November 22, 2022

STORM DRAINAGE EVALUATION

Generations

Tentative Map

PREPARED FOR:

CTA Engineering & Surveying

SUBMITTED TO:

El Dorado County

PREPARED BY:

Domenichelli & Associates, Inc.

5180 Golden Foothill Parkway Suite 220, El Dorado Hills, CA 95678

PHONE (916) 933-1997

REGISTERED PROFESSIONAL ENGINEER
BRIAN TRUMAN HAMMER
C77713
CIVIL
STATE OF CALIFORNIA

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GPA22-0001, Z22-0001, TM22-0001

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1. Introduction & Overview

The Generations project encompasses approximately 280 acres, located north of US Highway 50 in El Dorado Hills, in western El Dorado County. The property is located south of Green Valley Road, near the intersection with Malcolm Dixon Road, in the Community Region of El Dorado Hills. Two points of access to the project are proposed at Green Valley Road. Existing or approved adjacent subdivisions include Green Springs Ranch to the east and southeast, Serrano to the southwest, and Highland View to the west.

1.1. Purpose

The purpose of the report is to provide hydrologic and hydraulic analyses in support of storm drainage improvements shown on the tentative map application for the Generations development, and to verify adherence with guidelines and procedures outlined in the County of El Dorado *Drainage Manual*.

1.2. Previous Studies

No previously approved study was used in the development of this study. Hydrology and Hydraulic modeling were previously performed for Green Springs Creek which was used as a reference for the modeling in this study.

1.3. Topography

The project site generally slopes from South to North and East to West and is characterized by mostly grassland with scattered oak trees. Green Springs Creek flows from East to West through the Northern portion of the site, roughly paralleling Green Valley Road. Two existing man-made ponds are located within the project area, within the Green Springs Creek alignment.

The Generations development utilizes topography flown in 2011 and is based on the North American Vertical Datum of 1988 (NAVD88). A supplemental field survey was performed in 2012 at each of the two ponds. The hydrologic modeling for the Generations project extends beyond the scope of this topography. For areas outside of the flown topography digitized USGS quad maps are used.

2. Project Description

The Generations project includes a proposal for 379 new residential units, a clubhouse, a park, and the supporting improvements required to serve the development. In addition to standard drainage features typically associated with development, two existing drainage ponds will be modified with the development. Two road crossings of Green Springs Creek will be sized to maintain freeboard and flow criteria for the creek. On-site, several detention basins will be constructed which will reduce runoff potential from developed areas to re-create existing flow conditions for the 2-year, 10-year and 100-year 24-hour events.

The onsite development will include several basins which will mitigate the runoff peaks generated due to development. In addition to mitigating offsite flow, flows will also be mitigated at key discharge points onsite to maintain flow to wetland areas and prevent scouring.

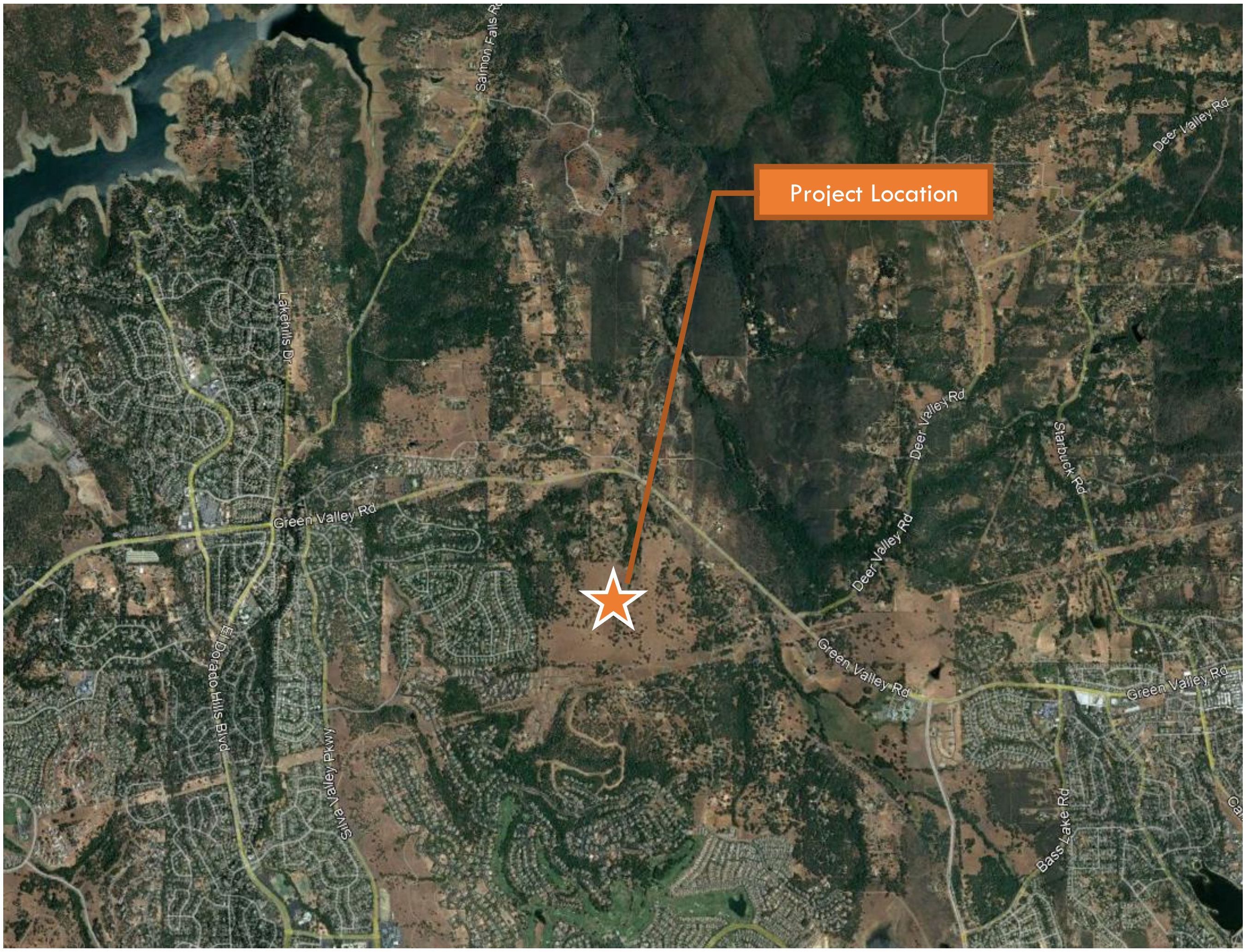


Figure 1. Generations Location Map

3. Modeling Parameters

The drainage study for the Generation project was carried out in conformance with the guidelines and procedures of the *County of El Dorado Drainage Manual*, adopted March 14, 1995, and adopted September 22, 2020, with precipitation data as revised in 2008.

The analysis of the hydrology was performed in HEC-HMS version 4.8. The hydraulic analysis of Green Springs Creek was created in HEC-RAS version 5.0.7.

3.1. Hydrologic Parameters

Existing Watershed Conditions

The existing watersheds used in this study are based on aerial topography and quad maps to determine compliance locations at various points in the project vicinity. Watershed maps and key points in the runoff analyses are provided in Exhibits 1, 1A and 1B.

As shown on the Exhibit 1.1 and Exhibit 1.2 in Appendix A, site runoff contributes to several drainage networks that ultimately tributary to Folsom Lake via New York Creek. The existing upstream shed contributing to Green Springs

Creek is 2.6 square miles and is the primary source of runoff which flows through the site via Green Springs Creek. The flow in Green Springs Creek is significant and mitigation is an important factor to consider in post-development conditions.

In most cases, watersheds were delineated based on the project boundary in order to provide a hydrograph at the project boundary for comparison purposes. Watersheds extend slightly into neighboring properties to capture the full extent of the on-site development. There is no proposed development outside of the project area except for access, and therefore, for the purposes of a comparison to developed conditions hydrographs, the resultant flow is considered the project boundary flow. Figure 2 shows a pre and post watershed and the associated compliance point.

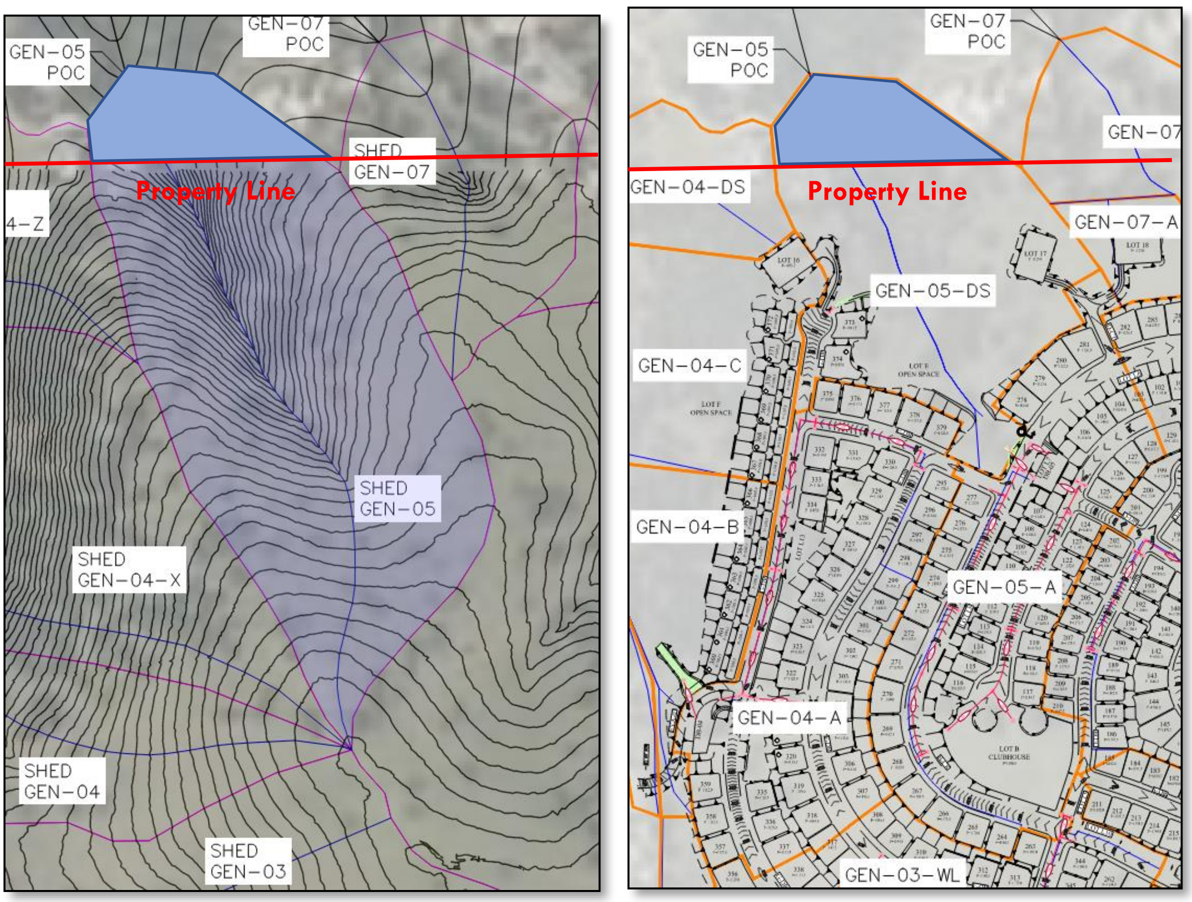


Figure 2. Pre and Post Watersheds Showing Same Off-Site Conditions

Proposed Watershed Conditions

Proposed conditions watersheds share the same external boundary as the Existing conditions watersheds. However, they were broken up into smaller sub-sheds based on the on-site design. Some on-site watersheds drain to a detention basin while other sheds are undisturbed and drain directly off-site. Watersheds are named based on their associated discharge location. For example, all GEN-05 watersheds in developed conditions eventually drain to the GEN-05 point of compliance which allows for a comparison to the existing conditions watershed at the same location.

Precipitation

The hydrograph method of runoff computation was used to evaluate project impacts on downstream facilities, wetlands, and the effectiveness of proposed mitigation measures. Throughout this study, the 50%, 10%, and 1%

reoccurrence interval storm events will be referred to as the 2-year, 10-year, and 100-year storm events. 24-hour duration hydrographs were produced for the 2-year, 10-year and 100-year storm events in HEC-HMS to identify and mitigate the impact of development. The Generations project's upstream sheds fall between the 26" and 28" mean annual precipitation contours and the generations subdivision is near the 26" contour as seen in Exhibit 3. The 27" mean annual precipitation values were chosen for the design storms and are shown in Table A2.2.1 in Appendix B. The generations project sits at an elevation ranging from 1000-1250ft, with the large upstream watershed having a maximum elevation of 1465ft. Since all elevations are lower than 1,640ft, in accordance with the County of El Dorado Drainage Manual, a type 1 temporal distribution was used for all design storms.

Runoff Calculations

To determine the hydrographs for each watershed, HEC-HMS was used to evaluate the watersheds based on SCS TR-55. An accompanying excel spreadsheet has been provided in Appendix B to identify the key parameters which include area, composite curve number, impervious percentage, lag time and reach characteristics. The initial abstraction was set to zero for all watersheds, assuming that the sheds would be saturated prior to the 24-hour peak. Since the soil types are a mix of C and D type soils, preceding events have the potential to produce these saturated conditions.

Curve Numbers and Soil Type

Composite curve numbers were calculated using google earth imagery and the tentative map layout to determine the weighted areas for each land use category. Soil type for the Generations onsite watersheds was determined to be D-Type soil and for the larger 2.6 square mile watershed the soil type was determined to be C-Type soil. Exhibit 4 in Appendix A shows the soil classifications from the USDA. Using the soil type and land use, curve numbers for each of the land use regions were determined using TR-55 and a spatially weighted average CN was computed for each watershed. The values used are highlighted on Table 2-2c in Appendix B. Generally speaking, due to the D-type soil found on-site, the pre-conditions CN values do not dramatically raise in the post-construction conditions. As D-type soil already has a low infiltration rate, the added impervious to the site does not significantly alter the runoff potential.

Lag time

Lag time was determined using the TR-55 manual and a characteristic water course lengths for each watershed. Sheet flow travel time was determined using the simplified solution to the kinematic-wave equations, shallow flow velocity was determined using Figure 3.1 of TR-55, and channel flow velocity was estimate using Manning's equation with typical n value, A/P ratio, and slope for the given channel. The travel time for each watercourse length was determined and the lag time was taken to be 60% of the total travel time for each shed. A summary of the calculations is presented in Appendix B.

Stream Flow Routing

In HEC-HMS, Muskingum-Cunge routing models were used for concentrated flow routing. Muskingum-Cunge is best suited for applications where timing is the key element of interest and storage volume can be ignored. The stream systems in question are all moderately steep and therefore limited storage will take place in the streams except at dedicated storage areas. Due to this, Muskingum-Cunge routing was picked as the preferred method. These routes were determined where sub catchments combined to flow through low flow channels and streams. The HEC-HMS input and routing are shown in Appendix B.

Detention

Peak flows are increased due to onsite development and need to be mitigated to maintain the existing condition flows for flood control and hydromodification mitigation. Through iteration, detention basins were sized, and outfall structures were designed to retain flows similar to, but not greater than, the existing peak flows at several key locations throughout the site for the 2-year (Hydromod), 10-year (Flood Control), and 100-year (Flood Control) storm events. A typical basin will contain a low-flow orifice, an overflow weir, and an emergency spillway sized to convey the 100-year event while maintaining 1.5 ft of freeboard in the basin.

Final design of the detention basins will be determined with improvement plan design submittal and final drainage report.

3.2. Hydraulic Parameters

Hydrographs

Hydrographs were taken from the runoff computations in HEC-HMS and inserted into the HEC-RAS model as lateral inflow or uniform later inflow conditions. The primary flow contribution to the model comes from the 2.6 square mile shed to the east of the Generations project site. Due to the steep nature of Green Springs Creek, hydrographs were added with minimum flows approximately 10% of the peak inflow to the model. This minimum flow helped to prevent instabilities throughout the model during the ramp up and trailing end of the flows. They do not have an impact on peak flow results.

Base Flow

Due to the relatively steep nature of the Generations site, baseflows for on-site hydrographs were assumed negligible for channelized flow. However, for Green Springs Creek baseflows were assumed to be approximately 5% of the peak discharge from the upstream shed for 100-year and 10-year storms and 10% for the 2-year storm. These assumptions provide HEC-RAS model stability at low-flows and pre-fill any low-flow storage that may occur in the creek.

Manning's 'n' Values

Green Springs Creek's main channel is generally a clean winding channel with some pools, shoals, weeds, and stones. The section of GSC near the downstream property line has additional ineffective slopes and sections with heavier weeds and stones. These two conditions result in Manning's n values of 0.045 and 0.055 respectively. The overbank floodplains of GSC were given 3 characteristic values. The first was 0.05 which is typical for light brush and trees in winter. The second was 0.04 which is typical of cleared land with tree stumps, no sprouts and the third was 0.1 representing heavy stand of timber, a few down trees, little undergrowth with flood stage below branches.

To determine routing within HEC-HMS a Manning's n value of 0.06 was used for all routing. This value is higher than that used in for the creek itself because stages are expected to be lower in the elements modeled in HEC-HMS. A value of 0.06 considers the added impact of grasses on the flow and will results in a slightly reduced velocity, which would be expected in the grassy, low flow channels.

Downstream Boundary Condition

The downstream boundary condition was set to normal depth with a characteristic slope taken from the HEC-RAS terrain in the Green Springs Creek channel.

Green Springs Creek Existing Conditions

The existing conditions in Green Springs Creek were modeled in HEC-RAS to determine existing flows and water surface elevations throughout the project reach. Currently, there are two permanent water ponds in the project reach with high-elevation bypasses. The embankments for both of these ponds are overtopped during a 100-year event. Each pond's bypass can handle small storms, up to the 2-year storm, but larger events use the embankments to weir flow.

Additionally, there is a small culvert crossing at the upstream boundary of the Generations project site. To determine the upstream water surface elevations for the existing conditions this crossing and culvert were omitted from the model. This results in a reduced water surface elevation which is more conservative for the purpose of comparing upstream water surface elevations to ensure the upstream property is not impacted by the proposed development.

Green Springs Creek Proposed Conditions

The proposed conditions in Green Spring Creek maintain largely the same geometry with a few exceptions. First, both ponds are removed by providing culverts through the embankments or removing the embankment entirely. Second, the upstream culvert crossing was removed and replaced with large Conspan crossings which re-shape the bottom of the channel within the right-of-way. Third, minor overbank grading is proposed for the project site. This grading has little impact on the cross-sectional area of the creek.

Due to the removal of the two ponds, proposed features are recommended to replace the floodplain storage. The downstream pond embankment is removed entirely, and the channel restored to its approximate natural state. The upstream embankment now an access road to the site and an upstream flow-control structure is planned which will recreate the 2-year, 10-year, and 100-year storage of the two existing ponds. An additional road crossing will be added near the upstream boundary of the site but that crossing is anticipated to provide no storage.

The locations and criteria for comparison between the existing and proposed models are as follows:

- Downstream hydrographs for all events
- 100-Year water surface elevations at any location where the WSEs extend beyond the property line
- Upstream water surface elevation at the upstream property line for all events

To recreate downstream peak flows leaving the site, detention within the onsite reach of Green Springs Creek was studied at each of the road crossings. However, the upstream most crossing must not impede flows due to its proximity to the upstream property. Therefore, the detention must occur at the new Green Springs Creek road crossing near the existing ponds.

The road crossing has significant storage capacity on the upstream side due to the existing pond geometry in the undeveloped conditions. The proposed CON/SPAN must be adequately sized to rule out the possibility of plugging during a major storm event. To achieve the desired results, a weir structure was modeled upstream of the CON/SPAN as part of the wingwall structure with two low flow orifices to pass frequent storm events and maintain the low flow channel. The crossing was designed in such a way that if, in the unlikely event that the CON/SPAN is plugged, that the overtopping of the road will not result in ponded water surface elevations to the elevation of any nearby structure.

4. Modeling Results

4.1. HEC-HMS Model

Using the parameters discussed above, a HEC-HMS model was created for the pre-conditions and post-conditions site. Using the model and an iterative approach, detention basins were sized at each watershed which required mitigation and an outlet structure was proposed to meter the flows for the 2-year, 10-year, and 100-year storm events. Twelve critical points (also referred to as points of compliance) are shown on Exhibit 1.1 and Exhibit 2 in Appendix A for the pre and post conditions. As discussed, these critical points are all at the project boundary. Tables 1.1 and 1.2 show the pre and post conditions flows for the 100-year event at each critical point. Full results for all storms can be found in Appendix B. Values from HEC-RAS model (US-POND and GSP-POC) are included in the tables below. The HEC-RAS model will be discussed further in section 4.2. The flow presented for US-POND is for the cross section upstream of the eastern most crossing of GSP (HEC-RAS Station 3441.5) and it represents the flow change as a result of improving the crossing to a pair of CON/SPAN culverts. The flow presented in GSP-POC is at the downstream most end of the model (HEC-RAS Station 10. It is downstream of the property line and shows that there are no negative off-site impacts as a result of the development.

Table 1.1: Pre and Post Conditions Peak Flows at Critical Points.

100YR	GEN-01-POC	GEN-02-POC	GEN-03-POC	GEN-04-DS-POC	GEN-04-US POC	GEN-05-POC
Existing	73.4	55.3	53.3	107.4	21.6	58.0
Proposed	66.8	52.8	36.8	97.7	16.3	55.3
Reduction	91.0%	95.5%	69.0%	91.0%	75.5%	95.3%

Table 1.2: Pre and Post Conditions Peak Flows at Critical Points.

100YR	GEN-06-POC	GEN-07-POC	GEN-08-POC	GEN-11-POC	GEN-12-POC	US-POND	GSP-POC
Existing	97.7	27.7	58.3	1883.2	1878.2	1883.7	2040.7
Proposed	75.6	26.7	48.4	1881.0	1876.5	1881.4	1950.7
Reduction	77.4%	96.4%	83.0%	99.9%	99.9%	99.9%	95.6%

In all cases, the proposed conditions 100-year storm event is reduced below the existing conditions storm event at the property boundary. Since Gen-03 and Gen-04 drain to adjacent development the reduction in these watersheds is conservatively proposed to ensure no adverse impacts downstream. If, during improvement plan development, additional detail at these locations is available for analysis, the mitigation required may be reduced to achieve flows similar to the existing conditions flows.

The reductions in flow at the property boundary are achieved primarily by use of detention basins. Seven detention basins are proposed on-site to mitigate peak flows. Each basin and outlet structure is sized to not use the emergency spillway during the 100-year event under normal operations. If the outlet of the basin becomes plugged, the emergency spillway is designed to pass the 100-year event while maintaining 1.5 ft of freeboard to the basin top. Table 2 below list the peak 100-year water surface elevations during normal basin operations and elevations of the spillway and basin top. The “100-year Freeboard to Emergency Spillway” column represents the distance from the peak 100-year WSE during normal operation to the emergency spillway elevation.

Table 2: Detention Basin Results in NAVD88.

	PEAK 100-YR WSE	EMERGENCY SPILLWAY ELEV	BASIN TOP	100-YEAR FREEBOARD TO EMERGENCY SPILLWAY (FT)
BASIN 1	1182.1	1183.0	1185	0.9
BASIN 3	1090.8	1093.0	1095	2.2
BASIN 4	1087.2	1088.3*	1090.3	1.1
BASIN 5	1118.7	1118.8*	1120.8	0.1
BASIN 6A	1102.4	1103.0	1107	0.6
BASIN 6B	1149.2	1150.0	1152	0.8
BASIN 8	1133.6	1135.0	1137	1.4

*Basin 4 and Basin 5 emergency spillways are non-typical, draining into the adjacent road and down the road embankment. Flow path is rock lined, acting as a spillway.

Full HEC-HMS global summaries are included in Appendix B. The results indicate that proposed development of the Generations Project Site does not increase peak runoff at the key points for design storms under consideration.

4.2. HEC-RAS Model

In addition to the HEC-HMS model provided to size features to serve the bulk of the site, the HEC-RAS model is needed to show compliance in Green Springs Creek. An existing conditions and proposed conditions geometry was created to model the difference between pre and post conditions. In addition to the geometric changes to the channel, post-development hydrographs were entered into the post-conditions HEC-RAS model. By doing so, all development impacts are accounted for, and mitigation can be sized accordingly. Factors looked at for post-project mitigation are the peak flows at the downstream property limit and the water surface elevations throughout the channel reach (including the resultant upstream water surface elevation).

Timing of the peak flows was studied to determine if the model required extension downstream. If the peak flow in GSP was reduced, but the timing of the peak changed substantially, it may result in coincidence with New York Creek prior to discharge into Folsom Lake. The modeling shows that the peak flow of the proposed condition occurs at a time where the peak flow of the existing condition hydrograph remains greater than the proposed. So, although the peak will shift slightly later in developed conditions, the peak flow will remain below the existing flow even at the later time. This can be seen visually in Figure 3.

Compliance on the downstream section is determined by the flow hydrographs for Green Springs Creek leaving the project area. In the existing conditions, the 100-year and 10-year events overtop the existing pond embankments and flow continues downstream unrestricted. The removal of the downstream embankment to maintain a low flow channel makes the 2-year event an important factor when analyzing the downstream boundary condition for compliance. HEC-RAS resulting hydrographs for the downstream cross section at W Green Springs Rd are provided in Appendix C. Figure 3 also shows these hydrographs. These hydrographs show that the peak outflow has been reduced for storm events analyzed in this study.

Removal of the downstream embankment to maintain a low flow channel through Green Springs Creek, without added mitigation, results in increased flow during smaller storm events as mentioned previously. To maintain compliance at low flow conditions the downstream CON/SPAN requires a control structure to meter flows downstream across a range of storm events. A concept level render of the control structure can be found in Appendix C that shows the WSEs at the control structure for the analyzed storm events.

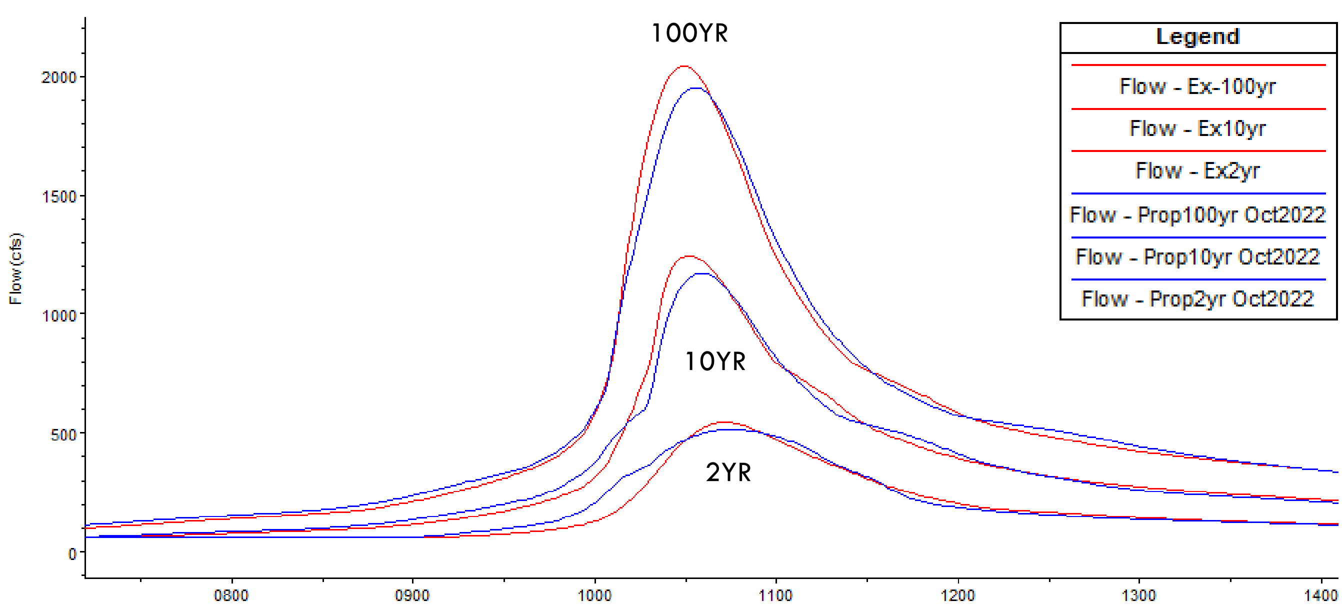


Figure 3. Green Springs Creek Hydrographs at Downstream Property Line

Compliance throughout the project reach and at the upstream boundary condition is determined by resulting water surface elevations. The upstream road crossing is near the property line which requires the CON/SPAN to be sufficiently large to maintain the existing floodplain limits across the property boundary. Several cross sections upstream of the property boundary are included to show the effects of the road crossing on the upstream property and can be seen in the profiles included in Appendix D. The results show that the WSEs are lower throughout the project reach with maximum increases in WSE of 0.1ft for the 100-year storm event. Any increase or decrease in WSE of 0.1ft or less is considered negligible and is within the computational accuracy of the model, often a result of the sensitivity of the calculations rather than a meaningful change to the flow or cross-sectional area.

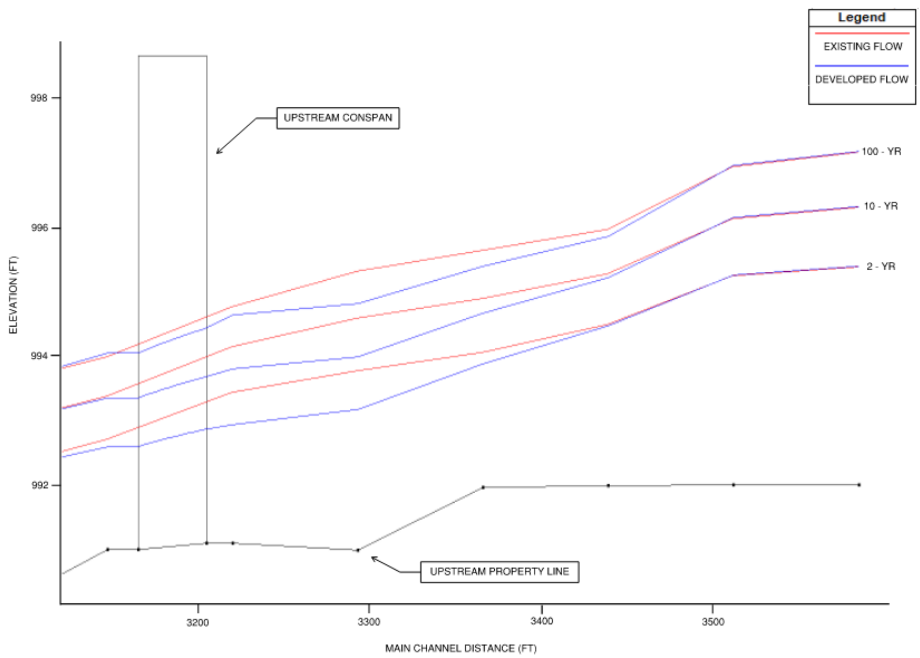


Figure 4. Green Springs Creek Upstream WSEs

Full HEC-RAS results are provided in Appendix C.

5. Hydromodification Mitigation

Hydromodification mitigation is provided to the satisfaction of the State Water Resources Quality Control Board MS4 Section E.12.f.ii.a. The post-project runoff shall not exceed estimated pre-project flow rates for the 2-year, 24-hour storm event. By establishing mitigation for the 2-year event in both the HEC-HMS model and HEC-RAS model the project has adequately satisfied the intent of the permit.

6. Low Impact Development

The Generations project is subject to low impact development (LID) standards per the El Dorado County West Slope Development and Redevelopment Standards and Post Construction Storm Water Plan Requirements. The development provides for LID on-site through bioretention basins which are either a part of a detention basin or built adjacent to the detention basin. The site also contains disconnected pavement and open space which provides for additional LID credit but are not considered in the sizing calculations. If, during improvement plan implementation, additional on-lot LID facilities are planned, the size of the bioretention basins can be reduced. Full LID credit will be achieved on-site through these features.

The tool provided on the El Dorado County website was used to create a template calculator for El Dorado County in Excel. Using the online tool, the following shared parameters were established for all LID facility sizing:

- Climate Station: Placerville
- Saturated Hydraulic Conductivity: 0.03 in/hr
- Impervious Area: Varies by shed
- Design Storm: 1.13 inches

Using the parameters above, a calculation was done for each watershed to determine the required size of any LID BMP type to treat the watershed. Appendix D contains the results of the calculations. On-site facilities are provided that meet the minimum sizing required for full LID credit.

7. Conclusion

The results of the analysis performed for this Technical Memorandum demonstrate that the proposed Generations development 2-year, 10-year, 100-year flows can be satisfactorily conveyed and mitigated within the proposed drainage facilities. The on-site storm drain system is not modeled in this TM since there is no off-site or regional storm drain system proposed and the on-site drainage system will be refined and calculated with the improvement plans. All detention facilities required to mitigate for on-site increase in impervious composition are calculated in this study in addition to facilities intended to recreate the lost floodplain storage in the creek. The in-line control structure in Green Springs Creek re-creates both the volume and conveyance necessary to allow the creek to pass the storm events similar to the existing conditions but without the overtopping of embankments or roads. Post-development peak flows are mitigated below pre-project conditions and the 100-year water surface elevations in the creek are below the existing elevations. HEC-HMS and HEC-RAS models are provided for review with this Technical Memorandum.

Appendix A: Exhibits

Exhibit 1.0: Overall Shed Map

Exhibit 1.1: Existing Shed Map

Exhibit 2: Developed Shed Map

Exhibit 3: Hydraulic Routing Map

Exhibit 4: USDA Soil Map

Exhibit 5: FEMA FIRM

Exhibit 6: 100-year Flood Limits

SCALE:
1:750

WARNING
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

DOMENICHELLI & ASSOCIATES
5180 Golden Foothill Prkwy, Suite 220
El Dorado Hills, CA 95762
Ph: (916) 933-1997
Fax: (916) 933-4778

EXHIBIT 1.0 - OVERALL SHED MAP

GENERATIONS
November 2022

SCALE: 1:300	WARNING 0 1/2 1 IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.	DOMENICHELLI & ASSOCIATES 5180 Golden Foothill Prkwy, Suite 220 El Dorado Hills, CA 95762 Ph: (916) 933-1997 Fax: (916) 933-4778	EXHIBIT 1.1 - EXISTING SHED MAP	GENERATIONS November 2022

SCALE:	WARNING			
1:300	0 1/2 1 IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.	**DOMENICHELLI & ASSOCIATES** 5180 Golden Foothill Prkwy, Suite 220 El Dorado Hills, CA 95762 Ph: (916) 933–1997 Fax: (916) 933–4778	EXHIBIT 2 - DEVELOPED SHED MAP	GENERATIONS November 2022

EXHIBIT 3 - MEAN ANNUAL PERCIPITATION MAP

DOMENICHELLI AND ASSOCIATES, INC.
CIVIL ENGINEERING

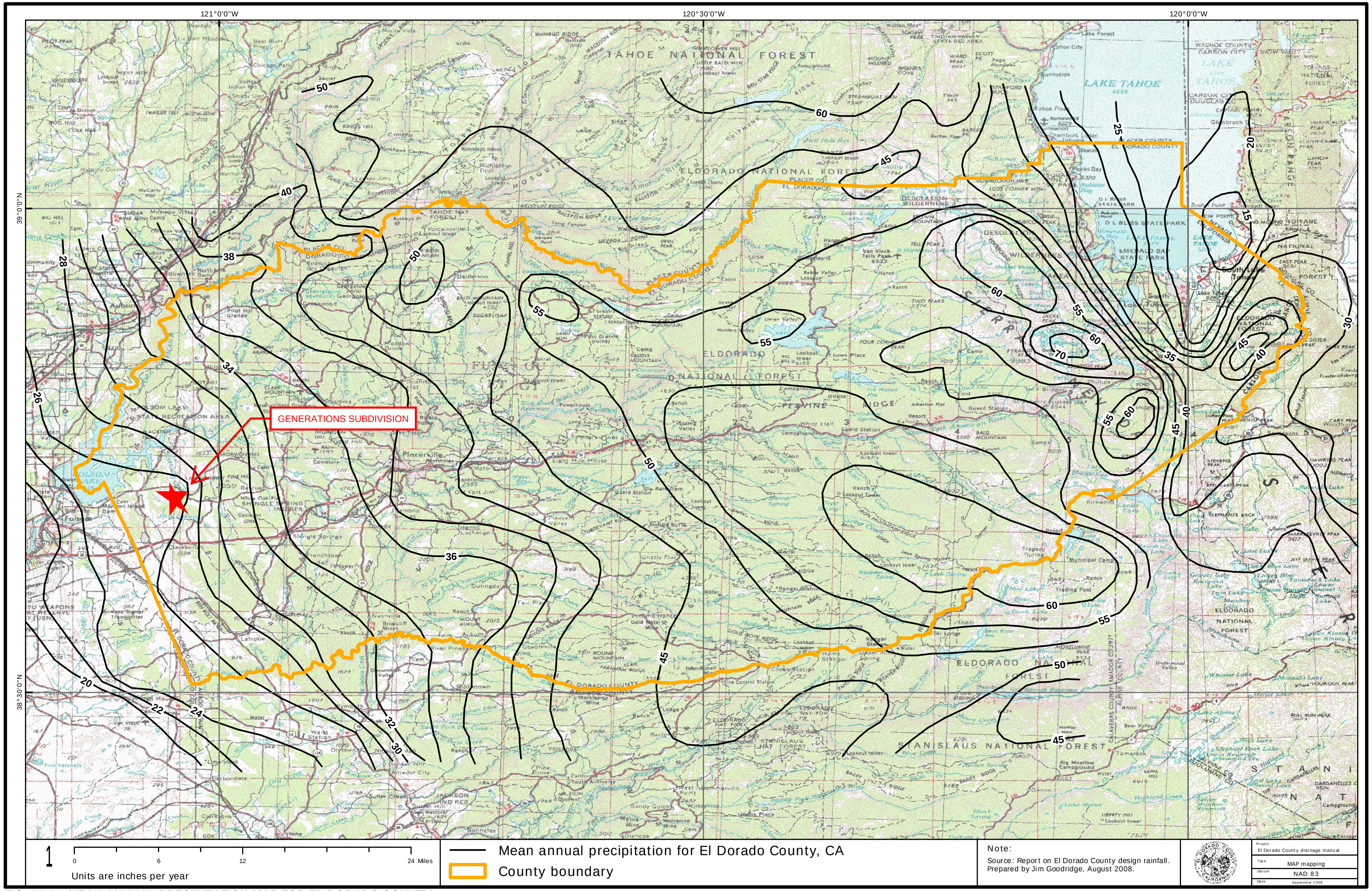
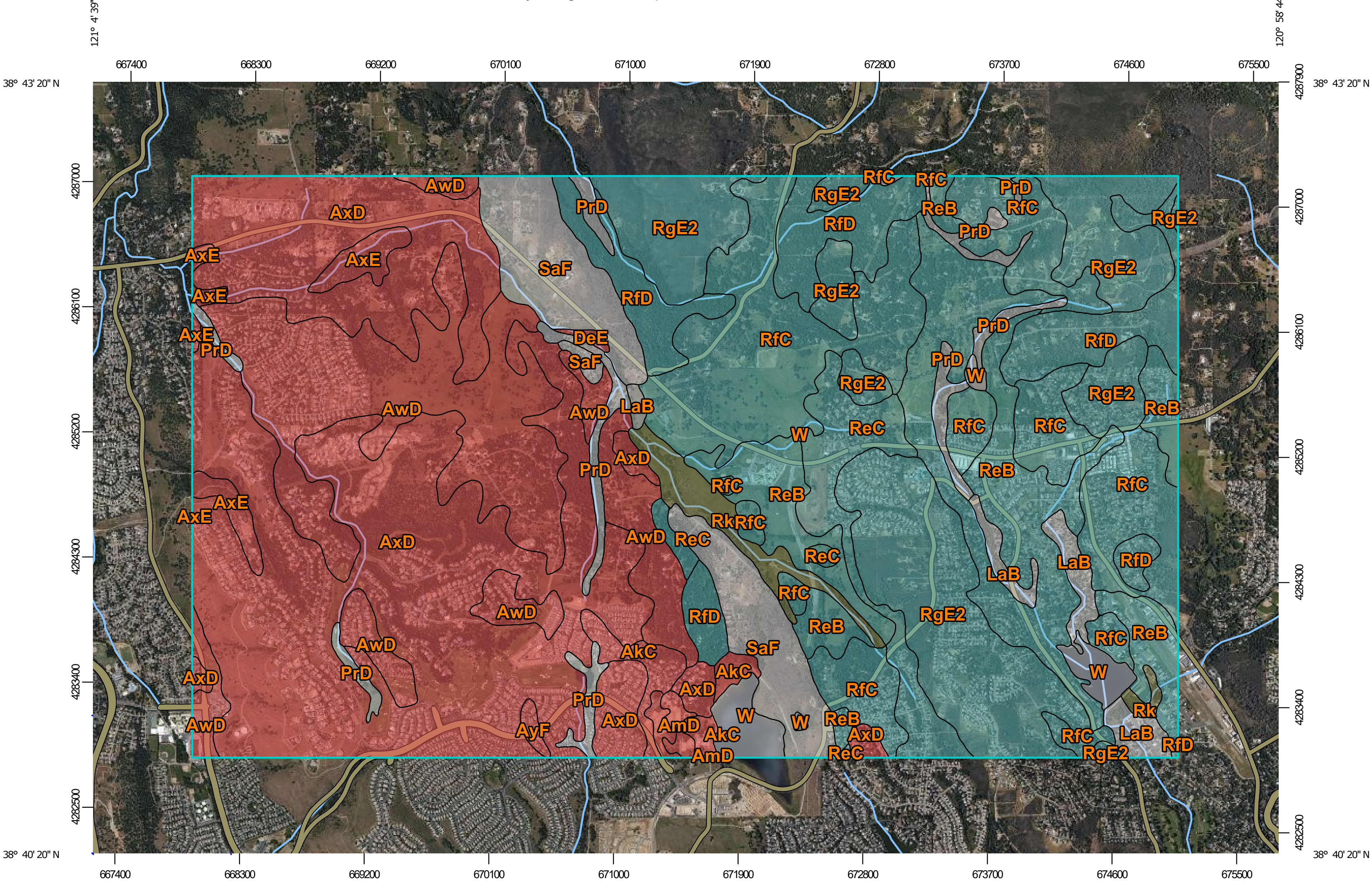


FIG. A2.2.1 MEAN ANNUAL PRECIPITATION MAP FOR EL DORADO COUNTY



Map Scale: 1:39,100 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 500, 1000, 2000, 3000

Feet: 0, 1500, 3000, 6000, 9000

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Dorado Area, California
Survey Area Data: Version 13, Sep 3, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 3, 2019—Oct 29, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction, and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The **projection** used in the preparation of this map was California State Plane, Zone II. The **horizontal datum** was NAD83, GRS80 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey, SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit their website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was derived from multiple sources. This information was compiled from the U.S. Geological Survey, 1989 and 1993, El Dorado County Surveyor Office, 2005, National Geodetic Survey, 2005, California Department of Forestry, 2004, and U.S. Bureau of Reclamation, 2003. Additional information was photogrammetrically compiled at a scale of 1:12,000 from U.S. Geological Survey aerial photography dated 1997 to 2001.

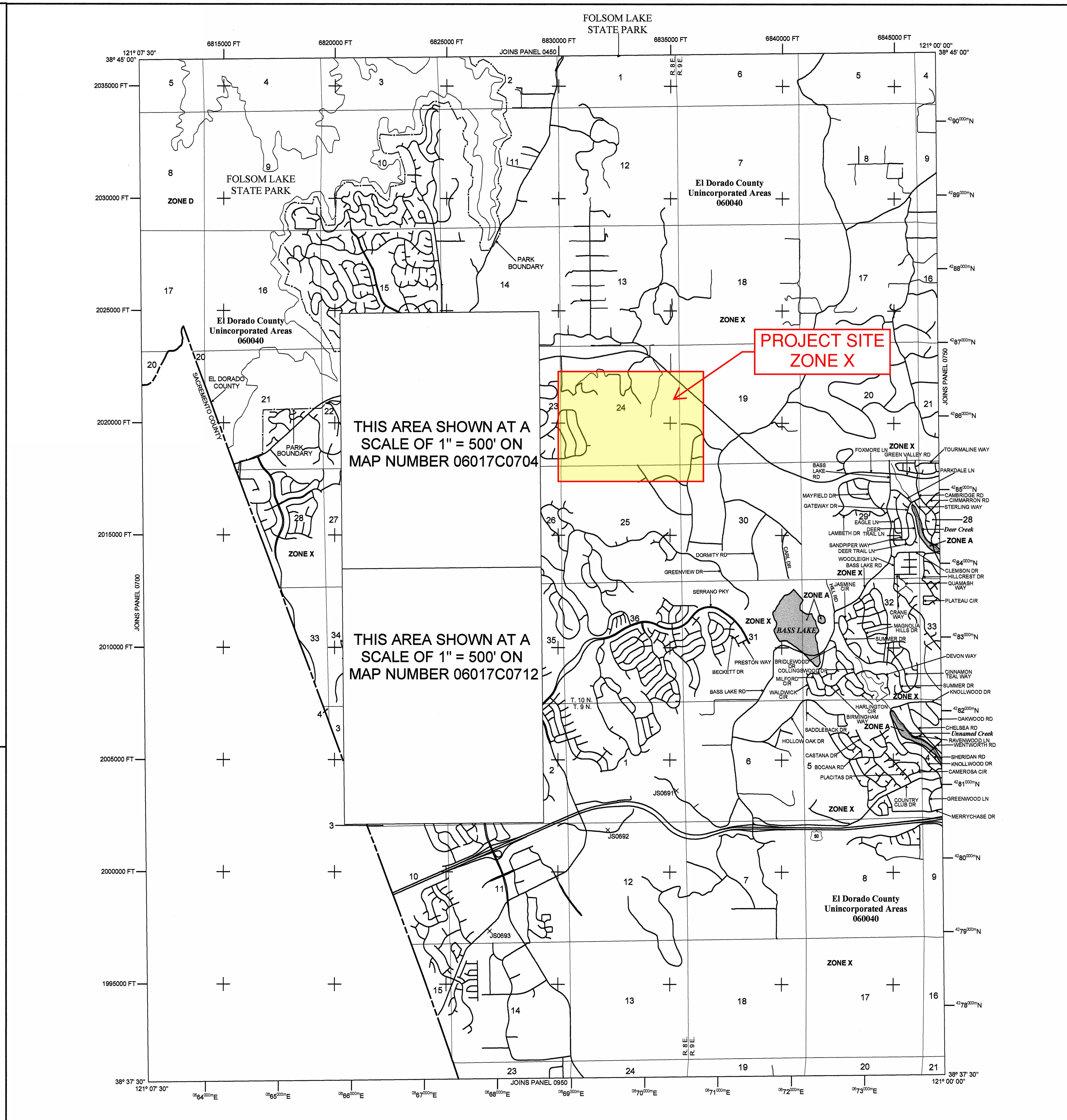
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and their website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1- 877- FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

Floodplain boundary
Floodway boundary
Zone D Boundary
CBRS and OPA Boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513 — Base Flood Elevation line and value; elevation in feet*
(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*
*Referenced to the North American Vertical Datum of 1988
A — A Cross section line
23 - - - - 23 Transect line
97° 07' 30", 32° 22' 30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
4276000m E — 1000-meter Universal Transverse Mercator grid values, zone 10
600000 FT — 5000-foot grid ticks: California State Plane coordinate system, zone II (FIPSZONE 0402), Lambert Conformal Conic Projection
DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index.

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP PANEL

SEPTEMBER 26, 2008

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET
600 0 600 1200 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0725E

FIRM
FLOOD INSURANCE RATE MAP
EL DORADO COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 725 OF 1125

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EL DORADO COUNTY	060040	0725	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06017C0725E

EFFECTIVE DATE
SEPTEMBER 26, 2008

Federal Emergency Management Agency

	SCALE: 1:150	WARNING 0 1/2 1 IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.	**DOMENICHELLI & ASSOCIATES** 5180 Golden Foothill Prkwy, Suite 220 El Dorado Hills, CA 95762 Ph: (916) 933-1997 Fax: (916) 933-4778	EXHIBIT 6 - 100-Year Floodplain Map	GENERATIONS November 2022

Appendix B: Hydrology Data and Results

Table A2.2.1 Rainfall Depth Table with Return Period of 2 Years

El Dorado County Design Rainfall
Precipitation Depth Duration Frequency
Return Period 2 Years

Mean Annual Precipitation	5 Min	10 Min	15 Min	30 Min	1 Hour	2 Hour	3 Hour	6 Hour	12 Hour	1 Day	2 Day	3 Day	4 Day	5 Day	6 Day	8 Day	10 Day	15 Day	20 Day	30 Day	60 Day	365 Day
8	0.04	0.06	0.07	0.10	0.14	0.19	0.23	0.33	0.46	0.65	0.87	1.01	1.11	1.20	1.27	1.44	1.60	1.93	2.18	2.69	3.91	7.81
10	0.05	0.07	0.09	0.12	0.17	0.24	0.29	0.41	0.58	0.81	1.09	1.26	1.39	1.50	1.59	1.80	2.00	2.41	2.72	3.36	4.89	9.76
12	0.06	0.08	0.10	0.14	0.20	0.29	0.35	0.49	0.69	0.98	1.31	1.51	1.67	1.81	1.91	2.16	2.40	2.89	3.26	4.03	5.87	11.71
14	0.07	0.10	0.12	0.17	0.24	0.33	0.41	0.57	0.81	1.14	1.53	1.77	1.94	2.11	2.23	2.52	2.80	3.38	3.81	4.70	6.85	13.66
16	0.08	0.11	0.14	0.19	0.27	0.38	0.47	0.66	0.93	1.30	1.75	2.02	2.22	2.41	2.55	2.88	3.21	3.86	4.35	5.38	7.83	15.61
18	0.09	0.13	0.15	0.22	0.31	0.43	0.52	0.74	1.04	1.47	1.97	2.27	2.50	2.71	2.86	3.24	3.61	4.34	4.90	6.05	8.81	17.57
20	0.10	0.14	0.17	0.24	0.34	0.48	0.58	0.82	1.16	1.63	2.19	2.5[illegible]	[illegible]	3.01	3.18	3.60	4.01	4.82	5.44	6.72	9.78	19.52
22	0.11	0.15	0.19	0.26	0.37	0.53	0.64	0.90	1.27	1.79	2.40	2.78	3.06	3.31	3.50	3.96	4.41	5.30	5.98	7.39	10.76	21.47
24	0.12	0.17	0.21	0.29	0.41	0.57	0.70	0.99	1.39	1.95	2.62	3.03	3.33	3.61	3.82	4.32	4.81	5.79	6.53	8.06	11.74	23.42
26	0.13	0.18	0.22	0.31	0.44	0.62	0.76	1.07	1.50	2.12	2.84	3.28	3.61	3.91	4.14	4.68	5.21	6.27	7.07	8.73	12.72	25.37
28	0.14	0.20	0.24	0.34	0.47	0.67	0.82	1.15	1.62	2.28	3.06	3.53	3.89	4.21	4.45	5.04	5.61	6.75	7.62	9.41	13.70	27.33
30	0.15	0.21	0.26	0.36	0.51	0.72	0.87	1.23	1.74	2.44	3.28	3.78	4.17	4.51	4.77	5.40	6.01	7.23	8.16	10.08	14.68	29.28
35	0.17	0.24	0.30	0.42	0.59	0.84	1.02	1.44	2.02	2.85	3.83	4.42	4.86	5.26	5.57	6.30	7.01	8.44	9.52	11.76	17.12	34.16
40	0.20	0.28	0.34	0.48	0.68	0.95	1.17	1.64	2.31	3.26	4.37	5.05	5.56	6.02	6.36	7.20	8.01	9.64	10.88	13.44	19.57	39.04
45	0.22	0.31	0.38	0.54	0.76	1.07	1.31	1.85	2.60	3.67	4.92	5.68	6.25	6.77	7.16	8.10	9.02	10.85	12.24	15.12	22.02	43.92
50	0.25	0.35	0.43	0.60	0.85	1.19	1.46	2.05	2.89	4.07	5.47	6.31	6.94	7.52	7.95	9.00	10.02	12.06	13.60	16.80	24.46	48.80
55	0.27	0.38	0.47	0.66	0.93	1.31	1.60	2.26	3.18	4.48	6.01	6.94	7.64	8.27	8.75	9.91	11.02	13.26	14.96	18.48	26.91	53.68
60	0.30	0.42	0.51	0.72	1.02	1.43	1.75	2.46	3.47	4.89	6.56	7.57	8.33	9.03	9.54	10.81	12.02	14.47	16.32	20.16	29.35	58.55
65	0.32	0.45	0.56	0.78	1.10	1.55	1.90	2.67	3.76	5.29	7.10	8.20	9.03	9.78	10.34	11.71	13.02	15.67	17.68	21.84	31.80	63.43
70	0.35	0.49	0.60	0.84	1.19	1.67	2.04	2.87	4.05	5.70	7.65	8.83	9.72	10.53	11.13	12.61	14.02	16.88	19.04	23.52	34.25	68.31

Source: Design Rainfall Tables for El Dorado County prepared by Jim Goodridge, August 30, 2008

27=2.20

Table A2.2.3 Rainfall Depth Table with Return Period of 10 Years

El Dorado County Design Rainfall
Precipitation Depth Duration Frequency
Return Period 10 Years

Mean Annual Precipitation	5 Min	10 Min	15 Min	30 Min	1 Hour	2 Hour	3 Hour	6 Hour	12 Hour	1 Day	2 Day	3 Day	4 Day	5 Day	6 Day	8 Day	10 Day	15 Day	20 Day	30 Day	60 Day	365 Day
8	0.06	0.09	0.11	0.15	0.22	0.30	0.37	0.52	0.73	1.03	1.42	1.68	1.87	2.04	2.16	2.44	2.67	3.13	3.53	4.32	6.22	11.79
10	0.08	0.11	0.14	0.19	0.27	0.38	0.46	0.65	0.92	1.29	1.78	2.10	2.34	2.54	2.70	3.05	3.34	3.92	4.42	5.40	7.77	14.74
12	0.09	0.13	0.16	0.23	0.32	0.45	0.56	0.78	1.10	1.55	2.13	2.52	2.81	3.05	3.24	3.66	4.01	4.70	5.30	6.48	9.32	17.68
14	0.11	0.16	0.19	0.27	0.38	0.53	0.65	0.91	1.28	1.81	2.49	2.94	3.27	3.56	3.78	4.28	4.68	5.48	6.18	7.56	10.88	20.63
16	0.13	0.18	0.22	0.31	0.43	0.61	0.74	1.04	1.47	2.07	2.84	3.36	3.74	4.07	4.32	4.89	5.34	6.27	7.07	8.64	12.43	23.58
18	0.14	0.20	0.24	0.34	0.48	0.68	0.83	1.17	1.65	2.33	3.20	3.78	4.21	4.58	4.86	5.50	6.01	7.05	7.95	9.72	13.98	26.52
20	0.16	0.22	0.27	0.38	0.54	0.76	0.93	1.30	1.83	2.58	3.55	4.2[illegible]	[illegible]	5.09	5.40	6.11	6.68	7.83	8.83	10.79	15.54	29.47
22	0.17	0.24	0.30	0.42	0.59	0.83	1.02	1.43	2.02	2.84	3.91	4.62	5.15	5.60	5.94	6.72	7.35	8.62	9.72	11.87	17.09	32.42
24	0.19	0.27	0.33	0.46	0.65	0.91	1.11	1.56	2.20	3.10	4.26	5.04	5.61	6.11	6.48	7.33	8.01	9.40	10.60	12.95	18.65	35.36
26	0.20	0.29	0.35	0.50	0.70	0.98	1.20	1.69	2.39	3.36	4.62	5.46	6.08	6.62	7.02	7.94	8.68	10.18	11.48	14.03	20.20	38.31
28	0.22	0.31	0.38	0.53	0.75	1.06	1.30	1.82	2.57	3.62	4.97	5.88	6.55	7.13	7.55	8.55	9.35	10.97	12.37	15.11	21.75	41.26
30	0.24	0.33	0.41	0.57	0.81	1.14	1.39	1.95	2.75	3.88	5.33	6.30	7.02	7.63	8.09	9.16	10.02	11.75	13.25	16.19	23.31	44.21
35	0.28	0.39	0.47	0.67	0.94	1.33	1.62	2.28	3.21	4.52	6.21	7.35	8.19	8.91	9.44	10.69	11.69	13.71	15.46	18.89	27.19	51.57
40	0.32	0.44	0.54	0.76	1.08	1.51	1.85	2.61	3.67	5.17	7.10	8.40	9.36	10.18	10.79	12.21	13.36	15.67	17.67	21.59	31.08	58.94
45	0.35	0.50	0.61	0.86	1.21	1.70	2.08	2.93	4.13	5.81	7.99	9.46	10.53	11.45	12.14	13.74	15.03	17.62	19.88	24.29	34.96	66.31
50	0.39	0.55	0.68	0.95	1.34	1.89	2.31	3.26	4.59	6.46	8.88	10.51	11.69	12.72	13.49	15.27	16.70	19.58	22.08	26.99	38.84	73.68
55	0.43	0.61	0.75	1.05	1.48	2.08	2.54	3.58	5.05	7.11	9.76	11.56	12.86	14.00	14.84	16.79	18.37	21.54	24.29	29.69	42.73	81.04
60	0.47	0.67	0.81	1.15	1.61	2.27	2.78	3.91	5.50	7.75	10.65	12.61	14.03	15.27	16.19	18.32	20.04	23.50	26.50	32.38	46.61	88.41
65	0.51	0.72	0.88	1.24	1.75	2.46	3.01	4.23	5.96	8.40	11.54	13.66	15.20	16.54	17.54	19.85	21.71	25.46	28.71	35.08	50.50	95.78
70	0.55	0.78	0.95	1.34	1.88	2.65	3.24	4.56	6.42	9.04	12.43	14.71	16.37	17.81	18.89	21.38	23.38	27.42	30.92	37.78	54.38	#####

27=3.49

Source: Design Rainfall Tables for El Dorado County prepared by Jim Goodridge, August 30, 2008

Table A2.2.6 Rainfall Depth Table with Return Period of 100 Years

El Dorado County Design Rainfall
Precipitation Depth Duration Frequency
Return Period 100 Years

Mean Annual Precipitation	5 Min	10 Min	15 Min	30 Min	1 Hour	2 Hour	3 Hour	6 Hour	12 Hour	1 Day	2 Day	3 Day	4 Day	5 Day	6 Day	8 Day	10 Day	15 Day	20 Day	30 Day	60 Day	365 Day
8	0.09	0.13	0.15	0.22	0.30	0.43	0.52	0.74	1.04	1.46	2.03	2.43	2.72	2.97	3.15	3.53	3.80	4.34	4.93	5.95	8.45	15.52
10	0.11	0.16	0.19	0.27	0.38	0.54	0.65	0.92	1.30	1.83	2.54	3.04	3.40	3.71	3.94	4.42	4.75	5.42	6.16	7.43	10.56	19.40
12	0.13	0.19	0.23	0.32	0.46	0.64	0.78	1.11	1.56	2.19	3.05	3.65	4.08	4.45	4.73	5.30	5.71	6.50	7.40	8.92	12.67	23.28
14	0.16	0.22	0.27	0.38	0.53	0.75	0.92	1.29	1.82	2.56	3.55	4.26	4.76	5.19	5.51	6.18	6.66	7.59	8.63	10.41	14.78	27.16
16	0.18	0.25	0.31	0.43	0.61	0.86	1.05	1.47	2.08	2.92	4.06	4.87	5.44	5.94	6.30	7.07	7.61	8.67	9.86	11.89	16.89	31.04
18	0.20	0.28	0.34	0.49	0.68	0.96	1.18	1.66	2.33	3.29	4.57	5.47	6.12	6.68	7.09	7.95	8.56	9.76	11.09	13.38	19.00	34.92
20	0.22	0.31	0.38	0.54	0.76	1.07	1.31	1.84	2.59	3.65	5.08	[illegible]	[illegible]	7.42	7.88	8.83	9.51	10.84	12.33	14.86	21.12	38.80
22	2.24	0.34	0.42	0.59	0.84	1.18	1.44	2.03	2.85	4.02	5.59	6.69	7.48	8.16	8.66	9.72	10.46	11.92	13.56	16.35	23.23	42.69
24	0.27	0.38	0.46	0.65	0.91	1.28	1.57	2.21	3.11	4.38	6.09	7.30	8.17	8.90	9.45	10.60	11.41	13.01	14.79	17.84	25.34	46.57
26	0.29	0.41	0.50	0.70	0.99	1.39	1.70	2.39	3.37	4.75	6.60	7.91	8.85	9.64	10.24	11.48	12.36	14.09	16.02	19.32	27.45	50.45
28	0.31	0.44	0.54	0.76	1.06	1.50	1.83	2.58	3.63	5.11	7.11	8.51	9.53	10.39	11.03	12.37	13.31	15.18	17.26	20.81	29.56	54.33
30	0.33	0.47	0.57	0.81	1.14	1.61	1.96	2.76	3.89	5.48	7.62	9.12	10.21	11.13	11.81	13.25	14.26	16.26	18.49	22.30	31.67	58.21
35	0.39	0.55	0.67	0.94	1.33	1.87	2.29	3.22	4.54	6.39	8.89	10.64	11.91	12.98	13.78	15.46	16.64	18.97	21.57	26.01	36.95	67.91
40	0.45	0.63	0.77	1.08	1.52	2.14	2.62	3.68	5.19	7.31	10.15	12.16	13.61	14.84	15.75	17.67	19.02	21.68	24.65	29.73	42.23	77.61
45	0.50	0.71	0.86	1.21	1.71	2.41	2.94	4.14	5.84	8.22	11.42	13.68	15.31	16.69	17.72	19.87	21.40	24.39	27.73	33.45	47.51	87.31
50	0.56	0.78	0.96	1.35	1.90	2.68	3.27	4.60	6.48	9.13	12.69	15.20	17.01	18.55	19.69	22.08	23.77	27.10	30.81	37.16	52.79	97.01
55	0.61	0.86	1.05	1.48	2.09	2.94	3.60	5.06	7.13	10.05	13.96	16.72	18.71	20.40	21.66	24.29	26.15	29.81	33.89	40.88	58.07	106.71
60	0.67	0.94	1.15	1.62	2.28	3.21	3.92	5.53	7.78	10.96	15.23	18.24	20.41	22.26	23.63	26.50	28.53	32.52	36.98	44.59	63.35	116.41
65	0.72	1.02	1.25	1.75	2.47	3.48	4.25	5.99	8.43	11.87	16.50	19.76	22.11	24.11	25.59	28.71	30.90	35.23	40.06	48.31	68.62	126.12
70	0.78	1.10	1.34	1.89	2.66	3.75	4.58	6.45	9.08	12.79	17.77	21.28	23.82	25.97	27.56	30.92	33.28	37.94	43.14	52.03	73.90	135.82

27=4.93

Source: Design Rainfall Tables for El Dorado County prepared by Jim Goodridge, August 30, 2008

Table 2-2c Runoff curve numbers for other agricultural lands [1/]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. [2/]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. [3/]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 [4/]	48	65	73
Woods—grass combination (orchard or tree farm). [5/]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. [6/]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 [4/]	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

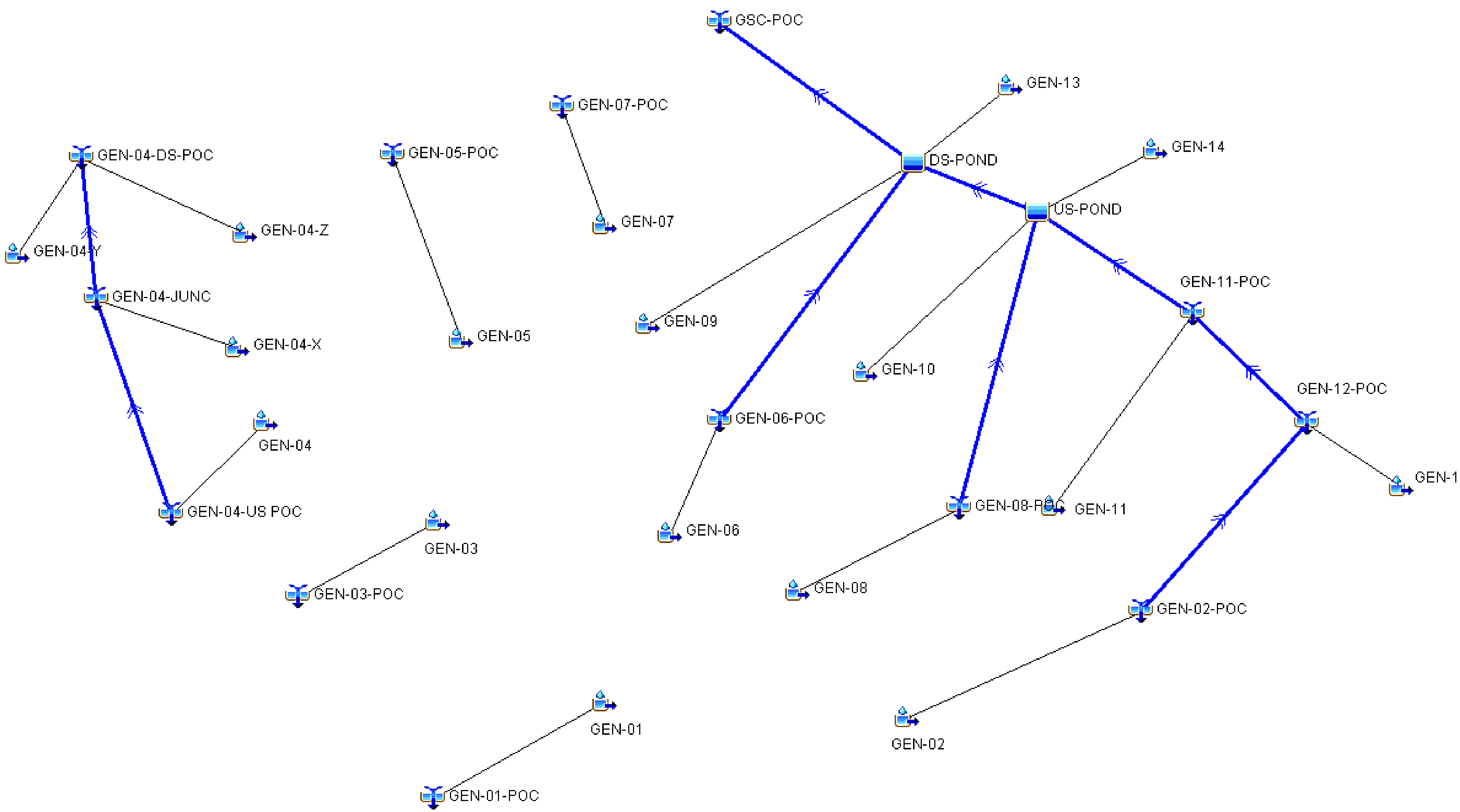
1 Average runoff condition, and $I_a = 0.2S$.
2 *Poor:* <50%) ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: > 75% ground cover and lightly or only occasionally grazed.
3 *Poor:* <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.
4 Actual curve number is less than 30; use CN = 30 for runoff computations.
5 CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.
6 *Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

Table 2-2a Runoff curve numbers for urban areas [1/]

Cover description: Cover type and hydrologic condition	Average percent impervious area [2/]	Curve numbers for hydrologic soil group: A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3/]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4/]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5/]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

1 Average runoff condition, and $I_a = 0.2S$.
2 The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.
3 CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.
4 Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.
5 Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

HEC-HMS - EXISTING CONDITIONS



1) Shed Area Description

SUB BASIN	Percent woods	Area Woods (ft^2)	Area Pasture (ft^2)	Area 1/4 AC lot (ft^2)	CN	Total Area (FT^2)	Total Area (AC)	Total Area (SqM)	Imp. Area (FT2)	Percent Imperv (%)
GEN-01	20%	302603	1210411	0	83.6	1592646	36.6	0.0571	79632	5%
GEN-02	30%	318488	743140	0	83.4	1117503	25.7	0.0401	55875	5%
GEN-03	5%	58443	1110422	0	83.9	1168865	26.8	0.0419	0	0%
GEN-04	10%	48185	433667	0	83.8	481852	11.1	0.0173	0	0%
GEN-04-X	85%	907310	160114	0	82.3	1067424	24.5	0.0383	0	0%
GEN-04-Y	50%	228271	0	228271	84.5	456543	10.5	0.0164	74194	16%
GEN-04-Z	85%	431497	76147	0	82.3	534362	12.3	0.0192	26718	5%
GEN-05	30%	442999	1033663	0	83.4	1506798	34.6	0.0540	30136	2%
GEN-06	20%	506583	2026333	0	83.6	2532916	58.1	0.0909	0	0%
GEN-07	30%	155508	362853	0	83.4	545643	12.5	0.0196	27282	5%
GEN-08	10%	125351	1128156	0	83.8	1253507	28.8	0.0450	0	0%
GEN-09	50%	654476	654475	0	83.0	1377843	31.6	0.0494	68892	5%
GEN-10	10%	143909	1295178	0	83.8	1439087	33.0	0.0516	0	0%
GEN-11	60%	507454	338302	0	82.8	909415	20.9	0.0326	63659	7%
GEN-12	31%	22731268	30339335	17256068	79.0	73326671	1683.3	2.6302	3000000	4%
GEN-13	5%	9244	175638	15000	84.1	235155	5.4	0.0084	35273	15%
GEN-14	5%	33134	629543	20000	84.0	718607	16.5	0.0258	35930	5%

2) Lag Time

SUB BASIN	Travel Time																		Lag time
	Overland flow					Shallow Concentrated						Channel flow						total travel time	
	Start Elev	End Elev	Length	Slope	time(min)	Start Elev	End Elev	Length	Slope	vel(fps)	time	Start Elev	End Elev	Length	slope	vel	time	(min)	(min)
GEN-01	1262	1239	300	0.077	14	1239	1126	1840	0.061	4.1	7.5	1126			-	-	-	21	**12.6**
GEN-02	1262	1230	300	0.107	12	1230	1149	1356	0.060	4.0	5.6	1149			-	-	-	18	**10.5**
GEN-03	1192	1173	300	0.063	15	1173	1020	1397	0.110	5.3	4.4	1020			-	-	-	19	**11.4**
GEN-04	1190	1178	300	0.040	18	1178	1080	1231	0.080	4.6	4.4	1080			-	-	-	22	**13.2**
GEN-04-X	1190	1178	300	0.040	18	1178	932	1200	0.205	7.4	2.7	932			-	-	-	20	**12.2**
GEN-04-Y	1105	1090	170	0.088	8	1090	1050	386	0.104	5.2	1.2	1050	840	1630	0.1288	10.0	2.7	12	**7.3**
GEN-04-Z	1190	1178	300	0.040	18	1178	840	972	0.348	9.4	1.7	840			-	-	-	19	**11.6**
GEN-05	1190	1186	300	0.020	23	1186	960	2054	0.110	5.3	6.4	960			-	-	-	30	**17.8**
GEN-06	1229	1221	300	0.027	21	1221	1072	2244	0.066	4.2	8.8	1072			-	-	-	30	**17.7**
GEN-07	1142	1133	300	0.030	14	1133	1040	875	0.106	5.3	2.8	1040			-	-	-	16	**9.8**
GEN-08	1242	1231	300	0.037	13	1231	1078	2047	0.075	4.5	7.6	1078			-	-	-	20	**12.1**
GEN-09	1159	1142	300	0.057	15	1142	975	2324	0.072	4.4	8.8	975	974	308	0.0032	2.4	2.2	26	**15.8**
GEN-10	1159	1123	300	0.120	11	1123	985	1529	0.090	4.9	5.2	985	980	799	0.0063	3.3	4.1	21	**12.4**
GEN-11	1166	1136	300	0.100	12	1136	992	906	0.159	6.4	2.4	992	991	295	0.0034	2.4	2.0	17	**10.0**
GEN-12	1445	1443	100	0.020	10	1443	1295	904	0.164	6.5	2.3	1295	1150	4750	0.0305	5.1	15.6	28	-
												1150	1020	6700	0.0194	6.8	16.5	44	-
												1020	990	3000	0.0100	4.9	10.3	54	**32.6**
GEN-13	1001	986	300	0.050	16	986	977	55	0.164	6.5	0.1	977	974	501	0.0060	3.2	2.6	19	**11.3**
GEN-14	1034	1028	245	0.024	18	1028	985	710	0.061	4.1	2.9	985	980	1016	0.0049	2.9	5.8	27	**16.2**

Overland time per equation 3-3 TR 55: n=0.24 or 0.15, p=7.0, Max L=300, Tt=(.007(nL)^.8)/((P)^.5 (s)^.4)

Shallow concentrated flow velocity based on Figure 3-1, TR-55: Length(ft) = 2000 max

Channel flow based on Manning's equation

Lag time = total travel time x 0.6

3) Reaches

Reach	US ELV	DS ELV	LENGTH	SLOPE	N VALUE	xH:1v	BOTTOM WIDTH	CELERITY
GEN-04-X-REACH	1070	932	836	0.165	0.06	3		5
GEN-04-Z-REACH	932	840	937	0.098	0.06	3		5
GEN-09-REACH	1073	974	2137	0.046	0.06	5		5
GEN-10-REACH	1078	980	2216	0.044	0.06	3.5		5
GEN-11-REACH	997	991	1004	0.006	0.06	15	15	5
GEN-12-REACH	1149	997	3988	0.038	0.06	10	15	5
GEN-13-REACH	980	974	546	0.011	0.06	6	15	5
GEN-14-REACH	991	980	1568	0.007	0.06	12	15	5

HEC-HMS EXISTING CONDITIONS

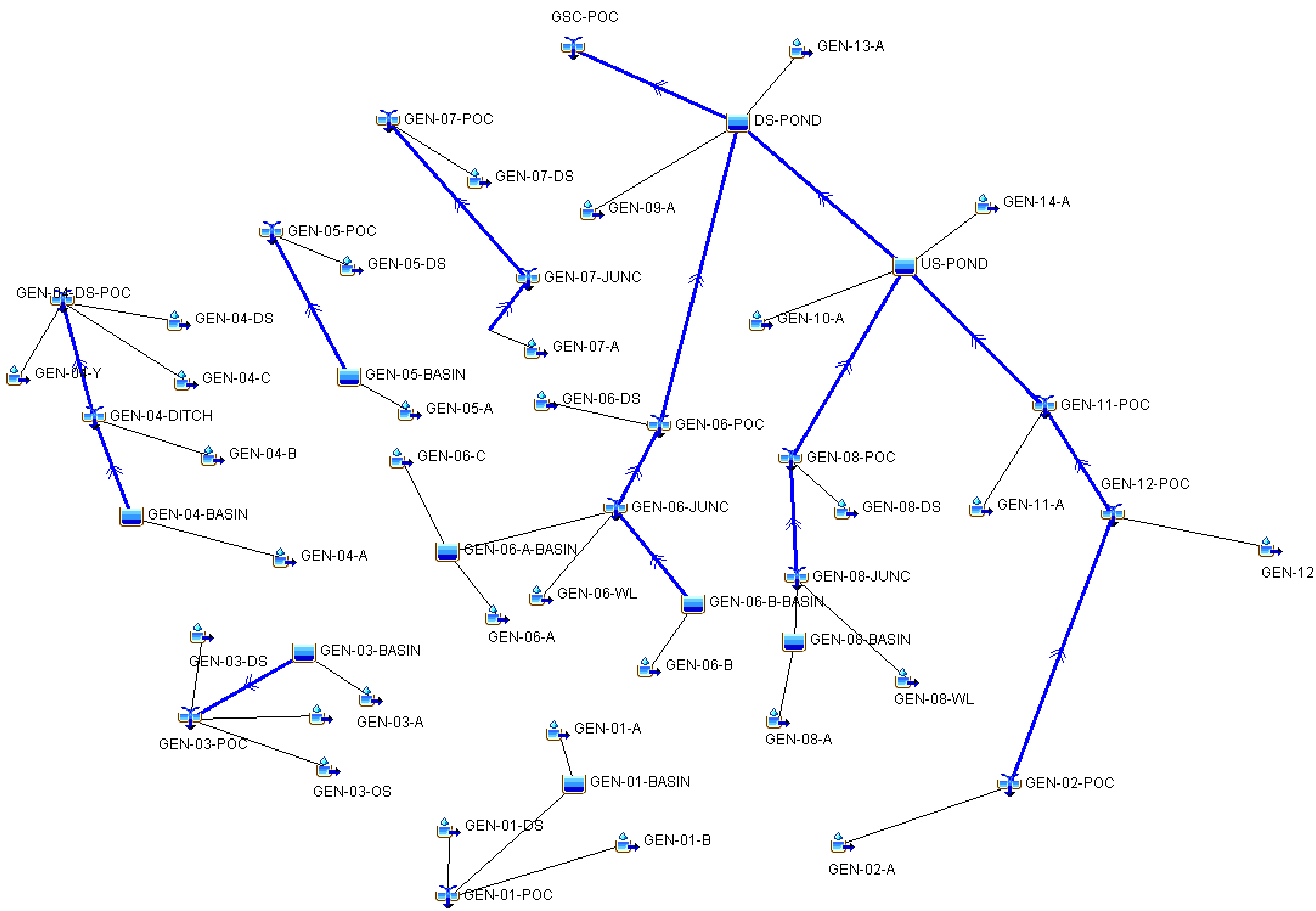
GLOBAL SUMMARY OF RESULTS

DOMENICHELLI AND ASSOCIATES, INC.
CIVIL ENGINEERING

EXISTING 2-YEAR RESULTS				
Element	Drainage Area (SqMi)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
GEN-05	0.054	18.4	Jan2013, 10:	1.18
GEN-04-X	0.0383	9.9	Jan2013, 10:	0.8
GEN-04	0.0173	6.8	Jan2013, 10:	1.17
GEN-04-US POC	0.0173	6.8	Jan2013, 10:	1.17
GEN-04-X-REAC	0.0173	6.8	Jan2013, 10:	1.17
GEN-04-JUNC	0.0556	16.5	Jan2013, 10:	0.91
GEN-04-Z-REAC	0.0556	16.5	Jan2013, 10:	0.91
GEN-04-Z	0.0192	5.6	Jan2013, 10:	0.87
GEN-04-Y	0.0164	7.6	Jan2013, 10:	1.12
GEN-12	2.6302	555.6	Jan2013, 10:	1.04
GEN-02	0.0401	17.9	Jan2013, 10:	1.21
GEN-02-POC	0.0401	17.9	Jan2013, 10:	1.21
GEN-12-REACH	0.0401	17.7	Jan2013, 10:	1.21
GEN-12-POC	2.6703	569.4	Jan2013, 10:	1.05
GEN-11-REACH	2.6703	567	Jan2013, 10:	1.05
GEN-11	0.0326	14.9	Jan2013, 10:	1.21
GEN-11-POC	2.7029	570.9	Jan2013, 10:	1.05
GEN-14-REACH	2.7029	568.1	Jan2013, 10:	1.05
GEN-08	0.045	18.5	Jan2013, 10:	1.17
GEN-08-POC	0.045	18.5	Jan2013, 10:	1.17
GEN-10	0.0516	22.9	Jan2013, 10:	1.17
GEN-10-REACH	0.045	18.4	Jan2013, 10:	1.17
GEN-14	0.0258	9.7	Jan2013, 10:	1.23
US-POND	2.8253	566.6	Jan2013, 10:	1.05
GEN-13-REACH	2.8253	566.1	Jan2013, 10:	1.05
GEN-06	0.0909	30.8	Jan2013, 10:	1.16
GEN-06-POC	0.0909	30.8	Jan2013, 10:	1.16
GEN-09-REACH	0.0909	30.8	Jan2013, 10:	1.16
GEN-09	0.0494	18.1	Jan2013, 10:	1.19
GEN-13	0.0084	4	Jan2013, 10:	1.34
DS-POND	2.974	515.1	Jan2013, 10:	1.06
AR	2.974	514.9	Jan2013, 10:	1.06
GSC-POC	2.974	514.9	Jan2013, 10:	1.06
GEN-04-DS-POC	0.0912	27.5	Jan2013, 10:	0.94
GEN-01	0.0571	23.8	Jan2013, 10:	1.21
GEN-01-POC	0.0571	23.8	Jan2013, 10:	1.21
GEN-05-POC	0.054	18.4	Jan2013, 10:	1.18
GEN-07	0.0196	9	Jan2013, 10:	1.21
GEN-03	0.0401	16.9	Jan2013, 10:	1.18
GEN-03-POC	0.0401	16.9	Jan2013, 10:	1.18
GEN-07-POC	0.0196	9	Jan2013, 10:	1.21

EXISTING 10-YEAR RESULTS				
Element	Drainage Area (SqMi)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
GEN-05	0.054	36.2	Jan2013, 10	2.25
GEN-04-X	0.0383	24.9	Jan2013, 10	1.8
GEN-04	0.0173	13.5	Jan2013, 10	2.25
GEN-04-US POC	0.0173	13.5	Jan2013, 10	2.25
GEN-04-X-REAC	0.0173	13.5	Jan2013, 10	2.25
GEN-04-JUNC	0.0556	37.9	Jan2013, 10	1.94
GEN-04-Z-REAC	0.0556	38	Jan2013, 10	1.94
GEN-04-Z	0.0192	13.3	Jan2013, 10	1.88
GEN-04-Y	0.0164	15.8	Jan2013, 10	2.21
GEN-12	2.6302	1122.7	Jan2013, 10	2.04
GEN-02	0.0401	34.8	Jan2013, 10	2.29
GEN-02-POC	0.0401	34.8	Jan2013, 10	2.29
GEN-12-REACH	0.0401	34.6	Jan2013, 10	2.29
GEN-12-POC	2.6703	1148.7	Jan2013, 10	2.04
GEN-11-REACH	2.6703	1144.1	Jan2013, 10	2.04
GEN-11	0.0326	29	Jan2013, 10	2.28
GEN-11-POC	2.7029	1151.8	Jan2013, 10	2.04
GEN-14-REACH	2.7029	1146.5	Jan2013, 10	2.04
GEN-08	0.045	36.5	Jan2013, 10	2.25
GEN-08-POC	0.045	36.5	Jan2013, 10	2.25
GEN-10	0.0516	45.1	Jan2013, 10	2.25
GEN-10-REACH	0.045	36.4	Jan2013, 10	2.25
GEN-14	0.0258	18.8	Jan2013, 10	2.32
US-POND	2.8253	1162.9	Jan2013, 10	2.05
GEN-13-REACH	2.8253	1162.3	Jan2013, 10	2.05
GEN-06	0.0909	61	Jan2013, 10	2.23
GEN-06-POC	0.0909	61	Jan2013, 10	2.23
GEN-09-REACH	0.0909	60.9	Jan2013, 10	2.23
GEN-09	0.0494	35.3	Jan2013, 10	2.26
GEN-13	0.0084	7.5	Jan2013, 10	2.45
DS-POND	2.974	1200.3	Jan2013, 10	2.06
AR	2.974	1200.1	Jan2013, 10	2.06
GSC-POC	2.974	1200.1	Jan2013, 10	2.06
GEN-04-DS-POC	0.0912	63.3	Jan2013, 10	1.97
GEN-01	0.0571	46.2	Jan2013, 10	2.3
GEN-01-POC	0.0571	46.2	Jan2013, 10	2.3
GEN-05-POC	0.054	36.2	Jan2013, 10	2.25
GEN-07	0.0196	17.5	Jan2013, 10	2.29
GEN-03	0.0401	33.4	Jan2013, 10	2.25
GEN-03-POC	0.0401	33.4	Jan2013, 10	2.25
GEN-07-POC	0.0196	17.5	Jan2013, 10	2.29

EXISTING 100-YEAR RESULTS				
Element	Drainage Area (SqMi)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
GEN-05	0.054	58	Jan2013, 10	3.54
GEN-04-X	0.0383	43.8	Jan2013, 10	3.04
GEN-04	0.0173	21.6	Jan2013, 10	3.54
GEN-04-US POC	0.0173	21.6	Jan2013, 10	3.54
GEN-04-X-REAC	0.0173	21.6	Jan2013, 10	3.54
GEN-04-JUNC	0.0556	64.6	Jan2013, 10	3.2
GEN-04-Z-REAC	0.0556	64.6	Jan2013, 10	3.2
GEN-04-Z	0.0192	22.9	Jan2013, 10	3.14
GEN-04-Y	0.0164	25.6	Jan2013, 10	3.52
GEN-12	2.6302	1837.3	Jan2013, 10	3.27
GEN-02	0.0401	55.3	Jan2013, 10	3.58
GEN-02-POC	0.0401	55.3	Jan2013, 10	3.58
GEN-12-REACH	0.0401	55.1	Jan2013, 10	3.59
GEN-12-POC	2.6703	1878.2	Jan2013, 10	3.27
GEN-11-REACH	2.6703	1870.8	Jan2013, 10	3.27
GEN-11	0.0326	46	Jan2013, 10	3.57
GEN-11-POC	2.7029	1883.2	Jan2013, 10	3.28
GEN-14-REACH	2.7029	1875.3	Jan2013, 10	3.27
GEN-08	0.045	58.3	Jan2013, 10	3.54
GEN-08-POC	0.045	58.3	Jan2013, 10	3.54
GEN-10	0.0516	72.1	Jan2013, 10	3.54
GEN-10-REACH	0.045	58.2	Jan2013, 10	3.54
GEN-14	0.0258	29.7	Jan2013, 10	3.62
US-POND	2.8253	1901.9	Jan2013, 10	3.28
GEN-13-REACH	2.8253	1901.5	Jan2013, 10	3.28
GEN-06	0.0909	97.7	Jan2013, 10	3.53
GEN-06-POC	0.0909	97.7	Jan2013, 10	3.53
GEN-09-REACH	0.0909	97.6	Jan2013, 10	3.53
GEN-09	0.0494	56.4	Jan2013, 10	3.56
GEN-13	0.0084	11.8	Jan2013, 10	3.77
DS-POND	2.974	1972.5	Jan2013, 10	3.29
AR	2.974	1972.2	Jan2013, 10	3.29
GSC-POC	2.974	1972.2	Jan2013, 10	3.29
GEN-04-DS-POC	0.0912	107.4	Jan2013, 10	3.24
GEN-01	0.0571	73.4	Jan2013, 10	3.6
GEN-01-POC	0.0571	73.4	Jan2013, 10	3.6
GEN-05-POC	0.054	58	Jan2013, 10	3.54
GEN-07	0.0196	27.7	Jan2013, 10	3.58
GEN-03	0.0401	53.3	Jan2013, 10	3.55
GEN-03-POC	0.0401	53.3	Jan2013, 10	3.55
GEN-07-POC	0.0196	27.7	Jan2013, 10	3.58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DS-POND
GEN-07-DS
GEN-09-A
GEN-14-A
GEN-05-POC
GEN-05-DS
US-POND
GEN-07-JUNC
GEN-04-DS-POC
GEN-04-DS
GEN-10-A
GEN-07-A
GEN-04-Y
GEN-04-C
GEN-05-BASIN
GEN-06-DS
GEN-11-POC
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GEN-06-POC
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GEN-06-C
GEN-08-POC
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GEN-08-WL
GEN-03-A
GEN-01-A
GEN-08-A
GEN-03-POC
GEN-03-OS
GEN-01-BASIN
GEN-02-POC
GEN-01-DS
GEN-01-B
GEN-02-A
GEN-01-POC

1) Shed Area Description

SUB BASIN	Area Woods (%)	Area Pasture (%)	Area 1/3 AC lot (%)	Area 1/4 AC lot (%)	Area 1/8 AC lot (%)	Area Woods (ft^2)	Area Pasture (ft^2)	Area 1/3 AC lot (ft^2)	Area 1/4 AC lot (ft^2)	Area 1/8 AC lot (ft^2)	CN	Total Area (ft^2)	Total Area (AC)	Total Area (SqM)	Imp. Area (ft^2)	Percent Imperv (%)
GEN-01-A	5%	70%	20%	0%	0%	23500	326944	92986	0	0	84.3	469992	10.8	0.0169	26562	6%
GEN-01-B	10%	83%	0%	0%	0%	70613	584809	0	0	0	83.8	706128	16.2	0.0253	50706	7%
GEN-01-DS	25%	64%	2%	0%	0%	126766	326491	9308	0	0	83.5	507065	11.6	0.0182	44500	9%
GEN-02-A	30%	66%	4%	0%	0%	324761	719549	40885	0	0	83.5	1082538	24.9	0.0388	2000	0%
GEN-03-A	5%	29%	0%	49%	0%	32400	185088	0	319880	0	85.7	648008	14.9	0.0232	110640	17%
GEN-03-WL	0%	100%	0%	0%	0%	0	54762	0	0	0	84.0	54762	1.3	0.0020	0	0%
GEN-03-OS	30%	53%	17%	0%	0%	38819	68262	22317	0	0	83.7	129398	3.0	0.0046	0	0%
GEN-03-DS	30%	70%	0%	0%	0%	54964	128250	0	0	0	83.4	183214	4.2	0.0066	0	0%
GEN-04-A	0%	34%	0%	47%	0%	0	268471	0	376804	0	85.8	793835	18.2	0.0285	148560	19%
GEN-04-B	5%	77%	0%	18%	0%	17946	277648	0	63334	0	84.4	358928	8.2	0.0129	0	0%
GEN-04-C	60%	28%	3%	10%	0%	339270	156325	14905	54950	0	83.1	565450	13.0	0.0203	0	0%
GEN-04-DS	80%	11%	0%	0%	0%	257498	35704	0	0	0	82.2	321872	7.4	0.0115	28670	9%
GEN-04-Y	50%	0%	0%	50%	0%	228271	0	0	228271	0	84.5	456542	10.5	0.0164	74194	16%
GEN-05-A	2%	22%	0%	42%	0%	17088	190826	0	359479	0	85.8	854423	19.6	0.0306	287030	34%
GEN-05-DS	40%	55%	4%	0%	0%	324366	448557	36121	0	0	83.3	810914	18.6	0.0291	1870	0%
GEN-06-A	0%	23%	0%	55%	0%	0	197091	0	481567	0	86.1	873696	20.1	0.0313	195038	22%
GEN-06-B	2%	30%	0%	0%	47%	15389	232242	0	0	361923	88.7	769438	17.7	0.0276	159884	21%
GEN-06-C	0%	24%	0%	0%	50%	0	140521	0	0	290436	89.4	576240	13.2	0.0207	145283	25%
GEN-06-WL	15%	57%	0%	0%	25%	43557	164144	0	0	72899	85.8	290378	6.7	0.0104	9778	3%
GEN-06-DS	25%	75%	0%	0%	0%	18597	55791	0	0	0	83.5	74388	1.7	0.0027	0	0%
GEN-07-A	10%	76%	12%	0%	0%	12323	94252	14995	0	0	84.0	123230	2.8	0.0044	1660	1%
GEN-07-DS	40%	53%	0%	0%	0%	145610	192528	0	0	0	83.1	364025	8.4	0.0131	25887	7%
GEN-08-A	15%	21%	0%	39%	0%	110967	158135	0	288237	0	85.2	739782	17.0	0.0265	182443	25%
GEN-08-WL	20%	46%	0%	34%	0%	55208	127855	0	92978	0	84.6	276041	6.3	0.0099	0	0%
GEN-08-DS	10%	78%	4%	0%	0%	42076	327864	14877	0	0	83.9	420755	9.7	0.0151	35938	9%
GEN-09-A	20%	63%	2%	0%	0%	242809	770449	26958	0	0	83.6	1214044	27.9	0.0435	173828	14%
GEN-10-A	10%	75%	7%	0%	0%	142351	1065075	93006	0	0	83.9	1423509	32.7	0.0511	123077	9%
GEN-11-A	60%	25%	3%	0%	0%	656444	270865	29985	0	0	82.7	1094073	25.1	0.0392	136779	13%
GEN-12	31%	41%	0%	24%	0%	22731268	30339335	0	17256068	0	79.0	73326671	1683.3	2.6302	3000000	4%
GEN-13-A	5%	81%	7%	0%	0%	10915	177247	14974	0	0	84.0	218302	5.0	0.0078	15166	7%
GEN-14-A	5%	88%	0%	0%	0%	33426	591490	0	0	0	83.9	668527	15.3	0.0240	43611	7%

2) Lag Time

SUB BASIN	Travel Time																Travel time	Lag time
	Overland flow					Shallow Concentrated						Channel flow						
	Start Elev	End Elev	Length	Slope	time(min)	Start Elev	End Elev	Length	Slope	vel(fps)	time	Start Elev	End Elev	Length	slope	vel	time	(min)	(min)
GEN-01-A	1238	1222	300	0.053	15.7	1222	1222	0	-	-	-	1222	1182	437	0.0915	10.0	0.7	16	**9.9**
GEN-01-B	1262	1238	300	0.080	13.3	1238	1155	1351	0.061	4.1	5.5	1155		0	-	-	-	19	**11.3**
GEN-01-DS	1230	1219	300	0.037	18.2	1219	1126	742	0.125	5.7	2.2	1126		0	-	-	-	20	**12.2**
GEN-02-A	1262	1230	300	0.107	11.9	1230	1149	1356	0.060	4.0	5.6	1149		0	-	-	-	18	**10.5**
GEN-03-A	1198	1197	50	0.020	5.5	1197	1191	292	0.021	2.2	2.2	1191	1104	1488	0.0585	10.0	2.5	10	**6.1**
GEN-03-WL	1154	1123	300	0.103	12.0	1123	1020	898	0.115	5.4	2.8	1020		0	-	-	-	15	**8.9**
GEN-03-OS	1183.5	1180	100	0.035	7.7	1180	1020	1644	0.097	5.1	5.4	1020		0	-	-	-	13	**7.9**
GEN-03-DS	1105	1094	300	0.037	12.5	1094	1020	540	0.137	5.9	1.5	1020		0	-	-	-	14	**8.4**
GEN-04-A	1150.5	1141.5	100	0.090	3.6	1142	1121	369	0.056	3.9	1.6	1121	1082	1428	0.0273	13.8	1.7	7	**4.2**
GEN-04-B	1092	1077	301	0.050	11.1	1077	1065	910	0.013	1.7	9.0	1065	1032	0	-	-	-	20	**12.1**
GEN-04-C	1102	1080	100	0.220	2.5	1080	1035	1183	0.038	3.2	6.2	1035	945	0	-	-	-	9	**5.3**
GEN-04-DS	1105	1077	300	0.093	12.5	1077	840	633	0.374	9.9	1.1	840		0	-	-	-	14	**8.2**
GEN-04-OS	1105	1090	170	0.088	8.1	1090	1050	386	0.104	5.2	1.2	1050	840	1630	0.1288	10.0	2.7	12	**7.3**
GEN-05-A	1184.5	1182.25	115	0.020	10.8	1182	1165	397	0.043	3.4	1.9	1165	1145	1078	0.0186	11.4	1.6	14	**8.6**
GEN-05-DS	1126	1090	197	0.183	6.9	1090	960	1210	0.107	5.3	3.8	960		0	-	-	-	11	**6.4**
GEN-06-A	1192	1190	100	0.020	6.6	1190	1174	321	0.050	3.7	1.5	1174	1095	1621	0.0487	18.5	1.5	10	**5.7**
GEN-06-B	1215	1213	100	0.020	6.6	1213	1202	610	0.018	2.0	5.0	1202	1143	1105	0.0534	19.4	1.0	13	**7.6**
GEN-06-C	1184	1178	100	0.060	4.3	1178	1175	308	0.010	1.4	3.6	1175	1100	1157	0.0648	21.3	0.9	9	**5.3**
GEN-06-WL	1174	1172	100	0.020	6.6	1172	1087	1066	0.080	4.6	3.8	1087		0	-	-	-	10	**6.3**
GEN-06-DS	1128	1106	300	0.073	9.5	1106	1073	276	0.120	5.5	0.8	1073		0	-	-	-	10	**6.2**
GEN-07-A	1137	1126	39	0.282	1.1	1126	1103	323	0.071	4.4	1.2	1103		0	-	-	-	2	**1.4**
GEN-07-DS	1131	1110	300	0.070	9.7	1110	1040	703	0.100	5.1	2.3	1040		0	-	-	-	12	**7.2**
GEN-08-A	1226	1224	100	0.020	6.6	1224	1209	443	0.034	3.0	2.5	1209	1135	1601	0.0462	18.0	1.5	11	**6.4**
GEN-08-WL	1211	1197	100	0.140	3.0	1197	1110	956	0.091	4.9	3.2	1110		0	-	-	-	6	**3.8**
GEN-08-DS	1211	1187	300	0.080	9.2	1187	1159	242	0.116	5.5	0.7	1159	1078	796	0.1018	10.0	1.3	11	**6.7**
GEN-09-A	1127	1107	300	0.067	9.9	1107	975	1761	0.075	4.5	6.5	975	974	393	0.0025	4.2	1.5	18	**10.8**
GEN-10-A	1078	1052	300	0.087	8.9	1052	985	1117	0.060	4.0	4.6	985	980	844	0.0059	6.4	2.2	16	**9.4**
GEN-11-A	1166	1159	100	0.070	4.0	1159	993	1106	0.150	6.2	3.0	993	990	295	0.0102	8.4	0.6	8	**4.5**
	1445	1443	100	0.020	9.6	1443	1295	904	0.164	6.5	2.3	1295	1150	4750	0.0305	5.1	15.6	28	-
GEN-12												1150	1020	6700	0.0194	6.8	16.5	16	-
												1020	990	3000	0.0100	4.9	10.3	10	**32.6**
GEN-13-A	983.5	982	100	0.020	6.6	982	976	441	0.014	1.7	4.3	976	974	166	0.0120	9.2	0.3	11	**6.7**
GEN-14-A	1034	1033	100	0.020	6.6	1033	984	970	0.051	3.7	4.4	984	980	844	0.0047	5.8	2.4	13	**8.1**

Overland time per equation 3-3 TR 55: n=0.24 or 0.15, p=7.0, Max L=300, Tt=(.007(nL)^.8)/((P)^.5 (s)^.4)
Shallow concentrated flow velocity based on Figure 3-1, TR-55: Length(ft) = 2000 max
Channel flow based on Manning's equation
Lag time = total travel time x 0.6

3) Reaches

Reach	US ELV	DS ELV	LENGTH	SLOPE	N VALUE	xH:1v	BOTTOM WIDTH	CELERITY
GEN-03-DS-REACH	1095	1020	574	0.131	0.06	6.5		5
GEN-04-X-REACH	1070	932	836	0.165	0.06	3		5
GEN-04-Z-REACH	932	840	937	0.098	0.06	3		5
GEN-05-DS-REACH	1094	960	1242	0.108	0.06	4		5
GEN-06-WL-REACH	1143	1085	957	0.061	0.06	6		5
GEN-06-DS-REACH	1085	1073	231	0.052	0.06	6.5		5
GEN-07-A-REACH	1105	1100	400	0.013	0.06	3	3	5
GEN-07-DS-REACH	1100	1040	2137	0.028	0.06	5.5		5
GEN-08-DS-REACH	1122	1078	570	0.077	0.06	3.6		5
GEN-09-REACH	1073	974	2137	0.046	0.06	5		5
GEN-10-REACH	1078	980	2216	0.044	0.06	3.5		5
GEN-11-REACH	997	991	1004	0.006	0.06	15	15	5
GEN-12-REACH	1149	997	3988	0.038	0.06	10	15	5
GEN-13-REACH	980	974	546	0.011	0.06	6	15	5
GEN-14-REACH	991	980	1568	0.007	0.06	12	15	5

HEC-HMS DEVELOPED CONDITIONS

GLOBAL SUMMARY RESULTS

PROPOSED 2-YEAR RESULTS				
Element	Drainage Area (SqMi)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
GEN-05-BASIN	0.0306	4.8	Jan2013, 10	1.57
GEN-06-A-BASI	0.052	18.4	Jan2013, 10	1.34
GEN-06-B-BASI	0.0276	2.1	Jan2013, 11	1.5
GEN-12	2.6302	555.6	Jan2013, 10	1.04
GEN-02-A	0.0388	16.7	Jan2013, 10	1.16
GEN-02-POC	0.0388	16.7	Jan2013, 10	1.16
GEN-12-REACH	0.0388	16.5	Jan2013, 10	1.16
GEN-12-POC	2.669	568.5	Jan2013, 10	1.04
GEN-11-REACH	2.669	566.1	Jan2013, 10	1.04
GEN-11-A	0.0392	22.9	Jan2013, 09	1.27
GEN-11-POC	2.7082	570.1	Jan2013, 10	1.05
GEN-14-REACH	2.7082	567.2	Jan2013, 10	1.05
GEN-08-BASIN	0.0265	6.1	Jan2013, 10	1.25
GEN-08-A	0.0265	14.3	Jan2013, 10	1.27
GEN-08-JUNC	0.0364	9.1	Jan2013, 09	1.16
GEN-08-DS-REA	0.0364	9.1	Jan2013, 10	1.16
GEN-08-WL	0.0099	4.4	Jan2013, 09	0.92
GEN-08-DS	0.0151	6.3	Jan2013, 10	1
GEN-08-POC	0.0515	15.4	Jan2013, 10	1.12
GEN-10-REACH	0.0515	15.4	Jan2013, 10	1.12
GEN-10-A	0.0511	24.9	Jan2013, 10	1.27
GEN-14-A	0.024	12.1	Jan2013, 10	1.25
US-POND	2.8348	565.8	Jan2013, 10	1.05
GEN-13-REACH	2.8348	565.4	Jan2013, 10	1.05
GEN-06-A	0.0313	17.7	Jan2013, 09	1.27
GEN-06-C	0.0207	13.8	Jan2013, 09	1.47
GEN-06-B	0.0276	16.3	Jan2013, 10	1.39
GEN-06-WL-REA	0.0276	2.1	Jan2013, 11	1.5
GEN-06-WL	0.0104	4.7	Jan2013, 10	1.03
GEN-06-JUNC	0.09	23.6	Jan2013, 10	1.35
GEN-06-DS-REA	0.09	23.6	Jan2013, 10	1.35
GEN-06-DS	0.0027	1.4	Jan2013, 09	1.16
GEN-06-POC	0.0927	24.7	Jan2013, 10	1.35

PROPOSED 10-YEAR RESULTS				
Element	Drainage Area (SqMi)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
GEN-05-BASIN	0.0306	12.6	Jan2013, 10	2.74
GEN-06-A-BASI	0.052	38.3	Jan2013, 10	2.5
GEN-06-B-BASI	0.0276	2.9	Jan2013, 12	2.49
GEN-12	2.6302	1122.7	Jan2013, 10	2.04
GEN-02-A	0.0388	33	Jan2013, 10	2.23
GEN-02-POC	0.0388	33	Jan2013, 10	2.23
GEN-12-REACH	0.0388	32.7	Jan2013, 10	2.23
GEN-12-POC	2.669	1147.4	Jan2013, 10	2.04
GEN-11-REACH	2.669	1142.8	Jan2013, 10	2.04
GEN-11-A	0.0392	43.5	Jan2013, 09	2.35
GEN-11-POC	2.7082	1150.4	Jan2013, 10	2.05
GEN-14-REACH	2.7082	1145.1	Jan2013, 10	2.04
GEN-08-BASIN	0.0265	8.7	Jan2013, 10	2.38
GEN-08-A	0.0265	28.3	Jan2013, 09	2.39
GEN-08-JUNC	0.0364	16.8	Jan2013, 09	2.27
GEN-08-DS-REA	0.0364	16.8	Jan2013, 10	2.27
GEN-08-WL	0.0099	10	Jan2013, 09	1.98
GEN-08-DS	0.0151	13.9	Jan2013, 10	2.06
GEN-08-POC	0.0515	30.7	Jan2013, 10	2.21
GEN-10-REACH	0.0515	30.6	Jan2013, 10	2.21
GEN-10-A	0.0511	47.7	Jan2013, 10	2.36
GEN-14-A	0.024	23.3	Jan2013, 10	2.34
US-POND	2.8348	1158.3	Jan2013, 10	2.05
GEN-13-REACH	2.8348	1157.5	Jan2013, 10	2.05
GEN-06-A	0.0313	34.8	Jan2013, 09	2.4
GEN-06-C	0.0207	25.5	Jan2013, 09	2.66
GEN-06-B	0.0276	30.8	Jan2013, 10	2.57
GEN-06-WL-REA	0.0276	2.9	Jan2013, 12	2.49
GEN-06-WL	0.0104	10.2	Jan2013, 09	2.12
GEN-06-JUNC	0.09	48.4	Jan2013, 10	2.45
GEN-06-DS-REA	0.09	48.4	Jan2013, 10	2.45
GEN-06-DS	0.0027	2.7	Jan2013, 09	2.23
GEN-06-POC	0.0927	50.6	Jan2013, 10	2.44

PROPOSED 100-YEAR RESULTS				
Element	Drainage Area (SqMi)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
GEN-05-BASIN	0.0306	23.9	Jan2013, 10	4.11
GEN-06-A-BASI	0.052	57.8	Jan2013, 10	3.85
GEN-06-B-BASI	0.0276	6.2	Jan2013, 11	3.46
GEN-12	2.6302	1837.3	Jan2013, 10	3.27
GEN-02-A	0.0388	52.8	Jan2013, 10	3.52
GEN-02-POC	0.0388	52.8	Jan2013, 10	3.52
GEN-12-REACH	0.0388	52.7	Jan2013, 10	3.52
GEN-12-POC	2.669	1876.5	Jan2013, 10	3.27
GEN-11-REACH	2.669	1869	Jan2013, 10	3.27
GEN-11-A	0.0392	68.5	Jan2013, 09	3.65
GEN-11-POC	2.7082	1881	Jan2013, 10	3.28
GEN-14-REACH	2.7082	1873.1	Jan2013, 10	3.27
GEN-08-BASIN	0.0265	14.9	Jan2013, 10	3.71
GEN-08-A	0.0265	44.8	Jan2013, 09	3.72
GEN-08-JUNC	0.0364	25.3	Jan2013, 09	3.59
GEN-08-DS-REA	0.0364	25.3	Jan2013, 09	3.59
GEN-08-WL	0.0099	16.8	Jan2013, 09	3.26
GEN-08-DS	0.0151	23.2	Jan2013, 10	3.35
GEN-08-POC	0.0515	48.4	Jan2013, 09	3.52
GEN-10-REACH	0.0515	48.3	Jan2013, 10	3.52
GEN-10-A	0.0511	75.1	Jan2013, 10	3.67
GEN-14-A	0.024	36.8	Jan2013, 10	3.65
US-POND	2.8348	1898.1	Jan2013, 10	3.29
GEN-13-REACH	2.8348	1897.6	Jan2013, 10	3.29
GEN-06-A	0.0313	54.9	Jan2013, 09	3.75
GEN-06-C	0.0207	38.8	Jan2013, 09	4.04
GEN-06-B	0.0276	47.4	Jan2013, 10	3.94
GEN-06-WL-REA	0.0276	6.2	Jan2013, 11	3.45
GEN-06-WL	0.0104	16.8	Jan2013, 09	3.43
GEN-06-JUNC	0.09	72.6	Jan2013, 10	3.68
GEN-06-DS-REA	0.09	72.4	Jan2013, 10	3.68
GEN-06-DS	0.0027	4.3	Jan2013, 09	3.52
GEN-06-POC	0.0927	75.6	Jan2013, 10	3.68

HEC-HMS DEVELOPED CONDITIONS

GLOBAL SUMMARY RESULTS

PROPOSED 2-YEAR RESULTS

Element	Drainage Area (SqMi)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
GEN-09-REACH	0.0927	24.7	Jan2013, 10	1.35
GEN-09-A	0.0435	20.8	Jan2013, 10	1.31
GEN-13-A	0.0078	4.2	Jan2013, 10	1.25
DS-POND	2.9788	509.9	Jan2013, 10	1.07
AR	2.9788	509.7	Jan2013, 10	1.07
GSC-POC	2.9788	509.7	Jan2013, 10	1.07
GEN-05-A	0.0306	19.1	Jan2013, 10	1.58
GEN-05-DS-REA	0.0306	4.8	Jan2013, 10	1.57
GEN-05-DS	0.0291	14.5	Jan2013, 10	1.15
GEN-04-BASIN	0.0285	3.2	Jan2013, 10	1.21
GEN-04-A	0.0285	16.4	Jan2013, 09	1.22
GEN-04-DS-REA	0.0285	3.2	Jan2013, 10	1.21
GEN-04-B	0.0129	5.4	Jan2013, 10	1.2
GEN-04-DITCH	0.0414	8.4	Jan2013, 10	1.21
GEN-04-DS-REA	0.0414	8.4	Jan2013, 10	1.21
GEN-04-C	0.0203	10.5	Jan2013, 09	1.14
GEN-04-Y	0.0164	7.6	Jan2013, 10	1.12
GEN-04-DS	0.0115	4	Jan2013, 10	0.92
GEN-04-DS-POC	0.0896	27.7	Jan2013, 10	1.14
GEN-05-POC	0.0597	17.5	Jan2013, 10	1.37
GEN-07-DS	0.0131	5	Jan2013, 10	0.94
GEN-07-A	0.0044	2.7	Jan2013, 09	1.19
GEN-07-A-REAC	0.0044	2.7	Jan2013, 09	1.19
GEN-07-JUNC	0.0044	2.7	Jan2013, 09	1.19
GEN-07-DS-REA	0.0044	2.6	Jan2013, 10	1.19
GEN-03-BASIN	0.0232	6.3	Jan2013, 10	1.38
GEN-03-A	0.0232	14.4	Jan2013, 09	1.41
GEN-03-DS-REA	0.0232	6.3	Jan2013, 10	1.38
GEN-03-DS	0.0066	3.1	Jan2013, 10	1.16
GEN-03-OS	0.0046	2.2	Jan2013, 10	1.17
GEN-03-WL	0.002	0.7	Jan2013, 10	0.89
GEN-01-B	0.0253	11.3	Jan2013, 10	1.24
GEN-01-DS	0.0182	7.9	Jan2013, 10	1.25
GEN-01-BASIN	0.0169	7.4	Jan2013, 00	1.52
GEN-01-A	0.0169	8	Jan2013, 10	1.25
GEN-01-POC	0.0604	23.7	Jan2013, 10	1.32
GEN-03-POC	0.0364	11.5	Jan2013, 10	1.29
GEN-07-POC	0.0175	7.3	Jan2013, 10	1

PROPOSED 10-YEAR RESULTS

Element	Drainage Area (SqMi)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
GEN-09-REACH	0.0927	50.6	Jan2013, 10	2.44
GEN-09-A	0.0435	39.1	Jan2013, 10	2.41
GEN-13-A	0.0078	8	Jan2013, 10	2.34
DS-POND	2.9788	1185.3	Jan2013, 10	2.07
AR	2.9788	1185.2	Jan2013, 10	2.07
GSC-POC	2.9788	1185.2	Jan2013, 10	2.07
GEN-05-A	0.0306	33.7	Jan2013, 10	2.75
GEN-05-DS-REA	0.0306	12.6	Jan2013, 10	2.74
GEN-05-DS	0.0291	28.7	Jan2013, 09	2.22
GEN-04-BASIN	0.0285	8.6	Jan2013, 10	2.34
GEN-04-A	0.0285	32.8	Jan2013, 09	2.34
GEN-04-DS-REA	0.0285	8.6	Jan2013, 10	2.34
GEN-04-B	0.0129	10.6	Jan2013, 10	2.28
GEN-04-DITCH	0.0414	18.1	Jan2013, 10	2.32
GEN-04-DS-REA	0.0414	18.4	Jan2013, 10	2.32
GEN-04-C	0.0203	20.8	Jan2013, 09	2.21
GEN-04-Y	0.0164	15.8	Jan2013, 10	2.21
GEN-04-DS	0.0115	9.3	Jan2013, 10	1.94
GEN-04-DS-POC	0.0896	56.2	Jan2013, 10	2.23
GEN-05-POC	0.0597	33.1	Jan2013, 10	2.49
GEN-07-DS	0.0131	11.3	Jan2013, 10	1.97
GEN-07-A	0.0044	5.3	Jan2013, 09	2.27
GEN-07-A-REAC	0.0044	5.3	Jan2013, 09	2.27
GEN-07-JUNC	0.0044	5.3	Jan2013, 09	2.27
GEN-07-DS-REA	0.0044	5.2	Jan2013, 10	2.27
GEN-03-BASIN	0.0232	9	Jan2013, 10	2.52
GEN-03-A	0.0232	26.5	Jan2013, 09	2.55
GEN-03-DS-REA	0.0232	9	Jan2013, 10	2.52
GEN-03-DS	0.0066	6	Jan2013, 10	2.22
GEN-03-OS	0.0046	4.3	Jan2013, 10	2.24
GEN-03-WL	0.002	1.6	Jan2013, 10	1.93
GEN-01-B	0.0253	21.8	Jan2013, 10	2.33
GEN-01-DS	0.0182	15.2	Jan2013, 10	2.34
GEN-01-BASIN	0.0169	7.5	Jan2013, 10	2.62
GEN-01-A	0.0169	15.5	Jan2013, 10	2.35
GEN-01-POC	0.0604	43.5	Jan2013, 10	2.41
GEN-03-POC	0.0364	19.8	Jan2013, 10	2.4
GEN-07-POC	0.0175	16	Jan2013, 10	2.05

PROPOSED 100-YEAR RESULTS

Element	Drainage Area (SqMi)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
GEN-09-REACH	0.0927	75.4	Jan2013, 10	3.67
GEN-09-A	0.0435	61.2	Jan2013, 10	3.72
GEN-13-A	0.0078	12.6	Jan2013, 10	3.65
DS-POND	2.9788	1950.9	Jan2013, 10	3.3
AR	2.9788	1950.6	Jan2013, 10	3.3
GSC-POC	2.9788	1950.6	Jan2013, 10	3.3
GEN-05-A	0.0306	50.9	Jan2013, 10	4.11
GEN-05-DS-REA	0.0306	23.9	Jan2013, 10	4.11
GEN-05-DS	0.0291	46	Jan2013, 09	3.5
GEN-04-BASIN	0.0285	16.3	Jan2013, 10	3.67
GEN-04-A	0.0285	52.2	Jan2013, 09	3.68
GEN-04-DS-REA	0.0285	16.3	Jan2013, 10	3.67
GEN-04-B	0.0129	16.9	Jan2013, 10	3.59
GEN-04-DITCH	0.0414	32.7	Jan2013, 10	3.64
GEN-04-DS-REA	0.0414	32.7	Jan2013, 10	3.64
GEN-04-C	0.0203	33.3	Jan2013, 09	3.49
GEN-04-Y	0.0164	25.6	Jan2013, 10	3.52
GEN-04-DS	0.0115	15.8	Jan2013, 10	3.21
GEN-04-DS-POC	0.0896	97.7	Jan2013, 10	3.53
GEN-05-POC	0.0597	55.3	Jan2013, 10	3.81
GEN-07-DS	0.0131	19.1	Jan2013, 10	3.25
GEN-07-A	0.0044	8.5	Jan2013, 09	3.57
GEN-07-A-REAC	0.0044	8.4	Jan2013, 09	3.57
GEN-07-JUNC	0.0044	8.4	Jan2013, 09	3.57
GEN-07-DS-REA	0.0044	8.3	Jan2013, 10	3.57
GEN-03-BASIN	0.0232	20.7	Jan2013, 10	3.87
GEN-03-A	0.0232	40.8	Jan2013, 09	3.9
GEN-03-DS-REA	0.0232	20.7	Jan2013, 10	3.87
GEN-03-DS	0.0066	9.7	Jan2013, 10	3.51
GEN-03-OS	0.0046	6.9	Jan2013, 10	3.53
GEN-03-WL	0.002	2.7	Jan2013, 10	3.21
GEN-01-B	0.0253	34.4	Jan2013, 10	3.64
GEN-01-DS	0.0182	24	Jan2013, 10	3.65
GEN-01-BASIN	0.0169	12.1	Jan2013, 10	3.93
GEN-01-A	0.0169	24.4	Jan2013, 10	3.66
GEN-01-POC	0.0604	66.8	Jan2013, 10	3.72
GEN-03-POC	0.0364	36.8	Jan2013, 10	3.72
GEN-07-POC	0.0175	26.7	Jan2013, 10	3.33

SUMMARY OF COMPLIANCE POINTS

1) Existing Flows (CFS)

	GEN-01-POC	GEN-02-POC	GEN-03-POC	GEN-04-DS-PO	GEN-04-US PO	GEN-05-POC	GEN-06-POC	GEN-07-POC	GEN-08-POC	GEN-11-POC	GEN-12-POC	US-POND	GSP-POC
2YR	23.8	17.9	16.9	27.5	6.8	18.4	30.8	9.0	18.5	570.9	569.4	571.4	543.4
10YR	46.2	34.8	33.4	63.3	13.5	36.2	61.0	17.5	36.5	1151.8	1148.7	1152.4	1243.6
100YR	73.4	55.3	53.3	107.4	21.6	58.0	97.7	27.7	58.3	1883.2	1878.2	1883.7	2040.7

2) Proposed Flows (CFS)

	GEN-01-POC	GEN-02-POC	GEN-03-POC	GEN-04-DS-PO	GEN-04-Basin	GEN-05-POC	GEN-06-POC	GEN-07-POC	GEN-08-POC	GEN-11-POC	GEN-12-POC	US-POND	GSP-POC
2YR	23.7	16.7	11.5	27.7	3.2	17.5	24.7	7.3	15.4	570.1	568.5	570.3	513.7
10YR	43.5	33.0	19.8	56.2	8.6	33.1	50.6	16.0	30.7	1150.4	1147.4	1150.8	1171.8
100YR	66.8	52.8	36.8	97.7	16.3	55.3	75.6	26.7	48.4	1881.0	1876.5	1881.4	1950.7

3) Proposed Flow as a Perctange of Existing Flows

	GEN-01-POC	GEN-02-POC	GEN-03-POC	GEN-04-POC	GEN-04-Basin	GEN-05-POC	GEN-06-POC	GEN-07-POC	GEN-08-POC	GEN-11-POC	GEN-12-POC	US-POND	DS-POND
2YR	99.6%	93.3%	68.0%	100.7%	47.1%	95.1%	80.2%	81.1%	83.2%	99.9%	99.8%	99.8%	94.5%
10YR	94.2%	94.8%	59.3%	88.8%	63.7%	91.4%	83.0%	91.4%	84.1%	99.9%	99.9%	99.9%	94.2%
100YR	91.0%	95.5%	69.0%	91.0%	75.5%	95.3%	77.4%	96.4%	83.0%	99.9%	99.9%	99.9%	95.6%

4) Proposed Basin Elevation Data

	PEAK ELV	SPILLWAY	TOP	Freeboard
BASIN 1	1182.1	1183.0	1185.0	0.9
BASIN 3	1090.8	1093.0	1095.0	2.2
BASIN 4	1087.2	1088.3	1090.3	1.1
BASIN 5	1118.7	1118.8	1120.8	0.1
BASIN 6A	1102.4	1103.0	1107.0	0.6
BASIN 6B	1149.2	1150.0	1152.0	0.8
BASIN 8	1133.6	1135.0	1137.0	1.4

NAVD 88 Feet

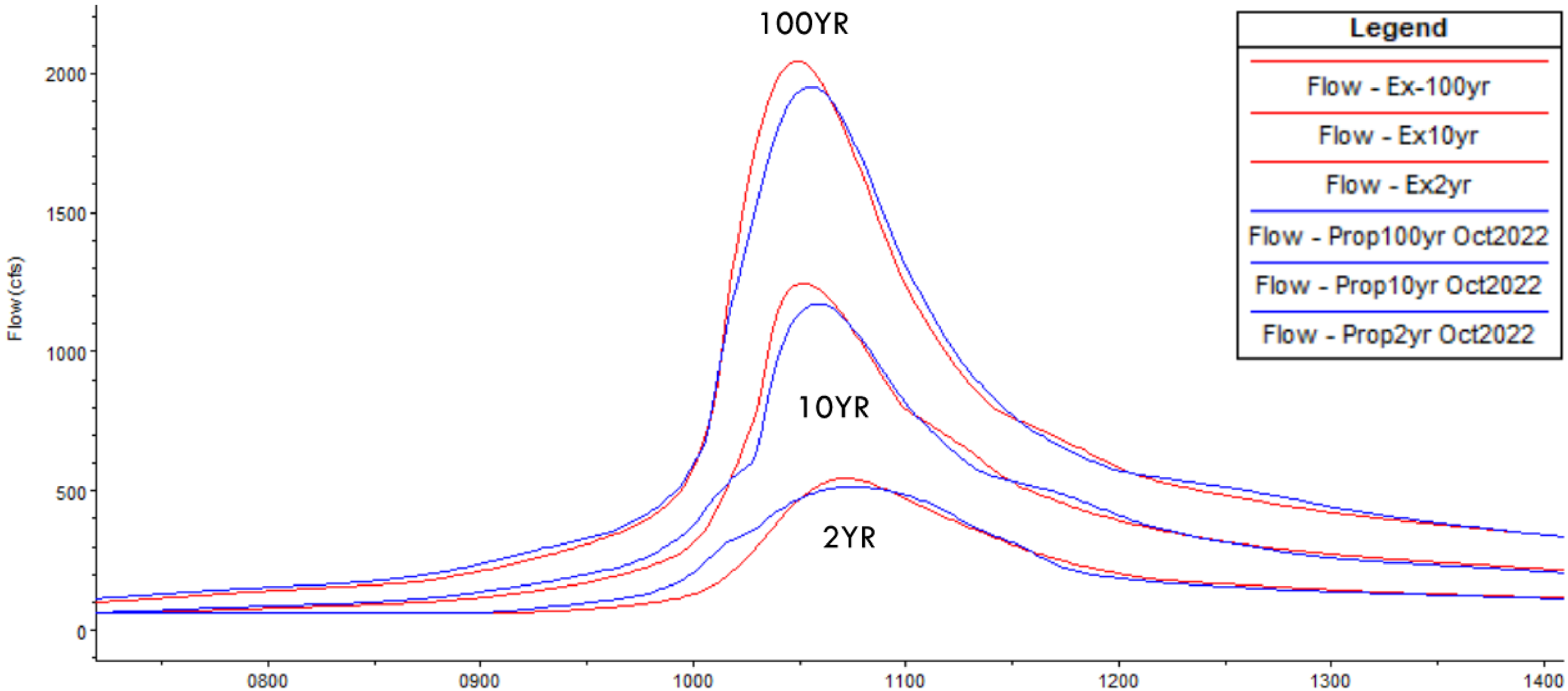
Appendix C: Hydraulics Data and Results

Manning's n for Channels (Chow, 1959).

Type of Channel and Description	Minimum	Normal	Maximum
Natural streams - minor streams (top width at floodstage < 100 ft)			
1. Main Channels			
a. clean, straight, full stage, no rifts or deep pools	0.025	0.030	0.033
b. same as above, but more stones and weeds	0.030	0.035	0.040
c. clean, winding, some pools and shoals	0.033	0.040	0.045
d. same as above, but some weeds and stones	0.035	0.045	0.050
e. same as above, lower stages, more ineffective slopes and sections	0.040	0.048	0.055
f. same as "d" with more stones	0.045	0.050	0.060
g. sluggish reaches, weedy, deep pools	0.050	0.070	0.080
h. very weedy reaches, deep pools, or floodways with heavy stand of timber and underbrush	0.075	0.100	0.150
2. Mountain streams, no vegetation in channel, banks usually steep, trees and brush along banks submerged at high stages			
a. bottom: gravels, cobbles, and few boulders	0.030	0.040	0.050
b. bottom: cobbles with large boulders	0.040	0.050	0.070
3. Floodplains			
a. Pasture, no brush			
1.short grass	0.025	0.030	0.035
2. high grass	0.030	0.035	0.050
b. Cultivated areas			
1. no crop	0.020	0.030	0.040
2. mature row crops	0.025	0.035	0.045
3. mature field crops	0.030	0.040	0.050
c. Brush			
1. scattered brush, heavy weeds	0.035	0.050	0.070
2. light brush and trees, in winter	0.035	0.050	0.060
3. light brush and trees, in summer	0.040	0.060	0.080
4. medium to dense brush, in winter	0.045	0.070	0.110
5. medium to dense brush, in summer	0.070	0.100	0.160
d. Trees			
1. dense willows, summer, straight	0.110	0.150	0.200
2. cleared land with tree stumps, no sprouts	0.030	0.040	0.050
3. same as above, but with heavy growth of sprouts	0.050	0.060	0.080
4. heavy stand of timber, a few down trees, little undergrowth, flood stage below branches	0.080	0.100	0.120
5. same as 4. with flood stage reaching branches	0.100	0.120	0.160

DOWNSTREAM HYDROGRAPHS

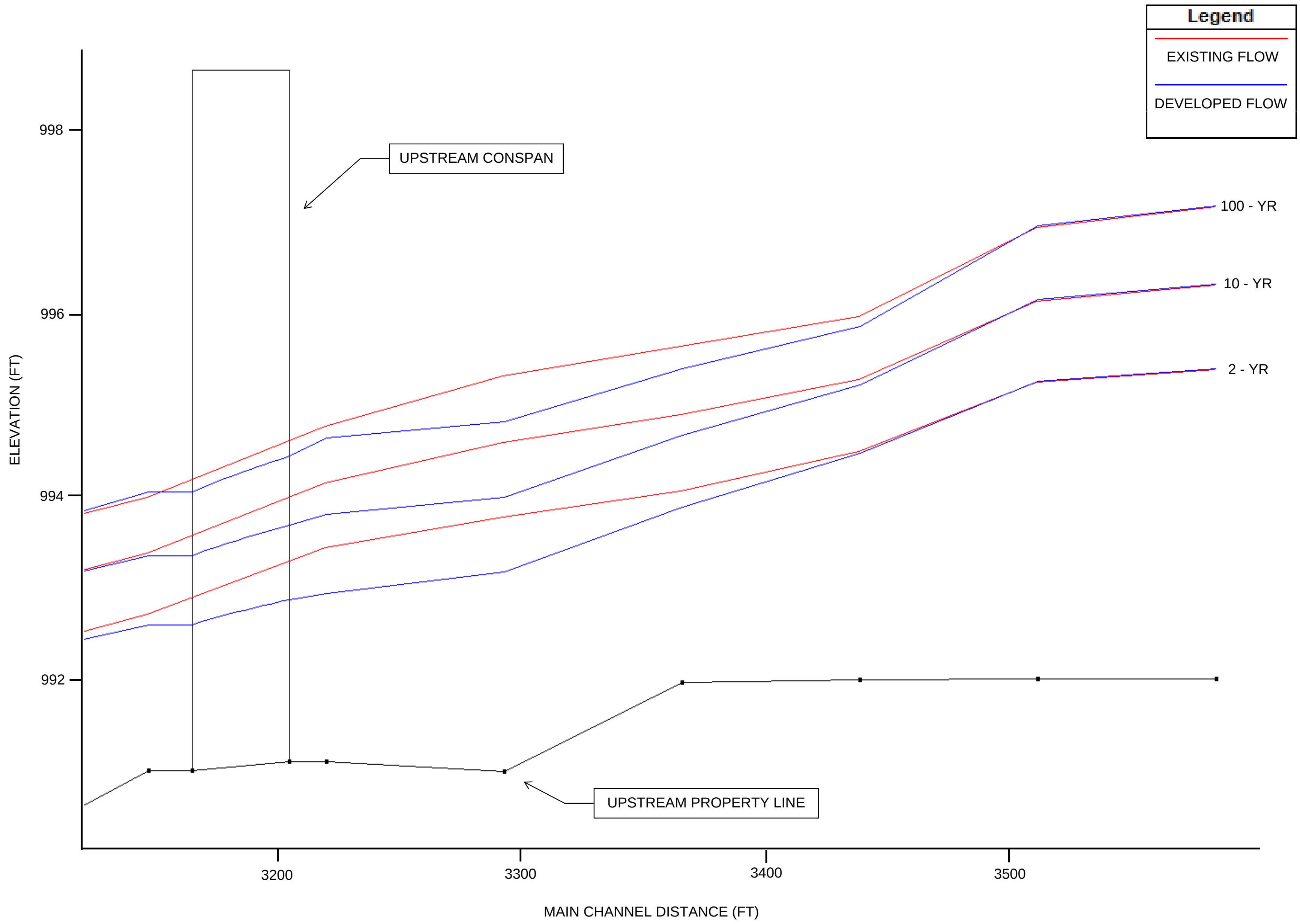
WEST GREEN SPRINGS ROAD



UPSTREAM PROFILE

GREEN SPRINGS CREEK

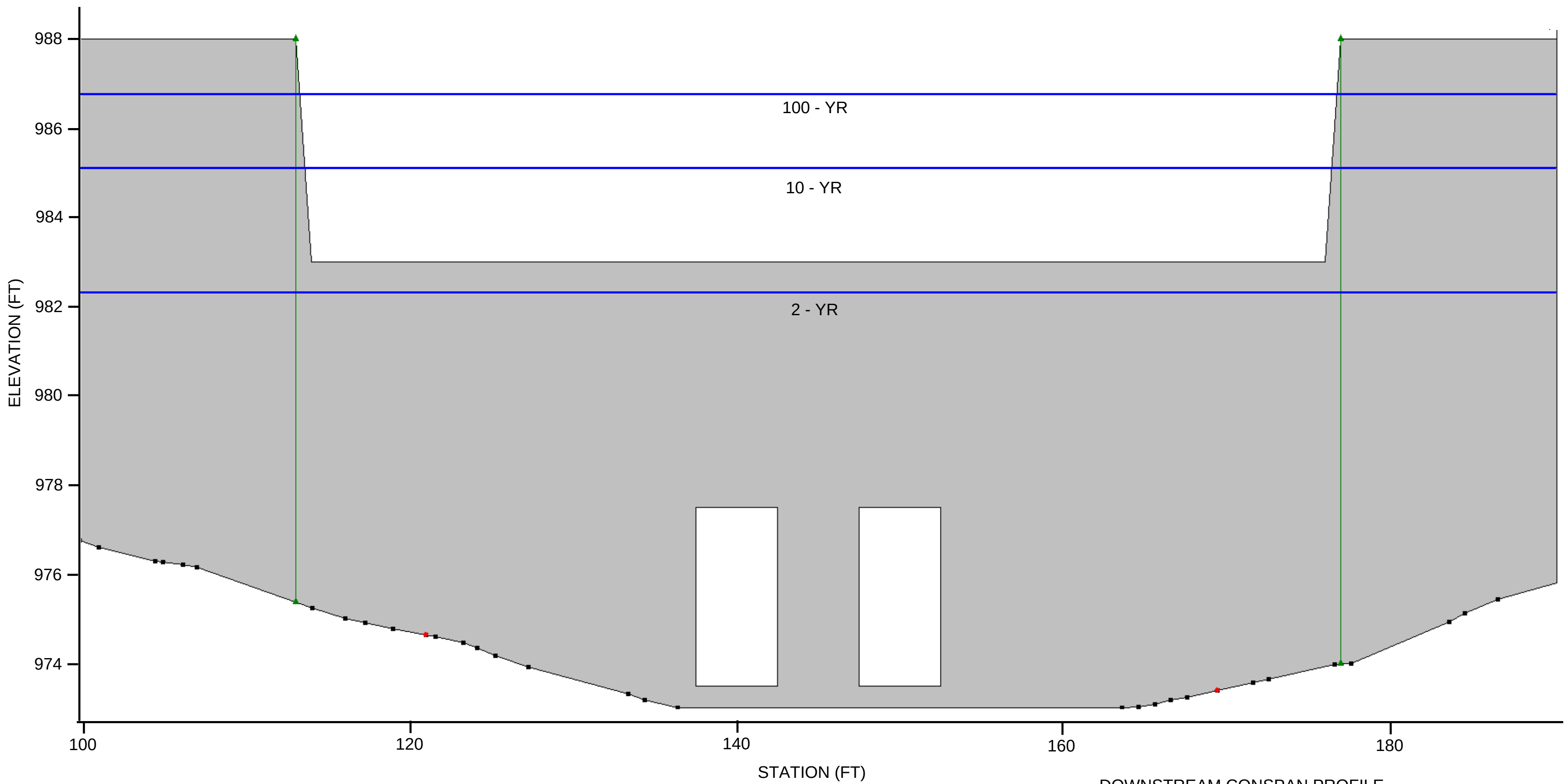
DOMENICHELLI AND ASSOCIATES, INC.
CIVIL ENGINEERING

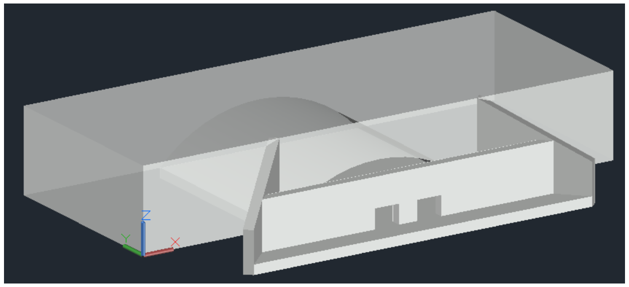


CONTROL STRUCTURE

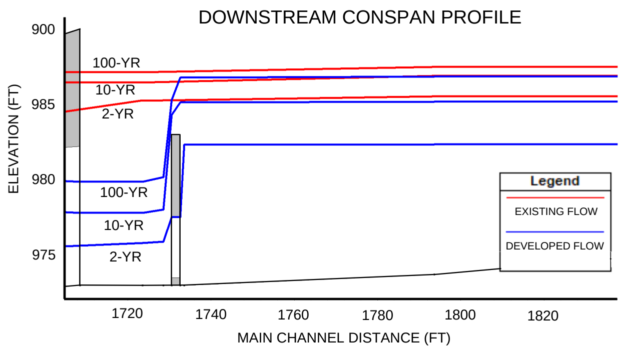
DOWNSTREAM CONSPAN

DOMENICHELLI AND ASSOCIATES, INC.
CIVIL ENGINEERING





ROUGH SKETCH RENDERING OF CONTROL STRUCTURE



HEC-RAS River: GreenSprings CK Reach: US Profile: Max WS

Reach	River Sta	Profile	Plan	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)	
US	3711	Max WS	Ex-100yr	1877.57	992.00	997.17		997.65	0.005524	7.10	409.58	173.65	0.56
US	3711	Max WS	Ex10yr	1148.50	992.00	996.31		996.72	0.005391	6.19	275.67	139.99	0.54
US	3711	Max WS	Ex2yr	569.38	992.00	995.39		995.66	0.004393	4.72	164.68	99.95	0.46
US	3711	Max WS	Prop100yr Oct2022	1875.70	992.00	997.19		997.67	0.005366	7.02	414.10	174.62	0.55
US	3711	Max WS	Prop10yr Oct2022	1146.77	992.00	996.34		996.73	0.005169	6.09	280.18	141.20	0.53
US	3711	Max WS	Prop2yr Oct2022	568.40	992.00	995.39		995.66	0.004363	4.70	164.91	100.04	0.46
US	3620.5	Max WS	Ex-100yr	1877.75	992.00	996.95		997.28	0.003723	5.59	462.36	166.37	0.46
US	3620.5	Max WS	Ex10yr	1148.45	992.00	996.13		996.36	0.003183	4.54	336.91	141.80	0.41
US	3620.5	Max WS	Ex2yr	569.37	992.00	995.25		995.38	0.002458	3.35	220.92	121.90	0.34
US	3620.5	Max WS	Prop100yr Oct2022	1875.57	992.00	996.97		997.29	0.003641	5.54	466.08	167.25	0.45
US	3620.5	Max WS	Prop10yr Oct2022	1146.70	992.00	996.16		996.39	0.003071	4.48	341.28	142.85	0.40
US	3620.5	Max WS	Prop2yr Oct2022	568.23	992.00	995.25		995.38	0.002452	3.34	220.77	121.88	0.34
US	3531	Max WS	Ex-100yr	1880.93	991.99	995.97		996.78	0.013027	9.29	299.31	140.27	0.83
US	3531	Max WS	Ex10yr	1150.37	991.99	995.28		995.91	0.012344	7.94	210.69	121.28	0.78
US	3531	Max WS	Ex2yr	570.43	991.99	994.50		994.97	0.011959	6.48	123.96	98.03	0.74
US	3531	Max WS	Prop100yr Oct2022	1878.58	991.99	995.85		996.75	0.014669	9.67	284.03	134.51	0.88
US	3531	Max WS	Prop10yr Oct2022	1148.77	991.99	995.22		995.90	0.013489	8.20	203.76	120.18	0.82
US	3531	Max WS	Prop2yr Oct2022	569.33	991.99	994.47		994.96	0.012531	6.59	121.45	97.03	0.75
US	3441.5	Max WS	Ex-100yr	1884.09	991.97	995.64		995.99	0.005861	5.99	432.68	180.91	0.55
US	3441.5	Max WS	Ex10yr	1152.46	991.97	994.90		995.17	0.006136	5.26	303.16	164.79	0.54
US	3441.5	Max WS	Ex2yr	571.45	991.97	994.06		994.25	0.006331	4.25	178.42	130.17	0.52
US	3441.5	Max WS	Prop100yr Oct2022	1881.71	991.97	995.40		995.83	0.007927	6.65	389.85	176.33	0.64
US	3441.5	Max WS	Prop10yr Oct2022	1150.79	991.97	994.67		995.02	0.008617	5.91	267.13	155.84	0.64
US	3441.5	Max WS	Prop2yr Oct2022	570.40	991.97	993.88		994.13	0.009117	4.81	156.28	123.83	0.62
US	3352	Max WS	Ex-100yr	1887.26	990.99	995.32		995.62	0.004220	5.64	470.24	175.99	0.48
US	3352	Max WS	Ex10yr	1154.52	990.99	994.59		994.81	0.003780	4.71	346.29	162.00	0.44
US	3352	Max WS	Ex2yr	572.50	990.99	993.78		993.91	0.003038	3.54	223.12	135.14	0.38
US	3352	Max WS	Prop100yr Oct2022	1884.79	990.99	994.82		995.28	0.007491	6.91	384.64	167.10	0.63
US	3352	Max WS	Prop10yr Oct2022	1152.85	990.99	993.99		994.40	0.008660	6.30	253.43	140.95	0.65
US	3352	Max WS	Prop2yr Oct2022	571.47	990.99	993.17		993.49	0.009716	5.37	146.28	120.05	0.65
US	3262.5	Max WS	Ex-100yr	1890.47	990.99	994.77		995.22	0.007413	6.81	381.70	158.75	0.62
US	3262.5	Max WS	Ex10yr	1156.60	990.99	994.15		994.46	0.006309	5.57	287.60	148.88	0.56
US	3262.5	Max WS	Ex2yr	573.53	990.99	993.44		993.63	0.005300	4.29	186.24	134.39	0.49
US	3262.5	Max WS	Prop100yr Oct2022	1887.98	991.10	994.65		994.88	0.002515	3.85	491.00	176.94	0.36
US	3262.5	Max WS	Prop10yr Oct2022	1154.89	991.10	993.80		993.95	0.002338	3.09	373.69	167.96	0.33
US	3262.5	Max WS	Prop2yr Oct2022	572.53	991.10	992.95		993.02	0.002046	2.24	255.30	158.46	0.29
US	3173	Max WS	Ex-100yr	1890.35	990.94	993.99		994.59	0.010454	6.95	310.18	148.02	0.71
US	3173	Max WS	Ex10yr	1156.55	990.94	993.39		993.83	0.011046	6.13	222.32	142.38	0.70
US	3173	Max WS	Ex2yr	573.55	990.94	992.72		993.07	0.014073	5.54	129.33	134.68	0.75
US	3173	Max WS	Prop100yr Oct2022	1887.98	991.00	994.06		994.36	0.004147	4.46	423.73	169.98	0.45
US	3173	Max WS	Prop10yr Oct2022	1154.91	991.00	993.36		993.55	0.003701	3.54	326.46	160.24	0.41
US	3173	Max WS	Prop2yr Oct2022	572.52	991.00	992.61		992.71	0.003241	2.57	222.96	149.89	0.36
US	3083.5	Max WS	Ex-100yr	1891.04	989.96	993.49		993.96	0.007132	6.15	347.80	156.64	0.60
US	3083.5	Max WS	Ex10yr	1156.99	989.96	992.86		993.19	0.006877	5.25	254.13	138.42	0.57
US	3083.5	Max WS	Ex2yr	573.72	989.96	992.18		992.39	0.006915	4.32	162.14	131.80	0.54
US	3083.5	Max WS	Prop100yr Oct2022	1888.30	989.96	993.54		993.98	0.006710	6.02	354.70	157.88	0.58
US	3083.5	Max WS	Prop10yr Oct2022	1155.11	989.96	992.86		993.19	0.006926	5.26	253.28	138.36	0.57
US	3083.5	Max WS	Prop2yr Oct2022	572.59	989.96	992.17		992.38	0.007198	4.39	159.88	131.64	0.55
US	2994	Max WS	Ex-100yr	1891.72	988.99	992.90		993.42	0.008092	7.05	340.19	165.45	0.65
US	2994	Max WS	Ex10yr	1157.33	988.99	992.41		992.74	0.006527	5.75	260.73	155.67	0.57
US	2994	Max WS	Ex2yr	573.93	988.99	991.77		991.99	0.005620	4.60	168.32	132.82	0.51
US	2994	Max WS	Prop100yr Oct2022	1888.75	988.99	992.95		993.45	0.007552	6.87	343.42	159.92	0.63
US	2994	Max WS	Prop10yr Oct2022	1155.33	988.99	992.33		992.70	0.007478	6.05	246.29	149.97	0.60
US	2994	Max WS	Prop2yr Oct2022	572.67	988.99	991.74		991.96	0.006071	4.74	163.69	132.29	0.53
US	2904.5	Max WS	Ex-100yr	1892.55	988.78	991.92		992.60	0.014559	8.34	293.45	170.79	0.84
US	2904.5	Max WS	Ex10yr	1157.97	988.78	991.38	991.38	991.94	0.016760	7.85	203.42	162.26	0.88
US	2904.5	Max WS	Ex2yr	574.13	988.78	990.77		991.19	0.016979	6.56	117.15	119.29	0.84
US	2904.5	Max WS	Prop100yr Oct2022	1889.11	988.78	991.89		992.62	0.015343	8.52	282.73	161.77	0.87
US	2904.5	Max WS	Prop10yr Oct2022	1155.59	988.78	991.31	991.35	991.95	0.019852	8.39	189.62	155.52	0.95
US	2904.5	Max WS	Prop2yr Oct2022	572.77	988.78	990.72	990.74	991.19	0.019514	6.92	111.34	117.22	0.90
US	2815	Max WS	Ex-100yr	1893.22	986.99	991.36		991.79	0.007465	7.11	370.53	186.52	0.62
US	2815	Max WS	Ex10yr	1158.37	986.99	990.66		991.03	0.007795	6.40	249.86	156.81	0.62
US	2815	Max WS	Ex2yr	574.34	986.99	989.95		990.25	0.009166	5.92	144.66	137.48	0.64
US	2815	Max WS	Prop100yr Oct2022	1889.37	986.99	991.38		991.81	0.007191	6.99	366.88	176.99	0.61
US	2815	Max WS	Prop10yr Oct2022	1155.82	986.99	990.74		991.07	0.006702	6.02	259.71	153.26	0.57
US	2815	Max WS	Prop2yr Oct2022	572.85	986.99	989.97		990.25	0.008649	5.78	147.44	138.29	0.63
US	2725.5	Max WS	Ex-100yr	1893.90	986.94	990.72		991.25	0.008374	7.14	336.94	160.55	0.66
US	2725.5	Max WS	Ex10yr	1158.77	986.94	989.95		990.42	0.010000	6.66	217.49	130.54	0.69
US	2725.5	Max WS	Ex2yr	574.50	986.94	989.20		989.57	0.011999	5.97	126.00	114.49	0.72
US	2725.5	Max WS	Prop100yr Oct2022	1889.60	986.94	990.83		991.32	0.007059	6.69	346.99	152.32	0.61
US	2725.5	Max WS	Prop10yr Oct2022	1156.05	986.94	990.04		990.50	0.009586	6.65	227.64	147.81	0.68
US	2725.5	Max WS	Prop2yr Oct2022	572.94	986.94	989.22		989.57	0.011577	5.89	127.34	114.72	0.71

HEC-RAS River: GreenSprings CK Reach: US Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	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)	
US	2636	Max WS	Ex-100yr	1894.47	985.95	989.71		990.52	0.012307	8.52	269.06	119.41	0.79
US	2636	Max WS	Ex10yr	1159.18	985.95	989.03		989.65	0.012955	7.59	190.10	110.26	0.79
US	2636	Max WS	Ex2yr	574.68	985.95	988.27		988.74	0.014500	6.56	112.09	94.82	0.79
US	2636	Max WS	Prop100yr Oct2022	1889.98	985.95	989.69		990.60	0.012857	8.68	251.13	102.19	0.81
US	2636	Max WS	Prop10yr Oct2022	1156.21	985.95	989.00		989.66	0.012985	7.56	182.31	97.92	0.78
US	2636	Max WS	Prop2yr Oct2022	573.10	985.95	988.25		988.73	0.014967	6.63	110.10	93.07	0.80
US	2546.5	Max WS	Ex-100yr	1895.21	984.95	989.12		989.78	0.008423	7.54	305.04	126.10	0.67
US	2546.5	Max WS	Ex10yr	1159.55	984.95	988.43		988.91	0.008085	6.49	220.79	116.47	0.64
US	2546.5	Max WS	Ex2yr	574.91	984.95	987.72		988.02	0.006880	5.07	142.19	102.92	0.56
US	2546.5	Max WS	Prop100yr Oct2022	1890.10	984.95	989.17		989.83	0.008078	7.43	297.50	110.85	0.66
US	2546.5	Max WS	Prop10yr Oct2022	1156.41	984.95	988.48		988.94	0.007412	6.27	222.25	107.51	0.61
US	2546.5	Max WS	Prop2yr Oct2022	573.22	984.95	987.72		988.02	0.006850	5.06	142.12	102.91	0.56
US	2457	Max WS	Ex-100yr	1895.89	984.88	988.25		989.01	0.012477	8.20	275.39	127.57	0.79
US	2457	Max WS	Ex10yr	1159.79	984.88	987.58		988.16	0.012763	7.13	194.50	114.03	0.77
US	2457	Max WS	Ex2yr	575.12	984.88	986.78		987.24	0.016474	6.39	110.04	96.28	0.83
US	2457	Max WS	Prop100yr Oct2022	1889.76	984.88	988.04		988.98	0.016093	8.92	245.65	115.36	0.89
US	2457	Max WS	Prop10yr Oct2022	1156.69	984.88	987.42		988.12	0.016465	7.78	176.61	108.38	0.87
US	2457	Max WS	Prop2yr Oct2022	573.35	984.88	986.78		987.24	0.016366	6.36	110.06	96.29	0.83
US	2387	Max WS	Ex-100yr	1896.60	983.86	988.02		988.39	0.004679	5.79	391.84	148.62	0.50
US	2387	Max WS	Ex10yr	1159.78	983.86	987.29		987.55	0.004334	4.89	287.19	136.03	0.47
US	2387	Max WS	Ex2yr	572.55	983.86	986.18		986.44	0.007411	4.91	147.63	116.94	0.57
US	2387	Max WS	Prop100yr Oct2022	1885.66	983.86	987.70		988.19	0.006565	6.50	339.67	134.12	0.59
US	2387	Max WS	Prop10yr Oct2022	1156.92	983.86	986.91		987.30	0.007438	5.92	236.40	125.86	0.60
US	2387	Max WS	Prop2yr Oct2022	573.39	983.86	986.20		986.45	0.007141	4.84	149.68	117.23	0.56
US	2317	Max WS	Ex-100yr	1942.91	982.95	987.73		988.08	0.003791	5.59	419.42	143.54	0.46
US	2317	Max WS	Ex10yr	1186.82	982.95	987.07		987.28	0.002930	4.42	327.01	133.42	0.39
US	2317	Max WS	Ex2yr	539.41	982.95	985.78		985.98	0.004668	4.29	165.53	119.03	0.46
US	2317	Max WS	Prop100yr Oct2022	1904.13	982.95	987.25		987.72	0.006118	6.59	351.28	136.27	0.57
US	2317	Max WS	Prop10yr Oct2022	1169.83	982.95	986.27		986.73	0.008854	6.61	224.29	124.20	0.66
US	2317	Max WS	Prop2yr Oct2022	587.74	982.95	985.56		985.90	0.009133	5.67	139.59	116.86	0.64
US	2247	Max WS	Ex-100yr	1942.81	983.00	987.62		987.86	0.002223	4.29	497.65	145.66	0.35
US	2247	Max WS	Ex10yr	1187.20	983.00	986.99		987.12	0.001507	3.20	407.38	137.80	0.28
US	2247	Max WS	Ex2yr	530.93	983.00	985.66		985.74	0.001662	2.55	233.57	123.89	0.28
US	2247	Max WS	Prop100yr Oct2022	1895.32	983.00	987.05		987.37	0.003616	5.00	415.63	138.50	0.44
US	2247	Max WS	Prop10yr Oct2022	1041.55	983.00	986.00		986.23	0.003804	4.19	276.38	127.53	0.43
US	2247	Max WS	Prop2yr Oct2022	586.48	983.00	985.25		985.41	0.004256	3.65	183.87	119.32	0.43
US	2177	Max WS	Ex-100yr	1941.89	982.90	987.56		987.73	0.001496	3.53	595.80	164.05	0.29
US	2177	Max WS	Ex10yr	1186.93	982.90	986.94		987.03	0.000982	2.60	495.60	158.26	0.23
US	2177	Max WS	Ex2yr	528.67	982.90	985.60		985.65	0.000949	1.94	294.49	140.67	0.21
US	2177	Max WS	Prop100yr Oct2022	1890.88	982.90	986.92		987.16	0.002539	4.16	492.54	158.06	0.37
US	2177	Max WS	Prop10yr Oct2022	1029.57	982.90	985.83		985.99	0.002590	3.39	328.07	144.07	0.35
US	2177	Max WS	Prop2yr Oct2022	503.79	982.90	985.08		985.16	0.002009	2.44	223.49	132.94	0.30
US	2107	Max WS	Ex-100yr	1941.76	982.91	987.47		987.62	0.001849	2.49	644.05	177.94	0.21
US	2107	Max WS	Ex10yr	1186.00	982.91	986.88		986.96	0.001200	1.83	541.03	172.52	0.16
US	2107	Max WS	Ex2yr	525.40	982.91	985.53		985.58	0.001242	1.40	319.23	154.45	0.15
US	2107	Max WS	Prop100yr Oct2022	1886.48	982.91	986.79		986.99	0.002275	3.85	524.94	171.39	0.35
US	2107	Max WS	Prop10yr Oct2022	1135.76	982.91	985.21		985.49	0.006226	4.47	271.25	149.07	0.53
US	2107	Max WS	Prop2yr Oct2022	579.72	982.91	984.83		984.95	0.003296	2.87	215.46	142.64	0.37
US	2037	Max WS	Ex-100yr	1943.13	981.26	987.45		987.53	0.000583	1.69	912.80	207.59	0.12
US	2037	Max WS	Ex10yr	1186.36	981.26	986.87		986.90	0.000331	1.19	793.54	198.07	0.09
US	2037	Max WS	Ex2yr	525.42	981.26	985.51		985.52	0.000211	0.78	538.69	176.37	0.07
US	2037	Max WS	Prop100yr Oct2022	1886.70	981.26	986.79		986.88	0.000696	2.65	778.31	196.94	0.20
US	2037	Max WS	Prop10yr Oct2022	1134.42	981.26	985.13		985.22	0.001106	2.61	473.65	170.07	0.24
US	2037	Max WS	Prop2yr Oct2022	512.49	981.26	982.70		983.05	0.018585	5.18	110.95	122.79	0.82
US	1967	Max WS	Ex-100yr	1943.05	979.00	987.46		987.50	0.000265	1.39	1318.26	231.93	0.09
US	1967	Max WS	Ex10yr	1186.66	979.00	986.87		986.88	0.000138	0.95	1182.83	224.74	0.06
US	1967	Max WS	Ex2yr	524.51	979.00	985.51		985.51	0.000062	0.56	894.71	198.79	0.04
US	1967	Max WS	Prop100yr Oct2022	1888.73	979.00	986.80		986.85	0.000211	1.82	1168.38	223.56	0.12
US	1967	Max WS	Prop10yr Oct2022	1134.54	979.00	985.14		985.17	0.000209	1.53	823.02	192.34	0.11
US	1967	Max WS	Prop2yr Oct2022	496.73	979.00	982.30		982.33	0.000578	1.61	335.61	151.18	0.17
US	1897	Max WS	Ex-100yr	1944.16	977.00	987.46		987.48	0.000163	1.17	1714.40	268.46	0.07
US	1897	Max WS	Ex10yr	1186.94	977.00	986.87		986.88	0.000081	0.79	1558.29	258.63	0.05
US	1897	Max WS	Ex2yr	525.28	977.00	985.51		985.51	0.000032	0.44	1227.38	227.13	0.03
US	1897	Max WS	Prop100yr Oct2022	1888.75	977.00	986.81		986.84	0.000097	1.34	1543.50	257.54	0.08
US	1897	Max WS	Prop10yr Oct2022	1135.67	977.00	985.14		985.16	0.000081	1.05	1146.51	219.47	0.07
US	1897	Max WS	Prop2yr Oct2022	497.88	977.00	982.30		982.31	0.000113	0.85	592.17	172.58	0.08
US	1827	Max WS	Ex-100yr	1944.29	976.67	987.46		987.47	0.000096	0.94	2105.90	302.51	0.05
US	1827	Max WS	Ex10yr	1186.95	976.67	986.87		986.87	0.000046	0.63	1930.15	291.66	0.04
US	1827	Max WS	Ex2yr	525.15	976.67	985.50		985.51	0.000017	0.35	1551.46	265.27	0.02
US	1827	Max WS	Prop100yr Oct2022	1888.72	976.67	986.81		986.83	0.000057	1.09	1914.72	290.43	0.06
US	1827	Max WS	Prop10yr Oct2022	1135.57	976.67	985.14		985.16	0.000045	0.84	1457.24	258.24	0.05
US	1827	Max WS	Prop2yr Oct2022	496.85	976.67	982.30		982.30	0.000050	0.64	799.95	205.35	0.05

HEC-RAS River: GreenSprings CK Reach: US Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	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)	
US	1757	Max WS	Ex-100yr	1944.87	975.43	987.45		987.46	0.000075	0.88	2238.70	301.49	0.05
US	1757	Max WS	Ex10yr	1187.29	975.43	986.86		986.87	0.000035	0.58	2065.36	288.42	0.03
US	1757	Max WS	Ex2yr	524.74	975.43	985.50		985.51	0.000013	0.32	1687.56	267.30	0.02
US	1757	Max WS	Prop100yr Oct2022	1888.06	975.43	986.81		986.83	0.000045	1.03	2050.27	287.59	0.06
US	1757	Max WS	Prop10yr Oct2022	1134.99	975.43	985.14		985.15	0.000034	0.78	1592.25	261.93	0.05
US	1757	Max WS	Prop2yr Oct2022	496.90	975.43	982.29		982.30	0.000032	0.57	912.96	211.67	0.04
US	1687	Max WS	Ex-100yr	1945.44	973.72	987.45		987.46	0.000051	0.77	2505.55	294.19	0.04
US	1687	Max WS	Ex10yr	1187.62	973.72	986.86		986.87	0.000023	0.50	2336.64	281.25	0.03
US	1687	Max WS	Ex2yr	524.89	973.72	985.50		985.50	0.000008	0.27	1963.17	268.46	0.02
US	1687	Max WS	Prop100yr Oct2022	1888.65	973.98	986.81		986.82	0.000026	0.86	2423.53	280.98	0.04
US	1687	Max WS	Prop10yr Oct2022	1135.35	973.98	985.14		985.15	0.000017	0.63	1968.13	265.00	0.04
US	1687	Max WS	Prop2yr Oct2022	497.23	973.98	982.29		982.30	0.000012	0.42	1259.27	229.18	0.03
US	1650			Lat Struct									
US	1627	Max WS	Prop100yr Oct2022	1888.64	973.00	986.76		986.83	0.000125	2.10	883.30	318.63	0.10
US	1627	Max WS	Prop10yr Oct2022	1135.26	973.00	985.12		985.15	0.000070	1.44	775.00	307.57	0.07
US	1627	Max WS	Prop2yr Oct2022	496.98	973.00	982.29		982.30	0.000034	0.84	587.96	283.04	0.05
US	1622	Max WS	Prop100yr Oct2022	1888.64	973.00	980.17		980.44	0.001198	4.19	448.13	225.78	0.28
US	1622	Max WS	Prop10yr Oct2022	1135.26	973.00	978.03		978.24	0.001528	3.72	306.98	180.11	0.30
US	1622	Max WS	Prop2yr Oct2022	496.98	973.00	975.91		976.05	0.002198	3.05	167.19	128.29	0.32
US	1617	Max WS	Ex-100yr	1090.14	980.50	987.11		987.54	0.006820	5.30	209.66	82.14	0.56
US	1617	Max WS	Ex10yr	805.70	980.50	986.43		986.86	0.009888	5.28	154.37	78.84	0.64
US	1617	Max WS	Ex2yr	513.86	980.50	985.22		985.82	0.005405	6.21	82.72	61.10	0.52
US	1617	Max WS	Prop100yr Oct2022	1888.66	973.00	979.73		980.46	0.003511	6.85	275.66	201.07	0.47
US	1617	Max WS	Prop10yr Oct2022	1135.27	973.00	977.69		978.25	0.004376	5.97	190.13	144.56	0.49
US	1617	Max WS	Prop2yr Oct2022	496.99	973.00	975.70		976.04	0.005781	4.66	106.54	120.72	0.52
US	1600			Culvert									
US	1575	Max WS	Ex-100yr	956.28	979.90	983.81	984.35	986.61	0.028627	13.43	71.18	37.77	1.22
US	1575	Max WS	Ex10yr	743.25	979.90	983.44	983.67	985.52	0.024284	11.56	64.29	37.14	1.11
US	1575	Max WS	Ex2yr	511.93	979.90	982.67	982.88	984.33	0.027522	10.34	49.51	35.66	1.13
US	1575	Max WS	Prop100yr Oct2022	1888.66	972.28	974.34	976.25	981.89	0.176874	22.05	85.64	107.83	2.75
US	1575	Max WS	Prop10yr Oct2022	1135.27	972.28	973.81	975.12	978.85	0.177853	18.02	63.00	101.10	2.62
US	1575	Max WS	Prop2yr Oct2022	496.97	972.28	973.23	973.94	975.82	0.175108	12.89	38.56	93.85	2.39
US	1550			Lat Struct									
US	1514	Max WS	Ex-100yr	864.37	977.00	985.17		985.39	0.001111	3.81	251.67	63.48	0.26
US	1514	Max WS	Ex10yr	623.31	977.00	984.40		984.55	0.000884	3.14	212.02	46.00	0.22
US	1514	Max WS	Ex2yr	451.54	977.00	983.15		983.28	0.001039	2.92	160.11	37.94	0.23
US	1514	Max WS	Prop100yr Oct2022	1888.68	968.08	973.42		973.63	0.001652	4.01	523.78	135.94	0.31
US	1514	Max WS	Prop10yr Oct2022	1135.31	968.08	972.00		972.18	0.002047	3.61	343.20	119.49	0.33
US	1514	Max WS	Prop2yr Oct2022	496.73	968.08	970.66		970.76	0.001963	2.63	198.91	96.19	0.30
US	1486	Max WS	Ex-100yr	730.27	975.96	977.87	979.50	984.34	0.218602	20.41	35.78	22.69	2.86
US	1486	Max WS	Ex10yr	532.49	975.96	977.56	978.89	982.86	0.220795	18.46	28.84	21.51	2.81
US	1486	Max WS	Ex2yr	378.36	975.96	977.32	978.37	981.23	0.196941	15.86	23.86	20.62	2.60
US	1486	Max WS	Prop100yr Oct2022	1950.91	967.82	973.03		973.43	0.003269	5.54	396.92	108.45	0.43
US	1486	Max WS	Prop10yr Oct2022	1171.35	967.82	971.53		971.93	0.005159	5.49	241.46	98.41	0.51
US	1486	Max WS	Prop2yr Oct2022	513.54	967.82	970.15		970.49	0.007704	4.84	117.23	78.41	0.58
US	1472	Max WS	Ex-100yr	739.40	975.14	979.16		979.61	0.011074	5.31	139.26	66.55	0.49
US	1472	Max WS	Ex10yr	475.29	975.14	978.53		978.88	0.011452	4.76	101.02	55.19	0.48
US	1472	Max WS	Ex2yr	322.38	975.14	977.91		978.24	0.014967	4.67	69.83	43.11	0.53
US	1472	Max WS	Prop100yr Oct2022	1950.68	966.88	972.94		973.36	0.003029	5.97	388.65	99.38	0.43
US	1472	Max WS	Prop10yr Oct2022	1171.27	966.88	971.43		971.83	0.004116	5.74	246.41	89.13	0.48
US	1472	Max WS	Prop2yr Oct2022	513.56	966.88	970.07		970.36	0.004503	4.71	131.62	78.94	0.47
US	1410.57	Max WS	Ex-100yr	729.67	964.79	978.72		978.73	0.000026	0.52	1481.83	209.19	0.03
US	1410.57	Max WS	Ex10yr	475.17	964.79	978.04		978.04	0.000015	0.37	1343.81	195.57	0.02
US	1410.57	Max WS	Ex2yr	322.08	964.79	977.23		977.23	0.000009	0.28	1192.08	178.94	0.02
US	1410.57	Max WS	Prop100yr Oct2022	1949.68	965.93	970.35	970.60	972.01	0.028833	10.35	188.39	74.13	1.14
US	1410.57	Max WS	Prop10yr Oct2022	1171.29	965.93	969.86		970.77	0.019530	7.65	153.02	70.77	0.92
US	1410.57	Max WS	Prop2yr Oct2022	475.83	965.93	968.89		969.34	0.016362	5.39	88.20	60.47	0.79
US	1400			Lat Struct									
US	1336.86	Max WS	Ex-100yr	2042.98	962.90	978.69		978.71	0.000081	1.00	2143.25	249.95	0.05
US	1336.86	Max WS	Ex10yr	1244.32	962.90	978.03		978.03	0.000037	0.65	1981.82	236.27	0.03
US	1336.86	Max WS	Ex2yr	544.08	962.90	977.23		977.23	0.000010	0.31	1796.73	227.42	0.02
US	1336.86	Max WS	Prop100yr Oct2022	1951.85	964.27	969.05	968.99	970.20	0.021305	8.59	227.33	94.52	0.98
US	1336.86	Max WS	Prop10yr Oct2022	1171.86	964.27	968.23	968.27	969.16	0.027305	7.72	151.87	89.48	1.04
US	1336.86	Max WS	Prop2yr Oct2022	513.84	964.27	967.12	967.29	968.00	0.033229	7.51	68.47	48.49	1.11
US	1263.14	Max WS	Ex-100yr	2042.16	963.00	978.69		978.70	0.000063	0.88	2432.56	288.43	0.04
US	1263.14	Max WS	Ex10yr	1244.01	963.00	978.03		978.03	0.000029	0.57	2246.47	269.27	0.03
US	1263.14	Max WS	Ex2yr	544.01	963.00	977.23		977.23	0.000007	0.28	2038.14	253.31	0.02
US	1263.14	Max WS	Prop100yr Oct2022	1952.14	962.91	968.77		969.22	0.005002	5.38	362.69	102.23	0.50
US	1263.14	Max WS	Prop10yr Oct2022	1172.00	962.91	967.67		968.00	0.005305	4.60	254.83	95.27	0.50

HEC-RAS River: GreenSprings CK Reach: US Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	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)	
US	1263.14	Max WS	Prop2yr Oct2022	513.94	962.91	966.60		966.76	0.004739	3.30	155.82	88.39	0.44
US	1190	Max WS	Prop100yr Oct2022	1952.05	962.27	968.07	967.08	968.74	0.008132	6.57	297.00	89.12	0.63
US	1190	Max WS	Prop10yr Oct2022	1171.96	962.27	966.95	966.28	967.48	0.009544	5.82	201.49	82.13	0.65
US	1190	Max WS	Prop2yr Oct2022	513.92	962.27	965.58	965.30	966.03	0.016847	5.35	96.10	68.20	0.79
US	1189.43	Max WS	Ex-100yr	2041.64	965.12	978.68	968.88	978.70	0.000094	0.96	2225.32	306.63	0.05
US	1189.43	Max WS	Ex10yr	1243.96	965.12	978.02	968.14	978.03	0.000046	0.64	2027.75	292.52	0.04
US	1189.43	Max WS	Ex2yr	543.97	965.12	977.23	967.23	977.23	0.000012	0.31	1804.93	268.16	0.02
US	1180			Inl Struct									
US	1170	Max WS	Prop100yr Oct2022	1952.05	961.00	966.58		967.13	0.008432	5.71	337.94	106.81	0.54
US	1170	Max WS	Prop10yr Oct2022	1171.96	961.00	965.53		965.93	0.010631	5.07	231.40	96.92	0.57
US	1170	Max WS	Prop2yr Oct2022	513.93	961.00	964.15		964.48	0.016406	4.61	111.42	71.77	0.65
US	1115.71	Max WS	Ex-100yr	2041.64	957.96	961.35	962.84	965.74	0.097926	18.19	136.48	67.38	1.80
US	1115.71	Max WS	Ex10yr	1243.97	957.96	960.66	961.68	964.08	0.105246	16.01	92.98	57.92	1.79
US	1115.71	Max WS	Ex2yr	543.97	957.96	959.79	960.50	962.10	0.119485	12.80	48.46	43.99	1.78
US	1115.71	Max WS	Prop100yr Oct2022	1952.06	957.96	961.28	962.73	965.58	0.099381	18.04	131.57	66.58	1.81
US	1115.71	Max WS	Prop10yr Oct2022	1171.92	957.96	960.57	961.58	963.97	0.109314	15.91	87.73	56.46	1.82
US	1115.71	Max WS	Prop2yr Oct2022	513.92	957.96	959.77	960.44	961.92	0.113736	12.36	47.34	43.56	1.73
US	1042.00	Max WS	Ex-100yr	2041.19	953.90	959.74		960.97	0.012592	9.67	265.00	72.83	0.71
US	1042.00	Max WS	Ex10yr	1243.89	953.90	958.40		959.38	0.013793	8.47	175.95	59.91	0.71
US	1042.00	Max WS	Ex2yr	543.93	953.90	957.03		957.55	0.011645	6.06	102.59	48.00	0.62
US	1042.00	Max WS	Prop100yr Oct2022	1952.01	953.90	959.66		960.83	0.012260	9.45	258.76	72.02	0.70
US	1042.00	Max WS	Prop10yr Oct2022	1171.89	953.90	958.25		959.21	0.014071	8.35	167.00	58.45	0.72
US	1042.00	Max WS	Prop2yr Oct2022	513.91	953.90	957.03		957.49	0.010506	5.75	102.21	47.93	0.58
US	968.29	Max WS	Ex-100yr	2040.23	953.00	959.43		960.11	0.006682	7.53	343.68	98.52	0.53
US	968.29	Max WS	Ex10yr	1243.83	953.00	957.95		958.53	0.006808	6.36	219.01	65.23	0.51
US	968.29	Max WS	Ex2yr	543.89	953.00	956.70		956.94	0.004165	4.08	144.46	55.12	0.38
US	968.29	Max WS	Prop100yr Oct2022	1951.92	953.00	959.34		960.00	0.006556	7.39	335.30	97.76	0.52
US	968.29	Max WS	Prop10yr Oct2022	1171.84	953.00	957.81		958.37	0.006766	6.22	209.93	63.82	0.51
US	968.29	Max WS	Prop2yr Oct2022	513.90	953.00	956.73		956.94	0.003599	3.81	146.09	55.30	0.35
US	894.57	Max WS	Ex-100yr	2040.79	952.90	957.40	957.34	959.19	0.023865	11.26	212.27	71.20	0.94
US	894.57	Max WS	Ex10yr	993.97	952.90	956.90		957.45	0.008533	6.22	180.50	57.51	0.55
US	894.57	Max WS	Ex2yr	381.08	952.90	956.42		956.53	0.001984	2.75	154.05	54.36	0.26
US	894.57	Max WS	Prop100yr Oct2022	1951.26	952.90	957.25	957.07	959.03	0.024649	11.18	201.98	65.94	0.95
US	894.57	Max WS	Prop10yr Oct2022	1045.18	952.90	956.92		957.53	0.009229	6.49	181.92	57.73	0.57
US	894.57	Max WS	Prop2yr Oct2022	513.87	952.90	956.48		956.68	0.003385	3.64	157.47	54.78	0.34
US	820.86	Max WS	Ex-100yr	1038.74	952.97	956.81		957.02	0.003301	3.80	305.19	103.21	0.34
US	820.86	Max WS	Ex10yr	946.97	952.97	956.77		956.95	0.002852	3.50	300.78	101.54	0.32
US	820.86	Max WS	Ex2yr	376.74	952.97	956.39		956.42	0.000644	1.55	264.13	90.49	0.15
US	820.86	Max WS	Prop100yr Oct2022	1060.09	952.97	956.81		957.03	0.003434	3.87	305.33	103.27	0.35
US	820.86	Max WS	Prop10yr Oct2022	1021.78	952.97	956.78		956.99	0.003275	3.76	302.30	101.95	0.34
US	820.86	Max WS	Prop2yr Oct2022	513.86	952.97	956.43		956.49	0.001147	2.09	268.11	91.02	0.20
US	747.14	Max WS	Ex-100yr	2041.68	948.87	952.79	953.46	954.94	0.052245	14.11	196.24	111.83	1.33
US	747.14	Max WS	Ex10yr	1244.57	948.87	952.01	952.76	954.62	0.087371	15.43	115.19	93.62	1.65
US	747.14	Max WS	Ex2yr	543.87	948.87	951.16	951.96	954.29	0.136390	15.01	46.97	61.46	1.93
US	747.14	Max WS	Prop100yr Oct2022	1952.08	948.87	952.71	953.38	954.89	0.054979	14.24	186.73	109.86	1.36
US	747.14	Max WS	Prop10yr Oct2022	1172.71	948.87	951.93	952.71	954.61	0.092593	15.57	107.78	91.61	1.69
US	747.14	Max WS	Prop2yr Oct2022	513.83	948.87	951.15	951.90	954.03	0.126558	14.38	46.07	61.00	1.86
US	673.43	Max WS	Ex-100yr	2041.53	944.91	952.06		952.34	0.001830	5.18	521.84	127.01	0.34
US	673.43	Max WS	Ex10yr	1244.32	944.91	950.28		950.58	0.002832	5.31	314.80	108.52	0.41
US	673.43	Max WS	Ex2yr	543.83	944.91	948.35		948.71	0.005204	5.32	125.85	70.48	0.51
US	673.43	Max WS	Prop100yr Oct2022	1951.82	944.91	951.91		952.19	0.001858	5.15	503.00	125.62	0.35
US	673.43	Max WS	Prop10yr Oct2022	1172.44	944.91	950.07		950.39	0.003127	5.43	291.94	107.04	0.43
US	673.43	Max WS	Prop2yr Oct2022	513.85	944.91	948.26		948.61	0.005264	5.25	119.29	66.06	0.51
US	599.71	Max WS	Ex-100yr	2041.42	943.00	945.57	947.24	951.00	0.104269	19.86	116.89	66.27	2.19
US	599.71	Max WS	Ex10yr	1244.20	943.00	945.05	946.03	948.60	0.088916	15.77	86.46	52.77	1.95
US	599.71	Max WS	Ex2yr	543.82	943.00	944.38	944.92	946.13	0.073090	10.96	53.15	46.83	1.65
US	599.71	Max WS	Prop100yr Oct2022	1951.86	943.00	945.55	947.02	950.59	0.097279	19.11	115.95	65.78	2.12
US	599.71	Max WS	Prop10yr Oct2022	1172.39	943.00	945.01	946.03	948.32	0.085239	15.23	84.22	52.31	1.90
US	599.71	Max WS	Prop2yr Oct2022	513.88	943.00	944.29	944.86	946.15	0.085347	11.27	48.65	45.96	1.77
US	526.00	Max WS	Ex-100yr	2041.40	939.00	943.88	944.28	945.70	0.021287	13.12	250.61	92.83	1.09
US	526.00	Max WS	Ex10yr	1244.13	939.00	943.28	943.23	944.38	0.014823	9.96	197.83	83.20	0.89
US	526.00	Max WS	Ex2yr	543.63	939.00	942.31		942.85	0.009624	6.64	123.75	68.86	0.68
US	526.00	Max WS	Prop100yr Oct2022	1951.79	939.00	943.80	944.15	945.57	0.020939	12.87	243.66	91.32	1.08
US	526.00	Max WS	Prop10yr Oct2022	1172.34	939.00	943.22	943.12	944.25	0.014155	9.62	192.48	82.24	0.86
US	526.00	Max WS	Prop2yr Oct2022	513.66	939.00	942.26		942.77	0.009293	6.44	119.96	67.93	0.67
US	452.29	Max WS	Ex-100yr	2041.33	937.73	943.98		944.25	0.001942	4.87	567.51	135.67	0.35
US	452.29	Max WS	Ex10yr	1243.98	937.73	943.27		943.41	0.001218	3.55	473.45	128.89	0.27
US	452.29	Max WS	Ex2yr	543.59	937.73	942.22		942.27	0.000562	2.09	345.73	114.73	0.18
US	452.29	Max WS	Prop100yr Oct2022	1951.65	937.73	943.89		944.15	0.001891	4.76	555.16	134.78	0.34
US	452.29	Max WS	Prop10yr Oct2022	1172.24	937.73	943.19		943.33	0.001145	3.41	464.13	128.17	0.26

HEC-RAS River: GreenSprings CK Reach: US Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	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)	
US	452.29	Max WS	Prop2yr Oct2022	513.68	937.73	942.16		942.20	0.000533	2.02	338.26	113.69	0.17
US	378.57	Max WS	Ex-100yr	2041.20	934.90	944.02		944.10	0.000366	2.73	1224.60	237.48	0.16
US	378.57	Max WS	Ex10yr	1243.93	934.90	943.28		943.32	0.000203	1.92	1053.00	228.74	0.12
US	378.57	Max WS	Ex2yr	543.52	934.90	942.22		942.24	0.000073	1.05	821.82	207.14	0.07
US	378.57	Max WS	Prop100yr Oct2022	1951.56	934.90	943.93		944.00	0.000351	2.65	1202.11	236.00	0.16
US	378.57	Max WS	Prop10yr Oct2022	1172.13	934.90	943.21		943.25	0.000188	1.84	1036.07	227.91	0.11
US	378.57	Max WS	Prop2yr Oct2022	513.64	934.90	942.14		942.15	0.000068	1.01	805.33	205.78	0.07
US	281			Culvert									
US	231.14	Max WS	Ex-100yr	2039.10	931.00	935.16	936.59	939.98	0.068056	17.79	116.35	137.05	1.82
US	231.14	Max WS	Ex10yr	1243.40	931.00	934.39	935.41	937.80	0.071943	14.96	84.64	129.35	1.78
US	231.14	Max WS	Ex2yr	543.50	931.00	933.74	934.11	935.13	0.046381	9.50	57.98	120.23	1.35
US	231.14	Max WS	Prop100yr Oct2022	1946.57	931.00	934.97	936.47	940.04	0.078445	18.26	108.35	135.41	1.93
US	231.14	Max WS	Prop10yr Oct2022	1171.84	931.00	934.37	935.29	937.46	0.065930	14.24	83.83	129.12	1.70
US	231.14	Max WS	Prop2yr Oct2022	513.63	931.00	933.76	934.04	934.96	0.038946	8.81	59.11	120.70	1.24
US	157.43	Max WS	Ex-100yr	2040.92	928.93	931.34	932.31	934.58	0.079248	15.08	142.72	114.30	1.85
US	157.43	Max WS	Ex10yr	1243.64	928.93	930.97	931.55	932.94	0.064037	11.87	112.17	110.76	1.61
US	157.43	Max WS	Ex2yr	543.47	928.93	930.40	930.74	931.53	0.063089	9.00	66.65	102.45	1.49
US	157.43	Max WS	Prop100yr Oct2022	1950.51	928.93	931.30	932.23	934.40	0.077541	14.74	139.72	113.97	1.82
US	157.43	Max WS	Prop10yr Oct2022	1171.85	928.93	930.93	931.47	932.79	0.062389	11.53	108.98	110.17	1.58
US	157.43	Max WS	Prop2yr Oct2022	513.64	928.93	930.37	930.70	931.47	0.064130	8.88	63.88	101.90	1.49
US	83.71	Max WS	Ex-100yr	2040.91	925.30	929.12	929.52	930.73	0.025264	11.48	210.61	107.32	1.12
US	83.71	Max WS	Ex10yr	1243.74	925.30	928.44	928.75	929.73	0.026635	10.10	145.52	89.00	1.11
US	83.71	Max WS	Ex2yr	543.48	925.30	927.57	927.79	928.44	0.029144	8.00	76.93	67.99	1.08
US	83.71	Max WS	Prop100yr Oct2022	1950.89	925.30	929.00	929.44	930.66	0.026652	12.28	198.45	104.17	1.17
US	83.71	Max WS	Prop10yr Oct2022	1172.01	925.30	928.33	928.68	929.67	0.028416	10.98	135.72	87.42	1.16
US	83.71	Max WS	Prop2yr Oct2022	513.65	925.30	927.48	927.78	928.46	0.031008	8.97	70.84	65.72	1.14
US	10	Max WS	Ex-100yr	2040.88	922.34	925.62	926.44	928.20	0.048405	15.64	174.11	108.60	1.55
US	10	Max WS	Ex10yr	1243.70	922.34	924.99	925.74	927.26	0.053040	14.12	112.92	83.28	1.56
US	10	Max WS	Ex2yr	543.46	922.34	924.19	924.79	926.07	0.064307	12.07	55.12	61.12	1.62
US	10	Max WS	Prop100yr Oct2022	1950.81	922.34	925.52	926.41	928.20	0.052056	15.88	163.39	104.83	1.60
US	10	Max WS	Prop10yr Oct2022	1171.94	922.34	924.95	925.65	927.09	0.050803	13.67	109.58	81.82	1.53
US	10	Max WS	Prop2yr Oct2022	513.65	922.34	924.26	924.73	925.73	0.048677	10.75	59.01	63.40	1.41

Appendix D: LID Results

El Dorado County LID Calculator		
Shed Name	GEN01	
Climate station	PLACERVILLE	
Saturated hydraulic conductivity	0.03	in/hr
Impervious area	1.458011938	acres
Design Storm	1.13	inches
Method	Design Storm	

LID BMP Types	**Area Needed (acres)**	
Bioretention Cell - 18" Soil - 12" Gravel Storage	0.10	ac
Bioretention Cell - 18" Soil - 24" Gravel Storage	0.08	ac
Bioretention Cell - 18" Soil - 36" Gravel Storage	0.06	ac
Bioretention Cell - 24" Soil - 12" Gravel Storage	0.09	ac
Bioretention Cell - 24" Soil - 24" Gravel Storage	0.07	ac
Bioretention Cell - 24" Soil - 36" Gravel Storage	0.06	ac
Bioretention Cell - Soil Depth Varies5 - No Gravel Storage	0.83	ac
Infiltration Basin - Vegetated	1.69	ac
Infiltration Gallery	0.30	ac
Infiltration Trench	1.11	ac
Overland Flow no amendment	N/A	
Porous Pavement	1.16	ac
Strip, Amended 6"	2.19	ac
Strip, Amended 12"	0.60	ac
Strip, Amended 18"	0.34	ac
Swale, Amended 6"6	2.19	ac
Swale, Amended 12"6	0.60	ac
Swale, Amended 18"6	0.34	ac
Capture and Use Storage7	5507.58	cf

*Note: Gen-01-DS and Gen-01-B contains existing downstream impervious not used in this calculation.

El Dorado County LID Calculator		
Shed Name	GEN03	
Climate station	PLACERVILLE	
Saturated hydraulic conductivity	0.03	in/hr
Impervious area	5.631016988	acres
Design Storm	1.13	inches
Method	Design Storm	

LID BMP Types	**Area Needed (acres)**	
Bioretention Cell - 18" Soil - 12" Gravel Storage	0.39	ac
Bioretention Cell - 18" Soil - 24" Gravel Storage	0.30	ac
Bioretention Cell - 18" Soil - 36" Gravel Storage	0.25	ac
Bioretention Cell - 24" Soil - 12" Gravel Storage	0.35	ac
Bioretention Cell - 24" Soil - 24" Gravel Storage	0.28	ac
Bioretention Cell - 24" Soil - 36" Gravel Storage	0.23	ac
Bioretention Cell - Soil Depth Varies5 - No Gravel Storage	3.21	ac
Infiltration Basin - Vegetated	6.52	ac
Infiltration Gallery	1.16	ac
Infiltration Trench	4.30	ac
Overland Flow no amendment	N/A	
Porous Pavement	4.47	ac
Strip, Amended 6"	8.47	ac
Strip, Amended 12"	2.30	ac
Strip, Amended 18"	1.33	ac
Swale, Amended 6"6	8.47	ac
Swale, Amended 12"6	2.30	ac
Swale, Amended 18"6	1.33	ac
Capture and Use Storage7	21270.92	cf

El Dorado County LID Calculator		
Shed Name	GEN04	
Climate station	PLACERVILLE	
Saturated hydraulic conductivity	0.03	in/hr
Impervious area	7.956726354	acres
Design Storm	1.13	inches
Method	Design Storm	

LID BMP Types	**Area Needed (acres)**	
Bioretention Cell - 18" Soil - 12" Gravel Storage	0.55	ac
Bioretention Cell - 18" Soil - 24" Gravel Storage	0.43	ac
Bioretention Cell - 18" Soil - 36" Gravel Storage	0.35	ac
Bioretention Cell - 24" Soil - 12" Gravel Storage	0.50	ac
Bioretention Cell - 24" Soil - 24" Gravel Storage	0.39	ac
Bioretention Cell - 24" Soil - 36" Gravel Storage	0.33	ac
Bioretention Cell - Soil Depth Varies5 - No Gravel Storage	4.53	ac
Infiltration Basin - Vegetated	9.22	ac
Infiltration Gallery	1.64	ac
Infiltration Trench	6.07	ac
Overland Flow no amendment	N/A	
Porous Pavement	6.31	ac
Strip, Amended 6"	11.97	ac
Strip, Amended 12"	3.25	ac
Strip, Amended 18"	1.88	ac
Swale, Amended 6"6	11.97	ac
Swale, Amended 12"6	3.25	ac
Swale, Amended 18"6	1.88	ac
Capture and Use Storage7	30056.18	cf

El Dorado County LID Calculator		
Shed Name	GEN05	
Climate station	PLACERVILLE	
Saturated hydraulic conductivity	0.03	in/hr
Impervious area	9.89	acres
Design Storm	1.13	inches
Method	Design Storm	

LID BMP Types	Area Needed (acres)	
Bioretention Cell - 18" Soil - 12" Gravel Storage	0.68	ac
Bioretention Cell - 18" Soil - 24" Gravel Storage	0.53	ac
Bioretention Cell - 18" Soil - 36" Gravel Storage	0.43	ac
Bioretention Cell - 24" Soil - 12" Gravel Storage	0.62	ac
Bioretention Cell - 24" Soil - 24" Gravel Storage	0.49	ac
Bioretention Cell - 24" Soil - 36" Gravel Storage	0.41	ac
Bioretention Cell - Soil Depth Varies5 - No Gravel Storage	5.63	ac
Infiltration Basin - Vegetated	11.46	ac
Infiltration Gallery	2.04	ac
Infiltration Trench	7.55	ac
Overland Flow no amendment	N/A	
Porous Pavement	7.85	ac
Strip, Amended 6"	14.88	ac
Strip, Amended 12"	4.04	ac
Strip, Amended 18"	2.34	ac
Swale, Amended 6"6	14.88	ac
Swale, Amended 12"6	4.04	ac
Swale, Amended 18"6	2.34	ac
Capture and Use Storage7	37360.13	cf

El Dorado County LID Calculator		
Shed Name	GEN06 A & C	
Climate station	PLACERVILLE	
Saturated hydraulic conductivity	0.03	in/hr
Impervious area	16.57	acres
Design Storm	1.13	inches
Method	Design Storm	

LID BMP Types	Area Needed (acres)	
Bioretention Cell - 18" Soil - 12" Gravel Storage	1.15	ac
Bioretention Cell - 18" Soil - 24" Gravel Storage	0.89	ac
Bioretention Cell - 18" Soil - 36" Gravel Storage	0.72	ac
Bioretention Cell - 24" Soil - 12" Gravel Storage	1.04	ac
Bioretention Cell - 24" Soil - 24" Gravel Storage	0.81	ac
Bioretention Cell - 24" Soil - 36" Gravel Storage	0.68	ac
Bioretention Cell - Soil Depth Varies5 - No Gravel Storage	9.43	ac
Infiltration Basin - Vegetated	19.19	ac
Infiltration Gallery	3.42	ac
Infiltration Trench	12.65	ac
Overland Flow no amendment	N/A	
Porous Pavement	13.15	ac
Strip, Amended 6"	24.93	ac
Strip, Amended 12"	6.77	ac
Strip, Amended 18"	3.92	ac
Swale, Amended 6"6	24.93	ac
Swale, Amended 12"6	6.77	ac
Swale, Amended 18"6	3.92	ac
Capture and Use Storage7	62587.39	cf

*Area can be split between both basins

El Dorado County LID Calculator		
Shed Name	GEN06 B	
Climate station	PLACERVILLE	
Saturated hydraulic conductivity	0.03	in/hr
Impervious area	10.38	acres
Design Storm	1.13	inches
Method	Design Storm	

LID BMP Types	Area Needed (acres)	
Bioretention Cell - 18" Soil - 12" Gravel Storage	0.72	ac
Bioretention Cell - 18" Soil - 24" Gravel Storage	0.56	ac
Bioretention Cell - 18" Soil - 36" Gravel Storage	0.45	ac
Bioretention Cell - 24" Soil - 12" Gravel Storage	0.65	ac
Bioretention Cell - 24" Soil - 24" Gravel Storage	0.51	ac
Bioretention Cell - 24" Soil - 36" Gravel Storage	0.43	ac
Bioretention Cell - Soil Depth Varies5 - No Gravel Storage	5.91	ac
Infiltration Basin - Vegetated	12.03	ac
Infiltration Gallery	2.14	ac
Infiltration Trench	7.93	ac
Overland Flow no amendment	N/A	
Porous Pavement	8.24	ac
Strip, Amended 6"	15.62	ac
Strip, Amended 12"	4.24	ac
Strip, Amended 18"	2.46	ac
Swale, Amended 6"6	15.62	ac
Swale, Amended 12"6	4.24	ac
Swale, Amended 18"6	2.46	ac
Capture and Use Storage7	39222.40	cf

El Dorado County LID Calculator		
Shed Name	GEN08	
Climate station	PLACERVILLE	
Saturated hydraulic conductivity	0.03	in/hr
Impervious area	8.62	acres
Design Storm	1.13	inches
Method	Design Storm	

LID BMP Types	**Area Needed (acres)**	
Bioretention Cell - 18" Soil - 12" Gravel Storage	0.60	ac
Bioretention Cell - 18" Soil - 24" Gravel Storage	0.46	ac
Bioretention Cell - 18" Soil - 36" Gravel Storage	0.38	ac
Bioretention Cell - 24" Soil - 12" Gravel Storage	0.54	ac
Bioretention Cell - 24" Soil - 24" Gravel Storage	0.42	ac
Bioretention Cell - 24" Soil - 36" Gravel Storage	0.36	ac
Bioretention Cell - Soil Depth Varies5 - No Gravel Storage	4.90	ac
Infiltration Basin - Vegetated	9.98	ac
Infiltration Gallery	1.78	ac
Infiltration Trench	6.58	ac
Overland Flow no amendment	N/A	
Porous Pavement	6.84	ac
Strip, Amended 6"	12.96	ac
Strip, Amended 12"	3.52	ac
Strip, Amended 18"	2.04	ac
Swale, Amended 6"6	12.96	ac
Swale, Amended 12"6	3.52	ac
Swale, Amended 18"6	2.04	ac
Capture and Use Storage7	32548.03	cf