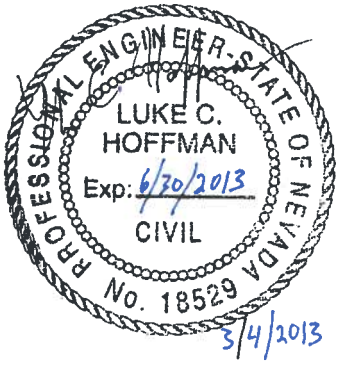
100% Drainage Report For South East Connector Phase I: Greg Street To Clean Water Way

Washoe County, Nevada

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1.0 INTRODUCTION

This Drainage Report has been prepared to support Phase 1 of the Regional Transportation Commission of Washoe County's SouthEast Connector (SEC) road project and associated volumetric mitigation. As shown in *Figure 1.0 – Vicinity Map,* the Phase 1 study area includes portions of Sections 10, 11, 14 and 15 within Township 19 North, Range 20 East, M.D.M. in the City of Sparks and Washoe County, Nevada. See *Figure 2.0 – SouthEast Connector – Phase 1 Project Elements* for a delineation of the Phase 1 location and general project elements.

The proposed SEC traverses a delineated floodplain and floodway its entire length which creates a significant design consideration for the project. The floodplain is shown as a Special Flood Hazard Area Zone AE on the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map (FIRM) for Washoe County, Nevada and Incorporated Areas (shown on panels 3063 and 3064 of 3475, revised March 16, 2009) and is created by flows from the Truckee River, Steamboat Creek and by backwater of flood flows concentrating at the Vista Narrows. The contributing watershed is approximately 1430 square miles, with flow emanating from the Truckee River, Steamboat Creek, the North Truckee Drain and all of their tributaries. Refer to Section 6.0 for further background information. Also see *Figure 3.0 – SouthEast Connector – Phase 1 FEMA Flood Map* for reference.

Due to the significance of this floodplain within the valley, the Regional Water Planning Commission's *2004-2025 Washoe County Comprehensive Plan* identifies the area as a Zone 1 Critical Flood Pool (CFP). Ordinance 1457 states that development within the CFP is subject to additional development criteria such as meeting a one to one (1:1) volumetric mitigation ratio.

The Truckee River Flood Management Agency (TRFMA), formerly the Truckee River Flood Project, and the United States Army Corps of Engineers (USACE) have been working on alternatives to develop flood control improvements to reduce the effect of flooding from the Truckee River within the Truckee Meadows. As part of their project, an unsteady state hydraulic, Hydrologic Engineering Center River Analysis System (HEC-RAS) model of the Truckee River, Steamboat Creek, North Truckee Drain and CFP was developed to evaluate the TRFMA and USACE alternatives.

Stantec utilized the TRFMA / USACE HEC-RAS model to evaluate the impacts of and develop mitigation for the SEC within the Zone 1 CFP. Stantec modified the HEC-RAS model to include the proposed roadway, bridges, culverts and volumetric mitigation basins to provide the required one to one (1:1) volumetric mitigation. The results of the modeling efforts demonstrate that the proposed improvements associated with the SEC will have "no adverse impact" to existing conditions water surface elevations or volumes in the Zone 1 CFP, and will be in compliance with all local ordinances. A Floodway Variance to Title 15 including a FEMA Certification of No-Rise and a Floodplain/Floodway Development Permit Application were prepared and submitted to the City of Sparks to document these findings.

Phase 1 does not impact any Waters of the US and therefore USACE 404 permitting and NDEP 401 Water Quality Certification (WQC) Applications are not required. However, prior to phasing of the project, Stantec along with Gibson and Skordall, Western Botanical Services, Kautz Environmental, Brown and Buntin and Rubik Environmental previously prepared an Application for Department of Army 404 Permit and a preliminary 401 WQC for the preliminary design of the entire SEC project (See References and Previous Studies Section). These reports contain pertinent information for Phase 1 of the project including soil

composition, groundwater elevations, weed control and revegetation recommendations. Phase 2 of the SEC will require both USACE 404 and NDEP 401 WQC permitting, which is currently underway in conjunction with final design of the Phase 2 roadway, flood control, wetlands and water quality improvements.

2.0 REFERENCES AND PREVIOUS STUDIES

The following references and previous studies provide the basis for establishing the drainage evaluation and design criteria for the SEC:

- *Alignment Study Tahoe/Pyramid Link*, SEA, Incorporated, dated October 21, 1983.
- *Application for Department of Army Permit SouthEast Connector,* Stantec Consulting, et al., dated May 31, 2011.
- *Conceptual Design Report – Lower Steamboat Creek Bank Stabilization and Enhancement*, HDR, dated October 12, 2007.
- *Conservation Plan, City of Reno Master Plan,* City of Reno, Ammemded by City Council October 22, 2008.
- *Final Existing Conditions Memorandum of Vegetation, Soils and Wetlands: SouthEast Connector, Washoe County, Nevada,* Western Botanical Services, Inc, dated November 7, 2011.
- *Final Geotechnical Investigation Report: SouthEast Connector Truckee River Bridge and Clean Water Way Grade Separation,* Washoe County, Nevada, Kleinfelder, dated August 30, 2012.
- *Final Plan Line Study for the SouthEast Connector*, Stantec, dated January 20, 2009.
- *Final Plan Line Study for the SouthEast Connector Addendum,* Stantec, March 23, 2009.
- *Final Plan Line Study for the SouthEast Connector Addendum II,* Stantec, dated February 4, 2011.
- *Flood Insurance Rate Maps (FIRM's) for Washoe County Nevada and Incorporated Areas*, Federal Emergency Management Agency, index dated June 6, 2001, revised March 16, 2009.
- *Flood Insurance Study (FIS) for Washoe County Nevada and Incorporated Areas*, Federal Emergency Management Agency, dated June 6, 2001, revised March 16, 2009.
- *Geotechnical Investigation SouthEast Connector Phase 1: Greg Street to Cleanwater Way*, Construction Materials Engineers, Inc., dated October 23, 2012.
- *Ordinance No. 1457 Amending the Washoe County Code Section 110.416.57 Standards for All Development in Critical Flood Zone 1*, dated January 21, 2011.*Preliminary Alignment Evaluation for Tahoe Pyramid Link, Rio Poco to Mill Street Extension,* SEA, Incorporated, dated October 1996.
- *Preliminary Geotechnical Investigation Report Proposed RTC SouthEast Connector Bridge Crossings, Washoe County, Nevada,* Kleinfelder, dated April 18, 2011.
- *Reach Y Restoration Feasibility Assessment, Final Draft,* River Run Consulting, dated March 2007.
- *Regional Transportation Commission Submittal to the US Army Corp of Engineers: SouthEast Connector (SPK-2010-01058) Supplemental Information,* Stantec Consulting, et al., dated December 20, 2011.
- *SouthEast Connector*: *Preliminary 401 Water Quality Certification Application*, Stantec Consulting, dated June 1, 2011.
- *Steamboat Creek Restoration Plan*, prepared for the Washoe-Storey Conservation District by Jeff Codega, Planning/Design, Inc., and WESTEC, Inc., dated January 15, 1998.
- *Steamboat Creek Restoration: Technical Memorandum Prepared for the Regional Transportation Commission in Support of the SouthEast Connector,* Stantec, dated December 12, 2011.
- *SouthEast Connector Phase 1: Greg Street to Clean Water Way Request for a Variance to Title 15,* Stantec Consulting, dated January 18, 2013.
- *Tall Whitetop (Lepidium latifoilium) Management Strategy and Performance Criteria: SouthEast Connector, Washoe County, Nevada,* Western Botanical Services, Inc, dated December 12, 2011.
- *Truckee Meadows Feasibility Study - Truckee River, Nevada – Hydrology Office Report*, USACE, dated July 16, 1999.

- *Truckee Meadows Flood Control Project Attachment B – Hydraulic Design (Draft)*, Sacramento District USACE, dated January 18, 2005.
- *Truckee Meadows, Nevada – Addendum to General Re-Evaluation Report Phase F3 Milestone Conference Revised Hydrology,* Sacramento District USACE, dated January 2003.
- *The Truckee Meadows Regional Stormwater Quality Management Program Low Impact Development Handbook,* Kennedy/Jenks Consultants, dated August 2007.
- *Truckee Meadows Regional Drainage Manual*, dated April 30, 2009.
- *The Truckee Meadows Structural Controls Design Manual,* Kennedy/Jenks Consultants, dated April 2007.
- *Truckee Meadows Construction Site Best Management Practices Handbook,* Kennedy/Jenks Consultants, June 2008.
- *Watercourse System Sediment Balance, Guideline 1, Lateral Migration Setback Allowance for Riverine Floodplains in Arizona,* Arizona Department of Water Resources Flood warning and Dam Safety Section, dated September 1996.

3.0 DESIGN CRITERIA

Excerpts from local manuals, policies and ordinances were compiled to develop drainage and flood control design criteria for Phase 1 as follows:

Truckee Meadows Regional Drainage Manual

- Culvert Crossings
  - Designed for the major storm event.
  - Headwater shall be 1.5 times the culvert height.
  - Adjacent properties must not be adversely affected.

- Bridge Crossings
  - 100-year design flow plus two feet of freeboard between the 100-year water surface elevation and the low chord of the bridge.
  - Additional freeboard may be required for special hydraulic conditions.
  - In Special Flood Hazard Areas (SFHA's), the bridge shall not back up the 100-year storm flow greater than 1-foot above the natural water surface elevation without mitigation measures.
  - Adjacent properties must not be adversely affected.

- The policy of Washoe County shall be to require culvert/bridge crossings of streets within the following limitations:

o Right-Of-Way Width	Minimum Capacity (Recurrence Interval)
Major and Minor Arterial Highways Greater than or equal to 80-feet	100-Year (No Overflow)
Collector and Local Streets Less than 80-feet	100-Year (See Note)

  - Note: A dipped overflow section may be allowed by the County Engineer if the maximum velocity does not exceed 6 feet per second and the maximum depth does not exceed 0.5-feet a the street crown. As a minimum, where the existing channel is incapable of passing the 100-year flow, the culvert or bridge shall pass the existing channel capacity.

- Roadway / Streets
  - Minor On-Site Storm Event (Q5)
    - Maximum velocity times depth will be 6-feet squared per second.
    - Runoff in excess of street capacity shall be piped.
    - Maximum limits of street inundation:
      - Local 12-foot width dry centered
      - Collector 18-foot width dry centered
      - Arterial 48-foot width dry centered
  - Major On-Site Storm Event (Q100)
    - Contained within street ROW.
    - Maximum velocity times depth will be 8-feet squared per second.
    - Maximum depth will be 1-foot at the gutter flowline.
    - Maximum limits of street inundation:
      - Local Street flooded.
      - Collector 1 lane (12-feet) dry centered.
      - Arterial 1 lane (12-feet) dry each direction 24 foot dry width centered.
  - Off-Site Minor and Major Storm Events
    - Diverted around or piped / channeled through development.
    - The construction in Special Flood Hazard Areas (SFHA's) as defined by NFIP and areas of interim delineation shall be completed in accordance with the Local Jurisdictional Development Code.
    - Flows must return to the natural drainage path after exiting development.
  - Streets which intersect State Highways where local, collector or arterial streets intersect State Highways, the criteria of the Nevada Department of Transportation shall be followed for design of storm drains and inlets at said intersections.

Washoe County Code Ordinance No. 1457 Amendment

An ordinance amending the Washoe County Code Chapter 110, *Development Code,* Article 416, *Flood Hazards,* in order to adopt guidelines for the mitigation of lost floodplain storage and maintenance of adequate storage in the Critical Flood Storage zone according to the procedure adopted by the Truckee River Flood Project Coordinating committee and to enact that process of determining appropriate mitigation, if any, including specific amendments to establish criteria for "no adverse impact", establish mitigation for grading and fill in the critical flood zone 1, and establish exceptions to grading in the critical flood zone 1, as well as specific amendments to WCC 110.416.57 "Standards for all Development in Critical Flood Storage zones" relating to the elevation and location of required mitigation for development in the Critical Flood Storage Zone and other necessary amendments to reflect updated information and procedures on the management of flood hazards.

The Board of County Commissioners of the County of Washoe do ordain:

- Section 1. Section 110.416.57, Flood Hazards, of the Washoe County Code is hereby amended to read as follows:
  - Section 110.416.57 Standards for All Development in Critical Flood Zone 1. The standards for development in Critical Flood Zone 1 are set forth in this section.

a) Mitigation Required for Displacing Projects. All displacing projects should meet the following requirements:
   1. Stormwater discharges from displacing projects should be limited to pre-development conditions relative to peak flows; and,
   2. Provide flood storage volume mitigation to achieve no adverse impact.

b) Mitigation Methods and Requirements. The mitigation requirements established in a) above may be met by:
   1. Creating one (1) unit of mitigation storage volume for every on (1) unit of floodplain storage volume that is displaced. The mitigation storage volume must occur within:
      i. The same flood storage area as the volume displaced; and,
      ii. At the same elevation band as the volume displaced; or
   2. If mitigation storage volume is proposed to be outside the same flood storage area or the same elevation band, then the mitigation within the Critical Flood Zone 1 must:
      i. Create a minimum of one (1) unit of mitigation storage volume for every one (1) unit of floodplain storage volume displaced or as needed to comply with Section 110.416.57.b.2.ii; and,
      ii. Demonstrate no adverse impact through application of the Truckee River Flood Project Mitigation model.

c) Mitigation Storage Volume. The entire amount of mitigation storage volume must be available for flood storage before any flood event. Detention basins required by other ordinances are not eligible to be counted as mitigation storage volume.

d) Mitigation Location. Mitigation cannot occur in conflict with and/or at the same location of approved Truckee River Flood Project features as indicated on maps on file in the Truckee River Flood Management Office.

e) Mitigation Timing. Mitigation must occur concurrently with or prior to a reduction of flood storage volume.

f) Exceptions. This applies only to the parcels shown on Figures 110.416.57.1-110.416.57.3 and at the time of building permit, the parcels must be zoned as shown on Figures 110.416.57.1-110.416.57.3 for the exceptions to apply.
   1. Any construction activity that decreases the volume of flood storage in Zone 1 shall be prohibited.
   2. All development located on the parcels shown on Figure 110.416.57.1 shall provide compensatory storage at a one to one (1:1) ratio on the project site or in a hydrologically connected basin, as determined by the Department of Public Works.
   3. Compensatory storage may be, but is not required to be, hydrologically connected to onsite drainage designs required under Article 420, Storm Drainage Standards, of the Development Code.
   4. No critical facilities will be allowed on parcels shown on Figures 110.416.57.1-110.416.57.3.
   5. Compensatory storage on a one to one (1:1) ratio may be allowed in an existing hydrologically connected regional storage mitigation facility determined adequate by the Department of Public Works.

g) Definitions. For the purposes of this article, the definitions listed hereunder shall be construed as specified in this section.

Critical Flood Zone 1 means that area depicted as Zone 1 in the Truckee Meadows Floodplain Storage Zones Map, figure 1-2 of the Regional Water Plan dated January 2004.

Displacing Projects means any proposed public or private construction which changes existing grades, imports fill, and/or displaces any volume of flood water in Critical Flood Zone 1 below the water surface indicated in Section 110.416.57.f.6.

Elevation Band means a range of elevation of (10) vertical feet from the project's lowest natural elevation as defined in Section 110.416.57.f.6.

Elevation Map means the latest version of the Truckee River Flood Management Project's Ground Elevation and Flood Water Elevation Map Series adopted and administered and updated from time to time pursuant to a cooperative agreement between all jurisdictions who have adopted similar regulations. A copy of the Elevation Map will be kept on the Truckee River Flood Management Project website.

Flood Storage Area means those areas designated on the Elevation Map. If construction or mitigation is to occur in an area that is not designated as a Flood Storage Area on the Elevation Map, then mitigation must occur as provided in b.2. of this section.

Mitigation Storage Volume means flood storage volume provided in Critical Flood Zone 1 to offset a displacement of flood water volume as a result of construction activity.

No Adverse Impact means as determined by the application and output of the Truckee River Flood Project Mitigation Model(s), water surface elevation in the critical flood zone 1 within the 1997 water surface elevation as determined by the Elevation Maps is not to be raised.

Truckee River Flood Project Mitigation Model means a hydraulic model as updated from time to time, adopted and administered pursuant to a cooperative agreement between all jurisdictions who have adopted similar regulations. Until such a cooperative agreement is reached, the HEC – RAS Version 4.0 model prepared by the United States Army Corps of Engineers shall be used.

Truckee River Flood Project Additional Criteria

The freeboard requirement for the SEC Bridge Crossing at the Truckee River will be a minimum of 4-feet over the 117-year water surface elevation at each overbank.

4.0 GEOTECHNICAL CONDITIONS

Geotechnical investigations were performed by Kleinfelder, for the proposed bridge at the Truckee River and across the flood pool and at the Clean Water Way grade separation. Construction Materials Engineers, Inc. (CME) prepared a geotechnical investigation for the proposed roadway fill areas. Summarized below are the

geotechnical conditions as they pertain to drainage analyses. For further geotechnical considerations please refer to the three geotechnical investigations outlined in Section 2.0 above (not included in this report.)

4.1 Groundwater Conditions

The geotechnical investigations listed the groundwater levels approximately ranging 6.4-feet to 20.9-feet below ground surface with an average groundwater elevation of 4378-feet. It shall be noted that groundwater levels may vary due to seasonal changes, storm events, existing channel water levels and/or irrigation use.

4.2 Soil Conditions

"The majority of the roadway alignment lies within floodplain deposits of the Truckee River and Steamboat Creek. These deposits are primarily fine grained consisting of silt or clay with variable quantities of fine grained sands and localized zones of organics. Flood plain deposits were interbedded by fluvial deposits derived from Steamboat Creek and the Truckee River, as well as alluvial fan material deposited from the hillsides east of the roadway alignment. Fluvial and alluvial fan deposits are generally granular consisting of mostly fine to medium grained sands with variable quantities of silt, clay and gravels. This geomorphic environment accounts for the complex interfingering of fine grained and granular soils encountered within the upper portion of the soil profile. Deeper soil strata generally consist of Pleistocene age glacial outwash deposits." (CME, 2012)

5.0 HYDROLOGIC ANALYSES

The hydrologic analyses were divided into two parts, onsite and localized offsite hydrologic analyses and offsite hydrologic analyses. Applicable analysis methods were selected based on the level and depth of analysis required for the area.

5.1 Onsite Hydrologic Analyses: Rational Method

Onsite watershed basins were delineated for both the existing and proposed conditions. Refer to *Figure 4.0 – Existing Conditions Watershed Map* and *Figure 5.0 – Proposed Conditions Watershed Map* for basin delineation. The site generally flows from west to east via sheet flow. The Rational Method was utilized to estimate peak flow rates in each basin for both the 5-year and 100-year storm events for each condition. The equation for the Rational Method is as follows:

$$Q = C*i*A$$

where: ***Q*** is the flowrate in cubic feet per second (cfs), ***C*** is the runoff coefficient, ***i*** is the intensity in inches per hour (in/hr) and ***A*** is the area in acres. Runoff coefficients were applied to the appropriate land uses within the study area and weighted averages were calculated for each drainage basin. The following runoff coefficients (C-values) were used for the project site to calculate weighted C-values for each watershed.

Land Use Type	C5	C100
Paved Roadway	0.88	0.93
Open Space	0.30	0.50

NOAA Atlas 14 was used for the precipitation estimates in conjunction with times of concentration for sub-basins within the site. Rainfall intensity values for each basin were obtained using the IDF curves created from the data given in the atlas. The time of concentration for each sub-basin was estimated using an initial overland flow time, plus the time of travel in a paved gutter, or other conveyance system. A minimum time of concentration of ten (10) minutes was required for each basin.

Existing conditions consist mostly of undeveloped farm land, paved roads, and bike pathways along the Truckee River shown as watershed basins E1 through E9 on *Figure 4.0 – Existing Conditions Watershed Map*. Refer to Appendix A for peak runoff flow calculations. The total peak flow in the 5-year event is 32.36-cfs and 127.85-cfs in the 100-year event.

Proposed conditions include the roadway, multi-use path, bioswale and intersection improvements. *Figure 5.0 – Proposed Conditions Watershed Map* outlines the proposed watershed basins P1 through P34. Refer to Appendix A for peak runoff flow calculations. The total peak flow in the 5-year event is 43.81-cfs, an increase of 11.45-cfs from existing to proposed conditions. The total peak flow in the 100-year event is 156.14-cfs, an increase of 28.29-cfs from existing to proposed conditions.

The peak flow rates estimated for the proposed condition 5-year and 100-year storm events were used to design all storm drainage infrastructure including storm drain and inlets, box and pipe culverts, bioswales, drainage ditches and vegetated buffers. Please refer to Section 6.0 Hydraulic Analysis for further information.

5.2 Hydrological Analyses for Water Quality / First Flush Scenario

In addition to the 5-year and 100-year events, the 2-year (first flush) event was also calculated for storm water quality purposes and best management practices (BMPs) sizing. The calculation encompasses only the onsite improvement areas. The Truckee Meadows Structural Controls and Low Impact Development (LID) Manuals were utilized to develop the proposed water quality improvements. The improvements include a multi-layered system of water quality infrastructure. All runoff from roadway paved surfaces are conveyed via sheet flow or concentrated flow swales into vegetated bioswales. The bioswales are conveyed to the volumetric basins which effectively act as a secondary vegetated buffer water quality feature. The maintenance access road has been lined with Articulated Concrete Blocks to provide LID maintenance road stability. Native plant species will be utilized to revegetate all roadway embankment slopes, bioswales, the volumetric basins and other disturbed areas. The Truckee Meadows Design Guidance Worksheets and results are located in Appendix A.

5.3 Offsite Hydrological Analyses: USACE Hydrographs

Hydrographs for the TRFMA / USACE Truckee River HEC-RAS Unsteady State Model were developed by the USACE and are based upon statistical analyses of Truckee River watershed gauge data, upstream reservoir operating data, as well as the Flood of 1997 as a pattern.

The USACE developed hypothetical hydrographs for the local watershed between the Reno and Vista gages for the Boynton Slough, Steamboat Creek at Huffaker Hills, Steamboat Creek at its confluence with the Truckee River, the North Truckee Drain, and the contributing area to the Truckee River below the North Truckee Drain.

Details of the USACE hydrologic analyses can be found in the *Truckee Meadows Flood Control Project Attachment B – Hydraulic Design (Draft) and Truckee Meadows, Nevada – Addendum to General Re-Evaluation Report Phase F3 Milestone Conference Revised Hydrology* reports. The hydrographs included with the HEC-RAS Unsteady state models were used without modification for both existing and proposed conditions. Refer to Appendix A for further data.

6.0 HYDRAULIC ANALYSES

Onsite and offsite hydraulic analyses were performed to demonstrate that with the appropriate design measures the SEC project will not adversely impact the existing floodplain. Please refer to the *SouthEast Connector Phase 1: Greg Street to Clean Water Way* plan set (Plans) for all onsite and offsite drainage

improvements. Refer to Appendices B and C for all hydraulic analyses, design calculations and worksheets, and modeling.

6.1 SouthEast Connector Roadway Drainage Improvements

The roadway drainage improvements consist of curb/barrier and gutter, storm sewer catch basins, storm drain piping and drainage ditches. Culverts and Bioswales will be addressed in the following sub-sections.

For the road portion south of the Truckee River bridge (Stations 262+72.17 to 289+00) four catch basins are proposed along the inside median of the north bound lanes in the super-elevated road section. Runoff will be collected at these inlets and conveyed via storm drain pipe to the bioswales located along the road improvements. The northernmost catch basin along the super-elevated road section will collect runoff and convey it directly into the Bioswale 1. The remaining 3 catch basins will convey flow to the box culvert at Station 282+50.

In addition to the catch basins, one runoff inlet spillway with riprap drainage ditch is proposed at the end of each bridge barrier rail at the Clean Water Way bridge and at the southerly end of the south bound bridge barrier rail at the Truckee River bridge for a total of five runoff inlet spillway systems.

For the road portion north of the Truckee River bridge, storm drainage improvements include a storm sewer system with 3 inlets, one manhole and 168-feet of reinforced concrete pipe (RCP). North of the northern Truckee River bridge abutment, one inlet is proposed along the shoulder of the southbound lanes and one double inlet is proposed along the inside median of the northbound lanes to collect runoff flowing off of the bridge. Two 12-inch RCP's will convey the flow from the inlets to a 36-inch RCP equalization culvert located at Station 304+90.

6.1.1 Bioswales

Roadway runoff will typically be conveyed via sheet flow off the road and down the vegetated embankments where it will be collected in the vegetated bioswales. A total of twelve roadway bioswales will be constructed to effectively treat the 2-year rainfall event and convey the 100-year rainfall event from theroadway to the volumetric basins. The eight bioswales west of the SEC flow towards one of the two equalization box culverts that convey flow from west to east under the SEC. The four bioswales east of the SEC convey flow along the road to a point near the downstream ends of the above mentioned culverts whereby the flow is then conveyed into one of the two volumetric mitigation basins. Localized offsite runoff that would normally be conveyed (in the existing condition) via overland flow across the site to Steamboat Creek will be intercepted along the western edge of the multi-use path in an offsite conveyance channel to the equalization culverts and into the volumetric mitigation basins. Refer to the Plans and Appendix B for further bioswale flow and geometry information.

Roadway embankments and bioswales shall be revegetated per the guidelines outlined in the *Final Existing Conditions Memorandum of Vegetation, Soils and Wetlands: SouthEast Connector, Washoe County, Nevada,* Western Botanical Services, Inc, dated November 7, 2011 and the *Tall Whitetop (Lepidium latifoilium) Management Strategy and Performance Criteria: SouthEast Connector, Washoe County, Nevada,* Western Botanical Services, Inc, dated December 12, 2011 reports.

6.1.2 Culverts

As previously mentioned in section 5.1.1 Bioswales and two equalization box culverts will be constructed to convey flow under the SEC ultimately to the volumetric mitigation basin areas. The first culvert, located at Station 268+25, shall consist of 182-feet of dual 8'x12' reinforced concrete box culvert. The second culvert, located at Station 282+50, shall consist of 147-feet of 8'x12' reinforced concrete box culvert.

In addition to the two box culverts, pipe culverts will also be installed to convey flow from the western western offsite conveyance channel to the upstream end of each box culvert. These pipes will convey flow under the multi-use path, where it will outlet onto a riprap pad just upstream of the box culvert entrance. Each pipe will be fitted with a flared end section at each end. Two 24-inch diameter pipes will be installed near the box at Station 282+50 and one 18-inch diameter pipe will be installed near the box at Station 268+25.

A 36-inch reinforced concrete pipe culvert will be installed at Station 304+90. The culvert will have a length of 285-feet and will act as an equalization culvert in addition to conveying local runoff and flow intercepted by the storm drain system previously discussed in this report.

Two additional reinforced concrete box equalization culverts will be placed under the existing Clean Water Way. These culverts have been sized to aid the conveyance of flow from one side of Clean Water Way to the other and will consist of 40-feet of a double 8-foot wide by 6-foot high RCB. This equalization culvert will drain into a swale with a 75-foot long 30-inch RCP that outlets at Steamboat Creek.

Refer to the Plans for culvert locations and Appendix B for hydraulic calculations.

6.1.3 Volumetric Mitigation Basins

Two volumetric mitigation basins were designed to mitigate the floodplain volume lost with the placement of fill for roadway. One basin will be located north of Clean Water Way and the other will be located south of Clean Water Way. Each basin will receive SEC road runoff via the drainage improvements discussed in previous sections and will outlet the runoff to Steamboat Creek.

Volumetric Basin I ranges in depth from 2.5-feet to 8-feet, covers an area of 700,530 sqft and consists of 98,860 cubic yards of total volume offset. Volumetric Basin II ranges in depth from 4-feet to 6-feet , covers an area of 279,050 sqft and consists of 50,000 cubic yards of total volume offset. All side slopes are 4:1 with the exception of 10:1 side slopes where an access road passes through each basin near its outfall. The portion of access road that passes through each basin will be armored with articulated concrete block.

The basins shall be revegetated per the guidelines outlined in the *Final Existing Conditions Memorandum of Vegetation, Soils and Wetlands: SouthEast Connector, Washoe County, Nevada,* Western Botanical Services, Inc, dated November 7, 2011 and the *Tall Whitetop (Lepidium latifoilium) Management Strategy and Performance Criteria: SouthEast Connector, Washoe County, Nevada,* Western Botanical Services, Inc, dated December 12, 2011 reports.

Refer to the Plans for complete Volumetric Basin details.

6.2 Truckee River Bridge Drainage

Runoff from the Truckee River Bridge will be collected on the bridge and be conveyed to the ground into bioswales that drain to volumetric mitigation basin I. For the southbound deck, runoff will be collected by one inlet with a curved vane grate at each pier. The grate will be located on the path side of the barrier. Barriers with openings/scuppers shall be installed to allow the flow to pass through the barrier to each inlet. The flow will be conveyed from the inlet through a bridge drainage pipe downspout at each pier. The flow will be intercepted by a riprap splash pad at the swale underneath the bridge. Spread along the southbound deck does not exceed the 8-foot shoulder width in the 5-year event and maintains the one drivable dry lane criteria in the 100-year event.

For the northbound deck, runoff will be collected by one inlet with a curved vane grate at each pier. The grate will be located next to the median in the left hand shoulder. The flow will be conveyed from the inlet through a

bridge drainage pipe downspout at each pier. The flow will be intercepted by a riprap splash pad at the swale underneath the bridge. Spread along the northbound deck does not exceed the 3-foot median shoulder width in the 5-year event and maintains the one drivable dry lane during the 100-year event.

Refer to the Plans and Appendix B for calculations.

6.3 Greg Street and Sparks Boulevard Improvements

Improvements to Greg Street include widening both sides of the road east and west of the SEC/Sparks Boulevard/Greg Street intersection. New curb, gutter and sidewalks will also be installed per the Plans. Storm drain improvements include adjustment of two inlets and their respective laterals, and installation of one new inlet and lateral east of the above mentioned intersection.

Improvements to Sparks Boulevard include adjustments to lane configurations due to a modified median, repaving, and improvements to the curb and gutter and side walk on the west side of the road. Three new catch basins, one manhole and 208-feet of RCP will be constructed to collect runoff. This runoff will outlet into an existing roadside ditch that flows parallel to Sparks Boulevard. In the existing condition this runoff was conveyed via sheet flow off the road into the same roadside ditch. Contributing watershed areas remain the same.

Please refer to the Plans for further information and Appendix B for hydraulic calculations.

6.4 Flood Control Modeling

Key components of the drainage analysis for the SEC Phase 1 project are to verify that the proposed improvements do not adversely impact the Zone 1 CFP, that they do not raise water surface elevations (WSEL's) in the Zone 1 CFP or floodway or decrease flood volumes in the Zone 1 CFP. Over the course of the SEC Phase 1 design Stantec has utilized two versions of the USACE / TRFMA hydraulic HEC-RAS flood model of the lower Truckee Meadows to demonstrate that the proposed SEC improvements comply with these components. The first version of the flood model, released by the USACE, with the plan titles "Alt 5 (117YR Des) – 117yr LPP" and "2.0NewBC w/ Debris-117yrUPDATE" was utilized during the 30% design that included a Steamboat Creek restoration initial design. As the project design parameters changed from a Steamboat Creek stream restoration design to a volumetric mitigation basin design, a newer version of the flood model, updated by West Engineers, was released to Stantec by the TRFMA. The updated model was used for the 95% and 100% designs. This plan within the newer version model is known as existing conditions without the LPP, titled "117-yr ConditionalWithoutProject."

Previous modeling efforts took in to account the proposed TRFMA project elements and verified that the propsed SouthEast Connector project elements would not impact the TRFMA project. Currently, the TRFMA project is in a state of flux as to which design event (50-year, 100-year or 117-year) and which proposed project elements will be included. The future TRFMA project was therefore excluded from our analyses. We do not anticipate any impact from the SEC on the future TRFMA project since all of our previous modeling that included the TRFMA project resulted in no impact to the TRFMA project.

Stantec modified the unsteady state HEC-RAS model for the 95-100% design by adding two additional plans, or sub-models. The first plan's purpose was to correct and calibrate the original existing plan ultimately creating a "Corrected Effective Base Model." The second plan's purpose was to build upon the Corrected Effective Base Model to include the final design of the bridge, roadway and volumetric mitigation basins, to create the proposed project "SEC Phase 1 Model." Naming conventions of the two specific model plans that were added to the model for the 95-100% design are as follows:

- 117-yr ConditionalWithoutProject – CE (EX-CE)
- 117-yr ConditionalWithoutProject – CE SEC (EX-SEC)

The model modification process for the EX-CE plan consisted of removing the 5A to 5B storage area (SA) weir connection and to combine SA5A and SA5B thus creating one larger area, SA5. This was done to more accurately depict the average water surface elevation within SA5 prior to any construction and/or mitigation. It also eliminated the unnecessary need for, and limitations of, multiple weir based storage area connection calculations not directly related to the Phase 1 project. The SA28 to SA29 connection was also adjusted slightly to straighten the meander on the south end and represent a more effective bottom flow elevation. The volumes for the affected SAs, including 5, 6 and the construction portion of 28 and 29, were resampled using a 2011 Stantec surveyed 1-foot interval contours for the majority and 2004 Washoe County 2-foot interval contours for a small slice of outlying area. Once these steps were completed with a successful model run, Stantec had a Corrected Effective Base Model to compare with the proposed project design.

Bridge, roadway and volumetric basin designs were added to the EX-CE plan to create the EX-SEC plan. This process consisted of updating and creating new cross sections in the Truckee River at the bridge location, adding bridge data, resampling the same SAs as in the EX-CE plan but with Phase 1 design contours included, updating the SA volumes accordingly and creating and/or updating SA weir connections to reflect the equalization culverts and bridge openings at the SEC and Clean Water Way.

Refer to the Plans for model based infrastructure details and see Appendix C for a Storage Area Sampling Volume spreadsheet.

Figure 6.0 – SouthEast Connector – Phase 1 Drainage and Flood Control Modeling Results illustrates the general elements of SEC Phase 1 in relation to the CFP and the flood model affected storage areas. Additionally *Figure 6.0* lists water surface elevation comparisons between the EX-CE and EX-SEC model plans.

6.4.1 Modeling Results

See Table 1 below for HEC-RAS modeling results shown by comparison of existing conditions and proposed conditions model plans. Specifically, Table 1 shows the differences in water surface elevations by storage area between the EX-CE and the EX-SEC model plans.

Table 1 – Direct Project Affected Storage Area Water Surface Elevations (WSEL) Comparisons

EX-CE		EX-SEC	
Storage Area	**WSEL (ft.)**	**Storage Area**	**WSEL (ft.)**
Area 5	4397.36	Area 5A	4397.36
Area 5	4397.36	Area 5B	4397.35
Area 6	4397.57	Area 6A	4397.56
Area 6	4397.57	Area 6B	4397.57
Area 28	4397.30	Area 28	4397.30
Area 29	4397.49	Area 29	4397.49

Table 1 illustrates that the water surface elevations for all project-affected storage areas are the same or slightly lower under proposed conditions with the SEC, volumetric basin mitigation and all associated equalization infrastructure. Near the confluence of the Truckee River and the proposed SEC Phase 1 Bridge, the EX-CE 117-yr WSEL is 4397.36 and the EX-SEC 117-yr WSEL is the same. A comparison of all other

SAs and cross sections across both model plans resulted in the same or slightly lowered water surface elevations in the EX-SEC plan.

See Appendix C for all other *HEC-RAS Backup Data* including storage area results and a general report for the both aforementioned plans.

6.5 Scour Analysis

The new Truckee River Bridge is proposed to be approximately 1400 feet in length and consist of 10 individual spans ranging from approximately 120 feet to 175 feet in length. There is one row of four piers and one abutment north of the Truckee River and eight rows of four piers and one abutment south of the Truckee River. The following section discusses the steps taken to generate recommended scour protection depths for all Truckee River proposed bridge piers and abutments. See Appendix C for the *Plan & Profile Bridge at Truckee River* exhibit, which was utilized as a modeling reference throughout the Scour analysis including such elements as bridge and pier locations, the Truckee River, Greg Street, HEC-RAS cross sections, HEC-RAS storage areas, a proposed model equalization culvert and the existing sanitary sewer.

6.5.1 Soils Data

Soils Data was provided by Kleinfelder in a report, *Final Geotechnical Investigation Report: SouthEast Connector Truckee River Bridge and Clean Water Way Grade Separation,* dated August 30, 2012. Kleinfelder's explorations with in the location of the proposed bridge reveal weak, compressible and potentially liquefiable flood plain deposits over the first 19 to 29 feet, and dense sands and gravels below that to approximately 100 to 120 foot depths. The boring data from this report in the location of the proposed bridge was used to obtain the D50 and D95 grain sizes for the scour calculations as discussed below. See Appendix C for Kleinfelder's boring location map and associated boring test results.

6.5.2 Previous Studies & References

Two references, the *Watercourse System Sediment Balance, Guideline 1, Lateral Migration Setback Allowance for Riverine Floodplains in Arizona* (Guideline 1) and the *Reach Y Restoration Feasibility Assessment* (Reach Y), cited at the beginning of this report, were used for lateral migration identification techniques and historical patterns of the Truckee River, respectively.

The Guideline 1 publication states that the minimum setbacks for a Level I analysis are 20 feet for a straight section of channel and 50 feet for a curved section of channel. However, any watershed greater than 30 square miles should be evaluated with a "Level III Approach." This approach states that any watershed greater than 30 square miles has too many variables to use the more direct "Level I" and "Level II" approaches when determining lateral migration of a river, and that more historical research such as evaluation of historical trends, qualitative analysis based on field evaluation and application of geomorphic principles and steady state hydraulic and sediment transport analyses would be necessary.

The *Reach Y Restoration Feasibility Assessment,* prepared for the City of Reno, the City of Sparks and the TMWRF facility, examines the current geomorphic and ecosystem functions of the Truckee River between East McCarran Boulevard and just east of TMWRF and outlines steps to restore these functions to their original conditions. The report focusses on the history of the Truckee River and draws from many references to conclude that "substantial lateral erosion and channel widening" could occur within the reach due to the completion of initial channel degradation. See Appendix C for Figures 15, 16 and 17, taken from the *Reach Y Restoration Feasibility Assessment* report that illustrates the conceptual possibilities for lateral migration through this particular reach. Stage 1 on Figure 15 shows the original condition of the Truckee River prior to any human modification, Stage 2 on Figure 15 shows the USACE reach straightening that took place in the late 50s and Stages 3-6 on Figures 16 and 17 illustrates the potential for natural lateral migration.

6.5.3 Long Term Aggradation, Degradation and Lateral Migration

Historically the meander of the river extended far into industrial Sparks as discussed in the Reach Y report. This scour analysis began with a lateral migration assessment of the Truckee River and its associated 1430 square mile watershed basin. This assessment was necessary to estimate the potential extents of lateral migration and to identify the number of SEC Bridge piers located outside the current river channel that should be protected from scour at maximum river velocities.

A conservative lateral migration distance of approximately 250 feet from the south bank of the Truckee River was selected based on the erosive nature of the existing soils, the historical meandering nature of the stream and the assumption that riverine migration countermeasures would be undertaken should the river begin to show extensive migration. This distance includes three rows of proposed bridge piers to the south of the Truckee River. The row of piers just to the north of the Truckee River was also subjected to scour calculations at maximum river velocities due to its close proximity to the main channel. These piers subjected to maximum velocity scour calculations will be termed “mainstream piers.” The remaining bridge piers, termed “overbank piers,” and the north and south abutments were assumed to be located outside of the potential lateral migration zone Thus at these locations scour calculations were performed based on localized maximum velocities rather than potential migrated maximum channel velocities. It is also important to note that the existing levees on the north and south side of the river will serve to reduce lateral migration provided the levee is maintained and any post major flood event emergency repairs are made.

6.5.4 Scour Calculation Methods

For the purposes of this scour analysis one of the overbank bridge piers to the north, one of the overbank bridge piers to the south and both abutments were included to fit within the HEC-RAS bridge cross section of the EX-SEC model plan. This overbank pier and abutment inclusion was accomplished by truncating the true distances.

The HEC-RAS *Flow Distribution Location* function was utilized to produce velocity distribution results per a user specified number of subsections in the main channel and both overbanks. This function was used for analyzing scour potential in the overbank areas and pin-pointing more accurate velocities. Without the velocity distribution function enabled, the maximum velocity is averaged over the entire cross section amounting in less accurate results across the section. The truncated bridge modifications and velocity distribution results at the Truckee River upstream bridge cross section are included in Appendix C.

After velocity distribution results were generated, the HEC-RAS Hydraulic Design – Bridge Scour function was used to calculate scour depths for all locations. This design function provides options for multiple types of scour equations to be used at a given time interval within a selected model plan.

6.5.5 Pier Scour

For the mainstream piers the time interval with the highest velocity in the EX-SEC plan was identified under maximum velocity and maximum depth variable conditions. These maximum conditions represent scour conditions if the main channel flows were to be subjected to each pier. Then the default CSU equation was selected and the following variables necessary to run the bridge scour functions were identified, specifically: a round nose pier shape, a pier width of 9ft, a D50 local particle size of 7.0 mm, a 14 degree angle of flow related to the piers, a clear water stream bed condition and a D95 local particle size of 12.5 mm. All other variables were generated from the particular model plan and the scour was then computed. For the overbank piers the time interval with the highest velocity in the EX-SEC plan was identified under local velocity and maximum depth variable conditions. These local conditions represent the worst case flood conditions in the overbank area. The same variables as the main channel piers were entered for the specific overbank piers

with the exception of the angle, which was increased from 14 degrees to 18 degrees due to the increased angle that could be required to reach the most outlying piers, and the scour was then calculated.

6.5.6 Abutment Scour

For abutment scour the HIRE Equation Specific Data method was utilized at the same maximum velocity time interval that was subjected to the overbank piers. This scenario best represents the unknowns of flooding 1400 feet away from the current channel and utilizes only the velocity in calculating scour. A cross check was done between the HIRE Equation and the Froehlich Equations when applied to abutments and the HIRE Equation proved to be slightly more conservative.

6.5.7 Scour Results and Recommended Protection

The scour results are as follows and have been rounded to the nearest foot:

- Main Channel Piers (16 each) = 25 feet of scour protection recommended
- Overbank Piers (20 each) = 12 feet of scour protection recommended
- North Abutment = 10 feet of scour protection recommended
- South Abutment = 18 feet of scour protection recommended

See Appendix C for the main channel pier scour, the overbank pier scour and the abutment scour HEC-RAS results.

7.0 FEMA FLOODPLAIN / FLOODWAY CONSIDERATIONS

The entire SEC Phase 1 project is located within a FEMA Special Flood Hazard Area Zone AE (with base flood elevations and established floodway) as shown on the FEMA Flood Insurance Rate Map (FIRM) for Washoe County, Nevada and Incorporated Areas, panels 3063 and 3064 of 3475, dated revised March 16, 2009. The floodplain and associated floodway are created by flows from the Truckee River, Steamboat Creek, and by backwater of flood flows concentrating at the Vista Narrows. The contributing watershed is approximately 1430 square miles, with flow emanating from the Truckee River, Steamboat Creek, the North Truckee Drain and all of their tributaries. The effective Flood Insurance Study (FIS) and FIRM mapping for the Truckee River and Steamboat Creek prepared for FEMA on September 30, 1994 and revised March 16, 2009 utilized the US Army Corps of Engineers HEC-2 Water Surface Profiles program to develop the floodplain and floodway mapping.

The FIS, on page 42, states “In modeling the floodways for the Truckee River and Steamboat Creek, it was determined that once the floodway data for the south bank of the Truckee River and the west bank of Steamboat Creek were combined, the resultant floodway would cover the entire area, and therefore, encroachment will not be considered. Encroachment was not considered on Steamboat Creek below Kimlick Lane (Clean Water Way) on the west bank or on the Truckee River south bank in the Truckee River reach. This method does not consider conveyance reduction, but does model the areas where encroachment is allowed between McCarran Boulevard and Vista.” This statement indicates that the modeling did not take into account any encroachment (or fill) to raise ground elevation in order to delineate the floodway within this area and also indicates that the model was not tested in this area to determine how fill would impact the floodway.

The proposed roadway and volumetric mitigation basins are also located within the Zone 1 CFP of the lower Truckee Meadows that is created by the backwater from the Vista Narrows. Development within the CFP must comply with Washoe County Code 110.416.57 “Standards for all Development in Critical Flood Storage Zones” Ordinance No. 1457 (Ordinance 1457). The CFP was delineated utilizing the USACE / TRFMA’s unsteady state HEC-RAS model of the lower Truckee Meadows and is based on a 117-year event.

The USACE / TRFMA 117-year event unsteady state HEC-RAS model results in water surface elevations that are higher than the effective FEMA 100-year event HEC-2 model, under existing conditions. Since the USACE/TRFMA model demonstrates under proposed conditions, as described in Section 6.4 above, that the proposed project does not impact the existing floodplain, floodway, or CFP volumes, the same will be true under the 100-year event. Given that the 117-year unsteady state hydraulic HEC-RAS model includes more detailed analyses than the effective steady state hydraulic HEC-2 model, utilizes a higher return event of 117-year versus 100-year, and results in no net increase in water surface elevations further illustrates that the proposed improvements comply with FEMA’s requirements of no adverse effect to the floodplain, floodway or adjacent property owners, preserves the conveyance area necessary for the passage of floodwaters and avoids any increases in flood elevations.

The SEC Phase 1 project is the first segment of an overall larger project and project area. The SEC Phase 2 improvements and the TRFMA proposed improvement are both currently under design or redesign. The full SEC project (including both Phase 1 and Phase 2) and the TRFMA project will take many years to complete, and it is assumed that both projects will provide a net benefit to the floodplain. Given the magnitude of both projects and the phasing of the first segment of the SEC, the Cities of Reno and Sparks and Washoe County Floodplain Managers have all come to a consensus that a FEMA Conditional Letter of Map Revision (CLOMR) or Letter of Map Revision (LOMR) will not be required for the project at this time and that the Cities and County may at any point in the future pursue the submittal of a CLOMR/LOMR in order to show any reductions in flood hazards or flood hazard areas.

The TRFMA has been issued a copy of this report and the aforementioned updated model plan modifications. Stantec is currently waiting for the TRFMA’s review for concurrence with the modeling efforts, methodologies and results of SEC Phase 1 modifications to the USACE / TRFMA model.

8.0 CONCLUSIONS

The hydrologic and hydraulic analyses prepared for the project include rational method analyses, drainage infrastructure analyses and modification of the USACE / TRFMA HEC-RAS models, which demonstrate the required mitigation measures in the form of bridges, box culverts, and one to one (1:1) volume mitigation. The results of our analyses show that the proposed SouthEast Connector will have no adverse impact to the TRFMA, water surface elevations or volumes in Critical Flood Zone 1 and will be in compliance with, or exceed, all local ordinances.

FIGURES

Figure 1.0 – Vicinity Map

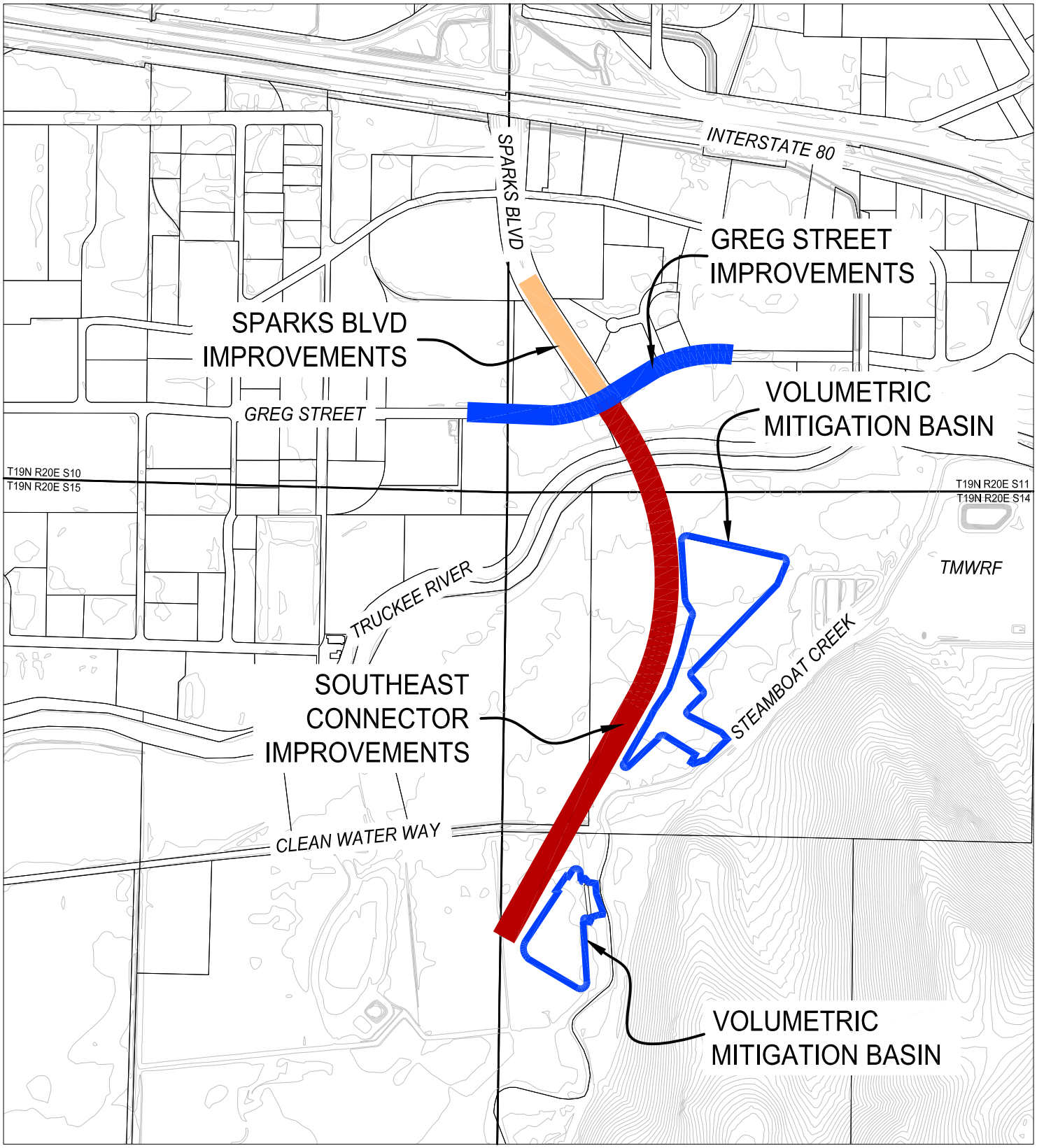
Figure 2.0 – SouthEast Connector – Phase I Proposed Condition Drainage Workmap

Figure 3.0 – SouthEast Connector – Phase I FEMA Flood Map

Figure 4.0 – Existing Conditions Watershed Map

Figure 5.0 – Proposed Conditions Watershed Map

Figure 6.0 – SouthEast Connector – Phase I Drainage and Flood Control HEC-RAS Modeling Results



MARCH 2013
180101226

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N
N.T.S.

Client/Project
RTC OF WASHOE COUNTY
SOUTHEAST CONNECTOR
PHASE 1

Figure No.
1.0

Title
VICINITY MAP

GRAPHIC SCALE
200 0 100 200 400
(IN FEET)
1 INCH = 400 FT

LEGEND
EFFLUENT LINE
OVERHEAD POWER LINES
SANITARY SEWER LINE & MANHOLE
WATER LINE

TMWRF
TRUCKEE RIVER
VOLUMETRIC BASIN (APPR. 105,000 CY)
EXISTING STEAMBOAT CREEK
PROPOSED BRIDGE AREA
BIOSWALE
OFFSITE FLOW CHANNEL
EQUALIZATION CULVERT
PROPOSED 30" EFFLUENT RE-ALIGNMENT
VOLUMETRIC BASIN (APPR. 50,000 CY)
SPARKS BLVD.
GREG STREET
CLEAN WATER WAY
PROPOSED 12" EFFLUENT TIE-IN
PROPOSED SOUTHEAST CONNECTOR
PHASE I
FUTURE PHASE

\\52801\active\180101226_SEC_TRB\drainage\drawing\RE-DESIGN\exhibits\fig2.0_phase1_exhibit.dwg
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FIGURE 2.0
SOUTHEAST CONNECTOR - PHASE I
PROJECT ELEMENTS

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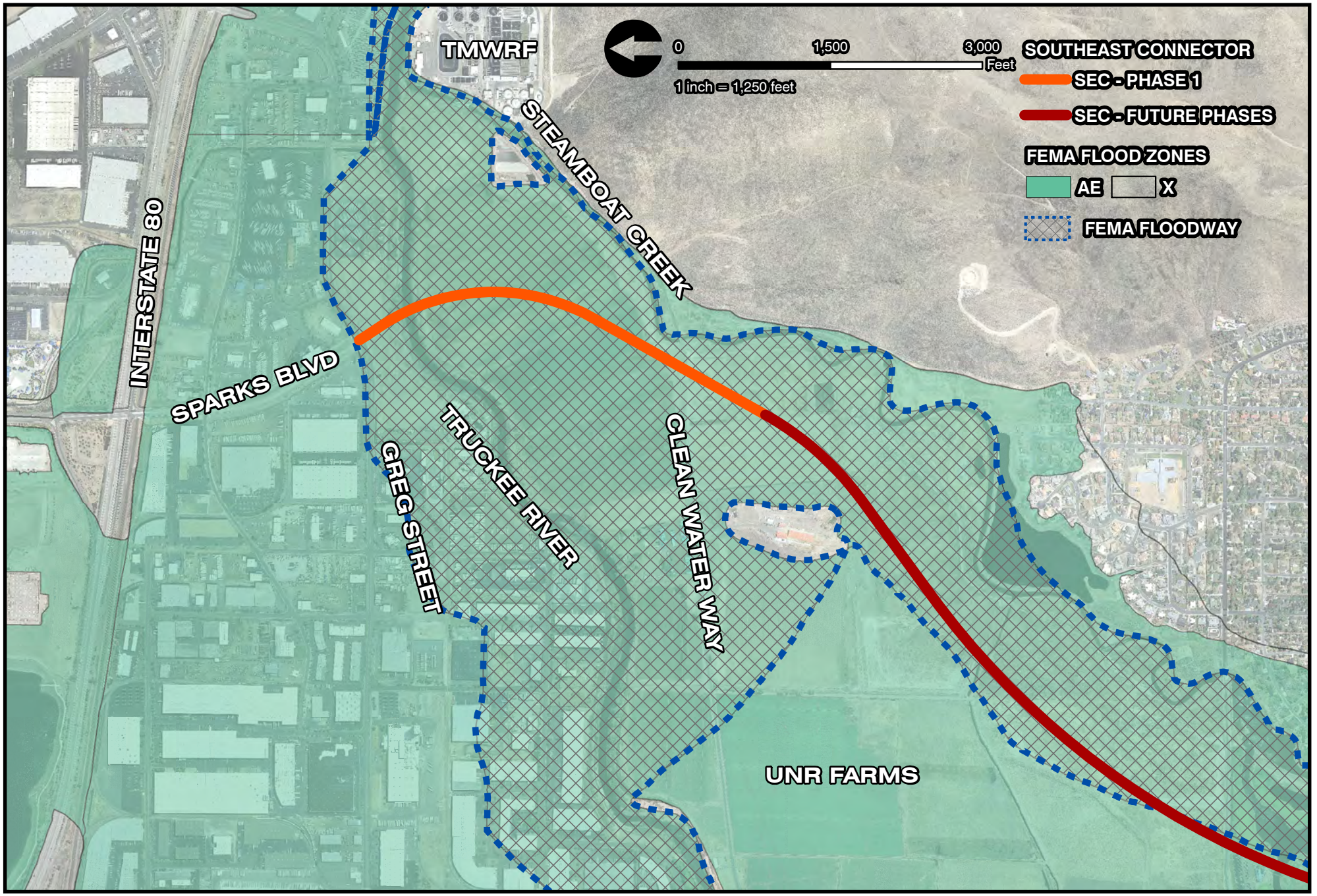
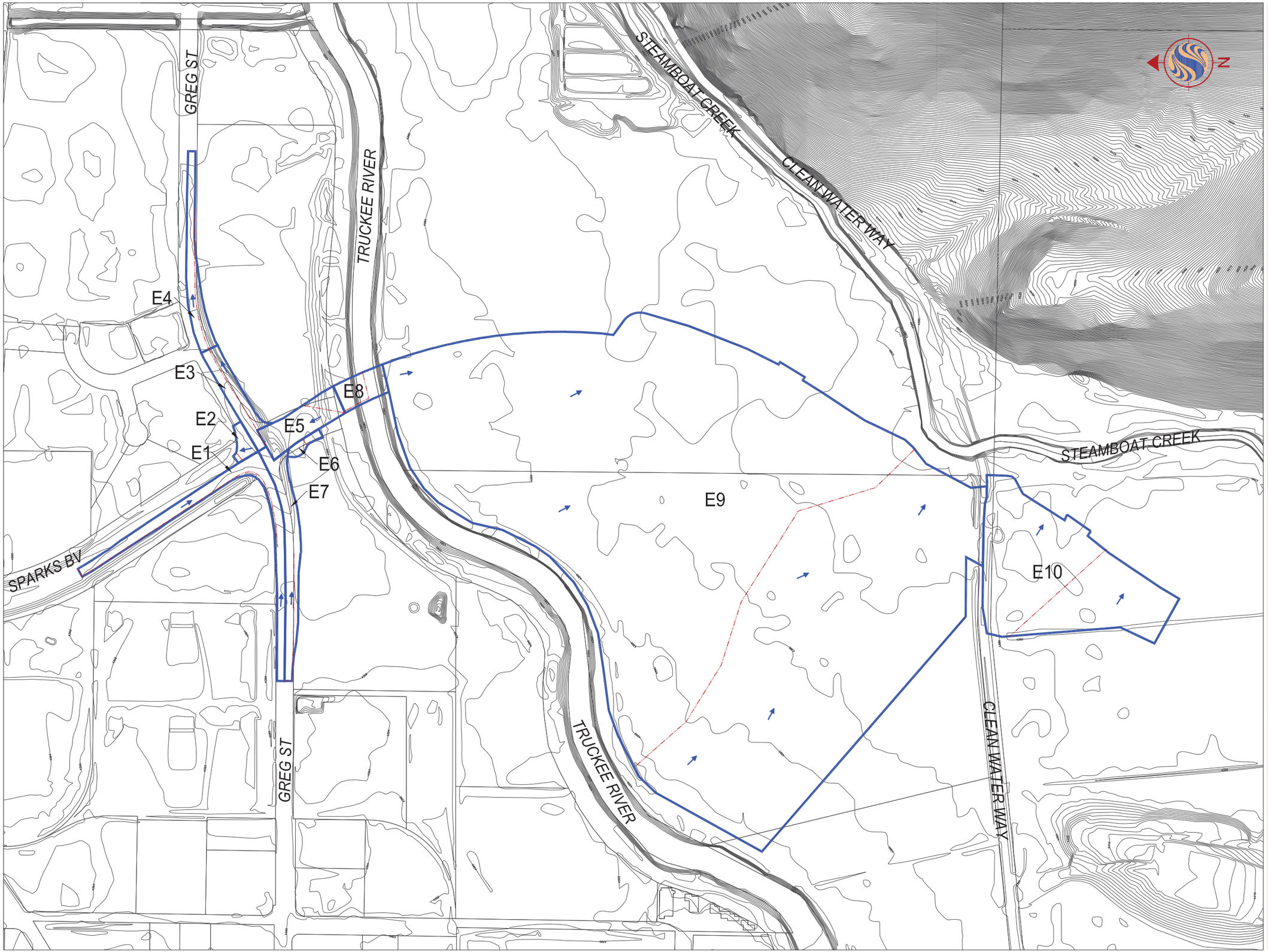


FIGURE 3.0

SOUTHEAST CONNECTOR - PHASE I

FEMA FLOOD MAP



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Consultants

Legend

WATERSHED BOUNDARY

LAG LINE

Notes

200 0 100 200 400

(IN FEET)
22"x34": 1 inch = 200 ft.
11"x17": 1 inch = 400 ft.

Revision	By	Appd.	YY.MM.DD

Issued	By	Appd.	YY.MM.DD

File Name: SEC_PH1_hydrology-figures.dwg	CKA	TMM	CKA	12.02.23
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

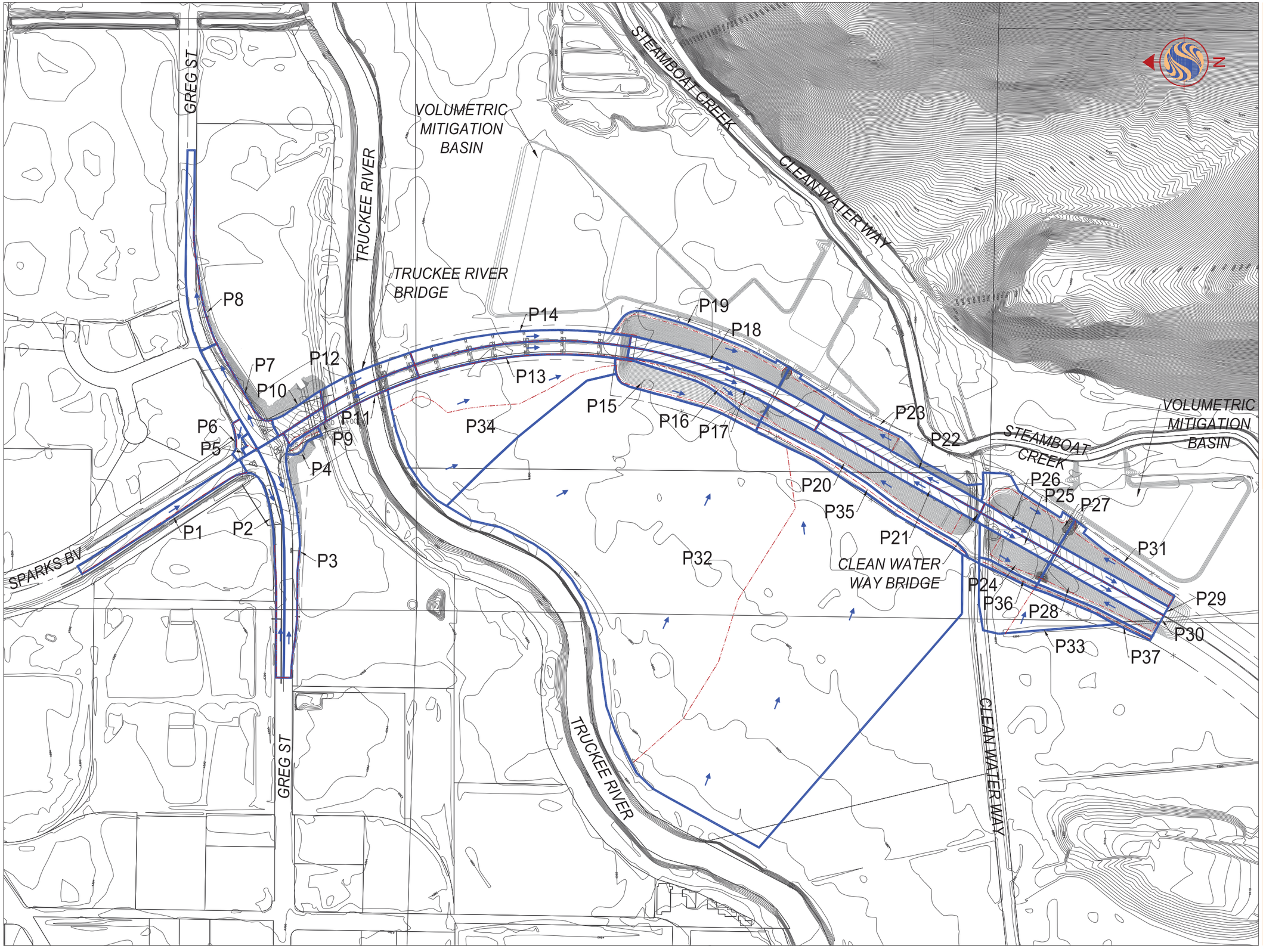
Permit-Seal

Client/Project
REGIONAL TRANSPORTATION COMMISSION OF WASHOE COUNTY

SOUTHEAST CONNECTOR PHASE 1
GREG STREET TO CLEAN WATER WAY
CITY OF SPARKS, WASHOE COUNTY, NEVADA

Title
EXISTING CONDTIONS
WATERSHED MAP

Project No.	Scale	
180101226	AS SHOWN	
Drawing No.	Sheet	Revision
4.0	1 of 1	0



CADD NAME (FULL PATH)

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Legend

WATERSHED BOUNDARY

LAG LINE

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Revision	By	Appd.	YY.MM.DD

Issued	By	Appd.	YY.MM.DD
File Name: SEC_PH1_hydrology-figures.dwg	CKA Dwn.	TMM Chkd.	CKA Dsgn.	12.02.23 YY.MM.DD

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Client/Project
REGIONAL TRANSPORTATION COMMISSION OF WASHOE COUNTY

SOUTHEAST CONNECTOR PHASE 1
GREG STREET TO CLEAN WATER WAY
CITY OF SPARKS, WASHOE COUNTY, NEVADA

Title
PROPOSED CONDTIONS
WATERSHED MAP

Project No.	Scale	
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Drawing No.	Sheet	Revision
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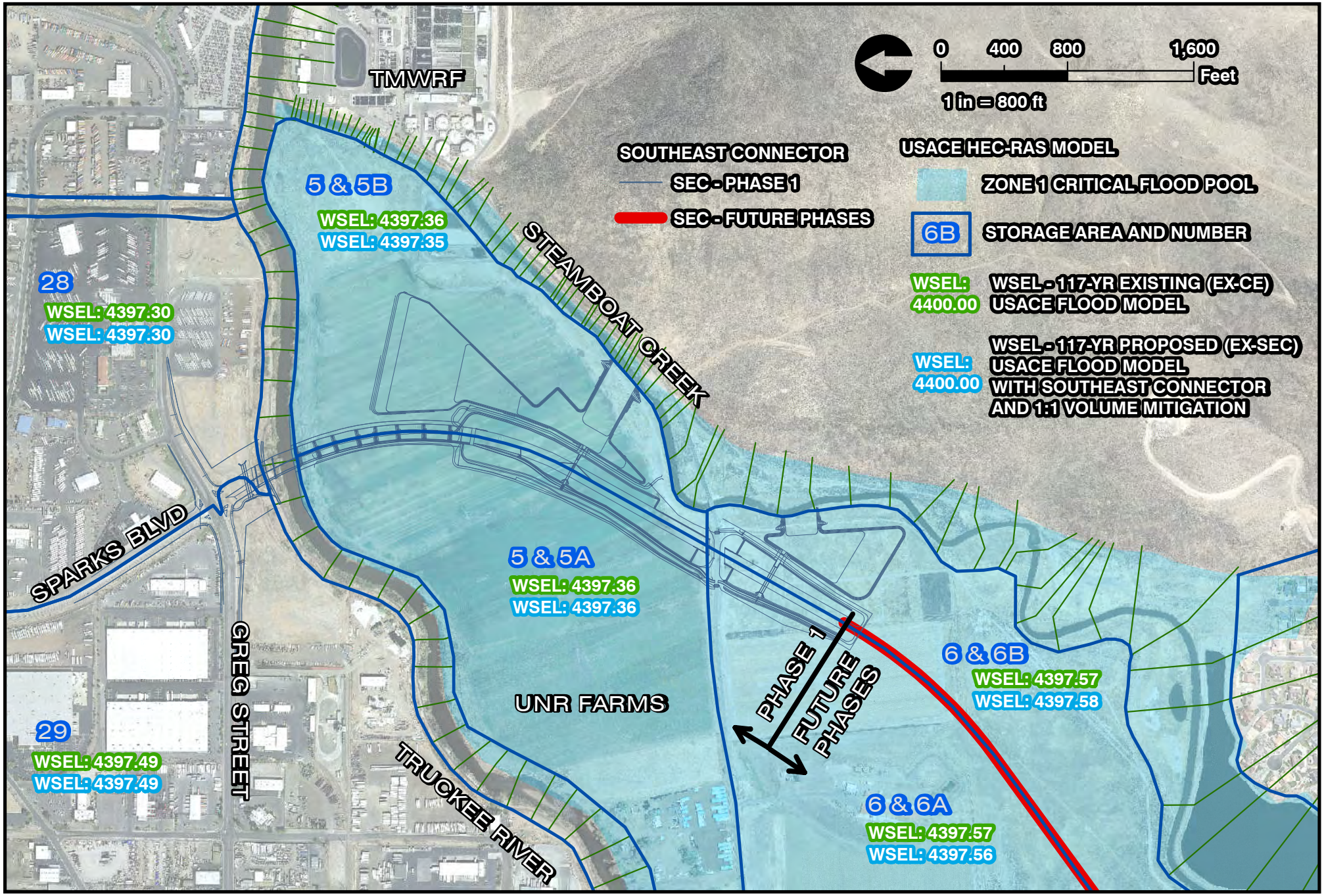


FIGURE 6.0

SOUTHEAST CONNECTOR - PHASE I

DRAINAGE AND FLOOD CONTROL HEC-RAS MODELING RESULTS

RTC

Stantec

APPENDIX A

NOAA National Weather Service
Hydrometeorological Design Studies Center
Precipitation Frequency Data Server (PFDS)

www.nws.noaa.gov

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Precipitation Frequency (PF)
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- PF in GIS Format
- PF Maps
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- Time Series Data
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- PF Documents

Probable Maximum Precipitation (PMP)
- PMP Documents
- Record Precipitation

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USA.gov

NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES

DATA DESCRIPTION

Data type: precipitation intensity | Units: english | Time series type: annual maximum

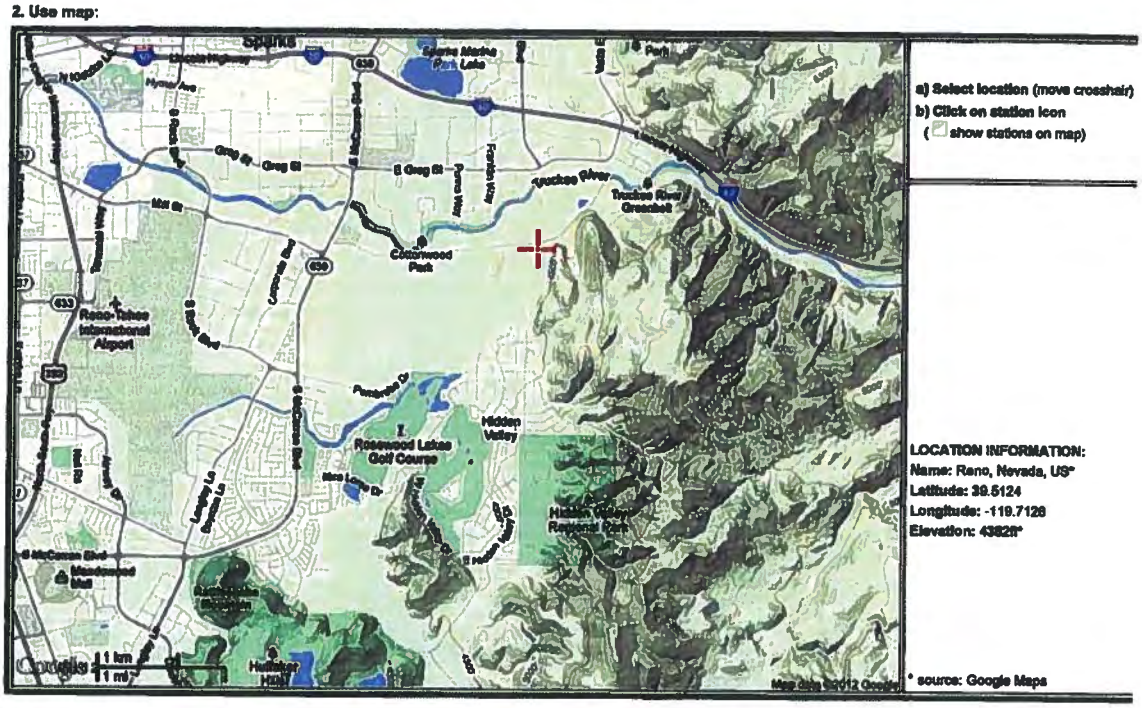
SELECT LOCATION

1. Manually:

a) Enter location (decimal degrees, use "-" for S and W): latitude: _____ longitude: _____ submit

b) Select station: select station

2. Use map:



POINT PRECIPITATION FREQUENCY (PF) ESTIMATES

WITH 90% CONFIDENCE INTERVALS AND SUPPLEMENTARY INFORMATION
NOAA Atlas 14, Volume 1, Version 5

PF tabular | PF graphical | Supplementary information | Print Page

AMS-based precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Annual exceedance probability (1/years)								
	1/2	1/5	1/10	1/25	1/50	1/100	1/200	1/500	1/1000
5-min	1.39 (1.02-1.42)	1.75 (1.49-2.09)	2.20 (1.88-2.62)	2.84 (2.42-3.54)	3.61 (2.88-4.43)	4.42 (3.41-5.48)	5.38 (3.98-6.83)	6.92 (4.82-9.14)	8.33 (5.56-11.3)
10-min	0.912 (0.774-1.08)	1.33 (1.13-1.58)	1.67 (1.42-1.99)	2.24 (1.84-2.70)	2.75 (2.19-3.36)	3.39 (2.59-4.17)	4.09 (3.03-5.20)	5.27 (3.67-6.95)	6.34 (4.23-8.57)
15-min	0.738 (0.640-0.882)	1.10 (0.932-1.30)	1.38 (1.17-1.65)	1.86 (1.52-2.23)	2.27 (1.81-2.78)	2.79 (2.14-3.45)	3.38 (2.51-4.30)	4.35 (3.04-5.75)	5.24 (3.49-7.09)
30-min	0.508 (0.432-0.600)	0.749 (0.629-0.878)	0.932 (0.788-1.11)	1.24 (1.03-1.50)	1.53 (1.22-1.87)	1.87 (1.44-2.32)	2.27 (1.69-2.89)	2.93 (2.04-3.87)	3.53 (2.35-4.77)
60-min	0.314 (0.267-0.371)	0.463 (0.389-0.543)	0.577 (0.488-0.687)	0.770 (0.634-0.928)	0.949 (0.753-1.16)	1.16 (0.893-1.44)	1.41 (1.04-1.79)	1.81 (1.27-2.39)	2.18 (1.46-2.95)
2-hr	0.208 (0.164-0.242)	0.291 (0.253-0.339)	0.362 (0.302-0.409)	0.442 (0.365-0.516)	0.529 (0.422-0.620)	0.612 (0.484-0.740)	0.724 (0.552-0.904)	0.936 (0.679-1.21)	1.14 (0.788-1.49)
3-hr	0.169 (0.149-0.189)	0.235 (0.201-0.257)	0.295 (0.238-0.305)	0.321 (0.276-0.370)	0.367 (0.312-0.430)	0.426 (0.353-0.505)	0.499 (0.404-0.607)	0.633 (0.499-0.815)	0.763 (0.578-1.00)
6-hr	0.116 (0.103-0.130)	0.156 (0.138-0.175)	0.192 (0.161-0.205)	0.214 (0.186-0.243)	0.238 (0.204-0.273)	0.263 (0.223-0.305)	0.291 (0.241-0.343)	0.339 (0.273-0.411)	0.384 (0.312-0.508)
12-hr	0.074 (0.066-0.083)	0.101 (0.091-0.114)	0.120 (0.106-0.134)	0.142 (0.124-0.162)	0.159 (0.138-0.182)	0.177 (0.151-0.206)	0.195 (0.162-0.229)	0.218 (0.175-0.262)	0.237 (0.187-0.290)
24-hr	0.045 (0.041-0.050)	0.062 (0.056-0.069)	0.074 (0.067-0.082)	0.089 (0.080-0.099)	0.101 (0.090-0.113)	0.114 (0.101-0.128)	0.127 (0.111-0.144)	0.146 (0.124-0.165)	0.159 (0.135-0.183)
2-day	0.027	0.037	0.044	0.053	0.060	0.068	0.076	0.087	0.095

	(0.024–0.030)	(0.033–0.041)	(0.039–0.049)	(0.047–0.059)	(0.053–0.068)	(0.059–0.077)	(0.065–0.087)	(0.073–0.100)	(0.079–0.112)
3-day	0.019 (0.017–0.022)	0.027 (0.024–0.030)	0.032 (0.029–0.036)	0.039 (0.035–0.044)	0.045 (0.039–0.050)	0.051 (0.044–0.057)	0.057 (0.049–0.063)	0.065 (0.055–0.075)	0.072 (0.060–0.084)
4-day	0.016 (0.014–0.017)	0.022 (0.020–0.024)	0.026 (0.023–0.029)	0.032 (0.028–0.036)	0.037 (0.032–0.041)	0.042 (0.036–0.047)	0.047 (0.040–0.054)	0.055 (0.046–0.063)	0.061 (0.050–0.071)
7-day	0.010 (0.009–0.012)	0.015 (0.013–0.017)	0.018 (0.016–0.020)	0.022 (0.019–0.024)	0.026 (0.022–0.028)	0.028 (0.024–0.032)	0.032 (0.027–0.036)	0.038 (0.031–0.043)	0.040 (0.033–0.045)
10-day	0.008 (0.007–0.009)	0.012 (0.010–0.013)	0.014 (0.012–0.016)	0.017 (0.015–0.019)	0.019 (0.017–0.022)	0.022 (0.019–0.025)	0.024 (0.021–0.028)	0.028 (0.023–0.032)	0.031 (0.025–0.035)
20-day	0.006 (0.004–0.005)	0.007 (0.006–0.008)	0.008 (0.007–0.009)	0.010 (0.009–0.011)	0.011 (0.010–0.013)	0.013 (0.011–0.014)	0.014 (0.012–0.016)	0.016 (0.013–0.018)	0.017 (0.014–0.020)
30-day	0.004 (0.003–0.004)	0.005 (0.005–0.006)	0.006 (0.006–0.007)	0.007 (0.007–0.008)	0.008 (0.007–0.010)	0.009 (0.008–0.011)	0.010 (0.009–0.012)	0.012 (0.010–0.014)	0.013 (0.011–0.015)
45-day	0.003 (0.003–0.003)	0.004 (0.004–0.005)	0.005 (0.004–0.005)	0.006 (0.005–0.006)	0.007 (0.006–0.007)	0.007 (0.006–0.008)	0.008 (0.007–0.009)	0.009 (0.008–0.010)	0.009 (0.008–0.011)
60-day	0.003 (0.002–0.003)	0.004 (0.003–0.004)	0.004 (0.004–0.005)	0.005 (0.004–0.005)	0.005 (0.005–0.006)	0.006 (0.005–0.007)	0.006 (0.006–0.007)	0.007 (0.006–0.008)	0.007 (0.006–0.008)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of annual maxima series (AMS).

Numbers in parentheses are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and annual exceedance probability) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Estimates from the table in csv format: upper bounds Submit

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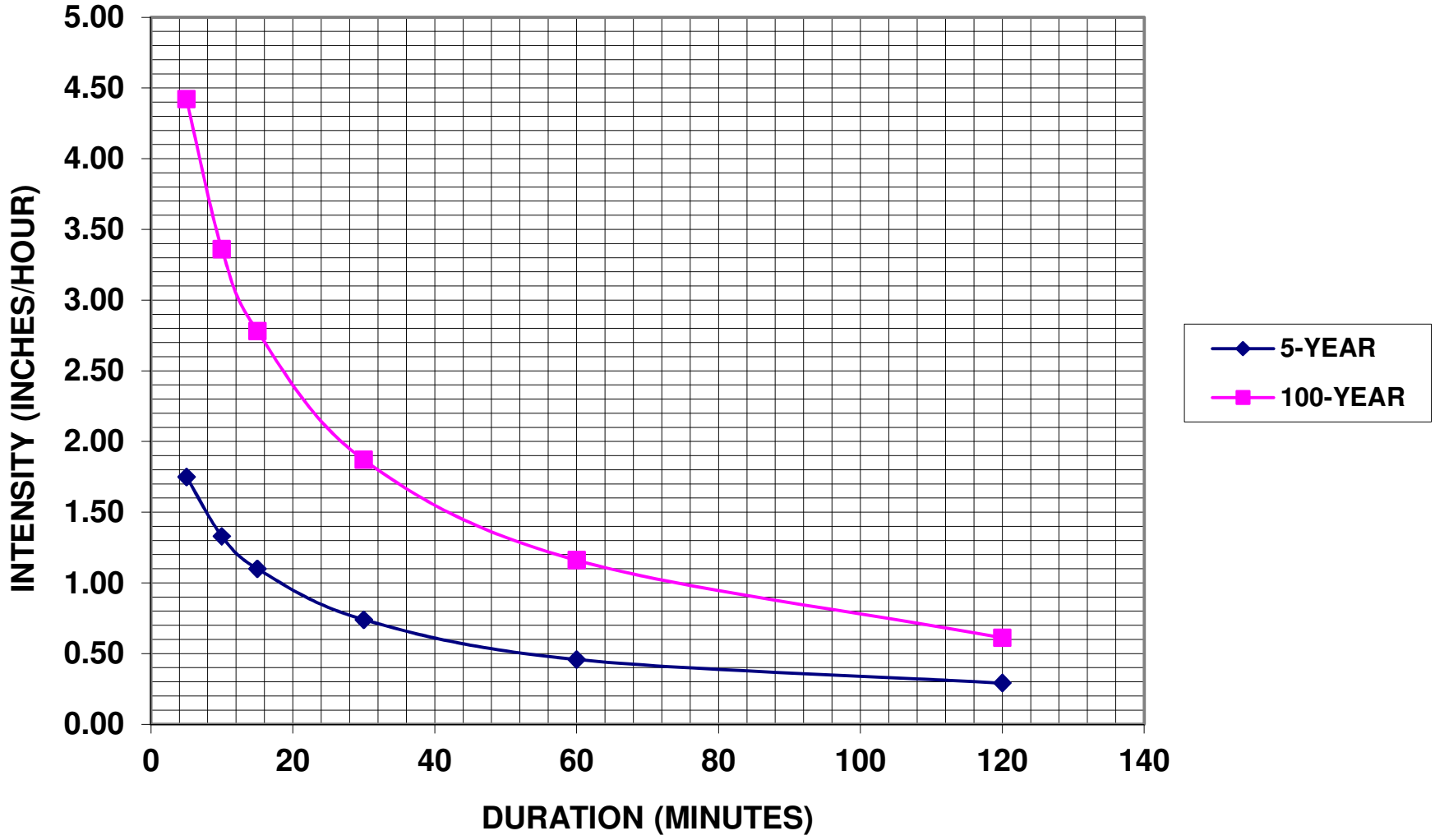
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5-YEAR & 100-YEAR IDF CURVES FOR THE SOUTH EAST CONNECTOR

(Point precipitation values obtained from NOAA Atlas 14)



RATIONAL METHOD										
WATERSHED	**A (ft^2)**	**A (acre)**	**Tc_5 (min)**	**Tc_{100} (min)**	**i_5 (in/hr)**	**i_{100} (in/hr)**	**C_5 weighted**	**C_{100} weighted**	**Q_5 (cfs)**	**Q_{100} (cfs)**
E1	86,008	1.97	13.8	13.3	1.13	2.92	0.88	0.93	1.96	5.36
E2	10,823	0.25	10.0	10.0	1.33	3.36	0.88	0.93	0.29	0.78
E3	36,115	0.83	10.0	10.0	1.33	3.36	0.69	0.79	0.76	2.19
E4	43,247	0.99	10.0	10.0	1.33	3.36	0.69	0.79	0.91	2.64
E5	49,688	1.14	10.0	10.0	1.33	3.36	0.30	0.50	0.46	1.92
E6	7,086	0.16	10.0	10.0	1.33	3.36	0.30	0.50	0.06	0.27
E7	63,448	1.46	10.6	10.0	1.29	3.36	0.69	0.79	1.29	3.85
E8	28,394	0.65	10.6	10.0	1.29	3.36	0.30	0.50	0.25	1.10
E9	3,517,186	80.74	20.8	20.8	0.93	2.34	0.30	0.50	22.62	94.64
E10	377,313	8.66	10.0	10.0	1.33	3.36	0.33	0.52	3.75	15.10
P1	39,752	0.91	10.0	10.0	1.33	3.36	0.88	0.93	1.07	2.85
P2	46,256	1.06	10.0	10.0	1.33	3.36	0.88	0.93	1.24	3.32
P3	68,905	1.58	10.0	10.0	1.33	3.36	0.88	0.93	1.85	4.94
P4	7,086	0.16	10.0	10.0	1.33	3.36	0.51	0.66	0.11	0.36
P5	3,545	0.08	10.0	10.0	1.33	3.36	0.88	0.93	0.10	0.25
P6	7,278	0.17	10.0	10.0	1.33	3.36	0.88	0.93	0.20	0.52
P7	41,731	0.96	10.0	10.0	1.33	3.36	0.88	0.93	1.12	2.99
P8	43,247	0.99	10.0	10.0	1.33	3.36	0.88	0.93	1.16	3.10
P9	11,590	0.27	10.0	10.0	1.33	3.36	0.88	0.93	0.31	0.83
P10	16,704	0.38	10.0	10.0	1.33	3.36	0.88	0.93	0.45	1.20
P11	26,654	0.61	10.0	10.0	1.33	3.36	0.88	0.93	0.72	1.91
P12	28,669	0.66	10.0	10.0	1.33	3.36	0.88	0.93	0.77	2.06
P13	56,730	1.30	11.6	11.1	1.22	3.16	0.88	0.93	1.40	3.83
P14	49,075	1.13	11.6	11.1	1.22	3.16	0.88	0.93	1.21	3.31
P15	59,779	1.37	14.6	14.6	1.11	2.82	0.30	0.50	0.46	1.93
P16	28,676	0.66	10.0	10.0	1.33	3.36	0.43	0.60	0.38	1.32
P17	39,282	0.90	10.0	10.0	1.33	3.36	0.88	0.93	1.06	2.82
P18	41,629	0.96	10.0	10.0	1.33	3.36	0.88	0.93	1.12	2.99
P19	79,286	1.82	15.2	15.2	1.08	2.76	0.30	0.50	0.58	2.51
P20	109,789	2.52	16.0	16.0	1.06	2.70	0.38	0.56	1.00	3.79
P21	35,773	0.82	10.0	10.0	1.33	3.36	0.88	0.93	0.96	2.57
P22	36,408	0.84	10.0	10.0	1.33	3.36	0.88	0.93	0.98	2.61
P23	61,004	1.40	10.0	10.0	1.33	3.36	0.31	0.51	0.58	2.41
P24	37,554	0.86	10.0	10.0	1.33	3.36	0.41	0.60	0.46	1.75
P25	16,544	0.38	10.0	10.0	1.33	3.36	0.88	0.93	0.44	1.19
P26	16,619	0.38	10.0	10.0	1.33	3.36	0.88	0.93	0.45	1.19
P27	54,987	1.26	10.0	10.0	1.33	3.36	0.31	0.51	0.52	2.17
P28	44,437	1.02	10.0	10.0	1.33	3.36	0.37	0.55	0.50	1.89
P29	24,526	0.56	10.0	10.0	1.33	3.36	0.88	0.93	0.66	1.76
P30	24,526	0.56	10.0	10.0	1.33	3.36	0.88	0.93	0.66	1.76
P31	43,161	0.99	11.5	10.6	1.23	3.26	0.30	0.50	0.36	1.62
P32	2,521,198	57.88	19.1	19.1	0.97	2.46	0.30	0.50	16.84	71.19
P33	94,989	2.18	10.0	10.0	1.33	3.36	0.30	0.50	0.87	3.66
P34	342,410	7.86	13.2	13.2	1.16	2.93	0.30	0.50	2.74	11.52
P35	39,437	0.91	16.0	16.0	1.06	2.70	0.30	0.50	0.29	1.22
P36	7,974	0.18	10.0	10.0	1.33	3.36	0.33	0.52	0.08	0.32
P37	12,098	0.28	10.0	10.0	1.33	3.36	0.30	0.50	0.11	0.47

WEIGHTED C VALUES BY AREA										
BASIN	**A (ft²)**	**A (acre)**	**% Cover By Area**	**Land Use**	**C_5**	**C_{100}**	**C_5 (%A)**	**C_{100} (A%)**	**C_5 weighted**	**C_{100} weighted**
E1	0	0.00	0.0	Open Space	0.30	0.50	0.00	0.00		
	86008	1.97	100.0	Paved Roadway	0.88	0.93	0.88	0.93		
TOTAL	*86008*		100.0						0.88	0.93
E2	0	0.00	0.0	Open Space	0.30	0.50	0.00	0.00		
	10823	0.25	100.0	Paved Roadway	0.88	0.93	0.88	0.93		
TOTAL	*10823*		100.0						0.88	0.93
E3	12000	0.28	33.2	Open Space	0.30	0.50	0.10	0.17		
	24115	0.55	66.8	Paved Roadway	0.88	0.93	0.59	0.62		
TOTAL	*36115*		100.0						0.69	0.79
E4	14000	0.32	32.4	Open Space	0.30	0.50	0.10	0.16		
	29247	0.67	67.6	Paved Roadway	0.88	0.93	0.60	0.63		
TOTAL	*43247*		100.0						0.69	0.79
E5	49688	1.14	100.0	Open Space	0.30	0.50	0.30	0.50		
	0	0.00	0.0	Paved Roadway	0.88	0.93	0.00	0.00		
TOTAL	*49688*		100.0						0.30	0.50
E6	7086	0.16	100.0	Open Space	0.30	0.50	0.30	0.50		
	0	0.00	0.0	Paved Roadway	0.88	0.93	0.00	0.00		
TOTAL	*7086*		100.0						0.30	0.50
E7	21000	0.48	33.1	Open Space	0.30	0.50	0.10	0.17		
	42448	0.97	66.9	Paved Roadway	0.88	0.93	0.59	0.62		
TOTAL	*63448*		100.0						0.69	0.79
E8	28394	0.65	100.0	Open Space	0.30	0.50	0.30	0.50		
	0	0.00	0.0	Paved Roadway	0.88	0.93	0.00	0.00		
TOTAL	*28394*		100.0						0.30	0.50
E9	3509836	80.57	99.8	Open Space	0.30	0.50	0.30	0.50		
	7350	0.17	0.2	Paved Roadway	0.88	0.93	0.00	0.00		
TOTAL	*3517186*		100.0						0.30	0.50
E10	360757	8.28	95.6	Open Space	0.30	0.50	0.29	0.48		
	16556	0.38	4.4	Paved Roadway	0.88	0.93	0.04	0.04		
TOTAL	*377313*		100.0						0.33	0.52
P1	0	0.00	0.0	Open Space	0.30	0.50	0.00	0.00		
	39752	0.91	100.0	Paved Roadway	0.88	0.93	0.88	0.93		
TOTAL	*39752*		100.0						0.88	0.93

WEIGHTED C VALUES BY AREA										
BASIN	**A (ft²)**	**A (acre)**	**% Cover By Area**	**Land Use**	**C_5**	**C_{100}**	**C_5 (%A)**	**C_{100} (A%)**	**C_5 weighted**	**C_{100} weighted**
P2	0	0.00	0.0	Open Space	0.30	0.50	0.00	0.00		
	46256	1.06	100.0	Paved Roadway	0.88	0.93	0.88	0.93		
TOTAL	*46256*		100.0						0.88	0.93
P3	0	0.00	0.0	Open Space	0.30	0.50	0.00	0.00		
	68905	1.58	100.0	Paved Roadway	0.88	0.93	0.88	0.93		
TOTAL	*68905*		100.0						0.88	0.93
P4	4500	0.10	63.5	Open Space	0.30	0.50	0.19	0.32		
	2586	0.06	36.5	Paved Roadway	0.88	0.93	0.32	0.34		
TOTAL	*7086*		100.0						0.51	0.66
P5	0	0.00	0.0	Open Space	0.30	0.50	0.00	0.00		
	3545	0.08	100.0	Paved Roadway	0.88	0.93	0.88	0.93		
TOTAL	*3545*		100.0						0.88	0.93
P6	0	0.00	0.0	Open Space	0.30	0.50	0.00	0.00		
	7278	0.17	100.0	Paved Roadway	0.88	0.93	0.88	0.93		
TOTAL	*7278*		100.0						0.88	0.93
P7	0	0.00	0.0	Open Space	0.30	0.50	0.00	0.00		
	41731	0.96	100.0	Paved Roadway	0.88	0.93	0.88	0.93		
TOTAL	*41731*		100.0						0.88	0.93
P8	0	0.00	0.0	Open Space	0.30	0.50	0.00	0.00		
	43247	0.99	100.0	Paved Roadway	0.88	0.93	0.88	0.93		
TOTAL	*43247*		100.0						0.88	0.93
P9	0	0.00	0.0	Open Space	0.30	0.50	0.00	0.00		
	11590	0.27	100.0	Paved Roadway	0.88	0.93	0.88	0.93		
TOTAL	*11590*		100.0						0.88	0.93
P10	0	0.00	0.0	Open Space	0.30	0.50	0.00	0.00		
	16704	0.38	100.0	Paved Roadway	0.88	0.93	0.88	0.93		
TOTAL	*16704*		100.0						0.88	0.93
P11	0	0.00	0.0	Open Space	0.30	0.50	0.00	0.00		
	26654	0.61	100.0	Paved Roadway	0.88	0.93	0.88	0.93		
TOTAL	*26654*		100.0						0.88	0.93
P12	0	0.00	0.0	Open Space	0.30	0.50	0.00	0.00		
	28669	0.66	100.0	Paved Roadway	0.88	0.93	0.88	0.93		
TOTAL	*28669*		100.0						0.88	0.93

WEIGHTED C VALUES BY AREA

BASIN	A (ft²)	A (acre)	% Cover By Area	Land Use	C_5	C_{100}	C_5 (%A)	C_{100} (A%)	C_5 weighted	C_{100} weighted
P13	0	0.00	0.0	Open Space	0.30	0.50	0.00	0.00		
	56730	1.30	100.0	Paved Roadway	0.88	0.93	0.88	0.93		
TOTAL	*56730*		100.0						0.88	0.93
P14	0	0.00	0.0	Open Space	0.30	0.50	0.00	0.00		
	49075	1.13	100.0	Paved Roadway	0.88	0.93	0.88	0.93		
TOTAL	*49075*		100.0						0.88	0.93
P15	59779	1.37	100.0	Open Space	0.30	0.50	0.30	0.50		
	0	0.00	0.0	Paved Roadway	0.88	0.93	0.00	0.00		
TOTAL	*59779*		100.0						0.30	0.50
P16	21681	0.50	75.6	Open Space	0.30	0.50	0.23	0.38		
	6550	0.15	22.8	Paved Roadway	0.88	0.93	0.20	0.21		
	445	0.01	1.6	Rip Rap	0.25	0.50	0.00	0.01		
TOTAL	*28676*		100.0						0.43	0.60
P17	0	0.00	0.0	Open Space	0.30	0.50	0.00	0.00		
	39282	0.90	100.0	Paved Roadway	0.88	0.93	0.88	0.93		
TOTAL	*39282*		100.0						0.88	0.93
P18	0	0.00	0.0	Open Space	0.30	0.50	0.00	0.00		
	41629	0.96	100.0	Paved Roadway	0.88	0.93	0.88	0.93		
TOTAL	*41629*		100.0						0.88	0.93
P19	75455	1.73	95.2	Open Space	0.30	0.50	0.29	0.48		
	0	0.00	0.0	Paved Roadway	0.88	0.93	0.00	0.00		
	3831	0.09	4.8	Rip Rap	0.25	0.50	0.01	0.02		
TOTAL	*79286*		100.0						0.30	0.50
P20	93821	2.15	85.5	Open Space	0.30	0.50	0.26	0.43		
	14396	0.33	13.1	Paved Roadway	0.88	0.93	0.12	0.12		
	1572	0.04	1.4	Rip Rap	0.25	0.50	0.00	0.01		
TOTAL	*109789*		100.0						0.38	0.56
P21	0	0.00	0.0	Open Space	0.30	0.50	0.00	0.00		
	35773	0.82	100.0	Paved Roadway	0.88	0.93	0.88	0.93		
TOTAL	*35773*		100.0						0.88	0.93
P22	0	0.00	0.0	Open Space	0.30	0.50	0.00	0.00		
	36408	0.84	100.0	Paved Roadway	0.88	0.93	0.88	0.93		
TOTAL	*36408*		100.0						0.88	0.93

WEIGHTED C VALUES BY AREA										
BASIN	**A (ft²)**	**A (acre)**	**% Cover By Area**	**Land Use**	**C_5**	**C_{100}**	**C_5 (%A)**	**C_{100} (A%)**	**C_5 weighted**	**C_{100} weighted**
P23	55516	1.27	91.0	Open Space	0.30	0.50	0.27	0.46		
	1740	0.04	2.9	Paved Roadway	0.88	0.93	0.03	0.03		
	3748	0.09	6.1	Rip Rap	0.25	0.50	0.02	0.03		
TOTAL	*61004*		100.0						0.31	0.51
P24	29600	0.68	78.8	Open Space	0.30	0.50	0.24	0.39		
	5844	0.13	15.6	Paved Roadway	0.88	0.93	0.14	0.14		
	2110	0.05	12.8	Rip Rap	0.25	0.50	0.03	0.06		
TOTAL	*37554*		107.1						0.41	0.60
P25	0	0.00	0.0	Open Space	0.30	0.50	0.00	0.00		
	16544	0.38	100.0	Paved Roadway	0.88	0.93	0.88	0.93		
TOTAL	*16544*		100.0						0.88	0.93
P26	0	0.00	0.0	Open Space	0.30	0.50	0.00	0.00		
	16619	0.38	100.0	Paved Roadway	0.88	0.93	0.88	0.93		
TOTAL	*16619*		100.0						0.88	0.93
P27	48667	1.12	88.5	Open Space	0.30	0.50	0.27	0.44		
	1520	0.03	2.8	Paved Roadway	0.88	0.93	0.02	0.03		
	4800	0.11	8.7	Rip Rap	0.25	0.50	0.02	0.04		
TOTAL	*54987*		100.0						0.31	0.51
P28	37981	0.87	85.5	Open Space	0.30	0.50	0.26	0.43		
	5460	0.13	12.3	Paved Roadway	0.88	0.93	0.11	0.11		
	996	0.02	2.2	Rip Rap	0.25	0.50	0.01	0.01		
TOTAL	*44437*		100.0						0.37	0.55
P29	0	0.00	0.0	Open Space	0.30	0.50	0.00	0.00		
	24526	0.56	100.0	Paved Roadway	0.88	0.93	0.88	0.93		
TOTAL	*24526*		100.0						0.88	0.93
P30	0	0.00	0.0	Open Space	0.30	0.50	0.00	0.00		
	24526	0.56	100.0	Paved Roadway	0.88	0.93	0.88	0.93		
TOTAL	*24526*		100.0						0.88	0.93
P31	40571	0.93	94.0	Open Space	0.30	0.50	0.28	0.47		
	0	0.00	0.0	Paved Roadway	0.88	0.93	0.00	0.00		
	2590	0.06	6.0	Rip Rap	0.25	0.50	0.02	0.03		
TOTAL	*43161*		100.0						0.30	0.50

WEIGHTED C VALUES BY AREA										
BASIN	**A (ft²)**	**A (acre)**	**% Cover By Area**	**Land Use**	**C_5**	**C_{100}**	**C_5 (%A)**	**C_{100} (A%)**	**C_5 weighted**	**C_{100} weighted**
P32	2521198	57.88	100.0	Open Space	0.30	0.50	0.30	0.50		
	0	0.00	0.0	Paved Roadway	0.88	0.93	0.00	0.00		
TOTAL	*2521198*		100.0						0.30	0.50
P33	94989	2.18	100.0	Open Space	0.30	0.50	0.30	0.50		
	0	0.00	0.0	Paved Roadway	0.88	0.93	0.00	0.00		
TOTAL	*94989*		100.0						0.30	0.50
P34	342410	7.86	100.0	Open Space	0.30	0.50	0.30	0.50		
	0	0.00	0.0	Paved Roadway	0.88	0.93	0.00	0.00		
TOTAL	*342410*		100.0						0.30	0.50
P35	39437	0.91	100.0	Open Space	0.30	0.50	0.30	0.50		
	0	0.00	0.0	Paved Roadway	0.88	0.93	0.00	0.00		
TOTAL	*39437*		100.0						0.30	0.50
P36	7514	0.17	94.2	Open Space	0.30	0.50	0.28	0.47		
	460	0.01	5.8	Paved Roadway	0.88	0.93	0.05	0.05		
TOTAL	*7974*		100.0						0.33	0.52
P37	12098	0.28	100.0	Open Space	0.30	0.50	0.30	0.50		
	0	0.00	0.0	Paved Roadway	0.88	0.93	0.00	0.00		
TOTAL	*12098*		100.0						0.30	0.50

TIME OF CONCENTRATION

SUB-BASIN DATA			INITIAL/OVERLAND TIME (Ti)			TRAVEL TIME (Tt)				$T_{c\ (Ti+Tt)}$	Tc Urbanized Basins Check		Final Tc
BASIN	C_5	A (acre)	L_i (ft)	S_i (%)	T_i	L_1 (ft)	S_1 (%)	V_1 (f/s)	Tt	Tc Min	Total L Ft	Tc=(L/180)+ 10 Min	Min_5
E1	0.88	1.97	40	1.50	2.2	1249	0.78	1.8	11.6	13.8	1289	17.2	13.8
E2	0.88	0.25	45	1.11	2.6	---	---	---	---	2.6	45	10.3	10.0
E3	0.69	0.83	---	---	---	498	0.60	1.6	5.3	5.3	498	12.8	10.0
E4	0.69	0.99	---	---	---	627	0.77	1.8	5.9	5.9	627	13.5	10.0
E5	0.30	1.14	---	---	---	189	3.65	3.9	0.8	0.8	189	11.1	10.0
E6	0.30	0.16	35	1.14	8.2	---	---	---	---	8.2	35	10.2	10.0
E7	0.69	1.46	31	1.29	3.8	562	0.46	1.4	6.8	10.6	593	13.3	10.6
E8	0.30	0.65	122	10.66	7.3	118	0.08	0.6	3.3	10.6	240	11.3	10.6
E9	0.30	80.74	---	---	---	1950	0.21	0.9	35.3	35.3	1950	20.8	20.8
E10	0.33	8.66	---	---	---	580	0.31	1.1	8.5	8.5	580	13.2	10.0
P1	0.88	0.91	40	1.50	2.2	818	1.05	2.1	6.5	8.7	858	14.8	10.0
P2	0.88	1.06	31	1.94	1.8	589	0.44	1.4	7.3	9.0	620	13.4	10.0
P3	0.88	1.58	31	1.94	1.8	567	0.48	1.4	6.7	8.5	598	13.3	10.0
P4	0.51	0.16	---	---	---	157	0.48	1.4	1.9	1.9	157	10.9	10.0
P5	0.88	0.08	50	1.34	2.5	---	---	---	---	2.5	50	10.3	10.0
P6	0.88	0.17	37	2.43	1.8	105	1.28	2.3	0.8	2.6	142	10.8	10.0
P7	0.88	0.96	---	---	---	440	1.39	2.4	3.1	3.1	440	12.4	10.0
P8	0.88	0.99	---	---	---	615	0.55	1.5	6.8	6.8	615	13.4	10.0
P9	0.88	0.27	64	2.00	2.5	192	3.42	3.8	0.9	3.4	256	11.4	10.0
P10	0.88	0.38	70	2.00	2.6	308	2.25	3.0	1.7	4.3	378	12.1	10.0
P11	0.88	0.61	60	3.50	2.0	448	3.35	3.7	2.0	4.0	508	12.8	10.0
P12	0.88	0.66	60	3.50	2.0	448	3.35	3.7	2.0	4.0	508	12.8	10.0
P13	0.88	1.30	60	3.50	2.0	960	0.68	1.7	9.5	11.6	1020	15.7	11.6
P14	0.88	1.13	60	3.50	2.0	960	0.68	1.7	9.5	11.6	1020	15.7	11.6
P15	0.30	1.37	70	28.49	4.0	764	0.29	1.1	11.6	15.6	834	14.6	14.6
P16	0.43	0.66	---	---	---	658	3.38	3.7	2.9	2.9	658	13.7	10.0
P17	0.88	0.90	44	2.00	2.1	---	---	---	---	2.1	44	10.2	10.0
P18	0.88	0.96	50	2.00	2.2	679	1.80	2.7	4.2	6.4	729	14.1	10.0
P19	0.30	1.82	96	25.52	4.9	847	0.18	0.9	16.5	21.4	943	15.2	15.2
P20	0.38	2.52	100	23.79	4.6	986	0.35	1.2	13.6	18.2	1086	16.0	16.0
P21	0.88	0.82	44	2.00	2.1	---	---	---	---	2.1	44	10.2	10.0
P22	0.88	0.84	44	2.00	2.1	1050	1.27	2.3	7.6	9.7	1094	16.1	10.0
P23	0.31	1.40	---	---	---	639	2.97	3.5	3.0	3.0	639	13.6	10.0
P24	0.41	0.86	95	23.64	4.3	247	1.32	2.3	1.8	6.1	342	11.9	10.0
P25	0.88	0.38	44	2.00	2.1	---	---	---	---	2.1	44	10.2	10.0
P26	0.88	0.38	44	2.00	2.1	375	1.54	2.5	2.5	4.6	419	12.3	10.0
P27	0.31	1.26	79	26.58	4.3	451	1.11	2.1	3.5	7.8	530	12.9	10.0
P28	0.37	1.02	43	18.37	3.3	546	0.51	1.5	6.2	9.5	589	13.3	10.0
P29	0.88	0.56	44	2.00	2.1	---	---	---	---	2.1	44	10.2	10.0
P30	0.88	0.56	44	2.00	2.1	551	1.39	2.4	3.8	5.9	595	13.3	10.0
P31	0.30	0.99	50	22.96	3.6	571	0.35	1.2	7.9	11.5	621	13.5	11.5
P32	0.30	57.88	---	---	---	1629	0.38	1.3	21.6	21.6	1629	19.1	19.1
P33	0.30	2.18	---	---	---	237	0.93	2.0	2.0	2.0	237	11.3	10.0
P34	0.30	7.86	---	---	---	1067	0.44	1.3	13.2	13.2	1067	15.9	13.2
P35	0.30	0.91	---	---	---	1081	0.29	1.1	16.4	16.4	1081	16.0	16.0
P36	0.33	0.18	---	---	---	258	0.28	1.1	4.0	4.0	258	11.4	10.0
P37	0.30	0.28	---	---	---	558	0.30	1.1	8.4	8.4	558	13.1	10.0

TIME OF CONCENTRATION

SUB-BASIN DATA			INITIAL/OVERLAND TIME (Ti)			TRAVEL TIME (Tt)				T_c (Ti+Tt)	Tc Urbanized Basins Check		Final Tc
BASIN	C_{100}	A (acre)	L_i (ft)	S_i (%)	T_i	L_1 (ft)	S_1 (%)	V_1 (f/s)	Tt	Tc Min	Total L Ft	Tc=(L/180)+ 10 Min	Min_{100}
E1	0.93	1.97	40	1.50	1.7	1249	0.78	1.8	11.6	13.3	1289	17.2	13.3
E2	0.93	0.25	45	1.11	2.0	---	---	---	---	2.0	45	10.3	10.0
E3	0.79	0.83	---	---	---	498	0.60	1.6	5.3	5.3	498	12.8	10.0
E4	0.79	0.99	---	---	---	627	0.77	1.8	5.9	5.9	627	13.5	10.0
E5	0.50	1.14	---	---	---	189	3.65	3.9	0.8	0.8	189	11.1	10.0
E6	0.50	0.16	35	1.14	6.1	---	---	---	---	6.1	35	10.2	10.0
E7	0.79	1.46	31	1.29	2.9	562	0.46	1.4	6.8	9.7	593	13.3	10.0
E8	0.50	0.65	122	10.66	5.5	118	0.08	0.6	3.3	8.8	240	11.3	10.0
E9	0.50	80.74	---	---	---	1950	0.21	0.9	35.3	35.3	1950	20.8	20.8
E10	0.52	8.66	---	---	---	580	0.31	1.1	8.5	8.5	580	13.2	10.0
P1	0.93	0.91	40	1.50	1.7	818	1.05	2.1	6.5	8.2	858	14.8	10.0
P2	0.93	1.06	31	1.94	1.4	589	0.44	1.4	7.3	8.6	620	13.4	10.0
P3	0.93	1.58	31	1.94	1.4	567	0.48	1.4	6.7	8.1	598	13.3	10.0
P4	0.66	0.16	---	---	---	157	0.48	1.4	1.9	1.9	157	10.9	10.0
P5	0.93	0.08	50	1.34	2.0	---	---	---	---	2.0	50	10.3	10.0
P6	0.93	0.17	37	2.43	1.4	105	1.28	2.3	0.8	2.2	142	10.8	10.0
P7	0.93	0.96	---	---	---	440	1.39	2.4	3.1	3.1	440	12.4	10.0
P8	0.93	0.99	---	---	---	615	0.55	1.5	6.8	6.8	615	13.4	10.0
P9	0.93	0.27	64	2.00	1.9	192	3.42	3.8	0.9	2.8	256	11.4	10.0
P10	0.93	0.38	70	2.00	2.0	308	2.25	3.0	1.7	3.7	378	12.1	10.0
P11	0.93	0.61	60	3.50	1.6	448	3.35	3.7	2.0	3.6	508	12.8	10.0
P12	0.93	0.66	60	3.50	1.6	448	3.35	3.7	2.0	3.6	508	12.8	10.0
P13	0.93	1.30	60	3.50	1.6	960	0.68	1.7	9.5	11.1	1020	15.7	11.1
P14	0.93	1.13	60	3.50	1.6	960	0.68	1.7	9.5	11.1	1020	15.7	11.1
P15	0.50	1.37	70	28.49	3.0	764	0.29	1.1	11.6	14.6	834	14.6	14.6
P16	0.60	0.66	---	---	---	658	3.38	3.7	2.9	2.9	658	13.7	10.0
P17	0.93	0.90	44	2.00	1.6	---	---	---	---	1.6	44	10.2	10.0
P18	0.93	0.96	50	2.00	1.7	679	1.80	2.7	4.2	5.9	729	14.1	10.0
P19	0.50	1.82	96	25.52	3.6	847	0.18	0.9	16.5	20.1	943	15.2	15.2
P20	0.56	2.52	100	23.79	3.4	986	0.35	1.2	13.6	17.1	1086	16.0	16.0
P21	0.93	0.82	44	2.00	1.6	---	---	---	---	1.6	44	10.2	10.0
P22	0.93	0.84	44	2.00	1.6	1050	1.27	2.3	7.6	9.2	1094	16.1	10.0
P23	0.51	1.40	---	---	---	639	2.97	3.5	3.0	3.0	639	13.6	10.0
P24	0.60	0.86	95	23.64	3.1	247	1.32	2.3	1.8	4.8	342	11.9	10.0
P25	0.93	0.38	44	2.00	1.6	---	---	---	---	1.6	44	10.2	10.0
P26	0.93	0.38	44	2.00	1.6	375	1.54	2.5	2.5	4.1	419	12.3	10.0
P27	0.51	1.26	79	26.58	3.2	451	1.11	2.1	3.5	6.7	530	12.9	10.0
P28	0.55	1.02	43	18.37	2.5	546	0.51	1.5	6.2	8.7	589	13.3	10.0
P29	0.93	0.56	44	2.00	1.6	---	---	---	---	1.6	44	10.2	10.0
P30	0.93	0.56	44	2.00	1.6	551	1.39	2.4	3.8	5.4	595	13.3	10.0
P31	0.50	0.99	50	22.96	2.7	571	0.35	1.2	7.9	10.6	621	13.5	10.6
P32	0.50	57.88	---	---	---	1629	0.38	1.3	21.6	21.6	1629	19.1	19.1
P33	0.50	2.18	---	---	---	237	0.93	2.0	2.0	2.0	237	11.3	10.0
P34	0.50	7.86	---	---	---	1067	0.44	1.3	13.2	13.2	1067	15.9	13.2
P35	0.50	0.91	---	---	---	1081	0.29	1.1	16.4	16.4	1081	16.0	16.0
P36	0.52	0.18	---	---	---	258	0.28	1.1	4.0	4.0	258	11.4	10.0
P37	0.50	0.28	---	---	---	558	0.30	1.1	8.4	8.4	558	13.1	10.0

RATIONAL METHOD: 2-YEAR EVENT (FIRST FLUSH)						
WATERSHED	**A (ft^2)**	**A (acre)**	**Tc (min)**	**i_2 (in/hr)**	**C weighted**	**Q_2 (cfs)**
P11	26,654	0.61	10.0	0.91	0.93	0.52
P12	28,669	0.66	10.0	0.91	0.93	0.56
P13	56,730	1.30	11.1	0.87	0.93	1.05
P14	49,075	1.13	11.1	0.87	0.93	0.91
P15	59,779	1.37	14.6	0.77	0.50	0.53
P16	28,676	0.66	10.0	0.91	0.60	0.36
P17	39,282	0.90	10.0	0.91	0.93	0.76
P18	41,629	0.96	10.0	0.91	0.93	0.81
P19	79,286	1.82	15.2	0.75	0.50	0.68
P20	109,789	2.52	16.0	0.73	0.56	1.03
P21	35,773	0.82	10.0	0.91	0.93	0.70
P22	36,408	0.84	10.0	0.91	0.93	0.71
P23	61,004	1.40	10.0	0.91	0.51	0.65
P24	37,554	0.86	10.0	0.91	0.60	0.47
P25	16,544	0.38	10.0	0.91	0.93	0.32
P26	16,619	0.38	10.0	0.91	0.93	0.32
P27	54,987	1.26	10.0	0.91	0.51	0.59
P28	44,437	1.02	10.0	0.91	0.55	0.51
P29	24,526	0.56	10.0	0.91	0.93	0.48
P30	24,526	0.56	10.0	0.91	0.93	0.48
P31	43,161	0.99	10.6	0.88	0.50	0.43
P35	39,437	0.91	16.0	0.73	0.50	0.33
P36	7,974	0.18	10.0	0.91	0.52	0.09
P37	12,098	0.28	10.0	0.91	0.50	0.13

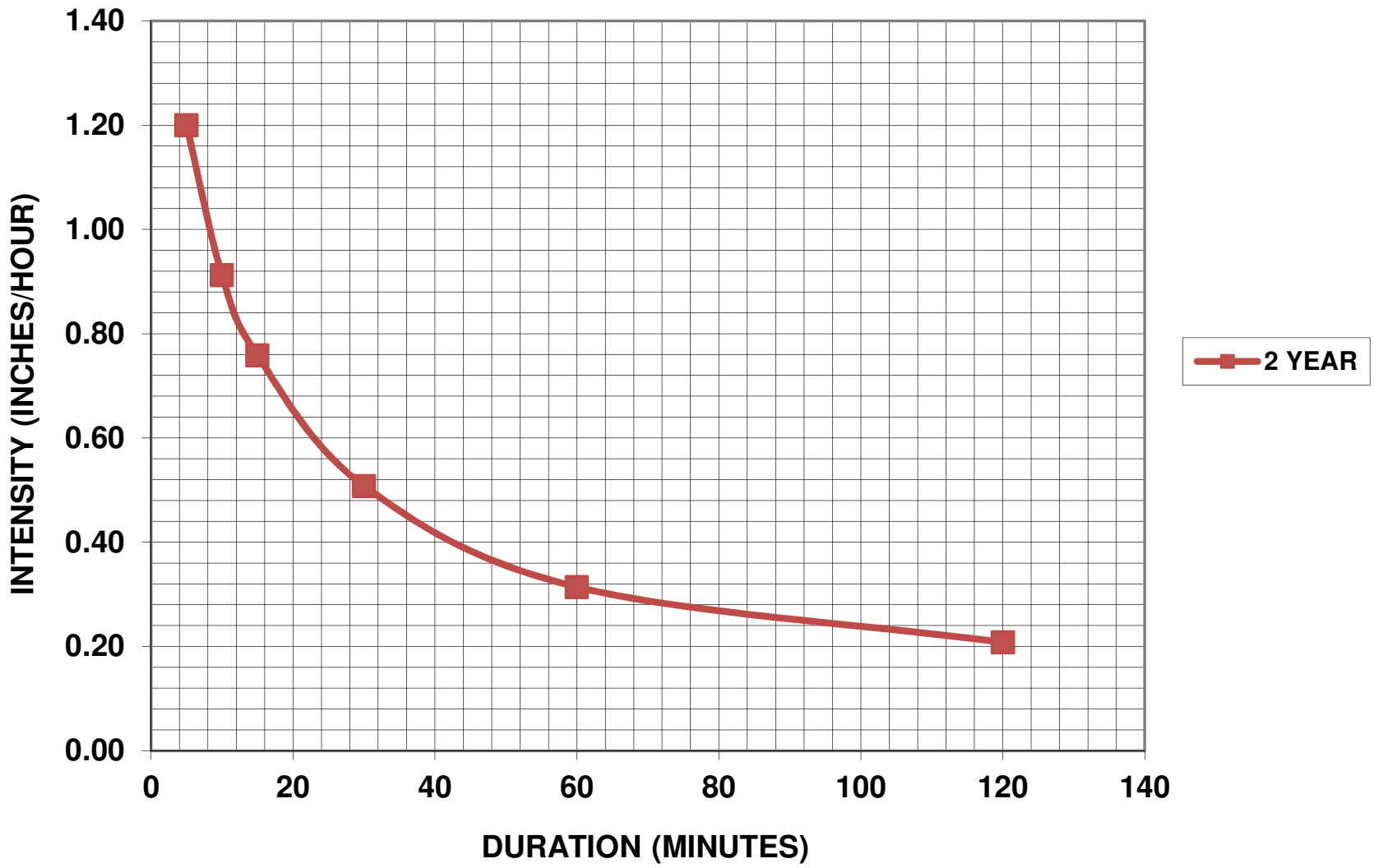
Notes:

1. First Flush calculations based on Section 3.2.1 of the Truckee Meadows Regional Stormwater Quality Management Program Structural Controls Design Manual, April 2007 Update.

2. To be conservative, the weighted C-Values and Tc values were obtained from Rational Method calculations for the 100-year event.

2-YEAR (FIRST FLUSH) IDF CURVE FOR THE SOUTH EAST CONNECTOR

(Point precipitation values obtained from NOAA Atlas 14)



City of Reno Storm Water Quality Management Program
Project Summary Worksheet

* Fill out worksheet from top to bottom

Reno Version 1.04 Released July 2012 (modified by E. T. Svetich)

Designer:	C Abrams / T Magoon
Company:	Stantec Consulting Inc.
Date:	December 1, 2012
Project Name:	SouthEast Connector Phase 1
Location:	City of Sparks and Washoe County Nevada

Project Characteristics

Total Project Area (acres):	18.90
Type of Development (new or redevelopment):	New
Total Area of New or Additional Impervious Surfaces (acres):	9.93
Type of Site Use (residential/commercial/industrial):	Roadway
Storm Water Run-on to Project Area From Offsite (yes/no):	Yes
Is a Seasonal or Permanent Water Feature Onsite (yes/no):	No
Type (stream, spring, etc.) :	N/A
Average Site Slope (%):	1.5
Are Municipal Stormwater Collection/ Conveyance Facilities Nearby (yes/no):	No
Minimum Depth (ft) to Seasonal High Groundwater	6.4
Date Measured	Jan-12

Hazardous Materials to be Used/Stored Onsite (if known)

Material: NONE Quantity:

Material: Quantity:

Identify Subbasins Where Hazardous Materials May Be Used/Stored

Vegetation for areas selected for Low Impact Development features, must be compatable with expected conditions. The final plans must have a stormwater quality treatment control vegetation plan stamped by a registered Landscape Architect.

See report prepared by WBS.

Design Considerations

What are the soil types on the property NRCS Soil Type (i.e. A,B,C,D)?:
C, D

Is Infiltration Proposed? (Y/N):	Y
Has Percolation Testing Been Conducted? (Y/N):	N

If yes, indicate on the percolation rate, location and depth on the plans.

Comments on soil conditions or percolation tests?

What waterways could the drainage from this project ultimately contribute to (ex. Whites Creek, Steamboat Creek, Truckee River)?
Steamboat Creek, Truckee River

Do any or all of these waterways have pollutants of concern or Total Maximum Daily Loads (TMDLs) identified on the EPA approved 303d list for the Truckee River Basin (http://ndep.nv.gov/bwqp/303dlist.htm)? If so, which waterways and which pollutants?
There is a TMDL on the Truckee River from East McCarran Blvd to Lockwood for Total Nitrogen, Total Phosphorus and Total Dissolved Solids. Steamboat Creek is listed on the 303d list for Arsenic, Boron, Iron and Zinc.

What Potential Pollutants that can be expected from this project ?(see Table 2-3 Structural Controls Manual)
Heavy Metals, Nutrients, Organic Compounds, Sediments, Trash & Debris, Oxygen Demanding Substances, Oil & Grease

In selection of the stormwater treatment control, reference the Design and Selection Matrices in Appendix A in the Structural Controls Design Manual to document the appropriateness of the selection.

Design Matrix 1. Land Use:
TC-10: S, TC-11: S, TC-62: S

Design Matrix 2. Site Physical Features:
See note 1 below.

Design Matrix 3. Storm Water Management Capability:
TC-10, TC-11, TC-62: Water Quality = A

Design Matrix 4. Community and Environmental Factors:
See note 2 below.

Design Matrix 5. Pollutant Removal Effectiveness:
See note 3 below.

Notes & Additional Information: 1. Soils: Native, Water table >3ft, Drainage Area < 5Acres, Site slope < 5%, Head: OK.
2. TC-10 and TC-11: Cold Climate Limitations: M, Ease of Maintenance: M, Affordability, Community Acceptance and Safety: H, Habitat: L
.....TC-62: Cold Climate Limitations: L, Ease of Maintenance: M, Affordability: M, Community Acceptance and Safety: H, Habitat: L
3. (TC-10: Sed=M, Nut=L, Tr=L, Met=M, Bac=L, O/G=M, Org=M) (TC-11: Sed=H, Nut=L, Tr=M, Met=H, Bac=L, O/G=H, Org=M) (TC-62: Sed=H, Nut=M, Tr=L, Met=M, Bac=M, O/G=M-H, Org=M-H)

City of Reno Storm Water Quality Management Program
Project Pass/Fail Checklist

* Fill out worksheet from top to bottom

Reno Version 1.04 Released July 2012 (modified by E. T. Svetich)

Designer: C Abrams / T Magoon

Company: Stantec Consulting Inc.

Date: Saturday, December 01, 2012

Project: SouthEast Connector Phase 1

Location: City of Sparks and Washoe County Nevada

Project Characteristics from Summary Sheet	
Total Project Area (acres):	18.90
Type of Development (new or redevelopment):	New
New or Additional Impervious Surfaces (acres):	9.93

Applicable Calculations

Water Quality Flow	**WQf=CIA**
Water Quality Volume	**WQv=(P*Rv*A)/12**
Rv	**Rv=0.05+0.009*I**
P = 90 Percentile for the Truckee Meadows = 0.60	

Total Number of Drainage Subbasins:	8
Sub-basin acreage must equal total Project Acreage	18.91
	All acreage is addressed
Total Post Subbasin WQ_f (ft³/sec)	12.38
Total Post Subbasin WQ_v (ft³)	19569.02
Total Post-Pre Subbasin WQ_f (ft³/sec)	3.78
Total Post - Pre Subbasin WQ_v (ft³)	17509.64
Total Actual Subbasin WQ_f (ft³/sec)	11.63
Total Actual Subbasin WQ_v (ft³)	2397.00
Project %WQf	307.94
Project %WQv	13.69
Project	Pass

Notes & Additional Information:

Continue to next page if there are more than 2 subbasins

Drainage Subbasin Characteristics

Subbasin #	BS-1	Subbasin Area (sq.ft.):	58370.00
		Subbasin Area (acres):	1.34
		Rainfall intensity from IDF curve	0.91
		Pre-Development Impervious area (sq ft):	0
		Post Development Impervious area (sq ft):	29461.0
		Pre-Development Runoff Coefficient:	0.50
		Post Development Runoff Coefficient:	0.79
		Pre-Development Percent Impervious:	0
		Post-Development Percent Impervious:	50
		Pre-dev.Subbasin WQ_f (ft³/sec)	0.61
		Pre-dev. Subbasin WQ_v (ft³)	145.93
		Post-dev.Subbasin WQ_f (ft³/sec)	0.96
		Post-dev. Subbasin WQ_v (ft³)	1471.67
		Post-Pre WQ_f (ft³/sec) Min.Requiring treatment	0.35
		Post - Pre WQ_v (ft³) Min. Requiring Treatment	1325.75
		Enter Treatment Control or indicate if "self treating"	TC-10
		Actual WQ_f (ft³/sec), if 'self treating' enter min WQf	0.93
		Actual Subbasin WQ_v (ft³)	170
		Sub-basin %WQf	262.99
		Sub-basin %WQv	12.82
		Sub-basin	Pass

Subbasin #	BS-3	Subbasin Area (sq.ft.):	159865.00
		Subbasin Area (acres):	3.67
		Rainfall intensity from IDF curve	0.91
		Pre-Development Impervious area (sq ft):	0
		Post Development Impervious area (sq ft):	59990.0
		Pre-Development Runoff Coefficient:	0.50
		Post Development Runoff Coefficient:	0.71
		Pre-Development Percent Impervious:	0
		Post-Development Percent Impervious:	38
		Pre-dev.Subbasin WQ_f (ft³/sec)	1.67
		Pre-dev. Subbasin WQ_v (ft³)	399.66
		Post-dev.Subbasin WQ_f (ft³/sec)	2.37
		Post-dev. Subbasin WQ_v (ft³)	3099.21
		Post-Pre WQ_f (ft³/sec) Min.Requiring treatment	0.70
		Post - Pre WQ_v (ft³) Min. Requiring Treatment	2699.55
		Enter Treatment Control or indicate if "self treating"	TC-10
		Actual WQ_f (ft³/sec), if 'self treating' enter min WQf	1.92
		Actual Subbasin WQ_v (ft³)	465
		Sub-basin %WQf	273.76
		Sub-basin %WQv	17.23
		Sub-basin	Pass

City of Reno Storm Water Quality Management Program

* Fill out worksheet from top to bottom

Designer: C Abrams / T Magoon

Company: Stantec Consulting Inc.

Date: Saturday, December 01, 2012

Project: SouthEast Connector Phase 1

Location: City of Sparks and Washoe County Nevada

Subbasin #	BS-5
Subbasin Area (sq.ft.):	235344.00
Subbasin Area (acres):	5.40
Rainfall intensity from IDF curve	0.91
Pre-Development Impervious area (sq ft):	0
Post Development Impervious area (sq ft):	156058.0
Pre-Development Runoff Coefficient:	0.50
Post Development Runoff Coefficient:	0.79
Pre-Development Percent Impervious:	0
Post-Development Percent Impervious:	66
Pre-dev.Subbasin WQ_f (ft^3/sec)	2.46
Pre-dev. Subbasin WQ_v (ft^3)	588.36
Post-dev.Subbasin WQ_f (ft^3/sec)	3.88
Post-dev. Subbasin WQ_v (ft^3)	7610.97
Post-Pre WQ_f (ft^3/sec) Min.Requiring treatment	1.43
Post - Pre WQ_v (ft^3) Min. Requiring Treatment	7022.61
Enter Treatment Control or indicate if "self treating"	TC-10
Actual WQ_f (ft^3/sec), if 'self treating' enter min WQf	3.62
Actual Subbasin WQ_v (ft^3)	685
Sub-basin %WQf	253.89
Sub-basin %WQv	9.75
Sub-basin	Pass

Subbasin #	BS-6
Subbasin Area (sq.ft.):	107819.00
Subbasin Area (acres):	2.48
Rainfall intensity from IDF curve	0.91
Pre-Development Impervious area (sq ft):	0
Post Development Impervious area (sq ft):	48555.0
Pre-Development Runoff Coefficient:	0.50
Post Development Runoff Coefficient:	0.69
Pre-Development Percent Impervious:	0
Post-Development Percent Impervious:	45
Pre-dev.Subbasin WQ_f (ft^3/sec)	1.13
Pre-dev. Subbasin WQ_v (ft^3)	269.55
Post-dev.Subbasin WQ_f (ft^3/sec)	1.55
Post-dev. Subbasin WQ_v (ft^3)	2454.52
Post-Pre WQ_f (ft^3/sec) Min.Requiring treatment	0.43
Post - Pre WQ_v (ft^3) Min. Requiring Treatment	2184.98
Enter Treatment Control or indicate if "self treating"	TC-10
Actual WQ_f (ft^3/sec), if 'self treating' enter min WQf	1.56
Actual Subbasin WQ_v (ft^3)	314
Sub-basin %WQf	364.52
Sub-basin %WQv	14.37
Sub-basin	Pass

Subbasin #	BS-7
Subbasin Area (sq.ft.):	71606.00
Subbasin Area (acres):	1.64
Rainfall intensity from IDF curve	0.91
Pre-Development Impervious area (sq ft):	0
Post Development Impervious area (sq ft):	18139.0
Pre-Development Runoff Coefficient:	0.50
Post Development Runoff Coefficient:	0.61
Pre-Development Percent Impervious:	0
Post-Development Percent Impervious:	25
Pre-dev.Subbasin WQ_f (ft^3/sec)	0.75
Pre-dev. Subbasin WQ_v (ft^3)	179.02
Post-dev.Subbasin WQ_f (ft^3/sec)	0.91
Post-dev. Subbasin WQ_v (ft^3)	995.27
Post-Pre WQ_f (ft^3/sec) Min.Requiring treatment	0.16
Post - Pre WQ_v (ft^3) Min. Requiring Treatment	816.26
Enter Treatment Control or indicate if "self treating"	TC-10
Actual WQ_f (ft^3/sec), if 'self treating' enter min WQf	0.91
Actual Subbasin WQ_v (ft^3)	208
Sub-basin %WQf	553.03
Sub-basin %WQv	25.48
Sub-basin	Pass

Subbasin #	BS-10
Subbasin Area (sq.ft.):	67687.00
Subbasin Area (acres):	1.55
Rainfall intensity from IDF curve	0.91
Pre-Development Impervious area (sq ft):	0
Post Development Impervious area (sq ft):	24526.0
Pre-Development Runoff Coefficient:	0.50
Post Development Runoff Coefficient:	0.66
Pre-Development Percent Impervious:	0
Post-Development Percent Impervious:	36
Pre-dev.Subbasin WQ_f (ft^3/sec)	0.71
Pre-dev. Subbasin WQ_v (ft^3)	169.22
Post-dev.Subbasin WQ_f (ft^3/sec)	0.93
Post-dev. Subbasin WQ_v (ft^3)	1272.89
Post-Pre WQ_f (ft^3/sec) Min.Requiring treatment	0.23
Post - Pre WQ_v (ft^3) Min. Requiring Treatment	1103.67
Enter Treatment Control or indicate if "self treating"	TC-10
Actual WQ_f (ft^3/sec), if 'self treating' enter min WQf	0.91
Actual Subbasin WQ_v (ft^3)	197
Sub-basin %WQf	402.22
Sub-basin %WQv	17.85
Sub-basin	Pass

City of Reno Storm Water Quality Management Program

* Fill out worksheet from top to bottom

Designer: C Abrams / T Magoon

Company: Stantec Consulting Inc.

Date: Saturday, December 01, 2012

Project: SouthEast Connector Phase 1

Location: City of Sparks and Washoe County Nevada

Subbasin #	BS-11
Subbasin Area (sq.ft.):	68963.00
Subbasin Area (acres):	1.58
Rainfall intensity from IDF curve	0.91
Pre-Development Impervious area (sq ft):	0
Post Development Impervious area (sq ft):	29986.0
Pre-Development Runoff Coefficient:	0.50
Post Development Runoff Coefficient:	0.69
Pre-Development Percent Impervious:	0
Post-Development Percent Impervious:	43
Pre-dev.Subbasin WQ_f (ft^3/sec)	0.72
Pre-dev. Subbasin WQ_v (ft^3)	172.41
Post-dev.Subbasin WQ_f (ft^3/sec)	0.99
Post-dev. Subbasin WQ_v (ft^3)	1521.78
Post-Pre WQ_f (ft^3/sec) Min.Requiring treatment	0.27
Post - Pre WQ_v (ft^3) Min. Requiring Treatment	1349.37
Enter Treatment Control or indicate if "self treating"	TC-10
Actual WQ_f (ft^3/sec), if 'self treating' enter min WQf	0.99
Actual Subbasin WQ_v (ft^3)	201
Sub-basin %WQf	361.67
Sub-basin %WQv	14.90
Sub-basin	Pass

Subbasin #	BS-12
Subbasin Area (sq.ft.):	54098.00
Subbasin Area (acres):	1.24
Rainfall intensity from IDF curve	0.91
Pre-Development Impervious area (sq ft):	0
Post Development Impervious area (sq ft):	22388.0
Pre-Development Runoff Coefficient:	0.50
Post Development Runoff Coefficient:	0.68
Pre-Development Percent Impervious:	0
Post-Development Percent Impervious:	41
Pre-dev.Subbasin WQ_f (ft^3/sec)	0.57
Pre-dev. Subbasin WQ_v (ft^3)	135.25
Post-dev.Subbasin WQ_f (ft^3/sec)	0.77
Post-dev. Subbasin WQ_v (ft^3)	1142.71
Post-Pre WQ_f (ft^3/sec) Min.Requiring treatment	0.20
Post - Pre WQ_v (ft^3) Min. Requiring Treatment	1007.46
Enter Treatment Control or indicate if "self treating"	TC-10
Actual WQ_f (ft^3/sec), if 'self treating' enter min WQf	0.79
Actual Subbasin WQ_v (ft^3)	157
Sub-basin %WQf	388.35
Sub-basin %WQv	15.58
Sub-basin	Pass

Subbasin #	
Subbasin Area (sq.ft.):	
Subbasin Area (acres):	
Rainfall intensity from IDF curve	
Pre-Development Impervious area (sq ft):	
Post Development Impervious area (sq ft):	
Pre-Development Runoff Coefficient:	
Post Development Runoff Coefficient:	
Pre-Development Percent Impervious:	
Post-Development Percent Impervious:	
Pre-dev.Subbasin WQ_f (ft^3/sec)	
Pre-dev. Subbasin WQ_v (ft^3)	
Post-dev.Subbasin WQ_f (ft^3/sec)	
Post-dev. Subbasin WQ_v (ft^3)	
Post-Pre WQ_f (ft^3/sec) Min.Requiring treatment	
Post - Pre WQ_v (ft^3) Min. Requiring Treatment	
Enter Treatment Control or indicate if "self treating"	
Actual WQ_f (ft^3/sec), if 'self treating' enter min WQf	
Actual Subbasin WQ_v (ft^3)	
Sub-basin %WQf	
Sub-basin %WQv	
Sub-basin	

Subbasin #	
Subbasin Area (sq.ft.):	
Subbasin Area (acres):	
Rainfall intensity from IDF curve	
Pre-Development Impervious area (sq ft):	
Post Development Impervious area (sq ft):	
Pre-Development Runoff Coefficient:	
Post Development Runoff Coefficient:	
Pre-Development Percent Impervious:	
Post-Development Percent Impervious:	
Pre-dev.Subbasin WQ_f (ft^3/sec)	
Pre-dev. Subbasin WQ_v (ft^3)	
Post-dev.Subbasin WQ_f (ft^3/sec)	
Post-dev. Subbasin WQ_v (ft^3)	
Post-Pre WQ_f (ft^3/sec) Min.Requiring treatment	
Post - Pre WQ_v (ft^3) Min. Requiring Treatment	
Enter Treatment Control or indicate if "self treating"	
Actual WQ_f (ft^3/sec), if 'self treating' enter min WQf	
Actual Subbasin WQ_v (ft^3)	
Sub-basin %WQf	
Sub-basin %WQv	
Sub-basin	

Truckee Meadows Regional Storm Water Quality Management Program
Design Guidance Worksheet: Swales TC-10

* Fill out worksheet from top to bottom

Reno Version 1.04 Released July 2012 (modified by E. T. Svetich)

Designer: C Abrams / T Magoon
Company: Stantec Consulting Inc.
Date: Saturday, December 01, 2012
Project: SouthEast Connector Phase 1
Location: City of Sparks and Washoe County Nevada

Subbasin # BS-1

Key: User Input | Calculated Result | *Italicized Font Indicates Value is Outside Recommended Range*

1. Water Quality & Design Flow Rates

a) Time of concentration (t_c) in minutes — t_c = 10.0 min

b) Rainfall Intensities for 2, 5 and 100-year storm events (I_2, I_5, and I_{100}) (Determine using the appropriate City or County Drainage Design Manual) — I_2 = 0.91 in/hr; I_5 = 1.33 in/hr

c) List City or County name and Rainfall Region — City of Reno, NOAA Atlas 14; I_{100} = 3.38 in/hr

d) Subbasin Area (A) in acres (43,560 ft² = 1 acre) (maximum drainage area = 10 acres) — A = 1.34 acres

e) Runoff Coefficient of Contributing Drainage Area = C (Determine using the appropriate City or County Drainage Design Manual) — C = 0.79

f) Discharge Rates: Water Quality Flow = WQ_F = Q_2 (cfs); Swale Design Flow: Q_5 (cfs) — Design Flow Q_5 = 1.41 cfs; WQ_F = 0.96 cfs; Q_{100} = 3.56 cfs

WQ_F = 0.96 cfs — Designer to input selected value for Water Quality Flow

2. Swale Geometry

a) Mannings Roughness Coefficient (*n*) (Use 0.25 for grass and 0.40 for mixed vegetation and rocks) — *n* = 0.40

b) Swale Side Slopes (max 4H:1V or flatter) — Left Side Slope H:V = 4.0 :1; Right Side Slope H:V = 4.0 :1

c) Bottom Width (BW) of Trapezoidal Channel (2' minimum, 10' maximum), — BW = 2.0 ft

d) Flow Depth (D): WQ_F depth (D_2) maximum = 3', Design Flow (Q_5) Depth = D_5 (Calculate using an external method, indicate method in notes below) — D_2 = 0.17 ft; D_5 = 0.44 ft

e) Minimum swale depth with 0.5 ft of freeboard — D_5 + 0.5' = 0.94 ft

e) Minimum swale Top Width (TW) with 0.5 ft of freeboard — TW = 9.52 ft

3. Swale Length, Slope & Flow Velcoity

a) Length of Swale (L_S), minimum = 100' — L_S = 338.0 ft

b) Longitudinal Slope (S), 0.5% minimum, 2.5% maximum — S = 3.00 %

NOTE: Slope exceeds 2.5% maximum

c) Flow Velocity (V) (WQ_F velocity = V_2 , maximum = 2.0 ft/sec) (Calculate using an external method, indicate method in notes below) — V_2 = 2.11 ft/sec; V_5 = 2.17 ft/sec

NOTE: Velocity exceeds recommended limit

4. Vegetation (Check "x" to indicate type used or describe "Other")

(Minimum vegetation height of 4 - 6" is recommended)

- [ ] Dryland Grass
- [ ] Irrigated Turf Grass
- [x] Other: Riprap lined

5. Underdrain & Outlet (Check "x" to indicate type used or describe "Other")

a) Check "x" if swale is in HSG C or D soils? x

[x] **Underdrain required if checked** (Provide a 4" diameter PVC underdrain for proper drainage)

b) Outlet for flows greater than the WQ_F

- [ ] Grated Inlet
- [x] Overland Flow to Valley Gutter or Downstream Swale
- [ ] Other:

Notes & Additional Information

3.c. Manning's 5.a. Underdrains not provided due to lack of available fall to daylight the underdrains. Secondary vegetated buffer strips were included in the design to make up for the lack of underdrains. D soils are interbedded with fluvial deposits consisting of mostly fine to medium grade sand with variable quantities of silt, clay and gravel in the upper portion of the soil profiles.

Original worksheet developed by and used with the permission of the Urban Drainage and Flood Control District (UDFCD) in Denver, Colorado. The original worksheet was modified and adapted for the Truckee Meadows Regional Storm Water Quality Management Program by Kennedy/Jenks Consultants.

end of worksheet

Truckee Meadows Regional Storm Water Quality Management Program
Design Guidance Worksheet: Swales TC-10

* Fill out worksheet from top to bottom

Reno Version 1.04 Released July 2012 (modified by E. T. Svetich)

Designer: C Abrams / T Magoon
Company: Stantec Consulting Inc.
Date: Saturday, December 01, 2012
Project: SouthEast Connector Phase 1
Location: City of Sparks and Washoe County Nevada

Subbasin # BS-3

Key: User Input | Calculated Result | *Italicized Font Indicates Value is Outside Recommended Range*

1. Water Quality & Design Flow Rates

a) Time of concentration (t_c) in minutes — t_c = 10.0 min

b) Rainfall Intensities for 2, 5 and 100-year storm events (I_2, I_5, and I_{100}) (Determine using the appropriate City or County Drainage Design Manual) — I_2 = 0.91 in/hr; I_5 = 1.33 in/hr

c) List City or County name and Rainfall Region — City of Reno, NOAA Atlas 14; I_{100} = 3.36 in/hr

d) Subbasin Area (A) in acres (43,560 ft² = 1 acre) (maximum drainage area = 10 acres) — A = 3.67 acres

e) Runoff Coefficient of Contributing Drainage Area = C (Determine using the appropriate City or County Drainage Design Manual) — C = 0.71

f) Discharge Rates: Water Quality Flow = $WQ_F = Q_2$ (cfs); Swale Design Flow: Q_5 (cfs) — WQ_F = 2.37 cfs; Design Flow Q_5 = 3.47 cfs; Q_{100} = 8.76 cfs

WQ_F = 2.37 cfs — Designer to input selected value for Water Quality Flow

2. Swale Geometry

a) Mannings Roughness Coefficient (*n*) (Use 0.25 for grass and 0.40 for mixed vegetation and rocks) — *n* = 0.40

b) Swale Side Slopes (max 4H:1V or flatter) — Left Side Slope H:V = 4.0 :1; Right Side Slope H:V = 4.0 :1

c) Bottom Width (BW) of Trapezoidal Channel (2' minimum, 10' maximum), — BW = 2.0 ft

d) Flow Depth (D): WQ_F depth (D_2) maximum = 3', Design Flow (Q_5) Depth = D_5 (Calculate using an external method, indicate method in notes below) — D_2 = 0.42 ft; D_5 = 0.40 ft

e) Minimum swale depth with 0.5 ft of freeboard — D_5 + 0.5' = 0.90 ft

e) Minimum swale Top Width (TW) with 0.5 ft of freeboard — TW = 9.20 ft

3. Swale Length, Slope & Flow Velocity

a) Length of Swale (L_s), minimum = 100' — L_s = 980.0 ft

b) Longitudinal Slope (S), 0.5% minimum, 2.5% maximum — S = 1.00 %

c) Flow Velocity (V) (WQ_F velocity = V_2, maximum = 2.0 ft/sec) (Calculate using an external method, indicate method in notes below) — V_2 = 1.53 ft/sec; V_5 = 1.55 ft/sec

4. Vegetation (Check "x" to indicate type used or describe "Other")

(Minimum vegetation height of 4 - 6" is recommended)

- [ ] Dryland Grass
- [ ] Irrigated Turf Grass
- [x] Other: Revegitation per WBS plan

5. Underdrain & Outlet (Check "x" to indicate type used or describe "Other")

a) Check "x" if swale is in HSG C or D soils? x

- [x] **Underdrain required if checked** (Provide a 4" diameter PVC underdrain for proper drainage)

b) Outlet for flows greater than the WQ_F

- [ ] Grated Inlet
- [x] Overland Flow to Valley Gutter or Downstream Swale
- [ ] Other:

Notes & Additional Information

3.c. Manning's 5.a. Underdrains not provided due to lack of available fall to daylight the underdrains. Secondary vegetated buffer strips were included in the design to make up for the lack of underdrains. D soils are interbedded with fluvial deposits consisting of mostly fine to medium grade sand with variable quantities of silt, clay and gravel in the upper portion of the soil profiles.

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end of worksheet

Truckee Meadows Regional Storm Water Quality Management Program
Design Guidance Worksheet: Swales TC-10

* Fill out worksheet from top to bottom

Reno Version 1.04 Released July 2012 (modified by E. T. Svetich)

Designer: C Abrams / T Magoon
Company: Stantec Consulting Inc.
Date: Saturday, December 01, 2012
Project: SouthEast Connector Phase 1
Location: City of Sparks and Washoe County Nevada

Subbasin # BS-5

Key: User Input | Calculated Result | *Italicized Font Indicates Value is Outside Recommended Range*

1. Water Quality & Design Flow Rates

a) Time of concentration (t_c) in minutes — t_c = 10.0 min

b) Rainfall Intensities for 2, 5 and 100-year storm events (I_2, I_5, and I_{100}) (Determine using the appropriate City or County Drainage Design Manual) — I_2 = 0.91 in/hr; I_5 = 1.33 in/hr

c) List City or County name and Rainfall Region — City of Reno, NOAA Atlas 14; I_{100} = 3.36 in/hr

d) Subbasin Area (A) in acres (43,560 ft² = 1 acre) (maximum drainage area = 10 acres) — A = 5.40 acres

e) Runoff Coefficient of Contributing Drainage Area = C (Determine using the appropriate City or County Drainage Design Manual) — C = 0.79

f) Discharge Rates: Water Quality Flow = $WQ_F = Q_2$ (cfs); Swale Design Flow: Q_5 (cfs) — WQ_F = 3.88 cfs; Design Flow Q_5 = 5.67 cfs; Q_{100} = 14.33 cfs

WQ_F = 3.88 cfs — Designer to input selected value for Water Quality Flow

2. Swale Geometry

a) Mannings Roughness Coefficient (n) (Use 0.25 for grass and 0.40 for mixed vegetation and rocks) — n = 0.40

b) Swale Side Slopes (max 4H:1V or flatter) — Left Side Slope H:V = 4.0 :1; Right Side Slope H:V = 4.0 :1

c) Bottom Width (BW) of Trapezoidal Channel (2' minimum, 10' maximum), — BW = 6.0 ft

d) Flow Depth (D): WQ_F depth (D_2) maximum = 3', Design Flow (Q_5) Depth = D_5 (Calculate using an external method, indicate method in notes below) — D_2 = 0.50 ft; D_5 = 0.55 ft

e) Minimum swale depth with 0.5 ft of freeboard — D_5 + 0.5' = 1.05 ft

e) Minimum swale Top Width (TW) with 0.5 ft of freeboard — TW = 14.40 ft

3. Swale Length, Slope & Flow Velcoity

a) Length of Swale (L_S), minimum = 100' — L_S = 1909.0 ft

b) Longitudinal Slope (S), 0.5% minimum, 2.5% maximum — S = 0.40 %

NOTE: Design slope less than 0.5%, underdrain system required

c) Flow Velocity (V) (WQ_F velocity = V_2 , maximum = 2.0 ft/sec) (Calculate using an external method, indicate method in notes below) — V_2 = 0.97 ft/sec; V_5 = 1.01 ft/sec

4. Vegetation (Check "x" to indicate type used or describe "Other")

(Minimum vegetation height of 4 - 6" is recommended)

	Dryland Grass
	Irrigated Turf Grass
x	Other: Revegitation per WBS plan.

5. Underdrain & Outlet (Check "x" to indicate type used or describe "Other")

a) Check "x" if swale is in HSG C or D soils? x

x **Underdrain required if checked**
(Provide a 4" diameter PVC underdrain for proper drainage)

b) Outlet for flows greater than the WQ_F

	Grated Inlet
x	Overland Flow to Valley Gutter or Downstream Swale
	Other:

Notes & Additional Information

3.c. Manning's 5.a. Underdrains not provided due to lack of available fall to daylight the underdrains. Secondary vegetated buffer strips were included in the design to make up for the lack of underdrains. D soils are interbedded with fluvial deposits consisting of mostly fine to medium grade sand with variable quantities of silt, clay and gravel in the upper portion of the soil profiles.

Original worksheet developed by and used with the permission of the Urban Drainage and Flood Control District (UDFCD) in Denver, Colorado. The original worksheet was modified and adapted for the Truckee Meadows Regional Storm Water Quality Management Program by Kennedy/Jenks Consultants.

end of worksheet

Truckee Meadows Regional Storm Water Quality Management Program
Design Guidance Worksheet: Swales TC-10

* Fill out worksheet from top to bottom

Reno Version 1.04 Released July 2012 (modified by E. T. Svetich)

Designer: C Abrams / T Magoon
Company: Stantec Consulting Inc.
Date: Saturday, December 01, 2012
Project: SouthEast Connector Phase 1
Location: City of Sparks and Washoe County Nevada

Subbasin # BS-6

Key: User Input | Calculated Result | *Italicized Font Indicates Value is Outside Recommended Range*

1. Water Quality & Design Flow Rates

a) Time of concentration (t_c) in minutes

b) Rainfall Intensities for 2, 5 and 100-year storm events (I_2, I_5, and I_{100})
(Determine using the appropriate City or County Drainage Design Manual)

c) List City or County name and Rainfall Region

d) Subbasin Area (A) in acres (43,560 ft² = 1 acre)
(maximum drainage area = 10 acres)

e) Runoff Coefficient of Contributing Drainage Area = C
(Determine using the appropriate City or County Drainage Design Manual)

f) Discharge Rates: Water Quality Flow = $WQ_F = Q_2$ (cfs)
Swale Design Flow: Q_5 (cfs)

a) t_c = 10.0 min

b) I_2 = 0.91 in/hr; I_5 = 1.33 in/hr

c) City of Reno, NOAA Atlas 14; I_{100} = 3.36 in/hr

d) A = 2.48 acres

e) C = 0.69

f) WQ_F = 1.56 cfs; Design Flow Q_5 = 2.28 cfs; Q_{100} = 5.75 cfs

WQ_F = 1.56 cfs — Designer to input selected value for Water Quality Flow

2. Swale Geometry

a) Mannings Roughness Coefficient (n)
(Use 0.25 for grass and 0.40 for mixed vegetation and rocks)

b) Swale Side Slopes (max 4H:1V or flatter)

c) Bottom Width (BW) of Trapezoidal Channel (2' minimum, 10' maximum),

d) Flow Depth (D): WQ_F depth (D_2) maximum = 3', Design Flow (Q_5) Depth = D_5
(Calculate using an external method, indicate method in notes below)

e) Minimum swale depth with 0.5 ft of freeboard

e) Minimum swale Top Width (TW) with 0.5 ft of freeboard

n = 0.40

	Left Side Slope	Right Side Slope
H:V =	4.0 :1	4.0 :1

BW = 2.0 ft

D_2 = 0.38 ft; D_5 = 0.42 ft

D_5 + 0.5' = 0.92 ft

TW = 9.36 ft

3. Swale Length, Slope & Flow Velcoity

a) Length of Swale (L_s), minimum = 100'

b) Longitudinal Slope (S), 0.5% minimum, 2.5% maximum

c) Flow Velocity (V) (WQ_F velocity = V_2 , maximum = 2.0 ft/sec)
(Calculate using an external method, indicate method in notes below)

L_s = 564.0 ft

S = 0.70 %

V_2 = 1.26 ft/sec; V_5 = 1.37 ft/sec

4. Vegetation (Check "x" to indicate type used or describe "Other")
(Minimum vegetation height of 4 - 6" is recommended)

	Dryland Grass
	Irrigated Turf Grass
x	Other: Revegitation per WBS plan.

5. Underdrain & Outlet (Check "x" to indicate type used or describe "Other")

a) Check "x" if swale is in HSG C or D soils? x

x — **Underdrain required if checked**
(Provide a 4" diameter PVC underdrain for proper drainage)

b) Outlet for flows greater than the WQ_F

	Grated Inlet
x	Overland Flow to Valley Gutter or Downstream Swale
	Other:

Notes & Additional Information

3.c. Manning's 5.a. Underdrains not provided due to lack of available fall to daylight the underdrains. Secondary vegetated buffer strips were included in the design to make up for the lack of underdrains. D soils are interbedded with fluvial deposits consisting of mostly fine to medium grade sand with variable quantities of silt, clay and gravel in the upper portion of the soil profiles.

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end of worksheet

Truckee Meadows Regional Storm Water Quality Management Program
Design Guidance Worksheet: Swales TC-10

* Fill out worksheet from top to bottom

Reno Version 1.04 Released July 2012 (modified by E. T. Svetich)

Designer: C Abrams / T Magoon
Company: Stantec Consulting Inc.
Date: Saturday, December 01, 2012
Project: SouthEast Connector Phase 1
Location: City of Sparks and Washoe County Nevada

Subbasin # BS-7

Key: User Input | Calculated Result | *Italicized Font Indicates Value is Outside Recommended Range*

1. Water Quality & Design Flow Rates

a) Time of concentration (t_c) in minutes — t_c = 10.0 min

b) Rainfall Intensities for 2, 5 and 100-year storm events (I_2, I_5, and I_{100}) (Determine using the appropriate City or County Drainage Design Manual) — I_2 = 0.91 in/hr; I_5 = 1.33 in/hr

c) List City or County name and Rainfall Region — City of Reno, NOAA Atlas 14; I_{100} = 3.36 in/hr

d) Subbasin Area (A) in acres (43,560 ft^2 = 1 acre) (maximum drainage area = 10 acres) — A = 1.84 acres

e) Runoff Coefficient of Contributing Drainage Area = C (Determine using the appropriate City or County Drainage Design Manual) — C = 0.61

f) Discharge Rates: Water Quality Flow = WQ_F = Q_2 (cfs); Swale Design Flow: Q_5 (cfs) — Design Flow Q_5 = 1.33 cfs; WQ_F = 0.91 cfs; Q_{100} = 3.36 cfs

WQ_F = 0.91 cfs — Designer to input selected value for Water Quality Flow

2. Swale Geometry

a) Mannings Roughness Coefficient (n) (Use 0.25 for grass and 0.40 for mixed vegetation and rocks) — n = 0.40

b) Swale Side Slopes (max 4H:1V or flatter) — Left Side Slope H:V = 4.0 :1; Right Side Slope H:V = 4.0 :1

c) Bottom Width (BW) of Trapezoidal Channel (2' minimum, 10' maximum), — BW = 2.0 ft

d) Flow Depth (D): WQ_F depth (D_2) maximum = 3', Design Flow (Q_5) Depth = D_5 (Calculate using an external method, indicate method in notes below) — D_2 = 0.29 ft; D_5 = 0.30 ft

e) Minimum swale depth with 0.5 ft of freeboard — D_5 + 0.5' = 0.80 ft

e) Minimum swale Top Width (TW) with 0.5 ft of freeboard — TW = 8.40 ft

3. Swale Length, Slope & Flow Velcoity

a) Length of Swale (L_S), minimum = 100' — L_S = 251.0 ft

b) Longitudinal Slope (S), 0.5% minimum, 2.5% maximum — S = 0.64 %

c) Flow Velocity (V) (WQ_F velocity = V_2 , maximum = 2.0 ft/sec) (Calculate using an external method, indicate method in notes below) — V_2 = 0.99 ft/sec; V_5 = 1.01 ft/sec

4. Vegetation (Check "x" to indicate type used or describe "Other")

(Minimum vegetation height of 4 - 6" is recommended)

	Dryland Grass
	Irrigated Turf Grass
x	Other: Revegitation per WBS plan.

5. Underdrain & Outlet (Check "x" to indicate type used or describe "Other")

a) Check "x" if swale is in HSG C or D soils? x

x **Underdrain required if checked**
(Provide a 4" diameter PVC underdrain for proper drainage)

b) Outlet for flows greater than the WQ_F

	Grated Inlet
x	Overland Flow to Valley Gutter or Downstream Swale
	Other:

Notes & Additional Information

3.c. Manning's 5.a. Underdrains not provided due to lack of available fall to daylight the underdrains. Secondary vegetated buffer stripes were included in the design to make up for the lack of underdrains. D soils are interbedded with fluvial deposits consisting of mostly fine to medium grade sand with variable quantities of silt, clay and gravel in the upper portion of the soil profiles.

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end of worksheet

Truckee Meadows Regional Storm Water Quality Management Program
Design Guidance Worksheet: Swales TC-10

* Fill out worksheet from top to bottom

Reno Version 1.04 Released July 2012 (modified by E. T. Svetich)

Designer: C Abrams / T Magoon
Company: Stantec Consulting Inc.
Date: Saturday, December 01, 2012
Project: SouthEast Connector Phase 1
Location: City of Sparks and Washoe County Nevada

Subbasin # BS-10

Key: User Input | Calculated Result | *Italicized Font Indicates Value is Outside Recommended Range*

1. Water Quality & Design Flow Rates

a) Time of concentration (t_c) in minutes — t_c = 10.0 min

b) Rainfall Intensities for 2, 5 and 100-year storm events (I_2, I_5, and I_{100}) (Determine using the appropriate City or County Drainage Design Manual) — I_2 = 0.91 in/hr; I_5 = 1.33 in/hr

c) List City or County name and Rainfall Region — City of Reno, NOAA Atlas 14; I_{100} = 3.36 in/hr

d) Subbasin Area (A) in acres (43,560 ft² = 1 acre) (maximum drainage area = 10 acres) — A = 1.55 acres

e) Runoff Coefficient of Contributing Drainage Area = C (Determine using the appropriate City or County Drainage Design Manual) — C = 0.66

f) Discharge Rates: Water Quality Flow = $WQ_F = Q_2$ (cfs); Swale Design Flow: Q_5 (cfs)

WQ_F = 0.93 cfs

Design Flow Q_5 = 1.36 cfs

Q_{100} = 3.44 cfs

WQ_F = 0.93 cfs

Designer to input selected value for Water Quality Flow

2. Swale Geometry

a) Mannings Roughness Coefficient (*n*) (Use 0.25 for grass and 0.40 for mixed vegetation and rocks) — *n* = 0.40

b) Swale Side Slopes (max 4H:1V or flatter) — Left Side Slope H:V = 4.0 :1; Right Side Slope H:V = 4.0 :1

c) Bottom Width (BW) of Trapezoidal Channel (2' minimum, 10' maximum), — BW = 2.0 ft

d) Flow Depth (D): WQ_F depth (D_2) maximum = 3', Design Flow (Q_5) Depth = D_5 (Calculate using an external method, indicate method in notes below) — D_2 = 0.33 ft; D_5 = 0.34 ft

e) Minimum swale depth with 0.5 ft of freeboard — D_5 + 0.5' = 0.84 ft

e) Minimum swale Top Width (TW) with 0.5 ft of freeboard — TW = 8.72 ft

3. Swale Length, Slope & Flow Velcoity

a) Length of Swale (L_s), minimum = 100' — L_s = 549.0 ft

b) Longitudinal Slope (S), 0.5% minimum, 2.5% maximum — S = 0.41 %

NOTE: Design slope less than 0.5%, underdrain system required

c) Flow Velocity (V) (WQ_F velocity = V_2 , maximum = 2.0 ft/sec) (Calculate using an external method, indicate method in notes below) — V_2 = 0.85 ft/sec; V_5 = 0.89 ft/sec

4. Vegetation (Check "x" to indicate type used or describe "Other")

(Minimum vegetation height of 4 - 6" is recommended)

- [ ] Dryland Grass
- [ ] Irrigated Turf Grass
- [x] Other: Revegitation per WBS plan.

5. Underdrain & Outlet (Check "x" to indicate type used or describe "Other")

a) Check "x" if swale is in HSG C or D soils? [x]

[x] **Underdrain required if checked**
(Provide a 4" diameter PVC underdrain for proper drainage)

b) Outlet for flows greater than the WQ_F

- [ ] Grated Inlet
- [x] Overland Flow to Valley Gutter or Downstream Swale
- [ ] Other:

Notes & Additional Information

3.c. Manning's 5.a. Underdrains not provided due to lack of available fall to daylight the underdrains. Secondary vegetated buffer stripe were included in the design to make up for the lack of underdrains. D soils are interbedded with fluvial deposits consisting of mostly fine to medium grade sand with variable quantities of silt, clay and gravel in the upper portion of the soil profiles.

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end of worksheet

Truckee Meadows Regional Storm Water Quality Management Program
Design Guidance Worksheet: Swales TC-10

* Fill out worksheet from top to bottom

Reno Version 1.04 Released July 2012 (modified by E. T. Svetich)

Designer: C Abrams / T Magoon
Company: Stantec Consulting Inc.
Date: Saturday, December 01, 2012
Project: SouthEast Connector Phase 1
Location: City of Sparks and Washoe County Nevada

Subbasin # BS-11

Key: User Input | Calculated Result | *Italicized Font Indicates Value is Outside Recommended Range*

1. Water Quality & Design Flow Rates

a) Time of concentration (t_c) in minutes

b) Rainfall Intensities for 2, 5 and 100-year storm events (I_2, I_5, and I_{100})
(Determine using the appropriate City or County Drainage Design Manual)

c) List City or County name and Rainfall Region

d) Subbasin Area (A) in acres (43,560 ft^2 = 1 acre)
(maximum drainage area = 10 acres)

e) Runoff Coefficient of Contributing Drainage Area = C
(Determine using the appropriate City or County Drainage Design Manual)

f) Discharge Rates: Water Quality Flow = WQ_F = Q_2 (cfs)
Swale Design Flow: Q_5 (cfs)

a) t_c = 10.0 min

b) I_2 = 0.91 in/hr; I_5 = 1.33 in/hr

c) City of Reno, NOAA Atlas 14; I_{100} = 3.36 in/hr

d) A = 1.58 acres

e) C = 0.69

f) WQ_F = 0.99 cfs

WQ_F = 0.99 cfs

Design Flow Q_5 = 1.45 cfs

Q_{100} = 3.66 cfs

Designer to input selected value for Water Quality Flow

2. Swale Geometry

a) Mannings Roughness Coefficient (n)
(Use 0.25 for grass and 0.40 for mixed vegetation and rocks)

b) Swale Side Slopes (max 4H:1V or flatter)

c) Bottom Width (BW) of Trapezoidal Channel (2' minimum, 10' maximum),

d) Flow Depth (D): WQ_F depth (D_2) maximum = 3', Design Flow (Q_5) Depth = D_5
(Calculate using an external method, indicate method in notes below)

e) Minimum swale depth with 0.5 ft of freeboard

e) Minimum swale Top Width (TW) with 0.5 ft of freeboard

n = 0.40

	Left Side Slope	Right Side Slope
H:V =	4.0 :1	4.0 :1

BW = 2.0 ft

D_2 = 0.23 ft; D_5 = 0.25 ft

D_5 + 0.5' = 0.75 ft

TW = 8.00 ft

3. Swale Length, Slope & Flow Velocity

a) Length of Swale (L_s), minimum = 100'

b) Longitudinal Slope (S), 0.5% minimum, 2.5% maximum

c) Flow Velocity (V) (WQ_F velocity = V_2 , maximum = 2.0 ft/sec)
(Calculate using an external method, indicate method in notes below)

L_s = 549.0 ft

S = 1.85 %

V_2 = 1.47 ft/sec; V_5 = 1.55 ft/sec

4. Vegetation (Check "x" to indicate type used or describe "Other")
(Minimum vegetation height of 4 - 6" is recommended)

	Dryland Grass
	Irrigated Turf Grass
x	Other: Revegitation per WBS plan.

5. Underdrain & Outlet (Check "x" to indicate type used or describe "Other")

a) Check "x" if swale is in HSG C or D soils? x

b) Outlet for flows greater than the WQ_F

x **Underdrain required if checked**
(Provide a 4" diameter PVC underdrain for proper drainage)

	Grated Inlet
x	Overland Flow to Valley Gutter or Downstream Swale
	Other:

Notes & Additional Information

3.c. Manning's 5.a. Underdrains not provided due to lack of available fall to daylight the underdrains. Secondary vegetated buffer strips were included in the design to make up for the lack of underdrains. D soils are interbedded with fluvial deposits consisting of mostly fine to medium grade sand with variable quantities of silt, clay and gravel in the upper portion of the soil profiles.

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end of worksheet

Truckee Meadows Regional Storm Water Quality Management Program
Design Guidance Worksheet: Swales TC-10

* Fill out worksheet from top to bottom

Reno Version 1.04 Released July 2012 (modified by E. T. Svetich)

Designer: C Abrams / T Magoon
Company: Stantec Consulting Inc.
Date: Saturday, December 01, 2012
Project: SouthEast Connector Phase 1
Location: City of Sparks and Washoe County Nevada

Subbasin # BS-12

Key: User Input | Calculated Result | *Italicized Font Indicates Value is Outside Recommended Range*

1. Water Quality & Design Flow Rates

a) Time of concentration (t_c) in minutes — t_c = 10.0 min

b) Rainfall Intensities for 2, 5 and 100-year storm events (I_2, I_5, and I_{100}) (Determine using the appropriate City or County Drainage Design Manual) — I_2 = 0.91 in/hr; I_5 = 1.33 in/hr

c) List City or County name and Rainfall Region — City of Reno, NOAA Atlas 14; I_{100} = 3.36 in/hr

d) Subbasin Area (A) in acres (43,560 ft² = 1 acre) (maximum drainage area = 10 acres) — A = 1.24 acres

e) Runoff Coefficient of Contributing Drainage Area = C (Determine using the appropriate City or County Drainage Design Manual) — C = 0.68

f) Discharge Rates: Water Quality Flow = WQ_F = Q_2 (cfs); Swale Design Flow: Q_5 (cfs)

WQ_F = 0.77 cfs

Design Flow Q_5 = 1.12 cfs

Q_{100} = 2.83 cfs

WQ_F = 0.77 cfs — Designer to input selected value for Water Quality Flow

2. Swale Geometry

a) Mannings Roughness Coefficient (*n*) (Use 0.25 for grass and 0.40 for mixed vegetation and rocks) — *n* = 0.40

b) Swale Side Slopes (max 4H:1V or flatter) — Left Side Slope H:V = 4.0 :1; Right Side Slope H:V = 4.0 :1

c) Bottom Width (BW) of Trapezoidal Channel (2' minimum, 10' maximum), — BW = 2.0 ft

d) Flow Depth (D): WQ_F depth (D_2) maximum = 3', Design Flow (Q_5) Depth = D_5 (Calculate using an external method, indicate method in notes below) — D_2 = 0.22 ft; D_5 = 0.24 ft

e) Minimum swale depth with 0.5 ft of freeboard — D_5 + 0.5' = 0.74 ft

e) Minimum swale Top Width (TW) with 0.5 ft of freeboard — TW = 7.92 ft

3. Swale Length, Slope & Flow Velcoity

a) Length of Swale (L_s), minimum = 100' — L_s = 248.0 ft

b) Longitudinal Slope (S), 0.5% minimum, 2.5% maximum — S = 1.23 %

c) Flow Velocity (V) (WQ_F velocity = V_2 , maximum = 2.0 ft/sec) (Calculate using an external method, indicate method in notes below) — V_2 = 1.22 ft/sec; V_5 = 1.27 ft/sec

4. Vegetation (Check "x" to indicate type used or describe "Other")

(Minimum vegetation height of 4 - 6" is recommended)

	Dryland Grass
	Irrigated Turf Grass
x	Other: Revegitation per WBS plan.

5. Underdrain & Outlet (Check "x" to indicate type used or describe "Other")

a) Check "x" if swale is in HSG C or D soils? x

x — **Underdrain required if checked** (Provide a 4" diameter PVC underdrain for proper drainage)

b) Outlet for flows greater than the WQ_F

	Grated Inlet
x	Overland Flow to Valley Gutter or Downstream Swale
	Other:

Notes & Additional Information

3.c. Manning's 5.a. Underdrains not provided due to lack of available fall to daylight the underdrains. Secondary vegetated buffer stripes were included in the design to make up for the lack of underdrains. D soils are interbedded with fluvial deposits consisting of mostly fine to medium grade sand with variable quantities of silt, clay and gravel in the upper portion of the soil profiles.

Original worksheet developed by and used with the permission of the Urban Drainage and Flood Control District (UDFCD) in Denver, Colorado. The original worksheet was modified and adapted for the Truckee Meadows Regional Storm Water Quality Management Program by Kennedy/Jenks Consultants.

end of worksheet

City of Reno Storm Water Quality Management Program
Design Guidance Worksheet: Vegetated Buffer Strips TC-11

* Fill out worksheet from top to bottom

Reno Version 1.04 Released July 2012 (modified by E. T. Svetich)

Designer: C Abrams / T Magoon
Company: Stantec Consulting Inc.
Date: Saturday, December 01, 2012
Project: SouthEast Connector Phase 1
Location: City of Sparks and Washoe County Nevada

Subbasin # BS1,3,5,6

Key: User Input | Calculated Result | *Italicized Font Indicates Value is Outside Recommended Range*

1. Water Quality Flow Rate			
a) Rainfall Intensity = I (2-year storm - determine using site location and appropriate City or County drainage design manual)	a)	I = 0.9	in/hr
b) List City or County name and Rainfall Region	b)	City of Reno, NOAA Atlas 14	
c) Drainage Area = A (acres) (43,560 ft² = 1 acre) - maximum drainage area is 5 acres	c)	A = *12.89*	acres
NOTE: Drainage area exceeds 5 acres			
d) Runoff Coefficient of Contributing Drainage Area = C	d)	C = 0.75	
e) 2-Year Design Discharge = WQ_F (cfs)	e)	WQ_F = 8.8	cfs
		WQ_F = 8.8	cfs — Designer to Input selected value for Water Quality Flow
2. Drainage Area Flow			
a) Design Length (Normal to runoff flow path): $L_G = WQ_F / 0.05$		L_G = 176.0	ft
3. Design Width Along Direction of Flow			
Use method (a) OR (b) below - use only one method			
a) Sheet Flow Control Level Spreader			
i) Length of Flow Path Over Upstream Impervious Drainage Area		L_L = 980.0	ft
ii) Design Width of Buffer Strip: $W_G = 0.2 * L_L$ (8' minimum)		W_G = 196.0	ft
b) Concentrated (Non-Sheet) Flow Control Level Spreader (requires a level spreader in step 5 below)			
i) Length of Drainage Area (normal to flow) adjacent to buffer strip		L_t =	ft
ii) Design Width of Buffer: $W_G = 0.15 * A_t / L_t$ (8' minimum)		W_G =	ft
4. Design Slope (should be between 2% and 4%)		S = 0.3	%
5. Flow Distribution (Check "x" the type used or describe "Other")			
Note: If Method b was Used In Step 3, Level Spreader Will Be Checked Here			Slotted Curbing
			Modular Block Porous Pavement
			Level Spreader
		x	Other: culvert outlet
6. Vegetation (Check "x" the type used or describe "Other")			
Note: Irrigation required during the dry season for vegetated buffer strips			Irrigated Turf Grass
		x	Other: Reveg per WBS report
7. Outflow Collection (Check "x" the type used or describe "Other")			Grass Lined Swale
			Street Gutter
			Storm Sewer Inlet
			Underdrain Used
		x	Other: Steamboat Creek

Notes & Additional Information

Original worksheet developed by and used with the permission of the Urban Drainage and Flood Control District (UDFCD) in Denver, Colorado. The original worksheet was modified and adapted for the Truckee Meadows Regional Storm Water Quality Management Program by Kennedy/Jenks Consultants.

end of worksheet

City of Reno Storm Water Quality Management Program
Design Guidance Worksheet: Vegetated Buffer Strips TC-11

* Fill out worksheet from top to bottom

Reno Version 1.04 Released July 2012 (modified by E. T. Svetich)

Designer: C Abrams / T Magoon
Company: Stantec Consulting Inc.
Date: Saturday, December 01, 2012
Project: SouthEast Connector Phase 1
Location: City of Sparks and Washoe County Nevada

Subbasin # BS7,10,11,12

Key: User Input | Calculated Result | *Italicized Font Indicates Value is Outside Recommended Range*

1. Water Quality Flow Rate

a) Rainfall Intensity = I (2-year storm - determine using site location and appropriate City or County drainage design manual)

b) List City or County name and Rainfall Region

c) Drainage Area = A (acres) (43,560 ft^2 = 1 acre)
- maximum drainage area is 5 acres

NOTE: Drainage area exceeds 5 acres

d) Runoff Coefficient of Contributing Drainage Area = C

e) 2-Year Design Discharge = WQ_F (cfs)

a) I = 0.9 in/hr

b) City of Reno, NOAA Atlas 14

c) A = *6.01* acres

d) C = 0.66

e) WQ_F = 3.6 cfs

WQ_F = 3.8 cfs

Designer to Input selected value for Water Quality Flow

2. Drainage Area Flow

a) Design Length (Normal to runoff flow path): $L_G = WQ_F / 0.05$

L_G = 72.0 ft

3. Design Width Along Direction of Flow

Use method (a) OR (b) below - use only one method

a) Sheet Flow Control Level Spreader
- i) Length of Flow Path Over Upstream Impervious Drainage Area
- ii) Design Width of Buffer Strip: $W_G = 0.2 * L_L$ (8' minimum)

L_L = 975.0 ft
W_G = 195.0 ft

b) Concentrated (Non-Sheet) Flow Control Level Spreader (requires a level spreader in step 5 below)
- i) Length of Drainage Area (normal to flow) adjacent to buffer strip
- ii) Design Width of Buffer: $W_G = 0.15 * A_t / L_t$ (8' minimum)

L_t = ft
W_G = ft

4. Design Slope (should be between 2% and 4%)

S = 0.7 %

5. Flow Distribution (Check "x" the type used or describe "Other")

Note: If Method b was Used In Step 3, Level Spreader Will Be Checked Here

- [ ] Slotted Curbing
- [ ] Modular Block Porous Pavement
- [ ] Level Spreader
- [x] Other: culvert outlet

6. Vegetation (Check "x" the type used or describe "Other")

Note: Irrigation required during the dry season for vegetated buffer strips

- [ ] Irrigated Turf Grass
- [x] Other: Reveg per WBS report

7. Outflow Collection (Check "x" the type used or describe "Other")

- [ ] Grass Lined Swale
- [ ] Street Gutter
- [ ] Storm Sewer Inlet
- [ ] Underdrain Used
- [x] Other: Steamboat Creek

Notes & Additional Information

Original worksheet developed by and used with the permission of the Urban Drainage and Flood Control District (UDFCD) in Denver, Colorado. The original worksheet was modified and adapted for the Truckee Meadows Regional Storm Water Quality Management Program by Kennedy/Jenks Consultants.

end of worksheet

APPENDIX B

HYDRAULIC ANALYSES SOUTH OF THE TRUCKEE RIVER: SOUTHEAST CONNECTOR

BRIDGE DECK DRAINAGE TABLE

SOUTH/LONG SIDE

Watershed P13 / South Bound Deck

Span	Pier	Q5 (cfs)	Qtotal (cfs)	Qcapture (cfs)	Qbypass (cfs)	Depth (ft)	Spread (ft)	Q100 (cfs)	Qtotal (cfs)	Qcapture (cfs)	Qbypass (cfs)	Depth (ft)	Spread (ft)	Inlets
7 partial	6	0.13	0.13	0.12	0.01	0.09	2.68	0.36	0.36	0.29	0.07	0.14	3.92	1
6	5	0.22	0.23	0.20	0.03	0.10	2.91	0.61	0.68	0.49	0.19	0.15	4.37	1
5	4	0.17	0.20	0.18	0.02	0.10	2.76	0.47	0.66	0.48	0.18	0.15	4.32	1
4	3	0.20	0.22	0.20	0.02	0.10	2.86	0.54	0.72	0.51	0.21	0.16	4.47	1
3	2	0.24	0.26	0.23	0.03	0.11	3.05	0.66	0.87	0.59	0.28	0.17	4.80	1
2	1	0.24	0.27	0.23	0.04	0.11	3.09	0.66	0.94	0.63	0.31	0.17	4.94	1

Watershed P14 / North Bound Deck

Span	Pier	Q5 (cfs)	Qtotal (cfs)	Qcapture (cfs)	Qbypass (cfs)	Depth (ft)	Spread (ft)	Q100 (cfs)	Qtotal (cfs)	Qcapture (cfs)	Qbypass (cfs)	Depth (ft)	Spread (ft)	Inlets
7 partial	6	0.11	0.11	0.10	0.01	0.09	2.51	0.31	0.31	0.27	0.07	0.13	3.84	1
6	5	0.19	0.20	0.18	0.02	0.10	2.76	0.52	0.59	0.44	0.15	0.15	4.15	1
5	4	0.15	0.17	0.16	0.01	0.09	2.60	0.41	0.56	0.42	0.14	0.14	4.07	1
4	3	0.17	0.18	0.16	0.02	0.09	2.66	0.47	0.61	0.45	0.16	0.15	4.20	1
3	2	0.21	0.23	0.20	0.03	0.10	2.91	0.57	0.73	0.52	0.21	0.16	4.49	1
2	1	0.21	0.24	0.21	0.03	0.10	2.96	0.57	0.78	0.54	0.24	0.16	4.60	1

NORTH/SHORT SIDE

Watershed P11 / South Bound Deck

Span	Pier	Q5 (cfs)	Qtotal (cfs)	Qcapture (cfs)	Qbypass (cfs)	Depth (ft)	Spread (ft)	Q100 (cfs)	Qtotal (cfs)	Qcapture (cfs)	Qbypass (cfs)	Depth (ft)	Spread (ft)	Inlets
7 partial	7	0.05	0.05	0.05	0.00	0.08	2.35	0.13	0.13	0.12	0.01	0.12	3.37	1
8	8	0.20	0.20	0.20	0.00	0.10	2.75	0.53	0.54	0.54	0.00	0.14	3.99	2
10	Abut 2*	0.47	0.47	0.47	0.00	0.10	2.88	1.25	1.25	1.25	0.00	0.15	4.16	3

Watershed P12 / North Bound Deck

Span	Pier	Q5 (cfs)	Qtotal (cfs)	Qcapture (cfs)	Qbypass (cfs)	Depth (ft)	Spread (ft)	Q100 (cfs)	Qtotal (cfs)	Qcapture (cfs)	Qbypass (cfs)	Depth (ft)	Spread (ft)	Inlets
7 partial	7	0.05	0.05	0.07	0.00	0.08	2.35	0.14	0.14	0.13	0.01	0.12	3.46	1
8	8	0.21	0.21	0.21	0.00	0.10	2.80	0.57	0.58	0.58	0.00	0.14	4.10	2
10	Abut 2*	0.51	0.51	0.51	0.00	0.10	2.97	1.35	1.35	1.35	0.00	0.15	4.28	3

*Flow will be collected north of the abutment just south of the Greg Street/Southeast Connector/Sparks Boulevard Intersection. Use NDOT Type 2 Drop inlet. One grate is 3-ft x 2-ft. (Grates at all other locations are 3-ft x 1.5-ft curved vane.)

Worksheet for Pier1-WSP13-GrateOnGrade-5yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.27	ft³/s
Slope		0.00680	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency	86.41	%
Intercepted Flow	0.23	ft³/s
Bypass Flow	0.04	ft³/s
Spread	3.09	ft
Depth	0.11	ft
Flow Area	0.17	ft²
Gutter Depression	0.00	ft
Total Depression	0.00	ft
Velocity	1.61	ft/s
Splash Over Velocity	5.14	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.20	
Grate Flow Ratio	0.83	
Active Grate Length	1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier1-WSP13-GrateOnGrade-100yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.94	ft³/s
Slope		0.00680	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		66.73	%
Intercepted Flow		0.63	ft³/s
Bypass Flow		0.31	ft³/s
Spread		4.94	ft
Depth		0.17	ft
Flow Area		0.43	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		2.20	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.13	
Grate Flow Ratio		0.62	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier1-WSP14-GrateOnGrade-5yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.24	ft³/s
Slope		0.00680	ft/ft
Gutter Width		2.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		88.03	%
Intercepted Flow		0.21	ft³/s
Bypass Flow		0.03	ft³/s
Spread		2.96	ft
Depth		0.10	ft
Flow Area		0.15	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		1.57	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.21	
Grate Flow Ratio		0.85	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier1-WSP14-GrateOnGrade-100yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.78	ft³/s
Slope		0.00680	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		69.80	%
Intercepted Flow		0.54	ft³/s
Bypass Flow		0.24	ft³/s
Spread		4.60	ft
Depth		0.16	ft
Flow Area		0.37	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		2.10	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.13	
Grate Flow Ratio		0.65	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier2-WSP13-GrateOnGrade-5yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.26	ft³/s
Slope		0.00680	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		86.94	%
Intercepted Flow		0.23	ft³/s
Bypass Flow		0.03	ft³/s
Spread		3.05	ft
Depth		0.11	ft
Flow Area		0.16	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		1.60	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.20	
Grate Flow Ratio		0.84	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier2-WSP13-GrateOnGrade-100yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.87	ft³/s
Slope		0.00680	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		68.01	%
Intercepted Flow		0.59	ft³/s
Bypass Flow		0.28	ft³/s
Spread		4.80	ft
Depth		0.17	ft
Flow Area		0.40	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		2.16	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.13	
Grate Flow Ratio		0.63	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier2-WSP14-GrateOnGrade-5yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.23	ft³/s
Slope		0.00680	ft/ft
Gutter Width		2.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		88.60	%
Intercepted Flow		0.20	ft³/s
Bypass Flow		0.03	ft³/s
Spread		2.91	ft
Depth		0.10	ft
Flow Area		0.15	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		1.55	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.21	
Grate Flow Ratio		0.86	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier2-WSP14-GrateOnGrade-100yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.73	ft³/s
Slope		0.00680	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		70.89	%
Intercepted Flow		0.52	ft³/s
Bypass Flow		0.21	ft³/s
Spread		4.49	ft
Depth		0.16	ft
Flow Area		0.35	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		2.07	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.14	
Grate Flow Ratio		0.66	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier3-WSP13-GrateOnGrade-5yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.22	ft³/s
Slope		0.00680	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		89.18	%
Intercepted Flow		0.20	ft³/s
Bypass Flow		0.02	ft³/s
Spread		2.86	ft
Depth		0.10	ft
Flow Area		0.14	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		1.53	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.22	
Grate Flow Ratio		0.86	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier3-WSP13-GrateOnGrade-100yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.72	ft³/s
Slope		0.00680	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		71.12	%
Intercepted Flow		0.51	ft³/s
Bypass Flow		0.21	ft³/s
Spread		4.47	ft
Depth		0.16	ft
Flow Area		0.35	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		2.06	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.14	
Grate Flow Ratio		0.66	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier3-WSP14-GrateOnGrade-5yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.18	ft³/s
Slope		0.00680	ft/ft
Gutter Width		2.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		91.66	%
Intercepted Flow		0.16	ft³/s
Bypass Flow		0.02	ft³/s
Spread		2.66	ft
Depth		0.09	ft
Flow Area		0.12	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		1.46	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.23	
Grate Flow Ratio		0.89	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier3-WSP14-GrateOnGrade-100yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.61	ft³/s
Slope		0.00680	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		73.83	%
Intercepted Flow		0.45	ft³/s
Bypass Flow		0.16	ft³/s
Spread		4.20	ft
Depth		0.15	ft
Flow Area		0.31	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		1.98	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.15	
Grate Flow Ratio		0.69	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier4-WSP13-GrateOnGrade-5yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.20	ft³/s
Slope		0.00680	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		90.39	%
Intercepted Flow		0.18	ft³/s
Bypass Flow		0.02	ft³/s
Spread		2.76	ft
Depth		0.10	ft
Flow Area		0.13	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		1.50	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.22	
Grate Flow Ratio		0.88	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier4-WSP13-GrateOnGrade-100yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.66	ft³/s
Slope		0.00680	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		72.54	%
Intercepted Flow		0.48	ft³/s
Bypass Flow		0.18	ft³/s
Spread		4.32	ft
Depth		0.15	ft
Flow Area		0.33	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		2.02	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.14	
Grate Flow Ratio		0.68	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier4-WSP14-GrateOnGrade-5yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.17	ft³/s
Slope		0.00680	ft/ft
Gutter Width		2.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		92.32	%
Intercepted Flow		0.16	ft³/s
Bypass Flow		0.01	ft³/s
Spread		2.60	ft
Depth		0.09	ft
Flow Area		0.12	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		1.44	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.24	
Grate Flow Ratio		0.90	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier4-WSP14-GrateOnGrade-100yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.56	ft³/s
Slope		0.00680	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		75.22	%
Intercepted Flow		0.42	ft³/s
Bypass Flow		0.14	ft³/s
Spread		4.07	ft
Depth		0.14	ft
Flow Area		0.29	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		1.94	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.15	
Grate Flow Ratio		0.71	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier5-WSP13-GrateOnGrade-5yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.23	ft³/s
Slope		0.00680	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		88.60	%
Intercepted Flow		0.20	ft³/s
Bypass Flow		0.03	ft³/s
Spread		2.91	ft
Depth		0.10	ft
Flow Area		0.15	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		1.55	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.21	
Grate Flow Ratio		0.86	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier5-WSP13-GrateOnGrade-100yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.68	ft³/s
Slope		0.00680	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		72.05	%
Intercepted Flow		0.49	ft³/s
Bypass Flow		0.19	ft³/s
Spread		4.37	ft
Depth		0.15	ft
Flow Area		0.33	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		2.03	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.14	
Grate Flow Ratio		0.67	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier5-WSP14-GrateOnGrade-5yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.20	ft³/s
Slope		0.00680	ft/ft
Gutter Width		2.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		90.39	%
Intercepted Flow		0.18	ft³/s
Bypass Flow		0.02	ft³/s
Spread		2.76	ft
Depth		0.10	ft
Flow Area		0.13	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		1.50	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.22	
Grate Flow Ratio		0.88	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier5-WSP14-GrateOnGrade-100yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.59	ft³/s
Slope		0.00680	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		74.37	%
Intercepted Flow		0.44	ft³/s
Bypass Flow		0.15	ft³/s
Spread		4.15	ft
Depth		0.15	ft
Flow Area		0.30	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		1.96	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.15	
Grate Flow Ratio		0.70	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier6-WSP13-GrateOnGrade-5yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.13	ft³/s
Slope		0.00340	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		92.83	%
Intercepted Flow		0.12	ft³/s
Bypass Flow		0.01	ft³/s
Spread		2.68	ft
Depth		0.09	ft
Flow Area		0.13	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		1.04	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.36	
Grate Flow Ratio		0.89	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier6-WSP13-GrateOnGrade-100yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.36	ft³/s
Slope		0.00340	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency	79.57	%
Intercepted Flow	0.29	ft³/s
Bypass Flow	0.07	ft³/s
Spread	3.92	ft
Depth	0.14	ft
Flow Area	0.27	ft²
Gutter Depression	0.00	ft
Total Depression	0.00	ft
Velocity	1.34	ft/s
Splash Over Velocity	5.14	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.26	
Grate Flow Ratio	0.72	
Active Grate Length	1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier6-WSP14-GrateOnGrade-5yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.11	ft³/s
Slope		0.00340	ft/ft
Gutter Width		2.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		94.46	%
Intercepted Flow		0.10	ft³/s
Bypass Flow		0.01	ft³/s
Spread		2.51	ft
Depth		0.09	ft
Flow Area		0.11	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		0.99	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.37	
Grate Flow Ratio		0.91	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier6-WSP14-GrateOnGrade-100yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.31	ft³/s
Slope		0.00340	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		81.79	%
Intercepted Flow		0.25	ft³/s
Bypass Flow		0.06	ft³/s
Spread		3.71	ft
Depth		0.13	ft
Flow Area		0.24	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		1.29	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.27	
Grate Flow Ratio		0.75	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier7-WSP11-GrateOnGrade-5yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.05	ft³/s
Slope		0.00100	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		97.74	%
Intercepted Flow		0.05	ft³/s
Bypass Flow		0.00	ft³/s
Spread		2.35	ft
Depth		0.08	ft
Flow Area		0.10	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		0.52	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.66	
Grate Flow Ratio		0.93	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier7-WSP11-GrateOnGrade-100yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.13	ft³/s
Slope		0.00100	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		90.87	%
Intercepted Flow		0.12	ft³/s
Bypass Flow		0.01	ft³/s
Spread		3.37	ft
Depth		0.12	ft
Flow Area		0.20	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		0.65	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.56	
Grate Flow Ratio		0.79	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier7-WSP12-GrateOnGrade-5yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.05	ft³/s
Slope		0.00100	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		97.74	%
Intercepted Flow		0.05	ft³/s
Bypass Flow		0.00	ft³/s
Spread		2.35	ft
Depth		0.08	ft
Flow Area		0.10	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		0.52	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.66	
Grate Flow Ratio		0.93	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier7-WSP12-GrateOnGrade-100yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.14	ft³/s
Slope		0.00100	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		90.14	%
Intercepted Flow		0.13	ft³/s
Bypass Flow		0.01	ft³/s
Spread		3.46	ft
Depth		0.12	ft
Flow Area		0.21	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		0.67	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.55	
Grate Flow Ratio		0.78	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier8-WSP11-GrateOnGrade-5yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.20	ft³/s
Slope		0.00700	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		90.51	%
Intercepted Flow		0.18	ft³/s
Bypass Flow		0.02	ft³/s
Spread		2.75	ft
Depth		0.10	ft
Flow Area		0.13	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		1.51	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.22	
Grate Flow Ratio		0.88	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier8-WSP11-GrateOnGrade-100yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.54	ft³/s
Slope		0.00700	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		75.95	%
Intercepted Flow		0.41	ft³/s
Bypass Flow		0.13	ft³/s
Spread		3.99	ft
Depth		0.14	ft
Flow Area		0.28	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		1.94	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.15	
Grate Flow Ratio		0.72	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier8-WSP12-GrateOnGrade-5yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.21	ft³/s
Slope		0.00700	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		89.90	%
Intercepted Flow		0.19	ft³/s
Bypass Flow		0.02	ft³/s
Spread		2.80	ft
Depth		0.10	ft
Flow Area		0.14	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		1.53	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.22	
Grate Flow Ratio		0.87	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pier8-WSP12-GrateOnGrade-100yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.58	ft³/s
Slope		0.00700	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		74.79	%
Intercepted Flow		0.43	ft³/s
Bypass Flow		0.15	ft³/s
Spread		4.10	ft
Depth		0.14	ft
Flow Area		0.29	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		1.97	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.15	
Grate Flow Ratio		0.70	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Abut2-WSP11-GrateOnGrade-5yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.47	ft³/s
Slope		0.03000	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		86.89	%
Intercepted Flow		0.41	ft³/s
Bypass Flow		0.06	ft³/s
Spread		2.88	ft
Depth		0.10	ft
Flow Area		0.15	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		3.23	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.07	
Grate Flow Ratio		0.86	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Abut2-WSP11-GrateOnGrade-100yr

Project Description

Solve For	Efficiency

Input Data

Discharge		1.25	ft³/s
Slope		0.03000	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		71.05	%
Intercepted Flow		0.89	ft³/s
Bypass Flow		0.36	ft³/s
Spread		4.16	ft
Depth		0.15	ft
Flow Area		0.30	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		4.13	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.04	
Grate Flow Ratio		0.70	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Abut2-WSP12-GrateOnGrade-5yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.51	ft³/s
Slope		0.03000	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		2.00	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		95.27	%
Intercepted Flow		0.49	ft³/s
Bypass Flow		0.02	ft³/s
Spread		2.97	ft
Depth		0.10	ft
Flow Area		0.15	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		3.30	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.06	
Grate Flow Ratio		0.95	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Abut2-WSP12-GrateOnGrade-100yr

Project Description

Solve For	Efficiency

Input Data

Discharge		1.35	ft³/s
Slope		0.03000	ft/ft
Gutter Width		8.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Grate Width		2.00	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		82.18	%
Intercepted Flow		1.11	ft³/s
Bypass Flow		0.24	ft³/s
Spread		4.28	ft
Depth		0.15	ft
Flow Area		0.32	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		4.21	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.04	
Grate Flow Ratio		0.81	
Active Grate Length		1.50	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

HYDRAULIC ANALYSES SOUTH OF THE TRUCKEE RIVER: SOUTHEAST CONNECTOR

CHANNEL TABLE: 5-YEAR EVENT

Name	Contributing Areas	Q5 (cfs)	Slope (ft/ft)	Side Slopes (H:V)	Bottom Width (ft)	Q Depth (ft)	Velocity (ft/s)	Riprap	Riprap Depth (in)
Bioswale 1	SB Abut 1, P16, 75%P17	1.68	0.0300	4:1	2	0.44	2.17	Class 150	12
Bioswale 1	SB Abut 1, P16, 75%P17	1.68	0.0493	4:1	2	0.23	2.50	Class 150	12
Bioswale 2	P34, 33%P32, P15	8.76	0.0030	4:1	12	0.53	1.17	NONE	NONE
Bioswale 2	P34, 33%P32, P15	8.76	0.0030	4:1	25	0.35	0.95	NONE	NONE
Bioswale 3	P20, P21, 25%P17	2.23	0.0030	4:1	2	0.54	0.99	NONE	NONE
Bioswale 3	P20, P21, 25%P17	2.23	0.0100	4:1	2	0.40	1.55	NONE	NONE
Bioswale 4	67%P32, P35	11.57	0.0030	4:1	25	0.41	1.06	NONE	NONE
Bioswale 5	Bridge Deck (34.4%P11&12)	0.51	0.0181	4:1	4	0.11	1.04	NONE	NONE
Bioswale 5	Bridge Deck (34.4% P11&12)	0.51	0.0119	4:1	4	0.13	0.87	NONE	NONE
Bioswale 5	Bridge Deck (34%P11&12, P13, P14)	3.12	0.0030	4:1	4	0.50	1.04	NONE	NONE
Bioswale 5	Bridge Deck, 75%P18, P19	4.54	0.0024	4:1	6	0.55	1.01	NONE	NONE
Bioswale 6	25%P18, P22, P23	2.12	0.0077	4:1	2	0.42	1.37	NONE	NONE
Bioswale 7	P26, P27	0.97	0.0064	4:1	2	0.30	1.01	NONE	NONE
Bioswale 8	50%P33, P36	0.52	0.0030	4:1	2	0.26	0.66	NONE	NONE
Bioswale 9	50%P33, P37	0.55	0.0030	4:1	2	0.27	0.66	NONE	NONE
Bioswale 10	P29, P31	1.02	0.0041	4:1	2	0.34	0.89	NONE	NONE
Bioswale 11	P28, P30	1.16	0.0030	4:1	2	0.39	0.84	NONE	NONE
Bioswale 11	P28, P30	1.16	0.0185	4:1	2	0.25	1.55	NONE	NONE
Bioswale 12	P24, P25	0.9	0.0062	4:1	2	0.29	0.98	NONE	NONE
Bioswale 12	P24, P25	0.9	0.0251	4:1	2	0.20	1.61	NONE	NONE
Bridge Splash Swales	Bridge Deck	0.23 Max	0.0030	2:1	2	0.18	0.54	NONE	NONE
CWW Bridge NE	50%P22	0.49	0.2500	3:1	4	0.05	2.36	Class 150	12
CWW Bridge NW	15%P21	0.14	0.2500	3:1	4	0.03	1.14	Class 150	12
CWW Bridge SW	40%P25	0.18	0.2500	3:1	4	0.03	1.47	Class 150	12
CWW Bridge SE	40%P26	0.18	0.2500	3:1	4	0.03	1.47	Class 150	12
Box 282+50 to NVMB	All WS S of TRB high point, N CWW	29.04	0.0025	10:1	18	0.45	2.87	NONE	NONE
Box 282+50 to NVMB	All WS S of TRB high point, N CWW	29.04	0.0146	10:1	18	0.44	2.95	NONE	NONE
Box 262+25 to SVMB	All WS S of CWW	5.12	0.0025	10:1	24.67	0.14	1.40	NONE	NONE
Box 262+25 to SVMB	All WS S of CWW	5.12	0.0306	10:1	24.67	0.11	1.81	NONE	NONE

HYDRAULIC ANALYSES SOUTH OF THE TRUCKEE RIVER: SOUTHEAST CONNECTOR

CHANNEL TABLE: 100-YEAR EVENT

Name	Contributing Areas	Q100 (cfs)	Slope (ft/ft)	Side Slopes (H:V)	Bottom Width (ft)	Q Depth (ft)	Velocity (ft/s)	Riprap	Riprap Depth (in)
Bioswale 1	SB Abut 1, P16, 75%P17	4.98	0.0300	4:1	2	0.65	2.95	Class 150	12
Bioswale 1	SB Abut 1, P16, 75%P17	4.98	0.0493	4:1	2	0.40	3.46	Class 150	12
Bioswale 2	P34, 33%P32, P15	36.94	0.0030	4:1	12	1.17	1.89	NONE	NONE
Bioswale 2	P34, 33%P32, P15	36.94	0.0030	4:1	25	0.81	1.61	NONE	NONE
Bioswale 3	P20, P21, 25%P17	7.07	0.0030	4:1	2	0.92	1.35	NONE	NONE
Bioswale 3	P20, P21, 25%P17	7.07	0.0100	4:1	2	0.70	2.10	NONE	NONE
Bioswale 4	67%P32, P35	48.92	0.0030	4:1	25	0.95	1.79	NONE	NONE
Bioswale 5	Bridge Deck (34.4%P11&12)	1.35	0.0181	4:1	4	0.20	1.41	NONE	NONE
Bioswale 5	Bridge Deck (34.4% P11&12)	1.35	0.0119	4:1	4	0.22	1.26	NONE	NONE
Bioswale 5	Bridge Deck (34%P11&12, P13, P14)	8.49	0.0030	4:1	4	0.84	1.37	NONE	NONE
Bioswale 5	Bridge Deck, 75%P18, P19	13.24	0.0024	4:1	6	0.96	1.40	NONE	NONE
Bioswale 6	25%P18, P22, P23	6.52	0.0077	4:1	2	0.72	1.86	NONE	NONE
Bioswale 7	P26, P27	3.36	0.0064	4:1	2	0.55	1.45	NONE	NONE
Bioswale 8	50%P33, P36	2.15	0.0030	4:1	2	0.53	0.98	NONE	NONE
Bioswale 9	50%P33, P37	2.3	0.0030	4:1	2	0.55	1.00	NONE	NONE
Bioswale 10	P29, P31	3.38	0.0041	4:1	2	0.61	1.25	NONE	NONE
Bioswale 11	P28, P30	3.65	0.0030	4:1	2	0.68	1.14	NONE	NONE
Bioswale 11	P28, P30	3.65	0.0185	4:1	2	0.44	2.21	NONE	NONE
Bioswale 12	P24, P25	2.94	0.0062	4:1	2	0.52	1.39	NONE	NONE
Bioswale 12	P24, P25	2.94	0.0251	4:1	2	0.37	2.28	NONE	NONE
Bridge Splash Swales	Bridge Deck	0.63 Max	0.0030	2:1	2	0.31	0.78	NONE	NONE
CWW Bridge NE	50%P22	1.31	0.2500	3:1	4	0.09	3.41	Class 150	12
CWW Bridge NW	15%P21	0.39	0.2500	3:1	4	0.05	1.88	Class 150	12
CWW Bridge SW	40%P25	0.48	0.2500	3:1	4	0.05	2.31	Class 150	12
CWW Bridge SE	40%P26	0.48	0.2500	3:1	4	0.05	2.31	Class 150	12
Box 282+50 to NVMB	All WS S of TRB high point, N CWW	111.03	0.0025	10:1	18	0.92	4.44	NONE	NONE
Box 282+50 to NVMB	All WS S of TRB high point, N CWW	111.03	0.0146	10:1	18	0.90	4.57	NONE	NONE
Box 262+25 to SVMB	All WS S of CWW	17.78	0.0025	10:1	24.67	0.29	2.22	NONE	NONE
Box 262+25 to SVMB	All WS S of CWW	17.78	0.0306	10:1	24.67	0.23	2.87	NONE	NONE

HYDRAULIC ANALYSES SOUTH OF THE TRUCKEE RIVER: SOUTHEAST CONNECTOR

CULVERT TABLE: 5-YEAR EVENT

Location	Contributing Areas	Q5 (cfs)	Length (ft)	Slope (ft/ft)	Shape	Size (ft)	Q Depth (ft)	Velocity (ft/s)	Riprap	Riprap Depth (in)	IE Up	IE Down
282+50 Path Culvert	P15, P32, P34, P35	20.32	36	0.0025	Circular	2- 24" RCP	1.58	3.95	Class 150	12	4384.84	4384.75
282+50 Box Culvert	Abut1, P15-17, P20, P21, P32, P34, P35	24.56	147	0.0020	Box	8'x12' RCB	4.31	0.53	Class 150	12	4384.68	4384.39
268+25 Path Culvert	P33, P36, P37	1.06	42	0.0026	Circular	18" RCP	0.94	0.99	Class 150	12	4385.40	4385.29
268+25 Box Culvert	P24, P25, P28, P30, P33, P36, P37	3.13	182	0.0025	Box	2 - 8'x12' RCB	4.03	0.03	Class 150	12	4385.20	4384.75

CULVERT TABLE: 100-YEAR EVENT

Location	Contributing Areas	Q100 (cfs)	Length (ft)	Slope (ft/ft)	Shape	Size (ft)	Q Depth (ft)	Velocity (ft/s)	Riprap	Riprap Depth (in)	IE Up	IE Down
282+50 Path Culvert	P15, P32, P34, P35	85.86	36	0.0025	Circular	2- 24" RCP	2.00	8.88	Class 150	12	4384.84	4384.75
282+50 Box Culvert	Abut1, P15-17, P20, P21, P32, P34, P35	97.20	147	0.0020	Box	8'x12' RCB	4.63	1.88	Class 150	12	4384.68	4384.39
268+25 Path Culvert	P33, P36, P37	4.45	42	0.0026	Circular	18" RCP	1.13	3.15	Class 150	12	4385.40	4385.29
268+25 Box Culvert	P24, P25, P28, P30, P33, P36, P37	11.04	182	0.0025	Box	2 - 8'x12' RCB	4.09	0.13	Class 150	12	4385.20	4384.75

HYDRAULIC ANALYSES SOUTH OF THE TRUCKEE RIVER: SOUTHEAST CONNECTOR

INLET TABLE: 5-YEAR EVENT

Location	Contributing Areas	Rim Elev	IE Out	Shape	Q (cfs)	Q Total (cfs)	Q Captured (cfs)	Q Bypass (cfs)	Depth (ft)	Spread (ft)
286+03	Portion of P18, P14Abutment1	± 4402.0	4399.99	4-R CB	0.60	0.60	0.54	0.06	0.12	3.41
283+58	Portion of P18	± 4399.0	4396.96	4-R CB	0.30	0.36	0.35	0.01	0.10	2.81
282+52	Portion of P18	± 4398.0	4393.63	4-R CB	0.13	0.14	0.14	0.00	0.09	2.56
280+87	Portion of P18	± 4397.5	4395.58	4-R CB	0.20	0.20	0.20	0.00	0.03	2.14

INLET TABLE: 100-YEAR EVENT

Location	Contributing Areas	Rim Elev	IE Out	Shape	Q (cfs)	Q Total (cfs)	Q Captured (cfs)	Q Bypass (cfs)	Depth (ft)	Spread (ft)
286+03	Portion of P18, P14Abutment1	± 4402.0	4399.99	4-R CB	1.77	1.77	1.26	0.51	0.18	5.11
283+58	Portion of P18	± 4399.0	4396.96	4-R CB	0.80	1.31	1.01	0.30	0.16	4.57
282+52	Portion of P18	± 4398.0	4393.63	4-R CB	0.35	0.65	0.57	0.08	0.16	4.55
280+87	Portion of P18	± 4397.5	4395.58	4-R CB	0.53	0.61	0.61	0.00	0.03	2.99

HYDRAULIC ANALYSES SOUTH OF THE TRUCKEE RIVER: SOUTHEAST CONNECTOR

STORM DRAIN TABLE: 5-YEAR EVENT

Location	Contributing Areas	Q5 (cfs)	Length (ft)	Slope (ft/ft)	Shape	Size (ft)	Q Depth (ft)	Velocity (ft/s)
286+03	Portion of P18, P14Abutment1	0.54	60	0.0417	Circular	12" RCP	0.19	5.15
283+58	Portion of P18	0.35	115	0.0050MIN	Circular	12" RCP	0.26	2.13
282+52	Portion of P18	0.14	43	0.0050MIN	Circular	12" RCP	0.16	1.71
280+87	Portion of P18	0.20	167	0.0050MIN	Circular	12" RCP	0.19	1.91

STORM DRAIN TABLE: 100-YEAR EVENT

Location	Contributing Areas	Q100 (cfs)	Length (ft)	Slope (ft/ft)	Shape	Size (ft)	Q Depth (ft)	Velocity (ft/s)
286+03	Portion of P18, P14Abutment1	1.26	60	0.0417	Circular	12" RCP	0.28	6.92
283+58	Portion of P18	1.01	115	0.0050MIN	Circular	12" RCP	0.44	3.01
282+52	Portion of P18	0.57	43	0.0050MIN	Circular	12" RCP	0.33	2.52
280+87	Portion of P18	0.61	167	0.0050MIN	Circular	12" RCP	0.34	2.57

HYDRAULIC ANALYSES SOUTH OF THE TRUCKEE RIVER: SOUTHEAST CONNECTOR

RIP RAP SIZE CALCULATION WORKSHEET

SECTION #	Velocity (ft/s)	Slope (ft/ft)	D50 (ft)	D50 (in)	Class	Depth (in)
Bioswale 1	2.95	0.0300	0.07	0.81	150	12
Bioswale 1	3.46	0.4930	0.24	2.90	150	12
Box Outlet 282+50	1.88	0.0025	0.01	0.14	150	12
Pipe Outlet 282+50	8.88	0.0020	0.24	2.94	150	12
Box Outlet 268+25	0.13	0.0025	0.00	0.00	150	12
Pipe Outlet 268+25	3.15	0.0026	0.03	0.40	150	12
CWW Bridge NE	3.41	0.2500	0.19	2.24	150	12
CWW Bridge NW	1.88	0.2500	0.06	0.68	150	12
CWW Bridge SW	2.31	0.2500	0.09	1.03	150	12
CWW Bridge SE	2.31	0.2500	0.09	1.03	150	12

200.07.04 LOOSE RIPRAP GRADING AND QUALITY REQUIREMENTS BY SIZE. Loose stone for riprap designated by size shall conform to the requirements of Tables 200.07.04-I and 200.07.04-II.

TABLE 200.07.04-I

Percentage by Mass Passing Sieve	Sieve Size (Inches)					
	Class 150	Class 300	Class 400	Class 550	Class 700	Class 900
100	10	20	30	40	48	60
70 – 85	9	18	27	36	45	54
30 – 50	6	12	18	24	30	36
5 – 15	2	5	7	12	18	24
0	1	2	3	6	8	12
D_{50} (1)	6	12	16	22	28	35

1. Mean Stone Size

Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 24 2012

Bioswale 1 (5year)

Trapezoidal

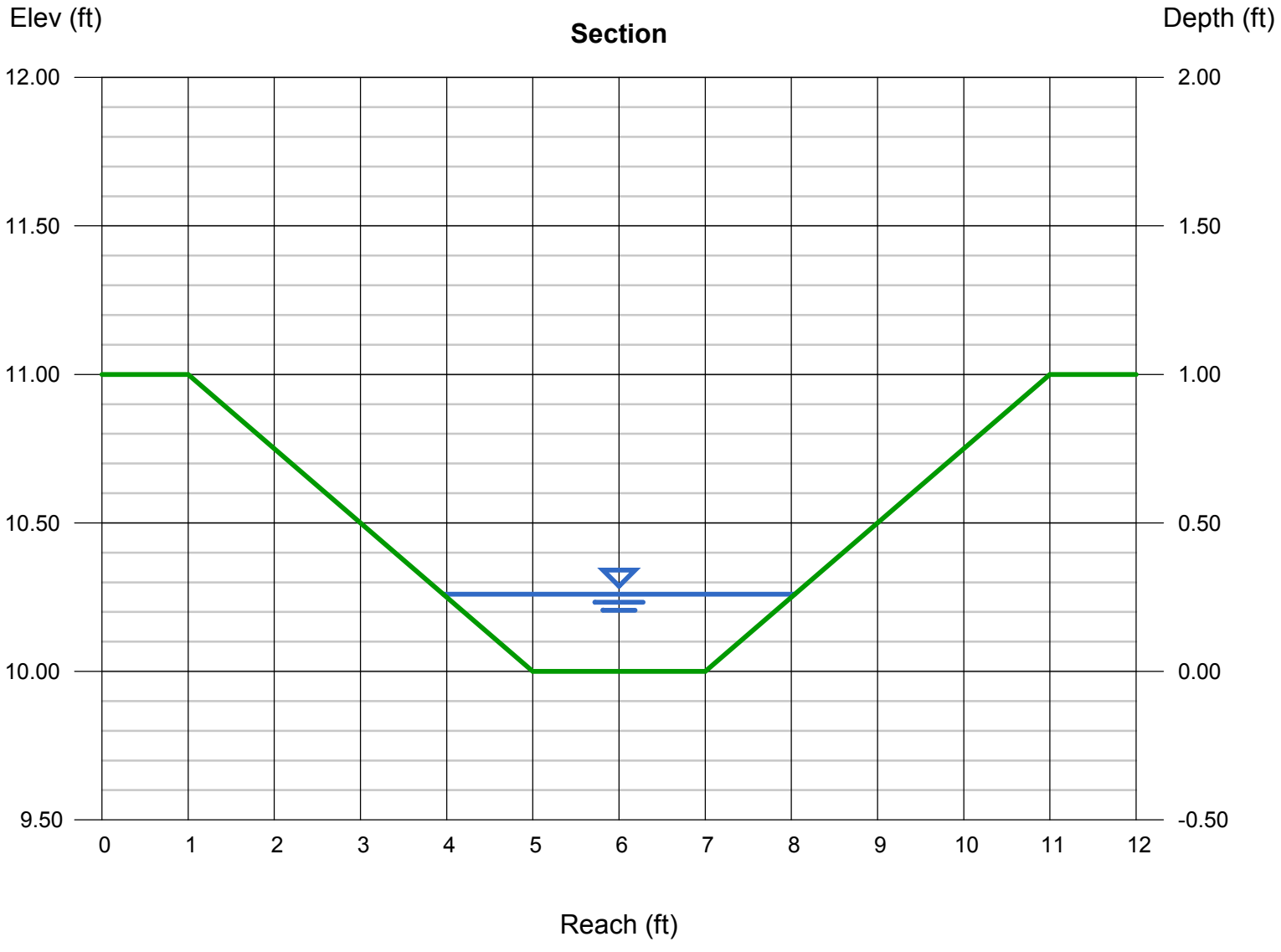
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 3.00
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.68

Highlighted

Depth (ft)	= 0.26
Q (cfs)	= 1.680
Area (sqft)	= 0.79
Velocity (ft/s)	= 2.13
Wetted Perim (ft)	= 4.14
Crit Depth, Yc (ft)	= 0.24
Top Width (ft)	= 4.08
EGL (ft)	= 0.33



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 24 2012

Bioswale 1 (5year) 2

Trapezoidal

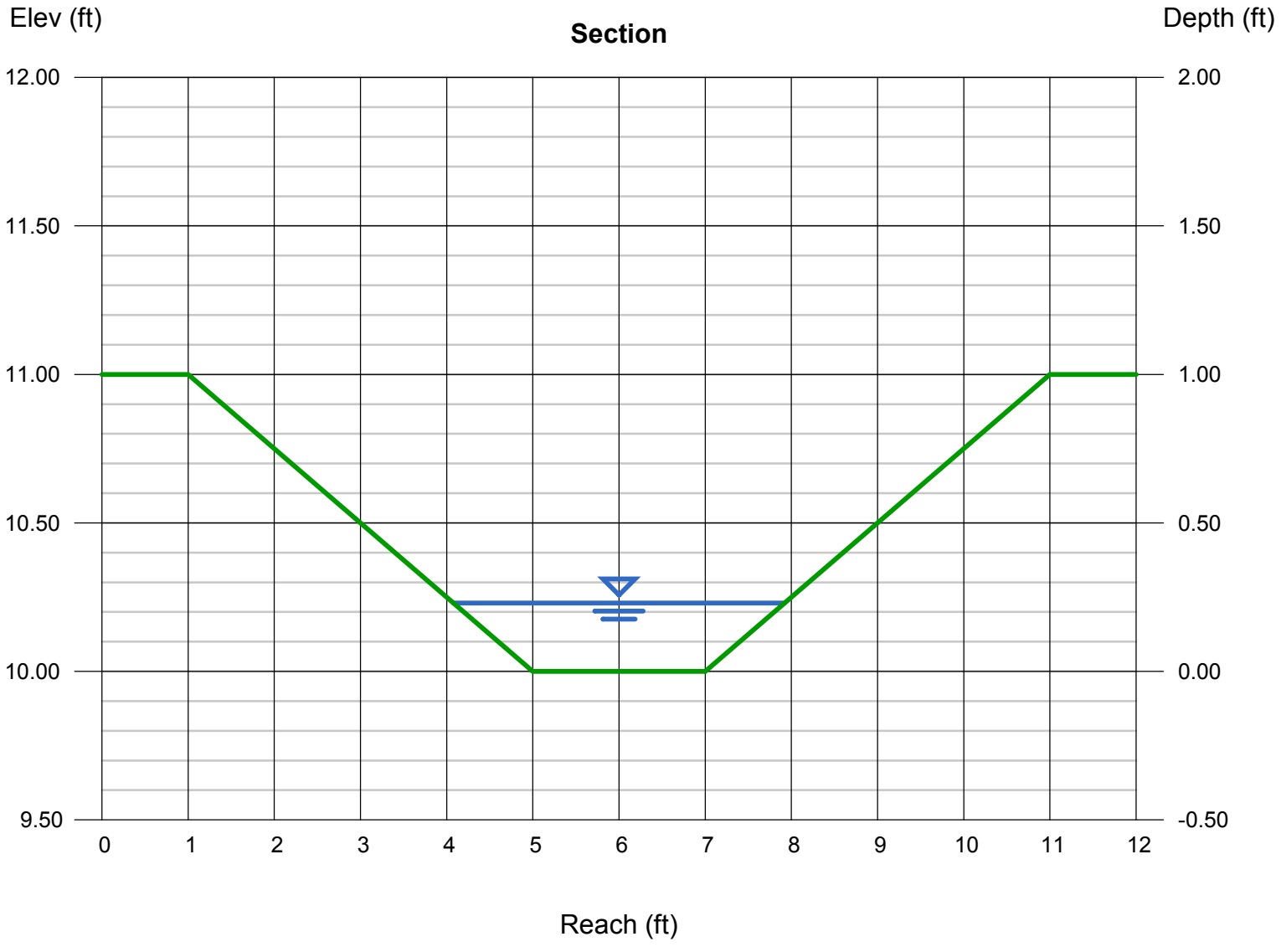
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 4.93
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.68

Highlighted

Depth (ft)	= 0.23
Q (cfs)	= 1.680
Area (sqft)	= 0.67
Velocity (ft/s)	= 2.50
Wetted Perim (ft)	= 3.90
Crit Depth, Yc (ft)	= 0.24
Top Width (ft)	= 3.84
EGL (ft)	= 0.33



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 24 2012

Bioswale 1 (100year)

Trapezoidal

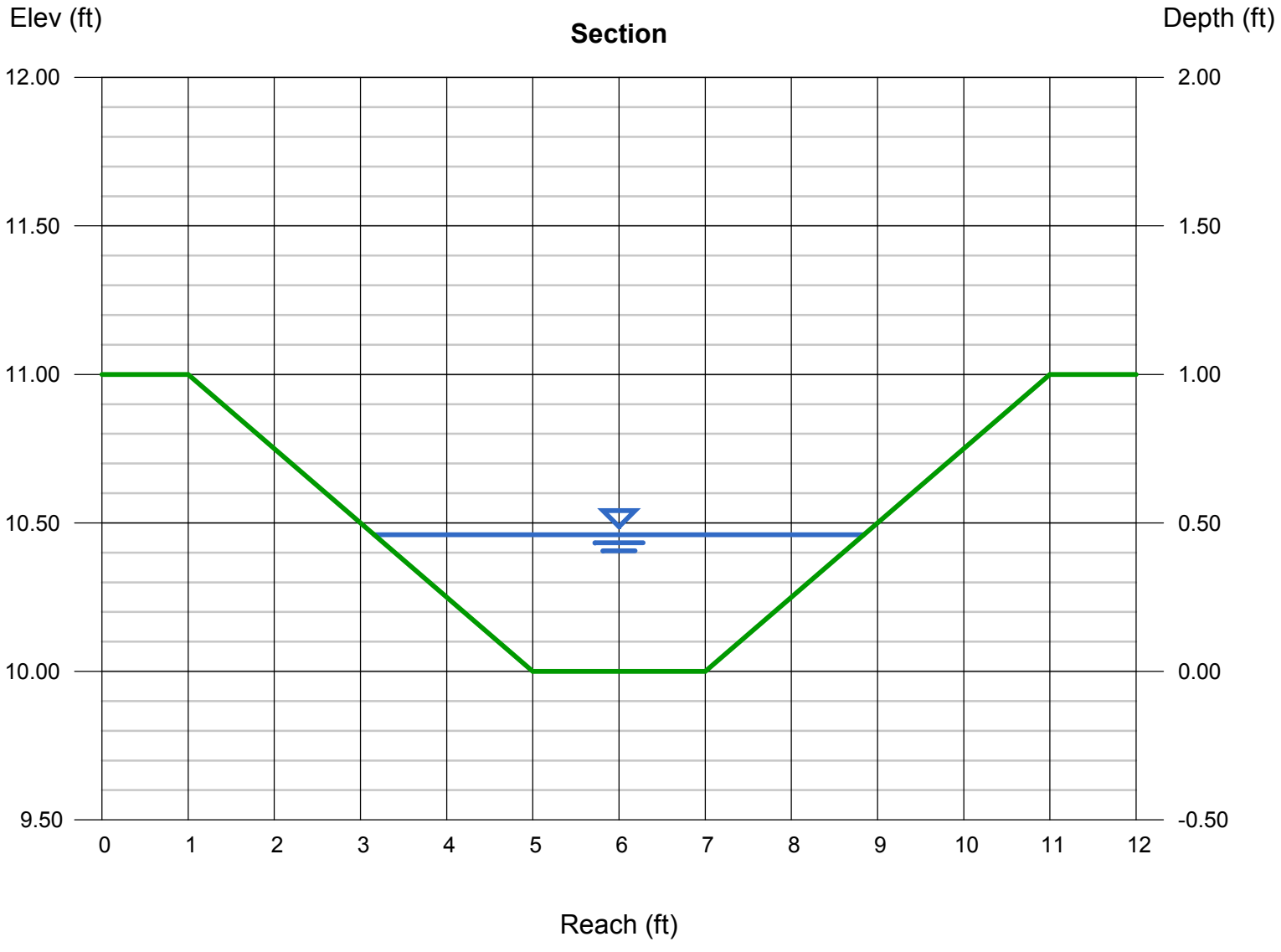
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 3.00
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 4.98

Highlighted

Depth (ft)	= 0.46
Q (cfs)	= 4.980
Area (sqft)	= 1.77
Velocity (ft/s)	= 2.82
Wetted Perim (ft)	= 5.79
Crit Depth, Yc (ft)	= 0.44
Top Width (ft)	= 5.68
EGL (ft)	= 0.58



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 24 2012

Bioswale 1 (100year) 2

Trapezoidal

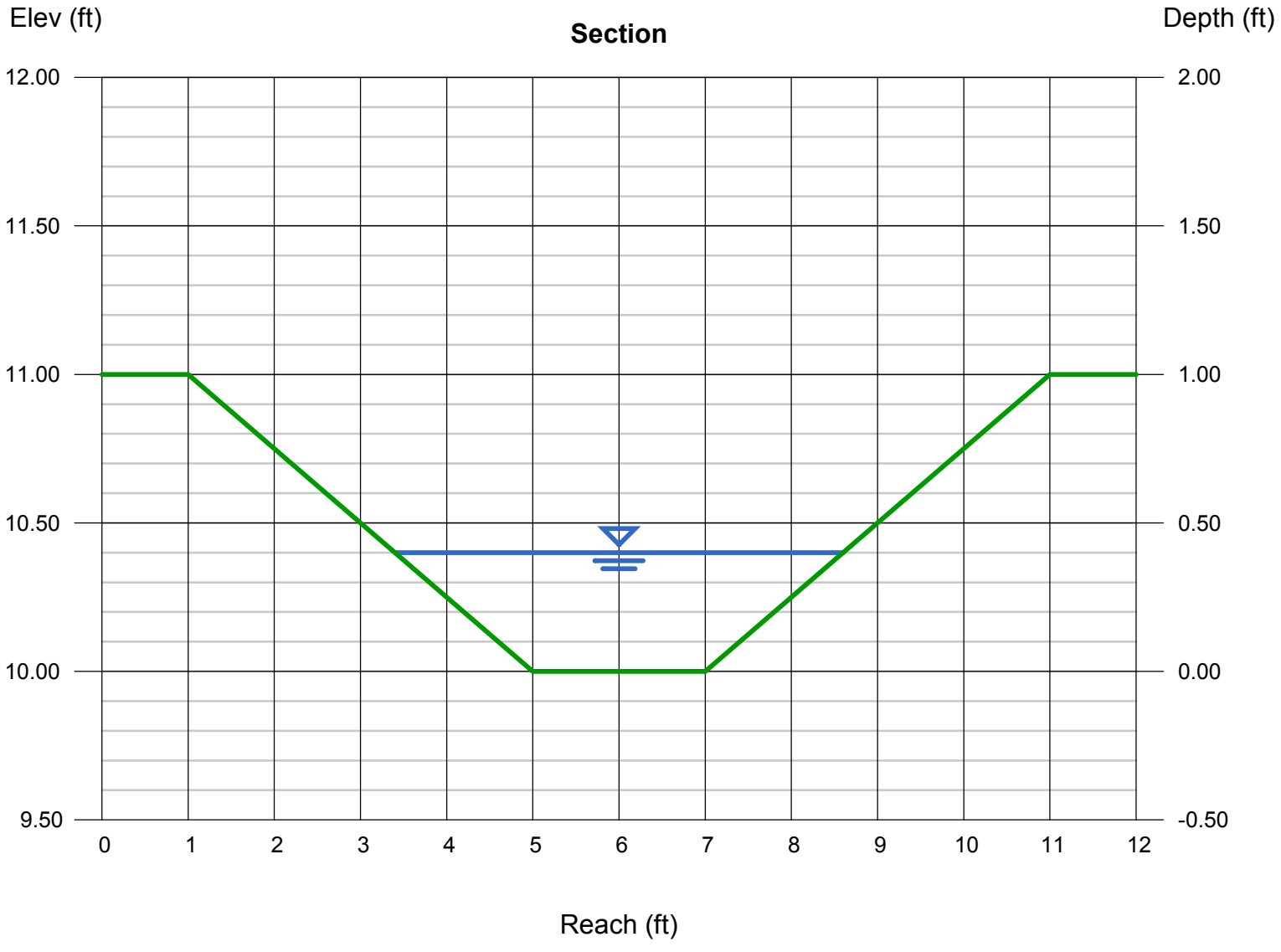
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 4.93
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 4.98

Highlighted

Depth (ft)	= 0.40
Q (cfs)	= 4.980
Area (sqft)	= 1.44
Velocity (ft/s)	= 3.46
Wetted Perim (ft)	= 5.30
Crit Depth, Yc (ft)	= 0.44
Top Width (ft)	= 5.20
EGL (ft)	= 0.59



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Bioswale 2 (5year)

Trapezoidal

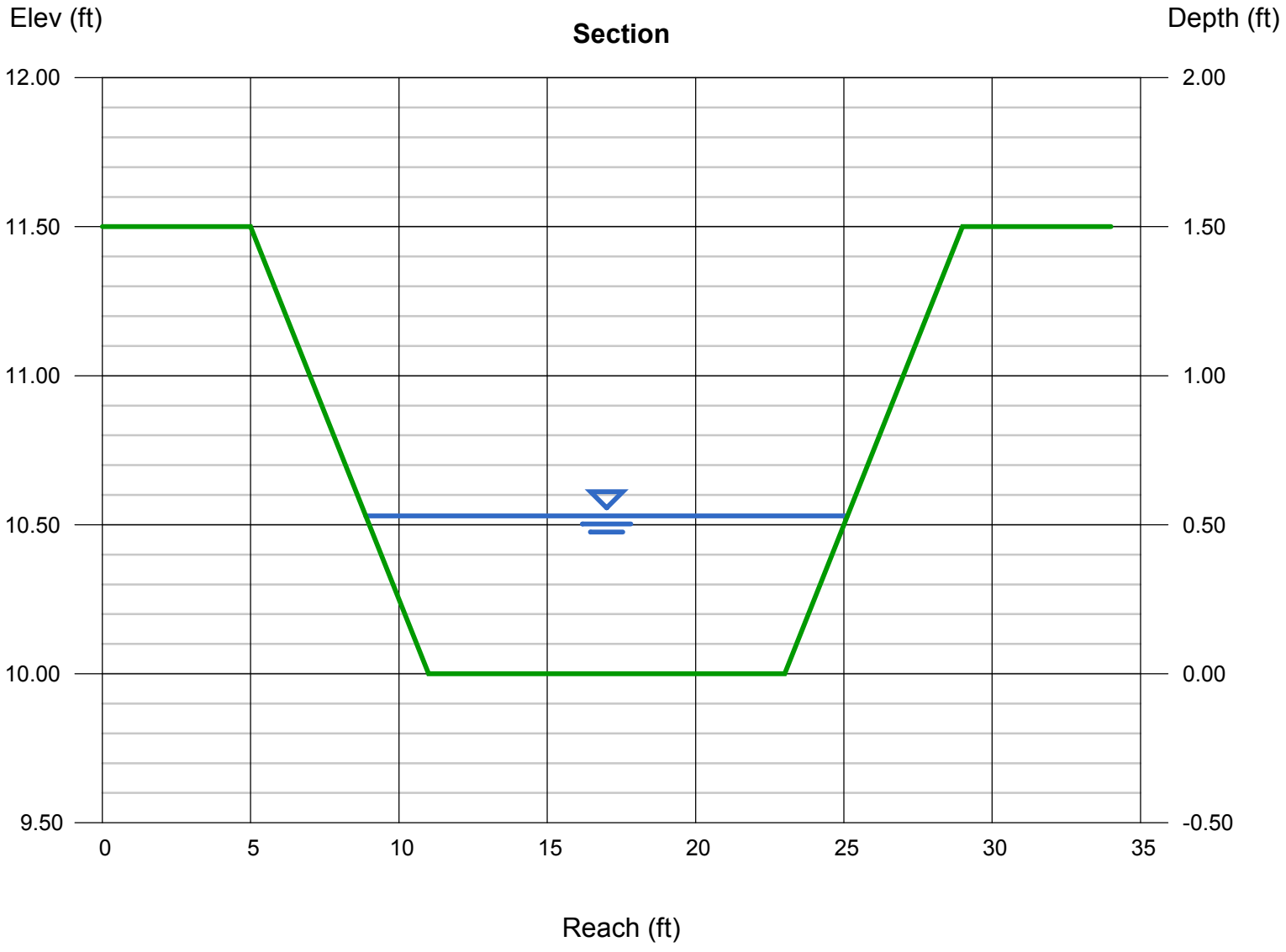
Bottom Width (ft)	= 12.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.50
Invert Elev (ft)	= 10.00
Slope (%)	= 0.30
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 8.76

Highlighted

Depth (ft)	= 0.53
Q (cfs)	= 8.760
Area (sqft)	= 7.48
Velocity (ft/s)	= 1.17
Wetted Perim (ft)	= 16.37
Crit Depth, Yc (ft)	= 0.25
Top Width (ft)	= 16.24
EGL (ft)	= 0.55



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Bioswale 2 (5year) 2

Trapezoidal

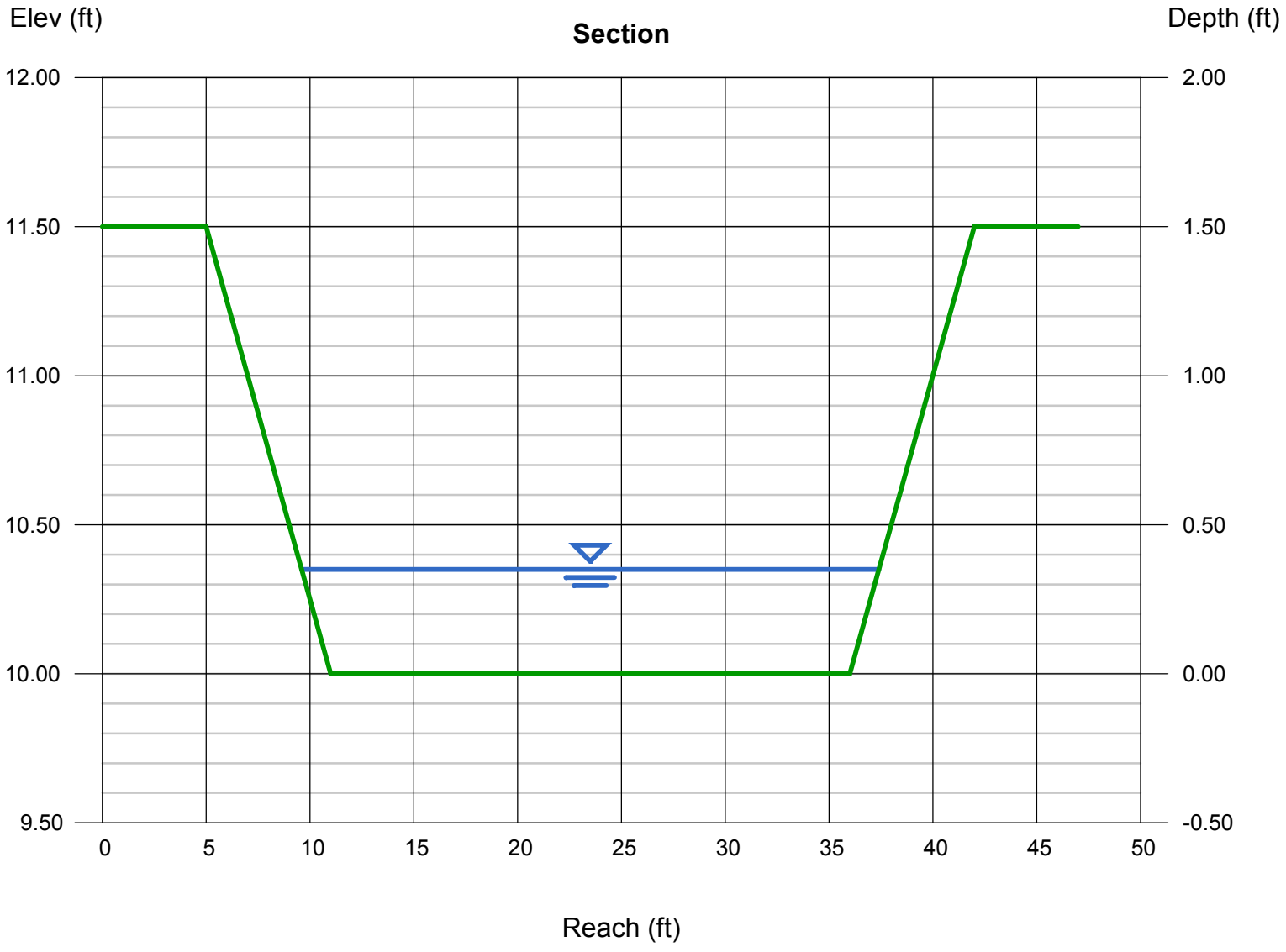
Bottom Width (ft)	= 25.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.50
Invert Elev (ft)	= 10.00
Slope (%)	= 0.30
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 8.76

Highlighted

Depth (ft)	= 0.35
Q (cfs)	= 8.760
Area (sqft)	= 9.24
Velocity (ft/s)	= 0.95
Wetted Perim (ft)	= 27.89
Crit Depth, Yc (ft)	= 0.16
Top Width (ft)	= 27.80
EGL (ft)	= 0.36



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Bioswale 2 (100year)

Trapezoidal

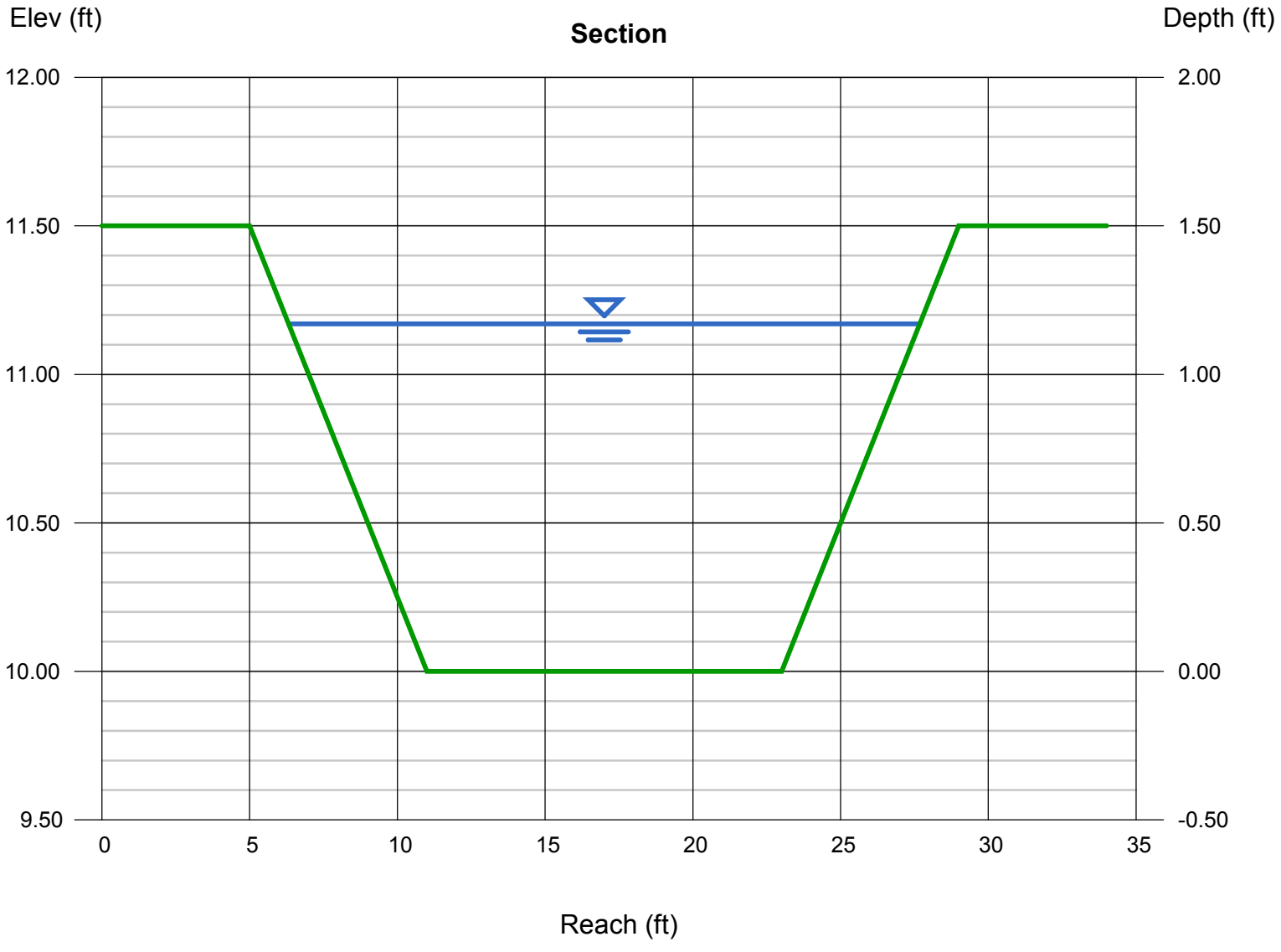
Bottom Width (ft)	= 12.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.50
Invert Elev (ft)	= 10.00
Slope (%)	= 0.30
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 36.94

Highlighted

Depth (ft)	= 1.17
Q (cfs)	= 36.94
Area (sqft)	= 19.52
Velocity (ft/s)	= 1.89
Wetted Perim (ft)	= 21.65
Crit Depth, Yc (ft)	= 0.62
Top Width (ft)	= 21.36
EGL (ft)	= 1.23



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Bioswale 2 (100year) 2

Trapezoidal

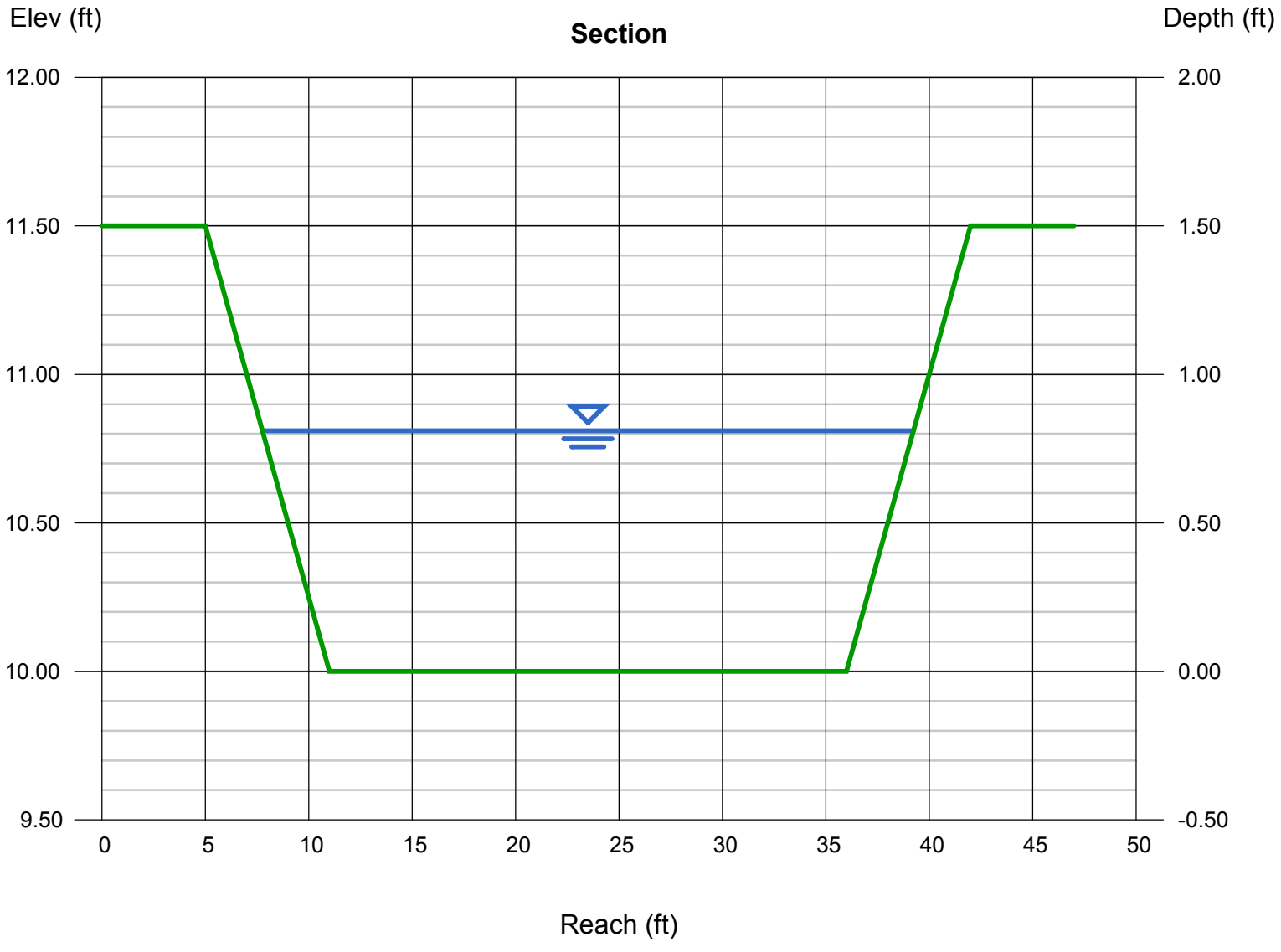
Bottom Width (ft)	= 25.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.50
Invert Elev (ft)	= 10.00
Slope (%)	= 0.30
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 36.94

Highlighted

Depth (ft)	= 0.81
Q (cfs)	= 36.94
Area (sqft)	= 22.87
Velocity (ft/s)	= 1.61
Wetted Perim (ft)	= 31.68
Crit Depth, Yc (ft)	= 0.40
Top Width (ft)	= 31.48
EGL (ft)	= 0.85



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Bioswale 3 (5year)

Trapezoidal

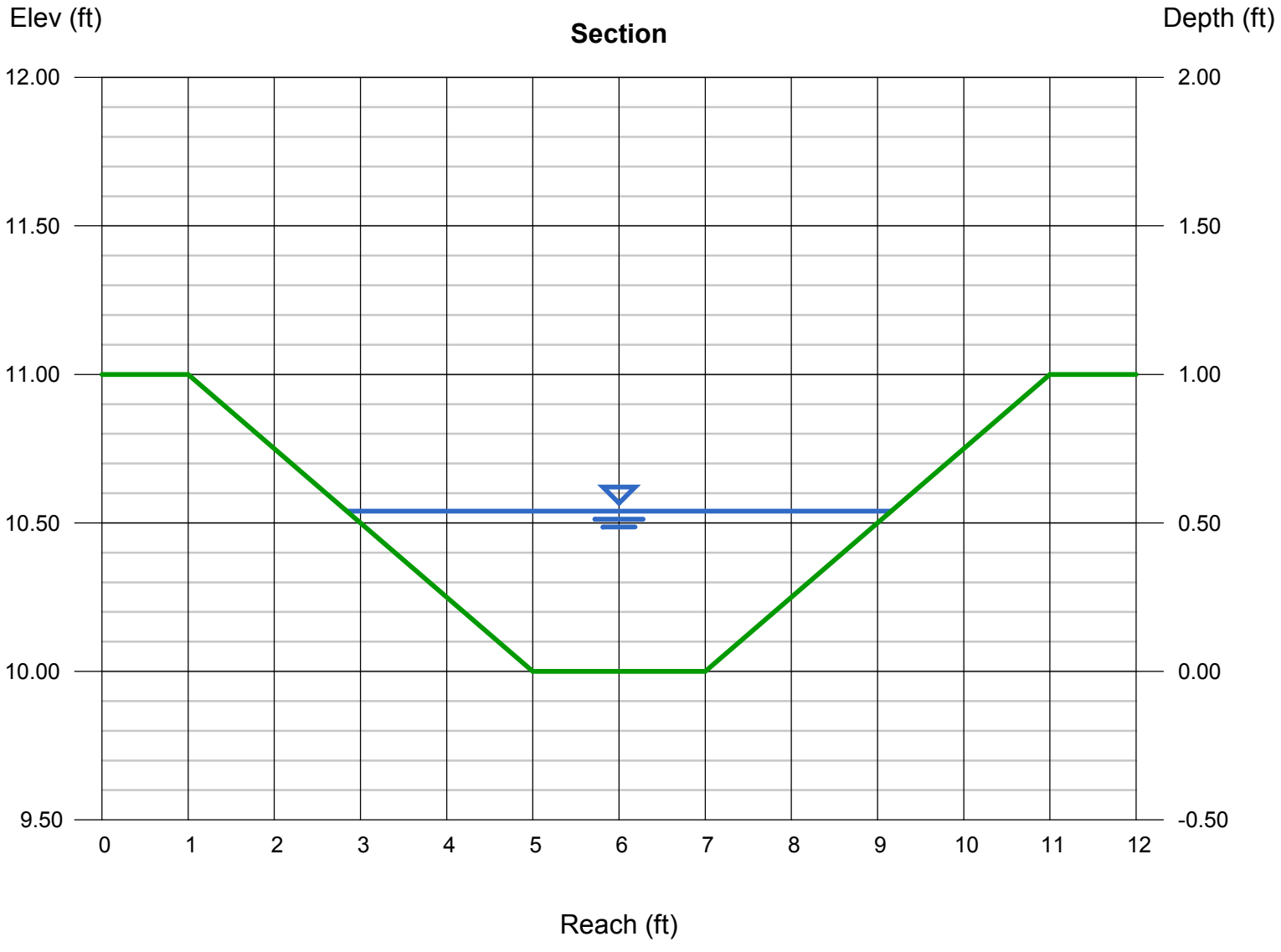
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 0.30
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 2.23

Highlighted

Depth (ft)	= 0.54
Q (cfs)	= 2.230
Area (sqft)	= 2.25
Velocity (ft/s)	= 0.99
Wetted Perim (ft)	= 6.45
Crit Depth, Yc (ft)	= 0.28
Top Width (ft)	= 6.32
EGL (ft)	= 0.56



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 24 2012

Bioswale 3 (5year) 2

Trapezoidal

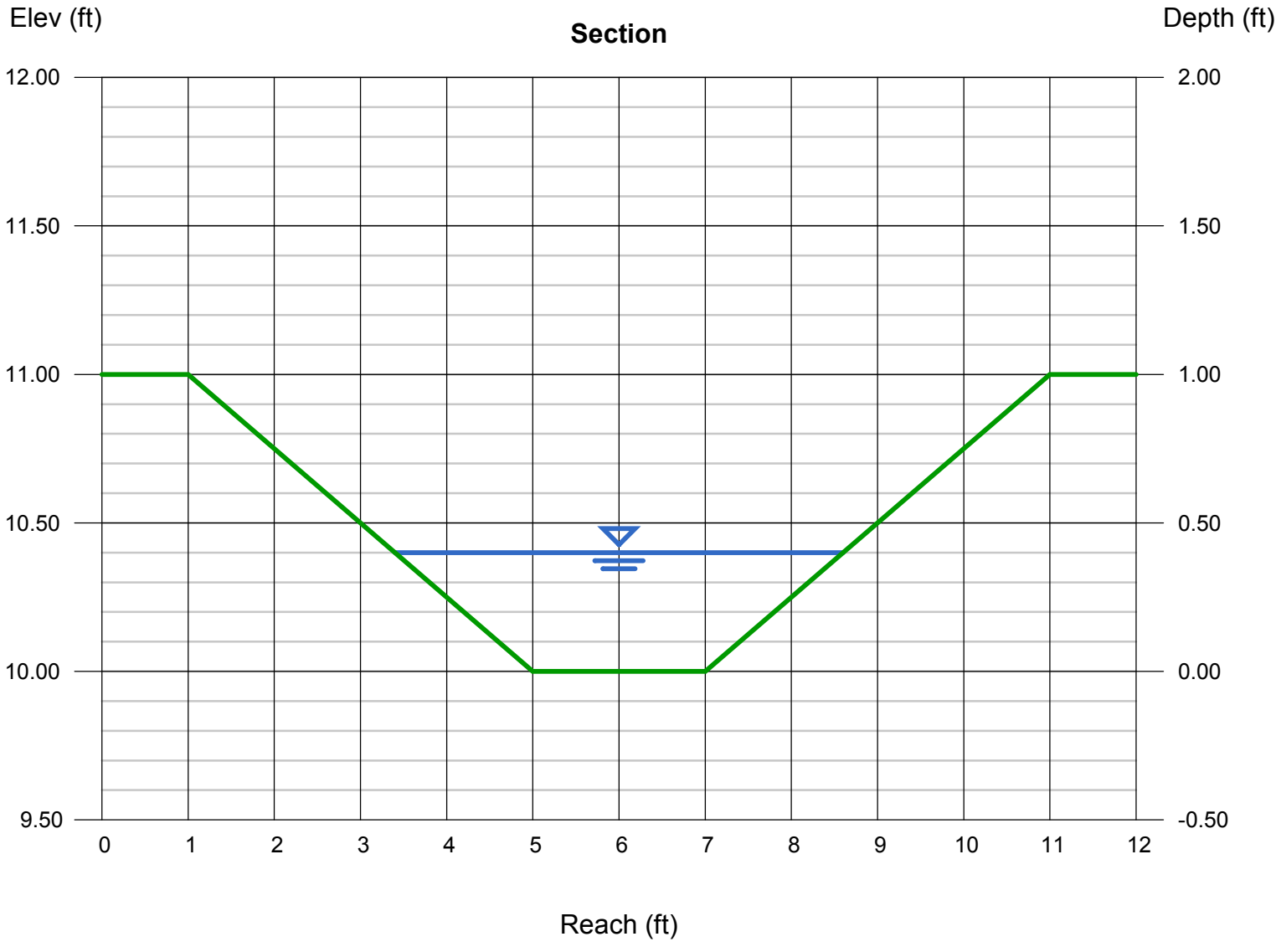
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 1.00
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 2.23

Highlighted

Depth (ft)	= 0.40
Q (cfs)	= 2.230
Area (sqft)	= 1.44
Velocity (ft/s)	= 1.55
Wetted Perim (ft)	= 5.30
Crit Depth, Yc (ft)	= 0.28
Top Width (ft)	= 5.20
EGL (ft)	= 0.44



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Bioswale 3 (100year)

Trapezoidal

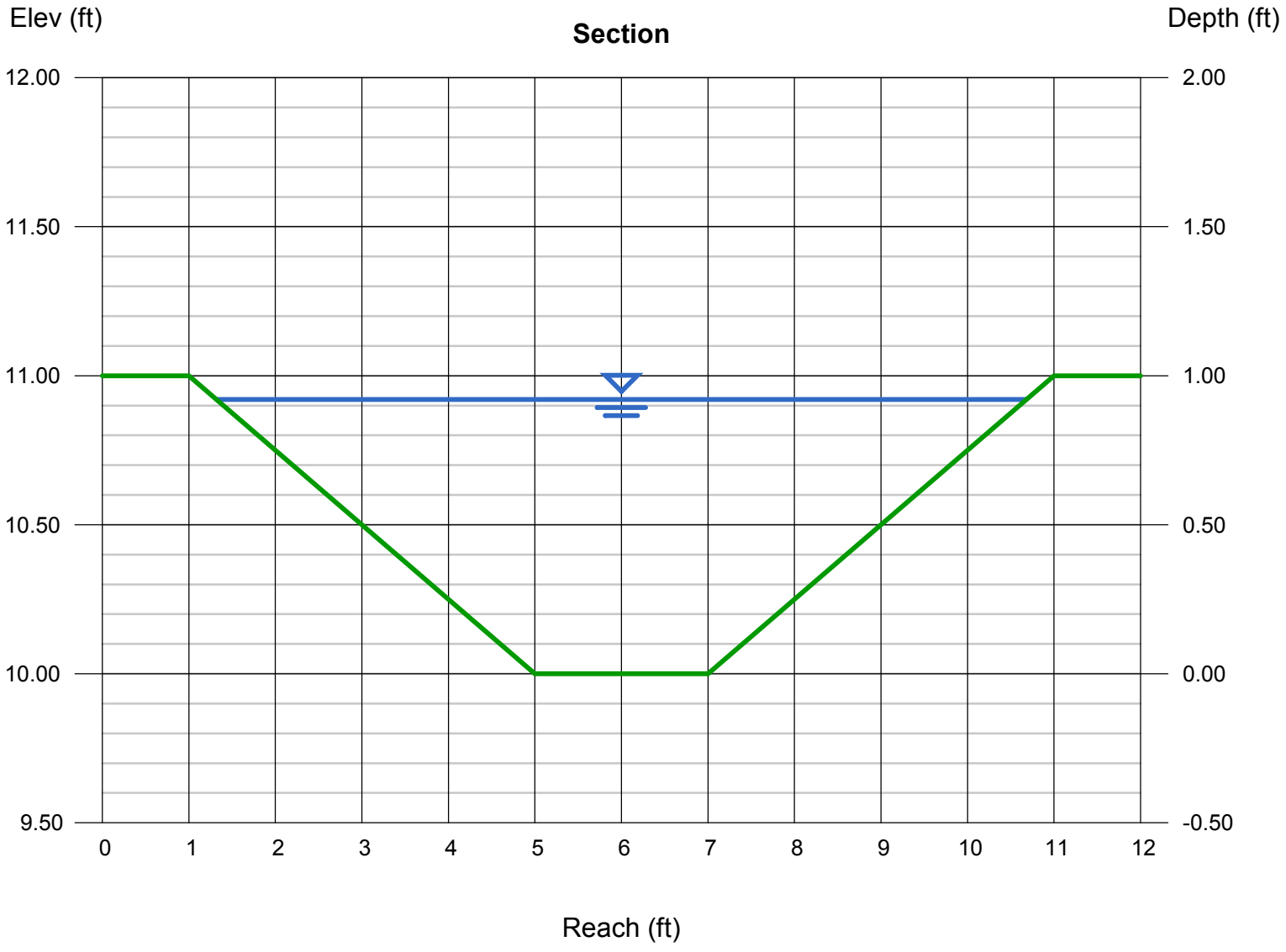
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 0.30
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 7.07

Highlighted

Depth (ft)	= 0.92
Q (cfs)	= 7.070
Area (sqft)	= 5.23
Velocity (ft/s)	= 1.35
Wetted Perim (ft)	= 9.59
Crit Depth, Yc (ft)	= 0.53
Top Width (ft)	= 9.36
EGL (ft)	= 0.95



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 24 2012

Bioswale 3 (100year) 2

Trapezoidal

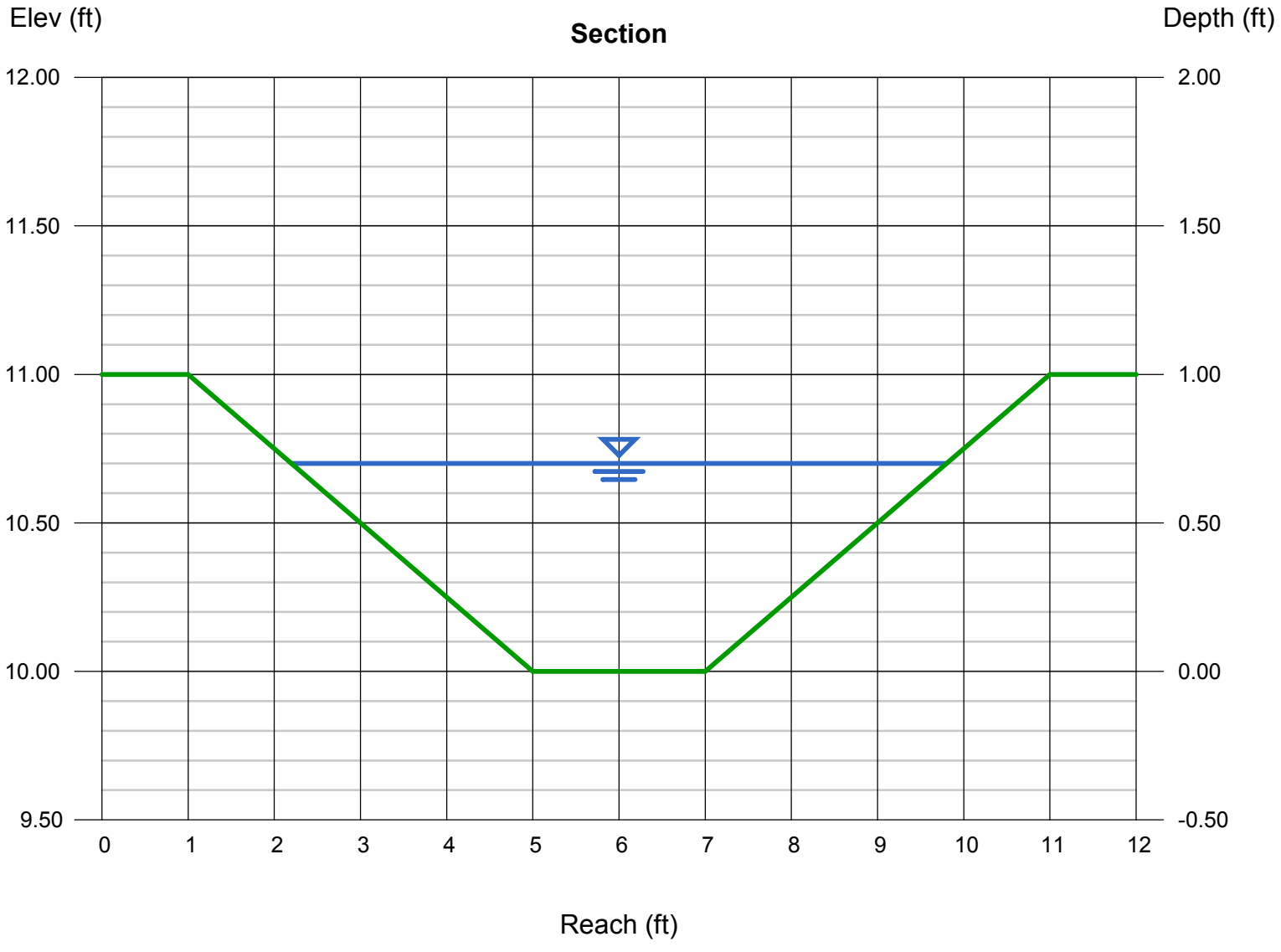
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 1.00
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 7.07

Highlighted

Depth (ft)	= 0.70
Q (cfs)	= 7.070
Area (sqft)	= 3.36
Velocity (ft/s)	= 2.10
Wetted Perim (ft)	= 7.77
Crit Depth, Yc (ft)	= 0.53
Top Width (ft)	= 7.60
EGL (ft)	= 0.77



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Bioswale 4 (5year)

Trapezoidal

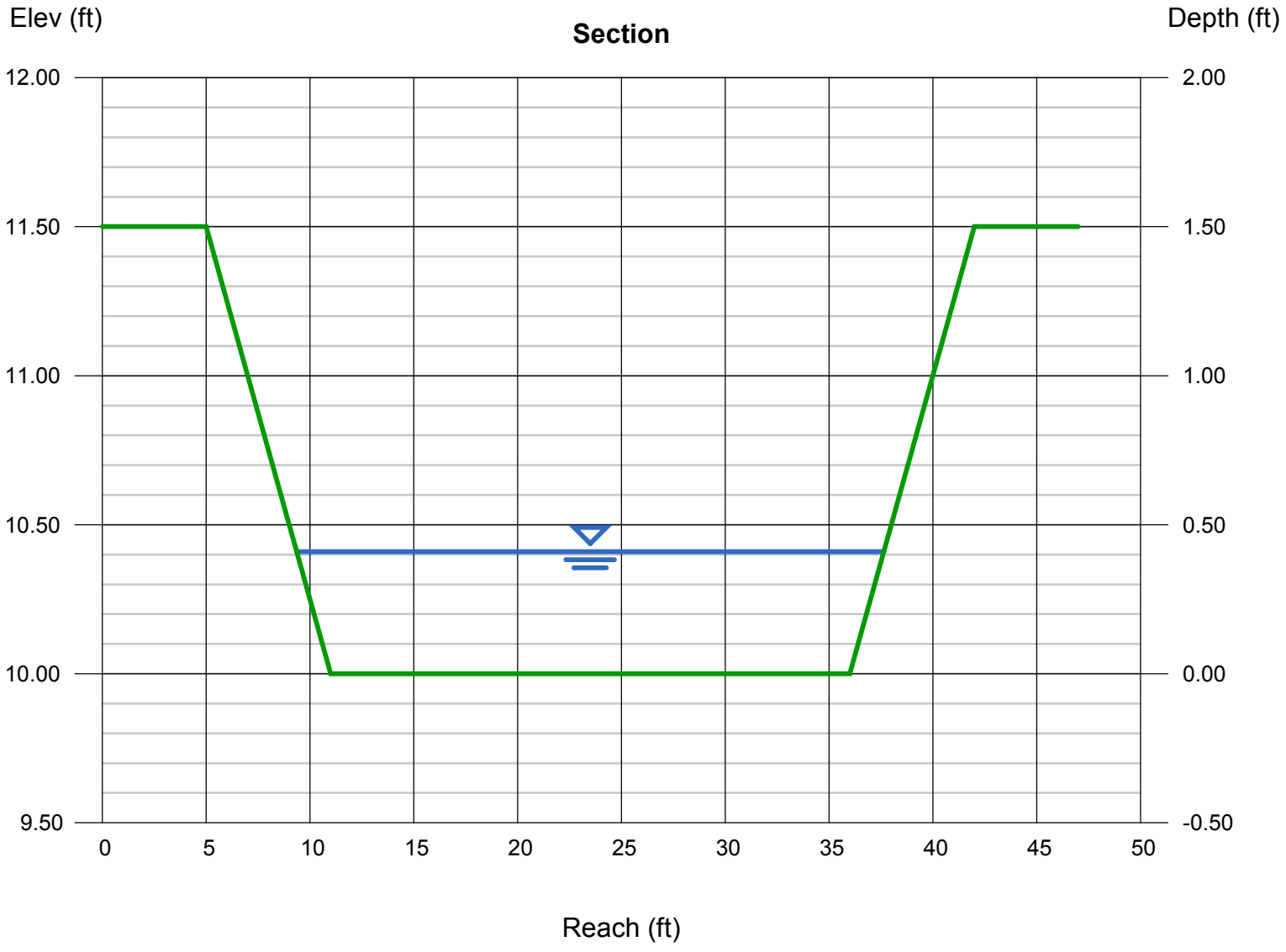
Bottom Width (ft)	= 25.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.50
Invert Elev (ft)	= 10.00
Slope (%)	= 0.30
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 11.57

Highlighted

Depth (ft)	= 0.41
Q (cfs)	= 11.57
Area (sqft)	= 10.92
Velocity (ft/s)	= 1.06
Wetted Perim (ft)	= 28.38
Crit Depth, Yc (ft)	= 0.19
Top Width (ft)	= 28.28
EGL (ft)	= 0.43



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Bioswale 4 (100year)

Trapezoidal

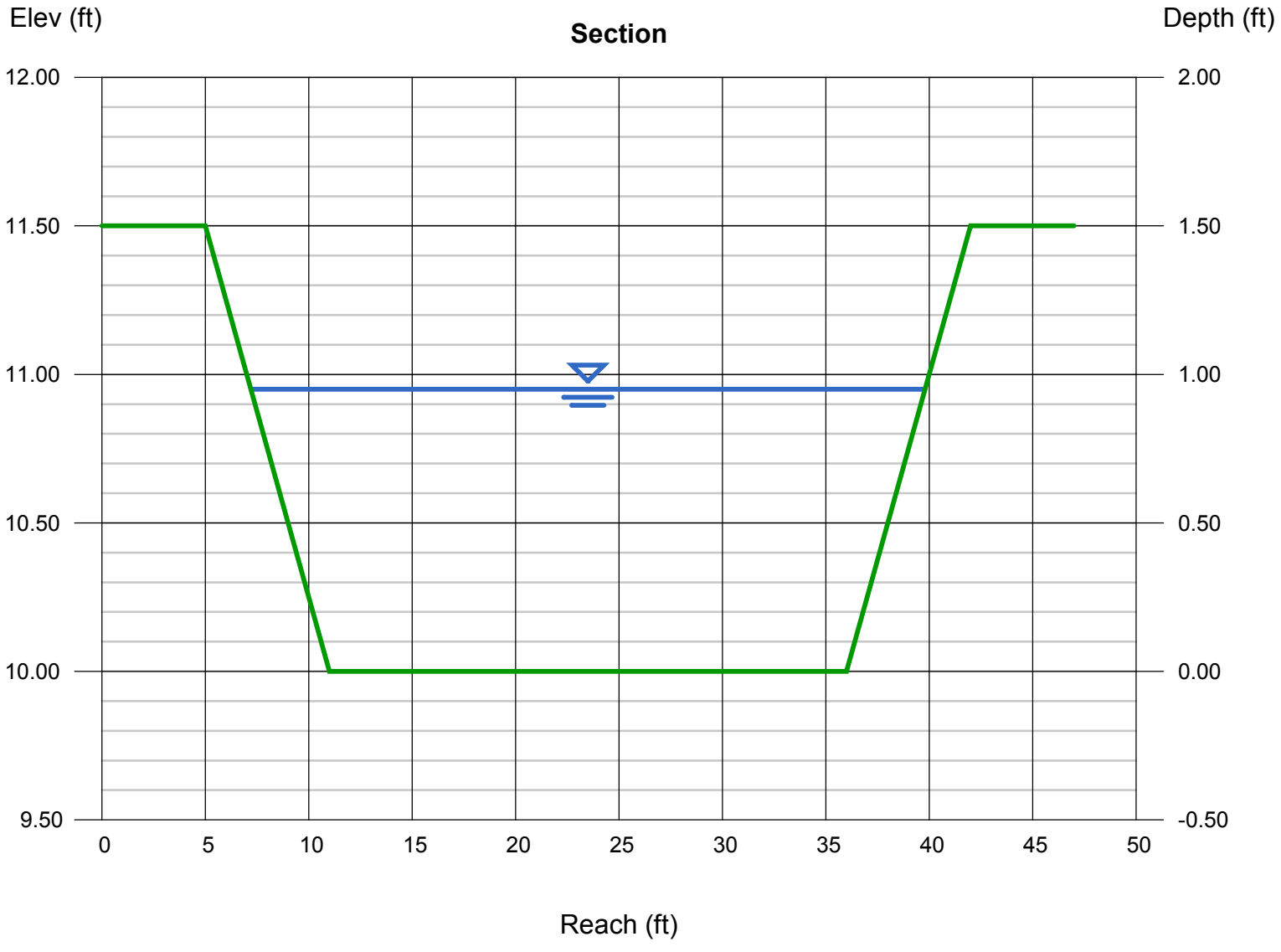
Bottom Width (ft)	= 25.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.50
Invert Elev (ft)	= 10.00
Slope (%)	= 0.30
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 48.92

Highlighted

Depth (ft)	= 0.95
Q (cfs)	= 48.92
Area (sqft)	= 27.36
Velocity (ft/s)	= 1.79
Wetted Perim (ft)	= 32.83
Crit Depth, Yc (ft)	= 0.48
Top Width (ft)	= 32.60
EGL (ft)	= 1.00



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Bioswale 5 (5year)

Trapezoidal

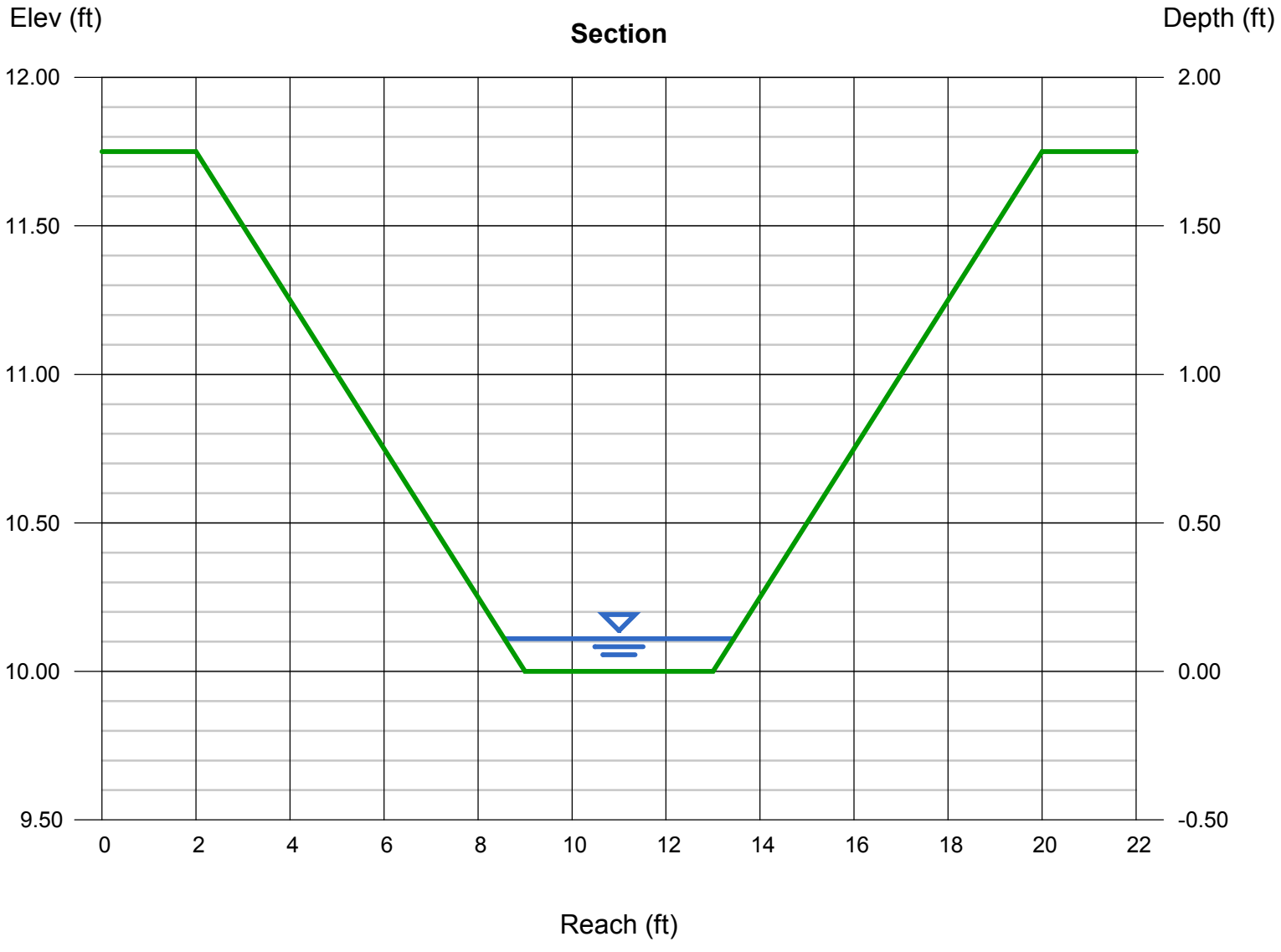
Bottom Width (ft)	= 4.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.75
Invert Elev (ft)	= 10.00
Slope (%)	= 1.81
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.51

Highlighted

Depth (ft)	= 0.11
Q (cfs)	= 0.510
Area (sqft)	= 0.49
Velocity (ft/s)	= 1.04
Wetted Perim (ft)	= 4.91
Crit Depth, Yc (ft)	= 0.08
Top Width (ft)	= 4.88
EGL (ft)	= 0.13



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Bioswale 5 (5year) 2

Trapezoidal

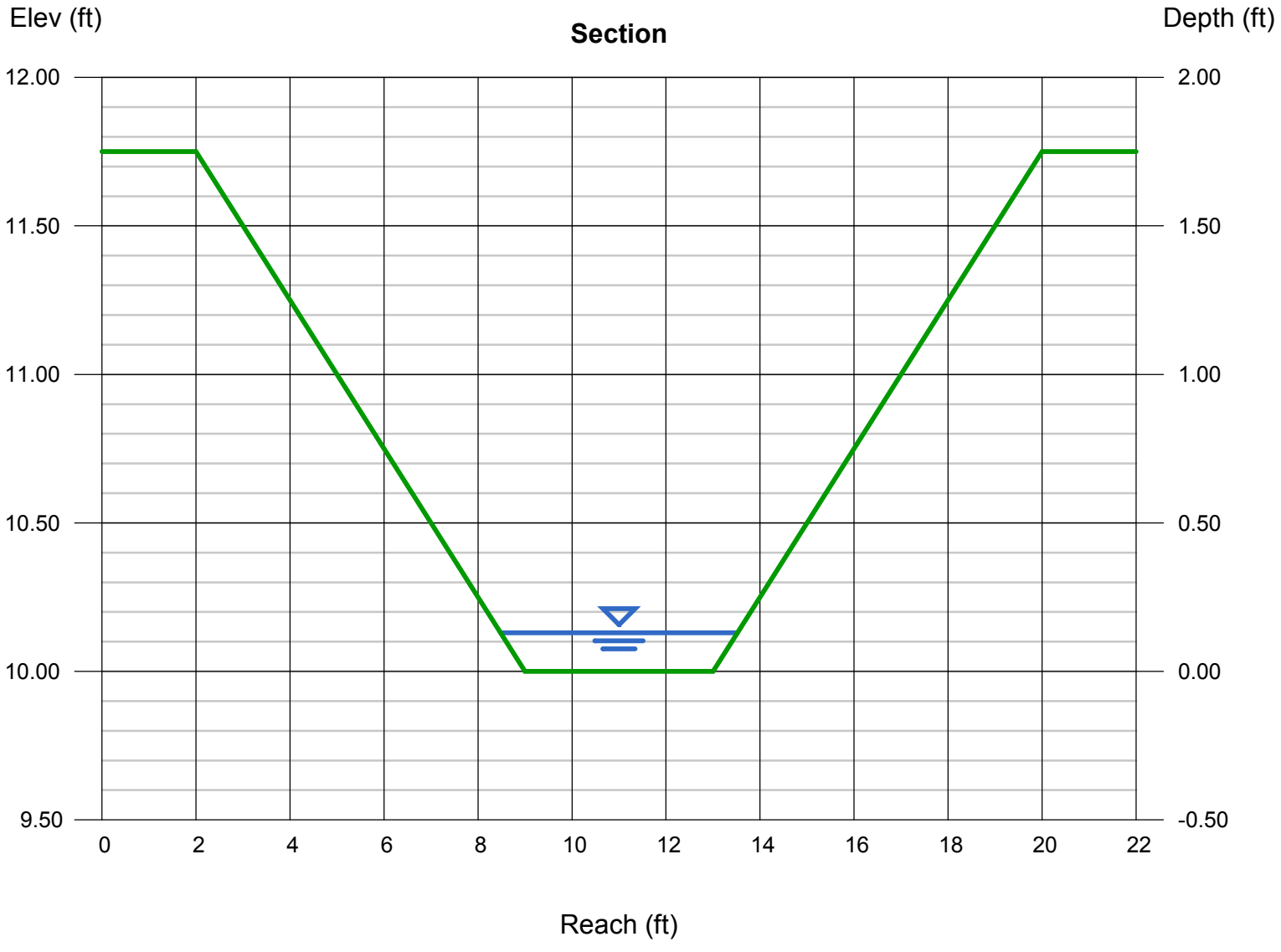
Bottom Width (ft)	= 4.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.75
Invert Elev (ft)	= 10.00
Slope (%)	= 1.19
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.51

Highlighted

Depth (ft)	= 0.13
Q (cfs)	= 0.510
Area (sqft)	= 0.59
Velocity (ft/s)	= 0.87
Wetted Perim (ft)	= 5.07
Crit Depth, Yc (ft)	= 0.08
Top Width (ft)	= 5.04
EGL (ft)	= 0.14



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Bioswale 5 (5year) 3

Trapezoidal

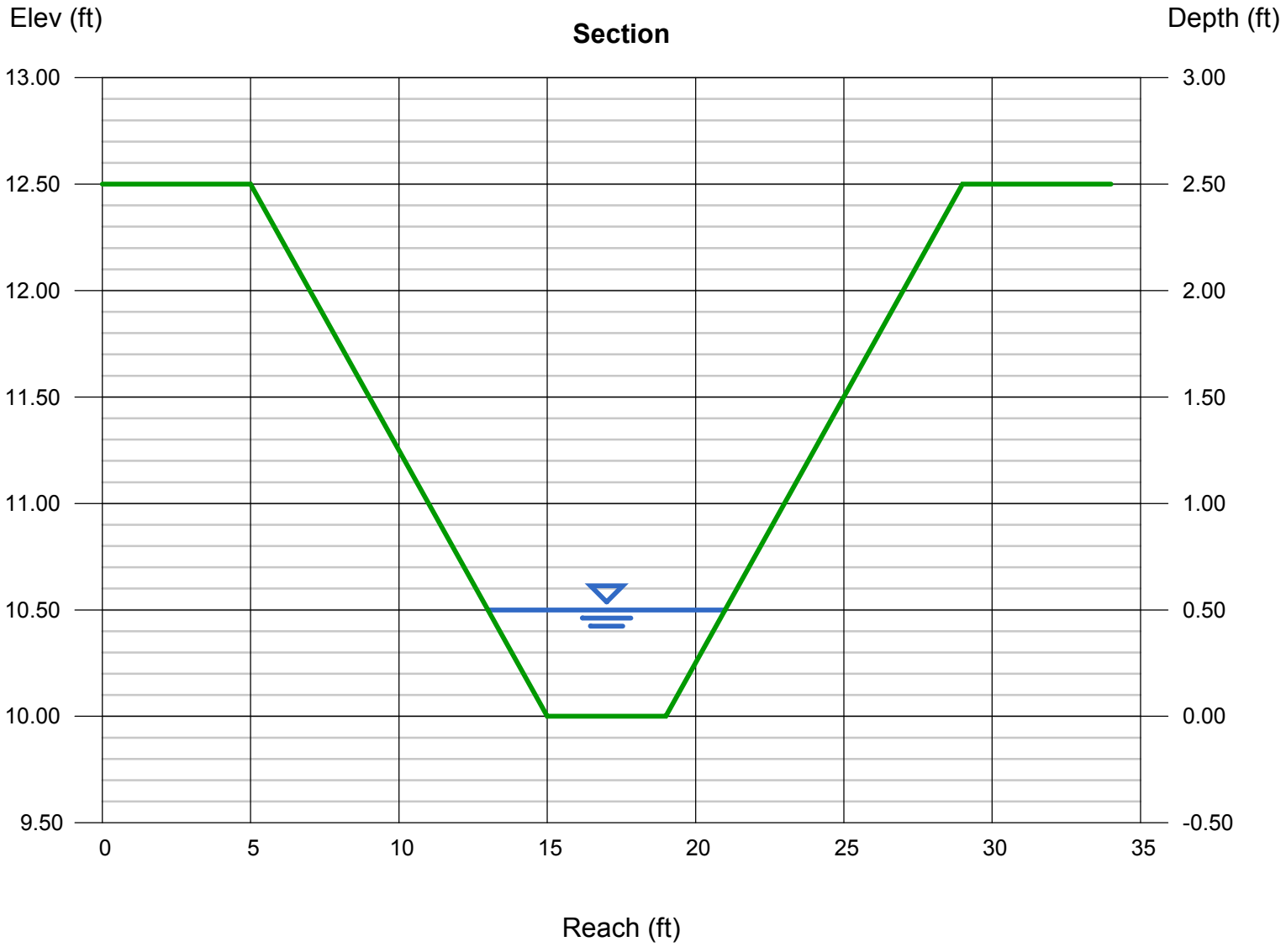
Bottom Width (ft)	= 4.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 2.50
Invert Elev (ft)	= 10.00
Slope (%)	= 0.30
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 3.12

Highlighted

Depth (ft)	= 0.50
Q (cfs)	= 3.120
Area (sqft)	= 3.00
Velocity (ft/s)	= 1.04
Wetted Perim (ft)	= 8.12
Crit Depth, Yc (ft)	= 0.25
Top Width (ft)	= 8.00
EGL (ft)	= 0.52



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Bioswale 5 (5year) 4

Trapezoidal

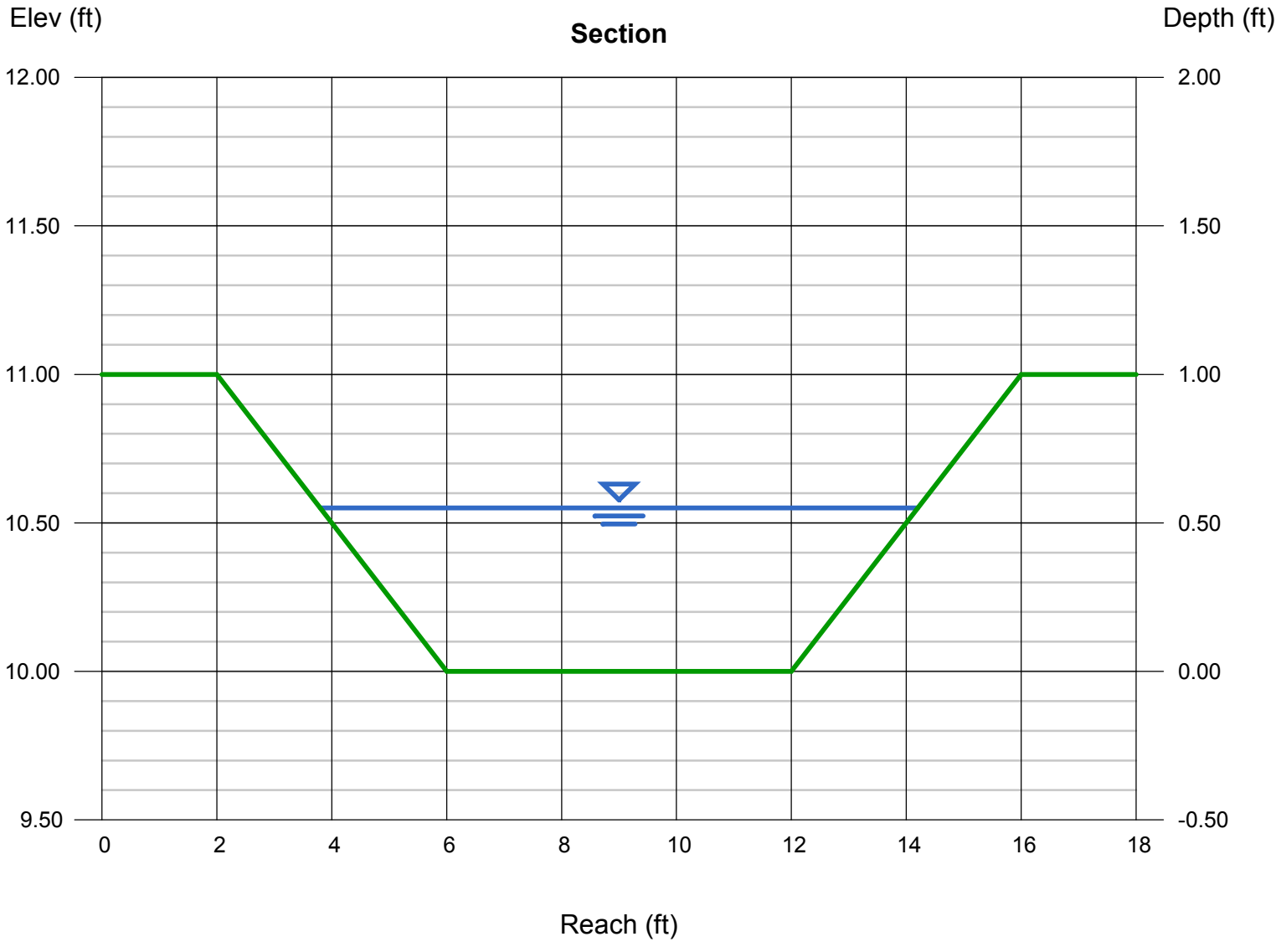
Bottom Width (ft)	= 6.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 0.24
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 4.54

Highlighted

Depth (ft)	= 0.55
Q (cfs)	= 4.540
Area (sqft)	= 4.51
Velocity (ft/s)	= 1.01
Wetted Perim (ft)	= 10.54
Crit Depth, Yc (ft)	= 0.25
Top Width (ft)	= 10.40
EGL (ft)	= 0.57



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Bioswale 5 (100year)

Trapezoidal

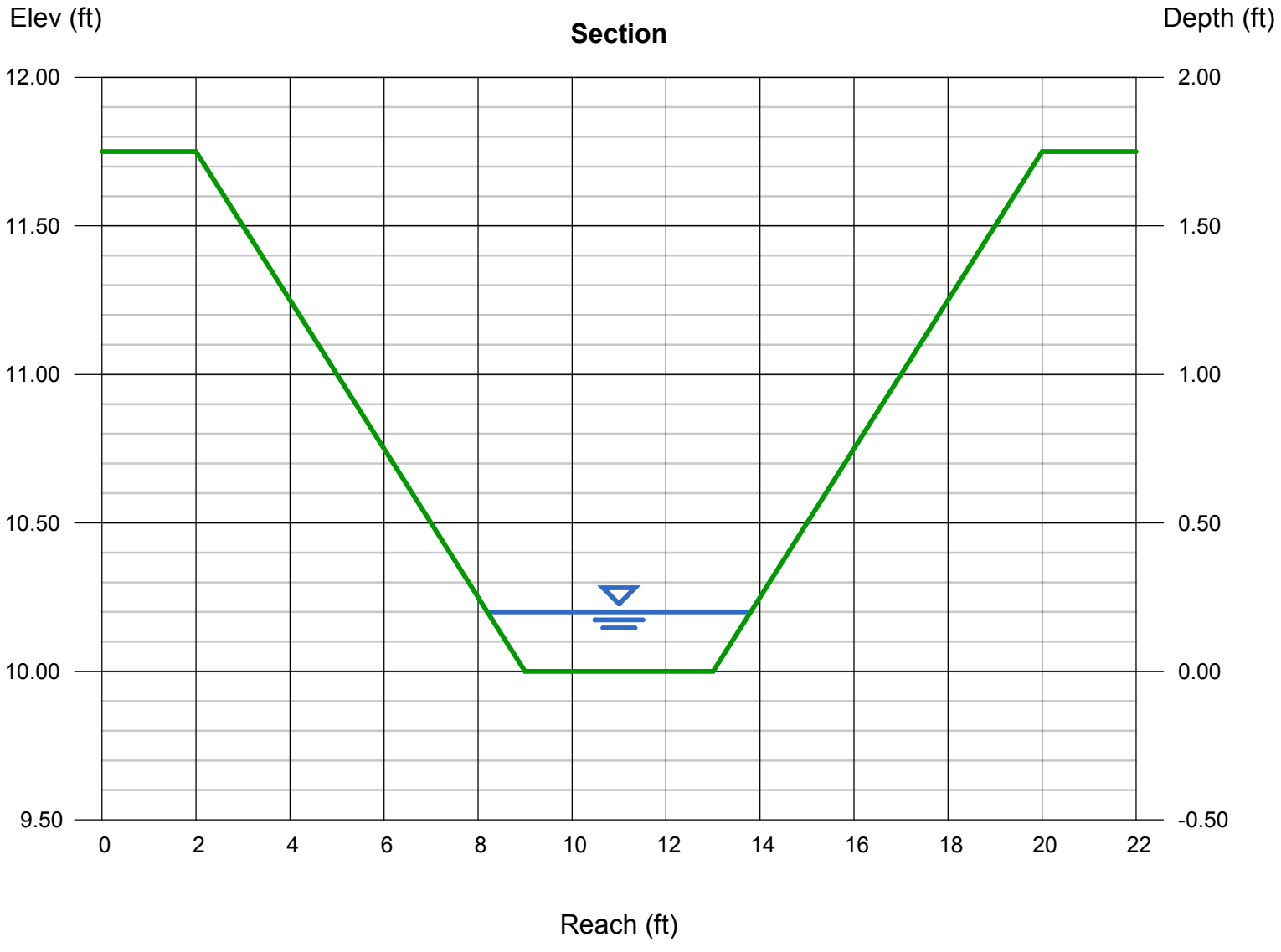
Bottom Width (ft)	= 4.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.75
Invert Elev (ft)	= 10.00
Slope (%)	= 1.81
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.35

Highlighted

Depth (ft)	= 0.20
Q (cfs)	= 1.350
Area (sqft)	= 0.96
Velocity (ft/s)	= 1.41
Wetted Perim (ft)	= 5.65
Crit Depth, Yc (ft)	= 0.15
Top Width (ft)	= 5.60
EGL (ft)	= 0.23



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Bioswale 5 (100year) 2

Trapezoidal

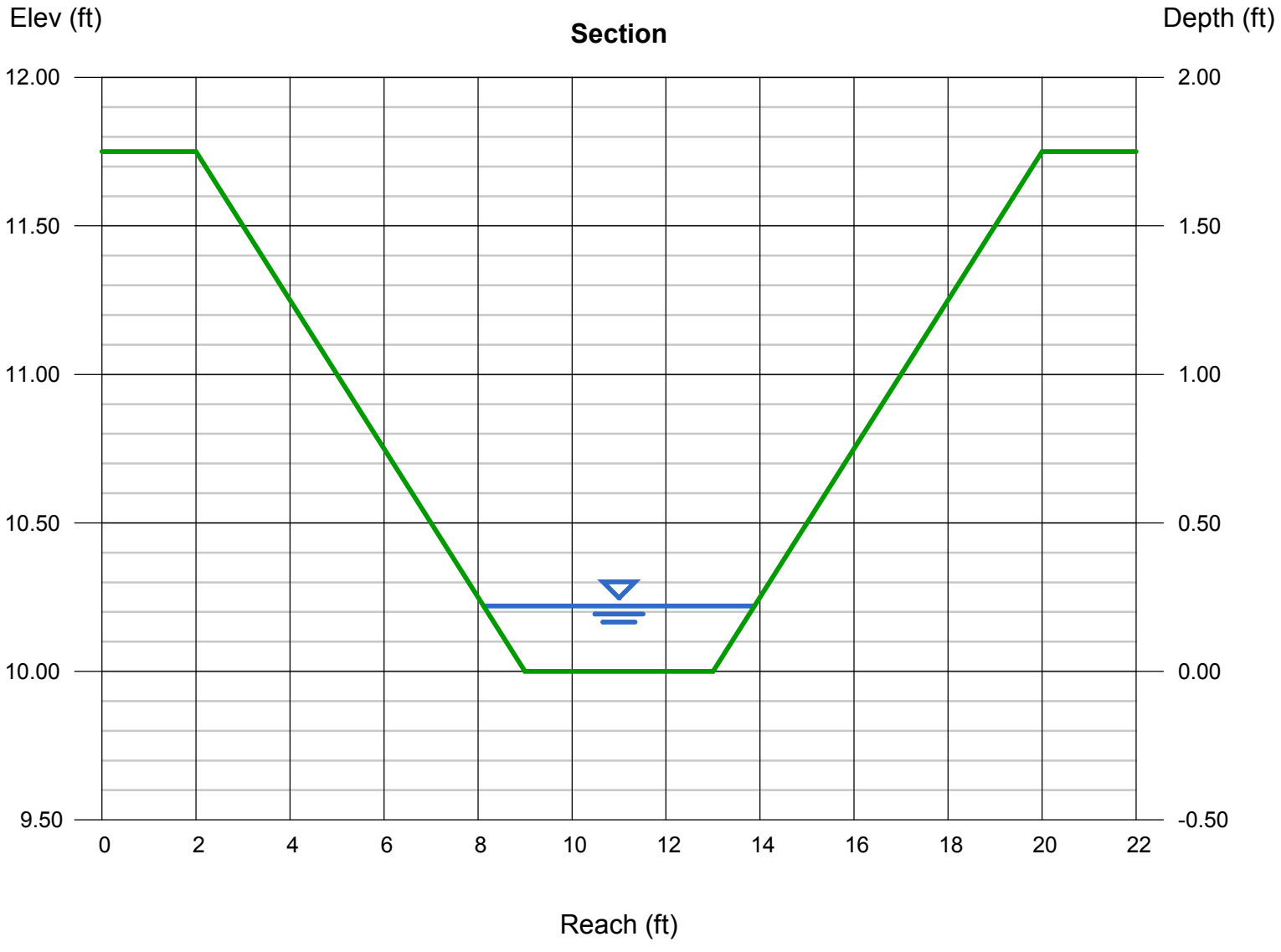
Bottom Width (ft)	= 4.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.75
Invert Elev (ft)	= 10.00
Slope (%)	= 1.19
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.35

Highlighted

Depth (ft)	= 0.22
Q (cfs)	= 1.350
Area (sqft)	= 1.07
Velocity (ft/s)	= 1.26
Wetted Perim (ft)	= 5.81
Crit Depth, Yc (ft)	= 0.15
Top Width (ft)	= 5.76
EGL (ft)	= 0.24



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Bioswale 5 (100year) 3

Trapezoidal

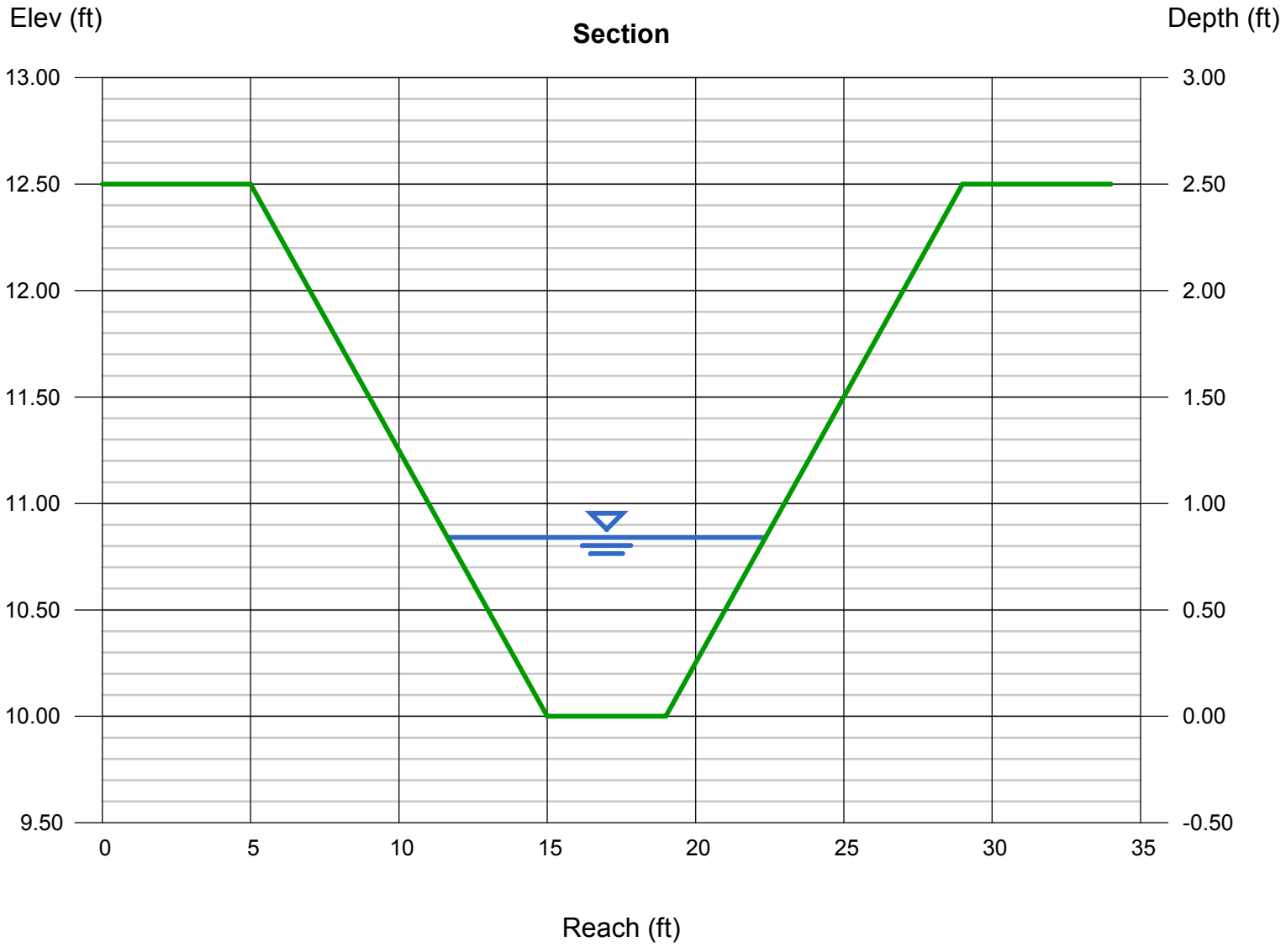
Bottom Width (ft)	= 4.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 2.50
Invert Elev (ft)	= 10.00
Slope (%)	= 0.30
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 8.49

Highlighted

Depth (ft)	= 0.84
Q (cfs)	= 8.490
Area (sqft)	= 6.18
Velocity (ft/s)	= 1.37
Wetted Perim (ft)	= 10.93
Crit Depth, Yc (ft)	= 0.45
Top Width (ft)	= 10.72
EGL (ft)	= 0.87



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Bioswale 5 (100year) 4

Trapezoidal

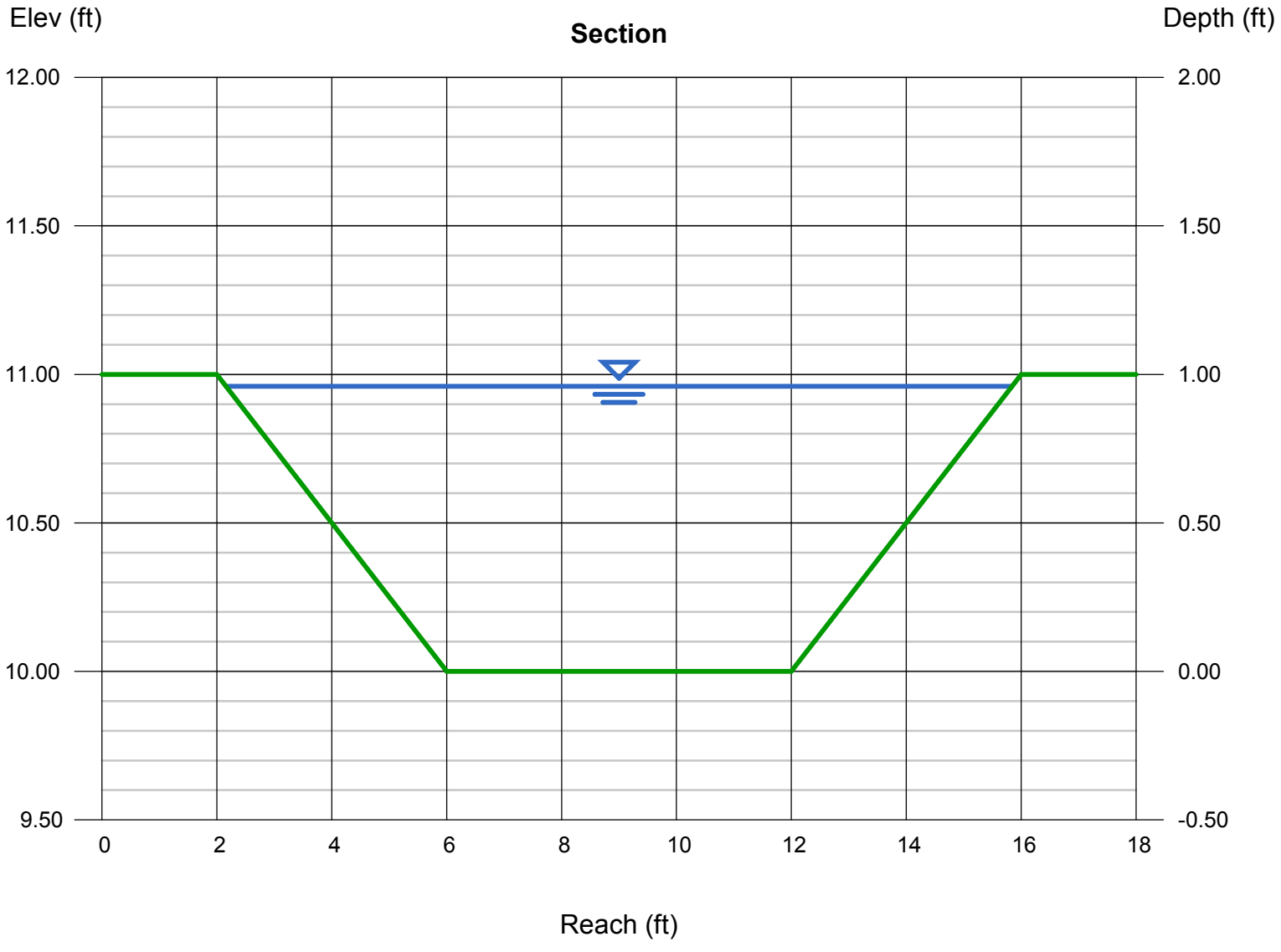
Bottom Width (ft)	= 6.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 0.24
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 13.24

Highlighted

Depth (ft)	= 0.96
Q (cfs)	= 13.24
Area (sqft)	= 9.45
Velocity (ft/s)	= 1.40
Wetted Perim (ft)	= 13.92
Crit Depth, Yc (ft)	= 0.48
Top Width (ft)	= 13.68
EGL (ft)	= 0.99



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Friday, Nov 16 2012

Bioswale 6 (5year)

Trapezoidal

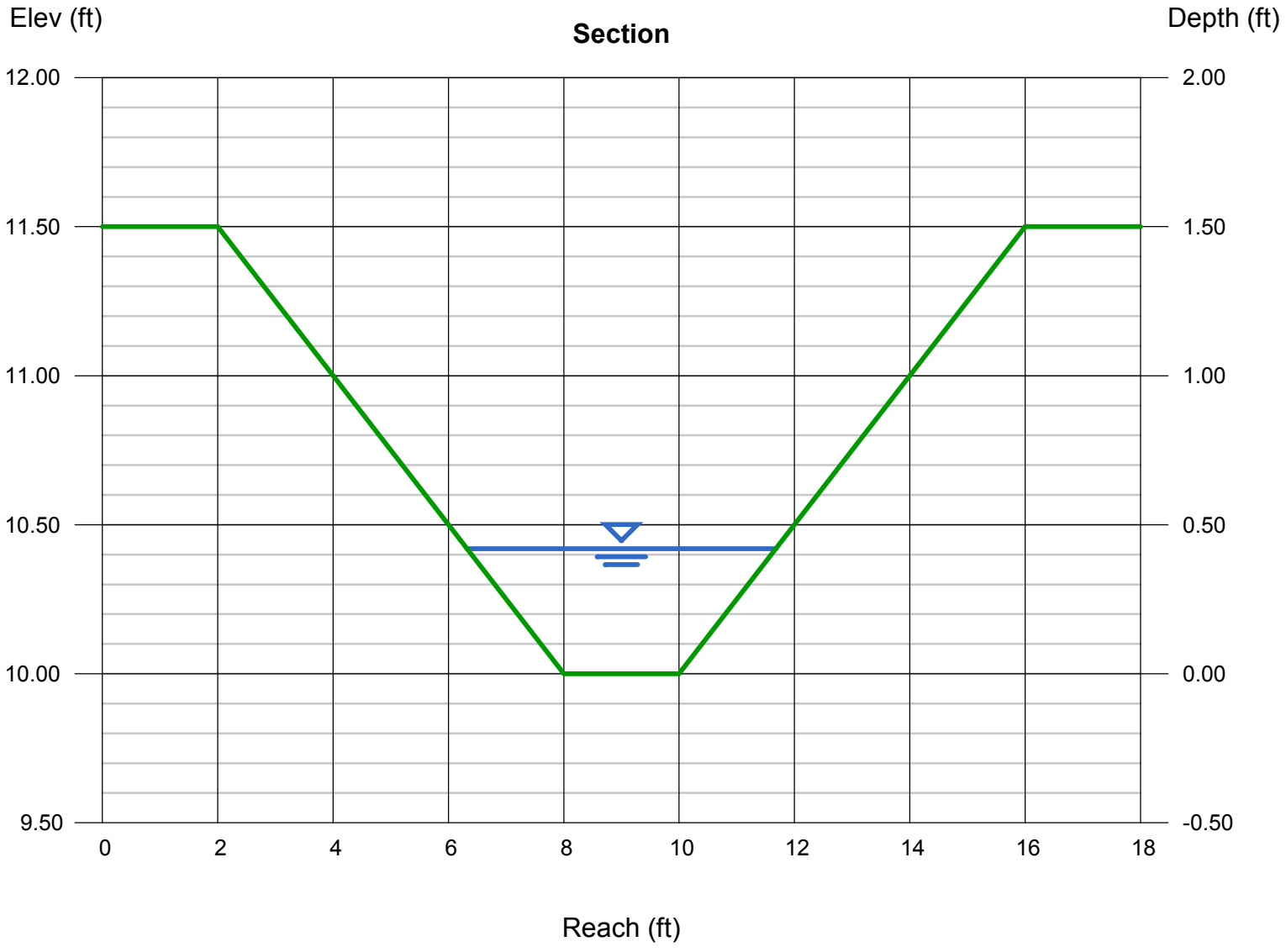
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.50
Invert Elev (ft)	= 10.00
Slope (%)	= 0.77
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 2.12

Highlighted

Depth (ft)	= 0.42
Q (cfs)	= 2.120
Area (sqft)	= 1.55
Velocity (ft/s)	= 1.37
Wetted Perim (ft)	= 5.46
Crit Depth, Yc (ft)	= 0.28
Top Width (ft)	= 5.36
EGL (ft)	= 0.45



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Friday, Nov 16 2012

Bioswale 6 (100year)

Trapezoidal

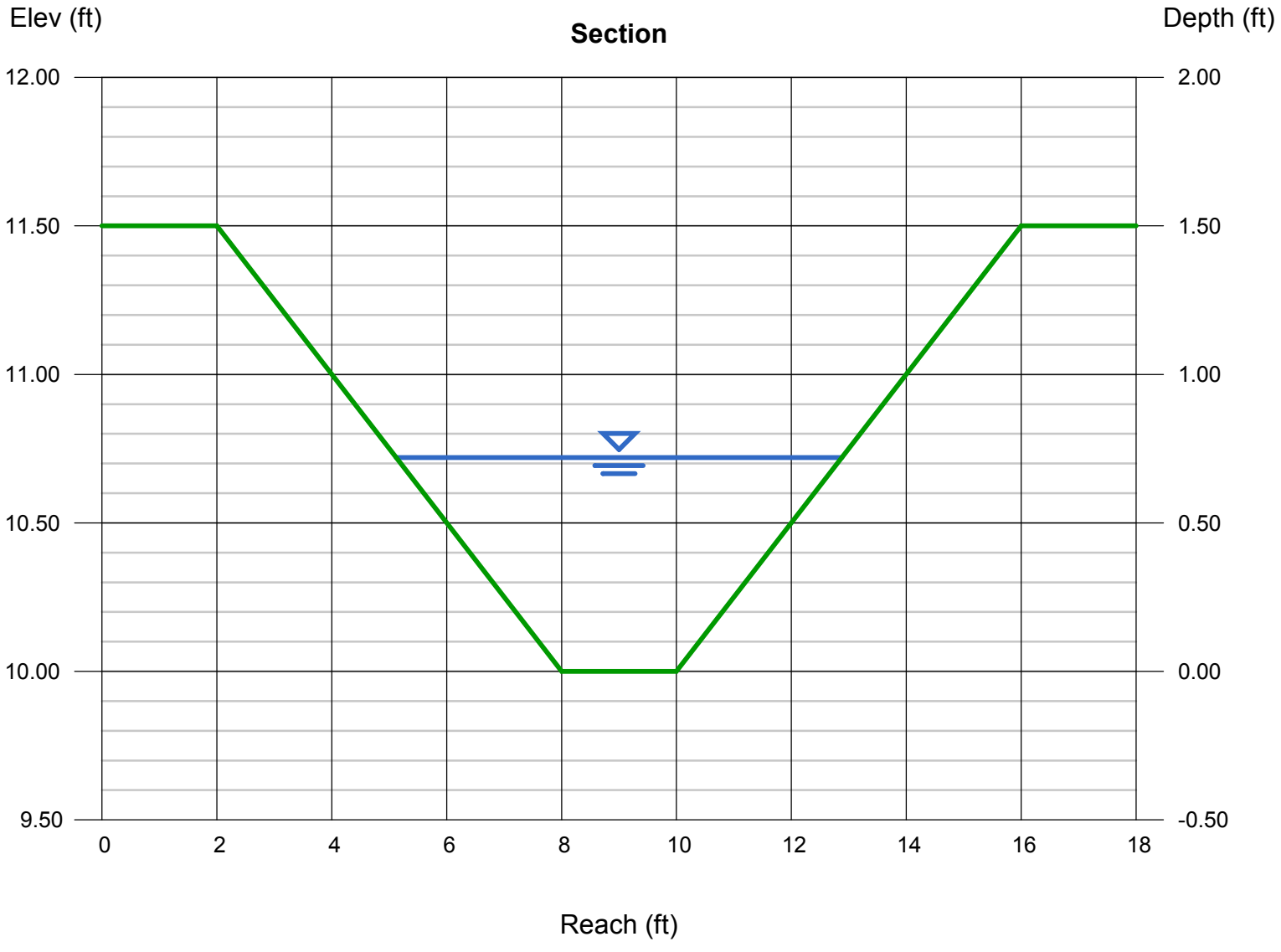
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.50
Invert Elev (ft)	= 10.00
Slope (%)	= 0.77
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 6.52

Highlighted

Depth (ft)	= 0.72
Q (cfs)	= 6.520
Area (sqft)	= 3.51
Velocity (ft/s)	= 1.86
Wetted Perim (ft)	= 7.94
Crit Depth, Yc (ft)	= 0.50
Top Width (ft)	= 7.76
EGL (ft)	= 0.77



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Friday, Nov 16 2012

Bioswale 7 (5year)

Trapezoidal

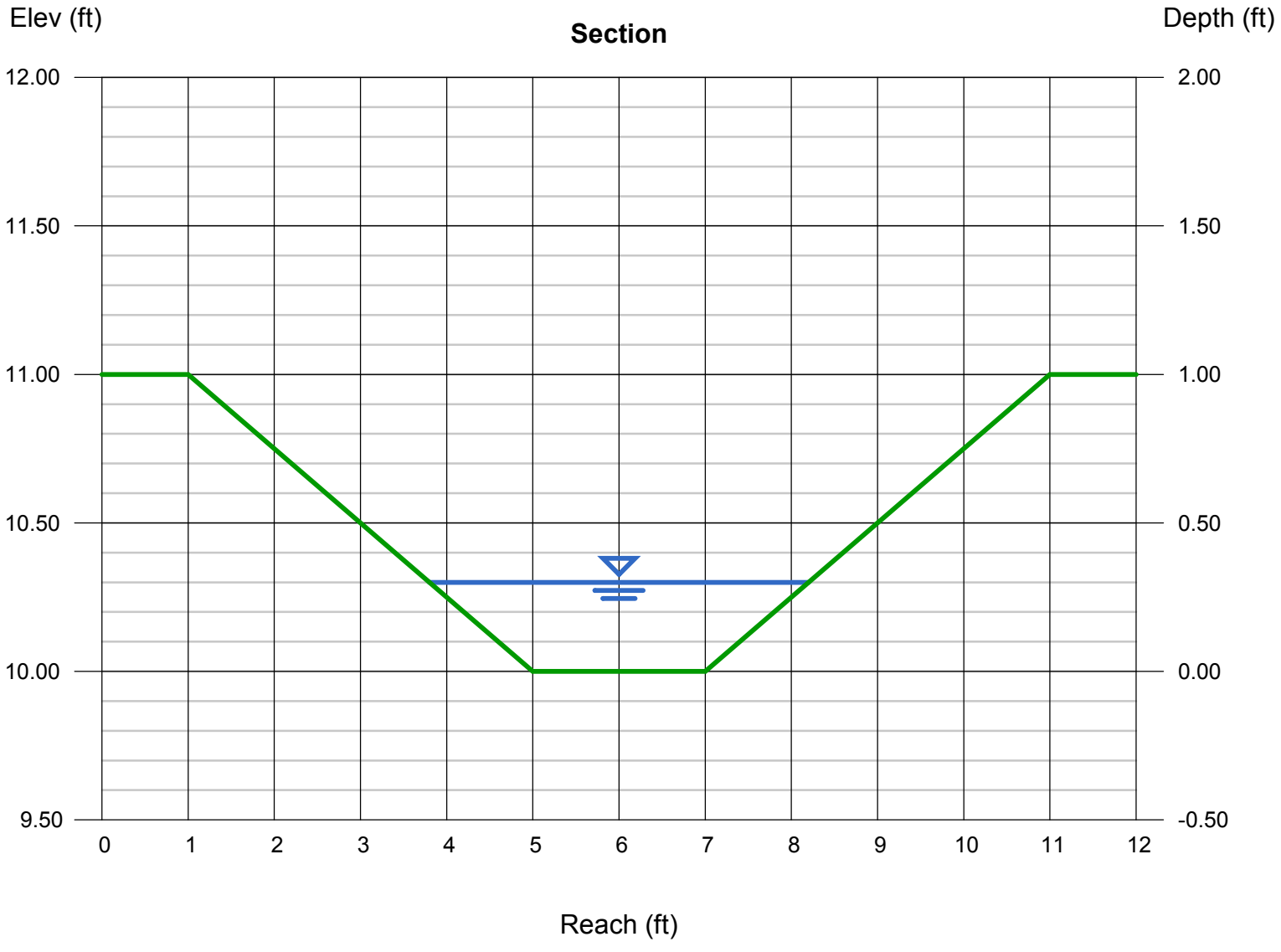
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 0.64
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.97

Highlighted

Depth (ft)	= 0.30
Q (cfs)	= 0.970
Area (sqft)	= 0.96
Velocity (ft/s)	= 1.01
Wetted Perim (ft)	= 4.47
Crit Depth, Yc (ft)	= 0.18
Top Width (ft)	= 4.40
EGL (ft)	= 0.32



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Friday, Nov 16 2012

Bioswale 7 (100year)

Trapezoidal

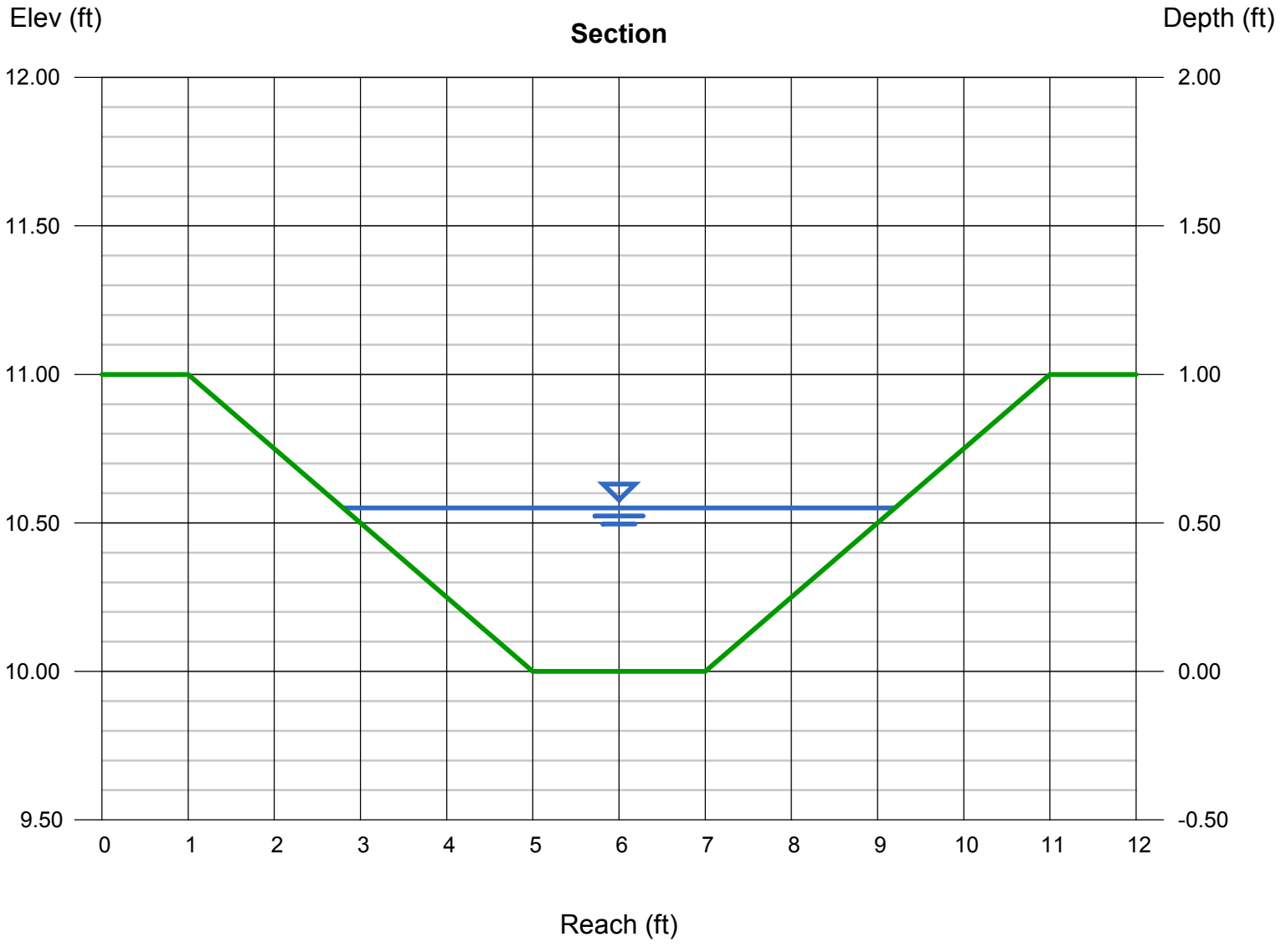
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 0.64
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 3.36

Highlighted

Depth (ft)	= 0.55
Q (cfs)	= 3.360
Area (sqft)	= 2.31
Velocity (ft/s)	= 1.45
Wetted Perim (ft)	= 6.54
Crit Depth, Yc (ft)	= 0.35
Top Width (ft)	= 6.40
EGL (ft)	= 0.58



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Bioswale 8 (5year)

Trapezoidal

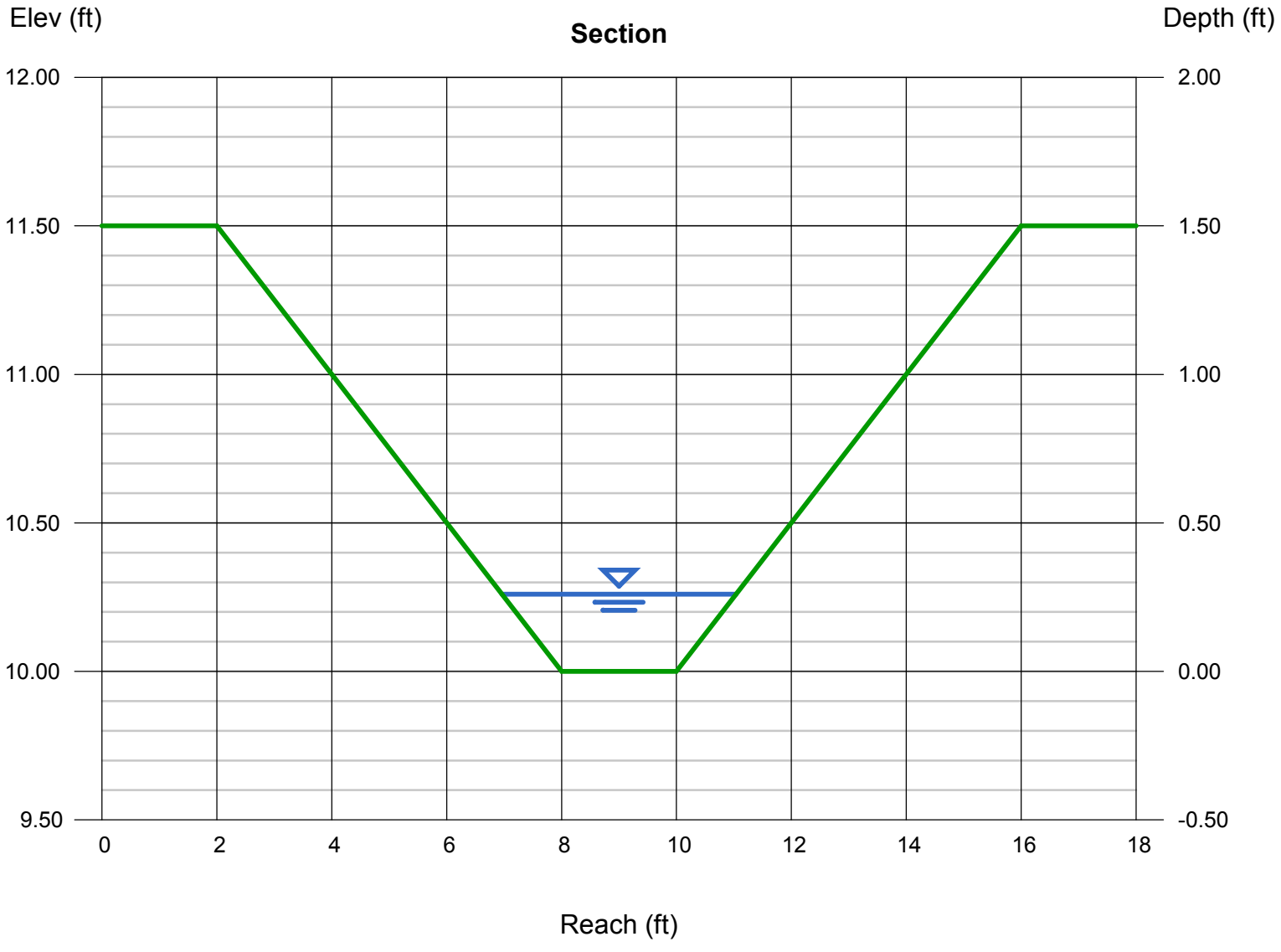
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.50
Invert Elev (ft)	= 10.00
Slope (%)	= 0.30
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.52

Highlighted

Depth (ft)	= 0.26
Q (cfs)	= 0.520
Area (sqft)	= 0.79
Velocity (ft/s)	= 0.66
Wetted Perim (ft)	= 4.14
Crit Depth, Yc (ft)	= 0.12
Top Width (ft)	= 4.08
EGL (ft)	= 0.27



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Bioswale 8 (100year)

Trapezoidal

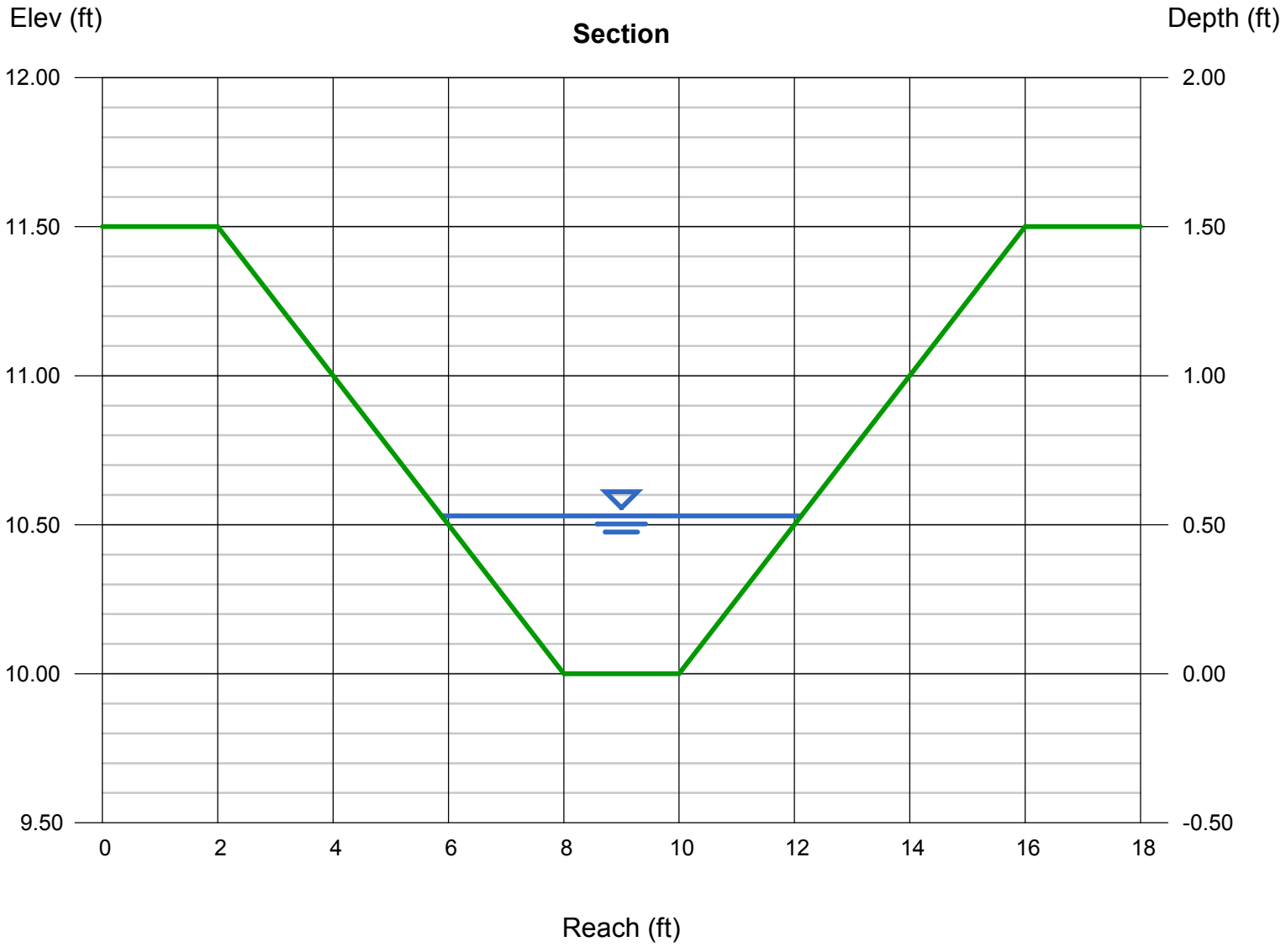
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.50
Invert Elev (ft)	= 10.00
Slope (%)	= 0.30
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 2.15

Highlighted

Depth (ft)	= 0.53
Q (cfs)	= 2.150
Area (sqft)	= 2.18
Velocity (ft/s)	= 0.98
Wetted Perim (ft)	= 6.37
Crit Depth, Yc (ft)	= 0.28
Top Width (ft)	= 6.24
EGL (ft)	= 0.55



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Bioswale 9 (5year)

Trapezoidal

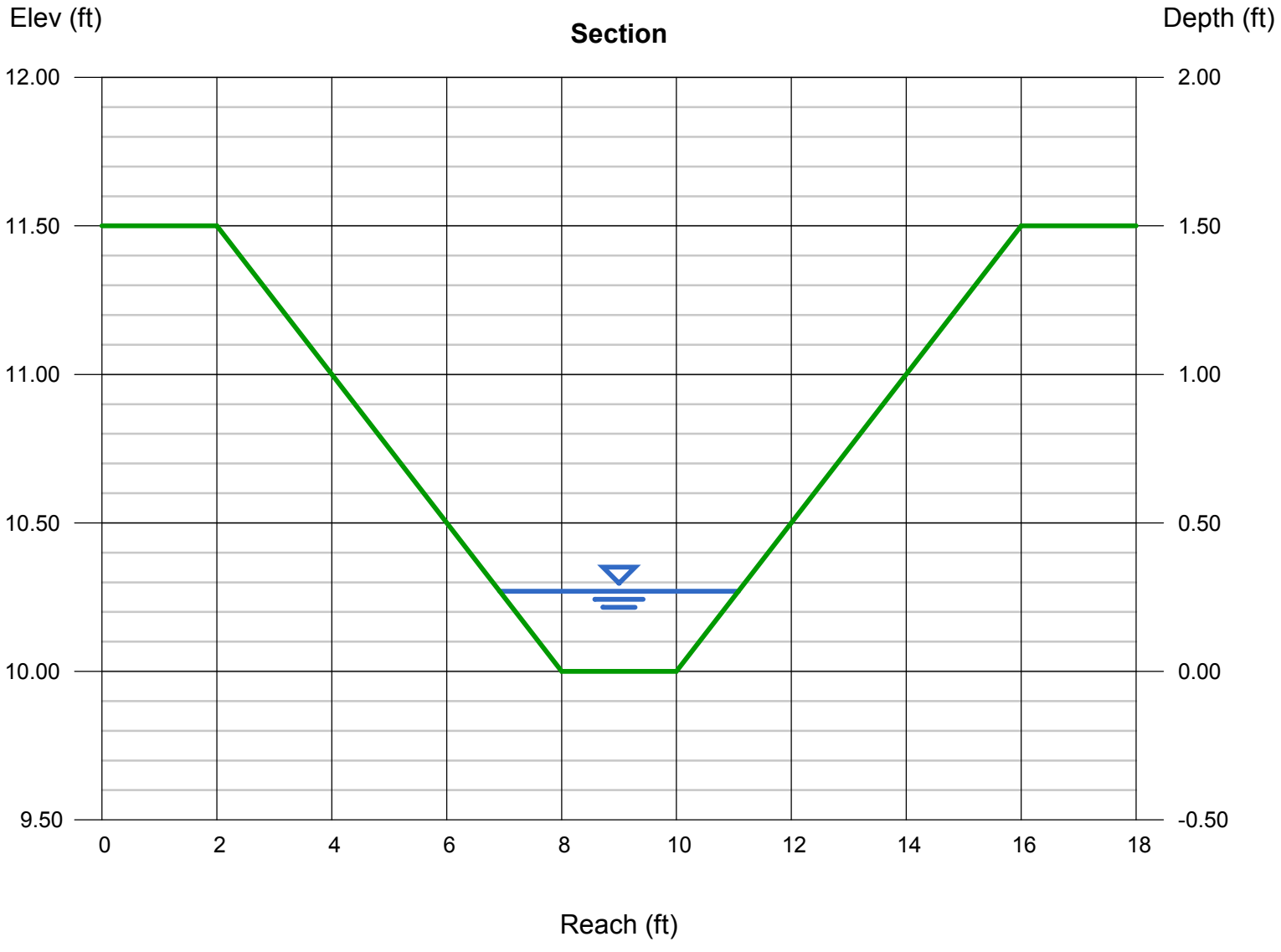
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.50
Invert Elev (ft)	= 10.00
Slope (%)	= 0.30
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.55

Highlighted

Depth (ft)	= 0.27
Q (cfs)	= 0.550
Area (sqft)	= 0.83
Velocity (ft/s)	= 0.66
Wetted Perim (ft)	= 4.23
Crit Depth, Yc (ft)	= 0.13
Top Width (ft)	= 4.16
EGL (ft)	= 0.28



Channel Report

Bioswale 9 (100year)

Trapezoidal

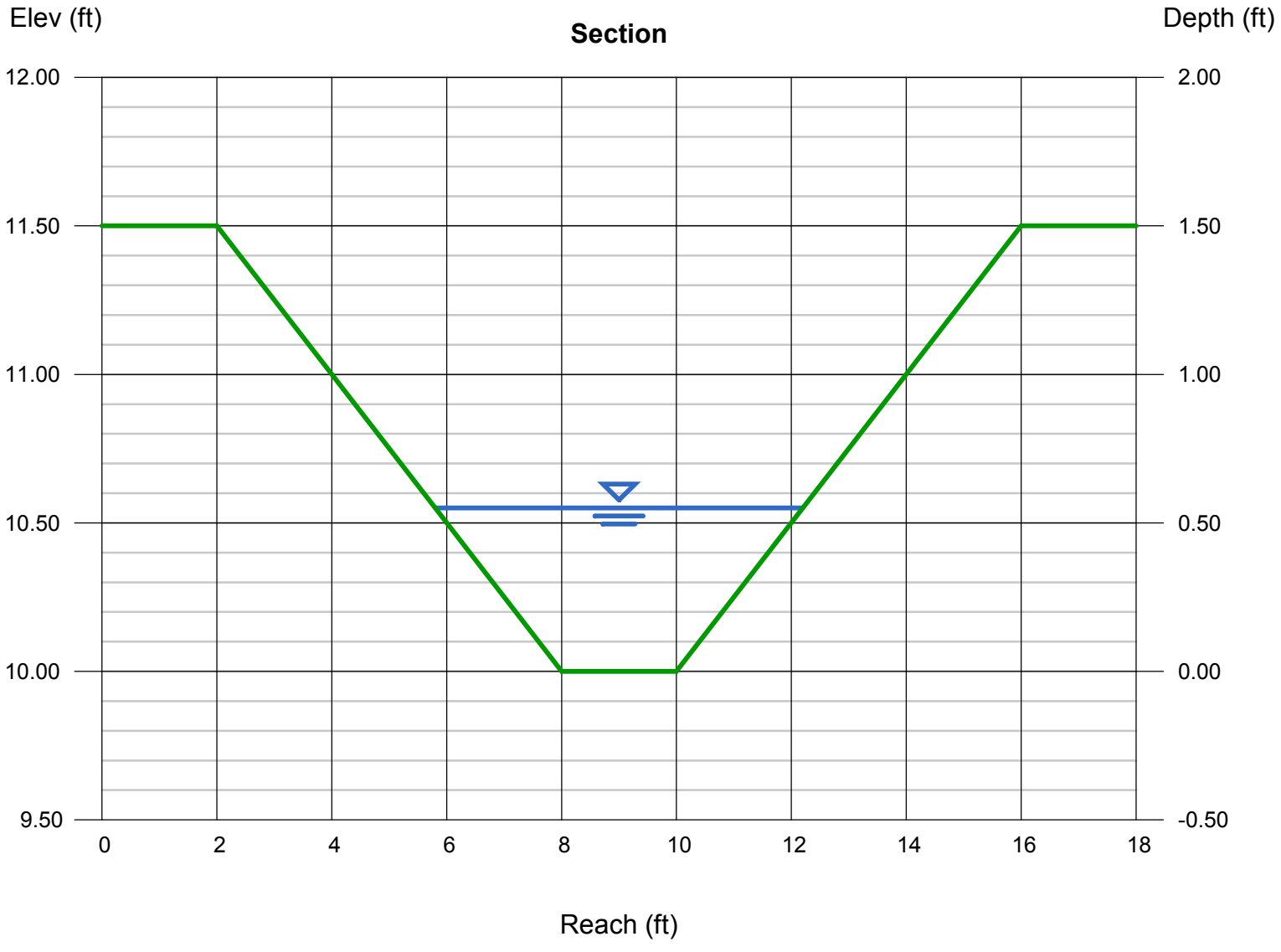
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.50
Invert Elev (ft)	= 10.00
Slope (%)	= 0.30
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 2.30

Highlighted

Depth (ft)	= 0.55
Q (cfs)	= 2.300
Area (sqft)	= 2.31
Velocity (ft/s)	= 1.00
Wetted Perim (ft)	= 6.54
Crit Depth, Yc (ft)	= 0.29
Top Width (ft)	= 6.40
EGL (ft)	= 0.57



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Bioswale 10 (5year)

Trapezoidal

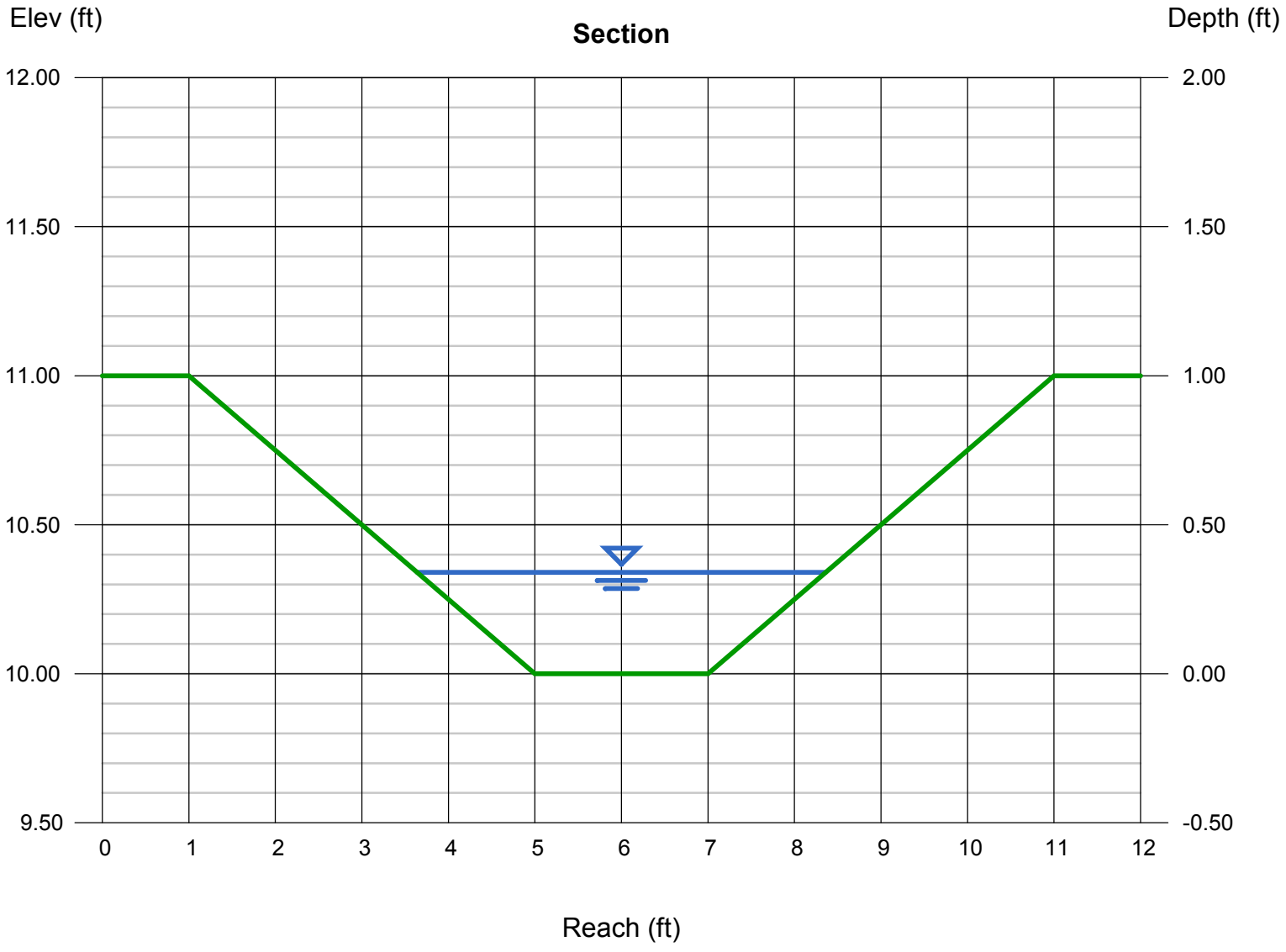
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 0.41
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.02

Highlighted

Depth (ft)	= 0.34
Q (cfs)	= 1.020
Area (sqft)	= 1.14
Velocity (ft/s)	= 0.89
Wetted Perim (ft)	= 4.80
Crit Depth, Yc (ft)	= 0.18
Top Width (ft)	= 4.72
EGL (ft)	= 0.35



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Bioswale 10 (100year)

Trapezoidal

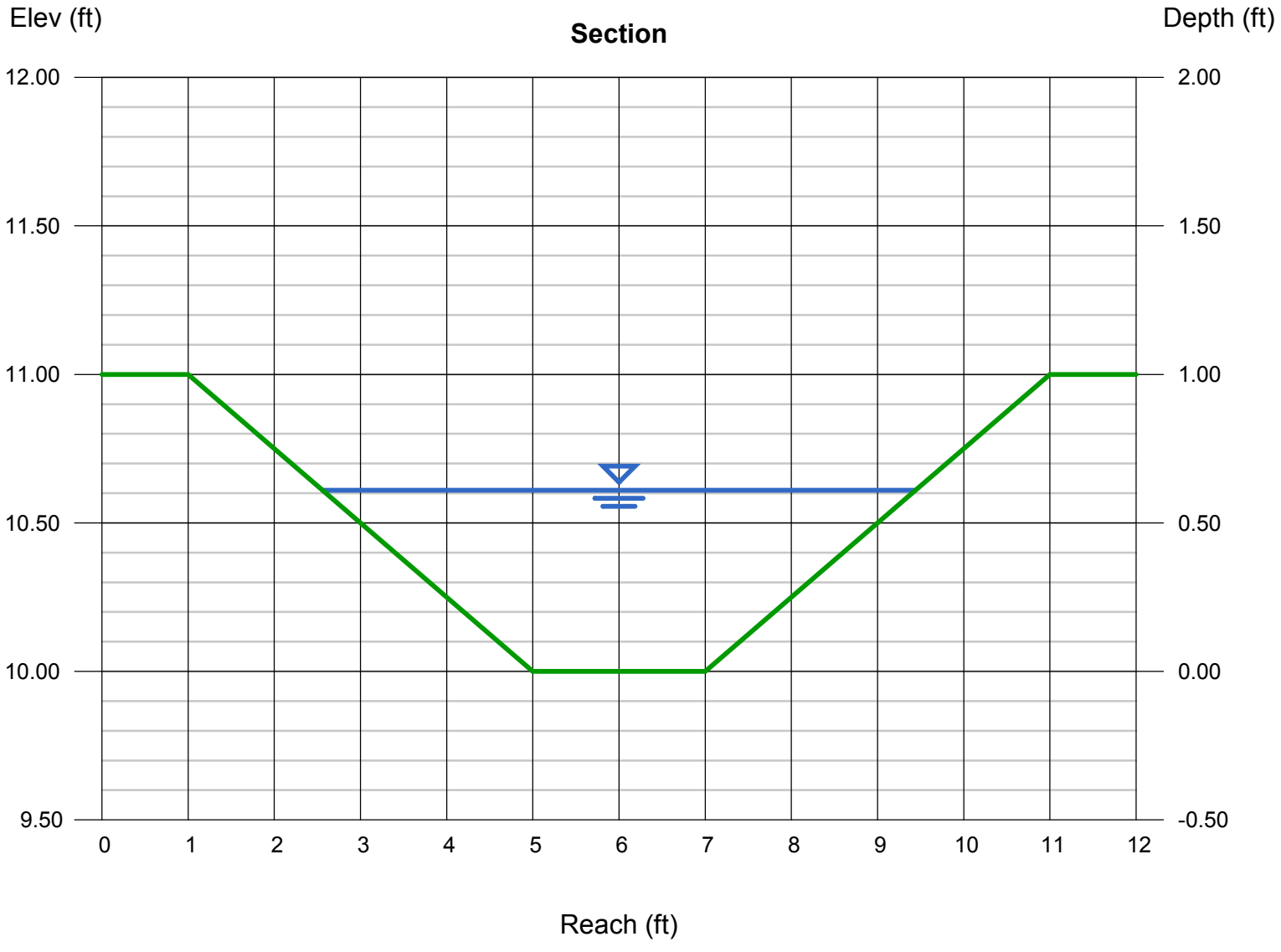
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 0.41
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 3.38

Highlighted

Depth (ft)	= 0.61
Q (cfs)	= 3.380
Area (sqft)	= 2.71
Velocity (ft/s)	= 1.25
Wetted Perim (ft)	= 7.03
Crit Depth, Yc (ft)	= 0.36
Top Width (ft)	= 6.88
EGL (ft)	= 0.63



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Bioswale 11 (5year)

Trapezoidal

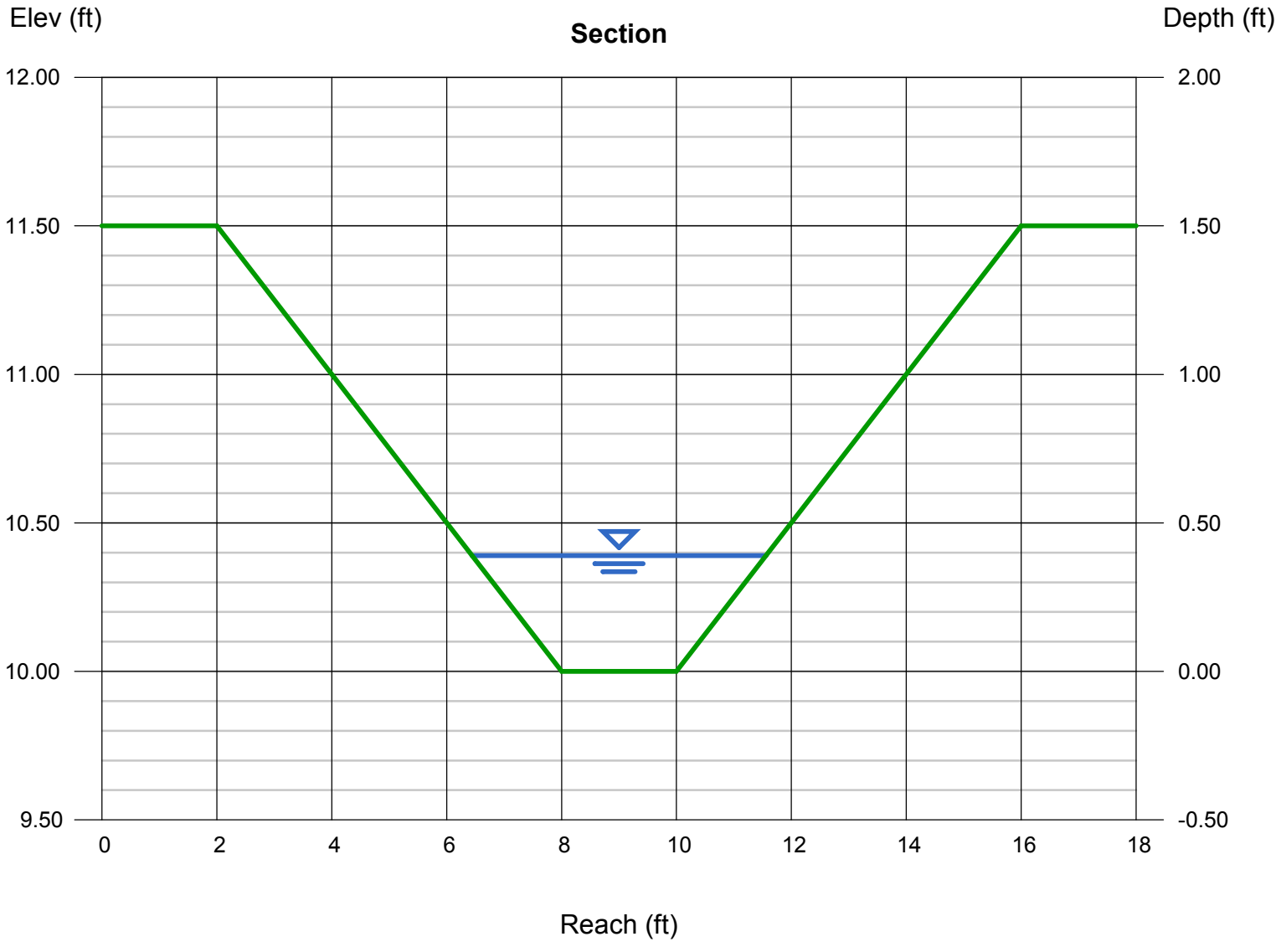
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.50
Invert Elev (ft)	= 10.00
Slope (%)	= 0.30
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.16

Highlighted

Depth (ft)	= 0.39
Q (cfs)	= 1.160
Area (sqft)	= 1.39
Velocity (ft/s)	= 0.84
Wetted Perim (ft)	= 5.22
Crit Depth, Yc (ft)	= 0.20
Top Width (ft)	= 5.12
EGL (ft)	= 0.40



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Bioswale 11 (100year)

Trapezoidal

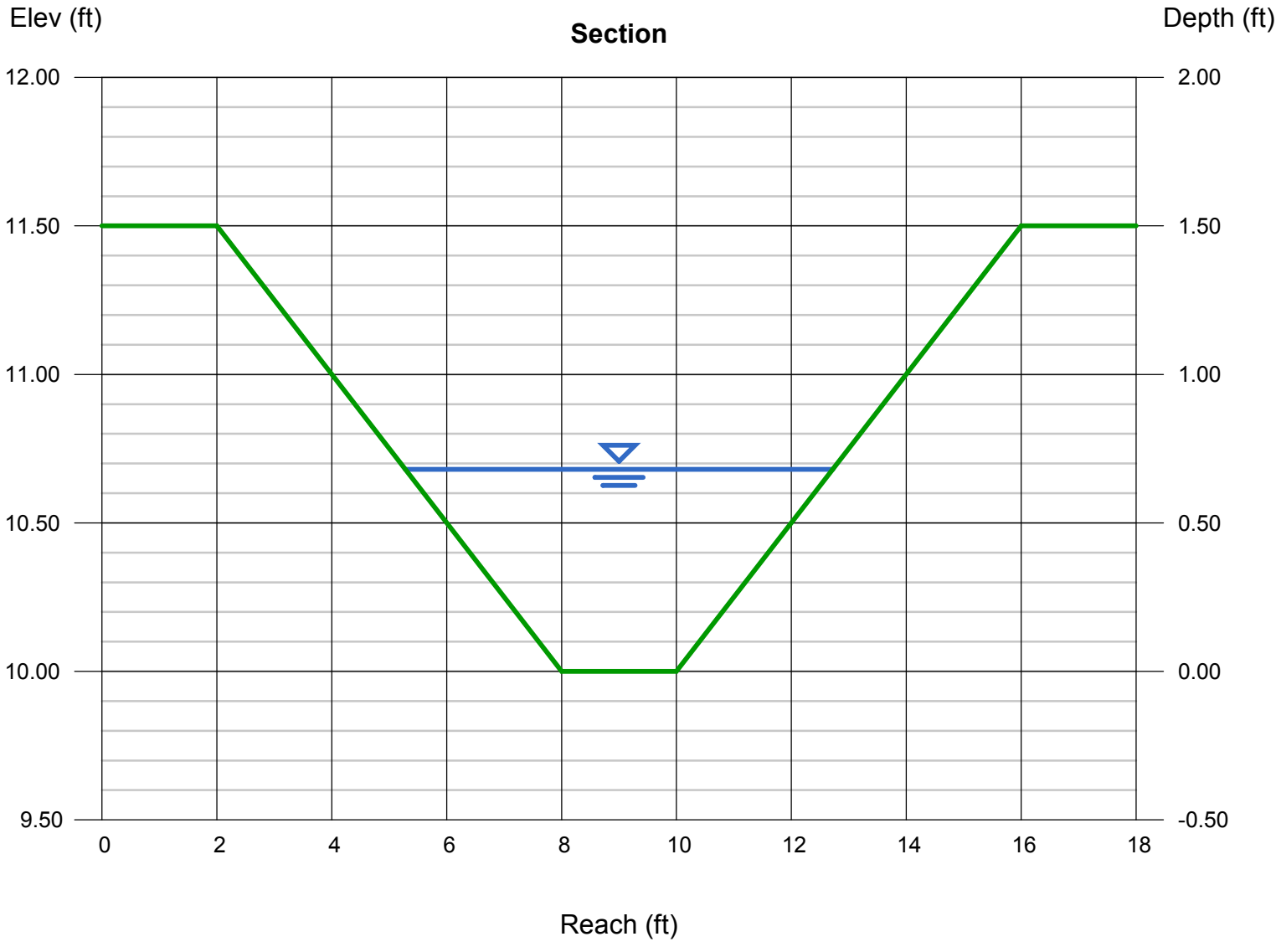
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.50
Invert Elev (ft)	= 10.00
Slope (%)	= 0.30
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 3.65

Highlighted

Depth (ft)	= 0.68
Q (cfs)	= 3.650
Area (sqft)	= 3.21
Velocity (ft/s)	= 1.14
Wetted Perim (ft)	= 7.61
Crit Depth, Yc (ft)	= 0.37
Top Width (ft)	= 7.44
EGL (ft)	= 0.70



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Friday, Nov 16 2012

Bioswale 11 (5year) 2

Trapezoidal

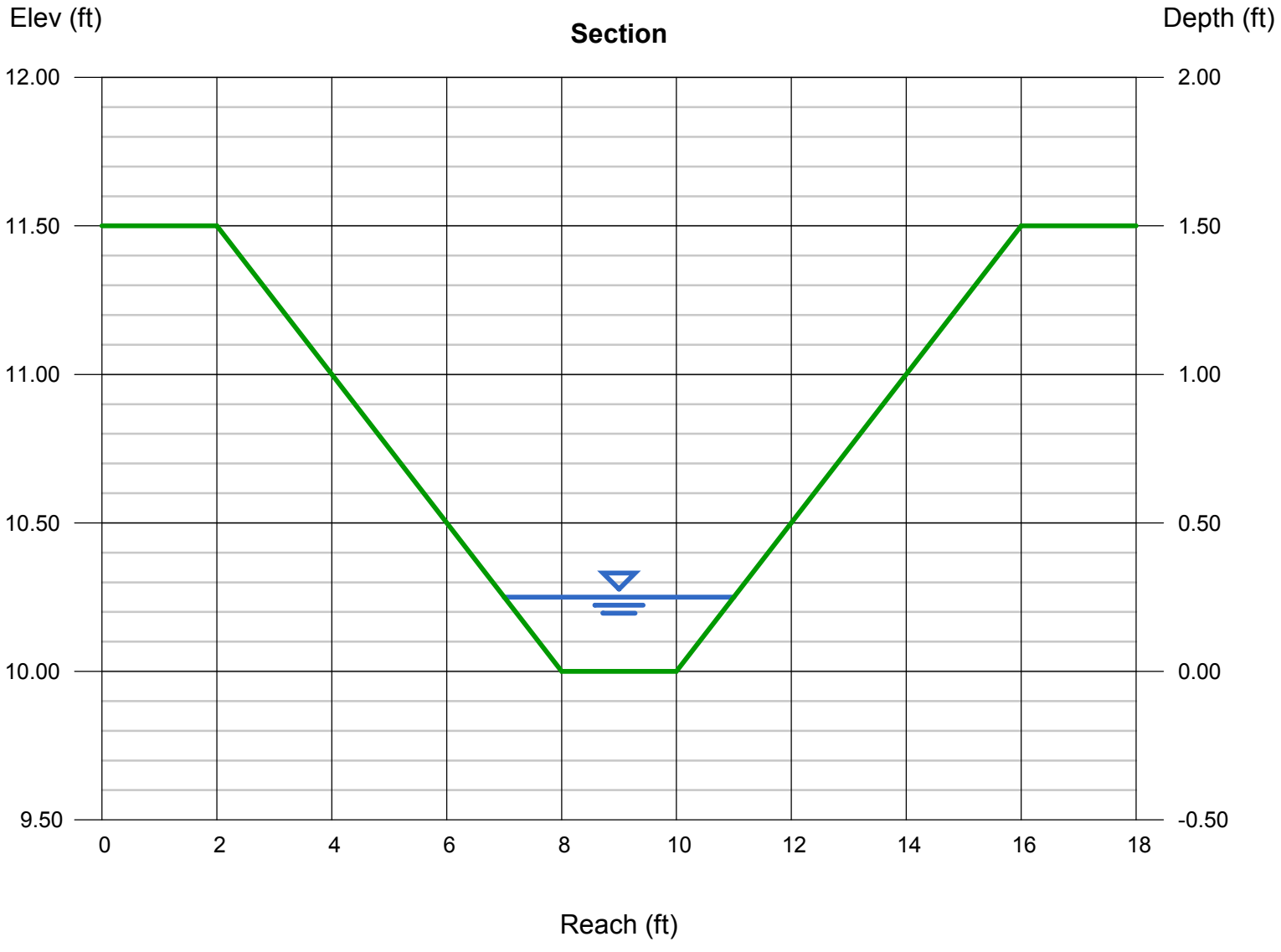
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.50
Invert Elev (ft)	= 10.00
Slope (%)	= 1.85
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.16

Highlighted

Depth (ft)	= 0.25
Q (cfs)	= 1.160
Area (sqft)	= 0.75
Velocity (ft/s)	= 1.55
Wetted Perim (ft)	= 4.06
Crit Depth, Yc (ft)	= 0.20
Top Width (ft)	= 4.00
EGL (ft)	= 0.29



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Friday, Nov 16 2012

Bioswale 11 (100year) 2

Trapezoidal

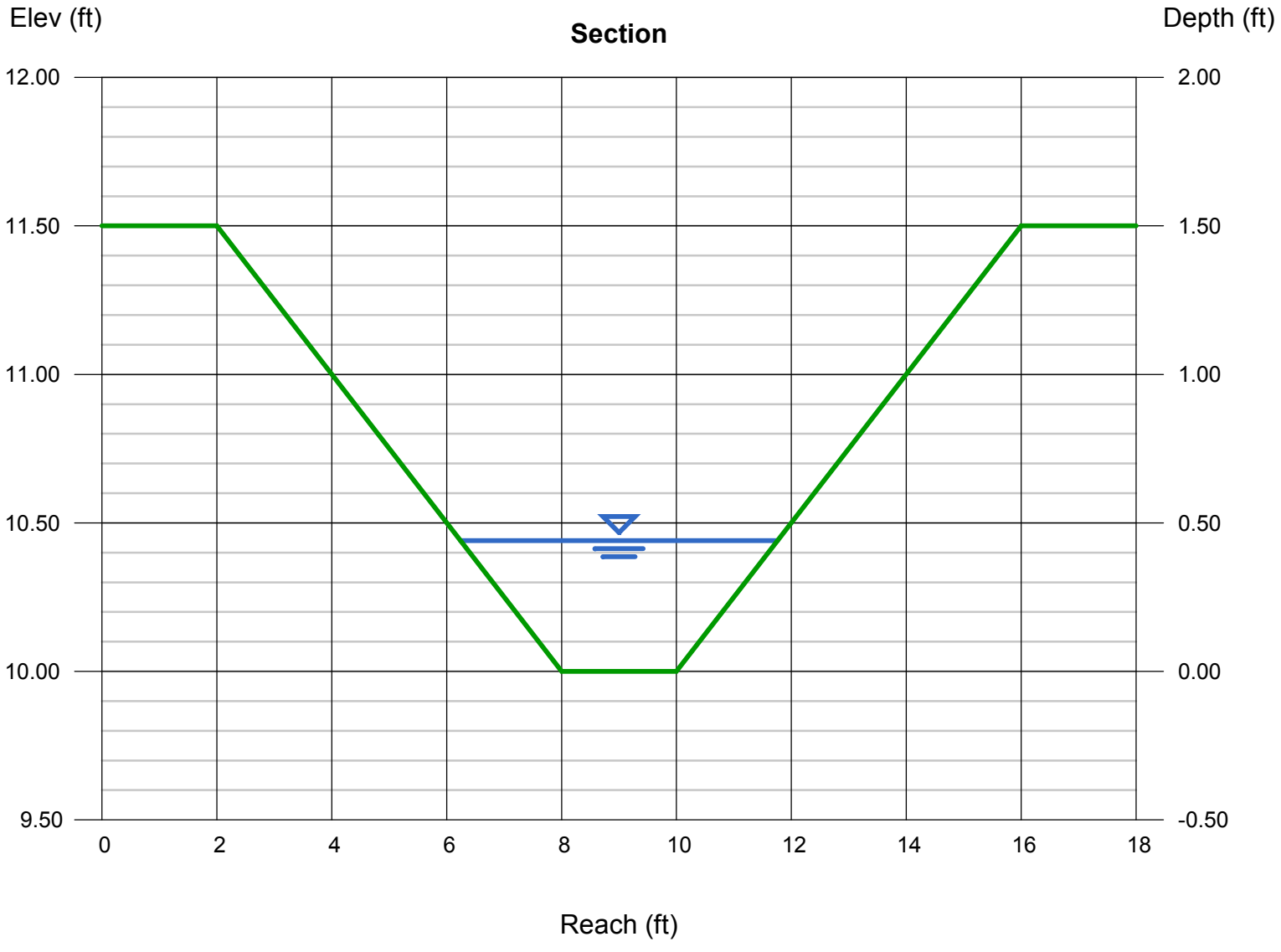
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.50
Invert Elev (ft)	= 10.00
Slope (%)	= 1.85
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 3.65

Highlighted

Depth (ft)	= 0.44
Q (cfs)	= 3.650
Area (sqft)	= 1.65
Velocity (ft/s)	= 2.21
Wetted Perim (ft)	= 5.63
Crit Depth, Yc (ft)	= 0.37
Top Width (ft)	= 5.52
EGL (ft)	= 0.52



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Bioswale 12 (5year)

Trapezoidal

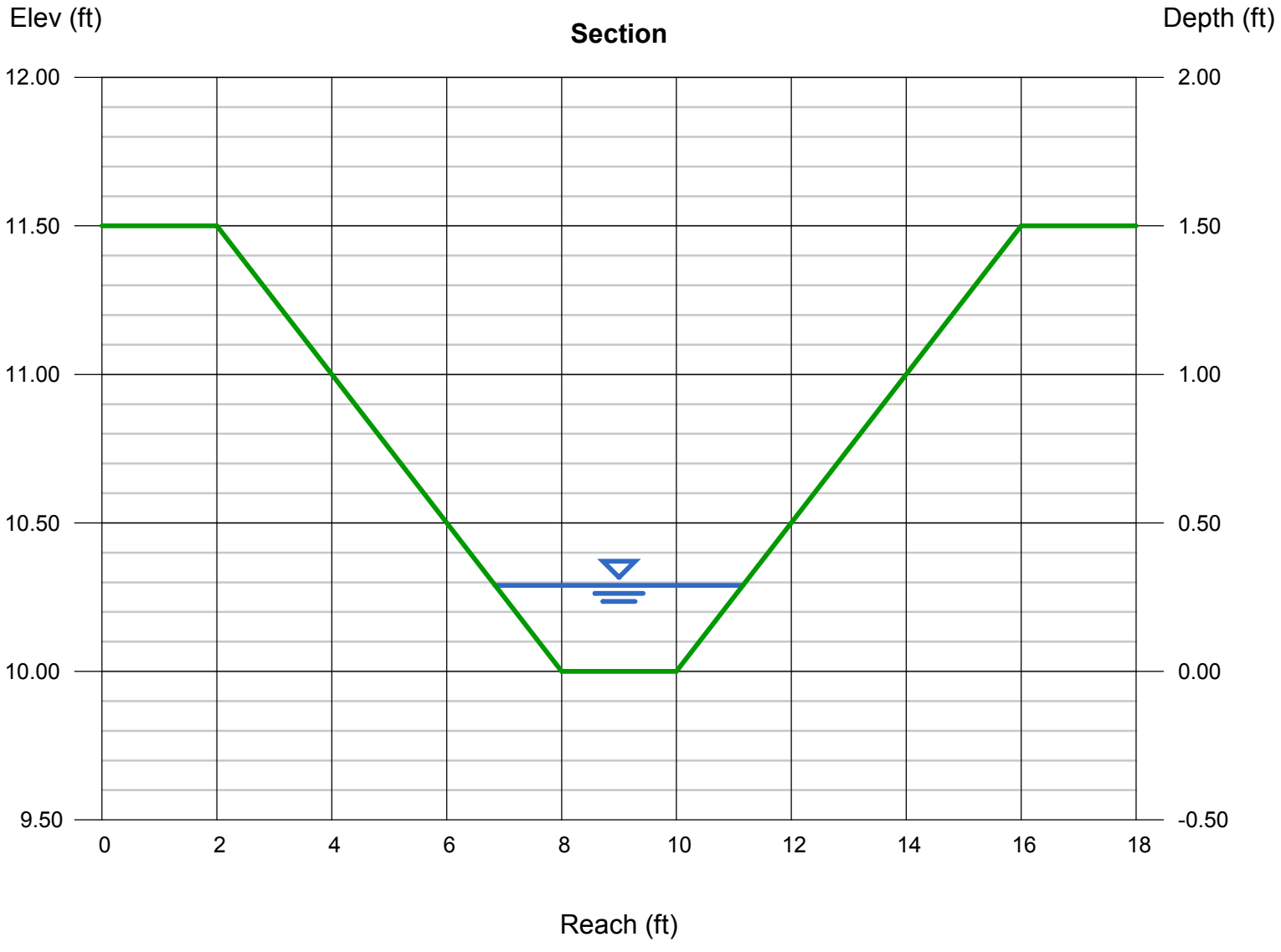
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.50
Invert Elev (ft)	= 10.00
Slope (%)	= 0.62
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.90

Highlighted

Depth (ft)	= 0.29
Q (cfs)	= 0.900
Area (sqft)	= 0.92
Velocity (ft/s)	= 0.98
Wetted Perim (ft)	= 4.39
Crit Depth, Yc (ft)	= 0.17
Top Width (ft)	= 4.32
EGL (ft)	= 0.30



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Bioswale 12 (100year)

Trapezoidal

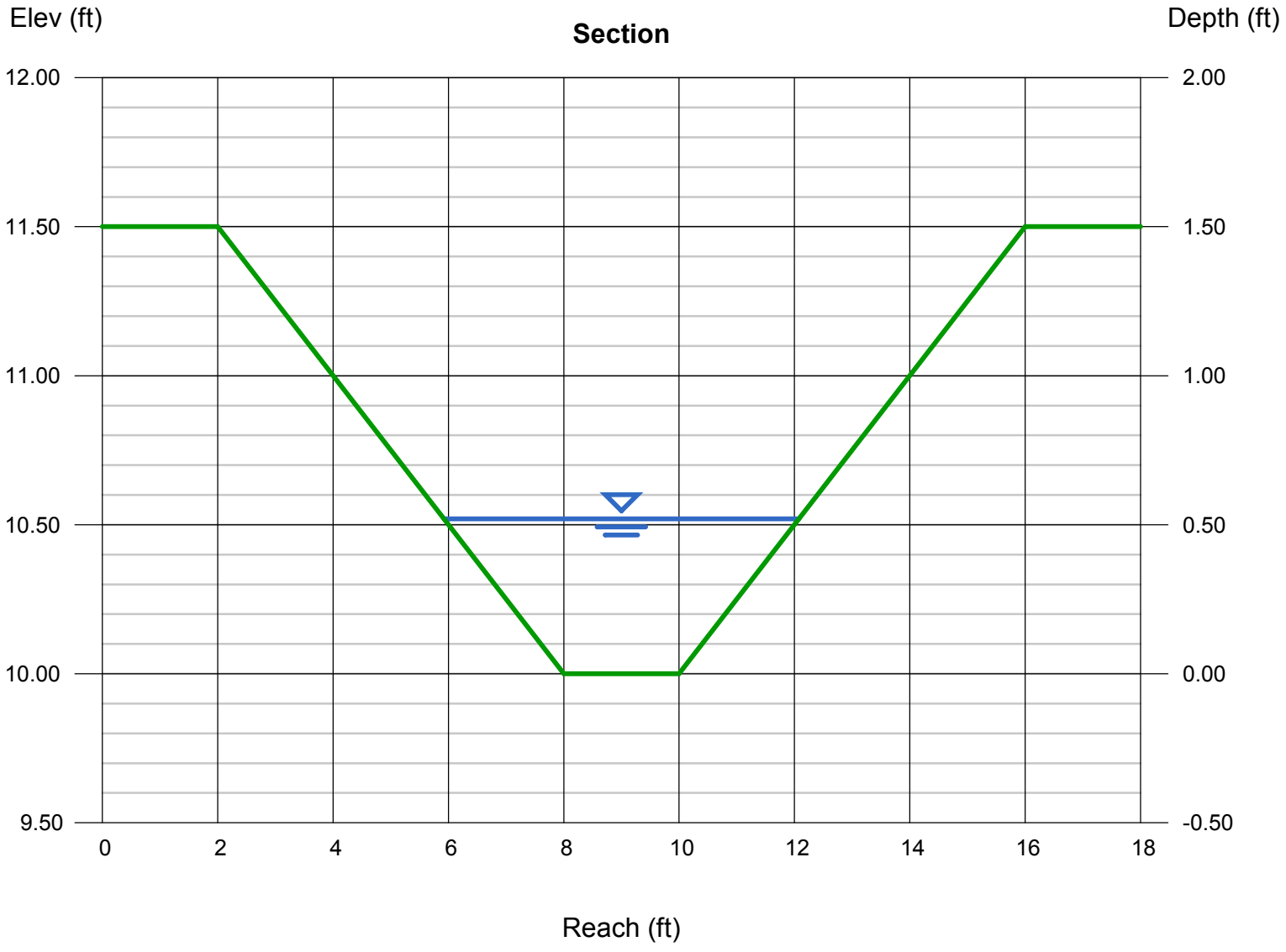
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.50
Invert Elev (ft)	= 10.00
Slope (%)	= 0.62
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 2.94

Highlighted

Depth (ft)	= 0.52
Q (cfs)	= 2.940
Area (sqft)	= 2.12
Velocity (ft/s)	= 1.39
Wetted Perim (ft)	= 6.29
Crit Depth, Yc (ft)	= 0.33
Top Width (ft)	= 6.16
EGL (ft)	= 0.55



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Friday, Nov 16 2012

Bioswale 12 (5year) 2

Trapezoidal

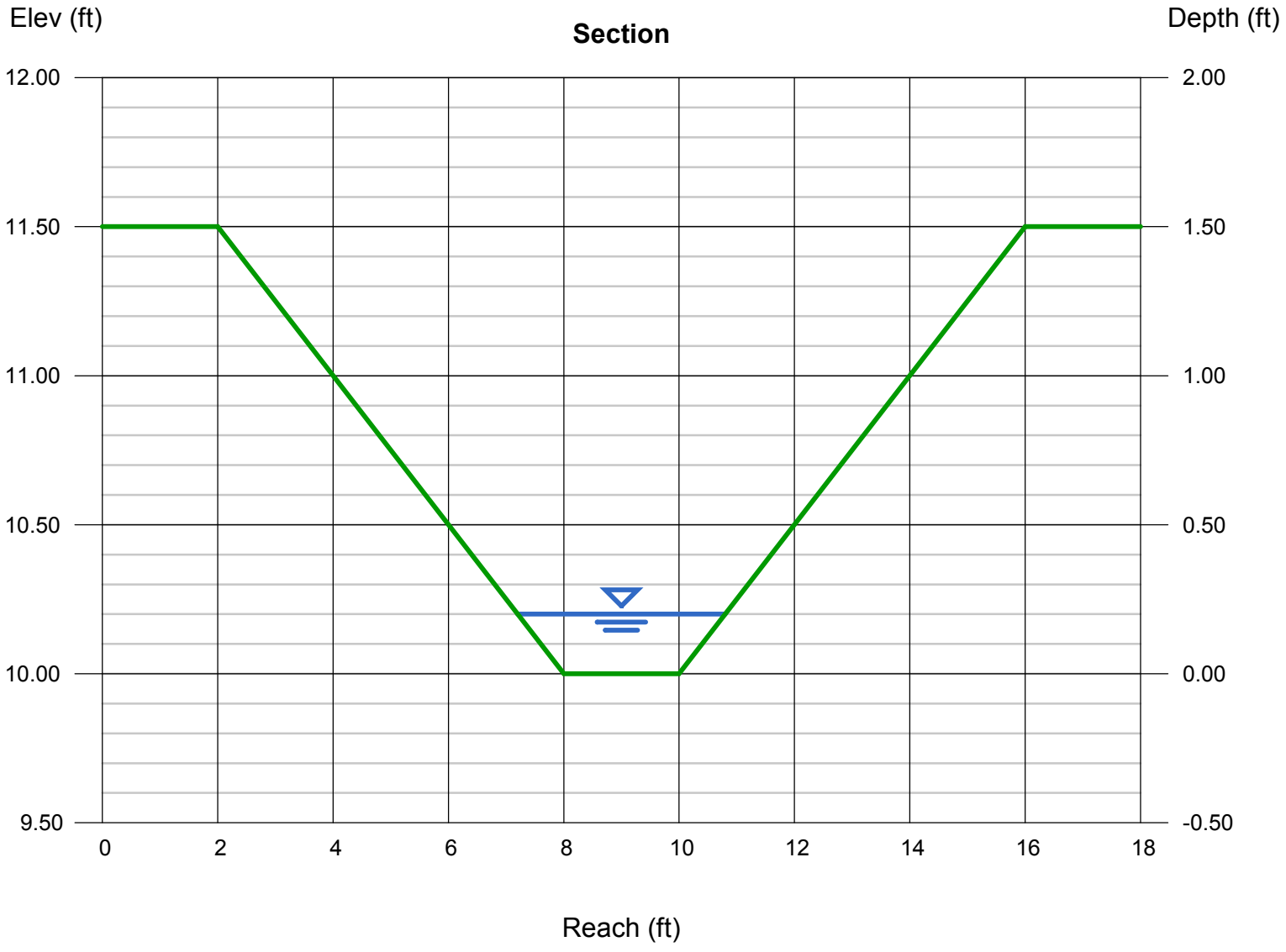
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.50
Invert Elev (ft)	= 10.00
Slope (%)	= 2.51
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.90

Highlighted

Depth (ft)	= 0.20
Q (cfs)	= 0.900
Area (sqft)	= 0.56
Velocity (ft/s)	= 1.61
Wetted Perim (ft)	= 3.65
Crit Depth, Yc (ft)	= 0.17
Top Width (ft)	= 3.60
EGL (ft)	= 0.24



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Friday, Nov 16 2012

Bioswale 12 (100year) 2

Trapezoidal

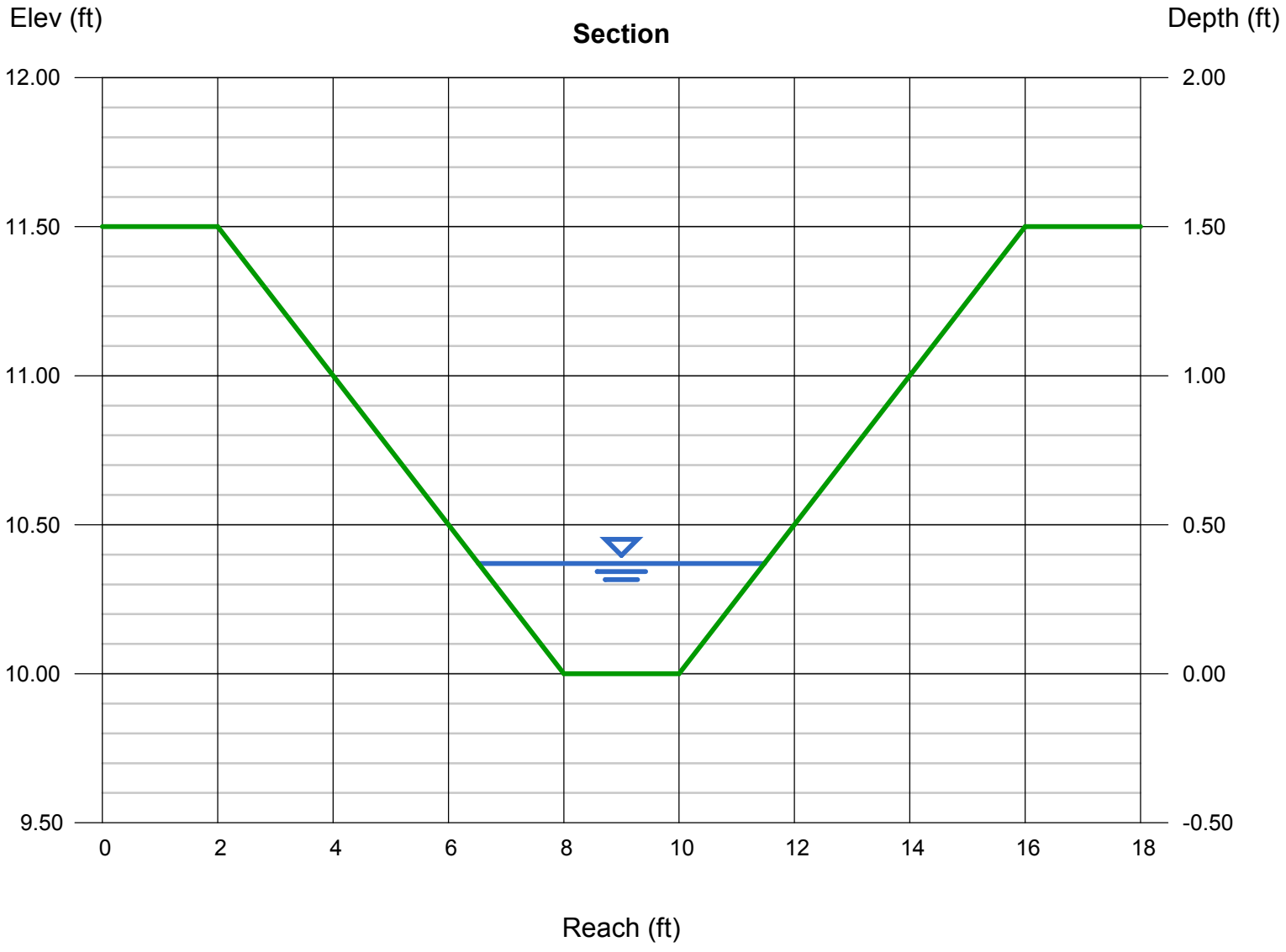
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.50
Invert Elev (ft)	= 10.00
Slope (%)	= 2.51
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 2.94

Highlighted

Depth (ft)	= 0.37
Q (cfs)	= 2.940
Area (sqft)	= 1.29
Velocity (ft/s)	= 2.28
Wetted Perim (ft)	= 5.05
Crit Depth, Yc (ft)	= 0.33
Top Width (ft)	= 4.96
EGL (ft)	= 0.45



Channel Report

Bridge Splash Pad Swale (0.30% Slope) (5yr)

Trapezoidal

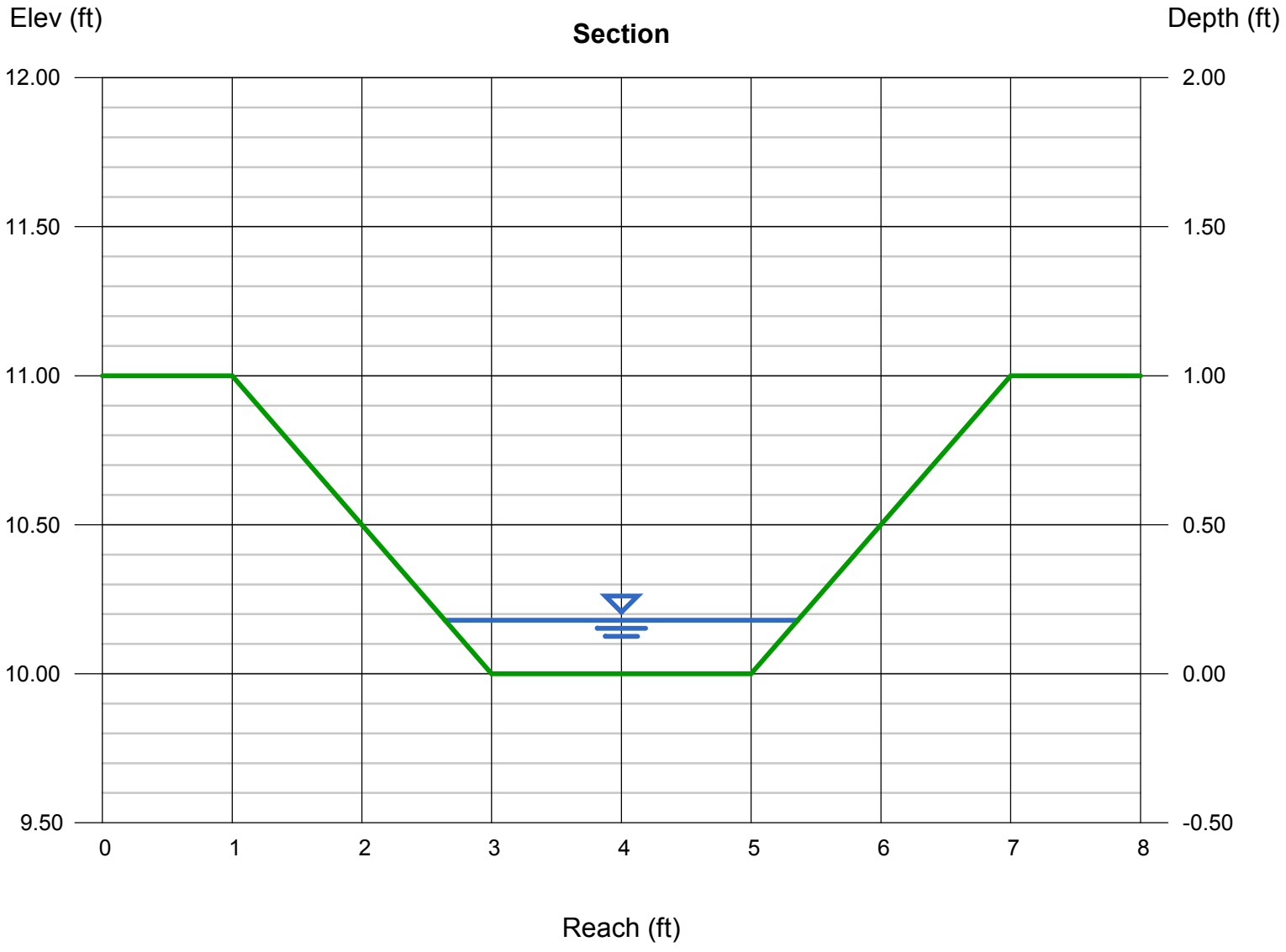
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 2.00, 2.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 0.30
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.23

Highlighted

Depth (ft)	= 0.18
Q (cfs)	= 0.230
Area (sqft)	= 0.42
Velocity (ft/s)	= 0.54
Wetted Perim (ft)	= 2.80
Crit Depth, Yc (ft)	= 0.08
Top Width (ft)	= 2.72
EGL (ft)	= 0.18



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Bridge Splash Pad Swale (0.30% Slope) (100yr)

Trapezoidal

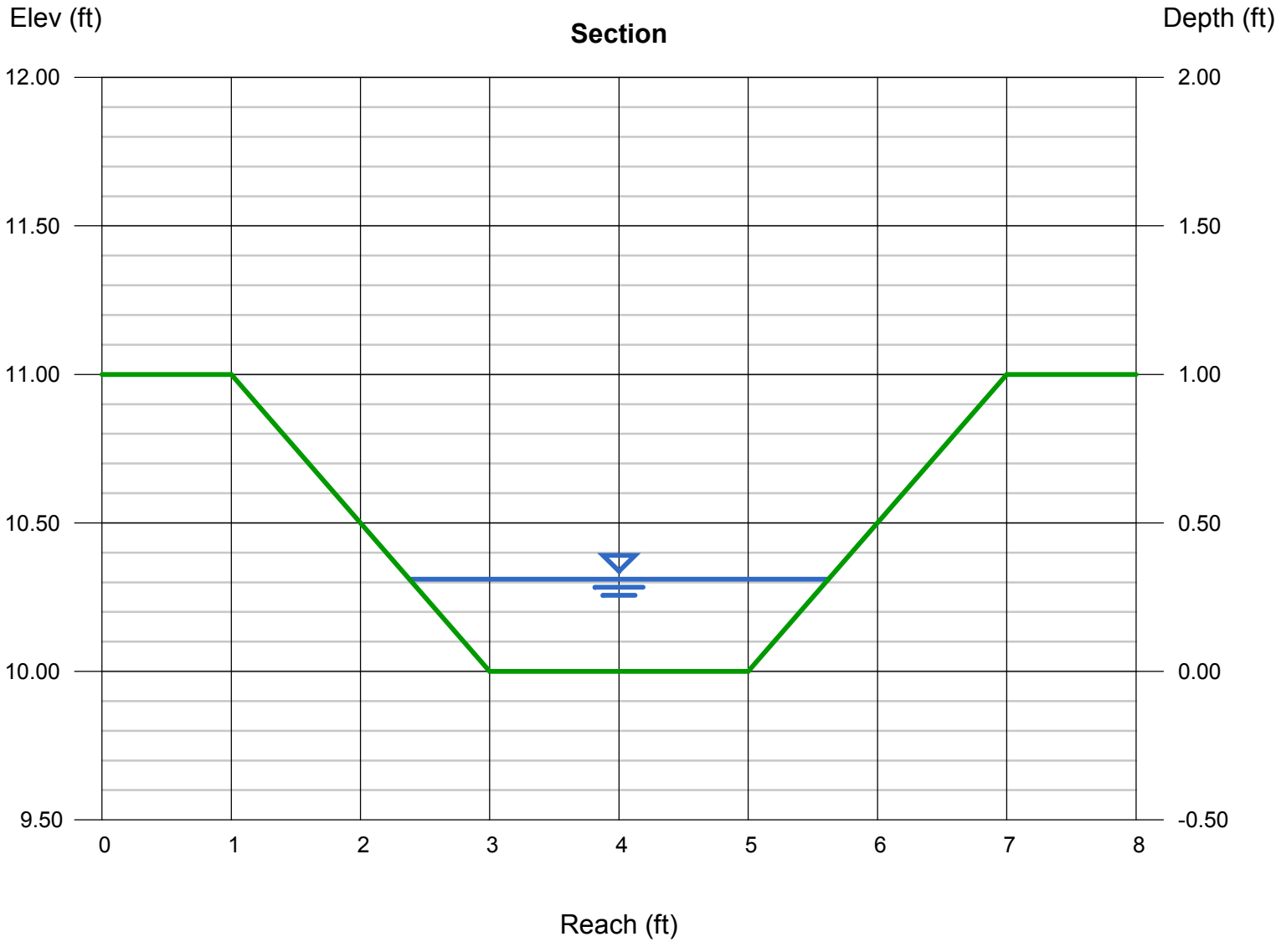
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 2.00, 2.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 0.30
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.63

Highlighted

Depth (ft)	= 0.31
Q (cfs)	= 0.630
Area (sqft)	= 0.81
Velocity (ft/s)	= 0.78
Wetted Perim (ft)	= 3.39
Crit Depth, Yc (ft)	= 0.14
Top Width (ft)	= 3.24
EGL (ft)	= 0.32



Channel Report

CWW NE Swale (5year)

Trapezoidal

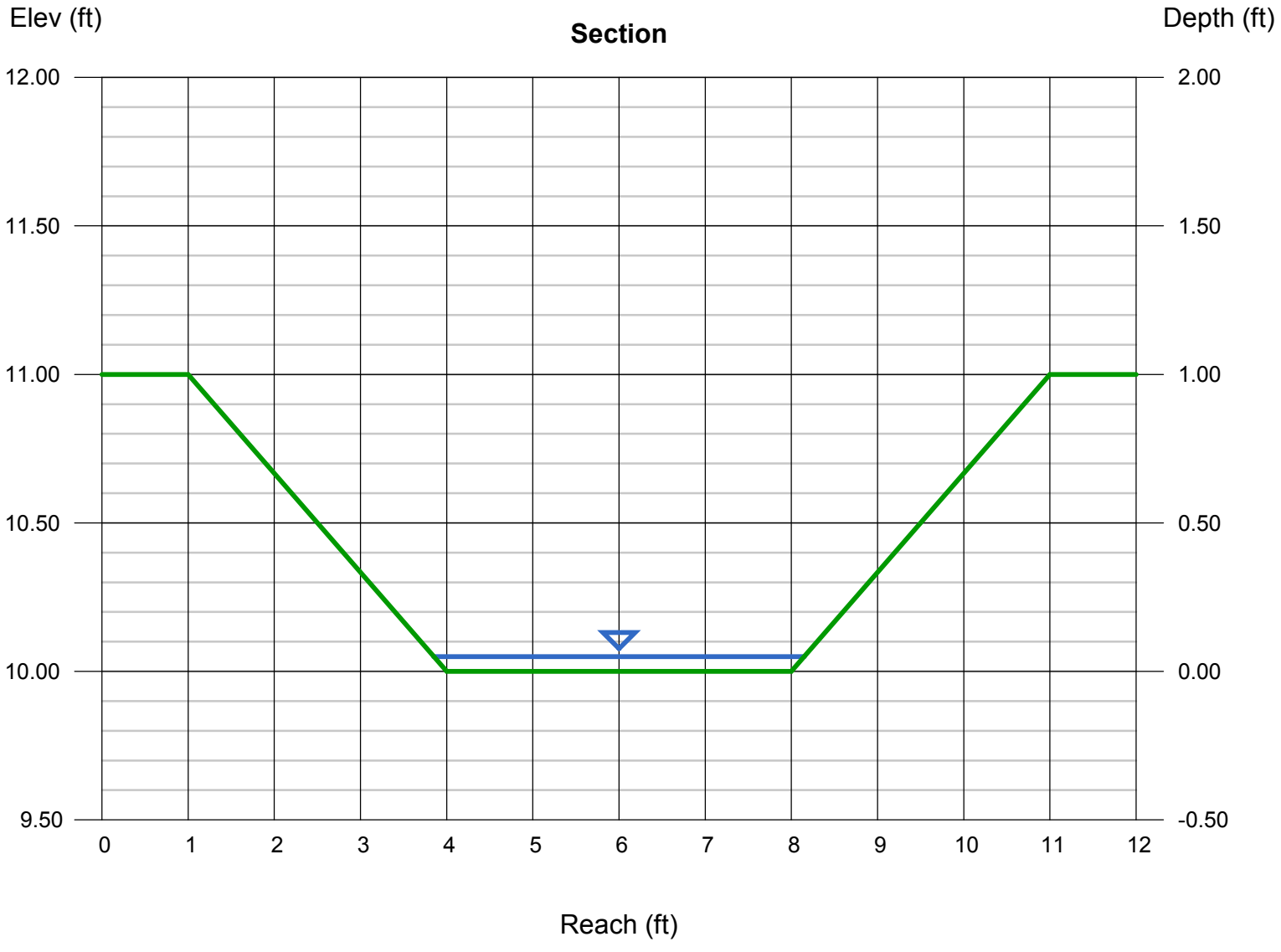
Bottom Width (ft)	= 4.00
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 25.00
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.49

Highlighted

Depth (ft)	= 0.05
Q (cfs)	= 0.490
Area (sqft)	= 0.21
Velocity (ft/s)	= 2.36
Wetted Perim (ft)	= 4.32
Crit Depth, Yc (ft)	= 0.08
Top Width (ft)	= 4.30
EGL (ft)	= 0.14



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

CWW NE Swale (100year)

Trapezoidal

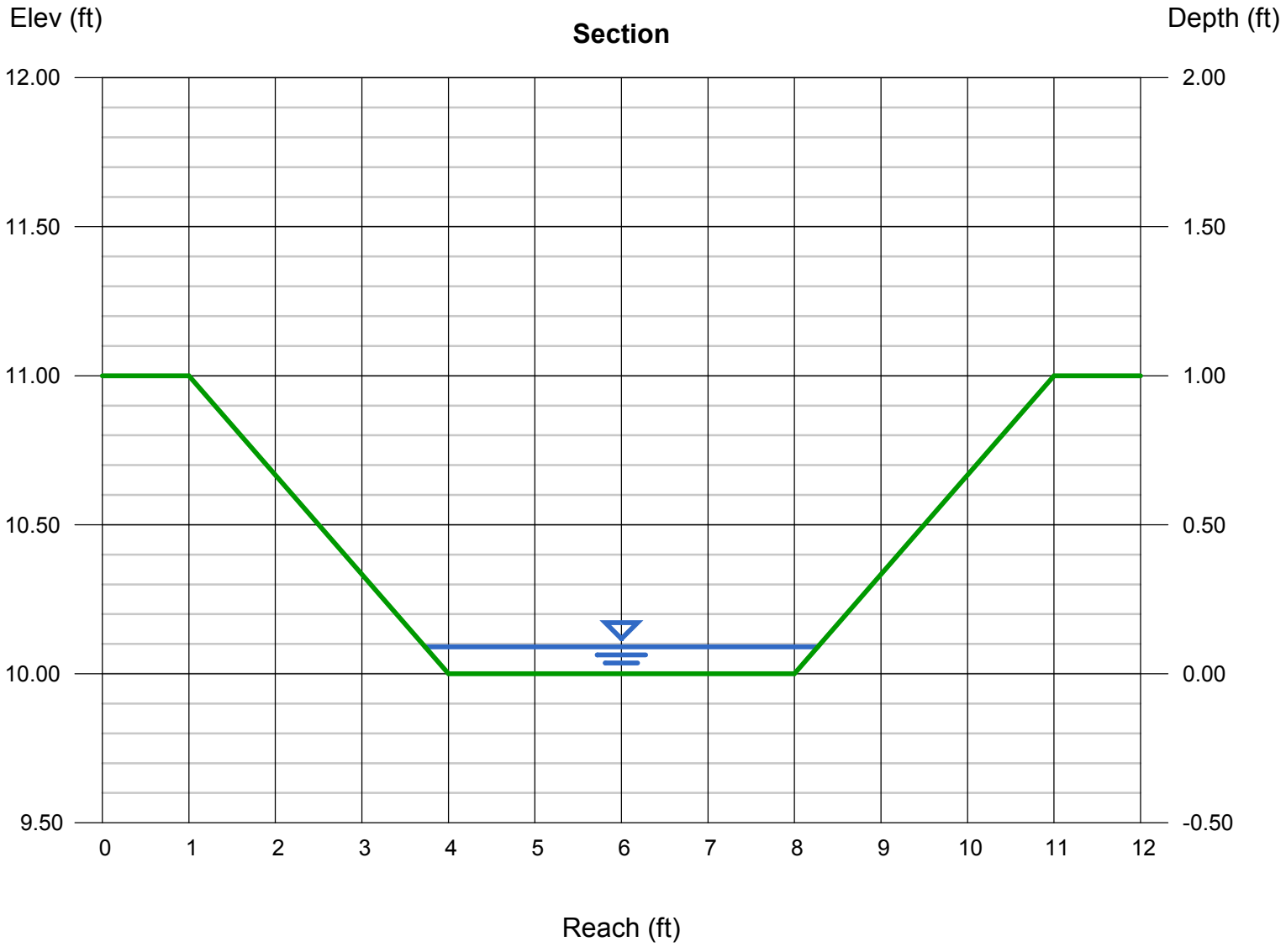
Bottom Width (ft)	= 4.00
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 25.00
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.31

Highlighted

Depth (ft)	= 0.09
Q (cfs)	= 1.310
Area (sqft)	= 0.38
Velocity (ft/s)	= 3.41
Wetted Perim (ft)	= 4.57
Crit Depth, Yc (ft)	= 0.15
Top Width (ft)	= 4.54
EGL (ft)	= 0.27



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

CWW NW Swale (5year)

Trapezoidal

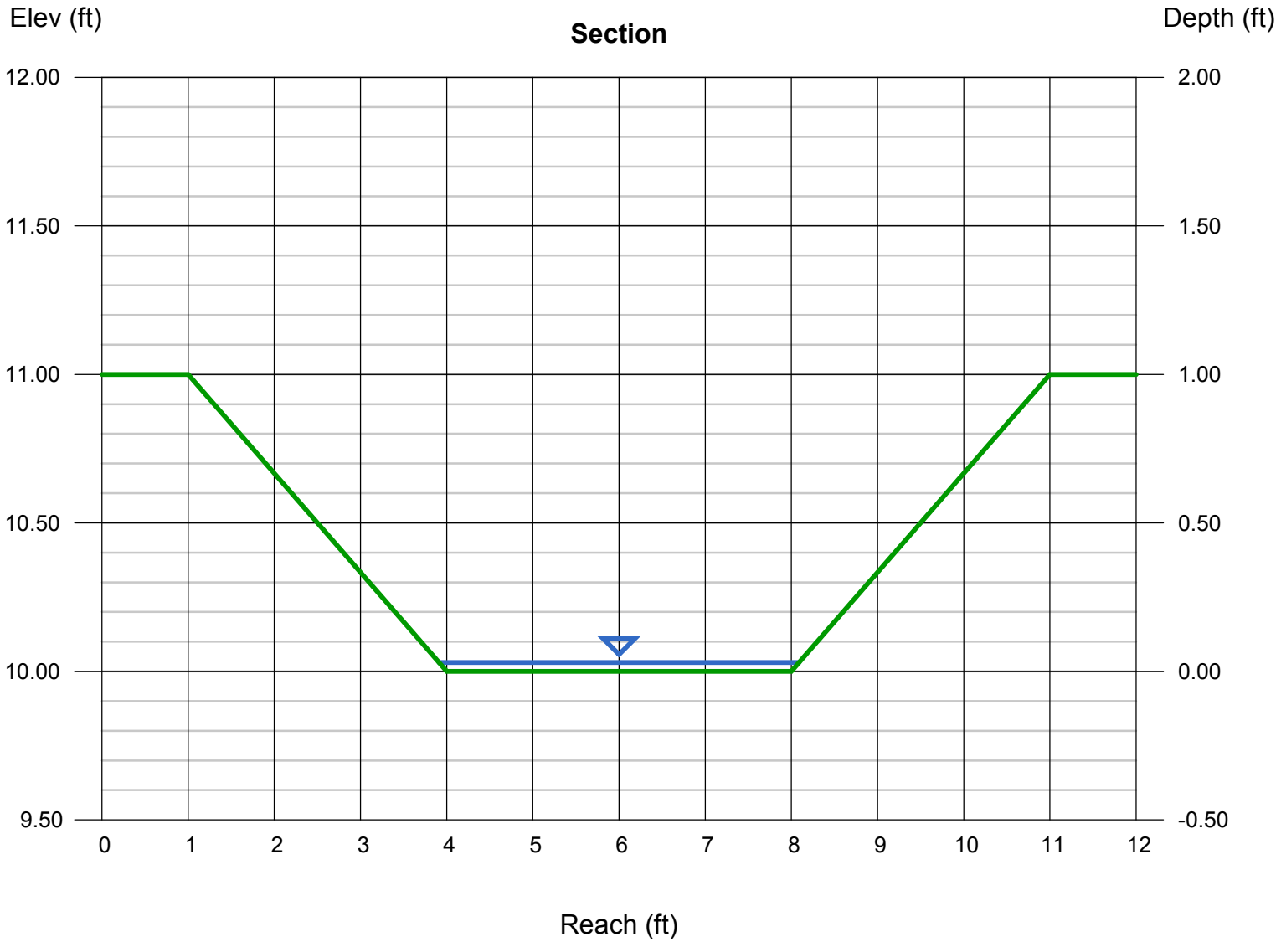
Bottom Width (ft)	= 4.00
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 25.00
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.14

Highlighted

Depth (ft)	= 0.03
Q (cfs)	= 0.140
Area (sqft)	= 0.12
Velocity (ft/s)	= 1.14
Wetted Perim (ft)	= 4.19
Crit Depth, Yc (ft)	= 0.04
Top Width (ft)	= 4.18
EGL (ft)	= 0.05



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

CWW NW Swale (100year)

Trapezoidal

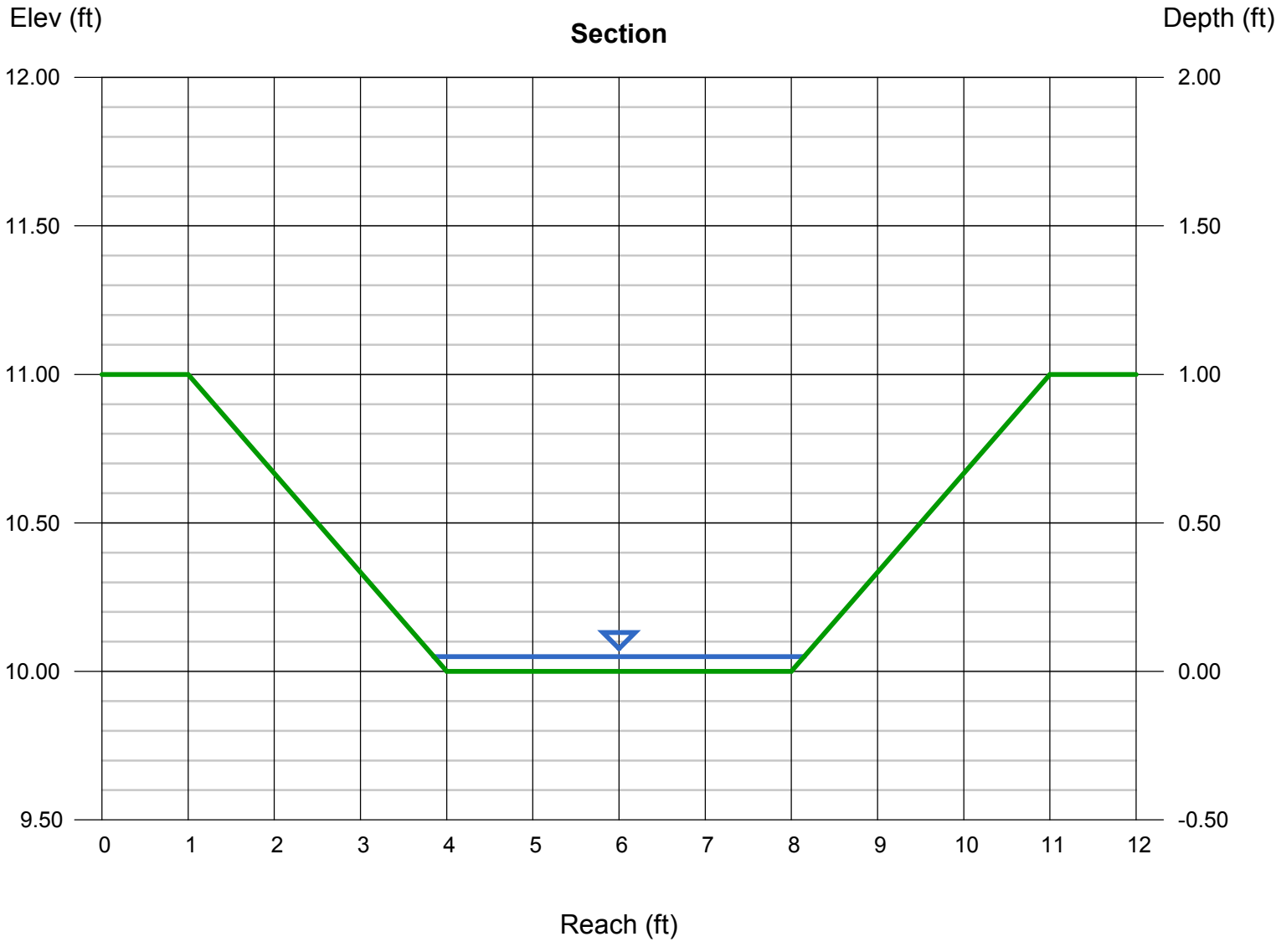
Bottom Width (ft)	= 4.00
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 25.00
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.39

Highlighted

Depth (ft)	= 0.05
Q (cfs)	= 0.390
Area (sqft)	= 0.21
Velocity (ft/s)	= 1.88
Wetted Perim (ft)	= 4.32
Crit Depth, Yc (ft)	= 0.07
Top Width (ft)	= 4.30
EGL (ft)	= 0.10



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

CWW SW Swale (5year)

Trapezoidal

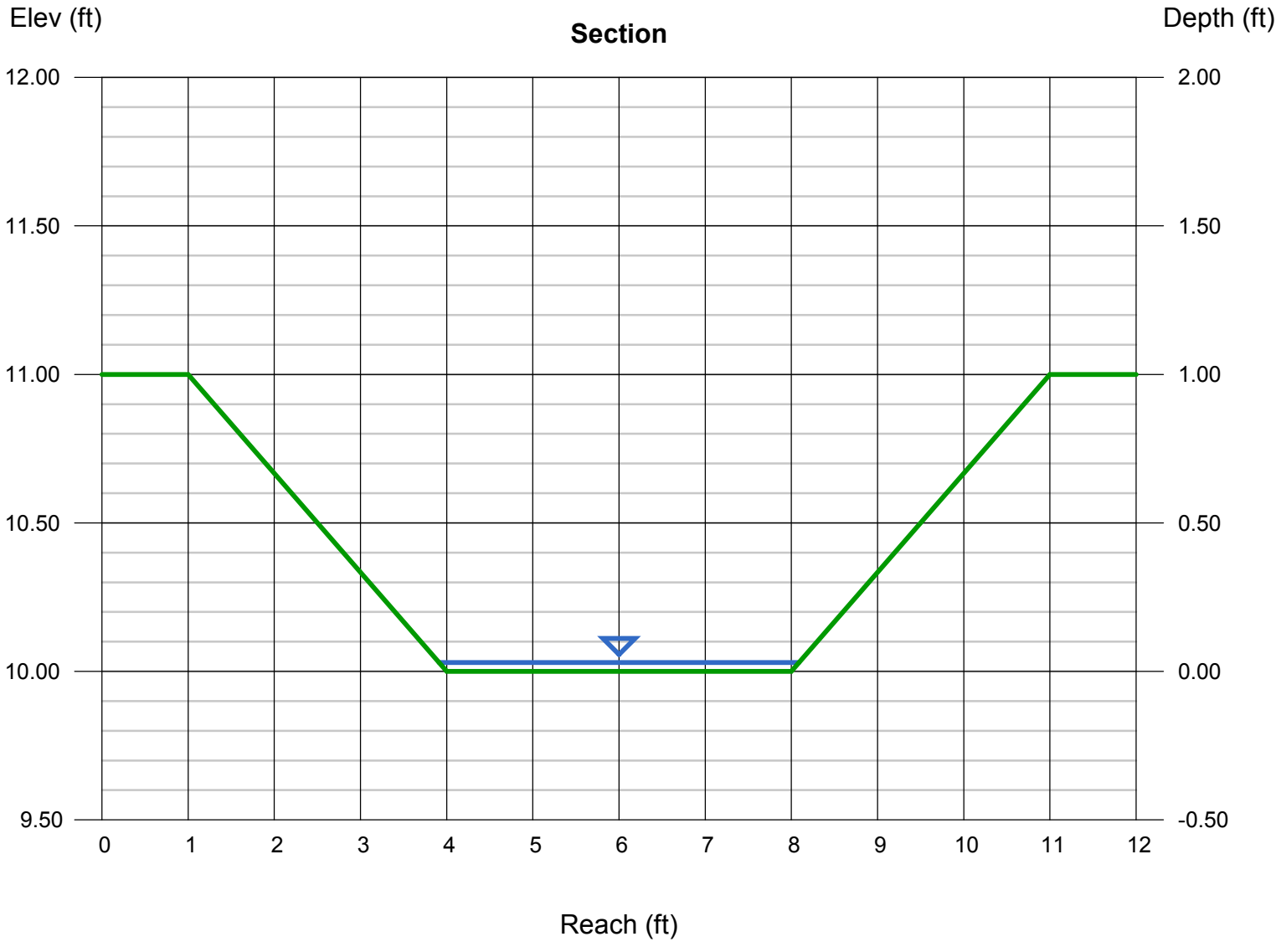
Bottom Width (ft)	= 4.00
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 25.00
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.18

Highlighted

Depth (ft)	= 0.03
Q (cfs)	= 0.180
Area (sqft)	= 0.12
Velocity (ft/s)	= 1.47
Wetted Perim (ft)	= 4.19
Crit Depth, Yc (ft)	= 0.04
Top Width (ft)	= 4.18
EGL (ft)	= 0.06



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

CWW SW Swale (100year)

Trapezoidal

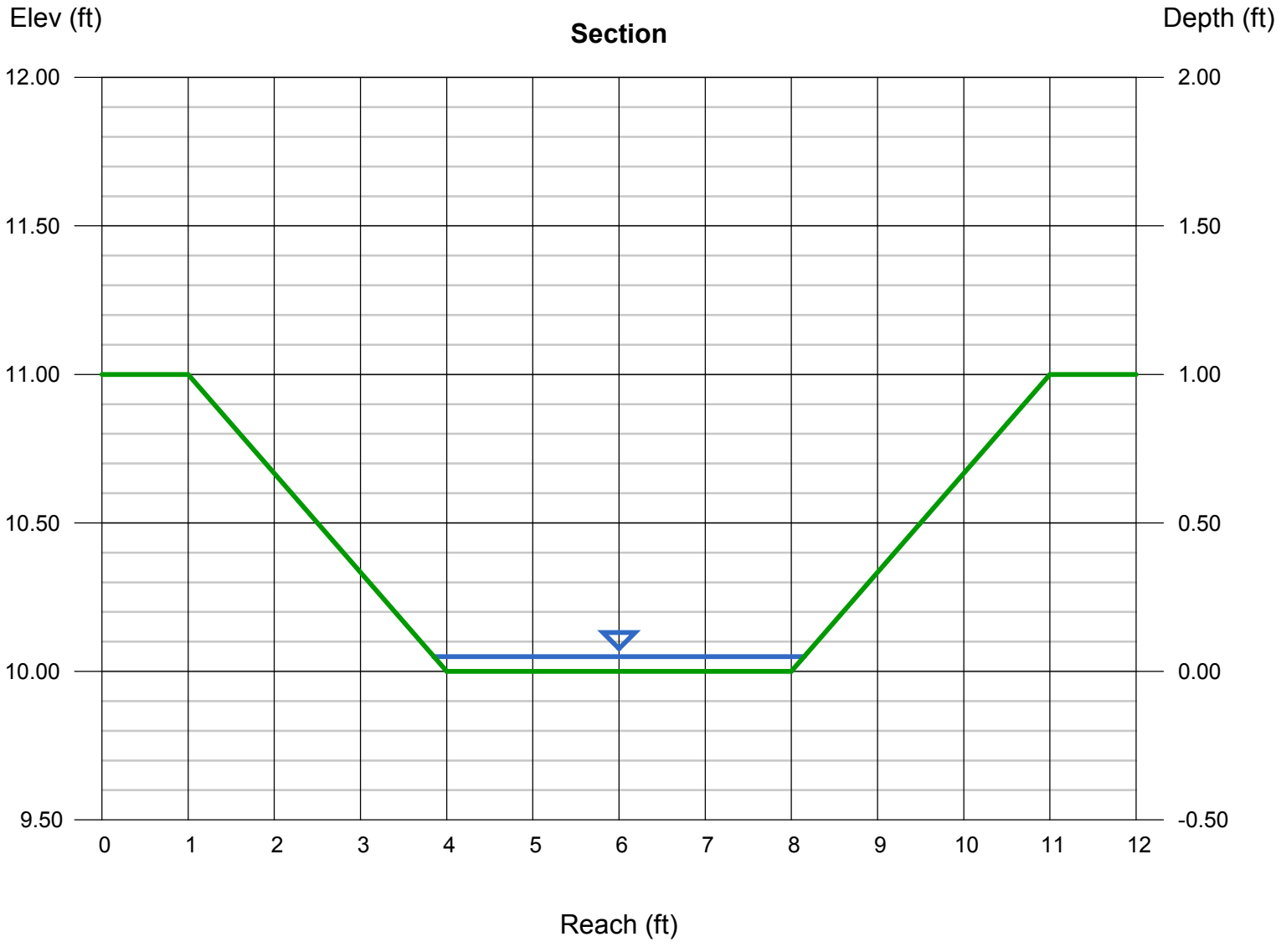
Bottom Width (ft)	= 4.00
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 25.00
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.48

Highlighted

Depth (ft)	= 0.05
Q (cfs)	= 0.480
Area (sqft)	= 0.21
Velocity (ft/s)	= 2.31
Wetted Perim (ft)	= 4.32
Crit Depth, Yc (ft)	= 0.08
Top Width (ft)	= 4.30
EGL (ft)	= 0.13



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

CWW SE Swale (5year)

Trapezoidal

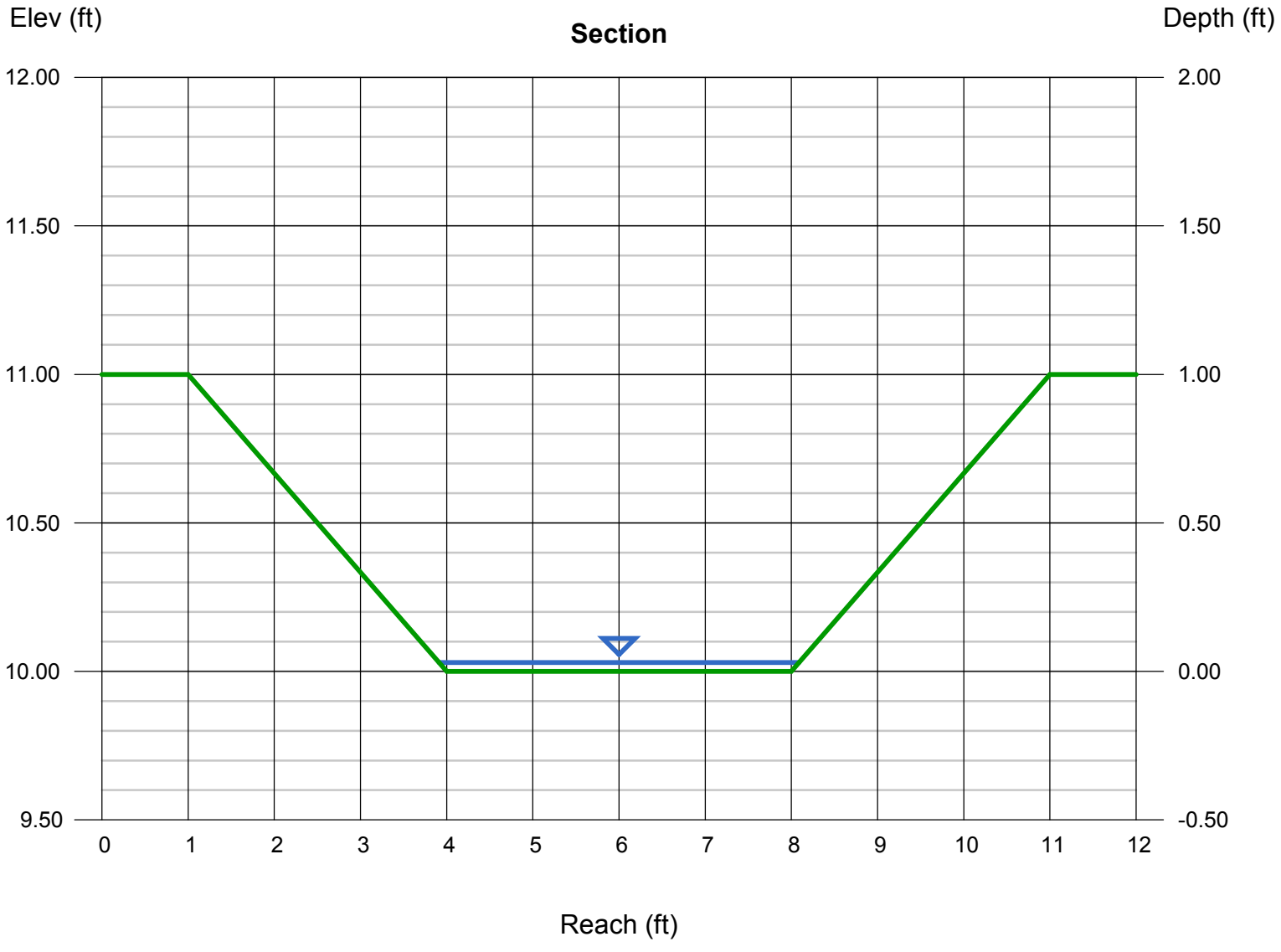
Bottom Width (ft)	= 4.00
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 25.00
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.18

Highlighted

Depth (ft)	= 0.03
Q (cfs)	= 0.180
Area (sqft)	= 0.12
Velocity (ft/s)	= 1.47
Wetted Perim (ft)	= 4.19
Crit Depth, Yc (ft)	= 0.04
Top Width (ft)	= 4.18
EGL (ft)	= 0.06



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

CWW SE Swale (100year)

Trapezoidal

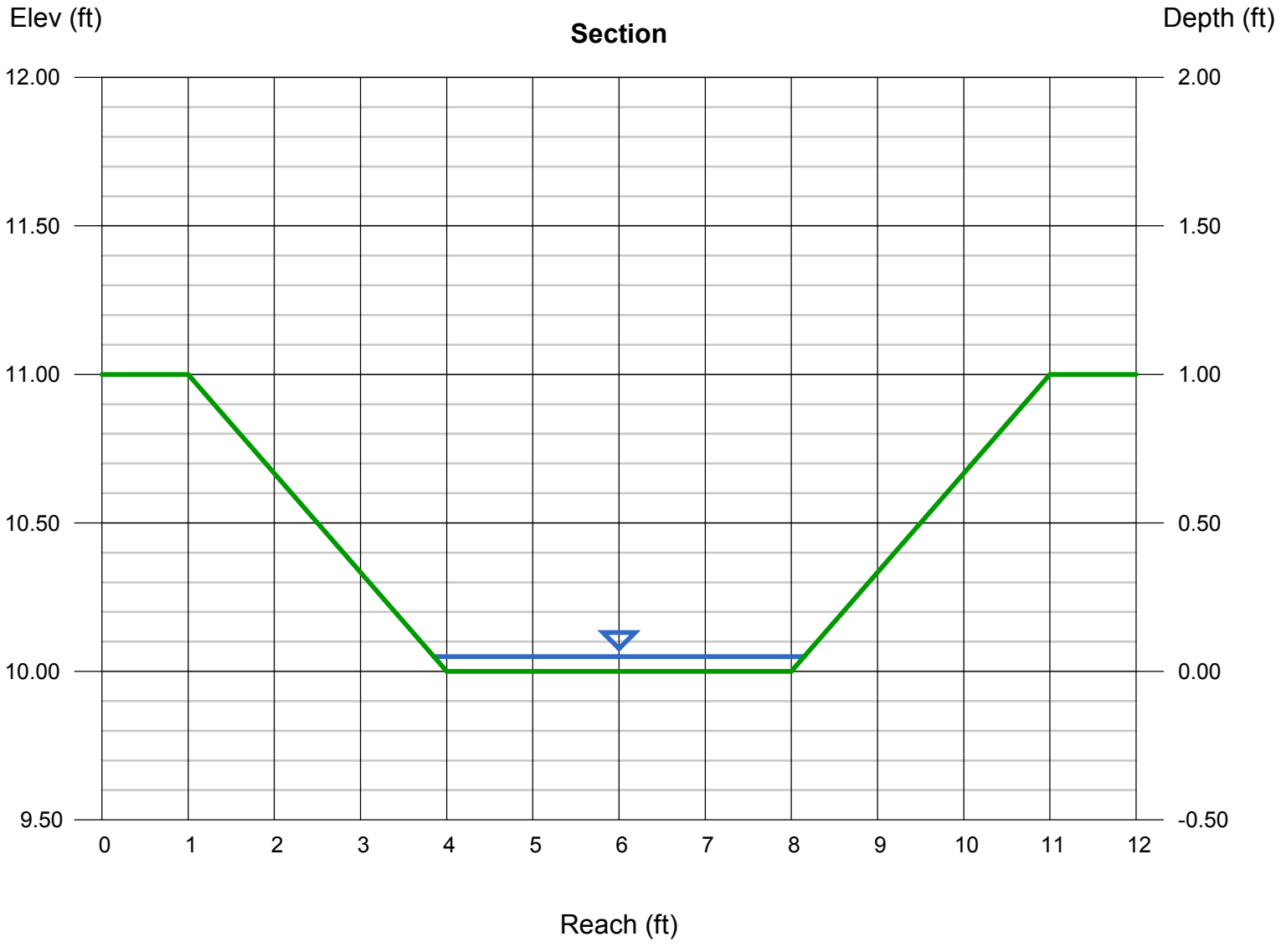
Bottom Width (ft)	= 4.00
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 25.00
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.48

Highlighted

Depth (ft)	= 0.05
Q (cfs)	= 0.480
Area (sqft)	= 0.21
Velocity (ft/s)	= 2.31
Wetted Perim (ft)	= 4.32
Crit Depth, Yc (ft)	= 0.08
Top Width (ft)	= 4.30
EGL (ft)	= 0.13



Channel Report

282+50 Box Outlet to Basin 5-Year Event (0.25% Slope)

Trapezoidal

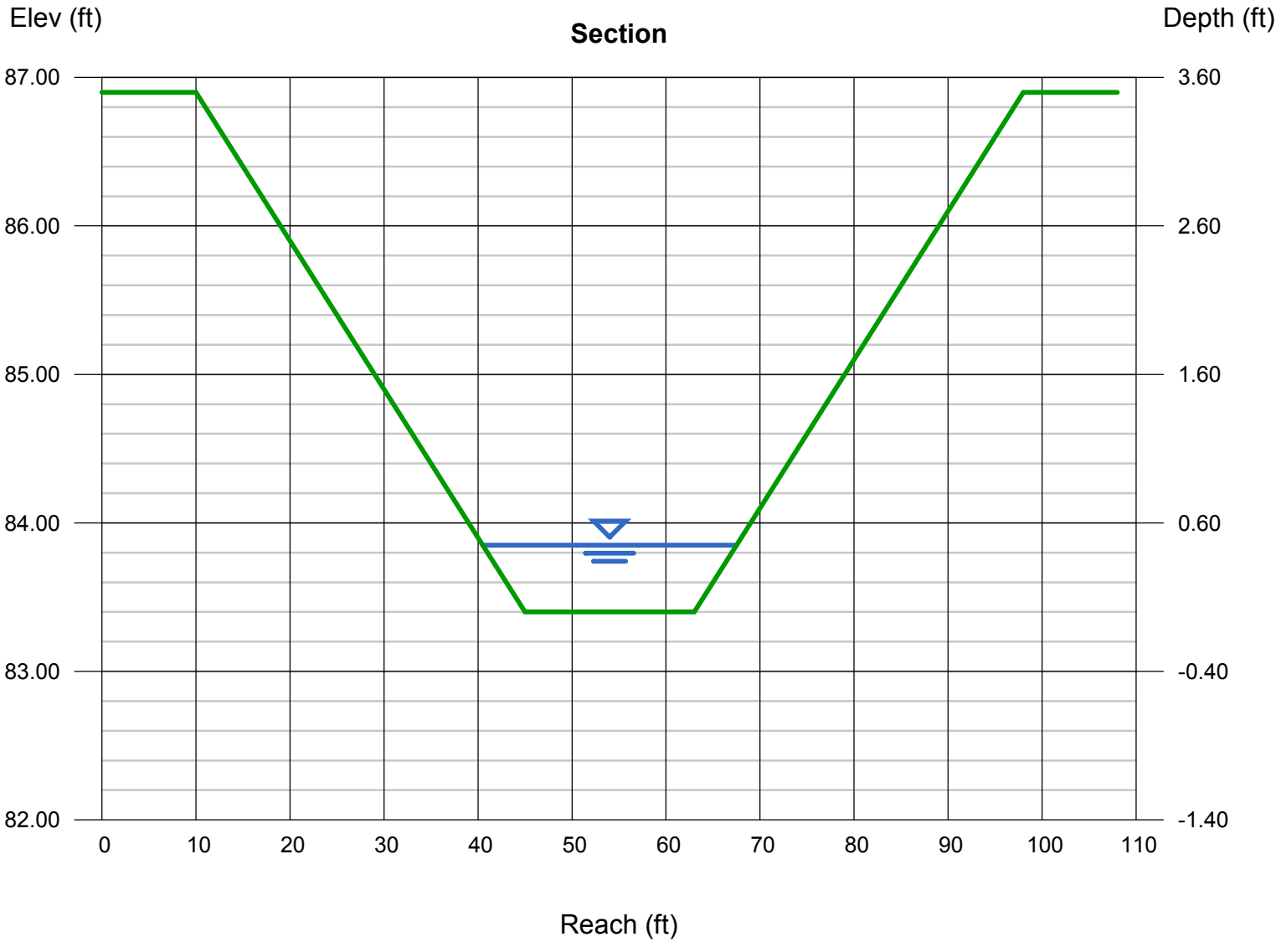
Bottom Width (ft)	= 18.00
Side Slopes (z:1)	= 10.00, 10.00
Total Depth (ft)	= 3.50
Invert Elev (ft)	= 83.40
Slope (%)	= 0.25
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 29.04

Highlighted

Depth (ft)	= 0.45
Q (cfs)	= 29.04
Area (sqft)	= 10.13
Velocity (ft/s)	= 2.87
Wetted Perim (ft)	= 27.04
Crit Depth, Yc (ft)	= 0.41
Top Width (ft)	= 27.00
EGL (ft)	= 0.58



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Friday, Nov 16 2012

282+50 Box Outlet to Basin 5-Year Event (1.46% Slope)

Trapezoidal

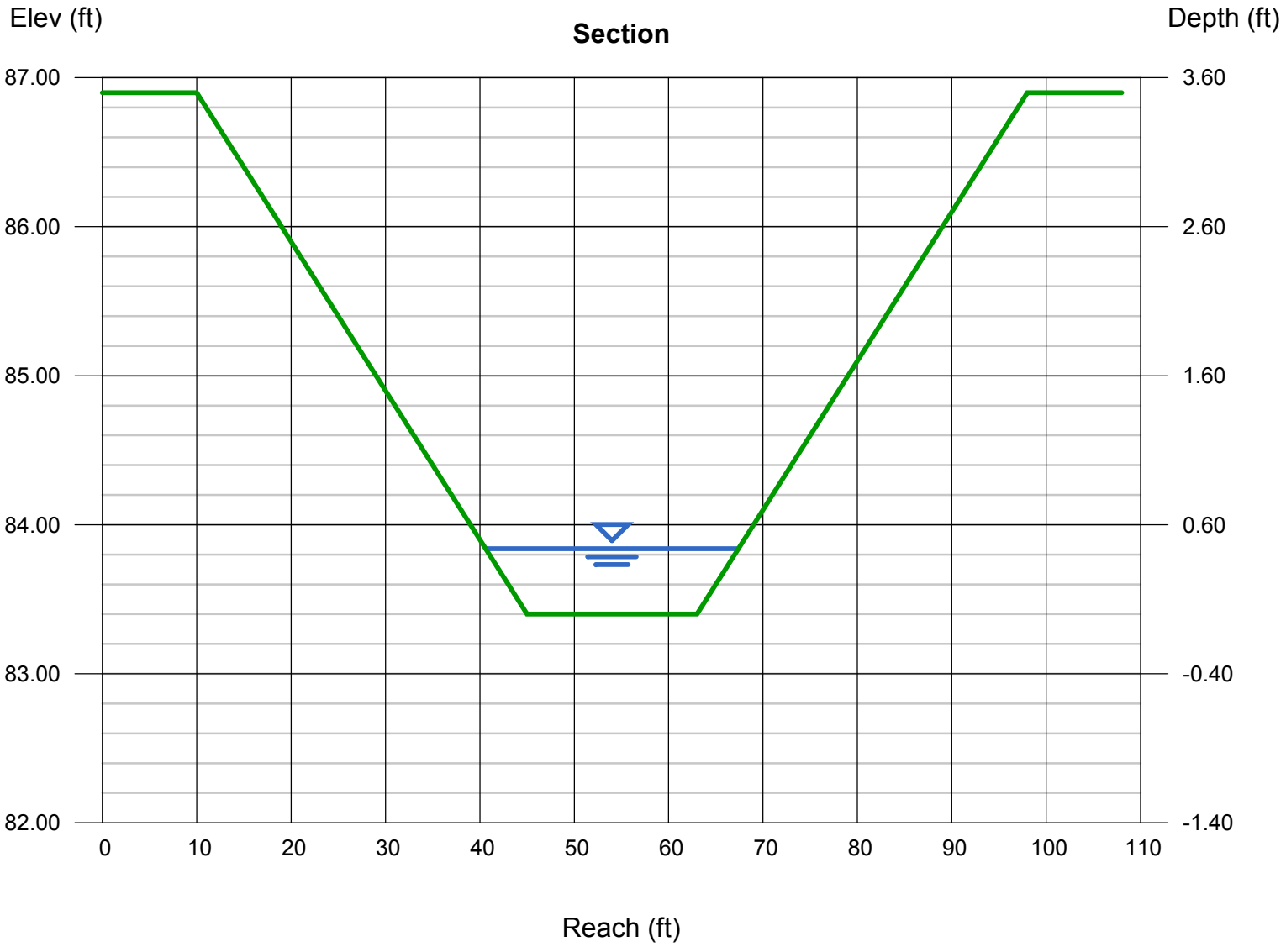
Bottom Width (ft)	= 18.00
Side Slopes (z:1)	= 10.00, 10.00
Total Depth (ft)	= 3.50
Invert Elev (ft)	= 83.40
Slope (%)	= 1.46
N-Value	= 0.030

Calculations

Compute by:	Known Q
Known Q (cfs)	= 29.04

Highlighted

Depth (ft)	= 0.44
Q (cfs)	= 29.04
Area (sqft)	= 9.86
Velocity (ft/s)	= 2.95
Wetted Perim (ft)	= 26.84
Crit Depth, Yc (ft)	= 0.41
Top Width (ft)	= 26.80
EGL (ft)	= 0.57



Channel Report

282+50 Box Outlet to Basin 100-Year Event (0.25% Slope)

Trapezoidal

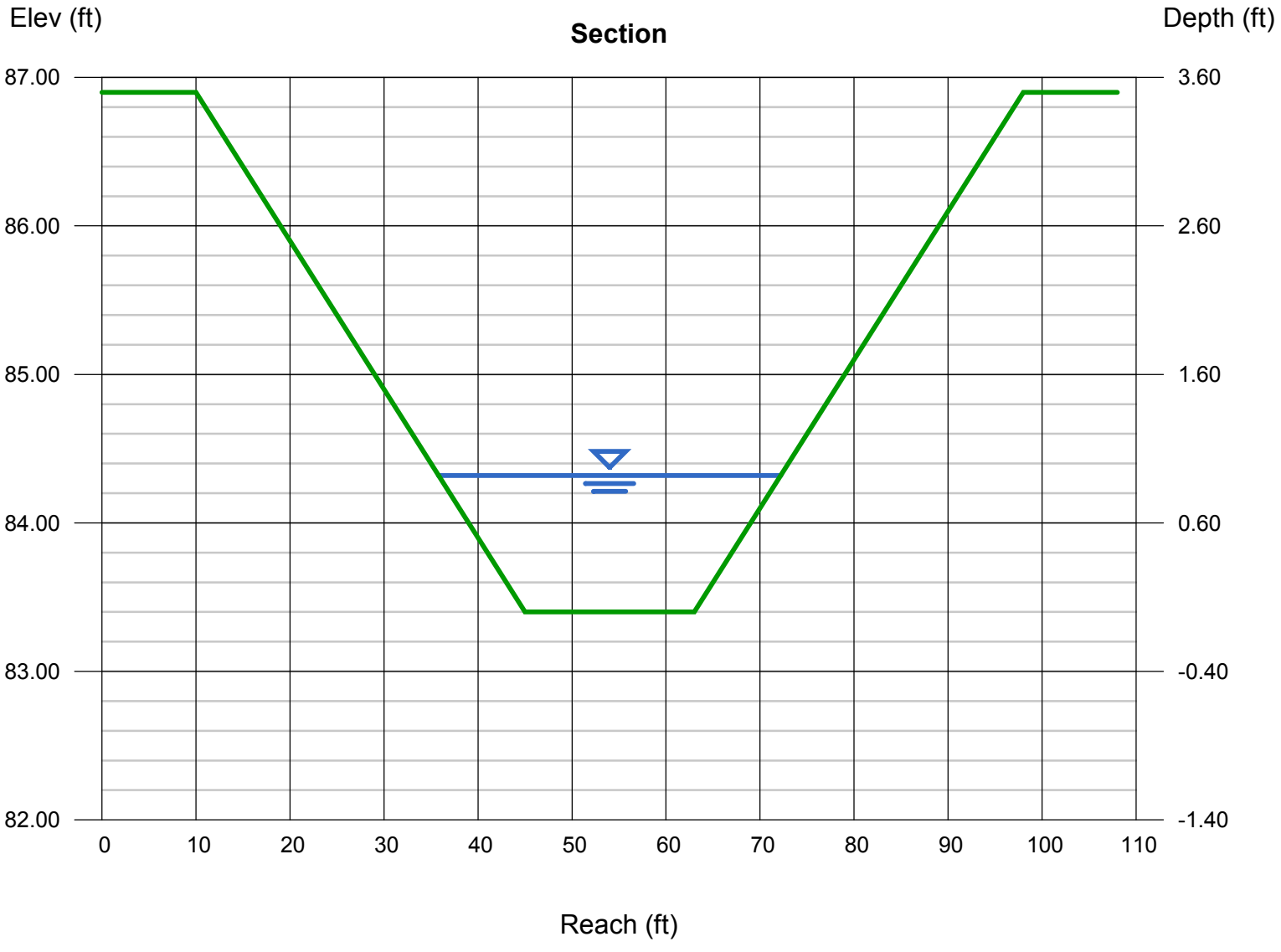
Bottom Width (ft)	= 18.00
Side Slopes (z:1)	= 10.00, 10.00
Total Depth (ft)	= 3.50
Invert Elev (ft)	= 83.40
Slope (%)	= 0.25
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 111.03

Highlighted

Depth (ft)	= 0.92
Q (cfs)	= 111.03
Area (sqft)	= 25.02
Velocity (ft/s)	= 4.44
Wetted Perim (ft)	= 36.49
Crit Depth, Yc (ft)	= 0.90
Top Width (ft)	= 36.40
EGL (ft)	= 1.23



Channel Report

282+50 Box Outlet to Basin 100-Year Event (1.46% Slope)

Trapezoidal

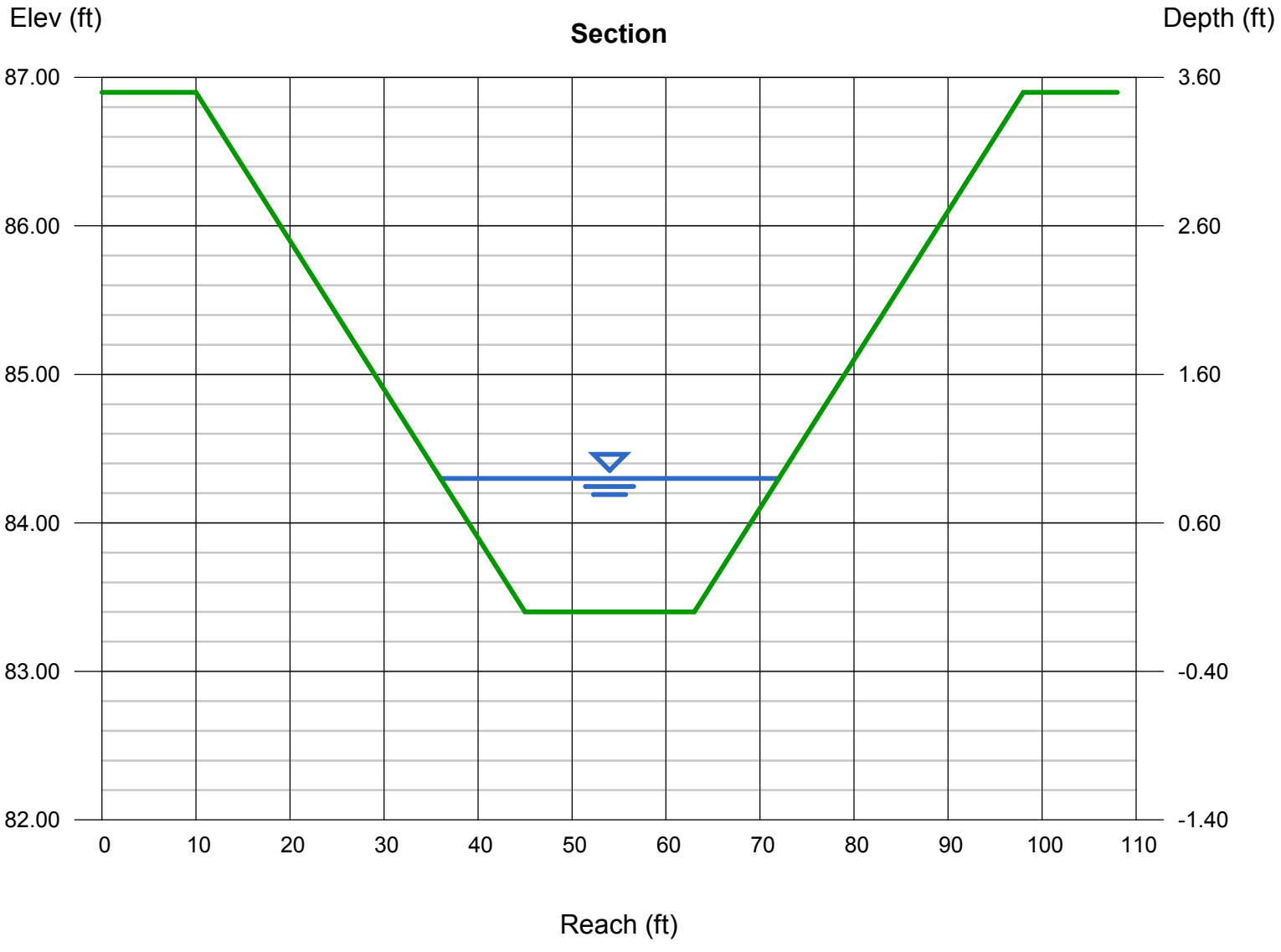
Bottom Width (ft)	= 18.00
Side Slopes (z:1)	= 10.00, 10.00
Total Depth (ft)	= 3.50
Invert Elev (ft)	= 83.40
Slope (%)	= 1.48
N-Value	= 0.030

Calculations

Compute by:	Known Q
Known Q (cfs)	= 111.03

Highlighted

Depth (ft)	= 0.90
Q (cfs)	= 111.03
Area (sqft)	= 24.30
Velocity (ft/s)	= 4.57
Wetted Perim (ft)	= 36.09
Crit Depth, Yc (ft)	= 0.90
Top Width (ft)	= 36.00
EGL (ft)	= 1.22



Channel Report

262+25 Box Outlet to Basin 5-Year Event (0.25% Slope)

Trapezoidal

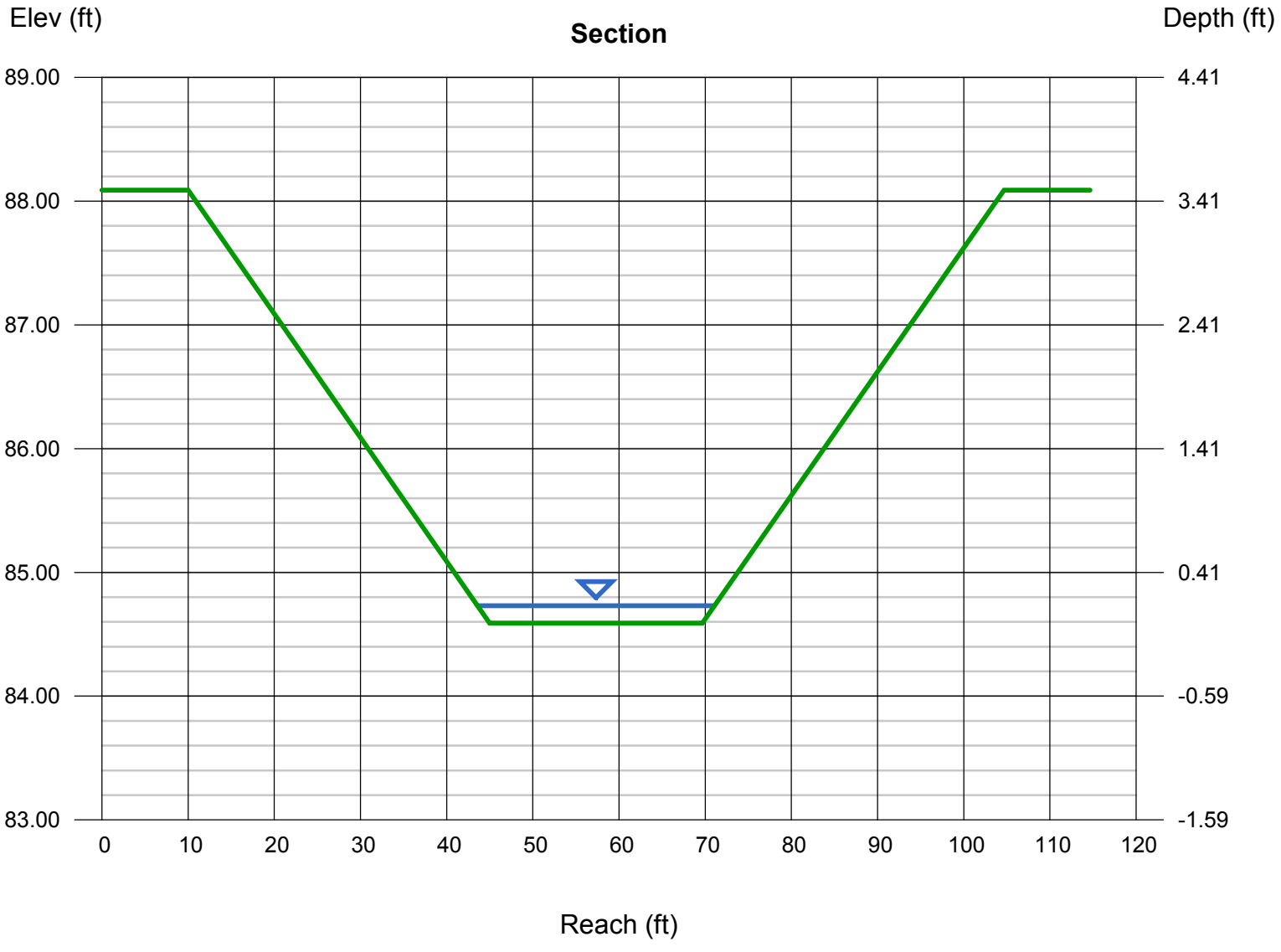
Bottom Width (ft)	= 24.67
Side Slopes (z:1)	= 10.00, 10.00
Total Depth (ft)	= 3.50
Invert Elev (ft)	= 84.59
Slope (%)	= 0.25
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 5.12

Highlighted

Depth (ft)	= 0.14
Q (cfs)	= 5.120
Area (sqft)	= 3.65
Velocity (ft/s)	= 1.40
Wetted Perim (ft)	= 27.48
Crit Depth, Yc (ft)	= 0.11
Top Width (ft)	= 27.47
EGL (ft)	= 0.17



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Friday, Nov 16 2012

262+25 Box Outlet to Basin 5-Year Event (3.06% Slope)

Trapezoidal

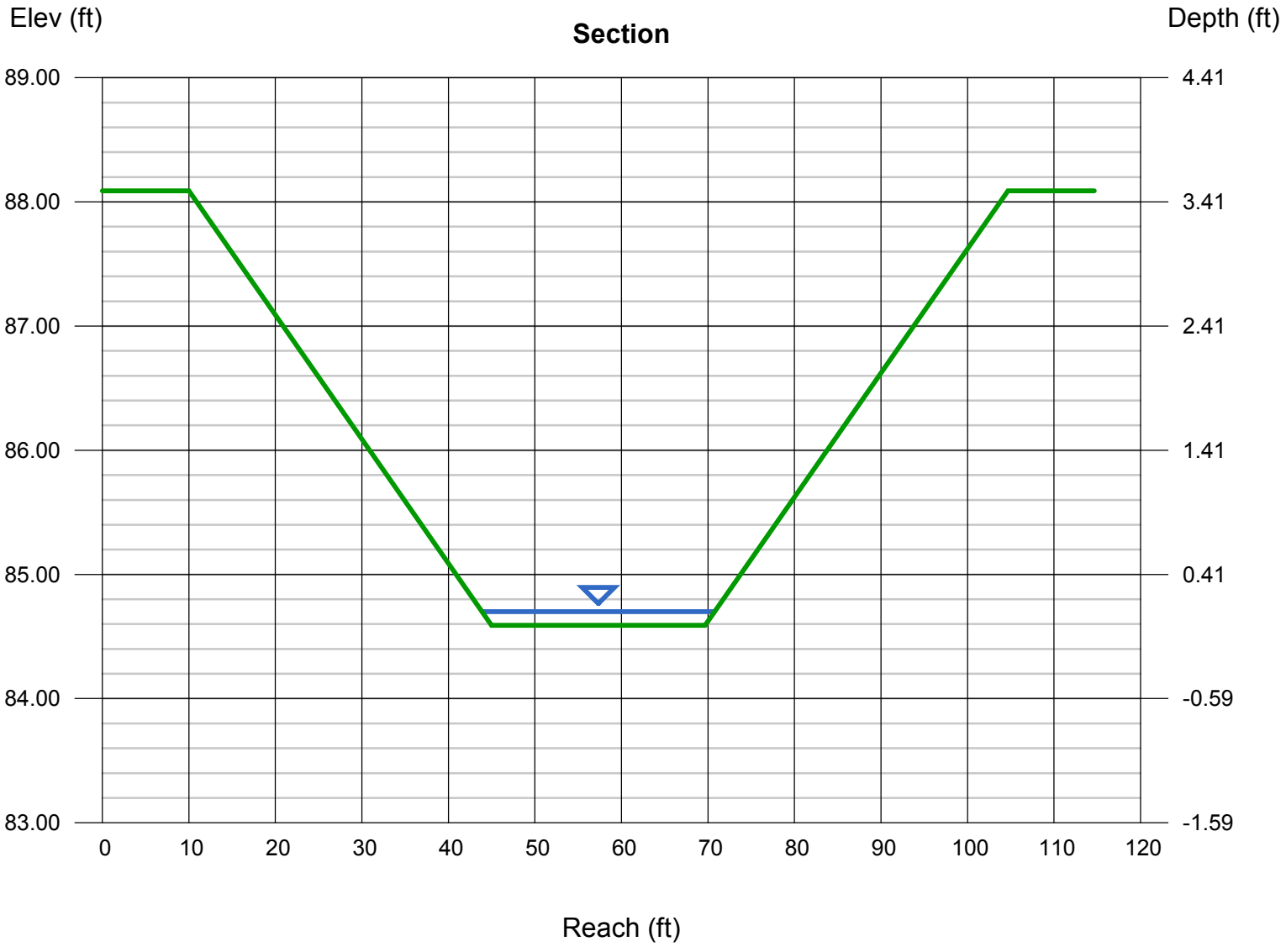
Bottom Width (ft)	= 24.67
Side Slopes (z:1)	= 10.00, 10.00
Total Depth (ft)	= 3.50
Invert Elev (ft)	= 84.59
Slope (%)	= 3.06
N-Value	= 0.030

Calculations

Compute by:	Known Q
Known Q (cfs)	= 5.12

Highlighted

Depth (ft)	= 0.11
Q (cfs)	= 5.120
Area (sqft)	= 2.83
Velocity (ft/s)	= 1.81
Wetted Perim (ft)	= 26.88
Crit Depth, Yc (ft)	= 0.11
Top Width (ft)	= 26.87
EGL (ft)	= 0.16



Channel Report

262+25 Box Outlet to Basin 100-Year Event (0.25% Slope)

Trapezoidal

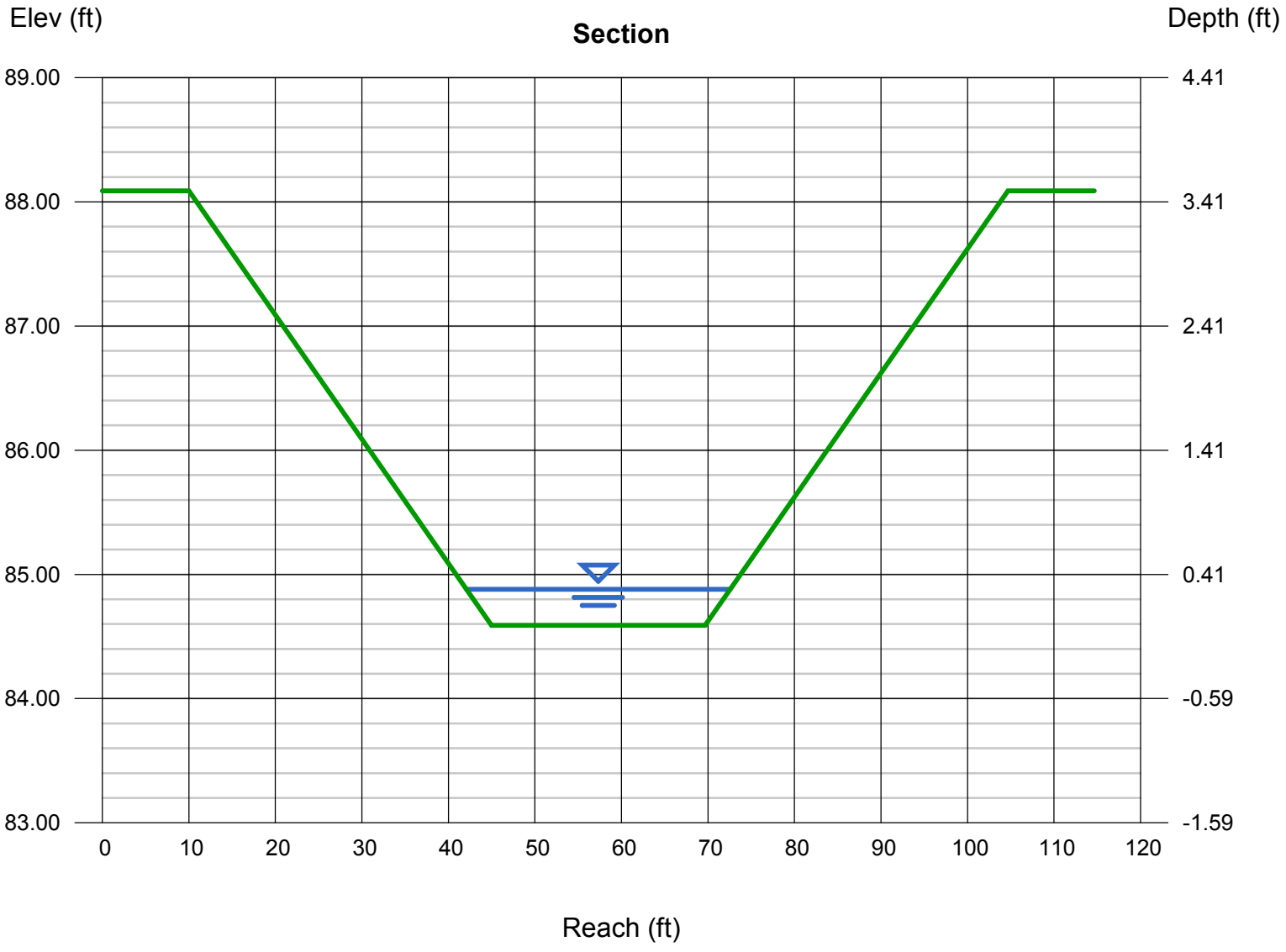
Bottom Width (ft)	= 24.67
Side Slopes (z:1)	= 10.00, 10.00
Total Depth (ft)	= 3.50
Invert Elev (ft)	= 84.59
Slope (%)	= 0.25
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 17.78

Highlighted

Depth (ft)	= 0.29
Q (cfs)	= 17.78
Area (sqft)	= 8.00
Velocity (ft/s)	= 2.22
Wetted Perim (ft)	= 30.50
Crit Depth, Yc (ft)	= 0.25
Top Width (ft)	= 30.47
EGL (ft)	= 0.37



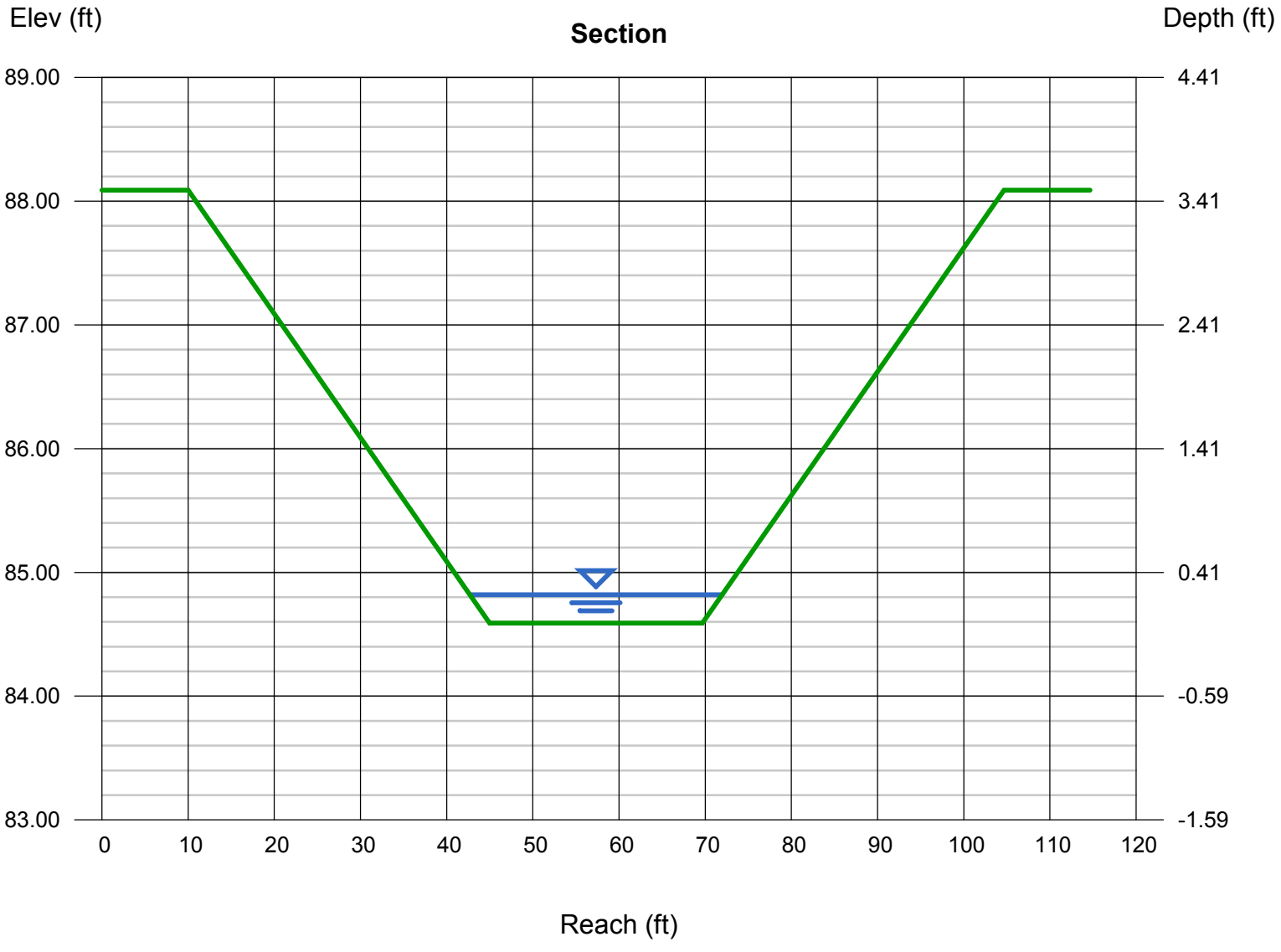
Channel Report

262+25 Box Outlet to Basin 100-Year Event (3.06% Slope)

Trapezoidal	
Bottom Width (ft)	= 24.67
Side Slopes (z:1)	= 10.00, 10.00
Total Depth (ft)	= 3.50
Invert Elev (ft)	= 84.59
Slope (%)	= 3.06
N-Value	= 0.030

Highlighted	
Depth (ft)	= 0.23
Q (cfs)	= 17.78
Area (sqft)	= 6.20
Velocity (ft/s)	= 2.87
Wetted Perim (ft)	= 29.29
Crit Depth, Yc (ft)	= 0.25
Top Width (ft)	= 29.27
EGL (ft)	= 0.36

Calculations	
Compute by:	Known Q
Known Q (cfs)	= 17.78



Culvert Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Path Culvert 282+50 (5yr)

Invert Elev Dn (ft)	= 4384.75
Pipe Length (ft)	= 36.00
Slope (%)	= 0.25
Invert Elev Up (ft)	= 4384.84
Rise (in)	= 24.0
Shape	= Cir
Span (in)	= 24.0
No. Barrels	= 2
n-Value	= 0.013
Inlet Edge	= 0
Coeff. K,M,c,Y,k	= 0.0045, 2, 0.0317, 0.69, 0.5

Embankment

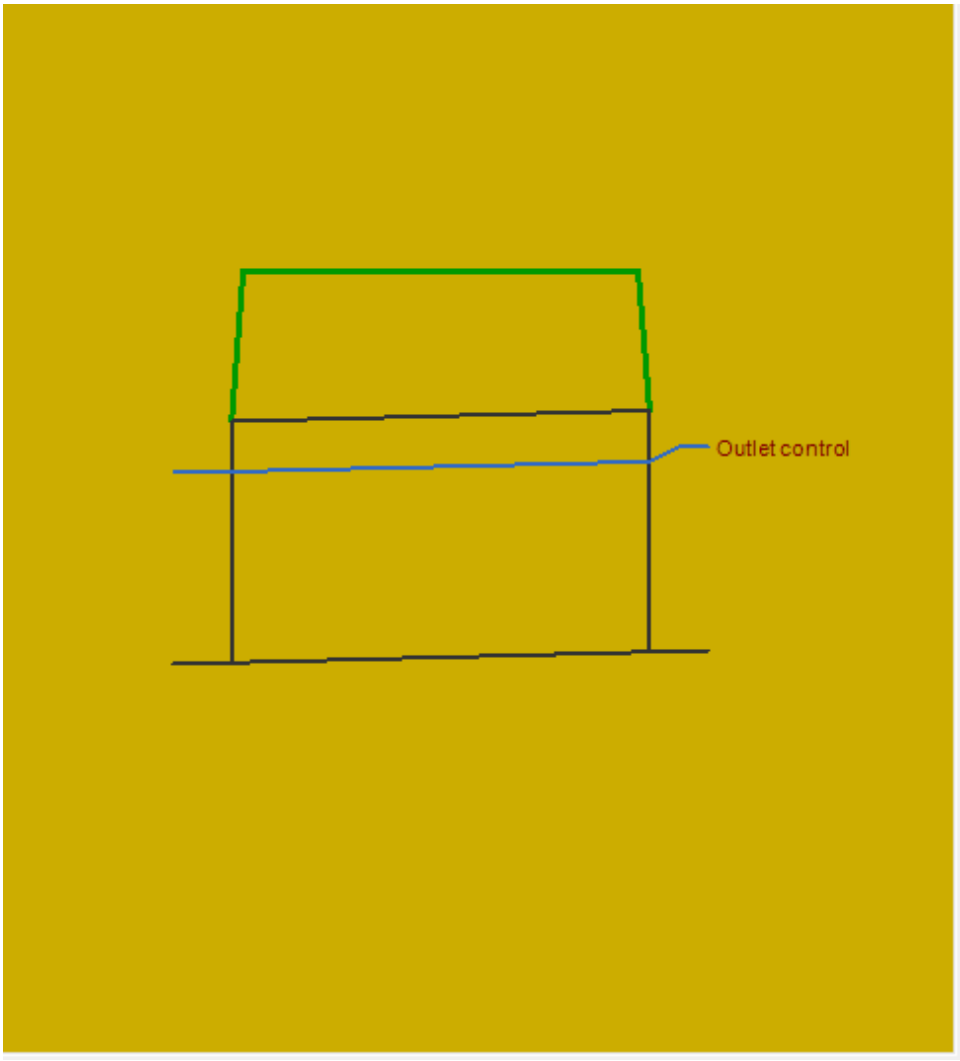
Top Elevation (ft)	= 4388.00
Top Width (ft)	= 34.00
Crest Width (ft)	= 20.00

Calculations

Qmin (cfs)	= 0.00
Qmax (cfs)	= 86.00
Tailwater Elev (ft)	= (dc+D)/2

Highlighted

Qtotal (cfs)	= 21.00
Qpipe (cfs)	= 21.00
Qovertop (cfs)	= 0.00
Veloc Dn (ft/s)	= 3.93
Veloc Up (ft/s)	= 3.95
HGL Dn (ft)	= 4386.33
HGL Up (ft)	= 4386.42
Hw Elev (ft)	= 4386.54
Hw/D (ft)	= 0.85
Flow Regime	= Outlet Control



Culvert Report

Path Culvert 282+50 (100yr)

Invert Elev Dn (ft)	= 4384.75
Pipe Length (ft)	= 36.00
Slope (%)	= 0.25
Invert Elev Up (ft)	= 4384.84
Rise (in)	= 24.0
Shape	= Cir
Span (in)	= 24.0
No. Barrels	= 2
n-Value	= 0.013
Inlet Edge	= 0
Coeff. K,M,c,Y,k	= 0.0045, 2, 0.0317, 0.69, 0.5

Embankment

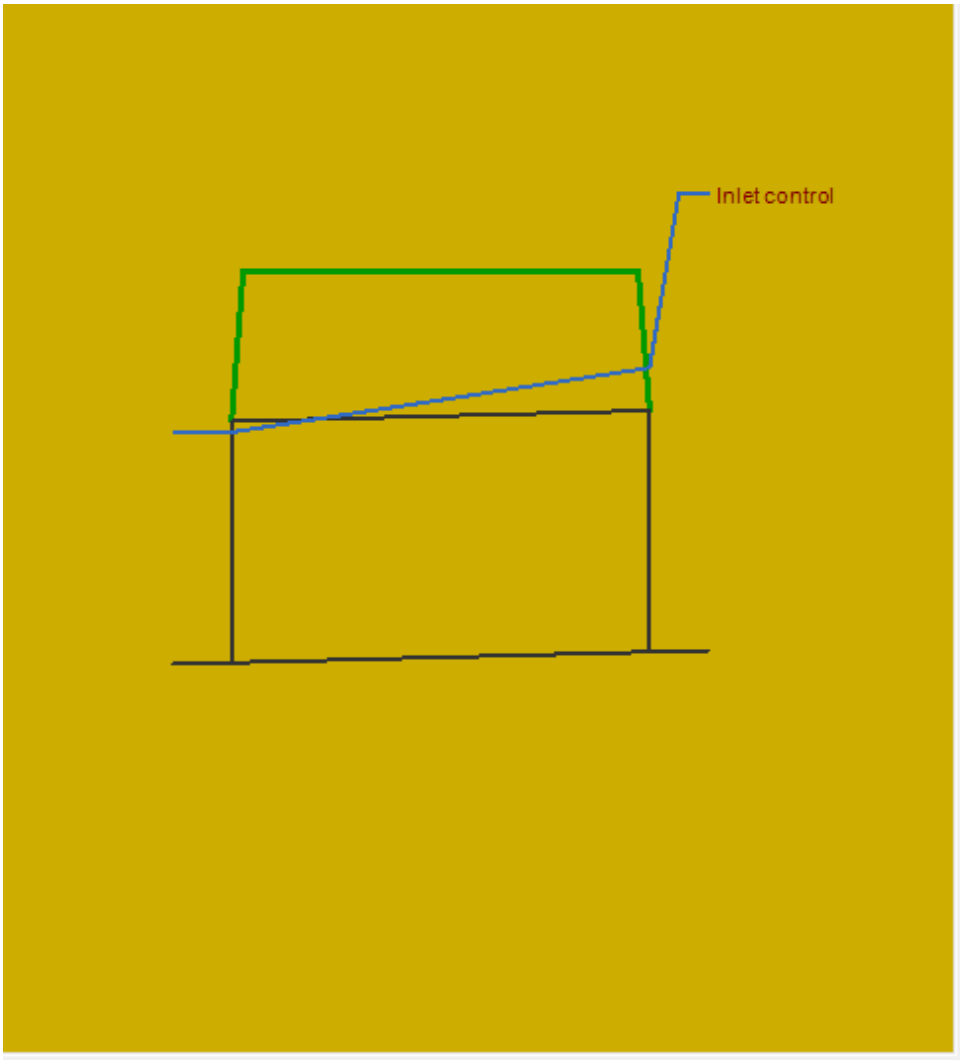
Top Elevation (ft)	= 4388.00
Top Width (ft)	= 34.00
Crest Width (ft)	= 20.00

Calculations

Qmin (cfs)	= 0.00
Qmax (cfs)	= 86.00
Tailwater Elev (ft)	= (dc+D)/2

Highlighted

Qtotal (cfs)	= 86.00
Qpipe (cfs)	= 54.89
Qovertop (cfs)	= 31.11
Veloc Dn (ft/s)	= 8.88
Veloc Up (ft/s)	= 8.74
HGL Dn (ft)	= 4386.66
HGL Up (ft)	= 4387.19
Hw Elev (ft)	= 4388.64
Hw/D (ft)	= 1.90
Flow Regime	= Inlet Control



Culvert Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Box Culvert 282+50 (5year)

Invert Elev Dn (ft)	= 4384.39
Pipe Length (ft)	= 147.00
Slope (%)	= 0.20
Invert Elev Up (ft)	= 4384.68
Rise (in)	= 96.0
Shape	= Box
Span (in)	= 144.0
No. Barrels	= 1
n-Value	= 0.013
Inlet Edge	= 0
Coeff. K,M,c,Y,k	= 0.0145, 1.75, 0.0419, 0.64, 0.5

Embankment

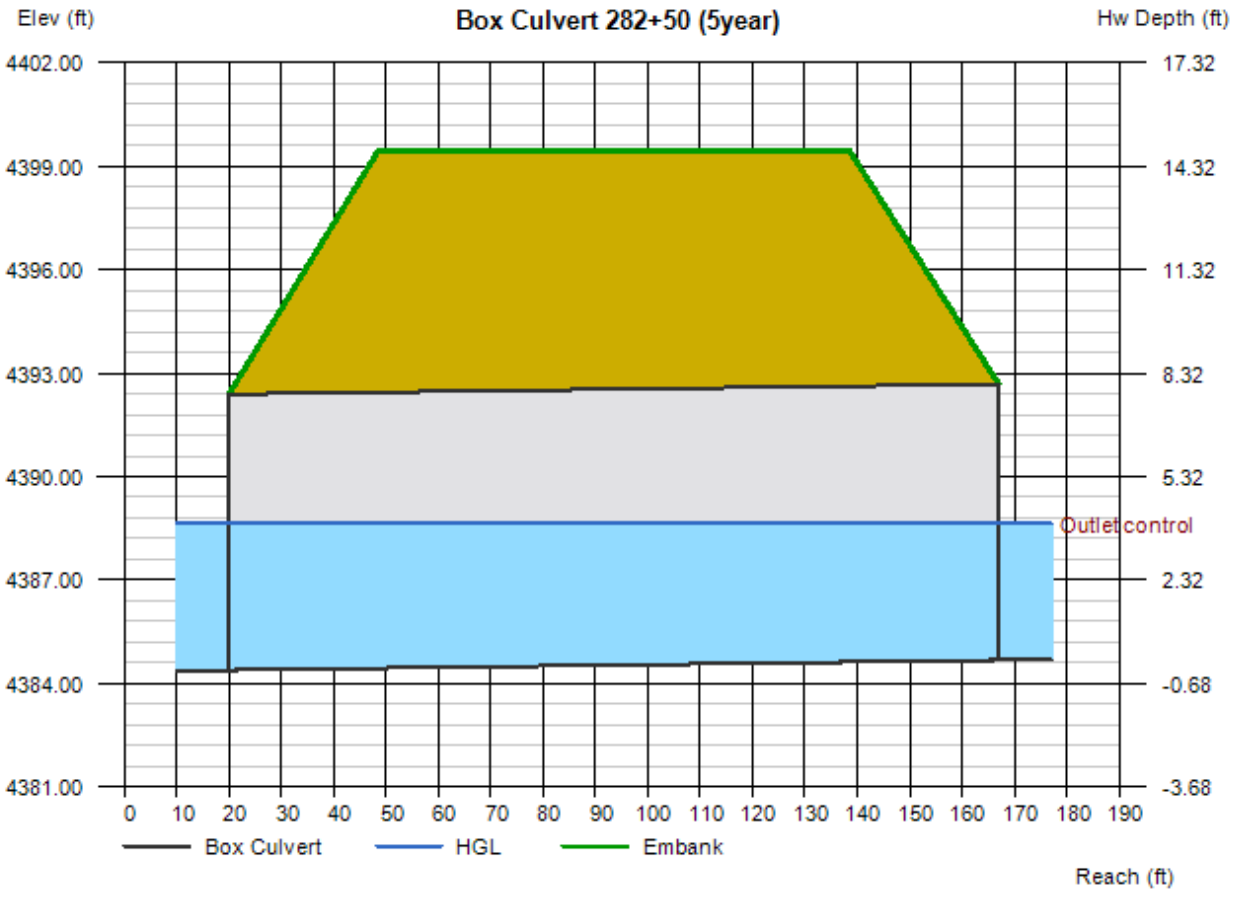
Top Elevation (ft)	= 4399.45
Top Width (ft)	= 90.00
Crest Width (ft)	= 50.00

Calculations

Qmin (cfs)	= 0.00
Qmax (cfs)	= 100.00
Tailwater Elev (ft)	= (dc+D)/2

Highlighted

Qtotal (cfs)	= 25.00
Qpipe (cfs)	= 25.00
Qovertop (cfs)	= 0.00
Veloc Dn (ft/s)	= 0.49
Veloc Up (ft/s)	= 0.53
HGL Dn (ft)	= 4388.65
HGL Up (ft)	= 4388.65
Hw Elev (ft)	= 4388.65
Hw/D (ft)	= 0.50
Flow Regime	= Outlet Control



Culvert Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Box Culvert 282+50 (100year)

Invert Elev Dn (ft)	= 4384.39
Pipe Length (ft)	= 147.00
Slope (%)	= 0.20
Invert Elev Up (ft)	= 4384.68
Rise (in)	= 96.0
Shape	= Box
Span (in)	= 144.0
No. Barrels	= 1
n-Value	= 0.013
Inlet Edge	= 0
Coeff. K,M,c,Y,k	= 0.0145, 1.75, 0.0419, 0.64, 0.5

Embankment

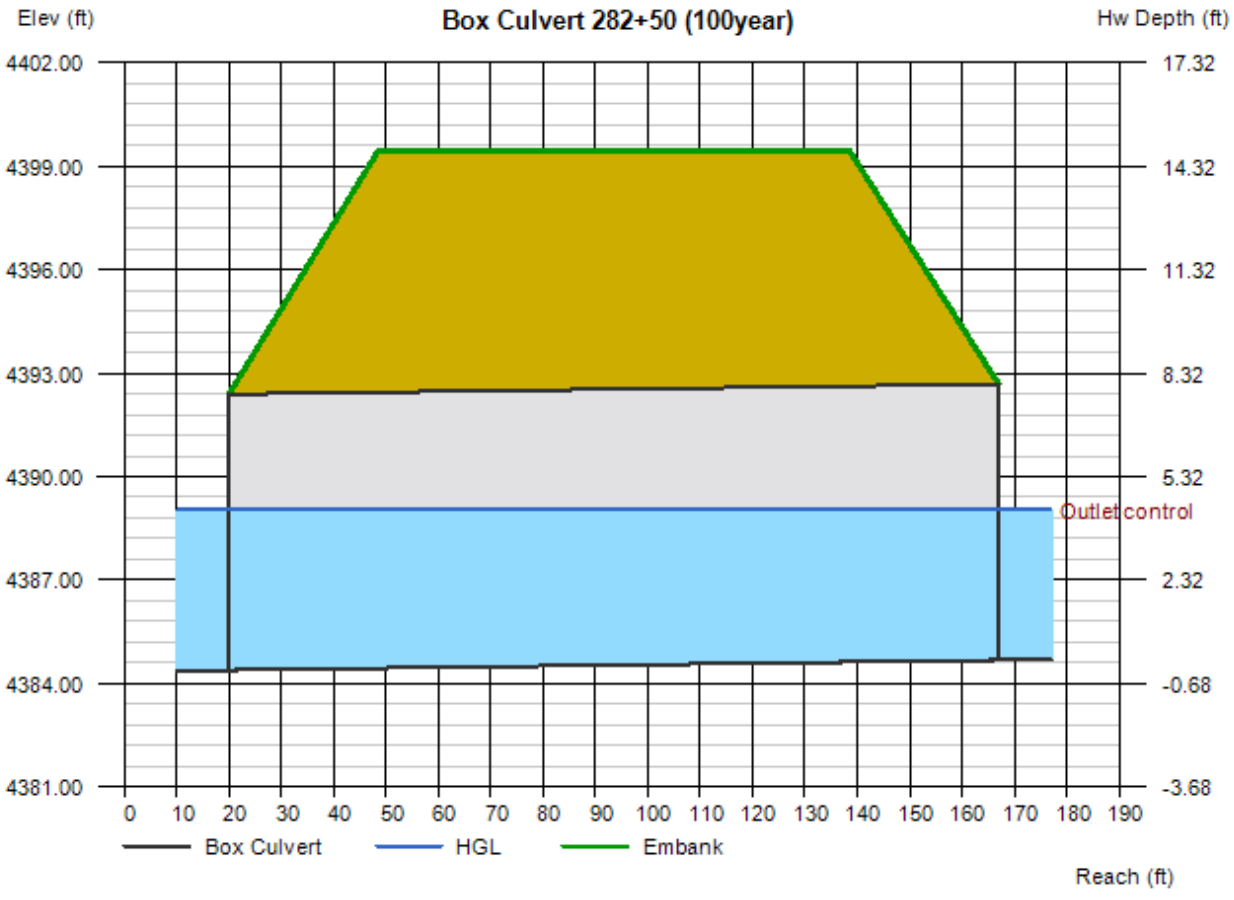
Top Elevation (ft)	= 4399.45
Top Width (ft)	= 90.00
Crest Width (ft)	= 50.00

Calculations

Qmin (cfs)	= 0.00
Qmax (cfs)	= 100.00
Tailwater Elev (ft)	= (dc+D)/2

Highlighted

Qtotal (cfs)	= 98.00
Qpipe (cfs)	= 98.00
Qovertop (cfs)	= 0.00
Veloc Dn (ft/s)	= 1.76
Veloc Up (ft/s)	= 1.88
HGL Dn (ft)	= 4389.03
HGL Up (ft)	= 4389.03
Hw Elev (ft)	= 4389.06
Hw/D (ft)	= 0.55
Flow Regime	= Outlet Control



Culvert Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Path Culvert 268+25 (5year)

Invert Elev Dn (ft)	= 4385.29
Pipe Length (ft)	= 42.00
Slope (%)	= 0.26
Invert Elev Up (ft)	= 4385.40
Rise (in)	= 18.0
Shape	= Cir
Span (in)	= 18.0
No. Barrels	= 1
n-Value	= 0.013
Inlet Edge	= 0
Coeff. K,M,c,Y,k	= 0.0045, 2, 0.0317, 0.69, 0.5

Embankment

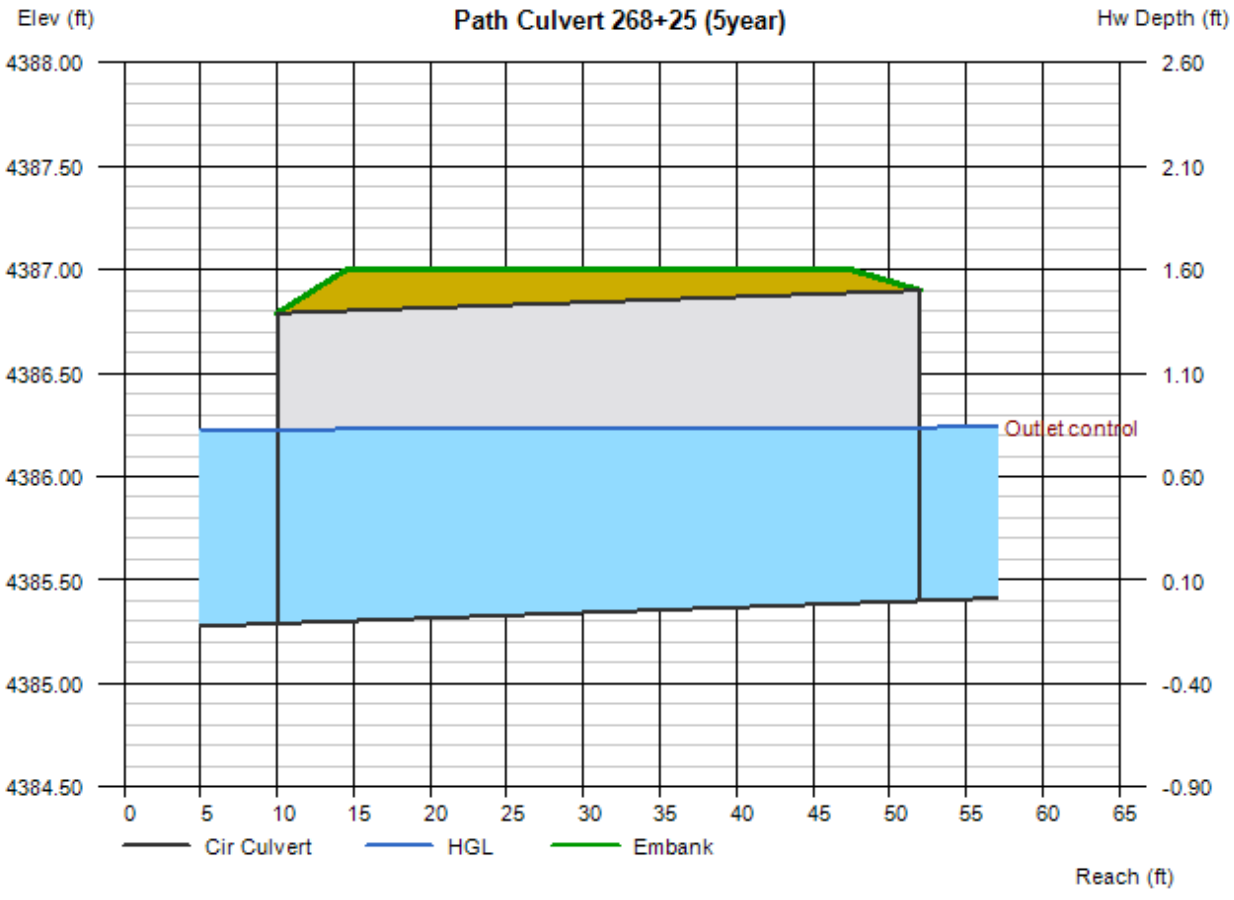
Top Elevation (ft)	= 4387.00
Top Width (ft)	= 33.00
Crest Width (ft)	= 33.00

Calculations

Qmin (cfs)	= 0.00
Qmax (cfs)	= 5.00
Tailwater Elev (ft)	= (dc+D)/2

Highlighted

Qtotal (cfs)	= 1.00
Qpipe (cfs)	= 1.00
Qovertop (cfs)	= 0.00
Veloc Dn (ft/s)	= 0.86
Veloc Up (ft/s)	= 0.99
HGL Dn (ft)	= 4386.23
HGL Up (ft)	= 4386.24
Hw Elev (ft)	= 4386.24
Hw/D (ft)	= 0.56
Flow Regime	= Outlet Control



Culvert Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Wednesday, Oct 10 2012

Path Culvert 268+25 (100year)

Invert Elev Dn (ft)	= 4385.29
Pipe Length (ft)	= 42.00
Slope (%)	= 0.26
Invert Elev Up (ft)	= 4385.40
Rise (in)	= 18.0
Shape	= Cir
Span (in)	= 18.0
No. Barrels	= 1
n-Value	= 0.013
Inlet Edge	= 0
Coeff. K,M,c,Y,k	= 0.0045, 2, 0.0317, 0.69, 0.5

Embankment

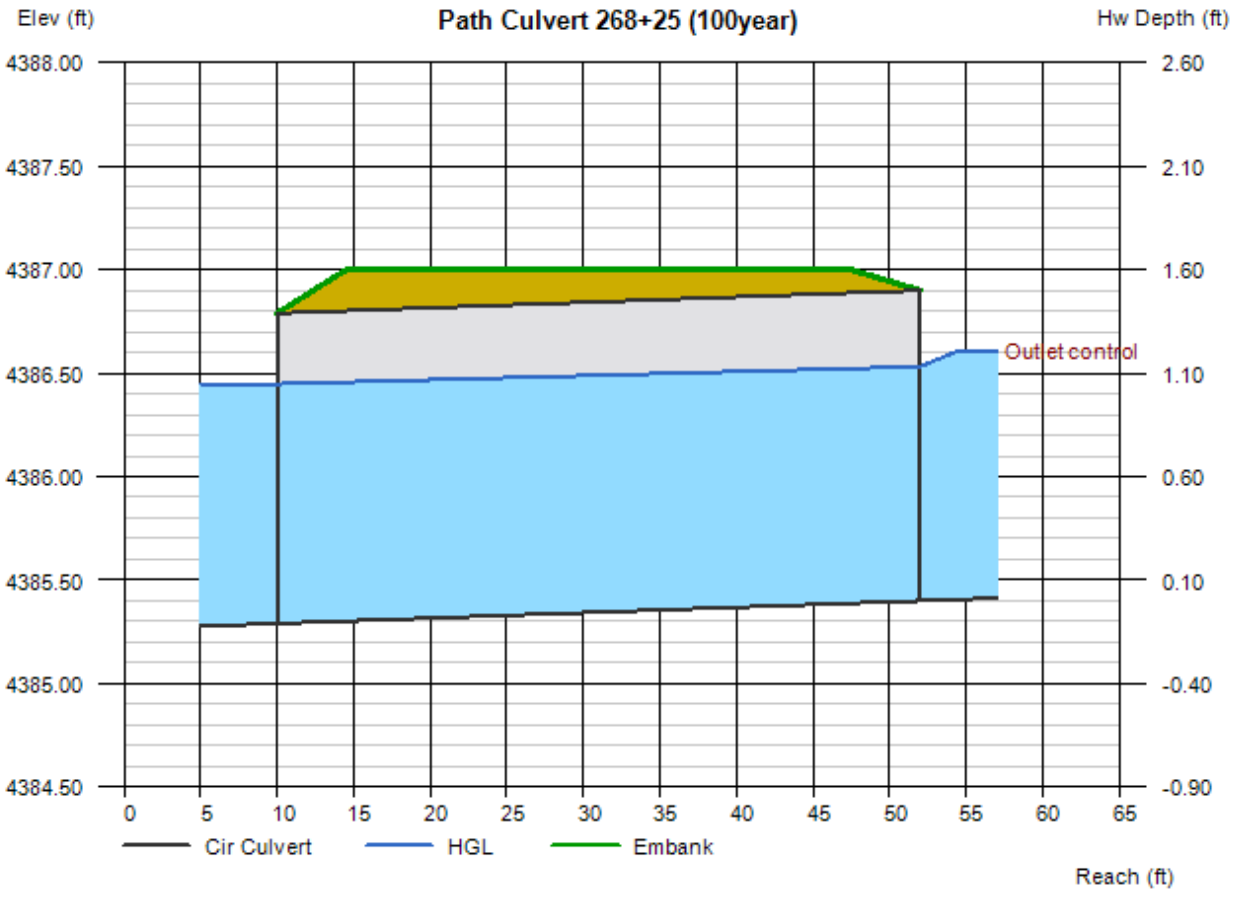
Top Elevation (ft)	= 4387.00
Top Width (ft)	= 33.00
Crest Width (ft)	= 33.00

Calculations

Qmin (cfs)	= 0.00
Qmax (cfs)	= 5.00
Tailwater Elev (ft)	= (dc+D)/2

Highlighted

Qtotal (cfs)	= 4.50
Qpipe (cfs)	= 4.50
Qovertop (cfs)	= 0.00
Veloc Dn (ft/s)	= 3.07
Veloc Up (ft/s)	= 3.15
HGL Dn (ft)	= 4386.45
HGL Up (ft)	= 4386.53
Hw Elev (ft)	= 4386.61
Hw/D (ft)	= 0.81
Flow Regime	= Outlet Control



Culvert Report

Box Culvert 268+25 (5year)

Invert Elev Dn (ft)	= 4384.75
Pipe Length (ft)	= 182.00
Slope (%)	= 0.25
Invert Elev Up (ft)	= 4385.20
Rise (in)	= 96.0
Shape	= Box
Span (in)	= 144.0
No. Barrels	= 2
n-Value	= 0.013
Inlet Edge	= 0
Coeff. K,M,c,Y,k	= 0.0145, 1.75, 0.0419, 0.64, 0.5

Embankment

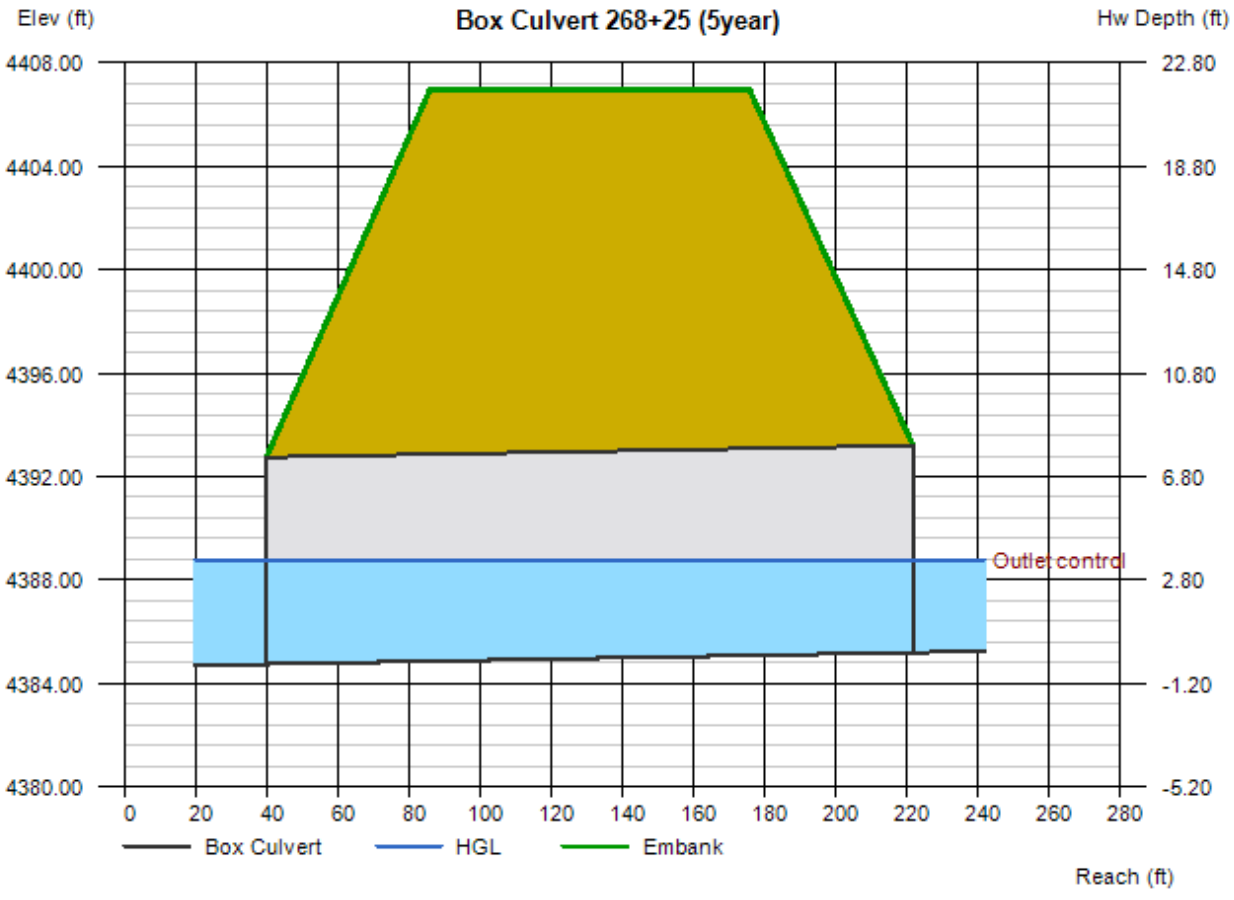
Top Elevation (ft)	= 4406.95
Top Width (ft)	= 90.00
Crest Width (ft)	= 50.00

Calculations

Qmin (cfs)	= 0.00
Qmax (cfs)	= 20.00
Tailwater Elev (ft)	= (dc+D)/2

Highlighted

Qtotal (cfs)	= 3.00
Qpipe (cfs)	= 3.00
Qovertop (cfs)	= 0.00
Veloc Dn (ft/s)	= 0.03
Veloc Up (ft/s)	= 0.03
HGL Dn (ft)	= 4388.79
HGL Up (ft)	= 4388.79
Hw Elev (ft)	= 4388.79
Hw/D (ft)	= 0.45
Flow Regime	= Outlet Control



Culvert Report

Box Culvert 268+25 (100year)

Invert Elev Dn (ft)	= 4384.75
Pipe Length (ft)	= 182.00
Slope (%)	= 0.25
Invert Elev Up (ft)	= 4385.20
Rise (in)	= 96.0
Shape	= Box
Span (in)	= 144.0
No. Barrels	= 2
n-Value	= 0.013
Inlet Edge	= 0
Coeff. K,M,c,Y,k	= 0.0145, 1.75, 0.0419, 0.64, 0.5

Embankment

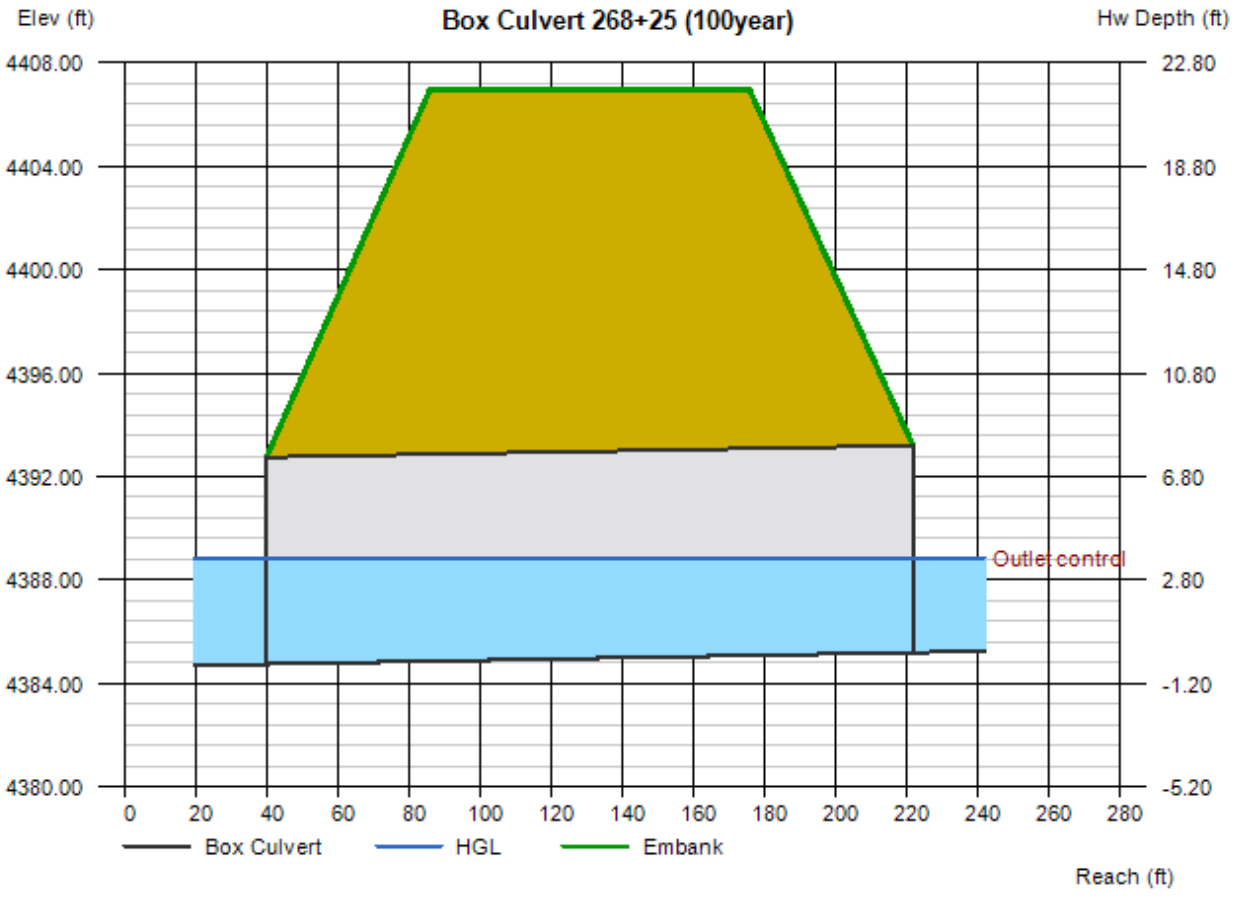
Top Elevation (ft)	= 4406.95
Top Width (ft)	= 90.00
Crest Width (ft)	= 50.00

Calculations

Qmin (cfs)	= 0.00
Qmax (cfs)	= 20.00
Tailwater Elev (ft)	= (dc+D)/2

Highlighted

Qtotal (cfs)	= 11.00
Qpipe (cfs)	= 11.00
Qovertop (cfs)	= 0.00
Veloc Dn (ft/s)	= 0.11
Veloc Up (ft/s)	= 0.13
HGL Dn (ft)	= 4388.84
HGL Up (ft)	= 4388.85
Hw Elev (ft)	= 4388.85
Hw/D (ft)	= 0.46
Flow Regime	= Outlet Control



Worksheet for Road01-286+03-ComboInletGrade-5yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.60	ft³/s
Slope		0.02000	ft/ft
Gutter Width		2.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Local Depression		2.00	in
Local Depression Width		3.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		3.00	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency		89.65	%
Intercepted Flow		0.54	ft³/s
Bypass Flow		0.06	ft³/s
Spread		3.41	ft
Depth		0.12	ft
Flow Area		0.20	ft²
Gutter Depression		0.00	ft
Total Depression		0.17	ft
Velocity		2.95	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.08	
Grate Flow Ratio		0.79	
Equivalent Cross Slope		0.08530	ft/ft
Active Grate Length		1.50	ft
Length Factor		0.17	
Total Interception Length		8.88	ft

Worksheet for Road01-286+03-ComboInletGrade-5yr

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Road01-286+03-ComboInletGrade-100yr

Project Description

Solve For	Efficiency

Input Data

Discharge		1.77	ft³/s
Slope		0.02000	ft/ft
Gutter Width		2.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Local Depression		2.00	in
Local Depression Width		3.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		3.00	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency		71.44	%
Intercepted Flow		1.26	ft³/s
Bypass Flow		0.51	ft³/s
Spread		5.11	ft
Depth		0.18	ft
Flow Area		0.46	ft²
Gutter Depression		0.00	ft
Total Depression		0.17	ft
Velocity		3.87	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.05	
Grate Flow Ratio		0.60	
Equivalent Cross Slope		0.07576	ft/ft
Active Grate Length		1.50	ft
Length Factor		0.10	
Total Interception Length		15.02	ft

Worksheet for Road01-286+03-ComboInletGrade-100yr

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Road02-283+58-ComboInletGrade-5yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.36	ft³/s
Slope		0.02000	ft/ft
Gutter Width		2.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Local Depression		2.00	in
Local Depression Width		3.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		3.00	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency		95.87	%
Intercepted Flow		0.35	ft³/s
Bypass Flow		0.01	ft³/s
Spread		2.81	ft
Depth		0.10	ft
Flow Area		0.14	ft²
Gutter Depression		0.00	ft
Total Depression		0.17	ft
Velocity		2.60	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.10	
Grate Flow Ratio		0.87	
Equivalent Cross Slope		0.08852	ft/ft
Active Grate Length		1.50	ft
Length Factor		0.21	
Total Interception Length		7.01	ft

Worksheet for Road02-283+58-ComboInletGrade-5yr

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Road02-283+58-ComboInletGrade-100yr

Project Description

Solve For	Efficiency

Input Data

Discharge		1.31	ft³/s
Slope		0.02000	ft/ft
Gutter Width		2.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Local Depression		2.00	in
Local Depression Width		3.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		3.00	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency		76.83	%
Intercepted Flow		1.01	ft³/s
Bypass Flow		0.30	ft³/s
Spread		4.57	ft
Depth		0.16	ft
Flow Area		0.37	ft²
Gutter Depression		0.00	ft
Total Depression		0.17	ft
Velocity		3.59	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.06	
Grate Flow Ratio		0.65	
Equivalent Cross Slope		0.07860	ft/ft
Active Grate Length		1.50	ft
Length Factor		0.12	
Total Interception Length		12.94	ft

Worksheet for Road02-283+58-ComboInletGrade-100yr

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Road03-282+52-ComboInletGrade-5yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.14	ft³/s
Slope		0.00500	ft/ft
Gutter Width		2.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Local Depression		2.00	in
Local Depression Width		3.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		3.00	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency		99.98	%
Intercepted Flow		0.14	ft³/s
Bypass Flow		0.00	ft³/s
Spread		2.56	ft
Depth		0.09	ft
Flow Area		0.11	ft²
Gutter Depression		0.00	ft
Total Depression		0.17	ft
Velocity		1.22	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.29	
Grate Flow Ratio		0.90	
Equivalent Cross Slope		0.08959	ft/ft
Active Grate Length		1.50	ft
Length Factor		0.49	
Total Interception Length		3.09	ft

Worksheet for Road03-282+52-ComboInletGrade-5yr

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Road03-282+52-ComboInletGrade-100yr

Project Description

Solve For	Efficiency

Input Data

Discharge		0.65	ft³/s
Slope		0.00500	ft/ft
Gutter Width		2.00	ft
Gutter Cross Slope		0.04	ft/ft
Road Cross Slope		0.04	ft/ft
Roughness Coefficient		0.013	
Local Depression		2.00	in
Local Depression Width		3.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		3.00	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	87.18	%
Intercepted Flow	0.57	ft³/s
Bypass Flow	0.08	ft³/s
Spread	4.55	ft
Depth	0.16	ft
Flow Area	0.36	ft²
Gutter Depression	0.00	ft
Total Depression	0.17	ft
Velocity	1.79	ft/s
Splash Over Velocity	5.14	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.17	
Grate Flow Ratio	0.66	
Equivalent Cross Slope	0.07867	ft/ft
Active Grate Length	1.50	ft
Length Factor	0.24	
Total Interception Length	6.36	ft

Worksheet for Road03-282+52-ComboInletGrade-100yr

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Road04-280+87-ComboInletSag5yr

Project Description

Solve For	Spread

Input Data

Discharge		0.20	ft³/s
Gutter Width		2.00	ft
Gutter Cross Slope		0.01	ft/ft
Road Cross Slope		0.01	ft/ft
Local Depression		2.00	in
Local Depression Width		3.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		3.00	ft
Opening Height		0.50	ft
Curb Throat Type	Vertical		
Throat Incline Angle		0.00	degrees

Options

Calculation Option	Use Both

Results

Spread	2.14	ft
Depth	-0.03	ft
Gutter Depression	0.00	ft
Total Depression	0.17	ft
Open Grate Area	0.79	ft²
Active Grate Weir Length	4.50	ft

Worksheet for Road04-280+87-ComboInletSag100yr

Project Description

Solve For	Spread

Input Data

Discharge		0.61	ft³/s
Gutter Width		2.00	ft
Gutter Cross Slope		0.01	ft/ft
Road Cross Slope		0.01	ft/ft
Local Depression		2.00	in
Local Depression Width		3.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		3.00	ft
Opening Height		0.50	ft
Curb Throat Type	Vertical		
Throat Incline Angle		0.00	degrees

Options

Calculation Option	Use Both

Results

Spread	2.99	ft
Depth	0.03	ft
Gutter Depression	0.00	ft
Total Depression	0.17	ft
Open Grate Area	0.79	ft²
Active Grate Weir Length	4.50	ft

Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Monday, Nov 19 2012

Storm Drain 286+03 (5year)

Circular

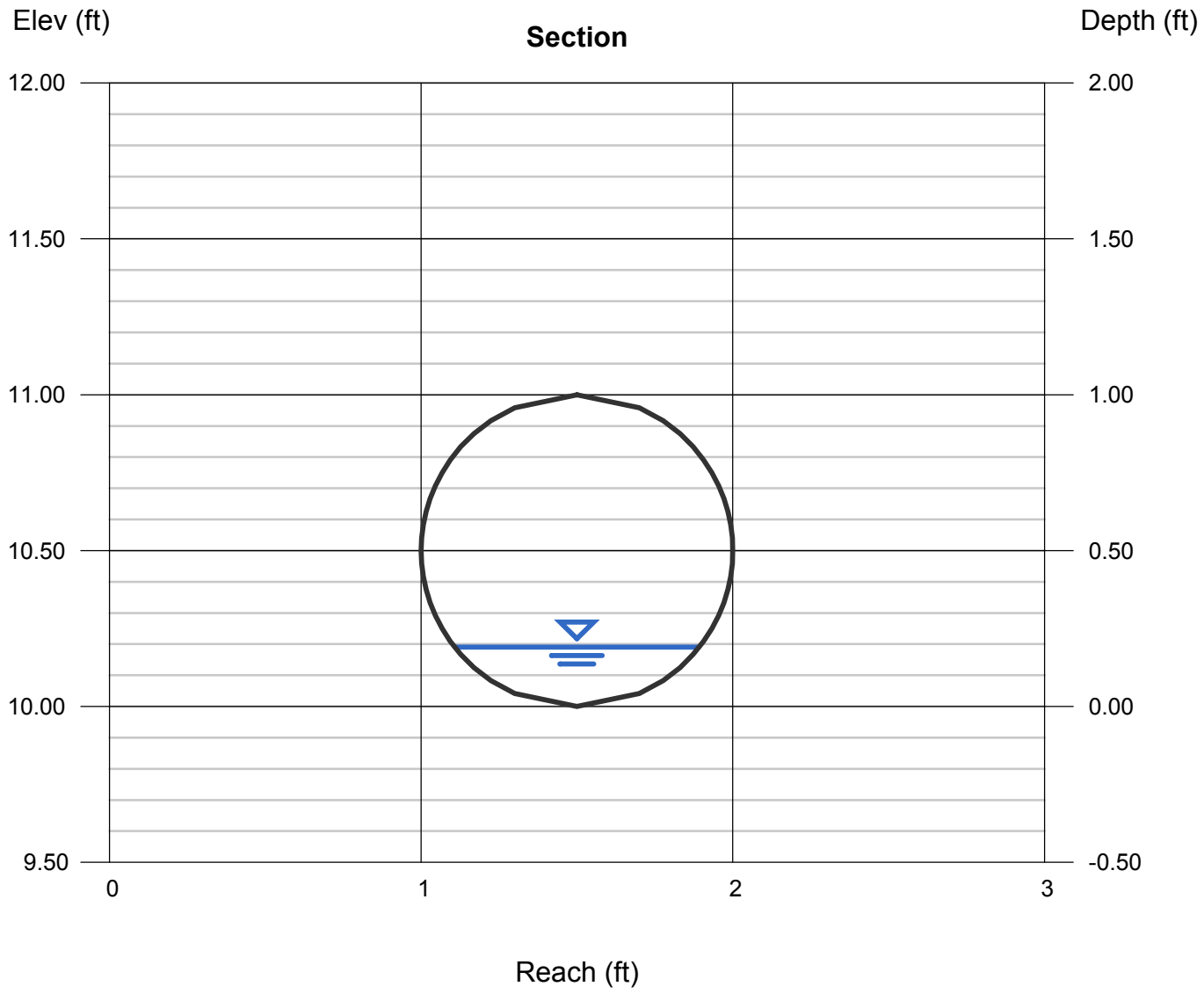
Diameter (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 4.17
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.54

Highlighted

Depth (ft)	= 0.19
Q (cfs)	= 0.540
Area (sqft)	= 0.10
Velocity (ft/s)	= 5.15
Wetted Perim (ft)	= 0.90
Crit Depth, Yc (ft)	= 0.31
Top Width (ft)	= 0.79
EGL (ft)	= 0.60



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Monday, Nov 19 2012

Storm Drain 286+03 (100year)

Circular

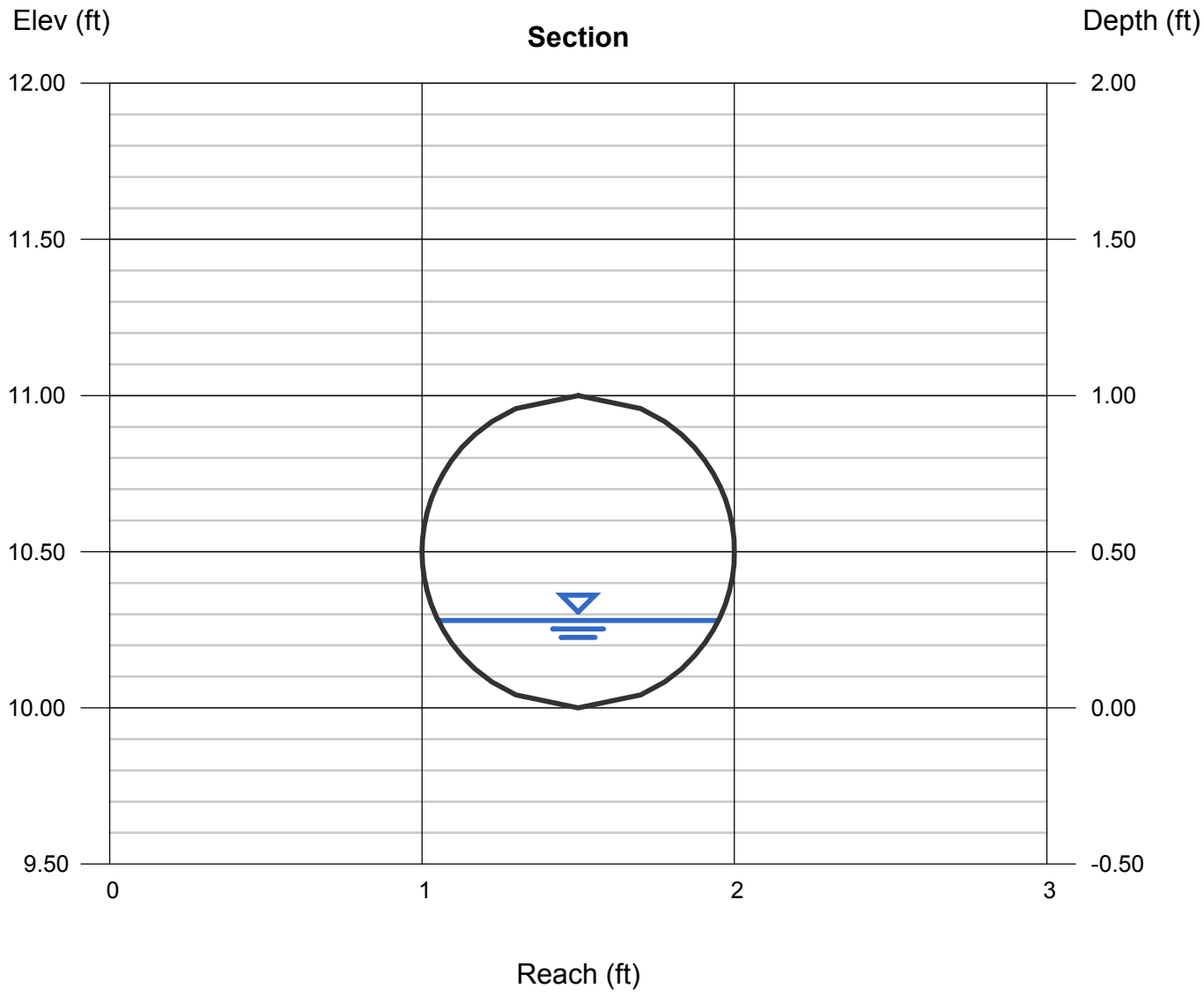
Diameter (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 4.17
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.26

Highlighted

Depth (ft)	= 0.28
Q (cfs)	= 1.260
Area (sqft)	= 0.18
Velocity (ft/s)	= 6.92
Wetted Perim (ft)	= 1.12
Crit Depth, Yc (ft)	= 0.48
Top Width (ft)	= 0.90
EGL (ft)	= 1.03



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Monday, Nov 19 2012

Storm Drain 283+58 (5year)

Circular

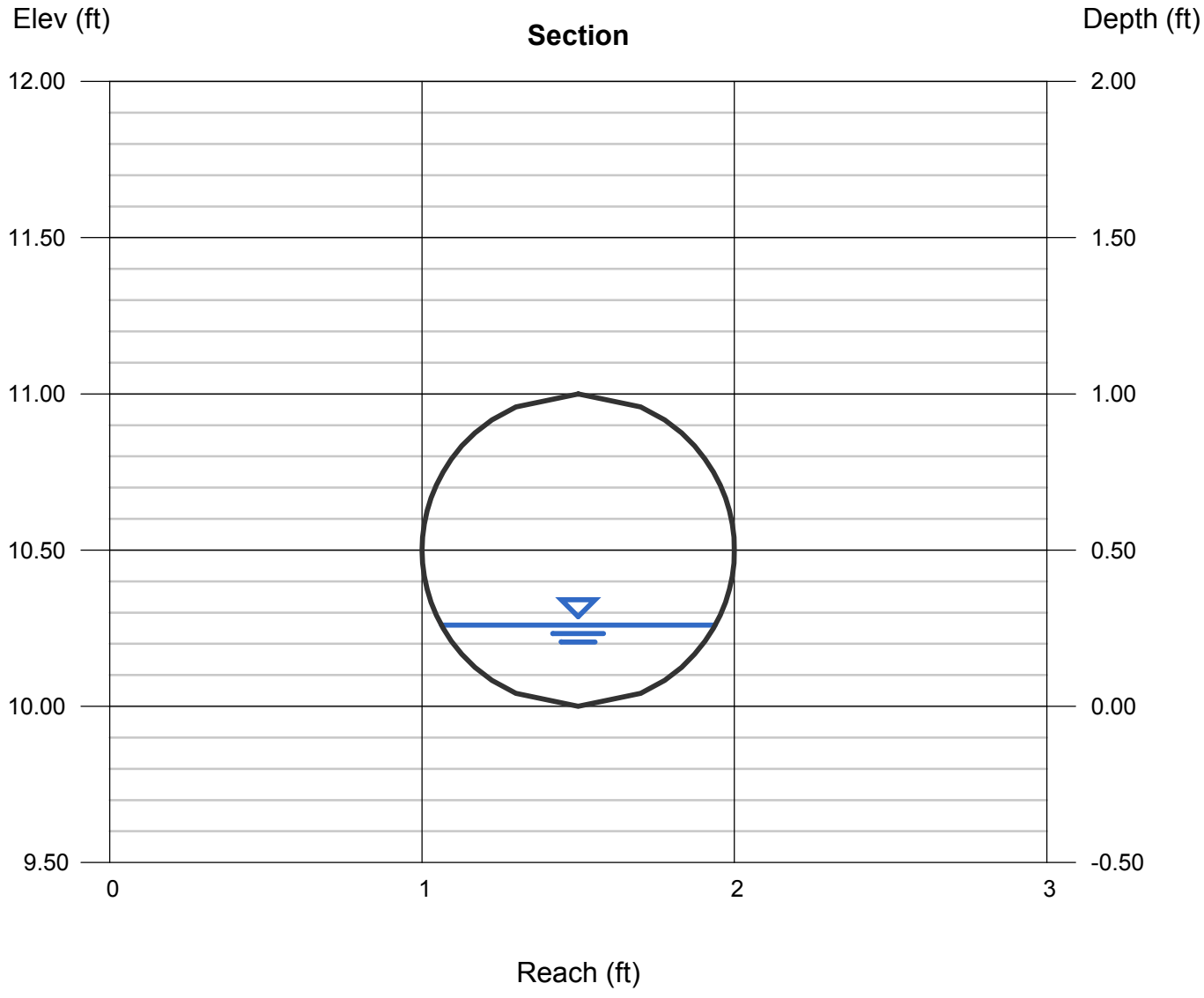
Diameter (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 0.50
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.35

Highlighted

Depth (ft)	= 0.26
Q (cfs)	= 0.350
Area (sqft)	= 0.16
Velocity (ft/s)	= 2.13
Wetted Perim (ft)	= 1.07
Crit Depth, Yc (ft)	= 0.25
Top Width (ft)	= 0.88
EGL (ft)	= 0.33



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Monday, Nov 19 2012

Storm Drain 283+58 (100year)

Circular

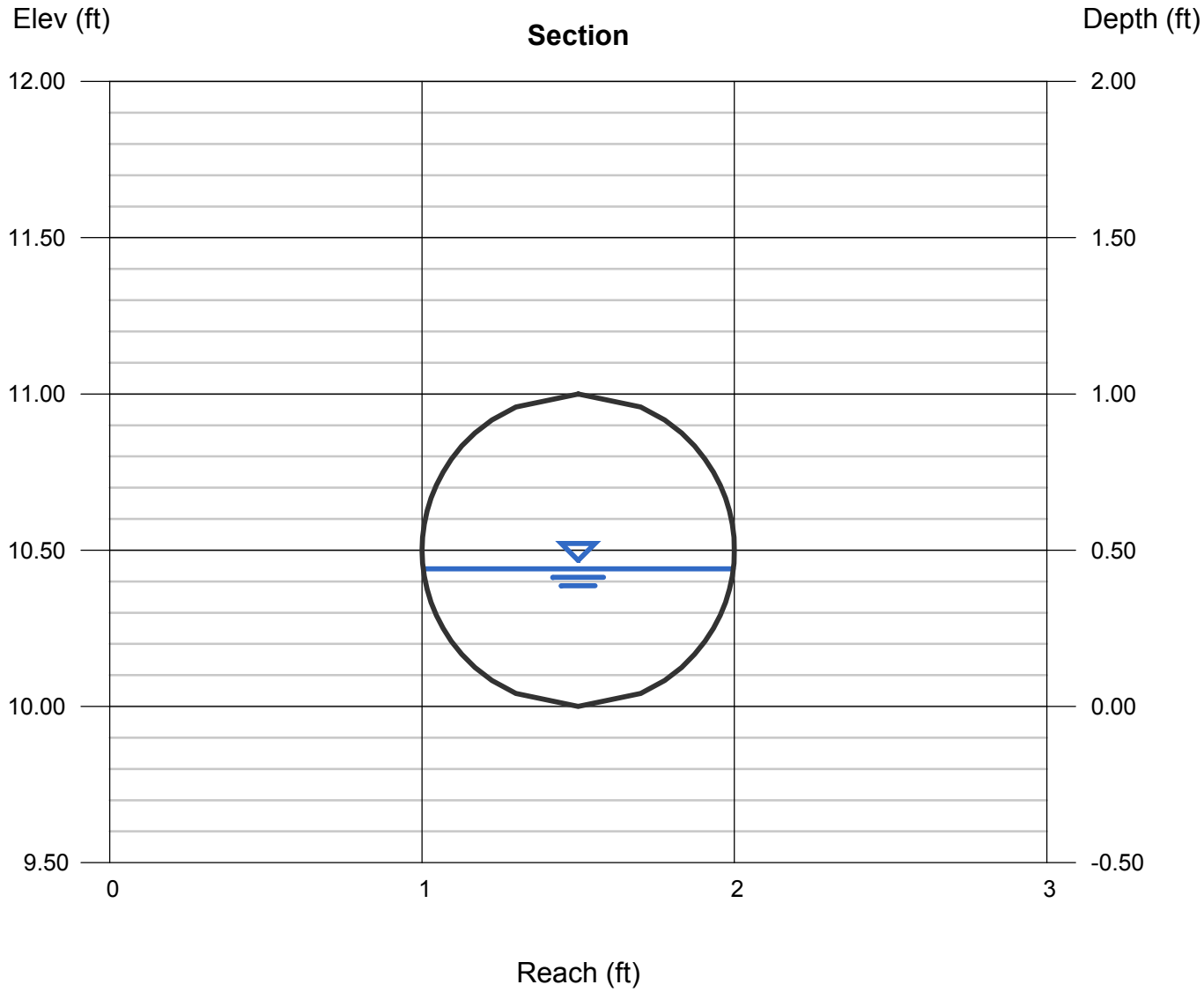
Diameter (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 0.50
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.01

Highlighted

Depth (ft)	= 0.44
Q (cfs)	= 1.010
Area (sqft)	= 0.34
Velocity (ft/s)	= 3.01
Wetted Perim (ft)	= 1.45
Crit Depth, Yc (ft)	= 0.42
Top Width (ft)	= 0.99
EGL (ft)	= 0.58



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Monday, Nov 19 2012

Storm Drain 282+50 (5year)

Circular

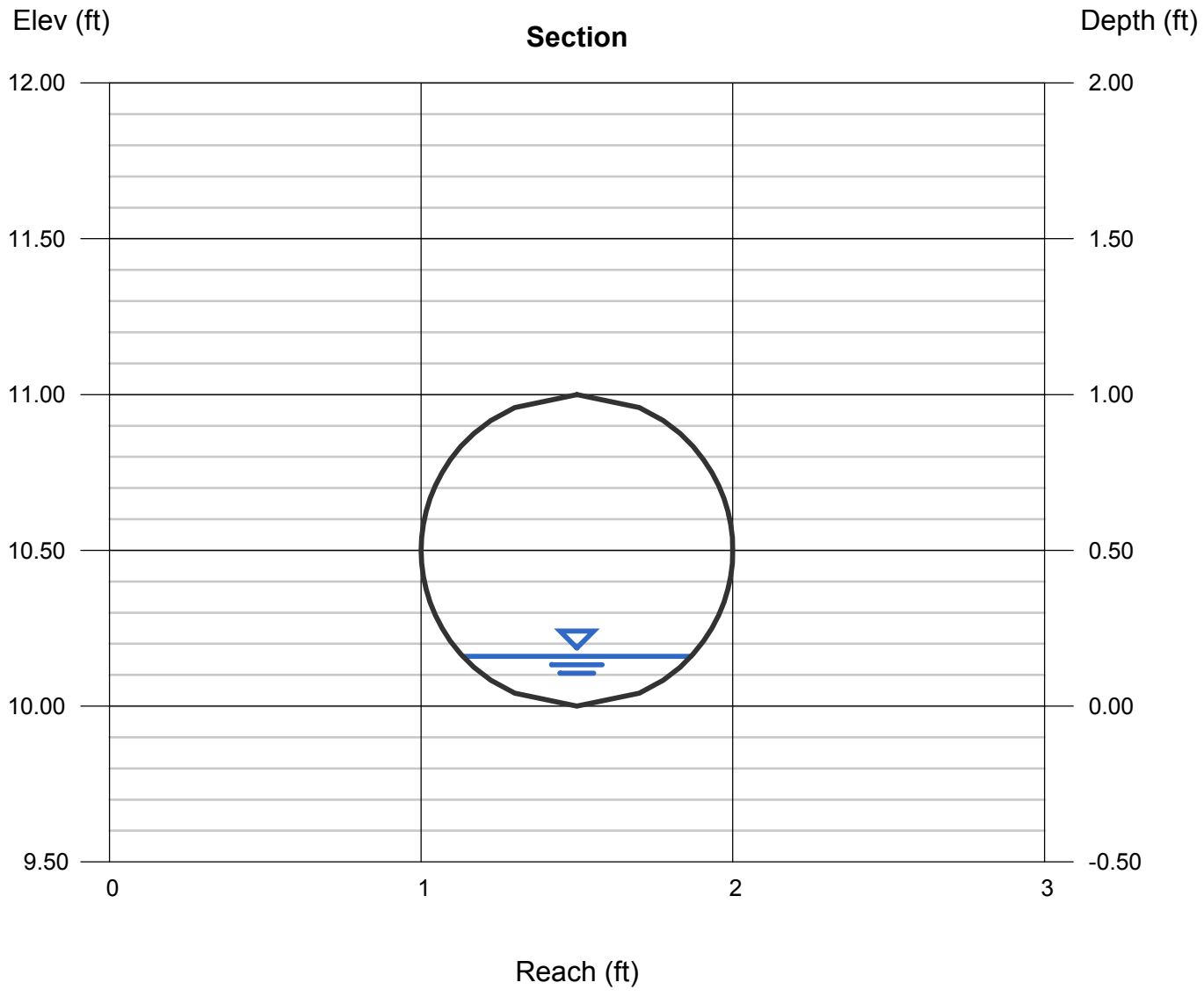
Diameter (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 0.50
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.14

Highlighted

Depth (ft)	= 0.16
Q (cfs)	= 0.140
Area (sqft)	= 0.08
Velocity (ft/s)	= 1.71
Wetted Perim (ft)	= 0.82
Crit Depth, Yc (ft)	= 0.16
Top Width (ft)	= 0.73
EGL (ft)	= 0.21



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Monday, Nov 19 2012

Storm Drain 282+50 (100year)

Circular

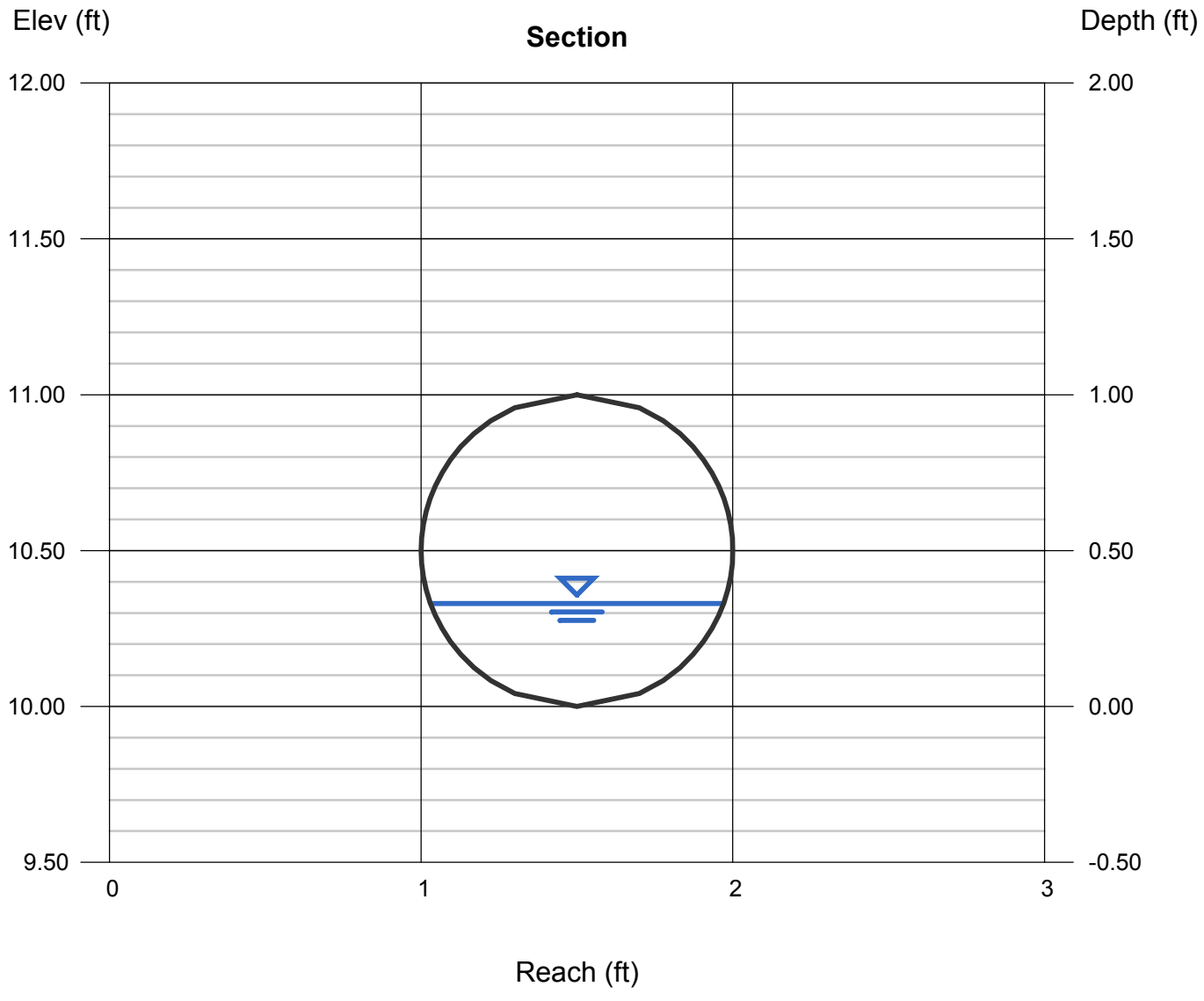
Diameter (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 0.50
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.57

Highlighted

Depth (ft)	= 0.33
Q (cfs)	= 0.570
Area (sqft)	= 0.23
Velocity (ft/s)	= 2.52
Wetted Perim (ft)	= 1.22
Crit Depth, Yc (ft)	= 0.32
Top Width (ft)	= 0.94
EGL (ft)	= 0.43



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Monday, Nov 19 2012

Storm Drain 280+87 (5year)

Circular

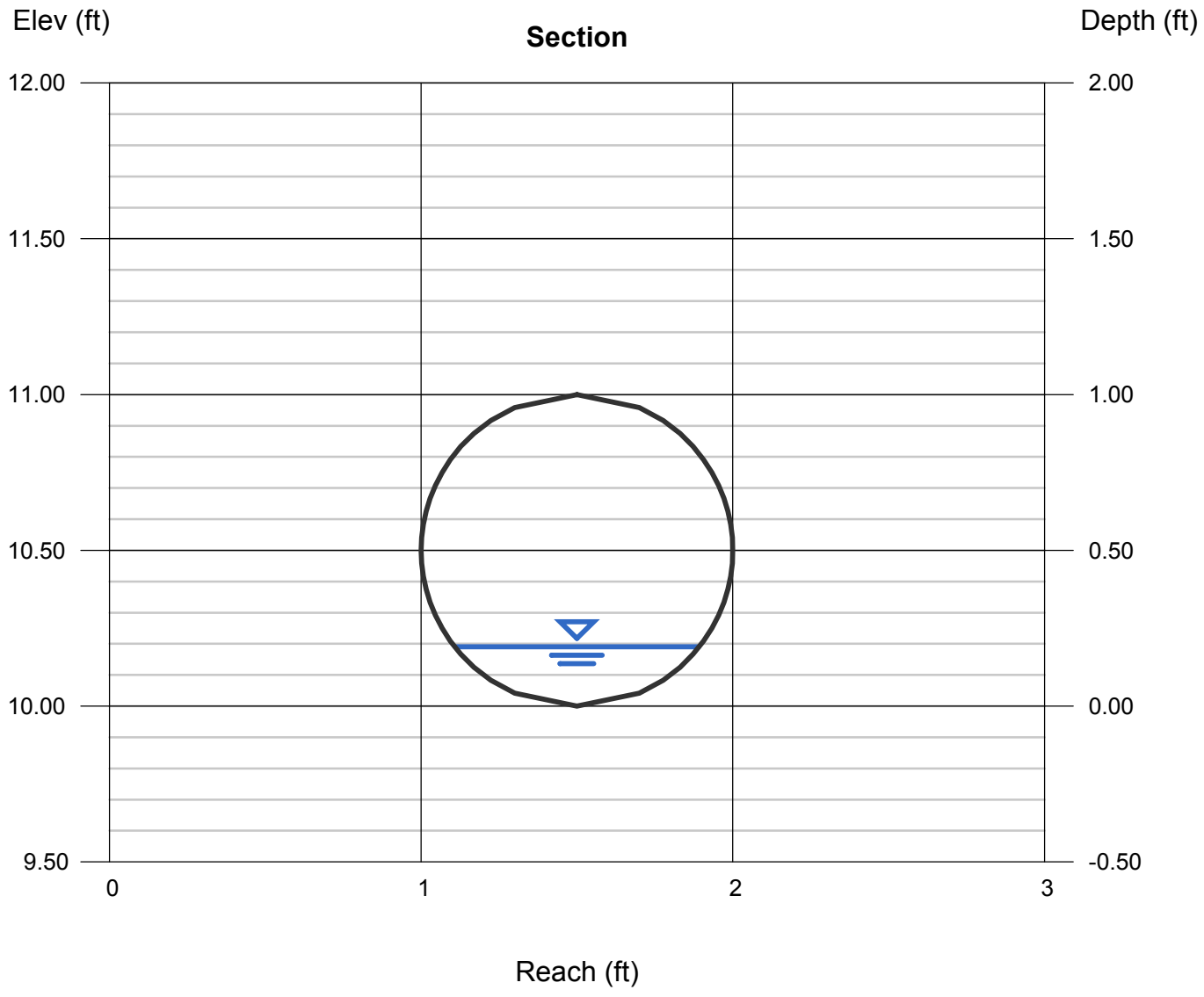
Diameter (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 0.50
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.20

Highlighted

Depth (ft)	= 0.19
Q (cfs)	= 0.200
Area (sqft)	= 0.10
Velocity (ft/s)	= 1.91
Wetted Perim (ft)	= 0.90
Crit Depth, Yc (ft)	= 0.19
Top Width (ft)	= 0.79
EGL (ft)	= 0.25



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Monday, Nov 19 2012

Storm Drain 280+87 (100year)

Circular

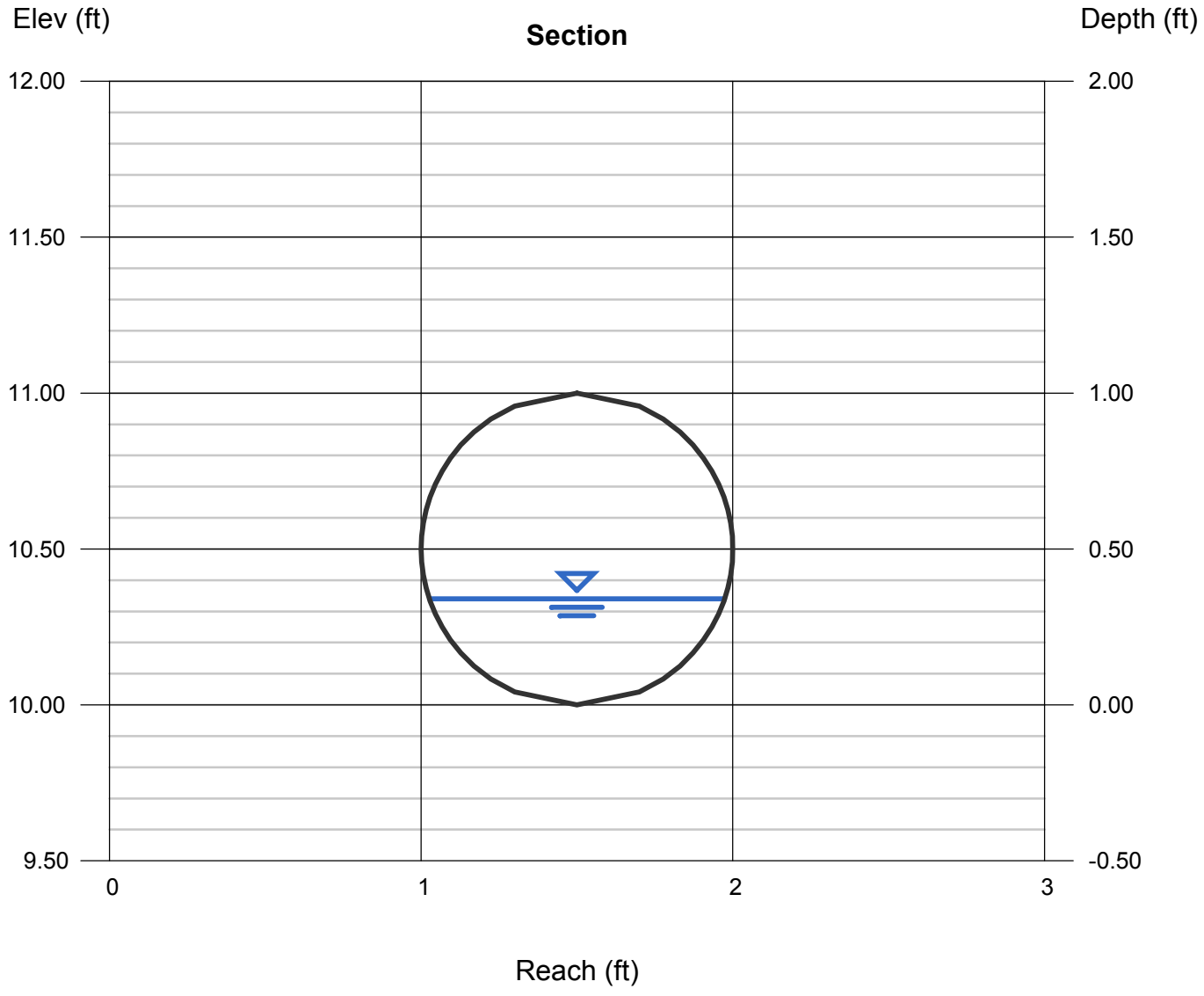
Diameter (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 0.50
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.61

Highlighted

Depth (ft)	= 0.34
Q (cfs)	= 0.610
Area (sqft)	= 0.24
Velocity (ft/s)	= 2.57
Wetted Perim (ft)	= 1.25
Crit Depth, Yc (ft)	= 0.33
Top Width (ft)	= 0.95
EGL (ft)	= 0.44



HYDRAULIC ANALYSES NORTH OF THE TRUCKEE RIVER BRIDGE: GREG STREET / SPARKS BLVD / SOUTH EAST CONNECTOR

FLOWMASTER PIPE TABLE

Label	Solve For	n Values	Slope	Depth (ft)	Diameter (ft)	Q (ft³/s)	Q Area (ft²)	Wetted Per (ft)	Hyd Radius (ft)	Top Width (ft)	Crit D (ft)	% Full (%)	Crit Slope (ft/ft)	Velocity (ft/s)	Velocity Head (ft)	Spec Energy (ft)	Froude #	Max Q (ft³/s)	Q Full (ft³/s)	Slope Full (ft/ft)	Flow Type
Greg_16+23_Pr_5yr_Pipe	Normal Depth	0.013	0.005	0.79	1	2.44	0.67	2.2	0.3	0.81	0.67	79.3	0.00756	3.66	0.21	1	0.71	2.71	2.52	0.00469	SubCritical
Greg_16+23_Pr_100yr_Pipe	Full Flow Capacity	0.013	0.005	1	1	2.52	0.79	3.14	0.25	0	0.68	100	0.0077	3.21	0.16	1.16	0	2.71	2.52	0.005	SubCritical
Greg_16+23_Ex_5yr_Pipe	Normal Depth	0.013	0.0125	0.46	1	1.75	0.36	1.5	0.24	1	0.56	46.4	0.00653	4.91	0.37	0.84	1.45	4.28	3.98	0.00241	SuperCritical
Greg_16+23_Ex_100yr_Pipe	Full Flow Capacity	0.013	0.0125	1	1	3.98	0.79	3.14	0.25	0	0.85	100	0.01186	5.07	0.4	1.4	0	4.28	3.98	0.0125	SubCritical
Greg_16+23_ExPipe_Pr5yrQ_Pipe	Normal Depth	0.013	0.0125	0.57	1	2.44	0.46	1.7	0.27	0.99	0.67	56.6	0.00756	5.33	0.44	1.01	1.38	4.28	3.98	0.00469	SuperCritical
Greg_16+50_Pr_5yr_Pipe	Normal Depth	0.013	0.0277	0.36	1	1.64	0.25	1.29	0.2	0.96	0.54	36	0.0064	6.45	0.65	1.01	2.21	6.38	5.93	0.00212	SuperCritical
Greg_16+50_Pr_100yr_Pipe	Normal Depth	0.013	0.0277	0.64	1	4.37	0.53	1.85	0.29	0.96	0.88	63.9	0.01359	8.25	1.06	1.7	1.96	6.38	5.93	0.01505	SuperCritical
Greg_16+50_Ex_5yr_Pipe	Normal Depth	0.013	0.0091	0.54	1	1.95	0.44	1.66	0.26	1	0.6	54.3	0.00679	4.48	0.31	0.85	1.19	3.66	3.4	0.003	SuperCritical
Greg_16+50_Ex_100yr_Pipe	Full Flow Capacity	0.013	0.0091	1	1	3.4	0.79	3.14	0.25	0	0.79	100	0.0098	4.33	0.29	1.29	0	3.66	3.4	0.0091	SubCritical
Greg_16+50_ExPipe_Pr5yrQ_Pipe	Normal Depth	0.013	0.0091	0.49	1	1.64	0.38	1.55	0.25	1	0.54	49	0.0064	4.29	0.29	0.78	1.22	3.66	3.4	0.00212	SuperCritical
Greg_25+97_Pr_5yr_Pipe	Normal Depth	0.013	0.01	0.45	1	1.48	0.34	1.47	0.23	0.99	0.52	45	0.00622	4.32	0.29	0.74	1.3	3.83	3.56	0.00173	SuperCritical
Greg_25+97_Pr_100yr_Pipe	Discharge	0.013	0.01	0.82	1	3.56	0.69	2.26	0.3	0.77	0.81	82	0.01032	5.17	0.42	1.24	0.96	3.83	3.56	0.01	SubCritical
Sparks_307+83_Pr_5yr_Pipe	Normal Depth	0.013	0.0978	0.24	1	1.41	0.15	1.02	0.14	0.85	0.5	24	0.00615	9.71	1.46	1.71	4.15	11.98	11.14	0.00157	SuperCritical
Sparks_307+83_Pr_100yr_Pipe	Normal Depth	0.013	0.0978	0.4	1	3.75	0.29	1.37	0.21	0.98	0.82	40	0.01096	12.79	2.54	2.94	4.12	11.98	11.14	0.01108	SuperCritical
Sparks_307+66_Pr_5yr_Pipe	Normal Depth	0.013	0.0178	0.36	1.5	1.8	0.33	1.54	0.21	1.28	0.51	24.2	0.00492	5.45	0.46	0.83	1.9	15.07	14.01	0.00029	SuperCritical
Sparks_307+66_Pr_100yr_Pipe	Normal Depth	0.013	0.0178	0.6	1.5	4.77	0.66	2.06	0.32	1.47	0.84	40.2	0.00568	7.17	0.8	1.4	1.88	15.07	14.01	0.00206	SuperCritical
Sparks_307+60_Pr_5yr_Pipe	Normal Depth	0.013	0.0544	0.12	1	0.26	0.05	0.71	0.08	0.65	0.21	12.1	0.00575	4.8	0.36	0.48	2.94	8.94	8.31	0.00005	SuperCritical
Sparks_307+60_Pr_100yr_Pipe	Normal Depth	0.013	0.0544	0.19	1	0.69	0.11	0.91	0.12	0.79	0.35	19.5	0.00564	6.41	0.64	0.83	3.06	8.94	8.31	0.00038	SuperCritical
Sparks_307+19_Pr_5yr_Pipe	Normal Depth	0.013	0.0688	0.08	1	0.13	0.03	0.58	0.05	0.55	0.15	8.2	0.00611	4.24	0.28	0.36	3.16	10.05	9.34	0.00001	SuperCritical
Sparks_307+19_Pr_100yr_Pipe	Normal Depth	0.013	0.0688	0.13	1	0.33	0.06	0.73	0.08	0.67	0.24	12.8	0.00568	5.59	0.49	0.61	3.32	10.05	9.34	0.00009	SuperCritical
SEC_304+17_Pr_5yr_Pipe	Normal Depth	0.013	0.1059	0.08	1	0.15	0.03	0.57	0.05	0.54	0.16	8	0.00598	5.11	0.41	0.49	3.87	12.47	11.59	0.00002	SuperCritical
SEC_304+17_Pr_100yr_Pipe	Normal Depth	0.013	0.1059	0.14	1	0.47	0.07	0.76	0.09	0.69	0.28	13.7	0.00561	7.23	0.81	0.95	4.15	12.47	11.59	0.00017	SuperCritical
SEC_305+22_Pr_5yr_Pipe	Normal Depth	0.013	0.08	0.13	1.25	0.41	0.07	0.82	0.08	0.76	0.25	10.4	0.00536	6.1	0.58	0.71	3.62	19.65	18.27	0.00004	SuperCritical
SEC_305+22_Pr_100yr_Pipe	Normal Depth	0.013	0.08	0.21	1.25	1.09	0.13	1.05	0.13	0.93	0.41	16.6	0.00521	8.18	1.04	1.25	3.81	19.65	18.27	0.00028	SuperCritical
SEC_305+73_Pr_5yr_Pipe	Normal Depth	0.013	0.0172	0.24	1	0.59	0.15	1.02	0.14	0.85	0.32	24	0.00562	4.07	0.26	0.5	1.74	5.03	4.67	0.00027	SuperCritical
SEC_305+73_Pr_100yr_Pipe	Normal Depth	0.013	0.0172	0.4	1	1.58	0.29	1.37	0.21	0.98	0.53	40.1	0.00633	5.37	0.45	0.85	1.73	5.03	4.67	0.00197	SuperCritical
SEC_304+50_Pr_5yr_Pipe	Normal Depth	0.013	0.0488	0.24	1	1	0.15	1.03	0.14	0.86	0.42	24.1	0.0058	6.87	0.73	0.97	2.93	8.47	7.87	0.00079	SuperCritical
SEC_304+50_Pr_100yr_Pipe	Normal Depth	0.013	0.0488	0.4	1	2.67	0.29	1.37	0.21	0.98	0.7	40.2	0.00799	9.05	1.27	1.68	2.91	8.47	7.87	0.00562	SuperCritical
SEC_304+10_Pr_5yr_Pipe	Normal Depth	0.013	0.5	0.11	1	0.69	0.05	0.69	0.07	0.64	0.35	11.4	0.00565	13.95	3.03	3.14	8.82	27.1	25.19	0.00038	SuperCritical
SEC_304+10_Pr_100yr_Pipe	Normal Depth	0.013	0.5	0.18	1	1.83	0.1	0.88	0.11	0.77	0.58	18.2	0.00663	18.67	5.42	5.6	9.24	27.1	25.19	0.00264	SuperCritical
SEC_303+95_Pr_5yr_Pipe	Normal Depth	0.013	0.47	0.11	1	0.67	0.05	0.69	0.07	0.64	0.34	11.4	0.00564	13.53	2.85	2.96	8.55	26.27	24.42	0.00035	SuperCritical
SEC_303+95_Pr_100yr_Pipe	Normal Depth	0.013	0.47	0.18	1	1.78	0.1	0.88	0.11	0.77	0.57	18.3	0.00657	18.12	5.1	5.29	8.96	26.27	24.42	0.0025	SuperCritical

FLOWMASTER GUTTER TABLE

Label	Solve For	Slope (ft/ft)	Q (ft³/s)	Gtr Wdth (ft)	Gtr XSlope (ft/ft)	Road XSlope (ft/ft)	Spread (ft)	n Value	Flow Area (ft²)	Depth (ft)	V (ft/s)
Greg_16+23_Ex_5yr_Gutter	Spread	0.0068	1.75	1.5	0.02	0.02	8.84	0.013	0.78	0.18	2.24
Greg_16+23_Ex_100yr_Gutter	Spread	0.0068	5.07	1.5	0.02	0.02	13.18	0.013	1.74	0.26	2.92
Greg_16+23_Ex_5yr_Gutter-2	Spread	0.0269	1.75	1.5	0.02	0.02	6.83	0.013	0.47	0.14	3.75
Greg_16+23_Ex_100yr_Gutter-2	Spread	0.0269	5.07	1.5	0.02	0.02	10.18	0.013	1.04	0.2	4.89
Greg_16+23_Pr_5yr_Gutter	Spread	0.0068	2.44	1.5	0.02	0.02	10.02	0.013	1	0.2	2.43
Greg_16+23_Pr_100yr_Gutter	Spread	0.0068	6.5	1.5	0.02	0.02	14.46	0.013	2.09	0.29	3.11
Greg_16+23_Pr_5yr_Gutter-2	Spread	0.0269	2.57	1.5	0.02	0.02	7.89	0.013	0.62	0.16	4.13
Greg_16+23_Pr_100yr_Gutter-2	Spread	0.0269	7.02	1.5	0.02	0.02	11.5	0.013	1.32	0.23	5.31
Greg_16+50_Ex_5yr_Gutter	Spread	0.0053	1.95	1.5	0.02	0.02	9.65	0.013	0.93	0.19	2.09
Greg_16+50_Ex_100yr_Gutter	Spread	0.0053	5.21	1.5	0.02	0.02	13.95	0.013	1.95	0.28	2.68
Greg_16+50_Ex_5yr_Gutter-2	Spread	0.02642	1.95	1.5	0.02	0.02	7.14	0.013	0.51	0.14	3.83
Greg_16+50_Ex_100yr_Gutter-2	Spread	0.0242	5.21	1.5	0.02	0.02	10.49	0.013	1.1	0.21	4.73
Greg_16+50_Pr_5yr_Gutter	Spread	0.0053	1.64	1.5	0.02	0.02	9.04	0.013	0.82	0.18	2.01
Greg_16+50_Pr_100yr_Gutter	Spread	0.0053	4.37	1.5	0.02	0.02	13.06	0.013	1.71	0.26	2.56
Greg_16+50_Pr_5yr_Gutter-2	Spread	0.0242	2.25	1.5	0.02	0.02	7.66	0.013	0.59	0.15	3.84
Greg_16+50_Pr_100yr_Gutter-2	Spread	0.0242	6.53	1.5	0.02	0.02	11.42	0.013	1.3	0.23	5.01
Greg_25+97_Pr_5yr_Gutter	Spread	0.0334	1.48	1.5	0.02	0.02	6.16	0.013	0.38	0.12	3.9
Greg_25+97_Pr_100yr_Gutter	Spread	0.0334	3.94	1.5	0.02	0.02	8.89	0.013	0.79	0.18	4.98
Greg_32+35_Ex_5yr_Gutter	Spread	0.0037	2.2	1.5	0.02	0.02	10.8	0.013	1.17	0.22	1.89
Greg_32+35_Ex_100yr_Gutter	Spread	0.0037	6.35	1.5	0.02	0.02	16.07	0.013	2.58	0.32	2.46
Greg_32+35_Pr_5yr_Gutter	Spread	0.0037	2.15	1.5	0.02	0.02	10.71	0.013	1.15	0.21	1.88
Greg_32+35_Pr_100yr_Gutter	Spread	0.0037	6.3	1.5	0.02	0.02	16.02	0.013	2.57	0.32	2.45
Sparks_307+83_Pr_5yr_Gutter	Spread	0.02	1.41	1.5	0.02	0.02	6.66	0.013	0.44	0.13	3.18
Sparks_307+83_Pr_100yr_Gutter	Spread	0.02	3.75	1.5	0.02	0.02	9.61	0.013	0.92	0.19	4.06
Sparks_307+60_Pr_5yr_Gutter	Spread	0.02	0.26	1.5	0.02	0.02	3.53	0.013	0.12	0.07	2.08
Sparks_307+60_Pr_100yr_Gutter	Spread	0.02	0.69	1.5	0.02	0.02	5.09	0.013	0.26	0.1	2.66
Sparks_307+19_Pr_5yr_Gutter	Spread	0.02	0.13	1.5	0.02	0.02	2.72	0.013	0.07	0.05	1.75
Sparks_307+19_Pr_100yr_Gutter	Spread	0.02	0.33	1.5	0.02	0.02	3.86	0.013	0.15	0.08	2.21
SEC_305+22_Pr_5yr_Gutter	Spread	0.035	0.41	2	0.01	0.01	5.82	0.013	0.17	0.06	2.42
SEC_305+22_Pr_100yr_Gutter	Spread	0.035	1.09	2	0.01	0.01	8.4	0.013	0.35	0.08	3.09
SEC_305+73_Pr_5yr_Gutter	Spread	0.035	0.59	2	0.01	0.01	6.67	0.013	0.22	0.07	2.65
SEC_305+73_Pr_100yr_Gutter	Spread	0.035	1.58	2	0.01	0.01	9.65	0.013	0.47	0.1	3.39

HYDRAULIC ANALYSES NORTH OF THE TRUCKEE RIVER BRIDGE: GREG STREET / SPARKS BLVD / SOUTH EAST CONNECTOR

FLOWMASTER COMBINATION INLET IN SAG TABLE

Label	Solve For	Q (ft³/s)	Spread (ft)	Gtr Wdth (ft)	Gtr XSlope (ft/ft)	Road XSlope (ft/ft)	Grate W (ft)	Grate L (ft)	Clogging (%)	Curb Open L (ft)	Open H (ft)	Depth (ft)
Greg_16+23_Ex_5yr_ComboSagInlet	Spread	1.75	11.07	1.5	0.02	0.02	1.5	3	50	3	0.5	0.22
Greg_16+23_Ex_100yr_ComboSagInlet	Spread	5.07	20.69	1.5	0.02	0.02	1.5	3	50	3	0.5	0.41
Greg_16+23_Pr_5yr_ComboSagInlet	Spread	2.57	13.41	1.5	0.02	0.02	1.5	3	50	3	0.5	0.27
Greg_16+23_Pr_100yr_ComboSagInlet	Spread	7.02	28.48	1.5	0.02	0.02	1.5	3	50	3	0.5	0.57
Greg_16+50_Ex_5yr_ComboSagInlet	Spread	1.95	11.69	1.5	0.02	0.02	1.5	3	50	3	0.5	0.23
Greg_16+50_Ex_100yr_ComboSagInlet	Spread	5.21	21.28	1.5	0.02	0.02	1.5	3	50	3	0.5	0.43
Greg_16+50_Pr_5yr_ComboSagInlet	Spread	2.25	12.55	1.5	0.02	0.02	1.5	3	50	3	0.5	0.25
Greg_16+50_Pr_100yr_ComboSagInlet	Spread	6.53	26.58	1.5	0.02	0.02	1.5	3	50	3	0.5	0.53
Greg_32+35_Ex_5yr_ComboSagInlet	Spread	2.2	12.41	1.5	0.02	0.02	1.5	3	50	3	0.5	0.25
Greg_32+35_Ex_100yr_ComboSagInlet	Spread	6.35	25.87	1.5	0.02	0.02	1.5	3	50	3	0.5	0.52
Greg_32+35_Pr_5yr_ComboSagInlet	Spread	2.15	12.27	1.5	0.02	0.02	1.5	3	50	3	0.5	0.25
Greg_32+35_Pr_100yr_ComboSagInlet	Spread	6.3	25.68	1.5	0.02	0.02	1.5	3	50	3	0.5	0.51
Sparks_307+60_Pr_5yr_ComboSagInlet	Spread	0.26	3.87	1.5	0.02	0.02	1.5	3	50	3	0.5	0.08
Sparks_307+60_Pr_100yr_ComboSagInlet	Spread	0.69	6.6	1.5	0.02	0.02	1.5	3	50	3	0.5	0.13
Sparks_307+19_Pr_5yr_ComboSagInlet	Spread	0.13	2.75	1.5	0.02	0.02	1.5	3	50	3	0.5	0.06
Sparks_307+19_Pr_100yr_ComboSagInlet	Spread	0.33	4.39	1.5	0.02	0.02	1.5	3	50	3	0.5	0.09

FLOWMASTER COMBINATION INLET ON GRADE TABLE

Label	Solve For	Q (ft³/s)	Slope (ft/ft)	Grate W (ft)	Gtr XSlope (ft/ft)	Road XSlope (ft/ft)	n Value	Efficiency (%)	Gutter Width (ft)	Grate Length (ft)	Clog (%)	Curb Open L (ft)	Intercepted Q (ft³/s)	Bypass Q (ft³/s)	Spread (ft)	Depth (ft)	Flow Area (ft²)	Velocity (ft/s)	XSlope (ft/ft)	Active Grate L (ft)	Total Int L (ft)
Greg_25+97_Pr_5yr_ComboInletOnGrade	Efficiency	1.48	0.0334	1.5	0.02	0.02	0.013	58.32	1.5	3	50	3	0.86	0.62	6.16	0.12	0.38	3.9	0.02	1.5	36.12
Greg_25+97_Pr_100yr_ComboInletOnGrade	Efficiency	3.94	0.0334	1.5	0.02	0.02	0.013	43.57	1.5	3	50	3	1.72	2.22	8.89	0.18	0.79	4.98	0.02	1.5	54.5
Sparks_307+83_Pr_5yr_ComboInletOnGrade	Efficiency	1.41	0.02	1.5	0.02	0.02	0.013	56.91	1.5	3	50	3	0.8	0.61	6.66	0.13	0.44	3.18	0.02	1.5	30.35
Sparks_307+83_Pr_100yr_ComboInletOnGrade	Efficiency	3.75	0.02	1.5	0.02	0.02	0.013	42.38	1.5	3	50	3	1.59	2.16	9.61	0.19	0.92	4.06	0.02	1.5	45.77
SEC_305+73_Pr_5yr_ComboInletOnGrade	Efficiency	0.59	0.035	1.5	0.01	0.01	0.013	55.23	1.5	3	50	3	0.33	0.26	6.67	0.07	0.22	2.65	0.01	1.5	37.74
SEC_305+73_Pr_100yr_ComboInletOnGrade	Efficiency	1.58	0.035	1.5	0.01	0.01	0.013	40.92	1.5	3	50	3	0.65	0.93	9.65	0.1	0.47	3.39	0.01	1.5	57.07

FLOWMASTER GRATE INLET ON GRADE TABLE

Label	Solve For	Q (ft³/s)	Slope (ft/ft)	Gutter W (ft)	Gtr XSlope (ft/ft)	Road XSlope (ft/ft)	n Value	Efficiency (%)	Grate Width (ft)	Grate Length (ft)	Clog (%)	Intercepted Q (ft³/s)	Bypass Q (ft³/s)	Spread (ft)	Depth (ft)	Flow Area (ft²)	Velocity (ft/s)	Act. Grate L (ft)
SEC_305+22_Pr_5yr_GrateOnGrade	Efficiency	0.41	0.035	2	0.01	0.01	0.013	68.59	2	3	50	0.28	0.13	5.82	0.06	0.17	2.42	1.5
SEC_305+22_Pr_100yr_GrateOnGrade	Efficiency	1.09	0.035	2	0.01	0.01	0.013	52.68	2	3	50	0.57	0.52	8.4	0.08	0.35	3.09	1.5

FLOWMASTER DITCH INLET IN SAG TABLE

Label	Solve For	Q (ft³/s)	Slope (ft/ft)	L Slope (ft/ft)	R Slope(ft/ft)	Bottom Width (ft)	Grate W (ft)	Grate L (ft)	Clogging (%)	Depth (ft)	Wet Per (ft)	Top Width (ft)	Open Grate A (ft²)
SEC_304+17_Pr_5yr_DitchSagInlet	Spread	0.15	2.01	0.16	0.16	2	2	2	50	0.04	2.08	2.01	0.7
SEC_304+17_Pr_100yr_DitchSagInlet	Spread	0.47	2.03	0.16	0.16	2	2	2	50	0.09	2.18	2.03	0.7

Worksheet for Greg_16+23_Pr_5yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00500	ft/ft
Diameter	1.00	ft
Discharge	2.44	ft³/s

Results

Normal Depth	0.79	ft
Flow Area	0.67	ft²
Wetted Perimeter	2.20	ft
Hydraulic Radius	0.30	ft
Top Width	0.81	ft
Critical Depth	0.67	ft
Percent Full	79.3	%
Critical Slope	0.00756	ft/ft
Velocity	3.66	ft/s
Velocity Head	0.21	ft
Specific Energy	1.00	ft
Froude Number	0.71	
Maximum Discharge	2.71	ft³/s
Discharge Full	2.52	ft³/s
Slope Full	0.00469	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	79.25	%
Downstream Velocity	Infinity	ft/s

Worksheet for Greg_16+23_Pr_5yr_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.79	ft
Critical Depth	0.67	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00756	ft/ft

Worksheet for Greg_16+23_Pr_100yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00500	ft/ft
Normal Depth	1.00	ft
Diameter	1.00	ft
Discharge	2.52	ft³/s

Results

Discharge	2.52	ft³/s
Normal Depth	1.00	ft
Flow Area	0.79	ft²
Wetted Perimeter	3.14	ft
Hydraulic Radius	0.25	ft
Top Width	0.00	ft
Critical Depth	0.68	ft
Percent Full	100.0	%
Critical Slope	0.00770	ft/ft
Velocity	3.21	ft/s
Velocity Head	0.16	ft
Specific Energy	1.16	ft
Froude Number	0.00	
Maximum Discharge	2.71	ft³/s
Discharge Full	2.52	ft³/s
Slope Full	0.00500	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Worksheet for Greg_16+23_Pr_100yr_Pipe

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.00	ft
Critical Depth	0.68	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00770	ft/ft

Worksheet for Greg_16+23_Ex_5yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01250	ft/ft
Diameter	1.00	ft
Discharge	1.75	ft³/s

Results

Normal Depth	0.46	ft
Flow Area	0.36	ft²
Wetted Perimeter	1.50	ft
Hydraulic Radius	0.24	ft
Top Width	1.00	ft
Critical Depth	0.56	ft
Percent Full	46.4	%
Critical Slope	0.00653	ft/ft
Velocity	4.91	ft/s
Velocity Head	0.37	ft
Specific Energy	0.84	ft
Froude Number	1.45	
Maximum Discharge	4.28	ft³/s
Discharge Full	3.98	ft³/s
Slope Full	0.00241	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	46.38	%
Downstream Velocity	Infinity	ft/s

Worksheet for Greg_16+23_Ex_5yr_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.46	ft
Critical Depth	0.56	ft
Channel Slope	0.01250	ft/ft
Critical Slope	0.00653	ft/ft

Worksheet for Greg_16+23_Ex_100yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01250	ft/ft
Normal Depth	1.00	ft
Diameter	1.00	ft
Discharge	3.98	ft³/s

Results

Discharge	3.98	ft³/s
Normal Depth	1.00	ft
Flow Area	0.79	ft²
Wetted Perimeter	3.14	ft
Hydraulic Radius	0.25	ft
Top Width	0.00	ft
Critical Depth	0.85	ft
Percent Full	100.0	%
Critical Slope	0.01186	ft/ft
Velocity	5.07	ft/s
Velocity Head	0.40	ft
Specific Energy	1.40	ft
Froude Number	0.00	
Maximum Discharge	4.28	ft³/s
Discharge Full	3.98	ft³/s
Slope Full	0.01250	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Worksheet for Greg_16+23_Ex_100yr_Pipe

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.00	ft
Critical Depth	0.85	ft
Channel Slope	0.01250	ft/ft
Critical Slope	0.01186	ft/ft

Worksheet for Greg_16+23_ExPipe_Pr5yrQ_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01250	ft/ft
Diameter	1.00	ft
Discharge	2.44	ft³/s

Results

Normal Depth	0.57	ft
Flow Area	0.46	ft²
Wetted Perimeter	1.70	ft
Hydraulic Radius	0.27	ft
Top Width	0.99	ft
Critical Depth	0.67	ft
Percent Full	56.6	%
Critical Slope	0.00756	ft/ft
Velocity	5.33	ft/s
Velocity Head	0.44	ft
Specific Energy	1.01	ft
Froude Number	1.38	
Maximum Discharge	4.28	ft³/s
Discharge Full	3.98	ft³/s
Slope Full	0.00469	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	56.56	%
Downstream Velocity	Infinity	ft/s

Worksheet for Greg_16+23_ExPipe_Pr5yrQ_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.57	ft
Critical Depth	0.67	ft
Channel Slope	0.01250	ft/ft
Critical Slope	0.00756	ft/ft

Worksheet for Greg_16+50_Pr_5yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.02770	ft/ft
Diameter	1.00	ft
Discharge	1.64	ft³/s

Results

Normal Depth	0.36	ft
Flow Area	0.25	ft²
Wetted Perimeter	1.29	ft
Hydraulic Radius	0.20	ft
Top Width	0.96	ft
Critical Depth	0.54	ft
Percent Full	36.0	%
Critical Slope	0.00640	ft/ft
Velocity	6.45	ft/s
Velocity Head	0.65	ft
Specific Energy	1.01	ft
Froude Number	2.21	
Maximum Discharge	6.38	ft³/s
Discharge Full	5.93	ft³/s
Slope Full	0.00212	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	35.96	%
Downstream Velocity	Infinity	ft/s

Worksheet for Greg_16+50_Pr_5yr_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.36	ft
Critical Depth	0.54	ft
Channel Slope	0.02770	ft/ft
Critical Slope	0.00640	ft/ft

Worksheet for Greg_16+50_Pr_100yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.02770	ft/ft
Diameter	1.00	ft
Discharge	4.37	ft³/s

Results

Normal Depth	0.64	ft
Flow Area	0.53	ft²
Wetted Perimeter	1.85	ft
Hydraulic Radius	0.29	ft
Top Width	0.96	ft
Critical Depth	0.88	ft
Percent Full	63.9	%
Critical Slope	0.01359	ft/ft
Velocity	8.25	ft/s
Velocity Head	1.06	ft
Specific Energy	1.70	ft
Froude Number	1.96	
Maximum Discharge	6.38	ft³/s
Discharge Full	5.93	ft³/s
Slope Full	0.01505	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	63.86	%
Downstream Velocity	Infinity	ft/s

Worksheet for Greg_16+50_Pr_100yr_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.64	ft
Critical Depth	0.88	ft
Channel Slope	0.02770	ft/ft
Critical Slope	0.01359	ft/ft

Worksheet for Greg_16+50_Ex_5yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00910	ft/ft
Diameter	1.00	ft
Discharge	1.95	ft^3/s

Results

Normal Depth	0.54	ft
Flow Area	0.44	ft^2
Wetted Perimeter	1.66	ft
Hydraulic Radius	0.26	ft
Top Width	1.00	ft
Critical Depth	0.60	ft
Percent Full	54.3	%
Critical Slope	0.00679	ft/ft
Velocity	4.48	ft/s
Velocity Head	0.31	ft
Specific Energy	0.85	ft
Froude Number	1.19	
Maximum Discharge	3.66	ft^3/s
Discharge Full	3.40	ft^3/s
Slope Full	0.00300	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	54.30	%
Downstream Velocity	Infinity	ft/s

Worksheet for Greg_16+50_Ex_5yr_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.54	ft
Critical Depth	0.60	ft
Channel Slope	0.00910	ft/ft
Critical Slope	0.00679	ft/ft

Worksheet for Greg_16+50_Ex_100yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00910	ft/ft
Normal Depth	1.00	ft
Diameter	1.00	ft
Discharge	3.40	ft³/s

Results

Discharge	3.40	ft³/s
Normal Depth	1.00	ft
Flow Area	0.79	ft²
Wetted Perimeter	3.14	ft
Hydraulic Radius	0.25	ft
Top Width	0.00	ft
Critical Depth	0.79	ft
Percent Full	100.0	%
Critical Slope	0.00980	ft/ft
Velocity	4.33	ft/s
Velocity Head	0.29	ft
Specific Energy	1.29	ft
Froude Number	0.00	
Maximum Discharge	3.66	ft³/s
Discharge Full	3.40	ft³/s
Slope Full	0.00910	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Worksheet for Greg_16+50_Ex_100yr_Pipe

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.00	ft
Critical Depth	0.79	ft
Channel Slope	0.00910	ft/ft
Critical Slope	0.00980	ft/ft

Worksheet for Greg_16+50_ExPipe_Pr5yrQ_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00910	ft/ft
Diameter	1.00	ft
Discharge	1.64	ft³/s

Results

Normal Depth	0.49	ft
Flow Area	0.38	ft²
Wetted Perimeter	1.55	ft
Hydraulic Radius	0.25	ft
Top Width	1.00	ft
Critical Depth	0.54	ft
Percent Full	49.0	%
Critical Slope	0.00640	ft/ft
Velocity	4.29	ft/s
Velocity Head	0.29	ft
Specific Energy	0.78	ft
Froude Number	1.22	
Maximum Discharge	3.66	ft³/s
Discharge Full	3.40	ft³/s
Slope Full	0.00212	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	48.95	%
Downstream Velocity	Infinity	ft/s

Worksheet for Greg_16+50_ExPipe_Pr5yrQ_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.49	ft
Critical Depth	0.54	ft
Channel Slope	0.00910	ft/ft
Critical Slope	0.00640	ft/ft

Worksheet for Greg_25+97_Pr_5yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Diameter	1.00	ft
Discharge	1.48	ft³/s

Results

Normal Depth	0.45	ft
Flow Area	0.34	ft²
Wetted Perimeter	1.47	ft
Hydraulic Radius	0.23	ft
Top Width	0.99	ft
Critical Depth	0.52	ft
Percent Full	45.0	%
Critical Slope	0.00622	ft/ft
Velocity	4.32	ft/s
Velocity Head	0.29	ft
Specific Energy	0.74	ft
Froude Number	1.30	
Maximum Discharge	3.83	ft³/s
Discharge Full	3.56	ft³/s
Slope Full	0.00173	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	44.96	%
Downstream Velocity	Infinity	ft/s

Worksheet for Greg_25+97_Pr_5yr_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.45	ft
Critical Depth	0.52	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00622	ft/ft

Worksheet for Greg_25+97_Pr_100yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Normal Depth	0.82	ft
Diameter	1.00	ft

Results

Discharge	3.56	ft^3/s
Flow Area	0.69	ft^2
Wetted Perimeter	2.26	ft
Hydraulic Radius	0.30	ft
Top Width	0.77	ft
Critical Depth	0.81	ft
Percent Full	82.0	%
Critical Slope	0.01032	ft/ft
Velocity	5.17	ft/s
Velocity Head	0.42	ft
Specific Energy	1.24	ft
Froude Number	0.96	
Maximum Discharge	3.83	ft^3/s
Discharge Full	3.56	ft^3/s
Slope Full	0.01000	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	81.96	%
Downstream Velocity	Infinity	ft/s

Worksheet for Greg_25+97_Pr_100yr_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.82	ft
Critical Depth	0.81	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.01032	ft/ft

Worksheet for Sparks_307+83_Pr_5yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.09780	ft/ft
Diameter	1.00	ft
Discharge	1.41	ft³/s

Results

Normal Depth	0.24	ft
Flow Area	0.15	ft²
Wetted Perimeter	1.02	ft
Hydraulic Radius	0.14	ft
Top Width	0.85	ft
Critical Depth	0.50	ft
Percent Full	24.0	%
Critical Slope	0.00615	ft/ft
Velocity	9.71	ft/s
Velocity Head	1.46	ft
Specific Energy	1.71	ft
Froude Number	4.15	
Maximum Discharge	11.98	ft³/s
Discharge Full	11.14	ft³/s
Slope Full	0.00157	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	24.03	%
Downstream Velocity	Infinity	ft/s

Worksheet for Sparks_307+83_Pr_5yr_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.24	ft
Critical Depth	0.50	ft
Channel Slope	0.09780	ft/ft
Critical Slope	0.00615	ft/ft

Worksheet for Sparks_307+83_Pr_100yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.09780	ft/ft
Diameter	1.00	ft
Discharge	3.75	ft³/s

Results

Normal Depth	0.40	ft
Flow Area	0.29	ft²
Wetted Perimeter	1.37	ft
Hydraulic Radius	0.21	ft
Top Width	0.98	ft
Critical Depth	0.82	ft
Percent Full	40.0	%
Critical Slope	0.01096	ft/ft
Velocity	12.79	ft/s
Velocity Head	2.54	ft
Specific Energy	2.94	ft
Froude Number	4.12	
Maximum Discharge	11.98	ft³/s
Discharge Full	11.14	ft³/s
Slope Full	0.01108	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	39.98	%
Downstream Velocity	Infinity	ft/s

Worksheet for Sparks_307+83_Pr_100yr_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.40	ft
Critical Depth	0.82	ft
Channel Slope	0.09780	ft/ft
Critical Slope	0.01096	ft/ft

Worksheet for Sparks_307+66_Pr_5yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01780	ft/ft
Diameter	1.50	ft
Discharge	1.80	ft³/s

Results

Normal Depth	0.36	ft
Flow Area	0.33	ft²
Wetted Perimeter	1.54	ft
Hydraulic Radius	0.21	ft
Top Width	1.28	ft
Critical Depth	0.51	ft
Percent Full	24.2	%
Critical Slope	0.00492	ft/ft
Velocity	5.45	ft/s
Velocity Head	0.46	ft
Specific Energy	0.83	ft
Froude Number	1.90	
Maximum Discharge	15.07	ft³/s
Discharge Full	14.01	ft³/s
Slope Full	0.00029	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	24.20	%
Downstream Velocity	Infinity	ft/s

Worksheet for Sparks_307+66_Pr_5yr_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.36	ft
Critical Depth	0.51	ft
Channel Slope	0.01780	ft/ft
Critical Slope	0.00492	ft/ft

Worksheet for Sparks_307+66_Pr_100yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01780	ft/ft
Diameter	1.50	ft
Discharge	4.77	ft³/s

Results

Normal Depth	0.60	ft
Flow Area	0.66	ft²
Wetted Perimeter	2.06	ft
Hydraulic Radius	0.32	ft
Top Width	1.47	ft
Critical Depth	0.84	ft
Percent Full	40.2	%
Critical Slope	0.00568	ft/ft
Velocity	7.17	ft/s
Velocity Head	0.80	ft
Specific Energy	1.40	ft
Froude Number	1.88	
Maximum Discharge	15.07	ft³/s
Discharge Full	14.01	ft³/s
Slope Full	0.00206	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	40.22	%
Downstream Velocity	Infinity	ft/s

Worksheet for Sparks_307+66_Pr_100yr_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.60	ft
Critical Depth	0.84	ft
Channel Slope	0.01780	ft/ft
Critical Slope	0.00568	ft/ft

Worksheet for Sparks_307+60_Pr_5yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.05440	ft/ft
Diameter	1.00	ft
Discharge	0.26	ft³/s

Results

Normal Depth	0.12	ft
Flow Area	0.05	ft²
Wetted Perimeter	0.71	ft
Hydraulic Radius	0.08	ft
Top Width	0.65	ft
Critical Depth	0.21	ft
Percent Full	12.1	%
Critical Slope	0.00575	ft/ft
Velocity	4.80	ft/s
Velocity Head	0.36	ft
Specific Energy	0.48	ft
Froude Number	2.94	
Maximum Discharge	8.94	ft³/s
Discharge Full	8.31	ft³/s
Slope Full	0.00005	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	12.11	%
Downstream Velocity	Infinity	ft/s

Worksheet for Sparks_307+60_Pr_5yr_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.12	ft
Critical Depth	0.21	ft
Channel Slope	0.05440	ft/ft
Critical Slope	0.00575	ft/ft

Worksheet for Sparks_307+60_Pr_100yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.05440	ft/ft
Diameter	1.00	ft
Discharge	0.69	ft³/s

Results

Normal Depth	0.19	ft
Flow Area	0.11	ft²
Wetted Perimeter	0.91	ft
Hydraulic Radius	0.12	ft
Top Width	0.79	ft
Critical Depth	0.35	ft
Percent Full	19.5	%
Critical Slope	0.00564	ft/ft
Velocity	6.41	ft/s
Velocity Head	0.64	ft
Specific Energy	0.83	ft
Froude Number	3.06	
Maximum Discharge	8.94	ft³/s
Discharge Full	8.31	ft³/s
Slope Full	0.00038	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	19.48	%
Downstream Velocity	Infinity	ft/s

Worksheet for Sparks_307+60_Pr_100yr_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.19	ft
Critical Depth	0.35	ft
Channel Slope	0.05440	ft/ft
Critical Slope	0.00564	ft/ft

Worksheet for Sparks_307+19_Pr_5yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.06880	ft/ft
Diameter	1.00	ft
Discharge	0.13	ft³/s

Results

Normal Depth	0.08	ft
Flow Area	0.03	ft²
Wetted Perimeter	0.58	ft
Hydraulic Radius	0.05	ft
Top Width	0.55	ft
Critical Depth	0.15	ft
Percent Full	8.2	%
Critical Slope	0.00611	ft/ft
Velocity	4.24	ft/s
Velocity Head	0.28	ft
Specific Energy	0.36	ft
Froude Number	3.16	
Maximum Discharge	10.05	ft³/s
Discharge Full	9.34	ft³/s
Slope Full	0.00001	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	8.23	%
Downstream Velocity	Infinity	ft/s

Worksheet for Sparks_307+19_Pr_5yr_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.08	ft
Critical Depth	0.15	ft
Channel Slope	0.06880	ft/ft
Critical Slope	0.00611	ft/ft

Worksheet for Sparks_307+19_Pr_100yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.06880	ft/ft
Diameter	1.00	ft
Discharge	0.33	ft³/s

Results

Normal Depth	0.13	ft
Flow Area	0.06	ft²
Wetted Perimeter	0.73	ft
Hydraulic Radius	0.08	ft
Top Width	0.67	ft
Critical Depth	0.24	ft
Percent Full	12.8	%
Critical Slope	0.00568	ft/ft
Velocity	5.59	ft/s
Velocity Head	0.49	ft
Specific Energy	0.61	ft
Froude Number	3.32	
Maximum Discharge	10.05	ft³/s
Discharge Full	9.34	ft³/s
Slope Full	0.00009	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	12.85	%
Downstream Velocity	Infinity	ft/s

Worksheet for Sparks_307+19_Pr_100yr_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.13	ft
Critical Depth	0.24	ft
Channel Slope	0.06880	ft/ft
Critical Slope	0.00568	ft/ft

Worksheet for SEC_304+17_Pr_5yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.10590	ft/ft
Diameter	1.00	ft
Discharge	0.15	ft³/s

Results

Normal Depth	0.08	ft
Flow Area	0.03	ft²
Wetted Perimeter	0.57	ft
Hydraulic Radius	0.05	ft
Top Width	0.54	ft
Critical Depth	0.16	ft
Percent Full	8.0	%
Critical Slope	0.00598	ft/ft
Velocity	5.11	ft/s
Velocity Head	0.41	ft
Specific Energy	0.49	ft
Froude Number	3.87	
Maximum Discharge	12.47	ft³/s
Discharge Full	11.59	ft³/s
Slope Full	0.00002	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	7.99	%
Downstream Velocity	Infinity	ft/s

Worksheet for SEC_304+17_Pr_5yr_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.08	ft
Critical Depth	0.16	ft
Channel Slope	0.10590	ft/ft
Critical Slope	0.00598	ft/ft

Worksheet for SEC_304+17_Pr_100yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.10590	ft/ft
Diameter	1.00	ft
Discharge	0.47	ft³/s

Results

Normal Depth	0.14	ft
Flow Area	0.07	ft²
Wetted Perimeter	0.76	ft
Hydraulic Radius	0.09	ft
Top Width	0.69	ft
Critical Depth	0.28	ft
Percent Full	13.7	%
Critical Slope	0.00561	ft/ft
Velocity	7.23	ft/s
Velocity Head	0.81	ft
Specific Energy	0.95	ft
Froude Number	4.15	
Maximum Discharge	12.47	ft³/s
Discharge Full	11.59	ft³/s
Slope Full	0.00017	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	13.74	%
Downstream Velocity	Infinity	ft/s

Worksheet for SEC_304+17_Pr_100yr_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.14	ft
Critical Depth	0.28	ft
Channel Slope	0.10590	ft/ft
Critical Slope	0.00561	ft/ft

Worksheet for SEC_305+22_Pr_5yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.08000	ft/ft
Diameter	1.25	ft
Discharge	0.41	ft³/s

Results

Normal Depth	0.13	ft
Flow Area	0.07	ft²
Wetted Perimeter	0.82	ft
Hydraulic Radius	0.08	ft
Top Width	0.76	ft
Critical Depth	0.25	ft
Percent Full	10.4	%
Critical Slope	0.00536	ft/ft
Velocity	6.10	ft/s
Velocity Head	0.58	ft
Specific Energy	0.71	ft
Froude Number	3.62	
Maximum Discharge	19.65	ft³/s
Discharge Full	18.27	ft³/s
Slope Full	0.00004	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	10.35	%
Downstream Velocity	Infinity	ft/s

Worksheet for SEC_305+22_Pr_5yr_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.13	ft
Critical Depth	0.25	ft
Channel Slope	0.08000	ft/ft
Critical Slope	0.00536	ft/ft

Worksheet for SEC_305+22_Pr_100yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.08000	ft/ft
Diameter	1.25	ft
Discharge	1.09	ft³/s

Results

Normal Depth	0.21	ft
Flow Area	0.13	ft²
Wetted Perimeter	1.05	ft
Hydraulic Radius	0.13	ft
Top Width	0.93	ft
Critical Depth	0.41	ft
Percent Full	16.6	%
Critical Slope	0.00521	ft/ft
Velocity	8.18	ft/s
Velocity Head	1.04	ft
Specific Energy	1.25	ft
Froude Number	3.81	
Maximum Discharge	19.65	ft³/s
Discharge Full	18.27	ft³/s
Slope Full	0.00028	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	16.57	%
Downstream Velocity	Infinity	ft/s

Worksheet for SEC_305+22_Pr_100yr_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.21	ft
Critical Depth	0.41	ft
Channel Slope	0.08000	ft/ft
Critical Slope	0.00521	ft/ft

Worksheet for SEC_305+73_Pr_5yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01720	ft/ft
Diameter	1.00	ft
Discharge	0.59	ft³/s

Results

Normal Depth	0.24	ft
Flow Area	0.15	ft²
Wetted Perimeter	1.02	ft
Hydraulic Radius	0.14	ft
Top Width	0.85	ft
Critical Depth	0.32	ft
Percent Full	24.0	%
Critical Slope	0.00562	ft/ft
Velocity	4.07	ft/s
Velocity Head	0.26	ft
Specific Energy	0.50	ft
Froude Number	1.74	
Maximum Discharge	5.03	ft³/s
Discharge Full	4.67	ft³/s
Slope Full	0.00027	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	24.01	%
Downstream Velocity	Infinity	ft/s

Worksheet for SEC_305+73_Pr_5yr_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.24	ft
Critical Depth	0.32	ft
Channel Slope	0.01720	ft/ft
Critical Slope	0.00562	ft/ft

Worksheet for SEC_305+73_Pr_100yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01720	ft/ft
Diameter	1.00	ft
Discharge	1.58	ft³/s

Results

Normal Depth	0.40	ft
Flow Area	0.29	ft²
Wetted Perimeter	1.37	ft
Hydraulic Radius	0.21	ft
Top Width	0.98	ft
Critical Depth	0.53	ft
Percent Full	40.1	%
Critical Slope	0.00633	ft/ft
Velocity	5.37	ft/s
Velocity Head	0.45	ft
Specific Energy	0.85	ft
Froude Number	1.73	
Maximum Discharge	5.03	ft³/s
Discharge Full	4.67	ft³/s
Slope Full	0.00197	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	40.09	%
Downstream Velocity	Infinity	ft/s

Worksheet for SEC_305+73_Pr_100yr_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.40	ft
Critical Depth	0.53	ft
Channel Slope	0.01720	ft/ft
Critical Slope	0.00633	ft/ft

Worksheet for SEC_304+50_Pr_5yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.04880	ft/ft
Diameter	1.00	ft
Discharge	1.00	ft³/s

Results

Normal Depth	0.24	ft
Flow Area	0.15	ft²
Wetted Perimeter	1.03	ft
Hydraulic Radius	0.14	ft
Top Width	0.86	ft
Critical Depth	0.42	ft
Percent Full	24.1	%
Critical Slope	0.00580	ft/ft
Velocity	6.87	ft/s
Velocity Head	0.73	ft
Specific Energy	0.97	ft
Froude Number	2.93	
Maximum Discharge	8.47	ft³/s
Discharge Full	7.87	ft³/s
Slope Full	0.00079	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	24.08	%
Downstream Velocity	Infinity	ft/s

Worksheet for SEC_304+50_Pr_5yr_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.24	ft
Critical Depth	0.42	ft
Channel Slope	0.04880	ft/ft
Critical Slope	0.00580	ft/ft

Worksheet for SEC_304+50_Pr_100yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.04880	ft/ft
Diameter	1.00	ft
Discharge	2.67	ft³/s

Results

Normal Depth	0.40	ft
Flow Area	0.29	ft²
Wetted Perimeter	1.37	ft
Hydraulic Radius	0.21	ft
Top Width	0.98	ft
Critical Depth	0.70	ft
Percent Full	40.2	%
Critical Slope	0.00799	ft/ft
Velocity	9.05	ft/s
Velocity Head	1.27	ft
Specific Energy	1.68	ft
Froude Number	2.91	
Maximum Discharge	8.47	ft³/s
Discharge Full	7.87	ft³/s
Slope Full	0.00562	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	40.16	%
Downstream Velocity	Infinity	ft/s

Worksheet for SEC_304+50_Pr_100yr_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.40	ft
Critical Depth	0.70	ft
Channel Slope	0.04880	ft/ft
Critical Slope	0.00799	ft/ft

Worksheet for SEC_304+10_Pr_5yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.50000	ft/ft
Diameter	1.00	ft
Discharge	0.69	ft³/s

Results

Normal Depth	0.11	ft
Flow Area	0.05	ft²
Wetted Perimeter	0.69	ft
Hydraulic Radius	0.07	ft
Top Width	0.64	ft
Critical Depth	0.35	ft
Percent Full	11.4	%
Critical Slope	0.00565	ft/ft
Velocity	13.95	ft/s
Velocity Head	3.03	ft
Specific Energy	3.14	ft
Froude Number	8.82	
Maximum Discharge	27.10	ft³/s
Discharge Full	25.19	ft³/s
Slope Full	0.00038	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	11.39	%
Downstream Velocity	Infinity	ft/s

Worksheet for SEC_304+10_Pr_5yr_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.11	ft
Critical Depth	0.35	ft
Channel Slope	0.50000	ft/ft
Critical Slope	0.00565	ft/ft

Worksheet for SEC_304+10_Pr_100yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.50000	ft/ft
Diameter	1.00	ft
Discharge	1.83	ft³/s

Results

Normal Depth	0.18	ft
Flow Area	0.10	ft²
Wetted Perimeter	0.88	ft
Hydraulic Radius	0.11	ft
Top Width	0.77	ft
Critical Depth	0.58	ft
Percent Full	18.2	%
Critical Slope	0.00663	ft/ft
Velocity	18.67	ft/s
Velocity Head	5.42	ft
Specific Energy	5.60	ft
Froude Number	9.24	
Maximum Discharge	27.10	ft³/s
Discharge Full	25.19	ft³/s
Slope Full	0.00264	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	18.24	%
Downstream Velocity	Infinity	ft/s

Worksheet for SEC_304+10_Pr_100yr_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.18	ft
Critical Depth	0.58	ft
Channel Slope	0.50000	ft/ft
Critical Slope	0.00663	ft/ft

Worksheet for SEC_303+95_Pr_5yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.47000	ft/ft
Diameter	1.00	ft
Discharge	0.67	ft³/s

Results

Normal Depth	0.11	ft
Flow Area	0.05	ft²
Wetted Perimeter	0.69	ft
Hydraulic Radius	0.07	ft
Top Width	0.64	ft
Critical Depth	0.34	ft
Percent Full	11.4	%
Critical Slope	0.00564	ft/ft
Velocity	13.53	ft/s
Velocity Head	2.85	ft
Specific Energy	2.96	ft
Froude Number	8.55	
Maximum Discharge	26.27	ft³/s
Discharge Full	24.42	ft³/s
Slope Full	0.00035	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	11.40	%
Downstream Velocity	Infinity	ft/s

Worksheet for SEC_303+95_Pr_5yr_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.11	ft
Critical Depth	0.34	ft
Channel Slope	0.47000	ft/ft
Critical Slope	0.00564	ft/ft

Worksheet for SEC_303+95_Pr_100yr_Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.47000	ft/ft
Diameter	1.00	ft
Discharge	1.78	ft³/s

Results

Normal Depth	0.18	ft
Flow Area	0.10	ft²
Wetted Perimeter	0.88	ft
Hydraulic Radius	0.11	ft
Top Width	0.77	ft
Critical Depth	0.57	ft
Percent Full	18.3	%
Critical Slope	0.00657	ft/ft
Velocity	18.12	ft/s
Velocity Head	5.10	ft
Specific Energy	5.29	ft
Froude Number	8.96	
Maximum Discharge	26.27	ft³/s
Discharge Full	24.42	ft³/s
Slope Full	0.00250	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	18.27	%
Downstream Velocity	Infinity	ft/s

Worksheet for SEC_303+95_Pr_100yr_Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.18	ft
Critical Depth	0.57	ft
Channel Slope	0.47000	ft/ft
Critical Slope	0.00657	ft/ft

Worksheet for Greg_16+23_Ex_5yr_Gutter

Project Description

Solve For	Spread

Input Data

Channel Slope	0.00680	ft/ft
Discharge	1.75	ft³/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	8.84	ft
Flow Area	0.78	ft²
Depth	0.18	ft
Gutter Depression	0.00	ft
Velocity	2.24	ft/s

Worksheet for Greg_16+23_Ex_5yr_Gutter-2

Project Description

Solve For	Spread

Input Data

Channel Slope	0.02690	ft/ft
Discharge	1.75	ft³/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	6.83	ft
Flow Area	0.47	ft²
Depth	0.14	ft
Gutter Depression	0.00	ft
Velocity	3.75	ft/s

Worksheet for Greg_16+23_Ex_100yr_Gutter

Project Description

Solve For	Spread

Input Data

Channel Slope	0.00680	ft/ft
Discharge	5.07	ft^3/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	13.18	ft
Flow Area	1.74	ft^2
Depth	0.26	ft
Gutter Depression	0.00	ft
Velocity	2.92	ft/s

Worksheet for Greg_16+23_Ex_100yr_Gutter-2

Project Description

Solve For	Spread

Input Data

Channel Slope	0.02690	ft/ft
Discharge	5.07	ft³/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	10.18	ft
Flow Area	1.04	ft²
Depth	0.20	ft
Gutter Depression	0.00	ft
Velocity	4.89	ft/s

Worksheet for Greg_16+23_Pr_5yr_Gutter

Project Description

Solve For	Spread

Input Data

Channel Slope	0.00680	ft/ft
Discharge	2.44	ft³/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	10.02	ft
Flow Area	1.00	ft²
Depth	0.20	ft
Gutter Depression	0.00	ft
Velocity	2.43	ft/s

Worksheet for Greg_16+23_Pr_5yr_Gutter-2

Project Description

Solve For	Spread

Input Data

Channel Slope	0.02690	ft/ft
Discharge	2.57	ft³/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	7.89	ft
Flow Area	0.62	ft²
Depth	0.16	ft
Gutter Depression	0.00	ft
Velocity	4.13	ft/s

Worksheet for Greg_16+23_Pr_100yr_Gutter

Project Description

Solve For	Spread

Input Data

Channel Slope	0.00680	ft/ft
Discharge	6.50	ft³/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	14.46	ft
Flow Area	2.09	ft²
Depth	0.29	ft
Gutter Depression	0.00	ft
Velocity	3.11	ft/s

Worksheet for Greg_16+23_Pr_100yr_Gutter-2

Project Description

Solve For	Spread

Input Data

Channel Slope	0.02690	ft/ft
Discharge	7.02	ft³/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	11.50	ft
Flow Area	1.32	ft²
Depth	0.23	ft
Gutter Depression	0.00	ft
Velocity	5.31	ft/s

Worksheet for Greg_16+50_Ex_5yr_Gutter

Project Description

Solve For	Spread

Input Data

Channel Slope	0.00530	ft/ft
Discharge	1.95	ft³/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	9.65	ft
Flow Area	0.93	ft²
Depth	0.19	ft
Gutter Depression	0.00	ft
Velocity	2.09	ft/s

Worksheet for Greg_16+50_Ex_5yr_Gutter-2

Project Description

Solve For	Spread

Input Data

Channel Slope	0.02642	ft/ft
Discharge	1.95	ft³/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	7.14	ft
Flow Area	0.51	ft²
Depth	0.14	ft
Gutter Depression	0.00	ft
Velocity	3.83	ft/s

Worksheet for Greg_16+50_Ex_100yr_Gutter

Project Description

Solve For	Spread

Input Data

Channel Slope	0.00530	ft/ft
Discharge	5.21	ft³/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	13.95	ft
Flow Area	1.95	ft²
Depth	0.28	ft
Gutter Depression	0.00	ft
Velocity	2.68	ft/s

Worksheet for Greg_16+50_Ex_100yr_Gutter-2

Project Description

Solve For	Spread

Input Data

Channel Slope	0.02420	ft/ft
Discharge	5.21	ft³/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	10.49	ft
Flow Area	1.10	ft²
Depth	0.21	ft
Gutter Depression	0.00	ft
Velocity	4.73	ft/s

Worksheet for Greg_16+50_Pr_5yr_Gutter

Project Description

Solve For	Spread

Input Data

Channel Slope	0.00530	ft/ft
Discharge	1.64	ft³/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	9.04	ft
Flow Area	0.82	ft²
Depth	0.18	ft
Gutter Depression	0.00	ft
Velocity	2.01	ft/s

Worksheet for Greg_16+50_Pr_5yr_Gutter-2

Project Description

Solve For	Spread

Input Data

Channel Slope	0.02420	ft/ft
Discharge	2.25	ft³/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	7.66	ft
Flow Area	0.59	ft²
Depth	0.15	ft
Gutter Depression	0.00	ft
Velocity	3.84	ft/s

Worksheet for Greg_16+50_Pr_100yr_Gutter

Project Description

Solve For	Spread

Input Data

Channel Slope	0.00530	ft/ft
Discharge	4.37	ft³/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	13.06	ft
Flow Area	1.71	ft²
Depth	0.26	ft
Gutter Depression	0.00	ft
Velocity	2.56	ft/s

Worksheet for Greg_16+50_Pr_100yr_Gutter-2

Project Description

Solve For	Spread

Input Data

Channel Slope	0.02420	ft/ft
Discharge	6.53	ft³/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	11.42	ft
Flow Area	1.30	ft²
Depth	0.23	ft
Gutter Depression	0.00	ft
Velocity	5.01	ft/s

Worksheet for Greg_25+97_Pr_5yr_Gutter

Project Description

Solve For	Spread

Input Data

Channel Slope	0.03340	ft/ft
Discharge	1.48	ft³/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	6.16	ft
Flow Area	0.38	ft²
Depth	0.12	ft
Gutter Depression	0.00	ft
Velocity	3.90	ft/s

Worksheet for Greg_25+97_Pr_100yr_Gutter

Project Description

Solve For	Spread

Input Data

Channel Slope	0.03340	ft/ft
Discharge	3.94	ft³/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	8.89	ft
Flow Area	0.79	ft²
Depth	0.18	ft
Gutter Depression	0.00	ft
Velocity	4.98	ft/s

Worksheet for Greg_32+35_Ex_5yr_Gutter

Project Description

Solve For	Spread

Input Data

Channel Slope	0.00370	ft/ft
Discharge	2.20	ft³/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	10.80	ft
Flow Area	1.17	ft²
Depth	0.22	ft
Gutter Depression	0.00	ft
Velocity	1.89	ft/s

Worksheet for Greg_32+35_Ex_100yr_Gutter

Project Description

Solve For	Spread

Input Data

Channel Slope	0.00370	ft/ft
Discharge	6.35	ft³/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	16.07	ft
Flow Area	2.58	ft²
Depth	0.32	ft
Gutter Depression	0.00	ft
Velocity	2.46	ft/s

Worksheet for Greg_32+35_Pr_5yr_Gutter

Project Description

Solve For	Spread

Input Data

Channel Slope	0.00370	ft/ft
Discharge	2.15	ft³/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	10.71	ft
Flow Area	1.15	ft²
Depth	0.21	ft
Gutter Depression	0.00	ft
Velocity	1.88	ft/s

Worksheet for Greg_32+35_Pr_100yr_Gutter

Project Description

Solve For	Spread

Input Data

Channel Slope	0.00370	ft/ft
Discharge	6.30	ft³/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	16.02	ft
Flow Area	2.57	ft²
Depth	0.32	ft
Gutter Depression	0.00	ft
Velocity	2.45	ft/s

Worksheet for Sparks_307+83_Pr_5yr_Gutter

Project Description

Solve For	Spread

Input Data

Channel Slope	0.02000	ft/ft
Discharge	1.41	ft³/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	6.66	ft
Flow Area	0.44	ft²
Depth	0.13	ft
Gutter Depression	0.00	ft
Velocity	3.18	ft/s

Worksheet for Sparks_307+83_Pr_100yr_Gutter

Project Description

Solve For	Spread

Input Data

Channel Slope	0.02000	ft/ft
Discharge	3.75	ft³/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	9.61	ft
Flow Area	0.92	ft²
Depth	0.19	ft
Gutter Depression	0.00	ft
Velocity	4.06	ft/s

Worksheet for Sparks_307+60_Pr_5yr_Gutter

Project Description

Solve For	Spread

Input Data

Channel Slope	0.02000	ft/ft
Discharge	0.26	ft³/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	3.53	ft
Flow Area	0.12	ft²
Depth	0.07	ft
Gutter Depression	0.00	ft
Velocity	2.08	ft/s

Worksheet for Sparks_307+60_Pr_100yr_Gutter

Project Description

Solve For	Spread

Input Data

Channel Slope	0.02000	ft/ft
Discharge	0.69	ft³/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	5.09	ft
Flow Area	0.26	ft²
Depth	0.10	ft
Gutter Depression	0.00	ft
Velocity	2.66	ft/s

Worksheet for Sparks_307+19_Pr_5yr_Gutter

Project Description

Solve For	Spread

Input Data

Channel Slope	0.02000	ft/ft
Discharge	0.13	ft³/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	2.72	ft
Flow Area	0.07	ft²
Depth	0.05	ft
Gutter Depression	0.00	ft
Velocity	1.75	ft/s

Worksheet for Sparks_307+19_Pr_100yr_Gutter

Project Description

Solve For	Spread

Input Data

Channel Slope	0.02000	ft/ft
Discharge	0.33	ft³/s
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	3.86	ft
Flow Area	0.15	ft²
Depth	0.08	ft
Gutter Depression	0.00	ft
Velocity	2.21	ft/s

Worksheet for SEC_305+22_Pr_5yr_Gutter

Project Description

Solve For	Spread

Input Data

Channel Slope	0.03500	ft/ft
Discharge	0.41	ft³/s
Gutter Width	2.00	ft
Gutter Cross Slope	0.01	ft/ft
Road Cross Slope	0.01	ft/ft
Roughness Coefficient	0.013	

Results

Spread	5.82	ft
Flow Area	0.17	ft²
Depth	0.06	ft
Gutter Depression	0.00	ft
Velocity	2.42	ft/s

Worksheet for SEC_305+22_Pr_100yr_Gutter

Project Description

Solve For	Spread

Input Data

Channel Slope	0.03500	ft/ft
Discharge	1.09	ft³/s
Gutter Width	2.00	ft
Gutter Cross Slope	0.01	ft/ft
Road Cross Slope	0.01	ft/ft
Roughness Coefficient	0.013	

Results

Spread	8.40	ft
Flow Area	0.35	ft²
Depth	0.08	ft
Gutter Depression	0.00	ft
Velocity	3.09	ft/s

Worksheet for SEC_305+73_Pr_5yr_Gutter

Project Description

Solve For	Spread

Input Data

Channel Slope	0.03500	ft/ft
Discharge	0.59	ft³/s
Gutter Width	2.00	ft
Gutter Cross Slope	0.01	ft/ft
Road Cross Slope	0.01	ft/ft
Roughness Coefficient	0.013	

Results

Spread	6.67	ft
Flow Area	0.22	ft²
Depth	0.07	ft
Gutter Depression	0.00	ft
Velocity	2.65	ft/s

Worksheet for SEC_305+73_Pr_100yr_Gutter

Project Description

Solve For	Spread

Input Data

Channel Slope	0.03500	ft/ft
Discharge	1.58	ft³/s
Gutter Width	2.00	ft
Gutter Cross Slope	0.01	ft/ft
Road Cross Slope	0.01	ft/ft
Roughness Coefficient	0.013	

Results

Spread	9.65	ft
Flow Area	0.47	ft²
Depth	0.10	ft
Gutter Depression	0.00	ft
Velocity	3.39	ft/s

Worksheet for Greg_16+23_Ex_5yr_ComboSagInlet

Project Description

Solve For	Spread

Input Data

Discharge		1.75	ft³/s
Gutter Width		1.50	ft
Gutter Cross Slope		0.02	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		3.00	ft
Opening Height		0.50	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option	Use Both

Results

Spread	11.07	ft
Depth	0.22	ft
Gutter Depression	0.00	ft
Total Depression	0.00	ft
Open Grate Area	0.79	ft²
Active Grate Weir Length	4.50	ft

Worksheet for Greg_16+23_Ex_100yr_ComboSagInlet

Project Description

Solve For	Spread

Input Data

Discharge		5.07	ft³/s
Gutter Width		1.50	ft
Gutter Cross Slope		0.02	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		3.00	ft
Opening Height		0.50	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option	Use Both

Results

Spread	20.69	ft
Depth	0.41	ft
Gutter Depression	0.00	ft
Total Depression	0.00	ft
Open Grate Area	0.79	ft²
Active Grate Weir Length	4.50	ft

Worksheet for Greg_16+23_Pr_5yr_ComboSagInlet

Project Description

Solve For	Spread

Input Data

Discharge		2.57	ft³/s
Gutter Width		1.50	ft
Gutter Cross Slope		0.02	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		3.00	ft
Opening Height		0.50	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option	Use Both

Results

Spread	13.41	ft
Depth	0.27	ft
Gutter Depression	0.00	ft
Total Depression	0.00	ft
Open Grate Area	0.79	ft²
Active Grate Weir Length	4.50	ft

Worksheet for Greg_16+23_Pr_100yr_ComboSagInlet

Project Description

Solve For	Spread

Input Data

Discharge		7.02	ft³/s
Gutter Width		1.50	ft
Gutter Cross Slope		0.02	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		3.00	ft
Opening Height		0.50	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option	Use Both

Results

Spread	28.48	ft
Depth	0.57	ft
Gutter Depression	0.00	ft
Total Depression	0.00	ft
Open Grate Area	0.79	ft²
Active Grate Weir Length	4.50	ft

Worksheet for Greg_16+50_Ex_5yr_ComboSagInlet

Project Description

Solve For	Spread

Input Data

Discharge		1.95	ft³/s
Gutter Width		1.50	ft
Gutter Cross Slope		0.02	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		3.00	ft
Opening Height		0.50	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option	Use Both

Results

Spread	11.69	ft
Depth	0.23	ft
Gutter Depression	0.00	ft
Total Depression	0.00	ft
Open Grate Area	0.79	ft²
Active Grate Weir Length	4.50	ft

Worksheet for Greg_16+50_Ex_100yr_ComboSagInlet

Project Description

Solve For	Spread

Input Data

Discharge		5.21	ft³/s
Gutter Width		1.50	ft
Gutter Cross Slope		0.02	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		3.00	ft
Opening Height		0.50	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option	Use Both

Results

Spread		21.28	ft
Depth		0.43	ft
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Open Grate Area		0.79	ft²
Active Grate Weir Length		4.50	ft

Worksheet for Greg_16+50_Pr_5yr_ComboSagInlet

Project Description

Solve For	Spread

Input Data

Discharge		2.25	ft³/s
Gutter Width		1.50	ft
Gutter Cross Slope		0.02	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		3.00	ft
Opening Height		0.50	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option	Use Both

Results

Spread	12.55	ft
Depth	0.25	ft
Gutter Depression	0.00	ft
Total Depression	0.00	ft
Open Grate Area	0.79	ft²
Active Grate Weir Length	4.50	ft

Worksheet for Greg_16+50_Pr_100yr_ComboSagInlet

Project Description

Solve For	Spread

Input Data

Discharge		6.53	ft³/s
Gutter Width		1.50	ft
Gutter Cross Slope		0.02	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		3.00	ft
Opening Height		0.50	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option	Use Both

Results

Spread		26.58	ft
Depth		0.53	ft
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Open Grate Area		0.79	ft²
Active Grate Weir Length		4.50	ft

Worksheet for Greg_32+35_Ex_5yr_ComboSagInlet

Project Description

Solve For	Spread

Input Data

Discharge		2.20	ft³/s
Gutter Width		1.50	ft
Gutter Cross Slope		0.02	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		3.00	ft
Opening Height		0.50	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option	Use Both

Results

Spread	12.41	ft
Depth	0.25	ft
Gutter Depression	0.00	ft
Total Depression	0.00	ft
Open Grate Area	0.79	ft²
Active Grate Weir Length	4.50	ft

Worksheet for Greg_32+35_Ex_100yr_ComboSagInlet

Project Description

Solve For	Spread

Input Data

Discharge		6.35	ft³/s
Gutter Width		1.50	ft
Gutter Cross Slope		0.02	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		3.00	ft
Opening Height		0.50	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option	Use Both

Results

Spread		25.87	ft
Depth		0.52	ft
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Open Grate Area		0.79	ft²
Active Grate Weir Length		4.50	ft

Worksheet for Greg_32+35_Pr_5yr_ComboSagInlet

Project Description

Solve For	Spread

Input Data

Discharge		2.15	ft³/s
Gutter Width		1.50	ft
Gutter Cross Slope		0.02	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		3.00	ft
Opening Height		0.50	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option	Use Both

Results

Spread	12.27	ft
Depth	0.25	ft
Gutter Depression	0.00	ft
Total Depression	0.00	ft
Open Grate Area	0.79	ft²
Active Grate Weir Length	4.50	ft

Worksheet for Greg_32+35_Pr_100yr_ComboSagInlet

Project Description

Solve For	Spread

Input Data

Discharge		6.30	ft³/s
Gutter Width		1.50	ft
Gutter Cross Slope		0.02	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		3.00	ft
Opening Height		0.50	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option	Use Both

Results

Spread		25.68	ft
Depth		0.51	ft
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Open Grate Area		0.79	ft²
Active Grate Weir Length		4.50	ft

Worksheet for Sparks_307+60_Pr_5yr_ComboSagInlet

Project Description

Solve For	Spread

Input Data

Discharge		0.26	ft³/s
Gutter Width		1.50	ft
Gutter Cross Slope		0.02	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		3.00	ft
Opening Height		0.50	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option	Use Both

Results

Spread	3.87	ft
Depth	0.08	ft
Gutter Depression	0.00	ft
Total Depression	0.00	ft
Open Grate Area	0.79	ft²
Active Grate Weir Length	4.50	ft

Worksheet for Sparks_307+60_Pr_100yr_ComboSagInlet

Project Description

Solve For	Spread

Input Data

Discharge		0.69	ft³/s
Gutter Width		1.50	ft
Gutter Cross Slope		0.02	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		3.00	ft
Opening Height		0.50	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option	Use Both

Results

Spread	6.60	ft
Depth	0.13	ft
Gutter Depression	0.00	ft
Total Depression	0.00	ft
Open Grate Area	0.79	ft²
Active Grate Weir Length	4.50	ft

Worksheet for Sparks_307+19_Pr_5yr_ComboSagInlet

Project Description

Solve For	Spread

Input Data

Discharge		0.13	ft³/s
Gutter Width		1.50	ft
Gutter Cross Slope		0.02	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		3.00	ft
Opening Height		0.50	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option	Use Both

Results

Spread	2.75	ft
Depth	0.06	ft
Gutter Depression	0.00	ft
Total Depression	0.00	ft
Open Grate Area	0.79	ft²
Active Grate Weir Length	4.50	ft

Worksheet for Sparks_307+19_Pr_100yr_ComboSagInlet

Project Description

Solve For	Spread

Input Data

Discharge		0.33	ft³/s
Gutter Width		1.50	ft
Gutter Cross Slope		0.02	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		3.00	ft
Opening Height		0.50	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option	Use Both

Results

Spread	4.39	ft
Depth	0.09	ft
Gutter Depression	0.00	ft
Total Depression	0.00	ft
Open Grate Area	0.79	ft²
Active Grate Weir Length	4.50	ft

Worksheet for Greg_25+97_Pr_5yr_ComboInletOnGrade

Project Description

Solve For	Efficiency

Input Data

Discharge	1.48	ft³/s
Slope	0.03340	ft/ft
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	0.00	in
Local Depression Width	0.00	ft
Grate Width	1.50	ft
Grate Length	3.00	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	3.00	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	58.32	%
Intercepted Flow	0.86	ft³/s
Bypass Flow	0.62	ft³/s
Spread	6.16	ft
Depth	0.12	ft
Flow Area	0.38	ft²
Gutter Depression	0.00	ft
Total Depression	0.00	ft
Velocity	3.90	ft/s
Splash Over Velocity	6.99	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.03	
Grate Flow Ratio	0.53	
Equivalent Cross Slope	0.02000	ft/ft
Active Grate Length	1.50	ft
Length Factor	0.04	
Total Interception Length	36.12	ft

Worksheet for Greg_25+97_Pr_100yr_ComboInletOnGrade

Project Description

Solve For	Efficiency

Input Data

Discharge	3.94	ft³/s
Slope	0.03340	ft/ft
Gutter Width	1.50	ft
Gutter Cross Slope	0.02	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	0.00	in
Local Depression Width	0.00	ft
Grate Width	1.50	ft
Grate Length	3.00	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	3.00	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	43.57	%
Intercepted Flow	1.72	ft³/s
Bypass Flow	2.22	ft³/s
Spread	8.89	ft
Depth	0.18	ft
Flow Area	0.79	ft²
Gutter Depression	0.00	ft
Total Depression	0.00	ft
Velocity	4.98	ft/s
Splash Over Velocity	6.99	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.02	
Grate Flow Ratio	0.39	
Equivalent Cross Slope	0.02000	ft/ft
Active Grate Length	1.50	ft
Length Factor	0.03	
Total Interception Length	54.50	ft

Worksheet for Sparks_307+83_Pr_5yr_ComboInletOnGrade

Project Description

Solve For	Efficiency

Input Data

Discharge		1.41	ft³/s
Slope		0.02000	ft/ft
Gutter Width		1.50	ft
Gutter Cross Slope		0.02	ft/ft
Road Cross Slope		0.02	ft/ft
Roughness Coefficient		0.013	
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%
Curb Opening Length		3.00	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency		56.91	%
Intercepted Flow		0.80	ft³/s
Bypass Flow		0.61	ft³/s
Spread		6.66	ft
Depth		0.13	ft
Flow Area		0.44	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		3.18	ft/s
Splash Over Velocity		6.99	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.04	
Grate Flow Ratio		0.49	
Equivalent Cross Slope		0.02000	ft/ft
Active Grate Length		1.50	ft
Length Factor		0.05	
Total Interception Length		30.35	ft

Worksheet for Sparks_307+83_Pr_100yr_ComboInletOnGrade

Project Description

Solve For	Efficiency

Input Data

Discharge		3.75	ft³/s
Slope		0.02000	ft/ft
Gutter Width		1.50	ft
Gutter Cross Slope		0.02	ft/ft
Road Cross Slope		0.02	ft/ft
Roughness Coefficient		0.013	
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%
Curb Opening Length		3.00	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency		42.38	%
Intercepted Flow		1.59	ft³/s
Bypass Flow		2.16	ft³/s
Spread		9.61	ft
Depth		0.19	ft
Flow Area		0.92	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		4.06	ft/s
Splash Over Velocity		6.99	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.03	
Grate Flow Ratio		0.36	
Equivalent Cross Slope		0.02000	ft/ft
Active Grate Length		1.50	ft
Length Factor		0.03	
Total Interception Length		45.77	ft

Worksheet for SEC_305+73_Pr_5yr_ComboInletOnGrade

Project Description

Solve For	Efficiency

Input Data

Discharge		0.59	ft³/s
Slope		0.03500	ft/ft
Gutter Width		1.50	ft
Gutter Cross Slope		0.01	ft/ft
Road Cross Slope		0.01	ft/ft
Roughness Coefficient		0.013	
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%
Curb Opening Length		3.00	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	55.23	%
Intercepted Flow	0.33	ft³/s
Bypass Flow	0.26	ft³/s
Spread	6.67	ft
Depth	0.07	ft
Flow Area	0.22	ft²
Gutter Depression	0.00	ft
Total Depression	0.00	ft
Velocity	2.65	ft/s
Splash Over Velocity	6.99	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.03	
Grate Flow Ratio	0.49	
Equivalent Cross Slope	0.01000	ft/ft
Active Grate Length	1.50	ft
Length Factor	0.04	
Total Interception Length	37.74	ft

Worksheet for SEC_305+73_Pr_100yr_ComboInletOnGrade

Project Description

Solve For	Efficiency

Input Data

Discharge		1.58	ft³/s
Slope		0.03500	ft/ft
Gutter Width		1.50	ft
Gutter Cross Slope		0.01	ft/ft
Road Cross Slope		0.01	ft/ft
Roughness Coefficient		0.013	
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Width		1.50	ft
Grate Length		3.00	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%
Curb Opening Length		3.00	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency		40.92	%
Intercepted Flow		0.65	ft³/s
Bypass Flow		0.93	ft³/s
Spread		9.65	ft
Depth		0.10	ft
Flow Area		0.47	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		3.39	ft/s
Splash Over Velocity		6.99	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.02	
Grate Flow Ratio		0.36	
Equivalent Cross Slope		0.01000	ft/ft
Active Grate Length		1.50	ft
Length Factor		0.03	
Total Interception Length		57.07	ft

Worksheet for SEC_305+22_Pr_5yr_GrateOnGrade

Project Description

Solve For	Efficiency

Input Data

Discharge		0.41	ft³/s
Slope		0.03500	ft/ft
Gutter Width		2.00	ft
Gutter Cross Slope		0.01	ft/ft
Road Cross Slope		0.01	ft/ft
Roughness Coefficient		0.013	
Grate Width		2.00	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency	68.59	%
Intercepted Flow	0.28	ft³/s
Bypass Flow	0.13	ft³/s
Spread	5.82	ft
Depth	0.06	ft
Flow Area	0.17	ft²
Gutter Depression	0.00	ft
Total Depression	0.00	ft
Velocity	2.42	ft/s
Splash Over Velocity	5.14	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.03	
Grate Flow Ratio	0.68	
Active Grate Length	1.50	ft

Worksheet for SEC_305+22_Pr_100yr_GrateOnGrade

Project Description

Solve For	Efficiency

Input Data

Discharge		1.09	ft³/s
Slope		0.03500	ft/ft
Gutter Width		2.00	ft
Gutter Cross Slope		0.01	ft/ft
Road Cross Slope		0.01	ft/ft
Roughness Coefficient		0.013	
Grate Width		2.00	ft
Grate Length		3.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Options

Grate Flow Option	Exclude None

Results

Efficiency		52.68	%
Intercepted Flow		0.57	ft³/s
Bypass Flow		0.52	ft³/s
Spread		8.40	ft
Depth		0.08	ft
Flow Area		0.35	ft²
Gutter Depression		0.00	ft
Total Depression		0.00	ft
Velocity		3.09	ft/s
Splash Over Velocity		5.14	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.02	
Grate Flow Ratio		0.52	
Active Grate Length		1.50	ft

Worksheet for SEC_304+17_Pr_5yr_DitchSagInlet

Project Description

Solve For	Spread

Input Data

Discharge		0.15	ft³/s
Left Side Slope		0.16	ft/ft (H:V)
Right Side Slope		0.16	ft/ft (H:V)
Bottom Width		2.00	ft
Grate Width		2.00	ft
Grate Length		2.00	ft
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Results

Spread	2.01	ft
Depth	0.04	ft
Wetted Perimeter	2.08	ft
Top Width	2.01	ft
Open Grate Area	0.70	ft²
Active Grate Weir Length	6.00	ft

Worksheet for SEC_304+17_Pr_100yr_DitchSagInlet

Project Description

Solve For	Spread

Input Data

Discharge		0.47	ft³/s
Left Side Slope		0.16	ft/ft (H:V)
Right Side Slope		0.16	ft/ft (H:V)
Bottom Width		2.00	ft
Grate Width		2.00	ft
Grate Length		2.00	ft
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Results

Spread	2.03	ft
Depth	0.09	ft
Wetted Perimeter	2.18	ft
Top Width	2.03	ft
Open Grate Area	0.70	ft²
Active Grate Weir Length	6.00	ft

APPENDIX C

SEC PHASE I - STORAGE AREA SAMPLING VOLUMES

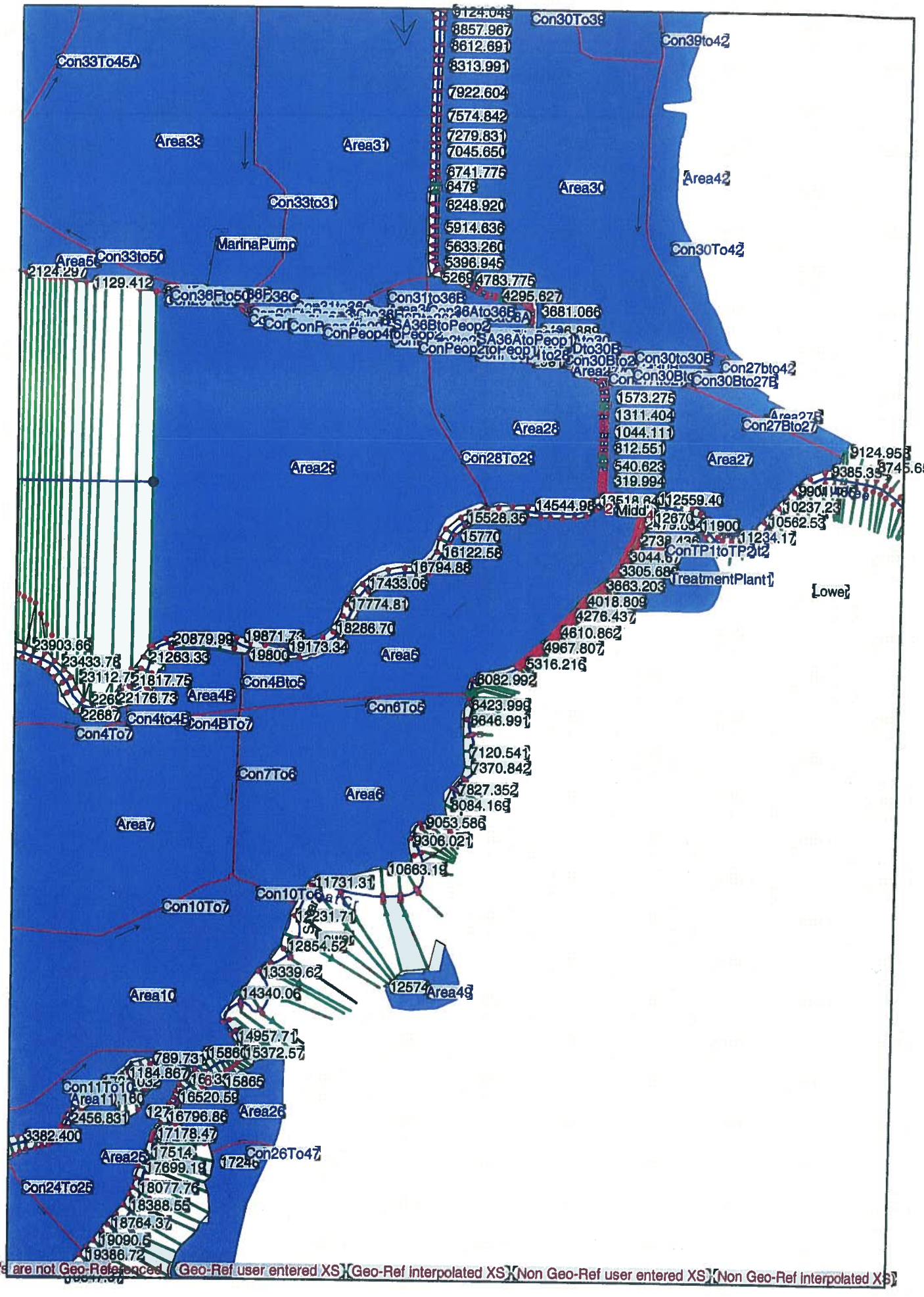
ORIGINAL									EXISTING - SAMPLED from Stantec Topo and Washoe 2004 Topo						
SA5A			SA5B			SA6			SA5				SA6		
el	acre-ft		el	acre-ft		el	acre-ft		el	CY	acre-ft		el	CY	acre-ft
4383.0	0.00		4382.0	0.00		4382.0	0.00		4381.0	38	0.02		4381.5	0	0.00
4383.2	0.01		4384.5	0.04		4382.2	0.01		4383.0	155	0.10		4386.0	24	0.01
4388.0	13.51		4387.0	8.38		4387.0	1.87		4385.0	367	0.23		4387.0	552	0.34
4390.5	151.56		4389.5	97.30		4389.5	155.64		4386.0	3651	2.26		4388.0	15791	9.79
4393.0	385.19		4392.0	270.90		4392.0	501.42		4387.0	12113	7.51		4389.5	215980	133.87
4395.5	654.36		4394.5	463.44		4394.5	940.72		4388.0	46849	29.04		4392.0	770924	477.85
4398.0	925.41		4397.0	657.18		4397.0	1393.30		4389.0	176298	109.28		4394.5	1488277	922.49
4400.5	1196.50		4399.5	856.06		4399.5	1848.70		4390.0	361506	224.07		4397.0	2222373	1377.50
4403.0	1467.50		4402.0	1058.60		4402.0	2306.10		4391.0	601823	373.03		4399.5	2961453	1835.61
			4404.5	1263.10		4404.5	2765.70		4392.0	873174	541.22		4402.0	3703889	2295.80
			4407.0	1467.50		4407.0	3228.20		4393.0	1166158	722.83		4404.5	4449890	2758.20
						4409.5	3693.80		4394.0	1462549	906.54		4407.0	5200567	3223.49
						4412.0	4162.00		4395.0	1759711	1090.73		4409.5	5956400	3691.98
						4414.5	4632.70		4397.0	2355088	1459.77		4412.0	6716594	4163.18
						4417.0	5107.00		4399.0	2955832	1832.13		4414.5	7480405	4636.61
						4419.5	5584.00		4401.0	3562091	2207.91		4417.0	8250017	5113.65
						4422.0	6061.00		4403.0	4170876	2585.25		4419.5	9023809	5593.27
						4424.5	6538.10		4405.0	4781198	2963.55		4422.0	9797894	6073.07
									4407.0	5391520	3341.85		4424.5	10571979	6552.88

PROPOSED - SAMPLED from Stantec Topo, Washoe 2004 Topo and Proposed SEC Phase I														
												SA6B		
SA5A				SA5B				SA6A				el	CY	acre-ft
el	CY	acre-ft		el	CY	acre-ft		el	CY	acre-ft		4381.0	30	0.00
4381.0	0	0.00		4381.0	38	0.02		4381.5	0	0.00		4381.5	139	0.09
4383.0	0	0.00		4383.0	5082	3.15		4386.0	0	0.00		4386.0	27739	17.19
4385.0	0	0.00		4385.0	27542	17.07		4387.0	485	0.30		4387.0	37850	23.46
4386.0	217	0.13		4386.0	53468	33.14		4388.0	10705	6.64		4388.0	53847	33.38
4387.0	2010	1.25		4387.0	86617	53.69		4389.5	159923	99.13		4389.5	107848	66.85
4388.0	18314	11.35		4388.0	131902	81.76		4392.0	523545	324.51		4392.0	282601	175.17
4389.0	87967	54.53		4389.0	195744	121.33		4394.5	976644	605.36		4394.5	531590	329.50
4390.0	185859	115.20		4390.0	273507	169.53		4397.0	1440277	892.73		4397.0	788964	489.03
4391.0	320802	198.84		4391.0	366704	227.30		4399.5	1913063	1185.78		4399.5	1050831	651.34
4392.0	475784	294.91		4392.0	471034	291.96		4402.0	2391207	1482.15		4402.0	1314886	815.01
4393.0	649004	402.28		4393.0	579274	359.05		4404.5	2872913	1780.73		4404.5	1578941	978.68
4394.0	825036	511.39		4394.0	688628	426.84		4407.0	3359285	2082.20		4407.0	1842996	1142.35
4395.0	1001923	621.03		4395.0	798473	494.92		4409.5	3850831	2386.88		4409.5	2107051	1306.02
4397.0	1357046	841.14		4397.0	1019570	631.96		4412.0	4346758	2694.27		4412.0	2371106	1469.69
4399.0	1718013	1064.88		4399.0	1250706	775.23		4414.5	4846302	3003.91		4414.5	2635161	1633.36
4401.0	2083682	1291.54		4401.0	1491297	924.36		4417.0	5351726	3317.19		4417.0	2899216	1797.03
4403.0	2449350	1518.19		4403.0	1734414	1075.05		4419.5	5861245	3633.00		4419.5	3163271	1960.71
4405.0	2815018	1744.85		4405.0	1979068	1226.70		4422.0	6371041	3948.99		4422.0	3427326	2124.38
4407.0	3180686	1971.50		4407.0	2223722	1378.34		4424.5	6880836	4264.98		4424.5	3691381	2288.05

Original			Sample EX Surface (SEC Portion)				Sample PR Surface (SEC Portion)					Apply difference	
SA28			SA28-EXSEC				SA28-PRSEC					SA28 PROPOSED	
el	acre-ft		el	CY	acre-ft		el	CY	acre-ft	dif		el	acre-ft
4385.0	0.00		4385.0	0	0.00		4385.0	0	0.00	0.00		4385.0	0.00
4387.5	1.83		4387.5	561	0.35		4387.5	207	0.13	0.22		4387.5	1.61
4390.0	30.74		4390.0	5856	3.63		4390.0	1962	1.22	2.41		4390.0	28.32
4392.5	127.84		4392.5	13108	8.12		4392.5	5152	3.19	4.93		4392.5	122.91
4395.0	305.58		4395.0	22234	13.78		4395.0	10191	6.32	7.46		4395.0	298.12
4397.5	554.80		4397.5	32386	20.07		4397.5	16569	10.27	9.80		4397.5	545.00
4400.0	820.39		4400.0	43128	26.73		4400.0	26525	16.44	10.29		4400.0	810.10
4402.5	1088.30		4402.5	54410	33.73		4402.5	37806	23.43	10.29		4402.5	1078.01
4405.0	1356.60		4405.0	65692	40.72		4405.0	49088	30.43	10.29		4405.0	1346.31
4407.5	1625.20		4407.5	76974	47.71		4407.5	60370	37.42	10.29		4407.5	1614.91
4410.0	1894.10		4410.0	88255	54.70		4410.0		0.00	10.29		4410.0	1883.81
4412.5	2163.30		4412.5	99537	61.70		4412.5		0.00	10.29		4412.5	2153.01
4415.0	2432.50		4415.0	110819	68.69		4415.0		0.00	10.29		4415.0	2422.21
4417.5	2702.10		4417.5	122101	75.68		4417.5		0.00	10.29		4417.5	2691.81
4420.0	2971.90		4420.0	133383	82.68		4420.0		0.00	10.29		4420.0	2961.61
4422.5	3241.80		4422.5	144665	89.67		4422.5		0.00	10.29		4422.5	3231.51
4425.0	3511.90		4425.0	155946	96.66		4425.0		0.00	10.29		4425.0	3501.61
4427.5	3782.10		4427.5	167228	103.65		4427.5		0.00	10.29		4427.5	3771.81
4430.0	4052.40		4430.0	178510	110.65		4430.0		0.00	10.29		4430.0	4042.11
4432.5	4322.70		4432.5	189792	117.64		4432.5	173189	107.35	10.29		4432.5	4312.41

Original			Sample EX Surface (SEC Portion)				Sample PR Surface (SEC Portion)					Apply difference	
SA29			SA29-EXSEC				SA29-PRSEC					SA29 PROPOSED	
el	acre-ft		el	CY	acre-ft		el	CY	acre-ft	dif		el	acre-ft
4379.0	0.00		4379.0	0	0.00		4379.0	0	0.00	0.00		4379.0	0.00
4389.0	17.00		4389.0	987	0.61		4389.0	0.57	0.00	0.61		4389.0	16.39
4391.5	199.33		4391.5	4812	2.98		4391.5	535	0.33	2.65		4391.5	196.68
4394.0	860.38		4394.0	9848	6.10		4394.0	1939	1.20	4.90		4394.0	855.48
4396.5	1861.62		4396.5	16600	10.29		4396.5	5296	3.28	7.01		4396.5	1854.62
4399.0	2953.75		4399.0	23689	14.68		4399.0	10562	6.55	8.14		4399.0	2945.62
4401.5	4052.59		4401.5	30939	19.18		4401.5	17812	11.04	8.14		4401.5	4044.46
4404.0	5152.42		4404.0		0.00		4404.0		0.00	8.14		4404.0	5144.28
4406.5	6252.80		4406.5		0.00		4406.5		0.00	8.14		4406.5	6244.66
4409.0	7353.60		4409.0		0.00		4409.0		0.00	8.14		4409.0	7345.46
4411.5	8454.73		4411.5		0.00		4411.5		0.00	8.14		4411.5	8446.59
4414.0	9556.08		4414.0		0.00		4414.0		0.00	8.14		4414.0	9547.94
4416.5	10657.72		4416.5		0.00		4416.5		0.00	8.14		4416.5	10649.58
4419.0	11759.64		4419.0		0.00		4419.0		0.00	8.14		4419.0	11751.50
4421.5	12861.86		4421.5		0.00		4421.5		0.00	8.14		4421.5	12853.72
4424.0	13964.35		4424.0		0.00		4424.0		0.00	8.14		4424.0	13956.21
4426.5	15067.16		4426.5		0.00		4426.5		0.00	8.14		4426.5	15059.02
4429.0	16170.36		4429.0		0.00		4429.0		0.00	8.14		4429.0	16162.22
4431.5	17273.58		4431.5	117932	73.10		4431.5	104805	64.96	8.14		4431.5	17265.44

HEC RAS EXISTING CONDITIONS MODEL RESULTS


Con33To45A
Area33
Area31
Con33to31
MarinaPump
Area5
Con33to50
2124.297
1129.412
Con36Fto50
Con31to36B
Con36Ato36B
ConPeop4toPeop2
SA36BtoPeop2
SA36AtoPeop1
ConPeop2toPeop1
Con30Bto30B
Con30to30B
Con30Bto27B
Con27bto42
Con39to42
Con30To39
Area42
Area30
Con30To42
Area28
Area29
Con28To28
Area27
Con27Bto27
1573.275
1311.404
1044.111
812.551
540.623
319.994
9124.958
9385.35
14544.98
12559.40
15528.35
15770
16122.58
16794.86
17433.06
17774.81
18286.70
19173.34
19800
20879.98
19871.74
23903.66
23433.78
23112.75
22687
21263.33
21817.75
22176.73
Area5
Con4Bto5
Area4B
Con4to4B
Con4BTo7
Con4To7
Con6To5
8082.992
6423.999
8646.991
7120.541
7370.842
7827.352
8084.169
9053.586
9306.021
10663.19
11731.31
12231.71
12854.52
13339.62
14340.06
12574
Area4B
Con7To6
Area6
Area7
Con10To7
Con10To6
Area10
14957.71
15372.57
15865
16520.59
16796.86
17178.47
17514
17699.19
17246
Con26To47
Area26
Area25
Con24To25
18077.76
18388.55
18764.37
19090.6
19386.72
Area11
Con11To10
2456.831
3382.400
5316.216
4967.807
4610.862
4276.437
4018.809
3663.203
3305.686
3044.6
ConTP1toTP2
TreatmentPlant
Lowe
10562.53
10237.23
11234.17
11900
12670
Middl
2 of the 906 XS's are not Geo-Referenced
Geo-Ref user entered XS
Geo-Ref interpolated XS
Non Geo-Ref user entered XS
Non Geo-Ref interpolated XS

HEC-RAS Plan: CE Profile: Max WS

Storage Area	Profile	W.S. Elev	SA Min El	Net Flux	SA Area	SA Volume
		(ft)	(ft)	(cfs)	(acres)	(acre-ft)
Area0	Max WS	4429.65	4408.00	-2668.53	61.04	713.19
Area1	Max WS	4417.51	4411.00	5.20	18.62	36.05
Area10	Max WS	4397.70	4382.00	-15.30	199.04	1517.56
Area11	Max WS	4397.77	4384.00	25.44	23.01	113.26
Area12	Max WS	4397.87	4386.00	88.75	126.08	570.87
Area13	Max WS	4398.84	4388.00	85.70	53.68	140.21
Area14	Max WS	4398.78	4385.00	226.27	16.97	26.77
Area15	Max WS	4399.38	4385.00	-40.28	64.71	164.42
Area16	Max WS	4400.64	4389.00	44.07	46.56	96.12
Area17	Max WS	4399.99	4387.00	38.15	211.16	437.63
Area18	Max WS	4404.29	4392.00	-9.69	253.68	857.26
Area19	Max WS	4408.90	4400.00	-74.53	87.21	210.43
Area1B	Max WS	4424.82	4418.00	0.90	20.39	45.00
Area2	Max WS	4408.58	4399.00	-635.91	32.50	82.03
Area20	Max WS	4399.89	4391.00	20.43	56.03	105.96
Area21	Max WS	4397.98	4388.00	71.68	74.19	222.49
Area23	Max WS	4397.89	4386.00	344.78	47.83	119.40
Area24	Max WS	4397.81	4385.00	-67.99	117.96	792.90
Area25	Max WS	4397.77	4380.00	80.41	63.73	506.26
Area26	Max WS	4397.75	4387.50	0.23	20.26	73.15
Area27	Max WS	4397.12	4383.00	-1172.22	104.90	563.13
Area27A	Max WS	4397.27	4383.00	-1.85	3.00	18.08
Area27B	Max WS	4397.30	4395.00	0.00	0.01	0.02
Area28	Max WS	4397.30	4385.00	74.93	99.69	534.84
Area29	Max WS	4397.49	4379.00	399.01	436.85	2295.49
Area3	Max WS	4402.63	4395.00	4.01	74.00	153.13
Area30	Max WS	4397.65	4391.00	-104.01	62.99	116.59
Area30B	Max WS	4397.30	4385.00	0.94	6.62	35.29
Area31	Max WS	4397.13	4378.00	532.36	194.25	635.84
Area33	Max WS	4397.12	4377.00	91.31	223.87	2058.25
Area35	Max WS	4398.41	4390.00	-3.13	77.79	102.96
Area36	Max WS	4398.40	4395.00	2.11	7.56	7.05
Area36-B	Max WS	4397.10	4382.00	159.95	7.62	34.00
Area36-C	Max WS	4397.33	4392.00	-1.05	2.83	4.54
Area36-D	Max WS	4397.32	4394.00	2.89	1.75	2.55
Area36A	Max WS	4397.61	4384.00	-12.99	13.54	36.77
Area36E	Max WS	4397.31	4394.00	2.36	0.78	1.13
Area36F	Max WS	4397.48	4379.92	-15.88	8.20	35.71
Area37	Max WS	4398.38	4395.00	1.16	5.83	5.38
Area37A	Max WS	4399.00	4399.00	0.00	0.06	0.00
Area38	Max WS	4405.58	4401.00	0.24	2.67	5.60
Area39	Max WS	4397.92	4394.00	23.74	22.29	31.80
Area4	Max WS	4398.15	4390.00	45.32	57.56	126.15
Area42	Max WS	4400.00	4400.00	0.00	0.10	0.00
Area43	Max WS	4400.50	4400.50	0.00	0.04	0.00
Area44	Max WS	4405.98	4399.50	0.50	3.14	7.83
Area45	Max WS	4398.49	4393.00	16.56	88.58	96.11
Area45A	Max WS	4394.00	4394.00	0.00	0.14	0.00
Area46	Max WS	4403.00	4403.00	0.00	0.13	0.00
Area47	Max WS	4397.76	4391.00	1.14	0.54	1.05
Area49	Max WS	4396.00	4396.00	0.00	0.00	0.00
Area4B	Max WS	4397.73	4388.00	-68.36	29.30	169.09
Area5	Max WS	4397.36	4381.00	359.60	186.18	1527.13
Area50	Max WS	4394.00	4387.00	6.73	2.92	7.35
Area51	Max WS	4417.18	4416.00	0.31	0.14	0.04
Area52	Max WS	4397.87	4387.00	115.27	19.19	92.29
Area53	Max WS	4397.85	4387.00	71.03	1.73	10.44
Area6	Max WS	4397.57	4381.50	57.39	183.24	1482.28
Area7	Max WS	4397.71	4383.00	77.81	223.84	1509.32
Area8	Max WS	4397.78	4387.00	42.69	212.99	922.34
Area9	Max WS	4397.81	4384.00	109.40	168.03	1014.52

HEC-RAS Plan: CE Profile: Max WS (Continued)

Storage Area	Profile	W.S. Elev	SA Min El	Net Flux	SA Area	SA Volume
		(ft)	(ft)	(cfs)	(acres)	(acre-ft)
SAPeoples1	Max WS	4397.33	4379.17	1.88	0.08	1.53
SAPeoples2	Max WS	4397.48	4382.07	-5.26	0.08	1.17
SAPeoples3	Max WS	4397.48	4381.30	15.47	0.09	1.53
SAPeoples4	Max WS	4397.48	4383.06	0.49	0.02	0.33
TreatmentPlant1	Max WS	4396.57	4395.00	0.07	0.01	0.01
TreatmentPlant2	Max WS	4395.00	4395.00	0.00	0.29	0.00

HEC-RAS Plan: CE Locations: User Defined Profile: Max WS

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
BoyntonSlough	Tributary	19758.67	Max WS	1470.78	4416.99	4425.99	4421.17	4426.17	0.000676	3.43	428.93	74.73	0.25
BoyntonSlough	Tributary	19723.05	Max WS	1470.71	4417.22	4425.97	4421.13	4426.15	0.000604	3.33	441.98	74.13	0.24
BoyntonSlough	Tributary	19667.33	Max WS	1470.65	4416.83	4425.86		4426.11	0.000560	4.05	363.17	65.83	0.25
BoyntonSlough	Tributary	19589.2		Culvert									
BoyntonSlough	Tributary	19509.64	Max WS	1470.75	4414.01	4422.25	4417.78	4422.52	0.000695	4.15	354.46	62.94	0.27
BoyntonSlough	Tributary	19509		Lat Struct									
BoyntonSlough	Tributary	19434		Lat Struct									
BoyntonSlough	Tributary	19433.93	Max WS	1470.70	4413.31	4422.20	4417.81	4422.46	0.000883	4.11	357.96	56.58	0.29
BoyntonSlough	Tributary	19360.97	Max WS	1470.69	4412.57	4422.12	4417.45	4422.40	0.000888	4.19	350.80	53.26	0.29
BoyntonSlough	Tributary	19283.82	Max WS	1470.56	4412.36	4422.09	4417.18	4422.33	0.000751	3.97	370.03	52.73	0.26
BoyntonSlough	Tributary	19202.45	Max WS	1470.51	4412.10	4421.93	4417.43	4422.26	0.001129	4.62	318.06	48.77	0.32
BoyntonSlough	Tributary	19132.94	Max WS	1470.48	4412.09	4421.88	4417.26	4422.18	0.001015	4.40	333.96	51.57	0.30
BoyntonSlough	Tributary	19061.42	Max WS	1470.62	4412.04	4421.82	4417.15	4422.11	0.001008	4.36	337.06	52.92	0.30
BoyntonSlough	Tributary	18980.69	Max WS	1470.49	4411.82	4421.84	4416.23	4422.05	0.000624	3.67	404.41	70.22	0.24
BoyntonSlough	Tributary	18904.68	Max WS	1450.92	4411.44	4421.81	4415.96	4422.01	0.000560	3.51	414.95	72.11	0.23
BoyntonSlough	Tributary	18854.52	Max WS	1450.37	4411.37	4421.83	4415.76	4421.98	0.000435	3.11	466.43	69.80	0.21
BoyntonSlough	Tributary	18832.37	Max WS	1450.34	4411.22	4421.69		4421.97	0.000640	4.29	338.02	62.33	0.26
BoyntonSlough	Tributary	18782		Culvert									
BoyntonSlough	Tributary	18715.66	Max WS	1450.30	4407.80	4413.14	4412.86	4414.57	0.077099	9.61	150.89	85.64	0.88
BoyntonSlough	Tributary	18715		Lat Struct									
BoyntonSlough	Tributary	18676.5		Lat Struct									
BoyntonSlough	Tributary	18637.31	Max WS	1450.27	4403.74	4410.79	4407.59	4411.10	0.001305	4.49	322.67	60.85	0.34
BoyntonSlough	Tributary	18524.96	Max WS	1450.33	4403.32	4410.12	4408.29	4410.83	0.003796	6.77	214.33	47.42	0.56
BoyntonSlough	Tributary	18420.64	Max WS	1450.35	4403.17	4409.37	4408.00	4410.37	0.005184	8.00	181.38	39.16	0.65
BoyntonSlough	Tributary	18323.75	Max WS	1450.34	4402.64	4409.50	4406.88	4409.99	0.002117	5.62	257.98	49.13	0.43
BoyntonSlough	Tributary	18219.05	Max WS	1450.34	4400.87	4408.48	4407.19	4409.60	0.006136	8.46	171.34	37.43	0.70
BoyntonSlough	Tributary	18101.10	Max WS	1450.28	4400.36	4408.71	4405.15	4409.08	0.001372	4.86	298.48	50.13	0.35
BoyntonSlough	Tributary	17993.59	Max WS	1450.33	4399.59	4408.50	4404.92	4408.92	0.001599	5.20	278.99	47.34	0.38
BoyntonSlough	Tributary	17895.49	Max WS	1450.33	4399.79	4408.26	4404.93	4408.75	0.001880	5.60	259.05	43.76	0.41
BoyntonSlough	Tributary	17794.66	Max WS	1450.25	4399.53	4407.90	4405.13	4408.52	0.002750	6.28	230.76	43.59	0.48
BoyntonSlough	Tributary	17702.15	Max WS	1450.32	4399.21	4407.88	4404.25	4408.31	0.001602	5.29	274.27	44.86	0.38
BoyntonSlough	Tributary	17701		Lat Struct									
BoyntonSlough	Tributary	17597.51	Max WS	1450.25	4400.17	4407.58	4404.78	4408.11	0.002251	5.88	246.65	45.10	0.44
BoyntonSlough	Tributary	17486.05	Max WS	1450.27	4400.62	4407.02	4405.11	4407.78	0.003685	7.00	207.13	42.36	0.56
BoyntonSlough	Tributary	17381.40	Max WS	1450.31	4400.25	4406.89	4404.63	4407.46	0.002558	6.01	241.20	47.85	0.47
BoyntonSlough	Tributary	17286.32	Max WS	1450.16	4399.60	4406.81	4403.73	4407.25	0.001806	5.32	272.33	48.00	0.39
BoyntonSlough	Tributary	17186.01	Max WS	1450.29	4399.39	4406.45	4404.07	4407.03	0.002590	6.11	237.18	46.20	0.48
BoyntonSlough	Tributary	17069.64	Max WS	1450.22	4398.96	4406.31	4403.23	4406.77	0.001855	5.42	267.33	47.38	0.40
BoyntonSlough	Tributary	16938.04	Max WS	1450.22	4398.50	4406.21	4402.57	4406.56	0.001290	4.73	306.91	50.20	0.34
BoyntonSlough	Tributary	16810.03	Max WS	1450.26	4398.48	4405.95	4403.04	4406.36	0.001805	5.13	282.78	54.95	0.40
BoyntonSlough	Tributary	16692.96	Max WS	1450.15	4398.41	4405.78	4402.67	4406.16	0.001641	4.94	293.49	56.74	0.38
BoyntonSlough	Tributary	16588.70	Max WS	1450.22	4397.80	4405.50	4403.04	4405.96	0.002211	5.45	266.33	55.76	0.44
BoyntonSlough	Tributary	16482.89	Max WS	1450.22	4397.72	4405.37	4402.29	4405.75	0.001644	4.94	293.44	56.84	0.38
BoyntonSlough	Tributary	16381.83	Max WS	1450.18	4397.57	4405.32	4401.66	4405.61	0.001170	4.35	333.28	60.91	0.33
BoyntonSlough	Tributary	16273.04	Max WS	1450.15	4397.54	4405.18	4401.60	4405.48	0.001180	4.37	331.69	60.65	0.33
BoyntonSlough	Tributary	16169.85	Max WS	1450.22	4397.35	4405.12	4401.14	4405.37	0.000948	4.02	360.51	63.18	0.30
BoyntonSlough	Tributary	16052.91	Max WS	1450.16	4396.90	4404.96		4405.24	0.001241	4.24	341.92	68.58	0.33
BoyntonSlough	Tributary	15611		Culvert									
BoyntonSlough	Tributary	15170.33	Max WS	1415.49	4395.18	4400.62	4398.78	4401.28	0.002104	6.49	217.97	45.56	0.52
BoyntonSlough	Tributary	15170		Lat Struct									
BoyntonSlough	Tributary	15132		Lat Struct									
BoyntonSlough	Tributary	15093.11	Max WS	1414.46	4394.86	4400.54	4398.61	4401.12	0.001921	6.13	230.88	49.75	0.50
BoyntonSlough	Tributary	14959.21	Max WS	1175.94	4394.73	4400.29	4398.04	4400.72	0.001380	5.24	224.38	47.35	0.42
BoyntonSlough	Tributary	14819.01	Max WS	1103.60	4394.52	4400.14	4397.59	4400.49	0.001150	4.79	230.22	47.26	0.38
BoyntonSlough	Tributary	14655.09	Max WS	1056.13	4394.34	4399.99	4397.22	4400.29	0.000947	4.46	238.20	52.71	0.35
BoyntonSlough	Tributary	14548.01	Max WS	1049.99	4393.22	4399.96	4396.52	4400.20	0.000653	3.93	267.19	46.93	0.29
BoyntonSlough	Tributary	14411.56	Max WS	1059.93	4390.43	4400.01	4394.02	4400.14	0.000230	2.91	395.13	90.27	0.18
BoyntonSlough	Tributary	14186.01	Max WS	986.91	4390.41	4399.94	4394.79	4400.09	0.000336	3.20	354.39	95.06	0.21
BoyntonSlough	Tributary	14055.37	Max WS	829.58	4390.41	4399.97	4395.00	4400.09	0.000292	2.88	320.91	90.34	0.19
BoyntonSlough	Tributary	14054		Lat Struct									
BoyntonSlough	Tributary	13924.57	Max WS	758.82	4390.41	4399.94	4395.70	4400.07	0.000374	2.97	286.87	93.48	0.21
BoyntonSlough	Tributary	13817.90	Max WS	737.44	4390.41	4399.93	4394.80	4400.04	0.000251	2.64	299.77	79.64	0.18
BoyntonSlough	Tributary	13736.18	Max WS	775.11	4390.41	4399.89	4394.97	4400.00	0.000264	2.69	321.75	79.72	0.18
BoyntonSlough	Tributary	13735		Lat Struct									
BoyntonSlough	Tributary	13667.97	Max WS	822.85	4390.41	4399.94	4393.67	4399.97	0.000106	1.57	565.20	105.31	0.10
BoyntonSlough	Tributary	13567.63	Max WS	826.73	4390.41	4399.95	4393.15	4399.96	0.000028	0.81	1037.79	166.17	0.05
BoyntonSlough	Tributary	13485.38	Max WS	822.64	4390.41	4399.95	4393.09	4399.96	0.000030	0.85	981.07	156.49	0.06
BoyntonSlough	Tributary	13376.65	Max WS	815.56	4389.53	4399.95	4392.65	4399.96	0.000029	0.85	979.39	147.56	0.06
BoyntonSlough	Tributary	13279.51	Max WS	794.96	4389.21	4399.94	4392.34	4399.96	0.000037	1.00	836.15	128.17	0.06
BoyntonSlough	Tributary	13171.90	Max WS	777.51	4388.91	4399.94	4392.63	4399.95	0.000034	0.93	856.43	126.93	0.06
BoyntonSlough	Tributary	13170		Lat Struct									
BoyntonSlough	Tributary	13052.12	Max WS	735.01	4387.87	4399.94	4391.88	4399.95	0.000023	0.79	958.71	137.81	0.05
BoyntonSlough	Tributary	12924.69	Max WS	708.97	4387.87	4399.94	4391.42	4399.95	0.000018	0.72	1000.17	136.56	0.04
BoyntonSlough	Tributary	12784.66	Max WS	721.80	4389.64	4399.93	4392.74	4399.94	0.000028	0.82	886.40	142.81	0.05
BoyntonSlough	Tributary	12783		Lat Struct									
BoyntonSlough	Tributary	12658.18	Max WS	725.21	4389.64	4399.93	4392.21	4399.94	0.000025	0.80	923.06	142.16	0.05
BoyntonSlough	Tributary	12496.53	Max WS	750.06	4389.63	4399.93	4393.01	4399.94	0.000029	0.84	925.25	150.44	0.05
BoyntonSlough	Tributary	12349.68	Max WS	801.18	4389.54	4399.92	4392.36	4399.93	0.000026	0.84	989.11	144.11	0.05
BoyntonSlough	Tributary	12213.56	Max WS	879.88	4389.36	4399.91	4392.09	4399.93	0.000029	0.89	1010.63	149.81	0.06
BoyntonSlough	Tributary	12028.77	Max WS	967.09	4388.94	4399.90	4391.89	4399.92	0.000032	0.96	1039.31	150.91	0.06
BoyntonSlough	Tributary	11890.70	Max WS	1066.47	4388.91	4399.89	4392.53	4399.91	0.000046	1.12	999.78	163.06	0.07
BoyntonSlough	Tributary	11889		Lat Struct									
BoyntonSlough	Tributary	11750.02	Max WS	1126.52	4388.91	4399.88	4391.99	4399.90	0.000042	1.08	1096.71	170.81	0.07
BoyntonSlough	Tributary	11587.87	Max WS	1301.63	4388.91	4399.87	4392.00	4399.89	0.000050	1.22	1133.28	166.82	0.07
BoyntonSlough	Tributary	11450		Lat Struct									
BoyntonSlough	Tributary	11447.10	Max WS	1413.57	4388.91	4399.85	4391.96	4399.88	0.000057	1.30	1108.92	147.09	0.08
BoyntonSlough	Tributary	11310.57	Max WS	1481.59	4388.87	4399.84	4392.03	4399.87	0.000054	1.27	1226.06	161.01	0.08
BoyntonSlough	Tributary	11136.21	Max WS	1876.40	4388.85	4399.80	4392.18	4399.84	0.000093	1.66	1140.30	156.74	0.10
BoyntonSlough	Tributary	11010.91	Max WS	1889.28	4388.84	4399.78	4391.97	4399.83	0.000104	1.76	1081.20	144.04	0.11
BoyntonSlough	Tributary	10865.34	Max WS	2166.76	4388.85	4399.72	4392.13	4399.79	0.000144	2.14	1063.94	152.21	0.13
BoyntonSlough	Tributary	10783.11	Max WS	2646.69	4388.85	4399.61	4393.58	4399.74	0.000321	2.98	953.08	155.84	0.19
BoyntonSlough	Tributary	10695.51	Max WS	3096.68	4388.85	4399.50	4393.68	4399.67	0.000397	3.36	1012.46	168.40	0.21
BoyntonSlough	Tributary	10649		Bridge									
BoyntonSlough	Tributary	10601.83	Max WS	3011.60	4388.85	4399.15	4392.32	4399.24	0.000192	2.48	1244.33	145.05	0.15
BoyntonSlough	Tributary	10600		Lat Struct									
BoyntonSlough	Tributary	10535		Lat Struct									
BoyntonSlough	Tributary	10528.97	Max WS	2843.74	4386.56	4398.91	4392.77	4399.23	0.000744	4.55	629.89	79.73	0.28
BoyntonSlough	Tributary	10408.32	Max WS	2776.06	4386.66	4398.91	4392.29	4399.17	0.000599	4.07	685.12	84.98	0.25
BoyntonSlough	Tributary	10302.13	Max WS	2669.29	4386.26	4398.93	4391.66	4399.13	0.000421	3.54	754.94	87.79	0.21
BoyntonSlough	Tributary	10195.45	Max WS	2589.80	4385.57	4398.93	4391.25	4399.11	0.000375	3.33	779.79	91.74	0.20
BoyntonSlough	Tributary	10089.67	Max WS	2459.18	4385.90	4398.92	4391.14	4399.08	0.000323	3.21	779.87	90.59	0.19
BoyntonSlough	Tributary	9957.009	Max WS	2337.10	4386.26	4398.90	4390.93	4399.05	0.000307	3.08	763.20	87.23	0.18
BoyntonSlough	Tributary	9835.542	Max WS	2235.88	4385.99	4398.88	4390.72	4399.03	0.000299	3.03	749.17	89.17	0.18
BoyntonSlough	Tributary	9713.677	Max WS	2171.94	4385.74	4398.87	4390.62	4399.00	0.000256	2.84	773.38	88.71	0.17
BoyntonSlough	Tributary	9611.474	Max WS	2129.62	4385.53	4398.88	4390.25	4398.98	0.000198	2.55	868.26	109.40	0.15
BoyntonSlough	Tributary	9610		Lat Struct									
BoyntonSlough	Tributary	9460.350	Max WS	2025.66	4385.63	4398.88	4390.07	4398.96	0.000169	2.31	897.51	104.89	0.14
BoyntonSlough	Tributary	9459		Lat Struct									

HEC-RAS Plan: CE Locations: User Defined Profile: Max WS (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
BoyntonSlough	Tributary	9304.842	Max WS	1978.69	4385.63	4398.83	4390.65	4398.94	0.000204	2.61	804.92	96.82	0.15
BoyntonSlough	Tributary	9189.458	Max WS	1963.22	4385.59	4398.82	4390.88	4398.91	0.000177	2.41	858.85	100.39	0.14
BoyntonSlough	Tributary	9094.572	Max WS	1980.48	4385.28	4398.83	4390.32	4398.90	0.000119	2.05	1009.93	110.60	0.12
BoyntonSlough	Tributary	8979.384	Max WS	1965.20	4385.87	4398.83	4390.13	4398.88	0.000096	1.86	1122.07	117.04	0.10
BoyntonSlough	Tributary	8865.809	Max WS	1982.89	4385.85	4398.82	4389.73	4398.87	0.000100	1.84	1095.32	120.98	0.11
BoyntonSlough	Tributary	8773.786	Max WS	1998.58	4385.69	4398.80	4389.81	4398.86	0.000109	1.97	1040.47	115.06	0.11
BoyntonSlough	Tributary	8715.761	Max WS	2044.60	4385.58	4398.78		4398.85	0.000124	2.14	965.60	182.02	0.12
BoyntonSlough	Tributary	8646		Culvert									
BoyntonSlough	Tributary	8589.367	Max WS	1852.92	4385.40	4397.90	4389.19	4397.98	0.000145	2.29	810.42	213.00	0.12
BoyntonSlough	Tributary	8589		Lat Struct									
BoyntonSlough	Tributary	8588		Lat Struct									
BoyntonSlough	Tributary	8506.099	Max WS	1784.89	4385.26	4397.92	4389.14	4397.98	0.000119	2.08	939.78	120.28	0.12
BoyntonSlough	Tributary	8402.262	Max WS	1673.69	4385.37	4397.91	4389.47	4397.98	0.000119	2.15	861.20	99.43	0.12
BoyntonSlough	Tributary	8305.379	Max WS	1635.85	4385.43	4397.88	4389.48	4397.96	0.000170	2.45	707.99	73.33	0.13
BoyntonSlough	Tributary	8240.585	Max WS	1621.09	4385.46	4397.90	4389.23	4397.96	0.000099	1.94	923.14	105.34	0.11
BoyntonSlough	Tributary	8079.865	Max WS	1552.97	4385.50	4397.90	4389.19	4397.94	0.000102	1.78	923.74	113.71	0.11
BoyntonSlough	Tributary	7933.380	Max WS	1497.39	4385.56	4397.90	4388.90	4397.93	0.000064	1.43	1076.46	132.20	0.08
BoyntonSlough	Tributary	7794.234	Max WS	1457.26	4385.53	4397.90	4388.82	4397.92	0.000061	1.38	1093.88	153.83	0.08
BoyntonSlough	Tributary	7658.699	Max WS	1391.67	4385.79	4397.90	4389.10	4397.92	0.000035	1.07	1367.52	160.20	0.06
BoyntonSlough	Tributary	7515		Lat Struct									
BoyntonSlough	Tributary	7513.437	Max WS	1331.62	4384.93	4397.90	4388.89	4397.92	0.000040	1.16	1286.26	167.97	0.07
BoyntonSlough	Tributary	7511		Lat Struct									
BoyntonSlough	Tributary	7318.041	Max WS	1297.73	4385.19	4397.89	4389.51	4397.91	0.000045	1.15	1178.88	166.38	0.07
BoyntonSlough	Tributary	7189.600	Max WS	1278.66	4384.53	4397.89	4388.32	4397.90	0.000039	1.10	1235.14	167.11	0.07
BoyntonSlough	Tributary	7056.191	Max WS	1257.61	4384.77	4397.88	4388.57	4397.90	0.000029	1.02	1341.13	161.70	0.06
BoyntonSlough	Tributary	6914.734	Max WS	1263.30	4385.47	4397.87	4389.00	4397.90	0.000044	1.27	1114.00	133.51	0.07
BoyntonSlough	Tributary	6788.478	Max WS	1284.87	4385.35	4397.87	4388.83	4397.89	0.000039	1.19	1202.98	147.15	0.07
BoyntonSlough	Tributary	6615.909	Max WS	1325.15	4385.55	4397.87	4388.43	4397.88	0.000018	0.80	1735.44	199.69	0.05
BoyntonSlough	Tributary	6471.306	Max WS	1369.07	4385.47	4397.87	4389.11	4397.88	0.000015	0.72	1993.99	239.87	0.04
BoyntonSlough	Tributary	6344.208	Max WS	1405.63	4384.91	4397.87	4388.62	4397.88	0.000017	0.76	1911.26	224.38	0.04
BoyntonSlough	Tributary	6248.985	Max WS	1430.07	4384.96	4397.87	4388.66	4397.88	0.000017	0.80	1929.08	235.06	0.05
BoyntonSlough	Tributary	6248		Lat Struct									
BoyntonSlough	Tributary	6246		Lat Struct									
BoyntonSlough	Tributary	6116.634	Max WS	1482.65	4385.54	4397.86	4388.93	4397.87	0.000020	0.83	1842.91	204.38	0.05
BoyntonSlough	Tributary	5953.142	Max WS	1550.82	4385.81	4397.86	4388.27	4397.87	0.000018	0.81	1968.32	218.74	0.05
BoyntonSlough	Tributary	5810		Lat Struct									
BoyntonSlough	Tributary	5806.779	Max WS	1673.39	4385.54	4397.84	4388.79	4397.86	0.000033	1.12	1562.98	177.58	0.06
BoyntonSlough	Tributary	5659.743	Max WS	1674.77	4385.22	4397.84	4388.51	4397.86	0.000035	1.17	1642.16	236.04	0.06
BoyntonSlough	Tributary	5427.769	Max WS	1651.92	4384.37	4397.85	4386.86	4397.85	0.000009	0.63	2760.57	293.87	0.03
BoyntonSlough	Tributary	5291.870	Max WS	1636.07	4384.29	4397.85	4386.35	4397.85	0.000005	0.48	3522.72	375.08	0.02
BoyntonSlough	Tributary	5204.933	Max WS	1624.18	4384.45	4397.85	4386.23	4397.85	0.000004	0.41	4036.63	401.79	0.02
BoyntonSlough	Tributary	5073.306	Max WS	1635.22	4384.71	4397.85	4386.12	4397.85	0.000004	0.45	3643.30	316.60	0.02
BoyntonSlough	Tributary	4900		Lat Struct									
BoyntonSlough	Tributary	4893.799	Max WS	1640.97	4385.01	4397.84	4386.89	4397.85	0.000007	0.57	2965.56	283.52	0.03
BoyntonSlough	Tributary	4719.572	Max WS	1667.15	4385.30	4397.84	4387.42	4397.85	0.000011	0.68	2534.61	242.53	0.04
BoyntonSlough	Tributary	4560		Lat Struct									
BoyntonSlough	Tributary	4559.278	Max WS	1695.15	4385.11	4397.83	4387.78	4397.84	0.000015	0.79	2172.31	212.17	0.04
BoyntonSlough	Tributary	4398.360	Max WS	1745.09	4385.10	4397.83	4387.92	4397.84	0.000025	0.98	1814.15	190.51	0.05
BoyntonSlough	Tributary	4258.562	Max WS	1826.57	4385.06	4397.82	4387.58	4397.84	0.000022	0.93	2020.76	209.00	0.05
BoyntonSlough	Tributary	4104.021	Max WS	1930.60	4385.17	4397.82	4387.59	4397.83	0.000022	0.95	2086.54	213.49	0.05
BoyntonSlough	Tributary	3969.593	Max WS	2057.49	4385.35	4397.81	4387.86	4397.83	0.000030	1.06	1959.19	206.02	0.06
BoyntonSlough	Tributary	3810.861	Max WS	2204.71	4385.22	4397.81	4387.70	4397.82	0.000022	0.96	2381.39	238.51	0.05
BoyntonSlough	Tributary	3660		Lat Struct									
BoyntonSlough	Tributary	3659		Lat Struct									
BoyntonSlough	Tributary	3658.941	Max WS	2321.02	4384.99	4397.81	4387.32	4397.82	0.000014	0.80	2956.02	273.71	0.04
BoyntonSlough	Tributary	3510.689	Max WS	2172.02	4385.08	4397.81	4387.24	4397.82	0.000013	0.75	2961.98	289.25	0.04
BoyntonSlough	Tributary	3382.400	Max WS	2038.63	4385.29	4397.80	4387.26	4397.81	0.000014	0.78	2698.52	259.82	0.04
BoyntonSlough	Tributary	3274.211	Max WS	1931.32	4385.39	4397.80	4387.26	4397.81	0.000015	0.83	2403.74	230.73	0.04
BoyntonSlough	Tributary	3117.925	Max WS	1788.38	4384.95	4397.80	4387.42	4397.81	0.000022	0.99	1878.45	185.35	0.05
BoyntonSlough	Tributary	3116		Lat Struct									
BoyntonSlough	Tributary	3021.461	Max WS	1720.10	4384.63	4397.79	4387.58	4397.81	0.000034	1.21	1499.36	154.32	0.06
BoyntonSlough	Tributary	2930.217	Max WS	1694.98	4384.86	4397.78	4387.41	4397.81	0.000045	1.38	1261.72	122.19	0.07
BoyntonSlough	Tributary	2851.237	Max WS	1702.53	4384.27	4397.75	4387.74	4397.80	0.000081	1.87	972.72	108.35	0.10
BoyntonSlough	Tributary	2772.449	Max WS	1713.15	4384.04	4397.77	4387.12	4397.80	0.000039	1.27	1384.20	146.86	0.07
BoyntonSlough	Tributary	2670.099	Max WS	1709.16	4383.67	4397.78	4386.70	4397.79	0.000026	1.08	1664.43	163.05	0.06
BoyntonSlough	Tributary	2596.269	Max WS	1707.82	4383.42	4397.77	4386.42	4397.79	0.000030	1.24	1458.77	126.36	0.06
BoyntonSlough	Tributary	2570.047	Max WS	1706.72	4383.34	4397.77	4386.42	4397.79	0.000031	1.23	1421.66	120.21	0.06
BoyntonSlough	Tributary	2570		Lat Struct									
BoyntonSlough	Tributary	2569		Lat Struct									
BoyntonSlough	Tributary	2456.831	Max WS	1707.81	4383.27	4397.77	4386.46	4397.79	0.000020	1.00	1781.26	151.97	0.05
BoyntonSlough	Tributary	2337.982	Max WS	1707.27	4383.17	4397.77	4386.22	4397.79	0.000015	0.88	2069.75	176.39	0.04
BoyntonSlough	Tributary	2227.835	Max WS	1706.77	4383.28	4397.77	4386.33	4397.79	0.000019	0.96	1886.82	163.15	0.05
BoyntonSlough	Tributary	2226		Lat Struct									
BoyntonSlough	Tributary	2099.160	Max WS	1707.54	4383.41	4397.77	4386.30	4397.78	0.000016	0.96	2166.95	193.07	0.05
BoyntonSlough	Tributary	1933.068	Max WS	1706.15	4383.15	4397.77	4386.31	4397.78	0.000017	0.99	1999.43	174.39	0.05
BoyntonSlough	Tributary	1781.032	Max WS	1712.62	4383.33	4397.76	4386.61	4397.78	0.000023	1.12	1828.85	179.73	0.05
BoyntonSlough	Tributary	1671.171	Max WS	1727.13	4383.12	4397.75	4386.56	4397.77	0.000035	1.12	1577.78	173.21	0.06
BoyntonSlough	Tributary	1550.965	Max WS	1786.23	4382.72	4397.75	4386.47	4397.77	0.000029	1.11	1678.16	176.71	0.06
BoyntonSlough	Tributary	1475		Lat Struct									
BoyntonSlough	Tributary	1473.929	Max WS	1814.37	4382.69	4397.76	4385.68	4397.77	0.000013	0.73	2611.82	310.43	0.04
BoyntonSlough	Tributary	1411.668	Max WS	1857.48	4382.63	4397.76	4385.25	4397.76	0.000006	0.54	3615.42	583.77	0.03
BoyntonSlough	Tributary	1357.150	Max WS	1863.01	4382.68	4397.76	4384.77	4397.76	0.000003	0.42	4617.00	657.12	0.02
BoyntonSlough	Tributary	1275.010	Max WS	1873.08	4382.46	4397.76	4384.29	4397.76	0.000003	0.39	4990.68	628.40	0.02
BoyntonSlough	Tributary	1274		Lat Struct									
BoyntonSlough	Tributary	1184.867	Max WS	1882.91	4382.23	4397.76	4384.55	4397.76	0.000002	0.37	5419.39	513.13	0.02
BoyntonSlough	Tributary	1096.324	Max WS	1886.74	4382.00	4397.76	4384.68	4397.76	0.000002	0.35	5960.27	509.13	0.02
BoyntonSlough	Tributary	1018.135	Max WS	1890.36	4381.80	4397.76	4384.72	4397.76	0.000002	0.36	5869.30	513.85	0.02
BoyntonSlough	Tributary	911.770	Max WS	1896.03	4381.53	4397.76	4384.78	4397.76	0.000004	0.44	4746.59	409.26	0.02
BoyntonSlough	Tributary	789.731	Max WS	1901.55	4381.13	4397.76	4384.77	4397.76	0.000007	0.61	3602.76	348.23	0.03
BoyntonSlough	Tributary	721.087	Max WS	1914.10	4381.22	4397.75	4384.98	4397.76	0.000012	0.71	2849.09	267.87	0.04
BoyntonSlough	Tributary	625.893	Max WS	1939.19	4382.40	4397.75	4385.70	4397.76	0.000011	0.79	3191.06	343.67	0.04
BoyntonSlough	Tributary	625		Lat Struct									
BoyntonSlough	Tributary	507.304	Max WS	1723.86	4383.07	4397.75	4385.90	4397.76	0.000015	0.80	2471.22	290.72	0.04
BoyntonSlough	Tributary	405.206	Max WS	1536.55	4382.93	4397.75	4385.56	4397.76	0.000013	0.76	2407.70	294.47	0.04
BoyntonSlough	Tributary	249.065	Max WS	1183.91	4382.59	4397.76	4384.83	4397.76	0.000007	0.57	2465.86	289.99	0.03
NTruckeeDrain	Tributary	19600	Max WS	1196.72	4410.35	4414.75	4413.93	4415.63	0.006280	7.54	158.62	45.24	0.71
NTruckeeDrain	Tributary	19564.83	Max WS	1196.69	4410.35	4414.75	4413.92	4415.63	0.006189	7.51	159.41	45.26	0.70
NTruckeeDrain	Tributary	19563		Lat Struct									
NTruckeeDrain	Tributary	19560		Lat Struct									
NTruckeeDrain	Tributary	19497.27	Max WS	1144.14	4410.36	4414.78	4413.78	4415.34	0.003832	6.16	201.79	68.84	0.56
NTruckeeDrain	Tributary	19427.87	Max WS	1079.02	4409.87	4414.14	4413.96	4415.10	0.008740	8.00	144.70	66.02	0.82
NTruckeeDrain	Tributary	19353.20	Max WS	1023.15	4409.85	4414.02	4413.23	4414.51	0.004052	5.87	195.55	88.07	0.57
NTruckeeDrain	Tributary	19242.97	Max WS	896.36	4408.49	4413.84	4412.35	4414.21	0.003042	4.99	195.93	100.98	0.49
NTruckeeDrain	Tributary	19133.41	Max WS	703.39	4408.40	4413.85	4411.99	4414.07	0.001608	3.77	208.51	102.61	0.36
NTruckeeDrain	Tributary	19030.12	Max WS	677.99	4407.14	4413.86	4410.49	4413.95	0.000474	2.52	300.14	99.91	0.20
NTruckeeDrain	Tributary	18921.76	Max WS	627.97	4407.14	4413.83	4409.90	4413.92	0.000378	2.33	293.39	91.05	0.18
NTruckeeDrain	Tributary	18820.26	Max WS	583.14	4407.14	4413.82	4409.75	4413.89	0.000339	2.21	281.71	88.92	0.17
NTruckeeDrain	Tributary	18743.76	Max WS	575.88	4407.14	4413.78	4409.79	4413.86	0.000406	2.32	253.35	89.47	0.19

HEC-RAS Plan: CE Locations: User Defined Profile: Max WS (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
NTruckeeDrain	Tributary	18630.83	Max WS	565.07	4407.14	4413.72		4413.82	0.000462	2.54	233.75	89.67	0.20
NTruckeeDrain	Tributary	18630		Culvert									
NTruckeeDrain	Tributary	18512.78	Max WS	565.06	4404.61	4409.89	4408.15	4410.31	0.003146	5.26	107.52	29.73	0.49
NTruckeeDrain	Tributary	18512		Lat Struct									
NTruckeeDrain	Tributary	18510		Lat Struct									
NTruckeeDrain	Tributary	18393.56	Max WS	537.37	4404.61	4409.62	4407.88	4410.00	0.002877	4.95	108.55	31.31	0.47
NTruckeeDrain	Tributary	18296.60	Max WS	537.36	4404.61	4409.46	4407.45	4409.75	0.002186	4.33	123.97	35.96	0.41
NTruckeeDrain	Tributary	18194.53	Max WS	537.38	4404.61	4409.34	4407.43	4409.55	0.001755	3.70	145.22	46.70	0.37
NTruckeeDrain	Tributary	18085.26	Max WS	537.39	4404.61	4408.79	4407.68	4409.23	0.004237	5.32	101.03	36.41	0.56
NTruckeeDrain	Tributary	17920.64	Max WS	537.34	4403.48	4408.56	4406.18	4408.76	0.001382	3.62	148.30	40.40	0.33
NTruckeeDrain	Tributary	17861.83	Max WS	537.38	4403.48	4408.43	4406.31	4408.67	0.001795	3.95	136.19	39.95	0.38
NTruckeeDrain	Tributary	17760.68	Max WS	537.31	4403.10	4408.28	4405.97	4408.50	0.001519	3.75	143.39	39.93	0.35
NTruckeeDrain	Tributary	17660.66	Max WS	537.33	4403.02	4408.10	4405.89	4408.34	0.001704	3.90	137.88	39.42	0.37
NTruckeeDrain	Tributary	17581.27	Max WS	537.30	4402.86	4407.98	4405.76	4408.21	0.001691	3.81	141.13	41.20	0.36
NTruckeeDrain	Tributary	17455.16	Max WS	537.27	4402.86	4407.79	4405.64	4408.00	0.001608	3.70	145.40	43.84	0.36
NTruckeeDrain	Tributary	17357.51	Max WS	537.40	4402.86	4407.64	4405.55	4407.84	0.001593	3.65	147.15	44.78	0.36
NTruckeeDrain	Tributary	17254.87	Max WS	537.36	4402.35	4407.49	4405.22	4407.69	0.001456	3.55	151.52	45.07	0.34
NTruckeeDrain	Tributary	17165.55	Max WS	537.28	4401.70	4407.42	4404.63	4407.58	0.001037	3.17	169.72	45.94	0.29
NTruckeeDrain	Tributary	17081.04	Max WS	537.36	4401.58	4407.32	4404.73	4407.48	0.001182	3.21	167.38	48.38	0.30
NTruckeeDrain	Tributary	16984.66	Max WS	537.27	4401.58	4407.25	4404.49	4407.38	0.000952	2.94	182.64	52.44	0.28
NTruckeeDrain	Tributary	16905.43	Max WS	537.36	4401.58	4407.19	4404.39	4407.31	0.000864	2.82	190.42	56.08	0.26
NTruckeeDrain	Tributary	16816.53	Max WS	535.76	4401.58	4407.11	4404.39	4407.23	0.000908	2.82	191.97	70.79	0.27
NTruckeeDrain	Tributary	16743.38	Max WS	535.73	4401.58	4407.05	4404.27	4407.16	0.000914	2.72	197.13	65.38	0.27
NTruckeeDrain	Tributary	16665.77	Max WS	535.71	4401.58	4406.97	4404.35	4407.09	0.000941	2.77	193.95	64.03	0.27
NTruckeeDrain	Tributary	16558.39	Max WS	535.71	4400.68	4406.88	4403.92	4407.00	0.000806	2.73	195.92	55.40	0.26
NTruckeeDrain	Tributary	16465.68	Max WS	535.67	4400.46	4406.80	4403.76	4406.93	0.000781	2.90	186.29	59.56	0.25
NTruckeeDrain	Tributary	16357.47	Max WS	531.05	4399.97	4406.74	4403.26	4406.85	0.000618	2.75	205.33	83.71	0.23
NTruckeeDrain	Tributary	16247.90	Max WS	527.16	4399.50	4406.69	4402.83	4406.79	0.000498	2.56	216.06	83.27	0.21
NTruckeeDrain	Tributary	16148.30	Max WS	488.29	4399.23	4406.69		4406.76	0.000364	2.14	230.11	87.50	0.18
NTruckeeDrain	Tributary	16140		Culvert									
NTruckeeDrain	Tributary	15491.88	Max WS	488.30	4399.39	4404.22	4402.04	4404.46	0.001678	3.92	124.60	34.28	0.36
NTruckeeDrain	Tributary	15490		Lat Struct									
NTruckeeDrain	Tributary	15489		Lat Struct									
NTruckeeDrain	Tributary	15420.38	Max WS	488.30	4399.33	4404.00	4402.25	4404.31	0.002488	4.49	108.83	33.11	0.44
NTruckeeDrain	Tributary	15332.44	Max WS	488.28	4399.27	4403.86	4401.97	4404.12	0.002024	4.05	120.55	37.05	0.40
NTruckeeDrain	Tributary	15232.21	Max WS	488.28	4398.87	4403.58	4401.87	4403.89	0.002594	4.48	109.00	34.24	0.44
NTruckeeDrain	Tributary	15218		Lat Struct									
NTruckeeDrain	Tributary	15143.84	Max WS	488.30	4398.16	4403.51	4400.90	4403.71	0.001328	3.60	135.59	35.17	0.32
NTruckeeDrain	Tributary	15042.60	Max WS	488.25	4397.81	4403.34	4400.98	4403.56	0.001649	3.77	129.42	37.67	0.36
NTruckeeDrain	Tributary	14938.70	Max WS	488.29	4398.28	4403.19	4401.00	4403.39	0.001648	3.59	135.90	43.29	0.36
NTruckeeDrain	Tributary	14831.55	Max WS	488.30	4398.28	4402.95	4401.13	4403.18	0.002288	3.82	127.77	47.63	0.41
NTruckeeDrain	Tributary	14725.53	Max WS	490.99	4398.28	4402.65	4401.22	4402.91	0.002822	4.05	121.09	48.19	0.45
NTruckeeDrain	Tributary	14607.58	Max WS	490.99	4397.34	4402.45	4400.36	4402.64	0.001784	3.50	140.09	48.92	0.36
NTruckeeDrain	Tributary	14491.20	Max WS	490.92	4396.96	4402.28	4400.20	4402.45	0.001465	3.30	148.87	48.17	0.33
NTruckeeDrain	Tributary	14368.64	Max WS	490.97	4396.81	4402.08	4400.19	4402.26	0.001697	3.36	146.19	52.37	0.35
NTruckeeDrain	Tributary	14248.39	Max WS	490.94	4396.53	4401.97	4399.56	4402.09	0.001037	2.79	175.85	58.25	0.28
NTruckeeDrain	Tributary	14143.24	Max WS	490.95	4396.05	4401.91	4398.91	4402.00	0.000764	2.44	201.47	65.67	0.25
NTruckeeDrain	Tributary	14026.87	Max WS	490.93	4395.53	4401.82	4398.46	4401.91	0.000740	2.49	198.62	64.48	0.24
NTruckeeDrain	Tributary	13898.59	Max WS	493.60	4395.58	4401.75	4398.48	4401.82	0.000613	2.24	219.94	68.44	0.22
NTruckeeDrain	Tributary	13791.80	Max WS	494.90	4395.09	4401.69	4398.21	4401.76	0.000509	2.15	230.83	70.51	0.20
NTruckeeDrain	Tributary	13693.87	Max WS	536.67	4395.09	4401.61	4398.33	4401.70	0.000603	2.34	229.54	66.25	0.22
NTruckeeDrain	Tributary	13601.42	Max WS	597.74	4394.10	4401.57	4397.31	4401.63	0.000397	2.06	289.81	73.13	0.18
NTruckeeDrain	Tributary	13503.65	Max WS	660.30	4394.10	4401.46		4401.57	0.000554	2.63	251.33	55.76	0.22
NTruckeeDrain	Tributary	13330		Culvert									
NTruckeeDrain	Tributary	13328.54	Max WS	659.97	4394.10	4400.32	4397.14	4400.51	0.001082	3.45	191.18	46.03	0.30
NTruckeeDrain	Tributary	13328		Lat Struct									
NTruckeeDrain	Tributary	13320		Lat Struct									
NTruckeeDrain	Tributary	13259.96	Max WS	660.16	4394.10	4400.22	4397.52	4400.42	0.001490	3.55	185.96	55.76	0.34
NTruckeeDrain	Tributary	13127.54	Max WS	659.98	4394.10	4400.14	4397.49	4400.26	0.000875	2.84	232.47	65.51	0.27
NTruckeeDrain	Tributary	13020.16	Max WS	659.84	4394.10	4400.06	4397.34	4400.17	0.000796	2.66	247.78	71.64	0.25
NTruckeeDrain	Tributary	12929.29	Max WS	660.08	4394.10	4400.00	4397.26	4400.10	0.000768	2.58	255.78	76.07	0.25
NTruckeeDrain	Tributary	12836.48	Max WS	659.98	4393.52	4399.94	4397.08	4400.04	0.000699	2.52	261.69	74.12	0.24
NTruckeeDrain	Tributary	12752.35	Max WS	659.85	4393.34	4399.86	4396.54	4399.97	0.000826	2.72	242.24	67.88	0.25
NTruckeeDrain	Tributary	12585.95	Max WS	659.13	4393.34	4399.74	4396.42	4399.84	0.000745	2.52	261.39	77.97	0.24
NTruckeeDrain	Tributary	12362.30	Max WS	658.82	4393.34	4399.49	4396.57	4399.64	0.001045	3.09	213.52	60.14	0.29
NTruckeeDrain	Tributary	12155.32	Max WS	657.83	4393.34	4399.15	4396.91	4399.35	0.001771	3.62	181.72	60.58	0.37
NTruckeeDrain	Tributary	11980.38	Max WS	657.23	4393.34	4398.97	4396.47	4399.10	0.001061	2.91	225.85	72.55	0.29
NTruckeeDrain	Tributary	11844.90	Max WS	656.85	4393.34	4398.79	4396.24	4398.95	0.001252	3.18	206.40	64.85	0.31
NTruckeeDrain	Tributary	11682.43	Max WS	542.27	4393.34	4398.59	4396.40	4398.72	0.001217	2.88	188.21	68.23	0.31
NTruckeeDrain	Tributary	11493.21	Max WS	536.50	4392.50	4398.44	4395.54	4398.53	0.000764	2.45	219.21	70.89	0.25
NTruckeeDrain	Tributary	11303.18	Max WS	531.36	4392.45	4398.34	4395.05	4398.41	0.000525	2.09	253.67	78.89	0.21
NTruckeeDrain	Tributary	11153.09	Max WS	533.67	4392.40	4398.31	4394.83	4398.35	0.000285	1.55	344.24	107.03	0.15
NTruckeeDrain	Tributary	10953.31	Max WS	530.28	4391.34	4398.27	4394.34	4398.30	0.000205	1.40	378.75	106.89	0.13
NTruckeeDrain	Tributary	10757.07	Max WS	527.58	4391.33	4398.24	4393.91	4398.27	0.000141	1.23	427.83	110.70	0.11
NTruckeeDrain	Tributary	10586.82	Max WS	526.44	4391.33	4398.21	4394.16	4398.24	0.000194	1.33	395.98	115.78	0.13
NTruckeeDrain	Tributary	10403.03	Max WS	526.47	4390.15	4398.18	4393.20	4398.21	0.000173	1.27	413.65	118.34	0.12
NTruckeeDrain	Tributary	10318.94	Max WS	522.57	4390.15	4398.16	4393.17	4398.19	0.000180	1.36	387.29	107.37	0.12
NTruckeeDrain	Tributary	10249.67	Max WS	524.01	4389.39	4398.15	4392.37	4398.18	0.000167	1.45	364.37	96.33	0.12
NTruckeeDrain	Tributary	10224.98	Max WS	522.98	4389.38	4398.14		4398.17	0.000173	1.49	351.59	77.16	0.12
NTruckeeDrain	Tributary	10150		Culvert									
NTruckeeDrain	Tributary	10060.93	Max WS	507.36	4390.10	4398.04	4392.88	4398.06	0.000123	1.29	393.18	83.73	0.10
NTruckeeDrain	Tributary	10059		Lat Struct									
NTruckeeDrain	Tributary	10058		Lat Struct									
NTruckeeDrain	Tributary	9970.661	Max WS	507.31	4390.10	4398.03	4392.66	4398.05	0.000109	1.12	455.17	121.52	0.10
NTruckeeDrain	Tributary	9876.722	Max WS	507.35	4390.09	4398.03	4392.77	4398.04	0.000101	0.97	522.24	162.39	0.09
NTruckeeDrain	Tributary	9755.691	Max WS	504.05	4389.51	4398.02	4391.93	4398.03	0.000072	0.86	585.56	167.45	0.08
NTruckeeDrain	Tributary	9609.739	Max WS	504.72	4388.26	4398.00		4398.02	0.000087	1.20	428.07	109.53	0.09
NTruckeeDrain	Tributary	9523		Culvert									
NTruckeeDrain	Tributary	9418.609	Max WS	503.14	4389.37	4397.82	4391.63	4397.84	0.000054	1.01	495.88	117.67	0.07
NTruckeeDrain	Tributary	9417		Lat Struct									
NTruckeeDrain	Tributary	9416		Lat Struct									
NTruckeeDrain	Tributary	9257.442	Max WS	503.87	4389.13	4397.80	4391.98	4397.82	0.000130	1.28	392.75	87.88	0.11
NTruckeeDrain	Tributary	9124.049	Max WS	503.86	4389.23	4397.79	4392.12	4397.81	0.000110	1.15	438.58	103.48	0.10
NTruckeeDrain	Tributary	9008.538	Max WS	502.90	4389.20	4397.77	4392.09	4397.80	0.000112	1.17	430.39	100.53	0.10
NTruckeeDrain	Tributary	8857.967	Max WS	500.02	4388.96	4397.76	4391.92	4397.78	0.000119	1.18	428.32	118.34	0.10
NTruckeeDrain	Tributary	8612.691	Max WS	457.06	4389.21	4397.74	4392.04	4397.76	0.000070	1.01	466.98	117.31	0.08
NTruckeeDrain	Tributary	8453.293	Max WS	445.16	4388.79	4397.74	4391.45	4397.75	0.000054	0.97	473.69	133.26	0.07
NTruckeeDrain	Tributary	8313.991	Max WS	397.80	4388.37	4397.74	4390.76	4397.75	0.000037	0.82	498.17	111.45	0.06
NTruckeeDrain	Tributary	8125		Lat Struct									
NTruckeeDrain	Tributary	8122.300	Max WS	381.53	4388.06	4397.73	4390.45	4397.74	0.000034	0.79	481.85	81.55	0.06
NTruckeeDrain	Tributary	8121		Lat Struct									
NTruckeeDrain	Tributary	7922.604	Max WS	381.54	4388.06	4397.72	4390.12	4397.73	0.000032	0.77	497.72	84.07	0.06
NTruckeeDrain	Tributary	7733.466	Max WS	381.03	4388.06	4397.72	4390.13	4397.73	0.000032	0.72	529.72	104.19	0.05
NTruckeeDrain	Tributary	7574.842	Max WS	371.28	4388.06	4397.72	4390.10	4397.72	0.000028	0.68	558.52	134.20	0.05
NTruckeeDrain	Tributary	7413.038	Max WS	312.72	4388.06	4397.72	4389.85	4397.72	0.000018	0.57	565.93	137.24	0.04
NTruckeeDrain	Tributary	7279.831	Max WS	308.76	4388.06	4397.71	4389.87	4397.72	0.000019	0.57	540.19	101.92	0.04
NTruckeeDrain	Tributary	7155.738	Max WS	308.47	4387.77	4397.71	4389.53	4397.72	0.000018	0.57	541.59	113.20	0.04
NTruckeeDrain	Tributary	7045.650	Max WS	308.50	4387.71	4397.71	4389.45	4397.71	0.000017	0.55	557.95	106.67	0.04

HEC-RAS Plan: CE Locations: User Defined Profile: Max WS (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
NTruckeeDrain	Tributary	6869.778	Max WS	298.66	4387.48	4397.71	4389.87	4397.71	0.000017	0.58	541.13	113.55	0.04
NTruckeeDrain	Tributary	6741.775	Max WS	281.73	4385.23	4397.71	4388.54	4397.71	0.000013	0.48	591.26	121.68	0.03
NTruckeeDrain	Tributary	6649.255	Max WS	277.78	4386.88	4397.71	4388.65	4397.71	0.000013	0.48	584.77	109.32	0.04
NTruckeeDrain	Tributary	6543.668	Max WS	272.99	4386.88	4397.71		4397.71	0.000008	0.45	628.67	114.42	0.03
NTruckeeDrain	Tributary	6479		Culvert									
NTruckeeDrain	Tributary	6420.515	Max WS	272.69	4386.87	4397.66	4388.43	4397.66	0.000010	0.50	543.91	69.53	0.03
NTruckeeDrain	Tributary	6419		Lat Struct									
NTruckeeDrain	Tributary	6418		Lat Struct									
NTruckeeDrain	Tributary	6248.920	Max WS	273.06	4386.44	4397.65	4388.47	4397.66	0.000021	0.67	429.36	104.14	0.04
NTruckeeDrain	Tributary	6072.075	Max WS	273.13	4386.44	4397.65	4388.31	4397.66	0.000017	0.63	455.61	102.47	0.04
NTruckeeDrain	Tributary	5914.636	Max WS	276.60	4386.26	4397.65	4388.35	4397.66	0.000022	0.71	434.13	112.58	0.05
NTruckeeDrain	Tributary	5773.892	Max WS	276.28	4386.26	4397.65	4388.29	4397.65	0.000018	0.65	465.06	105.50	0.04
NTruckeeDrain	Tributary	5633.260	Max WS	276.97	4385.90	4397.64	4387.91	4397.65	0.000014	0.61	518.21	124.21	0.04
NTruckeeDrain	Tributary	5509.261	Max WS	282.56	4385.90	4397.64	4387.83	4397.65	0.000004	0.66	531.48	125.15	0.04
NTruckeeDrain	Tributary	5396.945	Max WS	290.35	4385.90	4397.64	4387.98	4397.65	0.000005	0.73	497.07	113.50	0.04
NTruckeeDrain	Tributary	5270.003	Max WS	298.25	4385.81	4397.64	4388.63	4397.65	0.000005	0.71	526.01	138.85	0.04
NTruckeeDrain	Tributary	5269		Lat Struct									
NTruckeeDrain	Tributary	5160		Lat Struct									
NTruckeeDrain	Tributary	5159.651	Max WS	311.28	4385.68	4397.64	4388.14	4397.65	0.000006	0.72	450.33	80.73	0.05
NTruckeeDrain	Tributary	5021.206	Max WS	319.74	4385.68	4397.64	4387.79	4397.65	0.000006	0.69	466.21	69.31	0.05
NTruckeeDrain	Tributary	4888.770	Max WS	319.89	4385.69	4397.64	4387.83	4397.64	0.000006	0.70	459.96	64.55	0.05
NTruckeeDrain	Tributary	4783.775	Max WS	319.91	4385.69	4397.64	4387.66	4397.64	0.000006	0.69	462.52	62.32	0.04
NTruckeeDrain	Tributary	4660.862	Max WS	319.53	4385.54	4397.64	4387.68	4397.64	0.000006	0.67	476.14	69.33	0.05
NTruckeeDrain	Tributary	4547.564	Max WS	269.62	4385.31	4397.64	4387.29	4397.64	0.000003	0.52	643.91	86.47	0.03
NTruckeeDrain	Tributary	4411.208	Max WS	159.58	4385.32	4397.64	4386.61	4397.65	0.000001	0.34	539.07	81.05	0.02
NTruckeeDrain	Tributary	4295.627	Max WS	120.15	4385.10	4397.64	4386.39	4397.65	0.000001	0.25	518.51	68.55	0.01
NTruckeeDrain	Tributary	4219.063	Max WS	91.57	4384.79	4397.65		4397.65	0.000002	0.21	466.05	62.24	0.01
NTruckeeDrain	Tributary	4218		Culvert									
NTruckeeDrain	Tributary	4113.962	Max WS	91.65	4384.78	4397.63	4385.47	4397.63	0.000001	0.16	610.22	81.17	0.01
NTruckeeDrain	Tributary	4112		Lat Struct									
NTruckeeDrain	Tributary	4111		Lat Struct									
NTruckeeDrain	Tributary	4038.556	Max WS	108.40	4384.78	4397.63	4385.95	4397.63	0.000002	0.23	518.23	72.69	0.01
NTruckeeDrain	Tributary	3957.519	Max WS	129.05	4384.77	4397.63	4386.14	4397.63	0.000003	0.28	501.95	80.62	0.02
NTruckeeDrain	Tributary	3852.635	Max WS	164.88	4384.77	4397.63	4386.32	4397.63	0.000004	0.33	538.28	86.65	0.02
NTruckeeDrain	Tributary	3759.033	Max WS	180.97	4384.77	4397.62	4386.42	4397.63	0.000006	0.40	464.85	79.47	0.02
NTruckeeDrain	Tributary	3681.066	Max WS	176.63	4384.77	4397.62	4386.84	4397.63	0.000012	0.50	366.48	91.91	0.03
NTruckeeDrain	Tributary	3588.525	Max WS	172.05	4384.03	4397.62	4385.93	4397.63	0.000008	0.45	399.64	86.17	0.03
NTruckeeDrain	Tributary	3505.524	Max WS	166.88	4384.02	4397.62	4386.02	4397.62	0.000007	0.46	414.00	81.51	0.03
NTruckeeDrain	Tributary	3406.889	Max WS	172.50	4383.87	4397.62		4397.62	0.000004	0.34	529.13	66.97	0.02
NTruckeeDrain	Tributary	3298		Culvert									
NTruckeeDrain	Tributary	3188.225	Max WS	172.76	4382.64	4397.37	4384.09	4397.37	0.000003	0.30	624.19	87.29	0.02
NTruckeeDrain	Tributary	3145.065	Max WS	172.60	4382.15	4397.37	4384.14	4397.37	0.000003	0.33	562.27	89.28	0.02
NTruckeeDrain	Tributary	3100		Bridge									
NTruckeeDrain	Tributary	3059.291	Max WS	172.77	4381.93	4397.28	4383.68	4397.28	0.000001	0.19	1081.97	96.15	0.01
NTruckeeDrain	Tributary	3036		Lat Struct									
NTruckeeDrain	Tributary	3035		Lat Struct									
NTruckeeDrain	Tributary	3010.569	Max WS	235.39	4381.20	4397.28	4383.06	4397.28	0.000001	0.28	1068.08	94.54	0.01
NTruckeeDrain	Tributary	3010		Lat Struct									
NTruckeeDrain	Tributary	2962.043	Max WS	270.85	4380.94	4397.28	4382.16	4397.28	0.000001	0.23	1356.20	115.54	0.01
NTruckeeDrain	Tributary	2961		Lat Struct									
NTruckeeDrain	Tributary	2905.768 BREACH, DA 6	Max WS	299.30	4380.94	4397.28	4382.83	4397.28	0.000002	0.35	997.39	87.07	0.02
NTruckeeDrain	Tributary	2827.477	Max WS	329.02	4380.94	4397.28	4382.40	4397.28	0.000002	0.37	1037.05	87.85	0.02
NTruckeeDrain	Tributary	2740.825	Max WS	351.95	4380.94	4397.28	4382.53	4397.28	0.000003	0.36	1082.20	98.21	0.02
NTruckeeDrain	Tributary	2624.223	Max WS	379.51	4380.94	4397.28	4382.73	4397.28	0.000004	0.40	1073.77	98.58	0.02
NTruckeeDrain	Tributary	2524.351	Max WS	404.48	4380.94	4397.28	4383.00	4397.28	0.000004	0.43	1061.30	97.61	0.02
NTruckeeDrain	Tributary	2439.675	Max WS	432.59	4380.94	4397.27	4382.95	4397.28	0.000004	0.46	1106.98	98.12	0.02
NTruckeeDrain	Tributary	2357.439	Max WS	472.44	4380.94	4397.27	4382.90	4397.28	0.000005	0.49	1096.23	96.56	0.02
NTruckeeDrain	Tributary	2250.105	Max WS	523.33	4380.94	4397.27	4383.49	4397.28	0.000007	0.59	1049.83	101.18	0.03
NTruckeeDrain	Tributary	2155.553	Max WS	579.55	4380.94	4397.27	4383.39	4397.27	0.000010	0.61	1013.99	98.30	0.03
NTruckeeDrain	Tributary	2029.295	Max WS	619.39	4380.57	4397.27	4382.98	4397.27	0.000011	0.68	1005.62	121.92	0.03
NTruckeeDrain	Tributary	2028		Lat Struct									
NTruckeeDrain	Tributary	1927.129	Max WS	662.42	4379.22	4397.26	4382.12	4397.27	0.000012	0.76	997.55	118.95	0.04
NTruckeeDrain	Tributary	1814.655	Max WS	757.47	4379.22	4397.26	4382.68	4397.27	0.000016	0.87	1018.17	121.01	0.04
NTruckeeDrain	Tributary	1700		Lat Struct									
NTruckeeDrain	Tributary	1686.195	Max WS	848.49	4379.22	4397.25	4382.73	4397.26	0.000026	1.02	893.89	90.65	0.05
NTruckeeDrain	Tributary	1573.275	Max WS	455.08	4379.22	4397.26	4381.54	4397.27	0.000005	0.48	1049.28	138.00	0.02
NTruckeeDrain	Tributary	1465.880 BREACH, DA 7	Max WS	-47.18	4379.22	4397.27		4397.27	0.000000	-0.05	1086.84	116.43	0.00
NTruckeeDrain	Tributary	1422		Culvert									
NTruckeeDrain	Tributary	1385.576	Max WS	-46.70	4378.87	4397.27	4379.70	4397.27	0.000000	-0.06	937.01	123.29	0.00
NTruckeeDrain	Tributary	1384		Lat Struct									
NTruckeeDrain	Tributary	1383		Lat Struct									
NTruckeeDrain	Tributary	1311.404	Max WS	-30.29	4378.80	4397.27	4379.18	4397.27	0.000000	-0.03	1041.99	104.96	0.00
NTruckeeDrain	Tributary	1207.861	Max WS	-4.66	4378.34	4397.27	4378.52	4397.27	0.000000	-0.01	814.09	92.48	0.00
NTruckeeDrain	Tributary	1126.612	Max WS	18.56	4378.08	4397.27	4378.50	4397.27	0.000000	0.02	815.60	92.22	0.00
NTruckeeDrain	Tributary	1044.111	Max WS	42.64	4377.98	4397.27	4378.61	4397.27	0.000000	0.05	830.40	92.29	0.00
NTruckeeDrain	Tributary	922.250	Max WS	79.18	4377.92	4397.27	4378.82	4397.27	0.000000	0.10	844.84	101.50	0.00
NTruckeeDrain	Tributary	812.551	Max WS	113.66	4377.87	4397.27	4378.97	4397.27	0.000001	0.14	876.20	114.00	0.01
NTruckeeDrain	Tributary	723.402	Max WS	130.00	4377.91	4397.27	4379.09	4397.27	0.000001	0.15	881.89	112.20	0.01
NTruckeeDrain	Tributary	656.064	Max WS	142.31	4377.91	4397.27		4397.27	0.000001	0.18	811.71	87.31	0.01
NTruckeeDrain	Tributary	590		Culvert									
NTruckeeDrain	Tributary	540.623	Max WS	142.44	4375.97	4397.23	4376.94	4397.23	0.000000	0.11	1324.37	114.72	0.01
NTruckeeDrain	Tributary	539		Lat Struct									
NTruckeeDrain	Tributary	536		Lat Struct									
NTruckeeDrain	Tributary	523.133	Max WS	156.34	4377.81	4397.23	4379.02	4397.23	0.000001	0.16	1014.52	113.02	0.01
NTruckeeDrain	Tributary	434.091	Max WS	237.98	4377.81	4397.23	4379.42	4397.23	0.000002	0.27	968.45	118.06	0.01
NTruckeeDrain	Tributary	375.106	Max WS	290.82	4377.81	4397.23	4379.71	4397.23	0.000004	0.33	955.93	119.32	0.02
NTruckeeDrain	Tributary	319.994	Max WS	344.11	4377.81	4397.23	4379.99	4397.23	0.000006	0.39	930.08	107.48	0.02
NTruckeeDrain	Tributary	251.492	Max WS	420.87	4377.34	4397.22	4379.96	4397.23	0.000007	0.44	993.73	109.76	0.02
NTruckeeDrain	Tributary	178.328	Max WS	505.74	4377.34	4397.22	4379.86	4397.23	0.000006	0.45	1189.87	118.61	0.02
NTruckeeDrain	Tributary	107.382	Max WS	555.42	4376.14	4397.22	4379.57	4397.23	0.000008	0.55	1115.93	106.38	0.03
NTruckeeDrain	Tributary	0.01	Max WS	555.34	4371.84	4397.22	4375.27	4397.22	0.000003	0.39	1573.58	106.38	0.02
SteamBoatCr	Upper	29258.51	Max WS	5419.81	4409.05	4417.05	4416.73	4418.47	0.006349	11.96	1573.87	443.70	0.79
SteamBoatCr	Upper	29061.92	Max WS	5419.57	4409.05	4416.09	4415.57	4416.97	0.006257	11.06	2322.69	731.02	0.76
SteamBoatCr	Upper	28822.49	Max WS	5418.49	4409.05	4415.03	4414.02	4415.44	0.005478	9.19	3075.99	909.92	0.69
SteamBoatCr	Upper	28521.06	Max WS	5417.38	4408.63	4413.95	4412.41	4414.15	0.003863	7.40	3999.09	1120.90	0.58
SteamBoatCr	Upper	28144.01	Max WS	5417.16	4408.63	4412.90	4410.99	4412.98	0.003410	5.84	4941.89	1524.86	0.53
SteamBoatCr	Upper	27806.39	Max WS	5414.94	4408.28	4411.79	4408.96	4411.85	0.003906	5.45	4563.05	1308.18	0.55
SteamBoatCr	Upper	27733.0*	Max WS	5415.61	4407.69	4411.49	4408.73	4411.55	0.003958	5.21	4593.07	1313.77	0.54
SteamBoatCr	Upper	27659.6*	Max WS	5415.40	4407.09	4411.20	4408.49	4411.24	0.003988	5.03	4635.19	1308.16	0.54
SteamBoatCr	Upper	27586.31	Max WS	5415.73	4406.50	4410.90	4407.85	4410.94	0.003911	4.96	4721.12	1310.55	0.52
SteamBoatCr	Upper	27516.5*	Max WS	5414.71	4406.13	4410.62	4408.01	4410.66	0.003884	4.87	4710.14	1312.42	0.52
SteamBoatCr	Upper	27446.7*	Max WS	5415.17	4405.76	4410.34	4407.95	4410.39	0.003765	5.17	4715.64	1326.31	0.53
SteamBoatCr	Upper	27376.95	Max WS	5415.05	4405.39	4410.07	4407.79	4410.14	0.003532	5.68	4764.94	1327.04	0.53
SteamBoatCr	Upper	26995.9	Max WS	5413.69	4403.71	4408.78	4406.71	4408.87	0.003216	6.21	4769.86	1286.29	0.51
SteamBoatCr	Upper	26519.63	Max WS	5413.11	4402.45	4407.43	4405.50	4407.50	0.003508	5.62	4841.58	1406.53	0.52
SteamBoatCr	Upper	26383.9*	Max WS	5413.18	4402.18	4406.92	4405.05	4406.99	0.003963	5.66	4772.45	1467.21	0.55
SteamBoatCr	Upper	26248.3*	Max WS	5412.93	4401.92	4406.32	4404.73	4406.40	0.004704	5.91	4623.59	1535.10	0.59
SteamBoatCr	Upper	26112.71	Max WS	5412.73	4401.65	4405.64	4404.20	4405.72	0.005252	6.03	4560.83	1603.71	0.61

HEC-RAS Plan: CE Locations: User Defined Profile: Max WS (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
SteamBoatCr	Upper	25917.6*	Max WS	5412.21	4400.24	4404.55	4403.48	4404.64	0.005381	6.13	4988.76	2139.33	0.63
SteamBoatCr	Upper	25722.54	Max WS	5412.38	4398.83	4403.68	4402.17	4403.75	0.003185	4.99	5837.63	2221.84	0.50
SteamBoatCr	Upper	25655.1*	Max WS	5411.54	4398.35	4403.40	4401.85	4403.47	0.003339	5.37	5832.84	2226.44	0.51
SteamBoatCr	Upper	25587.8*	Max WS	5411.59	4397.86	4403.11	4401.48	4403.18	0.003190	5.39	5923.76	2179.25	0.50
SteamBoatCr	Upper	25520.43	Max WS	5412.01	4397.38	4402.85	4401.05	4402.90	0.002864	5.13	6070.37	2082.12	0.47
SteamBoatCr	Upper	25354.43	Max WS	5410.71	4396.12	4402.34	4400.58	4402.40	0.001857	4.51	6604.97	2113.88	0.40
SteamBoatCr	Upper	25354		Lat Struct									
SteamBoatCr	Upper	24653.49	Max WS	5409.33	4395.37	4400.89	4399.40	4400.94	0.003276	5.13	5718.15	1956.81	0.49
SteamBoatCr	Upper	24361.73	Max WS	5408.17	4395.18	4399.93	4398.23	4399.99	0.003873	5.57	5178.98	1702.11	0.52
SteamBoatCr	Upper	24361		Lat Struct									
SteamBoatCr	Upper	24129.94	Max WS	5405.17	4394.45	4399.26	4397.31	4399.32	0.002367	4.55	5851.30	1787.36	0.44
SteamBoatCr	Upper	23954.68	Max WS	5402.87	4393.51	4398.86	4396.44	4398.89	0.001860	4.10	6897.73	1988.21	0.37
SteamBoatCr	Upper	23954		Lat Struct									
SteamBoatCr	Upper	23811.76	Max WS	5383.30	4393.11	4398.58	4395.79	4398.59	0.001230	3.05	8151.96	2156.18	0.29
SteamBoatCr	Upper	23735.76	Max WS	5196.67	4393.09	4398.51	4395.19	4398.52	0.000743	2.09	9835.21	2447.65	0.23
SteamBoatCr	Upper	23730		Lat Struct									
SteamBoatCr	Upper	23660		Lat Struct									
SteamBoatCr	Upper	23657.7	Max WS	4485.42	4393.09	4398.46	4394.22	4398.46	0.000622	1.81	8645.48	1966.42	0.21
SteamBoatCr	Upper	23503.7	Max WS	4482.13	4392.58	4398.35	4393.91	4398.36	0.000652	2.36	7900.88	1681.52	0.22
SteamBoatCr	Upper	23248.73	Max WS	3361.43	4392.58	4398.24	4392.95	4398.25	0.000404	1.60	7361.30	1496.82	0.17
SteamBoatCr	Upper	23042.22	Max WS	3312.32	4392.03	4398.15	4393.83	4398.16	0.000507	1.88	6159.96	1188.29	0.19
SteamBoatCr	Upper	22829.57	Max WS	1902.50	4391.68	4398.05	4392.27	4398.05	0.000222	1.25	5090.03	938.76	0.13
SteamBoatCr	Upper	22530		Lat Struct									
SteamBoatCr	Upper	22523.2	Max WS	1499.67	4390.77	4397.99	4392.17	4398.00	0.000216	1.71	3659.96	627.15	0.13
SteamBoatCr	Upper	22459.0*	Max WS	1329.56	4390.73	4397.98	4392.94	4397.99	0.000174	1.63	3518.52	600.65	0.12
SteamBoatCr	Upper	22394.8*	Max WS	1293.76	4390.68	4397.97	4392.99	4397.98	0.000169	1.69	3378.65	574.48	0.12
SteamBoatCr	Upper	22330.7*	Max WS	1282.16	4390.64	4397.96	4393.14	4397.97	0.000171	1.78	3241.12	548.41	0.13
SteamBoatCr	Upper	22266.5*	Max WS	1173.53	4390.59	4397.95	4393.10	4397.96	0.000147	1.72	3106.32	522.37	0.12
SteamBoatCr	Upper	22202.3*	Max WS	1173.77	4390.54	4397.94	4393.11	4397.95	0.000150	1.81	2973.44	496.35	0.12
SteamBoatCr	Upper	22138.2	Max WS	1169.68	4390.50	4397.93	4393.13	4397.94	0.000153	1.88	2842.16	470.27	0.12
SteamBoatCr	Upper	22130		Inl Struct									
SteamBoatCr	Upper	22104.53	Max WS	1157.03	4389.03	4397.87	4392.34	4397.88	0.000100	0.98	2568.57	574.14	0.06
SteamBoatCr	Upper	22104		Lat Struct									
SteamBoatCr	Upper	21999.13	Max WS	1074.77	4388.59	4397.87	4391.93	4397.87	0.000016	0.64	3166.88	707.35	0.04
SteamBoatCr	Upper	21892.55	Max WS	1030.53	4388.80	4397.87	4391.55	4397.87	0.000013	0.55	3018.64	754.15	0.03
SteamBoatCr	Upper	21890		Lat Struct									
SteamBoatCr	Upper	21811.05	Max WS	1000.90	4390.04	4397.86	4391.60	4397.87	0.000042	0.68	1908.88	792.51	0.04
SteamBoatCr	Upper	21772.5*	Max WS	999.32	4389.31	4397.86	4391.35	4397.87	0.000044	0.71	1755.90	805.81	0.04
SteamBoatCr	Upper	21734.0*	Max WS	999.19	4388.57	4397.86	4390.69	4397.86	0.000040	0.70	1705.95	820.35	0.04
SteamBoatCr	Upper	21695.57	Max WS	993.31	4387.84	4397.86	4389.92	4397.86	0.000036	0.69	1641.66	834.80	0.04
SteamBoatCr	Upper	21674.46	Max WS	999.21	4387.61	4397.85		4397.86	0.000045	0.81	1483.71	839.45	0.05
SteamBoatCr	Upper	21598.56		Culvert									
SteamBoatCr	Upper	21525.74	Max WS	993.12	4386.88	4397.80	4388.87	4397.80	0.000014	0.71	1741.21	421.78	0.04
SteamBoatCr	Upper	21413.75	Max WS	993.81	4386.84	4397.80	4389.02	4397.80	0.000008	0.57	2237.30	432.06	0.03
SteamBoatCr	Upper	21412.56		Lat Struct									
SteamBoatCr	Upper	21285.79	Max WS	1012.06	4386.69	4397.80	4389.87	4397.80	0.000005	0.41	2482.50	439.29	0.02
SteamBoatCr	Upper	21178.89	Max WS	1031.55	4386.11	4397.80	4389.79	4397.80	0.000003	0.33	3124.99	391.83	0.02
SteamBoatCr	Upper	21058.15	Max WS	1041.86	4385.91	4397.80	4389.63	4397.80	0.000005	0.41	2571.90	302.59	0.02
SteamBoatCr	Upper	20927.06	Max WS	1069.30	4385.15	4397.80	4389.13	4397.80	0.000005	0.41	2595.09	302.69	0.02
SteamBoatCr	Upper	20809.64	Max WS	1101.44	4385.37	4397.80	4388.90	4397.80	0.000005	0.43	2580.76	288.60	0.03
SteamBoatCr	Upper	20690.41	Max WS	1135.36	4385.36	4397.80	4388.43	4397.80	0.000004	0.41	2753.12	292.73	0.02
SteamBoatCr	Upper	20584.56	Max WS	1165.04	4385.31	4397.79	4388.40	4397.80	0.000005	0.46	2530.75	269.89	0.03
SteamBoatCr	Upper	20469.92	Max WS	1206.37	4384.57	4397.79	4388.00	4397.80	0.000006	0.50	2397.19	248.19	0.03
SteamBoatCr	Upper	20321.14	Max WS	1284.58	4383.37	4397.79	4387.73	4397.80	0.000006	0.49	2666.01	273.22	0.03
SteamBoatCr	Upper	20320		Lat Struct									
SteamBoatCr	Upper	20223.28	Max WS	1348.59	4384.23	4397.79	4387.60	4397.80	0.000006	0.49	2767.78	278.01	0.03
SteamBoatCr	Upper	20156.8	Max WS	1386.26	4384.60	4397.79	4387.54	4397.79	0.000005	0.48	2888.04	290.60	0.03
SteamBoatCr	Upper	20089.65	Max WS	1418.70	4384.65	4397.79	4387.44	4397.79	0.000005	0.45	3209.96	325.73	0.02
SteamBoatCr	Upper	20015.97	Max WS	1449.60	4384.92	4397.79	4387.30	4397.79	0.000004	0.44	3394.84	341.60	0.02
SteamBoatCr	Upper	19940.35	Max WS	1496.75	4384.38	4397.79	4387.43	4397.79	0.000005	0.46	3267.15	328.98	0.03
SteamBoatCr	Upper	19847.37	Max WS	1560.11	4384.83	4397.79	4387.43	4397.79	0.000005	0.47	3435.31	370.36	0.03
SteamBoatCr	Upper	19755.16	Max WS	1610.16	4384.89	4397.79	4387.32	4397.79	0.000005	0.49	3674.27	433.76	0.03
SteamBoatCr	Upper	19613.12	Max WS	1758.34	4384.75	4397.79	4387.39	4397.79	0.000006	0.54	3566.21	608.32	0.03
SteamBoatCr	Upper	19612.56		Lat Struct									
SteamBoatCr	Upper	19386.72	Max WS	1997.05	4384.27	4397.78	4387.23	4397.79	0.000007	0.60	3553.86	673.88	0.03
SteamBoatCr	Upper	19327		Lat Struct									
SteamBoatCr	Upper	19243.17	Max WS	2085.78	4384.28	4397.78	4387.26	4397.79	0.000007	0.60	3772.80	1122.25	0.03
SteamBoatCr	Upper	19090.5	Max WS	2085.87	4384.10	4397.78	4386.83	4397.78	0.000007	0.59	3943.40	1097.44	0.03
SteamBoatCr	Upper	18906.85	Max WS	2081.50	4383.72	4397.78	4386.79	4397.78	0.000007	0.59	3862.38	1107.25	0.03
SteamBoatCr	Upper	18764.37	Max WS	2093.42	4383.89	4397.78	4386.78	4397.78	0.000006	0.58	3928.05	967.45	0.03
SteamBoatCr	Upper	18573.66	Max WS	2091.20	4383.64	4397.78	4386.72	4397.78	0.000006	0.56	3951.01	1042.56	0.03
SteamBoatCr	Upper	18388.55	Max WS	2088.65	4383.96	4397.78	4386.35	4397.78	0.000006	0.56	3771.13	943.82	0.03
SteamBoatCr	Upper	18200.96	Max WS	2090.01	4383.14	4397.78	4386.04	4397.78	0.000005	0.53	4319.81	935.46	0.03
SteamBoatCr	Upper	18077.76	Max WS	2089.61	4383.12	4397.77	4386.10	4397.78	0.000005	0.53	4306.15	920.18	0.03
SteamBoatCr	Upper	18076.56		Lat Struct									
SteamBoatCr	Upper	17874.56	Max WS	2089.57	4383.17	4397.77	4386.66	4397.78	0.000013	0.83	3110.06	859.82	0.04
SteamBoatCr	Upper	17699.19	Max WS	2090.97	4383.38	4397.77	4386.47	4397.78	0.000013	0.83	2721.64	865.92	0.04
SteamBoatCr	Upper	17514.	Max WS	2094.86	4382.91	4397.76	4386.13	4397.77	0.000011	0.76	2950.22	1012.60	0.04
SteamBoatCr	Upper	17316.97	Max WS	2091.62	4382.71	4397.77	4384.55	4397.77	0.000002	0.34	6462.69	1045.28	0.02
SteamBoatCr	Upper	17248.07	Max WS	2093.04	4381.91	4397.77	4383.55	4397.77	0.000001	0.22	9729.10	1046.29	0.01
SteamBoatCr	Upper	17246		Lat Struct									
SteamBoatCr	Upper	17178.47	Max WS	1978.05	4381.45	4397.77	4382.79	4397.77	0.000000	0.16	12389.27	910.98	0.01
SteamBoatCr	Upper	17080.01	Max WS	1952.68	4381.15	4397.77	4383.39	4397.77	0.000001	0.21	9813.57	772.18	0.01
SteamBoatCr	Upper	16992.67	Max WS	1941.85	4381.54	4397.77	4383.29	4397.77	0.000002	0.38	5650.33	435.57	0.02
SteamBoatCr	Upper	16904.73	Max WS	1940.46	4381.72	4397.77	4383.70	4397.77	0.000005	0.56	3815.95	316.05	0.03
SteamBoatCr	Upper	16903.56		Lat Struct									
SteamBoatCr	Upper	16796.86	Max WS	1945.02	4381.97	4397.76	4384.22	4397.77	0.000006	0.66	3285.81	269.08	0.03
SteamBoatCr	Upper	16710.79	Max WS	1951.23	4381.98	4397.76	4384.44	4397.77	0.000009	0.78	2838.15	237.38	0.04
SteamBoatCr	Upper	16602.78	Max WS	1975.07	4381.64	4397.75	4384.79	4397.77	0.000018	1.08	2072.46	177.50	0.05
SteamBoatCr	Upper	16601.56		Lat Struct									
SteamBoatCr	Upper	16520.59	Max WS	2026.54	4381.27	4397.75	4384.52	4397.77	0.000021	1.23	1915.26	157.37	0.06
SteamBoatCr	Upper	16439.21	Max WS	2064.47	4380.93	4397.75	4383.78	4397.76	0.000009	0.79	2970.70	248.25	0.04
SteamBoatCr	Upper	16334.3	Max WS	2083.21	4381.17	4397.76	4383.51	4397.76	0.000003	0.49	4584.89	352.15	0.02
SteamBoatCr	Upper	16233.06	Max WS	2107.67	4381.46	4397.76	4383.35	4397.76	0.000002	0.39	5671.99	401.80	0.02
SteamBoatCr	Upper	16151.45	Max WS	2113.61	4381.58	4397.76	4383.44	4397.76	0.000003	0.47	4786.54	360.63	0.02
SteamBoatCr	Upper	16086.9	Max WS	2108.43	4381.60	4397.76	4383.44	4397.76	0.000004	0.53	4278.44	324.66	0.02
SteamBoatCr	Upper	16008.16	Max WS	2097.66	4381.16	4397.76	4383.35	4397.76	0.000004	0.52	4264.60	308.55	0.02
SteamBoatCr	Lower	15956.98	Max WS	3281.57	4380.87	4397.76	4383.61	4397.76	0.000005	0.58	6271.78	546.89	0.03
SteamBoatCr	Lower	15866.74	Max WS	3283.25	4381.07	4397.76	4384.05	4397.76	0.000006	0.63	5743.78	507.92	0.03
SteamBoatCr	Lower	15865		Lat Struct									
SteamBoatCr	Lower	15860		Lat Struct									
SteamBoatCr	Lower	15759.12	Max WS	3071.90	4380.68	4397.76	4383.96	4397.76	0.000005	0.62	5335.00	441.89	0.03
SteamBoatCr	Lower	15665.81	Max WS	2874.64	4380.93	4397.75	4384.07	4397.76	0.000007	0.71	4377.85	350.94	0.03
SteamBoatCr	Lower	15589.79	Max WS	2729.07	4381.57	4397.76	4384.47	4397.76	0.000007	0.69	4525.51	442.39	0.03
SteamBoatCr	Lower	15520.35	Max WS	2606.37	4381.84	4397.75	4384.94	4397.76	0.000010	0.81	3810.48	396.25	0.04
SteamBoatCr	Lower	15447.35	Max WS	2467.88	4381.72	4397.75	4385.47	4397.76	0.000016	1.02	3066.43	366.87	0.05
SteamBoatCr	Lower	15372.57	Max WS	2341.53	4383.30	4397.74	4387.18	4397.77	0.000051	1.55	1989.47	329.43	0.08
SteamBoatCr	Lower	15299.22	Max WS	2535.05	4381.58	4397.62	4387.48	4397.78	0.000158	3.20	792.46	233.94	0.15

HEC-RAS Plan: CE Locations: User Defined Profile: Max WS (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
SteamBoatCr	Lower	15278.56		Bridge									
SteamBoatCr	Lower	15240.02	Max WS	2535.05	4382.30	4397.63	4387.24	4397.74	0.000117	2.74	925.08	226.36	0.13
SteamBoatCr	Lower	15240		Lat Struct									
SteamBoatCr	Lower	14957.71	Max WS	2831.54	4377.68	4397.66	4383.74	4397.68	0.000023	1.30	3976.50	663.17	0.06
SteamBoatCr	Lower	14739.25	Max WS	3006.00	4378.71	4397.66	4384.17	4397.67	0.000014	1.06	5350.60	863.40	0.05
SteamBoatCr	Lower	14340.06	Max WS	3422.49	4378.09	4397.65	4385.65	4397.66	0.000014	1.06	6548.99	993.70	0.05
SteamBoatCr	Lower	13988.00	Max WS	3456.93	4379.59	4397.65	4386.29	4397.66	0.000013	0.98	6268.91	992.71	0.05
SteamBoatCr	Lower	13719.15	Max WS	3560.41	4379.73	4397.64	4386.39	4397.65	0.000017	1.19	5351.30	774.48	0.05
SteamBoatCr	Lower	13339.62	Max WS	3884.39	4379.41	4397.63	4386.19	4397.65	0.000021	1.32	5503.97	992.19	0.06
SteamBoatCr	Lower	13134.71	Max WS	4235.49	4379.15	4397.62	4387.57	4397.64	0.000029	1.63	4876.74	873.39	0.07
SteamBoatCr	Lower	12854.52	Max WS	4644.75	4379.41	4397.62	4385.07	4397.63	0.000006	0.77	8547.25	936.45	0.03
SteamBoatCr	Lower	12574.68	Max WS	4890.68	4379.40	4397.62	4385.92	4397.63	0.000005	0.71	11193.92	1103.03	0.03
SteamBoatCr	Lower	12574		Lat Struct									
SteamBoatCr	Lower	12231.71	Max WS	5338.09	4379.30	4397.62	4386.12	4397.63	0.000004	0.62	12666.02	1061.50	0.03
SteamBoatCr	Lower	12200		Lat Struct									
SteamBoatCr	Lower	11731.31	Max WS	5311.66	4379.22	4397.62	4387.20	4397.62	0.000005	0.66	11795.95	933.23	0.03
SteamBoatCr	Lower	11301.38	Max WS	4935.39	4378.40	4397.61	4386.01	4397.62	0.000009	0.95	8545.60	738.53	0.04
SteamBoatCr	Lower	10663.19	Max WS	4437.62	4378.90	4397.61	4382.58	4397.62	0.000004	0.66	10283.75	675.54	0.03
SteamBoatCr	Lower	10402.49	Max WS	4218.14	4379.07	4397.61	4383.54	4397.62	0.000005	0.73	9404.60	1259.51	0.03
SteamBoatCr	Lower	10135.62	Max WS	4137.60	4379.01	4397.61	4384.11	4397.62	0.000005	0.74	10005.48	858.97	0.03
SteamBoatCr	Lower	9824.705	Max WS	4107.05	4379.00	4397.60	4384.65	4397.61	0.000011	1.01	6404.02	638.73	0.04
SteamBoatCr	Lower	9558.202	Max WS	3986.20	4378.70	4397.60	4384.57	4397.61	0.000012	1.05	6227.85	665.76	0.05
SteamBoatCr	Lower	9306.021	Max WS	3856.77	4378.28	4397.60	4383.83	4397.61	0.000010	0.98	7378.23	795.69	0.04
SteamBoatCr	Lower	9053.586	Max WS	3688.77	4377.96	4397.60	4385.29	4397.61	0.000010	0.90	7073.89	748.82	0.04
SteamBoatCr	Lower	8829.826	Max WS	3607.15	4378.55	4397.60	4384.55	4397.61	0.000015	1.19	5479.64	564.29	0.05
SteamBoatCr	Lower	8594.285	Max WS	3578.96	4378.22	4397.59	4383.74	4397.60	0.000017	1.36	4746.17	496.79	0.06
SteamBoatCr	Lower	8320.428	Max WS	3579.60	4378.01	4397.57	4384.72	4397.60	0.000034	1.73	3273.02	333.56	0.08
SteamBoatCr	Lower	8084.169	Max WS	3577.48	4377.85	4397.58	4384.31	4397.59	0.000021	1.42	4608.64	513.33	0.06
SteamBoatCr	Lower	7827.352	Max WS	3576.45	4377.46	4397.57	4384.80	4397.59	0.000023	1.37	4116.00	438.64	0.06
SteamBoatCr	Lower	7612.764	Max WS	3579.73	4377.71	4397.56	4384.08	4397.58	0.000028	1.64	3746.13	381.36	0.07
SteamBoatCr	Lower	7370.842	Max WS	3617.32	4377.36	4397.54	4384.07	4397.58	0.000040	1.92	2939.31	276.88	0.08
SteamBoatCr	Lower	7120.541	Max WS	3792.15	4377.22	4397.54	4383.61	4397.56	0.000028	1.62	3598.38	336.97	0.07
SteamBoatCr	Lower	6877.138	Max WS	3959.63	4377.32	4397.53	4384.12	4397.55	0.000024	1.53	4270.54	410.88	0.06
SteamBoatCr	Lower	6646.991	Max WS	4228.33	4377.51	4397.53	4384.49	4397.54	0.000020	1.41	5073.19	473.68	0.06
SteamBoatCr	Lower	6423.999	Max WS	4520.33	4377.48	4397.52	4384.13	4397.54	0.000024	1.57	5124.98	506.57	0.06
SteamBoatCr	Lower	6356.156	Max WS	4657.17	4377.07	4397.52	4384.77	4397.54	0.000027	1.42	5192.20	497.21	0.06
SteamBoatCr	Lower	6282.588	Max WS	4712.77	4376.91	4397.52	4385.09	4397.53	0.000021	1.20	6093.67	574.14	0.06
SteamBoatCr	Lower	6268.09		Bridge									
SteamBoatCr	Lower	6231.1	Max WS	4708.81	4377.39	4397.46	4384.88	4397.49	0.000042	1.72	4842.44	624.45	0.08
SteamBoatCr	Lower	6230.09		Lat Struct									
SteamBoatCr	Lower	6082.992	Max WS	4276.72	4376.95	4397.47	4384.90	4397.49	0.000030	1.36	5107.86	604.49	0.06
SteamBoatCr	Lower	5773.268	Max WS	3538.88	4377.34	4397.46	4383.21	4397.48	0.000031	1.58	3791.73	441.52	0.07
SteamBoatCr	Lower	5379.09	Max WS	3007.89	4377.17	4397.41	4384.80	4397.49	0.000091	2.48	1554.46	184.07	0.11
SteamBoatCr	Lower	5378.09		Lat Struct									
SteamBoatCr	Lower	5316.216	Max WS	2967.98	4376.50	4397.39	4384.95	4397.49	0.000122	2.74	1392.23	190.55	0.13
SteamBoatCr	Lower	5254.334	Max WS	2961.39	4376.29	4397.37	4383.92	4397.48	0.000132	2.75	1294.06	177.45	0.13
SteamBoatCr	Lower	5191.248	Max WS	2960.59	4376.68	4397.37	4384.37	4397.48	0.000123	2.73	1414.24	178.83	0.12
SteamBoatCr	Lower	5127.067	Max WS	2950.02	4377.27	4397.39	4382.90	4397.46	0.000077	2.35	1629.36	175.14	0.10
SteamBoatCr	Lower	5071.02	Max WS	2929.36	4376.30	4397.39	4382.05	4397.46	0.000067	2.22	1701.61	172.63	0.09
SteamBoatCr	Lower	5018.38	Max WS	2900.29	4375.93	4397.40	4381.66	4397.45	0.000050	2.01	1827.74	173.66	0.08
SteamBoatCr	Lower	4967.807	Max WS	2863.03	4375.65	4397.40	4381.63	4397.45	0.000045	1.89	1848.86	175.46	0.08
SteamBoatCr	Lower	4922.298	Max WS	2813.46	4375.97	4397.41	4381.48	4397.45	0.000038	1.66	1905.74	164.67	0.07
SteamBoatCr	Lower	4876.992	Max WS	2755.11	4376.87	4397.41	4382.16	4397.45	0.000037	1.68	2057.56	195.29	0.07
SteamBoatCr	Lower	4817.133	Max WS	2709.05	4375.30	4397.41	4381.83	4397.45	0.000044	1.86	1864.49	174.24	0.08
SteamBoatCr	Lower	4761.179	Max WS	2666.59	4374.93	4397.40	4381.82	4397.45	0.000049	1.97	1712.87	156.06	0.08
SteamBoatCr	Lower	4711.518	Max WS	2629.04	4375.06	4397.39	4381.65	4397.45	0.000054	2.05	1598.67	147.85	0.08
SteamBoatCr	Lower	4656.742	Max WS	2602.35	4375.16	4397.39	4381.55	4397.45	0.000051	1.99	1584.02	143.59	0.08
SteamBoatCr	Lower	4610.862	Max WS	2585.55	4375.01	4397.39	4381.06	4397.44	0.000056	1.95	1457.33	124.74	0.09
SteamBoatCr	Lower	4570		Lat Struct									
SteamBoatCr	Lower	4567.007	Max WS	2572.82	4374.93	4397.39	4381.07	4397.44	0.000050	1.94	1501.17	127.06	0.08
SteamBoatCr	Lower	4528.498	Max WS	2563.66	4376.09	4397.38	4381.71	4397.44	0.000051	2.03	1479.16	124.56	0.08
SteamBoatCr	Lower	4487.889	Max WS	2560.13	4377.29	4397.38	4382.39	4397.44	0.000060	1.95	1502.37	133.06	0.09
SteamBoatCr	Lower	4448.158	Max WS	2551.10	4375.52	4397.39	4381.40	4397.44	0.000051	1.82	1605.35	141.91	0.08
SteamBoatCr	Lower	4407.969	Max WS	2536.23	4375.79	4397.39	4381.23	4397.43	0.000040	1.74	1695.95	149.18	0.07
SteamBoatCr	Lower	4364.395	Max WS	2521.05	4375.92	4397.39	4381.12	4397.43	0.000040	1.75	1660.19	144.59	0.07
SteamBoatCr	Lower	4319.53	Max WS	2511.11	4376.41	4397.39	4381.41	4397.43	0.000040	1.74	1655.46	145.97	0.07
SteamBoatCr	Lower	4276.437	Max WS	2496.29	4376.68	4397.39	4381.66	4397.43	0.000036	1.57	1806.16	161.21	0.07
SteamBoatCr	Lower	4237.77	Max WS	2481.48	4376.61	4397.39	4381.88	4397.43	0.000037	1.67	1836.83	169.20	0.07
SteamBoatCr	Lower	4193.807	Max WS	2470.39	4376.04	4397.39	4381.93	4397.43	0.000045	1.87	1728.24	166.00	0.08
SteamBoatCr	Lower	4151.331	Max WS	2464.38	4376.19	4397.38	4381.77	4397.43	0.000044	1.90	1648.23	158.20	0.08
SteamBoatCr	Lower	4117.07	Max WS	2457.53	4376.16	4397.38	4381.21	4397.42	0.000037	1.73	1778.27	173.50	0.07
SteamBoatCr	Lower	4083.562	Max WS	2446.96	4376.05	4397.38	4381.19	4397.42	0.000036	1.70	1736.40	191.06	0.07
SteamBoatCr	Lower	4060.196	Max WS	2446.42	4376.03	4397.38	4380.96	4397.42	0.000034	1.66	1740.97	168.84	0.07
SteamBoatCr	Lower	4018.809	Max WS	2445.43	4375.98	4397.38	4381.09	4397.42	0.000038	1.61	1713.87	178.68	0.07
SteamBoatCr	Lower	3971.608	Max WS	2445.77	4376.26	4397.38	4380.97	4397.42	0.000038	1.61	1814.68	182.41	0.07
SteamBoatCr	Lower	3932.105	Max WS	2445.43	4376.40	4397.38	4380.98	4397.42	0.000038	1.60	1849.19	184.06	0.07
SteamBoatCr	Lower	3893.146	Max WS	2446.18	4375.81	4397.38	4380.84	4397.42	0.000035	1.56	1902.29	174.21	0.07
SteamBoatCr	Lower	3857.172	Max WS	2445.94	4375.76	4397.38	4380.83	4397.41	0.000036	1.57	1902.67	165.71	0.07
SteamBoatCr	Lower	3818.865	Max WS	2445.09	4375.71	4397.38	4380.96	4397.41	0.000033	1.52	1952.80	168.94	0.07
SteamBoatCr	Lower	3817.09		Lat Struct									
SteamBoatCr	Lower	3779.034	Max WS	2445.21	4375.94	4397.38	4381.00	4397.41	0.000035	1.58	1914.95	176.95	0.07
SteamBoatCr	Lower	3740.76	Max WS	2445.81	4376.63	4397.38	4381.40	4397.41	0.000033	1.54	1918.79	160.99	0.07
SteamBoatCr	Lower	3698.877	Max WS	2446.11	4376.28	4397.38	4381.09	4397.41	0.000033	1.51	1874.36	149.44	0.07
SteamBoatCr	Lower	3663.203	Max WS	2445.76	4375.54	4397.37	4380.73	4397.41	0.000034	1.53	1847.82	153.70	0.07
SteamBoatCr	Lower	3637.926	Max WS	2446.10	4375.69	4397.37	4381.16	4397.41	0.000035	1.47	1823.15	176.60	0.07
SteamBoatCr	Lower	3595.906	Max WS	2446.03	4375.78	4397.36	4381.07	4397.41	0.000034	1.71	1728.03	182.00	0.07
SteamBoatCr	Lower	3549		Lat Struct									
SteamBoatCr	Lower	3546.287	Max WS	2445.12	4375.56	4397.36	4381.16	4397.40	0.000037	1.75	1619.47	150.40	0.07
SteamBoatCr	Lower	3478.032	Max WS	2445.57	4375.27	4397.36	4381.36	4397.40	0.000038	1.54	1634.48	137.61	0.07
SteamBoatCr	Lower	3428.795	Max WS	2445.37	4376.02	4397.35	4382.00	4397.40	0.000057	1.86	1402.02	119.67	0.09
SteamBoatCr	Lower	3384.192	Max WS	2445.64	4375.19	4397.34	4382.90	4397.40	0.000068	1.81	1355.10	118.98	0.09
SteamBoatCr	Lower	3335.191	Max WS	2444.92	4377.00	4397.34	4381.97	4397.39	0.000053	1.85	1446.77	126.77	0.08
SteamBoatCr	Lower	3305.688	Max WS	2446.68	4375.28	4397.35	4381.24	4397.39	0.000043	1.70	1607.34	130.72	0.08
SteamBoatCr	Lower	3268.097	Max WS	2454.69	4376.33	4397.34	4381.36	4397.39	0.000052	1.87	1393.31	94.61	0.08
SteamBoatCr	Lower	3227.105	Max WS	2472.53	4376.24	4397.32	4382.92	4397.39	0.000071	2.03	1273.06	95.09	0.10
SteamBoatCr	Lower	3192.105	Max WS	2516.19	4376.04	4397.31	4382.73	4397.38	0.000080	2.23	1199.53	87.59	0.10
SteamBoatCr	Lower	3154.573	Max WS	2562.29	4374.74	4397.31	4382.39	4397.38	0.000075	2.16	1290.13	95.01	0.10
SteamBoatCr	Lower	3120.963	Max WS	2600.84	4375.70	4397.32	4382.42	4397.37	0.000052	1.84	1582.96	124.20	0.08
SteamBoatCr	Lower	3080		Lat Struct									
SteamBoatCr	Lower	3078.037	Max WS	2640.97	4377.90	4397.32	4383.29	4397.37	0.000056	1.86	1500.89	113.08	0.09
SteamBoatCr	Lower	3044.67	Max WS	2679.71	4377.90	4397.31	4382.83	4397.37	0.000062	1.96	1508.26	124.42	0.09
SteamBoatCr	Lower	3010.206	Max WS	2711.70	4377.90	4397.30	4382.58	4397.36	0.000063	1.98	1433.39	111.36	0.09
SteamBoatCr	Lower	2946.115	Max WS	2769.28	4377.90	4397.30	4383.44	4397.35	0.000070	1.94	1484.30	124.89	0.10
SteamBoatCr	Lower	2903.734	Max WS	2819.62	4377.90	4397.29	4382.28	4397.35	0.000057	1.88	1506.18	105.02	0.09
SteamBoatCr	Lower	2903		Lat Struct									
SteamBoatCr	Lower	2882.287	Max WS	2854.53	4377.90	4397.30	4382.09	4397.35	0.000045	1.73	1691.73	118.48	0.08
SteamBoatCr	Lower	2863.104	Max WS	2902.05	4377.90	4397.29	4381.70	4397.34	0.000044	1.81	1616.72	98.38	0.08
SteamBoatCr	Lower	2825.597	Max WS	2976.94	4377.90	4397.29	4382.09	4397.34	0.000055	1.87	1594.03	98.76	0.08

HEC-RAS Plan: CE Locations: User Defined Profile: Max WS (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
SteamBoatCr	Lower	2785.811	Max WS	3044.41	4377.90	4397.27	4382.39	4397.34	0.000070	2.06	1476.44	94.18	0.09
SteamBoatCr	Lower	2738.436	Max WS	3149.70	4377.90	4397.24	4382.49	4397.33	0.000095	2.29	1376.99	93.96	0.11
SteamBoatCr	Lower	2696.097	Max WS	3288.12	4377.90	4397.22	4382.53	4397.32	0.000094	2.49	1346.71	87.18	0.11
SteamBoatCr	Lower	2651.945	Max WS	3457.29	4377.90	4397.19	4383.15	4397.30	0.000096	2.66	1325.79	88.10	0.12
SteamBoatCr	Lower	2609.679	Max WS	3674.61	4377.90	4397.18	4382.64	4397.29	0.000090	2.63	1454.28	96.34	0.11
SteamBoatCr	Lower	2559.67	Max WS	3950.40	4377.90	4397.14	4383.71	4397.26	0.000122	2.78	1441.95	100.14	0.12
SteamBoatCr	Lower	2518.648	Max WS	4234.52	4377.90	4397.12	4383.40	4397.24	0.000104	2.78	1541.26	103.60	0.12
SteamBoatCr	Lower	2479.834	Max WS	4518.04	4377.90	4397.07	4383.51	4397.22	0.000139	3.13	1469.09	99.27	0.14
SteamBoatCr	Lower	2432.757	Max WS	4898.88	4377.87	4397.00	4383.73	4397.19	0.000171	3.45	1441.05	96.81	0.15
SteamBoatCr	Lower	2401.375	Max WS	5215.28	4377.87	4396.94	4384.27	4397.16	0.000215	3.79	1412.63	95.72	0.16
SteamBoatCr	Lower	2377.134	Max WS	5537.81	4377.87	4396.89	4384.21	4397.13	0.000227	3.91	1450.28	99.67	0.17
Truckee	Upper	41611.80	Max WS	23014.74	4438.40	4451.51	4449.22	4454.35	0.003988	13.52	1702.28	158.11	0.73
Truckee	Upper	41521.41	Max WS	23014.35	4438.17	4450.84	4449.18	4453.98	0.004760	14.22	1617.96	158.33	0.78
Truckee	Upper	41361.23	Max WS	23013.75	4437.35	4450.46	4448.57	4453.21	0.004445	13.30	1730.41	180.08	0.76
Truckee	Upper	41236.61	Max WS	23012.74	4436.88	4450.18	4447.94	4452.61	0.004753	12.52	1838.11	194.51	0.72
Truckee	Upper	41084.64	Max WS	23010.68	4436.45	4449.63	4447.05	4451.91	0.004358	12.13	1897.65	201.19	0.70
Truckee	Upper	40837.92	Max WS	23004.11	4435.42	4449.35	4446.09	4451.05	0.002526	10.47	2206.15	242.00	0.58
Truckee	Upper	40652.89	Max WS	22997.84	4434.44	4448.51	4446.53	4450.56	0.003226	11.67	2076.45	258.06	0.65
Truckee	Upper	40471.90	Max WS	22976.60	4433.16	4447.46	4445.97	4449.94	0.004126	12.74	1867.87	247.70	0.73
Truckee	Upper	40324.24	Max WS	22919.54	4431.83	4447.13	4445.30	4449.37	0.003339	12.23	1995.51	261.87	0.67
Truckee	Upper	40145.43	Max WS	22811.52	4431.92	4447.04	4444.54	4448.90	0.002273	11.59	2268.50	262.13	0.57
Truckee	Upper	39956.88	Max WS	22527.43	4431.72	4446.15	4443.21	4448.35	0.003176	11.91	1908.67	203.61	0.65
Truckee	Upper	39763.07	Max WS	22955.96	4431.96	4445.46	4442.67	4447.55	0.003070	11.72	2429.62	604.72	0.64
Truckee	Upper	39665.1*	Max WS	24164.90	4431.23	4444.82	4443.13	4447.50	0.004369	13.21	2163.51	616.90	0.75
Truckee	Upper	39567.24	Max WS	23866.16	4430.51	4444.38	4442.48	4447.09	0.004512	13.22	1804.90	192.43	0.76
Truckee	Upper	39486.5*	Max WS	23543.54	4430.26	4444.02	4442.39	4446.81	0.004459	13.45	2051.83	558.97	0.76
Truckee	Upper	39405.8*	Max WS	23522.09	4430.01	4443.67	4442.30	4446.62	0.004488	13.88	2148.29	582.71	0.77
Truckee	Upper	39325.14	Max WS	23397.98	4429.76	4443.32	4442.07	4446.39	0.004469	14.24	2289.76	553.15	0.77
Truckee	Upper	39146.14	Max WS	23258.99	4429.04	4442.48	4441.56	4445.61	0.004920	14.36	2286.56	623.97	0.80
Truckee	Upper	39048.14	Max WS	23245.24	4428.58	4441.94	4441.23	4445.84	0.006265	16.00	1986.75	559.49	0.88
Truckee	Upper	38981.14	Max WS	23218.24	4428.60	4441.52	4440.59	4445.15	0.006019	15.29	1539.46	175.91	0.86
Truckee	Upper	38895.14	Max WS	23161.59	4428.20	4441.86	4439.48	4444.12	0.003513	12.24	2697.85	780.11	0.67
Truckee	Upper	38812.14	Max WS	23159.83	4429.90	4442.40	4437.71	4443.33	0.001416	7.86	4034.91	874.48	0.43
Truckee	Upper	38760.14	Max WS	23171.22	4430.36	4442.65	4437.34	4443.14	0.000863	5.74	5239.98	1125.36	0.33
Truckee	Upper	38691.14		Inl Struct									
Truckee	Upper	38622.14	Max WS	23172.82	4428.84	4442.23	4436.20	4442.68	0.000662	5.39	4401.85	1175.99	0.29
Truckee	Upper	38552.14	Max WS	23168.26	4427.85	4441.66	4437.01	4442.65	0.001442	8.01	3116.28	931.06	0.43
Truckee	Upper	38400		Bridge									
Truckee	Upper	38371.89	Max WS	23161.53	4423.36	4440.43	4435.73	4441.38	0.001341	8.12	3433.45	369.08	0.42
Truckee	Upper	38371		Lat Struct									
Truckee	Upper	38325.1*	Max WS	23119.52	4423.46	4440.12	4435.64	4441.26	0.001586	8.72	3007.54	337.68	0.46
Truckee	Upper	38278.3*	Max WS	23097.14	4423.56	4439.80	4435.18	4441.11	0.001838	9.25	2663.53	304.31	0.49
Truckee	Upper	38231.6*	Max WS	23097.23	4423.66	4439.50	4434.86	4440.94	0.002060	9.64	2423.31	263.83	0.51
Truckee	Upper	38184.85	Max WS	23096.62	4423.76	4439.29	4434.57	4440.78	0.001957	9.79	2358.78	341.81	0.50
Truckee	Upper	38137.0*	Max WS	23090.47	4423.51	4439.06	4434.44	4440.61	0.002042	9.97	2315.56	256.82	0.51
Truckee	Upper	38089.3*	Max WS	23077.34	4423.26	4438.82	4434.27	4440.43	0.002140	10.17	2271.19	346.86	0.53
Truckee	Upper	38041.5*	Max WS	23083.51	4423.00	4438.58	4434.19	4440.25	0.002303	10.35	2272.13	466.25	0.54
Truckee	Upper	37993.8*	Max WS	23076.99	4422.75	4438.38	4434.05	4440.06	0.002347	10.44	2387.96	629.52	0.55
Truckee	Upper	37946.04	Max WS	23048.49	4422.50	4438.20	4433.93	4439.84	0.002295	10.41	2722.46	919.99	0.54
Truckee	Upper	37890.7*	Max WS	22965.75	4422.25	4437.87	4434.10	4439.66	0.002501	10.89	2767.48	856.89	0.57
Truckee	Upper	37835.4*	Max WS	22886.88	4422.00	4437.61	4434.21	4439.45	0.002570	11.15	2961.80	846.50	0.58
Truckee	Upper	37780.1*	Max WS	22839.61	4421.74	4437.42	4434.04	4439.21	0.002461	11.14	3270.41	813.25	0.57
Truckee	Upper	37724.79	Max WS	22781.88	4421.49	4437.39	4434.24	4438.92	0.002095	10.61	3832.68	780.00	0.53
Truckee	Upper	37723		Lat Struct									
Truckee	Upper	37675.7*	Max WS	22743.84	4421.46	4437.12	4433.11	4438.72	0.002188	10.57	3361.41	758.63	0.53
Truckee	Upper	37626.6*	Max WS	22688.64	4421.42	4436.96	4433.07	4438.53	0.002206	10.56	3337.68	654.31	0.53
Truckee	Upper	37577.5*	Max WS	22540.72	4421.39	4436.91	4432.97	4438.29	0.002132	9.96	3510.79	664.83	0.50
Truckee	Upper	37528.5*	Max WS	22358.70	4421.36	4436.86	4432.83	4438.06	0.002065	9.35	3664.93	640.64	0.48
Truckee	Upper	37479.4*	Max WS	22254.32	4421.32	4436.74	4432.51	4437.86	0.002015	9.03	3703.84	609.90	0.47
Truckee	Upper	37430.40	Max WS	22246.72	4421.29	4436.55	4432.27	4437.67	0.002117	8.96	3618.18	577.61	0.47
Truckee	Upper	37375.8*	Max WS	22240.33	4420.88	4436.18	4432.32	4437.46	0.002568	9.53	3247.24	619.36	0.51
Truckee	Upper	37321.3*	Max WS	22239.01	4420.48	4435.73	4432.33	4437.22	0.003095	10.12	2896.77	690.88	0.56
Truckee	Upper	37266.8*	Max WS	22237.22	4420.07	4435.23	4432.23	4436.90	0.003569	10.63	2582.03	694.93	0.59
Truckee	Upper	37212.3*	Max WS	22236.97	4419.67	4434.75	4431.95	4436.58	0.003935	11.03	2324.76	666.20	0.62
Truckee	Upper	37158		Lat Struct									
Truckee	Upper	37157.78	Max WS	21643.04	4419.26	4434.32	4431.36	4436.14	0.003870	10.90	2324.85	669.12	0.61
Truckee	Upper	37156		Lat Struct									
Truckee	Upper	37112.0*	Max WS	21562.06	4418.67	4433.97	4431.17	4435.93	0.004092	11.32	2177.66	679.34	0.63
Truckee	Upper	37066.3*	Max WS	21965.55	4418.08	4433.60	4431.10	4435.78	0.004465	11.97	2042.41	674.99	0.67
Truckee	Upper	37020.6*	Max WS	21937.04	4417.49	4433.01	4431.00	4435.52	0.005165	12.82	1879.83	652.01	0.72
Truckee	Upper	36974.9* BREACH, DA 8	Max WS	21660.79	4416.90	4432.31	4431.02	4435.23	0.006168	13.81	1694.86	628.41	0.78
Truckee	Upper	36929.19	Max WS	20803.51	4416.31	4431.88	4430.69	4434.92	0.006428	14.10	1582.21	606.47	0.79
Truckee	Upper	36861.3*	Max WS	19842.58	4416.77	4431.91	4430.34	4434.62	0.005743	13.31	1595.35	494.95	0.75
Truckee	Upper	36793.5*	Max WS	18809.73	4417.22	4432.26	4429.77	4434.40	0.004275	11.84	1706.69	474.57	0.65
Truckee	Upper	36725.76	Max WS	18679.46	4417.67	4432.15	4429.30	4434.14	0.003870	11.41	1745.57	448.82	0.62
Truckee	Upper	36647.5*	Max WS	18606.10	4417.98	4432.07	4428.90	4433.87	0.003159	10.82	1807.52	393.42	0.59
Truckee	Upper	36569.41	Max WS	18884.37	4418.27	4431.83	4428.60	4433.58	0.002828	10.66	1842.02	359.54	0.59
Truckee	Upper	36568		Lat Struct									
Truckee	Upper	36480.3*	Max WS	18834.14	4418.49	4431.54	4428.52	4433.34	0.002913	10.82	1827.59	381.52	0.60
Truckee	Upper	36391.32	Max WS	18792.16	4418.70	4431.25	4428.41	4433.09	0.003018	10.98	1815.04	462.98	0.61
Truckee	Upper	36300.5*	Max WS	18784.41	4418.40	4430.89	4428.13	4432.81	0.003195	11.20	1769.38	477.75	0.62
Truckee	Upper	36209.78	Max WS	18788.70	4418.10	4430.47	4427.91	4432.50	0.003478	11.51	1710.42	332.92	0.65
Truckee	Upper	36130.78	Max WS	18819.75	4417.84	4430.51	4427.46	4432.23	0.002846	10.61	1856.99	347.17	0.59
Truckee	Upper	36026.78	Max WS	18514.75	4417.53	4430.69	4426.61	4432.01	0.001947	9.30	2135.14	590.38	0.49
Truckee	Upper	35963.78	Max WS	18230.20	4417.68	4430.99	4426.24	4431.89	0.001397	7.67	2721.74	701.01	0.42
Truckee	Upper	35894.28		Inl Struct									
Truckee	Upper	35824.78	Max WS	18227.31	4414.82	4427.07	4424.00	4428.45	0.006167	9.43	1933.07	311.28	0.57
Truckee	Upper	35810		Lat Struct									
Truckee	Upper	35803.6*	Max WS	18227.35	4413.86	4427.04	4423.28	4428.33	0.005156	9.12	1999.55	299.35	0.53
Truckee	Upper	35794		Lat Struct									
Truckee	Upper	35782.4*	Max WS	18227.19	4412.89	4426.98	4422.64	4428.23	0.004533	8.97	2032.37	289.76	0.50
Truckee	Upper	35761.28	Max WS	18226.78	4411.93	4426.89	4422.04	4428.14	0.004159	8.96	2047.77	280.81	0.49
Truckee	Upper	35676.28	Max WS	18226.86	4411.36	4426.61	4421.86	4427.88	0.001899	9.08	2072.89	267.02	0.48
Truckee	Upper	35606.05	Max WS	18226.64	4411.48	4426.32	4422.27	4427.75	0.002230	9.59	1973.78	259.59	0.52
Truckee	Upper	35546.1*	Max WS	18225.38	4411.20	4426.13	4422.31	4427.62	0.002382	9.83	1955.51	248.43	0.54
Truckee	Upper	35486.25	Max WS	18225.74	4410.90	4425.90	4422.35	4427.52	0.002625	10.24	1861.26	579.78	0.56
Truckee	Upper	35400		Bridge									
Truckee	Upper	35352.36	Max WS	18225.74	4409.10	4425.11	4420.87	4426.65	0.002151	10.02	1930.15	214.29	0.52
Truckee	Upper	35351		Lat Struct									
Truckee	Upper	35350		Lat Struct									
Truckee	Upper	35262		Lat Struct									
Truckee	Upper	35261.04	Max WS	18229.56	4408.19	4425.04	4420.09	4426.44	0.002102	9.48	1934.93	427.75	0.51
Truckee	Upper	35179.6*	Max WS	18230.00	4408.56	4424.88	4420.10	4426.26	0.002154	9.46	1930.15	332.89	0.51
Truckee	Upper	35098.1*	Max WS	18229.87	4408.92	4424.64	4420.21	4426.08	0.002346	9.65	1888.65	250.52	0.53
Truckee	Upper	35016.7*	Max WS	18229.03	4409.29	4424.28	4420.38	4425.88	0.002718	10.13	1799.43	224.29	0.57
Truckee	Upper	34935.32	Max WS	18229.33	4409.65	4423.72	4420.64	4425.63	0.003518	11.09	1644.05	176.64	0.64
Truckee	Upper	34849.1*	Max WS	18230.36	4409.79	4423.48	4420.59	4425.32	0.003557	10.88	1675.04	187.17	0.64
Truckee	Upper	34763.0*	Max WS	18259.30	4409.94	4423.27	4420.33	4425.02	0.003287	10.60	1722.56	401.42	0.62

HEC-RAS Plan: CE Locations: User Defined Profile: Max WS (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Truckee	Upper	34676.91	Max WS	18324.67	4410.08	4423.09	4419.96	4424.74	0.002972	10.31	1776.98	433.36	0.59
Truckee	Upper	34602.8*	Max WS	18362.76	4410.17	4422.66	4419.90	4424.50	0.003328	10.87	1691.38	574.79	0.63
Truckee	Upper	34528.8*	Max WS	18274.79	4410.27	4422.32	4419.82	4424.28	0.003494	11.26	1678.41	725.00	0.64
Truckee	Upper	34454.76	Max WS	18269.57	4410.35	4422.06	4419.87	4424.03	0.003499	11.43	1844.58	803.95	0.65
Truckee	Upper	34453		Lat Struct									
Truckee	Upper	34382.0*	Max WS	18206.84	4410.30	4421.82	4419.35	4423.64	0.003227	10.95	1961.98	771.00	0.62
Truckee	Upper	34309.2*	Max WS	18149.64	4410.25	4421.59	4418.84	4423.29	0.003005	10.54	1941.93	721.82	0.60
Truckee	Upper	34236.54	Max WS	18120.48	4410.18	4421.45	4418.33	4423.00	0.002710	10.03	2015.39	651.08	0.57
Truckee	Upper	34141.7*	Max WS	18119.84	4409.66	4421.17	4418.13	4422.75	0.002831	10.13	1817.55	375.88	0.58
Truckee	Upper	34046.91	Max WS	18120.30	4409.12	4420.89	4417.93	4422.49	0.002905	10.13	1803.92	232.67	0.58
Truckee	Upper	33989.4*	Max WS	18109.54	4409.17	4420.73	4418.08	4422.31	0.003468	10.09	1833.16	248.97	0.63
Truckee	Upper	33932.07	Max WS	18098.77	4409.23	4420.41	4418.36	4422.10	0.004182	10.47	1766.25	248.55	0.68
Truckee	Upper	33931		Lat Struct									
Truckee	Upper	33872.4*	Max WS	18098.02	4408.96	4419.89	4418.41	4421.85	0.004961	11.29	1659.51	253.82	0.74
Truckee	Upper	33812.80	Max WS	18097.92	4408.40	4419.23	4418.38	4421.64	0.006314	12.50	1491.41	244.39	0.83
Truckee	Upper	33727.8*	Max WS	18098.06	4407.65	4418.96	4417.65	4421.05	0.005335	11.62	1561.96	229.56	0.76
Truckee	Upper	33642.99	Max WS	18097.69	4406.89	4419.04	4416.64	4420.62	0.003598	10.08	1794.88	228.66	0.63
Truckee	Upper	33642		Lat Struct									
Truckee	Upper	33477.26	Max WS	18096.66	4407.73	4418.21	4416.29	4420.06	0.003198	10.91	1658.30	207.17	0.68
Truckee	Upper	33318.83	Max WS	18096.57	4406.29	4418.47	4415.32	4419.62	0.001819	8.76	2403.04	437.76	0.52
Truckee	Upper	33141.24	Max WS	18093.93	4406.76	4418.38	4414.96	4419.32	0.001401	8.15	2798.73	462.31	0.47
Truckee	Upper	32984.21	Max WS	18057.97	4405.82	4417.83	4414.95	4419.09	0.002013	9.16	2289.61	443.34	0.55
Truckee	Upper	32983		Lat Struct									
Truckee	Upper	32851.30	Max WS	18047.82	4405.01	4417.53	4414.41	4418.85	0.001884	9.44	2306.11	423.25	0.54
Truckee	Upper	32707.99	Max WS	18058.61	4404.73	4417.48	4413.65	4418.57	0.001464	8.65	2499.68	363.78	0.48
Truckee	Upper	32566.20	Max WS	18172.36	4404.26	4417.17	4413.60	4418.34	0.001571	8.86	2276.97	289.89	0.49
Truckee	Upper	32460.36	Max WS	18350.58	4404.24	4416.56	4413.47	4418.14	0.002071	10.18	1910.22	236.66	0.57
Truckee	Upper	32391.38	Max WS	18517.13	4403.82	4415.80	4413.57	4417.98	0.002961	11.87	1600.22	197.75	0.67
Truckee	Upper	32323.85	Max WS	18771.36	4403.29	4416.37	4412.47	4417.71	0.001622	9.37	2162.94	284.27	0.50
Truckee	Upper	32300		Bridge									
Truckee	Upper	32220.09	Max WS	18771.36	4402.68	4415.45	4412.38	4417.08	0.002240	10.26	1852.41	216.42	0.59
Truckee	Upper	32220		Lat Struct									
Truckee	Upper	32219		Lat Struct									
Truckee	Upper	32100.13	Max WS	18773.00	4402.06	4414.50	4412.88	4416.80	0.003471	12.24	1599.18	204.31	0.72
Truckee	Upper	31963.03	Max WS	18771.47	4401.22	4414.32	4412.27	4416.30	0.003283	11.30	1668.14	220.83	0.69
Truckee	Upper	31795.06 BREACH, DA 9	Max WS	18769.04	4401.35	4413.22	4412.10	4415.73	0.004365	12.73	1490.34	198.71	0.79
Truckee	Upper	31523.22	Max WS	17840.28	4402.64	4413.13	4411.49	4414.74	0.003240	10.25	1793.38	272.69	0.67
Truckee	Upper	31350		Lat Struct									
Truckee	Upper	31273.71	Max WS	17561.42	4398.78	4412.53	4411.06	4413.97	0.003321	9.70	1896.95	325.39	0.67
Truckee	Upper	31037.96	Max WS	16478.80	4400.00	4412.74	4409.14	4413.50	0.001265	7.01	2406.71	314.31	0.43
Truckee	Upper	30789.09	Max WS	15991.40	4397.52	4411.12	4409.25	4413.19	0.003352	11.66	1470.92	217.51	0.69
Truckee	Upper	30581		Lat Struct									
Truckee	Upper	30509.03	Max WS	15995.49	4393.85	4410.79	4407.59	4412.43	0.002092	11.01	1955.41	252.66	0.57
Truckee	Upper	30211.71	Max WS	15995.93	4395.29	4409.70	4408.40	4411.84	0.003282	13.36	1849.75	278.62	0.70
Truckee	Upper	30210		Lat Struct									
Truckee	Upper	29931.50	Max WS	15797.09	4395.12	4409.40	4406.48	4410.80	0.002180	9.55	1711.32	229.32	0.56
Truckee	Upper	29640		Lat Struct									
Truckee	Upper	29635.26	Max WS	15241.84	4395.29	4409.15	4404.75	4410.35	0.001478	8.83	1824.42	202.64	0.48
Truckee	Upper	29422.51	Max WS	14757.19	4394.80	4408.84	4404.60	4410.09	0.001624	9.00	1694.04	188.73	0.49
Truckee	Upper	29164.29	Max WS	14806.22	4394.35	4408.28	4404.78	4409.63	0.001943	9.41	1695.26	222.67	0.53
Truckee	Upper	29163		Lat Struct									
Truckee	Upper	28986.09	Max WS	15388.79	4393.99	4407.34	4405.45	4409.06	0.003369	10.53	1475.99	211.55	0.68
Truckee	Upper	28777.22	Max WS	15627.45	4393.67	4406.72	4404.27	4408.37	0.002761	10.30	1521.43	186.42	0.63
Truckee	Upper	28562		Lat Struct									
Truckee	Upper	28561.76	Max WS	15976.09	4395.17	4406.01	4403.41	4407.70	0.002729	10.43	1532.02	176.95	0.62
Truckee	Upper	28334.18	Max WS	16370.10	4392.03	4404.76	4402.79	4406.91	0.003541	11.76	1391.54	162.68	0.71
Truckee	Upper	28333		Lat Struct									
Truckee	Upper	28079.65	Max WS	12422.54	4390.18	4404.21	4400.60	4405.32	0.001847	8.44	1476.30	177.10	0.51
Truckee	Upper	28078		Lat Struct									
Truckee	Upper	27953.75 BREACH, DA 5	Max WS	15735.84	4389.03	4404.28	4401.66	4405.77	0.002588	9.79	1608.08	197.67	0.60
Truckee	Upper	27840.41	Max WS	13941.96	4389.25	4404.88	4400.79	4405.82	0.001439	7.78	1792.12	196.79	0.45
Truckee	Upper	27679.10	Max WS	13942.08	4389.66	4404.20	4400.65	4405.55	0.001993	9.32	1495.54	158.73	0.54
Truckee	Upper	27678		Lat Struct									
Truckee	Upper	27571.37	Max WS	13941.26	4389.96	4404.16	4400.36	4405.34	0.001752	8.72	1598.74	171.07	0.50
Truckee	Upper	27427.44	Max WS	13942.43	4389.94	4404.27	4399.64	4405.13	0.001252	7.44	1874.83	196.86	0.42
Truckee	Upper	27282.45	Max WS	13940.24	4389.77	4403.86	4400.10	4404.92	0.001641	8.23	1696.41	191.03	0.48
Truckee	Upper	27281		Lat Struct									
Truckee	Upper	27150.44	Max WS	13919.38	4388.53	4403.59	4399.97	4404.73	0.001696	8.78	1794.01	231.95	0.50
Truckee	Upper	27011.59	Max WS	13750.82	4387.12	4403.47	4398.06	4404.55	0.001222	8.55	1962.74	273.06	0.43
Truckee	Upper	27010		Lat Struct									
Truckee	Upper	26854.46	Max WS	13724.45	4383.89	4403.06	4397.46	4404.32	0.001376	9.02	1536.11	144.24	0.46
Truckee	Upper	26853		Lat Struct									
Truckee	Upper	26711.46	Max WS	13618.35	4385.19	4403.19	4397.01	4404.16	0.001062	7.93	1724.42	151.01	0.40
Truckee	Upper	26588.41	Max WS	13428.11	4388.57	4402.75	4398.49	4404.03	0.001739	9.10	1513.17	197.26	0.50
Truckee	Upper	26465.88	Max WS	13512.64	4387.79	4402.36	4398.06	4403.81	0.001787	9.71	1472.21	201.48	0.52
Truckee	Upper	26464		Lat Struct									
Truckee	Upper	26319.22	Max WS	13905.67	4386.90	4402.40	4397.34	4403.50	0.001291	8.47	1788.02	223.92	0.44
Truckee	Upper	26167.21	Max WS	14055.52	4387.37	4401.57	4398.15	4403.21	0.002424	10.27	1380.00	162.01	0.59
Truckee	Upper	26056.23	Max WS	14295.51	4387.75	4401.28	4397.88	4402.89	0.002276	10.18	1410.42	149.63	0.57
Truckee	Upper	25935.87	Max WS	14804.20	4388.06	4401.44	4396.95	4402.57	0.001520	8.53	1813.67	213.54	0.47
Truckee	Upper	25800		Bridge									
Truckee	Upper	25787.10	Max WS	14802.25	4388.53	4400.62	4397.04	4401.93	0.001936	9.21	1632.21	192.38	0.53
Truckee	Upper	25786		Lat Struct									
Truckee	Upper	25785		Lat Struct									
Truckee	Upper	25685.79	Max WS	14755.69	4388.68	4400.58	4396.79	4401.75	0.001676	8.67	1702.68	178.98	0.49
Truckee	Upper	25557.57	Max WS	14770.71	4387.96	4400.76	4395.76	4401.57	0.001073	7.20	2068.46	216.78	0.40
Truckee	Upper	25320.47	Max WS	14756.25	4387.57	4400.42	4395.59	4401.30	0.001180	7.54	1957.40	194.56	0.42
Truckee	Upper	25319		Lat Struct									
Truckee	Upper	25043.05	Max WS	14045.45	4387.15	4398.71	4396.90	4400.66	0.003221	11.40	1385.35	208.76	0.68
Truckee	Upper	24897.16	Max WS	14695.31	4386.65	4399.36	4394.59	4400.26	0.001129	7.79	2163.35	283.09	0.42
Truckee	Upper	24750		Lat Struct									
Truckee	Upper	24749.13	Max WS	14689.17	4384.93	4399.43	4393.93	4400.09	0.000800	6.69	2552.37	325.73	0.35
Truckee	Upper	24558.96	Max WS	13812.85	4384.15	4399.00	4393.58	4399.91	0.001033	7.89	2185.53	316.18	0.40
Truckee	Upper	24373.14	Max WS	13388.56	4383.85	4398.63	4393.46	4399.71	0.001297	8.36	1685.96	227.01	0.44
Truckee	Upper	24232.12	Max WS	12934.54	4383.83	4398.35	4394.14	4399.51	0.001663	8.69	1566.24	212.22	0.49
Truckee	Upper	24231		Lat Struct									
Truckee	Upper	24094.85	Max WS	12600.35	4383.54	4398.32	4392.78	4399.35	0.001209	8.13	1587.90	188.00	0.43
Truckee	Upper	23903.66	Max WS	12552.97	4382.63	4398.49	4392.24	4399.18	0.000800	6.65	1963.97	228.92	0.35
Truckee	Upper	23902		Lat Struct									
Truckee	Upper	23764.74	Max WS	12284.70	4381.92	4398.53	4391.38	4399.10	0.000623	6.05	2104.37	222.73	0.31
Truckee	Upper	23610		Lat Struct									
Truckee	Upper	23609.90	Max WS	12154.83	4382.24	4398.54	4390.56	4399.02	0.000510	5.57	2205.94	232.52	0.28
Truckee	Upper	23433.78	Max WS	11908.25	4382.19	4398.04	4392.28	4398.87	0.001114	7.27	1641.34	169.70	0.40
Truckee	Upper	23264		Lat Struct									
Truckee	Upper	23263.74	Max WS	11955.49	4382.02	4398.22	4391.40	4398.72	0.000610	5.68	2149.45	211.94	0.30
Truckee	Upper	23112.71	Max WS	11837.54	4379.64	4398.22	4389.63	4398.66	0.000411	5.49	2580.07	259.65	0.26
Truckee	Upper	22944.66	Max WS	11674.53	4372.73	4398.18	4388.41	4398.59	0.000438	5.43	2597.37	232.46	0.26
Truckee	Upper	22690		Lat Struct									

HEC-RAS Plan: CE Locations: User Defined Profile: Max WS (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Truckee	Upper	22688.58	Max WS	11566.18	4376.68	4398.18	4386.96	4398.48	0.000267	4.41	2736.29	269.52	0.21
Truckee	Upper	22687		Lat Struct									
Truckee	Upper	22503.45	Max WS	11501.61	4376.76	4397.82	4389.05	4398.40	0.000699	6.15	1870.57	173.00	0.32
Truckee	Upper	22335.52	Max WS	11374.10	4380.32	4397.64	4389.59	4398.27	0.000669	6.40	1887.85	222.64	0.32
Truckee	Upper	22334		Lat Struct									
Truckee	Upper	22176.73	Max WS	11495.35	4381.25	4397.78	4389.01	4398.18	0.000408	5.11	2359.94	228.49	0.25
Truckee	Upper	22100		Lat Struct									
Truckee	Upper	21976		Lat Struct									
Truckee	Upper	21975.48	Max WS	11423.98	4380.20	4397.86	4387.92	4398.12	0.000236	4.09	2913.32	287.61	0.19
Truckee	Upper	21817.75	Max WS	11030.25	4375.33	4397.91	4386.34	4398.10	0.000161	3.56	3481.86	372.53	0.16
Truckee	Upper	21650.04	Max WS	10552.56	4369.79	4397.90	4384.63	4398.09	0.000160	3.52	3444.37	447.64	0.16
Truckee	Upper	21440		Lat Struct									
Truckee	Upper	21438.30	Max WS	10240.38	4370.18	4397.86	4383.94	4398.06	0.000171	3.62	3098.63	338.07	0.16
Truckee	Upper	21263.33	Max WS	9862.23	4369.31	4397.86	4384.59	4398.05	0.000150	3.47	3188.56	323.25	0.15
Truckee	Upper	21091.93	Max WS	9621.75	4372.20	4397.81	4385.72	4398.03	0.000199	3.82	2734.99	279.06	0.17
Truckee	Upper	21090		Lat Struct									
Truckee	Upper	20880		Lat Struct									
Truckee	Upper	20879.99	Max WS	9227.63	4378.44	4397.75	4386.16	4398.00	0.000229	4.01	2503.03	244.80	0.19
Truckee	Upper	20652.04	Max WS	9187.36	4378.31	4397.70	4386.00	4397.95	0.000198	4.03	2599.01	270.21	0.18
Truckee	Upper	20349.62	Max WS	9330.68	4377.52	4397.61	4385.93	4397.88	0.000232	4.26	2558.24	289.02	0.19
Truckee	Upper	20102.60	Max WS	9533.76	4377.83	4397.55	4385.46	4397.81	0.000213	4.14	2632.91	285.11	0.18
Truckee	Upper	19871.73	Max WS	9743.04	4377.12	4397.54	4385.19	4397.75	0.000178	3.78	2875.88	302.43	0.17
Truckee	Upper	19800		Lat Struct									
Truckee	Upper	19646.39	Max WS	9808.47	4377.26	4397.46	4384.84	4397.70	0.000204	3.97	2505.78	183.06	0.18
Truckee	Upper	19428.21	Max WS	9821.20	4376.72	4397.46	4384.96	4397.66	0.000173	3.65	2774.16	220.51	0.16
Truckee	Upper	19173.34	Max WS	9637.72	4376.91	4397.46	4383.86	4397.63	0.000128	3.30	3024.84	216.56	0.14
Truckee	Upper	19172		Lat Struct									
Truckee	Upper	18915.19	Max WS	9284.65	4376.57	4397.45	4384.17	4397.61	0.000135	3.22	2964.95	221.09	0.15
Truckee	Upper	18690.00	Max WS	8944.89	4376.25	4397.46	4383.25	4397.59	0.000097	2.91	3301.19	264.01	0.13
Truckee	Upper	18488.74	Max WS	8606.86	4374.60	4397.48	4381.91	4397.58	0.000069	2.61	3555.44	273.74	0.11
Truckee	Upper	18286.70	Max WS	8213.43	4373.39	4397.46	4381.99	4397.58	0.000076	2.76	3256.87	262.78	0.11
Truckee	Upper	18285		Lat Struct									
Truckee	Upper	18117.31	Max WS	8001.39	4374.53	4397.43	4382.46	4397.57	0.000099	2.98	2751.18	204.88	0.13
Truckee	Upper	17966.96	Max WS	7840.35	4375.43	4397.47	4381.72	4397.56	0.000060	2.43	3324.61	212.72	0.10
Truckee	Upper	17774.81	Max WS	7472.06	4373.62	4397.49	4380.22	4397.56	0.000038	2.01	3961.73	278.01	0.08
Truckee	Upper	17595.00	Max WS	7220.65	4373.77	4397.47	4381.27	4397.55	0.000050	2.31	3355.49	240.36	0.10
Truckee	Upper	17594		Lat Struct									
Truckee	Upper	17433.06	Max WS	7103.82	4372.61	4397.45	4380.43	4397.55	0.000060	2.60	2997.22	231.82	0.11
Truckee	Upper	17232.01	Max WS	7005.59	4374.24	4397.45	4380.33	4397.54	0.000051	2.46	3136.87	239.68	0.10
Truckee	Upper	17231		Lat Struct									
Truckee	Upper	17030.21	Max WS	6971.96	4373.29	4397.44	4379.64	4397.53	0.000045	2.36	3064.42	183.02	0.09
Truckee	Upper	16794.88	Max WS	6849.78	4368.74	4397.43	4377.40	4397.52	0.000047	2.37	2940.15	173.46	0.09
Truckee	Upper	16620.83	Max WS	6651.52	4363.54	4397.44	4374.00	4397.52	0.000036	2.25	3111.42	183.27	0.08
Truckee	Upper	16452.05	Max WS	6375.26	4366.80	4397.46	4375.33	4397.52	0.000031	2.03	3219.66	167.01	0.08
Truckee	Upper	16306.12	Max WS	6131.94	4371.39	4397.46	4378.09	4397.52	0.000032	2.03	3124.64	173.15	0.08
Truckee	Upper	16122.58 BREACH, DA 6	Max WS	5942.92	4372.50	4397.44	4379.15	4397.52	0.000041	2.23	2761.62	157.73	0.09
Truckee	Upper	15922		Lat Struct									
Truckee	Upper	15921.59	Max WS	6313.43	4372.27	4397.41	4379.26	4397.50	0.000058	2.33	2752.61	192.65	0.10
Truckee	Upper	15770		Lat Struct									
Truckee	Upper	15769.99	Max WS	6226.30	4371.53	4397.42	4378.14	4397.49	0.000041	2.13	2953.34	172.58	0.09
Truckee	Upper	15528.35	Max WS	6387.39	4372.10	4397.40	4378.25	4397.48	0.000039	2.22	3016.90	195.99	0.09
Truckee	Upper	15300.51	Max WS	6603.52	4370.80	4397.38	4378.71	4397.46	0.000049	2.40	2953.82	198.98	0.10
Truckee	Upper	15249		Lat Struct									
Truckee	Upper	15130	Max WS	7132.06	4369.11	4397.37	4377.42	4397.44	0.000040	2.26	3416.71	219.59	0.09
Truckee	Upper	14990	Max WS	6969.52	4369.11	4397.36	4377.33	4397.44	0.000037	2.21	3416.38	219.59	0.08
Truckee	Upper	14768		Lat Struct									
Truckee	Upper	14767.08	Max WS	6799.50	4372.88	4397.34	4379.72	4397.44	0.000054	2.48	2830.27	169.96	0.10
Truckee	Upper	14544.98	Max WS	6798.04	4372.59	4397.34	4379.09	4397.43	0.000043	2.29	3094.77	202.26	0.09
Truckee	Upper	14538		Lat Struct									
Truckee	Upper	14346.78	Max WS	6760.81	4371.78	4397.33	4378.83	4397.42	0.000051	2.38	2917.48	181.78	0.10
Truckee	Upper	14204		Lat Struct									
Truckee	Upper	14202.16	Max WS	6768.41	4370.74	4397.33	4378.28	4397.41	0.000043	2.22	3131.28	182.86	0.09
Truckee	Upper	14202		Lat Struct									
Truckee	Upper	14023.34	Max WS	6830.78	4371.79	4397.32	4378.05	4397.40	0.000041	2.24	3123.20	169.44	0.09
Truckee	Upper	13849.40	Max WS	6925.27	4371.38	4397.32	4377.68	4397.39	0.000040	2.22	3211.78	180.13	0.09
Truckee	Upper	13842		Lat Struct									
Truckee	Upper	13690.82	Max WS	7250.01	4371.44	4397.30	4378.04	4397.38	0.000044	2.27	3315.36	189.51	0.09
Truckee	Upper	13518.64	Max WS	7900.65	4371.55	4397.25	4378.73	4397.35	0.000063	2.57	3161.10	185.02	0.10
Truckee	Upper	13390.04	Max WS	8700.01	4370.93	4397.22	4378.52	4397.33	0.000059	2.61	3434.11	186.41	0.10
Truckee	Middle	13313.60	Max WS	9255.35	4370.55	4397.22	4378.55	4397.36	0.000087	2.94	3286.43	182.19	0.11
Truckee	Middle	13261.42 BREACH, DA 7	Max WS	9257.11	4370.83	4397.21	4378.59	4397.35	0.000102	2.98	3173.45	183.87	0.12
Truckee	Middle	13260		Lat Struct									
Truckee	Middle	13250		Lat Struct									
Truckee	Middle	13144.50	Max WS	9599.90	4370.98	4397.16	4378.83	4397.33	0.000112	3.27	3067.45	185.80	0.13
Truckee	Middle	13012.33	Max WS	11330.86	4370.61	4397.06	4379.10	4397.26	0.000130	3.60	3325.25	199.85	0.14
Truckee	Middle	12883.59	Max WS	13809.63	4370.53	4396.98	4379.68	4397.17	0.000127	3.71	4377.10	270.97	0.14
Truckee	Middle	12793.06	Max WS	15832.71	4370.29	4396.89	4380.41	4397.12	0.000154	4.00	4695.13	289.53	0.15
Truckee	Lower	12674.60	Max WS	21370.51	4370.03	4396.89	4382.67	4397.24	0.000469	4.81	4636.32	296.72	0.20
Truckee	Lower	12671	Max WS	21370.23	4371.11	4396.97	4381.22	4397.24	0.000290	4.15	5365.34	305.95	0.16
Truckee	Lower	12670		Lat Struct									
Truckee	Lower	12559.40	Max WS	21369.49	4370.36	4396.77	4381.54	4397.20	0.000518	5.25	4161.60	236.74	0.21
Truckee	Lower	12558		Lat Struct									
Truckee	Lower	12411.23	Max WS	21508.96	4370.27	4396.63	4381.54	4397.12	0.000537	5.65	3967.36	214.57	0.21
Truckee	Lower	12291		Lat Struct									
Truckee	Lower	12290.45	Max WS	21527.44	4370.05	4396.58	4381.25	4397.05	0.000512	5.52	4000.24	205.61	0.21
Truckee	Lower	12194.80	Max WS	21545.38	4369.80	4396.53	4380.97	4397.00	0.000502	5.49	4013.04	203.98	0.21
Truckee	Lower	12052.52	Max WS	21586.63	4369.62	4396.20	4382.36	4396.91	0.000875	6.79	3290.65	195.27	0.27
Truckee	Lower	11921.75	Max WS	21690.11	4370.70	4396.07	4383.01	4396.79	0.000887	6.87	3292.42	194.03	0.27
Truckee	Lower	11900		Lat Struct									
Truckee	Lower	11819.83	Max WS	21723.34	4371.05	4395.90	4383.43	4396.69	0.001022	7.23	3152.20	193.57	0.29
Truckee	Lower	11704.35	Max WS	21733.76	4371.00	4395.81	4383.01	4396.58	0.000901	7.14	3238.60	198.86	0.27
Truckee	Lower	11617.76	Max WS	21734.17	4371.36	4395.80	4382.83	4396.50	0.000869	6.75	3364.08	204.82	0.27
Truckee	Lower	11496.09	Max WS	21733.35	4370.87	4395.72	4382.38	4396.40	0.000850	6.74	3530.25	238.77	0.26
Truckee	Lower	11383.49	Max WS	21732.12	4369.62	4395.68	4382.46	4396.31	0.000771	6.58	3807.81	286.80	0.25
Truckee	Lower	11234.17	Max WS	21734.46	4367.92	4395.55	4382.40	4396.20	0.000757	6.63	3741.47	285.92	0.25
Truckee	Lower	11233		Lat Struct									
Truckee	Lower	11083.70	Max WS	21737.19	4368.21	4395.69	4380.26	4396.07	0.000414	5.01	4608.29	295.34	0.19
Truckee	Lower	10929.09	Max WS	21749.08	4367.43	4395.59	4380.21	4396.01	0.000467	5.28	4462.04	285.33	0.20
Truckee	Lower	10738.99	Max WS	21879.69	4367.66	4395.17	4382.92	4395.88	0.000980	6.76	3326.23	210.37	0.28
Truckee	Lower	10562.53	Max WS	22018.93	4368.91	4395.22	4380.20	4395.73	0.000548	5.75	4289.73	302.80	0.22
Truckee	Lower	10411.34	Max WS	22051.37	4369.82	4395.00	4381.02	4395.65	0.000737	6.55	4030.89	332.88	0.25
Truckee	Lower	10237.23	Max WS	22123.21	4370.52	4395.04	4380.58	4395.51	0.000522	5.55	4454.42	329.97	0.21
Truckee	Lower	10054.85	Max WS	22256.63	4371.06	4394.97	4380.56	4395.41	0.000497	5.39	4976.29	375.94	0.21
Truckee	Lower	10054		Lat Struct									
Truckee	Lower	9901.465	Max WS	22629.05	4370.32	4394.86	4380.58	4395.33	0.000537	5.56	5120.32	432.29	0.21
Truckee	Lower	9759.033	Max WS	22628.15	4368.55	4394.67	4382.09	4395.27	0.000772	6.42	4880.47	505.36	0.25
Truckee	Lower	9758		Lat Struct									
Truckee	Lower	9584.751	Max WS	22628.38	4368.42	4394.49	4381.52	4395.15	0.000770	6.68	4809.75	525.65	0.26

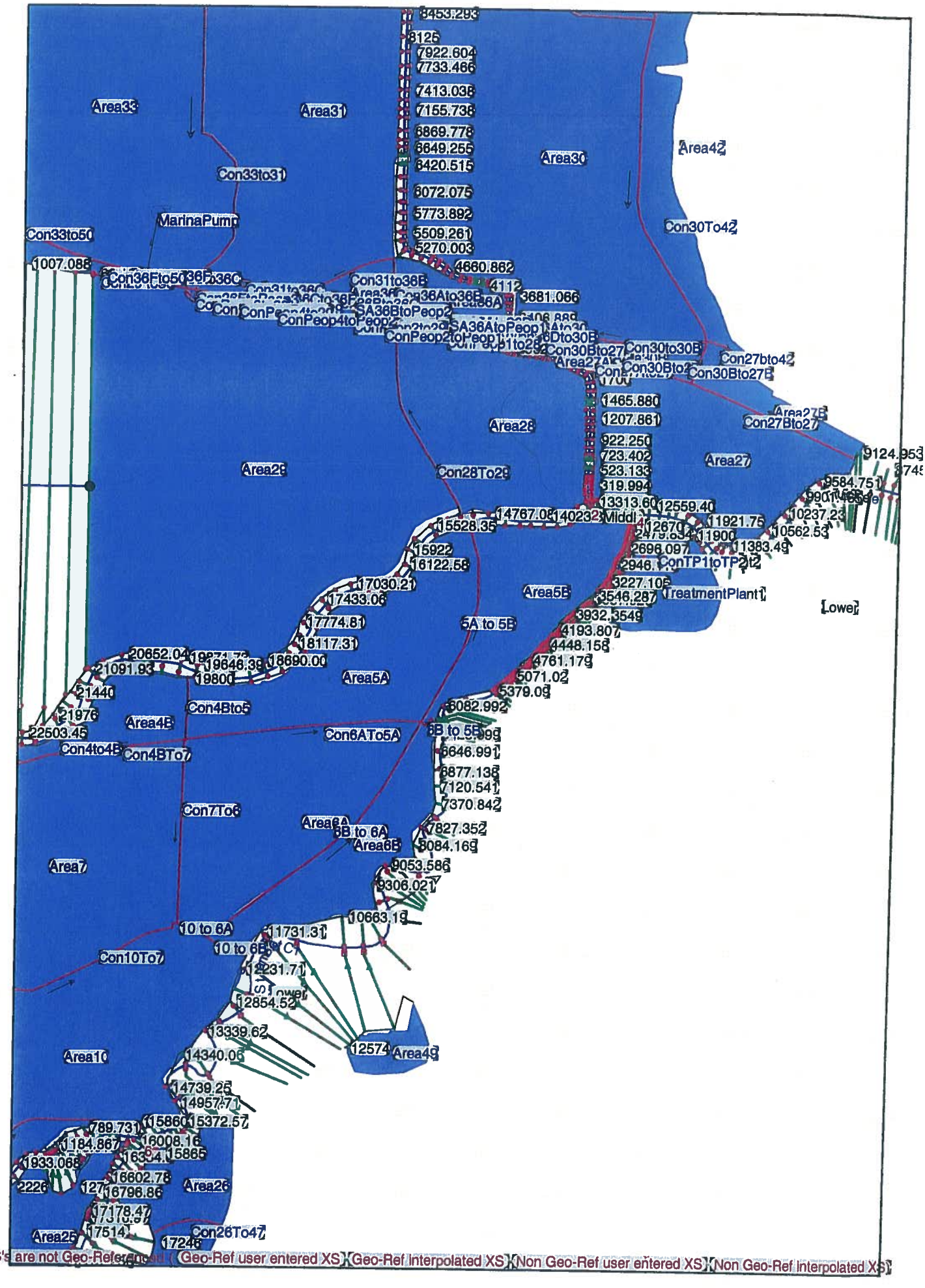
HEC-RAS Plan: CE Locations: User Defined Profile: Max WS (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Truckee	Lower	9385.354	Max WS	22736.97	4366.47	4394.37	4380.38	4394.98	0.000674	6.36	4779.07	536.87	0.24
Truckee	Lower	9234.001	Max WS	22741.42	4367.49	4394.13	4380.83	4394.88	0.000920	6.97	3499.03	395.17	0.28
Truckee	Lower	9124.953	Max WS	22786.39	4369.21	4394.26	4380.53	4394.78	0.000665	6.12	4647.52	624.56	0.24
Truckee	Lower	9064.256	Max WS	22785.39	4369.75	4394.21	4381.01	4394.75	0.000686	6.23	4597.29	522.86	0.24
Truckee	Lower	8898.097	Max WS	22785.82	4369.56	4394.09	4381.16	4394.62	0.000700	6.10	4355.49	446.92	0.24
Truckee	Lower	8745.655	Max WS	22784.83	4369.86	4393.97	4380.17	4394.52	0.000630	6.03	4448.60	677.15	0.23
Truckee	Lower	8617.348	Max WS	22784.66	4369.81	4393.89	4380.19	4394.43	0.000639	5.97	5127.80	668.91	0.23
Truckee	Lower	8490.330	Max WS	22785.39	4368.41	4393.72	4380.69	4394.38	0.000790	6.62	4971.00	645.35	0.25
Truckee	Lower	8388.340	Max WS	22785.28	4368.13	4393.64	4380.77	4394.29	0.000840	6.65	4882.53	625.30	0.26
Truckee	Lower	8228.509	Max WS	22785.26	4368.59	4393.45	4380.71	4394.17	0.000905	6.91	4458.36	530.95	0.27
Truckee	Lower	8090.012	Max WS	22784.86	4369.30	4393.38	4380.35	4394.03	0.000837	6.53	4385.41	458.53	0.25
Truckee	Lower	7961.973	Max WS	22784.38	4370.81	4393.23	4380.85	4393.92	0.000886	6.73	4001.97	388.13	0.26
Truckee	Lower	7820.225	Max WS	22785.70	4370.69	4393.11	4380.91	4393.79	0.000869	6.66	3971.51	384.56	0.26
Truckee	Lower	7664.775	Max WS	22785.35	4369.87	4392.74	4381.71	4393.66	0.001268	7.75	3455.98	344.19	0.32
Truckee	Lower	7511.357	Max WS	22785.29	4370.35	4392.61	4381.51	4393.46	0.001174	7.48	3634.73	377.87	0.31
Truckee	Lower	7406.445	Max WS	22784.73	4370.61	4392.61	4380.92	4393.33	0.000987	6.85	3526.73	254.36	0.28
Truckee	Lower	7258.546	Max WS	22784.53	4369.69	4392.33	4381.10	4393.21	0.000741	7.54	3070.17	193.50	0.31
Truckee	Lower	7131.793	Max WS	22784.68	4366.08	4391.73	4380.92	4393.10	0.001060	9.40	2423.82	142.46	0.38
Truckee	Lower	6976.285	Max WS	22784.68	4362.56	4391.39	4380.07	4392.96	0.000933	10.10	2345.03	170.33	0.37
Truckee	Lower	6887.051	Max WS	22784.62	4364.70	4391.51	4380.29	4392.87	0.000849	9.41	2548.40	200.34	0.35
Truckee	Lower	6812.174	Max WS	22784.95	4367.65	4391.23	4382.17	4392.81	0.001173	10.17	2395.51	213.20	0.40
Truckee	Lower	6735.577	Max WS	22784.63	4368.69	4391.12	4382.96	4392.69	0.001517	10.06	2265.77	171.85	0.45
Truckee	Lower	6682.363	Max WS	22784.47	4369.92	4390.82	4383.31	4392.63	0.001476	10.86	2198.87	207.51	0.45
Truckee	Lower	6650		Bridge									
Truckee	Lower	6619.967	Max WS	22784.76	4370.68	4390.75	4383.75	4392.55	0.001175	10.83	2236.09	173.45	0.46
Truckee	Lower	6489.055	Max WS	22784.68	4369.60	4390.70	4383.10	4392.41	0.001030	10.57	2294.77	155.57	0.44
Truckee	Lower	6327.249	Max WS	22784.86	4368.98	4390.49	4382.84	4392.22	0.001086	10.54	2164.55	181.30	0.44
Truckee	Lower	6216.105	Max WS	22784.66	4369.52	4390.37	4382.51	4392.11	0.000988	10.58	2184.53	182.48	0.43
Truckee	Lower	6088.776	Max WS	22784.75	4369.16	4389.97	4383.14	4391.98	0.001203	11.40	2046.31	178.61	0.48
Truckee	Lower	6033.843	Max WS	22784.50	4369.03	4389.84	4383.64	4391.91	0.001335	11.55	1995.46	179.74	0.50
Truckee	Lower	5839.856	Max WS	22784.46	4367.29	4389.82	4382.29	4391.87	0.001187	11.49	1990.08	171.20	0.47
Truckee	Lower	5504.302	Max WS	22784.47	4370.47	4389.57	4383.22	4391.38	0.001692	10.79	2111.38	162.17	0.53
Truckee	Lower	5109.454	Max WS	22784.10	4370.22	4389.00	4382.92	4390.76	0.001480	10.66	2188.60	180.38	0.50
Truckee	Lower	4605.342	Max WS	22783.55	4368.63	4388.16	4381.78	4390.01	0.001490	10.92	2110.82	197.70	0.50
Truckee	Lower	4107.256	Max WS	22783.71	4367.80	4387.94	4380.40	4389.35	0.001112	9.56	2519.15	272.93	0.44
Truckee	Lower	3601.522	Max WS	22784.05	4368.40	4387.77	4379.41	4388.84	0.000816	8.37	3021.91	385.86	0.38
Truckee	Lower	3078.293	Max WS	22783.61	4368.17	4387.34	4379.22	4388.44	0.000788	8.57	3122.73	327.92	0.37
Truckee	Lower	2470.082	Max WS	22783.89	4366.87	4386.54	4379.55	4387.85	0.001127	9.23	2546.46	224.28	0.44
Truckee	Lower	1970.402	Max WS	22783.67	4367.95	4384.46	4380.69	4387.08	0.002248	12.99	1771.75	137.63	0.62
Truckee	Lower	1472.411	Max WS	22783.45	4366.78	4383.65	4379.52	4386.04	0.001939	12.44	1888.30	151.66	0.58
Truckee	Lower	1331.88*	Max WS	22783.48	4366.91	4383.87	4378.72	4385.63	0.001388	10.69	2234.13	177.92	0.50
Truckee	Lower	1191.36*	Max WS	22783.57	4367.04	4383.79	4378.39	4385.34	0.001270	10.32	2524.52	202.64	0.48
Truckee	Lower	1050.84*	Max WS	22783.20	4367.18	4383.80	4377.67	4385.04	0.000976	9.23	2830.01	227.18	0.42
Truckee	Lower	910.317*	Max WS	22783.49	4367.31	4383.81	4377.16	4384.81	0.000786	8.25	3137.56	251.68	0.38
Truckee	Lower	769.794	Max WS	22783.14	4367.44	4383.80	4376.49	4384.63	0.000650	7.50	3438.94	276.20	0.34
Truckee	Lower	731.462*	Max WS	22782.92	4365.94	4383.73	4376.05	4384.61	0.000626	7.81	3402.36	309.47	0.34
Truckee	Lower	693.131*	Max WS	22783.04	4364.45	4383.53	4375.68	4384.62	0.000700	8.68	3086.27	355.71	0.37
Truckee	Lower	654.800*	Max WS	22782.78	4362.96	4383.30	4375.73	4384.63	0.000797	9.68	2783.58	840.30	0.40
Truckee	Lower	650		Bridge									
Truckee	Lower	616.469	Max WS	22782.74	4361.46	4380.36	4375.77	4383.13	0.001862	14.06	1892.70	691.40	0.60
Truckee	Lower	452.031*	Max WS	22782.35	4363.00	4381.36	4375.63	4382.42	0.000866	9.16	3851.74	523.79	0.41
Truckee	Lower	287.593*	Max WS	22782.81	4364.53	4381.25	4376.09	4382.17	0.000879	8.50	3803.90	389.62	0.40
Truckee	Lower	123.156	Max WS	22782.95	4366.07	4381.06	4376.44	4381.96	0.000973	8.44	3818.21	403.92	0.41
TruckeeOverbank	Overland	14235.67	Max WS	2.00	4436.25	4437.12	4425.50	4437.12	0.000024	0.04	50.48	82.29	0.01
TruckeeOverbank	Overland	14126.57	Max WS	322.66	4430.29	4437.02	4433.57	4437.03	0.001406	0.56	531.52	254.19	0.07
TruckeeOverbank	Overland	13988.16	Max WS	321.24	4430.10	4436.89	4433.48	4436.89	0.000433	0.34	890.48	382.23	0.04
TruckeeOverbank	Overland	13840.51	Max WS	846.43	4433.10	4436.43	4434.45	4436.44	0.004863	1.07	792.33	500.24	0.14
TruckeeOverbank	Overland	13708.67	Max WS	843.42	4432.06	4435.85	4433.71	4435.86	0.003444	0.82	1030.10	615.37	0.11
TruckeeOverbank	Overland	13522.07	Max WS	841.46	4431.05	4434.46	4432.52	4434.49	0.011625	1.27	664.31	512.44	0.20
TruckeeOverbank	Overland	13290.35	Max WS	840.62	4427.53	4432.66	4428.89	4432.69	0.003611	1.44	582.25	152.58	0.13
TruckeeOverbank	Overland	12967.18	Max WS	494.78	4427.52	4431.98	4427.94	4431.98	0.000177	0.31	1600.20	455.62	0.03
TruckeeOverbank	Overland	12606.02	Max WS	285.48	4428.35	4430.09	4429.22	4430.11	0.011904	0.99	291.12	398.86	0.19
TruckeeOverbank	Overland	12261.51	Max WS	285.41	4425.15	4428.21	4426.13	4428.21	0.000726	0.42	687.44	351.57	0.05
TruckeeOverbank	Overland	12039.35	Max WS	285.14	4425.17	4428.10	4426.32	4428.10	0.000336	0.24	1184.77	773.11	0.03
TruckeeOverbank	Overland	11840.18	Max WS	279.45	4425.04	4426.30	4425.77	4426.31	0.021889	1.03	270.41	466.24	0.24
TruckeeOverbank	Overland	11542.32	Max WS	47.27	4421.54	4422.96	4422.16	4422.96	0.007634	0.38	124.44	426.81	0.12
TruckeeOverbank	Overland	11124.42	Max WS	47.23	4420.56	4421.14	4420.77	4421.14	0.005120	0.32	146.86	480.60	0.10
TruckeeOverbank	Overland	10680.17	Max WS	47.32	4418.81	4419.93	4419.43	4419.93	0.002565	0.24	198.12	602.84	0.07
TruckeeOverbank	Overland	10227.45	Max WS	47.27	4417.19	4418.05	4417.68	4418.06	0.012958	0.47	101.49	382.23	0.16
TruckeeOverbank	Overland	9971.609	Max WS	34.68	4416.37	4417.09	4416.67	4417.09	0.000830	0.14	247.54	719.29	0.04
TruckeeOverbank	Overland	9655.103	Max WS	47.23	4414.62	4415.30	4415.02	4415.30	0.053246	0.78	60.35	301.18	0.31
TruckeeOverbank	Overland	9367.660	Max WS	47.17	4411.88	4413.61	4412.45	4413.61	0.002563	0.33	143.63	270.60	0.08
TruckeeOverbank	Overland	9300.865	Max WS	47.21	4412.53	4413.32	4412.97	4413.33	0.010799	0.55	85.23	215.88	0.16
TruckeeOverbank	Overland	9139.340	Max WS	46.68	4411.31	4412.74	4411.72	4412.74	0.000442	0.13	366.97	768.37	0.03
TruckeeOverbank	Overland	8851.320	Max WS	476.39	4409.88	4412.36	4410.66	4412.36	0.002123	0.49	976.56	882.55	0.08
TruckeeOverbank	Overland	8410.757	Max WS	475.67	4408.97	4411.83	4409.81	4411.83	0.000271	0.18	2669.68	2339.72	0.03
TruckeeOverbank	Overland	7928.016	Max WS	721.84	4408.37	4411.10	4409.91	4411.10	0.003596	0.47	1538.61	2420.17	0.10
TruckeeOverbank	Overland	7546.727	Max WS	722.16	4404.90	4409.77	4408.78	4409.77	0.004449	0.57	1259.58	1555.16	0.11
TruckeeOverbank	Overland	7058.409	Max WS	281.45	4406.45	4408.39	4406.81	4408.40	0.000178	0.13	2129.92	2132.49	0.02
TruckeeOverbank	Overland	6635.819	Max WS	721.57	4405.42	4407.07	4406.33	4407.07	0.003155	0.41	1749.32	2740.41	0.09
TruckeeOverbank	Overland	6378.595	Max WS	723.88	4403.80	4405.82	4404.50	4405.83	0.007424	0.74	977.04	1207.49	0.15
TruckeeOverbank	Overland	6176.761	Max WS	724.14	4399.80	4405.05	4403.26	4405.05	0.000722	0.31	2328.39	1838.51	0.05
TruckeeOverbank	Overland	5968.443	Max WS	724.06	4399.07	4404.83	4403.13	4404.83	0.001546	0.37	1948.00	2082.94	0.07
TruckeeOverbank	Overland	5769.313	Max WS	723.25	4398.29	4404.56	4401.84	4404.56	0.001536	0.37	1949.80	2082.80	0.07
TruckeeOverbank	Overland	5543.388	Max WS	723.41	4399.67	4404.33	4402.07	4404.33	0.000709	0.27	2724.59	2694.43	0.05
TruckeeOverbank	Overland	5302.488	Max WS	722.96	4399.87	4404.22	4401.80	4404.22	0.000267	0.17	4242.11	3929.98	0.03
TruckeeOverbank	Overland	5101.605	Max WS	3168.11	4399.22	4403.78	4401.61	4403.79	0.003919	0.76	4192.63	3107.91	0.11
TruckeeOverbank	Overland	4892.228	Max WS	3167.30	4399.04	4403.18	4400.78	4403.18	0.002021	0.58	5423.83	3607.48	0.08
TruckeeOverbank	Overland	4662.692	Max WS	3167.64	4398.69	4402.72	4400.73	4402.73	0.001997	0.58	5450.59	3612.78	0.08
TruckeeOverbank	Overland	4439.153	Max WS	3167.46	4398.51	4402.31	4400.32	4402.32	0.001686	0.52	6056.15	4148.65	0.08
TruckeeOverbank	Overland	4301.524	Max WS	3166.39	4396.17	4402.11	4399.59	4402.12	0.001252	0.46	6911.64	4620.96	0.07
TruckeeOverbank	Overland	4102.733	Max WS	3167.39	4395.50	4401.93	4398.10	4401.93	0.000667	0.38	8285.86	4531.84	0.05
TruckeeOverbank	Overland	3798.135	Max WS	3172.68	4394.92	4401.62	4398.27	4401.63	0.001300	0.57	5554.72	2739.90	0.07
TruckeeOverbank	Overland	3454.614	Max WS	3416.71	4395.54	4401.08	4398.45	4401.08	0.001857	0.68	5046.39	2520.47	0.08
TruckeeOverbank	Overland	3301.217	Max WS	2591.52	4396.32	4400.78	4398.36	4400.79	0.001896	0.65	4017.19	2186.96	0.08
TruckeeOverbank	Overland	3114.211	Max WS	2465.33	4396.76	4400.05	4397.89	4400.05	0.001575	0.52	4724.90	3089.98	0.07
TruckeeOverbank	Overland	3110		Inl Struct									
TruckeeOverbank	Overland	2965.298	Max WS	3399.09	4395.20	4398.50	4396.79	4398.51	0.003192	0.84	4045.18	2234.72	0.11
TruckeeOverbank	Overland	2960		Lat Struct									
TruckeeOverbank	Overland	2868.72*	Max WS	3426.23	4394.75	4398.18	4396.58	4398.19	0.003321	0.82	4220.96	2598.24	0.11
TruckeeOverbank	Overland	2772.150	Max WS	2846.44	4394.30	4397.97	4396.10	4397.98	0.001505	0.54	5333.73	3261.10	0.07
TruckeeOverbank	Overland	2693.59*	Max WS	2781.90	4393.43	4397.88	4395.11	4397.88	0.000877	0.45	6265.61	3399.20	0.06
TruckeeOverbank	Overland	2615.037	Max WS	2739.22	4392.56	4397.83	4393.88	4397.83	0.000494	0.35	7839.20	3958.64	0.04
TruckeeOverbank	Overland	2531.56*	Max WS	2735.26	4392.66	4397.79	4394.02	4397.80	0.000417	0.33	8320.81	4042.88	0.04
TruckeeOverbank	Overland	2500		Lat Struct									
TruckeeOverbank	Overland	2448.088	Max WS	2740.68	4392.76	4397.76	4394.14	4397.76	0.000351	0.31	8825.54	4121.16	0.04
TruckeeOverbank	Overland	2367.14*	Max WS	2718.98	4392.46	4397.73	4394.15	4397.73	0.000435	0.31	8739.39	4924.99	0.04
TruckeeOverbank	Overland	2286.19*	Max WS	2714.84	4392.17	4397.70	4394.14	4397.71	0.000346	0.29	9308.30	4843.67	0.04

HEC-RAS Plan: CE Locations: User Defined Profile: Max WS (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
TruckeeOverbank	Overland	2205.24*	Max WS	2705.34	4391.87	4397.68	4394.02	4397.68	0.000248	0.26	10389.86	4989.30	0.03
TruckeeOverbank	Overland	2124.297	Max WS	2685.11	4391.57	4397.66	4393.84	4397.66	0.000185	0.24	11502.37	5221.20	0.03
TruckeeOverbank	Overland	2035.78*	Max WS	2680.96	4391.49	4397.65	4394.13	4397.65	0.000183	0.24	11470.40	5237.06	0.03
TruckeeOverbank	Overland	1947.26*	Max WS	2672.34	4391.41	4397.63	4394.35	4397.63	0.000175	0.24	11486.15	5169.64	0.03
TruckeeOverbank	Overland	1858.75*	Max WS	2661.28	4391.32	4397.62	4394.43	4397.62	0.000156	0.23	11705.32	4989.88	0.03
TruckeeOverbank	Overland	1770.239	Max WS	2661.22	4391.24	4397.60	4394.26	4397.61	0.000143	0.22	12030.45	4919.94	0.02
TruckeeOverbank	Overland	1770		Lat Struct									
TruckeeOverbank	Overland	1685.76*	Max WS	2643.50	4391.29	4397.59	4394.11	4397.59	0.000137	0.22	12239.12	4942.22	0.02
TruckeeOverbank	Overland	1601.29*	Max WS	2636.47	4391.35	4397.58	4393.98	4397.58	0.000134	0.21	12432.35	5012.30	0.02
TruckeeOverbank	Overland	1516.81*	Max WS	2634.03	4391.40	4397.57	4393.82	4397.57	0.000125	0.21	12645.45	4963.04	0.02
TruckeeOverbank	Overland	1432.340	Max WS	2621.90	4391.45	4397.56	4393.56	4397.56	0.000112	0.20	12992.59	4911.71	0.02
TruckeeOverbank	Overland	1293.321	Max WS	2636.61	4391.26	4397.55	4393.58	4397.55	0.000085	0.18	14864.17	5604.67	0.02
TruckeeOverbank	Overland	1293		Lat Struct									
TruckeeOverbank	Overland	1129.412	Max WS	2624.40	4390.22	4397.54	4392.16	4397.54	0.000048	0.15	17775.71	5656.11	0.01
TruckeeOverbank	Overland	1007.088	Max WS	2735.06	4390.46	4397.53	4392.06	4397.53	0.000075	0.16	16423.90	6051.34	0.02
TruckeeOverbank	Overland	878		Lat Struct									
TruckeeOverbank	Overland	877.265	Max WS	2731.87	4389.59	4397.52	4392.45	4397.52	0.000070	0.16	16801.04	6078.77	0.02
TruckeeOverbank	Overland	599.925	Max WS	2782.66	4388.37	4397.51	4391.88	4397.51	0.000019	0.11	24973.98	6103.30	0.01
TruckeeOverbank	Overland	318.374	Max WS	3201.83	4385.84	4397.50	4391.83	4397.50	0.000043	0.16	20571.98	5563.92	0.01
TruckeeOverbank	Overland	318		Lat Struct									
TruckeeOverbank	Overland	66.123	Max WS	3376.19	4385.09	4397.49	4390.61	4397.49	0.000005	0.12	27403.67	5308.96	0.01
TruckeeOverbank	Overland	0.01	Max WS	3484.20	4385.07	4397.49	4392.40	4397.49	0.000013	0.17	20726.04	5271.38	0.01

HEC RAS PROPOSED CONDITIONS MODEL RESULTS


8453.293
8125
7922.604
7733.466
7413.038
7155.738
6869.778
6649.255
8420.515
6072.075
5773.892
5509.261
5270.003
4660.862
4112
3681.066
1007.086
Area33
Area31
Area30
Area42
Con33to31
MarinaPump
Con33to50
Con30To42
Con36Fto50
Con31to36B
Con36Ato36B
SA36BtoPeop2
ConPeop4toPeop2
ConPeop2toPeop1
SA36AtoPeop1
Con30Bto27
Con30to30B
Con30Bto2
Con27bto42
Con30Bto27B
1465.880
1207.861
Area28
Area27B
Con27Bto27
922.250
723.402
523.133
319.994
Area27
9124.953
Con28To29
9584.751
13313.60
12559.40
14767.08
14023.23
Middl
15528.35
12670
11921.75
11900
10237.23
10562.53
11383.49
15922
16122.58
2696.097
ConTP1toTP2
17030.21
17433.06
Area5B
3227.105
3546.287
TreatmentPlant
Lowe
17774.81
5A to 5B
3932.354
4193.807
18117.31
4448.158
20652.04
18690.00
4761.176
21091.93
19800
Area5A
5071.02
21440
5379.09
21976
Con4Bto5
6082.992
Area4B
22503.45
Con6ATo5A
6B to 5B
Con4to4B
Con4BTo7
6646.991
6877.138
7120.541
7370.842
Con7To6
Area6A
6B to 6A
7827.352
Area6B
8084.169
Area7
9053.586
9306.021
10663.19
10 to 6A
11731.31
10 to 6B
Con10To7
12231.71
12854.52
13339.62
12574
Area4
Area10
14340.06
14739.25
14957.71
15372.57
15866
789.731
1184.867
16008.16
15865
1933.068
16602.78
2226
16796.86
Area26
17178.47
17514
Area25
Con26To4
17246
2 of the 906 XS's are not Geo-Referenced
Geo-Ref user entered XS
Geo-Ref Interpolated XS
Non Geo-Ref user entered XS
Non Geo-Ref Interpolated XS

HEC-RAS Plan: CE SEC Profile: Max WS

Storage Area	Profile	W.S. Elev	SA Min El	Net Flux	SA Area	SA Volume
		(ft)	(ft)	(cfs)	(acres)	(acre-ft)
Area0	Max WS	4429.65	4408.00	-2668.61	61.04	713.19
Area1	Max WS	4417.51	4411.00	5.20	18.62	36.05
Area10	Max WS	4397.70	4382.00	-8.24	199.04	1516.69
Area11	Max WS	4397.76	4384.00	-9.07	23.01	113.17
Area12	Max WS	4397.87	4386.00	39.27	126.08	570.25
Area13	Max WS	4398.84	4388.00	83.66	53.68	140.06
Area14	Max WS	4398.77	4385.00	223.85	16.97	26.72
Area15	Max WS	4399.37	4385.00	-38.45	64.71	164.23
Area16	Max WS	4400.64	4389.00	44.92	46.56	96.08
Area17	Max WS	4399.99	4387.00	39.59	211.16	437.42
Area18	Max WS	4404.29	4392.00	-9.69	253.68	857.26
Area19	Max WS	4408.90	4400.00	-74.53	87.21	210.43
Area1B	Max WS	4424.82	4418.00	0.90	20.39	45.00
Area2	Max WS	4408.58	4399.00	-635.62	32.50	82.03
Area20	Max WS	4399.89	4391.00	18.59	56.03	105.90
Area21	Max WS	4397.98	4388.00	73.28	74.19	222.06
Area23	Max WS	4397.88	4386.00	346.61	47.83	119.14
Area24	Max WS	4397.81	4385.00	-62.02	117.96	792.33
Area25	Max WS	4397.77	4380.00	15.78	63.73	506.01
Area26	Max WS	4397.74	4387.50	2.47	20.26	73.05
Area27	Max WS	4397.11	4383.00	-1147.24	104.90	562.26
Area27A	Max WS	4397.27	4383.00	-0.18	3.00	18.07
Area27B	Max WS	4397.29	4395.00	0.00	0.01	0.02
Area28	Max WS	4397.30	4385.00	-1633.93	98.75	524.75
Area29	Max WS	4397.49	4379.00	2238.10	436.40	2287.19
Area3	Max WS	4402.63	4395.00	4.01	74.00	153.13
Area30	Max WS	4397.65	4391.00	-103.29	62.99	116.46
Area30B	Max WS	4397.29	4385.00	0.81	6.62	35.26
Area31	Max WS	4397.13	4378.00	529.98	194.25	635.27
Area33	Max WS	4397.12	4377.00	95.08	223.87	2057.38
Area35	Max WS	4398.41	4390.00	-3.38	77.79	102.88
Area36	Max WS	4398.40	4395.00	2.13	7.56	7.04
Area36-B	Max WS	4397.10	4382.00	157.09	7.62	34.00
Area36-C	Max WS	4397.33	4392.00	-1.12	2.83	4.53
Area36-D	Max WS	4397.32	4394.00	2.56	1.75	2.54
Area36A	Max WS	4397.61	4384.00	-14.30	13.54	36.74
Area36E	Max WS	4397.30	4394.00	0.28	0.78	1.13
Area36F	Max WS	4397.48	4379.92	-18.45	8.20	35.70
Area37	Max WS	4398.38	4395.00	1.16	5.83	5.38
Area37A	Max WS	4399.00	4399.00	0.00	0.06	0.00
Area38	Max WS	4405.58	4401.00	0.32	2.67	5.60
Area39	Max WS	4397.92	4394.00	23.72	22.29	31.76
Area4	Max WS	4398.15	4390.00	48.75	57.56	125.98
Area42	Max WS	4400.00	4400.00	0.00	0.10	0.00
Area43	Max WS	4400.50	4400.50	0.00	0.04	0.00
Area44	Max WS	4405.98	4399.50	0.50	3.14	7.83
Area45	Max WS	4398.49	4393.00	16.56	88.58	96.11
Area45A	Max WS	4394.00	4394.00	0.00	0.14	0.00
Area46	Max WS	4403.00	4403.00	0.00	0.13	0.00
Area47	Max WS	4397.75	4391.00	1.12	0.54	1.04
Area49	Max WS	4396.00	4396.00	0.00	0.00	0.00
Area4B	Max WS	4397.72	4388.00	-58.43	29.30	168.95
Area50	Max WS	4393.92	4387.00	6.51	2.92	7.10
Area51	Max WS	4417.18	4416.00	0.26	0.14	0.04
Area52	Max WS	4397.87	4387.00	113.20	19.19	92.22
Area53	Max WS	4397.84	4387.00	62.55	1.73	10.43
Area5A	Max WS	4397.36	4385.00	17316.34	111.87	881.83
Area5B	Max WS	4397.35	4381.00	-17102.07	71.63	656.90
Area6A	Max WS	4397.56	4386.00	-12.89	117.22	957.81
Area6B	Max WS	4397.57	4381.00	35.89	64.92	526.15
Area7	Max WS	4397.70	4383.00	25.19	223.84	1507.35

HEC-RAS Plan: CE SEC Profile: Max WS (Continued)

Storage Area	Profile	W.S. Elev	SA Min El	Net Flux	SA Area	SA Volume
		(ft)	(ft)	(cfs)	(acres)	(acre-ft)
Area8	Max WS	4397.78	4387.00	68.09	212.99	920.58
Area9	Max WS	4397.80	4384.00	139.96	168.03	1013.37
SAPeoples1	Max WS	4397.33	4379.17	3.26	0.08	1.53
SAPeoples2	Max WS	4397.47	4382.07	-5.28	0.08	1.17
SAPeoples3	Max WS	4397.48	4381.30	19.12	0.09	1.53
SAPeoples4	Max WS	4397.48	4383.06	-6.45	0.02	0.33
TreatmentPlant1	Max WS	4396.56	4395.00	-0.20	0.01	0.01
TreatmentPlant2	Max WS	4395.00	4395.00	0.00	0.29	0.00

HEC-RAS Plan: CE SEC Locations: User Defined Profile: Max WS

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
BoyntonSlough	Tributary	19758.67	Max WS	1470.74	4416.99	4425.99	4421.17	4426.17	0.000676	3.43	428.93	74.73	0.25
BoyntonSlough	Tributary	19723.05	Max WS	1470.71	4417.22	4425.97	4421.15	4426.15	0.000604	3.33	441.98	74.13	0.24
BoyntonSlough	Tributary	19667.33	Max WS	1470.60	4416.83	4425.86		4426.11	0.000560	4.05	363.17	65.83	0.25
BoyntonSlough	Tributary	19589.2		Culvert									
BoyntonSlough	Tributary	19509.64	Max WS	1470.71	4414.01	4422.25	4417.79	4422.52	0.000695	4.15	354.46	62.94	0.27
BoyntonSlough	Tributary	19509		Lat Struct									
BoyntonSlough	Tributary	19434		Lat Struct									
BoyntonSlough	Tributary	19433.93	Max WS	1470.62	4413.31	4422.20	4417.80	4422.46	0.000883	4.11	357.96	56.58	0.29
BoyntonSlough	Tributary	19360.97	Max WS	1470.74	4412.57	4422.12	4417.44	4422.40	0.000888	4.19	350.80	53.26	0.29
BoyntonSlough	Tributary	19283.82	Max WS	1470.53	4412.36	4422.09	4417.18	4422.33	0.000751	3.97	370.03	52.73	0.26
BoyntonSlough	Tributary	19202.45	Max WS	1470.60	4412.10	4421.93	4417.45	4422.26	0.001130	4.62	318.06	48.77	0.32
BoyntonSlough	Tributary	19132.94	Max WS	1470.56	4412.09	4421.88	4417.26	4422.18	0.001015	4.40	333.96	51.57	0.30
BoyntonSlough	Tributary	19061.42	Max WS	1470.54	4412.04	4421.82	4417.15	4422.11	0.001008	4.36	337.06	52.92	0.30
BoyntonSlough	Tributary	18980.69	Max WS	1470.51	4411.82	4421.84	4416.22	4422.05	0.000624	3.67	404.34	70.22	0.24
BoyntonSlough	Tributary	18904.68	Max WS	1450.93	4411.44	4421.81	4415.96	4422.01	0.000560	3.51	414.95	72.11	0.23
BoyntonSlough	Tributary	18854.52	Max WS	1450.38	4411.37	4421.83	4415.77	4421.98	0.000435	3.11	466.43	69.80	0.21
BoyntonSlough	Tributary	18832.37	Max WS	1450.35	4411.22	4421.69		4421.97	0.000640	4.29	338.02	62.33	0.26
BoyntonSlough	Tributary	18782		Culvert									
BoyntonSlough	Tributary	18715.66	Max WS	1450.22	4407.80	4413.14	4412.84	4414.57	0.077090	9.61	150.89	85.64	0.88
BoyntonSlough	Tributary	18715		Lat Struct									
BoyntonSlough	Tributary	18676.5		Lat Struct									
BoyntonSlough	Tributary	18637.31	Max WS	1450.33	4403.74	4410.79	4407.60	4411.10	0.001305	4.49	322.67	60.85	0.34
BoyntonSlough	Tributary	18524.96	Max WS	1450.39	4403.32	4410.12	4408.30	4410.83	0.003797	6.77	214.33	47.42	0.56
BoyntonSlough	Tributary	18420.64	Max WS	1450.36	4403.17	4409.37	4408.00	4410.37	0.005184	8.00	181.38	39.16	0.65
BoyntonSlough	Tributary	18323.75	Max WS	1450.34	4402.64	4409.50	4406.88	4409.99	0.002117	5.62	257.98	49.13	0.43
BoyntonSlough	Tributary	18219.05	Max WS	1450.33	4400.87	4408.48	4407.20	4409.60	0.006136	8.46	171.34	37.43	0.70
BoyntonSlough	Tributary	18101.10	Max WS	1450.26	4400.36	4408.71	4405.16	4409.08	0.001372	4.86	298.48	50.13	0.35
BoyntonSlough	Tributary	17993.59	Max WS	1450.30	4399.59	4408.50	4404.92	4408.92	0.001599	5.20	278.99	47.34	0.38
BoyntonSlough	Tributary	17895.49	Max WS	1450.28	4399.79	4408.26	4404.92	4408.75	0.001880	5.60	259.05	43.76	0.41
BoyntonSlough	Tributary	17794.66	Max WS	1450.29	4399.53	4407.90	4405.13	4408.52	0.002750	6.28	230.76	43.59	0.48
BoyntonSlough	Tributary	17702.15	Max WS	1450.27	4399.21	4407.88	4404.25	4408.31	0.001602	5.29	274.27	44.86	0.38
BoyntonSlough	Tributary	17701		Lat Struct									
BoyntonSlough	Tributary	17597.51	Max WS	1450.27	4400.17	4407.58	4404.77	4408.11	0.002251	5.88	246.65	45.10	0.44
BoyntonSlough	Tributary	17486.05	Max WS	1450.28	4400.62	4407.02	4405.11	4407.78	0.003686	7.00	207.13	42.36	0.56
BoyntonSlough	Tributary	17381.40	Max WS	1450.31	4400.25	4406.89	4404.63	4407.46	0.002558	6.01	241.20	47.85	0.47
BoyntonSlough	Tributary	17286.32	Max WS	1450.23	4399.60	4406.81	4403.73	4407.25	0.001806	5.33	272.33	48.00	0.39
BoyntonSlough	Tributary	17186.01	Max WS	1450.28	4399.39	4406.45	4404.07	4407.03	0.002590	6.11	237.18	46.20	0.48
BoyntonSlough	Tributary	17069.64	Max WS	1450.28	4398.96	4406.31	4403.24	4406.77	0.001855	5.43	267.33	47.38	0.40
BoyntonSlough	Tributary	16938.04	Max WS	1450.20	4398.50	4406.21	4402.57	4406.56	0.001290	4.73	306.91	50.20	0.34
BoyntonSlough	Tributary	16810.03	Max WS	1450.24	4398.48	4405.95	4403.03	4406.36	0.001805	5.13	282.78	54.95	0.40
BoyntonSlough	Tributary	16692.96	Max WS	1450.21	4398.41	4405.78	4402.67	4406.16	0.001641	4.94	293.49	56.74	0.38
BoyntonSlough	Tributary	16588.70	Max WS	1450.24	4397.80	4405.50	4403.04	4405.96	0.002211	5.45	266.33	55.76	0.44
BoyntonSlough	Tributary	16482.89	Max WS	1450.20	4397.72	4405.37	4402.28	4405.75	0.001644	4.94	293.44	56.84	0.38
BoyntonSlough	Tributary	16381.83	Max WS	1450.16	4397.57	4405.32	4401.65	4405.61	0.001170	4.35	333.28	60.91	0.33
BoyntonSlough	Tributary	16273.04	Max WS	1450.17	4397.54	4405.18	4401.60	4405.48	0.001180	4.37	331.69	60.65	0.33
BoyntonSlough	Tributary	16169.85	Max WS	1450.19	4397.35	4405.12	4401.14	4405.37	0.000948	4.02	360.51	63.18	0.30
BoyntonSlough	Tributary	16052.91	Max WS	1450.20	4396.90	4404.96		4405.24	0.001241	4.24	341.92	68.58	0.33
BoyntonSlough	Tributary	15611		Culvert									
BoyntonSlough	Tributary	15170.33	Max WS	1415.67	4395.18	4400.62	4398.78	4401.28	0.002104	6.49	217.97	45.56	0.52
BoyntonSlough	Tributary	15170		Lat Struct									
BoyntonSlough	Tributary	15132		Lat Struct									
BoyntonSlough	Tributary	15093.11	Max WS	1414.48	4394.86	4400.54	4398.61	4401.12	0.001921	6.13	230.88	49.75	0.50
BoyntonSlough	Tributary	14959.21	Max WS	1180.42	4394.73	4400.29	4398.05	4400.72	0.001393	5.26	224.29	47.35	0.43
BoyntonSlough	Tributary	14819.01	Max WS	1104.66	4394.52	4400.13	4397.60	4400.49	0.001153	4.80	230.13	47.26	0.38
BoyntonSlough	Tributary	14655.09	Max WS	1054.26	4394.34	4399.98	4397.21	4400.29	0.000945	4.45	238.15	52.70	0.35
BoyntonSlough	Tributary	14548.01	Max WS	1050.74	4393.22	4399.96	4396.52	4400.20	0.000654	3.93	267.14	46.93	0.29
BoyntonSlough	Tributary	14411.56	Max WS	1067.69	4390.43	4400.01	4394.03	4400.14	0.000233	2.93	394.95	90.24	0.18
BoyntonSlough	Tributary	14186.01	Max WS	982.26	4390.41	4399.94	4394.78	4400.09	0.000333	3.19	354.30	95.06	0.20
BoyntonSlough	Tributary	14055.37	Max WS	828.47	4390.41	4399.97	4395.00	4400.09	0.000291	2.88	320.82	90.31	0.19
BoyntonSlough	Tributary	14054		Lat Struct									
BoyntonSlough	Tributary	13924.57	Max WS	757.17	4390.41	4399.94	4395.70	4400.07	0.000373	2.96	286.78	93.48	0.21
BoyntonSlough	Tributary	13817.90	Max WS	738.85	4390.41	4399.93	4394.80	4400.03	0.000252	2.65	299.66	79.64	0.18
BoyntonSlough	Tributary	13736.18	Max WS	771.95	4390.41	4399.89	4394.97	4400.00	0.000262	2.68	321.67	79.72	0.18
BoyntonSlough	Tributary	13735		Lat Struct									
BoyntonSlough	Tributary	13667.97	Max WS	823.03	4390.41	4399.94	4393.67	4399.97	0.000106	1.57	565.10	105.31	0.10
BoyntonSlough	Tributary	13567.63	Max WS	825.51	4390.41	4399.95	4393.15	4399.96	0.000027	0.80	1037.63	166.15	0.05
BoyntonSlough	Tributary	13485.38	Max WS	822.03	4390.41	4399.95	4393.09	4399.96	0.000030	0.85	980.92	156.49	0.06
BoyntonSlough	Tributary	13376.65	Max WS	815.37	4389.53	4399.95	4392.65	4399.96	0.000029	0.85	979.24	147.56	0.06
BoyntonSlough	Tributary	13279.51	Max WS	794.48	4389.21	4399.94	4392.35	4399.95	0.000037	1.00	836.03	128.17	0.06
BoyntonSlough	Tributary	13171.90	Max WS	777.02	4388.91	4399.94	4392.63	4399.95	0.000034	0.93	856.31	126.93	0.06
BoyntonSlough	Tributary	13170		Lat Struct									
BoyntonSlough	Tributary	13052.12	Max WS	734.55	4387.87	4399.94	4391.89	4399.95	0.000023	0.79	958.58	137.81	0.05
BoyntonSlough	Tributary	12924.69	Max WS	709.60	4387.87	4399.94	4391.43	4399.95	0.000018	0.72	1000.04	136.56	0.04
BoyntonSlough	Tributary	12784.66	Max WS	721.40	4389.64	4399.93	4392.74	4399.94	0.000028	0.82	886.26	142.79	0.05
BoyntonSlough	Tributary	12783		Lat Struct									
BoyntonSlough	Tributary	12658.18	Max WS	724.77	4389.64	4399.93	4392.21	4399.94	0.000025	0.80	922.92	142.16	0.05
BoyntonSlough	Tributary	12496.53	Max WS	749.78	4389.63	4399.92	4392.98	4399.94	0.000029	0.84	925.11	150.44	0.05
BoyntonSlough	Tributary	12349.68	Max WS	801.36	4389.54	4399.92	4392.36	4399.93	0.000026	0.84	988.97	144.11	0.05
BoyntonSlough	Tributary	12213.56	Max WS	879.74	4389.36	4399.91	4392.08	4399.92	0.000029	0.89	1010.49	149.81	0.06
BoyntonSlough	Tributary	12028.77	Max WS	966.78	4388.94	4399.90	4391.89	4399.92	0.000032	0.96	1039.16	150.91	0.06
BoyntonSlough	Tributary	11890.70	Max WS	1067.13	4388.91	4399.89	4392.53	4399.91	0.000046	1.12	999.62	163.06	0.07
BoyntonSlough	Tributary	11889		Lat Struct									
BoyntonSlough	Tributary	11750.02	Max WS	1127.48	4388.91	4399.88	4391.99	4399.90	0.000042	1.08	1096.54	170.80	0.07
BoyntonSlough	Tributary	11587.87	Max WS	1299.91	4388.91	4399.87	4392.00	4399.89	0.000049	1.22	1133.12	166.82	0.07
BoyntonSlough	Tributary	11450		Lat Struct									
BoyntonSlough	Tributary	11447.10	Max WS	1412.58	4388.91	4399.85	4391.95	4399.88	0.000057	1.30	1108.78	147.09	0.08
BoyntonSlough	Tributary	11310.57	Max WS	1479.42	4388.87	4399.84	4392.04	4399.87	0.000054	1.27	1225.90	161.01	0.08
BoyntonSlough	Tributary	11136.21	Max WS	1878.81	4388.85	4399.80	4392.20	4399.84	0.000093	1.67	1140.14	156.74	0.10
BoyntonSlough	Tributary	11010.91	Max WS	1884.36	4388.84	4399.78	4391.97	4399.83	0.000104	1.75	1081.06	144.04	0.11
BoyntonSlough	Tributary	10865.34	Max WS	2172.07	4388.85	4399.72	4392.14	4399.79	0.000145	2.14	1063.64	152.21	0.13
BoyntonSlough	Tributary	10783.11	Max WS	2643.66	4388.85	4399.61	4393.57	4399.74	0.000321	2.97	952.93	155.84	0.19
BoyntonSlough	Tributary	10695.51	Max WS	3095.42	4388.85	4399.50	4393.68	4399.66	0.000397	3.35	1012.13	168.40	0.21
BoyntonSlough	Tributary	10649		Bridge									
BoyntonSlough	Tributary	10601.83	Max WS	3014.03	4388.85	4399.14	4392.35	4399.24	0.000193	2.48	1243.90	145.05	0.15
BoyntonSlough	Tributary	10600		Lat Struct									
BoyntonSlough	Tributary	10535		Lat Struct									
BoyntonSlough	Tributary	10528.97	Max WS	2853.15	4386.56	4398.90	4392.78	4399.23	0.000750	4.57	629.65	79.72	0.28
BoyntonSlough	Tributary	10408.32	Max WS	2775.96	4386.66	4398.91	4392.29	4399.17	0.000599	4.07	684.87	84.97	0.25
BoyntonSlough	Tributary	10302.13	Max WS	2688.19	4386.26	4398.93	4391.68	4399.13	0.000428	3.57	754.68	87.78	0.21
BoyntonSlough	Tributary	10195.45	Max WS	2566.22	4385.57	4398.93	4391.24	4399.10	0.000369	3.30	779.52	91.73	0.20
BoyntonSlough	Tributary	10089.67	Max WS	2460.40	4385.90	4398.92	4391.14	4399.08	0.000324	3.21	779.60	90.58	0.19
BoyntonSlough	Tributary	9957.009	Max WS	2358.87	4386.26	4398.90	4390.95	4399.05	0.000313	3.11	762.94	87.22	0.18
BoyntonSlough	Tributary	9835.542	Max WS	2223.13	4385.99	4398.88	4390.70	4399.02	0.000295	3.02	748.91	89.17	0.18
BoyntonSlough	Tributary	9713.677	Max WS	2180.51	4385.74	4398.87	4390.64	4399.00	0.000259	2.85	773.03	88.70	0.17
BoyntonSlough	Tributary	9611.474	Max WS	2125.87	4385.53	4398.88	4390.23	4398.98	0.000198	2.54	867.94	109.39	0.15
BoyntonSlough	Tributary	9610		Lat Struct									
BoyntonSlough	Tributary	9460.350	Max WS	2033.25	4385.63	4398.88	4390.09	4398.96	0.000171	2.32	897.20	104.88	0.14
BoyntonSlough	Tributary	9459		Lat Struct									

HEC-RAS Plan: CE SEC Locations: User Defined Profile: Max WS (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
BoyntonSlough	Tributary	9304.842	Max WS	1965.03	4385.63	4398.83	4390.64	4398.93	0.000202	2.59	804.73	96.81	0.15
BoyntonSlough	Tributary	9189.458	Max WS	1971.28	4385.59	4398.82	4390.91	4398.91	0.000178	2.42	858.51	100.39	0.14
BoyntonSlough	Tributary	9094.572	Max WS	1971.16	4385.28	4398.83	4390.30	4398.89	0.000118	2.04	1009.61	110.59	0.12
BoyntonSlough	Tributary	8979.384	Max WS	1971.70	4385.87	4398.83	4390.14	4398.88	0.000097	1.87	1121.62	117.03	0.10
BoyntonSlough	Tributary	8865.809	Max WS	1981.11	4385.85	4398.82	4389.74	4398.87	0.000099	1.84	1094.97	120.97	0.11
BoyntonSlough	Tributary	8773.786	Max WS	2003.99	4385.69	4398.80	4389.82	4398.86	0.000110	1.97	1040.13	115.05	0.11
BoyntonSlough	Tributary	8715.761	Max WS	2038.22	4385.58	4398.77		4398.84	0.000123	2.13	965.26	182.02	0.12
BoyntonSlough	Tributary	8646		Culvert									
BoyntonSlough	Tributary	8589.367	Max WS	1854.41	4385.40	4397.90	4389.20	4397.98	0.000145	2.29	810.05	213.00	0.12
BoyntonSlough	Tributary	8589		Lat Struct									
BoyntonSlough	Tributary	8588		Lat Struct									
BoyntonSlough	Tributary	8506.099	Max WS	1785.97	4385.26	4397.91	4389.16	4397.97	0.000119	2.09	939.08	120.28	0.12
BoyntonSlough	Tributary	8402.262	Max WS	1674.19	4385.37	4397.90	4389.47	4397.97	0.000119	2.15	860.56	99.43	0.12
BoyntonSlough	Tributary	8305.379	Max WS	1636.02	4385.43	4397.87	4389.48	4397.96	0.000170	2.45	707.56	73.33	0.13
BoyntonSlough	Tributary	8240.585	Max WS	1620.98	4385.46	4397.90	4389.23	4397.95	0.000099	1.94	922.62	105.34	0.11
BoyntonSlough	Tributary	8079.865	Max WS	1552.18	4385.50	4397.89	4389.19	4397.94	0.000102	1.78	923.07	113.71	0.11
BoyntonSlough	Tributary	7933.380	Max WS	1496.56	4385.56	4397.90	4388.90	4397.93	0.000064	1.43	1075.81	132.20	0.08
BoyntonSlough	Tributary	7794.234	Max WS	1449.46	4385.53	4397.89	4388.81	4397.92	0.000060	1.37	1093.13	153.83	0.08
BoyntonSlough	Tributary	7658.699	Max WS	1391.47	4385.79	4397.90	4389.09	4397.91	0.000035	1.07	1366.73	160.20	0.06
BoyntonSlough	Tributary	7515		Lat Struct									
BoyntonSlough	Tributary	7513.437	Max WS	1332.54	4384.93	4397.89	4388.88	4397.91	0.000040	1.16	1285.44	167.97	0.07
BoyntonSlough	Tributary	7511		Lat Struct									
BoyntonSlough	Tributary	7318.041	Max WS	1297.40	4385.19	4397.88	4389.51	4397.90	0.000045	1.15	1177.98	166.25	0.07
BoyntonSlough	Tributary	7189.600	Max WS	1274.78	4384.53	4397.88	4388.31	4397.90	0.000039	1.10	1234.32	167.11	0.07
BoyntonSlough	Tributary	7056.191	Max WS	1257.05	4384.77	4397.88	4388.57	4397.89	0.000030	1.02	1340.34	161.70	0.06
BoyntonSlough	Tributary	6914.734	Max WS	1259.62	4385.47	4397.87	4388.99	4397.89	0.000043	1.26	1113.34	133.51	0.07
BoyntonSlough	Tributary	6788.478	Max WS	1283.44	4385.35	4397.86	4388.84	4397.88	0.000039	1.19	1202.04	147.15	0.07
BoyntonSlough	Tributary	6615.909	Max WS	1322.51	4385.55	4397.87	4388.43	4397.88	0.000018	0.80	1734.47	199.69	0.05
BoyntonSlough	Tributary	6471.306	Max WS	1366.51	4385.47	4397.87	4389.13	4397.87	0.000015	0.72	1992.82	239.87	0.04
BoyntonSlough	Tributary	6344.208	Max WS	1403.57	4384.91	4397.86	4388.62	4397.87	0.000017	0.76	1909.83	224.38	0.04
BoyntonSlough	Tributary	6248.985	Max WS	1428.19	4384.96	4397.86	4388.65	4397.87	0.000017	0.80	1927.82	235.06	0.05
BoyntonSlough	Tributary	6248		Lat Struct									
BoyntonSlough	Tributary	6246		Lat Struct									
BoyntonSlough	Tributary	6116.634	Max WS	1479.99	4385.54	4397.86	4388.92	4397.87	0.000020	0.83	1841.71	204.38	0.05
BoyntonSlough	Tributary	5953.142	Max WS	1547.48	4385.81	4397.85	4388.28	4397.86	0.000018	0.81	1967.25	218.72	0.05
BoyntonSlough	Tributary	5810		Lat Struct									
BoyntonSlough	Tributary	5806.779	Max WS	1668.89	4385.54	4397.84	4388.79	4397.86	0.000033	1.12	1562.11	177.58	0.06
BoyntonSlough	Tributary	5659.743	Max WS	1667.27	4385.22	4397.83	4388.50	4397.85	0.000035	1.17	1641.01	236.04	0.06
BoyntonSlough	Tributary	5427.769	Max WS	1646.61	4384.37	4397.84	4386.87	4397.85	0.000009	0.63	2758.70	293.87	0.03
BoyntonSlough	Tributary	5291.870	Max WS	1630.77	4384.29	4397.84	4386.35	4397.84	0.000005	0.47	3520.70	374.69	0.02
BoyntonSlough	Tributary	5204.933	Max WS	1619.16	4384.45	4397.84	4386.23	4397.84	0.000004	0.41	4034.08	401.79	0.02
BoyntonSlough	Tributary	5073.306	Max WS	1629.46	4384.71	4397.84	4386.12	4397.84	0.000004	0.45	3641.29	316.60	0.02
BoyntonSlough	Tributary	4900		Lat Struct									
BoyntonSlough	Tributary	4893.799	Max WS	1635.06	4385.01	4397.84	4386.89	4397.84	0.000007	0.56	2964.18	283.52	0.03
BoyntonSlough	Tributary	4719.572	Max WS	1660.71	4385.30	4397.83	4387.41	4397.84	0.000011	0.68	2533.42	242.53	0.04
BoyntonSlough	Tributary	4560		Lat Struct									
BoyntonSlough	Tributary	4559.278	Max WS	1688.17	4385.11	4397.83	4387.78	4397.84	0.000015	0.79	2171.27	212.17	0.04
BoyntonSlough	Tributary	4398.360	Max WS	1740.50	4385.10	4397.82	4387.91	4397.83	0.000025	0.98	1813.12	190.51	0.05
BoyntonSlough	Tributary	4258.562	Max WS	1817.51	4385.06	4397.82	4387.57	4397.83	0.000021	0.92	2019.74	209.00	0.05
BoyntonSlough	Tributary	4104.021	Max WS	1927.79	4385.17	4397.81	4387.59	4397.83	0.000022	0.95	2085.49	213.49	0.05
BoyntonSlough	Tributary	3969.593	Max WS	2050.81	4385.35	4397.80	4387.86	4397.82	0.000030	1.06	1958.19	206.02	0.06
BoyntonSlough	Tributary	3810.861	Max WS	2200.49	4385.22	4397.80	4387.70	4397.81	0.000022	0.96	2380.10	238.51	0.05
BoyntonSlough	Tributary	3660		Lat Struct									
BoyntonSlough	Tributary	3659		Lat Struct									
BoyntonSlough	Tributary	3658.941	Max WS	2310.93	4384.99	4397.80	4387.32	4397.81	0.000014	0.80	2954.55	273.71	0.04
BoyntonSlough	Tributary	3510.689	Max WS	2162.31	4385.08	4397.80	4387.24	4397.81	0.000013	0.74	2960.43	289.25	0.04
BoyntonSlough	Tributary	3382.400	Max WS	2030.94	4385.29	4397.80	4387.24	4397.81	0.000014	0.78	2697.12	259.82	0.04
BoyntonSlough	Tributary	3274.211	Max WS	1927.09	4385.39	4397.80	4387.26	4397.81	0.000015	0.83	2402.27	230.73	0.04
BoyntonSlough	Tributary	3117.925	Max WS	1782.78	4384.95	4397.79	4387.42	4397.81	0.000022	0.98	1877.54	185.35	0.05
BoyntonSlough	Tributary	3116		Lat Struct									
BoyntonSlough	Tributary	3021.461	Max WS	1713.74	4384.63	4397.78	4387.57	4397.81	0.000034	1.21	1498.60	154.32	0.06
BoyntonSlough	Tributary	2930.217	Max WS	1689.39	4384.86	4397.77	4387.40	4397.80	0.000045	1.37	1261.12	122.19	0.07
BoyntonSlough	Tributary	2851.237	Max WS	1695.40	4384.27	4397.75	4387.74	4397.80	0.000080	1.86	972.29	108.35	0.10
BoyntonSlough	Tributary	2772.449	Max WS	1707.13	4384.04	4397.77	4387.11	4397.79	0.000038	1.27	1383.62	146.86	0.07
BoyntonSlough	Tributary	2670.099	Max WS	1703.36	4383.67	4397.77	4386.69	4397.79	0.000026	1.08	1663.63	163.05	0.06
BoyntonSlough	Tributary	2596.269	Max WS	1701.83	4383.42	4397.77	4386.41	4397.79	0.000030	1.23	1458.28	126.36	0.06
BoyntonSlough	Tributary	2570.047	Max WS	1702.03	4383.34	4397.76	4386.41	4397.79	0.000031	1.23	1421.07	120.21	0.06
BoyntonSlough	Tributary	2570		Lat Struct									
BoyntonSlough	Tributary	2569		Lat Struct									
BoyntonSlough	Tributary	2456.831	Max WS	1702.45	4383.27	4397.77	4386.45	4397.78	0.000020	1.00	1780.51	151.97	0.05
BoyntonSlough	Tributary	2337.982	Max WS	1702.02	4383.17	4397.77	4386.22	4397.78	0.000015	0.88	2069.06	176.39	0.04
BoyntonSlough	Tributary	2227.835	Max WS	1701.59	4383.28	4397.77	4386.33	4397.78	0.000019	0.96	1886.02	163.15	0.05
BoyntonSlough	Tributary	2226		Lat Struct									
BoyntonSlough	Tributary	2099.160	Max WS	1700.89	4383.41	4397.77	4386.28	4397.78	0.000016	0.95	2166.01	193.07	0.05
BoyntonSlough	Tributary	1933.068	Max WS	1701.42	4383.15	4397.76	4386.31	4397.78	0.000017	0.99	1998.58	174.39	0.05
BoyntonSlough	Tributary	1781.032	Max WS	1705.12	4383.33	4397.76	4386.60	4397.77	0.000023	1.12	1828.15	179.73	0.05
BoyntonSlough	Tributary	1671.171	Max WS	1722.33	4383.12	4397.75	4386.56	4397.77	0.000034	1.12	1577.11	173.21	0.06
BoyntonSlough	Tributary	1550.965	Max WS	1780.11	4382.72	4397.74	4386.46	4397.76	0.000029	1.11	1677.29	176.71	0.06
BoyntonSlough	Tributary	1475		Lat Struct									
BoyntonSlough	Tributary	1473.929	Max WS	1809.29	4382.69	4397.75	4385.68	4397.76	0.000013	0.73	2610.30	310.43	0.04
BoyntonSlough	Tributary	1411.668	Max WS	1850.12	4382.63	4397.75	4385.25	4397.76	0.000006	0.54	3613.64	583.77	0.03
BoyntonSlough	Tributary	1357.150	Max WS	1853.46	4382.68	4397.76	4384.77	4397.76	0.000003	0.42	4614.85	657.12	0.02
BoyntonSlough	Tributary	1275.010	Max WS	1865.85	4382.46	4397.76	4384.28	4397.76	0.000003	0.39	4988.47	628.40	0.02
BoyntonSlough	Tributary	1274		Lat Struct									
BoyntonSlough	Tributary	1184.867	Max WS	1876.28	4382.23	4397.76	4384.55	4397.76	0.000002	0.37	5417.02	513.13	0.02
BoyntonSlough	Tributary	1096.324	Max WS	1880.31	4382.00	4397.76	4384.67	4397.76	0.000002	0.34	5957.53	509.13	0.02
BoyntonSlough	Tributary	1018.135	Max WS	1882.15	4381.80	4397.76	4384.71	4397.76	0.000002	0.36	5866.54	513.85	0.02
BoyntonSlough	Tributary	911.770	Max WS	1886.30	4381.53	4397.76	4384.78	4397.76	0.000003	0.44	4745.00	409.26	0.02
BoyntonSlough	Tributary	789.731	Max WS	1894.38	4381.13	4397.75	4384.77	4397.76	0.000007	0.60	3601.06	348.23	0.03
BoyntonSlough	Tributary	721.087	Max WS	1906.72	4381.22	4397.75	4384.98	4397.76	0.000012	0.71	2848.04	267.87	0.04
BoyntonSlough	Tributary	625.893	Max WS	1930.02	4382.40	4397.75	4385.70	4397.76	0.000011	0.79	3189.72	343.67	0.04
BoyntonSlough	Tributary	625		Lat Struct									
BoyntonSlough	Tributary	507.304	Max WS	1716.85	4383.07	4397.75	4385.89	4397.76	0.000015	0.80	2470.09	290.72	0.04
BoyntonSlough	Tributary	405.206	Max WS	1530.70	4382.93	4397.75	4385.56	4397.76	0.000013	0.75	2406.55	294.47	0.04
BoyntonSlough	Tributary	249.065	Max WS	1179.54	4382.59	4397.75	4384.83	4397.76	0.000007	0.57	2464.44	289.99	0.03
NTruckeeDrain	Tributary	19600	Max WS	1196.67	4410.35	4414.75	4413.93	4415.63	0.006279	7.54	158.62	45.24	0.71
NTruckeeDrain	Tributary	19564.83	Max WS	1196.71	4410.35	4414.75	4413.92	4415.63	0.006189	7.51	159.41	45.26	0.70
NTruckeeDrain	Tributary	19563		Lat Struct									
NTruckeeDrain	Tributary	19560		Lat Struct									
NTruckeeDrain	Tributary	19497.27	Max WS	1144.11	4410.36	4414.78	4413.78	4415.34	0.003832	6.16	201.79	68.84	0.56
NTruckeeDrain	Tributary	19427.87	Max WS	1079.07	4409.87	4414.14	4413.96	4415.10	0.008741	8.00	144.70	66.02	0.82
NTruckeeDrain	Tributary	19353.20	Max WS	1023.19	4409.85	4414.02	4413.23	4414.51	0.004052	5.87	195.55	88.07	0.57
NTruckeeDrain	Tributary	19242.97	Max WS	896.31	4408.49	4413.84	4412.35	4414.21	0.003042	4.99	195.93	100.98	0.49
NTruckeeDrain	Tributary	19133.41	Max WS	703.37	4408.40	4413.85	4411.98	4414.07	0.001608	3.77	208.51	102.61	0.36
NTruckeeDrain	Tributary	19030.12	Max WS	677.98	4407.14	4413.86	4410.49	4413.95	0.000474	2.52	300.14	99.91	0.20
NTruckeeDrain	Tributary	18921.76	Max WS	627.99	4407.14	4413.83	4409.90	4413.92	0.000378	2.33	293.39	91.05	0.18
NTruckeeDrain	Tributary	18820.26	Max WS	583.08	4407.14	4413.82	4409.75	4413.89	0.000339	2.21	281.71	88.92	0.17
NTruckeeDrain	Tributary	18743.76	Max WS	575.85	4407.14	4413.78	4409.80	4413.86	0.000406	2.32	253.35	89.47	0.19

HEC-RAS Plan: CE SEC Locations: User Defined Profile: Max WS (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
NTruckeeDrain	Tributary	18630.83	Max WS	565.06	4407.14	4413.72		4413.82	0.000462	2.54	233.75	89.67	0.20
NTruckeeDrain	Tributary	18630		Culvert									
NTruckeeDrain	Tributary	18512.78	Max WS	565.00	4404.61	4409.89	4408.17	4410.31	0.003146	5.25	107.52	29.73	0.49
NTruckeeDrain	Tributary	18512		Lat Struct									
NTruckeeDrain	Tributary	18510		Lat Struct									
NTruckeeDrain	Tributary	18393.56	Max WS	537.32	4404.61	4409.62	4407.88	4410.00	0.002876	4.95	108.55	31.31	0.47
NTruckeeDrain	Tributary	18296.60	Max WS	537.40	4404.61	4409.46	4407.45	4409.75	0.002186	4.34	123.97	35.96	0.41
NTruckeeDrain	Tributary	18194.53	Max WS	537.36	4404.61	4409.34	4407.42	4409.55	0.001755	3.70	145.22	46.70	0.37
NTruckeeDrain	Tributary	18085.26	Max WS	537.34	4404.61	4408.79	4407.68	4409.23	0.004236	5.32	101.03	36.41	0.56
NTruckeeDrain	Tributary	17920.64	Max WS	537.34	4403.48	4408.56	4406.18	4408.76	0.001382	3.62	148.30	40.40	0.33
NTruckeeDrain	Tributary	17861.83	Max WS	537.36	4403.48	4408.43	4406.31	4408.67	0.001794	3.95	136.19	39.95	0.38
NTruckeeDrain	Tributary	17760.68	Max WS	537.32	4403.10	4408.28	4405.97	4408.50	0.001519	3.75	143.39	39.93	0.35
NTruckeeDrain	Tributary	17660.66	Max WS	537.30	4403.02	4408.10	4405.89	4408.34	0.001704	3.90	137.88	39.42	0.37
NTruckeeDrain	Tributary	17581.27	Max WS	537.32	4402.86	4407.98	4405.76	4408.21	0.001691	3.81	141.13	41.20	0.36
NTruckeeDrain	Tributary	17455.16	Max WS	537.31	4402.86	4407.79	4405.65	4408.00	0.001608	3.70	145.40	43.84	0.36
NTruckeeDrain	Tributary	17357.51	Max WS	537.38	4402.86	4407.64	4405.56	4407.84	0.001593	3.65	147.15	44.78	0.36
NTruckeeDrain	Tributary	17254.87	Max WS	537.39	4402.35	4407.49	4405.22	4407.69	0.001456	3.55	151.52	45.07	0.34
NTruckeeDrain	Tributary	17165.55	Max WS	537.38	4401.70	4407.42	4404.63	4407.58	0.001036	3.17	169.76	45.95	0.29
NTruckeeDrain	Tributary	17081.04	Max WS	537.36	4401.58	4407.32	4404.72	4407.48	0.001182	3.21	167.38	48.38	0.30
NTruckeeDrain	Tributary	16984.66	Max WS	537.29	4401.58	4407.25	4404.49	4407.38	0.000952	2.94	182.64	52.44	0.28
NTruckeeDrain	Tributary	16905.43	Max WS	537.40	4401.58	4407.19	4404.40	4407.31	0.000864	2.82	190.42	56.08	0.26
NTruckeeDrain	Tributary	16816.53	Max WS	535.75	4401.58	4407.11	4404.40	4407.23	0.000908	2.82	191.97	70.79	0.27
NTruckeeDrain	Tributary	16743.38	Max WS	535.69	4401.58	4407.05	4404.28	4407.16	0.000914	2.72	197.13	65.38	0.27
NTruckeeDrain	Tributary	16665.77	Max WS	535.74	4401.58	4406.97	4404.36	4407.09	0.000941	2.77	193.95	64.03	0.27
NTruckeeDrain	Tributary	16558.39	Max WS	535.69	4400.68	4406.88	4403.92	4407.00	0.000806	2.73	195.92	55.40	0.26
NTruckeeDrain	Tributary	16465.68	Max WS	535.70	4400.46	4406.80	4403.76	4406.93	0.000781	2.90	186.29	59.56	0.25
NTruckeeDrain	Tributary	16357.47	Max WS	530.97	4399.97	4406.74	4403.25	4406.85	0.000618	2.75	205.33	83.71	0.23
NTruckeeDrain	Tributary	16247.90	Max WS	527.32	4399.50	4406.69	4402.85	4406.79	0.000498	2.56	216.14	83.29	0.21
NTruckeeDrain	Tributary	16148.30	Max WS	488.28	4399.23	4406.69		4406.76	0.000364	2.14	230.11	87.50	0.18
NTruckeeDrain	Tributary	16140		Culvert									
NTruckeeDrain	Tributary	15491.88	Max WS	488.29	4399.39	4404.22	4402.05	4404.46	0.001678	3.92	124.60	34.28	0.36
NTruckeeDrain	Tributary	15490		Lat Struct									
NTruckeeDrain	Tributary	15489		Lat Struct									
NTruckeeDrain	Tributary	15420.38	Max WS	488.30	4399.33	4404.00	4402.24	4404.31	0.002488	4.49	108.83	33.11	0.44
NTruckeeDrain	Tributary	15332.44	Max WS	488.30	4399.27	4403.86	4401.96	4404.12	0.002024	4.05	120.55	37.05	0.40
NTruckeeDrain	Tributary	15232.21	Max WS	488.27	4398.87	4403.57	4401.87	4403.89	0.002596	4.48	108.97	34.24	0.44
NTruckeeDrain	Tributary	15218		Lat Struct									
NTruckeeDrain	Tributary	15143.84	Max WS	488.28	4398.16	4403.51	4400.90	4403.71	0.001328	3.60	135.59	35.17	0.32
NTruckeeDrain	Tributary	15042.60	Max WS	488.31	4397.81	4403.34	4400.98	4403.56	0.001650	3.77	129.42	37.67	0.36
NTruckeeDrain	Tributary	14938.70	Max WS	488.28	4398.28	4403.19	4401.00	4403.39	0.001650	3.59	135.86	43.28	0.36
NTruckeeDrain	Tributary	14831.55	Max WS	488.24	4398.28	4402.95	4401.13	4403.18	0.002290	3.82	127.72	47.62	0.41
NTruckeeDrain	Tributary	14725.53	Max WS	490.96	4398.28	4402.65	4401.22	4402.91	0.002822	4.05	121.09	48.19	0.45
NTruckeeDrain	Tributary	14607.58	Max WS	490.98	4397.34	4402.45	4400.36	4402.64	0.001784	3.50	140.09	48.92	0.36
NTruckeeDrain	Tributary	14491.20	Max WS	490.93	4396.96	4402.28	4400.20	4402.45	0.001467	3.30	148.83	48.16	0.33
NTruckeeDrain	Tributary	14368.64	Max WS	490.94	4396.81	4402.08	4400.18	4402.26	0.001699	3.36	146.14	52.36	0.35
NTruckeeDrain	Tributary	14248.39	Max WS	490.89	4396.53	4401.97	4399.57	4402.09	0.001038	2.79	175.79	58.24	0.28
NTruckeeDrain	Tributary	14143.24	Max WS	490.98	4396.05	4401.91	4398.92	4402.00	0.000765	2.44	201.41	65.66	0.25
NTruckeeDrain	Tributary	14026.87	Max WS	490.92	4395.53	4401.81	4398.46	4401.91	0.000741	2.49	198.56	64.47	0.24
NTruckeeDrain	Tributary	13898.59	Max WS	493.59	4395.58	4401.74	4398.49	4401.82	0.000614	2.24	219.87	68.43	0.22
NTruckeeDrain	Tributary	13791.80	Max WS	494.99	4395.09	4401.69	4398.21	4401.76	0.000510	2.15	230.76	70.49	0.20
NTruckeeDrain	Tributary	13693.87	Max WS	536.75	4395.09	4401.61	4398.33	4401.70	0.000603	2.34	229.47	66.24	0.22
NTruckeeDrain	Tributary	13601.42	Max WS	597.71	4394.10	4401.57	4397.31	4401.63	0.000397	2.06	289.74	73.11	0.18
NTruckeeDrain	Tributary	13503.65	Max WS	660.32	4394.10	4401.46		4401.57	0.000555	2.63	251.28	55.75	0.22
NTruckeeDrain	Tributary	13330		Culvert									
NTruckeeDrain	Tributary	13328.54	Max WS	660.25	4394.10	4400.32	4397.14	4400.51	0.001084	3.46	191.09	46.02	0.30
NTruckeeDrain	Tributary	13328		Lat Struct									
NTruckeeDrain	Tributary	13320		Lat Struct									
NTruckeeDrain	Tributary	13259.96	Max WS	660.25	4394.10	4400.22	4397.52	4400.42	0.001493	3.55	185.85	55.75	0.34
NTruckeeDrain	Tributary	13127.54	Max WS	659.89	4394.10	4400.14	4397.49	4400.26	0.000875	2.84	232.40	65.51	0.27
NTruckeeDrain	Tributary	13020.16	Max WS	660.05	4394.10	4400.06	4397.34	4400.17	0.000797	2.66	247.71	71.64	0.25
NTruckeeDrain	Tributary	12929.29	Max WS	659.90	4394.10	4400.00	4397.26	4400.10	0.000768	2.58	255.71	76.06	0.25
NTruckeeDrain	Tributary	12836.48	Max WS	660.02	4393.52	4399.93	4397.08	4400.03	0.000700	2.52	261.55	74.10	0.24
NTruckeeDrain	Tributary	12752.35	Max WS	659.82	4393.34	4399.85	4396.54	4399.97	0.000826	2.72	242.17	67.87	0.25
NTruckeeDrain	Tributary	12585.95	Max WS	659.82	4393.34	4399.74	4396.43	4399.84	0.000747	2.53	261.24	77.93	0.24
NTruckeeDrain	Tributary	12362.30	Max WS	658.91	4393.34	4399.49	4396.58	4399.64	0.001045	3.09	213.52	60.14	0.29
NTruckeeDrain	Tributary	12155.32	Max WS	657.77	4393.34	4399.15	4396.92	4399.35	0.001770	3.62	181.78	60.60	0.37
NTruckeeDrain	Tributary	11980.38	Max WS	657.71	4393.34	4398.97	4396.47	4399.11	0.001062	2.91	225.92	72.56	0.29
NTruckeeDrain	Tributary	11844.90	Max WS	657.26	4393.34	4398.79	4396.24	4398.95	0.001252	3.18	206.47	64.86	0.31
NTruckeeDrain	Tributary	11682.43	Max WS	540.27	4393.34	4398.59	4396.39	4398.72	0.001211	2.87	188.08	68.21	0.30
NTruckeeDrain	Tributary	11493.21	Max WS	536.11	4392.50	4398.44	4395.54	4398.53	0.000764	2.45	219.08	70.86	0.25
NTruckeeDrain	Tributary	11303.18	Max WS	528.97	4392.45	4398.34	4395.04	4398.41	0.000520	2.09	253.59	78.87	0.21
NTruckeeDrain	Tributary	11153.09	Max WS	528.94	4392.40	4398.31	4394.81	4398.35	0.000280	1.54	344.13	107.01	0.15
NTruckeeDrain	Tributary	10953.31	Max WS	528.87	4391.34	4398.27	4394.34	4398.30	0.000204	1.40	378.65	106.83	0.13
NTruckeeDrain	Tributary	10757.07	Max WS	528.82	4391.33	4398.24	4393.91	4398.27	0.000142	1.24	427.61	110.68	0.11
NTruckeeDrain	Tributary	10586.82	Max WS	527.72	4391.33	4398.21	4394.16	4398.24	0.000195	1.33	395.87	115.77	0.13
NTruckeeDrain	Tributary	10403.03	Max WS	521.77	4390.15	4398.18	4393.19	4398.21	0.000170	1.26	413.65	118.34	0.12
NTruckeeDrain	Tributary	10318.94	Max WS	522.52	4390.15	4398.16	4393.17	4398.19	0.000180	1.36	387.19	107.36	0.12
NTruckeeDrain	Tributary	10249.67	Max WS	521.40	4389.39	4398.15	4392.36	4398.18	0.000166	1.45	364.37	96.33	0.12
NTruckeeDrain	Tributary	10224.98	Max WS	521.26	4389.38	4398.14		4398.17	0.000172	1.48	351.59	77.16	0.12
NTruckeeDrain	Tributary	10150		Culvert									
NTruckeeDrain	Tributary	10060.93	Max WS	508.61	4390.10	4398.03	4392.89	4398.06	0.000123	1.29	393.10	83.72	0.11
NTruckeeDrain	Tributary	10059		Lat Struct									
NTruckeeDrain	Tributary	10058		Lat Struct									
NTruckeeDrain	Tributary	9970.661	Max WS	508.69	4390.10	4398.03	4392.67	4398.05	0.000110	1.12	455.05	121.49	0.10
NTruckeeDrain	Tributary	9876.722	Max WS	505.89	4390.09	4398.03	4392.76	4398.04	0.000100	0.97	522.08	162.33	0.09
NTruckeeDrain	Tributary	9755.691	Max WS	505.06	4389.51	4398.02	4391.93	4398.03	0.000072	0.86	585.39	167.03	0.08
NTruckeeDrain	Tributary	9609.739	Max WS	503.53	4388.26	4398.00		4398.02	0.000086	1.20	427.96	109.44	0.09
NTruckeeDrain	Tributary	9523		Culvert									
NTruckeeDrain	Tributary	9418.609	Max WS	503.78	4389.37	4397.82	4391.63	4397.84	0.000054	1.02	495.80	117.58	0.07
NTruckeeDrain	Tributary	9417		Lat Struct									
NTruckeeDrain	Tributary	9416		Lat Struct									
NTruckeeDrain	Tributary	9257.442	Max WS	503.50	4389.13	4397.80	4391.98	4397.82	0.000130	1.28	392.67	87.87	0.11
NTruckeeDrain	Tributary	9124.049	Max WS	503.39	4389.23	4397.79	4392.11	4397.81	0.000110	1.15	438.48	103.46	0.10
NTruckeeDrain	Tributary	9008.538	Max WS	503.45	4389.20	4397.77	4392.09	4397.79	0.000112	1.17	430.19	100.42	0.10
NTruckeeDrain	Tributary	8857.967	Max WS	499.63	4388.96	4397.76	4391.92	4397.78	0.000119	1.18	428.20	118.34	0.10
NTruckeeDrain	Tributary	8612.691	Max WS	457.57	4389.21	4397.74	4392.04	4397.76	0.000070	1.01	466.75	117.30	0.08
NTruckeeDrain	Tributary	8453.293	Max WS	445.98	4388.79	4397.73	4391.45	4397.75	0.000054	0.97	473.43	133.11	0.07
NTruckeeDrain	Tributary	8313.991	Max WS	397.64	4388.37	4397.73	4390.76	4397.74	0.000037	0.82	498.06	111.44	0.06
NTruckeeDrain	Tributary	8125		Lat Struct									
NTruckeeDrain	Tributary	8122.300	Max WS	381.60	4388.06	4397.73	4390.45	4397.74	0.000034	0.79	481.85	81.55	0.06
NTruckeeDrain	Tributary	8121		Lat Struct									
NTruckeeDrain	Tributary	7922.604	Max WS	381.98	4388.06	4397.72	4390.12	4397.73	0.000032	0.77	497.56	84.03	0.06
NTruckeeDrain	Tributary	7733.466	Max WS	382.03	4388.06	4397.72	4390.14	4397.73	0.000032	0.72	529.46	104.05	0.05
NTruckeeDrain	Tributary	7574.842	Max WS	371.66	4388.06	4397.71	4390.11	4397.72	0.000028	0.68	558.39	134.17	0.05
NTruckeeDrain	Tributary	7413.038	Max WS	313.17	4388.06	4397.71	4389.85	4397.72	0.000018	0.57	565.66	137.24	0.04
NTruckeeDrain	Tributary	7279.831	Max WS	309.06	4388.06	4397.71	4389.88	4397.72	0.000019	0.57	540.09	101.89	0.04
NTruckeeDrain	Tributary	7155.738	Max WS	308.92	4387.77	4397.71	4389.53	4397.72	0.000018	0.57	541.48	113.19	0.04
NTruckeeDrain	Tributary	7045.650	Max WS	308.74	4387.71	4397.71	4389.45	4397.71	0.000017	0.55	557.85	106.63	0.04

HEC-RAS Plan: CE SEC Locations: User Defined Profile: Max WS (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
NTruckeeDrain	Tributary	6869.778	Max WS	299.20	4387.48	4397.71	4389.88	4397.71	0.000017	0.58	540.91	113.54	0.04
NTruckeeDrain	Tributary	6741.775	Max WS	282.45	4385.23	4397.71	4388.54	4397.71	0.000013	0.48	591.03	121.67	0.03
NTruckeeDrain	Tributary	6649.255	Max WS	278.32	4386.88	4397.70	4388.65	4397.71	0.000013	0.48	584.56	109.25	0.04
NTruckeeDrain	Tributary	6543.668	Max WS	273.86	4386.88	4397.70		4397.71	0.000008	0.46	628.56	114.42	0.03
NTruckeeDrain	Tributary	6479		Culvert									
NTruckeeDrain	Tributary	6420.515	Max WS	273.75	4386.87	4397.66	4388.45	4397.66	0.000010	0.51	543.77	69.33	0.03
NTruckeeDrain	Tributary	6419		Lat Struct									
NTruckeeDrain	Tributary	6418		Lat Struct									
NTruckeeDrain	Tributary	6248.920	Max WS	273.83	4386.44	4397.65	4388.47	4397.66	0.000021	0.67	429.15	104.09	0.04
NTruckeeDrain	Tributary	6072.075	Max WS	273.87	4386.44	4397.65	4388.31	4397.66	0.000017	0.63	455.41	102.41	0.04
NTruckeeDrain	Tributary	5914.636	Max WS	277.42	4386.26	4397.65	4388.35	4397.65	0.000022	0.71	433.91	112.54	0.05
NTruckeeDrain	Tributary	5773.892	Max WS	277.23	4386.26	4397.64	4388.30	4397.65	0.000018	0.65	464.85	105.47	0.04
NTruckeeDrain	Tributary	5633.260	Max WS	277.76	4385.90	4397.64	4387.91	4397.65	0.000015	0.61	517.97	124.18	0.04
NTruckeeDrain	Tributary	5509.261	Max WS	283.32	4385.90	4397.64	4387.84	4397.65	0.000004	0.67	531.24	125.14	0.04
NTruckeeDrain	Tributary	5396.945	Max WS	291.11	4385.90	4397.64	4387.98	4397.65	0.000005	0.73	496.85	113.49	0.04
NTruckeeDrain	Tributary	5270.003	Max WS	299.08	4385.81	4397.64	4388.63	4397.65	0.000005	0.72	525.73	138.84	0.04
NTruckeeDrain	Tributary	5269		Lat Struct									
NTruckeeDrain	Tributary	5160		Lat Struct									
NTruckeeDrain	Tributary	5159.651	Max WS	311.81	4385.68	4397.64	4388.14	4397.64	0.000006	0.72	450.13	80.72	0.05
NTruckeeDrain	Tributary	5021.206	Max WS	320.39	4385.68	4397.64	4387.78	4397.64	0.000006	0.69	466.04	69.29	0.05
NTruckeeDrain	Tributary	4888.770	Max WS	320.37	4385.69	4397.63	4387.83	4397.64	0.000006	0.70	459.80	64.54	0.05
NTruckeeDrain	Tributary	4783.775	Max WS	320.30	4385.69	4397.63	4387.65	4397.64	0.000006	0.69	462.40	62.31	0.04
NTruckeeDrain	Tributary	4660.862	Max WS	320.40	4385.54	4397.63	4387.68	4397.64	0.000006	0.67	476.00	69.32	0.05
NTruckeeDrain	Tributary	4547.564	Max WS	269.54	4385.31	4397.64	4387.29	4397.64	0.000003	0.52	643.74	86.47	0.03
NTruckeeDrain	Tributary	4411.208	Max WS	160.17	4385.32	4397.64	4386.61	4397.64	0.000001	0.34	538.91	81.05	0.02
NTruckeeDrain	Tributary	4295.627	Max WS	120.97	4385.10	4397.64	4386.40	4397.64	0.000001	0.25	518.37	68.55	0.01
NTruckeeDrain	Tributary	4219.063	Max WS	91.48	4384.79	4397.64		4397.64	0.000002	0.21	465.93	62.24	0.01
NTruckeeDrain	Tributary	4218		Culvert									
NTruckeeDrain	Tributary	4113.962	Max WS	91.48	4384.78	4397.63	4385.44	4397.63	0.000001	0.16	610.06	81.17	0.01
NTruckeeDrain	Tributary	4112		Lat Struct									
NTruckeeDrain	Tributary	4111		Lat Struct									
NTruckeeDrain	Tributary	4038.556	Max WS	108.15	4384.78	4397.63	4385.94	4397.63	0.000002	0.23	518.09	72.69	0.01
NTruckeeDrain	Tributary	3957.519	Max WS	129.58	4384.77	4397.63	4386.15	4397.63	0.000003	0.28	501.87	80.62	0.02
NTruckeeDrain	Tributary	3852.635	Max WS	165.24	4384.77	4397.62	4386.32	4397.63	0.000004	0.33	538.11	86.65	0.02
NTruckeeDrain	Tributary	3759.033	Max WS	181.68	4384.77	4397.62	4386.43	4397.62	0.000006	0.40	464.61	79.26	0.02
NTruckeeDrain	Tributary	3681.066	Max WS	177.37	4384.77	4397.62	4386.85	4397.62	0.000012	0.50	366.21	91.91	0.03
NTruckeeDrain	Tributary	3588.525	Max WS	172.92	4384.03	4397.62	4385.93	4397.62	0.000008	0.45	399.39	86.17	0.03
NTruckeeDrain	Tributary	3505.524	Max WS	167.47	4384.02	4397.62	4386.02	4397.62	0.000007	0.46	413.84	81.51	0.03
NTruckeeDrain	Tributary	3406.889	Max WS	173.45	4383.87	4397.62		4397.62	0.000004	0.34	529.00	66.97	0.02
NTruckeeDrain	Tributary	3298		Culvert									
NTruckeeDrain	Tributary	3188.225	Max WS	173.30	4382.64	4397.37	4384.09	4397.37	0.000003	0.30	623.93	87.29	0.02
NTruckeeDrain	Tributary	3145.065	Max WS	173.39	4382.15	4397.36	4384.14	4397.37	0.000003	0.34	561.88	89.28	0.02
NTruckeeDrain	Tributary	3100		Bridge									
NTruckeeDrain	Tributary	3059.291	Max WS	173.39	4381.93	4397.28	4383.68	4397.28	0.000001	0.20	1081.50	96.15	0.01
NTruckeeDrain	Tributary	3036		Lat Struct									
NTruckeeDrain	Tributary	3035		Lat Struct									
NTruckeeDrain	Tributary	3010.569	Max WS	235.84	4381.20	4397.28	4383.06	4397.28	0.000001	0.28	1067.62	94.54	0.01
NTruckeeDrain	Tributary	3010		Lat Struct									
NTruckeeDrain	Tributary	2962.043	Max WS	270.76	4380.94	4397.28	4382.17	4397.28	0.000001	0.23	1355.64	115.54	0.01
NTruckeeDrain	Tributary	2961		Lat Struct									
NTruckeeDrain	Tributary	2905.768 BREACH, DA 6	Max WS	299.88	4380.94	4397.27	4382.83	4397.28	0.000002	0.36	997.05	87.07	0.02
NTruckeeDrain	Tributary	2827.477	Max WS	330.33	4380.94	4397.27	4382.40	4397.28	0.000002	0.37	1036.62	87.85	0.02
NTruckeeDrain	Tributary	2740.825	Max WS	353.21	4380.94	4397.27	4382.54	4397.28	0.000003	0.37	1081.82	98.21	0.02
NTruckeeDrain	Tributary	2624.223	Max WS	381.26	4380.94	4397.27	4382.73	4397.27	0.000004	0.40	1073.38	98.58	0.02
NTruckeeDrain	Tributary	2524.351	Max WS	406.23	4380.94	4397.27	4383.01	4397.27	0.000004	0.43	1060.92	97.61	0.02
NTruckeeDrain	Tributary	2439.675	Max WS	436.39	4380.94	4397.27	4382.96	4397.27	0.000005	0.46	1106.69	98.12	0.02
NTruckeeDrain	Tributary	2357.439	Max WS	476.71	4380.94	4397.27	4382.91	4397.27	0.000005	0.50	1095.86	96.56	0.02
NTruckeeDrain	Tributary	2250.105	Max WS	529.00	4380.94	4397.27	4383.51	4397.27	0.000008	0.60	1049.34	101.18	0.03
NTruckeeDrain	Tributary	2155.553	Max WS	586.93	4380.94	4397.26	4383.41	4397.27	0.000010	0.62	1013.61	98.29	0.03
NTruckeeDrain	Tributary	2029.295	Max WS	626.99	4380.57	4397.26	4383.00	4397.27	0.000011	0.69	1004.96	121.92	0.04
NTruckeeDrain	Tributary	2028		Lat Struct									
NTruckeeDrain	Tributary	1927.129	Max WS	670.44	4379.22	4397.26	4382.15	4397.27	0.000013	0.77	997.02	118.95	0.04
NTruckeeDrain	Tributary	1814.655	Max WS	766.68	4379.22	4397.25	4382.71	4397.26	0.000017	0.88	1017.58	121.01	0.04
NTruckeeDrain	Tributary	1700		Lat Struct									
NTruckeeDrain	Tributary	1686.195	Max WS	861.02	4379.22	4397.24	4382.76	4397.26	0.000027	1.04	893.45	90.58	0.05
NTruckeeDrain	Tributary	1573.275	Max WS	464.27	4379.22	4397.26	4381.57	4397.26	0.000006	0.49	1048.54	138.00	0.02
NTruckeeDrain	Tributary	1465.880 BREACH, DA 7	Max WS	-43.02	4379.22	4397.27		4397.27	0.000000	-0.04	1086.27	116.43	0.00
NTruckeeDrain	Tributary	1422		Culvert									
NTruckeeDrain	Tributary	1385.576	Max WS	-41.84	4378.87	4397.27	4379.65	4397.27	0.000000	-0.06	936.53	123.29	0.00
NTruckeeDrain	Tributary	1384		Lat Struct									
NTruckeeDrain	Tributary	1383		Lat Struct									
NTruckeeDrain	Tributary	1311.404	Max WS	-25.76	4378.80	4397.27	4379.14	4397.27	0.000000	-0.02	1041.58	104.94	0.00
NTruckeeDrain	Tributary	1207.861	Max WS	0.68	4378.34	4397.27	4378.41	4397.27	0.000000	0.00	813.73	92.48	0.00
NTruckeeDrain	Tributary	1126.612	Max WS	24.90	4378.08	4397.27	4378.57	4397.27	0.000000	0.03	815.24	92.22	0.00
NTruckeeDrain	Tributary	1044.111	Max WS	48.86	4377.98	4397.27	4378.67	4397.27	0.000000	0.06	829.95	92.07	0.00
NTruckeeDrain	Tributary	922.250	Max WS	86.92	4377.92	4397.27	4378.87	4397.27	0.000000	0.11	844.35	101.33	0.01
NTruckeeDrain	Tributary	812.551	Max WS	122.38	4377.87	4397.27	4379.02	4397.27	0.000001	0.15	875.76	114.00	0.01
NTruckeeDrain	Tributary	723.402	Max WS	139.90	4377.91	4397.27	4379.15	4397.27	0.000001	0.16	881.45	112.20	0.01
NTruckeeDrain	Tributary	656.064	Max WS	153.19	4377.91	4397.27		4397.27	0.000001	0.19	811.28	87.30	0.01
NTruckeeDrain	Tributary	590		Culvert									
NTruckeeDrain	Tributary	540.623	Max WS	152.76	4375.97	4397.22	4376.98	4397.22	0.000000	0.12	1323.47	114.72	0.01
NTruckeeDrain	Tributary	539		Lat Struct									
NTruckeeDrain	Tributary	536		Lat Struct									
NTruckeeDrain	Tributary	523.133	Max WS	168.29	4377.81	4397.22	4379.07	4397.22	0.000001	0.17	1013.64	113.02	0.01
NTruckeeDrain	Tributary	434.091	Max WS	253.96	4377.81	4397.22	4379.49	4397.22	0.000003	0.28	967.53	117.79	0.01
NTruckeeDrain	Tributary	375.106	Max WS	309.93	4377.81	4397.22	4379.78	4397.22	0.000004	0.35	954.88	118.57	0.02
NTruckeeDrain	Tributary	319.994	Max WS	367.86	4377.81	4397.22	4380.08	4397.22	0.000007	0.42	929.19	107.41	0.02
NTruckeeDrain	Tributary	251.492	Max WS	449.11	4377.34	4397.22	4380.07	4397.22	0.000008	0.47	992.71	109.72	0.02
NTruckeeDrain	Tributary	178.328	Max WS	542.68	4377.34	4397.21	4379.98	4397.22	0.000006	0.49	1188.65	118.61	0.02
NTruckeeDrain	Tributary	107.382	Max WS	603.43	4376.14	4397.21	4379.74	4397.22	0.000009	0.59	1114.84	106.38	0.03
NTruckeeDrain	Tributary	0.01	Max WS	603.63	4371.84	4397.21	4375.44	4397.21	0.000003	0.43	1572.49	106.38	0.02
SteamBoatCr	Upper	29258.51	Max WS	5419.81	4409.05	4417.05	4416.73	4418.47	0.006349	11.96	1573.87	443.70	0.79
SteamBoatCr	Upper	29061.92	Max WS	5419.64	4409.05	4416.09	4415.57	4416.97	0.006257	11.06	2322.69	731.02	0.76
SteamBoatCr	Upper	28822.49	Max WS	5419.27	4409.05	4415.03	4414.02	4415.44	0.005480	9.19	3075.99	909.92	0.69
SteamBoatCr	Upper	28521.06	Max WS	5417.45	4408.63	4413.95	4412.41	4414.15	0.003863	7.40	3999.09	1120.90	0.58
SteamBoatCr	Upper	28144.01	Max WS	5416.40	4408.63	4412.90	4410.99	4412.98	0.003409	5.84	4941.89	1524.86	0.53
SteamBoatCr	Upper	27806.39	Max WS	5416.07	4408.28	4411.79	4408.96	4411.85	0.003908	5.45	4563.05	1308.18	0.55
SteamBoatCr	Upper	27733.0*	Max WS	5416.30	4407.69	4411.49	4408.73	4411.55	0.003959	5.21	4593.07	1313.77	0.54
SteamBoatCr	Upper	27659.6*	Max WS	5415.83	4407.09	4411.20	4408.49	4411.24	0.003989	5.03	4635.19	1308.16	0.54
SteamBoatCr	Upper	27586.31	Max WS	5415.62	4406.50	4410.90	4407.84	4410.94	0.003911	4.96	4721.12	1310.55	0.52
SteamBoatCr	Upper	27516.5*	Max WS	5415.37	4406.13	4410.62	4408.01	4410.66	0.003885	4.87	4710.14	1312.42	0.52
SteamBoatCr	Upper	27446.7*	Max WS	5414.85	4405.76	4410.34	4407.95	4410.39	0.003765	5.17	4715.64	1326.31	0.53
SteamBoatCr	Upper	27376.95	Max WS	5415.47	4405.39	4410.07	4407.79	4410.14	0.003533	5.68	4764.94	1327.04	0.53
SteamBoatCr	Upper	26995.9	Max WS	5413.81	4403.71	4408.78	4406.71	4408.87	0.003217	6.21	4769.86	1286.29	0.51
SteamBoatCr	Upper	26519.63	Max WS	5413.20	4402.45	4407.43	4405.50	4407.50	0.003508	5.62	4841.58	1406.53	0.52
SteamBoatCr	Upper	26383.9*	Max WS	5413.12	4402.18	4406.92	4405.04	4406.99	0.003963	5.66	4772.45	1467.21	0.55
SteamBoatCr	Upper	26248.3*	Max WS	5412.98	4401.92	4406.32	4404.73	4406.40	0.004704	5.91	4623.59	1535.10	0.59
SteamBoatCr	Upper	26112.71	Max WS	5412.73	4401.65	4405.64	4404.20	4405.72	0.005252	6.03	4560.83	1603.71	0.61

HEC-RAS Plan: CE SEC Locations: User Defined Profile: Max WS (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
SteamBoatCr	Upper	25917.6*	Max WS	5412.21	4400.24	4404.55	4403.48	4404.64	0.005381	6.13	4988.76	2139.33	0.63
SteamBoatCr	Upper	25722.54	Max WS	5412.44	4398.83	4403.68	4402.17	4403.75	0.003185	4.99	5837.63	2221.84	0.50
SteamBoatCr	Upper	25655.1*	Max WS	5411.42	4398.35	4403.40	4401.85	4403.47	0.003339	5.37	5832.84	2226.44	0.51
SteamBoatCr	Upper	25587.8*	Max WS	5411.87	4397.86	4403.11	4401.45	4403.18	0.003190	5.39	5923.76	2179.25	0.50
SteamBoatCr	Upper	25520.43	Max WS	5410.65	4397.38	4402.85	4401.09	4402.90	0.002863	5.12	6070.37	2082.12	0.47
SteamBoatCr	Upper	25354.43	Max WS	5409.39	4396.12	4402.34	4400.57	4402.40	0.001856	4.51	6604.97	2113.88	0.40
SteamBoatCr	Upper	25354		Lat Struct									
SteamBoatCr	Upper	24653.49	Max WS	5409.45	4395.37	4400.89	4399.43	4400.94	0.003276	5.13	5718.15	1956.81	0.49
SteamBoatCr	Upper	24361.73	Max WS	5409.16	4395.18	4399.93	4398.19	4399.99	0.003875	5.57	5178.98	1702.11	0.52
SteamBoatCr	Upper	24361		Lat Struct									
SteamBoatCr	Upper	24129.94	Max WS	5404.64	4394.45	4399.25	4397.34	4399.32	0.002369	4.55	5849.55	1787.35	0.44
SteamBoatCr	Upper	23954.68	Max WS	5397.56	4393.51	4398.86	4396.44	4398.89	0.001857	4.09	6897.73	1988.21	0.37
SteamBoatCr	Upper	23954		Lat Struct									
SteamBoatCr	Upper	23811.76	Max WS	5382.58	4393.11	4398.58	4395.76	4398.59	0.001231	3.05	8149.85	2156.16	0.29
SteamBoatCr	Upper	23735.76	Max WS	5196.19	4393.09	4398.51	4395.19	4398.51	0.000743	2.09	9832.81	2447.63	0.23
SteamBoatCr	Upper	23730		Lat Struct									
SteamBoatCr	Upper	23660		Lat Struct									
SteamBoatCr	Upper	23657.7	Max WS	4491.58	4393.09	4398.46	4394.22	4398.46	0.000624	1.81	8643.56	1966.38	0.21
SteamBoatCr	Upper	23503.7	Max WS	4486.23	4392.58	4398.35	4394.30	4398.36	0.000654	2.36	7899.23	1681.50	0.23
SteamBoatCr	Upper	23248.73	Max WS	3335.67	4392.58	4398.24	4392.95	4398.24	0.000399	1.59	7353.26	1496.77	0.17
SteamBoatCr	Upper	23042.22	Max WS	3275.28	4392.03	4398.15	4393.83	4398.15	0.000497	1.86	6155.32	1188.23	0.19
SteamBoatCr	Upper	22829.57	Max WS	1885.29	4391.68	4398.04	4392.27	4398.05	0.000218	1.24	5086.36	938.71	0.13
SteamBoatCr	Upper	22530		Lat Struct									
SteamBoatCr	Upper	22523.2	Max WS	1498.07	4390.77	4397.98	4392.17	4397.99	0.000216	1.71	3656.90	627.13	0.13
SteamBoatCr	Upper	22459.0*	Max WS	1326.76	4390.73	4397.97	4392.94	4397.98	0.000174	1.63	3515.59	600.64	0.12
SteamBoatCr	Upper	22394.8*	Max WS	1287.87	4390.68	4397.96	4392.99	4397.97	0.000168	1.68	3376.40	574.47	0.12
SteamBoatCr	Upper	22330.7*	Max WS	1276.82	4390.64	4397.95	4393.14	4397.96	0.000170	1.77	3238.98	548.40	0.12
SteamBoatCr	Upper	22266.5*	Max WS	1176.70	4390.59	4397.94	4393.10	4397.95	0.000148	1.73	3103.78	522.36	0.12
SteamBoatCr	Upper	22202.3*	Max WS	1169.39	4390.54	4397.93	4393.10	4397.95	0.000150	1.80	2971.02	496.34	0.12
SteamBoatCr	Upper	22138.2	Max WS	1179.07	4390.50	4397.92	4393.13	4397.94	0.000156	1.90	2839.63	470.25	0.13
SteamBoatCr	Upper	22130		Inl Struct									
SteamBoatCr	Upper	22104.53	Max WS	1157.64	4389.03	4397.87	4392.34	4397.87	0.000101	0.98	2566.38	574.04	0.06
SteamBoatCr	Upper	22104		Lat Struct									
SteamBoatCr	Upper	21999.13	Max WS	1075.86	4388.59	4397.86	4391.93	4397.86	0.000016	0.64	3164.34	707.33	0.04
SteamBoatCr	Upper	21892.55	Max WS	1028.63	4388.80	4397.86	4391.54	4397.86	0.000013	0.55	3016.38	754.13	0.03
SteamBoatCr	Upper	21890		Lat Struct									
SteamBoatCr	Upper	21811.05	Max WS	1000.47	4390.04	4397.86	4391.56	4397.86	0.000042	0.68	1907.58	792.50	0.04
SteamBoatCr	Upper	21772.5*	Max WS	997.78	4389.31	4397.85	4391.36	4397.86	0.000044	0.71	1754.73	805.79	0.04
SteamBoatCr	Upper	21734.0*	Max WS	999.57	4388.57	4397.85	4390.68	4397.86	0.000040	0.70	1704.83	820.34	0.04
SteamBoatCr	Upper	21695.57	Max WS	1000.58	4387.84	4397.85	4389.92	4397.86	0.000036	0.69	1640.60	834.78	0.04
SteamBoatCr	Upper	21674.46	Max WS	999.16	4387.61	4397.85		4397.86	0.000045	0.81	1482.83	839.43	0.05
SteamBoatCr	Upper	21598.56		Culvert									
SteamBoatCr	Upper	21525.74	Max WS	993.37	4386.88	4397.79	4388.86	4397.80	0.000014	0.71	1740.23	421.76	0.04
SteamBoatCr	Upper	21413.75	Max WS	988.62	4386.84	4397.79	4389.01	4397.80	0.000008	0.57	2236.26	432.04	0.03
SteamBoatCr	Upper	21412.56		Lat Struct									
SteamBoatCr	Upper	21285.79	Max WS	1011.64	4386.69	4397.79	4389.89	4397.80	0.000005	0.41	2481.03	439.28	0.02
SteamBoatCr	Upper	21178.89	Max WS	1029.25	4386.11	4397.79	4389.78	4397.80	0.000003	0.33	3123.08	391.82	0.02
SteamBoatCr	Upper	21058.15	Max WS	1045.02	4385.91	4397.79	4389.63	4397.80	0.000005	0.41	2570.43	302.58	0.02
SteamBoatCr	Upper	20927.06	Max WS	1068.68	4385.15	4397.79	4389.11	4397.79	0.000005	0.41	2593.61	302.68	0.02
SteamBoatCr	Upper	20809.64	Max WS	1100.35	4385.37	4397.79	4388.89	4397.79	0.000005	0.43	2579.35	288.59	0.03
SteamBoatCr	Upper	20690.41	Max WS	1134.81	4385.36	4397.79	4388.43	4397.79	0.000004	0.41	2751.98	292.72	0.02
SteamBoatCr	Upper	20584.56	Max WS	1164.65	4385.31	4397.79	4388.40	4397.79	0.000005	0.46	2529.43	269.87	0.03
SteamBoatCr	Upper	20469.92	Max WS	1205.02	4384.57	4397.79	4388.00	4397.79	0.000006	0.50	2396.22	248.18	0.03
SteamBoatCr	Upper	20321.14	Max WS	1283.31	4383.37	4397.79	4387.72	4397.79	0.000006	0.49	2664.68	273.19	0.03
SteamBoatCr	Upper	20320		Lat Struct									
SteamBoatCr	Upper	20223.28	Max WS	1345.86	4384.23	4397.79	4387.60	4397.79	0.000006	0.49	2766.43	277.99	0.03
SteamBoatCr	Upper	20156.8	Max WS	1384.86	4384.60	4397.79	4387.54	4397.79	0.000005	0.48	2886.62	290.58	0.03
SteamBoatCr	Upper	20089.65	Max WS	1417.02	4384.65	4397.79	4387.44	4397.79	0.000005	0.45	3208.37	325.69	0.02
SteamBoatCr	Upper	20015.97	Max WS	1450.49	4384.92	4397.79	4387.30	4397.79	0.000004	0.44	3393.17	341.57	0.02
SteamBoatCr	Upper	19940.35	Max WS	1494.43	4384.38	4397.78	4387.43	4397.79	0.000005	0.46	3265.54	328.88	0.03
SteamBoatCr	Upper	19847.37	Max WS	1555.30	4384.83	4397.78	4387.43	4397.79	0.000005	0.47	3433.50	370.35	0.03
SteamBoatCr	Upper	19755.16	Max WS	1609.11	4384.89	4397.78	4387.31	4397.79	0.000005	0.49	3672.15	433.74	0.03
SteamBoatCr	Upper	19613.12	Max WS	1751.74	4384.75	4397.78	4387.38	4397.78	0.000006	0.54	3564.13	605.91	0.03
SteamBoatCr	Upper	19612.56		Lat Struct									
SteamBoatCr	Upper	19386.72	Max WS	1994.35	4384.27	4397.78	4387.23	4397.78	0.000007	0.60	3551.89	672.62	0.03
SteamBoatCr	Upper	19327		Lat Struct									
SteamBoatCr	Upper	19243.17	Max WS	2078.88	4384.28	4397.78	4387.25	4397.78	0.000007	0.60	3770.70	1122.08	0.03
SteamBoatCr	Upper	19090.5	Max WS	2077.04	4384.10	4397.77	4386.78	4397.78	0.000007	0.59	3941.09	1097.03	0.03
SteamBoatCr	Upper	18906.85	Max WS	2076.22	4383.72	4397.77	4386.79	4397.78	0.000007	0.59	3860.40	1106.92	0.03
SteamBoatCr	Upper	18764.37	Max WS	2081.78	4383.89	4397.77	4386.78	4397.78	0.000006	0.58	3926.49	967.42	0.03
SteamBoatCr	Upper	18573.66	Max WS	2082.57	4383.64	4397.77	4386.73	4397.78	0.000006	0.56	3949.47	1042.40	0.03
SteamBoatCr	Upper	18388.55	Max WS	2082.90	4383.96	4397.77	4386.35	4397.78	0.000006	0.56	3769.82	943.67	0.03
SteamBoatCr	Upper	18200.96	Max WS	2085.25	4383.14	4397.77	4386.02	4397.77	0.000005	0.52	4317.70	935.32	0.03
SteamBoatCr	Upper	18077.76	Max WS	2084.06	4383.12	4397.77	4386.10	4397.77	0.000005	0.53	4304.40	919.92	0.03
SteamBoatCr	Upper	18076.56		Lat Struct									
SteamBoatCr	Upper	17874.56	Max WS	2082.72	4383.17	4397.76	4386.66	4397.77	0.000013	0.83	3108.76	859.31	0.04
SteamBoatCr	Upper	17699.19	Max WS	2084.23	4383.38	4397.76	4386.48	4397.77	0.000013	0.83	2719.95	865.18	0.04
SteamBoatCr	Upper	17514.	Max WS	2087.89	4382.91	4397.76	4386.14	4397.77	0.000010	0.76	2948.93	1012.46	0.04
SteamBoatCr	Upper	17316.97	Max WS	2085.25	4382.71	4397.76	4384.55	4397.77	0.000002	0.33	6460.03	1043.47	0.02
SteamBoatCr	Upper	17248.07	Max WS	2088.53	4381.91	4397.77	4383.56	4397.77	0.000001	0.22	9725.31	1046.29	0.01
SteamBoatCr	Upper	17246		Lat Struct									
SteamBoatCr	Upper	17178.47	Max WS	1973.34	4381.45	4397.77	4382.79	4397.77	0.000000	0.16	12384.82	910.98	0.01
SteamBoatCr	Upper	17080.01	Max WS	1949.49	4381.15	4397.77	4383.39	4397.77	0.000001	0.21	9809.80	772.05	0.01
SteamBoatCr	Upper	16992.67	Max WS	1935.98	4381.54	4397.76	4383.28	4397.77	0.000002	0.38	5648.63	435.56	0.02
SteamBoatCr	Upper	16904.73	Max WS	1938.19	4381.72	4397.76	4383.71	4397.77	0.000005	0.56	3814.41	316.03	0.03
SteamBoatCr	Upper	16903.56		Lat Struct									
SteamBoatCr	Upper	16796.86	Max WS	1940.12	4381.97	4397.76	4384.22	4397.77	0.000006	0.66	3284.36	269.06	0.03
SteamBoatCr	Upper	16710.79	Max WS	1944.12	4381.98	4397.76	4384.43	4397.77	0.000009	0.78	2836.87	237.37	0.04
SteamBoatCr	Upper	16602.78	Max WS	1969.35	4381.64	4397.75	4384.77	4397.77	0.000018	1.08	2071.77	177.49	0.05
SteamBoatCr	Upper	16601.56		Lat Struct									
SteamBoatCr	Upper	16520.59	Max WS	2017.86	4381.27	4397.74	4384.51	4397.76	0.000021	1.22	1914.65	157.36	0.06
SteamBoatCr	Upper	16439.21	Max WS	2057.90	4380.93	4397.75	4383.77	4397.76	0.000009	0.79	2969.73	248.20	0.04
SteamBoatCr	Upper	16334.3	Max WS	2076.90	4381.17	4397.75	4383.51	4397.76	0.000003	0.48	4583.17	352.08	0.02
SteamBoatCr	Upper	16233.06	Max WS	2101.96	4381.46	4397.75	4383.35	4397.76	0.000002	0.39	5670.03	401.79	0.02
SteamBoatCr	Upper	16151.45	Max WS	2106.95	4381.58	4397.75	4383.44	4397.76	0.000003	0.47	4784.77	360.63	0.02
SteamBoatCr	Upper	16086.9	Max WS	2099.58	4381.60	4397.75	4383.44	4397.76	0.000004	0.53	4276.86	324.66	0.02
SteamBoatCr	Upper	16008.16	Max WS	2089.69	4381.16	4397.75	4383.34	4397.76	0.000004	0.52	4263.09	308.55	0.02
SteamBoatCr	Lower	15956.98	Max WS	3269.23	4380.87	4397.75	4383.60	4397.76	0.000004	0.57	6269.11	546.89	0.03
SteamBoatCr	Lower	15866.74	Max WS	3267.81	4381.07	4397.75	4384.06	4397.76	0.000006	0.62	5741.80	507.92	0.03
SteamBoatCr	Lower	15865		Lat Struct									
SteamBoatCr	Lower	15860		Lat Struct									
SteamBoatCr	Lower	15759.12	Max WS	3061.33	4380.68	4397.75	4383.96	4397.76	0.000005	0.62	5333.28	441.89	0.03
SteamBoatCr	Lower	15665.81	Max WS	2865.63	4380.93	4397.75	4384.06	4397.76	0.000007	0.70	4376.48	350.94	0.03
SteamBoatCr	Lower	15589.79	Max WS	2719.28	4381.57	4397.75	4384.46	4397.76	0.000007	0.69	4523.35	442.39	0.03
SteamBoatCr	Lower	15520.35	Max WS	2599.79	4381.84	4397.75	4384.93	4397.76	0.000010	0.81	3808.93	396.25	0.04
SteamBoatCr	Lower	15447.35	Max WS	2458.95	4381.72	4397.75	4385.46	4397.76	0.000016	1.02	3064.64	366.87	0.05
SteamBoatCr	Lower	15372.57	Max WS	2336.50	4383.30	4397.73	4387.17	4397.76	0.000051	1.55	1987.86	329.43	0.08
SteamBoatCr	Lower	15299.22	Max WS	2525.15	4381.58	4397.61	4387.49	4397.77	0.000157	3.19	792.21	233.94	0.15

HEC-RAS Plan: CE SEC Locations: User Defined Profile: Max WS (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
SteamBoatCr	Lower	15278.56		Bridge									
SteamBoatCr	Lower	15240.02	Max WS	2527.77	4382.30	4397.62	4387.23	4397.74	0.000116	2.73	924.89	226.36	0.13
SteamBoatCr	Lower	15240		Lat Struct									
SteamBoatCr	Lower	14957.71	Max WS	2814.85	4377.68	4397.66	4383.71	4397.67	0.000023	1.30	3973.58	663.04	0.06
SteamBoatCr	Lower	14739.25	Max WS	2983.74	4378.71	4397.66	4384.15	4397.67	0.000014	1.05	5347.00	863.31	0.05
SteamBoatCr	Lower	14340.06	Max WS	3390.92	4378.09	4397.65	4385.62	4397.66	0.000014	1.05	6545.22	993.47	0.05
SteamBoatCr	Lower	13988.00	Max WS	3427.13	4379.59	4397.65	4386.23	4397.65	0.000013	0.97	6266.79	992.69	0.04
SteamBoatCr	Lower	13719.15	Max WS	3530.12	4379.73	4397.64	4386.32	4397.65	0.000016	1.18	5349.49	774.46	0.05
SteamBoatCr	Lower	13339.62	Max WS	3846.20	4379.41	4397.63	4386.18	4397.64	0.000020	1.31	5501.99	992.16	0.06
SteamBoatCr	Lower	13134.71	Max WS	4187.33	4379.15	4397.62	4387.60	4397.64	0.000029	1.61	4875.05	873.28	0.07
SteamBoatCr	Lower	12854.52	Max WS	4585.29	4379.41	4397.62	4385.03	4397.63	0.000006	0.76	8545.39	936.43	0.03
SteamBoatCr	Lower	12574.68	Max WS	4822.93	4379.40	4397.62	4385.91	4397.63	0.000005	0.70	11191.49	1102.88	0.03
SteamBoatCr	Lower	12574		Lat Struct									
SteamBoatCr	Lower	12231.71	Max WS	5261.50	4379.30	4397.62	4386.05	4397.62	0.000004	0.61	12663.23	1061.39	0.03
SteamBoatCr	Lower	12200		Lat Struct									
SteamBoatCr	Lower	11731.31	Max WS	5256.77	4379.22	4397.62	4387.20	4397.62	0.000005	0.65	11794.21	933.20	0.03
SteamBoatCr	Lower	11301.38	Max WS	4894.63	4378.40	4397.61	4386.02	4397.62	0.000009	0.94	8543.60	737.22	0.04
SteamBoatCr	Lower	10663.19	Max WS	4420.32	4378.90	4397.61	4382.58	4397.61	0.000004	0.66	10281.77	675.54	0.03
SteamBoatCr	Lower	10402.49	Max WS	4214.85	4379.07	4397.61	4383.53	4397.61	0.000005	0.72	9402.60	1259.11	0.03
SteamBoatCr	Lower	10135.62	Max WS	4134.75	4379.01	4397.61	4384.11	4397.61	0.000005	0.74	10002.96	858.96	0.03
SteamBoatCr	Lower	9824.705	Max WS	4106.29	4379.00	4397.60	4384.66	4397.61	0.000011	1.01	6402.77	638.73	0.05
SteamBoatCr	Lower	9558.202	Max WS	3999.94	4378.70	4397.60	4384.57	4397.61	0.000013	1.06	6225.90	665.75	0.05
SteamBoatCr	Lower	9306.021	Max WS	3903.19	4378.28	4397.60	4383.86	4397.61	0.000010	0.99	7375.90	795.69	0.04
SteamBoatCr	Lower	9053.586	Max WS	3783.88	4377.96	4397.60	4385.46	4397.60	0.000011	0.92	7070.97	748.82	0.04
SteamBoatCr	Lower	8829.826	Max WS	3736.14	4378.55	4397.59	4384.65	4397.60	0.000016	1.23	5477.16	564.28	0.05
SteamBoatCr	Lower	8594.285	Max WS	3720.09	4378.22	4397.58	4383.85	4397.60	0.000019	1.42	4744.23	496.78	0.06
SteamBoatCr	Lower	8320.428	Max WS	3721.37	4378.01	4397.57	4384.86	4397.60	0.000037	1.80	3271.07	333.54	0.08
SteamBoatCr	Lower	8084.169	Max WS	3721.06	4377.85	4397.57	4384.44	4397.59	0.000022	1.48	4605.38	513.31	0.06
SteamBoatCr	Lower	7827.352	Max WS	3724.08	4377.46	4397.56	4384.95	4397.58	0.000025	1.42	4113.00	438.62	0.06
SteamBoatCr	Lower	7612.764	Max WS	3741.10	4377.71	4397.55	4384.25	4397.58	0.000031	1.71	3742.97	381.33	0.07
SteamBoatCr	Lower	7370.842	Max WS	3832.34	4377.36	4397.53	4384.29	4397.57	0.000045	2.04	2935.93	276.86	0.08
SteamBoatCr	Lower	7120.541	Max WS	4031.08	4377.22	4397.53	4383.61	4397.55	0.000019	1.38	4325.70	336.97	0.06
SteamBoatCr	Lower	6877.138	Max WS	4099.07	4377.32	4397.53	4383.83	4397.55	0.000018	1.38	4782.46	410.88	0.06
SteamBoatCr	Lower	6646.991	Max WS	4371.75	4377.51	4397.52	4384.61	4397.54	0.000021	1.46	5070.88	473.68	0.06
SteamBoatCr	Lower	6423.999	Max WS	4686.60	4377.48	4397.51	4384.28	4397.54	0.000026	1.63	5122.01	506.55	0.07
SteamBoatCr	Lower	6356.156	Max WS	4820.05	4377.07	4397.51	4384.94	4397.53	0.000030	1.47	5188.56	497.19	0.07
SteamBoatCr	Lower	6282.588	Max WS	4885.01	4376.91	4397.51	4385.20	4397.53	0.000023	1.24	6089.75	574.13	0.06
SteamBoatCr	Lower	6268.09		Bridge									
SteamBoatCr	Lower	6231.1	Max WS	4890.99	4377.39	4397.46	4385.00	4397.48	0.000046	1.79	4836.95	624.44	0.08
SteamBoatCr	Lower	6230.09		Lat Struct									
SteamBoatCr	Lower	6082.992	Max WS	4422.24	4376.95	4397.46	4385.06	4397.48	0.000032	1.41	5101.95	604.47	0.07
SteamBoatCr	Lower	5773.268	Max WS	3645.15	4377.34	4397.45	4383.31	4397.47	0.000033	1.63	3787.42	441.50	0.07
SteamBoatCr	Lower	5379.09	Max WS	3087.23	4377.17	4397.39	4384.89	4397.48	0.000096	2.54	1552.30	184.04	0.12
SteamBoatCr	Lower	5378.09		Lat Struct									
SteamBoatCr	Lower	5316.216	Max WS	3039.70	4376.50	4397.37	4385.06	4397.48	0.000128	2.81	1389.81	190.50	0.13
SteamBoatCr	Lower	5254.334	Max WS	3035.12	4376.29	4397.36	4384.03	4397.47	0.000139	2.83	1291.37	177.43	0.13
SteamBoatCr	Lower	5191.248	Max WS	3031.61	4376.68	4397.36	4384.43	4397.47	0.000128	2.79	1416.68	178.81	0.13
SteamBoatCr	Lower	5127.067	Max WS	3024.64	4377.27	4397.38	4382.90	4397.45	0.000063	2.28	1760.77	175.13	0.09
SteamBoatCr	Lower	5071.02	Max WS	3011.69	4376.30	4397.39	4382.25	4397.45	0.000054	2.12	1870.77	172.63	0.09
SteamBoatCr	Lower	5018.38	Max WS	2986.28	4375.93	4397.39	4381.92	4397.44	0.000045	1.95	1958.41	173.65	0.08
SteamBoatCr	Lower	4967.807	Max WS	2957.38	4375.65	4397.40	4382.01	4397.44	0.000036	1.75	2080.21	175.46	0.07
SteamBoatCr	Lower	4922.298	Max WS	2915.37	4375.97	4397.40	4381.58	4397.44	0.000037	1.65	1989.24	164.65	0.07
SteamBoatCr	Lower	4876.992	Max WS	2849.55	4376.87	4397.40	4382.27	4397.44	0.000040	1.74	2055.17	195.26	0.07
SteamBoatCr	Lower	4817.133	Max WS	2801.06	4375.30	4397.39	4381.93	4397.44	0.000047	1.93	1862.45	174.23	0.08
SteamBoatCr	Lower	4761.179	Max WS	2755.49	4374.93	4397.39	4381.93	4397.44	0.000053	2.04	1710.89	156.04	0.08
SteamBoatCr	Lower	4711.518	Max WS	2720.09	4375.06	4397.38	4381.78	4397.44	0.000058	2.12	1596.58	147.83	0.09
SteamBoatCr	Lower	4656.742	Max WS	2687.52	4375.16	4397.38	4381.66	4397.44	0.000054	2.06	1582.13	143.56	0.09
SteamBoatCr	Lower	4610.862	Max WS	2669.01	4375.01	4397.37	4381.17	4397.43	0.000059	2.02	1455.68	124.72	0.09
SteamBoatCr	Lower	4570		Lat Struct									
SteamBoatCr	Lower	4567.007	Max WS	2653.06	4374.93	4397.37	4381.17	4397.43	0.000053	2.00	1499.49	127.04	0.08
SteamBoatCr	Lower	4528.498	Max WS	2645.21	4376.09	4397.37	4381.80	4397.43	0.000055	2.09	1477.58	124.54	0.09
SteamBoatCr	Lower	4487.889	Max WS	2638.81	4377.29	4397.37	4382.48	4397.43	0.000064	2.02	1500.68	133.04	0.09
SteamBoatCr	Lower	4448.158	Max WS	2628.67	4375.52	4397.37	4381.50	4397.43	0.000054	1.88	1603.48	141.89	0.08
SteamBoatCr	Lower	4407.969	Max WS	2608.58	4375.79	4397.38	4381.32	4397.42	0.000042	1.79	1693.99	149.17	0.08
SteamBoatCr	Lower	4364.395	Max WS	2592.06	4375.92	4397.38	4381.22	4397.42	0.000043	1.80	1658.43	144.58	0.08
SteamBoatCr	Lower	4319.53	Max WS	2577.40	4376.41	4397.37	4381.49	4397.42	0.000042	1.79	1653.68	145.95	0.08
SteamBoatCr	Lower	4276.437	Max WS	2556.58	4376.68	4397.38	4381.74	4397.42	0.000038	1.61	1804.19	161.19	0.07
SteamBoatCr	Lower	4237.77	Max WS	2539.25	4376.61	4397.38	4381.95	4397.42	0.000039	1.71	1834.76	169.17	0.07
SteamBoatCr	Lower	4193.807	Max WS	2524.43	4376.04	4397.37	4382.02	4397.42	0.000047	1.91	1726.46	165.99	0.08
SteamBoatCr	Lower	4151.331	Max WS	2515.36	4376.19	4397.37	4381.85	4397.42	0.000046	1.94	1646.53	158.19	0.08
SteamBoatCr	Lower	4117.07	Max WS	2504.13	4376.16	4397.37	4381.26	4397.42	0.000038	1.76	1776.40	173.48	0.07
SteamBoatCr	Lower	4083.562	Max WS	2491.85	4376.05	4397.37	4381.24	4397.41	0.000038	1.73	1734.35	191.04	0.07
SteamBoatCr	Lower	4060.196	Max WS	2490.93	4376.03	4397.37	4381.01	4397.41	0.000035	1.70	1739.16	168.78	0.07
SteamBoatCr	Lower	4018.809	Max WS	2490.30	4375.98	4397.37	4381.15	4397.41	0.000039	1.65	1711.95	178.62	0.07
SteamBoatCr	Lower	3971.608	Max WS	2490.48	4376.26	4397.37	4381.01	4397.41	0.000039	1.65	1812.72	182.36	0.07
SteamBoatCr	Lower	3932.105	Max WS	2490.23	4376.40	4397.37	4381.05	4397.41	0.000039	1.63	1847.22	183.96	0.07
SteamBoatCr	Lower	3893.146	Max WS	2491.36	4375.81	4397.37	4380.89	4397.41	0.000037	1.59	1900.42	174.16	0.07
SteamBoatCr	Lower	3857.172	Max WS	2491.11	4375.76	4397.37	4380.88	4397.40	0.000037	1.60	1900.89	165.65	0.07
SteamBoatCr	Lower	3818.865	Max WS	2489.79	4375.71	4397.37	4381.01	4397.40	0.000034	1.55	1950.98	168.91	0.07
SteamBoatCr	Lower	3817.09		Lat Struct									
SteamBoatCr	Lower	3779.034	Max WS	2490.37	4375.94	4397.37	4381.06	4397.40	0.000036	1.61	1913.05	176.82	0.07
SteamBoatCr	Lower	3740.76	Max WS	2489.66	4376.63	4397.37	4381.45	4397.40	0.000035	1.57	1917.07	160.51	0.07
SteamBoatCr	Lower	3698.877	Max WS	2490.19	4376.28	4397.36	4381.14	4397.40	0.000035	1.54	1872.54	149.35	0.07
SteamBoatCr	Lower	3663.203	Max WS	2489.73	4375.54	4397.36	4380.79	4397.40	0.000035	1.56	1845.95	153.56	0.07
SteamBoatCr	Lower	3637.926	Max WS	2490.40	4375.69	4397.36	4381.21	4397.40	0.000036	1.50	1821.00	175.29	0.07
SteamBoatCr	Lower	3595.906	Max WS	2490.08	4375.78	4397.35	4381.14	4397.40	0.000035	1.75	1725.90	181.85	0.07
SteamBoatCr	Lower	3549		Lat Struct									
SteamBoatCr	Lower	3546.287	Max WS	2491.23	4375.56	4397.35	4381.21	4397.39	0.000039	1.78	1617.85	150.32	0.07
SteamBoatCr	Lower	3478.032	Max WS	2489.67	4375.27	4397.35	4381.42	4397.39	0.000040	1.57	1632.87	137.49	0.07
SteamBoatCr	Lower	3428.795	Max WS	2489.64	4376.02	4397.33	4382.06	4397.39	0.000059	1.89	1400.44	119.57	0.09
SteamBoatCr	Lower	3384.192	Max WS	2490.09	4375.19	4397.33	4382.95	4397.39	0.000071	1.84	1353.65	118.89	0.09
SteamBoatCr	Lower	3335.191	Max WS	2489.38	4377.00	4397.33	4382.02	4397.38	0.000055	1.88	1445.28	126.69	0.09
SteamBoatCr	Lower	3305.688	Max WS	2491.41	4375.28	4397.34	4381.29	4397.38	0.000045	1.73	1605.62	130.69	0.08
SteamBoatCr	Lower	3268.097	Max WS	2496.95	4376.33	4397.32	4381.41	4397.38	0.000054	1.90	1392.11	94.60	0.08
SteamBoatCr	Lower	3227.105	Max WS	2511.93	4376.24	4397.31	4382.99	4397.38	0.000073	2.07	1271.81	95.07	0.10
SteamBoatCr	Lower	3192.105	Max WS	2555.13	4376.04	4397.30	4382.79	4397.37	0.000083	2.27	1198.37	87.57	0.10
SteamBoatCr	Lower	3154.573	Max WS	2600.92	4374.74	4397.30	4382.45	4397.37	0.000077	2.19	1288.78	94.99	0.10
SteamBoatCr	Lower	3120.963	Max WS	2638.23	4375.70	4397.31	4382.47	4397.36	0.000054	1.87	1581.44	124.18	0.09
SteamBoatCr	Lower	3080		Lat Struct									
SteamBoatCr	Lower	3078.037	Max WS	2676.75	4377.90	4397.30	4383.33	4397.36	0.000058	1.89	1499.45	113.06	0.09
SteamBoatCr	Lower	3044.67	Max WS	2713.68	4377.90	4397.30	4382.86	4397.35	0.000064	1.99	1506.62	124.40	0.09
SteamBoatCr	Lower	3010.206	Max WS	2744.84	4377.90	4397.29	4382.61	4397.35	0.000064	2.01	1432.09	111.34	0.09
SteamBoatCr	Lower	2946.115	Max WS	2799.92	4377.90	4397.28	4383.48	4397.34	0.000072	1.96	1482.71	124.87	0.10
SteamBoatCr	Lower	2903.734	Max WS	2849.78	4377.90	4397.28	4382.31	4397.34	0.000058	1.90	1504.95	105.00	0.09
SteamBoatCr	Lower	2903		Lat Struct									
SteamBoatCr	Lower	2882.287	Max WS	2883.25	4377.90	4397.29	4382.11	4397.34	0.000046	1.74	1690.35	118.46	0.08
SteamBoatCr	Lower	2863.104	Max WS	2928.71	4377.90	4397.28	4381.73	4397.33	0.000045	1.83	1615.52	98.35	0.08
SteamBoatCr	Lower	2825.597	Max WS	3001.69	4377.90	4397.27	4382.11	4397.33	0.000056	1.88	1592.72	98.73	0.08

HEC-RAS Plan: CE SEC Locations: User Defined Profile: Max WS (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
SteamBoatCr	Lower	2785.811	Max WS	3067.54	4377.90	4397.26	4382.42	4397.32	0.000071	2.08	1475.20	94.12	0.09
SteamBoatCr	Lower	2738.436	Max WS	3170.70	4377.90	4397.23	4382.51	4397.31	0.000097	2.30	1375.85	93.92	0.11
SteamBoatCr	Lower	2696.097	Max WS	3307.24	4377.90	4397.21	4382.55	4397.30	0.000095	2.51	1345.56	87.14	0.11
SteamBoatCr	Lower	2651.945	Max WS	3472.34	4377.90	4397.18	4383.18	4397.29	0.000097	2.67	1324.76	88.03	0.12
SteamBoatCr	Lower	2609.679	Max WS	3685.09	4377.90	4397.17	4382.64	4397.27	0.000091	2.64	1453.11	96.25	0.11
SteamBoatCr	Lower	2559.67	Max WS	3957.09	4377.90	4397.13	4383.72	4397.25	0.000123	2.78	1440.82	100.10	0.12
SteamBoatCr	Lower	2518.648	Max WS	4236.92	4377.90	4397.11	4383.40	4397.23	0.000105	2.79	1539.99	103.60	0.12
SteamBoatCr	Lower	2479.834	Max WS	4516.61	4377.90	4397.06	4383.51	4397.21	0.000139	3.13	1468.12	99.24	0.14
SteamBoatCr	Lower	2432.757	Max WS	4892.12	4377.87	4396.99	4383.71	4397.18	0.000170	3.44	1440.20	96.77	0.15
SteamBoatCr	Lower	2401.375	Max WS	5205.16	4377.87	4396.93	4384.26	4397.15	0.000215	3.78	1411.75	95.69	0.16
SteamBoatCr	Lower	2377.134	Max WS	5524.13	4377.87	4396.88	4384.21	4397.12	0.000227	3.90	1449.45	99.64	0.17
Truckee	Upper	41611.80	Max WS	23014.74	4438.40	4451.51	4449.22	4454.35	0.003988	13.52	1702.28	158.11	0.73
Truckee	Upper	41521.41	Max WS	23014.54	4438.17	4450.84	4449.17	4453.98	0.004760	14.22	1617.96	158.33	0.78
Truckee	Upper	41361.23	Max WS	23013.68	4437.35	4450.46	4448.57	4453.21	0.004445	13.30	1730.41	180.08	0.76
Truckee	Upper	41236.61	Max WS	23012.71	4436.88	4450.18	4447.94	4452.61	0.004753	12.52	1838.11	194.51	0.72
Truckee	Upper	41084.64	Max WS	23010.50	4436.45	4449.63	4447.05	4451.91	0.004358	12.13	1897.65	201.19	0.70
Truckee	Upper	40837.92	Max WS	23004.06	4435.42	4449.35	4446.09	4451.05	0.002526	10.47	2206.15	242.00	0.58
Truckee	Upper	40652.89	Max WS	22997.55	4434.44	4448.51	4446.53	4450.56	0.003226	11.67	2076.45	258.06	0.65
Truckee	Upper	40471.90	Max WS	22976.69	4433.16	4447.46	4445.97	4449.94	0.004126	12.74	1867.87	247.70	0.73
Truckee	Upper	40324.24	Max WS	22919.59	4431.83	4447.13	4445.30	4449.37	0.003339	12.23	1995.51	261.87	0.67
Truckee	Upper	40145.43	Max WS	22811.61	4431.92	4447.04	4444.54	4448.90	0.002273	11.59	2268.50	262.13	0.57
Truckee	Upper	39956.88	Max WS	22536.67	4431.72	4446.15	4443.21	4448.35	0.003179	11.91	1908.67	203.61	0.65
Truckee	Upper	39763.07	Max WS	22955.58	4431.96	4445.46	4442.64	4447.55	0.003069	11.72	2429.62	604.72	0.64
Truckee	Upper	39665.1*	Max WS	24165.25	4431.23	4444.82	4443.12	4447.50	0.004369	13.21	2163.51	616.90	0.75
Truckee	Upper	39567.24	Max WS	23866.06	4430.51	4444.38	4442.49	4447.09	0.004512	13.22	1804.90	192.43	0.76
Truckee	Upper	39486.5*	Max WS	23553.69	4430.26	4444.02	4442.38	4446.82	0.004463	13.46	2051.83	558.97	0.76
Truckee	Upper	39405.8*	Max WS	23522.59	4430.01	4443.67	4442.33	4446.62	0.004488	13.88	2148.29	582.71	0.77
Truckee	Upper	39325.14	Max WS	23388.86	4429.76	4443.32	4442.06	4446.39	0.004467	14.23	2289.22	552.97	0.77
Truckee	Upper	39146.14	Max WS	23258.43	4429.04	4442.48	4441.57	4445.61	0.004920	14.36	2286.56	623.97	0.80
Truckee	Upper	39048.14	Max WS	23245.34	4428.58	4441.94	4441.22	4445.84	0.006265	16.00	1986.75	559.49	0.88
Truckee	Upper	38981.14	Max WS	23218.73	4428.60	4441.52	4440.58	4445.15	0.006019	15.29	1539.46	175.91	0.86
Truckee	Upper	38895.14	Max WS	23180.44	4428.20	4441.86	4439.47	4444.13	0.003518	12.25	2697.85	780.11	0.67
Truckee	Upper	38812.14	Max WS	23158.38	4429.90	4442.40	4437.74	4443.33	0.001417	7.86	4034.06	874.35	0.43
Truckee	Upper	38760.14	Max WS	23171.32	4430.36	4442.65	4437.34	4443.14	0.000863	5.74	5239.98	1125.36	0.33
Truckee	Upper	38691.14		Inl Struct									
Truckee	Upper	38622.14	Max WS	23171.21	4428.84	4442.23	4436.19	4442.68	0.000662	5.39	4401.43	1175.76	0.29
Truckee	Upper	38552.14	Max WS	23167.93	4427.85	4441.66	4437.01	4442.65	0.001442	8.01	3116.28	931.06	0.43
Truckee	Upper	38400		Bridge									
Truckee	Upper	38371.89	Max WS	23160.01	4423.36	4440.43	4435.72	4441.38	0.001341	8.11	3433.45	369.08	0.42
Truckee	Upper	38371		Lat Struct									
Truckee	Upper	38325.1*	Max WS	23118.11	4423.46	4440.12	4435.60	4441.26	0.001586	8.72	3007.54	337.68	0.46
Truckee	Upper	38278.3*	Max WS	23097.35	4423.56	4439.80	4435.18	4441.11	0.001838	9.25	2663.53	304.31	0.49
Truckee	Upper	38231.6*	Max WS	23090.10	4423.66	4439.50	4434.90	4440.94	0.002059	9.64	2423.31	263.83	0.51
Truckee	Upper	38184.85	Max WS	23095.44	4423.76	4439.29	4434.56	4440.78	0.001956	9.79	2358.78	341.81	0.50
Truckee	Upper	38137.0*	Max WS	23083.15	4423.51	4439.06	4434.41	4440.61	0.002041	9.97	2315.56	256.82	0.51
Truckee	Upper	38089.3*	Max WS	23077.39	4423.26	4438.82	4434.27	4440.43	0.002140	10.17	2271.19	346.86	0.53
Truckee	Upper	38041.5*	Max WS	23077.60	4423.00	4438.58	4434.09	4440.25	0.002302	10.35	2272.13	466.25	0.54
Truckee	Upper	37993.8*	Max WS	23071.93	4422.75	4438.38	4434.03	4440.06	0.002346	10.44	2387.96	629.52	0.55
Truckee	Upper	37946.04	Max WS	23038.51	4422.50	4438.20	4433.94	4439.84	0.002293	10.41	2722.46	919.99	0.54
Truckee	Upper	37890.7*	Max WS	22966.38	4422.25	4437.87	4434.08	4439.66	0.002501	10.89	2767.48	856.89	0.57
Truckee	Upper	37835.4*	Max WS	22886.71	4422.00	4437.61	4434.21	4439.45	0.002570	11.15	2961.80	846.50	0.58
Truckee	Upper	37780.1*	Max WS	22850.02	4421.74	4437.42	4434.04	4439.21	0.002463	11.14	3270.41	813.25	0.57
Truckee	Upper	37724.79	Max WS	22782.36	4421.49	4437.39	4434.23	4438.92	0.002095	10.61	3832.68	780.00	0.53
Truckee	Upper	37723		Lat Struct									
Truckee	Upper	37675.7*	Max WS	22742.79	4421.46	4437.12	4433.11	4438.72	0.002188	10.57	3361.41	758.63	0.53
Truckee	Upper	37626.6*	Max WS	22682.43	4421.42	4436.96	4433.06	4438.53	0.002205	10.56	3337.68	654.31	0.53
Truckee	Upper	37577.5*	Max WS	22545.54	4421.39	4436.91	4433.00	4438.29	0.002132	9.96	3510.79	664.83	0.50
Truckee	Upper	37528.5*	Max WS	22358.72	4421.36	4436.86	4432.83	4438.06	0.002065	9.35	3664.93	640.64	0.48
Truckee	Upper	37479.4*	Max WS	22256.64	4421.32	4436.74	4432.52	4437.86	0.002016	9.03	3703.84	609.90	0.47
Truckee	Upper	37430.40	Max WS	22246.87	4421.29	4436.55	4432.26	4437.67	0.002117	8.96	3618.18	577.61	0.47
Truckee	Upper	37375.8*	Max WS	22239.03	4420.88	4436.18	4432.32	4437.46	0.002568	9.53	3247.24	619.36	0.51
Truckee	Upper	37321.3*	Max WS	22238.74	4420.48	4435.73	4432.31	4437.22	0.003095	10.12	2896.77	690.88	0.56
Truckee	Upper	37266.8*	Max WS	22236.96	4420.07	4435.23	4432.23	4436.90	0.003569	10.63	2582.03	694.93	0.59
Truckee	Upper	37212.3*	Max WS	22229.22	4419.67	4434.75	4431.95	4436.58	0.003934	11.02	2324.38	666.18	0.62
Truckee	Upper	37158		Lat Struct									
Truckee	Upper	37157.78	Max WS	21645.78	4419.26	4434.32	4431.36	4436.14	0.003873	10.91	2323.87	669.11	0.61
Truckee	Upper	37156		Lat Struct									
Truckee	Upper	37112.0*	Max WS	21554.02	4418.67	4433.97	4431.17	4435.93	0.004088	11.32	2178.33	679.35	0.63
Truckee	Upper	37066.3*	Max WS	21761.94	4418.08	4433.60	4431.04	4435.74	0.004392	11.86	2042.10	674.97	0.66
Truckee	Upper	37020.6*	Max WS	21931.72	4417.49	4433.01	4431.00	4435.52	0.005163	12.82	1879.83	652.01	0.72
Truckee	Upper	36974.9* BREACH, DA 8	Max WS	21660.40	4416.90	4432.31	4431.02	4435.23	0.006167	13.81	1694.86	628.41	0.78
Truckee	Upper	36929.19	Max WS	20803.23	4416.31	4431.88	4430.69	4434.92	0.006427	14.10	1582.21	606.47	0.79
Truckee	Upper	36861.3*	Max WS	19847.42	4416.77	4431.91	4430.34	4434.62	0.005745	13.31	1595.35	494.95	0.75
Truckee	Upper	36793.5*	Max WS	18809.56	4417.22	4432.26	4429.77	4434.40	0.004275	11.84	1706.69	474.57	0.65
Truckee	Upper	36725.76	Max WS	18679.30	4417.67	4432.15	4429.30	4434.14	0.003870	11.41	1745.57	448.82	0.62
Truckee	Upper	36647.5*	Max WS	18606.35	4417.98	4432.07	4428.90	4433.87	0.003159	10.82	1807.52	393.42	0.59
Truckee	Upper	36569.41	Max WS	18885.03	4418.27	4431.83	4428.60	4433.58	0.002828	10.66	1842.02	359.54	0.59
Truckee	Upper	36568		Lat Struct									
Truckee	Upper	36480.3*	Max WS	18833.30	4418.49	4431.54	4428.53	4433.34	0.002912	10.82	1827.59	381.52	0.60
Truckee	Upper	36391.32	Max WS	18795.26	4418.70	4431.25	4428.41	4433.09	0.003019	10.98	1815.04	462.98	0.61
Truckee	Upper	36300.5*	Max WS	18784.98	4418.40	4430.89	4428.14	4432.81	0.003195	11.20	1769.38	477.75	0.62
Truckee	Upper	36209.78	Max WS	18801.23	4418.10	4430.47	4427.93	4432.50	0.003482	11.52	1710.42	332.92	0.65
Truckee	Upper	36130.78	Max WS	18812.98	4417.84	4430.51	4427.47	4432.23	0.002844	10.61	1856.99	347.17	0.59
Truckee	Upper	36026.78	Max WS	18514.90	4417.53	4430.69	4426.61	4432.01	0.001947	9.30	2135.14	590.38	0.49
Truckee	Upper	35963.78	Max WS	18229.39	4417.68	4430.99	4426.26	4431.89	0.001397	7.67	2721.74	701.01	0.42
Truckee	Upper	35894.28		Inl Struct									
Truckee	Upper	35824.78	Max WS	18223.40	4414.82	4427.07	4423.99	4428.45	0.006164	9.43	1933.07	311.28	0.57
Truckee	Upper	35810		Lat Struct									
Truckee	Upper	35803.6*	Max WS	18225.94	4413.86	4427.04	4423.28	4428.33	0.005156	9.12	1999.34	299.33	0.53
Truckee	Upper	35794		Lat Struct									
Truckee	Upper	35782.4*	Max WS	18228.92	4412.89	4426.98	4422.63	4428.23	0.004534	8.97	2032.37	289.76	0.50
Truckee	Upper	35761.28	Max WS	18226.67	4411.93	4426.89	4422.04	4428.14	0.004159	8.96	2047.77	280.81	0.49
Truckee	Upper	35676.28	Max WS	18226.61	4411.36	4426.61	4421.87	4427.88	0.001898	9.08	2072.89	267.02	0.48
Truckee	Upper	35606.05	Max WS	18223.87	4411.48	4426.32	4422.28	4427.75	0.002229	9.59	1973.78	259.59	0.52
Truckee	Upper	35546.1*	Max WS	18225.87	4411.20	4426.13	4422.30	4427.62	0.002381	9.82	1955.73	248.44	0.54
Truckee	Upper	35486.25	Max WS	18225.23	4410.90	4425.90	4422.32	4427.52	0.002625	10.24	1861.26	579.78	0.56
Truckee	Upper	35400		Bridge									
Truckee	Upper	35352.36	Max WS	18225.23	4409.10	4425.11	4420.88	4426.65	0.002151	10.02	1930.15	214.29	0.52
Truckee	Upper	35351		Lat Struct									
Truckee	Upper	35350		Lat Struct									
Truckee	Upper	35262		Lat Struct									
Truckee	Upper	35261.04	Max WS	18230.71	4408.19	4425.04	4420.09	4426.44	0.002102	9.48	1934.93	427.75	0.51
Truckee	Upper	35179.6*	Max WS	18229.86	4408.56	4424.88	4420.10	4426.26	0.002154	9.46	1930.15	332.89	0.51
Truckee	Upper	35098.1*	Max WS	18228.29	4408.92	4424.64	4420.21	4426.08	0.002346	9.65	1888.65	250.52	0.53
Truckee	Upper	35016.7*	Max WS	18228.46	4409.29	4424.28	4420.37	4425.88	0.002718	10.13	1799.43	224.29	0.57
Truckee	Upper	34935.32	Max WS	18228.02	4409.65	4423.72	4420.64	4425.63	0.003517	11.09	1644.05	176.64	0.64
Truckee	Upper	34849.1*	Max WS	18228.69	4409.79	4423.48	4420.62	4425.32	0.003556	10.88	1675.04	187.17	0.64
Truckee	Upper	34763.0*	Max WS	18257.56	4409.94	4423.27	4420.34	4425.02	0.003287	10.60	1722.56	401.42	0.62

HEC-RAS Plan: CE SEC Locations: User Defined Profile: Max WS (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Truckee	Upper	34676.91	Max WS	18324.00	4410.08	4423.09	4419.94	4424.74	0.002972	10.31	1776.98	433.36	0.59
Truckee	Upper	34602.8*	Max WS	18362.84	4410.17	4422.66	4419.90	4424.50	0.003328	10.87	1691.38	574.79	0.63
Truckee	Upper	34528.8*	Max WS	18272.40	4410.27	4422.32	4419.82	4424.28	0.003493	11.26	1678.41	725.00	0.64
Truckee	Upper	34454.76	Max WS	18265.26	4410.35	4422.06	4419.85	4424.03	0.003498	11.42	1844.58	803.95	0.65
Truckee	Upper	34453		Lat Struct									
Truckee	Upper	34382.0*	Max WS	18207.39	4410.30	4421.82	4419.32	4423.64	0.003228	10.96	1961.98	771.00	0.62
Truckee	Upper	34309.2*	Max WS	18148.67	4410.25	4421.59	4418.83	4423.29	0.003005	10.54	1941.93	721.82	0.60
Truckee	Upper	34236.54	Max WS	18121.26	4410.18	4421.45	4418.31	4423.00	0.002710	10.03	2015.39	651.08	0.57
Truckee	Upper	34141.7*	Max WS	18121.24	4409.66	4421.17	4418.13	4422.75	0.002831	10.13	1817.55	375.88	0.58
Truckee	Upper	34046.91	Max WS	18120.16	4409.12	4420.89	4417.94	4422.49	0.002905	10.13	1803.92	232.67	0.58
Truckee	Upper	33989.4*	Max WS	18108.56	4409.17	4420.73	4418.10	4422.31	0.003468	10.09	1833.16	248.97	0.63
Truckee	Upper	33932.07	Max WS	18098.73	4409.23	4420.41	4418.36	4422.10	0.004182	10.47	1766.25	248.55	0.68
Truckee	Upper	33931		Lat Struct									
Truckee	Upper	33872.4*	Max WS	18098.19	4408.96	4419.89	4418.38	4421.85	0.004961	11.29	1659.51	253.82	0.74
Truckee	Upper	33812.80	Max WS	18097.68	4408.40	4419.23	4418.38	4421.64	0.006313	12.50	1491.41	244.39	0.83
Truckee	Upper	33727.8*	Max WS	18098.00	4407.65	4418.96	4417.65	4421.05	0.005335	11.62	1561.96	229.56	0.76
Truckee	Upper	33642.99	Max WS	18097.79	4406.89	4419.04	4416.63	4420.62	0.003598	10.08	1794.88	228.66	0.63
Truckee	Upper	33642		Lat Struct									
Truckee	Upper	33477.26	Max WS	18095.02	4407.73	4418.21	4416.29	4420.06	0.003198	10.91	1658.30	207.17	0.68
Truckee	Upper	33318.83	Max WS	18097.26	4406.29	4418.47	4415.32	4419.62	0.001819	8.76	2403.04	437.76	0.52
Truckee	Upper	33141.24	Max WS	18094.67	4406.76	4418.38	4414.96	4419.32	0.001401	8.16	2798.73	462.31	0.47
Truckee	Upper	32984.21	Max WS	18057.73	4405.82	4417.83	4414.94	4419.09	0.002013	9.16	2289.61	443.34	0.55
Truckee	Upper	32983		Lat Struct									
Truckee	Upper	32851.30	Max WS	18047.69	4405.01	4417.53	4414.38	4418.85	0.001884	9.44	2306.11	423.25	0.54
Truckee	Upper	32707.99	Max WS	18057.08	4404.73	4417.48	4413.65	4418.57	0.001464	8.65	2499.68	363.78	0.48
Truckee	Upper	32566.20	Max WS	18171.37	4404.26	4417.17	4413.61	4418.34	0.001571	8.86	2276.97	289.89	0.49
Truckee	Upper	32460.36	Max WS	18350.83	4404.24	4416.56	4413.47	4418.14	0.002071	10.18	1910.22	236.66	0.57
Truckee	Upper	32391.38	Max WS	18517.31	4403.82	4415.80	4413.56	4417.98	0.002961	11.87	1600.22	197.75	0.67
Truckee	Upper	32323.85	Max WS	18771.73	4403.29	4416.37	4412.45	4417.71	0.001622	9.37	2162.94	284.27	0.50
Truckee	Upper	32300		Bridge									
Truckee	Upper	32220.09	Max WS	18772.32	4402.68	4415.45	4412.38	4417.08	0.002240	10.26	1852.41	216.42	0.59
Truckee	Upper	32220		Lat Struct									
Truckee	Upper	32219		Lat Struct									
Truckee	Upper	32100.13	Max WS	18773.04	4402.06	4414.50	4412.88	4416.80	0.003471	12.24	1599.18	204.31	0.72
Truckee	Upper	31963.03	Max WS	18771.99	4401.22	4414.32	4412.25	4416.30	0.003283	11.30	1668.14	220.83	0.69
Truckee	Upper	31795.06 BREACH, DA 9	Max WS	18768.54	4401.35	4413.22	4412.08	4415.73	0.004364	12.73	1490.34	198.71	0.79
Truckee	Upper	31523.22	Max WS	17840.29	4402.64	4413.13	4411.49	4414.74	0.003240	10.25	1793.38	272.69	0.67
Truckee	Upper	31350		Lat Struct									
Truckee	Upper	31273.71	Max WS	17561.44	4398.78	4412.53	4411.06	4413.97	0.003321	9.70	1896.95	325.39	0.67
Truckee	Upper	31037.96	Max WS	16478.87	4400.00	4412.74	4409.14	4413.50	0.001265	7.01	2406.71	314.31	0.43
Truckee	Upper	30789.09	Max WS	15991.27	4397.52	4411.12	4409.24	4413.19	0.003352	11.66	1470.92	217.51	0.69
Truckee	Upper	30581		Lat Struct									
Truckee	Upper	30509.03	Max WS	15995.55	4393.85	4410.79	4407.58	4412.43	0.002092	11.01	1955.41	252.66	0.57
Truckee	Upper	30211.71	Max WS	15995.13	4395.29	4409.70	4408.36	4411.84	0.003281	13.36	1849.75	278.62	0.70
Truckee	Upper	30210		Lat Struct									
Truckee	Upper	29931.50	Max WS	15797.92	4395.12	4409.40	4406.48	4410.80	0.002180	9.55	1711.55	229.32	0.56
Truckee	Upper	29640		Lat Struct									
Truckee	Upper	29635.26	Max WS	15241.74	4395.29	4409.15	4404.75	4410.35	0.001478	8.83	1824.42	202.64	0.48
Truckee	Upper	29422.51	Max WS	14757.15	4394.80	4408.84	4404.58	4410.09	0.001624	9.00	1694.04	188.73	0.49
Truckee	Upper	29164.29	Max WS	14806.63	4394.35	4408.28	4404.78	4409.63	0.001944	9.41	1695.26	222.67	0.53
Truckee	Upper	29163		Lat Struct									
Truckee	Upper	28986.09	Max WS	15389.10	4393.99	4407.34	4405.45	4409.06	0.003369	10.53	1475.99	211.55	0.68
Truckee	Upper	28777.22	Max WS	15627.39	4393.67	4406.72	4404.27	4408.37	0.002761	10.30	1521.43	186.42	0.63
Truckee	Upper	28562		Lat Struct									
Truckee	Upper	28561.76	Max WS	15975.69	4395.17	4406.01	4403.39	4407.70	0.002729	10.43	1532.02	176.95	0.62
Truckee	Upper	28334.18	Max WS	16370.44	4392.03	4404.76	4402.79	4406.91	0.003541	11.76	1391.54	162.68	0.71
Truckee	Upper	28333		Lat Struct									
Truckee	Upper	28079.65	Max WS	12422.64	4390.18	4404.21	4400.60	4405.32	0.001847	8.44	1476.30	177.10	0.51
Truckee	Upper	28078		Lat Struct									
Truckee	Upper	27953.75 BREACH, DA 5	Max WS	15735.75	4389.03	4404.28	4401.66	4405.77	0.002588	9.79	1608.08	197.67	0.60
Truckee	Upper	27840.41	Max WS	13942.32	4389.25	4404.88	4400.82	4405.82	0.001439	7.78	1792.12	196.79	0.45
Truckee	Upper	27679.10	Max WS	13942.38	4389.66	4404.20	4400.65	4405.55	0.001993	9.32	1495.54	158.73	0.54
Truckee	Upper	27678		Lat Struct									
Truckee	Upper	27571.37	Max WS	13941.57	4389.96	4404.16	4400.38	4405.34	0.001752	8.72	1598.57	171.07	0.50
Truckee	Upper	27427.44	Max WS	13942.43	4389.94	4404.27	4399.64	4405.13	0.001252	7.44	1874.83	196.86	0.42
Truckee	Upper	27282.45	Max WS	13940.45	4389.77	4403.86	4400.10	4404.92	0.001641	8.23	1696.41	191.03	0.48
Truckee	Upper	27281		Lat Struct									
Truckee	Upper	27150.44	Max WS	13917.50	4388.53	4403.59	4399.95	4404.73	0.001696	8.77	1794.01	231.95	0.50
Truckee	Upper	27011.59	Max WS	13751.03	4387.12	4403.47	4398.04	4404.55	0.001222	8.55	1962.74	273.06	0.43
Truckee	Upper	27010		Lat Struct									
Truckee	Upper	26854.46	Max WS	13726.86	4383.89	4403.06	4397.46	4404.32	0.001376	9.02	1536.11	144.24	0.46
Truckee	Upper	26853		Lat Struct									
Truckee	Upper	26711.46	Max WS	13613.65	4385.19	4403.19	4397.01	4404.16	0.001061	7.92	1724.42	151.01	0.40
Truckee	Upper	26588.41	Max WS	13428.68	4388.57	4402.75	4398.48	4404.03	0.001739	9.10	1513.17	197.26	0.50
Truckee	Upper	26465.88	Max WS	13508.50	4387.79	4402.36	4398.05	4403.81	0.001786	9.70	1472.21	201.48	0.52
Truckee	Upper	26464		Lat Struct									
Truckee	Upper	26319.22	Max WS	13906.31	4386.90	4402.40	4397.32	4403.50	0.001291	8.47	1788.02	223.92	0.44
Truckee	Upper	26167.21	Max WS	14056.84	4387.37	4401.57	4398.12	4403.21	0.002424	10.27	1380.00	162.01	0.59
Truckee	Upper	26056.23	Max WS	14296.96	4387.75	4401.28	4397.90	4402.89	0.002277	10.18	1410.42	149.63	0.57
Truckee	Upper	25935.87	Max WS	14802.93	4388.06	4401.44	4396.95	4402.57	0.001520	8.53	1813.67	213.54	0.47
Truckee	Upper	25800		Bridge									
Truckee	Upper	25787.10	Max WS	14791.89	4388.53	4400.62	4397.04	4401.93	0.001934	9.20	1632.21	192.38	0.53
Truckee	Upper	25786		Lat Struct									
Truckee	Upper	25785		Lat Struct									
Truckee	Upper	25685.79	Max WS	14757.66	4388.68	4400.58	4396.77	4401.75	0.001676	8.67	1702.68	178.98	0.49
Truckee	Upper	25557.57	Max WS	14760.55	4387.96	4400.76	4395.76	4401.57	0.001072	7.20	2068.24	216.77	0.40
Truckee	Upper	25320.47	Max WS	14756.34	4387.57	4400.42	4395.56	4401.30	0.001180	7.54	1957.40	194.56	0.42
Truckee	Upper	25319		Lat Struct									
Truckee	Upper	25043.05	Max WS	14040.80	4387.15	4398.71	4396.90	4400.66	0.003220	11.40	1385.15	208.45	0.68
Truckee	Upper	24897.16	Max WS	14693.76	4386.65	4399.36	4394.60	4400.26	0.001129	7.79	2163.35	283.09	0.42
Truckee	Upper	24750		Lat Struct									
Truckee	Upper	24749.13	Max WS	14689.84	4384.93	4399.43	4393.91	4400.09	0.000801	6.69	2552.05	325.70	0.35
Truckee	Upper	24558.96	Max WS	13803.48	4384.15	4399.00	4393.58	4399.90	0.001033	7.89	2184.91	316.17	0.40
Truckee	Upper	24373.14	Max WS	13409.04	4383.85	4398.63	4393.47	4399.71	0.001302	8.37	1685.29	226.98	0.44
Truckee	Upper	24232.12	Max WS	12918.87	4383.83	4398.35	4394.13	4399.51	0.001660	8.68	1565.83	212.20	0.49
Truckee	Upper	24231		Lat Struct									
Truckee	Upper	24094.85	Max WS	12584.92	4383.54	4398.32	4392.76	4399.34	0.001207	8.12	1587.54	187.97	0.43
Truckee	Upper	23903.66	Max WS	12510.03	4382.63	4398.49	4392.22	4399.17	0.000796	6.63	1963.52	228.91	0.35
Truckee	Upper	23902		Lat Struct									
Truckee	Upper	23764.74	Max WS	12312.30	4381.92	4398.53	4391.39	4399.10	0.000626	6.07	2103.93	222.73	0.31
Truckee	Upper	23610		Lat Struct									
Truckee	Upper	23609.90	Max WS	12152.71	4382.24	4398.54	4390.56	4399.02	0.000510	5.57	2205.26	232.29	0.28
Truckee	Upper	23433.78	Max WS	11924.85	4382.19	4398.04	4392.30	4398.87	0.001117	7.29	1641.01	169.69	0.40
Truckee	Upper	23264		Lat Struct									
Truckee	Upper	23263.74	Max WS	11954.86	4382.02	4398.22	4391.40	4398.71	0.000611	5.68	2149.04	211.89	0.30
Truckee	Upper	23112.71	Max WS	11826.78	4379.64	4398.22	4389.63	4398.66	0.000410	5.49	2579.57	259.64	0.26
Truckee	Upper	22944.66	Max WS	11690.43	4372.73	4398.17	4388.42	4398.59	0.000439	5.44	2596.69	232.46	0.26
Truckee	Upper	22690		Lat Struct									

HEC-RAS Plan: CE SEC Locations: User Defined Profile: Max WS (Continued)

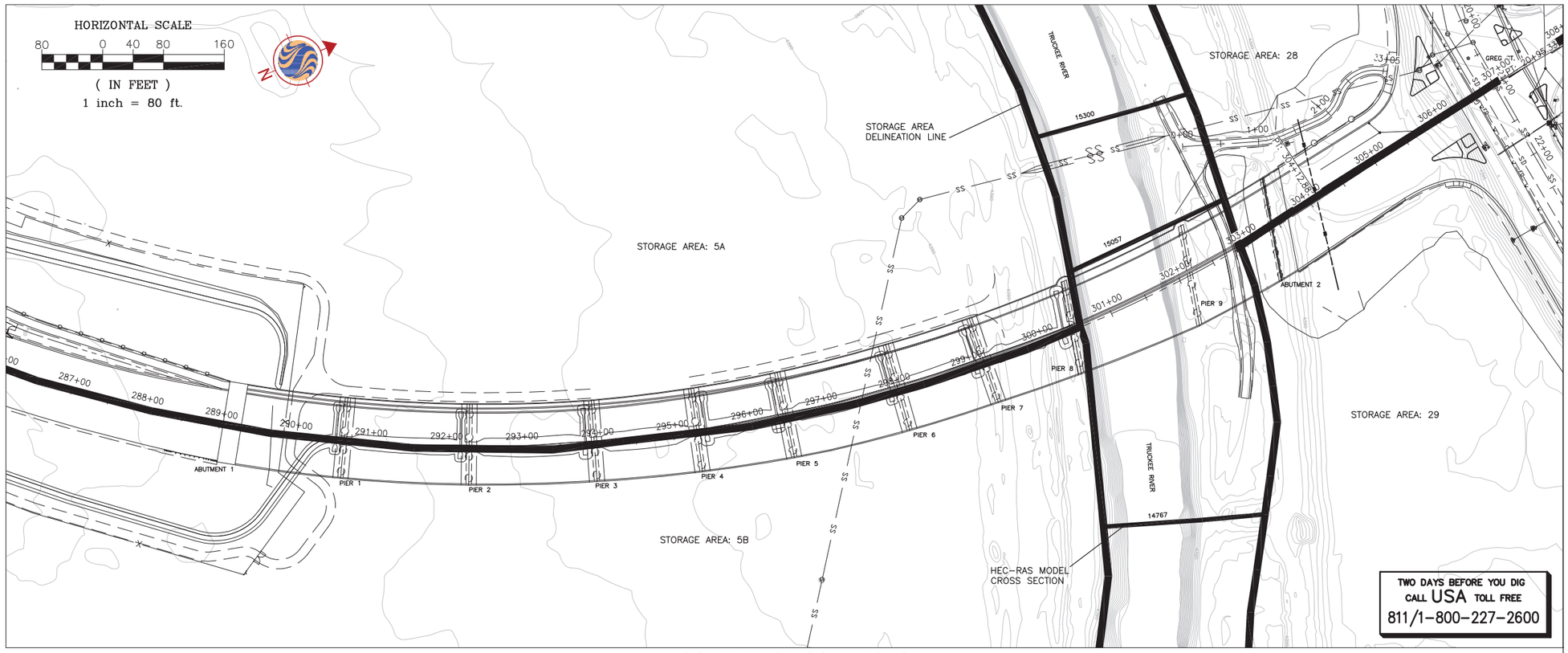
River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Truckee	Upper	22688.58	Max WS	11581.09	4376.68	4398.18	4386.97	4398.48	0.000268	4.41	2735.50	269.45	0.21
Truckee	Upper	22687		Lat Struct									
Truckee	Upper	22503.45	Max WS	11489.20	4376.76	4397.81	4389.04	4398.40	0.000698	6.15	1870.06	172.91	0.32
Truckee	Upper	22335.52	Max WS	11329.35	4380.32	4397.64	4389.57	4398.26	0.000664	6.37	1886.98	222.61	0.32
Truckee	Upper	22334		Lat Struct									
Truckee	Upper	22176.73	Max WS	11459.98	4381.25	4397.78	4388.98	4398.18	0.000406	5.10	2359.27	228.49	0.25
Truckee	Upper	22100		Lat Struct									
Truckee	Upper	21976		Lat Struct									
Truckee	Upper	21975.48	Max WS	11410.13	4380.20	4397.86	4387.93	4398.11	0.000236	4.08	2912.47	287.61	0.19
Truckee	Upper	21817.75	Max WS	11030.76	4375.33	4397.90	4386.31	4398.10	0.000161	3.56	3480.59	372.53	0.16
Truckee	Upper	21650.04	Max WS	10555.41	4369.79	4397.90	4384.62	4398.08	0.000160	3.52	3443.06	447.64	0.16
Truckee	Upper	21440		Lat Struct									
Truckee	Upper	21438.30	Max WS	10237.73	4370.18	4397.86	4383.91	4398.06	0.000171	3.62	3097.30	338.07	0.16
Truckee	Upper	21263.33	Max WS	9863.37	4369.31	4397.86	4384.59	4398.04	0.000150	3.47	3187.61	323.24	0.15
Truckee	Upper	21091.93	Max WS	9599.20	4372.20	4397.80	4385.68	4398.02	0.000198	3.82	2734.03	278.97	0.17
Truckee	Upper	21090		Lat Struct									
Truckee	Upper	20880		Lat Struct									
Truckee	Upper	20879.99	Max WS	9235.78	4378.44	4397.75	4386.16	4398.00	0.000230	4.02	2502.32	244.80	0.19
Truckee	Upper	20652.04	Max WS	9207.45	4378.31	4397.70	4386.01	4397.95	0.000199	4.04	2598.22	270.21	0.18
Truckee	Upper	20349.62	Max WS	9319.01	4377.52	4397.61	4385.93	4397.88	0.000232	4.25	2557.67	289.02	0.19
Truckee	Upper	20102.60	Max WS	9518.79	4377.83	4397.55	4385.46	4397.81	0.000212	4.13	2632.63	285.11	0.18
Truckee	Upper	19871.73	Max WS	9726.98	4377.12	4397.53	4385.18	4397.75	0.000178	3.77	2875.59	302.43	0.17
Truckee	Upper	19800		Lat Struct									
Truckee	Upper	19646.39	Max WS	9795.67	4377.26	4397.46	4384.81	4397.70	0.000204	3.97	2505.60	183.05	0.18
Truckee	Upper	19428.21	Max WS	9741.75	4376.72	4397.46	4384.93	4397.66	0.000171	3.62	2774.16	220.51	0.16
Truckee	Upper	19173.34	Max WS	9599.69	4376.91	4397.46	4383.84	4397.63	0.000127	3.29	3024.84	216.56	0.14
Truckee	Upper	19172		Lat Struct									
Truckee	Upper	18915.19	Max WS	9264.79	4376.57	4397.45	4384.17	4397.60	0.000135	3.21	2964.95	221.09	0.15
Truckee	Upper	18690.00	Max WS	8919.00	4376.25	4397.46	4383.24	4397.59	0.000096	2.90	3301.19	264.01	0.13
Truckee	Upper	18488.74	Max WS	8574.02	4374.60	4397.48	4381.92	4397.58	0.000068	2.60	3555.44	273.74	0.11
Truckee	Upper	18286.70	Max WS	8179.38	4373.39	4397.46	4381.97	4397.58	0.000075	2.75	3257.12	262.78	0.11
Truckee	Upper	18285		Lat Struct									
Truckee	Upper	18117.31	Max WS	7957.30	4374.53	4397.43	4382.44	4397.57	0.000097	2.97	2751.18	204.88	0.13
Truckee	Upper	17966.96	Max WS	7818.86	4375.43	4397.47	4381.71	4397.56	0.000060	2.43	3324.61	212.72	0.10
Truckee	Upper	17774.81	Max WS	7438.05	4373.62	4397.49	4380.21	4397.55	0.000037	2.00	3961.73	278.01	0.08
Truckee	Upper	17595.00	Max WS	7217.56	4373.77	4397.47	4381.27	4397.55	0.000049	2.31	3355.49	240.36	0.10
Truckee	Upper	17594		Lat Struct									
Truckee	Upper	17433.06	Max WS	7090.65	4372.61	4397.45	4380.44	4397.55	0.000059	2.60	2997.22	231.82	0.11
Truckee	Upper	17232.01	Max WS	7002.35	4374.24	4397.45	4380.32	4397.54	0.000051	2.46	3136.87	239.68	0.10
Truckee	Upper	17231		Lat Struct									
Truckee	Upper	17030.21	Max WS	6963.84	4373.29	4397.44	4379.63	4397.53	0.000045	2.36	3064.42	183.02	0.09
Truckee	Upper	16794.88	Max WS	6837.18	4368.74	4397.43	4377.36	4397.52	0.000047	2.37	2940.15	173.46	0.09
Truckee	Upper	16620.83	Max WS	6647.51	4363.54	4397.44	4374.00	4397.52	0.000036	2.25	3111.24	183.27	0.08
Truckee	Upper	16452.05	Max WS	6400.73	4366.80	4397.45	4375.35	4397.52	0.000032	2.04	3219.34	167.01	0.08
Truckee	Upper	16306.12	Max WS	6165.36	4371.39	4397.45	4378.12	4397.52	0.000033	2.04	3124.31	173.15	0.08
Truckee	Upper	16122.58 BREACH, DA 6	Max WS	5983.95	4372.50	4397.44	4379.19	4397.52	0.000041	2.25	2761.16	157.73	0.09
Truckee	Upper	15922		Lat Struct									
Truckee	Upper	15921.59	Max WS	6441.76	4372.27	4397.40	4379.35	4397.49	0.000061	2.38	2750.82	192.65	0.11
Truckee	Upper	15770		Lat Struct									
Truckee	Upper	15769.99	Max WS	6412.71	4371.53	4397.41	4378.26	4397.49	0.000043	2.20	2951.82	172.58	0.09
Truckee	Upper	15528.35	Max WS	6643.49	4372.10	4397.39	4378.39	4397.47	0.000043	2.31	3014.03	195.99	0.09
Truckee	Upper	15300.51	Max WS	6950.90	4370.80	4397.35	4378.90	4397.45	0.000054	2.53	2949.45	198.98	0.10
Truckee	Upper	15249		Lat Struct									
Truckee	Upper	15130	Max WS	7115.40	4369.11	4397.36	4377.44	4397.44	0.000040	2.26	3415.53	219.59	0.09
Truckee	Upper	15057		Bridge									
Truckee	Upper	14990	Max WS	7115.58	4369.11	4397.35	4377.44	4397.43	0.000040	2.26	3414.02	219.59	0.09
Truckee	Upper	14768		Lat Struct									
Truckee	Upper	14767.08	Max WS	6933.44	4372.88	4397.33	4379.77	4397.43	0.000056	2.53	2828.11	169.96	0.10
Truckee	Upper	14544.98	Max WS	6932.90	4372.59	4397.33	4379.17	4397.42	0.000045	2.34	3092.10	202.26	0.09
Truckee	Upper	14538		Lat Struct									
Truckee	Upper	14346.78	Max WS	6821.77	4371.78	4397.32	4378.86	4397.41	0.000052	2.41	2915.62	181.78	0.10
Truckee	Upper	14204		Lat Struct									
Truckee	Upper	14202.16	Max WS	6812.56	4370.74	4397.32	4378.32	4397.40	0.000043	2.23	3129.68	182.86	0.09
Truckee	Upper	14202		Lat Struct									
Truckee	Upper	14023.34	Max WS	6903.69	4371.79	4397.31	4378.08	4397.39	0.000042	2.27	3121.46	169.44	0.09
Truckee	Upper	13849.40	Max WS	7007.48	4371.38	4397.30	4377.73	4397.38	0.000041	2.25	3209.84	180.13	0.09
Truckee	Upper	13842		Lat Struct									
Truckee	Upper	13690.82	Max WS	7316.63	4371.44	4397.29	4378.10	4397.37	0.000045	2.29	3313.51	189.51	0.09
Truckee	Upper	13518.64	Max WS	7944.19	4371.55	4397.24	4378.73	4397.35	0.000064	2.59	3159.30	185.02	0.11
Truckee	Upper	13390.04	Max WS	8738.00	4370.93	4397.21	4378.52	4397.32	0.000059	2.63	3432.20	186.41	0.10
Truckee	Middle	13313.60	Max WS	9341.63	4370.55	4397.21	4378.59	4397.35	0.000089	2.97	3284.56	182.19	0.11
Truckee	Middle	13261.42 BREACH, DA 7	Max WS	9342.73	4370.83	4397.20	4378.65	4397.34	0.000104	3.01	3171.66	183.87	0.12
Truckee	Middle	13260		Lat Struct									
Truckee	Middle	13250		Lat Struct									
Truckee	Middle	13144.50	Max WS	9683.57	4370.98	4397.15	4378.87	4397.32	0.000115	3.30	3065.36	185.80	0.13
Truckee	Middle	13012.33	Max WS	11413.27	4370.61	4397.05	4379.22	4397.25	0.000132	3.63	3322.81	199.85	0.14
Truckee	Middle	12883.59	Max WS	13856.82	4370.53	4396.97	4379.71	4397.17	0.000128	3.72	4374.59	270.97	0.14
Truckee	Middle	12793.06	Max WS	15854.41	4370.29	4396.88	4380.41	4397.11	0.000155	4.00	4692.73	289.53	0.15
Truckee	Lower	12674.60	Max WS	21378.54	4370.03	4396.88	4382.63	4397.23	0.000470	4.81	4633.86	296.48	0.20
Truckee	Lower	12671	Max WS	21376.87	4371.11	4396.97	4381.24	4397.23	0.000291	4.15	5362.80	305.95	0.16
Truckee	Lower	12670		Lat Struct									
Truckee	Lower	12559.40	Max WS	21378.23	4370.36	4396.76	4381.54	4397.19	0.000519	5.26	4159.52	236.64	0.21
Truckee	Lower	12558		Lat Struct									
Truckee	Lower	12411.23	Max WS	21514.90	4370.27	4396.62	4381.54	4397.11	0.000538	5.65	3965.69	214.51	0.21
Truckee	Lower	12291		Lat Struct									
Truckee	Lower	12290.45	Max WS	21532.89	4370.05	4396.57	4381.27	4397.04	0.000513	5.52	3998.33	205.57	0.21
Truckee	Lower	12194.80	Max WS	21551.34	4369.80	4396.53	4380.93	4396.99	0.000503	5.49	4011.14	203.95	0.21
Truckee	Lower	12052.52	Max WS	21588.78	4369.62	4396.19	4382.35	4396.90	0.000876	6.79	3288.65	195.21	0.27
Truckee	Lower	11921.75	Max WS	21691.34	4370.70	4396.06	4382.93	4396.78	0.000888	6.87	3290.72	193.99	0.27
Truckee	Lower	11900		Lat Struct									
Truckee	Lower	11819.83	Max WS	21723.39	4371.05	4395.89	4383.42	4396.69	0.001023	7.23	3150.50	193.53	0.29
Truckee	Lower	11704.35	Max WS	21732.87	4371.00	4395.80	4382.99	4396.57	0.000903	7.15	3236.76	198.82	0.27
Truckee	Lower	11617.76	Max WS	21732.78	4371.36	4395.79	4382.86	4396.49	0.000870	6.75	3362.18	204.77	0.27
Truckee	Lower	11496.09	Max WS	21733.09	4370.87	4395.71	4382.35	4396.39	0.000852	6.75	3527.80	238.72	0.26
Truckee	Lower	11383.49	Max WS	21733.52	4369.62	4395.67	4382.49	4396.30	0.000772	6.58	3804.86	286.75	0.25
Truckee	Lower	11234.17	Max WS	21734.30	4367.92	4395.54	4382.41	4396.19	0.000758	6.63	3738.68	285.76	0.26
Truckee	Lower	11233		Lat Struct									
Truckee	Lower	11083.70	Max WS	21735.39	4368.21	4395.68	4380.27	4396.06	0.000415	5.01	4605.40	295.27	0.19
Truckee	Lower	10929.09	Max WS	21746.22	4367.43	4395.58	4380.22	4396.00	0.000468	5.28	4459.53	285.27	0.20
Truckee	Lower	10738.99	Max WS	21875.34	4367.66	4395.16	4382.91	4395.87	0.000981	6.77	3324.18	210.32	0.28
Truckee	Lower	10562.53	Max WS	22011.91	4368.91	4395.21	4380.19	4395.72	0.000549	5.75	4286.62	302.75	0.22
Truckee	Lower	10411.34	Max WS	22044.09	4369.82	4394.99	4381.00	4395.64	0.000737	6.56	4027.64	332.81	0.25
Truckee	Lower	10237.23	Max WS	22113.82	4370.52	4395.03	4380.59	4395.50	0.000523	5.55	4451.04	329.84	0.21
Truckee	Lower	10054.85	Max WS	22243.96	4371.06	4394.96	4380.53	4395.40	0.000497	5.39	4972.44	375.87	0.21
Truckee	Lower	10054		Lat Struct									
Truckee	Lower	9901.465	Max WS	22613.30	4370.32	4394.85	4380.54	4395.32	0.000537	5.56	5116.10	432.22	0.21
Truckee	Lower	9759.033	Max WS	22612.65	4368.55	4394.66	4382.04	4395.26	0.000772	6.42	4875.54	504.96	0.25
Truckee	Lower	9758		Lat Struct									

HEC-RAS Plan: CE SEC Locations: User Defined Profile: Max WS (Continued)

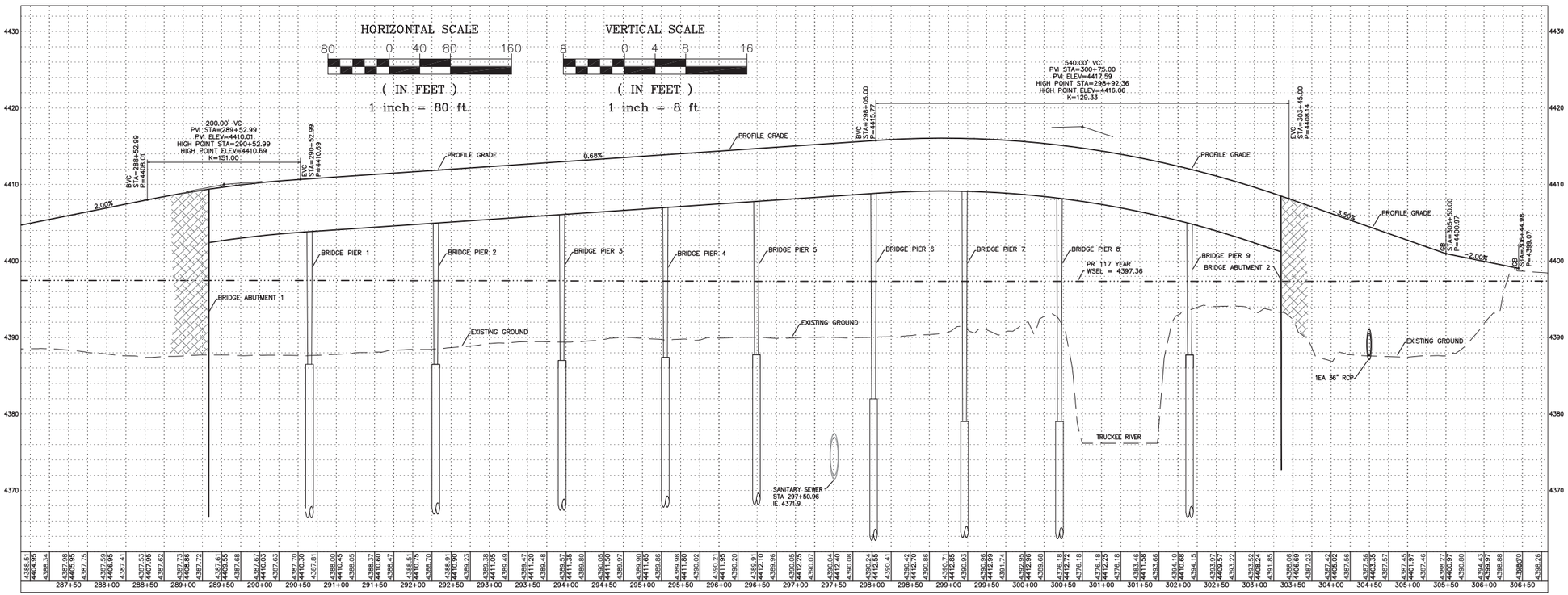
River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Truckee	Lower	9584.751	Max WS	22612.21	4368.42	4394.48	4381.52	4395.14	0.000770	6.68	4804.36	525.55	0.26
Truckee	Lower	9385.354	Max WS	22719.37	4366.47	4394.36	4380.36	4394.97	0.000674	6.36	4773.57	536.53	0.24
Truckee	Lower	9234.001	Max WS	22721.61	4367.49	4394.12	4380.82	4394.87	0.000920	6.96	3495.56	393.60	0.28
Truckee	Lower	9124.953	Max WS	22765.56	4369.21	4394.25	4380.52	4394.77	0.000665	6.12	4642.05	621.21	0.24
Truckee	Lower	9064.256	Max WS	22765.44	4369.75	4394.20	4381.00	4394.74	0.000687	6.23	4592.20	520.48	0.24
Truckee	Lower	8898.097	Max WS	22765.97	4369.56	4394.08	4381.16	4394.61	0.000700	6.10	4351.57	446.50	0.24
Truckee	Lower	8745.655	Max WS	22765.38	4369.86	4393.96	4380.17	4394.51	0.000630	6.03	4441.67	675.45	0.23
Truckee	Lower	8617.348	Max WS	22766.55	4369.81	4393.88	4380.19	4394.42	0.000639	5.97	5120.94	668.83	0.23
Truckee	Lower	8490.330	Max WS	22765.83	4368.41	4393.71	4380.70	4394.37	0.000790	6.62	4964.39	645.26	0.25
Truckee	Lower	8388.340	Max WS	22764.90	4368.13	4393.63	4380.77	4394.28	0.000840	6.64	4876.12	625.21	0.26
Truckee	Lower	8228.509	Max WS	22765.31	4368.59	4393.44	4380.71	4394.16	0.000905	6.91	4453.17	530.87	0.27
Truckee	Lower	8090.012	Max WS	22765.55	4369.30	4393.37	4380.34	4394.02	0.000837	6.53	4381.38	458.46	0.25
Truckee	Lower	7961.973	Max WS	22765.30	4370.81	4393.22	4380.84	4393.91	0.000886	6.72	3998.00	387.67	0.26
Truckee	Lower	7820.225	Max WS	22765.55	4370.69	4393.10	4380.91	4393.78	0.000868	6.66	3968.14	384.48	0.26
Truckee	Lower	7664.775	Max WS	22764.82	4369.87	4392.73	4381.68	4393.65	0.001268	7.74	3452.79	344.08	0.32
Truckee	Lower	7511.357	Max WS	22764.75	4370.35	4392.60	4381.49	4393.46	0.001174	7.48	3631.41	377.73	0.31
Truckee	Lower	7406.445	Max WS	22764.86	4370.61	4392.60	4380.91	4393.32	0.000987	6.84	3524.49	254.05	0.28
Truckee	Lower	7258.546	Max WS	22764.75	4369.69	4392.32	4381.11	4393.20	0.000741	7.54	3068.38	193.45	0.31
Truckee	Lower	7131.793	Max WS	22764.80	4366.08	4391.72	4380.92	4393.09	0.001059	9.40	2422.72	142.43	0.38
Truckee	Lower	6976.285	Max WS	22764.63	4362.56	4391.38	4380.03	4392.95	0.000932	10.09	2344.02	170.32	0.37
Truckee	Lower	6887.051	Max WS	22764.73	4364.70	4391.51	4380.31	4392.86	0.000849	9.41	2547.18	200.31	0.35
Truckee	Lower	6812.174	Max WS	22764.86	4367.65	4391.22	4382.17	4392.80	0.001173	10.16	2393.95	213.15	0.40
Truckee	Lower	6735.577	Max WS	22764.74	4368.69	4391.11	4382.92	4392.68	0.001517	10.05	2264.43	171.80	0.45
Truckee	Lower	6682.363	Max WS	22764.95	4369.92	4390.81	4383.31	4392.62	0.001476	10.86	2197.66	207.45	0.45
Truckee	Lower	6650		Bridge									
Truckee	Lower	6619.967	Max WS	22764.76	4370.68	4390.74	4383.74	4392.54	0.001175	10.83	2234.73	173.43	0.46
Truckee	Lower	6489.055	Max WS	22764.74	4369.60	4390.69	4383.07	4392.40	0.001030	10.56	2293.41	155.54	0.44
Truckee	Lower	6327.249	Max WS	22764.83	4368.98	4390.48	4382.83	4392.21	0.001086	10.54	2163.37	181.26	0.44
Truckee	Lower	6216.105	Max WS	22764.70	4369.52	4390.37	4382.51	4392.10	0.000988	10.57	2183.54	182.45	0.43
Truckee	Lower	6088.776	Max WS	22764.48	4369.16	4389.96	4383.13	4391.97	0.001203	11.40	2045.29	178.59	0.48
Truckee	Lower	6033.843	Max WS	22764.92	4369.03	4389.83	4383.62	4391.90	0.001334	11.55	1994.57	179.71	0.50
Truckee	Lower	5839.856	Max WS	22764.79	4367.29	4389.81	4382.25	4391.86	0.001186	11.48	1989.28	171.14	0.47
Truckee	Lower	5504.302	Max WS	22764.58	4370.47	4389.57	4383.21	4391.37	0.001692	10.79	2109.88	162.11	0.53
Truckee	Lower	5109.454	Max WS	22764.44	4370.22	4389.00	4382.90	4390.75	0.001481	10.66	2187.02	180.31	0.50
Truckee	Lower	4605.342	Max WS	22764.16	4368.63	4388.15	4381.77	4390.00	0.001490	10.92	2108.79	197.40	0.50
Truckee	Lower	4107.256	Max WS	22764.32	4367.80	4387.93	4380.41	4389.34	0.001112	9.56	2517.02	272.89	0.44
Truckee	Lower	3601.522	Max WS	22764.39	4368.40	4387.76	4379.41	4388.83	0.000816	8.36	3018.89	385.24	0.38
Truckee	Lower	3078.293	Max WS	22763.85	4368.17	4387.33	4379.21	4388.43	0.000788	8.57	3119.85	327.89	0.37
Truckee	Lower	2470.082	Max WS	22764.31	4366.87	4386.53	4379.55	4387.84	0.001128	9.23	2544.38	224.13	0.44
Truckee	Lower	1970.402	Max WS	22763.78	4367.95	4384.46	4380.68	4387.07	0.002249	12.98	1770.67	137.61	0.62
Truckee	Lower	1472.411	Max WS	22763.96	4366.78	4383.64	4379.52	4386.03	0.001939	12.43	1887.28	151.64	0.58
Truckee	Lower	1331.88*	Max WS	22763.80	4366.91	4383.87	4378.69	4385.62	0.001388	10.69	2232.57	177.89	0.50
Truckee	Lower	1191.36*	Max WS	22763.87	4367.04	4383.79	4378.39	4385.33	0.001270	10.32	2522.74	202.61	0.48
Truckee	Lower	1050.84*	Max WS	22763.80	4367.18	4383.79	4377.66	4385.04	0.000976	9.22	2828.01	227.15	0.42
Truckee	Lower	910.317*	Max WS	22763.37	4367.31	4383.80	4377.13	4384.80	0.000787	8.24	3134.98	251.65	0.38
Truckee	Lower	769.794	Max WS	22763.43	4367.44	4383.79	4376.48	4384.62	0.000650	7.49	3436.78	276.18	0.34
Truckee	Lower	731.462*	Max WS	22763.70	4365.94	4383.72	4375.94	4384.61	0.000626	7.81	3400.33	309.43	0.34
Truckee	Lower	693.131*	Max WS	22763.40	4364.45	4383.52	4375.71	4384.61	0.000701	8.67	3084.30	355.64	0.37
Truckee	Lower	654.800*	Max WS	22763.49	4362.96	4383.29	4375.72	4384.62	0.000797	9.68	2781.98	840.14	0.40
Truckee	Lower	650		Bridge									
Truckee	Lower	616.469	Max WS	22763.19	4361.46	4380.36	4375.74	4383.12	0.001860	14.05	1892.35	690.91	0.60
Truckee	Lower	452.031*	Max WS	22763.50	4363.00	4381.35	4375.69	4382.41	0.000866	9.16	3849.69	523.63	0.41
Truckee	Lower	287.593*	Max WS	22763.49	4364.53	4381.24	4376.11	4382.17	0.000879	8.50	3801.62	389.60	0.40
Truckee	Lower	123.156	Max WS	22763.74	4366.07	4381.05	4376.45	4381.96	0.000973	8.44	3815.85	403.90	0.41
TruckeeOverbank	Overland	14235.67	Max WS	2.00	4436.25	4437.12	4425.50	4437.12	0.000024	0.04	50.48	82.29	0.01
TruckeeOverbank	Overland	14126.57	Max WS	321.88	4430.29	4437.02	4433.57	4437.03	0.001400	0.56	531.52	254.19	0.07
TruckeeOverbank	Overland	13988.16	Max WS	321.85	4430.10	4436.89	4433.49	4436.89	0.000435	0.34	890.48	382.23	0.04
TruckeeOverbank	Overland	13840.51	Max WS	845.80	4433.10	4436.43	4434.45	4436.44	0.004856	1.07	792.33	500.24	0.14
TruckeeOverbank	Overland	13708.67	Max WS	843.54	4432.06	4435.85	4433.70	4435.86	0.003445	0.82	1030.10	615.37	0.11
TruckeeOverbank	Overland	13522.07	Max WS	841.48	4431.05	4434.46	4432.52	4434.49	0.011625	1.27	664.31	512.44	0.20
TruckeeOverbank	Overland	13290.35	Max WS	840.64	4427.53	4432.66	4428.88	4432.69	0.003611	1.44	582.25	152.58	0.13
TruckeeOverbank	Overland	12967.18	Max WS	495.05	4427.52	4431.98	4427.94	4431.98	0.000178	0.31	1600.20	455.62	0.03
TruckeeOverbank	Overland	12606.02	Max WS	285.48	4428.35	4430.09	4429.22	4430.11	0.011904	0.99	291.12	398.86	0.19
TruckeeOverbank	Overland	12261.51	Max WS	285.46	4425.15	4428.21	4426.13	4428.21	0.000727	0.42	687.44	351.57	0.05
TruckeeOverbank	Overland	12039.35	Max WS	285.70	4425.17	4428.10	4426.32	4428.10	0.000337	0.24	1184.77	773.11	0.03
TruckeeOverbank	Overland	11840.18	Max WS	279.44	4425.04	4426.30	4425.77	4426.31	0.021888	1.03	270.41	466.24	0.24
TruckeeOverbank	Overland	11542.32	Max WS	47.28	4421.54	4422.96	4422.16	4422.96	0.007638	0.38	124.44	426.81	0.12
TruckeeOverbank	Overland	11124.42	Max WS	47.19	4420.56	4421.14	4420.77	4421.14	0.005112	0.32	146.86	480.60	0.10
TruckeeOverbank	Overland	10680.17	Max WS	47.23	4418.81	4419.93	4419.43	4419.93	0.002555	0.24	198.12	602.84	0.07
TruckeeOverbank	Overland	10227.45	Max WS	47.28	4417.19	4418.05	4417.68	4418.06	0.012964	0.47	101.49	382.23	0.16
TruckeeOverbank	Overland	9971.609	Max WS	34.58	4416.37	4417.09	4416.66	4417.09	0.000832	0.14	246.83	718.89	0.04
TruckeeOverbank	Overland	9655.103	Max WS	47.25	4414.62	4415.30	4415.02	4415.30	0.053277	0.78	60.35	301.18	0.31
TruckeeOverbank	Overland	9367.660	Max WS	47.17	4411.88	4413.61	4412.45	4413.61	0.002563	0.33	143.63	270.60	0.08
TruckeeOverbank	Overland	9300.865	Max WS	47.15	4412.53	4413.32	4412.96	4413.33	0.010770	0.55	85.23	215.88	0.16
TruckeeOverbank	Overland	9139.340	Max WS	47.00	4411.31	4412.74	4411.72	4412.74	0.000445	0.13	367.72	768.98	0.03
TruckeeOverbank	Overland	8851.320	Max WS	476.64	4409.88	4412.36	4410.66	4412.37	0.002132	0.49	978.29	888.63	0.08
TruckeeOverbank	Overland	8410.757	Max WS	476.01	4408.97	4411.83	4409.81	4411.83	0.000270	0.18	2676.54	2342.25	0.03
TruckeeOverbank	Overland	7928.016	Max WS	722.30	4408.37	4411.09	4409.92	4411.10	0.003634	0.47	1532.20	2412.22	0.10
TruckeeOverbank	Overland	7546.727	Max WS	722.43	4404.90	4409.77	4408.79	4409.78	0.004355	0.57	1270.23	1562.00	0.11
TruckeeOverbank	Overland	7058.409	Max WS	285.92	4406.45	4408.39	4406.82	4408.39	0.000189	0.14	2110.16	2128.37	0.02
TruckeeOverbank	Overland	6635.819	Max WS	721.48	4405.42	4407.07	4406.34	4407.07	0.003155	0.41	1749.32	2740.41	0.09
TruckeeOverbank	Overland	6378.595	Max WS	723.71	4403.80	4405.82	4404.50	4405.83	0.007420	0.74	977.04	1207.49	0.15
TruckeeOverbank	Overland	6176.761	Max WS	722.71	4399.80	4405.05	4403.26	4405.05	0.000719	0.31	2328.39	1838.51	0.05
TruckeeOverbank	Overland	5968.443	Max WS	724.26	4399.07	4404.83	4403.13	4404.83	0.001547	0.37	1948.00	2082.94	0.07
TruckeeOverbank	Overland	5769.313	Max WS	723.30	4398.29	4404.56	4401.84	4404.56	0.001536	0.37	1949.80	2082.80	0.07
TruckeeOverbank	Overland	5543.388	Max WS	723.02	4399.67	4404.33	4402.05	4404.33	0.000709	0.27	2724.59	2694.43	0.05
TruckeeOverbank	Overland	5302.488	Max WS	721.82	4399.87	4404.22	4401.80	4404.22	0.000267	0.17	4242.11	3929.98	0.03
TruckeeOverbank	Overland	5101.605	Max WS	3168.09	4399.22	4403.78	4401.61	4403.79	0.003919	0.76	4192.63	3107.91	0.11
TruckeeOverbank	Overland	4892.228	Max WS	3167.09	4399.04	4403.18	4400.78	4403.18	0.002021	0.58	5423.83	3607.48	0.08
TruckeeOverbank	Overland	4662.692	Max WS	3167.45	4398.69	4402.72	4400.73	4402.73	0.001997	0.58	5450.59	3612.78	0.08
TruckeeOverbank	Overland	4439.153	Max WS	3167.45	4398.51	4402.31	4400.32	4402.32	0.001686	0.52	6056.15	4148.65	0.08
TruckeeOverbank	Overland	4301.524	Max WS	3164.64	4396.17	4402.11	4399.59	4402.12	0.001251	0.46	6911.64	4620.96	0.07
TruckeeOverbank	Overland	4102.733	Max WS	3168.60	4395.50	4401.93	4398.09	4401.93	0.000668	0.38	8285.86	4531.84	0.05
TruckeeOverbank	Overland	3798.135	Max WS	3172.98	4394.92	4401.62	4398.27	4401.63	0.001300	0.57	5554.72	2739.90	0.07
TruckeeOverbank	Overland	3454.614	Max WS	3415.72	4395.54	4401.07	4398.45	4401.08	0.001858	0.68	5043.93	2519.90	0.08
TruckeeOverbank	Overland	3301.217	Max WS	2593.28	4396.32	4400.78	4398.36	4400.78	0.001904	0.65	4012.92	2186.23	0.08
TruckeeOverbank	Overland	3114.211	Max WS	2468.47	4396.76	4400.05	4397.89	4400.05	0.001576	0.52	4727.91	3090.22	0.07
TruckeeOverbank	Overland	3110		Inl Struct									
TruckeeOverbank	Overland	2965.298	Max WS	3399.14	4395.20	4398.50	4396.79	4398.51	0.003197	0.84	4042.99	2234.36	0.11
TruckeeOverbank	Overland	2960		Lat Struct									
TruckeeOverbank	Overland	2868.72*	Max WS	3424.90	4394.75	4398.18	4396.57	4398.19	0.003318	0.82	4220.96	2598.24	0.11
TruckeeOverbank	Overland	2772.150	Max WS	2818.52	4394.30	4397.97	4396.10	4397.97	0.001481	0.53	5322.60	3253.51	0.07
TruckeeOverbank	Overland	2693.59*	Max WS	2728.15	4393.43	4397.88	4395.11	4397.88	0.000846	0.44	6258.97	3397.01	0.06
TruckeeOverbank	Overland	2615.037	Max WS	2722.07	4392.56	4397.83	4393.89	4397.83	0.000489	0.35	7831.47	3957.72	0.04
TruckeeOverbank	Overland	2531.56*	Max WS	2749.29	4392.66	4397.79	4394.02	4397.79	0.000422	0.33	8312.92	4041.69	0.04
TruckeeOverbank	Overland	2500		Lat Struct									
TruckeeOverbank	Overland	2448.088	Max WS	2716.48	4392.76	4397.76	4394.13	4397.76	0.000346	0.31	8821.52	4120.00	0.04
TruckeeOverbank	Overland	2367.14*	Max WS	2720.23	4392.46	4397.73	4394.16	4397.73	0.000436	0.31	8734.59	4924.19	0.04

HEC-RAS Plan: CE SEC Locations: User Defined Profile: Max WS (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
TruckeeOverbank	Overland	2286.19*	Max WS	2703.70	4392.17	4397.70	4394.14	4397.70	0.000344	0.29	9303.57	4842.67	0.04
TruckeeOverbank	Overland	2205.24*	Max WS	2692.52	4391.87	4397.68	4394.01	4397.68	0.000246	0.26	10384.99	4988.53	0.03
TruckeeOverbank	Overland	2124.297	Max WS	2691.85	4391.57	4397.66	4393.83	4397.66	0.000187	0.24	11497.28	5221.12	0.03
TruckeeOverbank	Overland	2035.78*	Max WS	2684.62	4391.49	4397.65	4394.13	4397.65	0.000184	0.24	11465.28	5236.97	0.03
TruckeeOverbank	Overland	1947.26*	Max WS	2682.66	4391.41	4397.63	4394.36	4397.63	0.000177	0.24	11481.10	5169.04	0.03
TruckeeOverbank	Overland	1858.75*	Max WS	2664.54	4391.32	4397.62	4394.43	4397.62	0.000157	0.23	11700.45	4989.23	0.03
TruckeeOverbank	Overland	1770.239	Max WS	2664.91	4391.24	4397.60	4394.26	4397.60	0.000144	0.22	12025.64	4919.37	0.02
TruckeeOverbank	Overland	1770		Lat Struct									
TruckeeOverbank	Overland	1685.76*	Max WS	2642.83	4391.29	4397.59	4394.11	4397.59	0.000137	0.22	12229.47	4939.70	0.02
TruckeeOverbank	Overland	1601.29*	Max WS	2636.85	4391.35	4397.58	4393.98	4397.58	0.000134	0.21	12422.56	5011.63	0.02
TruckeeOverbank	Overland	1516.81*	Max WS	2632.22	4391.40	4397.57	4393.82	4397.57	0.000126	0.21	12635.76	4961.89	0.02
TruckeeOverbank	Overland	1432.340	Max WS	2637.19	4391.45	4397.56	4393.56	4397.56	0.000114	0.20	12983.00	4910.61	0.02
TruckeeOverbank	Overland	1293.321	Max WS	2627.56	4391.26	4397.55	4393.57	4397.55	0.000084	0.18	14858.70	5604.51	0.02
TruckeeOverbank	Overland	1293		Lat Struct									
TruckeeOverbank	Overland	1129.412	Max WS	2620.37	4390.22	4397.54	4392.16	4397.54	0.000048	0.15	17770.19	5655.78	0.01
TruckeeOverbank	Overland	1007.088	Max WS	2734.35	4390.46	4397.53	4392.06	4397.53	0.000075	0.16	16412.09	6050.25	0.02
TruckeeOverbank	Overland	878		Lat Struct									
TruckeeOverbank	Overland	877.265	Max WS	2722.62	4389.59	4397.52	4392.43	4397.52	0.000069	0.16	16789.17	6078.24	0.02
TruckeeOverbank	Overland	599.925	Max WS	2777.50	4388.37	4397.51	4391.88	4397.51	0.000019	0.11	24968.02	6103.28	0.01
TruckeeOverbank	Overland	318.374	Max WS	3189.29	4385.84	4397.50	4391.83	4397.50	0.000043	0.16	20561.10	5563.60	0.01
TruckeeOverbank	Overland	318		Lat Struct									
TruckeeOverbank	Overland	66.123	Max WS	3357.72	4385.09	4397.49	4390.61	4397.49	0.000005	0.12	27393.29	5308.89	0.01
TruckeeOverbank	Overland	0.01	Max WS	3474.87	4385.07	4397.49	4392.34	4397.49	0.000013	0.17	20715.74	5271.23	0.01



SOUTHEAST CONNECTOR



V:\2301\ACTIVE\180101226_SEC_TRB\DRAINAGE\DRAWING RE-DESIGN\EXHIBITS\BRIDGE_EXHIBIT-UPDATED\SEC_PR_BRIDGE_EXHIBIT.DWG
1/24/2013 9:53:49 AM ABRAMS, DANIELE

ORIGINAL SHEET - ARCH D

Stantec Consulting Inc.
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Consultants

Legend

Notes

Revision	By	Appd.	YY.MM.DD

Issued	By	Appd.	YY.MM.DD

File Name: SEC_PR_BRIDGE_EXHIBIT.DWG	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
REGIONAL TRANSPORTATION COMMISSION OF WASHOE COUNTY

SOUTHEAST CONNECTOR PHASE I:
GREG STREET TO CLEAN WATER WAY
CITY OF SPARKS / WASHOE COUNTY, NV, U.S.A.

Title
PLAN & PROFILE
BRIDGE AT TRUCKEE RIVER

Project No.	Scale	
180101226	SEE SHEET	
Drawing No.	**Sheet**	**Revision**
1.0	1 of 1	0



Legend

Soil Boring Location

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PROJECT NO.	112746
DRAWN:	3/21/11
DRAWN BY:	I.McGovern
CHECKED BY:	D.Adams
FILE NAME:	EXP_Truckee.MXD

TRUCKEE RIVER
EXPLORATION LOCATION MAP

PRELIMINARY GEOTECHNICAL INVESTIGATION
PROPOSED RTC SOUTHEAST CONNECTOR
WASHOE COUNTY, NEVADA

PLATE
2

BORING NO.	SAMPLE DEPTH (ft)	DRY UNIT WEIGHT (pcf)	MOISTURE CONTENT (% of dry weight)	PARTICLE SIZE SIEVE SIZE (percent passing)						ATTERBERG LIMITS		OTHER TESTS
				6"	3"	3/4"	#4	#10	#200	L.L.	P.I.	
ML-1	12.5	54	72						96	78	27	Organic Content=12% Consolidation Test
												Triaxial Test Chemical Test
ML-1	13.0	59	64									
ML-1	17.5	97	46						69	63	28	Organic Content=7%
ML-1	18.0	94	51									
ML-1	19.0					100	98	97	80	69	35	Consolidation Test Triaxial Test
ML-1	22.5		39						68	38	15	
ML-1	25.5		40				100	99	53	39	15	
ML-1	35.5		13		100	89	64	54	5			
ML-1	45.0						100	99	59	33	12	
ML-1	55.0	85	37				100		71	41	20	Direct Shear
ML-1	75.5	110	20						49			
P-1	5.5	91	28				100	99	51	29	6	Consolidation Test
P-1	10.0											Chemical Tests
P-1	15.0								77	36	8	Consolidation Test Triaxial Test
P-1	16.5	91	32				100	100	46	NP	NP	
P-1	30.0		10		100	85	49	38	8	NP	NP	
P-1	45.0		28				100	100	30	24	4	
P-1	85.5	89	33						53	36	8	
TR-1	12.5	88	32						98	42	13	Consolidation Test Triaxial Test
												Chemical Tests
TR-1	20.0		33			100	99		28			
TR-1	20.5									NP	NP	
TR-1	25.5	86	36				100		81	36	8	
TR-1	75.0	97	25				100		8			Direct Shear
TR-2	6.0	64	23									
TR-2	12.5	92	28						78	34	14	Consolidation Test Triaxial Test
TR-2	15.5		21			100	99	98	20			
TR-2	20.5		39						81	39	12	
TR-2	25.5	136	8		100	69	42	32	6	NP	NP	
TR-2	60.5	103	21			100	90		10	36	16	Direct Shear
TR-3	7.5											Chemical Tests
TR-3	15.8		42		100	96	96	96	61	45	10	
TR-3	20.0		31				100	100	7			
TR-3	95.5	103	23				100		9			Direct Shear
TR-4	17.5		26		100	93	87	82	31	NP	NP	
TR-4	90.5	95	23			100	99	87	9	NP	NP	
TR-5	12.5	79	44						98	47	21	Consolidation Test Chemical Tests
TR-5	17.5	88	32						96	60	36	Consolidation Test Triaxial Test
TR-5	30.5				100	74	44	33	4			
TR-5	60.5	96	24				100		4			Direct Shear

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Project Number:	112746
Date:	02-14-11
Entry By:	D. Ross
Checked By:	D. Adams
File Name:	112746 0.1

SUMMARY OF LABORATORY TESTS

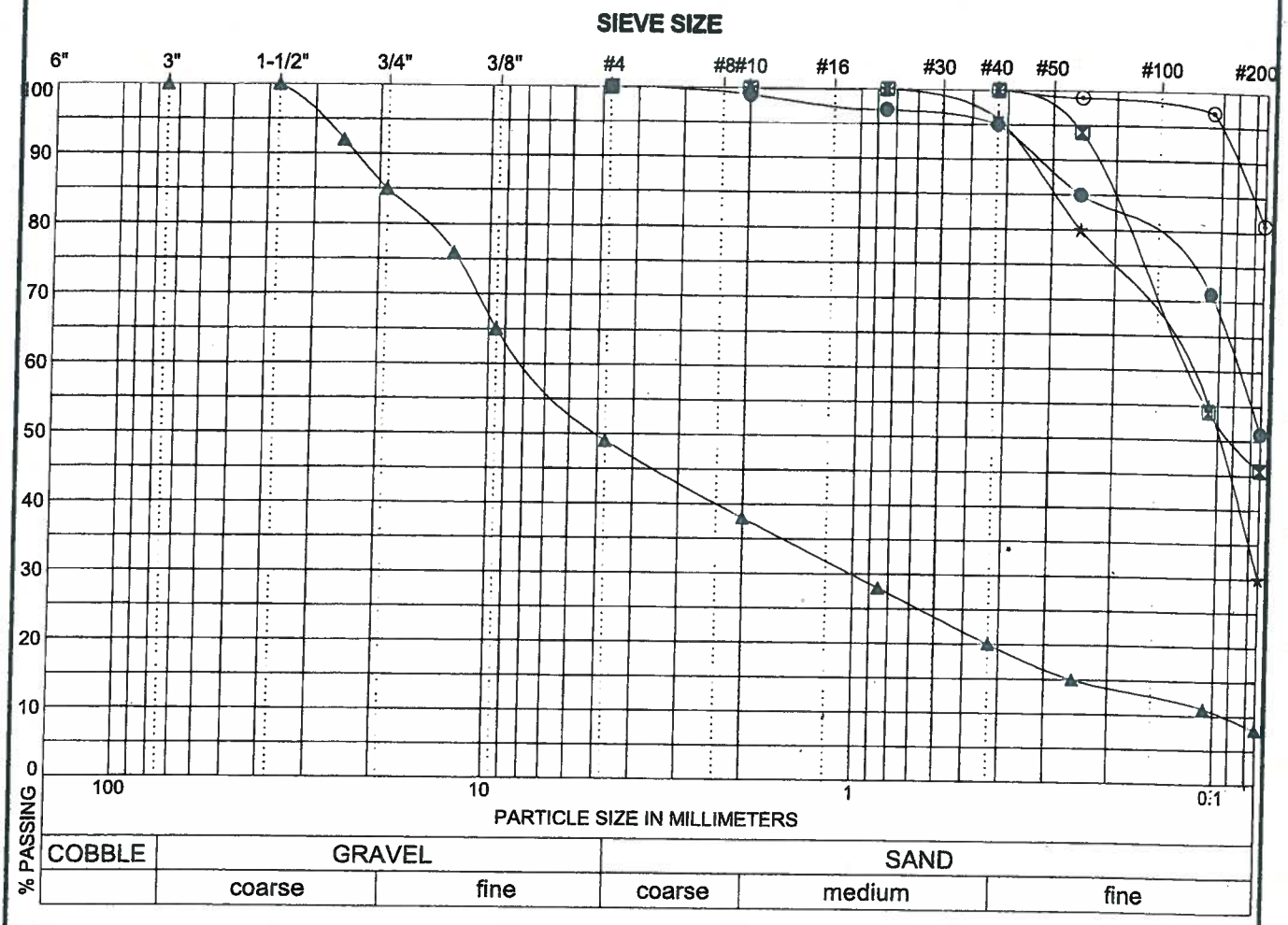
PRELIMINARY GEOTECHNICAL INVESTIGATION
PROPOSED RTC SOUTHEAST CONNECTOR
WASHOE COUNTY, NEVADA

Plate 1 of 1

B-1

KA LAB SUMMARY KA CORPORATE STD.GDT KA CORPORATE STD - FEBRUARY 02.GLB 112746-0.1.GPJ 4/11/11

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LEGEND:	SOURCE	DEPTH (ft)	COBBLE (%)	GRAVEL (%)	SAND (%)	FINES (%)	D60 (mm)	D10 (mm)	Cu	Cc	DESCRIPTION
●	P-1	5.5	0	0	49	51	0.09				Sandy SILT (ML)
⊠	P-1	16.5	0	0	54	46	0.12				SILT With Sand (ML)
▲	P-1	30.0	0	51	41	8	7.65	0.09	81	1.4	Well Graded GRAVEL With Silt And Sand (GW-GM)
★	P-1	45.0	0	0	70	30	0.13				Silty SAND (SM)
⊙	TR-1	25.5	0	0	19	81					SILT (ML)

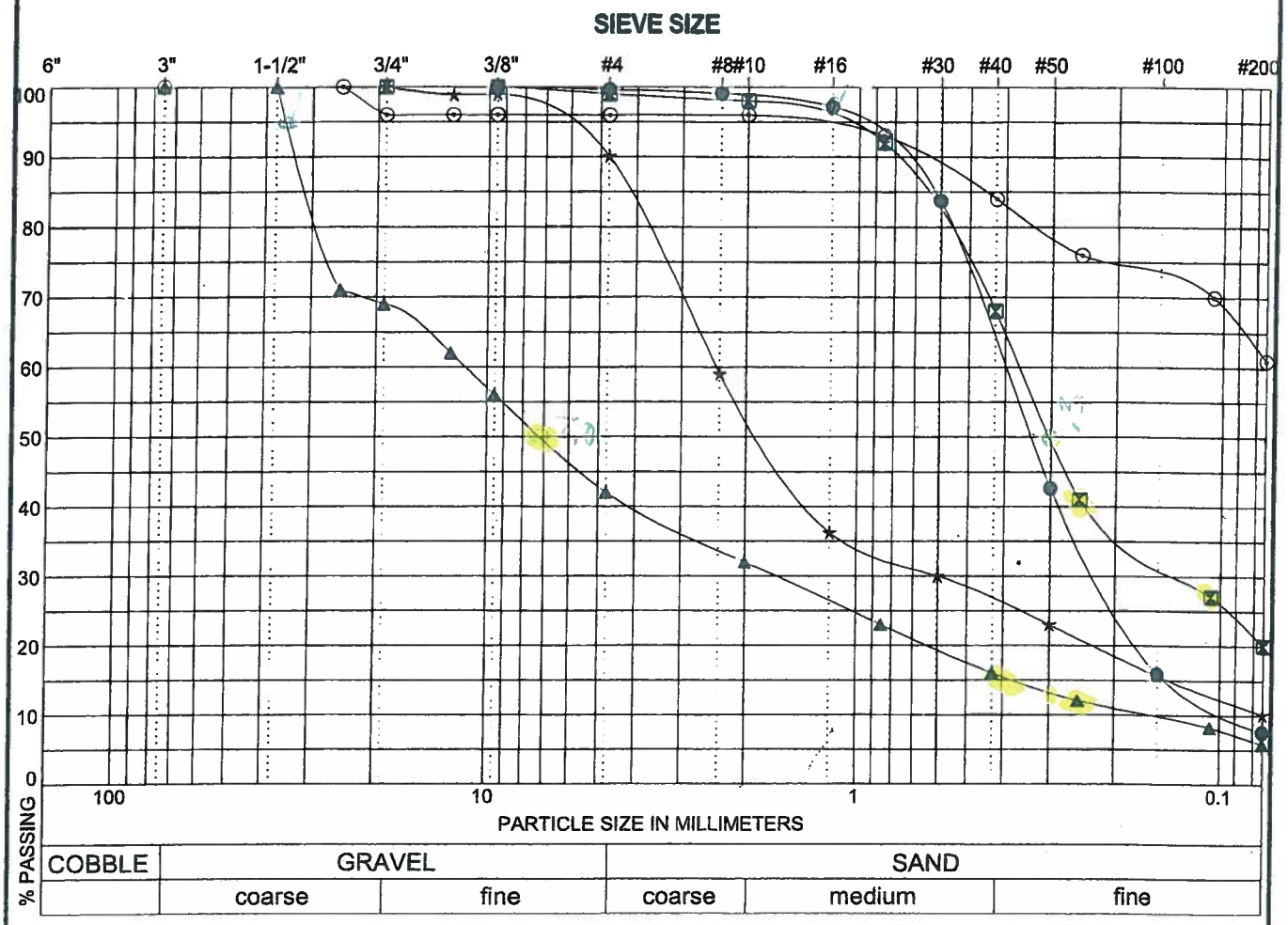
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Project Number: 112746	GRAIN SIZE ANALYSIS
Date: 02-14-11	
Entry By: D. Ross	PRELIMINARY GEOTECHNICAL INVESTIGATION PROPOSED RTC SOUTHEAST CONNECTOR WASHOE COUNTY, NEVADA
Checked By: D. Adams	
File Name: 112746 0.1	

Plate 2 of 5

B-2

KA SIEVE KA 2005.GDT KA CORPORATE STD - FEBRUARY 02.GLB 112746-0.1.GPJ 4/11/11



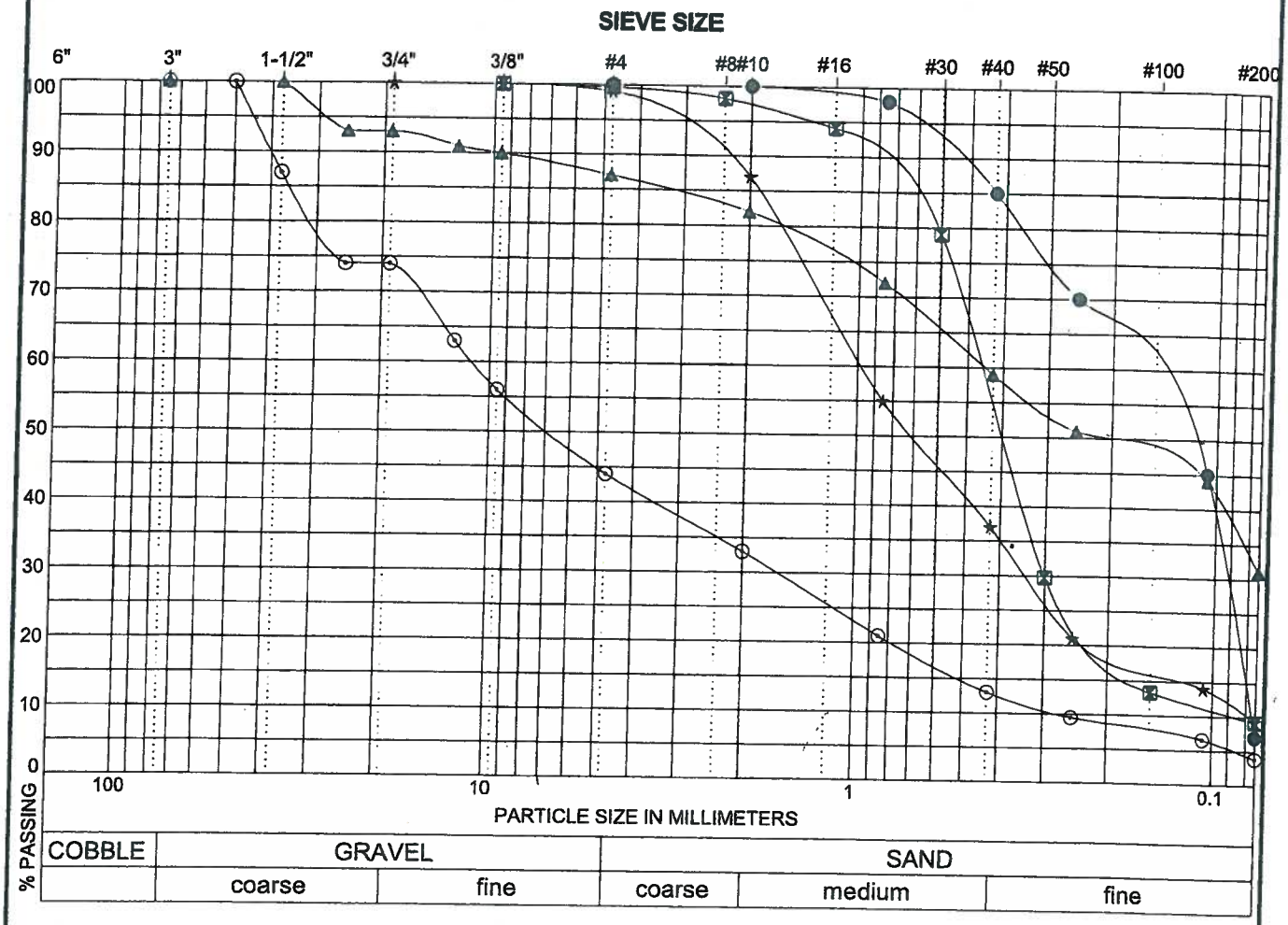
LEGEND:	SOURCE	DEPTH (ft)	COBBLE (%)	GRAVEL (%)	SAND (%)	FINES (%)	D60 (mm)	D10 (mm)	Cu	Cc	DESCRIPTION
●	TR-1	75.0	0	0	92	8	0.4	0.09	4.4	1.3	Poorly Graded SAND With Silt (SP-SM)
⊠	TR-2	15.5	0	1	79	20	0.36				Silty SAND (SM)
▲	TR-2	25.5	0	58	36	6	11.41	0.16	71.7	1.5	Well Graded GRAVEL With Silt And Sand (GW-GM)
★	TR-2	60.5	0	10	80	10	2.41		32.8	2	Well Graded SAND With Clay (SW-SC)
⊙	TR-3	15.8	0	4	35	61					Poorly Graded SAND (SP)

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Project Number: 112746	GRAIN SIZE ANALYSIS
Date: 02-14-11	
Entry By: D. Ross	PRELIMINARY GEOTECHNICAL INVESTIGATION PROPOSED RTC SOUTHEAST CONNECTOR WASHOE COUNTY, NEVADA
Checked By: D. Adams	
File Name: 112746 0.1	

Plate 3 of 5 **B-2**

KA_SIEVE_KA_2005.GDT KA CORPORATE.STD - FEBRUARY.02.GLB 112746-0.1.GPJ 4/11/11



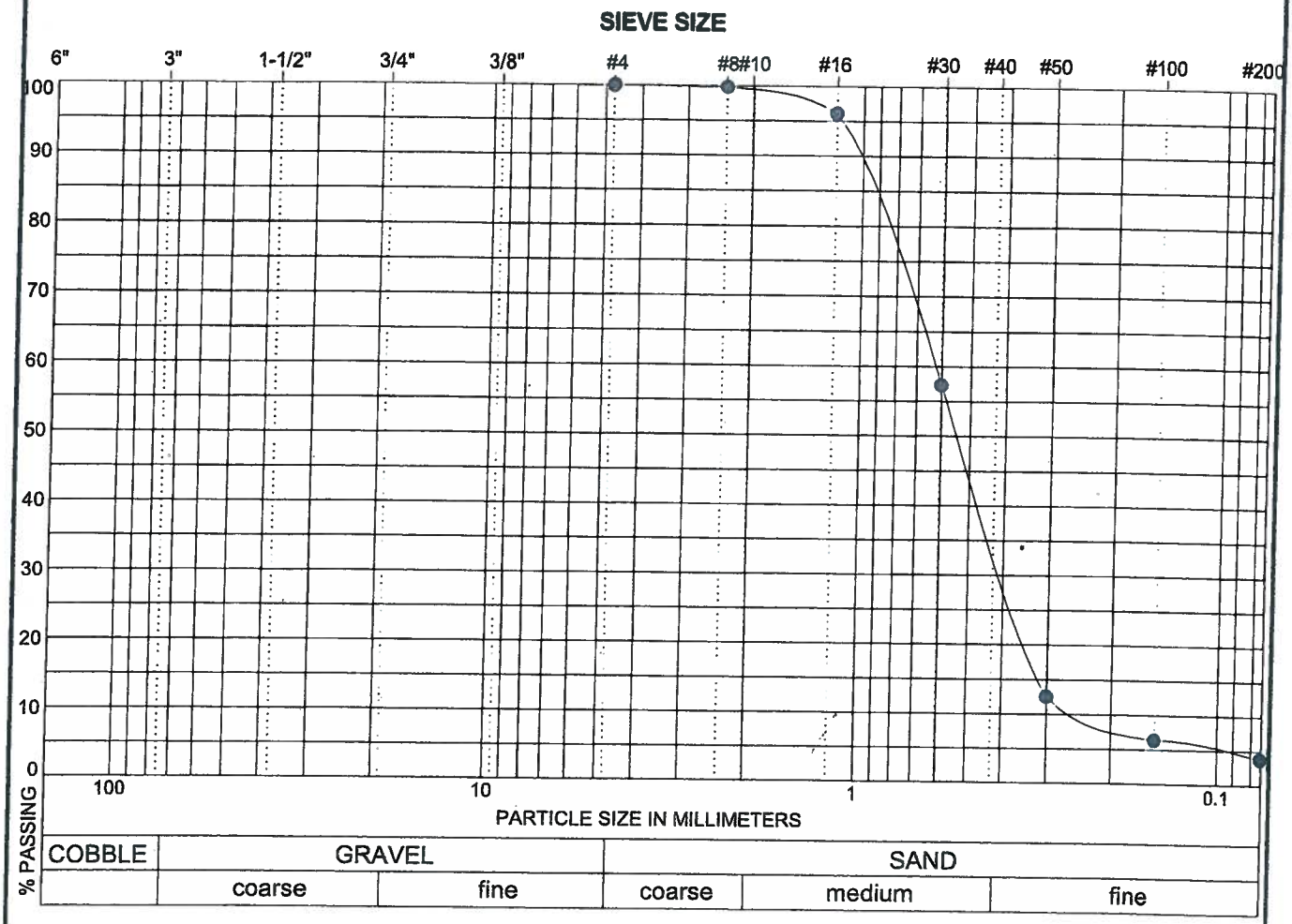
LEGEND:	SOURCE	DEPTH (ft)	COBBLE (%)	GRAVEL (%)	SAND (%)	FINES (%)	D60 (mm)	D10 (mm)	Cu	Cc	DESCRIPTION
●	TR-3	20.0	0	0	93	7	0.18	0.08	2.3	0.6	Poorly Graded SAND With Silt (SP-SM)
⊠	TR-3	95.5	0	0	90	9	0.46	0.09	5.4	2.3	Poorly Graded SAND With Silt (SP-SM)
▲	TR-4	17.5	0	13	56	31	0.45				Silty SAND (SM)
★	TR-4	90.5	0	1	90	9	0.97	0.08	12.4	1.5	Well Graded SAND With Silt (SW-SM)
⊙	TR-5	30.5	0	56	40	4	11.11	0.27	41.2	0.9	Well Graded GRAVEL With Sand (GW)

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Project Number: 112746	GRAIN SIZE ANALYSIS
Date: 02-14-11	
Entry By: D. Ross	PRELIMINARY GEOTECHNICAL INVESTIGATION PROPOSED RTC SOUTHEAST CONNECTOR WASHOE COUNTY, NEVADA
Checked By: D. Adams	
File Name: 112746 0.1	

Plate 4 of 5
B-2

KA SIEVE KA 2005.GDT KA CORPORATE STD - FEBRUARY 02.GLB 112746-0.1.GPJ 4/11/11



LEGEND:	SOURCE	DEPTH (ft)	COBBLE (%)	GRAVEL (%)	SAND (%)	FINES (%)	D60 (mm)	D10 (mm)	Cu	Cc	DESCRIPTION
●	TR-5	60.5	0	0	96	4	0.63	0.23	2.8	1.1	Poorly Graded SAND (SP)

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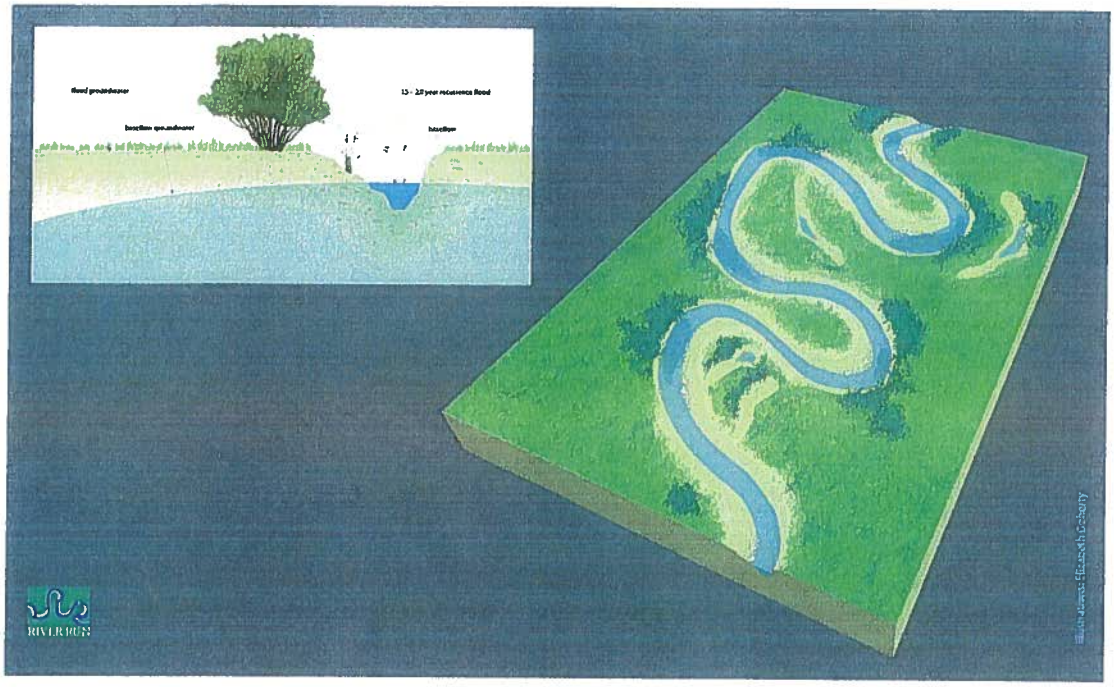
Project Number: 112746	**GRAIN SIZE ANALYSIS**
Date: 02-14-11	
Entry By: D. Ross	PRELIMINARY GEOTECHNICAL INVESTIGATION PROPOSED RTC SOUTHEAST CONNECTOR WASHOE COUNTY, NEVADA
Checked By: D. Adams	
File Name: 112746 0.1	

Plate 5 of 5

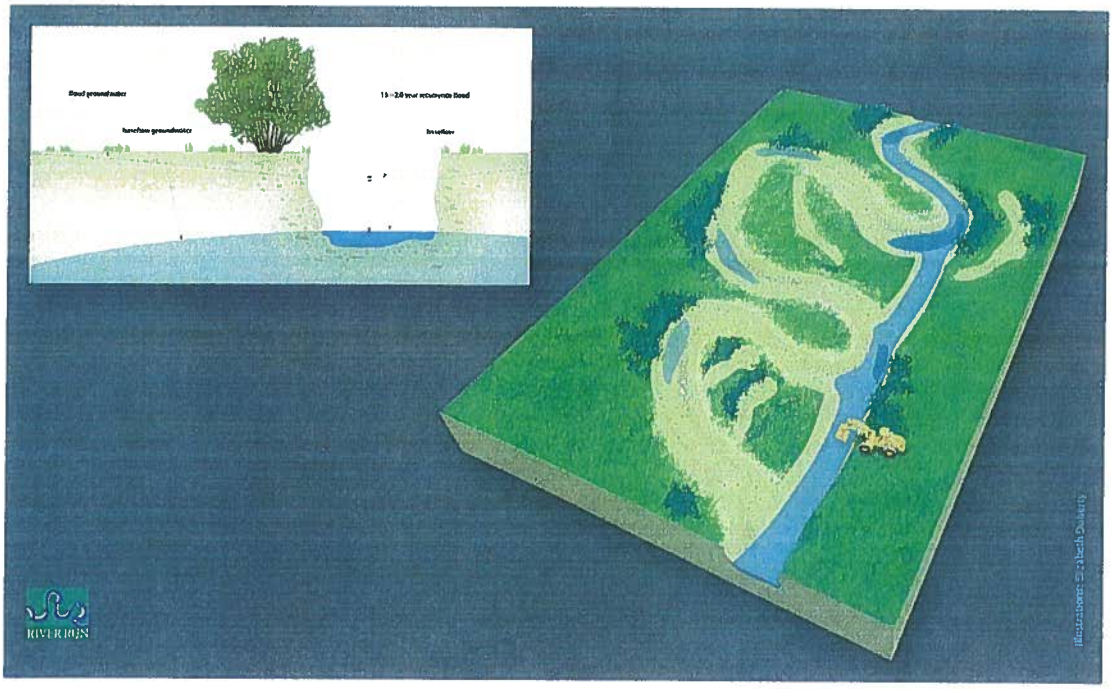
B-2

KA SIEVE KA 2005.GDT KA CORPORATE STD - FEBRUARY 02.GLB 112746-0.1.GPJ 4/11/11

Stage 1

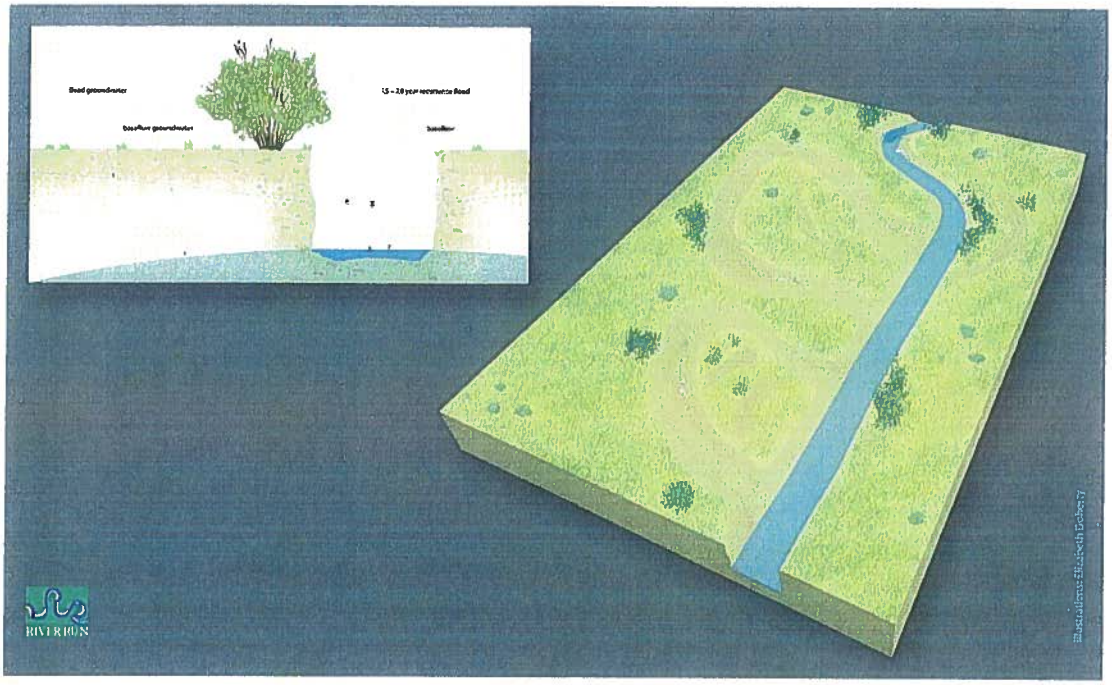


Stage 2

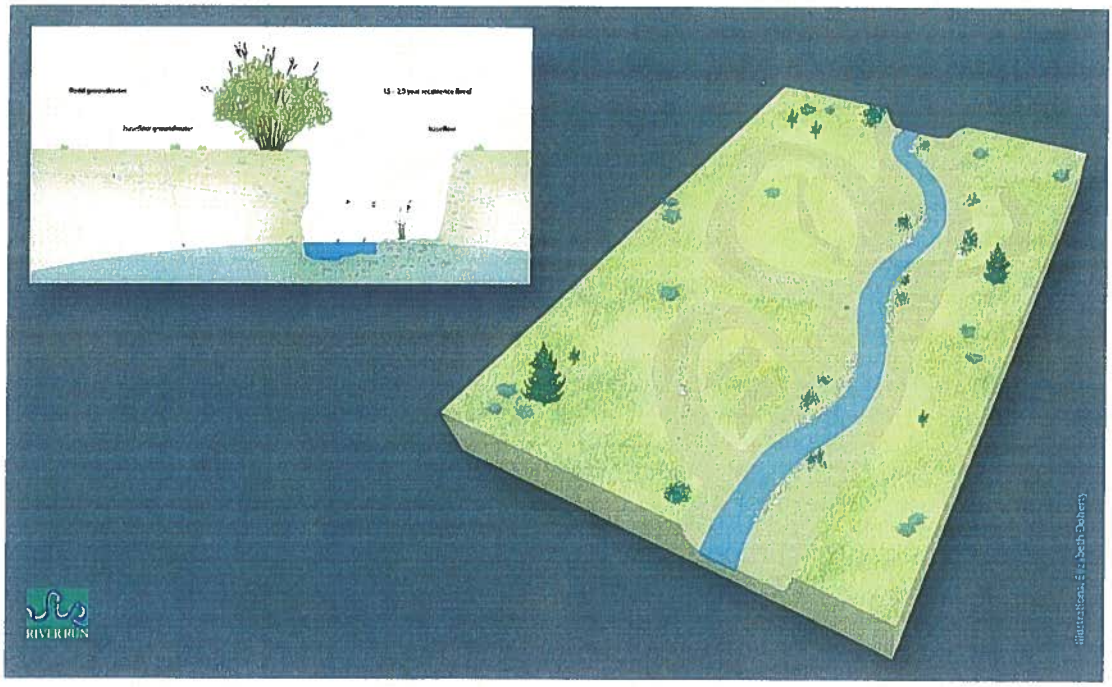


RIVER RUN consulting	***Reach Y Restoration Feasibility Assessment*** **Final Draft, March 2007** Prepared for: Cities of Reno and Sparks, NV TMWRF	**A model of channel evolution in response to disturbance.** **Stages 1 (undisturbed) and 2. After Schumm (1999) and Simon and Hupp (1986).**	**Figure 15**

Stage 3

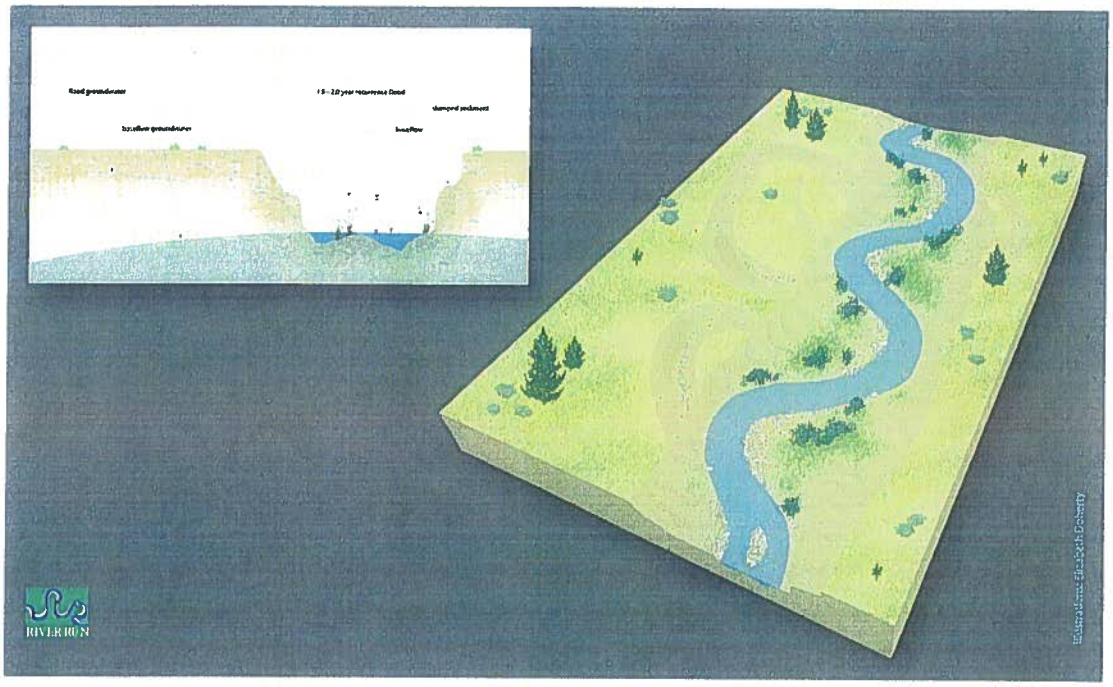


Stage 4

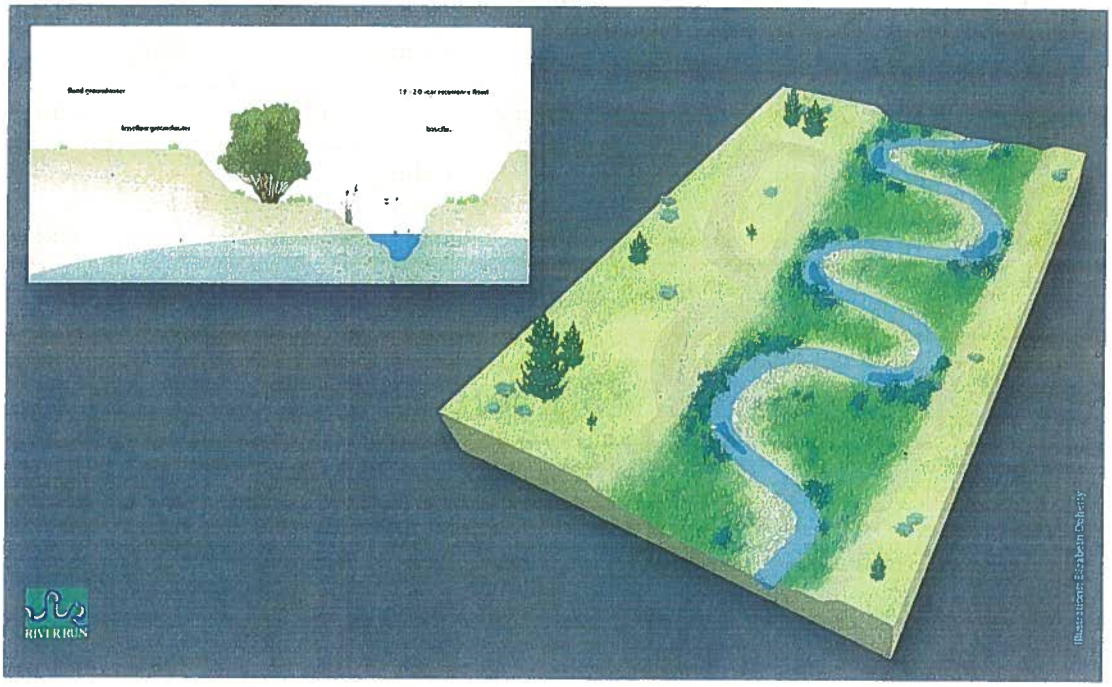


RIVER RUN consulting	***Reach Y Restoration Feasibility Assessment*** **Final Draft, March 2007** Prepared for: Cities of Reno and Sparks, NV TMWRF	**A model of channel evolution in response to disturbance.** **Stages 3 and 4. After Schumm (1999) and Simon and Hupp (1986).**	**Figure 16**

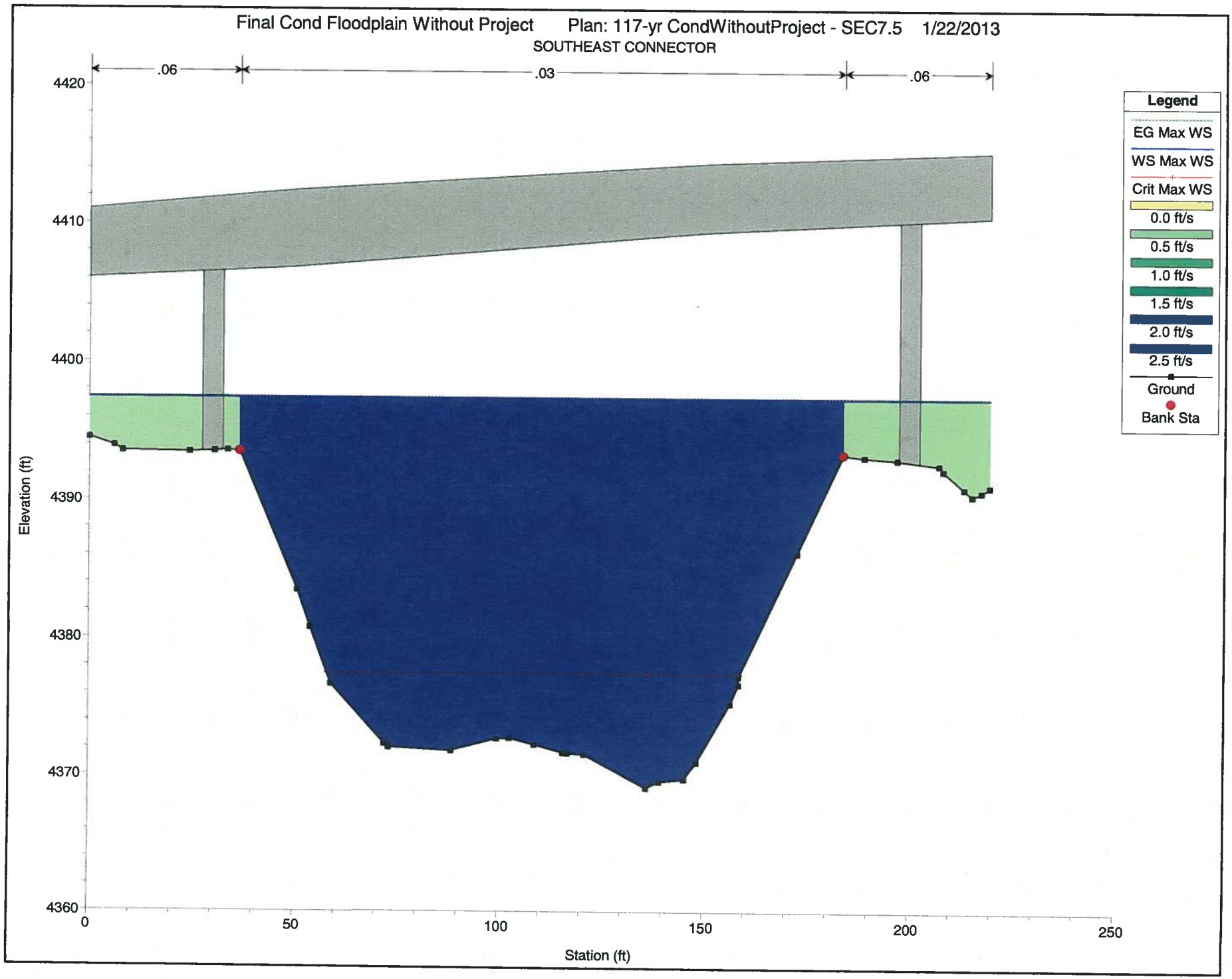
Stage 5

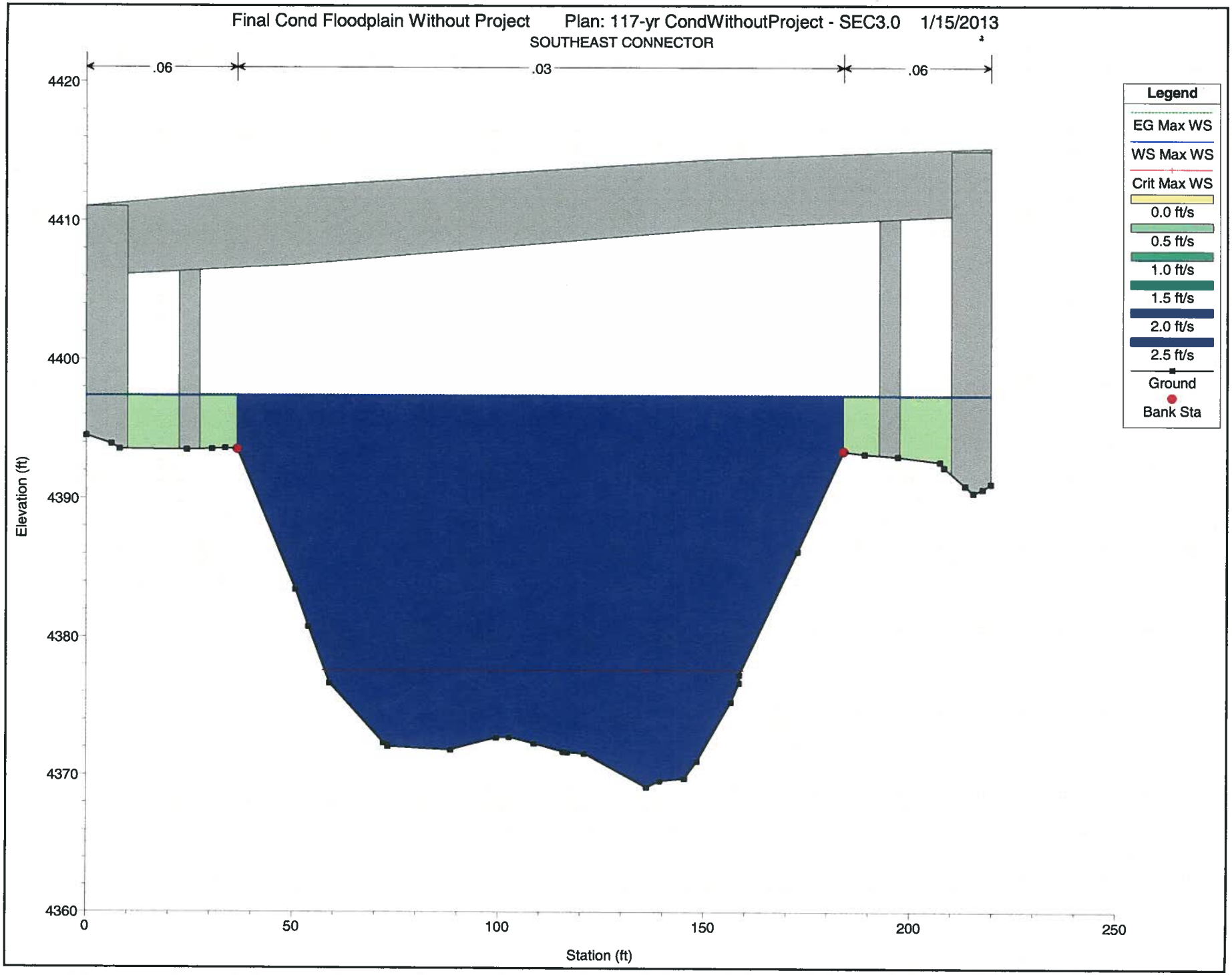


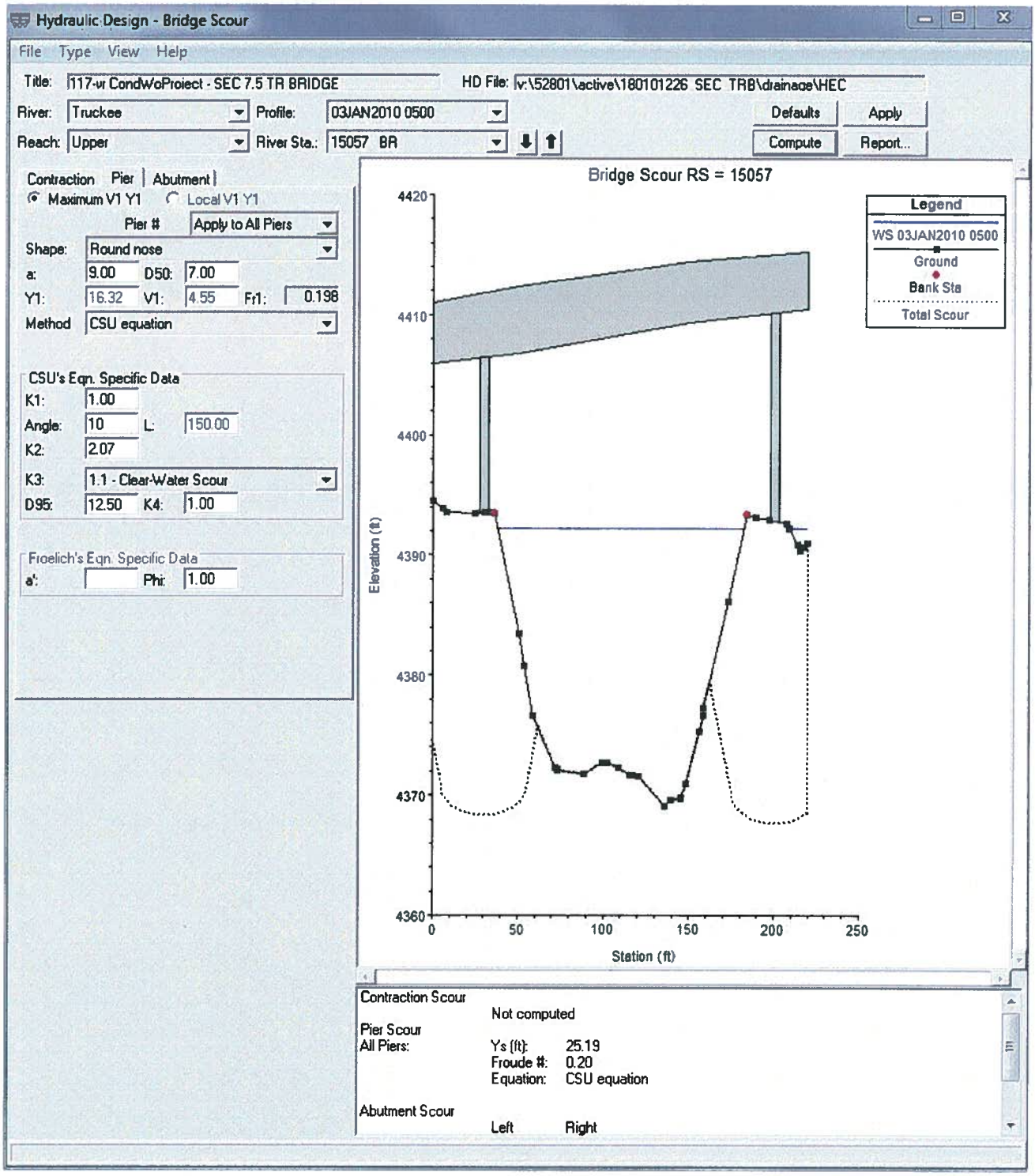
Stage 6

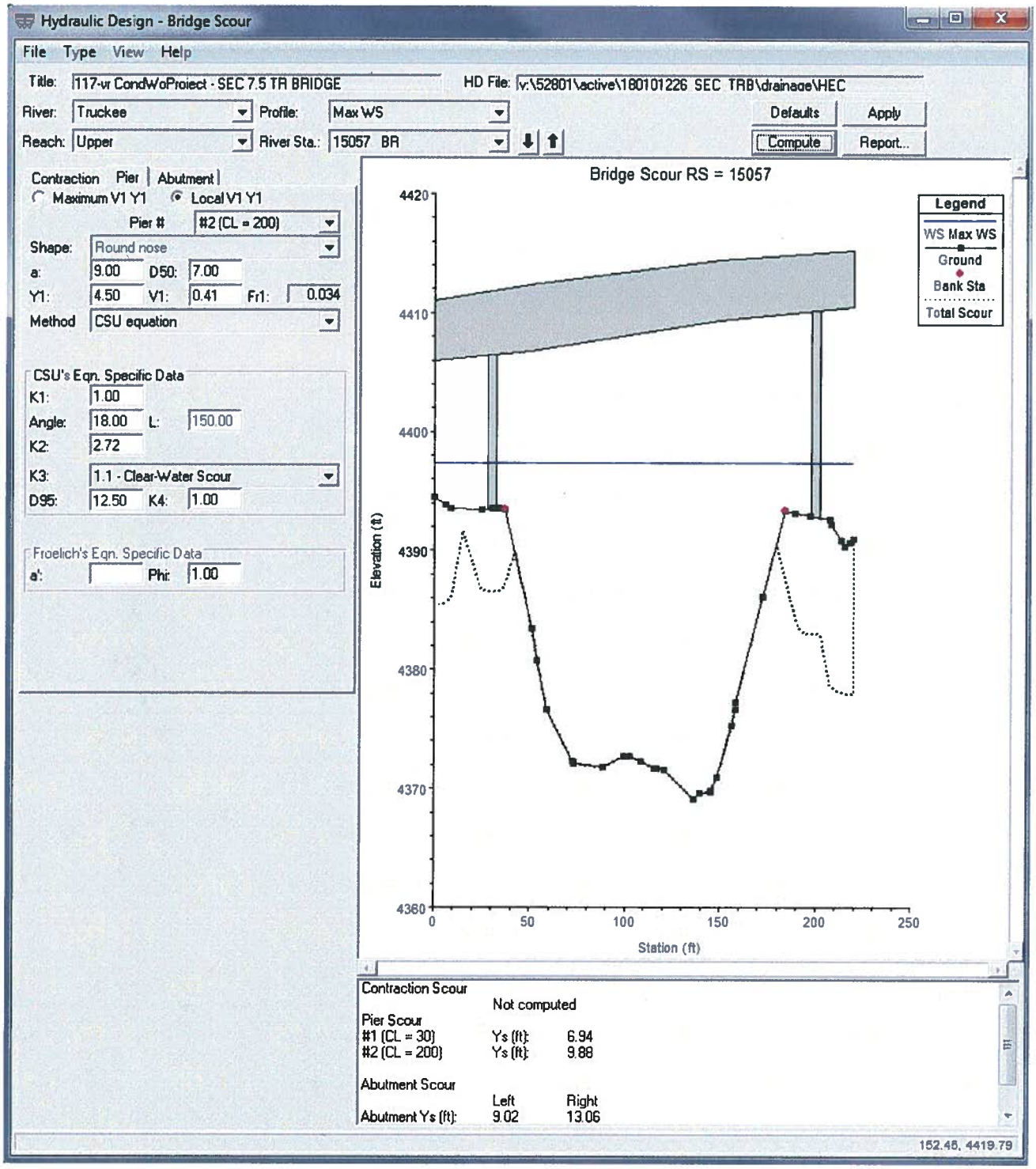


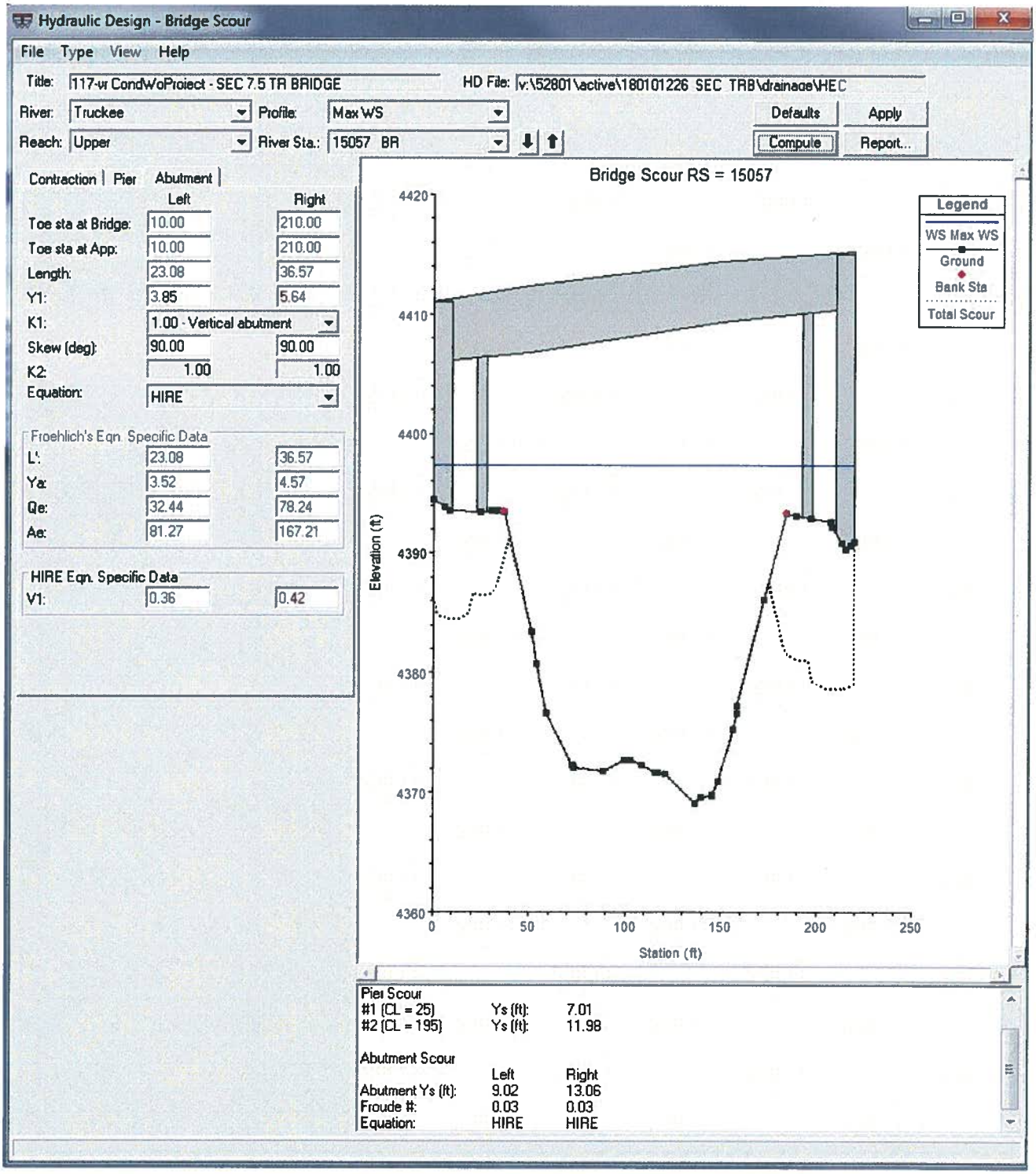
RIVER RUN consulting	***Reach Y Restoration Feasibility Assessment*** **Final Draft, March 2007** Prepared for: Cities of Reno and Sparks, NV TMWRF	**A model of channel evolution in response to disturbance.** **Stages 5 and 6. After Schumm (1999) and Simon and Hupp (1986).**	**Figure 17**

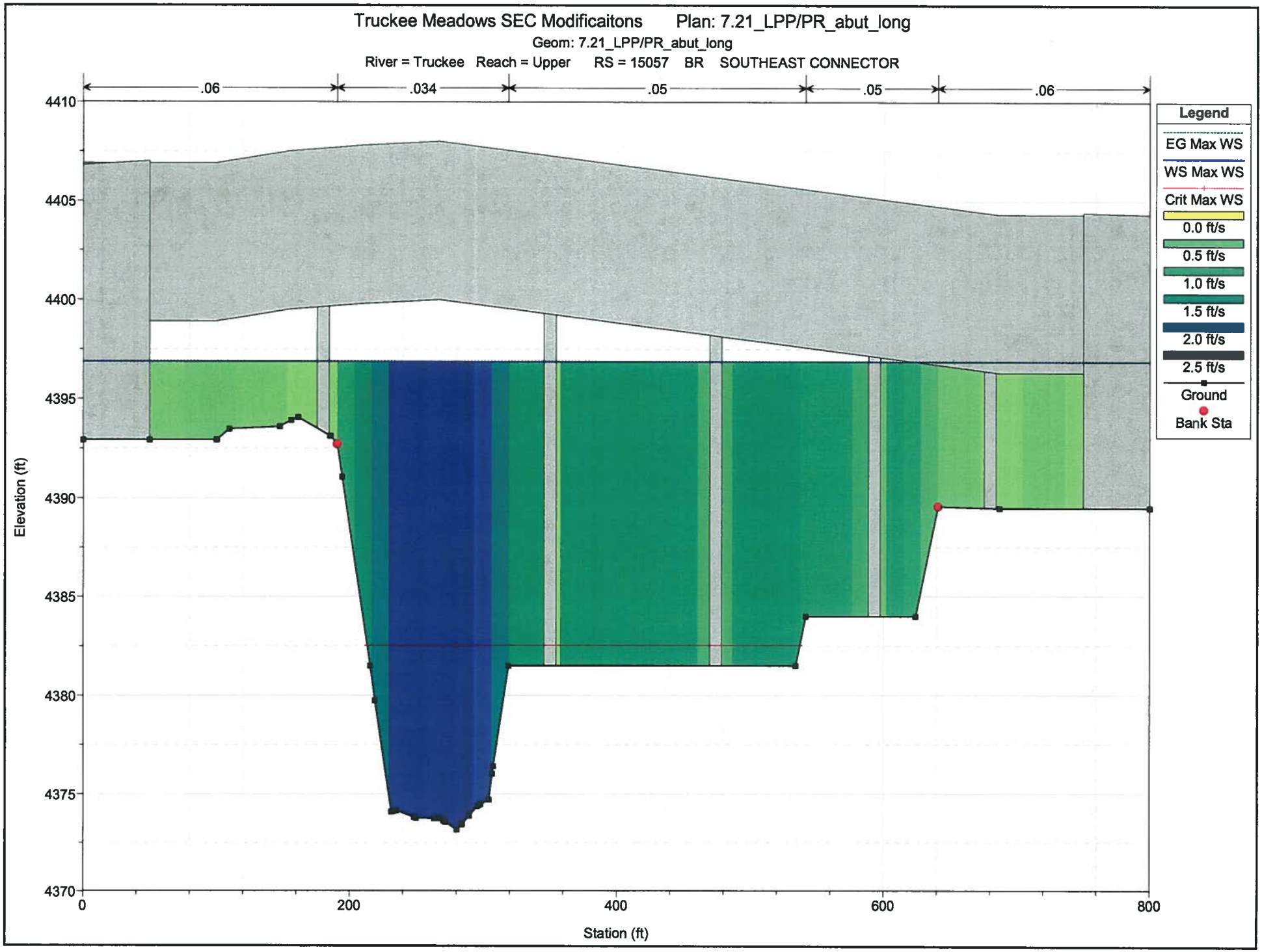

Final Cond Floodplain Without Project
Plan: 117-yr CondWithoutProject - SEC7.5
1/22/2013
SOUTHEAST CONNECTOR
.06
.03
.06
4420
4410
4400
4390
4380
4370
4360
Elevation (ft)
0
50
100
150
200
250
Station (ft)
Legend
EG Max WS
WS Max WS
Crit Max WS
0.0 ft/s
0.5 ft/s
1.0 ft/s
1.5 ft/s
2.0 ft/s
2.5 ft/s
Ground
Bank Sta

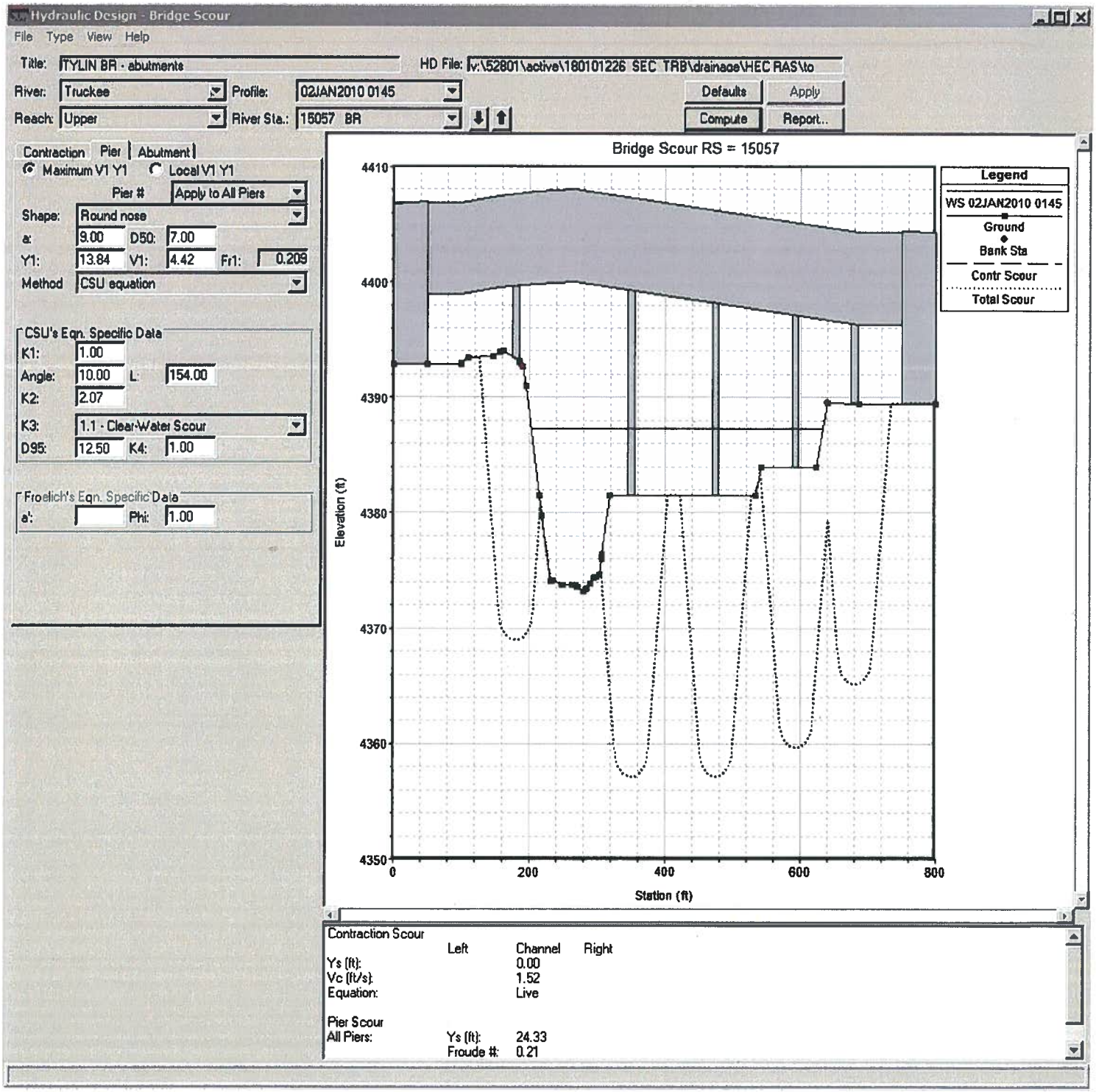

Final Cond Floodplain Without Project Plan: 117-yr CondWithoutProject - SEC3.0 1/15/2013
SOUTHEAST CONNECTOR
.06
.03
.06
4420
4410
4400
4390
4380
4370
4360
Elevation (ft)
0
50
100
150
200
250
Station (ft)
Legend
EG Max WS
WS Max WS
Crit Max WS
0.0 ft/s
0.5 ft/s
1.0 ft/s
1.5 ft/s
2.0 ft/s
2.5 ft/s
Ground
Bank Sta

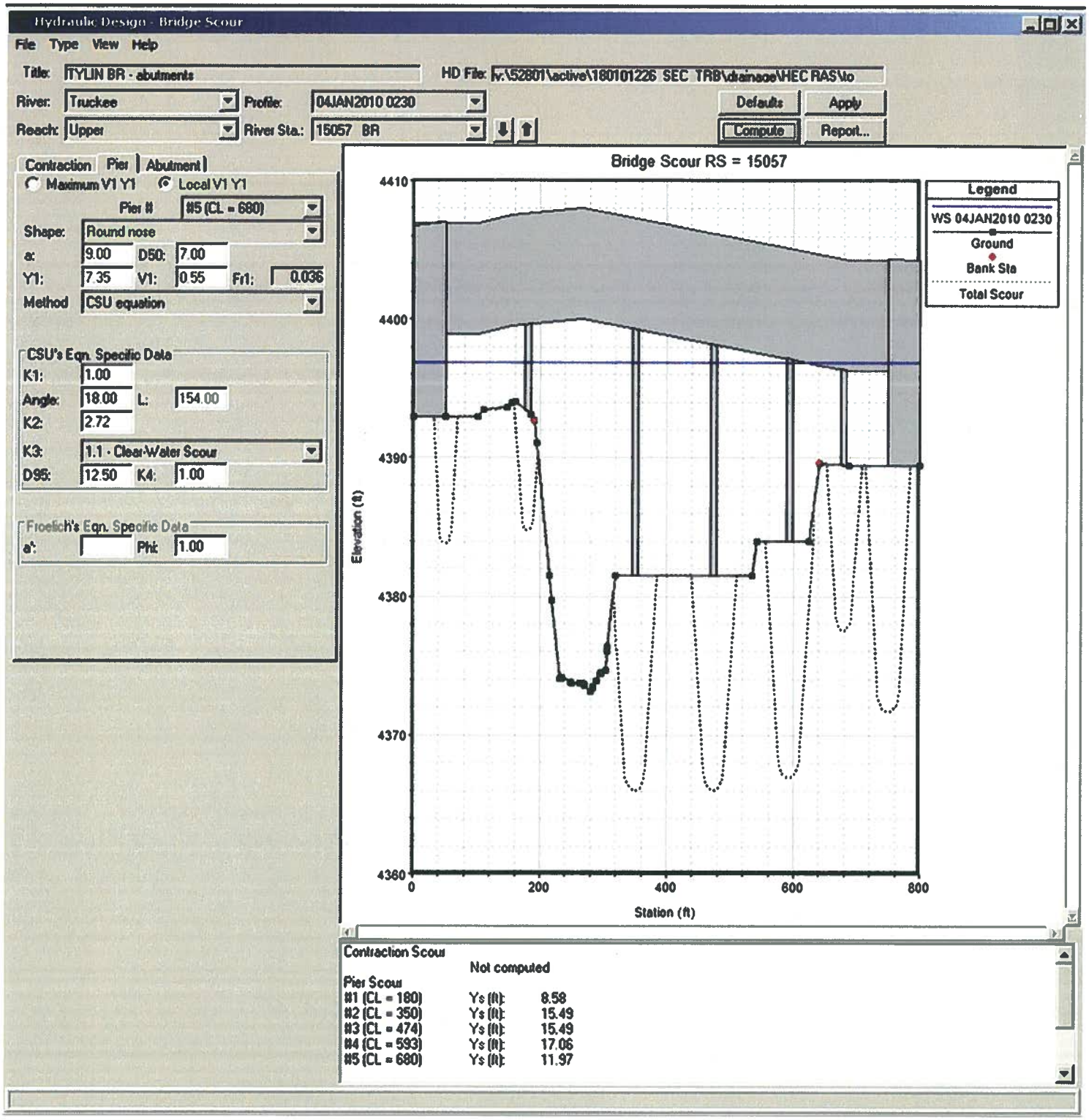

Hydraulic Design - Bridge Scour
File Type View Help
Title: 117-yr CondWoProject - SEC 7.5 TR BRIDGE
HD File: v:\52801\active\180101226 SEC TRB\drainage\HEC
River: Truckee
Profile: 03JAN2010 0500
Reach: Upper
River Sta.: 15057 BR
Defaults
Apply
Compute
Report...
Contraction Pier Abutment
Maximum V1 Y1
Local V1 Y1
Pier #
Apply to All Piers
Shape: Round nose
a: 9.00 D50: 7.00
Y1: 16.32 V1: 4.55 Fr1: 0.198
Method CSU equation
CSU's Eqn. Specific Data
K1: 1.00
Angle: 10 L: 150.00
K2: 2.07
K3: 1.1 - Clear-Water Scour
D95: 12.50 K4: 1.00
Froelich's Eqn. Specific Data
a': Phi: 1.00
Bridge Scour RS = 15057
Legend
WS 03JAN2010 0500
Ground
Bank Sta
Total Scour
Elevation (ft)
4420
4410
4400
4390
4380
4370
4360
0
50
100
150
200
250
Station (ft)
Contraction Scour
Not computed
Pier Scour
All Piers:
Ys (ft): 25.19
Froude #: 0.20
Equation: CSU equation
Abutment Scour
Left
Right

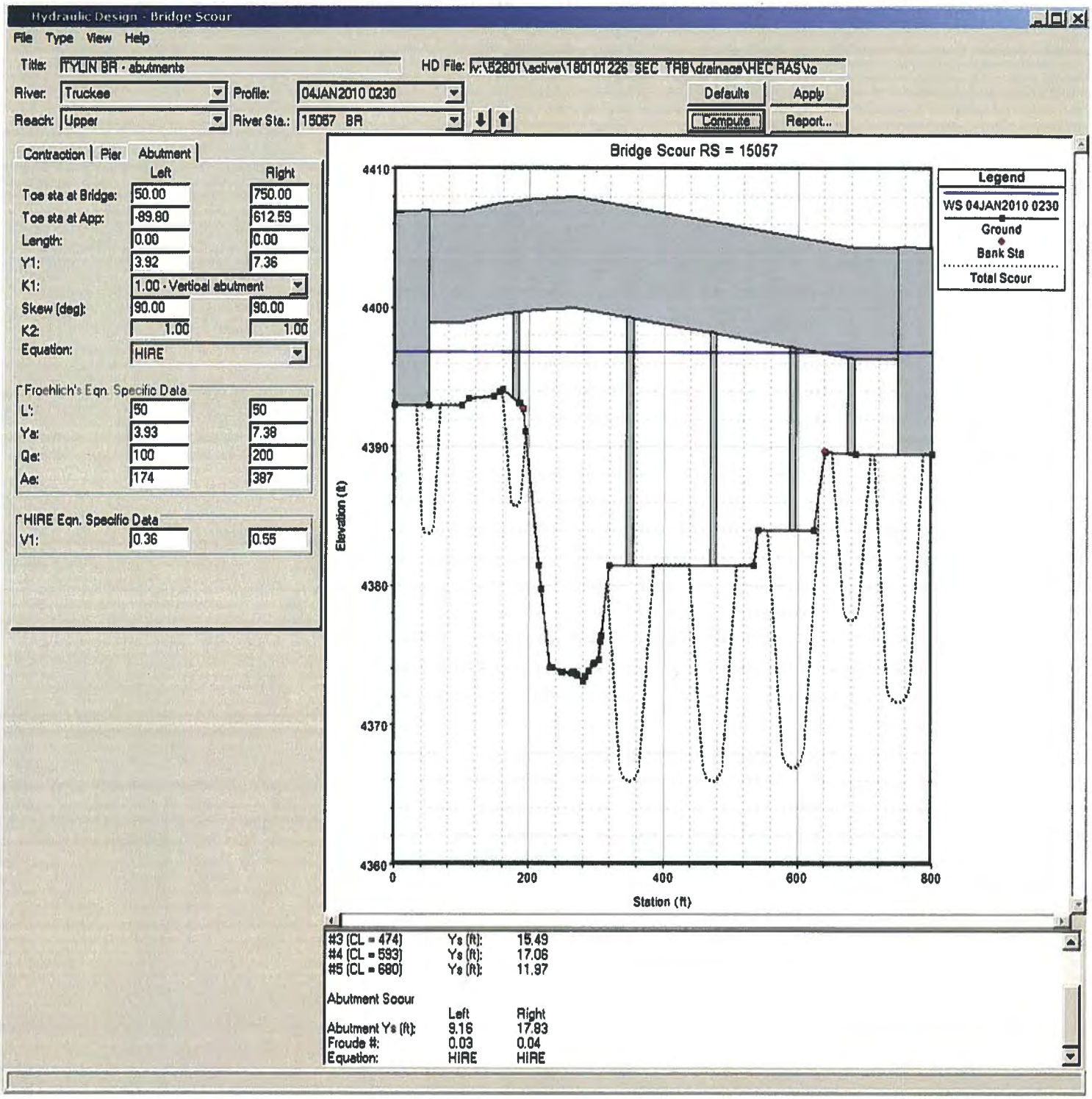

Hydraulic Design - Bridge Scour
File Type View Help
Title: 117-yr CondWoProject - SEC 7.5 TR BRIDGE
HD File: v:\52801\active\180101226 SEC TRB\drainage\HEC
River: Truckee
Profile: Max WS
Reach: Upper
River Sta.: 15057 BR
Defaults
Apply
Compute
Report...
Contraction Pier Abutment
Maximum V1 Y1
Local V1 Y1
Pier # #2 (CL = 200)
Shape: Round nose
a: 9.00 D50: 7.00
Y1: 4.50 V1: 0.41 Fr1: 0.034
Method CSU equation
CSU's Eqn. Specific Data
K1: 1.00
Angle: 18.00 L: 150.00
K2: 2.72
K3: 1.1 - Clear-Water Scour
D95: 12.50 K4: 1.00
Froelich's Eqn. Specific Data
a': Phi: 1.00
Bridge Scour RS = 15057
Legend
WS Max WS
Ground
Bank Sta
Total Scour
Elevation (ft)
Station (ft)
4420
4410
4400
4390
4380
4370
4360
0
50
100
150
200
250
Contraction Scour
Not computed
Pier Scour
#1 (CL = 30) Ys (ft): 6.94
#2 (CL = 200) Ys (ft): 9.88
Abutment Scour
Left Right
Abutment Ys (ft): 9.02 13.06
152.48, 4419.79


Hydraulic Design - Bridge Scour
File Type View Help
Title: 117-w CondWoProject - SEC 7.5 TR BRIDGE
HD File: v:\52801\active\180101226 SEC TRB\drainage\HEC
River: Truckee
Profile: Max WS
Reach: Upper
River Sta.: 15057 BR
Defaults
Apply
Compute
Report...
Contraction | Pier | Abutment
Left
Right
Toe sta at Bridge: 10.00 210.00
Toe sta at App: 10.00 210.00
Length: 23.08 36.57
Y1: 3.85 5.64
K1: 1.00 - Vertical abutment
Skew (deg): 90.00 90.00
K2: 1.00 1.00
Equation: HIRE
Froehlich's Eqn. Specific Data
L': 23.08 36.57
Ya: 3.52 4.57
Qe: 32.44 78.24
Ae: 81.27 167.21
HIRE Eqn. Specific Data
V1: 0.36 0.42
Bridge Scour RS = 15057
Legend
WS Max WS
Ground
Bank Sta
Total Scour
Elevation (ft)
4420
4410
4400
4390
4380
4370
4360
0
50
100
150
200
250
Station (ft)
Pier Scour
#1 (CL = 25) Ys (ft): 7.01
#2 (CL = 195) Ys (ft): 11.98
Abutment Scour
Left Right
Abutment Ys (ft): 9.02 13.06
Froude #: 0.03 0.03
Equation: HIRE HIRE


Truckee Meadows SEC Modificaitons Plan: 7.21_LPP/PR_abut_long
Geom: 7.21_LPP/PR_abut_long
River = Truckee Reach = Upper RS = 15057 BR SOUTHEAST CONNECTOR
.06
.034
.05
.05
.06
Legend
EG Max WS
WS Max WS
Crit Max WS
0.0 ft/s
0.5 ft/s
1.0 ft/s
1.5 ft/s
2.0 ft/s
2.5 ft/s
Ground
Bank Sta
Elevation (ft)
4410
4405
4400
4395
4390
4385
4380
4375
4370
0
200
400
600
800
Station (ft)


Hydraulic Design - Bridge Scour
File Type View Help
Title: TYLIN BR - abutments
HD File: v:\52801\active\180101226 SEC TRB\drainage\HEC RAS\to
River: Truckee
Profile: 02JAN2010 0145
Reach: Upper
River Sta.: 15057 BR
Defaults
Apply
Compute
Report...
Contraction Pier Abutment
Maximum V1 Y1
Local V1 Y1
Pier #
Apply to All Piers
Shape: Round nose
a: 9.00 D50: 7.00
Y1: 13.84 V1: 4.42 Fr1: 0.209
Method CSU equation
CSU's Eqn. Specific Data
K1: 1.00
Angle: 10.00 L: 154.00
K2: 2.07
K3: 1.1 - Clear-Water Scour
D95: 12.50 K4: 1.00
Froelich's Eqn. Specific Data
a': Phi: 1.00
Bridge Scour RS = 15057
Legend
WS 02JAN2010 0145
Ground
Bank Sta
Contr Scour
Total Scour
Elevation (ft)
4410
4400
4390
4380
4370
4360
4350
0
200
400
600
800
Station (ft)
Contraction Scour
Left
Channel
Right
Ys (ft): 0.00
Vc (ft/s): 1.52
Equation: Live
Pier Scour
All Piers: Ys (ft): 24.33
Froude #: 0.21


Hydraulic Design - Bridge Scour
File Type View Help
Title: TYLIN BR - abutments
HD File: iv:\52801\active\180101226 SEC TRB\drainage\HEC RAS\lo
River: Truckee
Profile: 04JAN2010 0230
Reach: Upper
River Sta.: 15057 BR
Defaults
Apply
Compute
Report...
Contraction Pier Abutment
Maximum V1 Y1
Local V1 Y1
Pier #: #5 (CL = 680)
Shape: Round nose
a: 9.00
D50: 7.00
Y1: 7.35
V1: 0.55
Fr1: 0.036
Method: CSU equation
CSU's Eqn. Specific Data
K1: 1.00
Angle: 18.00
L: 154.00
K2: 2.72
K3: 1.1 - Clear-Water Scour
D95: 12.50
K4: 1.00
Froelich's Eqn. Specific Data
a':
Phi: 1.00
Bridge Scour RS = 15057
Legend
WS 04JAN2010 0230
Ground
Bank Sta
Total Scour
Elevation (ft)
Station (ft)
4410
4400
4390
4380
4370
4360
0
200
400
600
800
Contraction Scour
Not computed
Pier Scour
#1 (CL = 180) Ys (ft): 8.58
#2 (CL = 350) Ys (ft): 15.49
#3 (CL = 474) Ys (ft): 15.49
#4 (CL = 593) Ys (ft): 17.06
#5 (CL = 680) Ys (ft): 11.97


Hydraulic Design - Bridge Scour
File Type View Help
Title: ITYLIN BR - abutments
HD File: iv:\52801\active\180101226 SEC TRB\drainage\HEC RAS\to
River: Truckee
Profile: 04JAN2010 0230
Reach: Upper
River Sta.: 15057 BR
Defaults
Apply
Compute
Report...
Contraction | Pier | Abutment
Left
Right
Toe sta at Bridge: 50.00 750.00
Toe sta at App: -89.80 612.59
Length: 0.00 0.00
Y1: 3.92 7.36
K1: 1.00 - Vertical abutment
Skew (deg): 90.00 90.00
K2: 1.00 1.00
Equation: HIRE
Froehlich's Eqn. Specific Data
L': 50 50
Ya: 3.93 7.38
Qe: 100 200
Ae: 174 387
HIRE Eqn. Specific Data
V1: 0.36 0.55
Bridge Scour RS = 15057
Legend
WS 04JAN2010 0230
Ground
Bank Sta
Total Scour
Elevation (ft)
Station (ft)
4410
4400
4390
4380
4370
4360
0
200
400
600
800
#3 (CL = 474) Ys (ft): 15.49
#4 (CL = 593) Ys (ft): 17.06
#5 (CL = 680) Ys (ft): 11.97
Abutment Scour
Left
Right
Abutment Ys (ft): 9.16 17.83
Froude #: 0.03 0.04
Equation: HIRE HIRE