2008 Lake Barcroft Inundation Mapping Study

Fairfax County, Virginia

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DECEMBER 17, 2008

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Executive Summary

This report summarizes a probable maximum flood (PMF) inundation zone mapping study completed by GKY & Associates, which was initiated by the Lake Barcroft Watershed and Improvement District (LBWID). The study involved using hydrologic and hydraulic models to simulate and map the effect of four unique meteorological and operational scenarios on Lake Barcroft and entities downstream of Lake Barcroft Dam. Figure 1 shows the location of Lake Barcroft within Fairfax County, Virginia and Figure 2 shows an aerial photograph of Lake Barcroft and its surrounding communities.

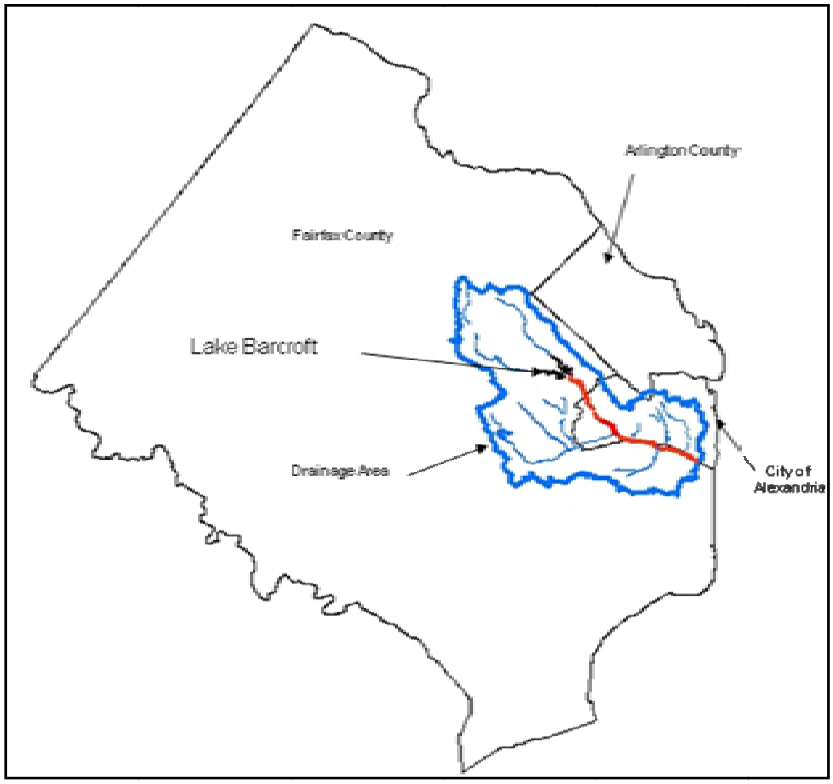


Figure 1. Lake Barcroft is located in Fairfax County, Virginia.

GKY used hydrologic and hydraulic modeling to accurately map the effects of the PMF event. The majority of the data needed for this modeling was provided by the United States Army Corps of Engineers (USACE). The LBWID provided the necessary information for Lake Barcroft Dam and its operation. GKY worked in conjunction with the LBWID to focus the study on scenarios that meet new regulation[1] as well as the interests of the LBWID. After completing the necessary modeling, GKY analyzed all model output to verify results and ensure model accuracy. Once quality checks were performed, GKY mapped the scenarios to digitize the hydraulic output.

[1] Based on Virginia Soil and Water Conservation Board, Chapter 20, Impounding Structure Regulations (§ 4 VAC 50-20-54).

Figure 2. Lake Barcroft aerial imagery.

USACE modeling software was utilized for both the hydrologic and hydraulic modeling. The USACE employs its Hydrologic Engineering Center (HEC) to develop modeling software for hydrologic engineering. HEC's Hydrologic Modeling System (HEC-HMS) was used for all hydrologic modeling and HEC's River Analysis System (HEC-RAS) was used for all hydraulic modeling in this study. Inundation mapping was accomplished using Arc-GIS (Geographical Information System), which is developed by the Environmental Systems Institute (ESRI). Another USACE software HEC-GeoRAS was utilized in conjunction with Arc-GIS to generate flood boundaries.

The following report will document, in detail, the methodology and process GKY used to complete this inundation mapping study. All necessary model input and results, to perform mapping, can be found in the report and the appendices.

Figure 3. Example inundation map.

Lake Barcroft Dam

Lake Barcroft is located in Fairfax County, Virginia and is owned and operated by the surrounding Lake Barcroft Association and the LBWID. The dam is oriented on the southeast corner of the lake and releases flow to Holmes Run which joins with Cameron Run and then the Potomac River further downstream. The dam is located just below the confluence of Tripps Run and Holmes Run.

Lake Barcroft is a 135 acre lake built in the early 20th Century. Lake Barcroft Dam was originally constructed as an earthen embankment and masonry structure. In 1972, Hurricane Agnes heavily eroded the earthen embankment section of the dam which acts as an emergency earthen fuse plug during large storm events, and the dam required reconstruction. The earthen embankment was rebuilt and a large bascule gate was added atop a masonry section of the dam to regulate Lake Barcroft's pool elevation more effectively. Figure 4 shows an aerial view of the dam.

Figure 4. Aerial image of Lake Barcroft Dam.

The dam is composed of four distinct structural parts as shown in Appendix A. The far west side (i.e. the left side looking upstream) of the structure is an earthen dam that acts as an emergency earthen fuse plug for large storm events. The earthen section of the dam ties into a concrete west abutment that spans 93.5' and is at elevation 211.5'. The main bascule gate spillway, control tower, and emergency gates sit atop the masonry section of the dam. The main spillway ties into the west abutment, spans 151', is at elevation 209.1' when closed, and elevation 197.1' when open. The main bascule gate is operated with four large hydraulic rams, which allow the gate to open and close as the pool level varies. Atop the eastern side of the masonry structure is the control tower and emergency gates with a span of 48' and weir elevation 208.3'. The masonry structure ties into the concrete east abutment with a span of 121' and elevation of 211.5'. The east abutment is keyed into bedrock. Figure 5 shows the bascule gate atop the masonry structure.

Figure 5. Bascule gate and masonry structure.

Hydrology

The hydrologic model selected for this study was a HEC-HMS model for the Cameron Run watershed, which was developed in 2007 by the USACE office in Baltimore, MD for a Federal Emergency Management Agency (FEMA) study. For the purpose of this document, the USACE HEC-HMS model will be referred to as the "source model". GKY received the source model in May 2007, and reviewed the parameterization where it related to the Lake Barcroft watershed. Seventy-five of the 354 elements (i.e. subbasins, reaches, junctions, and reservoirs) in the model are upstream of Lake Barcroft, including Fairview Lake (a.k.a. Reservoir 2A)[2]. The Corps calibrated and validated the model using historic storm and streamflow data. This source model was deemed a satisfactory base model for this level study with few changes needed. However, GKY made changes to the source model to better represent the operation of Lake Barcroft during extreme flooding events. For the purpose of this document, we will refer to the modified source model as the "modified GKY model". Changes to the source model included updating Lake Barcroft's storage and spillway parameterization as well as changing modeling methodology of junction points downstream. Figure 6 shows the extents of the source model that was used in the hydrologic study.

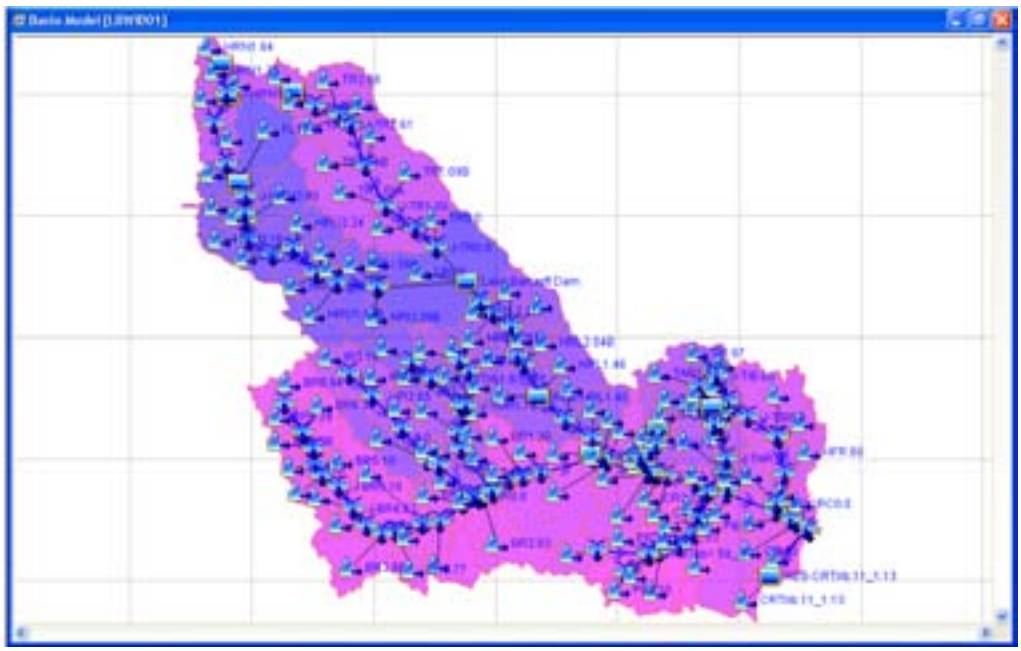


Figure 6. HEC-HMS model interface.

Modifications to USACE Model

The first change to the modified GKY HEC-HMS model involved updating the elevation-volume-discharge relationships for Lake Barcroft to reflect better available data. Lake Barcroft's new parameterization was supplied by the LBWID in the form of current bathymetry, gate performance, and structural data. Aside from the performance curve supplied by LBWID for the bascule gate, GKY simulated the lower spillway crest and the dam top as sharp-crested weirs to complete the lake's discharge relationship. Figure 7 shows the elevation-storage-discharge curves for Lake Barcroft before and after these changes.

[2] Modeling assumptions are given in the draft USACE report, entitled "Hydrologic and Hydraulic Analysis: Cameron Run, Virginia", and dated March 2007.

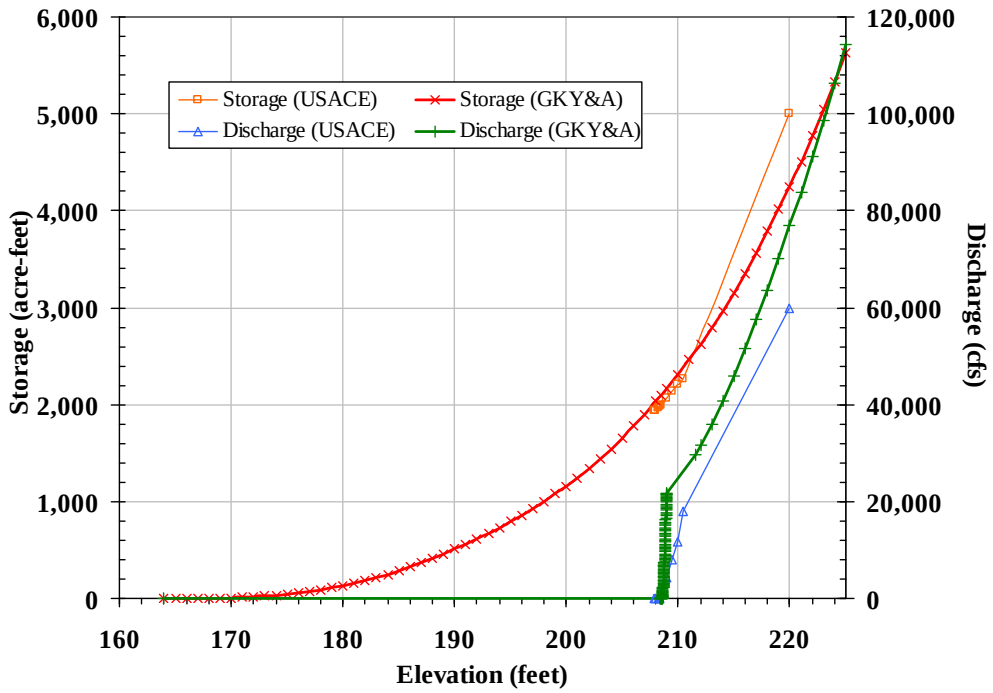


Figure 7. Updates to the elevation-storage-discharge curves for Lake Barcroft.

Another change made to the modified GKY model included altering the modeling methodology used for the I-395 roadway crossing over Holmes Run. GKY changed the crossing at I-395 from a junction to a reservoir in the modified GKY model due to its attenuation and storage capabilities during large storm events. Figure 8 shows a HEC-RAS screenshot of I-395 and the storage that is occurring during one of the storm scenarios.

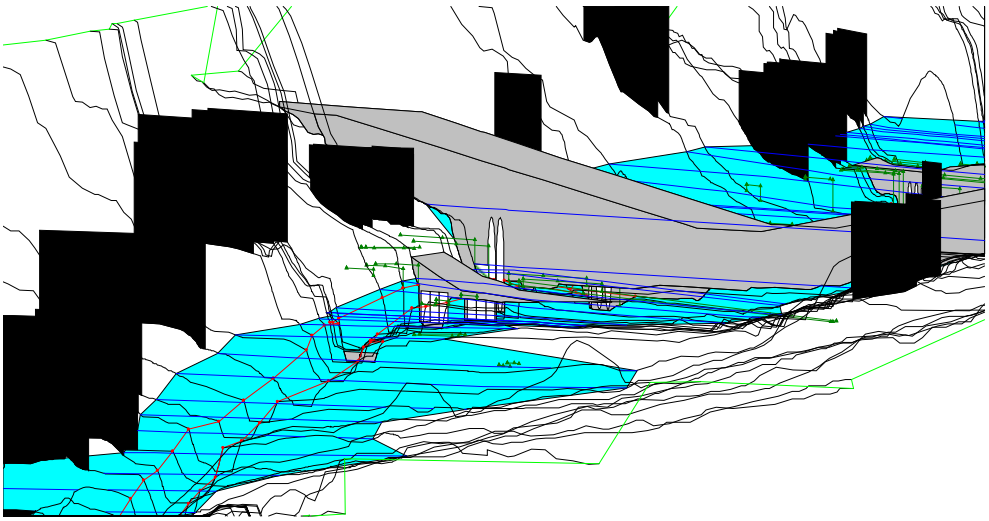


Figure 8. HEC-RAS perspective plot of storage behind I-395.

I-395 crosses Holmes Run approximately 2.2 miles downstream of Lake Barcroft. The I-395 structure directs flow through two large elliptical culverts and one small circular culvert for a length of 287 feet. The elliptical culverts have a 25 foot span and a 36 foot rise and the circular culvert is 10 foot diameter. The low point of the structure is at an elevation of 112

feet over an earthen embankment on the north (left) side. Figure 9 shows a HEC-RAS cross section view of the I-395 structure.

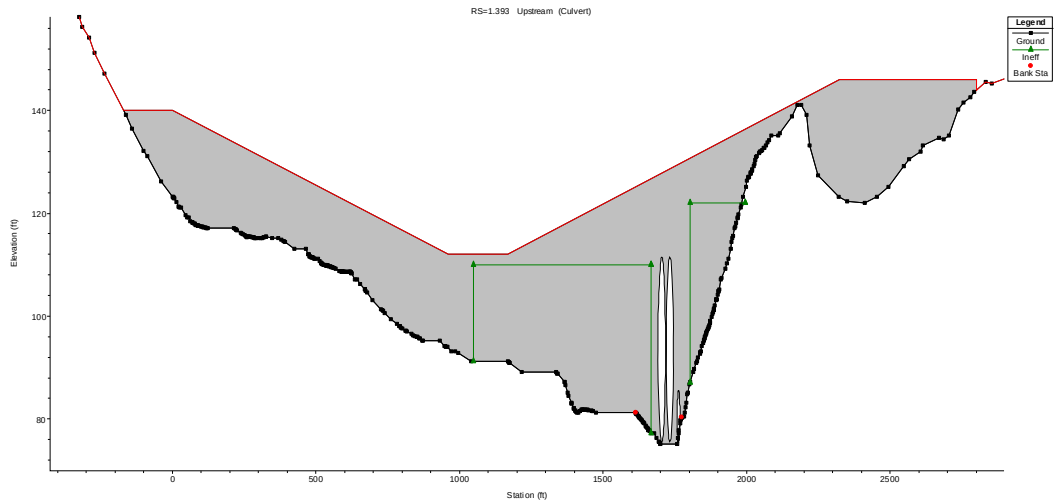


Figure 9. I-395 Structure.

As stated previously, the original USACE model treated the structure at I-395 as a junction. A junction in HEC-HMS combines multiple flows to a point and takes no consideration to attenuation, storage, or structure. This modeling technique is suitable only at locations with little or no attenuation. Due to the magnitude of the PMP and 0.5 PMP events, attenuation would likely occur at the I-395 crossing. GKY adjusted the technique at I-395 to include a reservoir which properly accounts for the possible attenuation/storage, allows for structure modeling input, and allows for dam breach scenarios.

An elevation-area rating curve was derived to allow storage upstream of I-395. The rating curve was derived using Arc-GIS tools with 5'-interval contour data. The culverts were modeled using the dimensions previously stated, with square edge concrete headwalls and inlet and outlet coefficients of 0.5 and 1.0, respectively. With the modeling changes made at I-395, GKY noted significant storage behind I-395 during all scenarios. Since many of the scenarios overtop the structure, cross section data was entered to define a dam top. Overtopping was modeled as a broad crested weir with a coefficient of 2.6.

Rainfall Amounts

The official Probable Maximum Precipitation (PMP) rainfall amounts for each length of storm are shown in Table 1 as were defined by the National Oceanographic and Atmospheric Administration (NOAA) in their Hydrometeorological Report No. 51 and 52.

Table 1. Probable Maximum Precipitation rainfall amounts.

Storm Duration (hours)	PMP Total Rainfall (inches)	½ PMP Total Rainfall (inches)	PMF Total Rainfall (inches)	½ PMF Total Rainfall (inches)
6	27.5	13.75	27.5	16.5
12	32.4	16.20	32.4	N/A
24	35.5	17.75	35.5	N/A

The "½ PMP" rainfall amounts have been determined as one-half of the PMP total rainfall amounts as shown in Table 1. The "1/2 PMF" rainfall amounts were determined from modeling simulations that results in peak flows in Lake Barcroft that were equivalent to one half the PMF peak flow.

Since the source model did not analyze storm events greater than the 500-year event, the PMF precipitation amounts shown in Table 1 were utilized in this study.

Rainfall Distribution

GKY utilized the ESFB[3] hydrologic rainfall distribution to simulate the hydrologic response of Barcroft's contributing watershed to 6, 12, and 24-hour-long probable maximum precipitation (PMP) events for Fairfax County, Virginia.

GKY consulted Dr. James Moore of the Natural Resources Conservation Service (NRCS) to obtain the ESFB distributions for 6, 12, and 24-hour durations. Figure 10 illustrates the shape of each cumulative rainfall distribution.

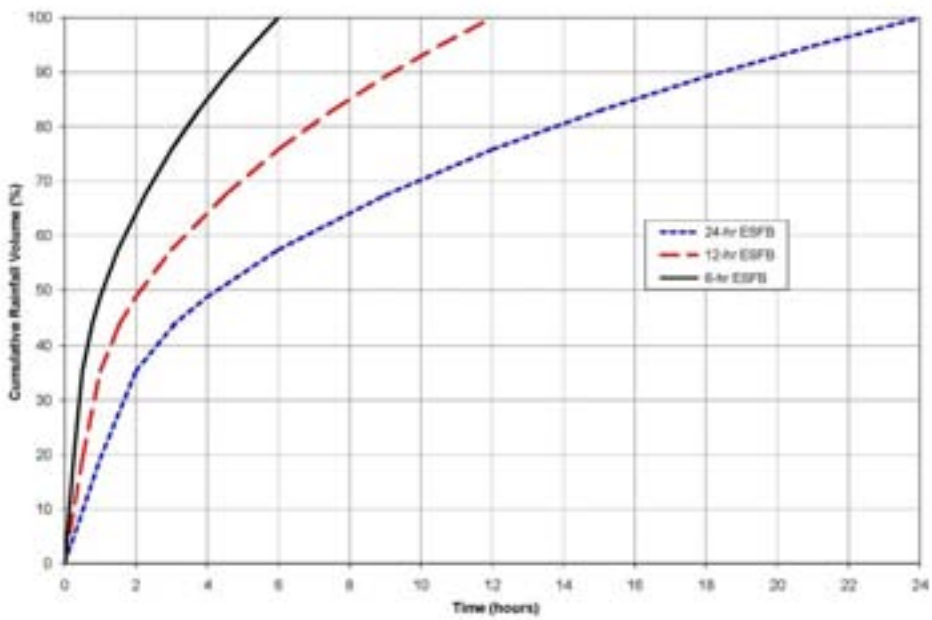


Figure 10. The ESFB distributions

All three rainfall distributions were simulated in HEC-HMS and output in a time series table with a 1-minute time step. The results for all three rainfall distributions are shown together to facilitate comparison and visualization. These figures can be found in Appendix B. The first figure in each pair shows the total inflow and outflow hydrographs for Lake Barcroft, and the second figure shows its water surface elevation and storage over the same period.

For Lake Barcroft, the maximum inflow, outflow, and water surface elevation occurs during the 6-hour PMP event using the standard rainfall distribution (i.e. ESFB) with an elevation of approximately 217 feet as shown in Appendix B. Based on this information, the 6-hour rainfall event using the ESFB rainfall distribution was used in all Lake Barcroft PMF and ½ PMF modeling scenarios.

[3] Emergency Spillway and Freeboard

Hydrologic Scenarios

GKY used the 6-hour ESFB rainfall distribution to model PMP events for the contributing watershed. PMP is the defined as the statistically estimated greatest possible depth of rainfall for a given duration that is physically possible for a particular geographical region. A PMP event provides the hydrology necessary to generate the PMF.

The selected rainfall distribution and rainfall event were then applied to the contributing study watershed. The Cameron Run Watershed is located primarily in Fairfax County, with small portions also located in Arlington County and the City of Alexandria. The contributing watershed to Lake Barcroft is approximately 14.5 square miles.

Four scenarios were selected to meet the Dam Break Inundation Zone Mapping requirements [§ 4 VAC 50-20-54] of the Virginia Department of Conservation and Recreation (DCR), Soil and Water Conservation Board Impounding Structure Regulations. These scenarios are as follows:

1. Sunny Day – A sunny day dam break analysis utilizing the volume retained at the normal or typical water surface elevation of the impounding structure meeting requirement [§ 4 VAC 50-20-54 (D)(1)]. This scenario models no precipitation during the hydrologic study. All flooding downstream is due to a piping failure within the dam during normal conditions. It does not create significant enough flooding for an I-395 breach downstream.

2. Dam Breach – A dam break analysis utilizing the spillway design flood with a dam failure meeting requirement [§ 4 VAC 50-20-54 (D)(2)]. Since Lake Barcroft is considered a high hazard dam, the spillway design flood (SDF) has been determined as the PMF event. Since the SDF has been determined to be the PMF event, this scenario also satisfies the dam break analysis utilizing the probable maximum flood with a dam failure requirement [§ 4 VAC 50-20-54 (D)(4)]. This Dam Breach scenario assumes a full embankment failure (i.e. masonry and earthen dam). This is a catastrophic event and thus has a short development time (2 minutes) which does not take erosion rate into effect. The breach shape also encompasses the entire impounding structure. This scenario was modeled to show a “worst case” scenario.

3. PMF Event – An analysis utilizing the spillway design flood without a dam failure [§ 4 VAC 50-20-54 (D)(3)]. This scenario includes an emergency breach of the earthen fuse plug at the western portion of the dam. The earthen embankment opens and acts as a fuse plug, relieving a large portion of the volume, while maintain the integrity of the masonry portion of the impounding structure.

4. 0.5 PMF Event – An analysis utilizing the ½ PMF event without a dam failure. Although this event is not required to satisfy the DCR regulations, it has been included to show that Lake Barcroft does not overtop in the ½ PMF event.

Specific modeling parameters for all four aforementioned scenarios are provided in Appendix C. Appendix D defines the breach parameters in more detail.

Hydrologic Results

The Results of the hydrologic model indicate that the Lake Barcroft dam, through the combination of its principal bascule gate spillway, emergency gate spillway, and emergency earthen fuse plug spillway, can convey the full probable maximum flood (1 PMF) with

limited over topping. The over topping that would occur is within the stability limits of the dam[4].

A summary of the hydrologic results can be found in Appendix E.

[4] Per information provided in the May 1978 Army Corp of Engineers Phase 1 Inspection Report for Lake Barcroft Dam

Hydraulics

The hydraulic model selected for this study was a HEC-RAS model for the Cameron Run watershed which was developed in 2007 by the USACE office in Baltimore, MD for a FEMA study. The HEC-RAS model encompasses portions of Holmes Run, Backlick Run, and Cameron Run. This model was modified to make the results more accurate for a large PMF event. Modifications included lengthening cross sections to contain the storm events, removing inappropriate obstructions, and revising Manning's n values. Figure 11 shows the extents of the HEC-RAS model from Lake Barcroft (i.e. upper left) to the Potomac River (i.e. lower right).

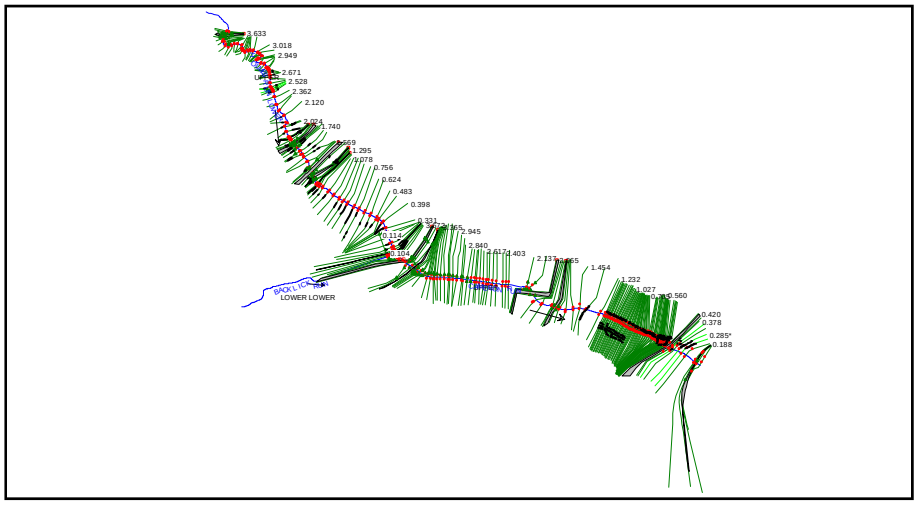


Figure 11. HEC-RAS model graphic interface.

Cross Section Extensions

GKY found that the USACE cross-sections did not extend far enough to contain the PMF event. With no area for the water to fill in the overbank regions the water level rose to unnatural elevations. All of the cross sections in the HEC-RAS model were extended using topographic data in Arc-GIS in conjunction with HEC-GeoRAS. Figures 12-15 illustrate an example of existing and modified cross sections. Lengthening was done to all cross sections in the modified GKY model.

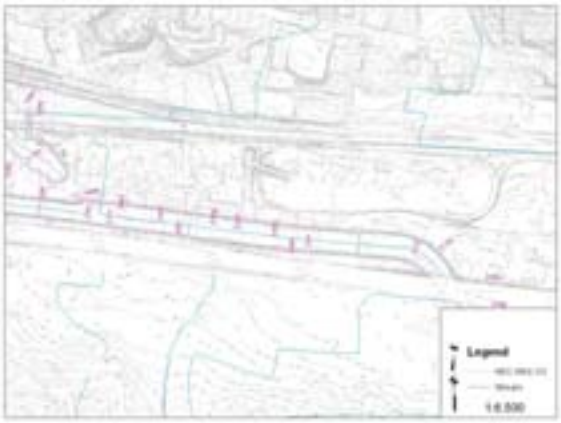


Figure 12. Existing hydraulics model cross sections were too narrow for large PMP events.

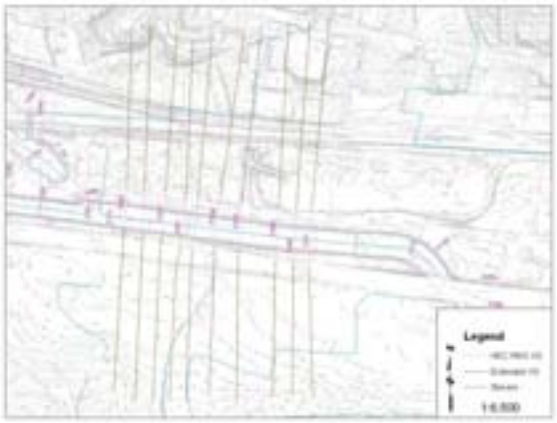


Figure 13. Modified cross sections extended to handle large PMP events.

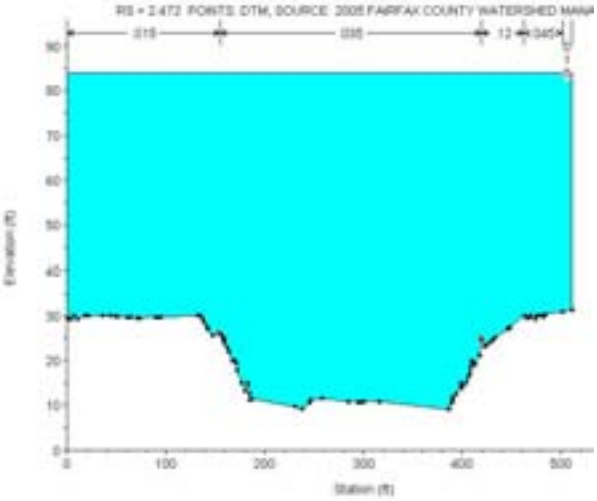


Figure 14. Existing hydraulics model cross sections are too narrow which create unrealistic results by unnaturally increasing the water surface elevation.

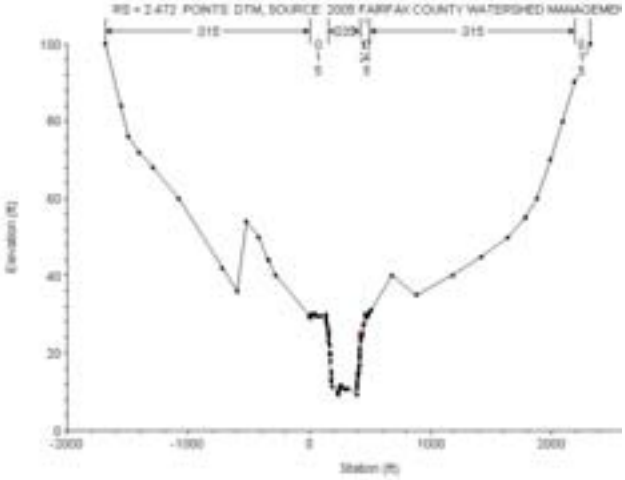


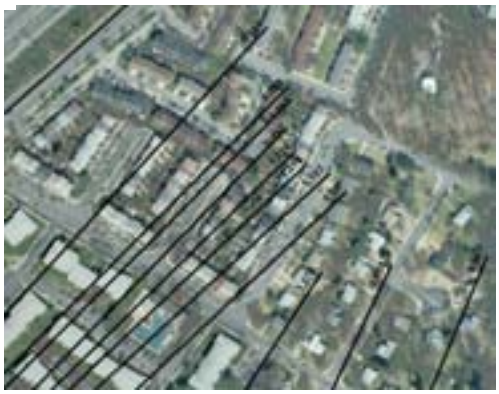
Figure 15. The proposed extended cross sections will allow the water to disperse onto the overbanks, thus reducing the maximum water surface elevation.

Roughness Coefficient Revisions

GKY increased the accuracy of the model by revising the Manning's n values with more precision for the overbank areas. The Manning's value used for these overbank areas ranged from 0.1 to 0.15 depending on the land use and cover. A value of 0.1 was used for areas that had little or no major obstructions impeding flow. A value of 0.15 was used in areas with many obstructions impeding flow. Using this technique, GKY was able to avoid having to model many obstructions on the overbank area. The following images show examples of areas with the varying Manning's n-value assignments.

n = 0.1

n = 0.12



n = 0.15

Blocked Obstruction and Ineffective Flow Revisions

The original USACE model contained many blocked obstructions and ineffective flow areas that extended to the ends of the USACE cross sections. These obstructions did not portray what was located across the sections in reality. The water surface elevations found by the USACE likely did not reach an elevation high enough to come in contact with the obstruction, thus not playing a factor in modeling. The effect of the obstructions on a PMF event is significant and raises the water level again to unnatural levels. GKY decided to revise the obstructions with accurate building locations and heights obtained from GIS information provided by the effected jurisdictions. The two cross sections, below, show an example of the changes made to the obstructions in the model. Figure 16 shows obstructions set in the original model and Figure 17 shows the change made by GKY to the same cross section. Notice that conveyance is allowed around the obstruction with more accurate modeling.

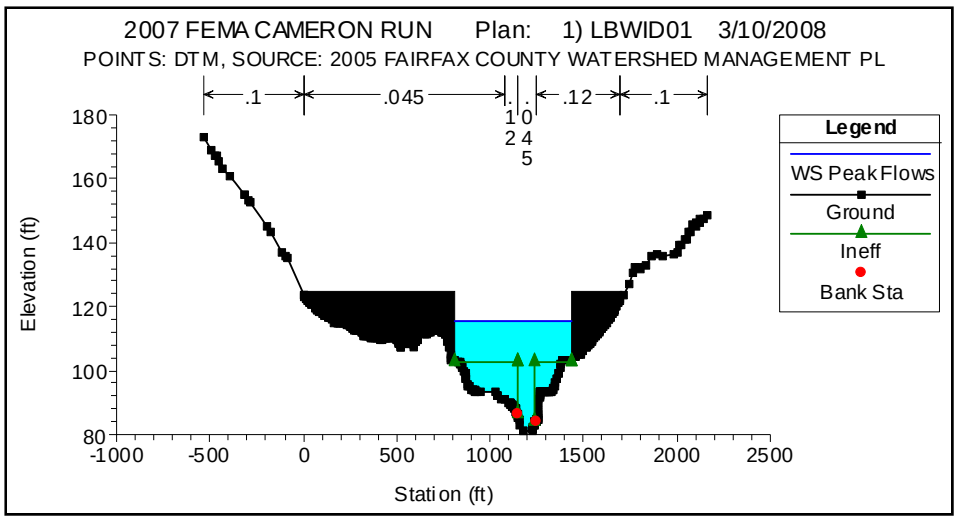


Figure 16. Cross section with USACE obstructions.

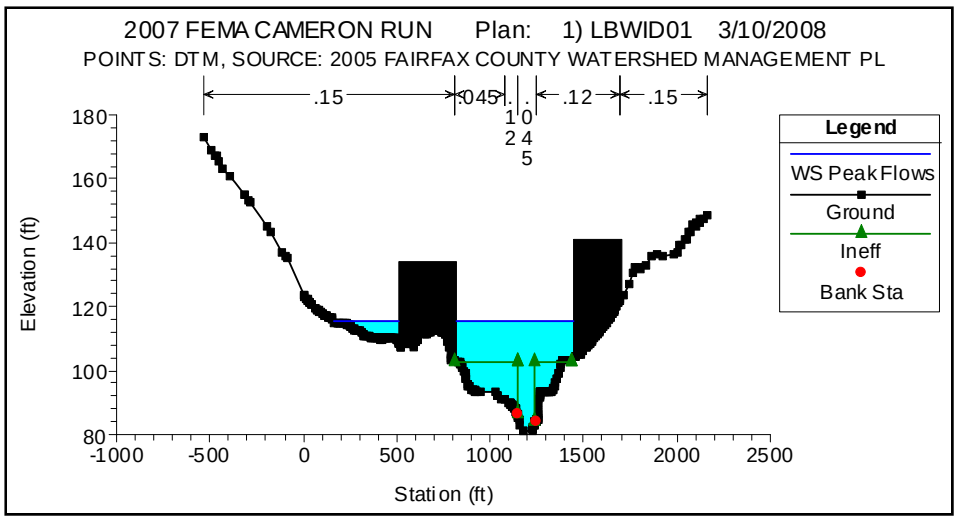


Figure 17. Cross section with modified obstructions.

Hydraulic Scenarios

After completing all modifications to the HEC-RAS geometry model, flow files were built from the HEC-HMS output described in the Hydrology sections of this report. HEC-HMS junctions from Lake Barcroft were matched to the closest HEC-RAS cross section. GKY specified a steady flow state for the entire model.

The hydraulic profiles from Lake Barcroft to the Potomac River are shown in Appendix F. Hydraulic summary result tables can be found in Appendix G and Appendix H. Due to the large amount of data contained in the full HEC-RAS reporting, the electronic HEC-RAS files have been included on CD-ROM in the back folder of this report.

Inundation Mapping

As stated in the introduction the purpose of this study was to perform inundation mapping for areas downstream of Lake Barcroft Dam. Hydrologic and hydraulic modeling provided the necessary data needed to perform inundation mapping.

The dam break inundation zone mapping was based on the Virginia Soil and Water Conservation Board Impounding Structure Regulations (§ 4 VAC 50-20) dated September 26, 2008. The following portions of the proposed regulations were adhered to:

> *"B. The location of the end of the inundation mapping should be indicated where the water surface elevation of the dam break inundation zone and the water surface elevation of the spillway design flood during an impounding structure nonfailure event converge to within one foot of each other. The inundation maps shall be supplemented with water surface profiles showing the peak water surface elevation prior to failure and the peak water surface elevation after failure.*
>
> *C. All inundation zone map(s), except those utilized in meeting the requirements of Emergency Preparedness for Low Hazard Potential Impounding Structures (4VAC50-20-177), shall be signed and sealed by a licensed professional engineer.*
>
> *D. For determining the hazard potential classification, a minimum of the following shall be provided to the department:*
>
> > *1. A sunny day dam break analysis utilizing the volume retained at the normal or typical water surface elevation of the impounding structure;*
> >
> > *2. A dam break analysis utilizing the spillway design flood with a dam failure;*
> >
> > *3. An analysis utilizing the spillway design flood without a dam failure; and*
> >
> > *4. For the purposes of future growth planning, a dam break analysis utilizing the probable maximum flood with a dam failure.*
>
> *E. To meet the requirements of Emergency Preparedness set out in 4VAC50-20-177, all Low Hazard Potential impounding structures shall provide a simple map, acceptable to the department, demonstrating the general inundation that would result from a dam failure. Such maps do not require preparation by a professional licensed engineer, however, it is preferred that the maps be prepared by a licensed professional engineer.*
>
> *F. To meet the Emergency Action Plan requirements set out in 4VAC50-20-175, all owners of High and Significant Hazard Potential impounding structures shall provide dam break inundation map(s) representing the impacts that would occur with both a sunny day dam failure and a spillway design flood dam failure."*

The scenarios run in this study meet the requirements for the determining the hazard potential classification. Water surface elevations found in the modified GKY HEC-RAS model were mapped on a GIS terrain dataset (see Figure 18). Through this process an accurate flood boundaries were produced.

GKY produced maps with all four flood scenarios shown. The flood boundaries were overlaid on aerial imagery from Fairfax County and the City of Alexandria to show areas where structures will be inundated. Appendix I contains panel maps of the entire study reach. A large map showing inundation from Lake Barcroft to the confluence of Cameron Run and the Potomac River can be found in the back folder of this report.

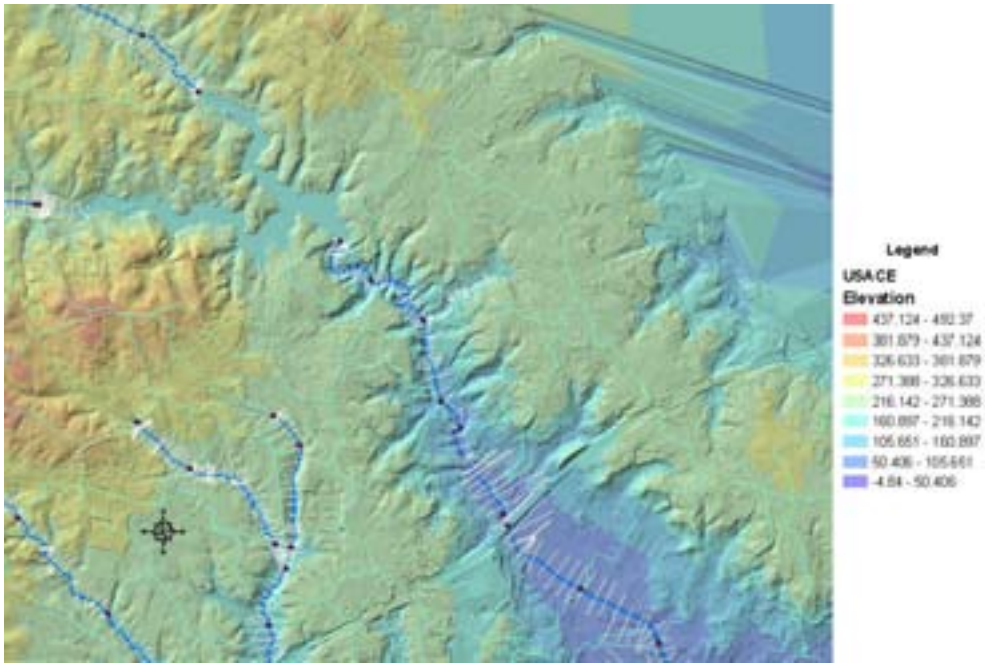
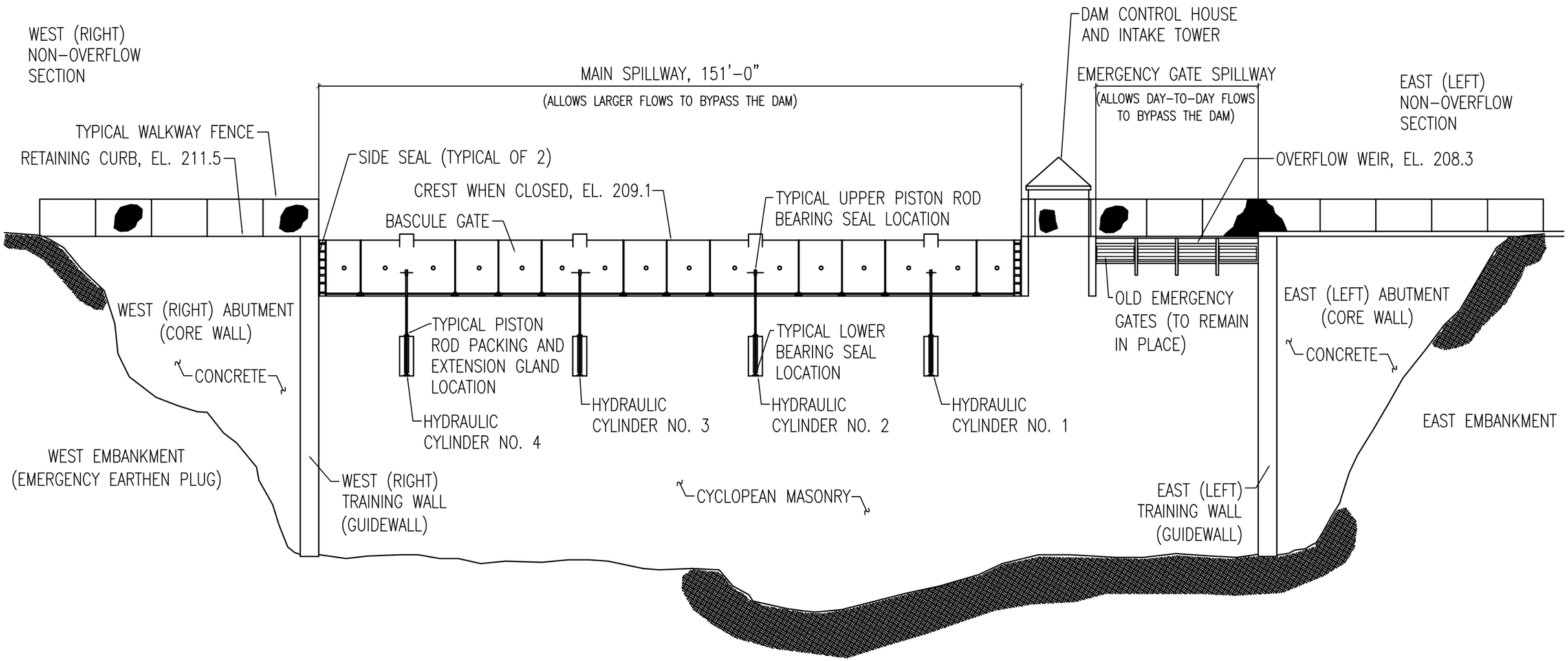


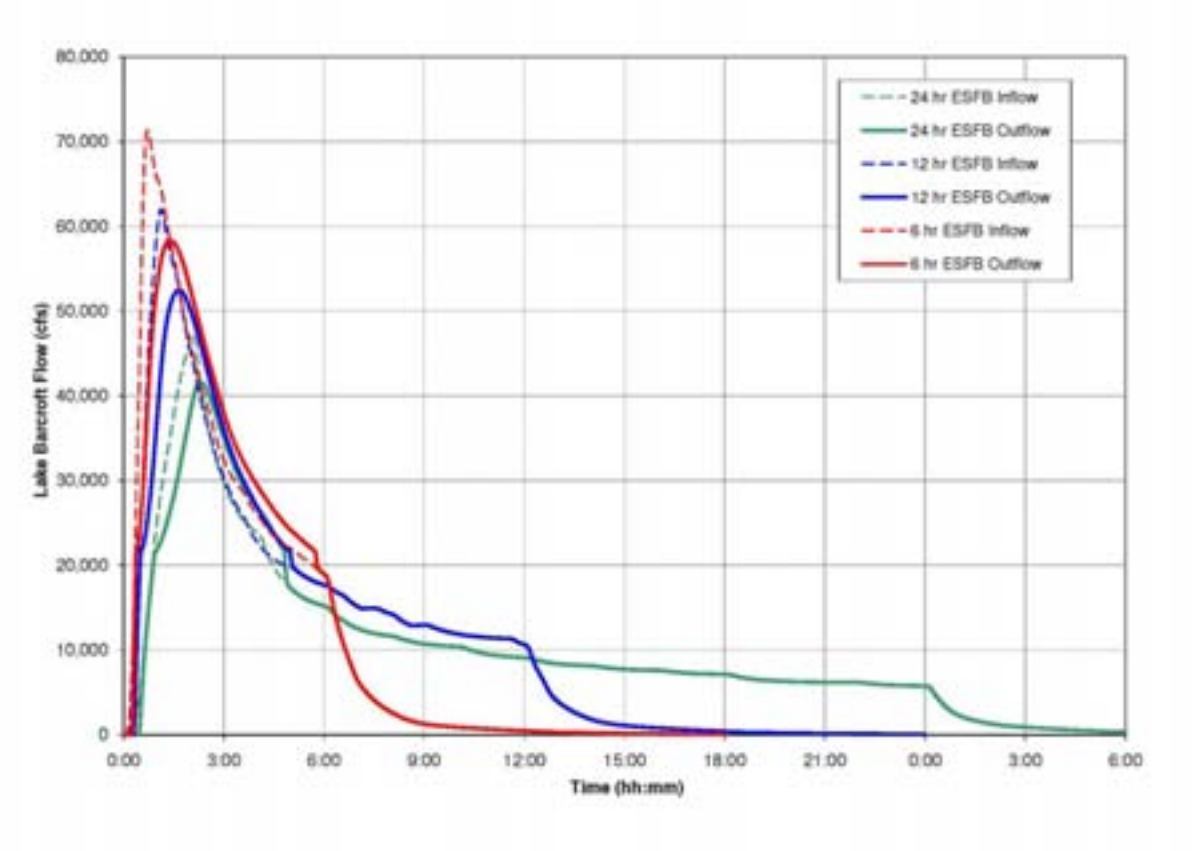
Figure 18. Cross sections on TIN dataset.

Appendix A -- Elevation – Dam and Bascule Gate

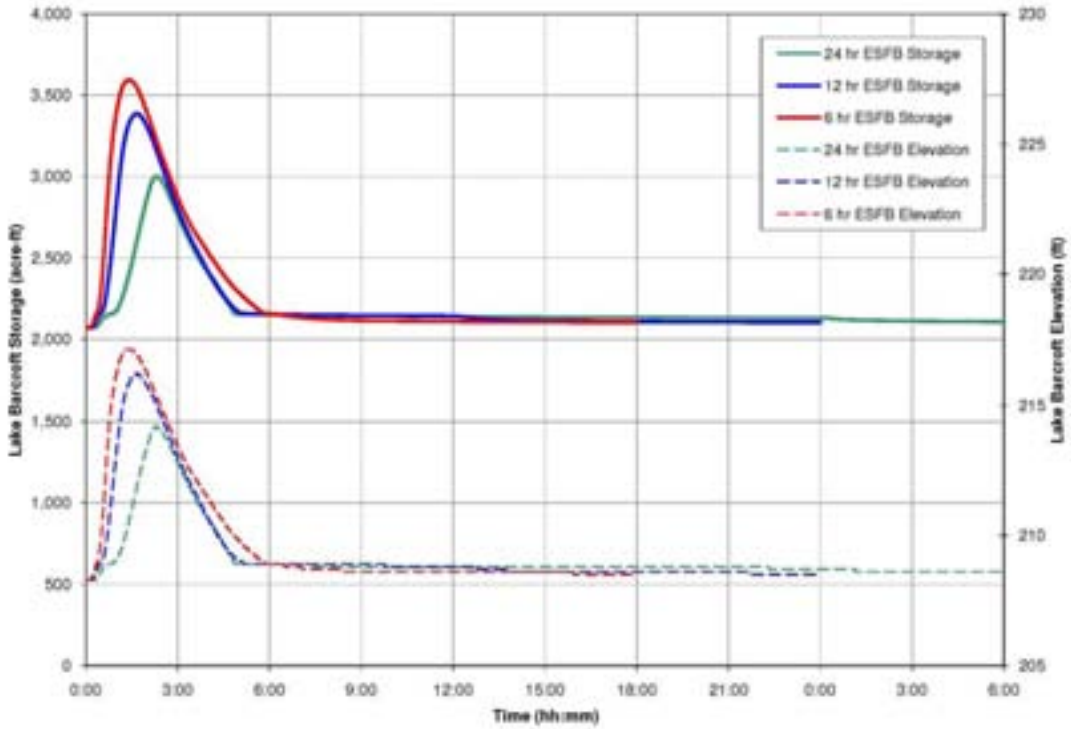


ELEVATION - DAM AND BASCULE GATE

Appendix B – Rainfall Distribution Comparisons



Lake Barcroft Inflow and Outflow for Three ESFB PMP Rainfall Events (assumes no breaching).



Lake Barcroft Elevation and Storage for Three ESFB PMP Rainfall Events (assumes no breaching).

Appendix C – Hydrologic Scenario Details

				Lake Barcroft				I-395			
	Distribution	**Storm Event**	**Starting Pool Elevation, ft**	**Gate Operation**	**Dam Breach**	**Breach Trigger**	**Breach Formation Time**	**Dam Breach**	**Breach Trigger**	**Breach Trigger**	**I-395 Culvert Blockage**
SUNNY DAY	None	None	208.3	Fully Closed	Sunny Day Piping	Normal Pool Elevation	24 Minutes	N/A	N/A	N/A	N/A
PMF EVENT	6-hr ESFB	PMF	208.3	Fully Open	Earthen Fuse Plug Activation	Start of Overtopping	24 Minutes	Yes	Start of Overtopping	10 Minutes	None
0.5 PMF EVENT	6-hr ESFB	0.5 PMF	208.3	Fully Operational	No	N/A	N/A	No	N/A	N/A	None
DAM BREACH	6-hr ESFB	PMF	208.3	Fully Open	Full Embankment Breach	Max Pool Elevation	2 Minutes	Yes	Max Pool Elevation	10 Minutes	None

The variable input parameters for these scenarios are described in detail, below:

- A 6-hr ESFB *rainfall distribution* was chosen for all scenarios except the Sunny Day event which has no precipitation. The 6-hr ESFB distribution was approved by the LBWID officers prior to being used as the principle distribution.

- There are three *storm events* being modeled in these scenarios. The PMF storm is the probable maximum flood event. The 0.5 PMF is half of the probable maximum flood event. The Sunny Day event has no precipitation occur. The storm design flood in this case is the PMF event and 0.5 PMF is shown as a point of comparison.

- The *starting pool elevation* is the elevation of the water in Lake Barcroft prior to precipitation. The normal Lake Barcroft operating pool elevation is 208.3'.

- The *gate operation* variable describes the position or operation of the primary spillway bascule gate on Lake Barcroft Dam during the precipitation event. The three modes of operation are fully operational, fully open, or fully closed. The gate is fully operational when it opens and closes as the water level changes based on the program established by the LBWID dam manager. This operation is modeled with the use of the rating curve derived by GKY. When the gate is fully open or fully closed there is no movement of the gate during the storm event and therefore the gate maintains an elevation of 197.1' and 209.1' respectively.

Lake Barcroft has three parameters for a dam breach scenario: location of the dam breach, breach trigger, and breach formation time. All three parameters are discussed below:

- The *dam breach location* is shown in the dam breach field of the scenarios table. There are two locations/modes of dam breach modeled (full embankment and piping). A full embankment breach is the entire dam (Masonry and Earthen Sections) structure failing catastrophically. A piping breach is a breach that forms internally in the dam structure due to internal erosion with no overtopping.

  (The Emergency Earthen Fuse Plug Spillway is not considered a "breach", it is a design function of the Lake Barcroft dam. The purpose of Emergency Earthen Fuse Plug Spillway is to allow for the passage of excess stormwater that could other wise cause dam failure.)

- The *breach trigger* tells the model when to start breaching the dam structure. The breach triggers for both Lake Barcroft and I-395 are one of the following: max pool elevation, start of overtopping, or normal pool elevation. Max pool elevation is set using the water levels highest point during a no dam breach scenario. Start of overtopping is when the water level reaches the lowest point on top of the structure. Normal elevation was used during the sunny day event and sets the breach trigger to the pool elevation that occurs during normal operation of the dam (i.e. the crest of the emergency spillway).

- *Breach formation time* is set using the principle that an earthen embankment will erode at a rate of two feet/minute. Therefore since Lake Barcroft has about 48' of earthen structure and I-395 has 20' feet of earthen structure, the formation times are set to 24 and 10 minutes respectively. This defines the length of time until the breach is fully formed, after reaching the breach trigger elevation, and is defined by bank slope and bottom width. Dam Breach has a formation time of 2 minutes due to a full breach of Lake Barcroft dam. A full breach of Lake Barcroft would be a catastrophic event thus given a short development time.

- *I-395 culvert blockage* states whether there is any obstruction in the culverts at I-395 impeding flow. This variable was considered but not used in any of the scenarios studied. A large storm event could potentially create enough floating debris to obstruct flow through the culverts under I-395.

Appendix D – Hydrologic Breach Parameters

Breach parameters were set within the modified HEC-HMS model for both Lake Barcroft and I-395. HEC-HMS has breach tools to enable a reservoir structure to breach based on modeler input. Breach parameter input includes trigger water surface elevation, development time, breach dimension (i.e. bottom width and side slopes), and breach progression.

There are other input variables for breach parameterization. A shape must be defined for the breach opening. The breach opening is defined using the top and bottom elevations of impounding structure, bottom width of the breach, and side slopes. It is assumed that a trapezoidal shaped breach will form in all cases. There is also a variable to input breach progression method. Progression method specifies the rate of breach formation during the development time. Linear breach progression assumes the breach will grow in equal increment of depth and width. The assumptions for the breach development time and shape are from previously studied dam breach events and engineering judgment. The following table outlines the variables chosen for Lake Barcroft and I-395 for the four study scenarios.

Breach parameters.

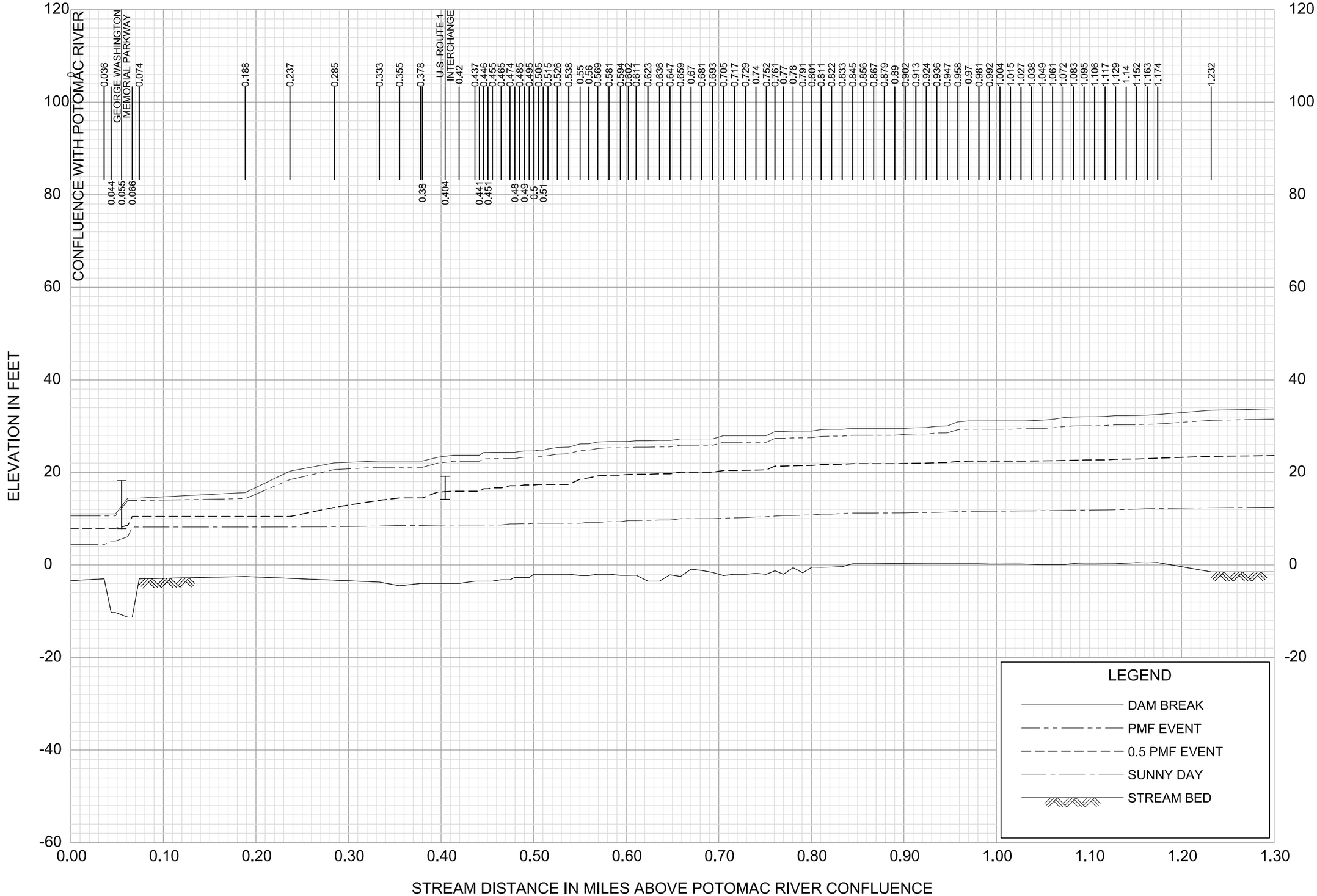
	Lake Barcroft			I-395		
	Bottom Width, ft	**Side Slope (XH:1V)**	**Breach Progression**	**Bottom Width, ft**	**Side Slope (XH:1V)**	**Breach Progression**
SUNNY DAY	60	0.5	Linear	N/A	N/A	N/A
PMF EVENT	60	0.5	Linear	41.68	1	Linear
0.5 PMF EVENT	N/A	N/A	N/A	N/A	N/A	N/A
DAM BREAK	436.5	0.1	Linear	41.68	1	Linear

I-395 Breach parameters were entered due to significant overtopping during PMF events. A breach would likely occur over a low spot on the north side of the stream crossing. Since this section of I-395 is an earthen embankment, GKY chose to use similar breach parameters as modeled for the earthen embankment of Lake Barcroft Dam.

Appendix E – Hydrologic Results Summary Table

				Lake Barcroft				I-395			
	Distribution	**Event**	**Starting Pool Elevation, ft**	**Maximum Inflow, cfs**	**Maximum Outflow, cfs**	**Maximum Pool Elevation, ft**	**Maximum Storage, acre-ft**	**Maximum Inflow, cfs**	**Maximum Outflow, cfs**	**Maximum Pool Elevation, ft**	**Maximum Storage, acre-ft**
SUNNY DAY	None	None	208.3	0	71501.9	208.3	2070.9	45241.5	24831.7	111.3	775.1
PMF EVENT	6-hr ESFB	PMF	208.3	71331.1	114020.7	214.6	3075.6	113577	106701.2	121.7	1477.2
0.5 PMF EVENT	6-hr ESFB	0.5 PMF	208.3	33728.1	29373.3	211.4	2528.8	34938.2	33634	115.3	1005.3
DAM BREAK	6-hr ESFB	PMF	208.3	71331.1	512716.8	217.3	3633.6	249889.6	229084.9	129.9	2201.6

Appendix F – Hydraulic Profiles

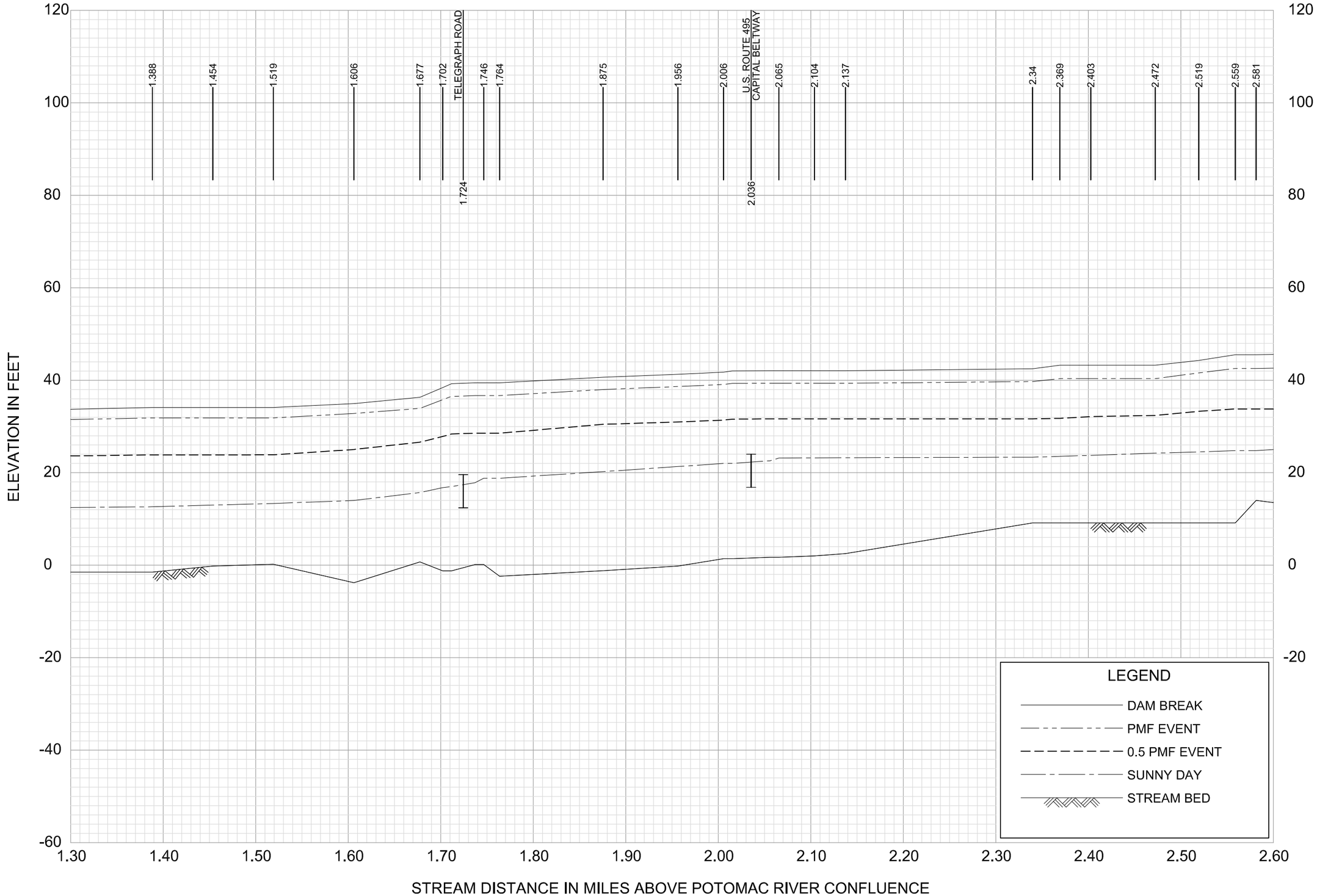


FLOOD PROFILES

CAMERON RUN

2008 LAKE BARCROFT INUNDATION MAPPING STUDY

01P

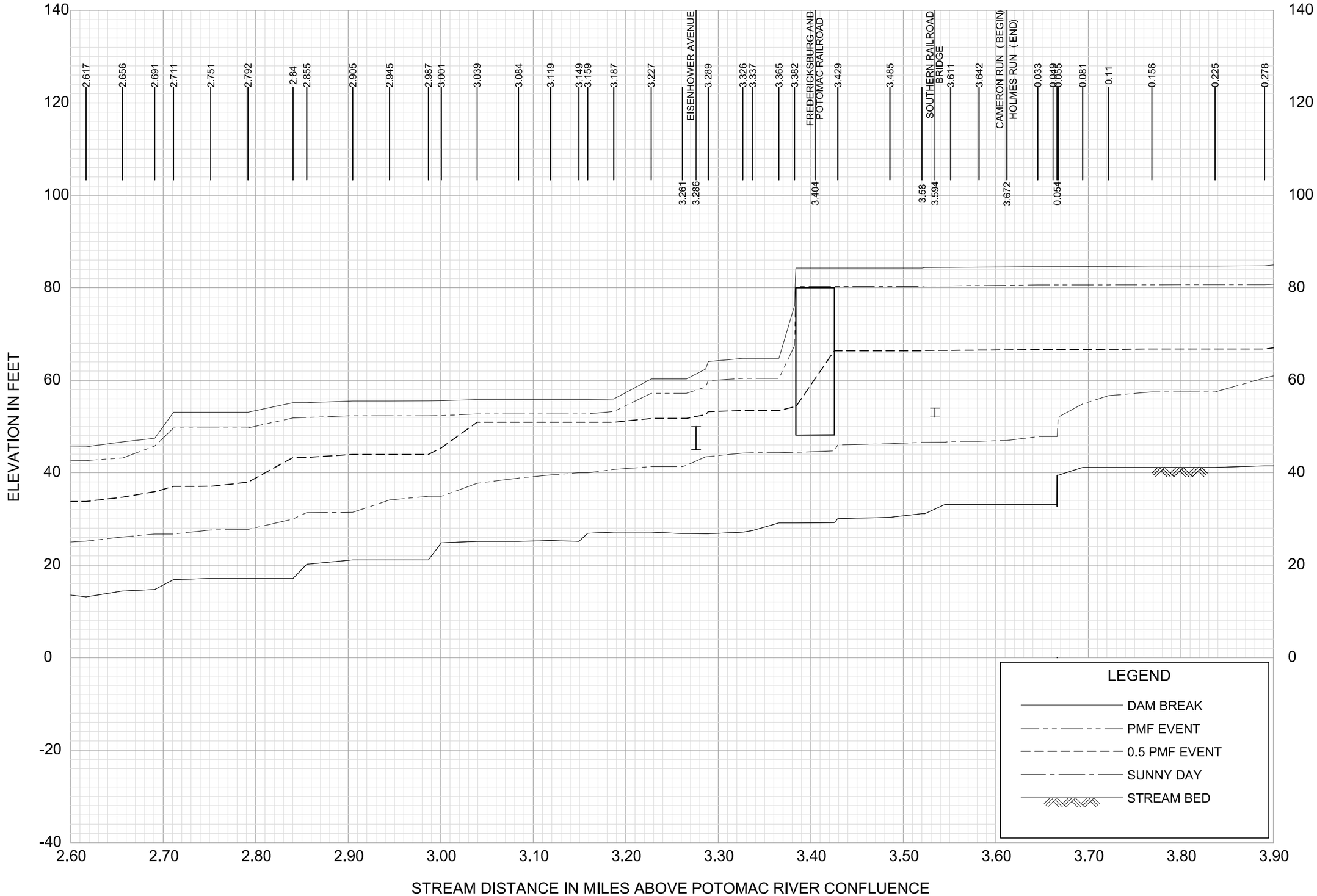


FLOOD PROFILES

CAMERON RUN

2008 LAKE BARCROFT INUNDATION MAPPING STUDY

02P

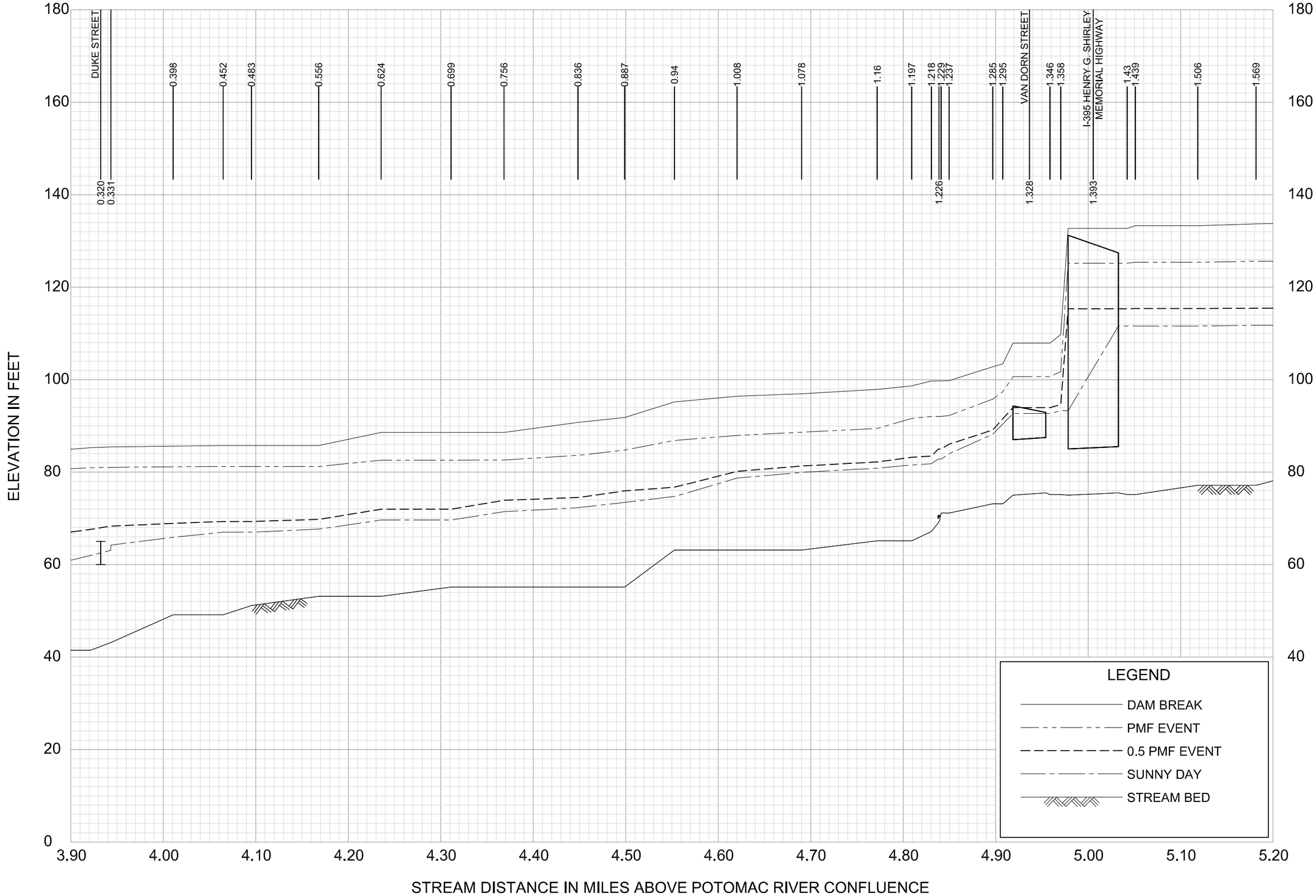


FLOOD PROFILES

HOLMES RUN / CAMERON RUN

2008 LAKE BARCROFT INUNDATION MAPPING STUDY

03P

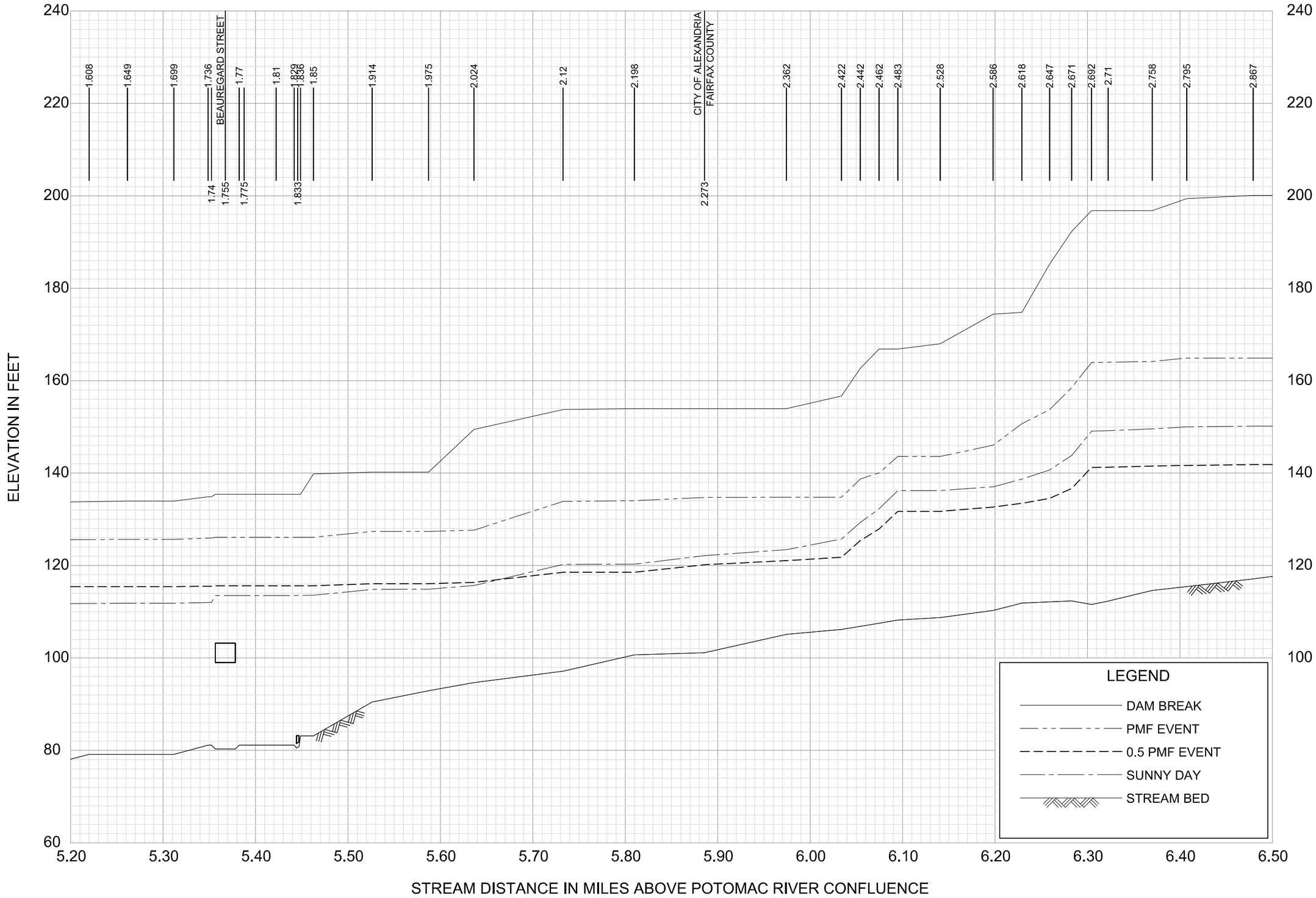


FLOOD PROFILES

HOLMES RUN

2008 LAKE BARCROFT INUNDATION MAPPING STUDY

04P

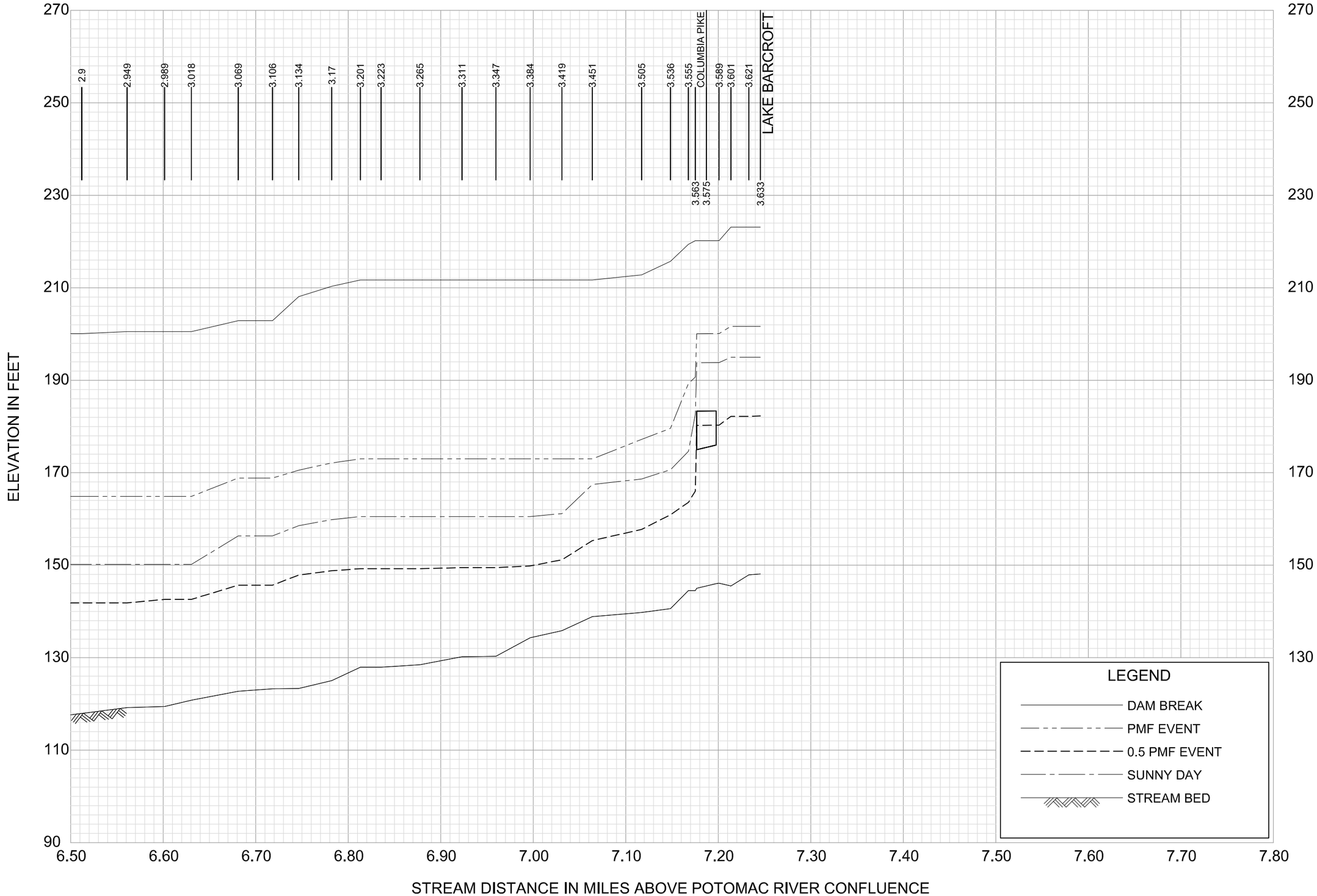


FLOOD PROFILES

HOLMES RUN

2008 LAKE BARCROFT INUNDATION MAPPING STUDY

05P



FLOOD PROFILES

HOLMES RUN

2008 LAKE BARCROFT INUNDATION MAPPING STUDY

06P

Appendix G – Hydraulic Profile Summary Table

HEC-RAS Profile: Peak Flows						
River	Reach	River Sta	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
HOLMES RUN LOWER	UPPER	3.633	DAM_BREAK	512716.8	148.1	219.74
HOLMES RUN LOWER	UPPER	3.633	PMF	114020.7	148.1	201.61
HOLMES RUN LOWER	UPPER	3.633	HALF_PMF	29373.33	148.1	182.27
HOLMES RUN LOWER	UPPER	3.633	SUNNY_DAY	71501.93	148.1	195
HOLMES RUN LOWER	UPPER	3.621	DAM_BREAK	512716.8	147.92	219.32
HOLMES RUN LOWER	UPPER	3.621	PMF	114020.7	147.92	201.35
HOLMES RUN LOWER	UPPER	3.621	HALF_PMF	29373.33	147.92	182.17
HOLMES RUN LOWER	UPPER	3.621	SUNNY_DAY	71501.93	147.92	194.82
HOLMES RUN LOWER	UPPER	3.601	DAM_BREAK	512716.8	145.51	223.11
HOLMES RUN LOWER	UPPER	3.601	PMF	114020.7	145.51	201.65
HOLMES RUN LOWER	UPPER	3.601	HALF_PMF	29373.33	145.51	182.19
HOLMES RUN LOWER	UPPER	3.601	SUNNY_DAY	71501.93	145.51	194.97
HOLMES RUN LOWER	UPPER	3.589	DAM_BREAK	512716.8	146.12	218.42
HOLMES RUN LOWER	UPPER	3.589	PMF	114020.7	146.12	200.08
HOLMES RUN LOWER	UPPER	3.589	HALF_PMF	29373.33	146.12	180.29
HOLMES RUN LOWER	UPPER	3.589	SUNNY_DAY	71501.93	146.12	193.81
HOLMES RUN LOWER	UPPER	3.575		Culvert		
HOLMES RUN LOWER	UPPER	3.563	DAM_BREAK	512716.8	144.52	220.18
HOLMES RUN LOWER	UPPER	3.563	PMF	114020.7	144.52	190.68
HOLMES RUN LOWER	UPPER	3.563	HALF_PMF	29373.33	144.52	166.03
HOLMES RUN LOWER	UPPER	3.563	SUNNY_DAY	71501.93	144.52	182.66
HOLMES RUN LOWER	UPPER	3.555	DAM_BREAK	512716.8	144.52	219.4
HOLMES RUN LOWER	UPPER	3.555	PMF	114020.7	144.52	189.31
HOLMES RUN LOWER	UPPER	3.555	HALF_PMF	29373.33	144.52	163.58
HOLMES RUN LOWER	UPPER	3.555	SUNNY_DAY	71501.93	144.52	174.62
HOLMES RUN LOWER	UPPER	3.536	DAM_BREAK	512716.8	140.61	215.72
HOLMES RUN LOWER	UPPER	3.536	PMF	114020.7	140.61	179.62
HOLMES RUN LOWER	UPPER	3.536	HALF_PMF	29373.33	140.61	160.93
HOLMES RUN LOWER	UPPER	3.536	SUNNY_DAY	71501.93	140.61	170.66
HOLMES RUN LOWER	UPPER	3.505	DAM_BREAK	512716.8	139.79	212.79
HOLMES RUN LOWER	UPPER	3.505	PMF	114020.7	139.79	177.21
HOLMES RUN LOWER	UPPER	3.505	HALF_PMF	29373.33	139.79	157.74
HOLMES RUN LOWER	UPPER	3.505	SUNNY_DAY	71501.93	139.79	168.65
HOLMES RUN LOWER	UPPER	3.451	DAM_BREAK	512716.8	138.88	206.47
HOLMES RUN LOWER	UPPER	3.451	PMF	114020.7	138.88	168.78
HOLMES RUN LOWER	UPPER	3.451	HALF_PMF	29373.33	138.88	155.33
HOLMES RUN LOWER	UPPER	3.451	SUNNY_DAY	71501.93	138.88	167.45
HOLMES RUN LOWER	UPPER	3.419	DAM_BREAK	512716.8	135.84	211.67

HEC-RAS Profile: Peak Flows						
River	Reach	River Sta	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
HOLMES RUN LOWER	UPPER	3.419	PMF	114020.7	135.84	170.67
HOLMES RUN LOWER	UPPER	3.419	HALF_PMF	29373.33	135.84	151.18
HOLMES RUN LOWER	UPPER	3.419	SUNNY_DAY	71501.93	135.84	161.16
HOLMES RUN LOWER	UPPER	3.384	DAM_BREAK	512716.8	134.31	204.87
HOLMES RUN LOWER	UPPER	3.384	PMF	114020.7	134.31	170.11
HOLMES RUN LOWER	UPPER	3.384	HALF_PMF	29373.33	134.31	149.85
HOLMES RUN LOWER	UPPER	3.384	SUNNY_DAY	71501.93	134.31	157.84
HOLMES RUN LOWER	UPPER	3.347	DAM_BREAK	512716.8	130.3	209.73
HOLMES RUN LOWER	UPPER	3.347	PMF	114020.7	130.3	172.63
HOLMES RUN LOWER	UPPER	3.347	HALF_PMF	29373.33	130.3	148.91
HOLMES RUN LOWER	UPPER	3.347	SUNNY_DAY	71501.93	130.3	160.27
HOLMES RUN LOWER	UPPER	3.311	DAM_BREAK	512716.8	130.2	209.76
HOLMES RUN LOWER	UPPER	3.311	PMF	114020.7	130.2	172.55
HOLMES RUN LOWER	UPPER	3.311	HALF_PMF	29373.33	130.2	149.48
HOLMES RUN LOWER	UPPER	3.311	SUNNY_DAY	71501.93	130.2	160.31
HOLMES RUN LOWER	UPPER	3.265	DAM_BREAK	512716.8	128.47	210.43
HOLMES RUN LOWER	UPPER	3.265	PMF	114020.7	128.47	172.49
HOLMES RUN LOWER	UPPER	3.265	HALF_PMF	29373.33	128.47	149.21
HOLMES RUN LOWER	UPPER	3.265	SUNNY_DAY	71501.93	128.47	160.08
HOLMES RUN LOWER	UPPER	3.223	DAM_BREAK	512716.8	127.96	211.41
HOLMES RUN LOWER	UPPER	3.223	PMF	114020.7	127.96	172.88
HOLMES RUN LOWER	UPPER	3.223	HALF_PMF	29373.33	127.96	149.08
HOLMES RUN LOWER	UPPER	3.223	SUNNY_DAY	71501.93	127.96	160.2
HOLMES RUN LOWER	UPPER	3.201	DAM_BREAK	450040.7	127.96	211.67
HOLMES RUN LOWER	UPPER	3.201	PMF	114548.4	127.96	173
HOLMES RUN LOWER	UPPER	3.201	HALF_PMF	30095.3	127.96	149.26
HOLMES RUN LOWER	UPPER	3.201	SUNNY_DAY	64801.99	127.96	160.53
HOLMES RUN LOWER	UPPER	3.17	DAM_BREAK	450040.7	125.05	210.31
HOLMES RUN LOWER	UPPER	3.17	PMF	114548.4	125.05	172.13
HOLMES RUN LOWER	UPPER	3.17	HALF_PMF	30095.3	125.05	148.8
HOLMES RUN LOWER	UPPER	3.17	SUNNY_DAY	64801.99	125.05	159.86
HOLMES RUN LOWER	UPPER	3.134	DAM_BREAK	450040.7	123.34	208.07
HOLMES RUN LOWER	UPPER	3.134	PMF	114548.4	123.34	170.54
HOLMES RUN LOWER	UPPER	3.134	HALF_PMF	30095.3	123.34	147.88
HOLMES RUN LOWER	UPPER	3.134	SUNNY_DAY	64801.99	123.34	158.55
HOLMES RUN LOWER	UPPER	3.106	DAM_BREAK	450040.7	123.27	193.56
HOLMES RUN LOWER	UPPER	3.106	PMF	114548.4	123.27	166.51
HOLMES RUN LOWER	UPPER	3.106	HALF_PMF	30095.3	123.27	145.61

HEC-RAS Profile: Peak Flows						
River	Reach	River Sta	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
HOLMES RUN LOWER	UPPER	3.106	SUNNY_DAY	64801.99	123.27	155.11
HOLMES RUN LOWER	UPPER	3.069	DAM_BREAK	450040.7	122.74	202.89
HOLMES RUN LOWER	UPPER	3.069	PMF	114548.4	122.74	168.86
HOLMES RUN LOWER	UPPER	3.069	HALF_PMF	30095.3	122.74	145.69
HOLMES RUN LOWER	UPPER	3.069	SUNNY_DAY	64801.99	122.74	156.34
HOLMES RUN LOWER	UPPER	3.018	DAM_BREAK	450040.7	120.82	200.52
HOLMES RUN LOWER	UPPER	3.018	PMF	114548.4	120.82	163.27
HOLMES RUN LOWER	UPPER	3.018	HALF_PMF	30095.3	120.82	142.52
HOLMES RUN LOWER	UPPER	3.018	SUNNY_DAY	64801.99	120.82	148.65
HOLMES RUN LOWER	UPPER	2.989	DAM_BREAK	450040.7	119.44	198.48
HOLMES RUN LOWER	UPPER	2.989	PMF	114548.4	119.44	163.84
HOLMES RUN LOWER	UPPER	2.989	HALF_PMF	30095.3	119.44	142.62
HOLMES RUN LOWER	UPPER	2.989	SUNNY_DAY	64801.99	119.44	149.66
HOLMES RUN LOWER	UPPER	2.949	DAM_BREAK	450040.7	119.23	200.51
HOLMES RUN LOWER	UPPER	2.949	PMF	114548.4	119.23	164.79
HOLMES RUN LOWER	UPPER	2.949	HALF_PMF	30095.3	119.23	141.3
HOLMES RUN LOWER	UPPER	2.949	SUNNY_DAY	64801.99	119.23	149.86
HOLMES RUN LOWER	UPPER	2.9	DAM_BREAK	450040.7	117.96	199.81
HOLMES RUN LOWER	UPPER	2.9	PMF	114548.4	117.96	164.29
HOLMES RUN LOWER	UPPER	2.9	HALF_PMF	30095.3	117.96	141.56
HOLMES RUN LOWER	UPPER	2.9	SUNNY_DAY	64801.99	117.96	149.46
HOLMES RUN LOWER	UPPER	2.867	DAM_BREAK	450040.7	117.12	200.09
HOLMES RUN LOWER	UPPER	2.867	PMF	114548.4	117.12	164.82
HOLMES RUN LOWER	UPPER	2.867	HALF_PMF	30095.3	117.12	141.85
HOLMES RUN LOWER	UPPER	2.867	SUNNY_DAY	64801.99	117.12	150.17
HOLMES RUN LOWER	UPPER	2.795	DAM_BREAK	450040.7	115.44	199.37
HOLMES RUN LOWER	UPPER	2.795	PMF	114548.4	115.44	164.89
HOLMES RUN LOWER	UPPER	2.795	HALF_PMF	30095.3	115.44	141.66
HOLMES RUN LOWER	UPPER	2.795	SUNNY_DAY	64801.99	115.44	150.01
HOLMES RUN LOWER	UPPER	2.758	DAM_BREAK	450040.7	114.63	195.57
HOLMES RUN LOWER	UPPER	2.758	PMF	114548.4	114.63	164.16
HOLMES RUN LOWER	UPPER	2.758	HALF_PMF	30095.3	114.63	141.53
HOLMES RUN LOWER	UPPER	2.758	SUNNY_DAY	64801.99	114.63	149.57
HOLMES RUN LOWER	UPPER	2.71	DAM_BREAK	450040.7	112.3	196.39
HOLMES RUN LOWER	UPPER	2.71	PMF	114548.4	112.3	163.99
HOLMES RUN LOWER	UPPER	2.71	HALF_PMF	30095.3	112.3	141.27
HOLMES RUN LOWER	UPPER	2.71	SUNNY_DAY	64801.99	112.3	149.18

HEC-RAS Profile: Peak Flows						
River	Reach	River Sta	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
HOLMES RUN LOWER	UPPER	2.692	DAM_BREAK	450040.7	111.58	196.8
HOLMES RUN LOWER	UPPER	2.692	PMF	114548.4	111.58	163.93
HOLMES RUN LOWER	UPPER	2.692	HALF_PMF	30095.3	111.58	141.22
HOLMES RUN LOWER	UPPER	2.692	SUNNY_DAY	64801.99	111.58	149.07
HOLMES RUN LOWER	UPPER	2.671	DAM_BREAK	335740.3	112.35	192.28
HOLMES RUN LOWER	UPPER	2.671	PMF	113578.6	112.35	158.48
HOLMES RUN LOWER	UPPER	2.671	HALF_PMF	31619.66	112.35	136.69
HOLMES RUN LOWER	UPPER	2.671	SUNNY_DAY	53653.36	112.35	143.82
HOLMES RUN LOWER	UPPER	2.647	DAM_BREAK	335740.3	112.14	185.22
HOLMES RUN LOWER	UPPER	2.647	PMF	113578.6	112.14	153.74
HOLMES RUN LOWER	UPPER	2.647	HALF_PMF	31619.66	112.14	134.54
HOLMES RUN LOWER	UPPER	2.647	SUNNY_DAY	53653.36	112.14	140.69
HOLMES RUN LOWER	UPPER	2.618	DAM_BREAK	335740.3	111.88	174.77
HOLMES RUN LOWER	UPPER	2.618	PMF	113578.6	111.88	150.7
HOLMES RUN LOWER	UPPER	2.618	HALF_PMF	31619.66	111.88	133.47
HOLMES RUN LOWER	UPPER	2.618	SUNNY_DAY	53653.36	111.88	138.7
HOLMES RUN LOWER	UPPER	2.586	DAM_BREAK	335740.3	110.29	174.37
HOLMES RUN LOWER	UPPER	2.586	PMF	113578.6	110.29	146.05
HOLMES RUN LOWER	UPPER	2.586	HALF_PMF	31619.66	110.29	132.66
HOLMES RUN LOWER	UPPER	2.586	SUNNY_DAY	53653.36	110.29	137.03
HOLMES RUN LOWER	UPPER	2.528	DAM_BREAK	335740.3	108.75	167.97
HOLMES RUN LOWER	UPPER	2.528	PMF	113578.6	108.75	143.1
HOLMES RUN LOWER	UPPER	2.528	HALF_PMF	31619.66	108.75	131.59
HOLMES RUN LOWER	UPPER	2.528	SUNNY_DAY	53653.36	108.75	135.56
HOLMES RUN LOWER	UPPER	2.483	DAM_BREAK	335740.3	108.2	163.89
HOLMES RUN LOWER	UPPER	2.483	PMF	113578.6	108.2	143.6
HOLMES RUN LOWER	UPPER	2.483	HALF_PMF	31619.66	108.2	131.73
HOLMES RUN LOWER	UPPER	2.483	SUNNY_DAY	53653.36	108.2	136.23
HOLMES RUN LOWER	UPPER	2.462*	DAM_BREAK	335740.3	107.53	166.86
HOLMES RUN LOWER	UPPER	2.462*	PMF	113578.6	107.53	140.06
HOLMES RUN LOWER	UPPER	2.462*	HALF_PMF	31619.66	107.53	127.93
HOLMES RUN LOWER	UPPER	2.462*	SUNNY_DAY	53653.36	107.53	132.29
HOLMES RUN LOWER	UPPER	2.442*	DAM_BREAK	335740.3	106.86	162.64
HOLMES RUN LOWER	UPPER	2.442*	PMF	113578.6	106.86	138.73
HOLMES RUN LOWER	UPPER	2.442*	HALF_PMF	31619.66	106.86	125.4
HOLMES RUN LOWER	UPPER	2.442*	SUNNY_DAY	53653.36	106.86	129.3
HOLMES RUN LOWER	UPPER	2.422	DAM_BREAK	335740.3	106.19	156.69
HOLMES RUN LOWER	UPPER	2.422	PMF	113578.6	106.19	134.59

HEC-RAS Profile: Peak Flows						
River	Reach	River Sta	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
HOLMES RUN LOWER	UPPER	2.422	HALF_PMF	31619.66	106.19	121.8
HOLMES RUN LOWER	UPPER	2.422	SUNNY_DAY	53653.36	106.19	125.74
HOLMES RUN LOWER	UPPER	2.362	DAM_BREAK	335740.3	105.1	153.42
HOLMES RUN LOWER	UPPER	2.362	PMF	113578.6	105.1	134.78
HOLMES RUN LOWER	UPPER	2.362	HALF_PMF	31619.66	105.1	121.07
HOLMES RUN LOWER	UPPER	2.362	SUNNY_DAY	53653.36	105.1	123.44
HOLMES RUN LOWER	UPPER	2.273	DAM_BREAK	335740.3	101.16	153.87
HOLMES RUN LOWER	UPPER	2.273	PMF	113578.6	101.16	134.74
HOLMES RUN LOWER	UPPER	2.273	HALF_PMF	31619.66	101.16	120.18
HOLMES RUN LOWER	UPPER	2.273	SUNNY_DAY	53653.36	101.16	122.14
HOLMES RUN LOWER	UPPER	2.198	DAM_BREAK	273684.7	100.67	153.95
HOLMES RUN LOWER	UPPER	2.198	PMF	109312.9	100.67	134.03
HOLMES RUN LOWER	UPPER	2.198	HALF_PMF	32060.17	100.67	118.56
HOLMES RUN LOWER	UPPER	2.198	SUNNY_DAY	45985.32	100.67	120.31
HOLMES RUN LOWER	UPPER	2.12	DAM_BREAK	273684.7	97.16	153.76
HOLMES RUN LOWER	UPPER	2.12	PMF	109312.9	97.16	133.88
HOLMES RUN LOWER	UPPER	2.12	HALF_PMF	32060.17	97.16	118.55
HOLMES RUN LOWER	UPPER	2.12	SUNNY_DAY	45985.32	97.16	120.24
HOLMES RUN LOWER	UPPER	2.024	DAM_BREAK	270370.3	94.68	149.45
HOLMES RUN LOWER	UPPER	2.024	PMF	111197	94.68	127.66
HOLMES RUN LOWER	UPPER	2.024	HALF_PMF	32934.16	94.68	116.36
HOLMES RUN LOWER	UPPER	2.024	SUNNY_DAY	45882.44	94.68	115.68
HOLMES RUN LOWER	UPPER	1.975	DAM_BREAK	270370.3	92.92	135.85
HOLMES RUN LOWER	UPPER	1.975	PMF	111197	92.92	127
HOLMES RUN LOWER	UPPER	1.975	HALF_PMF	32934.16	92.92	116.09
HOLMES RUN LOWER	UPPER	1.975	SUNNY_DAY	45882.44	92.92	114.88
HOLMES RUN LOWER	UPPER	1.914	DAM_BREAK	270370.3	90.49	140.22
HOLMES RUN LOWER	UPPER	1.914	PMF	111197	90.49	127.39
HOLMES RUN LOWER	UPPER	1.914	HALF_PMF	32934.16	90.49	116.09
HOLMES RUN LOWER	UPPER	1.914	SUNNY_DAY	45882.44	90.49	114.85
HOLMES RUN LOWER	UPPER	1.85	DAM_BREAK	270370.3	83.16	139.8
HOLMES RUN LOWER	UPPER	1.85	PMF	111197	83.16	125.49
HOLMES RUN LOWER	UPPER	1.85	HALF_PMF	32934.16	83.16	115.62
HOLMES RUN LOWER	UPPER	1.85	SUNNY_DAY	45882.44	83.16	113.57
HOLMES RUN LOWER	UPPER	1.836	DAM_BREAK	270370.3	83.16	132.2
HOLMES RUN LOWER	UPPER	1.836	PMF	111197	83.16	125.36
HOLMES RUN LOWER	UPPER	1.836	HALF_PMF	32934.16	83.16	115.61
HOLMES RUN LOWER	UPPER	1.836	SUNNY_DAY	45882.44	83.16	113.56

HEC-RAS Profile: Peak Flows						
River	Reach	River Sta	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
HOLMES RUN LOWER	UPPER	1.833		Culvert		
HOLMES RUN LOWER	UPPER	1.829	DAM_BREAK	270370.3	81.16	130.97
HOLMES RUN LOWER	UPPER	1.829	PMF	111197	81.16	124.91
HOLMES RUN LOWER	UPPER	1.829	HALF_PMF	32934.16	81.16	115.46
HOLMES RUN LOWER	UPPER	1.829	SUNNY_DAY	45882.44	81.16	113.28
HOLMES RUN LOWER	UPPER	1.81	DAM_BREAK	270370.3	81.16	131.98
HOLMES RUN LOWER	UPPER	1.81	PMF	111197	81.16	123.67
HOLMES RUN LOWER	UPPER	1.81	HALF_PMF	32934.16	81.16	115.18
HOLMES RUN LOWER	UPPER	1.81	SUNNY_DAY	45882.44	81.16	112.34
HOLMES RUN LOWER	UPPER	1.775	DAM_BREAK	270370.3	81.16	135.4
HOLMES RUN LOWER	UPPER	1.775	PMF	111197	81.16	126.13
HOLMES RUN LOWER	UPPER	1.775	HALF_PMF	32934.16	81.16	115.63
HOLMES RUN LOWER	UPPER	1.775	SUNNY_DAY	45882.44	81.16	113.51
HOLMES RUN LOWER	UPPER	1.77	DAM_BREAK	270370.3	81.16	135.41
HOLMES RUN LOWER	UPPER	1.77	PMF	111197	81.16	126.13
HOLMES RUN LOWER	UPPER	1.77	HALF_PMF	32934.16	81.16	115.63
HOLMES RUN LOWER	UPPER	1.77	SUNNY_DAY	45882.44	81.16	113.51
HOLMES RUN LOWER	UPPER	1.755		Culvert		
HOLMES RUN LOWER	UPPER	1.74	DAM_BREAK	270370.3	81.16	134.85
HOLMES RUN LOWER	UPPER	1.74	PMF	111197	81.16	125.95
HOLMES RUN LOWER	UPPER	1.74	HALF_PMF	32934.16	81.16	115.52
HOLMES RUN LOWER	UPPER	1.74	SUNNY_DAY	45882.44	81.16	112.02
HOLMES RUN LOWER	UPPER	1.736	DAM_BREAK	270370.3	81.16	134.89
HOLMES RUN LOWER	UPPER	1.736	PMF	111197	81.16	125.95
HOLMES RUN LOWER	UPPER	1.736	HALF_PMF	32934.16	81.16	115.52
HOLMES RUN LOWER	UPPER	1.736	SUNNY_DAY	45882.44	81.16	112.03
HOLMES RUN LOWER	UPPER	1.699	DAM_BREAK	270370.3	79.16	132.85
HOLMES RUN LOWER	UPPER	1.699	PMF	111197	79.16	125.38
HOLMES RUN LOWER	UPPER	1.699	HALF_PMF	32934.16	79.16	115.42
HOLMES RUN LOWER	UPPER	1.699	SUNNY_DAY	45882.44	79.16	111.76
HOLMES RUN LOWER	UPPER	1.649	DAM_BREAK	270370.3	79.16	133.96
HOLMES RUN LOWER	UPPER	1.649	PMF	111197	79.16	125.66
HOLMES RUN LOWER	UPPER	1.649	HALF_PMF	32934.16	79.16	115.46
HOLMES RUN LOWER	UPPER	1.649	SUNNY_DAY	45882.44	79.16	111.84
HOLMES RUN LOWER	UPPER	1.608	DAM_BREAK	270370.3	79.16	133.81
HOLMES RUN LOWER	UPPER	1.608	PMF	111197	79.16	125.61

HEC-RAS Profile: Peak Flows						
River	Reach	River Sta	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
HOLMES RUN LOWER	UPPER	1.608	HALF_PMF	32934.16	79.16	115.44
HOLMES RUN LOWER	UPPER	1.608	SUNNY_DAY	45882.44	79.16	111.77
HOLMES RUN LOWER	UPPER	1.569	DAM_BREAK	270370.3	77.16	133.7
HOLMES RUN LOWER	UPPER	1.569	PMF	111197	77.16	125.59
HOLMES RUN LOWER	UPPER	1.569	HALF_PMF	32934.16	77.16	115.44
HOLMES RUN LOWER	UPPER	1.569	SUNNY_DAY	45882.44	77.16	111.76
HOLMES RUN LOWER	UPPER	1.506	DAM_BREAK	270370.3	77.16	132.88
HOLMES RUN LOWER	UPPER	1.506	PMF	111197	77.16	125.3
HOLMES RUN LOWER	UPPER	1.506	HALF_PMF	32934.16	77.16	115.37
HOLMES RUN LOWER	UPPER	1.506	SUNNY_DAY	45882.44	77.16	111.55
HOLMES RUN LOWER	UPPER	1.439	DAM_BREAK	248100	75.16	133.27
HOLMES RUN LOWER	UPPER	1.439	PMF	111650	75.16	125.39
HOLMES RUN LOWER	UPPER	1.439	HALF_PMF	33832	75.16	115.38
HOLMES RUN LOWER	UPPER	1.439	SUNNY_DAY	45241.49	75.16	111.59
HOLMES RUN LOWER	UPPER	1.43	DAM_BREAK	229084.9	75.16	132.72
HOLMES RUN LOWER	UPPER	1.43	PMF	106701.2	75.16	125.18
HOLMES RUN LOWER	UPPER	1.43	HALF_PMF	33633.95	75.16	115.33
HOLMES RUN LOWER	UPPER	1.43	SUNNY_DAY	24831.7	75.16	111.59
HOLMES RUN LOWER	UPPER	1.393		Culvert		
HOLMES RUN LOWER	UPPER	1.358	DAM_BREAK	229084.9	75.16	109.76
HOLMES RUN LOWER	UPPER	1.358	PMF	106701.2	75.16	101.76
HOLMES RUN LOWER	UPPER	1.358	HALF_PMF	33633.95	75.16	94.61
HOLMES RUN LOWER	UPPER	1.358	SUNNY_DAY	24831.7	75.16	93.3
HOLMES RUN LOWER	UPPER	1.346	DAM_BREAK	229084.9	75.16	107.92
HOLMES RUN LOWER	UPPER	1.346	PMF	106701.2	75.16	100.64
HOLMES RUN LOWER	UPPER	1.346	HALF_PMF	33633.95	75.16	93.94
HOLMES RUN LOWER	UPPER	1.346	SUNNY_DAY	24831.7	75.16	92.68
HOLMES RUN LOWER	UPPER	1.328		Culvert		
HOLMES RUN LOWER	UPPER	1.295	DAM_BREAK	229084.9	73.16	103.41
HOLMES RUN LOWER	UPPER	1.295	PMF	106701.2	73.16	97.38
HOLMES RUN LOWER	UPPER	1.295	HALF_PMF	33633.95	73.16	91.54
HOLMES RUN LOWER	UPPER	1.295	SUNNY_DAY	24831.7	73.16	90.39
HOLMES RUN LOWER	UPPER	1.285	DAM_BREAK	229084.9	73.16	102.77
HOLMES RUN LOWER	UPPER	1.285	PMF	106701.2	73.16	95.79
HOLMES RUN LOWER	UPPER	1.285	HALF_PMF	33633.95	73.16	89.11
HOLMES RUN LOWER	UPPER	1.285	SUNNY_DAY	24831.7	73.16	88.21

HEC-RAS Profile: Peak Flows						
River	Reach	River Sta	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
HOLMES RUN LOWER	UPPER	1.237	DAM_BREAK	229084.9	71.16	99.79
HOLMES RUN LOWER	UPPER	1.237	PMF	106701.2	71.16	92.26
HOLMES RUN LOWER	UPPER	1.237	HALF_PMF	33633.95	71.16	86.04
HOLMES RUN LOWER	UPPER	1.237	SUNNY_DAY	24831.7	71.16	83.97
HOLMES RUN LOWER	UPPER	1.229	DAM_BREAK	229084.9	71.16	99.28
HOLMES RUN LOWER	UPPER	1.229	PMF	106701.2	71.16	91.83
HOLMES RUN LOWER	UPPER	1.229	HALF_PMF	33633.95	71.16	84.98
HOLMES RUN LOWER	UPPER	1.229	SUNNY_DAY	24831.7	71.16	82.81
HOLMES RUN LOWER	UPPER	1.226		Culvert		
HOLMES RUN LOWER	UPPER	1.218	DAM_BREAK	229084.9	67.16	99.73
HOLMES RUN LOWER	UPPER	1.218	PMF	106701.2	67.16	92.04
HOLMES RUN LOWER	UPPER	1.218	HALF_PMF	33633.95	67.16	83.47
HOLMES RUN LOWER	UPPER	1.218	SUNNY_DAY	24831.7	67.16	81.8
HOLMES RUN LOWER	UPPER	1.197	DAM_BREAK	229084.9	65.16	98.66
HOLMES RUN LOWER	UPPER	1.197	PMF	106701.2	65.16	91.63
HOLMES RUN LOWER	UPPER	1.197	HALF_PMF	33633.95	65.16	83.21
HOLMES RUN LOWER	UPPER	1.197	SUNNY_DAY	24831.7	65.16	81.54
HOLMES RUN LOWER	UPPER	1.16	DAM_BREAK	229084.9	65.16	97.87
HOLMES RUN LOWER	UPPER	1.16	PMF	106701.2	65.16	89.45
HOLMES RUN LOWER	UPPER	1.16	HALF_PMF	33633.95	65.16	82.2
HOLMES RUN LOWER	UPPER	1.16	SUNNY_DAY	24831.7	65.16	80.85
HOLMES RUN LOWER	UPPER	1.078	DAM_BREAK	229084.9	63.16	96.96
HOLMES RUN LOWER	UPPER	1.078	PMF	106701.2	63.16	88.62
HOLMES RUN LOWER	UPPER	1.078	HALF_PMF	33633.95	63.16	81.32
HOLMES RUN LOWER	UPPER	1.078	SUNNY_DAY	24831.7	63.16	79.95
HOLMES RUN LOWER	UPPER	1.008	DAM_BREAK	229084.9	63.16	96.42
HOLMES RUN LOWER	UPPER	1.008	PMF	106701.2	63.16	87.93
HOLMES RUN LOWER	UPPER	1.008	HALF_PMF	33633.95	63.16	80.17
HOLMES RUN LOWER	UPPER	1.008	SUNNY_DAY	24831.7	63.16	78.7
HOLMES RUN LOWER	UPPER	0.94	DAM_BREAK	229084.9	63.16	95.18
HOLMES RUN LOWER	UPPER	0.94	PMF	106701.2	63.16	86.85
HOLMES RUN LOWER	UPPER	0.94	HALF_PMF	33633.95	63.16	76.74
HOLMES RUN LOWER	UPPER	0.94	SUNNY_DAY	24831.7	63.16	74.74
HOLMES RUN LOWER	UPPER	0.887	DAM_BREAK	229084.9	55.16	91.82
HOLMES RUN LOWER	UPPER	0.887	PMF	106701.2	55.16	84.77
HOLMES RUN LOWER	UPPER	0.887	HALF_PMF	33633.95	55.16	75.95
HOLMES RUN LOWER	UPPER	0.887	SUNNY_DAY	24831.7	55.16	73.46

HEC-RAS Profile: Peak Flows						
River	Reach	River Sta	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
HOLMES RUN LOWER	UPPER	0.836	DAM_BREAK	227083.9	55.16	90.74
HOLMES RUN LOWER	UPPER	0.836	PMF	109204.6	55.16	83.63
HOLMES RUN LOWER	UPPER	0.836	HALF_PMF	34753.52	55.16	74.51
HOLMES RUN LOWER	UPPER	0.836	SUNNY_DAY	24804.94	55.16	72.3
HOLMES RUN LOWER	UPPER	0.756	DAM_BREAK	227083.9	55.16	87.57
HOLMES RUN LOWER	UPPER	0.756	PMF	109204.6	55.16	82.61
HOLMES RUN LOWER	UPPER	0.756	HALF_PMF	34753.52	55.16	73.91
HOLMES RUN LOWER	UPPER	0.756	SUNNY_DAY	24804.94	55.16	71.45
HOLMES RUN LOWER	UPPER	0.699	DAM_BREAK	227083.9	55.16	88.08
HOLMES RUN LOWER	UPPER	0.699	PMF	109204.6	55.16	82.25
HOLMES RUN LOWER	UPPER	0.699	HALF_PMF	34753.52	55.16	71.29
HOLMES RUN LOWER	UPPER	0.699	SUNNY_DAY	24804.94	55.16	69.33
HOLMES RUN LOWER	UPPER	0.624	DAM_BREAK	227083.9	53.16	88.58
HOLMES RUN LOWER	UPPER	0.624	PMF	109204.6	53.16	82.59
HOLMES RUN LOWER	UPPER	0.624	HALF_PMF	34753.52	53.16	71.98
HOLMES RUN LOWER	UPPER	0.624	SUNNY_DAY	24804.94	53.16	69.65
HOLMES RUN LOWER	UPPER	0.556	DAM_BREAK	227083.9	53.16	85.67
HOLMES RUN LOWER	UPPER	0.556	PMF	109204.6	53.16	81.18
HOLMES RUN LOWER	UPPER	0.556	HALF_PMF	34753.52	53.16	69.78
HOLMES RUN LOWER	UPPER	0.556	SUNNY_DAY	24804.94	53.16	67.67
HOLMES RUN LOWER	UPPER	0.483	DAM_BREAK	227083.9	51.16	84.55
HOLMES RUN LOWER	UPPER	0.483	PMF	109204.6	51.16	80.71
HOLMES RUN LOWER	UPPER	0.483	HALF_PMF	34753.52	51.16	68.62
HOLMES RUN LOWER	UPPER	0.483	SUNNY_DAY	24804.94	51.16	66.52
HOLMES RUN LOWER	UPPER	0.452	DAM_BREAK	227083.9	49.16	85.74
HOLMES RUN LOWER	UPPER	0.452	PMF	109204.6	49.16	81.22
HOLMES RUN LOWER	UPPER	0.452	HALF_PMF	34753.52	49.16	69.33
HOLMES RUN LOWER	UPPER	0.452	SUNNY_DAY	24804.94	49.16	67.01
HOLMES RUN LOWER	UPPER	0.398	DAM_BREAK	227083.9	49.16	85.62
HOLMES RUN LOWER	UPPER	0.398	PMF	109204.6	49.16	81.16
HOLMES RUN LOWER	UPPER	0.398	HALF_PMF	34753.52	49.16	68.92
HOLMES RUN LOWER	UPPER	0.398	SUNNY_DAY	24804.94	49.16	65.9
HOLMES RUN LOWER	UPPER	0.331	DAM_BREAK	213848.5	43.16	85.28
HOLMES RUN LOWER	UPPER	0.331	PMF	109592.4	43.16	80.95
HOLMES RUN LOWER	UPPER	0.331	HALF_PMF	35311.77	43.16	67.9
HOLMES RUN LOWER	UPPER	0.331	SUNNY_DAY	24642.69	43.16	64.23
HOLMES RUN LOWER	UPPER	0.32		Bridge		

HEC-RAS Profile: Peak Flows						
River	Reach	River Sta	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
HOLMES RUN LOWER	UPPER	0.278	DAM_BREAK	213848.5	41.49	84.78
HOLMES RUN LOWER	UPPER	0.278	PMF	109592.4	41.49	80.65
HOLMES RUN LOWER	UPPER	0.278	HALF_PMF	35311.77	41.49	66.57
HOLMES RUN LOWER	UPPER	0.278	SUNNY_DAY	24642.69	41.49	60.48
HOLMES RUN LOWER	UPPER	0.225	DAM_BREAK	213848.5	41.16	84.73
HOLMES RUN LOWER	UPPER	0.225	PMF	109592.4	41.16	80.64
HOLMES RUN LOWER	UPPER	0.225	HALF_PMF	35311.77	41.16	66.67
HOLMES RUN LOWER	UPPER	0.225	SUNNY_DAY	24642.69	41.16	55.39
HOLMES RUN LOWER	UPPER	0.156	DAM_BREAK	213848.5	41.16	84.71
HOLMES RUN LOWER	UPPER	0.156	PMF	109592.4	41.16	80.63
HOLMES RUN LOWER	UPPER	0.156	HALF_PMF	35311.77	41.16	66.78
HOLMES RUN LOWER	UPPER	0.156	SUNNY_DAY	24642.69	41.16	57.47
HOLMES RUN LOWER	UPPER	0.11	DAM_BREAK	213848.5	41.16	84.66
HOLMES RUN LOWER	UPPER	0.11	PMF	109592.4	41.16	80.6
HOLMES RUN LOWER	UPPER	0.11	HALF_PMF	35311.77	41.16	66.71
HOLMES RUN LOWER	UPPER	0.11	SUNNY_DAY	24642.69	41.16	56.67
HOLMES RUN LOWER	UPPER	0.081	DAM_BREAK	213848.5	41.16	84.65
HOLMES RUN LOWER	UPPER	0.081	PMF	109592.4	41.16	80.59
HOLMES RUN LOWER	UPPER	0.081	HALF_PMF	35311.77	41.16	66.68
HOLMES RUN LOWER	UPPER	0.081	SUNNY_DAY	24642.69	41.16	54.87
HOLMES RUN LOWER	UPPER	0.055	DAM_BREAK	213848.5	39.44	84.62
HOLMES RUN LOWER	UPPER	0.055	PMF	109592.4	39.44	80.58
HOLMES RUN LOWER	UPPER	0.055	HALF_PMF	35311.77	39.44	66.67
HOLMES RUN LOWER	UPPER	0.055	SUNNY_DAY	24642.69	39.44	52.02
HOLMES RUN LOWER	UPPER	0.054		Inl Struct		
HOLMES RUN LOWER	UPPER	0.049	DAM_BREAK	213848.5	33.16	84.61
HOLMES RUN LOWER	UPPER	0.049	PMF	109592.4	33.16	80.57
HOLMES RUN LOWER	UPPER	0.049	HALF_PMF	35311.77	33.16	66.66
HOLMES RUN LOWER	UPPER	0.049	SUNNY_DAY	24642.69	33.16	45.72
HOLMES RUN LOWER	UPPER	0.033	DAM_BREAK	213848.5	33.16	84.6
HOLMES RUN LOWER	UPPER	0.033	PMF	109592.4	33.16	80.57
HOLMES RUN LOWER	UPPER	0.033	HALF_PMF	35311.77	33.16	66.67
HOLMES RUN LOWER	UPPER	0.033	SUNNY_DAY	24642.69	33.16	47.81
CAMERON RUN	UPPER	3.672	DAM_BREAK	257804	33.16	84.51
CAMERON RUN	UPPER	3.672	PMF	176279.6	33.16	80.48
CAMERON RUN	UPPER	3.672	HALF_PMF	70094.73	33.16	66.59
CAMERON RUN	UPPER	3.672	SUNNY_DAY	23319.28	33.16	46.99

HEC-RAS Profile: Peak Flows						
River	Reach	River Sta	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
CAMERON RUN	UPPER	3.642	DAM_BREAK	257804	33.16	84.48
CAMERON RUN	UPPER	3.642	PMF	176279.6	33.16	80.46
CAMERON RUN	UPPER	3.642	HALF_PMF	70094.73	33.16	66.54
CAMERON RUN	UPPER	3.642	SUNNY_DAY	23319.28	33.16	46.77
CAMERON RUN	UPPER	3.611	DAM_BREAK	255901.9	33.16	84.35
CAMERON RUN	UPPER	3.611	PMF	177222.4	33.16	80.34
CAMERON RUN	UPPER	3.611	HALF_PMF	70914.17	33.16	66.42
CAMERON RUN	UPPER	3.611	SUNNY_DAY	23306.87	33.16	46.79
CAMERON RUN	UPPER	3.594		Bridge		
CAMERON RUN	UPPER	3.58	DAM_BREAK	255901.9	31.16	84.25
CAMERON RUN	UPPER	3.58	PMF	177222.4	31.16	80.26
CAMERON RUN	UPPER	3.58	HALF_PMF	70914.17	31.16	66.38
CAMERON RUN	UPPER	3.58	SUNNY_DAY	23306.87	31.16	46.58
CAMERON RUN	UPPER	3.485	DAM_BREAK	261610.8	30.35	84.27
CAMERON RUN	UPPER	3.485	PMF	184109.2	30.35	80.29
CAMERON RUN	UPPER	3.485	HALF_PMF	75627.79	30.35	66.37
CAMERON RUN	UPPER	3.485	SUNNY_DAY	23306.87	30.35	46.29
CAMERON RUN	UPPER	3.429	DAM_BREAK	261610.8	30.08	84.27
CAMERON RUN	UPPER	3.429	PMF	184109.2	30.08	80.29
CAMERON RUN	UPPER	3.429	HALF_PMF	75627.79	30.08	66.39
CAMERON RUN	UPPER	3.429	SUNNY_DAY	23306.87	30.08	46.03
CAMERON RUN	UPPER	3.404		Culvert		
CAMERON RUN	UPPER	3.382	DAM_BREAK	261610.8	29.16	76.08
CAMERON RUN	UPPER	3.382	PMF	184109.2	29.16	67.48
CAMERON RUN	UPPER	3.382	HALF_PMF	75627.79	29.16	54.26
CAMERON RUN	UPPER	3.382	SUNNY_DAY	23306.87	29.16	44.39
CAMERON RUN	UPPER	3.365	DAM_BREAK	261610.8	29.16	61.47
CAMERON RUN	UPPER	3.365	PMF	184109.2	29.16	55
CAMERON RUN	UPPER	3.365	HALF_PMF	75627.79	29.16	52.46
CAMERON RUN	UPPER	3.365	SUNNY_DAY	23306.87	29.16	44.3
CAMERON RUN	UPPER	3.337	DAM_BREAK	261610.8	27.53	64.26
CAMERON RUN	UPPER	3.337	PMF	184109.2	27.53	60
CAMERON RUN	UPPER	3.337	HALF_PMF	75627.79	27.53	53.03
CAMERON RUN	UPPER	3.337	SUNNY_DAY	23306.87	27.53	44.33
CAMERON RUN	UPPER	3.326	DAM_BREAK	261610.8	27.16	64.73
CAMERON RUN	UPPER	3.326	PMF	184109.2	27.16	60.41
CAMERON RUN	UPPER	3.326	HALF_PMF	75627.79	27.16	53.45

HEC-RAS Profile: Peak Flows						
River	Reach	River Sta	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
CAMERON RUN	UPPER	3.326	SUNNY_DAY	23306.87	27.16	44.25
CAMERON RUN	UPPER	3.289	DAM_BREAK	261610.8	26.81	64.04
CAMERON RUN	UPPER	3.289	PMF	184109.2	26.81	59.91
CAMERON RUN	UPPER	3.289	HALF_PMF	75627.79	26.81	53.22
CAMERON RUN	UPPER	3.289	SUNNY_DAY	23306.87	26.81	43.49
CAMERON RUN	UPPER	3.286		Bridge		
CAMERON RUN	UPPER	3.261	DAM_BREAK	261610.8	26.84	59.03
CAMERON RUN	UPPER	3.261	PMF	184109.2	26.84	56.38
CAMERON RUN	UPPER	3.261	HALF_PMF	75627.79	26.84	51.52
CAMERON RUN	UPPER	3.261	SUNNY_DAY	23306.87	26.84	41.1
CAMERON RUN	UPPER	3.227	DAM_BREAK	261610.8	27.16	60.3
CAMERON RUN	UPPER	3.227	PMF	184109.2	27.16	57.17
CAMERON RUN	UPPER	3.227	HALF_PMF	75627.79	27.16	51.74
CAMERON RUN	UPPER	3.227	SUNNY_DAY	23306.87	27.16	41.32
CAMERON RUN	UPPER	3.187	DAM_BREAK	261610.8	27.16	55.95
CAMERON RUN	UPPER	3.187	PMF	184109.2	27.16	53.25
CAMERON RUN	UPPER	3.187	HALF_PMF	75627.79	27.16	50.6
CAMERON RUN	UPPER	3.187	SUNNY_DAY	23306.87	27.16	40.7
CAMERON RUN	UPPER	3.159	DAM_BREAK	261610.8	26.93	55.06
CAMERON RUN	UPPER	3.159	PMF	184109.2	26.93	52.55
CAMERON RUN	UPPER	3.159	HALF_PMF	75627.79	26.93	50.54
CAMERON RUN	UPPER	3.159	SUNNY_DAY	23306.87	26.93	39.81
CAMERON RUN	UPPER	3.149	DAM_BREAK	261610.8	25.16	55.42
CAMERON RUN	UPPER	3.149	PMF	184109.2	25.16	52.4
CAMERON RUN	UPPER	3.149	HALF_PMF	75627.79	25.16	50.84
CAMERON RUN	UPPER	3.149	SUNNY_DAY	23306.87	25.16	39.99
CAMERON RUN	UPPER	3.119	DAM_BREAK	261610.8	25.35	55.47
CAMERON RUN	UPPER	3.119	PMF	184109.2	25.35	52.37
CAMERON RUN	UPPER	3.119	HALF_PMF	75627.79	25.35	50.82
CAMERON RUN	UPPER	3.119	SUNNY_DAY	23306.87	25.35	39.5
CAMERON RUN	UPPER	3.084	DAM_BREAK	261610.8	25.16	55.69
CAMERON RUN	UPPER	3.084	PMF	184109.2	25.16	52.69
CAMERON RUN	UPPER	3.084	HALF_PMF	75627.79	25.16	50.9
CAMERON RUN	UPPER	3.084	SUNNY_DAY	23306.87	25.16	38.86
CAMERON RUN	UPPER	3.039	DAM_BREAK	261610.8	25.16	55.81
CAMERON RUN	UPPER	3.039	PMF	184109.2	25.16	52.73
CAMERON RUN	UPPER	3.039	HALF_PMF	75627.79	25.16	50.91

HEC-RAS Profile: Peak Flows						
River	Reach	River Sta	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
CAMERON RUN	UPPER	3.039	SUNNY_DAY	23306.87	25.16	37.73
CAMERON RUN	UPPER	3.001	DAM_BREAK	261610.8	24.84	55.57
CAMERON RUN	UPPER	3.001	PMF	184109.2	24.84	52.36
CAMERON RUN	UPPER	3.001	HALF_PMF	75627.79	24.84	45.39
CAMERON RUN	UPPER	3.001	SUNNY_DAY	23306.87	24.84	34.55
CAMERON RUN	UPPER	2.987	DAM_BREAK	261610.8	21.16	55.55
CAMERON RUN	UPPER	2.987	PMF	184109.2	21.16	52.29
CAMERON RUN	UPPER	2.987	HALF_PMF	75627.79	21.16	40.43
CAMERON RUN	UPPER	2.987	SUNNY_DAY	23306.87	21.16	34.92
CAMERON RUN	UPPER	2.945	DAM_BREAK	261610.8	21.16	55.42
CAMERON RUN	UPPER	2.945	PMF	184109.2	21.16	52.22
CAMERON RUN	UPPER	2.945	HALF_PMF	75627.79	21.16	43.63
CAMERON RUN	UPPER	2.945	SUNNY_DAY	23306.87	21.16	34.12
CAMERON RUN	UPPER	2.905	DAM_BREAK	261610.8	21.16	55.51
CAMERON RUN	UPPER	2.905	PMF	184109.2	21.16	52.33
CAMERON RUN	UPPER	2.905	HALF_PMF	75627.79	21.16	43.95
CAMERON RUN	UPPER	2.905	SUNNY_DAY	23306.87	21.16	31.44
CAMERON RUN	UPPER	2.855	DAM_BREAK	261610.8	20.2	55.1
CAMERON RUN	UPPER	2.855	PMF	184109.2	20.2	51.96
CAMERON RUN	UPPER	2.855	HALF_PMF	75627.79	20.2	43.3
CAMERON RUN	UPPER	2.855	SUNNY_DAY	23306.87	20.2	31.37
CAMERON RUN	UPPER	2.84	DAM_BREAK	247317	17.16	55.14
CAMERON RUN	UPPER	2.84	PMF	185092.3	17.16	51.86
CAMERON RUN	UPPER	2.84	HALF_PMF	77181.38	17.16	43.3
CAMERON RUN	UPPER	2.84	SUNNY_DAY	23277.86	17.16	29.99
CAMERON RUN	UPPER	2.792	DAM_BREAK	249459.7	17.16	52.37
CAMERON RUN	UPPER	2.792	PMF	189400.1	17.16	48.81
CAMERON RUN	UPPER	2.792	HALF_PMF	80230.25	17.16	37.94
CAMERON RUN	UPPER	2.792	SUNNY_DAY	23183.09	17.16	27.75
CAMERON RUN	UPPER	2.751	DAM_BREAK	249459.7	17.16	52.88
CAMERON RUN	UPPER	2.751	PMF	189400.1	17.16	49.5
CAMERON RUN	UPPER	2.751	HALF_PMF	80230.25	17.16	37.07
CAMERON RUN	UPPER	2.751	SUNNY_DAY	23183.09	17.16	27.62
CAMERON RUN	UPPER	2.711	DAM_BREAK	249459.7	16.87	53.08
CAMERON RUN	UPPER	2.711	PMF	189400.1	16.87	49.7
CAMERON RUN	UPPER	2.711	HALF_PMF	80230.25	16.87	37.05
CAMERON RUN	UPPER	2.711	SUNNY_DAY	23183.09	16.87	26.39

HEC-RAS Profile: Peak Flows						
River	Reach	River Sta	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
CAMERON RUN	UPPER	2.691	DAM_BREAK	249459.7	14.74	47.46
CAMERON RUN	UPPER	2.691	PMF	189400.1	14.74	45.77
CAMERON RUN	UPPER	2.691	HALF_PMF	80230.25	14.74	35.9
CAMERON RUN	UPPER	2.691	SUNNY_DAY	23183.09	14.74	26.76
CAMERON RUN	UPPER	2.656	DAM_BREAK	249552.5	14.4	46.69
CAMERON RUN	UPPER	2.656	PMF	189655.1	14.4	43.18
CAMERON RUN	UPPER	2.656	HALF_PMF	80423.41	14.4	34.71
CAMERON RUN	UPPER	2.656	SUNNY_DAY	23178.31	14.4	26.1
CAMERON RUN	UPPER	2.617	DAM_BREAK	249552.5	13.16	45.61
CAMERON RUN	UPPER	2.617	PMF	189655.1	13.16	42.66
CAMERON RUN	UPPER	2.617	HALF_PMF	80423.41	13.16	32.77
CAMERON RUN	UPPER	2.617	SUNNY_DAY	23178.31	13.16	25.23
CAMERON RUN	UPPER	2.581	DAM_BREAK	249552.5	14	44.71
CAMERON RUN	UPPER	2.581	PMF	189655.1	14	41.91
CAMERON RUN	UPPER	2.581	HALF_PMF	80423.41	14	33.05
CAMERON RUN	UPPER	2.581	SUNNY_DAY	23178.31	14	24.22
CAMERON RUN	UPPER	2.559	DAM_BREAK	249552.5	9.16	45.52
CAMERON RUN	UPPER	2.559	PMF	189655.1	9.16	42.56
CAMERON RUN	UPPER	2.559	HALF_PMF	80423.41	9.16	33.79
CAMERON RUN	UPPER	2.559	SUNNY_DAY	23178.31	9.16	24.79
CAMERON RUN	UPPER	2.519	DAM_BREAK	247321.4	9.16	44.29
CAMERON RUN	UPPER	2.519	PMF	189788.5	9.16	41.59
CAMERON RUN	UPPER	2.519	HALF_PMF	80442.27	9.16	33.28
CAMERON RUN	UPPER	2.519	SUNNY_DAY	23000.23	9.16	24.49
CAMERON RUN	UPPER	2.472	DAM_BREAK	247321.4	9.16	41.92
CAMERON RUN	UPPER	2.472	PMF	189788.5	9.16	39.28
CAMERON RUN	UPPER	2.472	HALF_PMF	80442.27	9.16	32.39
CAMERON RUN	UPPER	2.472	SUNNY_DAY	23000.23	9.16	24.24
CAMERON RUN	UPPER	2.403	DAM_BREAK	247321.4	9.16	42.9
CAMERON RUN	UPPER	2.403	PMF	189788.5	9.16	40.1
CAMERON RUN	UPPER	2.403	HALF_PMF	80442.27	9.16	32.14
CAMERON RUN	UPPER	2.403	SUNNY_DAY	23000.23	9.16	23.76
CAMERON RUN	UPPER	2.369	DAM_BREAK	247321.4	9.16	43.24
CAMERON RUN	UPPER	2.369	PMF	189788.5	9.16	40.34
CAMERON RUN	UPPER	2.369	HALF_PMF	80442.27	9.16	31.76
CAMERON RUN	UPPER	2.369	SUNNY_DAY	23000.23	9.16	23.55
CAMERON RUN	UPPER	2.34	DAM_BREAK	247321.4	9.16	42.47
CAMERON RUN	UPPER	2.34	PMF	189788.5	9.16	39.71

HEC-RAS Profile: Peak Flows						
River	Reach	River Sta	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
CAMERON RUN	UPPER	2.34	HALF_PMF	80442.27	9.16	31.58
CAMERON RUN	UPPER	2.34	SUNNY_DAY	23000.23	9.16	23.36
CAMERON RUN	UPPER	2.137	DAM_BREAK	247321.4	2.5	41.65
CAMERON RUN	UPPER	2.137	PMF	189788.5	2.5	39.03
CAMERON RUN	UPPER	2.137	HALF_PMF	80442.27	2.5	31.52
CAMERON RUN	UPPER	2.137	SUNNY_DAY	23000.23	2.5	23.25
CAMERON RUN	UPPER	2.104	DAM_BREAK	247321.4	2	41.82
CAMERON RUN	UPPER	2.104	PMF	189788.5	2	39.16
CAMERON RUN	UPPER	2.104	HALF_PMF	80442.27	2	31.55
CAMERON RUN	UPPER	2.104	SUNNY_DAY	23000.23	2	23.23
CAMERON RUN	UPPER	2.065	DAM_BREAK	246378	1.7	41.9
CAMERON RUN	UPPER	2.065	PMF	190465.7	1.7	39.24
CAMERON RUN	UPPER	2.065	HALF_PMF	81015.38	1.7	31.58
CAMERON RUN	UPPER	2.065	SUNNY_DAY	22927.81	1.7	23.17
CAMERON RUN	UPPER	2.036		Bridge		
CAMERON RUN	UPPER	2.006	DAM_BREAK	246378	1.4	41.75
CAMERON RUN	UPPER	2.006	PMF	190465.7	1.4	39.09
CAMERON RUN	UPPER	2.006	HALF_PMF	81015.38	1.4	31.38
CAMERON RUN	UPPER	2.006	SUNNY_DAY	22927.81	1.4	22.02
CAMERON RUN	UPPER	1.956	DAM_BREAK	246378	-0.2	41.28
CAMERON RUN	UPPER	1.956	PMF	190465.7	-0.2	38.64
CAMERON RUN	UPPER	1.956	HALF_PMF	81015.38	-0.2	30.98
CAMERON RUN	UPPER	1.956	SUNNY_DAY	22927.81	-0.2	21.34
CAMERON RUN	UPPER	1.875	DAM_BREAK	246378	-1.2	40.64
CAMERON RUN	UPPER	1.875	PMF	190465.7	-1.2	38
CAMERON RUN	UPPER	1.875	HALF_PMF	81015.38	-1.2	30.47
CAMERON RUN	UPPER	1.875	SUNNY_DAY	22927.81	-1.2	20.24
CAMERON RUN	UPPER	1.764	DAM_BREAK	246378	-2.4	39.25
CAMERON RUN	UPPER	1.764	PMF	190465.7	-2.4	36.44
CAMERON RUN	UPPER	1.764	HALF_PMF	81015.38	-2.4	28.02
CAMERON RUN	UPPER	1.764	SUNNY_DAY	22927.81	-2.4	18.46
CAMERON RUN	UPPER	1.746	DAM_BREAK	249592	0.14	39.23
CAMERON RUN	UPPER	1.746	PMF	196925.4	0.14	36.44
CAMERON RUN	UPPER	1.746	HALF_PMF	84982.52	0.14	28.35
CAMERON RUN	UPPER	1.746	SUNNY_DAY	20238.08	0.14	18.82
CAMERON RUN	UPPER	1.724		Bridge		

HEC-RAS Profile: Peak Flows						
River	Reach	River Sta	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
CAMERON RUN	UPPER	1.702	DAM_BREAK	249592	-1.21	38.42
CAMERON RUN	UPPER	1.702	PMF	196925.4	-1.21	35.82
CAMERON RUN	UPPER	1.702	HALF_PMF	84982.52	-1.21	27.84
CAMERON RUN	UPPER	1.702	SUNNY_DAY	20238.08	-1.21	16.79
CAMERON RUN	UPPER	1.677	DAM_BREAK	249592	0.7	36.31
CAMERON RUN	UPPER	1.677	PMF	196925.4	0.7	33.92
CAMERON RUN	UPPER	1.677	HALF_PMF	84982.52	0.7	26.62
CAMERON RUN	UPPER	1.677	SUNNY_DAY	20238.08	0.7	15.72
CAMERON RUN	UPPER	1.606	DAM_BREAK	249592	-3.8	34.96
CAMERON RUN	UPPER	1.606	PMF	196925.4	-3.8	32.82
CAMERON RUN	UPPER	1.606	HALF_PMF	84982.52	-3.8	25.03
CAMERON RUN	UPPER	1.606	SUNNY_DAY	20238.08	-3.8	14
CAMERON RUN	UPPER	1.519	DAM_BREAK	250781.8	0.2	33.93
CAMERON RUN	UPPER	1.519	PMF	202027.9	0.2	31.64
CAMERON RUN	UPPER	1.519	HALF_PMF	86896.03	0.2	23.87
CAMERON RUN	UPPER	1.519	SUNNY_DAY	18168.1	0.2	13.35
CAMERON RUN	UPPER	1.454	DAM_BREAK	250781.8	-0.2	33.89
CAMERON RUN	UPPER	1.454	PMF	202027.9	-0.2	31.65
CAMERON RUN	UPPER	1.454	HALF_PMF	86896.03	-0.2	23.78
CAMERON RUN	UPPER	1.454	SUNNY_DAY	18168.1	-0.2	13.01
CAMERON RUN	UPPER	1.388	DAM_BREAK	250781.8	-1.5	34.13
CAMERON RUN	UPPER	1.388	PMF	202027.9	-1.5	31.85
CAMERON RUN	UPPER	1.388	HALF_PMF	86896.03	-1.5	23.86
CAMERON RUN	UPPER	1.388	SUNNY_DAY	18168.1	-1.5	12.64
CAMERON RUN	UPPER	1.232	DAM_BREAK	250781.8	-1.5	33.42
CAMERON RUN	UPPER	1.232	PMF	202027.9	-1.5	31.25
CAMERON RUN	UPPER	1.232	HALF_PMF	86896.03	-1.5	23.46
CAMERON RUN	UPPER	1.232	SUNNY_DAY	18168.1	-1.5	12.36
CAMERON RUN	UPPER	1.174	DAM_BREAK	250781.8	0.53	32.49
CAMERON RUN	UPPER	1.174	PMF	202027.9	0.53	30.44
CAMERON RUN	UPPER	1.174	HALF_PMF	86896.03	0.53	23.09
CAMERON RUN	UPPER	1.174	SUNNY_DAY	18168.1	0.53	12.23
CAMERON RUN	UPPER	1.163	DAM_BREAK	250781.8	0.45	32.37
CAMERON RUN	UPPER	1.163	PMF	202027.9	0.45	30.38
CAMERON RUN	UPPER	1.163	HALF_PMF	86896.03	0.45	22.97
CAMERON RUN	UPPER	1.163	SUNNY_DAY	18168.1	0.45	12.14
CAMERON RUN	UPPER	1.152	DAM_BREAK	250781.8	0.5	32.3
CAMERON RUN	UPPER	1.152	PMF	202027.9	0.5	30.29

HEC-RAS Profile: Peak Flows						
River	Reach	River Sta	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
CAMERON RUN	UPPER	1.152	HALF_PMF	86896.03	0.5	22.89
CAMERON RUN	UPPER	1.152	SUNNY_DAY	18168.1	0.5	12.05
CAMERON RUN	UPPER	1.14	DAM_BREAK	250781.8	0.41	32.25
CAMERON RUN	UPPER	1.14	PMF	202027.9	0.41	30.29
CAMERON RUN	UPPER	1.14	HALF_PMF	86896.03	0.41	22.87
CAMERON RUN	UPPER	1.14	SUNNY_DAY	18168.1	0.41	11.98
CAMERON RUN	UPPER	1.129	DAM_BREAK	250781.8	0.27	32.26
CAMERON RUN	UPPER	1.129	PMF	202027.9	0.27	30.27
CAMERON RUN	UPPER	1.129	HALF_PMF	86896.03	0.27	22.84
CAMERON RUN	UPPER	1.129	SUNNY_DAY	18168.1	0.27	11.91
CAMERON RUN	UPPER	1.117	DAM_BREAK	250781.8	0.25	32.11
CAMERON RUN	UPPER	1.117	PMF	202027.9	0.25	30.15
CAMERON RUN	UPPER	1.117	HALF_PMF	86896.03	0.25	22.69
CAMERON RUN	UPPER	1.117	SUNNY_DAY	18168.1	0.25	11.87
CAMERON RUN	UPPER	1.106	DAM_BREAK	250781.8	0.22	32.01
CAMERON RUN	UPPER	1.106	PMF	202027.9	0.22	30.05
CAMERON RUN	UPPER	1.106	HALF_PMF	86896.03	0.22	22.69
CAMERON RUN	UPPER	1.106	SUNNY_DAY	18168.1	0.22	11.85
CAMERON RUN	UPPER	1.095	DAM_BREAK	250781.8	0.22	32.02
CAMERON RUN	UPPER	1.095	PMF	202027.9	0.22	30.07
CAMERON RUN	UPPER	1.095	HALF_PMF	86896.03	0.22	22.67
CAMERON RUN	UPPER	1.095	SUNNY_DAY	18168.1	0.22	11.83
CAMERON RUN	UPPER	1.083	DAM_BREAK	250781.8	0.31	31.97
CAMERON RUN	UPPER	1.083	PMF	202027.9	0.31	30.04
CAMERON RUN	UPPER	1.083	HALF_PMF	86896.03	0.31	22.63
CAMERON RUN	UPPER	1.083	SUNNY_DAY	18168.1	0.31	11.8
CAMERON RUN	UPPER	1.072	DAM_BREAK	250781.8	0.06	31.81
CAMERON RUN	UPPER	1.072	PMF	202027.9	0.06	29.88
CAMERON RUN	UPPER	1.072	HALF_PMF	86896.03	0.06	22.58
CAMERON RUN	UPPER	1.072	SUNNY_DAY	18168.1	0.06	11.77
CAMERON RUN	UPPER	1.061	DAM_BREAK	250781.8	0.06	31.48
CAMERON RUN	UPPER	1.061	PMF	202027.9	0.06	29.63
CAMERON RUN	UPPER	1.061	HALF_PMF	86896.03	0.06	22.53
CAMERON RUN	UPPER	1.061	SUNNY_DAY	18168.1	0.06	11.74
CAMERON RUN	UPPER	1.049	DAM_BREAK	250781.8	0.06	31.27
CAMERON RUN	UPPER	1.049	PMF	202027.9	0.06	29.5
CAMERON RUN	UPPER	1.049	HALF_PMF	86896.03	0.06	22.48
CAMERON RUN	UPPER	1.049	SUNNY_DAY	18168.1	0.06	11.71

HEC-RAS Profile: Peak Flows						
River	Reach	River Sta	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
CAMERON RUN	UPPER	1.038	DAM_BREAK	250781.8	0.14	31.17
CAMERON RUN	UPPER	1.038	PMF	202027.9	0.14	29.47
CAMERON RUN	UPPER	1.038	HALF_PMF	86896.03	0.14	22.46
CAMERON RUN	UPPER	1.038	SUNNY_DAY	18168.1	0.14	11.68
CAMERON RUN	UPPER	1.027	DAM_BREAK	250781.8	0.2	31.08
CAMERON RUN	UPPER	1.027	PMF	202027.9	0.2	29.43
CAMERON RUN	UPPER	1.027	HALF_PMF	86896.03	0.2	22.44
CAMERON RUN	UPPER	1.027	SUNNY_DAY	18168.1	0.2	11.67
CAMERON RUN	UPPER	1.015	DAM_BREAK	250781.8	0.2	31
CAMERON RUN	UPPER	1.015	PMF	202027.9	0.2	29.32
CAMERON RUN	UPPER	1.015	HALF_PMF	86896.03	0.2	22.4
CAMERON RUN	UPPER	1.015	SUNNY_DAY	18168.1	0.2	11.64
CAMERON RUN	UPPER	1.004	DAM_BREAK	250781.8	0.19	30.89
CAMERON RUN	UPPER	1.004	PMF	202027.9	0.19	29.16
CAMERON RUN	UPPER	1.004	HALF_PMF	86896.03	0.19	22.35
CAMERON RUN	UPPER	1.004	SUNNY_DAY	18168.1	0.19	11.6
CAMERON RUN	UPPER	0.992	DAM_BREAK	250781.8	0.19	30.92
CAMERON RUN	UPPER	0.992	PMF	202027.9	0.19	29.19
CAMERON RUN	UPPER	0.992	HALF_PMF	86896.03	0.19	22.36
CAMERON RUN	UPPER	0.992	SUNNY_DAY	18168.1	0.19	11.6
CAMERON RUN	UPPER	0.981	DAM_BREAK	250781.8	0.27	30.84
CAMERON RUN	UPPER	0.981	PMF	202027.9	0.27	29.13
CAMERON RUN	UPPER	0.981	HALF_PMF	86896.03	0.27	22.34
CAMERON RUN	UPPER	0.981	SUNNY_DAY	18168.1	0.27	11.55
CAMERON RUN	UPPER	0.97	DAM_BREAK	250781.8	0.27	31.12
CAMERON RUN	UPPER	0.97	PMF	202027.9	0.27	29.34
CAMERON RUN	UPPER	0.97	HALF_PMF	86896.03	0.27	22.44
CAMERON RUN	UPPER	0.97	SUNNY_DAY	18168.1	0.27	11.57
CAMERON RUN	UPPER	0.958	DAM_BREAK	250781.8	0.27	30.91
CAMERON RUN	UPPER	0.958	PMF	202027.9	0.27	29.23
CAMERON RUN	UPPER	0.958	HALF_PMF	86896.03	0.27	22.37
CAMERON RUN	UPPER	0.958	SUNNY_DAY	18168.1	0.27	11.51
CAMERON RUN	UPPER	0.947	DAM_BREAK	250781.8	0.27	30.04
CAMERON RUN	UPPER	0.947	PMF	202027.9	0.27	28.55
CAMERON RUN	UPPER	0.947	HALF_PMF	86896.03	0.27	22.13
CAMERON RUN	UPPER	0.947	SUNNY_DAY	18168.1	0.27	11.42
CAMERON RUN	UPPER	0.936	DAM_BREAK	250781.8	0.28	29.96

HEC-RAS Profile: Peak Flows						
River	Reach	River Sta	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
CAMERON RUN	UPPER	0.936	PMF	202027.9	0.28	28.52
CAMERON RUN	UPPER	0.936	HALF_PMF	86896.03	0.28	22.09
CAMERON RUN	UPPER	0.936	SUNNY_DAY	18168.1	0.28	11.35
CAMERON RUN	UPPER	0.924	DAM_BREAK	250781.8	0.27	29.69
CAMERON RUN	UPPER	0.924	PMF	202027.9	0.27	28.29
CAMERON RUN	UPPER	0.924	HALF_PMF	86896.03	0.27	22
CAMERON RUN	UPPER	0.924	SUNNY_DAY	18168.1	0.27	11.33
CAMERON RUN	UPPER	0.913	DAM_BREAK	250781.8	0.27	29.65
CAMERON RUN	UPPER	0.913	PMF	202027.9	0.27	28.29
CAMERON RUN	UPPER	0.913	HALF_PMF	86896.03	0.27	21.98
CAMERON RUN	UPPER	0.913	SUNNY_DAY	18168.1	0.27	11.32
CAMERON RUN	UPPER	0.902	DAM_BREAK	250781.8	0.3	29.55
CAMERON RUN	UPPER	0.902	PMF	202027.9	0.3	28.23
CAMERON RUN	UPPER	0.902	HALF_PMF	86896.03	0.3	21.93
CAMERON RUN	UPPER	0.902	SUNNY_DAY	18168.1	0.3	11.26
CAMERON RUN	UPPER	0.89	DAM_BREAK	250781.8	0.3	29.48
CAMERON RUN	UPPER	0.89	PMF	202027.9	0.3	27.98
CAMERON RUN	UPPER	0.89	HALF_PMF	86896.03	0.3	21.88
CAMERON RUN	UPPER	0.89	SUNNY_DAY	18168.1	0.3	11.24
CAMERON RUN	UPPER	0.879	DAM_BREAK	250781.8	0.27	29.45
CAMERON RUN	UPPER	0.879	PMF	202027.9	0.27	27.99
CAMERON RUN	UPPER	0.879	HALF_PMF	86896.03	0.27	21.87
CAMERON RUN	UPPER	0.879	SUNNY_DAY	18168.1	0.27	11.23
CAMERON RUN	UPPER	0.867	DAM_BREAK	250781.8	0.27	29.48
CAMERON RUN	UPPER	0.867	PMF	202027.9	0.27	28
CAMERON RUN	UPPER	0.867	HALF_PMF	86896.03	0.27	21.86
CAMERON RUN	UPPER	0.867	SUNNY_DAY	18168.1	0.27	11.21
CAMERON RUN	UPPER	0.856	DAM_BREAK	250781.8	0.27	29.53
CAMERON RUN	UPPER	0.856	PMF	202027.9	0.27	28.01
CAMERON RUN	UPPER	0.856	HALF_PMF	86896.03	0.27	21.85
CAMERON RUN	UPPER	0.856	SUNNY_DAY	18168.1	0.27	11.19
CAMERON RUN	UPPER	0.845	DAM_BREAK	250781.8	0.28	29.55
CAMERON RUN	UPPER	0.845	PMF	202027.9	0.28	28.03
CAMERON RUN	UPPER	0.845	HALF_PMF	86896.03	0.28	21.87
CAMERON RUN	UPPER	0.845	SUNNY_DAY	18168.1	0.28	11.2
CAMERON RUN	UPPER	0.833	DAM_BREAK	250781.8	-0.37	29.24
CAMERON RUN	UPPER	0.833	PMF	202027.9	-0.37	27.78
CAMERON RUN	UPPER	0.833	HALF_PMF	86896.03	-0.37	21.76

HEC-RAS Profile: Peak Flows						
River	Reach	River Sta	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
CAMERON RUN	UPPER	0.833	SUNNY_DAY	18168.1	-0.37	11.12
CAMERON RUN	UPPER	0.822	DAM_BREAK	250781.8	-0.46	29.31
CAMERON RUN	UPPER	0.822	PMF	202027.9	-0.46	27.82
CAMERON RUN	UPPER	0.822	HALF_PMF	86896.03	-0.46	21.7
CAMERON RUN	UPPER	0.822	SUNNY_DAY	18168.1	-0.46	10.94
CAMERON RUN	UPPER	0.811	DAM_BREAK	250781.8	-0.5	29.26
CAMERON RUN	UPPER	0.811	PMF	202027.9	-0.5	27.78
CAMERON RUN	UPPER	0.811	HALF_PMF	86896.03	-0.5	21.68
CAMERON RUN	UPPER	0.811	SUNNY_DAY	18168.1	-0.5	10.96
CAMERON RUN	UPPER	0.801	DAM_BREAK	250781.8	-0.47	28.95
CAMERON RUN	UPPER	0.801	PMF	202027.9	-0.47	27.5
CAMERON RUN	UPPER	0.801	HALF_PMF	86896.03	-0.47	21.51
CAMERON RUN	UPPER	0.801	SUNNY_DAY	18168.1	-0.47	10.81
CAMERON RUN	UPPER	0.791	DAM_BREAK	250781.8	-1.7	28.93
CAMERON RUN	UPPER	0.791	PMF	202027.9	-1.7	27.48
CAMERON RUN	UPPER	0.791	HALF_PMF	86896.03	-1.7	21.48
CAMERON RUN	UPPER	0.791	SUNNY_DAY	18168.1	-1.7	10.75
CAMERON RUN	UPPER	0.78	DAM_BREAK	250781.8	-0.59	28.93
CAMERON RUN	UPPER	0.78	PMF	202027.9	-0.59	27.46
CAMERON RUN	UPPER	0.78	HALF_PMF	86896.03	-0.59	21.43
CAMERON RUN	UPPER	0.78	SUNNY_DAY	18168.1	-0.59	10.69
CAMERON RUN	UPPER	0.77	DAM_BREAK	250781.8	-2	28.61
CAMERON RUN	UPPER	0.77	PMF	202027.9	-2	27.19
CAMERON RUN	UPPER	0.77	HALF_PMF	86896.03	-2	21.31
CAMERON RUN	UPPER	0.77	SUNNY_DAY	18168.1	-2	10.67
CAMERON RUN	UPPER	0.761	DAM_BREAK	250781.8	-1.26	28.82
CAMERON RUN	UPPER	0.761	PMF	202027.9	-1.26	27.36
CAMERON RUN	UPPER	0.761	HALF_PMF	86896.03	-1.26	21.36
CAMERON RUN	UPPER	0.761	SUNNY_DAY	18168.1	-1.26	10.55
CAMERON RUN	UPPER	0.752	DAM_BREAK	250781.8	-2	27.79
CAMERON RUN	UPPER	0.752	PMF	202027.9	-2	26.32
CAMERON RUN	UPPER	0.752	HALF_PMF	86896.03	-2	20.55
CAMERON RUN	UPPER	0.752	SUNNY_DAY	18168.1	-2	10.43
CAMERON RUN	UPPER	0.74	DAM_BREAK	250781.8	-1.82	27.83
CAMERON RUN	UPPER	0.74	PMF	202027.9	-1.82	26.41
CAMERON RUN	UPPER	0.74	HALF_PMF	86896.03	-1.82	20.49
CAMERON RUN	UPPER	0.74	SUNNY_DAY	18168.1	-1.82	10.35

HEC-RAS Profile: Peak Flows						
River	Reach	River Sta	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
CAMERON RUN	UPPER	0.729	DAM_BREAK	250781.8	-2	27.89
CAMERON RUN	UPPER	0.729	PMF	202027.9	-2	26.45
CAMERON RUN	UPPER	0.729	HALF_PMF	86896.03	-2	20.45
CAMERON RUN	UPPER	0.729	SUNNY_DAY	18168.1	-2	10.24
CAMERON RUN	UPPER	0.717	DAM_BREAK	250781.8	-1.99	27.59
CAMERON RUN	UPPER	0.717	PMF	202027.9	-1.99	26.27
CAMERON RUN	UPPER	0.717	HALF_PMF	86896.03	-1.99	20.29
CAMERON RUN	UPPER	0.717	SUNNY_DAY	18168.1	-1.99	10.17
CAMERON RUN	UPPER	0.705	DAM_BREAK	250781.8	-2.3	27.92
CAMERON RUN	UPPER	0.705	PMF	202027.9	-2.3	26.51
CAMERON RUN	UPPER	0.705	HALF_PMF	86896.03	-2.3	20.4
CAMERON RUN	UPPER	0.705	SUNNY_DAY	18168.1	-2.3	10.07
CAMERON RUN	UPPER	0.693	DAM_BREAK	250781.8	-1.61	27.12
CAMERON RUN	UPPER	0.693	PMF	202027.9	-1.61	25.74
CAMERON RUN	UPPER	0.693	HALF_PMF	86896.03	-1.61	19.73
CAMERON RUN	UPPER	0.693	SUNNY_DAY	18168.1	-1.61	9.83
CAMERON RUN	UPPER	0.681	DAM_BREAK	250781.8	-1.2	26.55
CAMERON RUN	UPPER	0.681	PMF	202027.9	-1.2	25.27
CAMERON RUN	UPPER	0.681	HALF_PMF	86896.03	-1.2	19.71
CAMERON RUN	UPPER	0.681	SUNNY_DAY	18168.1	-1.2	9.86
CAMERON RUN	UPPER	0.67	DAM_BREAK	250781.8	-0.91	26.64
CAMERON RUN	UPPER	0.67	PMF	202027.9	-0.91	25.42
CAMERON RUN	UPPER	0.67	HALF_PMF	86896.03	-0.91	19.93
CAMERON RUN	UPPER	0.67	SUNNY_DAY	18168.1	-0.91	9.9
CAMERON RUN	UPPER	0.659	DAM_BREAK	238230.1	-2.5	27.24
CAMERON RUN	UPPER	0.659	PMF	202831.2	-2.5	25.86
CAMERON RUN	UPPER	0.659	HALF_PMF	87100.4	-2.5	20.05
CAMERON RUN	UPPER	0.659	SUNNY_DAY	15218.71	-2.5	9.99
CAMERON RUN	UPPER	0.647	DAM_BREAK	238230.1	-2.12	26.8
CAMERON RUN	UPPER	0.647	PMF	202831.2	-2.12	25.42
CAMERON RUN	UPPER	0.647	HALF_PMF	87100.4	-2.12	19.57
CAMERON RUN	UPPER	0.647	SUNNY_DAY	15218.71	-2.12	9.71
CAMERON RUN	UPPER	0.636	DAM_BREAK	238230.1	-3.5	26.9
CAMERON RUN	UPPER	0.636	PMF	202831.2	-3.5	25.52
CAMERON RUN	UPPER	0.636	HALF_PMF	87100.4	-3.5	19.69
CAMERON RUN	UPPER	0.636	SUNNY_DAY	15218.71	-3.5	9.7
CAMERON RUN	UPPER	0.623	DAM_BREAK	238230.1	-3.5	26.82
CAMERON RUN	UPPER	0.623	PMF	202831.2	-3.5	25.44

HEC-RAS Profile: Peak Flows						
River	Reach	River Sta	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
CAMERON RUN	UPPER	0.623	HALF_PMF	87100.4	-3.5	19.58
CAMERON RUN	UPPER	0.623	SUNNY_DAY	15218.71	-3.5	9.63
CAMERON RUN	UPPER	0.611	DAM_BREAK	238230.1	-2.23	26.82
CAMERON RUN	UPPER	0.611	PMF	202831.2	-2.23	25.44
CAMERON RUN	UPPER	0.611	HALF_PMF	87100.4	-2.23	19.6
CAMERON RUN	UPPER	0.611	SUNNY_DAY	15218.71	-2.23	9.58
CAMERON RUN	UPPER	0.602	DAM_BREAK	238230.1	-2.25	26.69
CAMERON RUN	UPPER	0.602	PMF	202831.2	-2.25	25.32
CAMERON RUN	UPPER	0.602	HALF_PMF	87100.4	-2.25	19.55
CAMERON RUN	UPPER	0.602	SUNNY_DAY	15218.71	-2.25	9.57
CAMERON RUN	UPPER	0.594	DAM_BREAK	238230.1	-2.25	26.65
CAMERON RUN	UPPER	0.594	PMF	202831.2	-2.25	25.26
CAMERON RUN	UPPER	0.594	HALF_PMF	87100.4	-2.25	19.34
CAMERON RUN	UPPER	0.594	SUNNY_DAY	15218.71	-2.25	9.31
CAMERON RUN	UPPER	0.581	DAM_BREAK	238230.1	-2	26.68
CAMERON RUN	UPPER	0.581	PMF	202831.2	-2	25.3
CAMERON RUN	UPPER	0.581	HALF_PMF	87100.4	-2	19.41
CAMERON RUN	UPPER	0.581	SUNNY_DAY	15218.71	-2	9.34
CAMERON RUN	UPPER	0.569	DAM_BREAK	238230.1	-2	26.56
CAMERON RUN	UPPER	0.569	PMF	202831.2	-2	25.18
CAMERON RUN	UPPER	0.569	HALF_PMF	87100.4	-2	19.24
CAMERON RUN	UPPER	0.569	SUNNY_DAY	15218.71	-2	9.2
CAMERON RUN	UPPER	0.56	DAM_BREAK	238230.1	-2.27	26.17
CAMERON RUN	UPPER	0.56	PMF	202831.2	-2.27	24.79
CAMERON RUN	UPPER	0.56	HALF_PMF	87100.4	-2.27	18.83
CAMERON RUN	UPPER	0.56	SUNNY_DAY	15218.71	-2.27	9.2
CAMERON RUN	UPPER	0.55	DAM_BREAK	238230.1	-2.27	26.16
CAMERON RUN	UPPER	0.55	PMF	202831.2	-2.27	24.77
CAMERON RUN	UPPER	0.55	HALF_PMF	87100.4	-2.27	18.54
CAMERON RUN	UPPER	0.55	SUNNY_DAY	15218.71	-2.27	8.97
CAMERON RUN	UPPER	0.538	DAM_BREAK	238230.1	-2	25.45
CAMERON RUN	UPPER	0.538	PMF	202831.2	-2	24.01
CAMERON RUN	UPPER	0.538	HALF_PMF	87100.4	-2	17.27
CAMERON RUN	UPPER	0.538	SUNNY_DAY	15218.71	-2	8.98
CAMERON RUN	UPPER	0.526	DAM_BREAK	238230.1	-2	25.38
CAMERON RUN	UPPER	0.526	PMF	202831.2	-2	23.93
CAMERON RUN	UPPER	0.526	HALF_PMF	87100.4	-2	17.25
CAMERON RUN	UPPER	0.526	SUNNY_DAY	15218.71	-2	8.86

HEC-RAS Profile: Peak Flows						
River	Reach	River Sta	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
CAMERON RUN	UPPER	0.515	DAM_BREAK	238230.1	-2	25.07
CAMERON RUN	UPPER	0.515	PMF	202831.2	-2	23.62
CAMERON RUN	UPPER	0.515	HALF_PMF	87100.4	-2	16.82
CAMERON RUN	UPPER	0.515	SUNNY_DAY	15218.71	-2	8.85
CAMERON RUN	UPPER	0.51	DAM_BREAK	238230.1	-2	24.4
CAMERON RUN	UPPER	0.51	PMF	202831.2	-2	23.08
CAMERON RUN	UPPER	0.51	HALF_PMF	87100.4	-2	17.18
CAMERON RUN	UPPER	0.51	SUNNY_DAY	15218.71	-2	8.93
CAMERON RUN	UPPER	0.505	DAM_BREAK	238230.1	-2	24.8
CAMERON RUN	UPPER	0.505	PMF	202831.2	-2	23.46
CAMERON RUN	UPPER	0.505	HALF_PMF	87100.4	-2	17.41
CAMERON RUN	UPPER	0.505	SUNNY_DAY	15218.71	-2	8.99
CAMERON RUN	UPPER	0.5	DAM_BREAK	238230.1	-2	24.19
CAMERON RUN	UPPER	0.5	PMF	202831.2	-2	22.85
CAMERON RUN	UPPER	0.5	HALF_PMF	87100.4	-2	17.14
CAMERON RUN	UPPER	0.5	SUNNY_DAY	15218.71	-2	8.97
CAMERON RUN	UPPER	0.495	DAM_BREAK	238230.1	-2.7	24.51
CAMERON RUN	UPPER	0.495	PMF	202831.2	-2.7	23.16
CAMERON RUN	UPPER	0.495	HALF_PMF	87100.4	-2.7	17.23
CAMERON RUN	UPPER	0.495	SUNNY_DAY	15218.71	-2.7	8.88
CAMERON RUN	UPPER	0.49	DAM_BREAK	238230.1	-2.7	24.63
CAMERON RUN	UPPER	0.49	PMF	202831.2	-2.7	23.29
CAMERON RUN	UPPER	0.49	HALF_PMF	87100.4	-2.7	17.29
CAMERON RUN	UPPER	0.49	SUNNY_DAY	15218.71	-2.7	8.89
CAMERON RUN	UPPER	0.485	DAM_BREAK	238230.1	-2.7	24.52
CAMERON RUN	UPPER	0.485	PMF	202831.2	-2.7	23.18
CAMERON RUN	UPPER	0.485	HALF_PMF	87100.4	-2.7	17.13
CAMERON RUN	UPPER	0.485	SUNNY_DAY	15218.71	-2.7	8.89
CAMERON RUN	UPPER	0.48	DAM_BREAK	238230.1	-2.7	24.29
CAMERON RUN	UPPER	0.48	PMF	202831.2	-2.7	22.97
CAMERON RUN	UPPER	0.48	HALF_PMF	87100.4	-2.7	17.1
CAMERON RUN	UPPER	0.48	SUNNY_DAY	15218.71	-2.7	8.86
CAMERON RUN	UPPER	0.474	DAM_BREAK	238230.1	-3.2	24.27
CAMERON RUN	UPPER	0.474	PMF	202831.2	-3.2	22.96
CAMERON RUN	UPPER	0.474	HALF_PMF	87100.4	-3.2	17.12
CAMERON RUN	UPPER	0.474	SUNNY_DAY	15218.71	-3.2	8.85
CAMERON RUN	UPPER	0.465	DAM_BREAK	238230.1	-3.2	24.12

HEC-RAS Profile: Peak Flows						
River	Reach	River Sta	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
CAMERON RUN	UPPER	0.465	PMF	202831.2	-3.2	22.78
CAMERON RUN	UPPER	0.465	HALF_PMF	87100.4	-3.2	16.58
CAMERON RUN	UPPER	0.465	SUNNY_DAY	15218.71	-3.2	8.62
CAMERON RUN	UPPER	0.455	DAM_BREAK	238230.1	-3.5	24.33
CAMERON RUN	UPPER	0.455	PMF	202831.2	-3.5	22.98
CAMERON RUN	UPPER	0.455	HALF_PMF	87100.4	-3.5	16.65
CAMERON RUN	UPPER	0.455	SUNNY_DAY	15218.71	-3.5	8.62
CAMERON RUN	UPPER	0.451	DAM_BREAK	238230.1	-3.5	23.84
CAMERON RUN	UPPER	0.451	PMF	202831.2	-3.5	22.49
CAMERON RUN	UPPER	0.451	HALF_PMF	87100.4	-3.5	15.88
CAMERON RUN	UPPER	0.451	SUNNY_DAY	15218.71	-3.5	8.63
CAMERON RUN	UPPER	0.446	DAM_BREAK	238230.1	-3.5	24.31
CAMERON RUN	UPPER	0.446	PMF	202831.2	-3.5	22.94
CAMERON RUN	UPPER	0.446	HALF_PMF	87100.4	-3.5	16.46
CAMERON RUN	UPPER	0.446	SUNNY_DAY	15218.71	-3.5	8.61
CAMERON RUN	UPPER	0.441	DAM_BREAK	238230.1	-3.5	22.9
CAMERON RUN	UPPER	0.441	PMF	202831.2	-3.5	21.56
CAMERON RUN	UPPER	0.441	HALF_PMF	87100.4	-3.5	14.16
CAMERON RUN	UPPER	0.441	SUNNY_DAY	15218.71	-3.5	8.58
CAMERON RUN	UPPER	0.437	DAM_BREAK	238230.1	-3.5	23.28
CAMERON RUN	UPPER	0.437	PMF	202831.2	-3.5	21.93
CAMERON RUN	UPPER	0.437	HALF_PMF	87100.4	-3.5	14.36
CAMERON RUN	UPPER	0.437	SUNNY_DAY	15218.71	-3.5	8.59
CAMERON RUN	UPPER	0.42	DAM_BREAK	237010.6	-4	23.22
CAMERON RUN	UPPER	0.42	PMF	204599.1	-4	21.89
CAMERON RUN	UPPER	0.42	HALF_PMF	88250.55	-4	15.18
CAMERON RUN	UPPER	0.42	SUNNY_DAY	14992.43	-4	8.59
CAMERON RUN	UPPER	0.404		Bridge		
CAMERON RUN	UPPER	0.38	DAM_BREAK	237010.6	-4	21.95
CAMERON RUN	UPPER	0.38	PMF	204599.1	-4	20.63
CAMERON RUN	UPPER	0.38	HALF_PMF	88250.55	-4	13.73
CAMERON RUN	UPPER	0.38	SUNNY_DAY	14992.43	-4	8.41
CAMERON RUN	UPPER	0.378	DAM_BREAK	237010.6	-4	22.17
CAMERON RUN	UPPER	0.378	PMF	204599.1	-4	20.87
CAMERON RUN	UPPER	0.378	HALF_PMF	88250.55	-4	14.3
CAMERON RUN	UPPER	0.378	SUNNY_DAY	14992.43	-4	8.48
CAMERON RUN	UPPER	0.355*	DAM_BREAK	237010.6	-4.5	22.42

HEC-RAS Profile: Peak Flows						
River	Reach	River Sta	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
CAMERON RUN	UPPER	0.355*	PMF	204599.1	-4.5	21.1
CAMERON RUN	UPPER	0.355*	HALF_PMF	88250.55	-4.5	14.47
CAMERON RUN	UPPER	0.355*	SUNNY_DAY	14992.43	-4.5	8.5
CAMERON RUN	UPPER	0.333	DAM_BREAK	237010.6	-3.7	22.45
CAMERON RUN	UPPER	0.333	PMF	204599.1	-3.7	21.1
CAMERON RUN	UPPER	0.333	HALF_PMF	88250.55	-3.7	13.95
CAMERON RUN	UPPER	0.333	SUNNY_DAY	14992.43	-3.7	8.4
CAMERON RUN	UPPER	0.285*	DAM_BREAK	236966.6	-3.3	22.07
CAMERON RUN	UPPER	0.285*	PMF	206352.9	-3.3	20.63
CAMERON RUN	UPPER	0.285*	HALF_PMF	89322.34	-3.3	12.45
CAMERON RUN	UPPER	0.285*	SUNNY_DAY	14528.47	-3.3	8.27
CAMERON RUN	UPPER	0.237*	DAM_BREAK	236966.6	-2.9	20.28
CAMERON RUN	UPPER	0.237*	PMF	206352.9	-2.9	18.44
CAMERON RUN	UPPER	0.237*	HALF_PMF	89322.34	-2.9	10.12
CAMERON RUN	UPPER	0.237*	SUNNY_DAY	14528.47	-2.9	8.23
CAMERON RUN	UPPER	0.188	DAM_BREAK	236966.6	-2.5	15.64
CAMERON RUN	UPPER	0.188	PMF	206352.9	-2.5	14.33
CAMERON RUN	UPPER	0.188	HALF_PMF	89322.34	-2.5	9.24
CAMERON RUN	UPPER	0.188	SUNNY_DAY	14528.47	-2.5	8.2
CAMERON RUN	UPPER	0.074	DAM_BREAK	233248.1	-3	14.33
CAMERON RUN	UPPER	0.074	PMF	205730.3	-3	13.82
CAMERON RUN	UPPER	0.074	HALF_PMF	89022.38	-3	10.42
CAMERON RUN	UPPER	0.074	SUNNY_DAY	14027.55	-3	8.2
CAMERON RUN	UPPER	0.066	DAM_BREAK	233248.1	-11.3	14.44
CAMERON RUN	UPPER	0.066	PMF	205730.3	-11.3	13.92
CAMERON RUN	UPPER	0.066	HALF_PMF	89022.38	-11.3	10.46
CAMERON RUN	UPPER	0.066	SUNNY_DAY	14027.55	-11.3	8.2
CAMERON RUN	UPPER	0.055		Bridge		
CAMERON RUN	UPPER	0.044	DAM_BREAK	231983.9	-10.3	10.8
CAMERON RUN	UPPER	0.044	PMF	205783.8	-10.3	10.37
CAMERON RUN	UPPER	0.044	HALF_PMF	89106.67	-10.3	7.67
CAMERON RUN	UPPER	0.044	SUNNY_DAY	13613.89	-10.3	5.17
CAMERON RUN	UPPER	0.036	DAM_BREAK	231983.9	-3	10.92
CAMERON RUN	UPPER	0.036	PMF	205783.8	-3	10.48
CAMERON RUN	UPPER	0.036	HALF_PMF	89106.67	-3	7.71
CAMERON RUN	UPPER	0.036	SUNNY_DAY	13613.89	-3	3.33
CAMERON RUN	UPPER	0	DAM_BREAK	231983.9	-3.4	11.03

HEC-RAS Profile: Peak Flows						
River	Reach	River Sta	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
CAMERON RUN	UPPER	0	PMF	205783.8	-3.4	10.6
CAMERON RUN	UPPER	0	HALF_PMF	89106.67	-3.4	7.91
CAMERON RUN	UPPER	0	SUNNY_DAY	13613.89	-3.4	4.41
BACKLICK RUN	LOWER	0.114	DAM_BREAK	90873.5	35.16	85.33
BACKLICK RUN	LOWER	0.114	PMF	90873.5	35.16	81.5
BACKLICK RUN	LOWER	0.114	HALF_PMF	46045.28	35.16	67.51
BACKLICK RUN	LOWER	0.114	SUNNY_DAY	0.1	35.16	48.37
BACKLICK RUN	LOWER	0.104	DAM_BREAK	90873.5	35.16	84.79
BACKLICK RUN	LOWER	0.104	PMF	90873.5	35.16	80.81
BACKLICK RUN	LOWER	0.104	HALF_PMF	46045.28	35.16	66.9
BACKLICK RUN	LOWER	0.104	SUNNY_DAY	0.1	35.16	48.37
BACKLICK RUN	LOWER	0.101		Bridge		
BACKLICK RUN	LOWER	0.099	DAM_BREAK	90873.5	35.16	84.49
BACKLICK RUN	LOWER	0.099	PMF	90873.5	35.16	80.4
BACKLICK RUN	LOWER	0.099	HALF_PMF	46045.28	35.16	66.5
BACKLICK RUN	LOWER	0.099	SUNNY_DAY	0.1	35.16	48.37
	LOWER					
BACKLICK RUN	LOWER	0.083	DAM_BREAK	90873.5	35.16	84.5
BACKLICK RUN	LOWER	0.083	PMF	90873.5	35.16	80.39
BACKLICK RUN	LOWER	0.083	HALF_PMF	46045.28	35.16	66.35
BACKLICK RUN	LOWER	0.083	SUNNY_DAY	0.1	35.16	48.37
BACKLICK RUN	LOWER	0.053	DAM_BREAK	90873.5	33.28	83.77
BACKLICK RUN	LOWER	0.053	PMF	90873.5	33.28	79.43
BACKLICK RUN	LOWER	0.053	HALF_PMF	46045.28	33.28	65.66
BACKLICK RUN	LOWER	0.053	SUNNY_DAY	0.1	33.28	48.37
BACKLICK RUN	LOWER	0.031	DAM_BREAK	90873.5	33.16	83.67
BACKLICK RUN	LOWER	0.031	PMF	90873.5	33.16	79.29
BACKLICK RUN	LOWER	0.031	HALF_PMF	46045.28	33.16	65.64
BACKLICK RUN	LOWER	0.031	SUNNY_DAY	0.1	33.16	48.37

Appendix H – Hydraulic Profile Culvert Tables

HEC-RAS Profile: Peak Flows								
River	Reach	River Sta	Plan	W.S. US.	Q Culv Group	Q Weir	Culv Vel US	Culv Vel DS
				(ft)	(cfs)	(cfs)	(ft/s)	(ft/s)
HOLMES RUN LOWER	UPPER	3.575 COLUMBIA PK	DAM_BREAK	218.42	18553	494163.8	11.44	11.44
HOLMES RUN LOWER	UPPER	3.575 COLUMBIA PK	PMF	200.08	29837.44	84183.27	18.39	18.39
HOLMES RUN LOWER	UPPER	3.575 COLUMBIA PK	HALF_PMF	180.29	29107.11	409.48	25.15	21.9
HOLMES RUN LOWER	UPPER	3.575 COLUMBIA PK	SUNNY_DAY	193.81	33125.43	38376.5	20.42	20.42
HOLMES RUN LOWER	UPPER	1.833 IN-LINE STR	DAM_BREAK	132.2	6.72	271046.4	4.28	4.28
HOLMES RUN LOWER	UPPER	1.833 IN-LINE STR	PMF	125.36	6.67	111398	4.24	4.24
HOLMES RUN LOWER	UPPER	1.833 IN-LINE STR	HALF_PMF	115.61	4.2	32894.63	2.67	2.67
HOLMES RUN LOWER	UPPER	1.833 IN-LINE STR	SUNNY_DAY	113.56	5.79	45770.23	3.69	3.69
HOLMES RUN LOWER	UPPER	1.755 BEAUREGARD1	DAM_BREAK	135.41	1254.47	266208.3	4.81	4.81
HOLMES RUN LOWER	UPPER	1.755 BEAUREGARD2	DAM_BREAK	135.41	1422.06	266208.3	4.83	4.83
HOLMES RUN LOWER	UPPER	1.755 BEAUREGARD3	DAM_BREAK	135.41	1485.53	266208.3	4.84	4.84
HOLMES RUN LOWER	UPPER	1.755 BEAUREGARD1	PMF	126.13	926.12	107682.4	3.55	3.55
HOLMES RUN LOWER	UPPER	1.755 BEAUREGARD2	PMF	126.13	1051.42	107682.4	3.57	3.57
HOLMES RUN LOWER	UPPER	1.755 BEAUREGARD3	PMF	126.13	1098.96	107682.4	3.58	3.58
HOLMES RUN LOWER	UPPER	1.755 BEAUREGARD1	HALF_PMF	115.63	719.62	30537.2	2.76	2.76
HOLMES RUN LOWER	UPPER	1.755 BEAUREGARD2	HALF_PMF	115.63	819.63	30537.2	2.78	2.78
HOLMES RUN LOWER	UPPER	1.755 BEAUREGARD3	HALF_PMF	115.63	857.71	30537.2	2.79	2.79
HOLMES RUN LOWER	UPPER	1.755 BEAUREGARD1	SUNNY_DAY	113.51	1948.53	39382.68	7.46	7.46
HOLMES RUN LOWER	UPPER	1.755 BEAUREGARD2	SUNNY_DAY	113.51	2223.24	39382.68	7.55	7.55
HOLMES RUN LOWER	UPPER	1.755 BEAUREGARD3	SUNNY_DAY	113.51	2328	39382.68	7.58	7.58
HOLMES RUN LOWER	UPPER	1.393 SHIRLEY MEM1	DAM_BREAK	132.72	41981.56	185493.2	29.11	39.97
HOLMES RUN LOWER	UPPER	1.393 SHIRLEY MEM2	DAM_BREAK	132.72	1683.98	185493.2	21.44	21.44
HOLMES RUN LOWER	UPPER	1.393 SHIRLEY MEM1	PMF	125.18	36732.27	68281.23	27.6	30.38
HOLMES RUN LOWER	UPPER	1.393 SHIRLEY MEM2	PMF	125.18	1687.69	68281.23	21.49	21.49
HOLMES RUN LOWER	UPPER	1.393 SHIRLEY MEM1	HALF_PMF	115.33	27281.71	4770.56	23.88	26.38
HOLMES RUN LOWER	UPPER	1.393 SHIRLEY MEM2	HALF_PMF	115.33	1581.68	4770.56	20.14	20.14
HOLMES RUN LOWER	UPPER	1.393 SHIRLEY MEM1	SUNNY_DAY	111.59	23346.29		22.45	24.77

HEC-RAS Profile: Peak Flows								
River	Reach	River Sta	Plan	W.S. US.	Q Culv Group	Q Weir	Culv Vel US	Culv Vel DS
				(ft)	(cfs)	(cfs)	(ft/s)	(ft/s)
HOLMES RUN LOWER	UPPER	1.393 SHIRLEY MEM2	SUNNY_DAY	111.59	1485.41		18.91	18.91
HOLMES RUN LOWER	UPPER	1.328 VAN DORN ST	DAM_BREAK	107.92	4431.28	224653.6	6.15	6.15
HOLMES RUN LOWER	UPPER	1.328 VAN DORN ST	PMF	100.64	3901.58	102799.6	5.42	5.42
HOLMES RUN LOWER	UPPER	1.328 VAN DORN ST	HALF_PMF	93.94	5510.03	28123.92	7.65	7.65
HOLMES RUN LOWER	UPPER	1.328 VAN DORN ST	SUNNY_DAY	92.68	5960.4	18871.29	8.28	8.28
HOLMES RUN LOWER	UPPER	1.226 IN-LINE STR	DAM_BREAK	99.28	10.56	228986.4	4.48	4.48
HOLMES RUN LOWER	UPPER	1.226 IN-LINE STR	PMF	91.83	8.53	106895.1	3.62	3.62
HOLMES RUN LOWER	UPPER	1.226 IN-LINE STR	HALF_PMF	84.98	11.9	33573.05	5.05	5.05
HOLMES RUN LOWER	UPPER	1.226 IN-LINE STR	SUNNY_DAY	82.81	20.88	24811.44	8.86	8.86
CAMERON RUN	UPPER	3.404 FRED_POT RR1	DAM_BREAK	84.27	37056.09	186141.5	19.46	19.46
CAMERON RUN	UPPER	3.404 FRED_POT RR2	DAM_BREAK	84.27	5487.6	186141.5	19.35	19.35
CAMERON RUN	UPPER	3.404 FRED_POT RR3	DAM_BREAK	84.27	5487.6	186141.5	19.35	19.35
CAMERON RUN	UPPER	3.404 FRED_POT RR4	DAM_BREAK	84.27	5487.6	186141.5	19.35	19.35
CAMERON RUN	UPPER	3.404 FRED_POT RR5	DAM_BREAK	84.27	5487.6	186141.5	19.35	19.35
CAMERON RUN	UPPER	3.404 FRED_POT RR6	DAM_BREAK	84.27	5487.6	186141.5	19.35	19.35
CAMERON RUN	UPPER	3.404 FRED_POT RR7	DAM_BREAK	84.27	5487.6	186141.5	19.35	19.35
CAMERON RUN	UPPER	3.404 FRED_POT RR8	DAM_BREAK	84.27	5487.6	186141.5	19.35	19.35
CAMERON RUN	UPPER	3.404 FRED_POT RR1	PMF	80.29	46098.07	90178.93	24.21	24.21
CAMERON RUN	UPPER	3.404 FRED_POT RR2	PMF	80.29	6833.25	90178.93	24.1	24.1
CAMERON RUN	UPPER	3.404 FRED_POT RR3	PMF	80.29	6832.77	90178.93	24.1	24.1
CAMERON RUN	UPPER	3.404 FRED_POT RR4	PMF	80.29	6833.24	90178.93	24.1	24.1
CAMERON RUN	UPPER	3.404 FRED_POT RR5	PMF	80.29	6833.22	90178.93	24.1	24.1
CAMERON RUN	UPPER	3.404 FRED_POT RR6	PMF	80.29	6833.24	90178.93	24.1	24.1
CAMERON RUN	UPPER	3.404 FRED_POT RR7	PMF	80.29	6833.24	90178.93	24.1	24.1
CAMERON RUN	UPPER	3.404 FRED_POT RR8	PMF	80.29	6833.24	90178.93	24.1	24.1
CAMERON RUN	UPPER	3.404 FRED_POT RR1	HALF_PMF	66.39	29157.04		22.38	23
CAMERON RUN	UPPER	3.404 FRED_POT RR2	HALF_PMF	66.39	6638.68		23.41	23.41

HEC-RAS Profile: Peak Flows								
River	Reach	River Sta	Plan	W.S. US.	Q Culv Group	Q Weir	Culv Vel US	Culv Vel DS
				(ft)	(cfs)	(cfs)	(ft/s)	(ft/s)
CAMERON RUN	UPPER	3.404 FRED_POT RR3	HALF_PMF	66.39	6638.68		23.41	23.41
CAMERON RUN	UPPER	3.404 FRED_POT RR4	HALF_PMF	66.39	6638.68		23.41	23.41
CAMERON RUN	UPPER	3.404 FRED_POT RR5	HALF_PMF	66.39	6638.68		23.41	23.41
CAMERON RUN	UPPER	3.404 FRED_POT RR6	HALF_PMF	66.39	6638.68		23.41	23.41
CAMERON RUN	UPPER	3.404 FRED_POT RR7	HALF_PMF	66.39	6638.68		23.41	23.41
CAMERON RUN	UPPER	3.404 FRED_POT RR8	HALF_PMF	66.39	6638.68		23.41	23.41
CAMERON RUN	UPPER	3.404 FRED_POT RR1	SUNNY_DAY	46.03	5663.39		10.12	10.14
CAMERON RUN	UPPER	3.404 FRED_POT RR2	SUNNY_DAY	46.03	2469.69		10.24	10.4
CAMERON RUN	UPPER	3.404 FRED_POT RR3	SUNNY_DAY	46.03	2537.32		10.22	10.41
CAMERON RUN	UPPER	3.404 FRED_POT RR4	SUNNY_DAY	46.03	2561.24		10.59	10.33
CAMERON RUN	UPPER	3.404 FRED_POT RR5	SUNNY_DAY	46.03	2526.36		11.25	10.11
CAMERON RUN	UPPER	3.404 FRED_POT RR6	SUNNY_DAY	46.03	2466.38		11.35	10.1
CAMERON RUN	UPPER	3.404 FRED_POT RR7	SUNNY_DAY	46.03	2543.71		10.81	10.27
CAMERON RUN	UPPER	3.404 FRED_POT RR8	SUNNY_DAY	46.03	2538.78		10.53	10.34

Appendix I – Inundation Map

Lake Barcroft
Columbia Pike
Vicinity Map
Washington, DC
City of Falls Church
Arlington County
Lake Barcroft
City of Alexandria
Fairfax County
Map Tile Legend
A1
A2
B1
B2
C2
C3
C5
D2
D3
D4
D5
E4
E5
F5
- Current Map
Legend
Dam Break
PMF Event
Half PMF Event
Sunny Day
Cross Section
Corporate Limits
0
250
500
Feet
LAKE BARCROFT
WATERSHED IMPROVEMENT DISTRICT
FAIRFAX, VIRGINIA
2008 LAKE BARCROFT
INUNDATION MAPPING STUDY
DECEMBER 2008
MAP NO. A1

Vicinity Map

Map Tile Legend

A1	A2			
B1	B2			
	C2	C3		C5
	D2	D3	D4	D5
			E4	E5
				F5

- Current Map

Legend

- Dam Break
- PMF Event
- Half PMF Event
- Sunny Day
- Cross Section
- Corporate Limits

0 250 500 Feet

LAKE BARCROFT
WATERSHED IMPROVEMENT DISTRICT
FAIRFAX, VIRGINIA

2008 LAKE BARCROFT INUNDATION MAPPING STUDY

DECEMBER 2008 MAP NO. A2

Vicinity Map

Map Tile Legend

A1	A2			
B1	B2			
	C2	C3		C5
	D2	D3	D4	D5
			E4	E5
				F5

- Current Map

Legend

- Dam Break
- PMF Event
- Half PMF Event
- Sunny Day
- 2.37 Cross Section
- Corporate Limits

0 250 500 Feet

LAKE BARCROFT
WATERSHED IMPROVEMENT DISTRICT
FAIRFAX, VIRGINIA

2008 LAKE BARCROFT INUNDATION MAPPING STUDY

DECEMBER 2008 MAP NO. B1

Beauregard Street
I-395
Vicinity Map
Washington, DC
City of Falls Church
Arlington County
Lake Barcroft
City of Alexandria
Fairfax County
Map Tile Legend
A1
A2
B1
B2
C2
C3
C5
D2
D3
D4
D5
E4
E5
F5
- Current Map
Legend
Dam Break
PMF Event
Half PMF Event
Sunny Day
Cross Section
Corporate Limits
0
250
500
Feet
LAKE BARCROFT WATERSHED IMPROVEMENT DISTRICT
FAIRFAX, VIRGINIA
2008 LAKE BARCROFT INUNDATION MAPPING STUDY
DECEMBER 2008
MAP NO. B2

Map Tile Legend

A1	A2			
B1	B2			
	C2	C3		C5
	D2	D3	D4	D5
			E4	E5
				F5

- Current Map

Legend

- Dam Break
- PMF Event
- Half PMF Event
- Sunny Day
- Cross Section
- Corporate Limits

0 250 500 Feet

LAKE BARCROFT WATERSHED IMPROVEMENT DISTRICT FAIRFAX, VIRGINIA

2008 LAKE BARCROFT INUNDATION MAPPING STUDY

DECEMBER 2008 MAP NO. C2

Vicinity Map

Map Tile Legend

A1	A2			
B1	B2			
	C2	C3		C5
	D2	D3	D4	D5
			E4	E5
				F5

- Current Map

Legend

- Dam Break
- PMF Event
- Half PMF Event
- Sunny Day
- 2.37 Cross Section
- Corporate Limits

0 250 500 Feet

LAKE BARCROFT WATERSHED IMPROVEMENT DISTRICT FAIRFAX, VIRGINIA

2008 LAKE BARCROFT INUNDATION MAPPING STUDY

DECEMBER 2008 MAP NO. C3

Map Tile Legend

A1	A2			
B1	B2			
	C2	C3		C5
	D2	D3	D4	D5
			E4	E5
				F5

- Current Map

Legend

- Dam Break
- PMF Event
- Half PMF Event
- Sunny Day
- Cross Section
- Corporate Limits

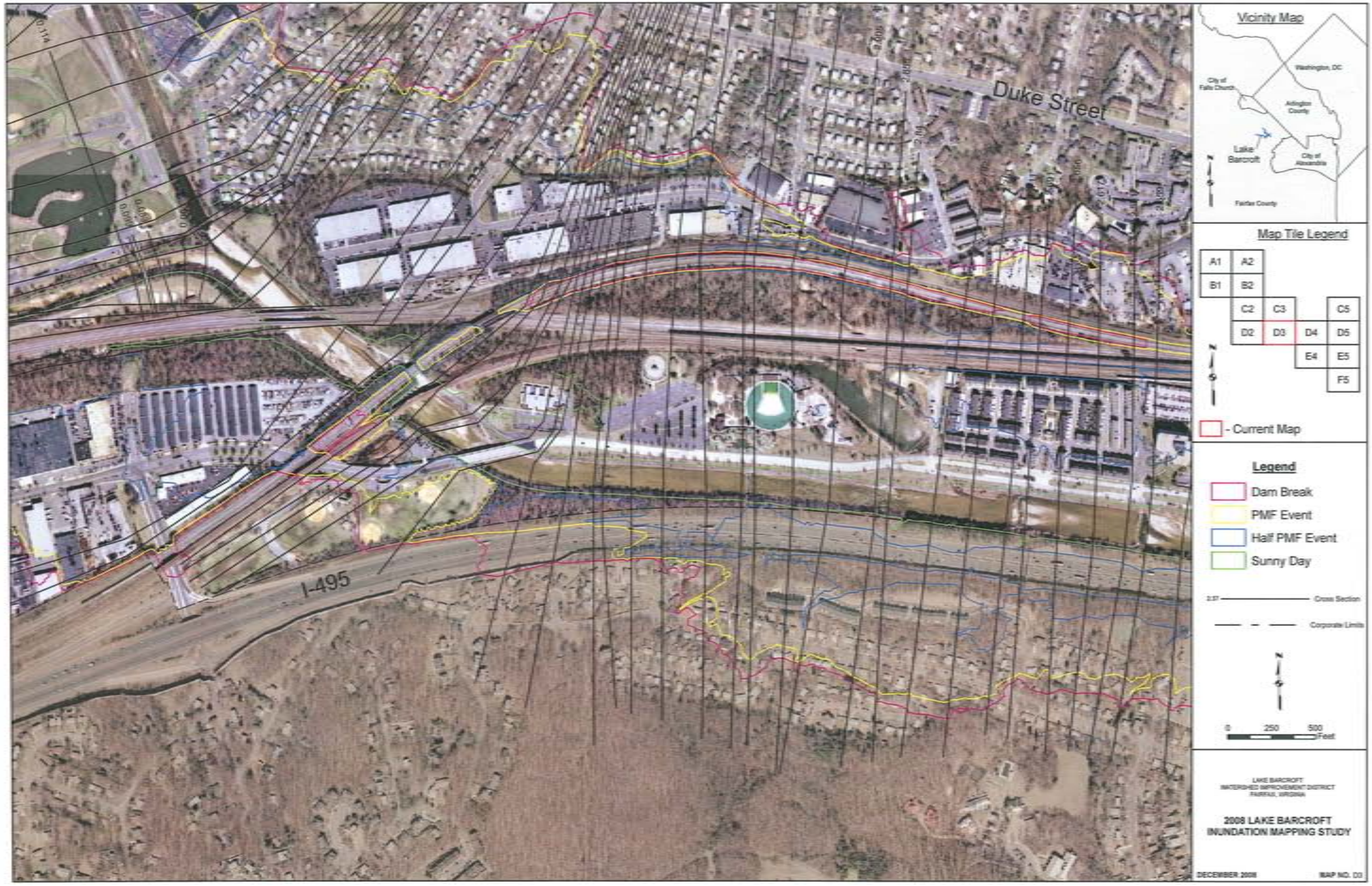
0 250 500 Feet

LAKE BARCROFT WATERSHED IMPROVEMENT DISTRICT
FAIRFAX, VIRGINIA

2008 LAKE BARCROFT INUNDATION MAPPING STUDY

DECEMBER 2008 MAP NO. C5

Van Dorn Street
Pickett Street
Eisenhower Avenue
I-495
Vicinity Map
Washington, DC
City of Falls Church
Arlington County
Lake Barcroft
City of Alexandria
Fairfax County
Map Tile Legend
A1
A2
B1
B2
C2
C3
C5
D2
D3
D4
D5
E4
E5
F5
- Current Map
Legend
Dam Break
PMF Event
Half PMF Event
Sunny Day
Cross Section
Corporate Limits
0
250
500
Feet
LAKE BARCROFT
WATERSHED IMPROVEMENT DISTRICT
FAIRFAX, VIRGINIA
2008 LAKE BARCROFT
INUNDATION MAPPING STUDY
DECEMBER 2008
MAP NO. 02


Duke Street
I-495
Vicinity Map
Washington, DC
City of Falls Church
Arlington County
Lake Barcroft
City of Alexandria
Fairfax County
Map Tile Legend
A1
A2
B1
B2
C2
C3
C5
D2
D3
D4
D5
E4
E5
F5
- Current Map
Legend
Dam Break
PMF Event
Half PMF Event
Sunny Day
Cross Section
Corporate Limits
0
250
500
Feet
LAKE BARCROFT
WATERSHED IMPROVEMENT DISTRICT
FAIRFAX, VIRGINIA
2008 LAKE BARCROFT
INUNDATION MAPPING STUDY
DECEMBER 2008
MAP NO. D3

Eisenhower
Avenue
I-495
Telegraph Road
Vicinity Map
Washington, DC
City of Falls Church
Arlington County
Lake Barcroft
City of Alexandria
Fairfax County
Map Tile Legend
A1
A2
B1
B2
C2
C3
C5
D2
D3
D4
D5
E4
E5
F5
- Current Map
Legend
Dam Break
PMF Event
Half PMF Event
Sunny Day
Cross Section
Corporate Limits
0
250
500
Feet
LAKE BARCROFT
WATERSHED IMPROVEMENT DISTRICT
FAIRFAX, VIRGINIA
2008 LAKE BARCROFT
INUNDATION MAPPING STUDY
DECEMBER 2008
MAP NO. D4

Map Tile Legend

A1	A2			
B1	B2			
	C2	C3		C5
	D2	D3	D4	D5
			E4	E5
				F5

- Current Map

Legend

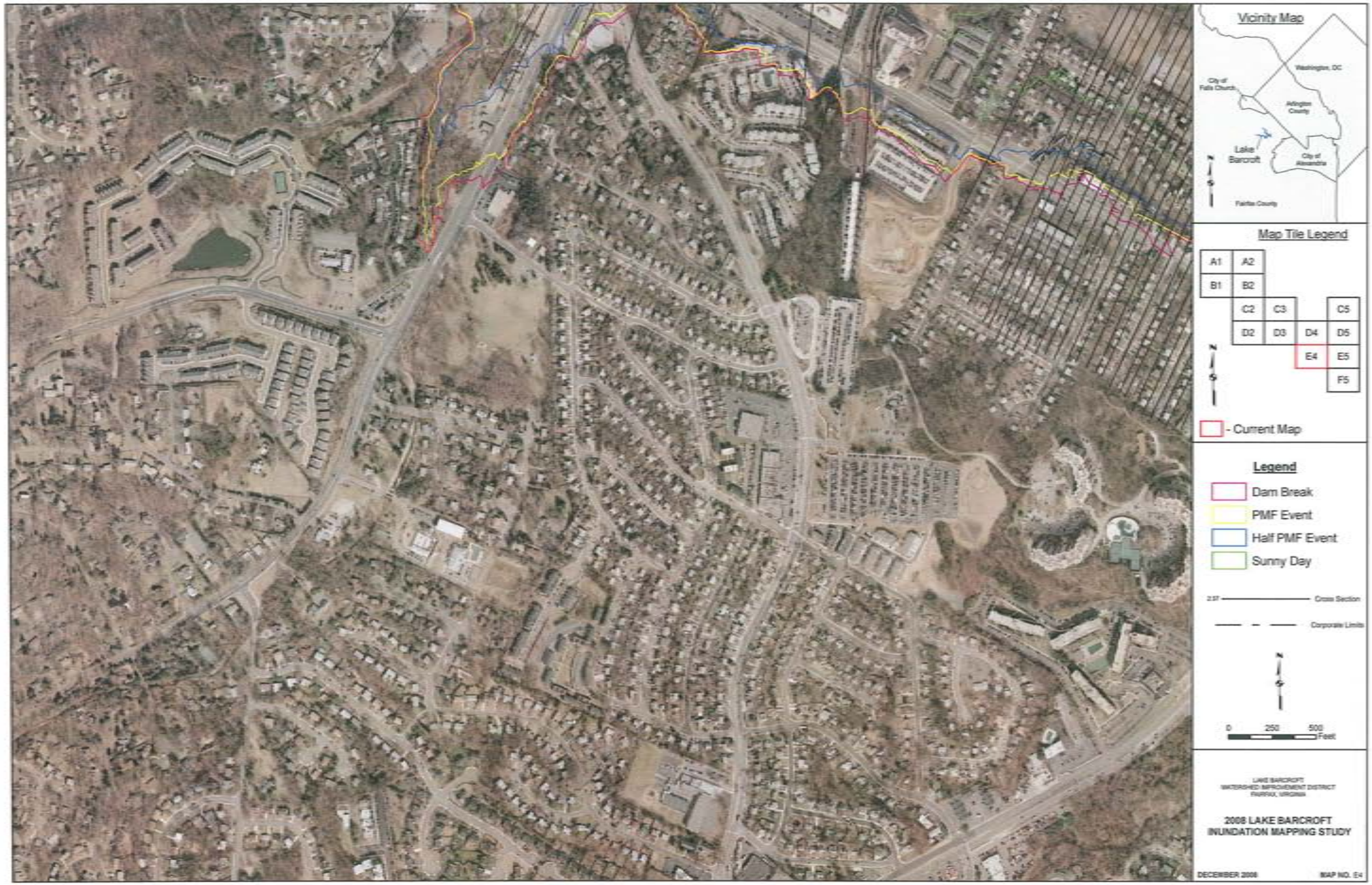
- Dam Break
- PMF Event
- Half PMF Event
- Sunny Day
- Cross Section
- Corporate Limits

0 250 500 Feet

LAKE BARCROFT WATERSHED IMPROVEMENT DISTRICT
FAIRFAX, VIRGINIA

2008 LAKE BARCROFT INUNDATION MAPPING STUDY

DECEMBER 2008 MAP NO. D5


Vicinity Map
Washington, DC
City of Falls Church
Arlington County
Lake Barcroft
City of Alexandria
Fairfax County
Map Tile Legend
A1
A2
B1
B2
C2
C3
C5
D2
D3
D4
D5
E4
E5
F5
- Current Map
Legend
Dam Break
PMF Event
Half PMF Event
Sunny Day
Cross Section
Corporate Limits
0
250
500
Feet
LAKE BARCROFT
WATERSHED IMPROVEMENT DISTRICT
FAIRFAX, VIRGINIA
2008 LAKE BARCROFT
INUNDATION MAPPING STUDY
DECEMBER 2008
MAP NO. E4

S. Washington Street
I-495
Richmond Hwy
Potomac River
Vicinity Map
Washington, DC
City of Falls Church
Arlington County
Lake Barcroft
City of Alexandria
Fairfax County
Map Tile Legend
A1
A2
B1
B2
C2
C3
C5
D2
D3
D4
D5
E4
E5
F5
- Current Map
Legend
Dam Break
PMF Event
Half PMF Event
Sunny Day
Cross Section
Corporate Limits
0
250
500
Feet
LAKE BARCROFT
WATERSHED IMPROVEMENT DISTRICT
FAIRFAX, VIRGINIA
2008 LAKE BARCROFT
INUNDATION MAPPING STUDY
DECEMBER 2008
MAP NO. E5

Potomac River
Vicinity Map
Washington, DC
City of Falls Church
Arlington County
Lake Barcroft
City of Alexandria
Fairfax County
Map Tile Legend
A1
A2
B1
B2
C2
C3
C5
D2
D3
D4
D5
E4
E5
F5
- Current Map
Legend
Dam Break
PMF Event
Half PMF Event
Sunny Day
Cross Section
Corporate Limits
0
250
500
Feet
LAKE BARCROFT
WATERSHED IMPROVEMENT DISTRICT
FAIRFAX, VIRGINIA
2008 LAKE BARCROFT
INUNDATION MAPPING STUDY
DECEMBER 2008
MAP NO. F5

GENERAL NOTES:

Hydrologic analysis encompasses the entire watershed draining to the Potomac River. All tributary flows have been included in the mapping.

The mapping reflects hydraulic results of Lake Barcroft operations downstream through Holmes Run and Cameron Run, including potential backwater effects. The mapping does not include hydraulic results of the Holmes Run and Cameron Run tributaries.

SPECIFIC NOTES:

1. Aerial photography from Fairfax County dated 2007.
2. Aerial photography from the City of Alexandria 2007.
3. Potential backwater effects from Cameron Run flooding. The flooding limits shown may or may not be fully realized during the flooding events shown.
4. The new Wilson Bridge interchanges were not provided in the source data. Therefore, the effects (if any) of the new Wilson Bridge interchanges are not included in the mapping.
5. Additional flooding may occur south of the mapped flooding limits due to drainage basin transfer.

NOTE:
THE INFORMATION CONTAINED IN THIS MAP IS PREPARED FOR USE IN NOTIFICATION OF DOWNSTREAM PROPERTY OWNERS BY EMERGENCY MANAGEMENT PERSONNEL

Legend

- Dam Break
- PMF Event
- Half PMF Event
- Sunny Day
- Corporate Limits

N

0 600 1,200 2,400 Feet

LAKE BARCROFT
WATERSHED IMPROVEMENT DISTRICT
FAIRFAX, VIRGINIA

2008 LAKE BARCROFT INUNDATION MAPPING STUDY

DECEMBER 2008 PROJECT NO. 2006-012