

**ANNEX 1-B**

**FREDERICK HOUSE RIVER WANATANGO FALLS  
HYDRAULIC REPORT**



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**Xeneca Power and Development  
Headpond Inundation Mapping**

**Frederick House River  
Site #12-Wanatango Falls**

**Hydraulic Report**

*Prepared By:*

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June 29, 2011

File No: PCG019617

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The following breakdown has been provided to outline the general configuration each appendix of this report.

**Appendix A- Hydraulic Summary Tables**

- Figure 1: Existing Conditions Calibration and Validation
- Figure 2: Existing Condition Flow Profiles
- Figure 3: Existing Condition- High Water Mark Iterations
- Figure 4: Existing Condition Typical Cross Section Plots
- Figure 5: Existing Conditions vs. Proposed Conditions Comparison

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- Existing Conditions- Calibration Flow Results
- Existing Conditions- Validation Flow Results
- Existing Conditions- Long Term Average Flow (LTAF) Results
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## 1.0 Introduction

This report summarizes the analysis carried out to define hydraulic backwater flood elevations and develop digital flood line inundation mapping for Wanatango Falls, located on the Frederick House River.

This report will summarize a generalized overall methodology used in the construction of the HEC-RAS models for The Wanatango Falls Site and provide commentary on key project requirements and assumptions used within the modelling. The terms “flood” and “inundation” have been used regularly in this report and have been intended to be understood in the same context.

## 2.0 Project Purpose and Scope

The purpose of this report is to develop a steady state and un-steady state hydraulic model using the latest HEC-RAS 4.1.0 software and provide flood inundation mapping for Wanatango Falls. The hydraulic model will replicate a number of flow scenarios during existing conditions as well as flow conditions that will be anticipated after construction of a proposed hydroelectric dam.

A total of six flow profiles have been selected to be simulated using the steady state model, outlined in **Table 1** below.

**Table 1: Simulated Flow Profiles**

Flow Description	Flow	Flow Condition Modeled	
		Existing Conditions	Proposed Conditions
Calibration Flow	2.0	X	
Validation Flow	5.0	X	
Long Term Average Flow (LTAF)	33.2	X	X
*High Water Mark Flow (HWM)	55-160	X	
1:2 Year Flood Flow	188.7	X	X
1:100 Year Flood Flow	425.20	X	X

The HWM flow for Wanatango Falls has not been provided but rather will be determined through the modeling. The Wanatango Falls Site is remote and there are no structures or Town(s) in close proximity to the site where a High Water Mark can be confirmed. Commentary outlining the computational procedure has been outlined in **Section 4.3.2** below.

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The un-steady state hydraulic model has been developed to represent operating conditions associated with the proposed dam. This modeling scenario will be further discussed in **Section 5.0** below.

The HEC-RAS model iterations were completed to calibrate to a desired vertical tolerance of  $\pm 0.1$ m. Given the absence of low flow geometry in key areas of each reach, a desired vertical tolerance of 0.1m may not be achievable. Key areas would include but are not limited to sections of turbulent flow through rapids, riffle crests, area's experiencing split flow scenarios, etc. The use of survey data, aerial photography, site photos, measured flows and available mapping has been used to calibrate each model. Please refer to **Section 4.1** for additional details on the calibration procedure.

The hydraulic model will be further validated using pro-rated hydrometric data from the Water Survey of Canada and water surface elevation data extracted from LIDAR mapping. Further commentary has been provided in **Section 4.2** outlining the validation procedure.

### **3.0 Background Information**

The preparation of this report and the hydraulic modeling outlined in this report draws information from several sources. These sources include LIDAR Reports/Mapping, conceptual drawings, hydrology reports, survey/bathymetry data, measured flow data and Water Survey of Canada Hydrometric data, etc. This background information has been referenced accordingly within this report.

### **4.0 Steady State Hydraulic Modeling**

Survey and bathymetry data has been provided for The Wanatango Falls Site and provided by BPR Engineering<sup>i</sup>. A total of seven survey sections (Section ID -4 to 3) has been provided for Wanatango Falls. These survey sections have been located upstream, downstream and in the close vicinity of the proposed structure. Bathymetry data has also been provided key non-turbulent areas upstream and downstream of the proposed structure.

Beyond the limits of survey and bathymetry data, LIDAR mapping was provided by Xeneca Power (Xeneca) and obtained by a flight over the project site on June 25, 2009 by Terrapoint<sup>vii</sup>. The mapping extends approximately 1.9km downstream to 10.0km upstream of the proposed structure.

Steady state modeling for this report has been completed using cross sectional survey/bathymetry data as well as using available LIDAR data. The location and alignment of the survey sections have been maintained in the modeling. Additional cross

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sections have been cut and added to the model in key locations throughout each reach that may have an impact on the flood elevations. These locations include but are not limited to river profile changes, expansion/contraction of the anticipated floodplain, areas in close proximity to the proposed structure, etc.

#### 4.1 Calibration Procedure

The calibration of the existing condition HEC-RAS modeling has been completed using a four step iteration process. The iteration process has been started with minimal data and further moving to a more complex model. Applicable manning's coefficients for the main channel section and overbanks have been selected by observing site photos and aerial photography for each site. Generally, a manning's  $n=0.10$  has been applied to the overbank areas for thick dense wooded vegetation. A manning's  $n=0.03-0.035$  has been applied to the main channel and corresponds to the USGS Verified Roughness Characteristics of Natural Channels<sup>V</sup>. These coefficients correspond to values outlined in Table 3-1 of the HEC-RAS Hydraulic Reference Manual<sup>IV</sup>.

For the calibration procedures, a known survey water elevation of 248.65m was used as downstream boundary condition. A measured flow of  $2.0\text{m}^3/\text{s}$  was used for the calibration procedure. Computed HEC-RAS water surface elevations were then compared with surveyed water surface elevations. Measured flows and survey data have been provided by BPR Engineering<sup>I</sup>.

Firstly, a simplistic model consisting of only survey cross sections within the model was created. In general, computed water surface elevations at the downstream survey cross sections was observed to be within the required 0.1m vertical tolerance with noticeable differences outside the tolerance of 0.1m moving upstream. These results can be attributed to the normal flow conditions experienced at the downstream limits of the site and absence of required data in key areas of the model required to produce the required water surface elevations moving towards the upstream limits of the sites. Results of this first iteration are summarized on within **Appendix A** on **Figure 1-** with the column heading **1-Water Elev(m)**.

Secondly, building on the first iteration, additional cross sections were added to then model. These additional cross sections utilized the available LIDAR data and survey bathymetry data in the model. Again, computed HEC-RAS water surface elevations were then compared with surveyed water surface elevations. Generally the vertical separation between the computed water elevations and surveyed water elevations improved but yet were still outside the required tolerance. Results from the second iteration are summarized within **Appendix A** on **Figure 1-** with the column heading **2-Water Elev(m)**.

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Thirdly, after observing the results from the second iteration, additional cross sections were again added to the model. These additional cross sections were cut using LIDAR data only and added in key control areas of the reach. Again, computed HEC-RAS water surface elevations were then compared with surveyed water surface elevations. Generally the computed water surface elevations were observed to be higher than the surveyed water elevations. This can be attributed the absence of low flow geometry within the newly created sections. Results from the third iteration are summarized within Appendix A on **Figure 1-** with the column heading **3-Water Elev(m)**.

Finally, maintaining the same quantity and locations of cross sections of the third iteration, low flow geometry was added to LIDAR cross sections below the LIDAR water surface elevation. The low flow geometry has been interpolated from surveyed/bathymetry cross sections in close proximity to the LIDAR section. The low flow geometry has been adjusted to both vertically and horizontally to fit the newly added LIDAR Sections. Again, computed HEC-RAS water surface elevations were then compared with surveyed water surface elevations. The depth of the low flow geometry at each cross section was further adjusted where applicable to produce computed results within the desired vertical tolerance. Results from the fourth iteration are summarized within **Appendix A** on **Figure 1-** with the column heading **4-Water Elev(m)**.

Calibration and validation results for each site have been provided on **Figure 1 of Appendix A**

The calibration result comparison tables illustrated on **Figure 1 in Appendix A** have been provided at survey cross section locations only. These locations have been selected for comparison purposes only as there are two known data sets (measured flow and survey low geometry) in which computed water surface elevations and surveyed water surface elevations may be accurately compared. The calibration water surface elevations for Wanatango Falls has been modeled to within 0.55m of the surveyed water elevations. This vertical range in water surface elevations is outside the desired vertical tolerance of 0.1m, however, commentary supporting the calibration results has been provided in **Section 4.2** below.

## **4.2 Validation Procedure**

The validation procedure for Wanatango Falls has built on the calibrated model results as outlined in **Section 4.1.1** above.

LIDAR mapping was obtained by a flight over the project site on June 25, 2009 by Terrapoint<sup>iii</sup>, The Wanatango Falls site is located downstream of the Frederick House Dam. Accordingly, a flow of 0m<sup>3</sup>/s has observed on June 25, 2009 at the Frederick House Dam. Comparatively, the flow from the Frederick House Dam was also measured



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to be  $0\text{m}^3/\text{s}$  on October 16, 2010, the date at which a flow of  $2.0\text{m}^3/\text{s}$  was measured at the Wanatango Falls site by BPR Engineering<sup>1</sup>. To account for sheet flow and runoff from tributaries located between the Wanatango Falls site and the Frederick House Dam, an arbitrary flow of  $5\text{m}^3/\text{s}$  was used for the validation procedure.

For the validation procedure, a known survey water elevation of 249.50m was used as downstream boundary condition. Using the LIDAR water surface elevations and newly acquired validation flow, the computed HEC-RAS water surface elevations were then compared with LIDAR water surface elevations throughout the model. Generally, the vertical elevation differences range from  $0\pm 0.3\text{m}$  depending on location within the reach.

Validation results have been generally summarized within **Appendix A** on **Figure 1** with the column heading **5-Water Elev(m)**.

### 4.3 Construction of the Full Reach Model

The calibration procedure and validation procedure as outlined in **Sections 4.4.1 and 4.1.2** outlined above was initially confined to the limits of the survey cross sections. Generally, the surveyed cross sections have been spaced at regular intervals of 200-300m, with one cross section located in the close vicinity of the proposed dam and three or four cross sections located upstream and downstream of the dam respectively. This would produce a total short reach length of approximately 1.6km. Anticipating a requirement to define a tailwater condition applicable for a number of flow scenarios and also a requirement to compare flood elevations (existing vs. proposed) in the head pond area of the reach, the HEC-RAS model was further extended downstream and upstream to the limits of the LIDAR mapping.

Additional cross sections have been added to the limits of the mapping in a similar format as outlined in **Section 4.1**. Generally, the limits of the mapping have produced a total modeled reach length of 12.0km.

#### 4.3.1 Boundary Conditions

The steady state flow conditions associated with the steady state modeling was completed using a mixed flow computation procedure. The mixed flow regime requires boundary conditions to be defined at the upstream and downstream limits of the site and allows for computations of subcritical and supercritical flow.

The calibration and validation procedures listed above both utilize a known water surface elevation as a downstream boundary condition within each of the HEC-RAS model. As downstream water elevations are not known for other flow scenarios two methods have been explored to determine downstream boundary conditions.

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Firstly, the normal depth boundary condition has been explored. This method assumes a normal laminar flow within a reach and accordingly a numerical river profile slope is entered as a boundary condition. As survey data typically only extends a short distance downstream of the project site and therefore the normal depth slope has been iterated to observe flood water fluctuations in the reach. Given the relatively flat nature of the downstream limits of The Wanatango Falls Site, it has been observed that small fluctuations in the normal depth slope have large impacts on the water surface elevations.

Observing the fluctuations of the downstream computed water surface elevations using a normal depth slope as a boundary condition, an alternative method was further explored. Utilizing HEC-RAS's computational abilities, the critical depth boundary condition was selected.

Using aerial photography and site photos, the Frederick House River was explored and observed downstream of the project limits. The purpose of this exploration has been to determine a location of rapids downstream of the project limits at which it was anticipated that flows would enter a supercritical state.

Downstream of the project limits, flows within the Frederick House River appear to be laminar for a distance of approximately 2.0km. Further beyond the 2.0km threshold, flows enter a supercritical state through a series of rapids. Accordingly, the 2.0km threshold has been used in the HEC-RAS model for further computational purposes.

The most downstream survey cross section (**Survey Section (SS3)**, Burnside Section ID 121) was then copied to a distance of 2.0km downstream. To utilize the iteration capabilities of HEC-RAS, a total of 10 copied cross sections(SS3), spaced at 1m apart, have been further coded into the model at this location. By selecting critical depth as a boundary condition, HEC-RAS will default to a critical depth at the most downstream cross section. HEC-RAS then further performs a series of water surface iterations with the upstream cross sections in search for a normal depth flow condition. By coding a series of cross section is close proximity to one another, it has been observed that normal depth flow conditions are experienced prior to the limits of these copied cross sections. Therefore normal depth flow conditions are also produced back to downstream limits of Wanatango Falls. Additional information supporting the critical depth boundary condition applicability and water surface elevation iteration procedure can be referenced in Chapter 2 of the HEC-RAS Reference Manual <sup>IV</sup>.

To determine the validity of this critical depth boundary condition, the computed water surface elevations for the Calibration Flow and Validation flow were then compared to the surveyed and LIDAR water surface elevations respectively. The computed water surface elevations (using the critical depth boundary condition) for both flow scenarios

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have produced comparable results ( $\pm 0.20\text{m}$ ) to those produced with a known water surface boundary condition. The LTAF flow was then further explored. It has been noted, in the majority of the project sites that the LTAF flow is greater than the calibration flow, yet less than the validation flow. Computed water surface elevations for the LTAF flow, seem to fit quite well between the calibration and validation water surface elevations, also utilizing the critical depth boundary condition. Therefore, this boundary condition has been employed for all project sites.

The upstream boundary condition was also explored. Surveyed and LIDAR water surface elevations at the upstream limits of each site were observed to be relatively flat and therefore experiencing normal depth flow conditions. For calibration and validation purposes a known water surface elevation was used. For all other flow scenarios the normal depth slope method was used, assuming a relatively flat slope of  $0.0001\text{m/m}$ .

Additional commentary discussing the sensitivity of each boundary condition will be outlined in **Section 4.3.3** below.

#### **4.3.2 High Water Mark Methodology**

As initially discussed in **Section 2.0** above, the High Water Mark (HWM) peak flow for Wanatango Falls has not been provided. Accordingly, the HWM flow will be determined through a series of modeling iterations. Evidence of the HWM elevations have been provided by BPR Engineering<sup>i</sup> and have been identified at each survey section in the field. The HWM elevations have been identified by observing historical flood elevation scarring on rocks, trees, etc. Typically, multiple high water mark elevations have been provided at each survey section.

It has been assumed that a flow range rather than a single flow would be more representative of the high water elevations within each reach. Accordingly, an average surveyed elevation has been used at each cross section for determination of a corresponding flow scenario. Iterating several flows scenarios, a high water mark flow range for Wanatango Falls has been determined to be  $55\text{-}160\text{m}^3/\text{s}$ . The range of flow scenarios and comparisons between the computer water surface elevations and surveyed elevations have been provided in **Figure 3 in Appendix A**,

#### **4.3.3 Sensitivity Analysis**

A sensitivity analysis was completed to determine an effect of varying manning's roughness coefficients, upstream and downstream boundary conditions.

Typical manning's n values as outlined in **Section 4.1** above were varied  $\pm 20\%$  of the initial estimated value. Computed water surface elevation fluctuations have been

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observed to be  $\pm 0.10\text{m}$  for increasing or decreasing roughness coefficients. This fluctuation is minor and has not been assumed to have a significant impact on the computed water surface elevations.

As previously discussed in **Section 4.3.1**, a sensitivity analysis was completed by varying the downstream boundary condition. The normal depth boundary condition has been observed to be quite sensitive to the downstream normal depth slope computations. Accordingly, the critical depth boundary condition has been used for The Wanatango Falls.

The normal depth slope of the upstream boundary condition has been varied  $\pm 20\%$  of the initially estimated channel slope. This boundary condition has been observed to have a negligible impact of computed water surface elevations.

#### 4.4 Proposed Conditions

Steady state hydraulic modeling of the proposed structure has built on the existing conditions modeling previously discussed. The proposed structure of each project site has been coded into HEC-RAS geometric data as an Inline Structure. Conceptual drawings the proposed structure has been provided by HATCH Engineering<sup>iii</sup>. These drawings have been used to identify key dimensions, location and orientation of the proposed structure. Two weir crest elevations of 257.50m and 259.0m have been modeled as directed by Xeneca. Proposed condition results for each weir crest elevation have been illustrated on **Figure 5, in Appendix A**. The column headings starting with "A-PR" (Scenario A) represent proposed flood elevations with a weir crest elevation of 257.50m. Similarly, column headings starting with "B-PR" (Scenario B) represent proposed flood elevations with a weir crest elevation of 259.0m.

Proposed condition flows have been adjusted in the vicinity of the structure in accordance with the configuration of the dam. At the upstream limits of the proposed structure, design flows as provided in by Xeneca have been subtracted from each flow scenario as a portion of flows approaching the structure would be used for producing electricity. Downstream of the proposed structure the design flows have been re-added to each flow scenario at the limits of the spillway

#### 4.5 Existing vs. Proposed Condition Comparison

It has been observed that computed water surface elevation differences between existing and proposed conditions are most noticeable within the head pond area upstream of the structure. Flood elevation increases have been noted to be in the range 0.1-3.5m depending on location. Extents of the head pond area, existing versus proposed comparisons of computed water elevations for the LTAF, 2-year and 100-year flow scenarios illustrated within **Figure 5 in Appendix A**.

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Specific attention and observation has been directed to the Inundation Limit of each of the LTAF, 2 and 100-year flow scenarios. For the purpose of this report the Inundation Limit will be defined as the location of reach upstream of the proposed hydroelectric dam where there is a zero water surface elevation difference between the existing and proposed condition flood elevations.

The Inundation Limits for the LTAF, 2 and 100-year flows in Scenario A have been indentified to be located between 750-780m upstream of the proposed structure. The Inundation Limits for the LTAF, 2 and 100-year flows in Scenario B have been observed to stretch approximately 9.8km upstream to the base of the Frederick House Dam

HEC-RAS output summaries for existing conditions, proposed Scenario A and Scenario B have been provided in **Appendix B**.

## 5.0 Un-Steady State Modeling

HEC-RAS has the unique ability to model variations in flow within a standard time step. Often flow hydrographs are used in unsteady state hydraulic models which correspond with hydrologic runoff, typical daily dam operations, dam break analysis, etc. Unsteady state hydraulic modeling has been completed downstream of the proposed structure. The unsteady state model will define flow pulsing characteristics and reflect normal operating conditions. The un-steady state modeling will provide an understanding of flow conditions moving downstream of the proposed structure associated with attenuation of the pulse curve. The proposed unsteady state hydrograph shape, criteria and duration at each site has as been provided by ORTECH (ORTECH) Environmental. The downstream reach length of interest for The Wanatango Falls has been identified by ORTECH to be 2km.

The un-steady state modeling for the Wanatango Falls Site has been completed using previously modeled river geometry downstream of the proposed structure. As, previously outlined in **Sections 4.1 and 4.2**, the steady state models have been calibrated and validated to within 0.3m. Given the variance in channel geometry, flow characterizations and overall profile of the river within the area of interest as identified by ORTECH, the unsteady state modeling has produced un-stable results. It is recommended that additional survey be completed downstream of the proposed structure within the 2.0km area of interest should the results of the unsteady state modeling need to be subject to further analysis.

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## 6.0 Conclusions and Recommendations

The results of the steady, un-steady state modelling and flood line mapping for the Wanatango Falls site outlined in this report has been included within **Appendix A and Appendix B**. Digital modelling files have been provided on a CD and included at the back of this report.

The hydraulic methodology, commentary and results outlined in this report have been based on available information, correspondence and key assumptions made during the course of the project. The results in this hydraulic report have been prepared for the preliminary stages only of determining floodline inundation elevations for each respective site. It is recommended that additional reconnaissance be completed to better define downstream boundary conditions, calibration of additional flows with corresponding surveyed water surface elevations, flow conditions in critical areas, etc.

The modeling, analysis and presentation of hydraulic information have been prepared using the best available information at the time of writing of this report. The results of this report and mapping are to be used in the Environmental Assessment of the proposed hydro-electric dams. Burnside understands that the hydroelectric dam is conceptual at this stage and as such the inundation mapping should be verified as detailed design progresses.

If you have any questions, or require further information, please do not hesitate to contact the undersigned.

Prepared by:

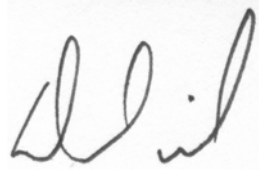
### R.J. Burnside & Associates Limited



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June 29, 2011

## Reference Material

<sup>i</sup> Hydrological Memo Report 12-Wanatango-Frederick House River. BPR Engineering, November 23, 2010.

<sup>ii</sup> Hydrology Review for Wanatango Hydro Project. Hatch Engineering. October 6, 2009.

<sup>iii</sup> Wanatango Hydropower Development Conceptual Site Development Layout-Plate 1-13. Hatch Engineering. October 2009.

<sup>iv</sup> HEC-RAS Hydraulic Reference Manual, Version 4.1. USACE Hydrologic Engineering Centre. January 2010.

<sup>v</sup> USGS. Verified Roughness Characteristics of Natural Channels. [Online] 05 April. 2011.

< <http://wwwrcamnl.wr.usgs.gov/sws/fieldmethods/Indirects/nvalues/index.htm> >

<sup>vi</sup> Terrapoint #: 2009-161-C;2009-172-C; and 2009174-C. Terrapoint. October 1, 2010.

<sup>vii</sup> Terrapoint #: 2008-172-C (C1 and C2 inclusive). Terrapoint. August 5, 2009.



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**Appendix A**  
**Hydraulic Summary Tables**



Project Name: Xeneca FIT Contract- Headpond Inudation mapping  
 Project No.: PCG019617  
 Site: 12\_Wanantango Falls  
 River: Frederick House River  
 Designed by: T.Lozon  
 Checked by: D.Miller  
 Date Created: 28-Jun-11



Figure #1-Site #12- Wanantango Falls- Existing Conditions Calibration and Validation

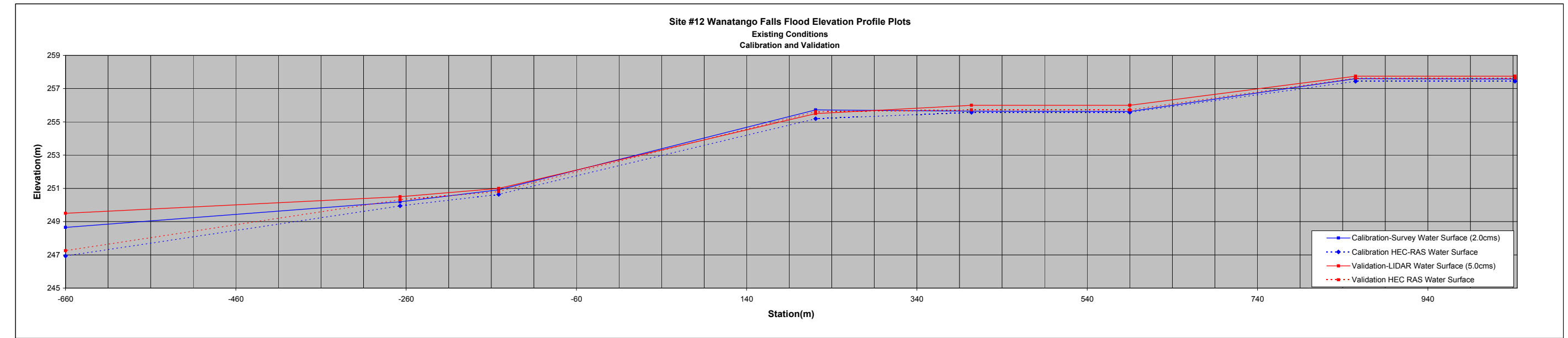
General Data					Existing Conditions-Calibration										Existing Conditions-Validation			
Survey Section#	Burnside X-Sec ID	Distance from Dam (m)	LB-Surveyed Water Elev (m)	RB-Surveyed Water Elev (m)	Calibration Flow (m3/s)	Surveyed Water Elev (m)	1-Water Elev (m)	1-Water Elev Diff (m)	2- Water Elev (m)	2-Water Elev Diff (m)	3- Water Elev (m)	3-Water Elev Diff (m)	4- Water Elev (m)	4-Water Elev Diff (m)	Validation Flow (m3/s)	LIDAR Water Elev (m)	5-Water Elev (m)	5- Water Elev Diff (m)
-4	415	1042.36	257.58	257.58	2.00	257.58	254.98	-2.60	255.56	-2.02	255.56	-2.02	257.44	-0.14	5.00	257.75	257.63	-0.12
-3	412	855.13	257.60	257.60		257.60	252.76	-4.84	255.56	-2.04	255.56	-2.04	257.44	-0.16		257.75	257.63	-0.12
-2	408	589.92	255.64	255.62		255.62	252.77	-2.85	252.34	-3.28	252.34	-3.28	255.57	-0.05		256.00	255.72	-0.28
-1	405	404.09	255.65	255.65		255.65	252.76	-2.89	252.32	-3.33	252.32	-3.33	255.57	-0.08		256.00	255.72	-0.28
0	210	221.08	253.84	255.73		255.73	252.6	-3.13	N/A	N/A	N/A	N/A	255.19	-0.53		255.50	255.61	0.11
1	131	-151.32	250.93	250.92		250.92	249.92	-1.00	249.94	-0.98	250.8	-0.12	250.64	-0.28		251.00	250.81	-0.19
2	129	-267.07	250.22	250.19		250.19	249.7	-0.49	249.83	-0.36	249.99	-0.20	249.95	-0.24		250.50	250.32	-0.18
3	121	-659.97	248.65	248.65	248.65	248.65	0.00	248.65	0.00	N/A	N/A	246.93	-1.72	249.50	247.25	-2.25		

Modelling Iterations

- 1-Water Elev -EXISTING CONDITIONS CALIBRATION-Survey Data Only
- 2-Water Elev -EXISTING CONDITIONS CALIBRATION- Survey+ Bathymetry
- 3-Water Elev -EXISTING CONDITIONS VALIDATION-Survey + Bathymetry + LIDAR
- 4-Water Elev -EXISTING CONDITIONS VALIDATION-Survey + Bathymetry + LIDAR Adjusted Low Flow Geometry
- 5-Water Elev -EXISTING CONDITIONS VALIDATION-Survey + Bathymetry + LIDAR Adjusted Low Flow Geometry

Data Legend

<span style="background-color: #00FFFF; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span>	Known Data
<span style="background-color: #CCCCCC; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span>	Modelling Results
<span style="background-color: #00FF00; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span>	Governing Modelling Iteration

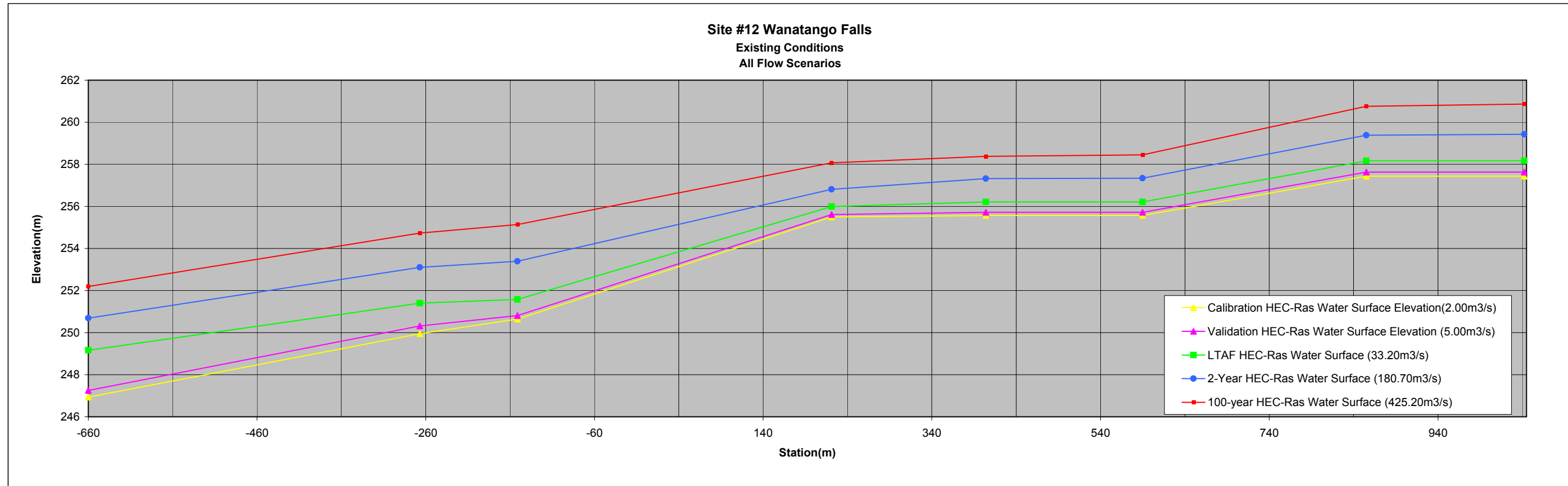


**Project Name:** Xeneca FIT Contract- Headpond Inudation mapping  
**Project No.:** PCG019617  
**Site:** 12\_Wanatango Falls  
**River:** Frederick House River  
**Designed by:** T.Lozone  
**Checked by:** D.Miller  
**Date Created:** 28-Jun-11



**Figure #2- Site #12- Wanatango Falls- Existing Condition Flow Profiles**

General Data			Calibration		Long Term Average Flow		Validation		2-Year		100-Year	
Survey Section#	Burnside X-Sec ID	Cumulative Length (m)	Calibration Flow (m3/s)	Calibration Water Elev (m)	LTAf Flow(m3/s)	LTAf Water Elev (m)	Validation Flow (m3/s)	LIDAR Water Elev (m)	2-year Flow(m3/s)	2-year Water Elev (m)	100-Year Flow(m3/s)	100-Year Water Elev (m)
-4	415	1042.36	2.00	257.44	33.20	258.17	5.00	257.63	180.70	259.43	425.20	260.86
-3	412	855.13		257.44		258.17		257.63		259.38		260.76
-2	408	589.92		255.57		256.21		255.72		257.34		258.45
-1	405	404.09		255.57		256.21		255.72		257.32		258.38
0	210	221.08		255.50		255.99		255.61		256.81		258.07
1	131	-151.32		250.64		251.58		250.81		253.39		255.14
2	129	-267.07		249.95		251.40		250.32		253.10		254.73
3	121	-659.97		246.93		249.16		247.25		250.69		252.19



**Project Name:** Xeneca FIT Contract- Headpond Inudation mapping  
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**Site:** 12\_Wanatango Falls  
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**Checked by:** D.Miller  
**Date Created:** 28-Jun-11



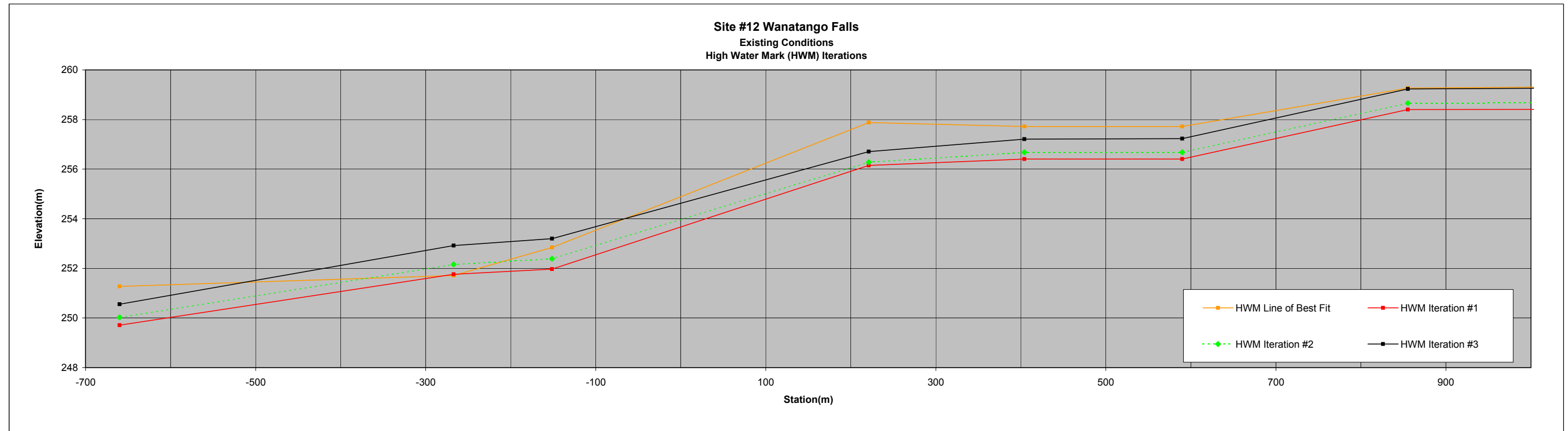
**Figure #3-Site #12-Wanatango Falls- High Water Mark (HWM) Flow Iterations**

General Data			HWM Survey Data			HWM Iteration #1			HWM Iteration #2			HWM Iteration #3		
Survey Section#	Burnside X-Sec ID	Cumulative Length (m)	HWM Elev #1 (m)	HWM Elev #2 (m)	HWM Elev Average (m)	HWM Flow (m3/s)	HMF Water Elev (m)	HWM Water Elev Diff (m)	HWM Flow (m3/s)	HMF Water Elev (m)	HWM Water Elev Diff (m)	HWM Flow (m3/s)	HMF Water Elev (m)	HWM Water Elev Diff (m)
-4	415	1042.36	259.3	259.338	259.32	55	258.41	-0.91	85	258.68	-0.64	160	259.27	-0.05
-3	412	855.13	258.58	259.95	259.27		258.40	-0.87		258.66	-0.60		259.23	-0.03
-2	408	589.92	257.62	257.815	257.72		256.41	-1.31		256.68	-1.04		257.23	-0.49
-1	405	404.09	258.129	257.31	257.72		256.41	-1.31		256.68	-1.04		257.21	-0.51
0	210	221.08	257.881		257.88		256.15	-1.73		256.28	-1.60		256.71	-1.17
1	131	-151.32	252.24	253.44	252.84		251.97	-0.87		252.39	-0.45		253.20	0.36
2	129	-267.07	251.53	251.895	251.71		251.76	0.05		252.16	0.45		252.92	1.21
3	121	-659.97	250.86	251.69	251.28		249.71	-1.57		250.02	-1.26		250.55	-0.72

High Water Mark Flow Range			
Survey Section#	Burnside X-Sec ID	Flow (m3/s)	Accuracy (m)
-4	415	160	-0.05
-3	412	160	-0.03
-2	408		
-1	405		
0	210		
1	131		
2	129	55	0.05
3	121		

**High Water Mark Notes**

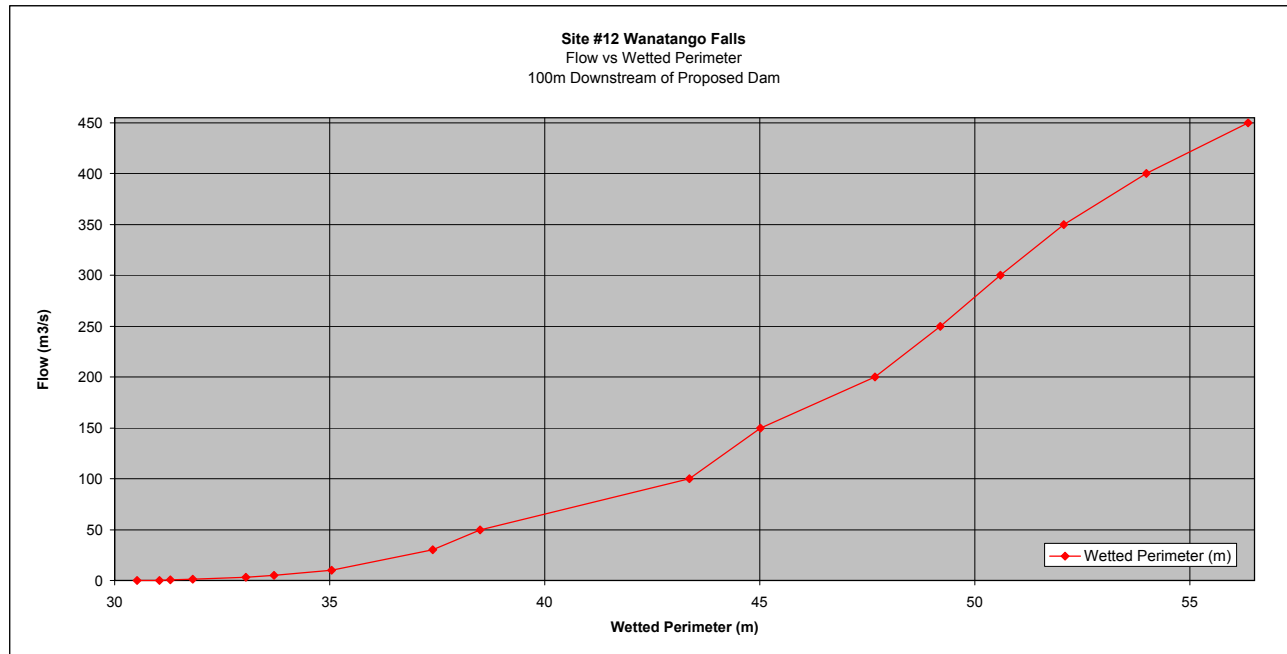
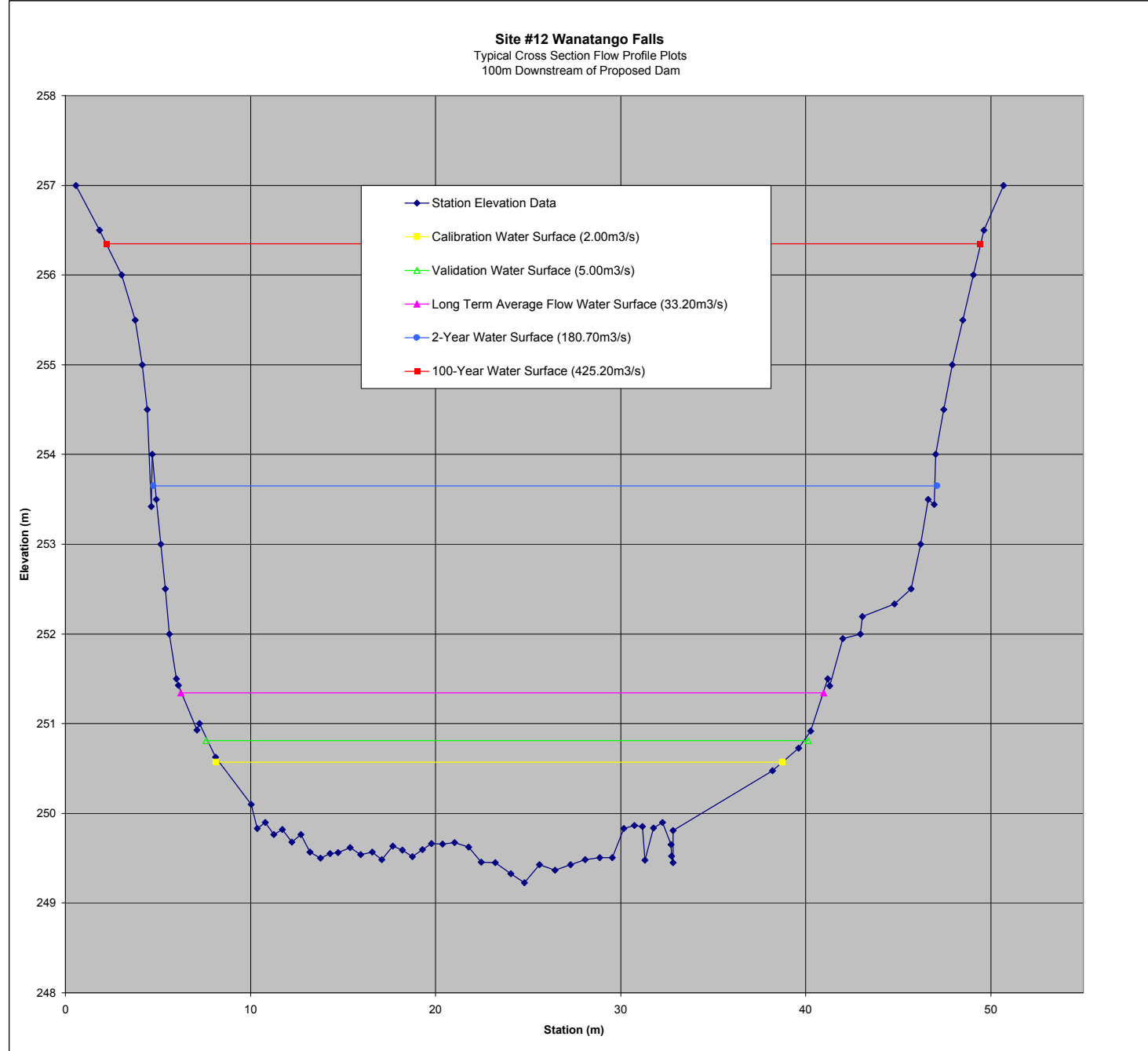
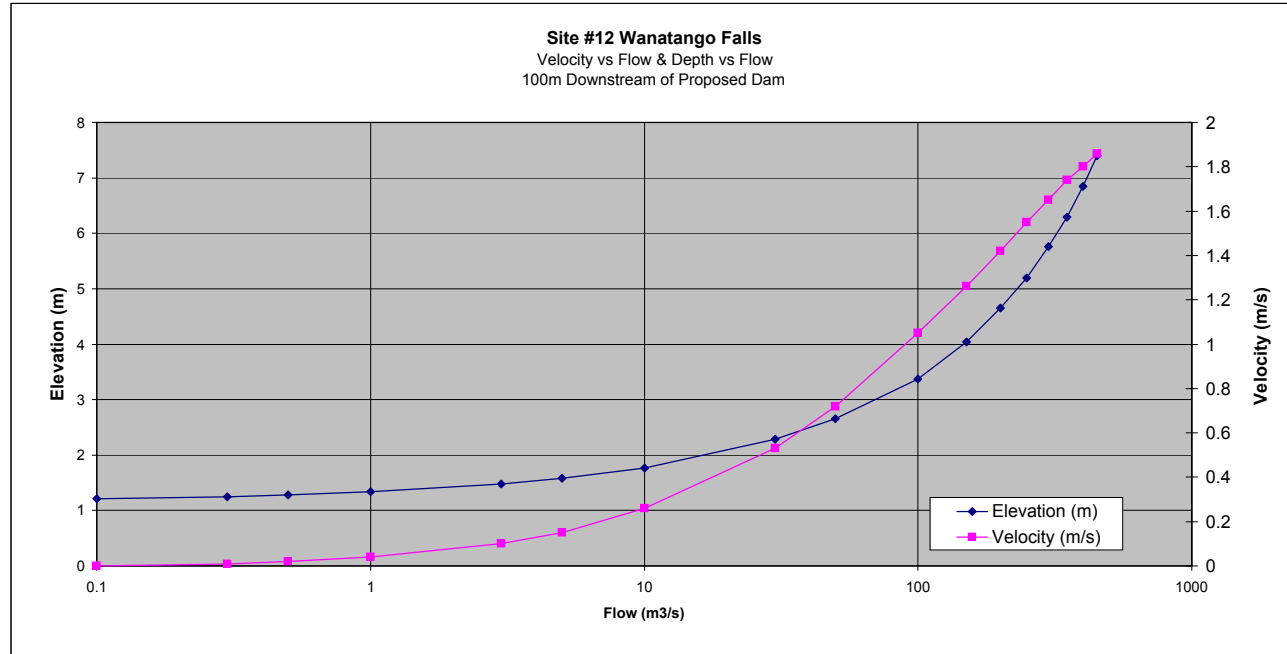
- The High Water Flow Mark range for the Wanatango Falls site has been determined to be 55-160m3/s



**Project Name:** Xeneca FIT Contract- Headpond Inudation mapping  
**Project No.:** PCG019617  
**Site:** 12\_Wanatango Falls  
**River:** Frederick House River  
**Designed by:** T.Lozon  
**Checked by:** D.Miller  
**Date Created:** 28-Jun-11



Figure #4-Site #12 Wanatango Falls - Typical Cross Section Plot



Project Name: Xeneca FIT Contract- Headpond Inundation mapping  
 Project No.: PCG019617  
 Site: 12\_Wanantago Falls  
 River: Frederick House River  
 Designed by: T.Lozon  
 Checked by: D.Miller  
 Date Created: 28-Jun-11

Note  
 -Column headings starting with 'A-PR' represent proposed conditions flood elevations with a weir crest elevation of 257.5  
 -Column headings starting with 'B-PR' represent proposed conditions flood elevations with a weir crest elevation of 259.0



Figure #5-Site #12 Wanantago Falls- Existing Conditions vs Proposed Conditions

General Data			Validation vs LIDAR Flow Comparison				Long Term Average Flow (LTAF) Comparison						2-year Flow Comparison				100-year Flow Comparison								
Survey Section#	Burnside X-Sec ID	Distance from Dam (m)	Validation Flow(m3/s)	Validation HEC-Ras Water Elev (m)	LIDAR Water Elev (m)	Validation Difference (m)	LTAF Flow(m3/s)	EX-LTAF Water Elev (m)	A-PR-LTAF Water Elev (m)	B-PR-LTAF Water Elev (m)	A-LTAF Water Elev Difference (m)	B-LTAF Water Elev Difference (m)	2-year Flow(m3/s)	EX-2-year Water Elev (m)	A-PR-2-year Water Elev (m)	B-PR-2-year Water Elev (m)	A-3-year Water Elev Difference (m)	B-2-year Water Elev Difference (m)	100-year Flow(m3/s)	EX-100-year Water Elev (m)	A-PR-100-year Water Elev (m)	B-PR-100-year Water Elev (m)	A-100-year Water Elev Difference (m)	B-100-year Water Elev Difference (m)	
Limits of Mapping	590	9638.37		258.57	259.25	-0.68		259.34	259.34	259.45	0	0.11		261.06	261.06	261.18	0	0.12		262.73	262.73	262.75	0	0.02	
	585	9725.03		258.55	258.75	-0.2		259.34	259.34	259.45	0	0.11		261.14	261.14	261.25	0	0.11		262.88	262.88	262.9	0	0.02	
	580	9417.52		258.5	258.75	-0.25		259.27	259.27	259.4	0	0.13		261.04	261.04	261.17	0	0.13		262.77	262.77	262.79	0	0.02	
	575	9157.30		258.43	258.75	-0.32		259.18	259.18	259.34	0	0.16		260.92	260.92	261.07	0	0.15		262.63	262.63	262.65	0	0.02	
	570	8719.18		258.2	258.75	-0.55		258.98	258.98	259.23	0	0.25		260.7	260.7	260.89	0	0.19		262.36	262.36	262.38	0	0.02	
	565	8471.34		257.97	258.25	-0.28		258.71	258.71	259.12	0	0.41		260.29	260.29	260.6	0	0.31		261.86	261.86	261.9	0	0.04	
	560	8157.24		257.64	257.75	-0.11		258.24	258.24	259.04	0	0.8		259.83	259.83	260.36	0	0.53		261.45	261.45	261.51	0	0.06	
	555	8128.96		257.64	257.75	-0.11		258.27	258.27	259.05	0	0.78		259.93	259.93	260.43	0	0.5		261.62	261.62	261.67	0	0.05	
	550	7714.86		257.64	257.75	-0.11		258.24	258.24	259.04	0	0.8		259.88	259.88	260.4	0	0.52		261.6	261.6	261.66	0	0.06	
	545	7332.29		257.64	257.75	-0.11		258.22	258.22	259.04	0	0.82		259.77	259.77	260.34	0	0.57		261.46	261.46	261.53	0	0.07	
	540	6945.49		257.64	257.75	-0.11		258.21	258.21	259.04	0	0.83		259.76	259.76	260.33	0	0.57		261.45	261.45	261.52	0	0.07	
	535	6543.13		257.64	257.75	-0.11		258.2	258.2	259.03	0	0.83		259.69	259.69	260.29	0	0.6		261.36	261.36	261.43	0	0.07	
	530	6142.65		257.64	257.75	-0.11		258.2	258.2	259.03	0	0.83		259.68	259.68	260.28	0	0.6		261.33	261.33	261.41	0	0.08	
	525	5743.91		257.64	257.75	-0.11		258.2	258.2	259.03	0	0.83		259.66	259.66	260.27	0	0.61		261.29	261.29	261.37	0	0.08	
	520	5347.81		257.63	257.75	-0.12		258.19	258.19	259.03	0	0.84		259.61	259.61	260.24	0	0.63		261.21	261.21	261.29	0	0.08	
	515	4950.87		257.63	257.75	-0.12		258.19	258.19	259.03	0	0.84		259.6	259.6	260.24	0	0.64		261.2	261.2	261.28	0	0.08	
	510	4551.21		257.63	257.75	-0.12		258.19	258.19	259.03	0	0.84		259.59	259.59	260.23	0	0.64		261.17	261.17	261.25	0	0.09	
	505	4152.48		257.63	257.75	-0.12		258.19	258.19	259.03	0	0.83		259.56	259.56	260.21	0	0.65		261.12	261.12	261.21	0	0.09	
	500	3753.19		257.63	257.75	-0.12		258.18	258.18	259.02	0	0.84		259.54	259.54	260.2	0	0.66		261.08	261.08	261.17	0	0.09	
	495	3354.07		257.63	257.75	-0.12		258.18	258.18	259.02	0	0.84		259.52	259.52	260.19	0	0.67		261.05	261.05	261.14	0	0.09	
	490	2955.07		257.63	257.75	-0.12		258.18	258.18	259.02	0	0.84		259.51	259.51	260.18	0	0.67		261.01	261.01	261.1	0	0.09	
	485	2556.07		257.63	257.75	-0.12		258.18	258.18	259.02	0	0.84		259.48	259.48	260.16	0	0.68		260.96	260.96	261.06	0	0.1	
	480	2157.07		257.63	257.75	-0.12		258.17	258.17	259.02	0	0.85		259.44	259.44	260.14	0	0.7		260.89	260.89	261.0	0	0.09	
	475	1758.07		257.63	257.75	-0.12		258.17	258.17	259.02	0	0.85		259.43	259.43	260.13	0	0.7		260.86	260.86	260.96	0	0.1	
	470	1359.07		257.63	257.75	-0.12		258.16	258.16	259.02	0	0.85		259.42	259.42	260.12	0	0.73		260.85	260.85	260.96	0	0.11	
	465	960.07		257.63	257.75	-0.12		258.17	258.17	259.02	0	0.85		259.38	259.38	260.1	0	0.72		260.76	260.76	260.86	0	0.1	
	460	561.07		257.62	257.75	-0.13		258.08	258.08	259	0	0.92		258.71	258.71	259.56	-0.01	1.25		259.85	259.85	260.37	0	0.52	
	455	162.07		257.21	257.75	-0.54		257.64	257.64	259	0	1.36		258.26	258.26	259.56	260.02	0.3	1.76		259.54	259.54	260.59	1.29	2.05
	450	73.07		255.55	256	-0.45		255.86	257.5	259	1.64	3.14		256.82	256.82	258.64	260	1.82	3.18		257.59	257.59	260.49	2.15	2.9
	445	34.07		255.72	256	-0.28		256.21	257.51	259.01	1.3	2.8		257.33	258.71	260.03	1.38	2.7		258.42	259.92	260.6	1.5	2.18	
	440	5.07		255.72	256	-0.28		256.21	257.51	259.01	1.3	2.8		257.34	258.71	260.03	1.37	2.69		258.45	259.93	260.61	1.48	2.16	
	435	5.07		255.72	256	-0.28		256.21	257.51	259.01	1.3	2.8		257.32	258.7	260.03	1.38	2.71		258.38	259.9	260.58	1.52	2.2	
	430	5.07		255.72	256	-0.28		256.21	257.51	259.01	1.3	2.8		257.32	258.7	260.03	1.38	2.71		258.39	259.9	260.59	1.51	2.2	
	425	5.07		255.72	256	-0.28		256.21	257.51	259.01	1.3	2.8		257.31	258.7	260.02	1.39	2.71		258.33	259.88	260.57	1.55	2.24	
	420	5.07		255.72	256	-0.28		256.21	257.51	259.01	1.3	2.8		257.3	258.69	260.02	1.39	2.72		258.31	259.87	260.57	1.56	2.26	
	415	5.07		255.72	256	-0.28		256.21	257.51	259.01	1.31	2.81		257.28	258.69	260.02	1.41	2.74		258.27	259.86	260.56	1.59	2.29	
	410	5.07		255.29	255.5	-0.21		255.68	257.5	259	1.82	3.32		256.81	258.68	260.01	1.85	3.2		258.06	259.82	260.54	1.76	2.48	
	405	5.07		255.29	255.5	-0.21		255.68	257.51	259.01	1.83	3.33		256.81	258.68	260.02	1.87	3.21		258.06	259.85	260.55	1.79	2.49	
	400	5.07		255.29	255.5	-0.21		255.68	257.51	259.01	1.83	3.33		256.79	258.67	260.02	1.84	3.19		258.04	259.84	260.55	1.7	2.41	
	395	5.07		255.29	255.5	-0.21		255.68	257.51	259.01	1.83	3.33		256.79	258.67	260.02	1.88	3.23		258.13	259.83	260.55	1.7	2.42	
	390	5.07		254.29	254.5	-0.21		254.67	254.99	254.99	0.12	0.12		256.37	256.68	256.68	0.21	0.21		257.05	257.5	257.5	0.45	0.45	
	385	5.07		253.55	254	-0.45		254.23	254.23	254.23	0	0		255.53	255.53	255.53	0	0		256.9	256.9	256.9	0	0	
	380	5.07		250.81	251	-0.19		251.59	251.59	251.59	0	0		253.42	253.42	253.42	0	0		255.17	255.17	255.17	0	0	
	375	5.07		250.81	251	-0.19		251.58	251.58	251.58	0	0		253.39	253.39	253.39	0	0		255.14	255.14	255.14	0	0	
	370	5.07		250.81	251.5	0.18		251.35	251.35	251.35	0	0		252.94	252.94	252.94	0	0		254.39	254.39	254.39	0	0	
	365	5.07		250.32	250.5	-0.18		251.4	251.4	251.4	0	0		253.1	253.1	253.1	0	0		254.73	254.73	254.73	0	0	
	360	5.07		250.28	250.5	-0.22		251.35	251.35	251.35	0	0		252.91	252.91	252.91	0	0		254.28	254.28	254.28	0	0	
	355																								



**BURNSIDE**

[ THE DIFFERENCE IS OUR PEOPLE ]

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**Appendix B**  
**HEC-RAS Output Tables**

Site #12- Wanatango Falls  
Existing Conditions  
2-year Flow Results

Reach	River Sta	Station (m)	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	W.P. Total (m)	Flow Area (m2)	Top Width (m)	Froude # Chl
INUNDATION	590	9838.37	2-YEAR	180.7	257.99	261.04	260.04	261.3	0.001331	2.38	56.6	109.64	55.39	0.45
INUNDATION	585	9725.03	2-YEAR	180.7	257.99	261.12		261.18	0.000274	1.14	69.37	173.75	68.15	0.21
INUNDATION	580	9417.52	2-YEAR	180.7	257.99	261.02		261.09	0.000326	1.2	64.49	157.5	63.47	0.23
INUNDATION	575	9157.30	2-YEAR	180.7	258	260.89		260.99	0.000446	1.37	60.94	142.54	60.13	0.26
INUNDATION	570	8719.18	2-YEAR	180.7	257.75	260.66		260.77	0.000534	1.48	52.54	126.48	51.35	0.29
INUNDATION	565	8471.34	2-YEAR	180.7	257.5	260.21		260.53	0.001906	2.59	63.23	100.14	61.88	0.53
INUNDATION	560	8157.24	2-YEAR	180.7	257.14	259.61		259.91	0.001972	2.46	55.8	83.15	53.63	0.53
INUNDATION	555	8128.96	2-YEAR	180.7	256.9	259.74		259.83	0.000425	1.3	66.28	148.26	65.32	0.26
INUNDATION	550	7714.86	2-YEAR	180.7	256.2	259.67		259.71	0.000173	0.87	100.79	225.73	99.07	0.16
INUNDATION	545	7133.29	2-YEAR	180.7	255.8	259.54		259.59	0.000219	1.03	99.08	177.49	97.12	0.19
INUNDATION	540	6945.49	2-YEAR	180.7	255.6	259.52		259.55	0.000135	0.81	127.42	233.89	124.55	0.15
INUNDATION	535	5943.13	2-YEAR	180.7	255.25	259.43		259.45	0.000075	0.64	102.82	286.65	100.84	0.11
INUNDATION	530	5542.65	2-YEAR	180.7	255.1	259.41		259.42	0.000051	0.56	91.13	325.42	88.73	0.09
INUNDATION	525	5193.91	2-YEAR	180.7	255.1	259.38		259.4	0.00007	0.65	80.86	278.61	78.24	0.11
INUNDATION	520	4817.81	2-YEAR	180.7	255	259.33		259.37	0.000128	0.87	60.78	207.87	57.79	0.14
INUNDATION	515	4609.87	2-YEAR	180.7	254.7	259.32		259.34	0.000073	0.7	70.28	259.93	67.09	0.11
INUNDATION	510	4151.21	2-YEAR	180.7	254.7	259.3		259.31	0.000049	0.58	89.67	316.12	87.11	0.09
INUNDATION	505	3625.48	2-YEAR	180.7	254.7	259.26		259.28	0.000064	0.65	75.24	278.05	72.16	0.1
INUNDATION	500	3329.19	2-YEAR	180.7	254.7	259.24		259.26	0.000078	0.71	98.04	274.46	94.88	0.11
INUNDATION	439	3058.07	2-YEAR	180.7	254.7	259.21		259.24	0.000084	0.73	70.25	249.05	67.31	0.12
INUNDATION	437	2860.26	2-YEAR	180.7	254.7	259.19		259.22	0.000094	0.77	68.24	236.04	65.7	0.13
INUNDATION	425	1966.87	2-YEAR	180.7	254.7	259.15		259.17	0.00004	0.51	103.62	357.12	101.41	0.08
INUNDATION	418	1341.65	2-YEAR	180.7	254.7	259.11		259.13	0.000074	0.68	98.86	267.88	96.25	0.11
INUNDATION	415	1042.36	2-YEAR	180.7	254.72	259.09		259.11	0.000075	0.69	116.89	268.07	114.39	0.11
INUNDATION	413	933.65	2-YEAR	180.7	253	258.98		259.08	0.00047	1.42	46.26	127.29	41.88	0.26
INUNDATION	412	855.13	2-YEAR	180.7	251.76	259.03		259.05	0.000051	0.6	79.14	302.28	75.15	0.09
INUNDATION	411.5	822.18	2-YEAR	180.7	257.2	258.72	258.54	259.02	0.00442	2.19	76.84	75.36	75.95	0.7
INUNDATION	411	789.59	2-YEAR	180.7	256.9	258.33	258.33	258.78	0.008867	3.04	71.51	61.56	70.82	0.99
INUNDATION	410.5	757.80	2-YEAR	180.7	255.25	256.8	257.24	258.26	0.032343	5.36	39.95	33.74	39.55	1.85
INUNDATION	410	722.91	2-YEAR	180.7	252.7	257.69	254.74	257.71	0.000066	0.63	106.73	297.06	104.97	0.11
INUNDATION	408	589.92	2-YEAR	180.7	249.79	257.7		257.7	0.000009	0.31	144.68	595.72	140.24	0.04
INUNDATION	405	404.09	2-YEAR	180.7	251.76	257.68		257.7	0.000037	0.56	94.44	348.04	92.09	0.08
INUNDATION	403	340.41	2-YEAR	180.7	251.7	257.69		257.7	0.000029	0.47	120.73	393.58	118.94	0.07
INUNDATION	402	310.37	2-YEAR	180.7	251.65	257.67		257.69	0.000062	0.68	103.66	296.83	100.47	0.1
INUNDATION	401	278.86	2-YEAR	180.7	251.65	257.67		257.69	0.000074	0.73	111.73	286.64	108.41	0.11
INUNDATION	400	255.07	2-YEAR	180.7	252.95	257.65		257.69	0.000137	0.87	113.27	239.96	110.72	0.15
INUNDATION	210		2-YEAR	180.7	255.3	257.11	257.11	257.63	0.020391	2.48	65.14	63.65	64.13	0.63
INUNDATION	209		2-YEAR	180.7	254	256.77		256.94	0.001573	1.89	60.59	101.59	59.3	0.41
INUNDATION	208		2-YEAR	180.7	251	256.85	254.04	256.89	0.000193	0.89	79.67	211.99	76.98	0.15
INUNDATION	207		2-YEAR	180.7	251.5	256.84	254.05	256.89	0.000175	0.95	76.07	198.98	74.26	0.16
INUNDATION	206		2-YEAR	180.7	252.5	256.81	254.57	256.88	0.000483	1.18	64.41	156.05	63.19	0.22
INUNDATION	205		2-YEAR	180.7	253	256.81	254.45	256.86	0.000196	1	62.65	182.6	61.22	0.18
INUNDATION	204		2-YEAR	180.7	251.5	256.84	252.94	256.85	0.000041	0.57	80.19	320.02	78.65	0.09
INUNDATION	203		2-YEAR	180.7	253.5	256.79	255.36	256.85	0.000538	1.04	83.85	173.95	83.07	0.23
INUNDATION	202		2-YEAR	180.7	255.05	256.62	256.15	256.82	0.018907	1.97	68.25	91.69	67.66	0.54
INUNDATION	201	0.00	2-YEAR	180.7	254	256.37	255.78	256.7	0.025609	2.56	38.18	70.65	37.08	0.59
INUNDATION	200	-57.55	2-YEAR	180.7	253.2	255.53	255.53	256.3	0.036231	3.18	40.4	50.06	39.29	0.79
INUNDATION	132	-135.53	2-YEAR	180.7	247.5	253.67	250.21	253.75	0.000207	1.22	43.15	152.64	36.26	0.18
INUNDATION	131	-151.32	2-YEAR	180.7	249.23	253.65		253.74	0.000307	1.36	46.73	140.88	42.17	0.22
INUNDATION	130	-199.19	2-YEAR	180.7	250.3	253.36		253.69	0.001767	2.56	35.95	75.73	34.35	0.51
INUNDATION	129	-267.07	2-YEAR	180.7	249.39	253.47		253.57	0.000418	1.43	49.52	131.7	47.46	0.26
INUNDATION	128	-310.91	2-YEAR	180.7	249.14	253.33		253.53	0.000808	2	36.84	96.5	34.34	0.36
INUNDATION	127	-355.17	2-YEAR	180.7	249.13	253.36		253.48	0.00048	1.57	49.59	129.97	47.65	0.28
INUNDATION	126	-406.75	2-YEAR	180.7	247.47	253.41		253.45	0.000164	0.88	74.01	206.49	71.28	0.16
INUNDATION	125	-450.39	2-YEAR	180.7	248.3	253.33		253.43	0.000411	1.36	47.93	132.99	44.84	0.25
INUNDATION	124	-512.31	2-YEAR	180.7	248.4	253.3		253.4	0.000425	1.39	46.64	130.38	44.08	0.25
INUNDATION	123	-561.32	2-YEAR	180.7	249	253.18		253.36	0.001028	1.88	43.99	96.21	42.1	0.38
INUNDATION	122	-644.31	2-YEAR	180.7	249.1	253.1		253.28	0.000993	1.89	73.62	99.46	71.64	0.38
INUNDATION	121	-659.97	2-YEAR	180.7	247.65	251.99	251.99	253.15	0.00741	5.64	36.62	66.43	30.35	0.96
INUNDATION	120	-675.22	2-YEAR	180.7	246.58	249.38	250.25	252.63	0.056092	7.99	22.21	22.61	20.46	2.43
INUNDATION	119	-698.11	2-YEAR	180.7	246.64	249.06	249.72	251.22	0.040403	6.5	29.05	27.78	27.72	2.07
INUNDATION	118	-759.15	2-YEAR	180.7	246.5	250.63	247.44	250.64	0.000048	0.58	109.16	357.8	106.46	0.09
INUNDATION	116	-849.58	2-YEAR	180.7	246.9	250.63		250.64	0.000033	0.42	148.43	440.1	147.67	0.07
INUNDATION	115	-916.21	2-YEAR	180.7	246.93	250.63		250.63	0.000023	0.36	169.53	514.18	168.6	0.06
INUNDATION	114	-939.43	2-YEAR	180.7	246.85	250.63		250.63	0.000031	0.41	177.06	474.59	175.45	0.07
INUNDATION	112	-1092.32	2-YEAR	180.7	246.85	250.62		250.63	0.000043	0.49	132.3	387.38	129.34	0.08
INUNDATION	110	-1232.26	2-YEAR	180.7	246.9	250.61		250.62	0.000043	0.49	126.86	382.33	122.79	0.08
INUNDATION	109	-1281.15	2-YEAR	180.7	246.95	250.57		250.61	0.000208	0.91	82.26	199.4	81.19	0.18
INUNDATION	108	-1325.95	2-YEAR	180.7	246.95	250.57		250.6	0.000126	0.8	148.73	247.82	147.4	0.14
INUNDATION	106	-1483.86	2-YEAR	180.7	246.95	250.55		250.58	0.000141	0.84	96.88	226.34	95.57	0.15
INUNDATION	104	-1626.58	2-YEAR	180.7	246.95	250.53		250.56	0.000125	0.8	83.59	230.06	82.33	0.14
INUNDATION	100	-1924.13	2-YEAR	180.7	246.9	250.43		250.5	0.000277	1.18	77.98	167.35	76.56	0.21
INUNDATION	10		2-YEAR	180.7	246.9	248.64		249.04	0.004718	2.78	49.3	64.95	48.81	0.76
INUNDATION	9		2-YEAR	180.7	246.9	248.63		249.03	0.004829	2.8	49.24	64.49	48.75	0.77
INUNDATION	8		2-YEAR	180.7	246.9	248.62		249.03	0.004948	2.82	49.17	64.01	48.69	0.78
INUNDATION	7		2-YEAR	180.7	246.9	248.61		249.03	0.005075	2.85	49.11	63.52	48.63	0.79
INUNDATION	6		2-YEAR	180.7	246.9	248.6		249.02	0.005213	2.87	49.04	63	48.56	0.8
INUNDATION	5		2-YEAR	180.7	246.9	248.59		249.02	0.005384	2.9	48.95	62.39	48.48	0.81
INUNDATION	4		2-YEAR	180.7	246.9	248.58		249.01	0.005574	2.93	48.86	61.74	48.4	0.82
INUNDATION	3		2-YEAR	180.7	246.9	248.56		249.01	0.005788	2.96	48.77	61.04	48.31	0.84
INUNDATION	2		2-YEAR	180.7	246.9	248.54	248.42	249	0.006071	3	48.65	60.16	48.2	0.86
INUNDATION	1		2-YEAR	180.7	246.9	248.42	248.42	248.98	0.008556	3.34	47.97	54.1	47.58	1</

Site #12- Wanatango Falls  
Existing Conditions  
100-year Flow Results

Reach	River Sta	Station (m)	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	W.P. Total (m)	Flow Area (m2)	Top Width (m)	Froude # Chl
INUNDATION	590	9838.37	100-YEAR	425.2	257.99	262.64	261.2	263.11	0.001421	3.31	70.25	211.58	68.5	0.5
INUNDATION	585	9725.03	100-YEAR	425.2	257.99	262.8		262.94	0.000328	1.68	74.47	291.82	71.88	0.25
INUNDATION	580	9417.52	100-YEAR	425.2	257.99	262.68		262.83	0.00037	1.74	81.88	282.24	80.35	0.26
INUNDATION	575	9157.30	100-YEAR	425.2	258	262.53		262.72	0.000498	1.98	70.64	248.59	69.26	0.3
INUNDATION	570	8719.18	100-YEAR	425.2	257.75	262.23		262.47	0.00063	2.19	63.66	213.82	61.9	0.34
INUNDATION	565	8471.34	100-YEAR	425.2	257.5	261.62		262.18	0.001995	3.59	74.31	193.86	72.4	0.58
INUNDATION	560	8157.24	100-YEAR	425.2	257.14	261.02		261.56	0.001922	3.37	62.88	163.02	59.92	0.56
INUNDATION	555	8128.96	100-YEAR	425.2	256.9	261.25		261.43	0.000504	1.92	75.23	253.66	73.56	0.3
INUNDATION	550	7714.86	100-YEAR	425.2	256.2	261.2		261.27	0.000197	1.23	295.69	556.06	293.54	0.19
INUNDATION	545	7133.29	100-YEAR	425.2	255.8	261.01		261.13	0.000293	1.55	193.46	406.68	191.24	0.23
INUNDATION	540	6945.49	100-YEAR	425.2	255.6	261		261.07	0.000188	1.24	158.51	440.26	155.32	0.18
INUNDATION	535	5943.13	100-YEAR	425.2	255.25	260.86		260.92	0.000123	1.03	190.07	483.51	187.99	0.15
INUNDATION	530	5542.65	100-YEAR	425.2	255.1	260.83		260.87	0.000091	0.92	185.35	549.95	182.77	0.13
INUNDATION	525	5193.91	100-YEAR	425.2	255.1	260.77		260.83	0.000129	1.09	154.2	446.96	151.49	0.15
INUNDATION	520	4817.81	100-YEAR	425.2	255	260.66		260.76	0.000239	1.46	129.28	357.43	125.94	0.21
INUNDATION	515	4609.87	100-YEAR	425.2	254.7	260.64		260.71	0.000151	1.22	143.87	402.52	140.08	0.17
INUNDATION	510	4151.21	100-YEAR	425.2	254.7	260.6		260.65	0.000103	1.01	150.78	474.52	148.06	0.14
INUNDATION	505	3625.48	100-YEAR	425.2	254.7	260.52		260.59	0.000135	1.14	183.75	454.98	180.39	0.16
INUNDATION	500	3329.19	100-YEAR	425.2	254.7	260.47		260.54	0.000166	1.25	165.4	421.59	161.9	0.18
INUNDATION	439	3058.07	100-YEAR	425.2	254.7	260.42		260.5	0.000178	1.27	176.02	414.95	172.52	0.18
INUNDATION	437	2860.26	100-YEAR	425.2	254.7	260.36		260.46	0.000208	1.37	110.86	345.49	108.07	0.2
INUNDATION	425	1966.87	100-YEAR	425.2	254.7	260.28		260.32	0.000092	0.92	135.54	492.2	133.19	0.13
INUNDATION	418	1341.85	100-YEAR	425.2	254.7	260.16		260.24	0.000177	1.24	117.95	377.66	115.09	0.18
INUNDATION	415	1042.36	100-YEAR	425.2	254.72	260.11		260.19	0.00018	1.24	131.44	393.58	128.62	0.18
INUNDATION	413	933.65	100-YEAR	425.2	253	259.77		260.12	0.001291	2.62	55.82	162.92	51.26	0.44
INUNDATION	412	855.13	100-YEAR	425.2	251.76	259.94		260.01	0.000146	1.17	88.47	373.4	84.14	0.16
INUNDATION	411.5	822.18	100-YEAR	425.2	257.2	259.43	259.23	259.95	0.004908	3.3	98.32	136.85	97.21	0.81
INUNDATION	411	789.59	100-YEAR	425.2	256.9	259.08	259.08	259.73	0.006391	3.78	97.21	120.82	96.04	0.92
INUNDATION	410.5	757.80	100-YEAR	425.2	255.25	257.69	258.14	259.37	0.015856	5.75	50.13	75.23	49.45	1.44
INUNDATION	410	722.91	100-YEAR	425.2	252.7	258.42	255.43	258.49	0.000194	1.22	153.86	388.46	152.07	0.19
INUNDATION	408	589.92	100-YEAR	425.2	249.79	258.45		258.47	0.000033	0.63	187.22	714.04	182.62	0.08
INUNDATION	405	404.09	100-YEAR	425.2	251.76	258.38		258.45	0.000129	1.15	142.25	425.13	139.77	0.16
INUNDATION	403	340.41	100-YEAR	425.2	251.7	258.39		258.44	0.000096	0.94	132.51	482.51	130.54	0.13
INUNDATION	402	310.37	100-YEAR	425.2	251.65	258.33		258.43	0.00021	1.38	149.72	379.47	146.29	0.2
INUNDATION	401	278.86	100-YEAR	425.2	251.65	258.31		258.42	0.000248	1.47	159.35	371.95	155.79	0.21
INUNDATION	400	255.07	100-YEAR	425.2	252.95	258.27		258.41	0.000425	1.7	139.77	312.95	136.94	0.27
INUNDATION	210		100-YEAR	425.2	255.3	258.07	257.99	258.36	0.0008718	2.24	155.26	220.91	152.71	0.45
INUNDATION	209		100-YEAR	425.2	254	258.15	256.84	258.26	0.000656	1.69	184.49	314.6	179.93	0.28
INUNDATION	208		100-YEAR	425.2	251	258.15	254.99	258.25	0.000335	1.45	100.91	318.56	96.46	0.21
INUNDATION	207		100-YEAR	425.2	251.5	258.13	255.14	258.24	0.0003	1.53	97.97	305.04	94.79	0.23
INUNDATION	206		100-YEAR	425.2	252.5	258.06	255.68	258.23	0.000734	1.85	92.38	246.8	90.03	0.29
INUNDATION	205		100-YEAR	425.2	253	258.06	255.36	258.21	0.000357	1.68	75.53	266.02	73.8	0.25
INUNDATION	204		100-YEAR	425.2	251.5	258.14	253.75	258.17	0.00005	0.75	203	635.18	198.49	0.1
INUNDATION	203		100-YEAR	425.2	253.5	258.13	256.03	258.17	0.000129	0.71	218.75	541.85	215.42	0.12
INUNDATION	202		100-YEAR	425.2	255.05	258.12	256.86	258.16	0.001666	0.96	233.82	494.19	229.86	0.18
INUNDATION	201	0.00	100-YEAR	425.2	254	257.05	256.84	258.04	0.051577	4.42	40.67	96.44	39.01	0.88
INUNDATION	200	-57.55	100-YEAR	425.2	253.2	256.9	256.9	257.59	0.012918	2.75	81.82	125.18	79.83	0.52
INUNDATION	132	-135.53	100-YEAR	425.2	247.5	256.36	251.52	256.53	0.000253	1.82	59.37	267.71	51.15	0.21
INUNDATION	131	-151.32	100-YEAR	425.2	249.23	256.35		256.52	0.000271	1.83	55.1	259.9	47.27	0.23
INUNDATION	130	-199.19	100-YEAR	425.2	250.3	256.08		256.48	0.000819	2.83	46.47	180.21	43.18	0.39
INUNDATION	129	-267.07	100-YEAR	425.2	249.39	256.22		256.38	0.00027	1.75	65.01	280.98	61.41	0.23
INUNDATION	128	-310.91	100-YEAR	425.2	249.14	256.05		256.34	0.000536	2.46	56.03	213.46	52.41	0.32
INUNDATION	127	-355.17	100-YEAR	425.2	249.13	256.11		256.29	0.000317	1.92	99.13	300.8	96.08	0.25
INUNDATION	126	-406.75	100-YEAR	425.2	247.47	256.19		256.24	0.000098	1.05	133.45	497.85	130.11	0.14
INUNDATION	125	-450.39	100-YEAR	425.2	248.3	256.1		256.23	0.000246	1.62	106.36	331.93	102.67	0.21
INUNDATION	124	-512.31	100-YEAR	425.2	248.4	256.09		256.22	0.000247	1.63	115.77	343.26	112.77	0.22
INUNDATION	123	-561.32	100-YEAR	425.2	249	256.02		256.2	0.000388	1.93	127.02	316.02	124.63	0.27
INUNDATION	122	-644.31	100-YEAR	425.2	249.1	256		256.16	0.000341	1.85	130.34	357.67	127.68	0.25
INUNDATION	121	-659.97	100-YEAR	425.2	247.65	253.4	253.4	255.91	0.01115	8.66	52.39	115.98	42.39	1.25
INUNDATION	120	-675.22	100-YEAR	425.2	246.58	250.07	251.35	255.18	0.073182	10.02	36.23	42.44	34.22	2.87
INUNDATION	119	-698.11	100-YEAR	425.2	246.64	249.78	250.86	253.53	0.041846	8.58	35.07	49.54	32.89	2.23
INUNDATION	118	-759.15	100-YEAR	425.2	246.5	252.27	248.13	252.31	0.000081	0.95	125.69	548.39	122.21	0.13
INUNDATION	116	-849.58	100-YEAR	425.2	246.9	252.28		252.3	0.000045	0.64	188.68	727.05	187.5	0.09
INUNDATION	115	-916.21	100-YEAR	425.2	246.93	252.28		252.3	0.000033	0.56	195.16	815.7	193.94	0.08
INUNDATION	114	-939.43	100-YEAR	425.2	246.85	252.28		252.29	0.000042	0.62	200.79	785.46	198.87	0.09
INUNDATION	112	-1092.32	100-YEAR	425.2	246.85	252.26		252.29	0.000059	0.74	198.1	667.93	194.55	0.11
INUNDATION	110	-1232.26	100-YEAR	425.2	246.9	252.25		252.28	0.000061	0.75	168.06	623.39	163.27	0.11
INUNDATION	109	-1281.15	100-YEAR	425.2	246.95	252.18		252.26	0.000219	1.28	175.51	422.63	174.26	0.2
INUNDATION	108	-1325.95	100-YEAR	425.2	246.95	252.19		252.25	0.000153	1.16	184.8	524.28	183.05	0.17
INUNDATION	106	-1483.86	100-YEAR	425.2	246.95	252.15		252.22	0.000183	1.26	138.13	419.83	136.55	0.18
INUNDATION	104	-1626.58	100-YEAR	425.2	246.95	252.12		252.2	0.000174	1.24	113.08	388.43	111.6	0.18
INUNDATION	100	-1924.13	100-YEAR	425.2	246.9	251.98		252.12	0.000354	1.75	164.49	372.49	162.44	0.26
INUNDATION	10		100-YEAR	425.2	246.9	249.58		250.34	0.004471	3.85	54.87	113.37	53.95	0.81
INUNDATION	9		100-YEAR	425.2	246.9	249.57		250.33	0.004535	3.87	54.82	112.85	53.91	0.82
INUNDATION	8		100-YEAR	425.2	246.9	249.56		250.33	0.004601	3.89	54.77	112.32	53.86	0.82
INUNDATION	7		100-YEAR	425.2	246.9	249.55		250.33	0.004671	3.9	54.72	111.77	53.82	0.83
INUNDATION	6		100-YEAR	425.2	246.9	249.54		250.32	0.004756	3.93	54.66	111.12	53.76	0.84
INUNDATION	5		100-YEAR	425.2	246.9	249.53		250.32	0.004846	3.95	54.6	110.45	53.7	0.84
INUNDATION	4		100-YEAR	425.2	246.9	249.51		250.32	0.004942	3.97	54.53	109.75	53.64	0.85
INUNDATION	3		100-YEAR	425.2	246.9	249.5		250.31	0.005058	4	54.46	108.93	53.57	0.86
INUNDATION	2		100-YEAR	425										



Site #12- Wanatango Falls  
Existing Conditions  
Calibration Results

Reach	River Sta	Station (m)	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	W.P. Total (m)	Flow Area (m2)	Top Width (m)	Froude # Chl
INUNDATION	590	9838.37	CALIB	2	257.99	258.39	258.19	258.4	0.000499	0.33	20.39	6.04	20.15	0.19
INUNDATION	585	9725.03	CALIB	2	257.99	258.38		258.38	0.000091	0.14	46.19	13.96	46.12	0.08
INUNDATION	580	9417.52	CALIB	2	257.99	258.34		258.34	0.000144	0.17	44.33	11.98	44.26	0.1
INUNDATION	575	9157.30	CALIB	2	258	258.28		258.28	0.000048	0.25	39.43	7.96	39.36	0.18
INUNDATION	570	8719.18	CALIB	2	257.75	258.04		258.04	0.000604	0.28	36.57	7.21	36.47	0.2
INUNDATION	565	8471.34	CALIB	2	257.5	257.89	257.7	257.9	0.000056	0.34	21.4	5.95	21.16	0.2
INUNDATION	560	8157.24	CALIB	2	257.14	257.33	257.33	257.37	0.021557	0.95	24.89	2.11	24.76	1.03
INUNDATION	555	8128.96	CALIB	2	256.9	257.3	257.06	257.3	0.000107	0.15	44.8	13.15	44.68	0.09
INUNDATION	550	7714.86	CALIB	2	256.2	257.3		257.3	0.000002	0.04	57.73	50.47	57.34	0.01
INUNDATION	545	7133.29	CALIB	2	255.8	257.3		257.3	0.000001	0.03	48.57	57.86	47.81	0.01
INUNDATION	540	6945.49	CALIB	2	255.6	257.3		257.3	0	0.02	59.81	81.4	58.97	0.01
INUNDATION	535	5943.13	CALIB	2	255.25	257.3		257.3	0	0.02	71.94	118.76	70.95	0
INUNDATION	530	5542.65	CALIB	2	255.1	257.3		257.3	0	0.01	82.46	147.24	81.42	0
INUNDATION	525	5193.91	CALIB	2	255.1	257.3		257.3	0	0.02	70.96	125.79	69.78	0
INUNDATION	520	4817.81	CALIB	2	255	257.3		257.3	0	0.02	53.15	97.18	51.61	0
INUNDATION	515	4609.87	CALIB	2	254.7	257.3		257.3	0	0.02	62.69	130.3	61.02	0
INUNDATION	510	4151.21	CALIB	2	254.7	257.3		257.3	0	0.01	75.99	159.17	74.6	0
INUNDATION	505	3625.48	CALIB	2	254.7	257.3		257.3	0	0.01	67.98	141.86	66.4	0
INUNDATION	500	3329.19	CALIB	2	254.7	257.3		257.3	0	0.02	62.13	129	60.48	0
INUNDATION	439	3058.07	CALIB	2	254.7	257.3		257.3	0	0.02	61.44	127.49	59.77	0
INUNDATION	437	2860.26	CALIB	2	254.7	257.3		257.3	0	0.02	58.7	120.89	57.1	0
INUNDATION	425	1966.87	CALIB	2	254.7	257.3		257.3	0	0.01	88.72	186.75	87.5	0
INUNDATION	418	1341.65	CALIB	2	254.7	257.3		257.3	0	0.01	67.39	140.41	65.88	0
INUNDATION	415	1042.36	CALIB	2	254.72	257.3		257.3	0	0.01	67.81	140.11	66.36	0
INUNDATION	413	933.65	CALIB	2	253	257.3		257.3	0	0.03	36.54	65.45	32.96	0.01
INUNDATION	412	855.13	CALIB	2	251.76	257.3		257.3	0	0.01	71.01	177.92	67.96	0
INUNDATION	411.5	822.18	CALIB	2	257.2	257.28		257.3	0.00136	0.12	14.03	3.68	13.82	0.22
INUNDATION	411	789.59	CALIB	2	256.9	257.1	257.1	257.17	0.016967	0.93	12.72	1.72	12.55	0.93
INUNDATION	410.5	757.80	CALIB	2	255.25	255.48	255.59	255.98	0.298319	3.14	8.92	0.64	8.8	3.72
INUNDATION	410	722.91	CALIB	2	252.7	255.58	253.15	255.58	0	0.02	75.79	121	74.57	0
INUNDATION	408	589.92	CALIB	2	249.79	255.58		255.58	0	0.01	108.94	357.55	105.79	0
INUNDATION	405	404.09	CALIB	2	251.76	255.58		255.58	0	0.01	75.58	175.78	74.3	0
INUNDATION	403	340.41	CALIB	2	251.7	255.58		255.58	0	0.01	83.31	197.09	82.1	0
INUNDATION	402	310.37	CALIB	2	251.65	255.58		255.58	0	0.01	57.58	135.88	55.87	0
INUNDATION	401	278.86	CALIB	2	251.65	255.58		255.58	0	0.02	53.27	125.13	51.44	0
INUNDATION	400	255.07	CALIB	2	252.95	255.58		255.58	0	0.02	51.99	82.58	51.08	0.01
INUNDATION	210		CALIB	2	255.3	255.49	255.49	255.57	0.124487	1.21	11.3	1.66	11.28	1
INUNDATION	209		CALIB	2	254	255.19	254.1	255.19	0.000004	0.07	31.27	30.42	31.01	0.02
INUNDATION	208		CALIB	2	251	255.19	251.28	255.19	0	0.02	51.02	106.56	49.75	0
INUNDATION	207		CALIB	2	251.5	255.19	251.77	255.19	0	0.02	49.85	98.76	49.15	0
INUNDATION	206		CALIB	2	252.5	255.19	252.65	255.19	0	0.03	41.99	72.99	41.48	0.01
INUNDATION	205		CALIB	2	253	255.19	253.11	255.19	0	0.02	53.07	90.41	52.35	0.01
INUNDATION	204		CALIB	2	251.5	255.19	251.59	255.19	0	0.01	70.44	198.26	69.53	0
INUNDATION	203		CALIB	2	253.5	255.19	253.82	255.19	0.000002	0.04	66.86	50.42	66.75	0.01
INUNDATION	202		CALIB	2	255.05	255.15	255.15	255.19	0.22794	0.87	29.32	2.29	29.32	1
INUNDATION	201	0.00	CALIB	2	254	254.18	254.15	254.22	0.106908	0.89	15.98	2.26	15.97	0.75
INUNDATION	200	-57.55	CALIB	2	253.2	253.41	253.41	253.49	0.183109	1.28	9.62	1.57	9.58	1.01
INUNDATION	132	-135.53	CALIB	2	247.5	250.64	248.08	250.64	0.000001	0.04	32.55	56.4	27.88	0.01
INUNDATION	131	-151.32	CALIB	2	249.23	250.64		250.64	0.000006	0.07	32.55	27.5	31.08	0.02
INUNDATION	130	-199.19	CALIB	2	250.3	250.57	250.57	250.64	0.01906	1.14	14.22	1.75	13.8	1.02
INUNDATION	129	-267.07	CALIB	2	249.39	249.92	249.7	249.94	0.001689	0.66	8.91	3.01	8.8	0.36
INUNDATION	128	-310.91	CALIB	2	249.14	249.87		249.89	0.000904	0.58	7.81	3.44	7.59	0.28
INUNDATION	127	-355.17	CALIB	2	249.13	249.84		249.85	0.000631	0.48	9.56	4.16	9.38	0.23
INUNDATION	126	-406.75	CALIB	2	247.47	249.85		249.85	0.000004	0.08	16.62	24.27	15.4	0.02
INUNDATION	125	-450.39	CALIB	2	248.3	249.85		249.85	0.000034	0.19	11.24	10.64	10.48	0.06
INUNDATION	124	-512.31	CALIB	2	248.4	249.84		249.84	0.00004	0.19	11.57	10.3	10.92	0.06
INUNDATION	123	-561.32	CALIB	2	249	249.82		249.84	0.001005	0.65	6.37	3.08	6.03	0.29
INUNDATION	122	-644.31	CALIB	2	249.1	249.48	249.48	249.62	0.014351	1.64	4.66	1.22	4.53	1.01
INUNDATION	121	-659.97	CALIB	2	247.65	247.99	248.22	249	0.158711	4.46	2.31	0.45	2.14	3.1
INUNDATION	120	-675.22	CALIB	2	246.58	247.57	247.01	247.59	0.000474	0.52	6.28	3.83	5.7	0.2
INUNDATION	119	-698.11	CALIB	2	246.64	247.56		247.58	0.00048	0.52	6.52	3.87	6.1	0.21
INUNDATION	118	-759.15	CALIB	2	246.5	247.57		247.57	0.000001	0.03	72.79	71.14	71.98	0.01
INUNDATION	116	-849.58	CALIB	2	246.9	247.57		247.57	0.000006	0.05	102.36	44.26	102.29	0.02
INUNDATION	115	-916.21	CALIB	2	246.93	247.57		247.57	0.000005	0.04	122.13	50.19	122.08	0.02
INUNDATION	114	-939.43	CALIB	2	246.85	247.57		247.57	0.000005	0.04	102.99	46.6	102.75	0.02
INUNDATION	112	-1092.32	CALIB	2	246.85	247.57		247.57	0.000006	0.05	88.83	41.17	88.58	0.02
INUNDATION	110	-1232.26	CALIB	2	246.9	247.57		247.57	0.000008	0.05	91.28	37.99	91.07	0.03
INUNDATION	109	-1281.15	CALIB	2	246.95	247.57		247.57	0.00006	0.14	37.03	14.49	36.9	0.07
INUNDATION	108	-1325.95	CALIB	2	246.95	247.57		247.57	0.000029	0.1	53.65	20.95	53.55	0.05
INUNDATION	106	-1483.86	CALIB	2	246.95	247.56		247.56	0.000032	0.1	51.92	20.07	51.82	0.05
INUNDATION	104	-1626.58	CALIB	2	246.95	247.56		247.56	0.000029	0.09	55.3	21.18	55.21	0.05
INUNDATION	100	-1924.13	CALIB	2	246.9	247.54		247.55	0.000049	0.13	38.08	15.59	37.94	0.06
INUNDATION	10		CALIB	2	246.9	247.24		247.25	0.002446	0.44	32.88	4.54	32.84	0.38
INUNDATION	9		CALIB	2	246.9	247.23		247.24	0.002621	0.45	32.78	4.44	32.75	0.39
INUNDATION	8		CALIB	2	246.9	247.23		247.24	0.002828	0.46	32.68	4.34	32.64	0.4
INUNDATION	7		CALIB	2	246.9	247.23		247.24	0.003082	0.47	32.57	4.22	32.53	0.42
INUNDATION	6		CALIB	2	246.9	247.22		247.23	0.0034	0.49	32.44	4.09	32.41	0.44
INUNDATION	5		CALIB	2	246.9	247.22		247.23	0.003817	0.51	32.3	3.94	32.26	0.46
INUNDATION	4		CALIB	2	246.9	247.21		247.23	0.004395	0.53	32.13	3.77	32.1	0.49
INUNDATION	3		CALIB	2	246.9	247.21		247.22	0.005299	0.56	31.97	3.56	31.93	0.54
INUNDATION	2		CALIB	2	246.9	247.2	247.14	247.22	0.007139	0.62	31.77	3.25	31.74	0.61
INUNDATION	1		CALIB	2	246.9	247.14	247.14	247.2	0.016752	1.13	13.24	1.77	13.21	0.98

Site #12- Wanatango Falls  
Existing Conditions  
High Water Mark Flow Results

Reach	River Sta	Station (m)	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	W.P. Total (m)	Flow Area (m2)	Top Width (m)	Froude # Chl
INUNDATION	590	9838.37	HWM6	160	257.99	260.86	259.9	261.1	0.001318	2.27	55.24	100.05	54.1	0.44
INUNDATION	585	9725.03	HWM6	160	257.99	260.93		260.99	0.000267	1.08	68.47	161.19	67.37	0.21
INUNDATION	580	9417.52	HWM6	160	257.99	260.83		260.9	0.000319	1.13	62.92	146.08	61.95	0.22
INUNDATION	575	9157.30	HWM6	160	258	260.72		260.8	0.00044	1.3	59.8	131.89	59.05	0.26
INUNDATION	570	8719.18	HWM6	160	257.75	260.49		260.59	0.000523	1.41	51.85	117.67	50.75	0.28
INUNDATION	565	8471.34	HWM6	160	257.5	260.05		260.35	0.001919	2.49	62.63	90.32	61.37	0.52
INUNDATION	560	8157.24	HWM6	160	257.14	259.46		259.73	0.001971	2.34	46.44	75.2	44.38	0.52
INUNDATION	555	8128.96	HWM6	160	256.9	259.57		259.65	0.000418	1.24	64.68	137.27	63.79	0.25
INUNDATION	550	7714.86	HWM6	160	256.2	259.5		259.53	0.000165	0.82	96.4	209.29	94.79	0.16
INUNDATION	545	7133.29	HWM6	160	255.8	259.38		259.42	0.000203	0.96	60.83	166.59	58.94	0.18
INUNDATION	540	6945.49	HWM6	160	255.6	259.36		259.39	0.000122	0.75	89.72	219	86.96	0.14
INUNDATION	535	5943.13	HWM6	160	255.25	259.28		259.3	0.000069	0.59	97.01	271.83	95.05	0.11
INUNDATION	530	5542.65	HWM6	160	255.1	259.26		259.27	0.000045	0.51	90.33	312.23	87.99	0.09
INUNDATION	525	5193.91	HWM6	160	255.1	259.24		259.25	0.000063	0.6	79.74	267.26	77.16	0.1
INUNDATION	520	4817.81	HWM6	160	255	259.19		259.22	0.000115	0.8	60.2	199.84	57.28	0.14
INUNDATION	515	4609.87	HWM6	160	254.7	259.18		259.2	0.000064	0.64	69.83	250.65	66.74	0.1
INUNDATION	510	4151.21	HWM6	160	254.7	259.16		259.17	0.000043	0.53	86.61	304.45	84.07	0.09
INUNDATION	505	3625.48	HWM6	160	254.7	259.13		259.15	0.000056	0.6	74.76	268.56	71.76	0.1
INUNDATION	500	3329.19	HWM6	160	254.7	259.11		259.13	0.000068	0.65	97.08	262.31	93.96	0.11
INUNDATION	439	3058.07	HWM6	160	254.7	259.09		259.11	0.000073	0.67	69.76	240.62	66.89	0.11
INUNDATION	437	2860.26	HWM6	160	254.7	259.07		259.09	0.000082	0.7	67.16	228.03	64.65	0.12
INUNDATION	425	1966.87	HWM6	160	254.7	259.03		259.05	0.000035	0.46	99.07	345.41	96.89	0.08
INUNDATION	418	1341.65	HWM6	160	254.7	259		259.02	0.000064	0.62	74.66	257.25	72.09	0.1
INUNDATION	415	1042.36	HWM6	160	254.72	258.98		259	0.000065	0.62	75.2	256.66	72.75	0.1
INUNDATION	413	933.65	HWM6	160	253	258.89		258.98	0.000401	1.3	45.68	123.46	41.32	0.24
INUNDATION	412	855.13	HWM6	160	251.76	258.93		258.95	0.000043	0.55	78.71	294.76	74.79	0.09
INUNDATION	411.5	822.18	HWM6	160	257.2	258.64		258.92	0.00434	2.05	74.55	69.62	73.69	0.68
INUNDATION	411	789.59	HWM6	160	256.9	258.25	258.25	258.67	0.009382	2.95	69.66	55.85	69.01	1
INUNDATION	410.5	757.80	HWM6	160	255.25	256.71	257.14	258.14	0.033315	5.3	37.14	30.19	36.75	1.87
INUNDATION	410	722.91	HWM6	160	252.7	257.57	254.66	257.58	0.000058	0.57	100.61	284.29	98.85	0.1
INUNDATION	408	589.92	HWM6	160	249.79	257.57		257.58	0.000008	0.28	141.31	578.19	136.94	0.04
INUNDATION	405	404.09	HWM6	160	251.76	257.56		257.57	0.000032	0.51	90.83	336.8	88.51	0.08
INUNDATION	403	340.41	HWM6	160	251.7	257.56		257.57	0.000025	0.43	117.82	378.97	116.05	0.07
INUNDATION	402	310.37	HWM6	160	251.65	257.55		257.57	0.000054	0.62	99.82	284.81	96.7	0.1
INUNDATION	401	278.86	HWM6	160	251.65	257.54		257.57	0.000064	0.67	108.18	273.71	104.94	0.11
INUNDATION	400	255.07	HWM6	160	252.95	257.53		257.56	0.000122	0.8	111.55	226.83	109.09	0.14
INUNDATION	210		HWM6	160	255.3	257.02	257.02	257.51	0.021227	2.42	61.67	57.47	60.76	0.63
INUNDATION	209		HWM6	160	254	256.6	255.63	256.76	0.001664	1.84	59.1	91.76	57.99	0.41
INUNDATION	208		HWM6	160	251	256.68	253.84	256.72	0.000181	0.84	78.49	199.07	76.04	0.14
INUNDATION	207		HWM6	160	251.5	256.67	253.93	256.71	0.000164	0.89	74.2	186.66	72.59	0.16
INUNDATION	206		HWM6	160	252.5	256.64	254.44	256.7	0.000465	1.11	62.28	145.79	61.2	0.22
INUNDATION	205		HWM6	160	253	256.65	254.36	256.69	0.000183	0.93	61.48	172.57	60.1	0.17
INUNDATION	204		HWM6	160	251.5	256.67	252.85	256.68	0.000037	0.53	79.05	306.9	77.56	0.08
INUNDATION	203		HWM6	160	253.5	256.63	255.28	256.68	0.000553	1	83.19	160.22	82.51	0.23
INUNDATION	202		HWM6	160	255.05	256.44	256.08	256.65	0.023638	2.01	67.36	79.61	66.86	0.59
INUNDATION	201	0.00	HWM6	160	254	256.2	255.66	256.52	0.026462	2.48	37.63	64.63	36.65	0.6
INUNDATION	200	-57.55	HWM6	160	253.2	255.42	255.42	256.12	0.038214	3.14	39.01	45.76	37.98	0.8
INUNDATION	132	-135.53	HWM6	160	247.5	253.42	250.06	253.49	0.000193	1.14	42.16	143.75	35.4	0.17
INUNDATION	131	-151.32	HWM6	160	249.23	253.4		253.48	0.000303	1.29	45.33	130.26	41.56	0.22
INUNDATION	130	-199.19	HWM6	160	250.3	253.11		253.43	0.001963	2.52	35.11	67.27	33.71	0.53
INUNDATION	129	-267.07	HWM6	160	249.39	253.21		253.31	0.000435	1.38	48.31	119.79	46.38	0.26
INUNDATION	128	-310.91	HWM6	160	249.14	253.09		253.27	0.000832	1.92	35.9	88.15	33.55	0.36
INUNDATION	127	-355.17	HWM6	160	249.13	253.11		253.22	0.000497	1.51	48	118.18	46.19	0.28
INUNDATION	126	-406.75	HWM6	160	247.47	253.15		253.19	0.000172	0.85	71.3	188.58	68.65	0.16
INUNDATION	125	-450.39	HWM6	160	248.3	253.08		253.17	0.00043	1.31	46.82	121.8	43.86	0.25
INUNDATION	124	-512.31	HWM6	160	248.4	253.05		253.14	0.000445	1.34	45.55	119.34	43.12	0.26
INUNDATION	123	-561.32	HWM6	160	249	252.92		253.1	0.001154	1.86	40.62	85.81	38.83	0.4
INUNDATION	122	-644.31	HWM6	160	249.1	252.83		253.01	0.001144	1.88	41.44	85.51	39.58	0.4
INUNDATION	121	-659.97	HWM6	160	247.65	251.67	251.67	252.87	0.008475	5.66	34.65	56.82	29.25	1.01
INUNDATION	120	-675.22	HWM6	160	246.58	249.27	250.14	252.34	0.053699	7.76	20.45	20.61	18.73	2.36
INUNDATION	119	-698.11	HWM6	160	246.64	248.98	249.59	250.96	0.03984	6.23	28.31	25.67	27.06	2.04
INUNDATION	118	-759.15	HWM6	160	246.5	250.44	247.36	250.45	0.000045	0.54	107.21	337.8	104.61	0.09
INUNDATION	116	-849.58	HWM6	160	246.9	250.44		250.45	0.000031	0.39	145.51	412.29	144.78	0.07
INUNDATION	115	-916.21	HWM6	160	246.93	250.44		250.44	0.000022	0.34	166.6	482.35	165.71	0.06
INUNDATION	114	-939.43	HWM6	160	246.85	250.44		250.44	0.000029	0.38	175.12	441.4	173.55	0.07
INUNDATION	112	-1092.32	HWM6	160	246.85	250.43		250.44	0.000041	0.46	128.47	363.31	125.63	0.08
INUNDATION	110	-1232.26	HWM6	160	246.9	250.42		250.43	0.000041	0.46	125.44	359.23	121.63	0.08
INUNDATION	109	-1281.15	HWM6	160	246.95	250.38		250.42	0.000208	0.87	78.87	184.71	77.84	0.18
INUNDATION	108	-1325.95	HWM6	160	246.95	250.38		250.41	0.000122	0.75	106.01	225.04	104.75	0.14
INUNDATION	106	-1483.86	HWM6	160	246.95	250.36		250.39	0.000136	0.79	92.53	209.01	91.25	0.15
INUNDATION	104	-1626.58	HWM6	160	246.95	250.34		250.37	0.00012	0.75	78.89	215.53	77.67	0.14
INUNDATION	100	-1924.13	HWM6	160	246.9	250.26		250.32	0.000265	1.11	73.67	154.13	72.37	0.21
INUNDATION	10		HWM6	160	246.9	248.55		248.91	0.004697	2.65	48.68	60.41	48.23	0.75
INUNDATION	9		HWM6	160	246.9	248.54		248.9	0.004813	2.67	48.62	59.96	48.18	0.76
INUNDATION	8		HWM6	160	246.9	248.53		248.9	0.004938	2.69	48.56	59.5	48.12	0.77
INUNDATION	7		HWM6	160	246.9	248.52		248.89	0.005073	2.71	48.5	59.02	48.06	0.78
INUNDATION	6		HWM6	160	246.9	248.51		248.89	0.005219	2.73	48.43	58.52	47.99	0.79
INUNDATION	5		HWM6	160	246.9	248.5		248.89	0.005376	2.76	48.36	58	47.93	0.8
INUNDATION	4		HWM6	160	246.9	248.48		248.88	0.005566	2.79	48.3	57.37	47.87	0.81
INUNDATION	3		HWM6	160	246.9	248.47		248.88	0.005778	2.82	48.23	56.69	47.81	0.83
INUNDATION	2		HWM6	160	246.9	248.45	248.32	248.87	0.006059	2.86	48.15	55.85	47.74	0.85
INUNDATION	1		HWM6	160	246.9	248.32	248.32	248.85	0.008797	3.22	47.53	49.69	47.18	1

Site #12- Wanatango Falls  
 Existing Conditions  
 Long Term Average Flow (LTAF) Results

Reach	River Sta	Station (m)	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	W.P. Total (m)	Flow Area (m2)	Top Width (m)	Froude # Chl
INUNDATION	590	9838.37	LTAF	33.2	257.99	259.35	258.75	259.42	0.001185	1.22	33.86	27.34	33.09	0.37
INUNDATION	585	9725.03	LTAF	33.2	257.99	259.34		259.36	0.000193	0.52	55.61	63.94	55.18	0.15
INUNDATION	580	9417.52	LTAF	33.2	257.99	259.27		259.29	0.000258	0.57	52.53	58.04	52.09	0.17
INUNDATION	575	9157.30	LTAF	33.2	258	259.18		259.2	0.000422	0.69	49.51	48.42	49.24	0.22
INUNDATION	570	8719.18	LTAF	33.2	257.75	258.98		259.01	0.000463	0.72	45.05	45.8	44.68	0.23
INUNDATION	565	8471.34	LTAF	33.2	257.5	258.72		258.81	0.00161	1.33	25.4	25.05	24.71	0.42
INUNDATION	560	8157.24	LTAF	33.2	257.14	258.12		258.21	0.002258	1.36	30.75	24.43	30.25	0.48
INUNDATION	555	8128.96	LTAF	33.2	256.9	258.15		258.17	0.00031	0.61	52.65	54.67	52.25	0.19
INUNDATION	550	7714.86	LTAF	33.2	256.2	258.12		258.12	0.000055	0.33	63.32	99.38	62.51	0.08
INUNDATION	545	7133.29	LTAF	33.2	255.8	258.09		258.09	0.000046	0.34	52.25	96.83	51.06	0.08
INUNDATION	540	6945.49	LTAF	33.2	255.6	258.08		258.09	0.000023	0.26	63.3	128.83	61.83	0.06
INUNDATION	535	5943.13	LTAF	33.2	255.25	258.07		258.07	0.000011	0.19	75.68	174.71	74.17	0.04
INUNDATION	530	5542.65	LTAF	33.2	255.1	258.07		258.07	0.000007	0.16	84.94	210.37	83.19	0.03
INUNDATION	525	5193.91	LTAF	33.2	255.1	258.06		258.06	0.000009	0.18	74.38	180.23	72.54	0.04
INUNDATION	520	4817.81	LTAF	33.2	255	258.06		258.06	0.000016	0.24	55.99	137.2	53.81	0.05
INUNDATION	515	4609.87	LTAF	33.2	254.7	258.06		258.06	0.000008	0.19	65.7	177.43	63.41	0.04
INUNDATION	510	4151.21	LTAF	33.2	254.7	258.05		258.05	0.000006	0.15	79.41	216.6	77.5	0.03
INUNDATION	505	3625.48	LTAF	33.2	254.7	258.05		258.05	0.000007	0.17	71.07	192.69	68.85	0.03
INUNDATION	500	3329.19	LTAF	33.2	254.7	258.05		258.05	0.000009	0.19	76.54	175.26	74.31	0.04
INUNDATION	439	3058.07	LTAF	33.2	254.7	258.04		258.05	0.000009	0.19	64.49	172.99	62.25	0.04
INUNDATION	437	2860.26	LTAF	33.2	254.7	258.04		258.04	0.00001	0.2	61.96	164.45	59.94	0.04
INUNDATION	425	1966.87	LTAF	33.2	254.7	258.04		258.04	0.000004	0.13	92.53	252.72	90.84	0.03
INUNDATION	418	1341.65	LTAF	33.2	254.7	258.03		258.04	0.000007	0.17	70.54	189.85	68.51	0.03
INUNDATION	415	1042.96	LTAF	33.2	254.72	258.03		258.03	0.000007	0.17	71.08	189.82	69.18	0.03
INUNDATION	413	933.65	LTAF	33.2	253	258.02		258.03	0.000041	0.37	39.47	90.12	35.38	0.07
INUNDATION	412	855.13	LTAF	33.2	251.76	258.03		258.03	0.000004	0.15	74.99	228.63	71.56	0.03
INUNDATION	411.5	822.18	LTAF	33.2	257.2	257.94		258.02	0.002989	0.92	52.88	27.39	52.35	0.49
INUNDATION	411	789.59	LTAF	33.2	256.9	257.64	257.64	257.81	0.012174	1.96	52.66	18.24	52.25	1
INUNDATION	410.5	757.80	LTAF	33.2	255.25	255.86	256.17	257	0.090116	4.74	21.5	7.01	21.27	2.64
INUNDATION	410	722.91	LTAF	33.2	252.7	256.4	253.9	256.4	0.00001	0.18	81.01	184.27	79.52	0.04
INUNDATION	408	589.92	LTAF	33.2	249.79	256.4		256.4	0.000001	0.07	112.49	445.96	108.87	0.01
INUNDATION	405	404.09	LTAF	33.2	251.76	256.4		256.4	0.000004	0.14	81.73	239.86	80	0.03
INUNDATION	403	340.41	LTAF	33.2	251.7	256.4		256.4	0.000003	0.12	91.73	268.26	90.33	0.02
INUNDATION	402	310.37	LTAF	33.2	251.65	256.4		256.4	0.000007	0.18	78.69	189.44	76.5	0.03
INUNDATION	401	278.86	LTAF	33.2	251.65	256.4		256.4	0.000008	0.2	73.95	174.84	71.63	0.04
INUNDATION	400	255.07	LTAF	33.2	252.95	256.39		256.4	0.000022	0.26	73.08	132.25	71.78	0.06
INUNDATION	210		LTAF	33.2	255.3	256.15	256.15	256.37	0.050682	2.06	38.18	16.13	37.96	0.82
INUNDATION	209		LTAF	33.2	254	255.67		255.7	0.000325	0.72	35.62	46.35	35.25	0.2
INUNDATION	208		LTAF	33.2	251	255.69	252.36	255.69	0.00002	0.25	53.95	131.87	52.47	0.05
INUNDATION	207		LTAF	33.2	251.5	255.69	252.67	255.69	0.000021	0.27	54.06	124.27	53.2	0.06
INUNDATION	206		LTAF	33.2	252.5	255.68	253.37	255.69	0.000043	0.35	46.63	94.5	46.01	0.08
INUNDATION	205		LTAF	33.2	253	255.68	253.6	255.69	0.000027	0.28	56.34	117	55.4	0.06
INUNDATION	204		LTAF	33.2	251.5	255.68	252.04	255.69	0.000004	0.14	73.39	233.28	72.31	0.03
INUNDATION	203		LTAF	33.2	253.5	255.68	254.49	255.68	0.000115	0.39	75.67	85.6	75.44	0.12
INUNDATION	202		LTAF	33.2	255.05	255.51	255.51	255.67	0.114449	1.74	62.29	19.09	62.27	1
INUNDATION	201	0.00	LTAF	33.2	254	254.87	254.75	255.04	0.065777	1.83	30.53	18.19	30.4	0.75
INUNDATION	200	-57.55	LTAF	33.2	253.2	254.22	254.22	254.6	0.100741	2.71	16.77	12.23	16.43	1
INUNDATION	132	-135.53	LTAF	33.2	247.5	251.59	248.87	251.6	0.000045	0.4	35.79	83.92	30.26	0.08
INUNDATION	131	-151.32	LTAF	33.2	249.23	251.58		251.59	0.000154	0.56	37.59	58.94	35.57	0.14
INUNDATION	130	-199.19	LTAF	33.2	250.3	251.34		251.55	0.005998	2.06	22.75	16.16	22.13	0.77
INUNDATION	129	-267.07	LTAF	33.2	249.39	251.39		251.42	0.000493	0.78	39.67	42.71	38.82	0.24
INUNDATION	128	-310.91	LTAF	33.2	249.14	251.34		251.39	0.000776	1.01	30.37	33.1	29.31	0.3
INUNDATION	127	-355.17	LTAF	33.2	249.13	251.32		251.36	0.000497	0.81	39.11	41.39	38.28	0.24
INUNDATION	126	-406.75	LTAF	33.2	247.47	251.33		251.34	0.000084	0.41	52.94	81.4	50.89	0.1
INUNDATION	125	-450.39	LTAF	33.2	248.3	251.31		251.33	0.000293	0.67	38.41	49.27	36.77	0.19
INUNDATION	124	-512.31	LTAF	33.2	248.4	251.29		251.31	0.000301	0.68	38.24	48.79	36.73	0.19
INUNDATION	123	-561.32	LTAF	33.2	249	251.2		251.28	0.001741	1.27	30.05	28.18	28.95	0.43
INUNDATION	122	-644.31	LTAF	33.2	249.1	250.68	250.68	250.96	0.011496	2.33	27.21	14.28	26.47	1.01
INUNDATION	121	-659.97	LTAF	33.2	247.65	249.62	249.95	250.65	0.021025	4.5	16.18	8.05	14.05	1.34
INUNDATION	120	-675.22	LTAF	33.2	246.58	247.77	248.41	250.01	0.062863	6.64	7.07	5	6.37	2.39
INUNDATION	119	-698.11	LTAF	33.2	246.64	248.62	248.38	248.82	0.005027	1.97	22.2	16.87	21.17	0.7
INUNDATION	118	-759.15	LTAF	33.2	246.5	248.76		248.76	0.000014	0.21	97.86	168.07	96.24	0.05
INUNDATION	116	-849.58	LTAF	33.2	246.9	248.75		248.76	0.000017	0.18	126.75	186.14	126.37	0.05
INUNDATION	115	-916.21	LTAF	33.2	246.93	248.75		248.75	0.000012	0.15	150.8	220.08	150.42	0.04
INUNDATION	114	-939.43	LTAF	33.2	246.85	248.75		248.75	0.000017	0.18	131.97	190.21	131.1	0.05
INUNDATION	112	-1092.32	LTAF	33.2	246.85	248.75		248.75	0.000022	0.21	112.78	163.69	111.66	0.05
INUNDATION	110	-1232.26	LTAF	33.2	246.9	248.75		248.75	0.000023	0.21	113.49	163.43	112.06	0.05
INUNDATION	109	-1281.15	LTAF	33.2	246.95	248.73		248.74	0.000154	0.46	61.46	72.17	61.02	0.14
INUNDATION	108	-1325.95	LTAF	33.2	246.95	248.73		248.74	0.000071	0.35	68.07	94.96	67.58	0.09
INUNDATION	106	-1483.86	LTAF	33.2	246.95	248.72		248.73	0.000077	0.36	66	91.42	65.49	0.1
INUNDATION	104	-1626.58	LTAF	33.2	246.95	248.71		248.72	0.000069	0.34	69.8	96.52	69.26	0.09
INUNDATION	100	-1924.13	LTAF	33.2	246.9	248.67		248.69	0.000147	0.5	49.51	66.51	49	0.14
INUNDATION	10		LTAF	33.2	246.9	247.71		247.83	0.004576	1.5	41.05	22.19	40.88	0.65
INUNDATION	9		LTAF	33.2	246.9	247.71		247.82	0.004754	1.52	40.9	21.9	40.74	0.66
INUNDATION	8		LTAF	33.2	246.9	247.7		247.82	0.004953	1.54	40.75	21.6	40.58	0.67
INUNDATION	7		LTAF	33.2	246.9	247.69		247.81	0.005175	1.56	40.59	21.29	40.42	0.69
INUNDATION	6		LTAF	33.2	246.9	247.68		247.81	0.005425	1.58	40.41	20.95	40.25	0.7
INUNDATION	5		LTAF	33.2	246.9	247.67		247.81	0.005751	1.62	40.2	20.55	40.04	0.72
INUNDATION	4		LTAF	33.2	246.9	247.66		247.8	0.00614	1.65	39.97	20.1	39.81	0.74
INUNDATION	3		LTAF	33.2	246.9	247.65		247.79	0.00662	1.69	39.71	19.6	39.55	0.77
INUNDATION	2		LTAF	33.2	246.9	247.63		247.79	0.007359	1.75	39.4	18.93	39.25	0.81
INUNDATION	1		LTAF	33.2	246.9	247.56	247.56	247.77	0.012069	2.06	38.3	16.13	38.15	1.01

Site #12- Wanatango Falls  
Existing Conditions  
Validation Results

Reach	River Sta	Station (m)	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	W.P. Total (m)	Flow Area (m2)	Top Width (m)	Froude # Chl
INUNDATION	590	9838.37	VALID-REV	5	257.99	258.57	258.27	258.59	0.000671	0.51	21.34	9.76	21.02	0.24
INUNDATION	585	9725.03	VALID-REV	5	257.99	258.55		258.56	0.000127	0.22	48.95	22.4	48.84	0.11
INUNDATION	580	9417.52	VALID-REV	5	257.99	258.51		258.51	0.000193	0.26	46.97	19.45	46.87	0.13
INUNDATION	575	9157.30	VALID-REV	5	258	258.43		258.43	0.000491	0.36	41.4	13.97	41.31	0.2
INUNDATION	570	8719.18	VALID-REV	5	257.75	258.21		258.21	0.000501	0.37	38.13	13.44	38	0.2
INUNDATION	565	8471.34	VALID-REV	5	257.5	258.03		258.04	0.000967	0.56	22.1	8.87	21.8	0.28
INUNDATION	560	8157.24	VALID-REV	5	257.14	257.5		257.53	0.003382	0.76	27.09	6.61	26.9	0.49
INUNDATION	555	8128.96	VALID-REV	5	256.9	257.51		257.51	0.000119	0.22	46.92	22.48	46.75	0.1
INUNDATION	550	7714.86	VALID-REV	5	256.2	257.5		257.5	0.000005	0.08	59.17	62.16	58.68	0.02
INUNDATION	545	7133.29	VALID-REV	5	255.8	257.5		257.5	0.000003	0.07	49.47	67.46	48.6	0.02
INUNDATION	540	6945.49	VALID-REV	5	255.6	257.5		257.5	0.000001	0.05	60.69	93.21	59.69	0.01
INUNDATION	535	5943.13	VALID-REV	5	255.25	257.5		257.5	0.000001	0.04	72.86	132.92	71.74	0.01
INUNDATION	530	5542.65	VALID-REV	5	255.1	257.5		257.5	0	0.03	83.31	163.46	82.11	0.01
INUNDATION	525	5193.91	VALID-REV	5	255.1	257.5		257.5	0	0.04	71.8	139.69	70.45	0.01
INUNDATION	520	4817.81	VALID-REV	5	255	257.5		257.5	0.000001	0.05	53.87	107.45	52.17	0.01
INUNDATION	515	4609.87	VALID-REV	5	254.7	257.5		257.5	0	0.04	63.6	142.43	61.78	0.01
INUNDATION	510	4151.21	VALID-REV	5	254.7	257.5		257.5	0	0.03	77.06	174	75.54	0.01
INUNDATION	505	3625.48	VALID-REV	5	254.7	257.5		257.5	0	0.03	68.94	155.05	67.2	0.01
INUNDATION	500	3329.19	VALID-REV	5	254.7	257.5		257.5	0	0.04	63.04	141.01	61.25	0.01
INUNDATION	439	3058.07	VALID-REV	5	254.7	257.5		257.5	0	0.04	62.34	139.36	60.53	0.01
INUNDATION	437	2860.26	VALID-REV	5	254.7	257.5		257.5	0	0.04	59.68	132.24	57.99	0.01
INUNDATION	425	1966.87	VALID-REV	5	254.7	257.5		257.5	0	0.02	89.92	204.09	88.58	0.01
INUNDATION	418	1341.85	VALID-REV	5	254.7	257.5		257.5	0	0.03	68.37	153.46	66.74	0.01
INUNDATION	415	1042.36	VALID-REV	5	254.72	257.5		257.5	0	0.03	68.81	153.26	67.25	0.01
INUNDATION	413	933.65	VALID-REV	5	253	257.5		257.5	0.000002	0.07	37.27	72	33.57	0.02
INUNDATION	412	855.13	VALID-REV	5	251.76	257.5		257.5	0	0.03	72.06	191.4	68.93	0.01
INUNDATION	411.5	822.18	VALID-REV	5	257.2	257.47		257.49	0.001968	0.38	27.97	7.18	27.63	0.33
INUNDATION	411	789.59	VALID-REV	5	256.9	257.21	257.21	257.32	0.016419	1.28	17.81	3.47	17.59	1
INUNDATION	410.5	757.80	VALID-REV	5	255.25	255.55	255.69	256.21	0.209845	3.58	12.27	1.4	12.14	3.37
INUNDATION	410	722.91	VALID-REV	5	252.7	255.75	253.37	255.75	0.000001	0.04	76.83	134.16	75.56	0.01
INUNDATION	408	589.92	VALID-REV	5	249.79	255.75		255.75	0	0.01	109.81	376.17	106.58	0.01
INUNDATION	405	404.09	VALID-REV	5	251.76	255.75		255.75	0	0.03	77.47	188.96	76.15	0
INUNDATION	403	340.41	VALID-REV	5	251.7	255.75		255.75	0	0.02	85.37	211.66	84.12	0
INUNDATION	402	310.37	VALID-REV	5	251.65	255.75		255.75	0	0.03	58.99	145.79	57.23	0.01
INUNDATION	401	278.86	VALID-REV	5	251.65	255.75		255.75	0	0.04	54.58	134.25	52.69	0.01
INUNDATION	400	255.07	VALID-REV	5	252.95	255.75		255.75	0.000001	0.05	53.74	91.67	52.79	0.01
INUNDATION	210		VALID-REV	5	255.3	255.63	255.63	255.74	0.105416	1.5	14.72	3.34	14.67	1
INUNDATION	209		VALID-REV	5	254	255.28	254.19	255.29	0.000019	0.15	32.15	33.38	31.86	0.05
INUNDATION	208		VALID-REV	5	251	255.29	251.48	255.29	0.000001	0.04	51.54	111.3	50.23	0.01
INUNDATION	207		VALID-REV	5	251.5	255.29	251.95	255.29	0.000001	0.05	50.88	103.47	50.16	0.01
INUNDATION	206		VALID-REV	5	252.5	255.29	252.78	255.29	0.000002	0.06	42.92	76.96	42.39	0.02
INUNDATION	205		VALID-REV	5	253	255.29	253.19	255.29	0.000001	0.05	53.82	95.39	53.06	0.01
INUNDATION	204		VALID-REV	5	251.5	255.29	251.66	255.29	0	0.02	71.01	204.87	70.07	0
INUNDATION	203		VALID-REV	5	253.5	255.28	253.97	255.29	0.000009	0.09	69.31	56.83	69.2	0.03
INUNDATION	202		VALID-REV	5	255.05	255.22	255.22	255.28	0.193807	1.11	35.19	4.48	35.18	1
INUNDATION	201	0.00	VALID-REV	5	254	254.29	254.25	254.36	0.107748	1.22	18.21	4.11	18.18	0.82
INUNDATION	200	-57.55	VALID-REV	5	253.2	253.56	253.56	253.69	0.150269	1.65	10.96	3.04	10.89	1
INUNDATION	132	-135.53	VALID-REV	5	247.5	250.81	248.26	250.81	0.000003	0.08	33.08	61	28.3	0.02
INUNDATION	131	-151.32	VALID-REV	5	249.23	250.81		250.81	0.000022	0.15	33.71	32.66	32.2	0.05
INUNDATION	130	-199.19	VALID-REV	5	250.3	250.68	250.68	250.79	0.015667	1.48	15.95	3.37	15.51	1.01
INUNDATION	129	-267.07	VALID-REV	5	249.39	250.28	249.89	250.31	0.001012	0.73	11.85	6.82	11.59	0.31
INUNDATION	128	-310.91	VALID-REV	5	249.14	250.24		250.27	0.000878	0.77	9.39	6.48	8.91	0.29
INUNDATION	127	-355.17	VALID-REV	5	249.13	250.21		250.23	0.00057	0.62	11.58	8.02	11.19	0.23
INUNDATION	126	-406.75	VALID-REV	5	247.47	250.22		250.22	0.000018	0.16	26.29	31.52	24.81	0.04
INUNDATION	125	-450.39	VALID-REV	5	248.3	250.22		250.22	0.000113	0.34	16.1	14.88	15.07	0.11
INUNDATION	124	-512.31	VALID-REV	5	248.4	250.21		250.21	0.000117	0.34	15.73	14.58	14.83	0.11
INUNDATION	123	-561.32	VALID-REV	5	249	250.15		250.2	0.001319	0.95	7.51	5.25	6.88	0.35
INUNDATION	122	-644.31	VALID-REV	5	249.1	249.72	249.72	249.93	0.012543	2.02	6.19	2.47	5.97	1
INUNDATION	121	-659.97	VALID-REV	5	247.65	248.24	248.57	249.42	0.083865	4.82	2.94	1.04	2.51	2.39
INUNDATION	120	-675.22	VALID-REV	5	246.58	247.82	247.27	247.86	0.00121	0.94	7.29	5.32	6.55	0.33
INUNDATION	119	-698.11	VALID-REV	5	246.64	247.79		247.83	0.001233	0.93	7.53	5.36	7	0.34
INUNDATION	118	-759.15	VALID-REV	5	246.5	247.82		247.82	0.000002	0.06	75.54	89.27	74.55	0.02
INUNDATION	116	-849.58	VALID-REV	5	246.9	247.82		247.82	0.000008	0.07	114.31	71.01	114.23	0.03
INUNDATION	115	-916.21	VALID-REV	5	246.93	247.82		247.82	0.000007	0.06	137.04	82.16	136.98	0.03
INUNDATION	114	-939.43	VALID-REV	5	246.85	247.82		247.82	0.000008	0.07	114.76	73.42	114.47	0.03
INUNDATION	112	-1092.32	VALID-REV	5	246.85	247.82		247.82	0.00001	0.08	99.59	64.41	99.28	0.03
INUNDATION	110	-1232.26	VALID-REV	5	246.9	247.81		247.81	0.000012	0.08	103.2	61.91	102.95	0.03
INUNDATION	109	-1281.15	VALID-REV	5	246.95	247.81		247.81	0.000081	0.21	41.5	24.02	41.34	0.09
INUNDATION	108	-1325.95	VALID-REV	5	246.95	247.81		247.81	0.000039	0.14	60.1	34.77	59.99	0.06
INUNDATION	106	-1483.86	VALID-REV	5	246.95	247.8		247.8	0.000042	0.15	58.14	33.34	58.02	0.06
INUNDATION	104	-1626.58	VALID-REV	5	246.95	247.8		247.8	0.000038	0.14	61.9	35.23	61.79	0.06
INUNDATION	100	-1924.13	VALID-REV	5	246.9	247.78		247.78	0.000073	0.2	42.37	25.02	42.2	0.08
INUNDATION	10		VALID-REV	5	246.9	247.32		247.35	0.003089	0.66	35.28	7.55	35.23	0.46
INUNDATION	9		VALID-REV	5	246.9	247.32		247.34	0.003285	0.68	35.23	7.4	35.18	0.47
INUNDATION	8		VALID-REV	5	246.9	247.32		247.34	0.003515	0.69	35.19	7.25	35.14	0.48
INUNDATION	7		VALID-REV	5	246.9	247.31		247.34	0.003791	0.71	35.14	7.09	35.09	0.5
INUNDATION	6		VALID-REV	5	246.9	247.31		247.33	0.004128	0.72	35.08	6.9	35.03	0.52
INUNDATION	5		VALID-REV	5	246.9	247.3		247.33	0.004557	0.75	35.02	6.7	34.97	0.54
INUNDATION	4		VALID-REV	5	246.9	247.29		247.32	0.005127	0.77	34.95	6.46	34.9	0.57
INUNDATION	3		VALID-REV	5	246.9	247.28		247.32	0.005938	0.81	34.86	6.17	34.82	0.61
INUNDATION	2		VALID-REV	5	246.9	247.27		247.31	0.007307	0.87	34.46	5.77	34.42	0.67
INUNDATION	1		VALID-REV	5	246.9	247.23	247.23	247.3	0.016752	1.13	32.75	4.41	32.72	0.99

Site #12- Wanatango Falls  
Proposed Conditions  
2-year Flow Results

Proposed Weir Crest Elevation @ 257.50m

Reach	River Sta	Station (m)	Profile	Q Total (m <sup>3</sup> /s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	W.P. Total (m)	Flow Area (m <sup>2</sup> )	Top Width (m)	Froude # Chl
INUNDATION	590	9838.37	2-YEAR	180.7	257.99	261.06	260.04	261.32	0.001295	2.36	56.93	110.86	55.72	0.45
INUNDATION	585	9725.03	2-YEAR	180.7	257.99	261.14		261.2	0.000268	1.13	69.44	175.16	68.21	0.21
INUNDATION	580	9417.52	2-YEAR	180.7	257.99	261.04		261.11	0.000317	1.19	64.99	158.98	63.96	0.22
INUNDATION	575	9157.30	2-YEAR	180.7	258	260.92		261.01	0.000431	1.35	61.11	144.16	60.29	0.26
INUNDATION	570	8719.18	2-YEAR	180.7	257.75	260.7		260.81	0.000511	1.46	52.68	128.35	51.48	0.28
INUNDATION	565	8471.34	2-YEAR	180.7	257.5	260.29		260.58	0.00171	2.51	63.51	104.65	62.11	0.5
INUNDATION	560	8157.24	2-YEAR	180.7	257.14	259.83		260.07	0.001416	2.22	56.81	94.98	54.52	0.45
INUNDATION	555	8128.96	2-YEAR	180.7	256.9	259.93		260.01	0.000335	1.21	68.07	160.94	67.04	0.23
INUNDATION	550	7714.86	2-YEAR	180.7	256.2	259.88		259.91	0.000138	0.81	106.23	247.01	104.37	0.15
INUNDATION	545	7133.29	2-YEAR	180.7	255.8	259.77		259.82	0.00017	0.96	101.47	200.68	99.46	0.17
INUNDATION	540	6945.49	2-YEAR	180.7	255.6	259.76		259.79	0.000104	0.75	129.04	264.1	126.09	0.13
INUNDATION	535	5943.13	2-YEAR	180.7	255.25	259.69		259.71	0.000058	0.59	115.08	314.59	113.07	0.1
INUNDATION	530	5542.65	2-YEAR	180.7	255.1	259.68		259.69	0.00004	0.52	141.06	356.73	138.61	0.08
INUNDATION	525	5193.91	2-YEAR	180.7	255.1	259.65		259.67	0.000055	0.61	96.52	301.18	93.87	0.1
INUNDATION	520	4817.81	2-YEAR	180.7	255	259.61		259.64	0.0001	0.81	119.27	230.59	116.17	0.13
INUNDATION	515	4609.87	2-YEAR	180.7	254.7	259.6		259.62	0.000058	0.65	86.65	280.61	83.26	0.1
INUNDATION	510	4151.21	2-YEAR	180.7	254.7	259.59		259.6	0.000039	0.54	101.34	342.49	98.73	0.08
INUNDATION	505	3625.48	2-YEAR	180.7	254.7	259.56		259.58	0.00005	0.61	133.06	302.79	129.84	0.09
INUNDATION	500	3329.19	2-YEAR	180.7	254.7	259.54		259.56	0.00006	0.66	100.22	303.44	96.97	0.1
INUNDATION	439	3058.07	2-YEAR	180.7	254.7	259.52		259.54	0.000065	0.67	147.55	271.43	144.44	0.11
INUNDATION	437	2860.26	2-YEAR	180.7	254.7	259.5		259.53	0.000072	0.71	97.84	257.03	95.22	0.11
INUNDATION	425	1966.87	2-YEAR	180.7	254.7	259.47		259.49	0.00003	0.47	116	391.77	113.75	0.07
INUNDATION	418	1341.85	2-YEAR	180.7	254.7	259.44		259.46	0.000056	0.63	100.82	300.14	98.09	0.1
INUNDATION	415	1042.36	2-YEAR	180.7	254.72	259.42		259.44	0.000056	0.63	120.95	307.36	118.38	0.1
INUNDATION	413	933.65	2-YEAR	180.7	253	259.34		259.42	0.000345	1.26	48.89	142.87	44.41	0.23
INUNDATION	412	855.13	2-YEAR	180.7	251.76	259.38		259.4	0.000039	0.56	81.29	328.92	77.13	0.08
INUNDATION	411.5	822.18	2-YEAR	180.7	257.2	258.77	258.7	259.34	0.015293	4.2	78.3	79.1	77.39	1.31
INUNDATION	411	789.59	2-YEAR	180.7	256.9	258.93		259.08	0.001602	1.78	83.66	107.54	82.61	0.45
INUNDATION	410.5	757.80	2-YEAR	180.7	255.25	258.95		259.04	0.000407	1.35	81.3	151.21	79.61	0.25
INUNDATION	410	722.91	2-YEAR	180.7	252.7	259		259.01	0.000022	0.45	165.07	482.51	163.14	0.06
INUNDATION	408	589.92	2-YEAR	180.7	249.79	259.01		259.01	0.000004	0.24	194.29	819.57	189.53	0.03
INUNDATION	405	404.09	2-YEAR	180.7	251.76	259		259.01	0.000016	0.43	163.96	519.77	161.37	0.06
INUNDATION	403	340.41	2-YEAR	180.7	251.7	259		259.01	0.000012	0.35	137.69	563.59	135.55	0.05
INUNDATION	402	310.37	2-YEAR	180.7	251.65	258.99		259.01	0.000024	0.5	156.93	478.71	153.36	0.07
INUNDATION	401	278.86	2-YEAR	180.7	251.65	258.99		259.01	0.000027	0.53	172.19	482.61	168.56	0.07
INUNDATION	400	255.07	2-YEAR	180.7	252.95	258.99		259	0.000042	0.6	168.88	427.07	165.91	0.09
INUNDATION	206	221.08	2-YEAR	180.7	253	258.97		259	0.000141	0.96	208.08	456.81	202.95	0.15
INUNDATION	205	149.56	2-YEAR	180.7	252.5	258.98		258.99	0.000025	0.5	220.77	588.78	215.47	0.07
INUNDATION	204	51.14	2-YEAR	180.7	254	258.98		258.99	0.000031	0.5	295.52	652.99	291.19	0.08
INUNDATION	203	16.61	2-YEAR	130.7	253	258.4	258.4	258.85	0.012477	3.46	71.63	63.14	246.05	1.17
INUNDATION	202		Inl Struct											
INUNDATION	201	0.00	2-YEAR	130.7	254	258.29	258.29	258.75	0.01283	3.46	71.46	62.81	195.37	1.17
INUNDATION	200	-57.55	2-YEAR	180.7	253.2	255.26	255.53	256.4	0.077853	4.2	38.96	39.8	36.05	1.11
INUNDATION	132	-135.63	2-YEAR	180.7	247.5	253.42	250.21	253.51	0.000247	1.29	42.15	143.72	35.4	0.19
INUNDATION	131	-151.32	2-YEAR	180.7	249.23	253.39		253.5	0.00039	1.46	45.31	129.93	41.55	0.25
INUNDATION	130	-199.19	2-YEAR	180.7	250.3	252.94		253.42	0.003233	3.08	34.52	61.68	33.24	0.67
INUNDATION	129	-267.07	2-YEAR	180.7	249.39	253.1		253.24	0.000633	1.62	47.79	114.74	45.91	0.31
INUNDATION	128	-310.91	2-YEAR	180.7	249.14	252.91		253.18	0.001305	2.31	35.3	82.36	33.06	0.45
INUNDATION	127	-355.17	2-YEAR	180.7	249.13	252.94		253.11	0.000771	1.81	47.1	110.59	45.39	0.35
INUNDATION	126	-406.75	2-YEAR	180.7	247.47	253		253.05	0.000264	1.01	69.72	178.41	67.11	0.2
INUNDATION	125	-450.39	2-YEAR	180.7	248.3	252.9		253.03	0.00068	1.59	46.11	113.81	43.27	0.31
INUNDATION	124	-512.31	2-YEAR	180.7	248.4	252.85		252.98	0.000718	1.63	44.72	110.63	42.39	0.32
INUNDATION	123	-561.32	2-YEAR	180.7	249	252.6		252.91	0.002333	2.46	38.93	73.48	37.27	0.56
INUNDATION	122	-644.31	2-YEAR	180.7	249.2	251.8	251.8	252.53	0.008271	3.8	33.9	47.56	32.67	1.01
INUNDATION	121	-659.97	2-YEAR	180.7	246.52	250.69	251.13	252.25	0.02509	5.53	30.45	32.66	24.58	1.53
INUNDATION	120	-675.22	2-YEAR	180.7	246.58	249.6	250.25	251.72	0.038171	6.45	28.41	28.01	26.61	2.01
INUNDATION	119	-698.11	2-YEAR	180.7	246.64	250.44	249.72	250.74	0.002592	2.43	43.54	74.46	40.82	0.57
INUNDATION	118	-759.15	2-YEAR	180.7	246.5	250.63		250.64	0.000048	0.58	109.16	357.81	106.46	0.09
INUNDATION	116	-849.58	2-YEAR	180.7	246.9	250.63		250.64	0.000033	0.42	148.43	440.1	147.67	0.07
INUNDATION	115	-916.21	2-YEAR	180.7	246.93	250.63		250.63	0.000023	0.36	169.53	514.18	168.6	0.06
INUNDATION	114	-939.43	2-YEAR	180.7	246.85	250.63		250.63	0.000031	0.41	177.06	474.6	175.45	0.07
INUNDATION	112	-1092.32	2-YEAR	180.7	246.85	250.62		250.63	0.000043	0.49	132.3	387.39	129.34	0.08
INUNDATION	110	-1232.26	2-YEAR	180.7	246.9	250.61		250.62	0.000043	0.49	126.86	382.33	122.79	0.08
INUNDATION	109	-1281.15	2-YEAR	180.7	246.95	250.57		250.61	0.000208	0.91	82.26	199.4	81.19	0.18
INUNDATION	108	-1325.95	2-YEAR	180.7	246.95	250.57		250.6	0.000126	0.8	148.73	247.82	147.4	0.14
INUNDATION	106	-1483.86	2-YEAR	180.7	246.95	250.55		250.58	0.000141	0.84	96.88	226.35	95.57	0.15
INUNDATION	104	-1626.58	2-YEAR	180.7	246.95	250.53		250.56	0.000125	0.8	83.6	230.07	82.33	0.14
INUNDATION	100	-1924.13	2-YEAR	180.7	246.9	250.43		250.5	0.000277	1.18	77.98	167.35	76.56	0.21
INUNDATION	10		2-YEAR	180.7	246.9	248.64		249.04	0.004723	2.79	49.3	64.92	48.8	0.76
INUNDATION	9		2-YEAR	180.7	246.9	248.63		249.03	0.004834	2.81	49.23	64.47	48.75	0.77
INUNDATION	8		2-YEAR	180.7	246.9	248.62		249.03	0.004954	2.83	49.17	63.99	48.69	0.78
INUNDATION	7		2-YEAR	180.7	246.9	248.61		249.02	0.005082	2.85	49.1	63.49	48.62	0.79
INUNDATION	6		2-YEAR	180.7	246.9	248.6		249.02	0.00522	2.87	49.03	62.98	48.56	0.8
INUNDATION	5		2-YEAR	180.7	246.9	248.59		249.02	0.005392	2.9	48.95	62.36	48.48	0.81
INUNDATION	4		2-YEAR	180.7	246.9	248.57		249.01	0.005583	2.93	48.86	61.71	48.4	0.82
INUNDATION	3		2-YEAR	180.7	246.9	248.56		249.01	0.005825	2.97	48.75	60.92	48.3	0.84
INUNDATION	2		2-YEAR	180.7	246.9	248.54	248.42	249	0.006114	3.01	48.63	60.04	48.19	0.86
INUNDATION	1		2-YEAR	180.7	246.9	248.42	248.42	248.98	0.008556	3.34	47.97	54.1	47.58	1

Site #12- Wanatango Falls  
Proposed Conditions  
100-year Flow Results

Proposed Weir Crest Elevation @ 257.50m

Reach	River Sta	Station (m)	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	W.P. Total (m)	Flow Area (m2)	Top Width (m)	Froude # Chl
INUNDATION	590	9838.37	100-YEAR	425.2	257.99	262.74	261.2	263.19	0.001307	3.23	70.66	218.55	68.86	0.48
INUNDATION	585	9725.03	100-YEAR	425.2	257.99	262.89		263.03	0.000307	1.65	74.79	298.42	72.15	0.24
INUNDATION	580	9417.52	100-YEAR	425.2	257.99	262.79		262.93	0.000343	1.7	82.37	290.35	80.8	0.25
INUNDATION	575	9157.30	100-YEAR	425.2	258	262.64		262.82	0.000457	1.93	71.36	256.44	69.93	0.29
INUNDATION	570	8719.18	100-YEAR	425.2	257.75	262.37		262.6	0.000563	2.12	64.59	222.71	62.78	0.32
INUNDATION	565	8471.34	100-YEAR	425.2	257.5	261.88		262.35	0.001569	3.32	75.39	212.54	73.34	0.52
INUNDATION	560	8157.24	100-YEAR	425.2	257.14	261.48		261.9	0.001254	2.95	64.76	191.21	61.51	0.47
INUNDATION	555	8128.96	100-YEAR	425.2	256.9	261.65		261.8	0.000366	1.74	76.89	283.58	75	0.26
INUNDATION	550	7714.86	100-YEAR	425.2	256.2	261.63		261.68	0.000133	1.07	298.98	683.13	296.71	0.16
INUNDATION	545	7133.29	100-YEAR	425.2	255.8	261.5		261.59	0.000196	1.35	198.38	501.26	196.05	0.19
INUNDATION	540	6945.49	100-YEAR	425.2	255.6	261.49		261.55	0.000129	1.1	169.43	519.52	166.18	0.16
INUNDATION	535	5943.13	100-YEAR	425.2	255.25	261.4		261.44	0.000083	0.91	215.64	593.39	213.52	0.13
INUNDATION	530	5542.65	100-YEAR	425.2	255.1	261.38		261.41	0.000062	0.82	192.48	652.27	189.8	0.11
INUNDATION	525	5193.91	100-YEAR	425.2	255.1	261.34		261.38	0.000088	0.97	171.82	537.62	169.06	0.13
INUNDATION	520	4817.81	100-YEAR	425.2	255	261.26		261.34	0.000158	1.28	133.52	434.37	129.99	0.17
INUNDATION	515	4609.87	100-YEAR	425.2	254.7	261.25		261.3	0.000102	1.07	147.91	488.76	143.93	0.14
INUNDATION	510	4151.21	100-YEAR	425.2	254.7	261.22		261.26	0.000069	0.89	166.38	572.03	163.53	0.12
INUNDATION	505	3625.48	100-YEAR	425.2	254.7	261.17		261.22	0.000087	0.99	202.77	577.83	199.27	0.13
INUNDATION	500	3329.19	100-YEAR	425.2	254.7	261.13		261.19	0.000106	1.08	172.38	532.23	168.73	0.14
INUNDATION	439	3058.07	100-YEAR	425.2	254.7	261.1		261.16	0.00011	1.09	184.19	536.66	180.47	0.15
INUNDATION	437	2860.26	100-YEAR	425.2	254.7	261.07		261.14	0.000131	1.19	117.1	423.72	114.14	0.16
INUNDATION	425	1966.87	100-YEAR	425.2	254.7	261.02		261.05	0.000057	0.79	142.33	593.69	139.76	0.11
INUNDATION	418	1341.65	100-YEAR	425.2	254.7	260.95		260.9	0.000105	1.06	124.97	470.59	121.86	0.14
INUNDATION	415	1042.36	100-YEAR	425.2	254.72	260.92		260.97	0.000103	1.05	140.37	500.45	137.38	0.14
INUNDATION	413	933.65	100-YEAR	425.2	253	260.72		260.93	0.000581	2.06	69.98	218.7	65.27	0.31
INUNDATION	412	855.13	100-YEAR	425.2	251.76	260.82		260.87	0.000085	0.99	115.45	466.89	110.88	0.13
INUNDATION	411.5	822.18	100-YEAR	425.2	257.2	260.27		260.81	0.004518	4.13	133.3	233.83	132.02	0.83
INUNDATION	411	789.59	100-YEAR	425.2	256.9	260.51		260.63	0.000695	1.87	152.82	293.99	150.65	0.34
INUNDATION	410.5	757.80	100-YEAR	425.2	255.25	260.42		260.61	0.000509	1.99	143.86	311.54	140.28	0.3
INUNDATION	410	722.91	100-YEAR	425.2	252.7	260.53		260.56	0.000046	0.77	175.53	737.48	173.11	0.1
INUNDATION	408	589.92	100-YEAR	425.2	249.79	260.54		260.55	0.000012	0.46	204.36	1116.06	199.07	0.05
INUNDATION	405	404.09	100-YEAR	425.2	251.76	260.51		260.54	0.000038	0.78	179.68	776.96	176.59	0.09
INUNDATION	403	340.41	100-YEAR	425.2	251.7	260.52		260.54	0.000028	0.64	146.49	774.96	143.78	0.08
INUNDATION	402	310.37	100-YEAR	425.2	251.65	260.5		260.53	0.000054	0.89	171.09	719.69	167.15	0.11
INUNDATION	401	278.86	100-YEAR	425.2	251.65	260.49		260.53	0.00006	0.92	184.65	744.93	180.64	0.11
INUNDATION	400	255.07	100-YEAR	425.2	252.95	260.49		260.53	0.00008	0.99	179.22	683.11	175.79	0.13
INUNDATION	206	221.08	100-YEAR	425.2	253	260.47		260.53	0.000198	1.41	216.97	765.66	210.6	0.19
INUNDATION	205	149.56	100-YEAR	425.2	252.5	260.48		260.51	0.000052	0.85	234.83	922.27	229.15	0.1
INUNDATION	204	51.14	100-YEAR	425.2	254	260.48		260.51	0.000052	0.77	307.8	1100.36	303.06	0.1
INUNDATION	203	16.61	100-YEAR	375.2	253	259.32	259.32	260.23	0.009767	4.91	71.63	127.94	265.01	1.16
INUNDATION	202			Inl Struct										
INUNDATION	201	0.00	100-YEAR	375.2	254	259.21	259.21	260.12	0.010124	4.91	71.46	126.96	209.46	1.17
INUNDATION	200	-57.55	100-YEAR	425.2	253.2	256.12	256.9	258.26	0.053716	4.54	47.86	75.2	46.29	1.01
INUNDATION	132	-135.63	100-YEAR	425.2	247.5	255.17	251.51	255.41	0.000458	2.18	50.75	211.71	43.11	0.28
INUNDATION	131	-151.32	100-YEAR	425.2	249.23	255.14		255.4	0.000546	2.27	51.01	204.95	44.04	0.32
INUNDATION	130	-199.19	100-YEAR	425.2	250.3	254.39		255.29	0.003073	4.24	39.54	112.69	37.21	0.72
INUNDATION	129	-267.07	100-YEAR	425.2	249.39	254.73		255.01	0.000733	2.37	55.8	195.23	53.14	0.36
INUNDATION	128	-310.91	100-YEAR	425.2	249.14	254.28		254.93	0.001852	3.6	42.17	130.78	39.26	0.57
INUNDATION	127	-355.17	100-YEAR	425.2	249.13	254.41		254.78	0.001013	2.75	58.8	183.33	56.37	0.43
INUNDATION	126	-406.75	100-YEAR	425.2	247.47	254.57		254.68	0.000307	1.49	106.74	308.45	103.71	0.23
INUNDATION	125	-450.39	100-YEAR	425.2	248.3	254.35		254.64	0.000871	2.4	65.09	183.2	61.69	0.38
INUNDATION	124	-512.31	100-YEAR	425.2	248.4	254.27		254.58	0.000928	2.47	63.18	178.59	60.37	0.39
INUNDATION	123	-561.32	100-YEAR	425.2	249	253.89		254.49	0.002422	3.42	51.49	129.16	49.36	0.62
INUNDATION	122	-644.31	100-YEAR	425.2	249.2	252.94	252.94	254.11	0.007052	4.79	41.94	89.18	40.12	1
INUNDATION	121	-659.97	100-YEAR	425.2	246.52	252.18	252.45	253.92	0.011224	5.84	39.76	74.24	31.14	1.15
INUNDATION	120	-675.22	100-YEAR	425.2	246.58	250.42	251.35	253.51	0.03342	7.79	37.79	54.6	35.53	2.01
INUNDATION	119	-698.11	100-YEAR	425.2	246.64	252	250.86	252.44	0.001715	2.98	98.21	175.92	94.8	0.52
INUNDATION	118	-759.15	100-YEAR	425.2	246.5	252.27		252.31	0.000081	0.95	125.7	548.47	122.22	0.13
INUNDATION	116	-849.58	100-YEAR	425.2	246.9	252.28		252.3	0.000045	0.64	188.68	727.18	187.51	0.09
INUNDATION	115	-916.21	100-YEAR	425.2	246.93	252.28		252.3	0.000033	0.56	195.16	815.84	193.94	0.08
INUNDATION	114	-939.43	100-YEAR	425.2	246.85	252.28		252.3	0.000042	0.62	200.79	785.6	198.88	0.09
INUNDATION	112	-1092.32	100-YEAR	425.2	246.85	252.26		252.29	0.000059	0.74	198.1	668.07	194.55	0.11
INUNDATION	110	-1232.26	100-YEAR	425.2	246.9	252.25		252.28	0.000061	0.75	168.07	623.51	163.28	0.11
INUNDATION	109	-1281.15	100-YEAR	425.2	246.95	252.18		252.27	0.000218	1.28	175.52	422.76	174.26	0.2
INUNDATION	108	-1325.95	100-YEAR	425.2	246.95	252.19		252.25	0.000152	1.16	184.8	524.42	183.06	0.17
INUNDATION	106	-1483.86	100-YEAR	425.2	246.95	252.15		252.22	0.000183	1.26	138.13	419.94	136.55	0.18
INUNDATION	104	-1626.58	100-YEAR	425.2	246.95	252.12		252.2	0.000174	1.24	113.08	388.52	111.6	0.18
INUNDATION	100	-1924.13	100-YEAR	425.2	246.9	251.98		252.12	0.000354	1.75	164.51	372.63	162.46	0.26
INUNDATION	10		100-YEAR	425.2	246.9	249.57		250.33	0.004517	3.87	54.84	112.99	53.92	0.82
INUNDATION	9		100-YEAR	425.2	246.9	249.56		250.33	0.004583	3.88	54.79	112.46	53.87	0.82
INUNDATION	8		100-YEAR	425.2	246.9	249.55		250.33	0.004652	3.9	54.74	111.92	53.83	0.83
INUNDATION	7		100-YEAR	425.2	246.9	249.54		250.32	0.004736	3.92	54.68	111.28	53.77	0.83
INUNDATION	6		100-YEAR	425.2	246.9	249.53		250.32	0.004825	3.94	54.61	110.61	53.72	0.84
INUNDATION	5		100-YEAR	425.2	246.9	249.52		250.32	0.004919	3.97	54.55	109.91	53.66	0.85
INUNDATION	4		100-YEAR	425.2	246.9	249.5		250.31	0.005033	3.99	54.47	109.1	53.59	0.86
INUNDATION	3		100-YEAR	425.2	246.9	249.49	249.29	250.31	0.005157	4.02	54.38	108.24	53.51	0.87
INUNDATION	2		100-YEAR	425.2	246.9	249.47	249.29	250.3	0.005313	4.06	54.27	107.21	53.41	0.88
INUNDATION	1		100-YEAR	425.2	246.9	249.29	249.29	250.28	0.007041	4.42	53.29	97.92	52.5	1

Site #12- Wanatango Falls  
Proposed Conditions  
Long Term Average Flow Results

Proposed Weir Crest Elevation @ 257.50m

Reach	River Sta	Station (m)	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	W.P. Total (m)	Flow Area (m2)	Top Width (m)	Froude # Chl
INUNDATION	590	9838.37	LTAF	33.2	257.99	259.34	258.75	259.42	0.001189	1.22	33.44	27.3	32.66	0.37
INUNDATION	585	9725.03	LTAF	33.2	257.99	259.34		259.36	0.000193	0.53	55.6	63.87	55.17	0.15
INUNDATION	580	9417.52	LTAF	33.2	257.99	259.27		259.29	0.000259	0.57	52.52	57.96	52.09	0.17
INUNDATION	575	9157.30	LTAF	33.2	258	259.18		259.2	0.000425	0.69	49.49	48.32	49.22	0.22
INUNDATION	570	8719.18	LTAF	33.2	257.75	258.98		259.01	0.000468	0.73	45.01	45.62	44.65	0.23
INUNDATION	565	8471.34	LTAF	33.2	257.5	258.71		258.8	0.001649	1.34	25.37	24.86	24.69	0.42
INUNDATION	560	8157.24	LTAF	33.2	257.14	258.24		258.31	0.001442	1.18	31.55	28.24	30.98	0.39
INUNDATION	555	8128.96	LTAF	33.2	256.9	258.27		258.28	0.000221	0.55	53.56	60.76	53.12	0.16
INUNDATION	550	7714.86	LTAF	33.2	256.2	258.24		258.25	0.000044	0.31	64.48	107.2	63.62	0.08
INUNDATION	545	7133.29	LTAF	33.2	255.8	258.22		258.22	0.000038	0.32	52.75	103.49	51.48	0.07
INUNDATION	540	6945.49	LTAF	33.2	255.6	258.21		258.22	0.000019	0.24	63.62	136.92	62.01	0.05
INUNDATION	535	5943.13	LTAF	33.2	255.25	258.2		258.2	0.000009	0.18	76.14	184.6	74.53	0.04
INUNDATION	530	5542.65	LTAF	33.2	255.1	258.2		258.2	0.000006	0.15	85.44	221.5	83.62	0.03
INUNDATION	525	5193.91	LTAF	33.2	255.1	258.2		258.2	0.000008	0.17	74.76	189.96	72.78	0.03
INUNDATION	520	4817.81	LTAF	33.2	255	258.19		258.19	0.000014	0.23	56.41	144.47	54.12	0.04
INUNDATION	515	4609.87	LTAF	33.2	254.7	258.19		258.19	0.000007	0.18	66.25	186.02	63.85	0.03
INUNDATION	510	4151.21	LTAF	33.2	254.7	258.19		258.19	0.000005	0.15	79.85	227.12	77.83	0.03
INUNDATION	505	3625.48	LTAF	33.2	254.7	258.19		258.19	0.000006	0.16	71.49	202.06	69.15	0.03
INUNDATION	500	3329.19	LTAF	33.2	254.7	258.18		258.18	0.000007	0.18	78.51	185.51	76.14	0.03
INUNDATION	499	3058.07	LTAF	33.2	254.7	258.18		258.18	0.000008	0.18	65.33	181.54	62.99	0.03
INUNDATION	437	2860.26	LTAF	33.2	254.7	258.18		258.18	0.000009	0.19	62.45	172.68	60.35	0.04
INUNDATION	425	1966.87	LTAF	33.2	254.7	258.18		258.18	0.000003	0.13	93.11	265.24	91.33	0.02
INUNDATION	418	1341.65	LTAF	33.2	254.7	258.17		258.17	0.000006	0.17	71	199.34	68.87	0.03
INUNDATION	415	1042.36	LTAF	33.2	254.72	258.17		258.17	0.000006	0.17	71.6	199.42	69.6	0.03
INUNDATION	413	933.65	LTAF	33.2	253	258.16		258.17	0.000035	0.35	40.56	95.12	36.43	0.07
INUNDATION	412	855.13	LTAF	33.2	251.76	258.17		258.17	0.000004	0.14	75.52	238.6	72.02	0.02
INUNDATION	411.5	822.18	LTAF	33.2	257.2	258.08	257.74	258.16	0.007245	1.69	55.62	34.65	55.02	0.79
INUNDATION	411	789.59	LTAF	33.2	256.9	257.64	257.64	257.81	0.01233	1.97	52.61	18.16	52.21	1
INUNDATION	410.5	757.80	LTAF	33.2	255.25	257.52	256.17	257.54	0.000139	0.5	49.38	67.11	48.78	0.13
INUNDATION	410	722.91	LTAF	33.2	252.7	257.53		257.53	0.000003	0.12	98.94	280.94	97.19	0.02
INUNDATION	408	589.92	LTAF	33.2	249.79	257.53		257.53	0	0.06	140.17	572.65	135.85	0.01
INUNDATION	405	404.09	LTAF	33.2	251.76	257.53		257.53	0.000001	0.11	89.57	334.31	87.25	0.02
INUNDATION	403	340.41	LTAF	33.2	251.7	257.53		257.53	0.000001	0.09	117.13	375.59	115.37	0.01
INUNDATION	402	310.37	LTAF	33.2	251.65	257.53		257.53	0.000002	0.13	99.27	283.12	96.15	0.02
INUNDATION	401	278.86	LTAF	33.2	251.65	257.53		257.53	0.000003	0.14	107.81	272.36	104.57	0.02
INUNDATION	400	255.07	LTAF	33.2	252.95	257.53		257.53	0.000005	0.17	111.53	226.74	109.07	0.03
INUNDATION	206	221.08	LTAF	33.2	253	257.53		257.53	0.000027	0.31	132.34	204.17	127.99	0.06
INUNDATION	205	149.56	LTAF	33.2	252.5	257.53		257.53	0.000003	0.13	128.79	324.57	124.05	0.02
INUNDATION	204	51.14	LTAF	33.2	254	257.53		257.53	0.000004	0.14	160.08	298.42	156.4	0.03
INUNDATION	203	16.61	LTAF	0	253	257.53	257.51	257.53	0	0	71.63	2.08	142.23	0
INUNDATION	202		Inl Struct											
INUNDATION	201	0.00	LTAF	0	254	257.53	257.41	257.53	0	0	71.46	8.91	112.74	0
INUNDATION	200	-57.55	LTAF	33.2	253.2	254.23	254.23	254.6	0.099021	2.7	16.8	12.3	16.46	1
INUNDATION	132	-135.53	LTAF	33.2	247.5	251.59	248.87	251.6	0.000045	0.39	35.8	84.07	30.27	0.08
INUNDATION	131	-151.32	LTAF	33.2	249.23	251.58		251.6	0.000153	0.56	37.6	59.12	35.58	0.14
INUNDATION	130	-199.19	LTAF	33.2	250.3	251.35		251.56	0.005656	2.02	22.85	16.47	22.23	0.75
INUNDATION	129	-267.07	LTAF	33.2	249.39	251.4		251.43	0.000476	0.77	39.71	43.19	38.86	0.23
INUNDATION	128	-310.91	LTAF	33.2	249.14	251.35		251.4	0.000746	1	30.42	33.51	29.35	0.29
INUNDATION	127	-355.17	LTAF	33.2	249.13	251.34		251.37	0.000476	0.8	39.27	41.95	38.43	0.24
INUNDATION	126	-406.75	LTAF	33.2	247.47	251.34		251.35	0.000082	0.4	53.07	82.14	51.02	0.1
INUNDATION	125	-450.39	LTAF	33.2	248.3	251.32		251.33	0.000283	0.67	38.49	49.83	36.84	0.18
INUNDATION	124	-512.31	LTAF	33.2	248.4	251.3		251.33	0.00029	0.67	38.32	49.38	36.81	0.19
INUNDATION	123	-561.32	LTAF	33.2	249	251.22		251.29	0.00163	1.24	30.26	26.77	29.15	0.41
INUNDATION	122	-644.31	LTAF	33.2	249.2	250.72	250.72	250.99	0.011445	2.31	27.54	14.37	26.89	1.01
INUNDATION	121	-659.97	LTAF	33.2	246.52	249.15	249.78	250.57	0.041287	5.27	9.2	6.31	5.78	1.61
INUNDATION	120	-675.22	LTAF	33.2	246.58	248.72	248.41	249.8	0.053267	6.24	7.29	5.32	6.55	2.21
INUNDATION	119	-698.11	LTAF	33.2	246.64	248.62	248.38	248.82	0.00503	1.97	22.19	16.86	21.16	0.7
INUNDATION	118	-759.15	LTAF	33.2	246.5	248.76		248.76	0.000014	0.21	97.86	168.05	96.24	0.05
INUNDATION	116	-849.58	LTAF	33.2	246.9	248.75		248.76	0.000017	0.18	126.75	186.12	126.37	0.05
INUNDATION	115	-916.21	LTAF	33.2	246.93	248.75		248.75	0.000012	0.15	150.8	220.05	150.42	0.04
INUNDATION	114	-939.43	LTAF	33.2	246.85	248.75		248.75	0.000017	0.18	131.97	190.19	131.1	0.05
INUNDATION	112	-1092.32	LTAF	33.2	246.85	248.75		248.75	0.000022	0.21	112.77	163.67	111.66	0.05
INUNDATION	110	-1232.26	LTAF	33.2	246.9	248.75		248.75	0.000023	0.21	113.49	163.41	112.06	0.05
INUNDATION	109	-1281.15	LTAF	33.2	246.95	248.73		248.74	0.000154	0.46	61.46	72.16	61.01	0.14
INUNDATION	108	-1325.95	LTAF	33.2	246.95	248.73		248.74	0.000071	0.35	68.07	94.95	67.58	0.09
INUNDATION	106	-1483.86	LTAF	33.2	246.95	248.72		248.73	0.000077	0.36	65.99	91.41	65.49	0.1
INUNDATION	104	-1626.58	LTAF	33.2	246.95	248.71		248.72	0.000069	0.34	69.8	96.51	69.26	0.09
INUNDATION	100	-1924.13	LTAF	33.2	246.9	248.67		248.69	0.000147	0.5	49.51	66.5	49	0.14
INUNDATION	10		LTAF	33.2	246.9	247.71		247.83	0.004541	1.49	41.07	22.24	40.91	0.65
INUNDATION	9		LTAF	33.2	246.9	247.71		247.82	0.004717	1.51	40.93	21.96	40.77	0.66
INUNDATION	8		LTAF	33.2	246.9	247.7		247.82	0.004911	1.53	40.78	21.67	40.62	0.67
INUNDATION	7		LTAF	33.2	246.9	247.69		247.82	0.005128	1.55	40.62	21.35	40.46	0.68
INUNDATION	6		LTAF	33.2	246.9	247.68		247.81	0.005372	1.58	40.45	21.02	40.29	0.7
INUNDATION	5		LTAF	33.2	246.9	247.68		247.81	0.005649	1.61	40.27	20.67	40.11	0.71
INUNDATION	4		LTAF	33.2	246.9	247.66		247.8	0.006018	1.64	40.04	20.24	39.88	0.74
INUNDATION	3		LTAF	33.2	246.9	247.65		247.8	0.006466	1.68	39.79	19.76	39.63	0.76
INUNDATION	2		LTAF	33.2	246.9	247.64		247.79	0.007072	1.73	39.5	19.17	39.34	0.79
INUNDATION	1		LTAF	33.2	246.9	247.56	247.56	247.77	0.012112	2.06	38.29	16.12	38.15	1.01

Site #12- Wanatango Falls  
Proposed Conditions  
2-year Flow Results

Proposed Weir Crest Elevation @ 259.0m

Reach	River Sta	Station (m)	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	W.P. Total (m)	Flow Area (m2)	Top Width (m)	Froude # Chl
INUNDATION	590	9838.37	2-YEAR	180.7	257.99	261.28	260.04	261.49	0.000992	2.17	60.28	123.45	59.03	0.4
INUNDATION	585	9725.03	2-YEAR	180.7	257.99	261.35		261.4	0.000213	1.06	70.12	189.47	68.74	0.19
INUNDATION	580	9417.52	2-YEAR	180.7	257.99	261.27		261.33	0.000244	1.1	69.92	174.29	68.86	0.2
INUNDATION	575	9157.30	2-YEAR	180.7	258	261.18		261.26	0.000318	1.23	62.84	160.04	61.94	0.23
INUNDATION	570	8719.18	2-YEAR	180.7	257.75	261.02		261.11	0.000349	1.31	54.01	145.34	52.64	0.24
INUNDATION	565	8471.34	2-YEAR	180.7	257.5	260.79		260.97	0.000878	2.02	66.47	136.29	64.85	0.37
INUNDATION	560	8157.24	2-YEAR	180.7	257.14	260.61		260.74	0.000528	1.63	60.78	139.07	58.05	0.29
INUNDATION	555	8128.96	2-YEAR	180.7	256.9	260.67		260.71	0.000153	0.95	72.3	211.57	70.92	0.16
INUNDATION	550	7714.86	2-YEAR	180.7	256.2	260.65		260.66	0.000062	0.63	281.14	395.68	279.07	0.1
INUNDATION	545	7133.29	2-YEAR	180.7	255.8	260.6		260.62	0.000077	0.74	183.7	328.67	181.55	0.12
INUNDATION	540	6945.49	2-YEAR	180.7	255.6	260.59		260.61	0.000047	0.59	154.43	377.93	151.33	0.07
INUNDATION	535	5943.13	2-YEAR	180.7	255.25	260.56		260.57	0.000028	0.47	159.7	431.21	157.64	0.07
INUNDATION	530	5542.65	2-YEAR	180.7	255.1	260.55		260.56	0.00002	0.42	181.2	500.01	178.66	0.06
INUNDATION	525	5193.91	2-YEAR	180.7	255.1	260.54		260.55	0.000027	0.49	146.55	412.84	143.85	0.07
INUNDATION	520	4817.81	2-YEAR	180.7	255	260.52		260.54	0.000048	0.64	128.13	339.99	124.82	0.07
INUNDATION	515	4609.87	2-YEAR	180.7	254.7	260.52		260.53	0.00003	0.53	142.98	385.03	139.22	0.07
INUNDATION	510	4151.21	2-YEAR	180.7	254.7	260.51		260.52	0.00002	0.44	147.93	460.94	145.23	0.06
INUNDATION	505	3625.48	2-YEAR	180.7	254.7	260.49		260.51	0.000025	0.49	182.8	449.58	179.44	0.07
INUNDATION	500	3329.19	2-YEAR	180.7	254.7	260.48		260.5	0.00003	0.53	165.82	424.4	162.32	0.07
INUNDATION	439	3058.07	2-YEAR	180.7	254.7	260.47		260.49	0.000031	0.53	176.91	425.23	173.39	0.08
INUNDATION	437	2860.26	2-YEAR	180.7	254.7	260.47		260.48	0.000035	0.57	111.61	356.78	108.79	0.08
INUNDATION	425	1966.87	2-YEAR	180.7	254.7	260.45		260.46	0.000015	0.38	138.24	515.55	135.87	0.05
INUNDATION	418	1341.65	2-YEAR	180.7	254.7	260.44		260.45	0.000026	0.5	120.85	409.34	117.91	0.07
INUNDATION	415	1042.36	2-YEAR	180.7	254.72	260.43		260.44	0.000026	0.49	134.36	434.89	131.47	0.07
INUNDATION	413	933.65	2-YEAR	180.7	253	260.39		260.43	0.000136	0.95	65.34	197.89	60.69	0.15
INUNDATION	412	855.13	2-YEAR	180.7	251.76	260.41		260.42	0.00002	0.45	112.57	421.81	108.13	0.06
INUNDATION	411.5	822.18	2-YEAR	180.7	257.2	260.31		260.41	0.00076	1.72	134.58	240.22	133.28	0.34
INUNDATION	411	789.59	2-YEAR	180.7	256.9	260.35		260.38	0.000152	0.84	144.4	270.82	142.31	0.16
INUNDATION	410.5	757.80	2-YEAR	180.7	255.25	260.34		260.37	0.000099	0.87	141.13	299.92	137.66	0.13
INUNDATION	410	722.91	2-YEAR	180.7	252.7	260.36		260.36	0.000009	0.34	173.93	708.1	171.55	0.04
INUNDATION	408	589.92	2-YEAR	180.7	249.79	260.36		260.36	0.000002	0.2	202.93	1080.62	197.7	0.02
INUNDATION	405	404.09	2-YEAR	180.7	251.76	260.35		260.36	0.000007	0.34	178.39	748.9	175.36	0.04
INUNDATION	403	340.41	2-YEAR	180.7	251.7	260.35		260.36	0.000005	0.28	145.44	751.67	142.78	0.03
INUNDATION	402	310.37	2-YEAR	180.7	251.65	260.35		260.36	0.000011	0.39	169.69	695.19	165.79	0.05
INUNDATION	401	278.86	2-YEAR	180.7	251.65	260.35		260.36	0.000012	0.4	183.45	718.92	179.48	0.05
INUNDATION	400	255.07	2-YEAR	180.7	252.95	260.35		260.36	0.000016	0.43	178.27	658.94	174.88	0.06
INUNDATION	206	221.08	2-YEAR	180.7	253	260.34		260.36	0.000039	0.62	216.01	740.1	209.68	0.09
INUNDATION	205	149.56	2-YEAR	180.7	252.5	260.35		260.35	0.00001	0.37	233.54	891.58	227.9	0.05
INUNDATION	204	51.14	2-YEAR	180.7	254	260.35		260.35	0.00001	0.34	306.84	1059.62	302.14	0.05
INUNDATION	203	16.61	2-YEAR	130.7	253	260.04	260.04	260.28	0.008593	2.57	237.65	113.62	267.49	0.93
INUNDATION	202		Inl Struct											
INUNDATION	201	0.00	2-YEAR	130.7	254	259.95	259.94	260.18	0.009001	2.58	239.43	113.81	240.53	0.94
INUNDATION	200	-57.55	2-YEAR	180.7	253.2	254.9	255.53	257.1	0.262816	6.51	31.33	27.5	30.66	1.88
INUNDATION	132	-135.63	2-YEAR	180.7	247.5	253.42	250.21	253.51	0.000247	1.29	42.15	143.72	35.4	0.19
INUNDATION	131	-151.32	2-YEAR	180.7	249.23	253.39		253.5	0.00039	1.46	45.31	129.93	41.55	0.25
INUNDATION	130	-199.19	2-YEAR	180.7	250.3	252.94		253.42	0.003233	3.08	34.52	61.68	33.24	0.67
INUNDATION	129	-267.07	2-YEAR	180.7	249.39	253.1		253.24	0.000633	1.62	47.79	114.74	45.91	0.31
INUNDATION	128	-310.91	2-YEAR	180.7	249.14	252.91		253.18	0.001305	2.31	35.3	82.36	33.06	0.45
INUNDATION	127	-355.17	2-YEAR	180.7	249.13	252.94		253.11	0.000771	1.81	47.1	110.59	45.39	0.35
INUNDATION	126	-406.75	2-YEAR	180.7	247.47	253		253.05	0.000264	1.01	69.72	178.41	67.11	0.2
INUNDATION	125	-450.39	2-YEAR	180.7	248.3	252.9		253.03	0.00068	1.59	46.11	113.81	43.27	0.31
INUNDATION	124	-512.31	2-YEAR	180.7	248.4	252.85		252.98	0.000718	1.63	44.72	110.63	42.39	0.32
INUNDATION	123	-561.32	2-YEAR	180.7	249	252.6		252.91	0.002333	2.46	38.93	73.48	37.27	0.56
INUNDATION	122	-644.31	2-YEAR	180.7	249.2	251.8	251.8	252.53	0.008271	3.8	33.9	47.56	32.67	1.01
INUNDATION	121	-659.97	2-YEAR	180.7	246.52	250.69	251.13	252.24	0.025059	5.53	30.46	32.68	24.58	1.53
INUNDATION	120	-675.22	2-YEAR	180.7	246.58	249.6	250.25	251.72	0.038159	6.45	28.42	28.02	26.61	2.01
INUNDATION	119	-698.11	2-YEAR	180.7	246.64	250.44	249.72	250.74	0.002592	2.43	43.54	74.46	40.82	0.57
INUNDATION	118	-759.15	2-YEAR	180.7	246.5	250.63		250.64	0.000048	0.58	109.16	357.81	106.46	0.09
INUNDATION	116	-849.58	2-YEAR	180.7	246.9	250.63		250.64	0.000033	0.42	148.43	440.1	147.67	0.07
INUNDATION	115	-916.21	2-YEAR	180.7	246.93	250.63		250.63	0.000023	0.36	169.53	514.18	168.6	0.06
INUNDATION	114	-939.43	2-YEAR	180.7	246.85	250.63		250.63	0.000031	0.41	177.06	474.6	175.45	0.07
INUNDATION	112	-1092.32	2-YEAR	180.7	246.85	250.62		250.63	0.000043	0.49	132.3	387.39	129.34	0.08
INUNDATION	110	-1232.26	2-YEAR	180.7	246.9	250.61		250.62	0.000043	0.49	126.86	382.33	122.79	0.08
INUNDATION	109	-1281.15	2-YEAR	180.7	246.95	250.57		250.61	0.000208	0.91	82.26	199.4	81.19	0.18
INUNDATION	108	-1325.95	2-YEAR	180.7	246.95	250.57		250.6	0.000126	0.8	148.73	247.82	147.4	0.14
INUNDATION	106	-1483.86	2-YEAR	180.7	246.95	250.55		250.58	0.000141	0.84	96.88	226.35	95.57	0.15
INUNDATION	104	-1626.58	2-YEAR	180.7	246.95	250.53		250.56	0.000125	0.8	83.6	230.07	82.33	0.14
INUNDATION	100	-1924.13	2-YEAR	180.7	246.9	250.43		250.5	0.000277	1.18	77.98	167.35	76.56	0.21
INUNDATION	10		2-YEAR	180.7	246.9	248.64		249.04	0.004723	2.79	49.3	64.92	48.8	0.76
INUNDATION	9		2-YEAR	180.7	246.9	248.63		249.03	0.004834	2.81	49.23	64.47	48.75	0.77
INUNDATION	8		2-YEAR	180.7	246.9	248.62		249.03	0.004954	2.83	49.17	63.99	48.69	0.78
INUNDATION	7		2-YEAR	180.7	246.9	248.61		249.02	0.005082	2.85	49.1	63.49	48.62	0.79
INUNDATION	6		2-YEAR	180.7	246.9	248.6		249.02	0.0052	2.87	49.03	62.98	48.56	0.8
INUNDATION	5		2-YEAR	180.7	246.9	248.59		249.02	0.005392	2.9	48.95	62.36	48.48	0.81
INUNDATION	4		2-YEAR	180.7	246.9	248.57		249.01	0.005583	2.93	48.86	61.71	48.4	0.82
INUNDATION	3		2-YEAR	180.7	246.9	248.56		249.01	0.005825	2.97	48.75	60.92	48.3	0.84
INUNDATION	2		2-YEAR	180.7	246.9	248.54	248.42	249	0.006114	3.01	48.63	60.04	48.19	0.86
INUNDATION	1		2-YEAR	180.7	246.9	248.42	248.42	248.98	0.008556	3.34	47.97	54.1	47.58	1



Site #12- Wanatango Falls  
Proposed Conditions  
100-year Flow Results

Proposed Weir Crest Elevation @ 259.0m

Reach	River Sta	Station (m)	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	W.P. Total (m)	Flow Area (m2)	Top Width (m)	Froude # Chl
INUNDATION	590	9838.37	100-YEAR	425.2	257.99	262.84	261.2	263.26	0.001207	3.15	71.05	225.31	69.2	0.47
INUNDATION	585	9725.03	100-YEAR	425.2	257.99	262.98		263.11	0.000288	1.62	75.11	304.87	72.41	0.23
INUNDATION	580	9417.52	100-YEAR	425.2	257.99	262.88		263.02	0.000319	1.66	82.85	298.22	81.23	0.24
INUNDATION	575	9157.30	100-YEAR	425.2	258	262.75		262.92	0.000421	1.88	72.04	264	70.58	0.28
INUNDATION	570	8719.18	100-YEAR	425.2	257.75	262.5		262.71	0.000509	2.05	65.44	231.03	63.59	0.31
INUNDATION	565	8471.34	100-YEAR	425.2	257.5	262.09		262.5	0.00131	3.14	76.23	227.62	74.07	0.48
INUNDATION	560	8157.24	100-YEAR	425.2	257.14	261.78		262.13	0.000982	2.73	65.96	209.37	62.51	0.42
INUNDATION	555	8128.96	100-YEAR	425.2	256.9	261.92		262.05	0.000302	1.64	77.91	303.62	75.86	0.24
INUNDATION	550	7714.86	100-YEAR	425.2	256.2	261.91		261.95	0.000105	0.99	300.85	765.48	298.49	0.14
INUNDATION	545	7133.29	100-YEAR	425.2	255.8	261.8		261.88	0.000155	1.25	200.73	560.69	198.3	0.17
INUNDATION	540	6945.49	100-YEAR	425.2	255.6	261.8		261.85	0.000105	1.03	173.69	570.58	170.38	0.14
INUNDATION	535	5943.13	100-YEAR	425.2	255.25	261.72		261.76	0.000067	0.85	223.59	663.46	221.43	0.11
INUNDATION	530	5542.65	100-YEAR	425.2	255.1	261.7		261.73	0.000051	0.77	195.95	714.79	193.2	0.1
INUNDATION	525	5193.91	100-YEAR	425.2	255.1	261.67		261.71	0.000072	0.91	181.03	595.53	178.24	0.12
INUNDATION	520	4817.81	100-YEAR	425.2	255	261.61		261.67	0.000126	1.19	135.36	479.81	131.69	0.16
INUNDATION	515	4609.87	100-YEAR	425.2	254.7	261.6		261.65	0.000083	1	150.17	539.45	146.08	0.13
INUNDATION	510	4151.21	100-YEAR	425.2	254.7	261.58		261.61	0.000056	0.83	171.65	631.05	168.72	0.11
INUNDATION	505	3625.48	100-YEAR	425.2	254.7	261.54		261.58	0.00007	0.92	214.31	652.79	210.73	0.12
INUNDATION	500	3329.19	100-YEAR	425.2	254.7	261.51		261.55	0.000084	1	175.38	595.68	171.64	0.13
INUNDATION	439	3058.07	100-YEAR	425.2	254.7	261.48		261.53	0.000086	1	186.89	605.72	183.04	0.13
INUNDATION	437	2860.26	100-YEAR	425.2	254.7	261.45		261.51	0.000103	1.1	119.62	468.21	116.53	0.14
INUNDATION	425	1966.87	100-YEAR	425.2	254.7	261.42		261.44	0.000045	0.74	144.92	649.69	142.2	0.1
INUNDATION	418	1341.65	100-YEAR	425.2	254.7	261.36		261.4	0.000082	0.98	127.28	521.23	124	0.13
INUNDATION	415	1042.36	100-YEAR	425.2	254.72	261.33		261.38	0.00008	0.96	143.11	558.66	139.96	0.13
INUNDATION	413	933.65	100-YEAR	425.2	253	261.18		261.35	0.000416	1.86	75.99	250.2	71.18	0.27
INUNDATION	412	855.13	100-YEAR	425.2	251.76	261.26		261.3	0.000067	0.92	125.87	517.85	121.12	0.12
INUNDATION	411.5	822.18	100-YEAR	425.2	257.2	261		261.27	0.001705	3.01	147.03	336.3	145.36	0.53
INUNDATION	411	789.59	100-YEAR	425.2	256.9	261.12		261.19	0.000358	1.51	156.79	386.11	154.43	0.25
INUNDATION	410.5	757.80	100-YEAR	425.2	255.25	261.04		261.17	0.000312	1.7	179.55	407.63	175.6	0.24
INUNDATION	410	722.91	100-YEAR	425.2	252.7	261.11		261.13	0.000034	0.7	187.8	841.96	185.28	0.08
INUNDATION	408	589.92	100-YEAR	425.2	249.79	261.12		261.13	0.000009	0.43	209.99	1233.5	204.55	0.05
INUNDATION	405	404.09	100-YEAR	425.2	251.76	261.1		261.12	0.000029	0.71	185.86	882.54	182.62	0.08
INUNDATION	403	340.41	100-YEAR	425.2	251.7	261.1		261.12	0.000021	0.59	151.65	860.69	148.79	0.07
INUNDATION	402	310.37	100-YEAR	425.2	251.65	261.09		261.12	0.00004	0.81	177.08	820.2	173.02	0.09
INUNDATION	401	278.86	100-YEAR	425.2	251.65	261.09		261.12	0.000044	0.83	189.53	853.32	185.38	0.1
INUNDATION	400	255.07	100-YEAR	425.2	252.95	261.08		261.12	0.000056	0.89	183.31	788.84	179.7	0.11
INUNDATION	206	221.08	100-YEAR	425.2	253	261.07		261.11	0.000129	1.22	221.75	894.12	215.2	0.16
INUNDATION	205	149.56	100-YEAR	425.2	252.5	261.08		261.1	0.000037	0.76	240.56	1061	234.73	0.09
INUNDATION	204	51.14	100-YEAR	425.2	254	261.08		261.1	0.000035	0.68	311.69	1283.03	306.76	0.08
INUNDATION	203	16.61	100-YEAR	375.2	253	260.56	260.56	260.98	0.010407	3.68	274.28	236.25	269.14	1.09
INUNDATION	202			Inl Struct										
INUNDATION	201	0.00	100-YEAR	375.2	254	260.44	260.44	260.88	0.010238	3.82	248.55	229.68	243.54	1.08
INUNDATION	200	-57.55	100-YEAR	425.2	253.2	256	256.9	258.43	0.070723	5	45.97	69.62	44.5	1.14
INUNDATION	132	-135.63	100-YEAR	425.2	247.5	255.17	251.51	255.41	0.000458	2.18	50.75	211.71	43.11	0.28
INUNDATION	131	-151.32	100-YEAR	425.2	249.23	255.14		255.4	0.000546	2.27	51.01	204.95	44.04	0.32
INUNDATION	130	-199.19	100-YEAR	425.2	250.3	254.39		255.29	0.003073	4.24	39.54	112.69	37.21	0.72
INUNDATION	129	-267.07	100-YEAR	425.2	249.39	254.73		255.01	0.000733	2.37	55.8	195.23	53.14	0.36
INUNDATION	128	-310.91	100-YEAR	425.2	249.14	254.28		254.93	0.001852	3.6	42.17	130.78	39.26	0.57
INUNDATION	127	-355.17	100-YEAR	425.2	249.13	254.41		254.78	0.001013	2.75	58.8	183.33	56.37	0.43
INUNDATION	126	-406.75	100-YEAR	425.2	247.47	254.57		254.68	0.000307	1.49	106.74	308.45	103.71	0.23
INUNDATION	125	-450.39	100-YEAR	425.2	248.3	254.35		254.64	0.000871	2.4	65.09	183.2	61.69	0.38
INUNDATION	124	-512.31	100-YEAR	425.2	248.4	254.27		254.58	0.000928	2.47	63.18	178.59	60.37	0.39
INUNDATION	123	-561.32	100-YEAR	425.2	249	253.89		254.49	0.002422	3.42	51.49	129.16	49.36	0.62
INUNDATION	122	-644.31	100-YEAR	425.2	249.2	252.94	252.94	254.11	0.007052	4.79	41.94	89.18	40.12	1
INUNDATION	121	-659.97	100-YEAR	425.2	246.52	252.19	252.45	253.92	0.011159	5.83	39.82	74.39	31.18	1.14
INUNDATION	120	-675.22	100-YEAR	425.2	246.58	250.42	251.35	253.51	0.033397	7.79	37.79	54.61	35.53	2
INUNDATION	119	-698.11	100-YEAR	425.2	246.64	252	250.86	252.44	0.001715	2.98	98.21	175.92	94.8	0.52
INUNDATION	118	-759.15	100-YEAR	425.2	246.5	252.27		252.31	0.000081	0.95	125.7	548.47	122.22	0.13
INUNDATION	116	-849.58	100-YEAR	425.2	246.9	252.28		252.3	0.000045	0.64	188.68	727.18	187.51	0.09
INUNDATION	115	-916.21	100-YEAR	425.2	246.93	252.28		252.3	0.000033	0.56	195.16	815.84	193.94	0.08
INUNDATION	114	-939.43	100-YEAR	425.2	246.85	252.28		252.3	0.000042	0.62	200.79	785.6	198.88	0.09
INUNDATION	112	-1092.32	100-YEAR	425.2	246.85	252.26		252.29	0.000059	0.74	198.1	668.07	194.55	0.11
INUNDATION	110	-1232.26	100-YEAR	425.2	246.9	252.25		252.28	0.000061	0.75	168.07	623.51	163.28	0.11
INUNDATION	109	-1281.15	100-YEAR	425.2	246.95	252.18		252.27	0.000218	1.28	175.52	422.76	174.26	0.2
INUNDATION	108	-1325.95	100-YEAR	425.2	246.95	252.19		252.25	0.000152	1.16	184.8	524.42	183.06	0.17
INUNDATION	106	-1483.86	100-YEAR	425.2	246.95	252.15		252.22	0.000183	1.26	138.13	419.94	136.55	0.18
INUNDATION	104	-1626.58	100-YEAR	425.2	246.95	252.12		252.2	0.000174	1.24	113.08	388.52	111.6	0.18
INUNDATION	100	-1924.13	100-YEAR	425.2	246.9	251.98		252.12	0.000354	1.75	164.51	372.63	162.46	0.26
INUNDATION	10		100-YEAR	425.2	246.9	249.57		250.33	0.004517	3.87	54.84	112.99	53.92	0.82
INUNDATION	9		100-YEAR	425.2	246.9	249.56		250.33	0.004583	3.88	54.79	112.46	53.87	0.82
INUNDATION	8		100-YEAR	425.2	246.9	249.55		250.33	0.004652	3.9	54.74	111.92	53.83	0.83
INUNDATION	7		100-YEAR	425.2	246.9	249.54		250.32	0.004736	3.92	54.68	111.28	53.77	0.83
INUNDATION	6		100-YEAR	425.2	246.9	249.53		250.32	0.004825	3.94	54.61	110.61	53.72	0.84
INUNDATION	5		100-YEAR	425.2	246.9	249.52		250.32	0.004919	3.97	54.55	109.91	53.66	0.85
INUNDATION	4		100-YEAR	425.2	246.9	249.5		250.31	0.005033	3.99	54.47	109.1	53.59	0.86
INUNDATION	3		100-YEAR	425.2	246.9	249.49	249.29	250.31	0.005157	4.02	54.38	108.24	53.51	0.87
INUNDATION	2		100-YEAR	425.2	246.9	249.47	249.29	250.3	0.005313	4.06	54.27	107.21	53.41	0.88
INUNDATION	1		100-YEAR	425.2	246.9	249.29	249.29	250.28	0.007041	4.42	53.29	97.92	52.5	1

Site #12- Wanatango Falls  
Proposed Conditions  
Long Term Average Flow Results

Proposed Weir Crest Elevation @ 259.0m

Reach	River Sta	Station (m)	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	W.P. Total (m)	Flow Area (m2)	Top Width (m)	Froude # Chl
INUNDATION	590	9838.37	LTAf	33.2	257.99	259.45	258.75	259.51	0.00088	1.11	39.89	31.28	39.1	0.32
INUNDATION	585	9725.03	LTAf	33.2	257.99	259.45		259.46	0.000145	0.48	56.31	69.87	55.83	0.13
INUNDATION	580	9417.52	LTAf	33.2	257.99	259.4		259.41	0.000182	0.51	53.02	64.65	52.51	0.15
INUNDATION	575	9157.30	LTAf	33.2	258	259.34		259.36	0.00026	0.59	50.76	56.29	50.45	0.18
INUNDATION	570	8719.18	LTAf	33.2	257.75	259.23		259.25	0.000224	0.58	46.25	57.09	45.77	0.16
INUNDATION	565	8471.34	LTAf	33.2	257.5	259.12		259.17	0.000548	0.94	45.54	37.21	44.65	0.26
INUNDATION	560	8157.24	LTAf	33.2	257.14	259.05		259.07	0.00018	0.61	43.35	57.6	41.79	0.15
INUNDATION	555	8128.96	LTAf	33.2	256.9	259.05		259.06	0.00004	0.33	61.11	105.24	60.39	0.07
INUNDATION	550	7714.86	LTAf	33.2	256.2	259.05		259.05	0.000013	0.2	88.37	168.36	87.12	0.04
INUNDATION	545	7133.29	LTAf	33.2	255.8	259.04		259.04	0.000013	0.23	57.35	147.3	55.62	0.04
INUNDATION	540	6945.49	LTAf	33.2	255.6	259.04		259.04	0.000007	0.18	78.86	192.74	76.34	0.03
INUNDATION	535	5943.13	LTAf	33.2	255.25	259.03		259.04	0.000004	0.13	87.63	249.76	85.72	0.02
INUNDATION	530	5542.65	LTAf	33.2	255.1	259.03		259.03	0.000002	0.11	89.12	292.46	86.87	0.02
INUNDATION	525	5193.91	LTAf	33.2	255.1	259.03		259.03	0.000003	0.13	78.17	251.7	75.65	0.02
INUNDATION	520	4817.81	LTAf	33.2	255	259.03		259.03	0.000006	0.17	59.53	190.78	56.7	0.03
INUNDATION	515	4609.87	LTAf	33.2	254.7	259.03		259.03	0.000003	0.14	69.35	240.65	66.37	0.02
INUNDATION	510	4151.21	LTAf	33.2	254.7	259.03		259.03	0.000002	0.11	83.64	293.55	81.13	0.02
INUNDATION	505	3625.48	LTAf	33.2	254.7	259.03		259.03	0.000003	0.13	74.38	261.16	71.44	0.02
INUNDATION	500	3329.19	LTAf	33.2	254.7	259.03		259.03	0.000003	0.14	96.47	254.6	93.37	0.02
INUNDATION	499	3058.07	LTAf	33.2	254.7	259.02		259.03	0.000003	0.14	69.51	236.42	66.67	0.02
INUNDATION	437	2860.26	LTAf	33.2	254.7	259.02		259.03	0.000004	0.15	66.76	225.1	64.26	0.02
INUNDATION	425	1966.87	LTAf	33.2	254.7	259.02		259.02	0.000002	0.1	98.62	344.28	96.44	0.02
INUNDATION	418	1341.65	LTAf	33.2	254.7	259.02		259.02	0.000003	0.13	98.34	259.56	95.77	0.02
INUNDATION	415	1042.36	LTAf	33.2	254.72	259.02		259.02	0.000003	0.13	116.15	260.67	113.67	0.02
INUNDATION	413	933.65	LTAf	33.2	253	259.02		259.02	0.000015	0.26	46.5	128.76	42.11	0.05
INUNDATION	412	855.13	LTAf	33.2	251.76	259.02		259.02	0.000002	0.11	79.08	301.29	75.1	0.02
INUNDATION	411.5	822.18	LTAf	33.2	252.2	259		259.02	0.000274	0.64	85.37	98.27	84.38	0.18
INUNDATION	411	789.59	LTAf	33.2	256.9	259.01		259.01	0.000045	0.31	95	114.01	93.89	0.08
INUNDATION	410.5	757.80	LTAf	33.2	255.25	259.01		259.01	0.000013	0.24	81.92	155.83	80.16	0.05
INUNDATION	410	722.91	LTAf	33.2	252.7	259.01		259.01	0.000001	0.08	165.1	483.25	163.16	0.01
INUNDATION	408	589.92	LTAf	33.2	249.79	259.01		259.01	0	0.04	194.3	819.74	189.53	0.01
INUNDATION	405	404.09	LTAf	33.2	251.76	259.01		259.01	0.000001	0.08	164.08	521.2	161.49	0.01
INUNDATION	403	340.41	LTAf	33.2	251.7	259.01		259.01	0	0.06	137.73	564.64	135.58	0.01
INUNDATION	402	310.37	LTAf	33.2	251.65	259.01		259.01	0.000001	0.09	157.07	480.96	153.49	0.01
INUNDATION	401	278.86	LTAf	33.2	251.65	259.01		259.01	0.000001	0.1	172.38	485.42	168.75	0.01
INUNDATION	400	255.07	LTAf	33.2	252.95	259.01		259.01	0.000001	0.11	169.05	430.57	166.08	0.02
INUNDATION	206	221.08	LTAf	33.2	253	259.01		259.01	0.000005	0.17	208.37	464.64	203.22	0.03
INUNDATION	205	149.56	LTAf	33.2	252.5	259.01		259.01	0.000001	0.09	221.02	594.78	215.72	0.01
INUNDATION	204	51.14	LTAf	33.2	254	259.01		259.01	0.000001	0.09	295.8	661.65	291.46	0.01
INUNDATION	203	16.61	LTAf	0	253	259.01	259.01	259.01	0	0	71.63	0.58	263.06	0
INUNDATION	202		Inl Struct											
INUNDATION	201	0.00	LTAf	0	254	258.97	259.01	258.97	0	0	72.04	4.95	201.26	0
INUNDATION	200	-57.55	LTAf	33.2	253.2	254.23	254.23	254.6	0.099021	2.7	16.8	12.3	16.46	1
INUNDATION	132	-135.53	LTAf	33.2	247.5	251.59	248.87	251.6	0.000045	0.39	35.8	84.07	30.27	0.08
INUNDATION	131	-151.32	LTAf	33.2	249.23	251.58		251.6	0.000153	0.56	37.6	59.12	35.58	0.14
INUNDATION	130	-199.19	LTAf	33.2	250.3	251.35		251.56	0.005656	2.02	22.85	16.47	22.23	0.75
INUNDATION	129	-267.07	LTAf	33.2	249.39	251.4		251.43	0.000476	0.77	39.71	43.19	38.86	0.23
INUNDATION	128	-310.91	LTAf	33.2	249.14	251.35		251.4	0.000746	1	30.42	33.51	29.35	0.29
INUNDATION	127	-355.17	LTAf	33.2	249.13	251.34		251.37	0.000476	0.8	39.27	41.95	38.43	0.24
INUNDATION	126	-406.75	LTAf	33.2	247.47	251.34		251.35	0.000082	0.4	53.07	82.14	51.02	0.1
INUNDATION	125	-450.39	LTAf	33.2	248.3	251.32		251.35	0.000283	0.67	38.49	49.83	36.84	0.18
INUNDATION	124	-512.31	LTAf	33.2	248.4	251.3		251.33	0.00029	0.67	38.32	49.38	36.81	0.19
INUNDATION	123	-561.32	LTAf	33.2	249	251.22		251.29	0.00163	1.24	30.26	26.77	29.15	0.41
INUNDATION	122	-644.31	LTAf	33.2	249.2	250.72	250.72	250.99	0.011445	2.31	27.54	14.37	26.89	1.01
INUNDATION	121	-659.97	LTAf	33.2	246.52	249.16	249.78	250.56	0.040971	5.25	9.21	6.32	5.79	1.6
INUNDATION	120	-675.22	LTAf	33.2	246.58	247.82	248.41	249.8	0.053185	6.23	7.29	5.33	6.55	2.21
INUNDATION	119	-698.11	LTAf	33.2	246.64	248.62	248.38	248.82	0.00503	1.97	22.19	16.86	21.16	0.7
INUNDATION	118	-759.15	LTAf	33.2	246.5	248.76		248.76	0.000014	0.21	97.86	168.05	96.24	0.05
INUNDATION	116	-849.58	LTAf	33.2	246.9	248.75		248.76	0.000017	0.18	126.75	186.12	126.37	0.05
INUNDATION	115	-916.21	LTAf	33.2	246.93	248.75		248.75	0.000012	0.15	150.8	220.05	150.42	0.04
INUNDATION	114	-939.43	LTAf	33.2	246.85	248.75		248.75	0.000017	0.18	131.97	190.19	131.1	0.05
INUNDATION	112	-1092.32	LTAf	33.2	246.85	248.75		248.75	0.000022	0.21	112.77	163.67	111.66	0.05
INUNDATION	110	-1232.26	LTAf	33.2	246.9	248.75		248.75	0.000023	0.21	113.49	163.41	112.06	0.05
INUNDATION	109	-1281.15	LTAf	33.2	246.95	248.73		248.74	0.000154	0.46	61.46	72.16	61.01	0.14
INUNDATION	108	-1325.95	LTAf	33.2	246.95	248.73		248.74	0.000071	0.35	68.07	94.95	67.58	0.09
INUNDATION	106	-1483.86	LTAf	33.2	246.95	248.72		248.73	0.000077	0.36	65.99	91.41	65.49	0.1
INUNDATION	104	-1626.58	LTAf	33.2	246.95	248.71		248.72	0.000069	0.34	69.8	96.51	69.26	0.09
INUNDATION	100	-1924.13	LTAf	33.2	246.9	248.67		248.69	0.000147	0.5	49.51	66.5	49	0.14
INUNDATION	10		LTAf	33.2	246.9	247.71		247.83	0.004541	1.49	41.07	22.24	40.91	0.65
INUNDATION	9		LTAf	33.2	246.9	247.71		247.82	0.004717	1.51	40.93	21.96	40.77	0.66
INUNDATION	8		LTAf	33.2	246.9	247.7		247.82	0.004911	1.53	40.78	21.67	40.62	0.67
INUNDATION	7		LTAf	33.2	246.9	247.69		247.82	0.005128	1.55	40.62	21.35	40.46	0.68
INUNDATION	6		LTAf	33.2	246.9	247.68		247.81	0.005372	1.58	40.45	21.02	40.29	0.7
INUNDATION	5		LTAf	33.2	246.9	247.68		247.81	0.005649	1.61	40.27	20.67	40.11	0.71
INUNDATION	4		LTAf	33.2	246.9	247.66		247.8	0.006018	1.64	40.04	20.24	39.88	0.74
INUNDATION	3		LTAf	33.2	246.9	247.65		247.8	0.006466	1.68	39.79	19.76	39.63	0.76
INUNDATION	2		LTAf	33.2	246.9	247.64		247.79	0.007072	1.73	39.5	19.17	39.34	0.79
INUNDATION	1		LTAf	33.2	246.9	247.56	247.56	247.77	0.012112	2.06	38.29	16.12	38.15	1.01