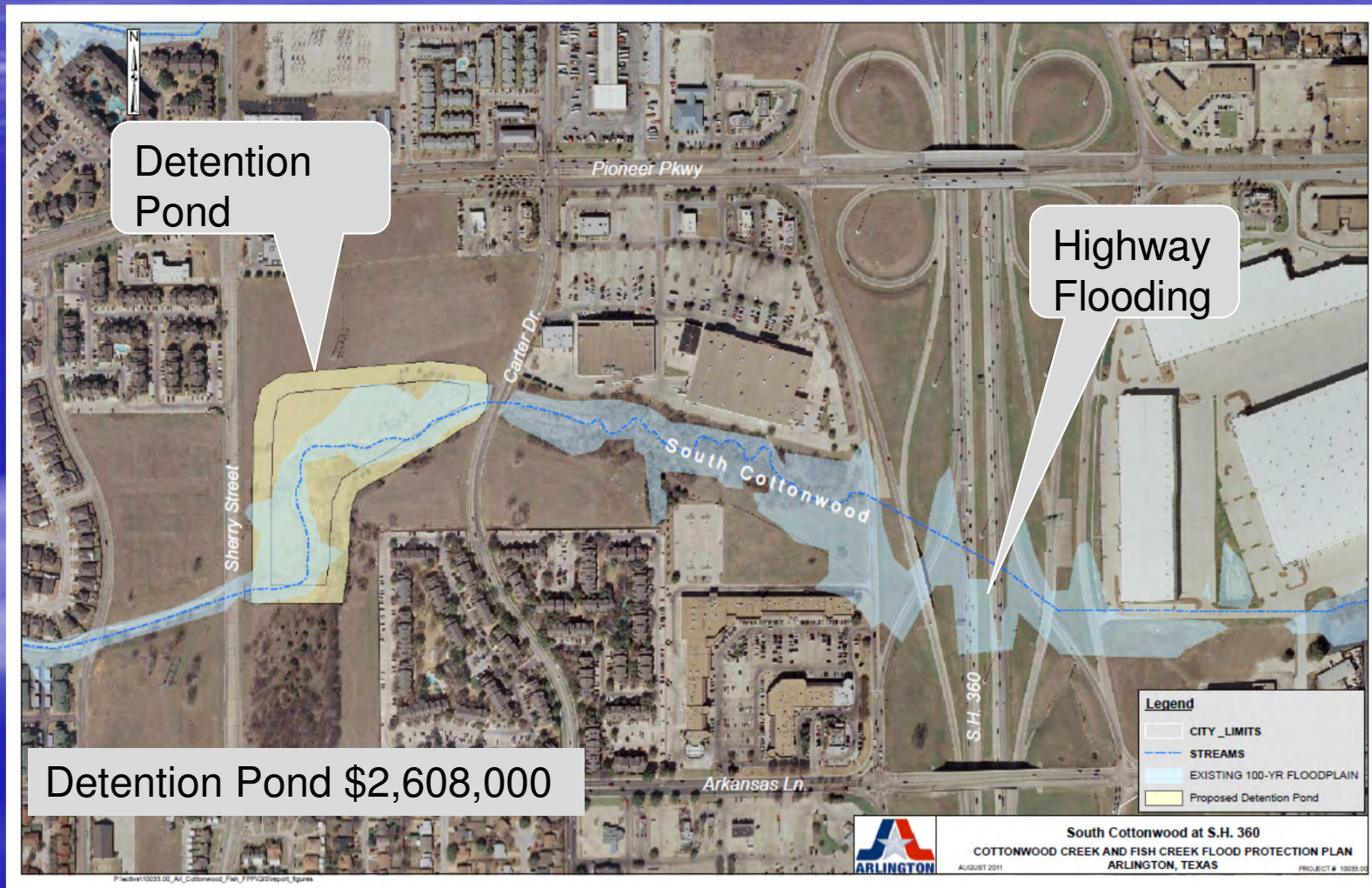
Identification of Flood Problems & Proposed Mitigation

- Tributary CC-3 at Hillcrest Drive
Two single family residences



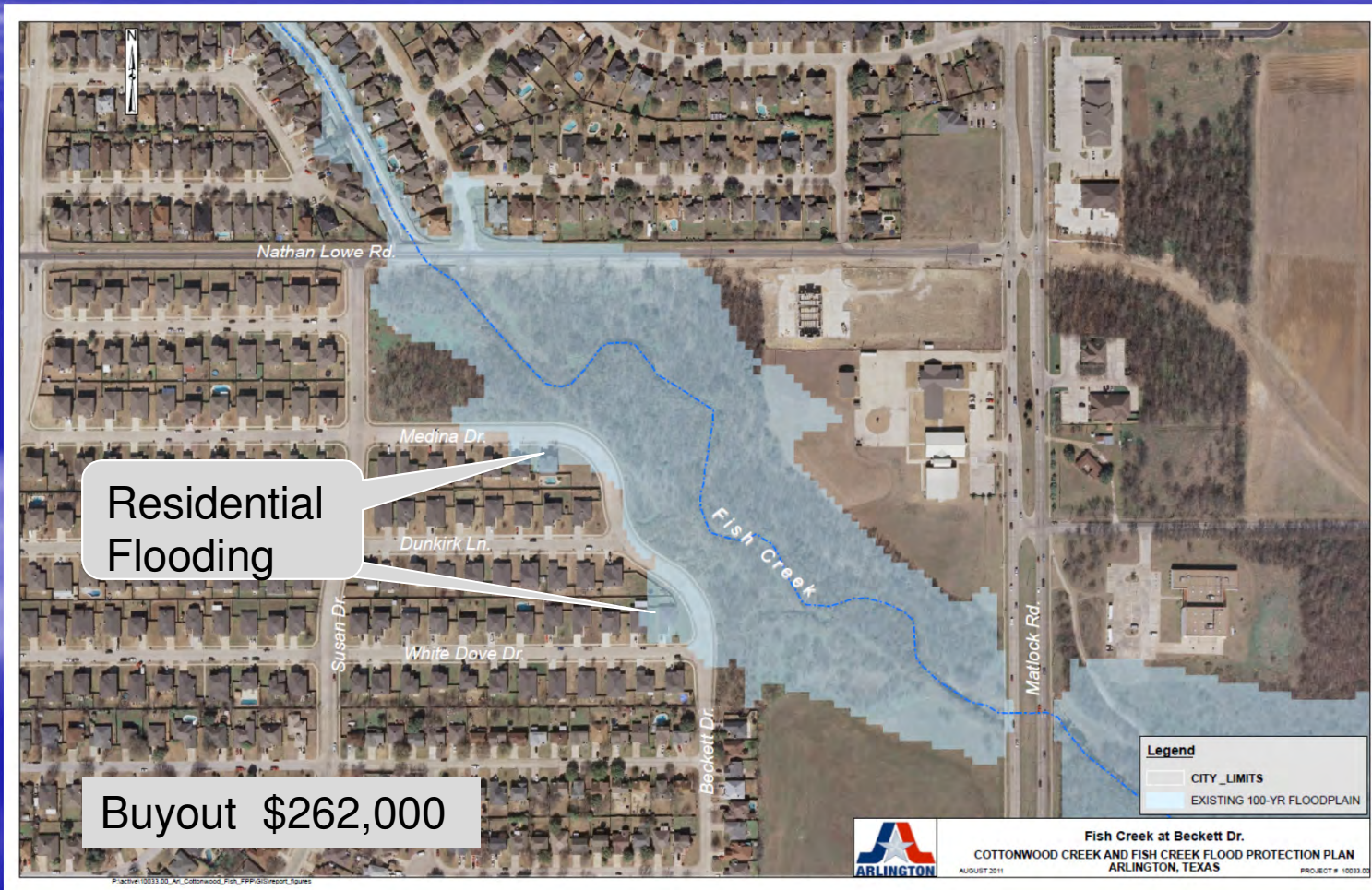
Identification of Flood Problems & Proposed Mitigation

- South Cottonwood at State Highway 360
Highway Main Lanes Flooded by 2 feet



Identification of Flood Problems & Proposed Mitigation

- Fish Creek at Beckett Drive
- Two single family residences



Identification of Flood Problems & Proposed Mitigation

- Tributary FC-3 at S.H. 360
S.B. frontage road floods 1.7' deep



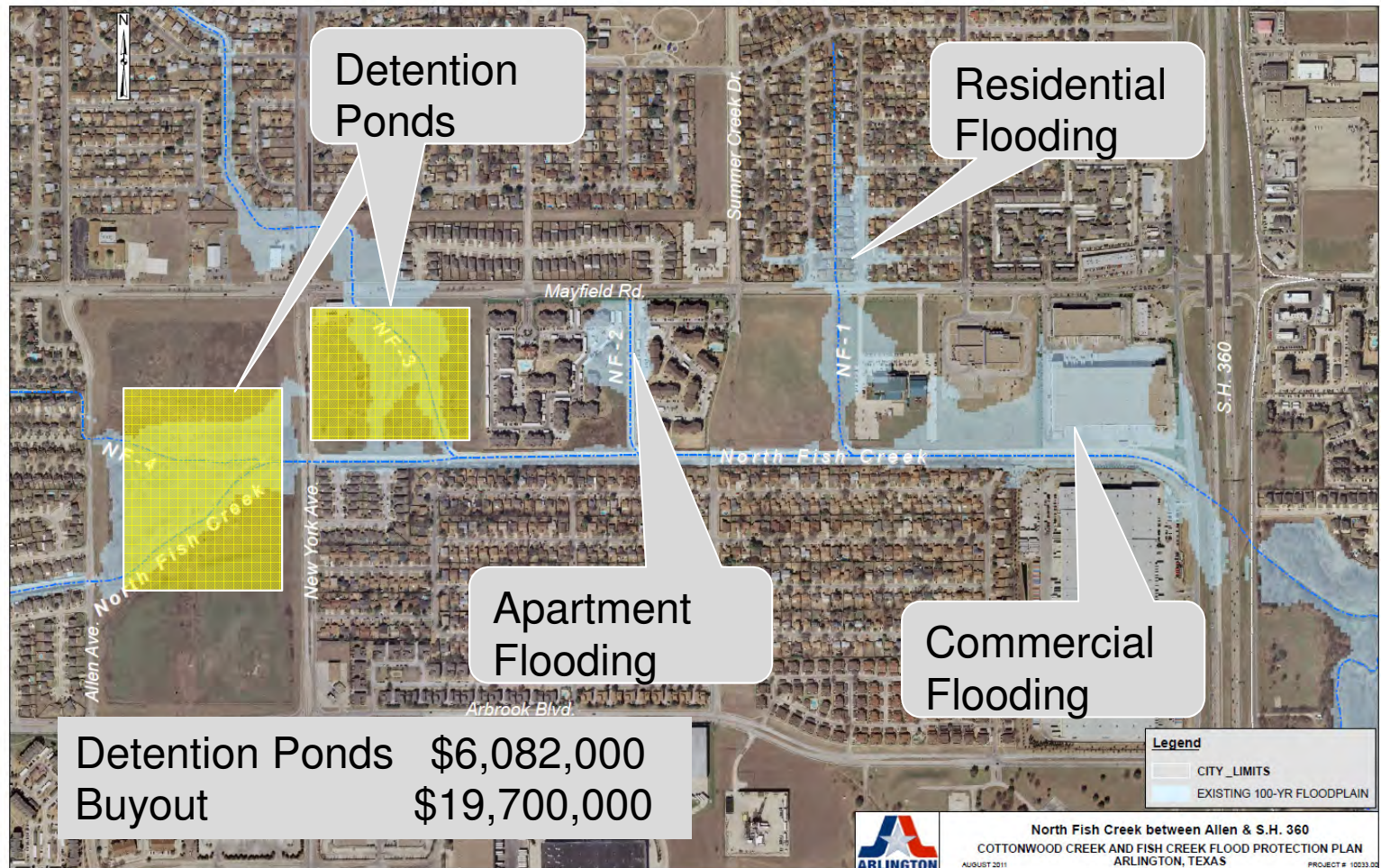
Identification of Flood Problems & Proposed Mitigation

- Tributary FC-4 at S.H. 360
S.B. frontage road floods 1.2' deep



Identification of Flood Problems & Proposed Mitigation

- North Fish between Allen Ave. & S.H. 360
School Bldg., Apartments & Warehouse

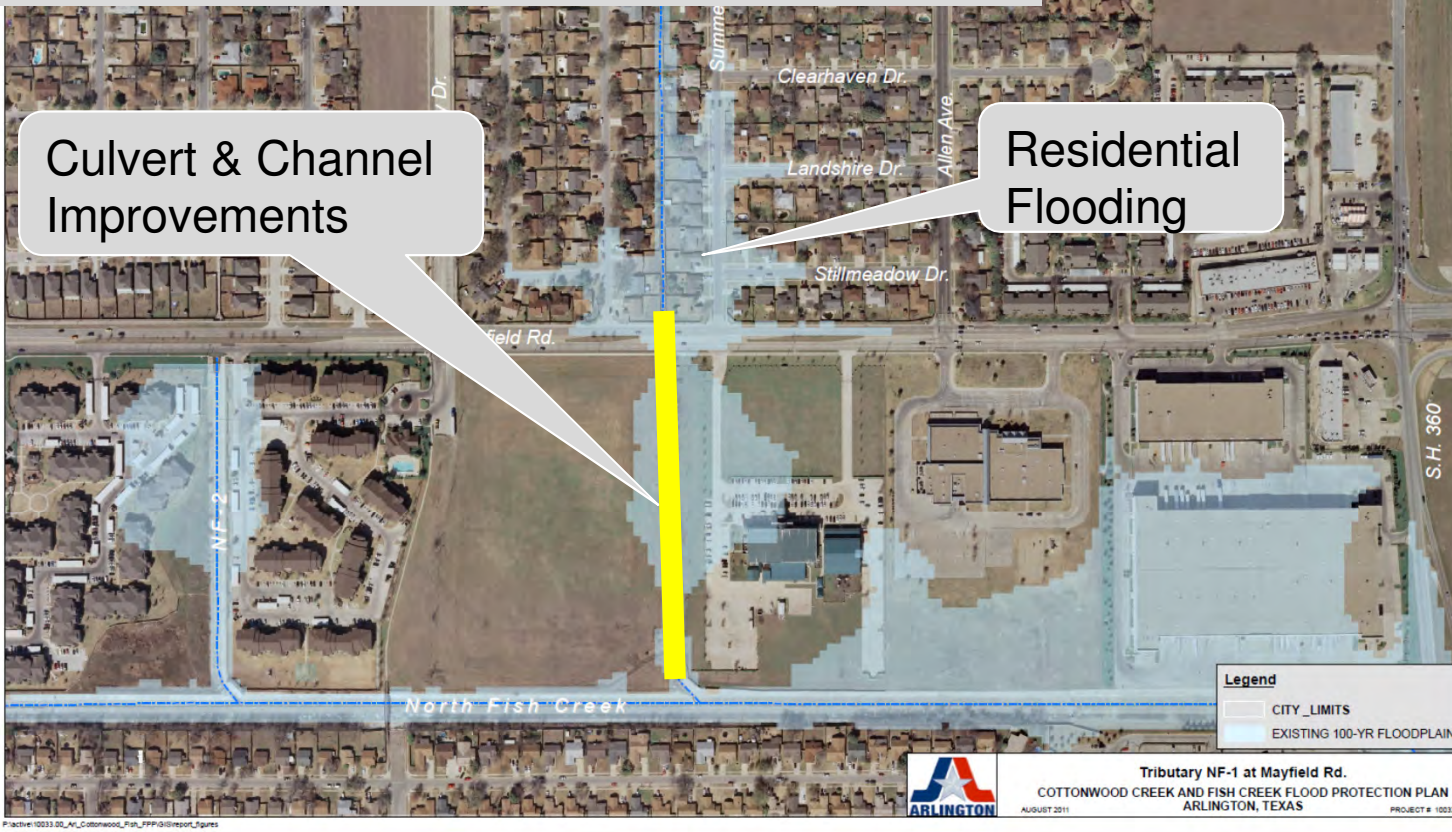


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Identification of Flood Problems & Proposed Mitigation

- Tributary NF-1 at Mayfield Road
Thirteen single family residences

Culverts & Channel Improvements \$465,000
Buyout \$1,437,000



Benefit Cost

1. Benefits = Flood Damages Avoided

Divided by

Cost = Capital Improvements to Reduce Flooding

2. B/C RATIOS greater to or equal to one are typically considered cost effective without consideration of additional benefits.

3. ARLINGTON'S STORMWATER MANAGEMENT PLAN includes provisions for recommending high prioritization when B/C Ratio ≥ 1

B/C Ratios for Recommended Improvements

| Project Summary | | | |
|--|--|--------------|--------------------|
| Project Name | Type of Improvement | Capital Cost | Benefit/Cost Ratio |
| Cottonwood Creek at Susan Drive | two 8' wide by 8' high box culverts | \$124,000 | 6.6 |
| Cottonwood Creek at Park Row | Buyout | \$1,260,000 | 0.7 |
| Tributary CC-2 at Susan, Buena Vista & Plaza | Buyout | \$1,600,000 | 0.2 |
| Tributary CC-3 at Hillcrest | 10' wide by 5' high box culverts | \$93,000 | 1.0 |
| Fish Creek at Beckett | Verify house elevations and if necessary buyout | \$393,000 | 0.2 |
| North Fish Creek between Allen & S.H. 360 | Construct a 21 acre pond & a 10 acre pond | \$6,082,000 | 0.2 |
| Tributary NF-1 at Mayfield Rd | Verify residential flooding depth, 12' wide channel & two 8' wide by 6' high culverts. | \$1,437,000 | 0.1 |
| Cottonwood Creek at Sherry Street | Construct two additional 10' wide by 5' high box culverts | \$775,000 | N/A* |
| South Cottonwood Creek at S.H. 360 | Construct xx acre detention pond | \$2,608,000 | N/A* |
| Tributary FC-3 at S.H. 360 | No Adverse Impact (NAI) Development. | \$0 | N/A* |
| Tributary FC-4 at S.H. 360 | No Adverse Impact (NAI) Development. | \$0 | N/A* |

* For road overtopping there are no "actual" flood damages, therefore prioritization must consider other factors.

Prioritization Criteria

Arlington Stormwater Management Plan

| Criterion | Source | Measurement |
|---|------------------------|---|
| Improving safety | Goal 1 of City SWMP | Number of structures & road overtopping removed |
| Reducing property damage | Goal 1 of City SWMP | Number of properties |
| Reducing future Arlington & downstream damage | Goal 2 of City SWMP | Improving valley storage, higher rank |
| Improving stream quality | Goal 3 of City SWMP | Velocity reductions, higher rank |
| Environmental enhancement | Goal 4 of City SWMP | Natural improvements, higher rank |
| Lowest cost | Section 5 of City SWMP | Lowest cost, higher rank |
| Highest B/C Ratio | Section 5 of City SWMP | Highest B/C, highest rank |

SWMP - Arlington Stormwater Management Plan

Prioritization Criteria

Arlington Complaint Database

| Criterion | Measurement |
|-----------------------------|---|
| Reduces Structural Flooding | Number of structures removed from floodplain |
| Reduces Property Flooding | Properties w/o structures removed from floodplain |
| Reduces Street Flooding | Depth of street overtopping removed |
| Reduces Erosion Potential | Improved potential to reduce erosion |
| Reduces Maintenance | Improved potential to reduce erosion |

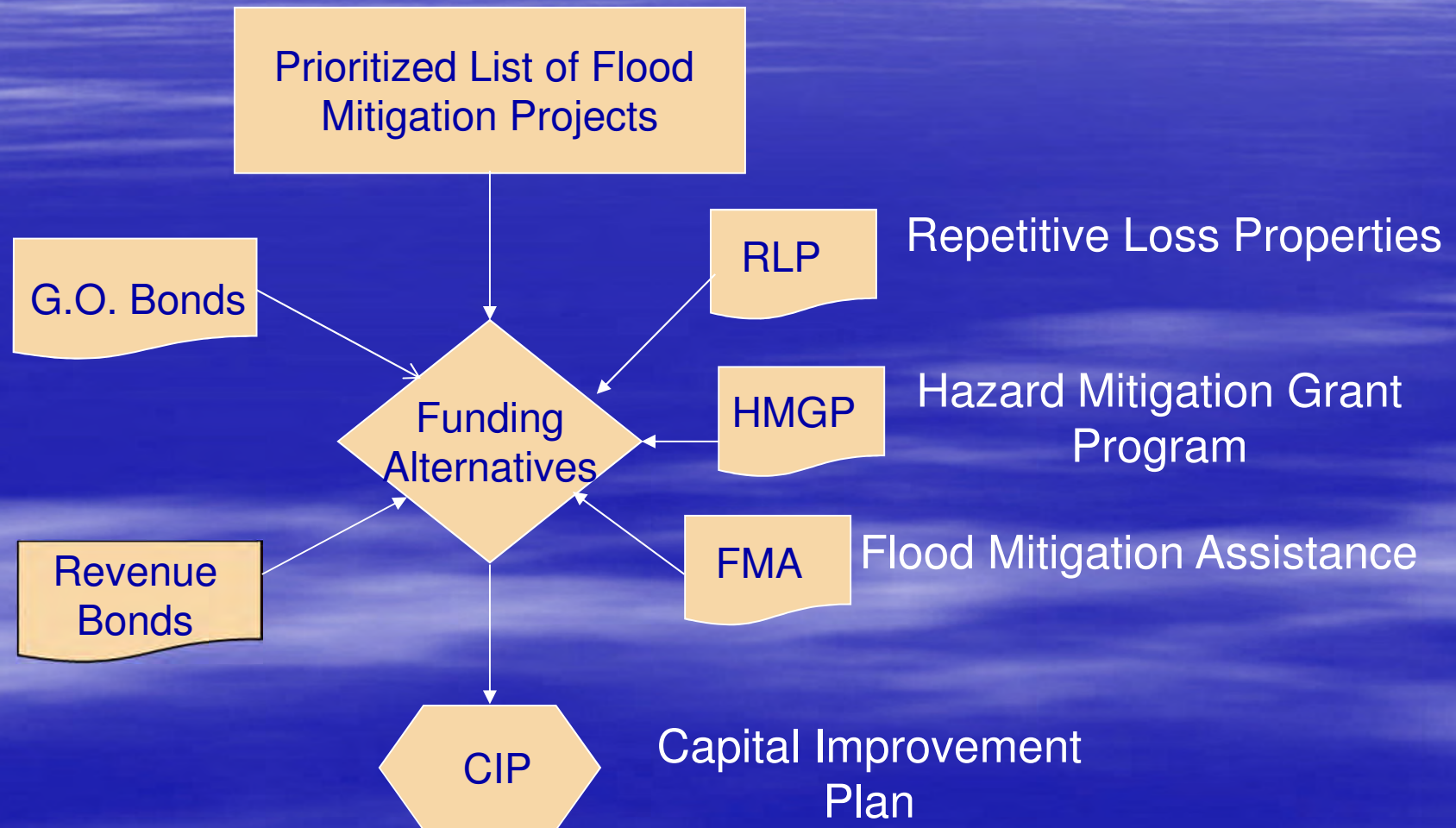
Prioritized Projects

| | Improving safety | Reducing property damage | Reducing future Arlington & downstream damage | Improving stream quality | Environmental enhancement | Lowest cost | Highest B/C Ratio | Reduces Structural Flooding | Reduces Property Flooding | Reduces Street Flooding | Reduces Erosion Potential | Total Ranking Points | |
|--|------------------|--------------------------|---|--------------------------|---------------------------|-------------|-------------------|-----------------------------|---------------------------|-------------------------|---------------------------|----------------------|----|
| North Fish Creek between Allen & S.H. 360 | 10 | 5 | 10 | 10 | 10 | 1 | 7 | 10 | 5 | 5 | 10 | 10 | 93 |
| Tributary CC-3 at Hillcrest | 3 | 10 | 0 | 5 | 5 | 9 | 8 | 10 | 10 | 10 | 5 | 5 | 80 |
| South Cottonwood Creek at S.H. 360 | 0 | 5 | 10 | 10 | 10 | 2 | 5 | 0 | 5 | 10 | 10 | 10 | 77 |
| Cottonwood Creek at Susan Drive | 10 | 10 | 0 | 5 | 5 | 8 | 10 | 10 | 10 | 8 | 0 | 0 | 76 |
| Tributary FC-4 at S.H. 360 | 0 | 0 | 10 | 10 | 10 | 10 | 5 | 0 | 0 | 0 | 10 | 10 | 65 |
| Tributary FC-3 at S.H. 360 | 0 | 0 | 10 | 10 | 10 | 10 | 5 | 0 | 0 | 0 | 10 | 10 | 65 |
| Cottonwood Creek at Sherry | 10 | 10 | 0 | 5 | 5 | 5 | 5 | 0 | 10 | 10 | 0 | 0 | 60 |
| Tributary NF-1 at Mayfield Rd | 10 | 10 | 0 | 0 | 0 | 6 | 4 | 10 | 10 | 8 | 0 | 0 | 58 |
| Cottonwood Creek at Park Row | 10 | 0 | 5 | 5 | 5 | 4 | 8 | 10 | 0 | 0 | 5 | 5 | 57 |
| Tributary CC-2 at Susan, Buena Vista & Plaza | 10 | 0 | 5 | 5 | 5 | 3 | 5 | 10 | 0 | 0 | 5 | 5 | 53 |
| Fish Creek at Beckett | 3 | 0 | 5 | 5 | 5 | 7 | 7 | 10 | 0 | 0 | 5 | 5 | 52 |

Recommended Action Plan

| Ranked Recommended Improvements | Priority Ranking Score | Capital Cost |
|--|------------------------|--------------|
| North Fish Creek between Allen & S.H. 360 | 93 | \$6,082,000 |
| Tributary CC-3 at Hillcrest | 80 | \$93,000 |
| South Cottonwood Creek at S.H. 360 | 77 | \$2,608,000 |
| Cottonwood Creek at Susan Drive | 76 | \$124,000 |
| Tributary FC-4 at S.H. 360 | 65 | \$0 |
| Tributary FC-3 at S.H. 360 | 65 | \$0 |
| Cottonwood Creek at Sherry | 60 | \$500,000 |
| Tributary NF-1 at Mayfield Rd | 58 | \$1,437,000 |
| Cottonwood Creek at Park Row | 57 | \$1,260,000 |
| Tributary CC-2 at Susan, Buena Vista & Plaza | 53 | \$1,600,000 |
| Fish Creek at Beckett | 52 | \$393,000 |

Implementation Considerations Project Funding



Conclusions

- Cottonwood and Fish Creek flooding can be reduced.
- Prioritizations and availability of funds will dictate the rate of flood reduction.
- City of Arlington must necessarily evaluate these two watersheds and improvements needed in combination with other City drainage needs to accomplish a plan for implementation.

For Additional Information Contact:

- **J. William Brown**

Storm Water Executive Manager
Public Works and Transportation

101 W. Abram St.
P.O. Box 90231 MS 01-0220
Arlington, TX 76004-3231

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- **Gilbert Ward**

Texas Water Development Board
Research and Planning Fund

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Austin, Texas 78711-3231

Phone: (512) 463-6418

Email:

gilbert.ward@twdb.state.tx.us

Cottonwood and Fish Creeks Flood Protection Plan Public Meeting



Presented August 17, 2011
City of Arlington and
Texas Water Development Board
with assistance from Espey Consultants, Inc.

Overview

- **What** is this Flood Protection Plan?
- **Why** do Flood Protection Planning?
- **How** Flood Protection Planning is Done?
- **Where** will Flood Protection Planning Lead Arlington?
- **Where** does Flooding Occur?
- **When** will Flood Protection Planning be Completed?
- **Who** to Contact for More Information?

What is this Flood Protection Plan?

- Each year, the TWDB invites Texas cities to compete for grants to fund flood protection planning
- Each application must meet specific criteria
- In April 2010, TWDB selected Arlington's application for the Cottonwood and Fish Creek Watersheds

The image shows the cover page of a grant application for flood protection planning. At the top right is the Texas Water Development Board (TWDB) logo. Below it, the text reads "Application for Flood Protection Planning Study Grant" and "COTTONWOOD AND FISH CREEK WATERSHEDS FLOOD PROTECTION PLAN". A central map shows the study area with a legend for "100 Year Flood", "City Limits", "Proposed Retention Area", and "Potential Flood Hazards". The map labels the "CITY OF GRAND PRAIRIE" and "CITY OF ARLINGTON". To the left of the map is the vertical text "Espey Consultants, Inc.". Below the map are logos for the City of Grand Prairie, City of Dallas, Tarrant County, NCTCOG, US Army Corps of Engineers, and TxDOT. The applicant is identified as "City of Arlington". The date "January 22, 2010" and project number "Project No. P0222.08" are also present. A box at the bottom lists participating and supporting organizations: City of Grand Prairie, City of Dallas, Tarrant County, North Central Texas Council of Governments, U.S. Army Corps of Engineers - Fort Worth District, and Texas Department of Transportation - Fort Worth District. The Espey Consultants logo is in the bottom left corner.

Application for Flood Protection Planning Study Grant
COTTONWOOD AND FISH CREEK WATERSHEDS
FLOOD PROTECTION PLAN

Legend
100 Year Flood
City Limits
Proposed Retention Area
Potential Flood Hazards

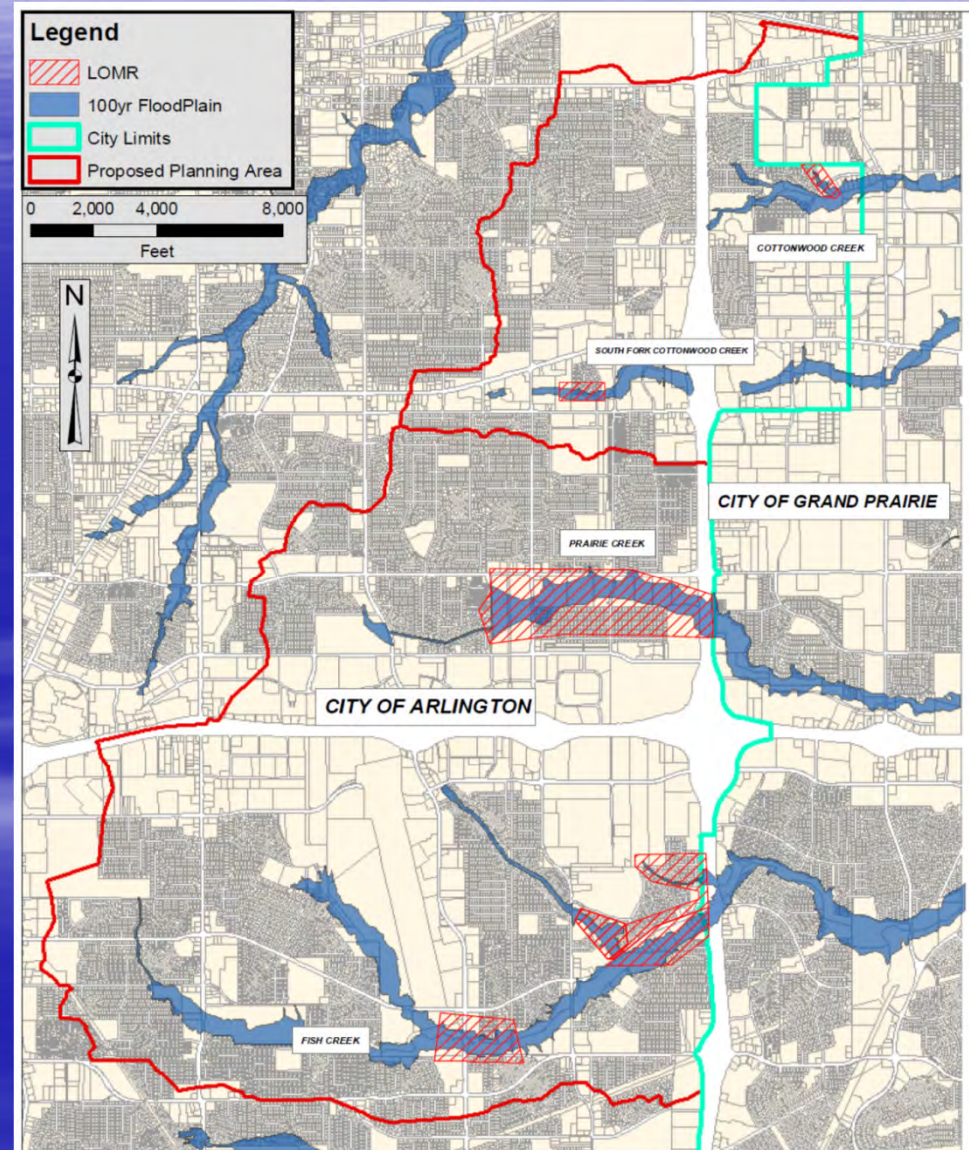
Applicant: City of Arlington

January 22, 2010
Project No. P0222.08

Including participation / support of:
• City of Grand Prairie
• City of Dallas
• Tarrant County
• North Central Texas Council of Governments
• U.S. Army Corps of Engineers - Fort Worth District
• Texas Department of Transportation - Fort Worth District

What is this Flood Protection Plan?

- TWDB selected Arlington's Cottonwood and Fish Creek Watersheds
 - Met criteria for:
 - Basin-wide planning
 - Multi-city benefit
 - Documenting flooding issues
 - Likelihood of study resulting in improvement
 - Potential savings from lowering flood losses



Why do Flood Protection Plan?

City of Arlington Stormwater Management Plan- SEVEN GOALS

1. Reduce the existing potential for stormwater damage to public health, safety, life, property, and the environment.
2. Control future increase in stormwater damage within the City of Arlington and in adjacent jurisdictions affected by City of Arlington drainage.
3. Protect and enhance the quality, quantity, and availability of surface and groundwater resources.
4. Preserve and enhance existing aquatic and riparian environments and encourage restoration of degraded areas.
5. Control sediment and erosion in and from drainageways, developments, and construction sites.
- 6. Establish comprehensive basin plans within each watershed that quantify, plan for, and manage stormwater flows within and among the jurisdictions in those watersheds.**
7. Promote equitable, acceptable, and legal measures for stormwater management.

Why do Flood Protection Planning for Cottonwood and Fish Creek?

- Historically Cottonwood and Fish Creek watersheds have experienced flooding



Property



Roadways

Why do Flood Protection Planning for Cottonwood and Fish Creek?



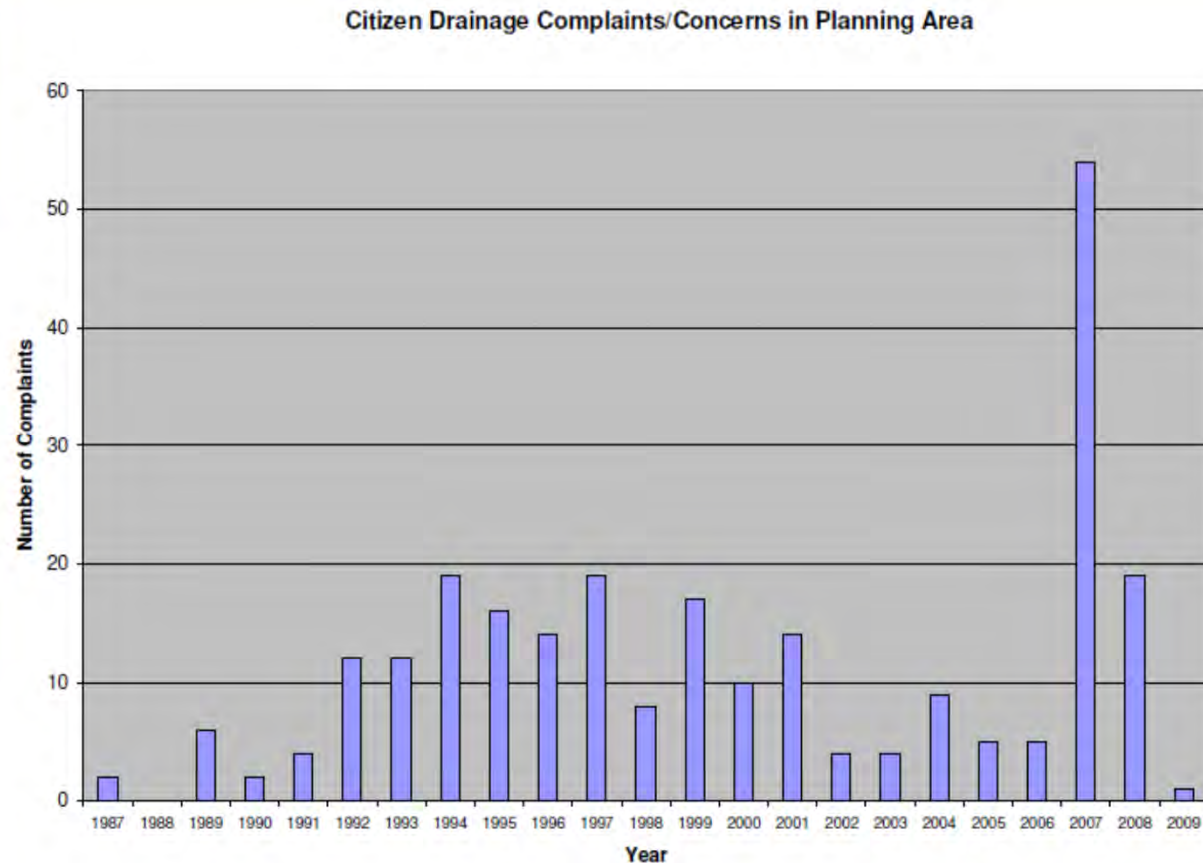
Why do Flood Protection Planning for Cottonwood and Fish Creek?

- Arlington's value of property in these watersheds in the 100-year floodplain

- Population in 100-year floodplain
7,637
- Assumed persons per household
3.15
- Estimated homes
2,425
- Average value per home
\$136,034
- Estimated Value at Risk in 100-year floodplain
\$329,882,450

Why do Flood Protection Planning for Cottonwood and Fish Creek?

- Planning area has averaged 15-20 drainage concerns per year since mid 1990s spiking to over fifty four concerns during 2007



Why do Flood Protection Planning for Cottonwood and Fish Creek?

- Over 50% of citizen concerns in the planning area relate to flooding of structures, property, or streets

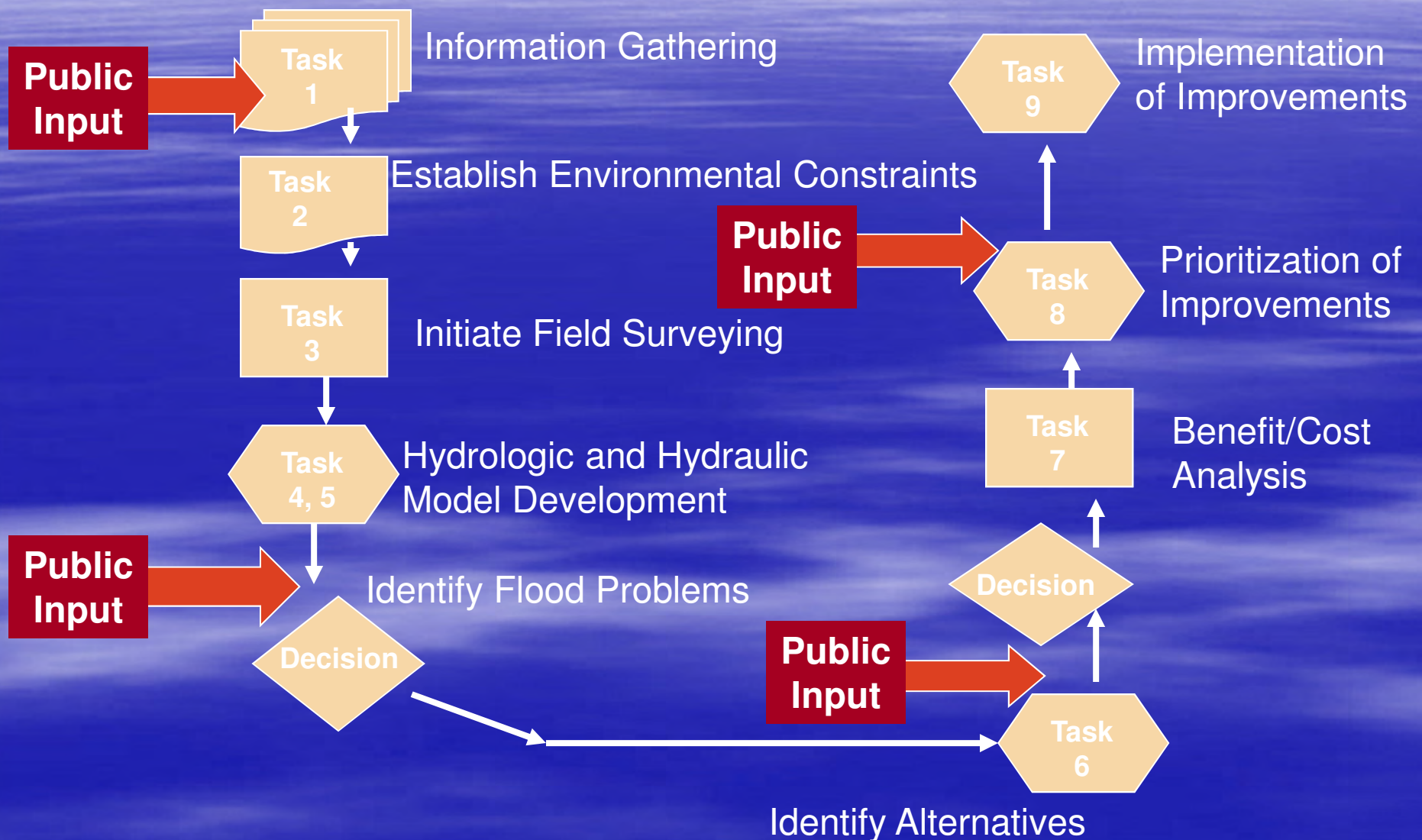
| Drainage Concerns from Citizens in Planning Area | |
|--|--------------------|
| Type | Number of Concerns |
| Structure Flooding | 44 |
| Property Flooding | 64 |
| Street Flooding | 40 |
| Erosion Problems | 47 |
| ST System Maintenance | 34 |
| Creek/Channel System Maintenance | 43 |

Why do Flood Protection Planning for Cottonwood and Fish Creek?

- Arlington's citizens have flood insurance which have paid on losses
- NFIP Statistics (as of October 31, 2009) for City of Arlington in planning area

| | |
|--------------------------------------|-----------------------|
| Policies in Effect | 1640 |
| Insurance in-Force | \$ 355,535,000 |
| Total Number of Losses | 705 |
| Total Payments (1978-3Q 2009) | \$ 10,216,116 |

How will Flood Protection Planning Be Accomplished?



How will Flood Protection Planning Be Accomplished?

Guidance and Funding



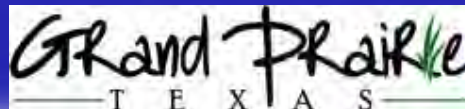
Study Sponsors



Technical Input



Study Stakeholders



Localized Input

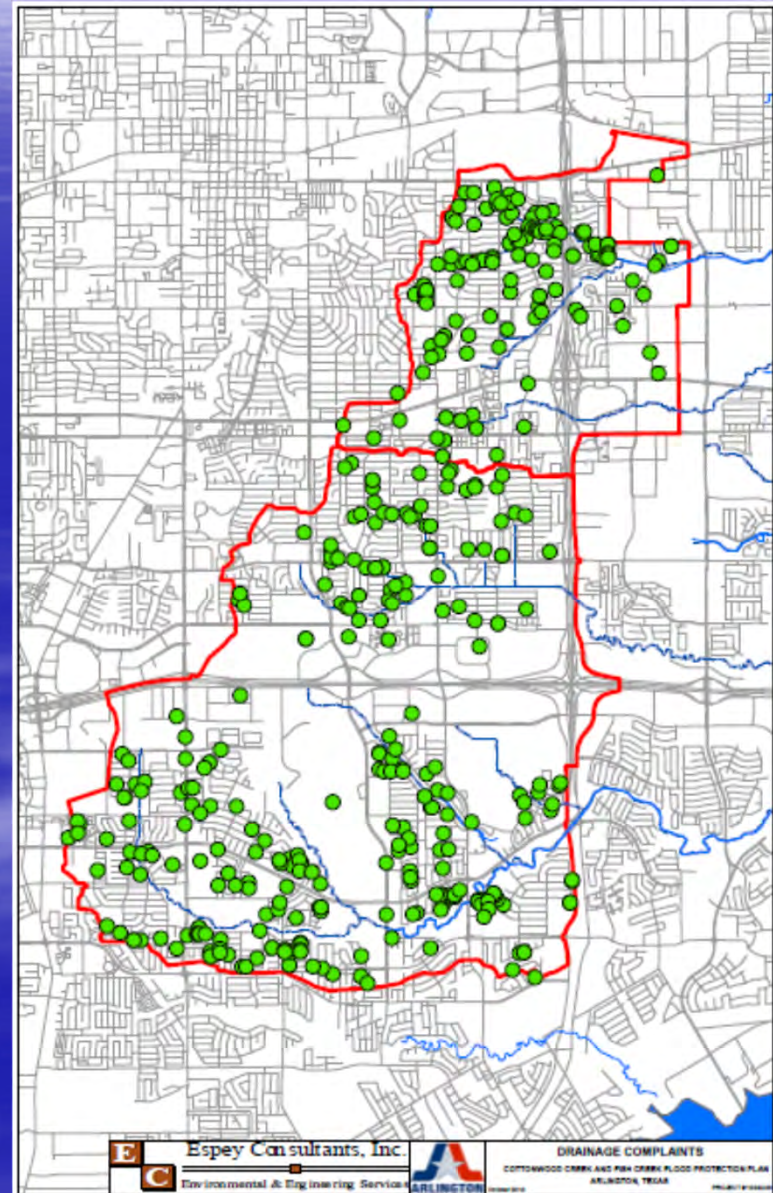
Parties with Functional Interests

General Public



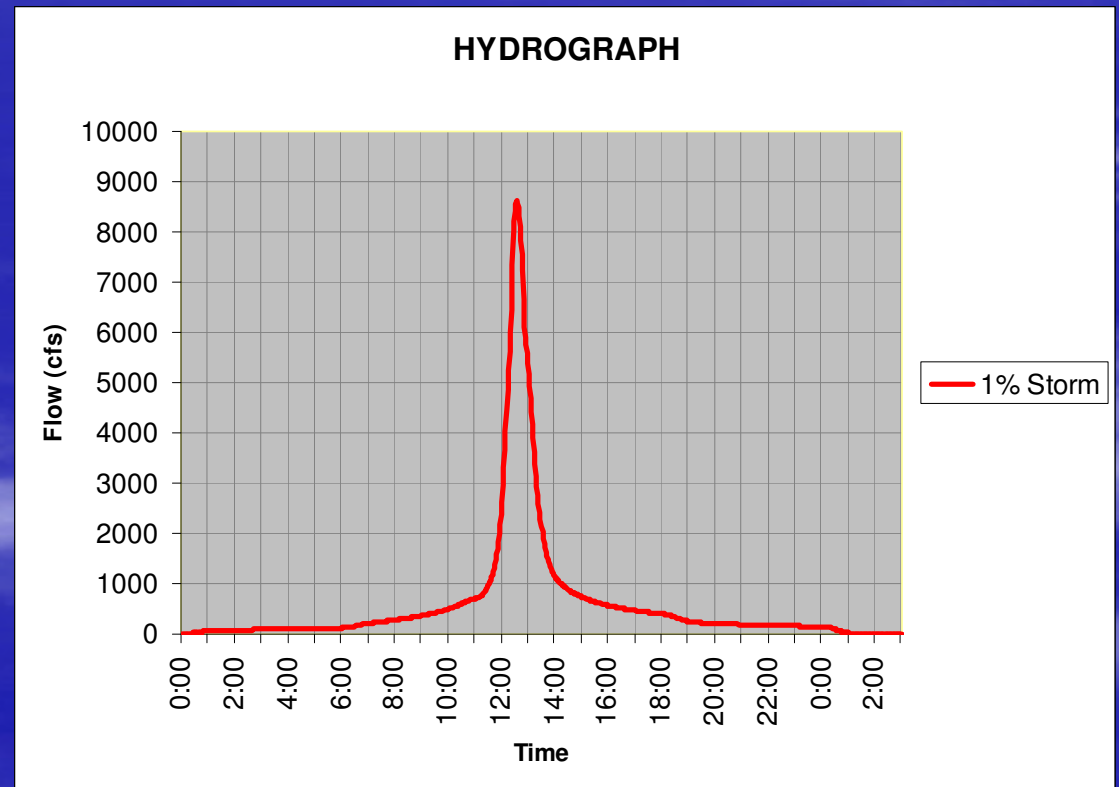
How will Flood Protection Planning Be Accomplished?

| Type | Example |
|------------------|---|
| Previous Reports | Existing Studies Existing Models |
| Field Surveys | Concrete Channels Bridges Creek Crossings |
| City Data | Aerials LiDARs Concern Database |
| Environmental | Wetlands Protected Areas Brown Fields |



How will Flood Protection Planning Be Accomplished?

- This study will focus on the 1% annual chance event (100 year storm) assuming ultimate build-out conditions in the watershed.
- Modeling will predict flooding impacts
 - Property Flooding
 - Roadway Overtopping
 - 1% - 100 year storm
 - 2% - 50 year storm
 - 4% - 25 year storm
 - 10% - 10 year storm



How will Flood Protection Planning Be Accomplished?

■ **Structural**

- Detention Ponds
- Channel Improvements
- Bridge / Culvert Improvements
- Channel Diversions



■ **Non-Structural**

- Development Regulations
- Floodplain Land Acquisition
- Warning Systems



Where Does Flooding Occur?



- Cottonwood Creek
Susan Dr.
Park Row
Lovers Ln.
- South Cottonwood Creek
Forum Dr.
State Hwy 360
Brazos Dr.
Park Ave.
- Tributaries of Cottonwood Creek
Susan Dr., Buena Vista Dr., & Plaza St.
Brookshire
Hillcrest

Where Does Flooding Occur?

- Fish Creek
Creek Front Ct.
Beagle Dr.
Brook Forest
Lakeway Dr.
Beckett
Nathan Lowe
- Tributaries of Fish Creek
Engleside Dr.
Collins
Summer Creek Dr.
- North Fish Creek
State Hwy 360
Seaboard Dr., Wintersmith
Mayfield Rd.
Volunteer Dr.

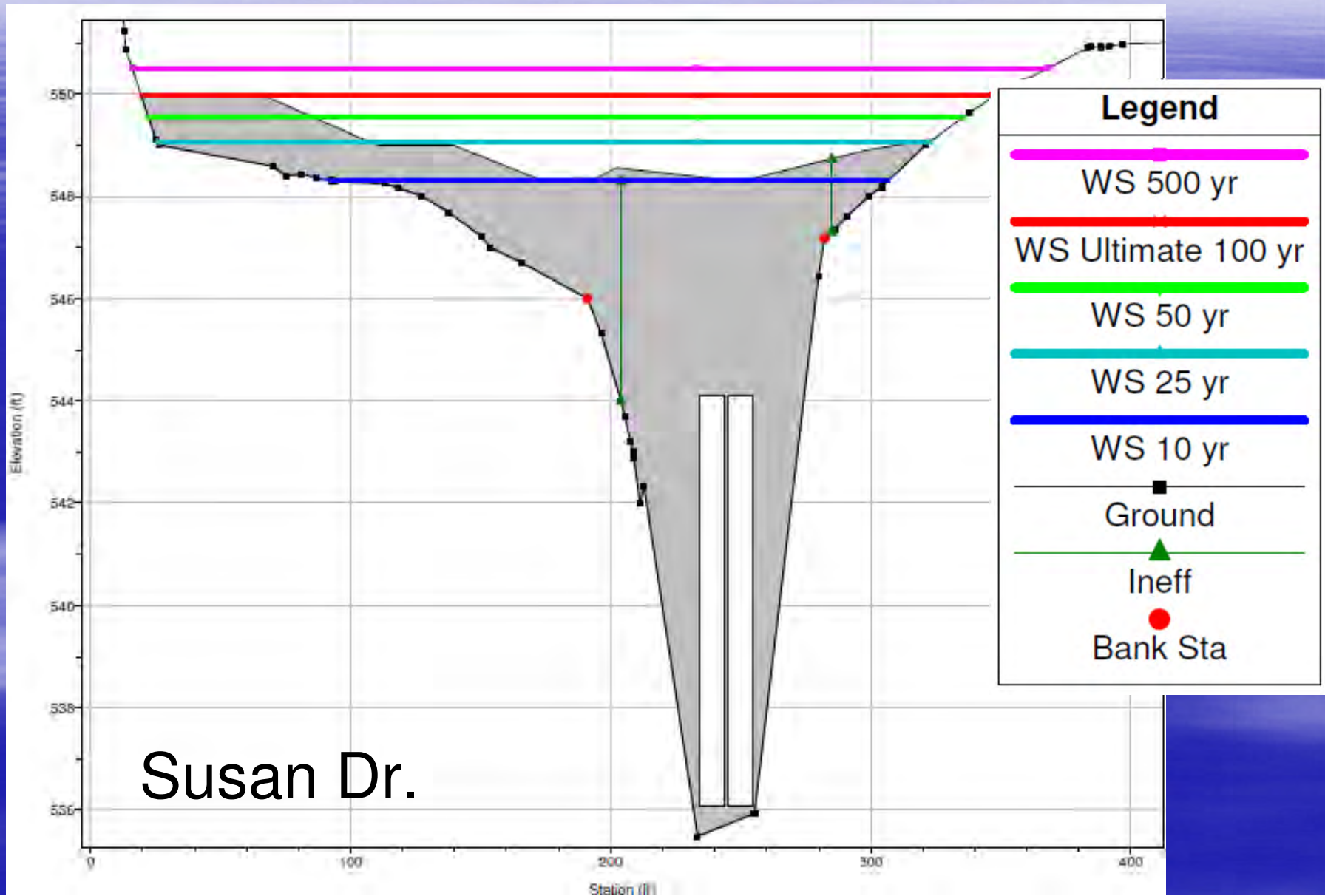


Where Does Flooding Occur? Cottonwood Creek



- Susan Dr. Overtopped 1.7'
- Parking Lot 1' to 2'
- Apartment Bldgs. less than a foot.

Where Does Flooding Occur?



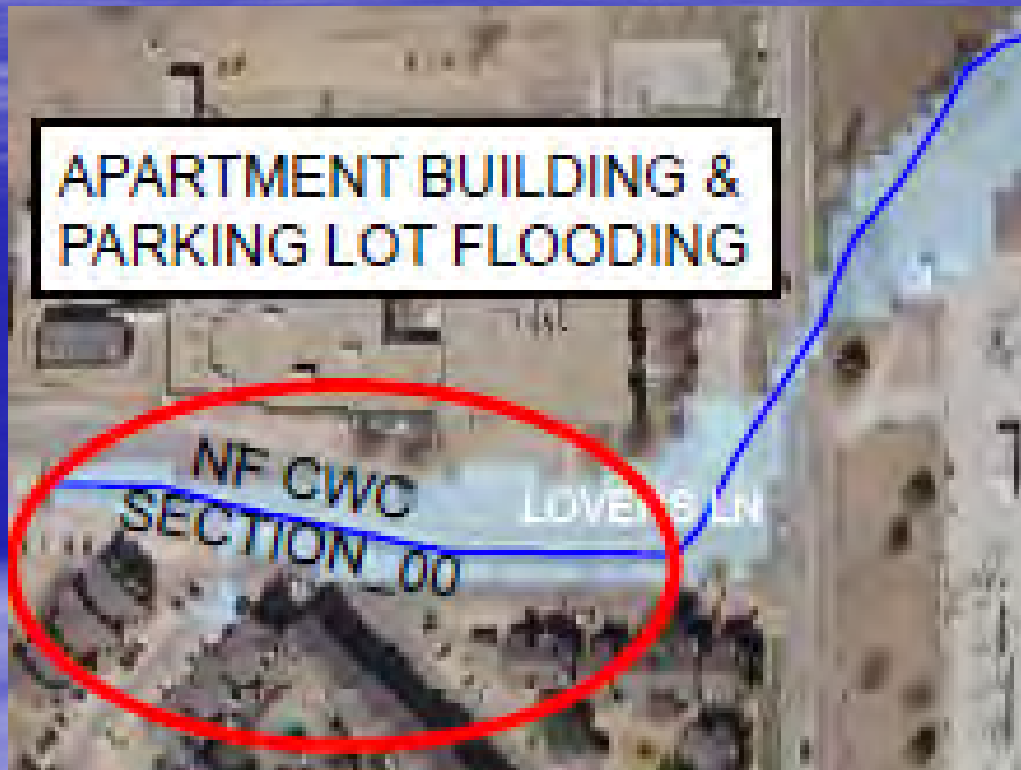
Where Does Flooding Occur?

Cottonwood Creek

- Park Row Overtopped 2'
- Parking Lot 1' to 2'
- Apartment Bldgs. 1' to 2'



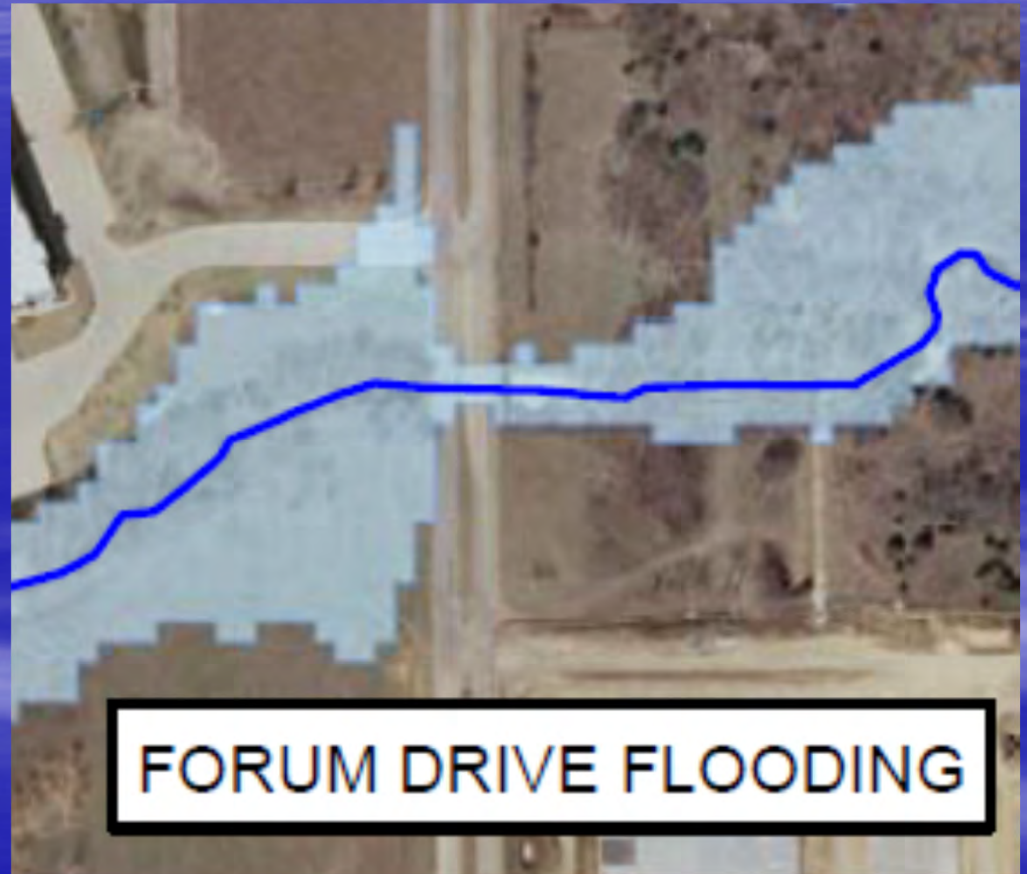
Where Does Flooding Occur? Cottonwood Creek



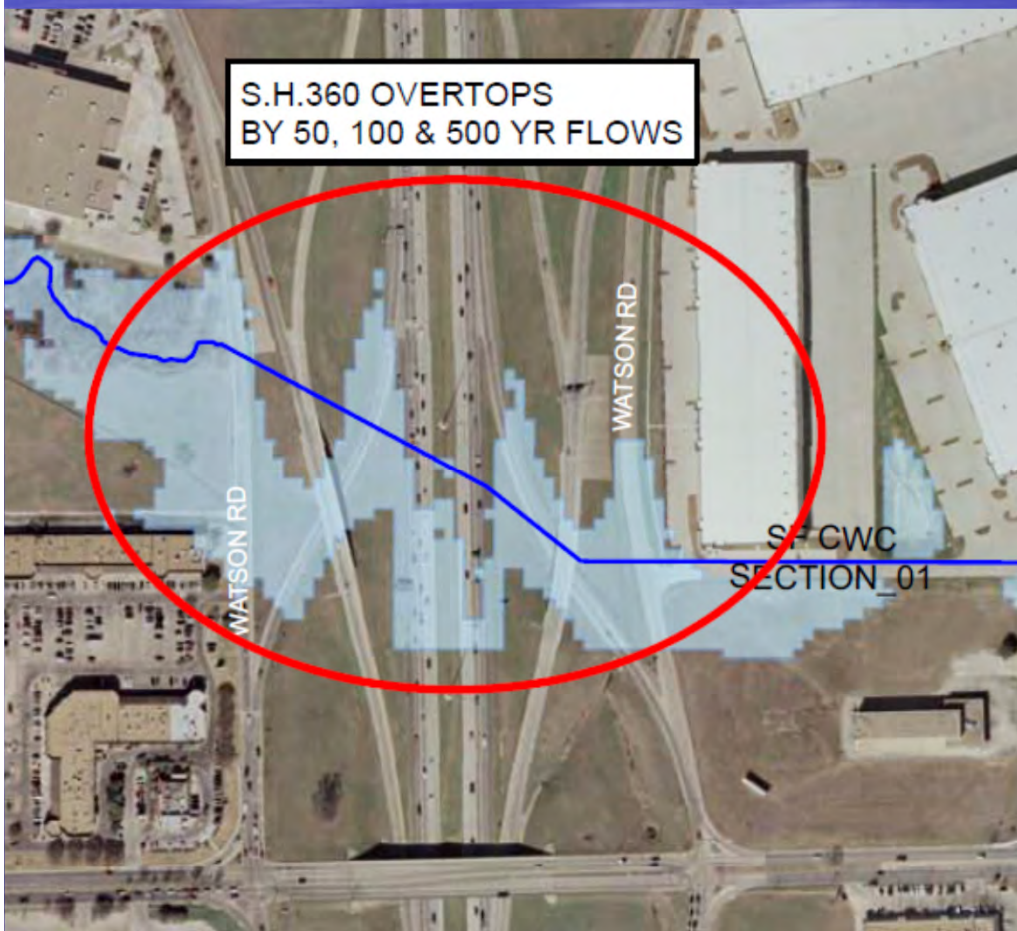
- Sherry St. Overtopped 2.4'
- Parking Lot 1' to 2'

Where Does Flooding Occur? South Cottonwood Creek

- Forum Drive
Overtopped 1.4'



Where Does Flooding Occur? South Cottonwood Creek



- State Hwy 360 Main Lanes Overtopped 1' to 2'
Frontage Rd overtopped 3'

Where Does Flooding Occur?

South Cottonwood Creek

- Brazos Drive < 1'
- Springcrest Dr. 1.3'
- Park Ave. 1.4'
- Apartment 1' to 2'
- Parking Lot 1'



Where Does Flooding Occur?

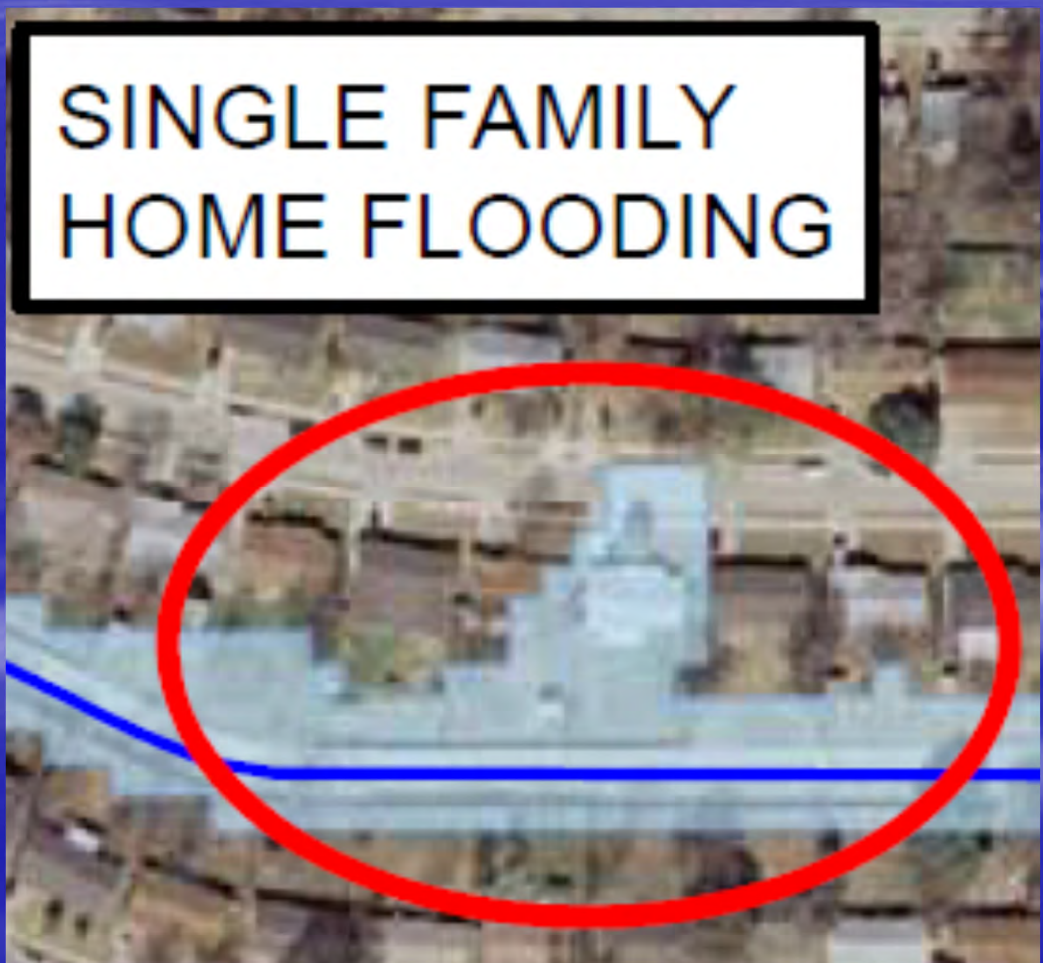
Cottonwood Creek Tributary CC2



- Susan Dr. 2.5'
- Buena Vista 5.8'
- Plaza St. 1'
- Residential Flooding of up to 3'

Where Does Flooding Occur? Cottonwood Creek Tributary CC2

- Gilbert Cir.
Residential
Flooding <6”



Where Does Flooding Occur? Cottonwood Creek Tributary CC3



- Brookshire Residential Flooding <1'
- Sherry St overtopped 1.1'

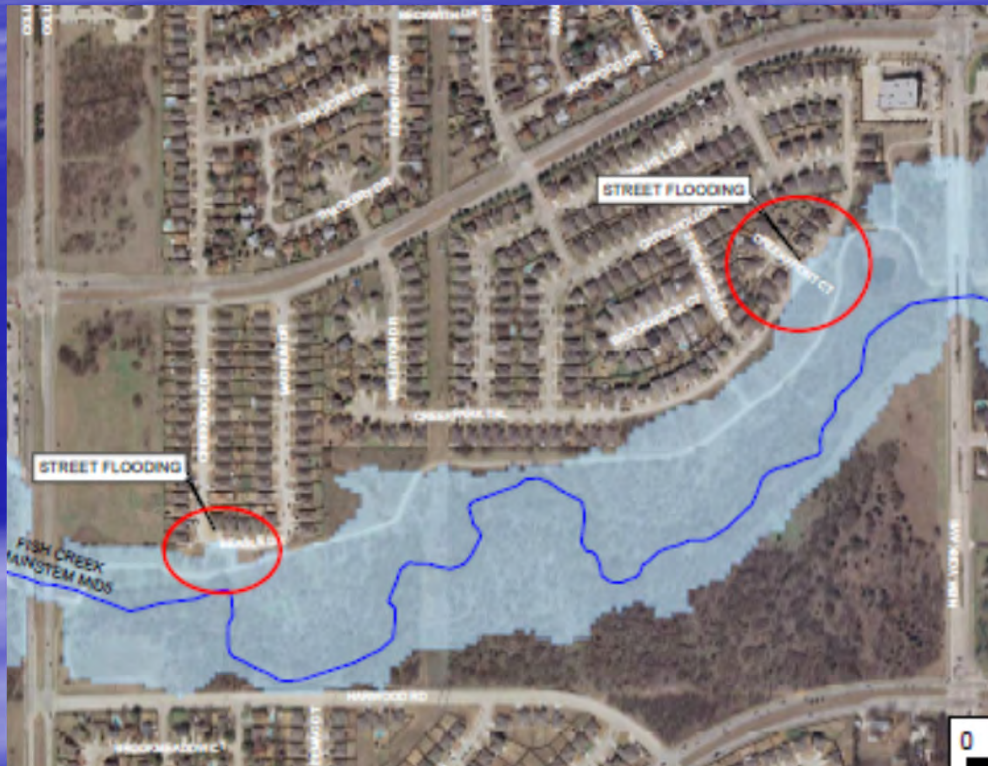
Where Does Flooding Occur? Cottonwood Creek Tributary CC3

- Hillcrest Residential Flooding <1'
- Hillcrest Dr. 2.6'



Where Does Flooding Occur?

Fish Creek



- Creek Front Ct.
Street Flooding <1'
- Beagle Dr.
Street Flooding <1'

Where Does Flooding Occur?

Fish Creek

- Brookforest Lot Flooding up to 2'
- Lakeway Dr. Lot Flooding < 1'



Where Does Flooding Occur?

Fish Creek

- Beckett Residential Flooding up to 1.5'
- Beckett Street Flooding up to 3.5'
- Rolling Green Residential Flooding <6"
- Rolling Green Street Flooding up to 2'
- Nathan Lowe overtopped 1.4'



Where Does Flooding Occur?

Fish Creek Tributaries



- Collins Street Overtopped 1.6'

- Engleside Dr. Street Flooding <1'



Where Does Flooding Occur?

Fish Creek Tributaries

- Summer Creek Dr. Street Flooding up to 3'
- State Hwy. 360 Frontage Rd. Overtopped 1.7'



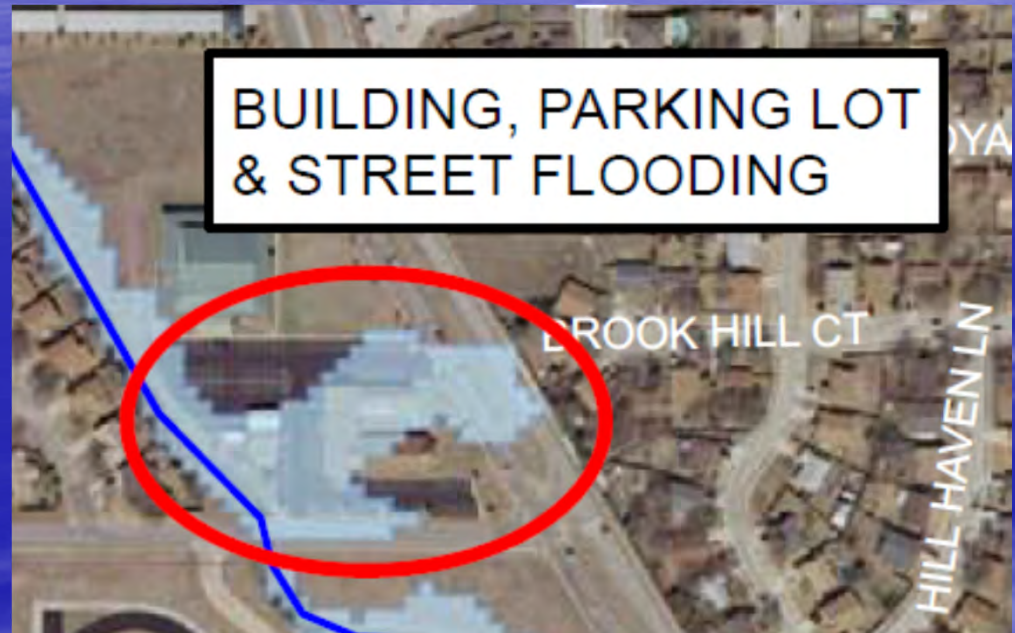
Where Does Flooding Occur? North Fish Creek



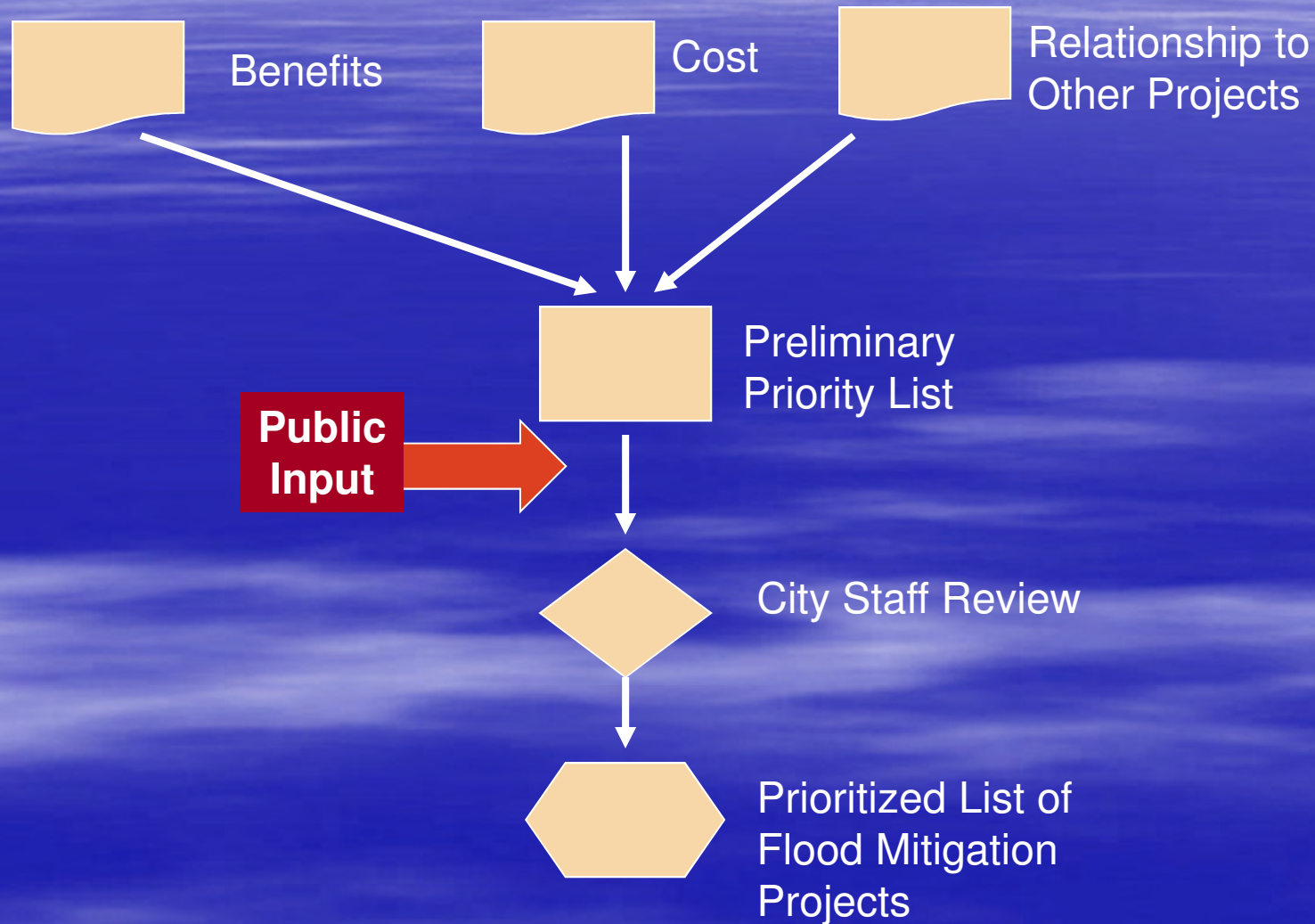
- Seaboard Dr. & Wintersmith Residential Flooding up to 1'
- Warehouse Flooding up to 2'
- State Hwy. 360 Frontage Rd. overtopped 1.6'

Where Does Flooding Occur? North Fish Creek

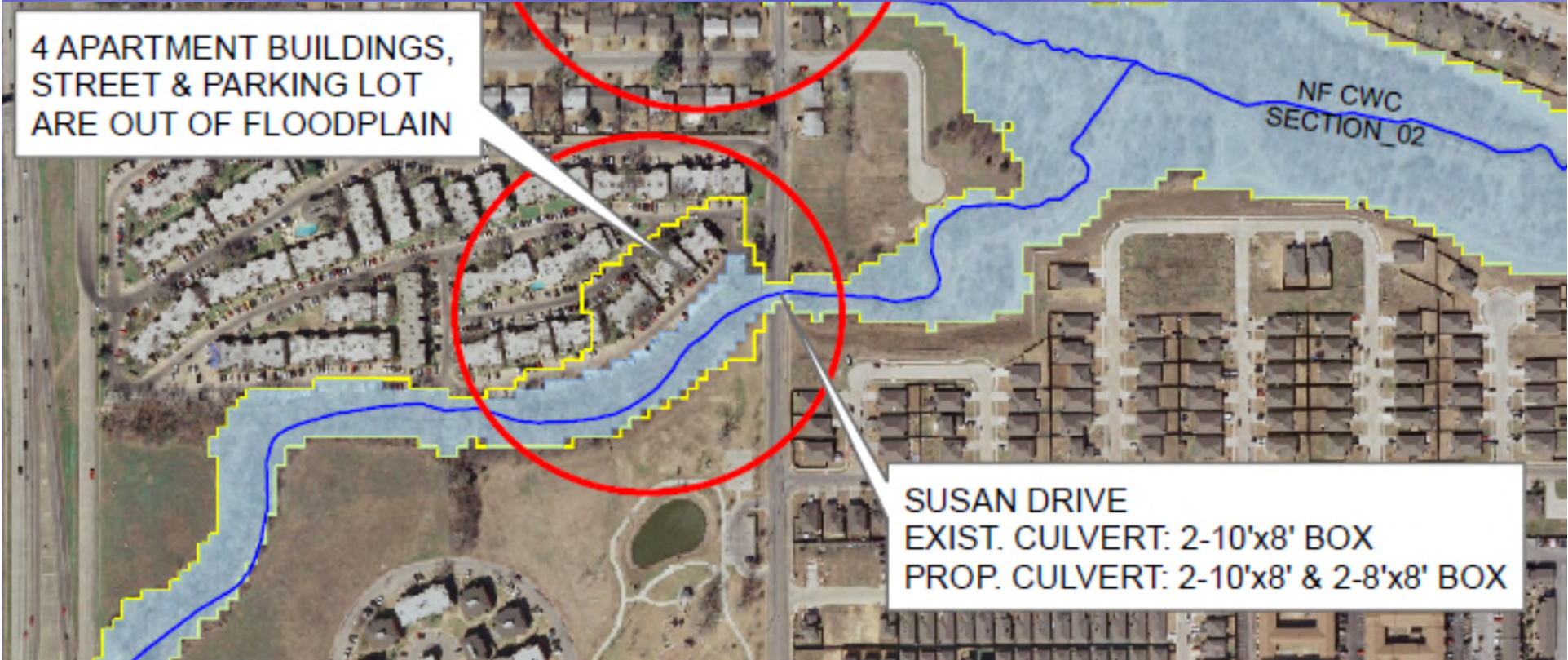
- Building Flooding
<6"
- Volunteer Dr.
overtopped < 6"
- Collins Dr.
Street Flooding up
to 2'



Where Does Flood Protection Planning Lead Arlington?



Where Does Flood Protection Planning Lead Arlington?

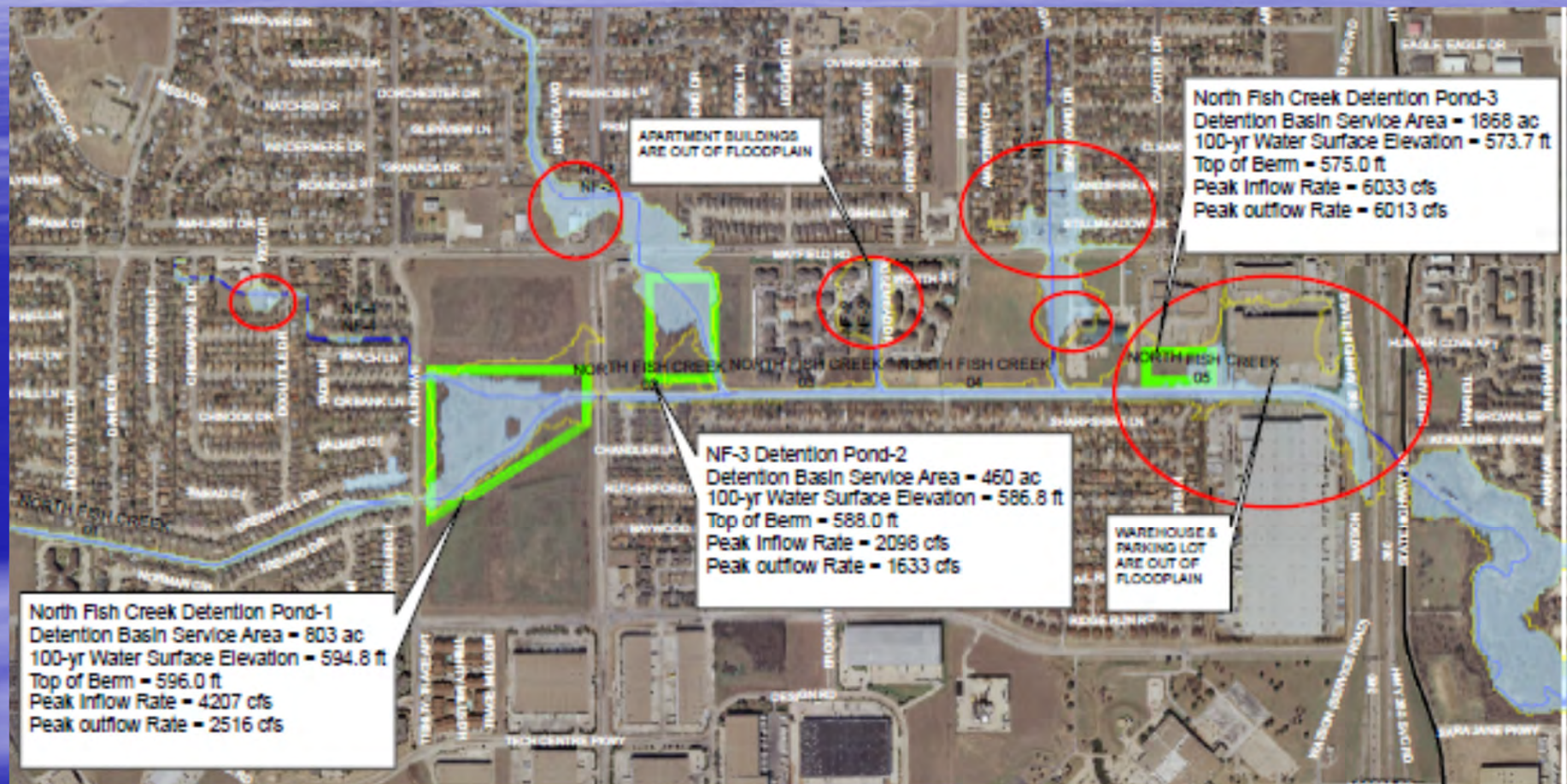


4 APARTMENT BUILDINGS,
STREET & PARKING LOT
ARE OUT OF FLOODPLAIN

SUSAN DRIVE
EXIST. CULVERT: 2-10'x8' BOX
PROP. CULVERT: 2-10'x8' & 2-8'x8' BOX

NF CWC
SECTION_02

Where Does Flood Protection Planning Lead Arlington?



Where Does Flood Protection Planning Lead Arlington?

Prioritized List of Flood Mitigation Projects



Decision for Funding



Implementation of Improvements



RLP

Repetitive Loss Properties

HMGP

Hazard Mitigation Grant Program

FMA

Flood Mitigation Assistance

COA

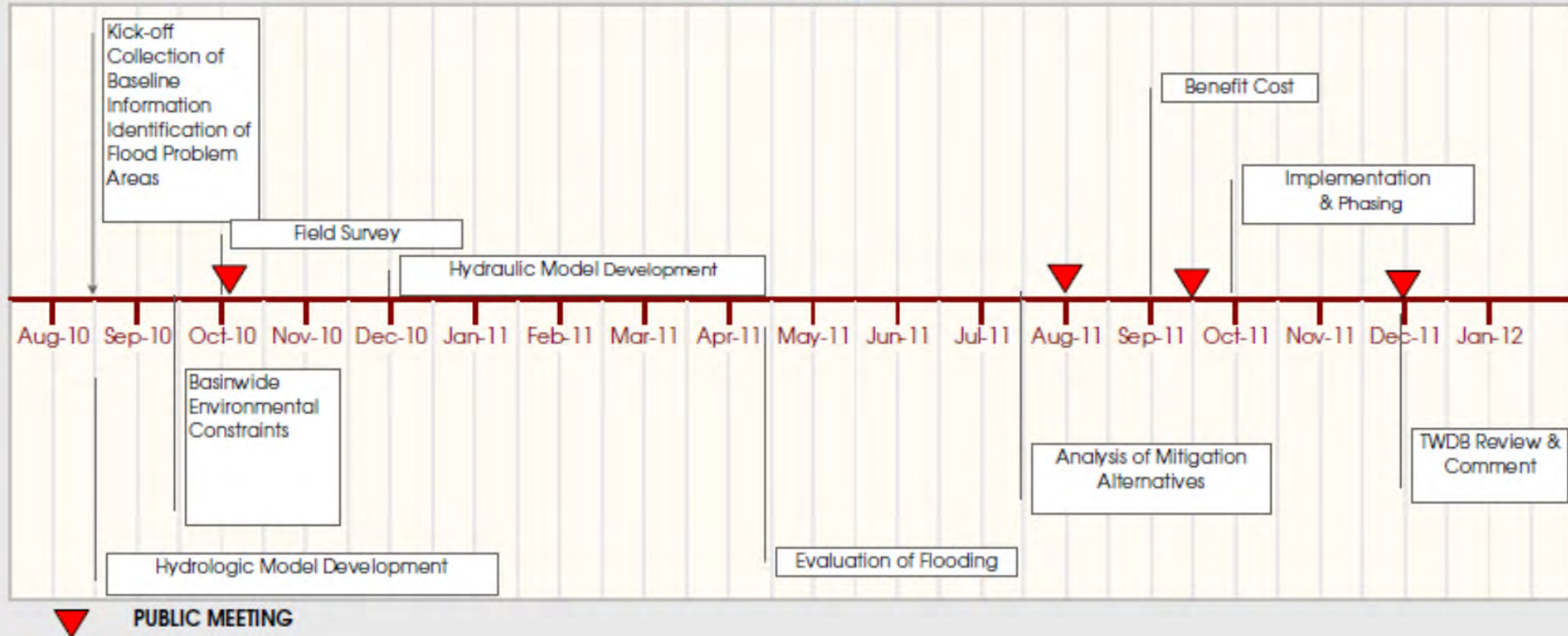
City of Arlington
Stormwater Utility



FEMA

When will the Flood Protection Planning Be Completed?

Cottonwood & Fish Creeks Flood Protection Planning City of Arlington



Who to Contact for Additional Information?

- **J. William Brown**

Storm Water Executive Manager
Public Works and Transportation

101 W. Abram St.
P.O. Box 90231 MS 01-0220
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Cottonwood and Fish Creeks Flood Protection Plan Public Meeting



Presented October 7, 2010
City of Arlington and
Texas Water Development Board
with assistance from Espey Consultants, Inc.

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COTTONWOOD AND FISH CREEK WATERSHEDS
FLOOD PROTECTION PLAN

Legend
100 Year Flood
City Limits
Proposed Retention Basin
Potential Flood Hazards

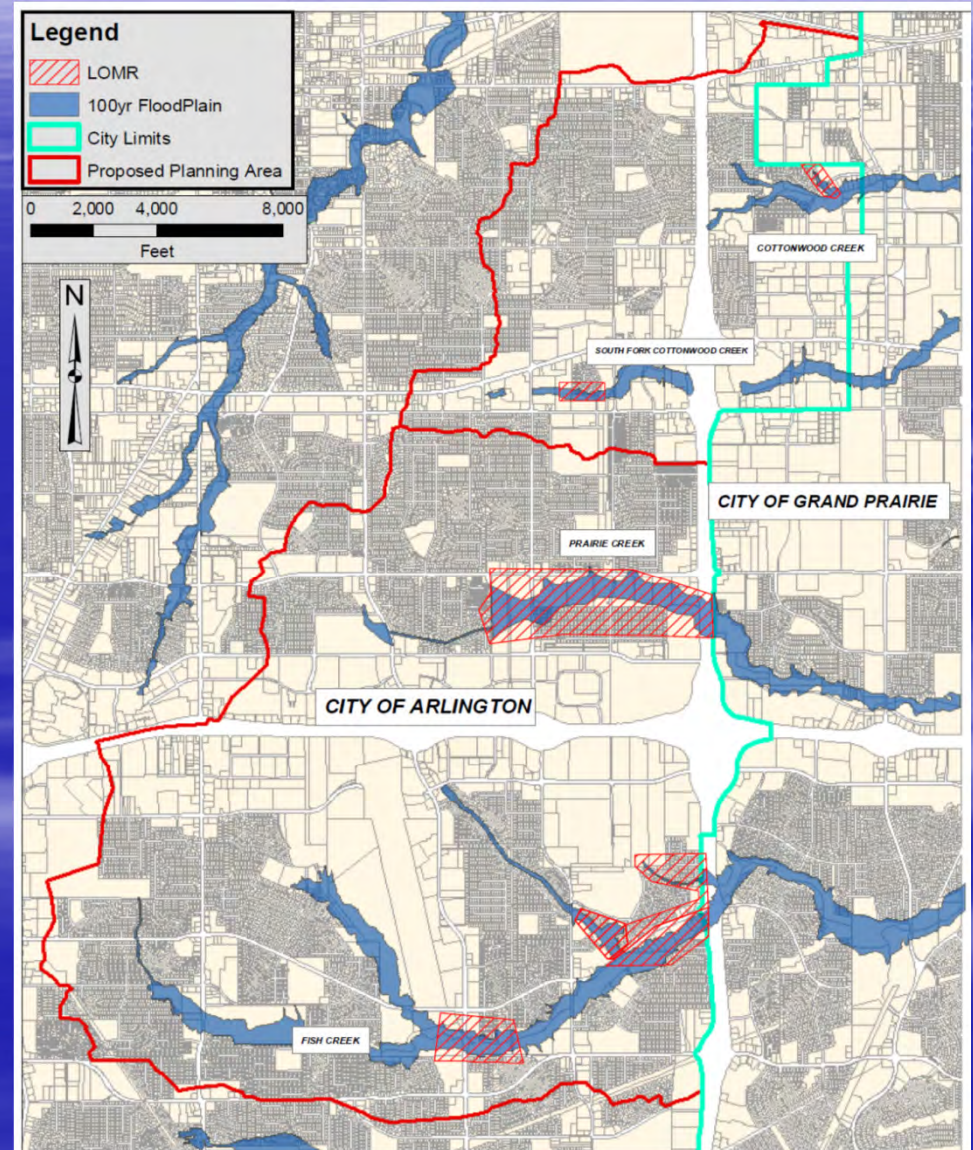
Applicant: City of Arlington

January 22, 2010
Project No. P0222.08

Including participation / support of:
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 - Met criteria for:
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Why do Flood Protection Plan?

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Why do Flood Protection Planning for Cottonwood and Fish Creek?

- Historically Cottonwood and Fish Creek watersheds have experienced flooding



Property



Roadways

Why do Flood Protection Planning for Cottonwood and Fish Creek?



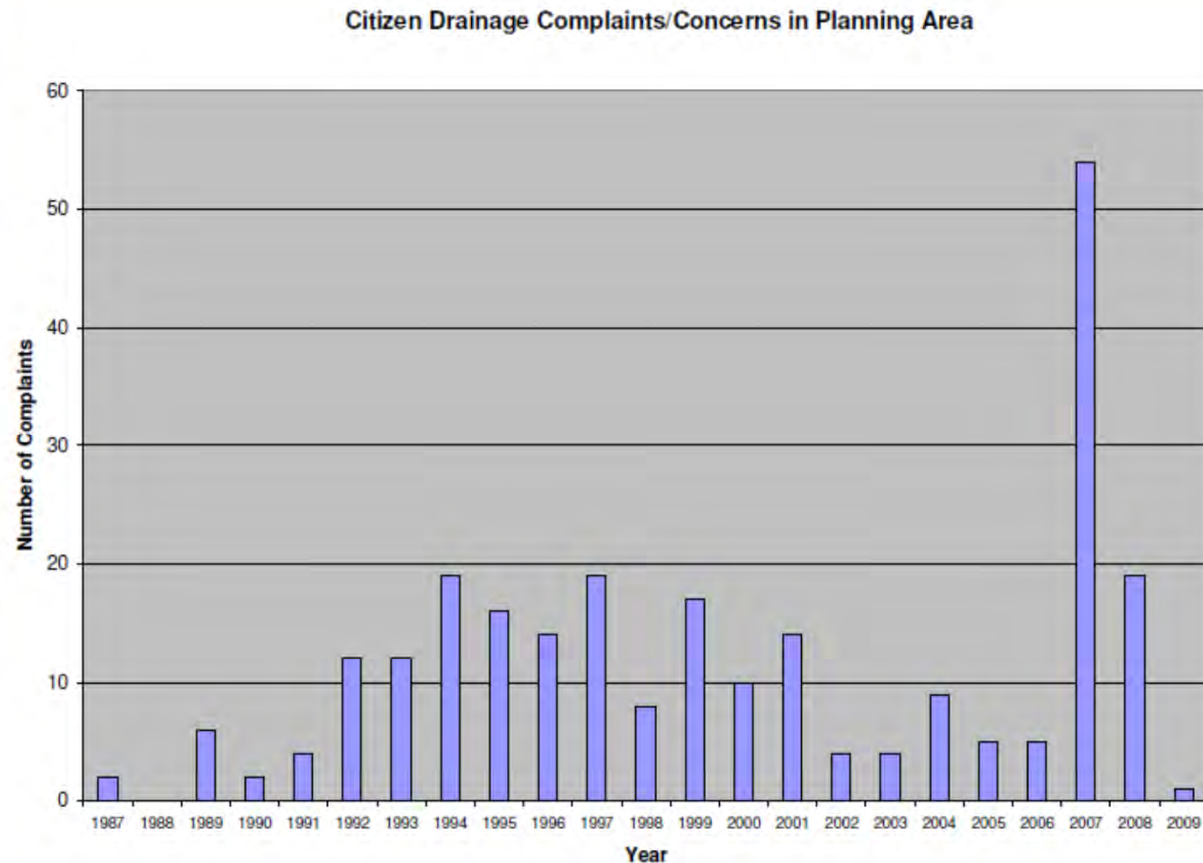
Why do Flood Protection Planning for Cottonwood and Fish Creek?

- Arlington's value of property in these watersheds in the 100-year floodplain

- Population in 100-year floodplain
7,637
- Assumed persons per household
3.15
- Estimated homes
2,425
- Average value per home
\$136,034
- Estimated Value at Risk in 100-year floodplain
\$329,882,450

Why do Flood Protection Planning for Cottonwood and Fish Creek?

- Planning area has averaged 15-20 drainage complaints per year since mid 1990s spiking to over fifty four complaints during 2007



Why do Flood Protection Planning for Cottonwood and Fish Creek?

- Over 50% of citizen complaints in the planning area relate to flooding of structures, property, or streets

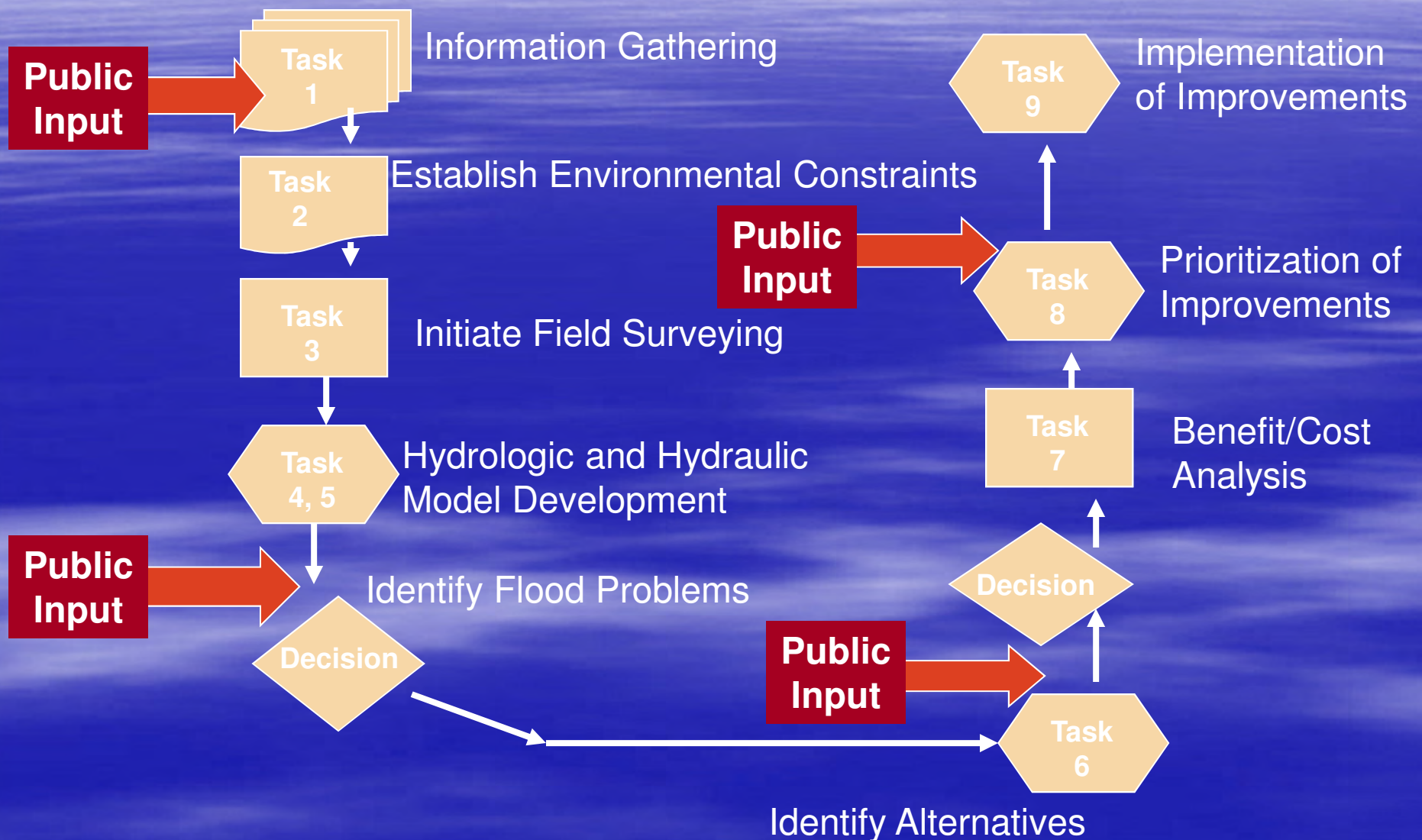
| Drainage Complaints/Concerns from Citizens in Planning Area | |
|---|----------------------|
| Type | Number of Complaints |
| Structure Flooding | 44 |
| Property Flooding | 64 |
| Street Flooding | 40 |
| Erosion Problems | 47 |
| ST System Maintenance | 34 |
| Creek/Channel System Maintenance | 43 |

Why do Flood Protection Planning for Cottonwood and Fish Creek?

- Arlington's citizens have flood insurance which have paid on losses
- NFIP Statistics (as of October 31, 2009) for City of Arlington in planning area

| | |
|-------------------------------|----------------|
| Policies in Effect | 1640 |
| Insurance in-Force | \$ 355,535,000 |
| Total Number of Losses | 705 |
| Total Payments (1978-3Q 2009) | \$ 10,216,116 |

How will Flood Protection Planning Be Accomplished?



How will Flood Protection Planning Be Accomplished?

Guidance and Funding



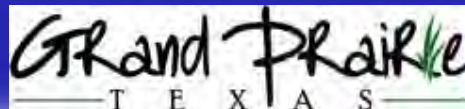
Study Sponsors



Technical Input



Study Stakeholders



Localized Input

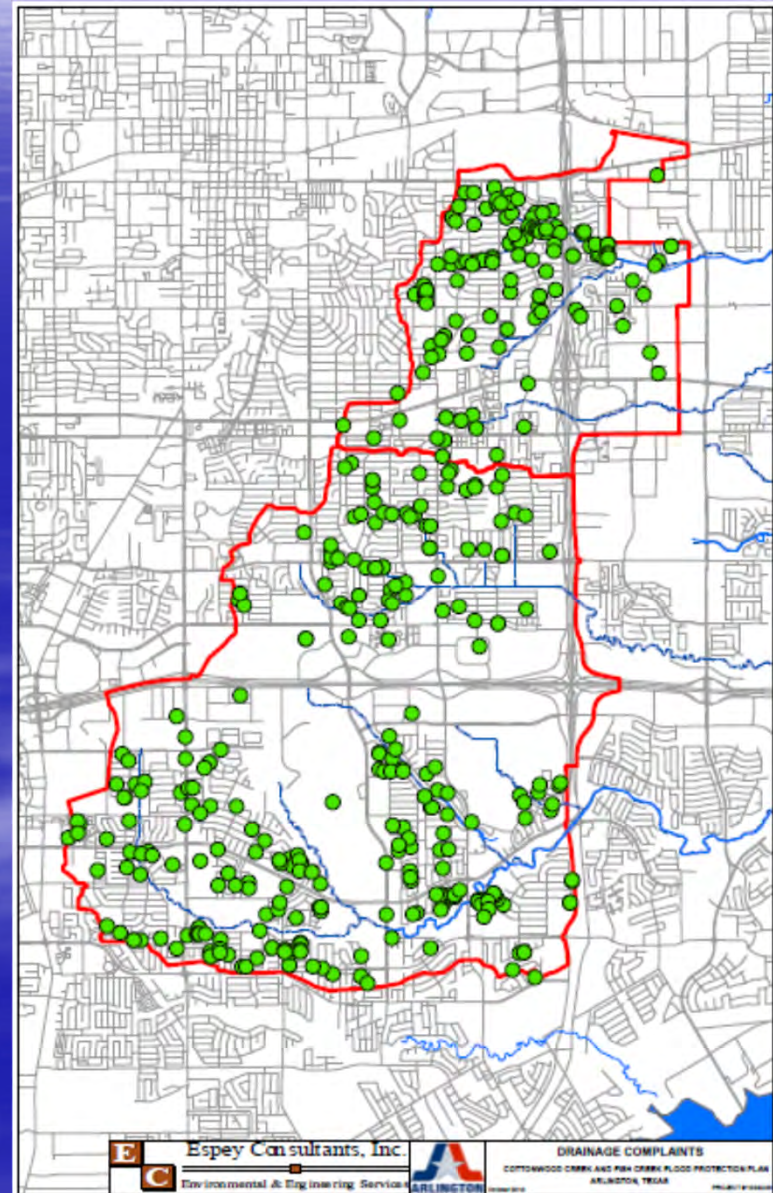
Parties with Functional Interests

General Public



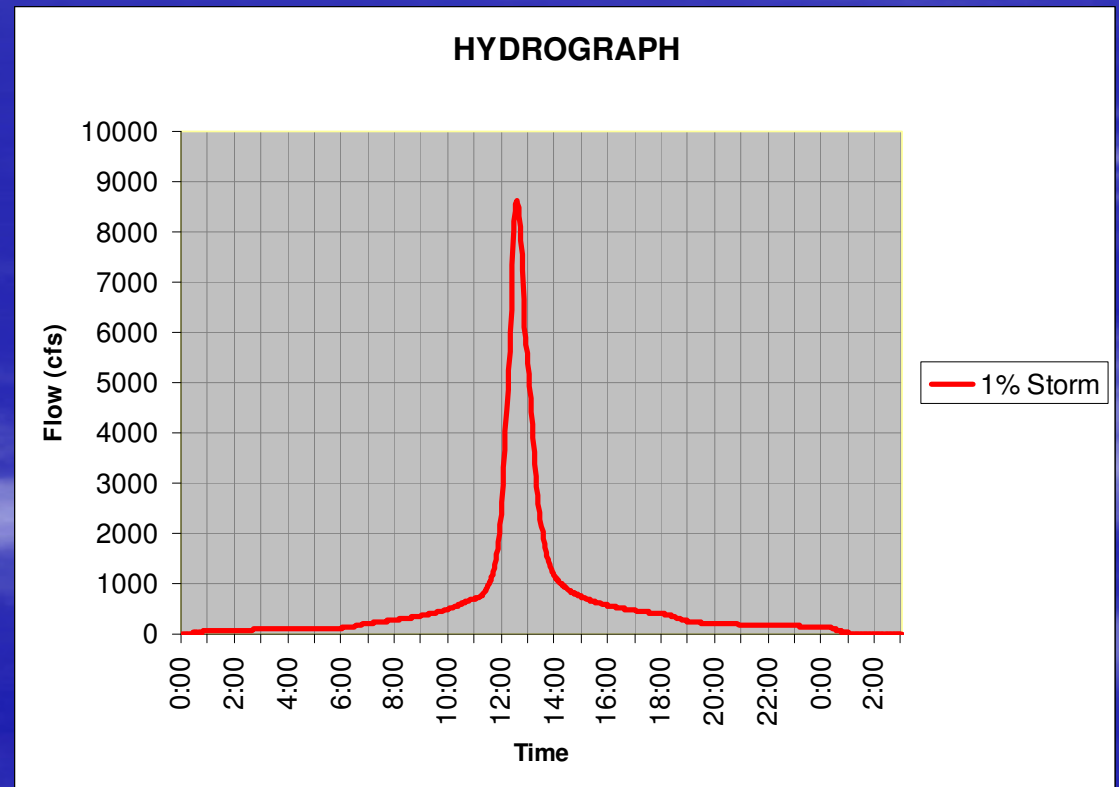
How will Flood Protection Planning Be Accomplished?

| Type | Example |
|------------------|---|
| Previous Reports | Existing Studies Existing Models |
| Field Surveys | Concrete Channels Bridges Creek Crossings |
| City Data | Aerials LiDARs Complaint Database |
| Environmental | Wetlands Protected Areas Brown Fields |



How will Flood Protection Planning Be Accomplished?

- This study will focus on the 1% annual chance event (100 year storm) assuming ultimate build-out conditions in the watershed.
- Modeling will predict flooding impacts
 - Property Flooding
 - Roadway Overtopping
 - 1% - 100 year storm
 - 2% - 50 year storm
 - 4% - 25 year storm
 - 10% - 10 year storm



How will Flood Protection Planning Be Accomplished?

■ **Structural**

- Detention Ponds
- Channel Improvements
- Bridge / Culvert Improvements
- Channel Diversions

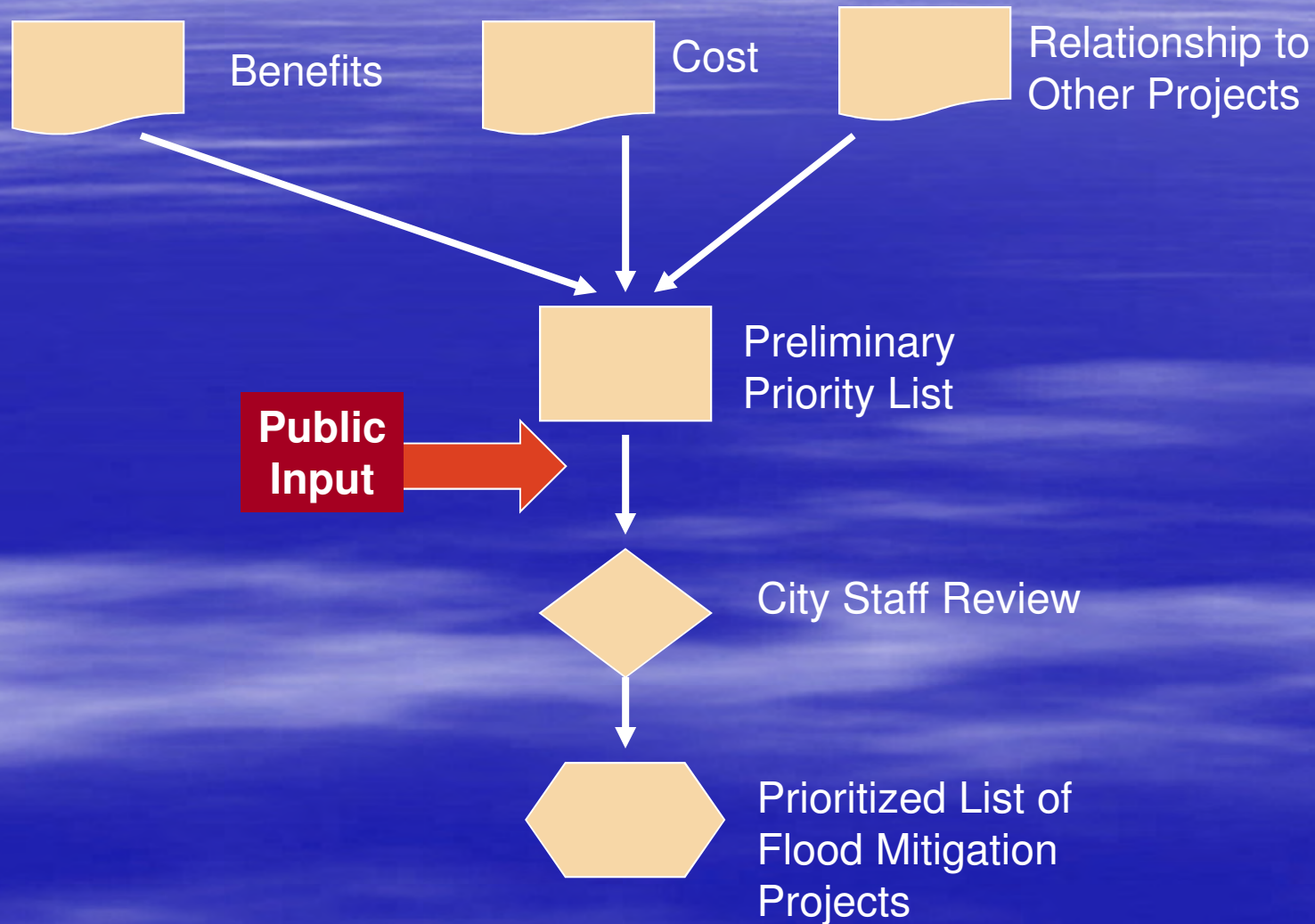


■ **Non-Structural**

- Development Regulations
- Floodplain Land Acquisition
- Warning Systems



Where Does Flood Protection Planning Lead Arlington?

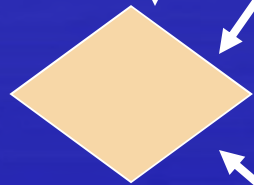


Where Does Flood Protection Planning Lead Arlington?

Prioritized List of Flood Mitigation Projects



Decision for Funding



RLP

Repetitive Loss Properties

HMGP

Hazard Mitigation Grant Program

FMA

Flood Mitigation Assistance

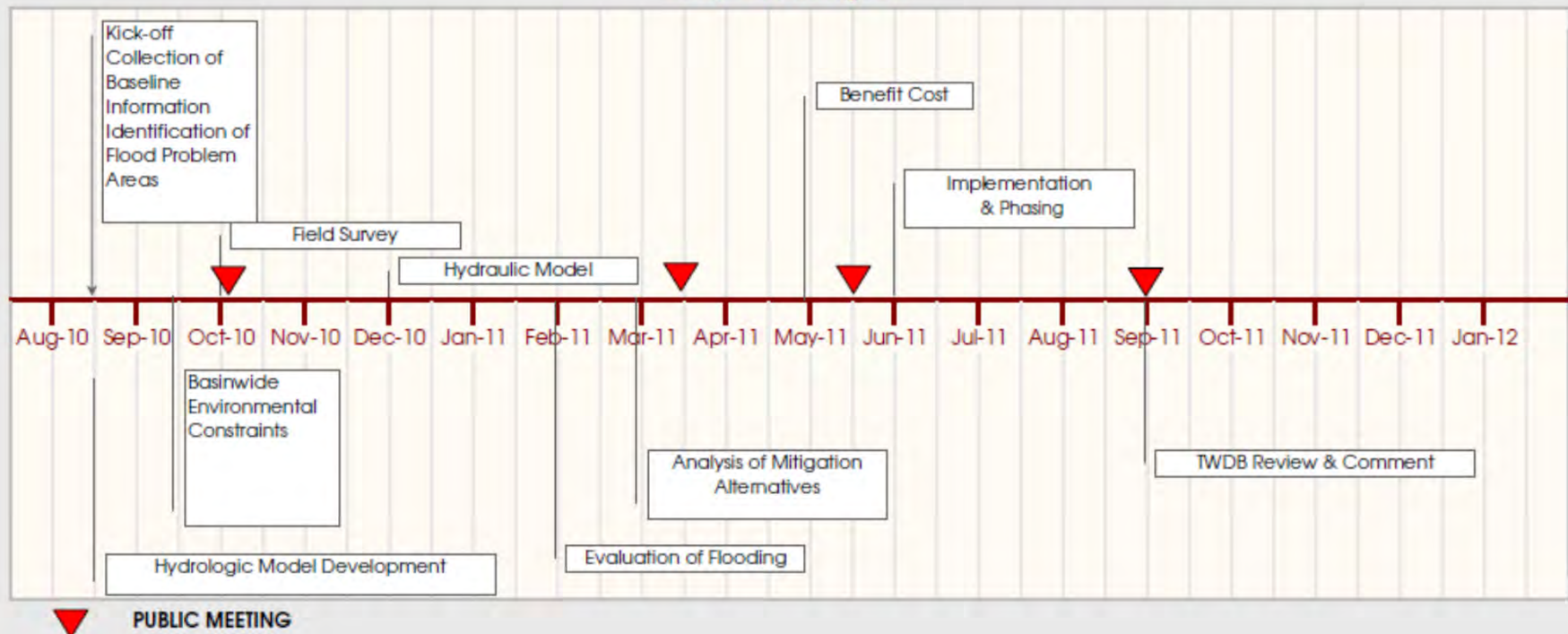
Implementation of Improvements



FEMA

When will the Flood Protection Planning Be Completed?

Cottonwood & Fish Creeks Flood Protection Planning City of Arlington



Who to Contact for Additional Information?

- **J. William Brown**

Storm Water Executive Manager
Public Works and Transportation

101 W. Abram St.
P.O. Box 90231 MS 01-0220
Arlington, TX 76004-3231

Phone: (817) 459-6567

Email:

Bill.Brown@arlingtontx.gov

- **Gilbert Ward**

Texas Water Development Board
Research and Planning Fund

1700 North Congress Avenue
P.O. Box 13231
Austin, Texas 78711-3231

Phone: (512) 463-6418

Email:

gilbert.ward@twdb.state.tx.us



**COTTONWOOD and FISH CREEK WATERSHEDS
FLOOD PROTECTION PLAN
August 17, 2010
Meeting Summary**

- I. Introductions: Meeting attendees included Bill Brown and Audra Valamides, City of Arlington and Wayne Hunter and Ken Tillman, Espey Consultants, Inc.
- II. City's objectives: A general discussion of objectives for the study for the City of Arlington was conducted with the following objectives being defined for consideration into addressing these issues through execution of the project:
 - A. Identifying flooding problems and risks is one of the highest priorities of the City Council
 - B. Identifying erosion risks is desired recognizing that this is not a focus of the TWDB which impacts the degree it can be addressed
 - C. Use of updated mapping from modeling which couples with the city of Grand Prairie and allows for FEMA mapping
 - D. Providing education to address the reality of prior policies for moving accelerated removal of onsite drainage and improved ways for addressing flooding impacts with detention
 - E. Use of City's Planning Department outreach to improve access to flooding issues and the impacted community
 - F. Providing education to demonstrate impacts caused by development
 - G. Recognition of water quality as an emerging issue with offsite drainage providing incentives for improvement
- III. Schedule (see attached schedule): A schedule was reviewed. In general, the intended completion time of September 2011 was proposed which met TWDB requirements; however, city management requested that consideration be given to accelerating the schedule to an earlier completion if possible.



- IV. Technical Advisory Committee (see preliminary list): The purpose of a technical advisory committee for this type of work was discussed followed by the development of an initial list of Technical Advisory Committee members, shown as follows:

| Name | Organization |
|-------------------------------------|----------------|
| William Brown, P.E. | Arlington |
| Audra Valamides | Arlington |
| Neighborhood Planning Outreach | Arlington |
| Gilbert Ward, P.E. | TWDB |
| Wayne Hunter, P.E. | Espey |
| Kenneth Tillman, P.E. | Espey |
| Gene Rice P.E. | USACOE |
| Jack Tidwell | NCTCOG |
| TBD | TxDOT |
| TBD | Tarrant County |
| TBD | FEMA |
| TBD | AISS |
| Romin A. Khavari or Gabriel Johnson | Grand Prairie |
| TBD | TCEQ |

- V. Public communication plan: The purpose of the Public Meetings was discussed for this project. City management suggested that a meeting place within the study area may be possible such as a recreation center but as a fall back, with some planning, the city council chambers would be available for public meetings. It was agreed that September 23rd would be considered as a target date for the initial kickoff public meeting, allowing sufficient time for Espey Consultants to develop some familiarity with the study area and information regarding flooding complaints. Audra Valamides offered to contact all individuals on the list with the exception of TCEQ which would be contacted by Wayne Hunter. It was agreed that the Technical Advisory Committee meeting would be scheduled to take place on the same day but prior to the Public Meeting.
- VI. Communication protocols (see attached contact list): it was agreed that communication to the City would be made to Audra Valamides, copying Bill Brown and that this might change in the future with the additional of a new city staff member. Contact to Espey Consultants was agreed to be made to Ken Tillman, copying Wayne Hunter.



| City of Arlington Cottonwood & Fish Creek FPP | | | | |
|---|---|--------------|------------------------------------|---------------------------------|
| Contact List | | | | |
| Name | Position | Organization | Phone | e-mail |
| William Brown, P.E. | Storm Water Executive Manager | Arlington | (817) 459-6567 | Bill.Brown@arlingtontx.gov |
| Audra Valamides, P.E. | Stormwater Management | Arlington | (817) 459-6590 | Audra.Valamides@arlingtontx.gov |
| Gilbert Ward, P.E. | Grants Coordinator, Flood Mitigation Planning | TWDB | (512) 463-6418 | gilbert.ward@twdb.state.tx.us |
| Wayne Hunter, P.E. | Principal | Espey | (214) 951-0807o (214)679-2765 c | whunter@espeyconsultants.com |
| Kenneth Tillman, P.E. | Project Manager | Espey | (214) 951-0807o 9214) 504-6435c | ktillman@espeyconsultants.com |

VII. Data needs (see attached Data Inventory): Ken reviewed a preliminary data information needs list to which Audra and Bill Brown provided guidance on what was available (see attachment).

VIII. Status reporting: EC agreed to perform monthly status report updates which were deemed acceptable.

IX. Other:

- A. The City reported that the critical storm event may be less than standard 24 hr event so Espey Consultants will do some preliminary investigation on this and report back
- B. .Espey Consultants is to check the contract regarding 10% retainage as to whether it applies to payments from Arlington to Espey Consultants or just to payments from TWDB to Arlington?
- C. Espey Consultants offered prior to its engagement of a surveying firm to strive to identify a MWBE surveying firm which is located in the city of Arlington, which was supported by the City.

Cottonwood/Fish Creek Flood Protection Planning
August 17, 2011

| Name | Address | Phone # | E-Mail Address |
|----------------|-------------------|--------------|---------------------------------|
| 1 CHG WILLY | 5516 MARQUETTE ST | 817-291-5314 | RIEMANN@PRODIGY.NET |
| 2 Angel Carder | " | 817-437-1560 | Black_knights_engl@histmail.com |
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**CITY OF ARLINGTON AND TEXAS WATER DEVELOPMENT BOARD
COTTONWOOD and FISH CREEK WATERSHEDS
FLOOD PROTECTION PLAN
Mitigation Options Meeting
October 20, 2011, 2:30 PM
Arlington City Hall, Public Works Conference Room
AGENDA**

- I. Introductions
- II. Overview of Flooding Locations
 - A. Cottonwood Creek
 - B. Fish Creek
- III. Discussions of mitigation options & relevant benefits
 - A. Non-Structural
 - B. Structural
- IV. Consideration of alternative mitigation actions.
- V. Discussion of Arlington's Desired criteria for prioritizing and/or phasing projects
- VI. Schedule next Technical Advisor Committee meeting & Public meeting
- VII. Other



**COTTONWOOD and FISH CREEK WATERSHEDS
FLOOD PROTECTION PLAN
TECHNICAL ADVISORY COMMITTEE MEETING
October 7, 2010, 3:00 PM, Arlington City Hall
AGENDA**

- I. Introductions
- II. Objectives for the Project
 - A. Background for this FPP
 - B. Overall FPP objectives
 - C. Additional FPP needs by city
 - 1. Culture education on development impacts
 - 2. Benefits of natural systems
 - 3. Understanding of risk
 - 4. Use of planning department outreach
- III. Schedule (see attached schedule)
- IV. Technical Advisory Committee (see proposed list)

| Name | Organization |
|-------------------------------------|----------------|
| William Brown, P.E. | Arlington |
| Audra Valamides | Arlington |
| Neighborhood Contact | Arlington |
| Gilbert Ward, P.E. | TWDB |
| Wayne Hunter, P.E. | Espey |
| Kenneth Tillman, P.E. | Espey |
| Gene Rice P.E. | USACOE |
| Jack Tidwell | NCTCOG |
| - | TxDOT |
| Trammel | Tarrant County |
| Ronald.Wanhanen | FEMA |
| - | AISS |
| Romin A. Khavari Gabriel Johnson | Grand Prairie |
| - | |

- V. Public communication plan



VI. Communication protocols

| City of Arlington Cottonwood & Fish Creek FPP | | | | |
|---|---|--------------|------------------------------------|---------------------------------|
| Contact List | | | | |
| Name | Position | Organization | Phone | e-mail |
| William Brown, P.E. | Storm Water Executive Manager | Arlington | (817) 459-6567 | Bill.Brown@arlingtontx.gov |
| Audra Valamides, P.E. | Stormwater Management | Arlington | (817) 459-6590 | Audra.Valamides@arlingtontx.gov |
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| Kenneth Tillman, P.E. | Project Manager | Espey | (214) 951-0807o 9214) 504-6435c | ktillman@espeyconsultants.com |

VII. Proposed Technical Advisory Committee Involvement (see attached table)

VIII. Data needs (see attached Data Inventory)

IX. Status reporting

X. Other



**CITY OF ARLINGTON AND TEXAS WATER DEVELOPMENT BOARD
COTTONWOOD and FISH CREEK WATERSHEDS
FLOOD PROTECTION PLAN
Mitigation Options Meeting
October 20, 2011, 2:30 PM
Arlington City Hall, Public Works Conference Room
AGENDA**

- I. Problem Identification
 - A. Summary
- II. Benefit Cost
- III. Prioritization
 - A. Stormwater Management Plan – 7 Goals
 - B. Benefit/Cost analysis
 - C. Summary
- IV. Action Forward

Appendix **I**
Digital Data

