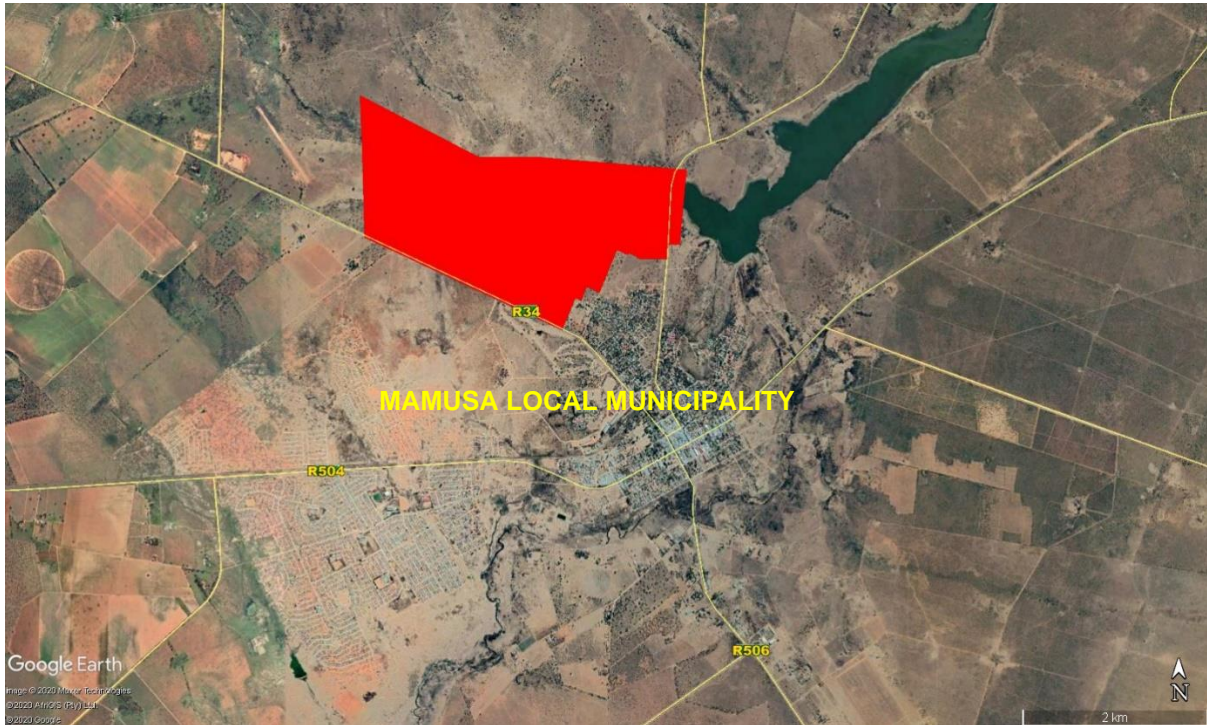


**FLOOD LINE DELINEATION OF THE 1:100 YEAR FLOOD LINES:
PROPOSED TOWNSHIP IPELEGENG EXTENTION 12: MAMUSA
LOCAL MUNICIPALITY: NORTH-WEST PROVINCE**



CLIENT: MAXIM PLANNING SOLUTIONS

CWT Consulting

REPORT No. CWT 402020

DATE: 22 SEPTEMBER 2020

CONTENTS

1. INTRODUCTION

2. LOCATION

3. HYDROLOGY

3.1 Rainfall Data

3.2 Catchments of the stream

3.3 Characteristics of the Catchment at the Study Site

4. FLOOD PEAKS

4.1 The Effect of Dams on the Flood Peaks

4.2 Methods used to calculate the Flood Peaks

4.2.1 Analysis Methodology

4.2.2 Statistical Methods

4.2.3 Deterministic Methods

4.2.4 Results of the Deterministic Flood Peak Calculations

4.2.5 Recommended Flood Peaks

5. DESCRIPTION OF CALCULATION

5.1 Hydraulic Model

5.2 Procedure

6. STREAM GEOMETRY

7. RESULTS OF THE CALCULATION

8. REFERENCES

9. ADDENDA – SEE NEXT PAGE

ADDENDA

ADDENDUM 1	1:100 YEAR FLOOD LINES IN THE STREAM
ADDENDUM 2	LAYOUT OF ALL THE FLOOD LINE SECTIONS
ADDENDUM 3	1: 100 YEAR FLOOD LEVELS & DETAILS
ADDENDUM 4	CROSS SECTIONS: 1:100 YEAR FLOOD
ADDENDUM 5	LONGITUDINAL SECTION 1: 100 YR FLOOD
ADDENDUM 6	STREAM FLOOD PEAK CALCULATIONS

**FLOOD LINE DELINEATION OF THE 1:100 YEAR FLOOD LINES:
PROPOSED TOWNSHIP IPELEGENG EXTENTION 12: MAMUSA
LOCAL MUNICIPALITY: NORTH-WEST PROVINCE**

CLIENT

Company	MAXIM PLANNING SOLUTIONS
Contact Person	KOOT RAUBENHEIMER
Adress	Unit 35 Corpus Novem Office Park, 35 Dr Yusuf Dadoo Avenue, Wilkoppies, Klerksdorp, 2571 PO Box 6848, Flamwood, 2572
Tel No.	(018) 468 6366
Cell	083 263 4960
Fax No.	(018) 468 6378
E-mail	koot@maxim.co.za

1. INTRODUCTION

CWT Consulting was appointed by the **Maxim Planning Solutions** to calculate the 1:100 year flood levels in **an unnamed stream** at a proposed new development, **Ipelegeng Extention 12** in the local municipality of **Mamusa**, North-West Province. According to **section 144 of the National Water Act (ACT No. 36 of 1998)** as amended, no person may establish a development unless the layout plan shows (in a form acceptable to the local authority concerned) lines indicating the maximum level likely to be reached by floodwaters on average once in every 100 years.

The area to be developed is riparian to a non-perennial stream and the 1:100 year flood lines must therefore be shown on the layout plans.

2. LOCATION

The location of the area to be developed is shown below.

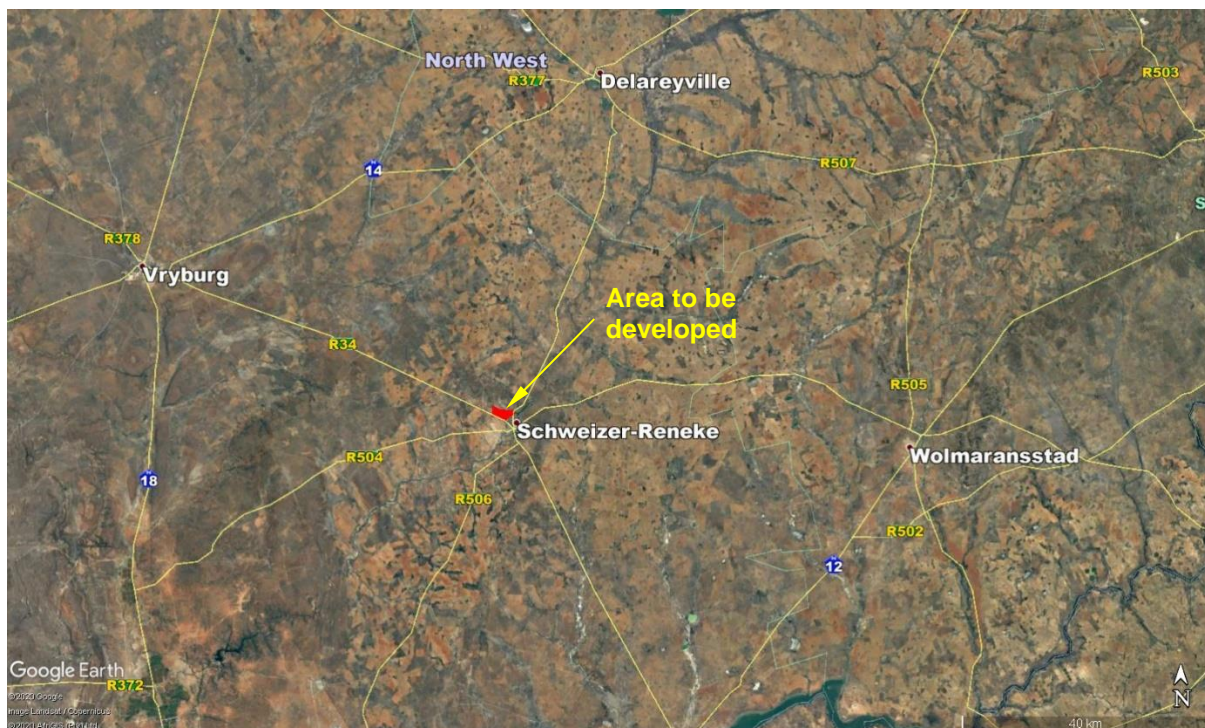


Figure 1

3. Hydrology

3.1 Rainfall Data

The rainfall data in **Table 2** below was derived using software to estimate the storm rainfall in any catchment where coordinates of a reference point in the catchment is used. This program implements procedures to estimate design rainfall in South Africa developed by JC Smithers and RE Schulze. Funding for this project was obtained from the Water Research Commission through a project **entitled "Rainfall Statistics for Design Flood Estimation in South Africa" (WRC Project K5/1060)**, and from the University of Natal Research Fund. Details of the procedures are contained in the **WRC Report No. 1060/1/03** entitled "Design Rainfall and Flood Estimation in South Africa" by JC Smithers and RE Schulze. The software was developed by MJ Gorven. The Weather Bureau stations nearest to the reference point in the study area were used to determine the point storm rainfall depths for the 1:100 year storm associated with the two catchments.

The study area is located in the **C31E** quaternary drainage area.

The 4 nearest Weather Bureau stations used are listed in **Table 1**.

The coordinates of the reference point in the catchment are:

Latitude: 27° 8' 30.75"S

Longitude: 25°16' 12.57"E

The data was extracted from Daily Rainfall Estimate Database File updated to 2020.

Name of the Weather Bureau station	Number of the Weather Bureau station	Distance from the Reference point km	Length of record Years
SCHWEIZER-RENEKE (POS)	0397581AW	6,5	41
SCHWEIZER-RENEKE (POL)	0397581_W	8	67
ZANDFONTEIN	0397588_W	15,4	38
HOLPAN	0397704_W	17,7	34

Table 1

Mean annual precipitation at the reference point: **523 mm**

Precipitations in **mm** associated with various storm durations are given in **Table2**.

Storm Duration minutes/hours	Rainfall Return Period (RP)	
	50 Year	100 Year
5m	17.9	20
10m	26.8	29.9
15m	33.9	37.9
30m	45.3	50.5
45m	53.7	59.9
1h	60.5	67.5
1.5h	71.6	79.9
2h	80.7	90.1
4h	93.3	104.1
6h	101.6	113.3
8h	107.8	120.3

Table 2

3.2 Catchment of the Stream

The streams draining stormwater to **the study area** are shown below in **Figure 2**.

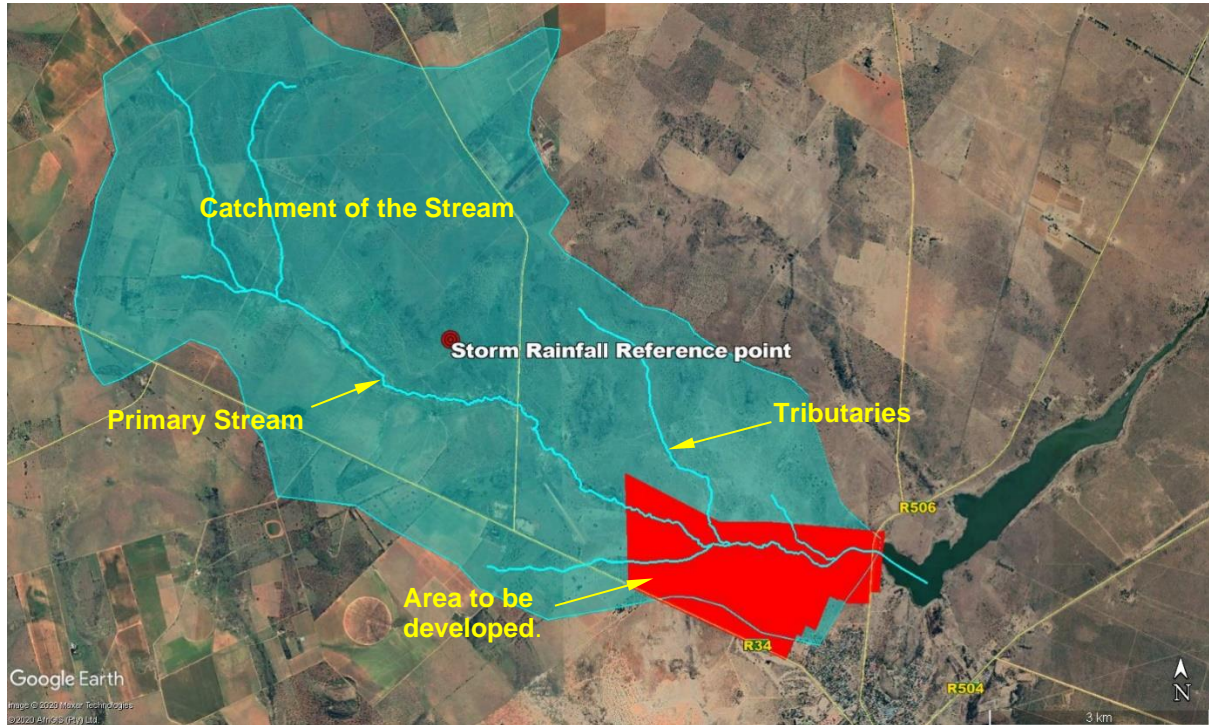


Figure 2

3.3 Characteristics of the catchment at the study site

Area of catchment:	52,4	km ²
Length of longest watercourse:	13,8	km
Equal area height difference:	76,1	m
10 – 85 slope height difference:	77,3	m
Distance to catchment centroid:	6,6	km
Time of concentration	198	minutes

4. FLOOD PEAKS

4.1 The Effect of Dams on the Flood Peaks

The effect of any dam in the catchment was not taken into account because the *1:100 year flood peak **will not be attenuated** by 2% or more by a dam with a smaller storage capacity than at least **6 times** the total mean annual runoff (MAR) of the catchment draining into the dam.*

No dam in the catchment that qualifies to this rule, exists.

4.2 Methods used to calculate the Flood Peak

4.2.1 Analysis Methodology

The final recommended 1:100 year flood peaks were calculated after considering both **statistical methods** or **deterministic methods**.

Both totally different types of flood peak calculation were therefore considered to determine the final recommended 1:100 year flood peaks at the study site.

4.2.2 Statistical Methods

No flood records for floods in the stream exist and Statistical Methods can therefore not be used.

4.2.3 Deterministic Methods

Various different deterministic methods were used to calculate the flood hydrology for the catchment as this increases the accuracy of the final flood peak calculation. All the methods used take the following into account:

- Evaporation during rain storm
- Wind during rainstorm
- Depth of rainstorm
- Infiltration
- Flow roughness of area.

The following deterministic methods were considered:

1. Rational method as implemented by the Department of Water Affairs.
2. Rational method using an alternative implementation.
3. Standard Design Flood (SDF) method as developed at Pretoria University.
4. The Unit Hydrograph method.
5. The Herbst Algorithm as developed at the Department of Water & Sanitation.
6. The HRU Algorithm as developed at the University of Witwatersrand.
7. The Stephenson & Ten Noordt Algorithms as developed at the University of Witwatersrand.

Due to the size of the catchment the results obtained from only the **first four deterministic methods** mentioned above are deemed to be applicable for this study.

See **Addendum 6**.

4.2.4 Results of the Deterministic Flood Peak Calculations

The **1:100 year** results for the stream are listed in **Table 3**.

Method	Flood peak Stream m ³ /s
Rational Method as implemented by the Department of Water & Sanitation	170
Rational Method using Alternative Algorithms	206
Standard Design Flood Method (SDF) developed at the University of Pretoria	94
The Unit Hydrograph Method	29

Table 3

4.2.5 Recommended Flood Peaks

The flood peaks were calculated by applying the following algorithm:

$$Q_T = [RMDWS + RMA + UH + SDF] / N$$

With:

- Q_T** = Flood peak for return period T
- T** = Return Period: either 50 Year or 100 Year
- RMDWS** = Rational method DWS
- RMA** = Rational method Alternative Algorithms
- UH** = Unit Hydrograph method
- SDF** = SDF method
- N** = 4

The recommended flood peak in m³/s (cubic meter per second) at the site are listed in **Table 4** below:

See **Addendum 6** for the flood peak calculations.

Return Period Year	Flood peak m ³ /s
1:100	125

Table 4

5. DESCRIPTION OF THE FLOOD LINE CALCULATION

5.1 Hydraulic Model

The HEC-RAS model was used to perform the calculations of the water levels.

HEC-RAS is an integrated package of hydraulic analysis programs, in which the user interacts with the system through the use of a Graphical User Interface (GUI).

HEC-RAS is equipped to model a network of channels, a dendritic system or a single river reach. Certain simplifications must be made in order to model some complex flow situations using the HEC-RAS one-dimensional approach. It is capable of modeling subcritical, supercritical, and mixed flow regime flow along with the effects of bridges, culverts, weirs, and structures.

5.2 Procedure

The basic computational procedure of HEC-RAS for steady flow is based on the solution of the one-dimensional energy equation. Energy losses are evaluated by friction and contraction / expansion.

The momentum equation may be used in situations where the water surface profile is rapidly varied. These situations include hydraulic jumps, hydraulics of bridges, and evaluating profiles at river confluences. For unsteady flow, HEC-RAS solves the full, dynamic, Saint-Venant equation using an implicit, finite difference method. The unsteady flow equation solver was adapted from Dr. Robert L. Barkau's UNET package.

6. STREAM GEOMETRY

The detailed contour survey was supplied by the client on 17 September 2020. The geometry of the stream at the study site was obtained from **24 cross sections**. These sections were used to compile the geometric model.

Sections were interpolated at **5 m** interval to facilitate the calculations. The layout of all the **cross sections** is shown in **Figure 3 (Addendum 2)**.



Figure 3

7. RESULTS OF THE CALCULATION

The flow condition in the stream during the 1:100 year flood is sub-critical flow and the water level at **Section 1** (the section at the downstream end of the study area) will be controlled by the **Wentzel Dam**. The spillway level (Full Supply Level) or **FSL** of the **Wentzel Dam** is **1297,70 m**. The back-water effect of the spillway will raise the water level at **Section 1** with **1,53 m** above the spillway to **1299,23 m**.

The 1:100 year flood lines are detailed and geo-referenced in **Addendum 1 (Drawing CWT 402020/1)**. The exact positions of the sections to compile the model are shown in **Addendum 2 (Drawing CWT 402020/2)**. The detailed flood peak calculations, water level calculations, cross sections and longitudinal section of the **stream** are included in **Addenda 3 to 7**. The 1:100 year flood lines are shown below in **Figure 4**.



Figure 4

The flow depth during the 1:100 year flood in the **Stream** will be almost **6 meter** at **Section 1** (which is in the inflow to the Wentzel Dam). Both the Road – and the Rail

Bridges will not be overtopped. The backwater influence of the **Wentzel Dam** will end in the vicinity of the Rail Bridge from where the Rail bridge will have a further backwater effect up to the position of **Section 9** which is **800 meter** upstream of **Section 1**. The maximum **flow velocity** will be approximately **2 m/s (Addendum 3)** in the area between Section 19 and Section 20. Scouring will occur in this area.

8. REFERENCES

1. *Water Research Commission (WRC) Report TT 382/08.*
2. *Department of Water Affairs publication TR102.*
3. *Hydrological Research Unit Report No. 1/72.*
4. *Planet-GIS Geographic Information System (GIS) software suite.*
5. *QGIS software suite.*
6. *Other relative documents and spreadsheets in my possession.*
7. *Department of Water Affairs publication Floods Database.*
8. *GN.704 of 4 June 1999.*
9. *GN.636 of 23 August 2013.*
10. *HRU. Report 2/78. Depth-Duration-Frequency diagram.*
11. *Hec-Ras model software.*
12. *Department of Transport. (2005) Road Infrastructure Strategic Framework for South Africa. (RISFSA).*
13. *Kruger. E.J. (editor)(2006) Drainage Manual South African Roads Agency Limited.*
14. *WRC Report WR2012 (updated to 2019)*
15. *WRC Report 1060/1/03: Design Rainfall and Flood Estimation in SA.*

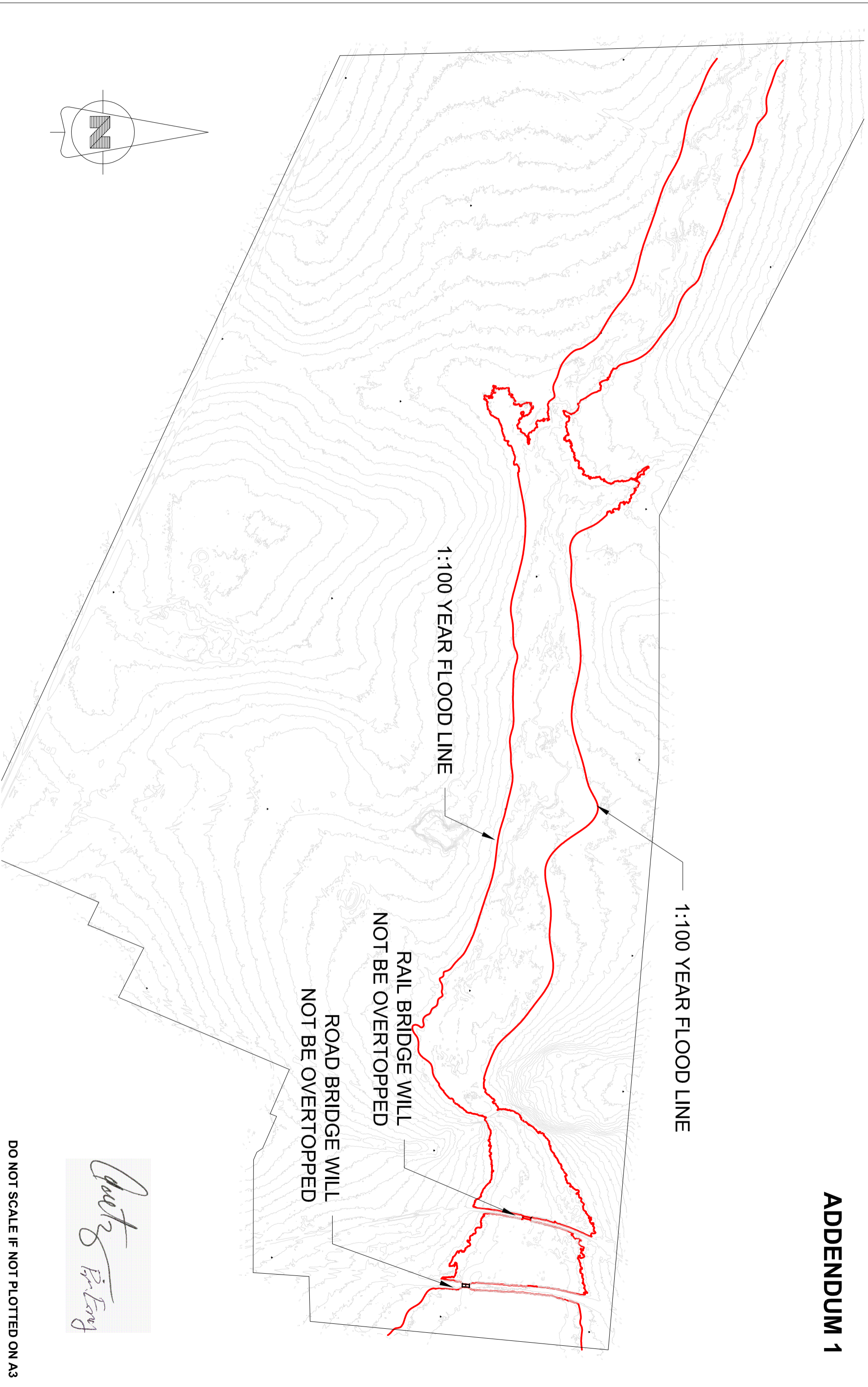


C. J. COETZER (Pr Eng)

ECSA REG NUMBER: 800339


Date: 22 September 2020

ADDENDUM 1



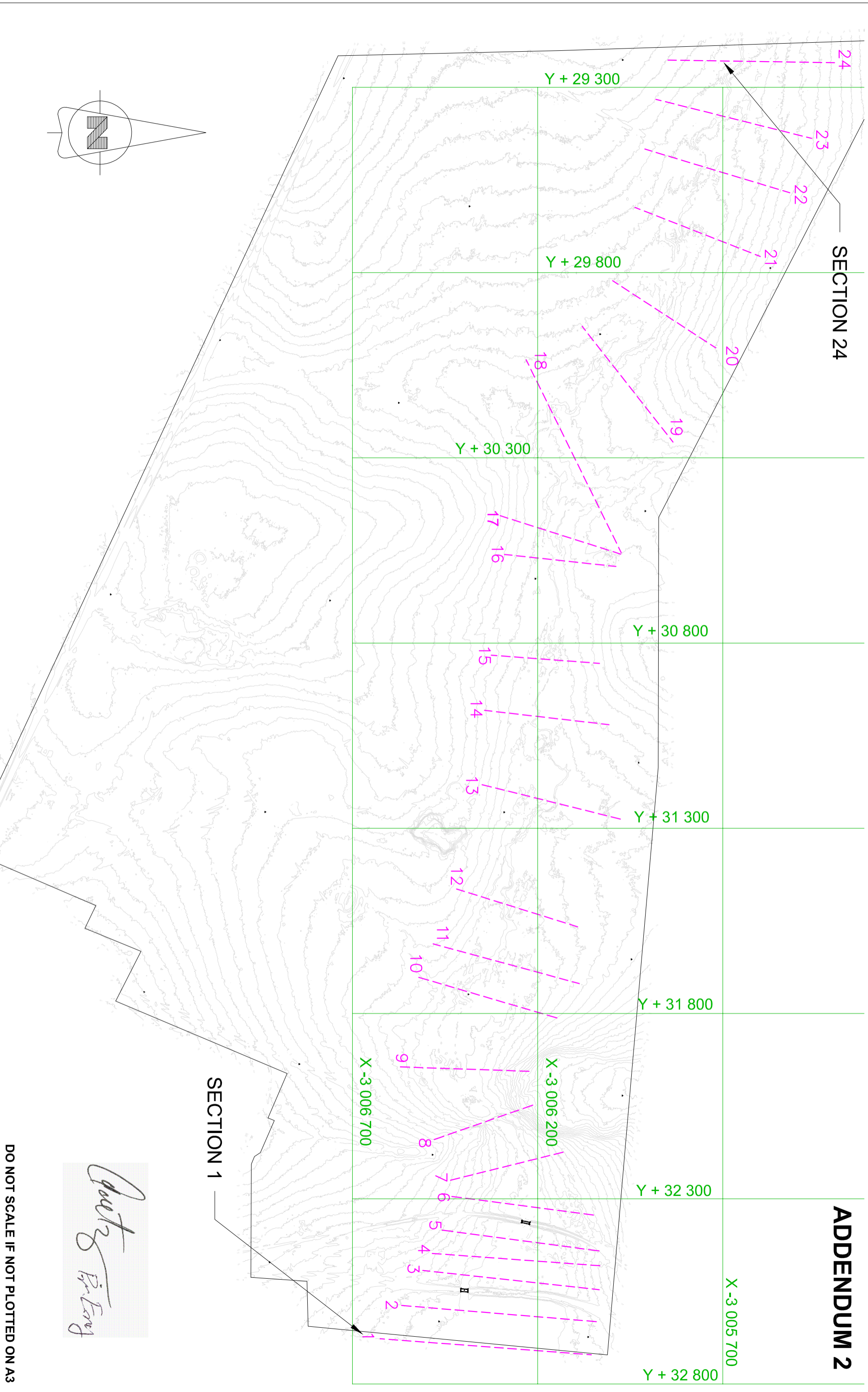
Cas Coetzer B.Sc. Eng

DO NOT SCALE IF NOT PLOTTED ON A3

PROJECT 1:100 YEAR FLOOD LINES: IPELEGENG EXTENTION 12: MAMUSA LOCAL MUNICIPALITY: NORTH-WEST PROVINCE	DESIGNED C. J. COETZER	ENGINEER C. J. COETZER No. 800339	DATE 21 SEP 2020	CWT CONSULTING 882 BEYERS STREET RIETFOONTEIN, PRETORIA 0084 TEL 083 230 8752 FAX 012 331 1033 e-mail cas52@mweb.co.za	 CWT <i>Specialists in Water Technology</i> Cas Coetzer PrEng BSc.Eng (Civ JprEng) M ECSA MSACE	PLAN NO. CWT 402020/1
--	----------------------------------	--	----------------------------	---	---	---------------------------------

SECTION 24

ADDENDUM 2



SECTION 1

Cas Coetzer B.Sc. Eng

DO NOT SCALE IF NOT PLOTTED ON A3

PROJECT FLOOD LINE SECTIONS LAYOUT: IPELEGENG EXTENTION 12: MAMUSA LOCAL MUNICIPALITY: NORTH-WEST PROVINCE		DESIGNED C. J. COETZER	ENGINEER C. J. COETZER No. 800339	DATE 21 SEP 2020	CWT CONSULTING 882 BEYERS STREET RIETFontein, PRETORIA 0084 TEL 083 230 8752 FAX 012 331 1033 e-mail cas52@mweb.co.za		CWT <i>Specialist in Water Technology</i> Cas Coetzer BEng BSc Eng (Civ) (Pret) MESA MSACE	PLAN NO. CWT 402020/2
--	--	----------------------------------	--	----------------------------	--	--	--	---------------------------------

ADDENDUM 3

HEC-RAS Plan: Plan 01 River: 1 Reach: 1 Profile: PF 1

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
1	1	125.00	1293.50	1299.23	1294.36	1299.23	0.000004	0.09	1383.16	523.12	0.02
1	1.0526*	125.00	1293.54	1299.23		1299.23	0.000004	0.09	1361.93	518.71	0.02
1	1.1053*	125.00	1293.57	1299.23		1299.23	0.000004	0.09	1341.03	514.47	0.02
1	1.1579*	125.00	1293.61	1299.23		1299.23	0.000004	0.09	1320.86	510.28	0.02
1	1.2105*	125.00	1293.65	1299.23		1299.23	0.000004	0.10	1300.86	506.39	0.02
1	1.2632*	125.00	1293.68	1299.23		1299.23	0.000004	0.10	1281.36	500.91	0.02
1	1.3158*	125.00	1293.72	1299.23		1299.23	0.000004	0.10	1262.40	493.79	0.02
1	1.3684*	125.00	1293.76	1299.23		1299.23	0.000005	0.10	1243.94	487.94	0.02
1	1.4211*	125.00	1293.80	1299.23		1299.23	0.000005	0.10	1225.79	481.70	0.02
1	1.4737*	125.00	1293.83	1299.23		1299.23	0.000005	0.10	1208.18	473.06	0.02
1	1.5263*	125.00	1293.87	1299.23		1299.23	0.000005	0.10	1191.27	469.20	0.02
1	1.5789*	125.00	1293.91	1299.23		1299.23	0.000005	0.11	1174.48	465.49	0.02
1	1.6316*	125.00	1293.94	1299.23		1299.23	0.000005	0.11	1158.07	461.65	0.02
1	1.6842*	125.00	1293.98	1299.23		1299.23	0.000006	0.11	1142.02	457.63	0.02
1	1.7368*	125.00	1294.02	1299.23		1299.23	0.000006	0.11	1126.46	453.98	0.02
1	1.7895*	125.00	1294.05	1299.23		1299.23	0.000006	0.11	1111.17	450.33	0.02
1	1.8421*	125.00	1294.09	1299.23		1299.23	0.000006	0.11	1096.51	447.31	0.02
1	1.8947*	125.00	1294.13	1299.23		1299.23	0.000007	0.12	1081.95	444.28	0.02
1	1.9474*	125.00	1294.16	1299.23		1299.23	0.000007	0.12	1067.87	441.18	0.02
1	2	125.00	1294.20	1299.23		1299.23	0.000007	0.12	1054.14	438.07	0.02
1	2.5	Culvert									
1	3	125.00	1294.40	1299.58	1295.31	1299.58	0.000008	0.14	914.86	348.63	0.03
1	3.0833*	125.00	1294.62	1299.58		1299.58	0.000009	0.14	878.41	343.94	0.03
1	3.1667*	125.00	1294.83	1299.58		1299.58	0.000011	0.15	843.48	341.56	0.03
1	3.2500*	125.00	1295.05	1299.58		1299.58	0.000012	0.15	810.19	334.84	0.03
1	3.3333*	125.00	1295.27	1299.58		1299.58	0.000013	0.16	778.91	332.52	0.03
1	3.4167*	125.00	1295.48	1299.58		1299.58	0.000015	0.17	748.94	330.32	0.04
1	3.5000*	125.00	1295.70	1299.58		1299.58	0.000017	0.17	720.65	326.46	0.04
1	3.5833*	125.00	1295.92	1299.58		1299.58	0.000019	0.18	693.68	324.51	0.04
1	3.6667*	125.00	1296.13	1299.58		1299.58	0.000021	0.19	668.19	321.55	0.04
1	3.7500*	125.00	1296.35	1299.58		1299.58	0.000024	0.19	644.35	318.87	0.04
1	3.8333*	125.00	1296.57	1299.58		1299.58	0.000026	0.20	622.09	313.55	0.05
1	3.9167*	125.00	1296.78	1299.58		1299.58	0.000032	0.21	602.79	306.63	0.05
1	4	125.00	1297.00	1299.58		1299.58	0.000035	0.21	584.97	304.23	0.05
1	4.0909*	125.00	1297.00	1299.58		1299.58	0.000038	0.22	565.88	302.79	0.05
1	4.1818*	125.00	1297.00	1299.58		1299.58	0.000042	0.23	547.09	302.88	0.06
1	4.2727*	125.00	1297.00	1299.58		1299.58	0.000046	0.24	528.78	301.42	0.06
1	4.3636*	125.00	1297.00	1299.58		1299.58	0.000051	0.24	510.75	301.37	0.06
1	4.4545*	125.00	1297.00	1299.58		1299.58	0.000056	0.25	493.21	301.65	0.06
1	4.5455*	125.00	1297.00	1299.58		1299.58	0.000062	0.26	475.82	307.21	0.07
1	4.6364*	125.00	1297.00	1299.58		1299.58	0.000068	0.27	459.20	303.74	0.07
1	4.7273*	125.00	1297.00	1299.58		1299.58	0.000076	0.28	442.88	299.67	0.07
1	4.8182*	125.00	1297.00	1299.58		1299.58	0.000084	0.29	427.03	294.44	0.08
1	4.9091*	125.00	1297.00	1299.58		1299.58	0.000093	0.30	411.43	289.22	0.08
1	5	125.00	1297.00	1299.58		1299.58	0.000102	0.32	396.37	284.06	0.09
1	5.5	Culvert									
1	6	125.00	1297.50	1301.05	1298.09	1301.05	0.000011	0.16	780.47	281.89	0.03
1	6.0417*	125.00	1297.50	1301.05		1301.05	0.000012	0.17	756.92	279.74	0.03
1	6.0833*	125.00	1297.50	1301.05		1301.05	0.000013	0.17	733.05	276.17	0.03
1	6.1250*	125.00	1297.50	1301.05		1301.05	0.000014	0.18	709.00	274.49	0.04
1	6.1667*	125.00	1297.50	1301.05		1301.05	0.000016	0.18	684.83	272.52	0.04
1	6.2083*	125.00	1297.50	1301.05		1301.05	0.000018	0.19	660.52	271.58	0.04
1	6.2500*	125.00	1297.50	1301.05		1301.05	0.000020	0.20	636.16	269.00	0.04
1	6.2917*	125.00	1297.50	1301.05		1301.05	0.000022	0.20	611.97	265.47	0.04
1	6.3333*	125.00	1297.50	1301.05		1301.05	0.000025	0.21	588.17	263.20	0.05
1	6.3750*	125.00	1297.50	1301.05		1301.05	0.000028	0.22	564.83	258.99	0.05
1	6.4167*	125.00	1297.50	1301.05		1301.05	0.000031	0.23	542.19	253.35	0.05
1	6.4583*	125.00	1297.50	1301.05		1301.05	0.000033	0.24	521.44	242.22	0.05
1	6.5000*	125.00	1297.50	1301.05		1301.06	0.000035	0.25	502.92	233.04	0.05
1	6.5417*	125.00	1297.50	1301.05		1301.06	0.000038	0.26	485.96	225.73	0.06
1	6.5833*	125.00	1297.50	1301.05		1301.06	0.000040	0.27	470.09	215.68	0.06
1	6.6250*	125.00	1297.50	1301.05		1301.06	0.000043	0.27	455.45	211.40	0.06
1	6.6667*	125.00	1297.50	1301.05		1301.06	0.000046	0.28	441.39	204.25	0.06
1	6.7083*	125.00	1297.50	1301.05		1301.06	0.000048	0.29	428.07	196.50	0.06
1	6.7500*	125.00	1297.50	1301.05		1301.06	0.000052	0.30	415.47	192.62	0.07
1	6.7917*	125.00	1297.50	1301.05		1301.06	0.000057	0.31	402.90	190.24	0.07
1	6.8333*	125.00	1297.50	1301.05		1301.06	0.000061	0.32	390.42	185.49	0.07
1	6.8750*	125.00	1297.50	1301.05		1301.06	0.000066	0.33	378.24	181.05	0.07
1	6.9167*	125.00	1297.50	1301.05		1301.06	0.000071	0.34	366.21	176.78	0.08
1	6.9583*	125.00	1297.50	1301.05		1301.06	0.000076	0.35	354.35	172.67	0.08
1	7	125.00	1297.50	1301.05		1301.06	0.000083	0.36	342.66	168.68	0.08
1	7.0357*	125.00	1297.50	1301.05		1301.06	0.000092	0.38	327.87	162.75	0.09
1	7.0714*	125.00	1297.50	1301.05		1301.06	0.000099	0.40	314.21	155.22	0.09
1	7.1071*	125.00	1297.50	1301.05		1301.06	0.000107	0.41	302.34	149.32	0.09
1	7.1429*	125.00	1297.50	1301.05		1301.06	0.000115	0.43	291.61	143.93	0.10
1	7.1786*	125.00	1297.50	1301.05		1301.06	0.000123	0.44	281.61	138.71	0.10
1	7.2143*	125.00	1297.50	1301.05		1301.06	0.000130	0.46	272.35	132.66	0.10

Reach	River Sta	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)	Flow Area (m2)	Top Width (m)	Froude # Chl
1	7.2500*	125.00	1297.50	1301.05		1301.06	0.000138	0.47	263.97	128.47	0.11
1	7.2857*	125.00	1297.50	1301.05		1301.07	0.000146	0.49	256.12	124.43	0.11
1	7.3214*	125.00	1297.50	1301.05		1301.07	0.000156	0.50	248.62	121.44	0.11
1	7.3571*	125.00	1297.50	1301.05		1301.07	0.000168	0.52	241.29	119.17	0.12
1	7.3929*	125.00	1297.50	1301.05		1301.07	0.000181	0.53	234.02	116.78	0.12
1	7.4286*	125.00	1297.50	1301.05		1301.07	0.000196	0.55	226.84	114.47	0.12
1	7.4643*	125.00	1297.50	1301.05		1301.07	0.000213	0.57	219.70	112.54	0.13
1	7.5000*	125.00	1297.50	1301.06		1301.07	0.000232	0.59	212.57	110.51	0.14
1	7.5357*	125.00	1297.50	1301.06		1301.07	0.000253	0.61	205.43	108.15	0.14
1	7.5714*	125.00	1297.50	1301.06		1301.08	0.000275	0.63	198.38	105.49	0.15
1	7.6071*	125.00	1297.50	1301.06		1301.08	0.000296	0.65	191.48	102.14	0.15
1	7.6429*	125.00	1297.50	1301.06		1301.08	0.000320	0.68	184.72	98.84	0.16
1	7.6786*	125.00	1297.50	1301.06		1301.08	0.000345	0.70	178.12	95.60	0.16
1	7.7143*	125.00	1297.50	1301.06		1301.08	0.000370	0.73	171.72	91.82	0.17
1	7.7500*	125.00	1297.50	1301.06		1301.09	0.000396	0.76	165.53	88.13	0.18
1	7.7857*	125.00	1297.50	1301.06		1301.09	0.000424	0.78	159.50	84.46	0.18
1	7.8214*	125.00	1297.50	1301.06		1301.09	0.000453	0.81	153.64	80.80	0.19
1	7.8571*	125.00	1297.50	1301.06		1301.10	0.000481	0.84	148.00	77.00	0.19
1	7.8929*	125.00	1297.50	1301.06		1301.10	0.000512	0.88	142.54	73.39	0.20
1	7.9286*	125.00	1297.50	1301.06		1301.10	0.000543	0.91	137.24	69.76	0.21
1	7.9643*	125.00	1297.50	1301.06		1301.11	0.000575	0.95	132.13	66.16	0.21
1	8	125.00	1297.50	1301.06		1301.11	0.000607	0.98	127.18	62.59	0.22
1	8.0323*	125.00	1297.60	1301.07		1301.11	0.000519	0.92	136.50	66.47	0.20
1	8.0645*	125.00	1297.69	1301.08		1301.12	0.000458	0.86	144.88	70.30	0.19
1	8.0968*	125.00	1297.79	1301.08		1301.12	0.000415	0.82	152.42	74.12	0.18
1	8.1290*	125.00	1297.89	1301.09		1301.12	0.000385	0.79	159.04	77.98	0.18
1	8.1613*	125.00	1297.98	1301.09		1301.12	0.000364	0.76	164.82	81.80	0.17
1	8.1935*	125.00	1298.08	1301.10		1301.13	0.000350	0.74	169.77	85.52	0.17
1	8.2258*	125.00	1298.18	1301.10		1301.13	0.000342	0.72	173.85	89.20	0.16
1	8.2581*	125.00	1298.27	1301.10		1301.13	0.000339	0.71	177.10	92.97	0.16
1	8.2903*	125.00	1298.37	1301.11		1301.13	0.000342	0.70	179.50	96.80	0.16
1	8.3226*	125.00	1298.47	1301.11		1301.13	0.000350	0.69	181.07	100.66	0.16
1	8.3548*	125.00	1298.57	1301.11		1301.13	0.000363	0.69	181.79	104.49	0.17
1	8.3871*	125.00	1298.66	1301.11		1301.14	0.000381	0.69	181.69	108.34	0.17
1	8.4194*	125.00	1298.76	1301.11		1301.14	0.000406	0.69	180.74	112.18	0.17
1	8.4516*	125.00	1298.86	1301.12		1301.14	0.000439	0.70	178.98	116.02	0.18
1	8.4839*	125.00	1298.95	1301.12		1301.14	0.000481	0.71	176.40	119.86	0.19
1	8.5161*	125.00	1299.05	1301.12		1301.15	0.000535	0.72	173.05	123.70	0.20
1	8.5484*	125.00	1299.15	1301.12		1301.15	0.000605	0.74	168.83	127.59	0.21
1	8.5806*	125.00	1299.24	1301.12		1301.15	0.000692	0.76	163.82	130.86	0.22
1	8.6129*	125.00	1299.34	1301.12		1301.16	0.000805	0.79	158.04	133.97	0.23
1	8.6452*	125.00	1299.44	1301.13		1301.16	0.000927	0.82	151.57	134.24	0.25
1	8.6774*	125.00	1299.53	1301.13		1301.17	0.001088	0.86	144.56	134.48	0.27
1	8.7097*	125.00	1299.63	1301.13		1301.17	0.001309	0.91	136.93	134.89	0.29
1	8.7419*	125.00	1299.73	1301.14		1301.18	0.001604	0.97	128.81	134.83	0.32
1	8.7742*	125.00	1299.82	1301.14		1301.19	0.002007	1.04	120.20	134.18	0.35
1	8.8065*	125.00	1299.92	1301.14		1301.21	0.002667	1.12	111.17	136.66	0.40
1	8.8387*	125.00	1300.02	1301.15		1301.23	0.003680	1.23	101.66	139.12	0.46
1	8.8710*	125.00	1300.11	1301.16		1301.25	0.005246	1.36	91.90	141.04	0.54
1	8.9032*	125.00	1300.21	1301.17		1301.29	0.007711	1.52	82.25	142.68	0.64
1	8.9355*	125.00	1300.31	1301.20		1301.34	0.011353	1.70	73.68	144.82	0.76
1	8.9677*	125.00	1300.40	1301.24		1301.42	0.015705	1.85	67.46	148.23	0.88
1	9	125.00	1300.50	1301.32	1301.29	1301.50	0.018134	1.90	65.62	154.04	0.93
1	9.0244*	125.00	1300.51	1301.46		1301.57	0.007829	1.44	86.78	165.05	0.63
1	9.0488*	125.00	1300.52	1301.51		1301.60	0.006325	1.34	93.47	169.36	0.57
1	9.0732*	125.00	1300.54	1301.55		1301.63	0.005620	1.28	97.99	174.38	0.54
1	9.0976*	125.00	1300.55	1301.59		1301.66	0.005352	1.22	102.05	186.09	0.53
1	9.1220*	125.00	1300.56	1301.62		1301.69	0.004918	1.18	105.68	190.59	0.51
1	9.1463*	125.00	1300.57	1301.64		1301.71	0.004539	1.15	108.73	192.69	0.49
1	9.1707*	125.00	1300.59	1301.67		1301.73	0.004255	1.12	111.32	194.71	0.47
1	9.1951*	125.00	1300.60	1301.69		1301.75	0.004040	1.10	113.51	196.63	0.46
1	9.2195*	125.00	1300.61	1301.71		1301.77	0.003856	1.08	115.56	198.56	0.45
1	9.2439*	125.00	1300.62	1301.73		1301.79	0.003711	1.07	117.34	200.43	0.44
1	9.2683*	125.00	1300.63	1301.75		1301.81	0.003585	1.05	119.00	202.28	0.44
1	9.2927*	125.00	1300.65	1301.77		1301.83	0.003486	1.04	120.43	204.14	0.43
1	9.3171*	125.00	1300.66	1301.79		1301.85	0.003407	1.03	121.71	205.96	0.43
1	9.3415*	125.00	1300.67	1301.81		1301.86	0.003319	1.02	122.98	207.28	0.42
1	9.3659*	125.00	1300.68	1301.83		1301.88	0.003243	1.01	124.13	208.52	0.42
1	9.3902*	125.00	1300.70	1301.84		1301.89	0.003173	1.00	125.21	209.62	0.41
1	9.4146*	125.00	1300.71	1301.86		1301.91	0.003118	0.99	126.17	210.87	0.41
1	9.4390*	125.00	1300.72	1301.88		1301.93	0.003063	0.98	127.14	212.13	0.41
1	9.4634*	125.00	1300.73	1301.89		1301.94	0.003029	0.98	127.88	213.40	0.40
1	9.4878*	125.00	1300.74	1301.91		1301.96	0.002992	0.97	128.67	214.71	0.40
1	9.5122*	125.00	1300.76	1301.92		1301.97	0.002955	0.97	129.49	216.14	0.40
1	9.5366*	125.00	1300.77	1301.94		1301.98	0.002926	0.96	130.22	217.54	0.40
1	9.5610*	125.00	1300.78	1301.95		1302.00	0.002903	0.96	130.85	218.94	0.39
1	9.5854*	125.00	1300.79	1301.97		1302.01	0.002878	0.95	131.56	220.42	0.39

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
1	9.6098*	125.00	1300.81	1301.98		1302.03	0.002864	0.95	132.14	222.06	0.39
1	9.6341*	125.00	1300.82	1302.00		1302.04	0.002842	0.94	132.83	223.64	0.39
1	9.6585*	125.00	1300.83	1302.01		1302.06	0.002830	0.94	133.39	225.30	0.39
1	9.6829*	125.00	1300.84	1302.03		1302.07	0.002812	0.93	134.09	227.17	0.39
1	9.7073*	125.00	1300.85	1302.04		1302.08	0.002810	0.93	134.54	229.02	0.39
1	9.7317*	125.00	1300.87	1302.05		1302.10	0.002810	0.93	135.10	231.36	0.39
1	9.7561*	125.00	1300.88	1302.07		1302.11	0.002817	0.92	135.71	234.42	0.39
1	9.7805*	125.00	1300.89	1302.08		1302.13	0.002820	0.92	136.37	237.47	0.39
1	9.8049*	125.00	1300.90	1302.10		1302.14	0.002814	0.91	137.08	240.17	0.39
1	9.8293*	125.00	1300.92	1302.11		1302.15	0.002800	0.91	137.60	241.55	0.38
1	9.8537*	125.00	1300.93	1302.13		1302.17	0.002780	0.90	138.25	243.05	0.38
1	9.8780*	125.00	1300.94	1302.14		1302.18	0.002763	0.90	138.83	244.50	0.38
1	9.9024*	125.00	1300.95	1302.15		1302.20	0.002750	0.90	139.38	246.03	0.38
1	9.9268*	125.00	1300.96	1302.17		1302.21	0.002740	0.89	139.90	247.68	0.38
1	9.9512*	125.00	1300.98	1302.18		1302.22	0.002738	0.89	140.31	249.36	0.38
1	9.9756*	125.00	1300.99	1302.20		1302.24	0.002732	0.89	140.81	251.16	0.38
1	10	125.00	1301.00	1302.21		1302.25	0.002722	0.88	141.42	253.16	0.38
1	10.048*	125.00	1301.00	1302.22		1302.26	0.002479	0.87	144.40	248.65	0.36
1	10.095*	125.00	1301.00	1302.24		1302.27	0.002309	0.85	146.42	244.06	0.35
1	10.143*	125.00	1301.00	1302.25		1302.28	0.002190	0.85	147.59	239.31	0.34
1	10.190*	125.00	1301.00	1302.26		1302.30	0.002104	0.84	148.09	234.26	0.34
1	10.238*	125.00	1301.00	1302.27		1302.31	0.002052	0.84	148.01	229.59	0.34
1	10.286*	125.00	1301.00	1302.28		1302.32	0.002029	0.85	147.32	224.97	0.33
1	10.333*	125.00	1301.00	1302.29		1302.32	0.002035	0.86	146.04	220.59	0.34
1	10.381*	125.00	1301.00	1302.30		1302.33	0.002069	0.87	144.23	216.49	0.34
1	10.429*	125.00	1301.00	1302.31		1302.35	0.002138	0.88	142.09	213.74	0.34
1	10.476*	125.00	1301.00	1302.32		1302.36	0.002208	0.90	139.46	208.97	0.35
1	10.524*	125.00	1301.00	1302.32		1302.37	0.002309	0.92	136.45	204.61	0.36
1	10.571*	125.00	1301.00	1302.33		1302.38	0.002450	0.94	133.02	200.71	0.37
1	10.619*	125.00	1301.00	1302.34		1302.39	0.002636	0.97	129.33	197.61	0.38
1	10.667*	125.00	1301.00	1302.36		1302.41	0.002908	1.00	125.46	197.16	0.40
1	10.714*	125.00	1301.00	1302.37		1302.42	0.003207	1.03	121.61	196.26	0.42
1	10.762*	125.00	1301.00	1302.38		1302.44	0.003635	1.06	118.15	200.59	0.44
1	10.810*	125.00	1301.00	1302.40		1302.46	0.004100	1.08	115.81	208.80	0.46
1	10.857*	125.00	1301.00	1302.42		1302.48	0.004515	1.08	115.76	224.24	0.48
1	10.905*	125.00	1301.00	1302.44		1302.50	0.004286	1.05	118.93	230.74	0.47
1	10.952*	125.00	1301.00	1302.47		1302.52	0.003929	1.02	122.97	234.95	0.45
1	11	125.00	1301.00	1302.49		1302.54	0.003528	0.98	128.14	240.21	0.43
1	11.031*	125.00	1301.05	1302.50		1302.56	0.003959	1.01	123.27	237.80	0.45
1	11.063*	125.00	1301.09	1302.52		1302.58	0.004399	1.05	118.99	235.56	0.47
1	11.094*	125.00	1301.14	1302.54		1302.60	0.004829	1.08	115.26	233.28	0.49
1	11.125*	125.00	1301.19	1302.56		1302.63	0.005222	1.11	112.19	231.29	0.51
1	11.156*	125.00	1301.23	1302.59		1302.65	0.005568	1.14	109.72	229.54	0.53
1	11.188*	125.00	1301.28	1302.61		1302.68	0.005889	1.16	107.59	227.94	0.54
1	11.219*	125.00	1301.33	1302.64		1302.71	0.005841	1.18	105.98	218.16	0.54
1	11.250*	125.00	1301.38	1302.67		1302.74	0.005810	1.19	105.00	212.33	0.54
1	11.281*	125.00	1301.42	1302.69		1302.77	0.005743	1.20	104.21	206.56	0.54
1	11.313*	125.00	1301.47	1302.72		1302.80	0.005756	1.21	103.45	203.13	0.54
1	11.344*	125.00	1301.52	1302.75		1302.82	0.005785	1.22	102.73	200.36	0.54
1	11.375*	125.00	1301.56	1302.78		1302.85	0.005784	1.22	102.16	197.61	0.54
1	11.406*	125.00	1301.61	1302.80		1302.88	0.005386	1.23	101.48	184.17	0.53
1	11.438*	125.00	1301.66	1302.83		1302.91	0.005327	1.24	100.74	179.36	0.53
1	11.469*	125.00	1301.70	1302.85		1302.93	0.005311	1.25	99.99	175.65	0.53
1	11.500*	125.00	1301.75	1302.88		1302.96	0.005330	1.26	99.28	172.99	0.53
1	11.531*	125.00	1301.80	1302.90		1302.99	0.005395	1.27	98.47	171.03	0.53
1	11.563*	125.00	1301.84	1302.93		1303.01	0.005500	1.28	97.60	169.72	0.54
1	11.594*	125.00	1301.89	1302.95		1303.04	0.005659	1.29	96.59	168.95	0.55
1	11.625*	125.00	1301.94	1302.98		1303.07	0.005833	1.31	95.68	168.79	0.55
1	11.656*	125.00	1301.98	1303.01		1303.10	0.006025	1.32	94.85	169.22	0.56
1	11.688*	125.00	1302.03	1303.04		1303.13	0.006282	1.33	93.82	169.91	0.57
1	11.719*	125.00	1302.08	1303.07		1303.16	0.006244	1.35	92.80	164.55	0.57
1	11.750*	125.00	1302.13	1303.10		1303.19	0.006569	1.36	91.76	166.22	0.59
1	11.781*	125.00	1302.17	1303.13		1303.22	0.006910	1.38	90.81	168.22	0.60
1	11.813*	125.00	1302.22	1303.16		1303.26	0.007270	1.39	89.91	170.46	0.61
1	11.844*	125.00	1302.27	1303.19		1303.29	0.007627	1.40	89.14	172.93	0.62
1	11.875*	125.00	1302.31	1303.23		1303.33	0.007907	1.41	88.75	175.71	0.63
1	11.906*	125.00	1302.36	1303.27		1303.37	0.008194	1.41	88.37	178.55	0.64
1	11.938*	125.00	1302.41	1303.31		1303.41	0.008448	1.42	88.15	181.56	0.65
1	11.969*	125.00	1302.45	1303.35		1303.46	0.008696	1.42	87.99	184.70	0.66
1	12	125.00	1302.50	1303.40		1303.50	0.008841	1.42	88.16	187.94	0.66
1	12.017*	125.00	1302.51	1303.45		1303.54	0.006633	1.30	96.24	188.61	0.58
1	12.033*	125.00	1302.52	1303.49		1303.57	0.005640	1.24	100.94	188.17	0.54
1	12.050*	125.00	1302.53	1303.52		1303.60	0.005045	1.20	104.17	187.23	0.51
1	12.067*	125.00	1302.53	1303.55		1303.62	0.004713	1.17	106.59	188.42	0.50
1	12.083*	125.00	1302.54	1303.58		1303.64	0.004526	1.15	108.59	191.49	0.49
1	12.100*	125.00	1302.55	1303.60		1303.66	0.004269	1.13	110.24	190.34	0.48
1	12.117*	125.00	1302.56	1303.62		1303.69	0.004078	1.12	111.50	189.15	0.47

Reach	River Sta	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)	Flow Area (m2)	Top Width (m)	Froude # Chl
1	12.133*	125.00	1302.57	1303.64		1303.71	0.003930	1.11	112.42	187.82	0.46
1	12.150*	125.00	1302.58	1303.66		1303.72	0.003814	1.11	113.10	186.42	0.45
1	12.167*	125.00	1302.58	1303.68		1303.74	0.003723	1.10	113.60	185.06	0.45
1	12.183*	125.00	1302.59	1303.70		1303.76	0.003652	1.10	113.89	183.58	0.44
1	12.200*	125.00	1302.60	1303.72		1303.78	0.003594	1.10	114.10	182.18	0.44
1	12.217*	125.00	1302.61	1303.74		1303.80	0.003554	1.10	114.11	180.68	0.44
1	12.233*	125.00	1302.62	1303.75		1303.81	0.003523	1.10	114.03	179.17	0.44
1	12.250*	125.00	1302.63	1303.77		1303.83	0.003500	1.10	113.91	177.78	0.44
1	12.267*	125.00	1302.63	1303.79		1303.85	0.003488	1.10	113.65	176.29	0.44
1	12.283*	125.00	1302.64	1303.80		1303.87	0.003488	1.10	113.27	174.81	0.44
1	12.300*	125.00	1302.65	1303.82		1303.88	0.003494	1.11	112.86	173.42	0.44
1	12.317*	125.00	1302.66	1303.84		1303.90	0.003503	1.11	112.42	172.05	0.44
1	12.333*	125.00	1302.67	1303.86		1303.92	0.003518	1.12	111.92	170.68	0.44
1	12.350*	125.00	1302.68	1303.87		1303.94	0.003541	1.12	111.38	169.41	0.44
1	12.367*	125.00	1302.68	1303.89		1303.95	0.003568	1.13	110.79	168.12	0.44
1	12.383*	125.00	1302.69	1303.91		1303.97	0.003606	1.13	110.14	166.95	0.45
1	12.400*	125.00	1302.70	1303.92		1303.99	0.003646	1.14	109.48	165.79	0.45
1	12.417*	125.00	1302.71	1303.94		1304.01	0.003690	1.15	108.81	164.70	0.45
1	12.433*	125.00	1302.72	1303.96		1304.03	0.003738	1.16	108.14	163.74	0.45
1	12.450*	125.00	1302.73	1303.98		1304.05	0.003789	1.16	107.48	162.88	0.46
1	12.467*	125.00	1302.73	1304.00		1304.07	0.003849	1.17	106.77	162.06	0.46
1	12.483*	125.00	1302.74	1304.02		1304.09	0.003932	1.18	106.10	162.08	0.46
1	12.500*	125.00	1302.75	1304.03		1304.11	0.003999	1.19	105.47	161.70	0.47
1	12.517*	125.00	1302.76	1304.05		1304.13	0.004077	1.19	104.83	161.53	0.47
1	12.533*	125.00	1302.77	1304.07		1304.15	0.004158	1.20	104.20	161.47	0.48
1	12.550*	125.00	1302.78	1304.09		1304.17	0.004243	1.21	103.61	161.60	0.48
1	12.567*	125.00	1302.78	1304.11		1304.19	0.004332	1.21	103.07	161.98	0.49
1	12.583*	125.00	1302.79	1304.14		1304.21	0.004429	1.22	102.57	162.68	0.49
1	12.600*	125.00	1302.80	1304.16		1304.23	0.004522	1.22	102.15	163.52	0.49
1	12.617*	125.00	1302.81	1304.18		1304.26	0.004619	1.23	101.80	164.69	0.50
1	12.633*	125.00	1302.82	1304.20		1304.28	0.004768	1.23	101.61	167.89	0.50
1	12.650*	125.00	1302.83	1304.23		1304.30	0.004851	1.23	101.55	169.80	0.51
1	12.667*	125.00	1302.83	1304.25		1304.33	0.004931	1.23	101.66	172.36	0.51
1	12.683*	125.00	1302.84	1304.28		1304.35	0.005008	1.23	101.88	175.30	0.51
1	12.700*	125.00	1302.85	1304.30		1304.38	0.005155	1.22	102.38	181.36	0.52
1	12.717*	125.00	1302.86	1304.33		1304.40	0.005325	1.21	103.33	190.18	0.52
1	12.733*	125.00	1302.87	1304.36		1304.43	0.005345	1.19	104.71	197.19	0.52
1	12.750*	125.00	1302.88	1304.38		1304.45	0.005382	1.17	106.51	206.84	0.52
1	12.767*	125.00	1302.88	1304.41		1304.48	0.005311	1.15	108.83	216.15	0.52
1	12.783*	125.00	1302.89	1304.44		1304.51	0.005140	1.12	111.61	224.68	0.51
1	12.800*	125.00	1302.90	1304.47		1304.53	0.004924	1.09	114.78	233.34	0.50
1	12.817*	125.00	1302.91	1304.50		1304.55	0.004555	1.06	117.88	235.22	0.48
1	12.833*	125.00	1302.92	1304.52		1304.58	0.004244	1.04	120.52	235.78	0.46
1	12.850*	125.00	1302.93	1304.54		1304.60	0.003999	1.02	122.81	236.34	0.45
1	12.867*	125.00	1302.93	1304.56		1304.62	0.003791	1.00	124.86	236.59	0.44
1	12.883*	125.00	1302.94	1304.58		1304.63	0.003625	0.99	126.59	236.72	0.43
1	12.900*	125.00	1302.95	1304.60		1304.65	0.003482	0.98	128.13	236.77	0.42
1	12.917*	125.00	1302.96	1304.62		1304.67	0.003355	0.96	129.57	236.74	0.42
1	12.933*	125.00	1302.97	1304.64		1304.68	0.003243	0.95	130.89	236.67	0.41
1	12.950*	125.00	1302.98	1304.66		1304.70	0.003199	0.94	132.33	240.76	0.41
1	12.967*	125.00	1302.98	1304.67		1304.72	0.003083	0.93	133.78	240.59	0.40
1	12.983*	125.00	1302.99	1304.69		1304.73	0.002981	0.93	135.10	240.39	0.39
1	13	125.00	1303.00	1304.70		1304.75	0.002883	0.92	136.41	240.14	0.39
1	13.022*	125.00	1303.03	1304.72		1304.76	0.002600	0.95	130.94	237.75	0.41
1	13.044*	125.00	1303.07	1304.73		1304.78	0.002666	0.99	125.91	235.42	0.43
1	13.067*	125.00	1303.10	1304.75		1304.80	0.004072	1.03	121.54	233.20	0.45
1	13.089*	125.00	1303.13	1304.76		1304.82	0.004483	1.06	117.66	231.09	0.48
1	13.111*	125.00	1303.17	1304.78		1304.85	0.004870	1.09	114.35	229.04	0.49
1	13.133*	125.00	1303.20	1304.81		1304.87	0.005093	1.12	111.65	223.11	0.51
1	13.156*	125.00	1303.23	1304.83		1304.90	0.005403	1.14	109.34	221.32	0.52
1	13.178*	125.00	1303.27	1304.86		1304.93	0.005571	1.16	107.48	216.96	0.53
1	13.200*	125.00	1303.30	1304.88		1304.95	0.005699	1.18	105.97	213.02	0.53
1	13.222*	125.00	1303.33	1304.91		1304.98	0.005786	1.19	104.71	209.09	0.54
1	13.244*	125.00	1303.37	1304.94		1305.01	0.005942	1.21	103.56	207.52	0.55
1	13.267*	125.00	1303.40	1304.97		1305.04	0.006047	1.22	102.72	206.04	0.55
1	13.289*	125.00	1303.43	1305.00		1305.07	0.006140	1.23	101.99	204.74	0.55
1	13.311*	125.00	1303.47	1305.03		1305.10	0.006221	1.23	101.35	203.52	0.56
1	13.333*	125.00	1303.50	1305.06		1305.13	0.006242	1.24	101.02	202.38	0.56
1	13.356*	125.00	1303.53	1305.09		1305.17	0.006273	1.24	100.65	201.29	0.56
1	13.378*	125.00	1303.57	1305.12		1305.20	0.006312	1.25	100.26	200.26	0.56
1	13.400*	125.00	1303.60	1305.15		1305.23	0.006298	1.25	100.13	199.28	0.56
1	13.422*	125.00	1303.63	1305.18		1305.26	0.006287	1.25	99.98	198.29	0.56
1	13.444*	125.00	1303.67	1305.21		1305.29	0.006283	1.25	99.81	197.33	0.56
1	13.467*	125.00	1303.70	1305.24		1305.32	0.006281	1.25	99.62	196.38	0.56
1	13.489*	125.00	1303.73	1305.27		1305.35	0.006252	1.26	99.56	195.42	0.56
1	13.511*	125.00	1303.77	1305.30		1305.38	0.006266	1.26	99.30	194.46	0.56
1	13.533*	125.00	1303.80	1305.33		1305.42	0.006203	1.26	99.25	192.73	0.56

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
1	13.556*	125.00	1303.83	1305.36		1305.45	0.006112	1.26	99.26	190.65	0.56
1	13.578*	125.00	1303.87	1305.39		1305.48	0.006121	1.26	99.03	189.77	0.56
1	13.600*	125.00	1303.90	1305.43		1305.51	0.006087	1.26	99.03	188.96	0.56
1	13.622*	125.00	1303.93	1305.46		1305.54	0.006046	1.26	99.08	188.23	0.56
1	13.644*	125.00	1303.97	1305.49		1305.57	0.006069	1.26	98.82	187.53	0.56
1	13.667*	125.00	1304.00	1305.52		1305.60	0.006042	1.26	98.82	186.90	0.56
1	13.689*	125.00	1304.03	1305.55		1305.63	0.006008	1.26	98.86	186.29	0.55
1	13.711*	125.00	1304.07	1305.58		1305.66	0.006010	1.27	98.74	185.74	0.55
1	13.733*	125.00	1304.10	1305.61		1305.69	0.005988	1.27	98.73	185.22	0.55
1	13.756*	125.00	1304.13	1305.64		1305.72	0.005977	1.27	98.68	184.72	0.55
1	13.778*	125.00	1304.17	1305.66		1305.75	0.005978	1.27	98.58	184.24	0.55
1	13.800*	125.00	1304.20	1305.69		1305.78	0.005961	1.27	98.58	183.83	0.55
1	13.822*	125.00	1304.23	1305.72		1305.81	0.005963	1.27	98.48	183.41	0.55
1	13.844*	125.00	1304.27	1305.75		1305.84	0.005947	1.27	98.44	182.82	0.55
1	13.867*	125.00	1304.30	1305.78		1305.86	0.005733	1.27	98.29	177.13	0.55
1	13.889*	125.00	1304.33	1305.81		1305.89	0.005755	1.27	98.08	176.69	0.55
1	13.911*	125.00	1304.37	1305.84		1305.92	0.005775	1.28	97.89	176.30	0.55
1	13.933*	125.00	1304.40	1305.87		1305.95	0.005773	1.28	97.73	175.46	0.55
1	13.956*	125.00	1304.43	1305.90		1305.98	0.005779	1.28	97.56	174.80	0.55
1	13.978*	125.00	1304.47	1305.92		1306.01	0.005768	1.28	97.48	174.17	0.55
1	14	125.00	1304.50	1305.95		1306.04	0.005776	1.28	97.31	173.60	0.55
1	14.031*	125.00	1304.52	1305.98		1306.06	0.005637	1.27	98.06	173.81	0.54
1	14.063*	125.00	1304.53	1306.01		1306.09	0.005498	1.27	98.80	173.89	0.54
1	14.094*	125.00	1304.55	1306.04		1306.12	0.005413	1.26	99.25	173.84	0.53
1	14.125*	125.00	1304.56	1306.06		1306.14	0.005343	1.25	99.74	174.37	0.53
1	14.156*	125.00	1304.58	1306.09		1306.17	0.005264	1.25	100.13	174.18	0.53
1	14.188*	125.00	1304.59	1306.12		1306.20	0.005182	1.24	100.55	173.99	0.52
1	14.219*	125.00	1304.61	1306.14		1306.22	0.005111	1.24	100.91	173.82	0.52
1	14.250*	125.00	1304.63	1306.17		1306.25	0.005055	1.24	101.19	173.62	0.52
1	14.281*	125.00	1304.64	1306.19		1306.27	0.005007	1.23	101.42	173.41	0.51
1	14.313*	125.00	1304.66	1306.22		1306.30	0.004940	1.23	101.78	173.22	0.51
1	14.344*	125.00	1304.67	1306.24		1306.32	0.004903	1.23	101.95	173.03	0.51
1	14.375*	125.00	1304.69	1306.27		1306.34	0.004858	1.22	102.18	172.84	0.51
1	14.406*	125.00	1304.70	1306.29		1306.37	0.004806	1.22	102.46	172.69	0.51
1	14.438*	125.00	1304.72	1306.31		1306.39	0.004762	1.22	102.70	172.51	0.50
1	14.469*	125.00	1304.73	1306.34		1306.41	0.004709	1.21	103.01	172.41	0.50
1	14.500*	125.00	1304.75	1306.36		1306.44	0.004669	1.21	103.16	171.96	0.50
1	14.531*	125.00	1304.77	1306.38		1306.46	0.004593	1.21	103.40	170.86	0.50
1	14.563*	125.00	1304.78	1306.41		1306.48	0.004526	1.21	103.70	170.27	0.49
1	14.594*	125.00	1304.80	1306.43		1306.50	0.004471	1.20	103.97	169.85	0.49
1	14.625*	125.00	1304.81	1306.45		1306.52	0.004417	1.20	104.30	169.64	0.49
1	14.656*	125.00	1304.83	1306.47		1306.55	0.004339	1.19	104.62	168.72	0.48
1	14.688*	125.00	1304.84	1306.50		1306.57	0.004225	1.19	104.89	166.47	0.48
1	14.719*	125.00	1304.86	1306.52		1306.59	0.004156	1.19	105.25	165.83	0.48
1	14.750*	125.00	1304.88	1306.54		1306.61	0.004104	1.18	105.50	165.27	0.47
1	14.781*	125.00	1304.89	1306.56		1306.63	0.004049	1.18	105.80	164.81	0.47
1	14.813*	125.00	1304.91	1306.58		1306.65	0.004000	1.18	106.11	164.50	0.47
1	14.844*	125.00	1304.92	1306.60		1306.67	0.003953	1.17	106.41	164.19	0.47
1	14.875*	125.00	1304.94	1306.62		1306.69	0.003912	1.17	106.66	163.90	0.46
1	14.906*	125.00	1304.95	1306.64		1306.71	0.003858	1.17	107.03	163.61	0.46
1	14.938*	125.00	1304.97	1306.65		1306.72	0.003820	1.17	107.29	163.38	0.46
1	14.969*	125.00	1304.98	1306.67		1306.74	0.003771	1.16	107.65	163.15	0.46
1	15	125.00	1305.00	1306.69		1306.76	0.003732	1.16	107.94	162.95	0.45
1	15.019*	125.00	1305.02	1306.71		1306.78	0.003722	1.16	107.91	162.53	0.45
1	15.037*	125.00	1305.04	1306.73		1306.80	0.003710	1.16	107.91	162.16	0.45
1	15.056*	125.00	1305.06	1306.75		1306.82	0.003700	1.16	107.89	161.78	0.45
1	15.074*	125.00	1305.07	1306.77		1306.83	0.003685	1.16	107.91	161.37	0.45
1	15.093*	125.00	1305.09	1306.78		1306.85	0.003678	1.16	107.87	160.99	0.45
1	15.111*	125.00	1305.11	1306.80		1306.87	0.003674	1.16	107.80	160.61	0.45
1	15.130*	125.00	1305.13	1306.82		1306.89	0.003663	1.16	107.78	160.19	0.45
1	15.148*	125.00	1305.15	1306.84		1306.91	0.003652	1.16	107.77	159.80	0.45
1	15.167*	125.00	1305.17	1306.86		1306.93	0.003644	1.16	107.73	159.40	0.45
1	15.185*	125.00	1305.19	1306.88		1306.94	0.003644	1.16	107.62	159.01	0.45
1	15.204*	125.00	1305.20	1306.89		1306.96	0.003638	1.16	107.57	158.59	0.45
1	15.222*	125.00	1305.22	1306.91		1306.98	0.003627	1.16	107.55	158.19	0.45
1	15.241*	125.00	1305.24	1306.93		1307.00	0.003621	1.16	107.49	157.80	0.45
1	15.259*	125.00	1305.26	1306.95		1307.02	0.003622	1.16	107.37	157.39	0.45
1	15.278*	125.00	1305.28	1306.97		1307.03	0.003618	1.16	107.30	157.00	0.45
1	15.296*	125.00	1305.30	1306.98		1307.05	0.003610	1.17	107.26	156.57	0.45
1	15.315*	125.00	1305.32	1307.00		1307.07	0.003607	1.17	107.17	156.18	0.45
1	15.333*	125.00	1305.33	1307.02		1307.09	0.003609	1.17	107.04	155.75	0.45
1	15.352*	125.00	1305.35	1307.04		1307.11	0.003603	1.17	106.99	155.37	0.45
1	15.370*	125.00	1305.37	1307.05		1307.12	0.003594	1.17	106.95	154.95	0.45
1	15.389*	125.00	1305.39	1307.07		1307.14	0.003589	1.17	106.88	154.55	0.45
1	15.407*	125.00	1305.41	1307.09		1307.16	0.003586	1.17	106.79	154.12	0.45
1	15.426*	125.00	1305.43	1307.11		1307.18	0.003588	1.17	106.65	153.71	0.45
1	15.444*	125.00	1305.44	1307.13		1307.20	0.003576	1.17	106.65	153.29	0.45

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
1	15.463*	125.00	1305.46	1307.14		1307.21	0.003573	1.17	106.56	152.89	0.45
1	15.481*	125.00	1305.48	1307.16		1307.23	0.003567	1.17	106.46	152.35	0.45
1	15.500*	125.00	1305.50	1307.18		1307.25	0.003555	1.18	106.37	151.61	0.45
1	15.519*	125.00	1305.52	1307.20		1307.27	0.003542	1.18	106.26	150.83	0.45
1	15.537*	125.00	1305.54	1307.21		1307.28	0.003534	1.18	106.14	150.15	0.45
1	15.556*	125.00	1305.56	1307.23		1307.30	0.003523	1.18	106.04	149.46	0.45
1	15.574*	125.00	1305.57	1307.25		1307.32	0.003510	1.18	105.99	148.85	0.45
1	15.593*	125.00	1305.59	1307.27		1307.34	0.003504	1.18	105.85	148.17	0.45
1	15.611*	125.00	1305.61	1307.28		1307.35	0.003498	1.18	105.75	147.63	0.45
1	15.630*	125.00	1305.63	1307.30		1307.37	0.003490	1.18	105.66	147.05	0.45
1	15.648*	125.00	1305.65	1307.32		1307.39	0.003480	1.18	105.60	146.53	0.45
1	15.667*	125.00	1305.67	1307.34		1307.41	0.003479	1.19	105.45	145.98	0.45
1	15.685*	125.00	1305.69	1307.35		1307.42	0.003474	1.19	105.35	145.49	0.45
1	15.704*	125.00	1305.70	1307.37		1307.44	0.003474	1.19	105.21	145.00	0.45
1	15.722*	125.00	1305.72	1307.39		1307.46	0.003467	1.19	105.14	144.51	0.45
1	15.741*	125.00	1305.74	1307.41		1307.48	0.003466	1.19	105.02	144.08	0.45
1	15.759*	125.00	1305.76	1307.42		1307.49	0.003466	1.19	104.88	143.60	0.45
1	15.778*	125.00	1305.78	1307.44		1307.51	0.003465	1.19	104.77	143.18	0.45
1	15.796*	125.00	1305.80	1307.46		1307.53	0.003460	1.19	104.69	142.77	0.45
1	15.815*	125.00	1305.82	1307.47		1307.55	0.003460	1.20	104.58	142.37	0.45
1	15.833*	125.00	1305.83	1307.49		1307.56	0.003461	1.20	104.45	141.97	0.45
1	15.852*	125.00	1305.85	1307.51		1307.58	0.003461	1.20	104.34	141.59	0.45
1	15.870*	125.00	1305.87	1307.53		1307.60	0.003455	1.20	104.28	141.20	0.45
1	15.889*	125.00	1305.89	1307.54		1307.62	0.003453	1.20	104.20	140.86	0.45
1	15.907*	125.00	1305.91	1307.56		1307.63	0.003455	1.20	104.07	140.47	0.45
1	15.926*	125.00	1305.93	1307.58		1307.65	0.003458	1.20	103.96	140.15	0.45
1	15.944*	125.00	1305.94	1307.59		1307.67	0.003458	1.20	103.86	139.83	0.45
1	15.963*	125.00	1305.96	1307.61		1307.69	0.003457	1.20	103.77	139.49	0.45
1	15.981*	125.00	1305.98	1307.63		1307.70	0.003461	1.21	103.65	139.19	0.45
1	16	125.00	1306.00	1307.65		1307.72	0.003462	1.21	103.54	138.84	0.45
1	16.059*	125.00	1306.00	1307.66		1307.74	0.003633	1.23	101.62	137.39	0.46
1	16.118*	125.00	1306.00	1307.68		1307.76	0.003785	1.25	100.00	136.09	0.47
1	16.176*	125.00	1306.00	1307.70		1307.78	0.003866	1.27	98.74	134.00	0.47
1	16.235*	125.00	1306.00	1307.71		1307.80	0.003961	1.28	97.75	133.05	0.48
1	16.294*	125.00	1306.00	1307.73		1307.82	0.004024	1.29	97.02	132.16	0.48
1	16.353*	125.00	1306.00	1307.75		1307.84	0.004061	1.30	96.52	131.36	0.48
1	16.412*	125.00	1306.00	1307.77		1307.86	0.004062	1.30	96.30	130.62	0.48
1	16.471*	125.00	1306.00	1307.79		1307.88	0.004093	1.30	96.30	131.39	0.48
1	16.529*	125.00	1306.00	1307.81		1307.90	0.004047	1.29	96.55	131.13	0.48
1	16.588*	125.00	1306.00	1307.83		1307.92	0.004011	1.29	97.01	131.79	0.48
1	16.647*	125.00	1306.00	1307.85		1307.94	0.003961	1.28	97.61	132.60	0.48
1	16.706*	125.00	1306.00	1307.88		1307.96	0.003905	1.27	98.31	133.53	0.47
1	16.765*	125.00	1306.00	1307.90		1307.98	0.003836	1.26	99.15	134.60	0.47
1	16.824*	125.00	1306.00	1307.92		1308.00	0.003768	1.25	100.02	135.73	0.46
1	16.882*	125.00	1306.00	1307.94		1308.01	0.003687	1.24	101.05	137.01	0.46
1	16.941*	125.00	1306.00	1307.96		1308.03	0.003609	1.22	102.12	138.41	0.46
1	17	125.00	1306.00	1307.97		1308.05	0.003459	1.21	103.32	138.03	0.45
1	17.015*	125.00	1306.03	1307.99		1308.07	0.003566	1.22	102.27	137.67	0.45
1	17.029*	125.00	1306.06	1308.01		1308.09	0.003670	1.23	101.29	137.32	0.46
1	17.044*	125.00	1306.09	1308.03		1308.10	0.003771	1.25	100.37	137.02	0.46
1	17.059*	125.00	1306.12	1308.04		1308.12	0.003872	1.26	99.50	136.75	0.47
1	17.074*	125.00	1306.15	1308.06		1308.14	0.003957	1.27	98.77	136.47	0.48
1	17.088*	125.00	1306.18	1308.08		1308.16	0.004047	1.27	98.05	136.25	0.48
1	17.103*	125.00	1306.21	1308.10		1308.18	0.004121	1.28	97.45	136.04	0.48
1	17.118*	125.00	1306.24	1308.12		1308.20	0.004193	1.29	96.88	135.81	0.49
1	17.132*	125.00	1306.27	1308.14		1308.23	0.004265	1.30	96.34	135.67	0.49
1	17.147*	125.00	1306.29	1308.16		1308.25	0.004315	1.30	95.97	135.54	0.49
1	17.162*	125.00	1306.32	1308.18		1308.27	0.004364	1.31	95.60	135.41	0.50
1	17.176*	125.00	1306.35	1308.20		1308.29	0.004420	1.31	95.21	135.30	0.50
1	17.191*	125.00	1306.38	1308.23		1308.31	0.004453	1.32	94.97	135.24	0.50
1	17.206*	125.00	1306.41	1308.25		1308.34	0.004506	1.32	94.60	135.11	0.50
1	17.221*	125.00	1306.44	1308.27		1308.36	0.004534	1.32	94.41	135.08	0.51
1	17.235*	125.00	1306.47	1308.29		1308.38	0.004561	1.33	94.24	135.07	0.51
1	17.250*	125.00	1306.50	1308.32		1308.41	0.004608	1.33	94.10	135.63	0.51
1	17.265*	125.00	1306.53	1308.34		1308.43	0.004628	1.33	93.96	135.58	0.51
1	17.279*	125.00	1306.56	1308.36		1308.45	0.004643	1.33	93.86	135.53	0.51
1	17.294*	125.00	1306.59	1308.39		1308.48	0.004659	1.33	93.75	135.50	0.51
1	17.309*	125.00	1306.62	1308.41		1308.50	0.004676	1.33	93.64	135.48	0.51
1	17.324*	125.00	1306.65	1308.43		1308.52	0.004688	1.34	93.56	135.45	0.51
1	17.338*	125.00	1306.68	1308.46		1308.55	0.004701	1.34	93.48	135.44	0.51
1	17.353*	125.00	1306.71	1308.48		1308.57	0.004706	1.34	93.45	135.45	0.51
1	17.368*	125.00	1306.74	1308.50		1308.60	0.004717	1.34	93.38	135.43	0.51
1	17.382*	125.00	1306.77	1308.53		1308.62	0.004726	1.34	93.33	135.47	0.52
1	17.397*	125.00	1306.79	1308.55		1308.64	0.004731	1.34	93.30	135.46	0.52
1	17.412*	125.00	1306.82	1308.58		1308.67	0.004733	1.34	93.29	135.49	0.52
1	17.426*	125.00	1306.85	1308.60		1308.69	0.004752	1.34	93.19	135.52	0.52
1	17.441*	125.00	1306.88	1308.62		1308.72	0.004757	1.34	93.18	135.58	0.52

Reach	River Sta	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)	Flow Area (m2)	Top Width (m)	Froude # Chl
1	17.456*	125.00	1306.91	1308.65		1308.74	0.004761	1.34	93.16	135.63	0.52
1	17.471*	125.00	1306.94	1308.67		1308.76	0.004771	1.34	93.12	135.68	0.52
1	17.485*	125.00	1306.97	1308.70		1308.79	0.004772	1.34	93.14	135.76	0.52
1	17.500*	125.00	1307.00	1308.72		1308.81	0.004778	1.34	93.12	135.86	0.52
1	17.515*	125.00	1307.03	1308.74		1308.84	0.004784	1.34	93.11	135.94	0.52
1	17.529*	125.00	1307.06	1308.77		1308.86	0.004790	1.34	93.10	136.06	0.52
1	17.544*	125.00	1307.09	1308.79		1308.89	0.004797	1.34	93.09	136.17	0.52
1	17.559*	125.00	1307.12	1308.82		1308.91	0.004803	1.34	93.10	136.33	0.52
1	17.574*	125.00	1307.15	1308.84		1308.93	0.004804	1.34	93.14	136.50	0.52
1	17.588*	125.00	1307.18	1308.87		1308.96	0.004809	1.34	93.16	136.66	0.52
1	17.603*	125.00	1307.21	1308.89		1308.98	0.004820	1.34	93.14	136.84	0.52
1	17.618*	125.00	1307.24	1308.92		1309.01	0.004822	1.34	93.17	137.00	0.52
1	17.632*	125.00	1307.27	1308.94		1309.03	0.004836	1.34	93.16	137.29	0.52
1	17.647*	125.00	1307.29	1308.96		1309.06	0.004833	1.34	93.24	137.51	0.52
1	17.662*	125.00	1307.32	1308.99		1309.08	0.004838	1.34	93.28	137.78	0.52
1	17.676*	125.00	1307.35	1309.01		1309.11	0.004846	1.34	93.35	138.19	0.52
1	17.691*	125.00	1307.38	1309.04		1309.13	0.004945	1.34	93.46	140.72	0.52
1	17.706*	125.00	1307.41	1309.06		1309.15	0.004943	1.34	93.56	141.08	0.52
1	17.721*	125.00	1307.44	1309.09		1309.18	0.004940	1.33	93.68	141.48	0.52
1	17.735*	125.00	1307.47	1309.11		1309.20	0.004939	1.33	93.81	141.93	0.52
1	17.750*	125.00	1307.50	1309.14		1309.23	0.004952	1.33	93.99	142.87	0.52
1	17.765*	125.00	1307.53	1309.17		1309.25	0.004949	1.33	94.24	143.79	0.52
1	17.779*	125.00	1307.56	1309.19		1309.28	0.004957	1.32	94.43	144.67	0.52
1	17.794*	125.00	1307.59	1309.22		1309.31	0.004955	1.32	94.71	145.73	0.52
1	17.809*	125.00	1307.62	1309.24		1309.33	0.004970	1.32	94.90	146.79	0.52
1	17.824*	125.00	1307.65	1309.27		1309.36	0.004974	1.31	95.16	147.91	0.52
1	17.838*	125.00	1307.68	1309.30		1309.38	0.005493	1.29	96.66	165.68	0.54
1	17.853*	125.00	1307.71	1309.33		1309.41	0.005608	1.25	100.06	183.40	0.54
1	17.868*	125.00	1307.74	1309.36		1309.44	0.004983	1.19	105.39	191.04	0.51
1	17.882*	125.00	1307.77	1309.40		1309.46	0.004594	1.13	110.44	202.00	0.49
1	17.897*	125.00	1307.79	1309.43		1309.48	0.004670	1.07	116.65	234.42	0.49
1	17.912*	125.00	1307.82	1309.46		1309.51	0.004511	1.00	125.20	272.68	0.47
1	17.926*	125.00	1307.85	1309.49		1309.53	0.004981	0.90	138.46	377.82	0.48
1	17.941*	125.00	1307.88	1309.52		1309.55	0.004026	0.83	151.05	400.39	0.43
1	17.956*	125.00	1307.91	1309.54		1309.57	0.003367	0.77	162.18	418.18	0.40
1	17.971*	125.00	1307.94	1309.56		1309.59	0.003025	0.72	173.04	453.74	0.37
1	17.985*	125.00	1307.97	1309.58		1309.60	0.002510	0.68	183.22	454.98	0.34
1	18	125.00	1308.00	1309.59		1309.61	0.002188	0.65	192.96	467.24	0.32
1	18.024*	125.00	1308.04	1309.60		1309.63	0.003180	0.73	171.10	458.01	0.38
1	18.048*	125.00	1308.07	1309.61		1309.65	0.003052	0.82	151.54	327.72	0.39
1	18.071*	125.00	1308.11	1309.62		1309.66	0.003307	0.90	138.39	277.34	0.41
1	18.095*	125.00	1308.14	1309.63		1309.68	0.003473	0.98	127.03	232.19	0.42
1	18.119*	125.00	1308.18	1309.65		1309.71	0.004226	1.07	116.90	218.58	0.47
1	18.143*	125.00	1308.21	1309.66		1309.73	0.005222	1.16	108.06	210.48	0.52
1	18.167*	125.00	1308.25	1309.68		1309.76	0.006325	1.24	100.49	202.71	0.56
1	18.190*	125.00	1308.29	1309.71		1309.80	0.006454	1.31	95.11	179.35	0.58
1	18.214*	125.00	1308.32	1309.73		1309.83	0.006302	1.37	91.08	158.10	0.58
1	18.238*	125.00	1308.36	1309.76		1309.87	0.006863	1.42	88.06	154.97	0.60
1	18.262*	125.00	1308.39	1309.79		1309.90	0.007338	1.46	85.69	152.25	0.62
1	18.286*	125.00	1308.43	1309.83		1309.94	0.007686	1.49	83.94	149.73	0.64
1	18.310*	125.00	1308.46	1309.86		1309.98	0.006910	1.51	82.83	133.76	0.61
1	18.333*	125.00	1308.50	1309.89		1310.01	0.005960	1.52	82.45	118.35	0.58
1	18.357*	125.00	1308.54	1309.92		1310.04	0.005885	1.52	82.44	117.18	0.58
1	18.381*	125.00	1308.57	1309.95		1310.07	0.005742	1.52	82.41	114.95	0.57
1	18.405*	125.00	1308.61	1309.98		1310.10	0.005457	1.52	82.34	110.41	0.56
1	18.429*	125.00	1308.64	1310.01		1310.13	0.005396	1.52	82.12	108.74	0.56
1	18.452*	125.00	1308.68	1310.03		1310.15	0.005354	1.53	81.93	107.47	0.56
1	18.476*	125.00	1308.71	1310.06		1310.18	0.005368	1.53	81.74	107.06	0.56
1	18.500*	125.00	1308.75	1310.09		1310.21	0.005383	1.53	81.52	106.59	0.56
1	18.524*	125.00	1308.79	1310.11		1310.23	0.005404	1.54	81.28	106.09	0.56
1	18.548*	125.00	1308.82	1310.14		1310.26	0.005408	1.54	81.11	105.59	0.56
1	18.571*	125.00	1308.86	1310.16		1310.29	0.005413	1.54	80.92	105.06	0.56
1	18.595*	125.00	1308.89	1310.19		1310.31	0.005417	1.55	80.73	104.47	0.56
1	18.619*	125.00	1308.93	1310.22		1310.34	0.005415	1.55	80.54	103.84	0.56
1	18.643*	125.00	1308.96	1310.24		1310.37	0.005391	1.55	80.45	103.21	0.56
1	18.667*	125.00	1309.00	1310.27		1310.39	0.005390	1.56	80.24	102.51	0.56
1	18.690*	125.00	1309.04	1310.30		1310.42	0.005380	1.56	80.06	101.79	0.56
1	18.714*	125.00	1309.07	1310.32		1310.45	0.005259	1.56	79.92	99.65	0.56
1	18.738*	125.00	1309.11	1310.35		1310.47	0.005295	1.57	79.74	99.58	0.56
1	18.762*	125.00	1309.14	1310.37		1310.50	0.005321	1.57	79.60	99.53	0.56
1	18.786*	125.00	1309.18	1310.40		1310.53	0.005359	1.57	79.42	99.48	0.56
1	18.810*	125.00	1309.21	1310.43		1310.55	0.005347	1.57	79.47	99.47	0.56
1	18.833*	125.00	1309.25	1310.45		1310.58	0.005385	1.58	79.29	99.44	0.56
1	18.857*	125.00	1309.29	1310.48		1310.61	0.005425	1.58	79.11	99.41	0.57
1	18.881*	125.00	1309.32	1310.51		1310.63	0.005424	1.58	79.11	99.41	0.57
1	18.905*	125.00	1309.36	1310.53		1310.66	0.005465	1.58	78.92	99.38	0.57
1	18.929*	125.00	1309.39	1310.56		1310.69	0.005499	1.59	78.78	99.37	0.57

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
1	18.952*	125.00	1309.43	1310.59		1310.71	0.005525	1.59	78.67	99.39	0.57
1	18.976*	125.00	1309.46	1310.61		1310.74	0.005516	1.59	78.71	99.40	0.57
1	19	125.00	1309.50	1310.64		1310.77	0.005549	1.59	78.58	99.41	0.57
1	19.024*	125.00	1309.54	1310.66		1310.80	0.006092	1.64	76.07	98.33	0.60
1	19.048*	125.00	1309.57	1310.69		1310.83	0.006608	1.69	73.93	97.32	0.62
1	19.071*	125.00	1309.61	1310.72		1310.87	0.007090	1.73	72.11	96.40	0.64
1	19.095*	125.00	1309.64	1310.75		1310.91	0.007545	1.77	70.52	95.51	0.66
1	19.119*	125.00	1309.68	1310.78		1310.95	0.007942	1.81	69.20	94.70	0.67
1	19.143*	125.00	1309.71	1310.82		1310.99	0.008256	1.83	68.19	93.96	0.69
1	19.167*	125.00	1309.75	1310.86		1311.03	0.008550	1.86	67.28	93.29	0.70
1	19.190*	125.00	1309.79	1310.90		1311.08	0.008796	1.88	66.53	92.67	0.71
1	19.214*	125.00	1309.82	1310.94		1311.12	0.008966	1.90	65.96	91.98	0.71
1	19.238*	125.00	1309.86	1310.98		1311.17	0.009120	1.91	65.43	91.31	0.72
1	19.262*	125.00	1309.89	1311.02		1311.21	0.009238	1.92	64.99	90.66	0.73
1	19.286*	125.00	1309.93	1311.07		1311.26	0.009341	1.94	64.60	90.03	0.73
1	19.310*	125.00	1309.96	1311.11		1311.30	0.009398	1.94	64.30	89.42	0.73
1	19.333*	125.00	1310.00	1311.16		1311.35	0.009455	1.95	64.02	88.84	0.73
1	19.357*	125.00	1310.04	1311.21		1311.40	0.010668	1.94	64.50	99.10	0.77
1	19.381*	125.00	1310.07	1311.27		1311.45	0.010156	1.89	66.06	101.40	0.75
1	19.405*	125.00	1310.11	1311.32		1311.50	0.009903	1.86	67.10	103.46	0.74
1	19.429*	125.00	1310.14	1311.37		1311.55	0.009706	1.84	68.07	105.64	0.73
1	19.452*	125.00	1310.18	1311.42		1311.59	0.009533	1.81	69.05	108.00	0.72
1	19.476*	125.00	1310.21	1311.48		1311.64	0.009357	1.78	70.20	111.00	0.71
1	19.500*	125.00	1310.25	1311.53		1311.68	0.009159	1.75	71.41	113.99	0.71
1	19.524*	125.00	1310.29	1311.57		1311.72	0.008790	1.73	72.39	114.37	0.69
1	19.548*	125.00	1310.32	1311.62		1311.77	0.008531	1.71	73.15	114.76	0.68
1	19.571*	125.00	1310.36	1311.66		1311.81	0.008354	1.70	73.72	115.21	0.68
1	19.595*	125.00	1310.39	1311.71		1311.85	0.008661	1.68	74.42	121.21	0.68
1	19.619*	125.00	1310.43	1311.75		1311.89	0.008351	1.65	75.85	123.68	0.67
1	19.643*	125.00	1310.46	1311.80		1311.93	0.008045	1.62	77.20	125.68	0.66
1	19.667*	125.00	1310.50	1311.84		1311.97	0.007776	1.59	78.41	127.38	0.65
1	19.690*	125.00	1310.54	1311.88		1312.00	0.007533	1.57	79.51	128.76	0.64
1	19.714*	125.00	1310.57	1311.92		1312.04	0.007307	1.55	80.52	129.88	0.63
1	19.738*	125.00	1310.61	1311.96		1312.08	0.007101	1.53	81.43	130.78	0.62
1	19.762*	125.00	1310.64	1311.99		1312.11	0.006919	1.52	82.24	131.47	0.61
1	19.786*	125.00	1310.68	1312.03		1312.14	0.007273	1.49	83.63	142.30	0.62
1	19.810*	125.00	1310.71	1312.07		1312.18	0.006873	1.47	85.12	142.57	0.61
1	19.833*	125.00	1310.75	1312.10		1312.21	0.006553	1.45	86.40	142.78	0.59
1	19.857*	125.00	1310.79	1312.14		1312.24	0.006291	1.43	87.52	143.00	0.58
1	19.881*	125.00	1310.82	1312.17		1312.27	0.006073	1.41	88.50	143.18	0.57
1	19.905*	125.00	1310.86	1312.20		1312.30	0.005905	1.40	89.30	143.38	0.57
1	19.929*	125.00	1310.89	1312.23		1312.33	0.005757	1.39	90.03	143.57	0.56
1	19.952*	125.00	1310.93	1312.26		1312.36	0.005631	1.38	90.69	143.79	0.55
1	19.976*	125.00	1310.96	1312.29		1312.39	0.005516	1.37	91.32	144.05	0.55
1	20	125.00	1311.00	1312.32		1312.42	0.005407	1.36	91.92	144.26	0.54
1	20.020*	125.00	1311.03	1312.35		1312.45	0.005717	1.39	90.07	142.96	0.56
1	20.040*	125.00	1311.06	1312.37		1312.48	0.005975	1.41	88.58	141.73	0.57
1	20.060*	125.00	1311.09	1312.40		1312.51	0.006211	1.43	87.26	140.57	0.58
1	20.080*	125.00	1311.12	1312.43		1312.54	0.006415	1.45	86.15	139.46	0.59
1	20.100*	125.00	1311.15	1312.46		1312.57	0.006587	1.47	85.19	138.34	0.60
1	20.120*	125.00	1311.18	1312.49		1312.61	0.006726	1.48	84.42	137.38	0.60
1	20.140*	125.00	1311.21	1312.53		1312.64	0.006853	1.49	83.75	136.55	0.61
1	20.160*	125.00	1311.24	1312.56		1312.67	0.006951	1.50	83.22	135.83	0.61
1	20.180*	125.00	1311.27	1312.59		1312.71	0.007149	1.51	82.82	137.08	0.62
1	20.200*	125.00	1311.30	1312.63		1312.75	0.007186	1.51	82.59	136.64	0.62
1	20.220*	125.00	1311.33	1312.66		1312.78	0.007209	1.52	82.41	136.25	0.62
1	20.240*	125.00	1311.36	1312.70		1312.82	0.007224	1.52	82.28	135.92	0.62
1	20.260*	125.00	1311.39	1312.73		1312.85	0.007236	1.52	82.16	135.61	0.62
1	20.280*	125.00	1311.42	1312.77		1312.89	0.007241	1.52	82.09	135.38	0.62
1	20.300*	125.00	1311.45	1312.81		1312.92	0.007243	1.52	82.03	135.16	0.62
1	20.320*	125.00	1311.48	1312.84		1312.96	0.007236	1.52	82.02	135.01	0.62
1	20.340*	125.00	1311.51	1312.88		1313.00	0.007231	1.52	82.01	134.90	0.62
1	20.360*	125.00	1311.54	1312.91		1313.03	0.007223	1.52	82.02	134.84	0.62
1	20.380*	125.00	1311.57	1312.95		1313.07	0.007205	1.52	82.08	134.86	0.62
1	20.400*	125.00	1311.60	1312.98		1313.10	0.007196	1.52	82.12	134.90	0.62
1	20.420*	125.00	1311.63	1313.02		1313.14	0.007311	1.52	82.34	137.42	0.63
1	20.440*	125.00	1311.66	1313.06		1313.17	0.007314	1.51	82.80	139.38	0.63
1	20.460*	125.00	1311.69	1313.10		1313.21	0.007295	1.50	83.38	141.58	0.62
1	20.480*	125.00	1311.72	1313.13		1313.25	0.007255	1.49	84.09	144.03	0.62
1	20.500*	125.00	1311.75	1313.17		1313.28	0.007187	1.47	84.97	146.79	0.62
1	20.520*	125.00	1311.78	1313.21		1313.32	0.007106	1.45	85.96	149.82	0.61
1	20.540*	125.00	1311.81	1313.25		1313.35	0.007042	1.43	87.15	154.02	0.61
1	20.560*	125.00	1311.84	1313.28		1313.38	0.006842	1.41	88.53	156.75	0.60
1	20.580*	125.00	1311.87	1313.32		1313.42	0.006665	1.39	89.89	159.70	0.59
1	20.600*	125.00	1311.90	1313.35		1313.45	0.006493	1.37	91.35	162.99	0.58
1	20.620*	125.00	1311.93	1313.39		1313.48	0.006410	1.34	92.94	168.55	0.58
1	20.640*	125.00	1311.96	1313.42		1313.51	0.006104	1.32	94.70	170.30	0.57

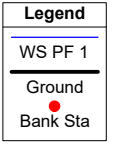
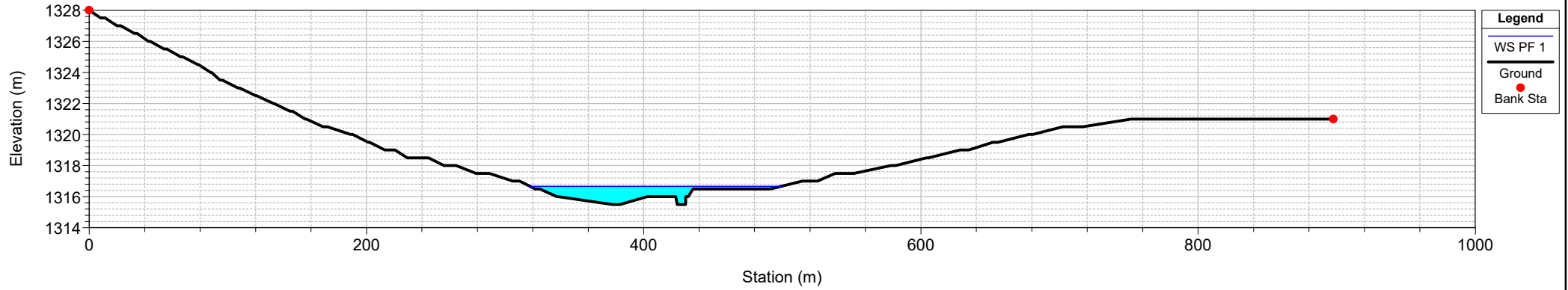
Reach	River Sta	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
1	20.660*	125.00	1311.99	1313.46		1313.54	0.005819	1.30	96.30	171.32	0.55
1	20.680*	125.00	1312.02	1313.49		1313.57	0.005591	1.28	97.69	172.34	0.54
1	20.700*	125.00	1312.05	1313.52		1313.60	0.005384	1.26	99.04	173.37	0.53
1	20.720*	125.00	1312.08	1313.54		1313.62	0.005198	1.25	100.32	174.39	0.52
1	20.740*	125.00	1312.11	1313.57		1313.65	0.005032	1.23	101.55	175.42	0.52
1	20.760*	125.00	1312.14	1313.60		1313.68	0.004890	1.22	102.75	176.81	0.51
1	20.780*	125.00	1312.17	1313.63		1313.70	0.004753	1.20	103.91	178.03	0.50
1	20.800*	125.00	1312.20	1313.65		1313.72	0.004624	1.19	105.04	179.16	0.50
1	20.820*	125.00	1312.23	1313.68		1313.75	0.004505	1.18	106.14	180.33	0.49
1	20.840*	125.00	1312.26	1313.70		1313.77	0.004426	1.16	107.33	182.97	0.49
1	20.860*	125.00	1312.29	1313.72		1313.79	0.004302	1.15	108.77	185.16	0.48
1	20.880*	125.00	1312.32	1313.75		1313.81	0.004013	1.13	110.15	181.39	0.47
1	20.900*	125.00	1312.35	1313.77		1313.83	0.003877	1.12	111.31	181.45	0.46
1	20.920*	125.00	1312.38	1313.79		1313.85	0.003748	1.11	112.47	181.50	0.45
1	20.940*	125.00	1312.41	1313.81		1313.87	0.003631	1.10	113.56	181.57	0.44
1	20.960*	125.00	1312.44	1313.83		1313.89	0.003519	1.09	114.65	181.65	0.44
1	20.980*	125.00	1312.47	1313.84		1313.90	0.003414	1.08	115.71	181.68	0.43
1	21	125.00	1312.50	1313.86		1313.92	0.003311	1.07	116.80	181.75	0.43
1	21.029*	125.00	1312.53	1313.88		1313.94	0.003650	1.10	113.44	181.80	0.45
1	21.057*	125.00	1312.56	1313.89		1313.96	0.003992	1.13	110.45	181.89	0.46
1	21.086*	125.00	1312.59	1313.91		1313.98	0.004341	1.16	107.74	182.02	0.48
1	21.114*	125.00	1312.61	1313.93		1314.00	0.004670	1.19	105.45	182.24	0.50
1	21.143*	125.00	1312.64	1313.95		1314.03	0.004988	1.21	103.44	182.48	0.51
1	21.171*	125.00	1312.67	1313.98		1314.06	0.005296	1.23	101.65	182.76	0.53
1	21.200*	125.00	1312.70	1314.00		1314.08	0.005567	1.25	100.23	183.14	0.54
1	21.229*	125.00	1312.73	1314.03		1314.11	0.005806	1.26	99.05	183.53	0.55
1	21.257*	125.00	1312.76	1314.06		1314.14	0.006007	1.27	98.14	183.97	0.56
1	21.286*	125.00	1312.79	1314.09		1314.17	0.006199	1.28	97.31	184.41	0.56
1	21.314*	125.00	1312.81	1314.12		1314.20	0.006331	1.29	96.81	184.95	0.57
1	21.343*	125.00	1312.84	1314.15		1314.24	0.006456	1.30	96.34	185.42	0.57
1	21.371*	125.00	1312.87	1314.18		1314.27	0.006544	1.30	96.06	185.96	0.58
1	21.400*	125.00	1312.90	1314.21		1314.30	0.006633	1.31	95.77	186.44	0.58
1	21.429*	125.00	1312.93	1314.25		1314.33	0.006688	1.31	95.63	186.96	0.58
1	21.457*	125.00	1312.96	1314.28		1314.37	0.006728	1.31	95.56	187.44	0.58
1	21.486*	125.00	1312.99	1314.31		1314.40	0.006760	1.31	95.52	187.91	0.59
1	21.514*	125.00	1313.01	1314.35		1314.43	0.006757	1.31	95.63	188.37	0.59
1	21.543*	125.00	1313.04	1314.38		1314.47	0.006772	1.31	95.62	188.66	0.59
1	21.571*	125.00	1313.07	1314.41		1314.50	0.006776	1.31	95.65	188.88	0.59
1	21.600*	125.00	1313.10	1314.45		1314.54	0.006776	1.31	95.66	188.97	0.59
1	21.629*	125.00	1313.13	1314.48		1314.57	0.006765	1.31	95.69	188.87	0.59
1	21.657*	125.00	1313.16	1314.52		1314.60	0.006740	1.31	95.74	188.61	0.59
1	21.686*	125.00	1313.19	1314.55		1314.64	0.006713	1.31	95.74	188.06	0.58
1	21.714*	125.00	1313.21	1314.58		1314.67	0.006653	1.30	95.86	187.33	0.58
1	21.743*	125.00	1313.24	1314.61		1314.70	0.006253	1.31	95.77	178.44	0.57
1	21.771*	125.00	1313.27	1314.65		1314.73	0.006260	1.31	95.48	177.22	0.57
1	21.800*	125.00	1313.30	1314.68		1314.76	0.006286	1.31	95.14	176.17	0.57
1	21.829*	125.00	1313.33	1314.71		1314.80	0.006297	1.32	94.87	175.18	0.57
1	21.857*	125.00	1313.36	1314.74		1314.83	0.006315	1.32	94.66	174.57	0.57
1	21.886*	125.00	1313.39	1314.77		1314.86	0.006327	1.32	94.49	174.02	0.57
1	21.914*	125.00	1313.41	1314.80		1314.89	0.006329	1.32	94.37	173.56	0.57
1	21.943*	125.00	1313.44	1314.83		1314.92	0.006341	1.33	94.18	172.92	0.57
1	21.971*	125.00	1313.47	1314.86		1314.95	0.006334	1.33	94.10	172.38	0.57
1	22	125.00	1313.50	1314.89		1314.98	0.006325	1.33	93.99	171.71	0.57
1	22.033*	125.00	1313.53	1314.93		1315.01	0.006090	1.31	95.22	172.40	0.56
1	22.067*	125.00	1313.57	1314.96		1315.05	0.005899	1.30	96.20	172.66	0.56
1	22.100*	125.00	1313.60	1314.99		1315.07	0.005726	1.29	97.07	172.68	0.55
1	22.133*	125.00	1313.63	1315.02		1315.10	0.005612	1.28	97.64	172.61	0.54
1	22.167*	125.00	1313.67	1315.05		1315.13	0.005529	1.27	98.06	172.54	0.54
1	22.200*	125.00	1313.70	1315.08		1315.16	0.005453	1.27	98.44	172.37	0.54
1	22.233*	125.00	1313.73	1315.10		1315.19	0.005394	1.27	98.74	172.23	0.53
1	22.267*	125.00	1313.77	1315.13		1315.21	0.005353	1.26	98.94	172.11	0.53
1	22.300*	125.00	1313.80	1315.16		1315.24	0.005312	1.26	99.15	171.99	0.53
1	22.333*	125.00	1313.83	1315.19		1315.27	0.005281	1.26	99.29	171.83	0.53
1	22.367*	125.00	1313.87	1315.21		1315.29	0.005268	1.26	99.34	171.70	0.53
1	22.400*	125.00	1313.90	1315.24		1315.32	0.005257	1.26	99.38	171.58	0.53
1	22.433*	125.00	1313.93	1315.27		1315.35	0.005245	1.26	99.44	171.49	0.53
1	22.467*	125.00	1313.97	1315.29		1315.37	0.005252	1.26	99.38	171.40	0.53
1	22.500*	125.00	1314.00	1315.32		1315.40	0.005256	1.26	99.36	171.38	0.53
1	22.533*	125.00	1314.03	1315.35		1315.43	0.005223	1.26	99.33	170.40	0.53
1	22.567*	125.00	1314.07	1315.37		1315.45	0.005217	1.26	99.09	169.20	0.53
1	22.600*	125.00	1314.10	1315.40		1315.48	0.005052	1.26	98.97	164.64	0.52
1	22.633*	125.00	1314.13	1315.42		1315.50	0.005091	1.26	98.83	164.95	0.52
1	22.667*	125.00	1314.17	1315.45		1315.53	0.005165	1.27	98.52	165.39	0.52
1	22.700*	125.00	1314.20	1315.47		1315.56	0.005217	1.27	98.45	166.31	0.53
1	22.733*	125.00	1314.23	1315.50		1315.58	0.005297	1.27	98.32	167.63	0.53
1	22.767*	125.00	1314.27	1315.53		1315.61	0.005386	1.27	98.13	168.91	0.53
1	22.800*	125.00	1314.30	1315.55		1315.64	0.005463	1.28	98.00	170.13	0.54

Reach	River Sta	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)	Flow Area (m2)	Top Width (m)	Froude # Chl
1	22.833*	125.00	1314.33	1315.58		1315.67	0.005539	1.28	97.88	171.37	0.54
1	22.867*	125.00	1314.37	1315.61		1315.69	0.005620	1.28	97.74	172.60	0.54
1	22.900*	125.00	1314.40	1315.64		1315.72	0.005697	1.28	97.61	173.75	0.55
1	22.933*	125.00	1314.43	1315.67		1315.75	0.005758	1.28	97.56	174.91	0.55
1	22.967*	125.00	1314.47	1315.70		1315.78	0.005830	1.28	97.45	175.98	0.55
1	23	125.00	1314.50	1315.73		1315.81	0.005886	1.28	97.41	177.03	0.55
1	23.031*	125.00	1314.53	1315.76		1315.84	0.005940	1.29	97.26	177.59	0.55
1	23.063*	125.00	1314.56	1315.78		1315.87	0.005976	1.29	97.18	178.05	0.56
1	23.094*	125.00	1314.59	1315.82		1315.90	0.006020	1.29	97.07	178.57	0.56
1	23.125*	125.00	1314.63	1315.85		1315.93	0.006032	1.29	97.10	178.98	0.56
1	23.156*	125.00	1314.66	1315.88		1315.96	0.006042	1.29	97.14	179.42	0.56
1	23.188*	125.00	1314.69	1315.91		1315.99	0.006055	1.29	97.15	179.77	0.56
1	23.219*	125.00	1314.72	1315.94		1316.02	0.006039	1.28	97.30	180.14	0.56
1	23.250*	125.00	1314.75	1315.97		1316.05	0.006021	1.28	97.45	180.43	0.56
1	23.281*	125.00	1314.78	1316.00		1316.08	0.005993	1.28	97.65	180.74	0.56
1	23.313*	125.00	1314.81	1316.03		1316.11	0.005972	1.28	97.80	180.99	0.56
1	23.344*	125.00	1314.84	1316.06		1316.14	0.005957	1.28	97.91	181.19	0.55
1	23.375*	125.00	1314.88	1316.09		1316.17	0.005925	1.27	98.11	181.39	0.55
1	23.406*	125.00	1314.91	1316.12		1316.20	0.005902	1.27	98.25	181.53	0.55
1	23.438*	125.00	1314.94	1316.15		1316.23	0.005875	1.27	98.41	181.66	0.55
1	23.469*	125.00	1314.97	1316.18		1316.26	0.005839	1.27	98.60	181.73	0.55
1	23.500*	125.00	1315.00	1316.21		1316.29	0.005809	1.27	98.77	181.79	0.55
1	23.531*	125.00	1315.03	1316.24		1316.32	0.005776	1.26	98.93	181.79	0.55
1	23.563*	125.00	1315.06	1316.27		1316.35	0.005744	1.26	99.09	181.77	0.55
1	23.594*	125.00	1315.09	1316.30		1316.38	0.005713	1.26	99.24	181.74	0.54
1	23.625*	125.00	1315.13	1316.33		1316.41	0.005788	1.26	99.51	184.82	0.55
1	23.656*	125.00	1315.16	1316.36		1316.44	0.005709	1.25	99.85	184.47	0.54
1	23.688*	125.00	1315.19	1316.39		1316.47	0.005666	1.25	100.01	184.19	0.54
1	23.719*	125.00	1315.22	1316.41		1316.49	0.005606	1.25	100.25	183.82	0.54
1	23.750*	125.00	1315.25	1316.44		1316.52	0.005546	1.24	100.50	183.48	0.54
1	23.781*	125.00	1315.28	1316.47		1316.55	0.005503	1.24	100.66	183.15	0.53
1	23.813*	125.00	1315.31	1316.50		1316.58	0.005468	1.24	100.79	182.86	0.53
1	23.844*	125.00	1315.34	1316.53		1316.61	0.005457	1.24	100.76	182.48	0.53
1	23.875*	125.00	1315.38	1316.56		1316.63	0.005416	1.24	100.93	182.20	0.53
1	23.906*	125.00	1315.41	1316.58		1316.66	0.005393	1.24	101.00	181.92	0.53
1	23.938*	125.00	1315.44	1316.61		1316.69	0.005392	1.24	100.92	181.57	0.53
1	23.969*	125.00	1315.47	1316.64		1316.72	0.005369	1.24	101.00	181.32	0.53
1	24	125.00	1315.50	1316.67	1316.34	1316.74	0.005347	1.24	101.06	181.04	0.53

SECTION 24

1:100 YEAR FLOOD

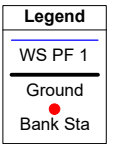
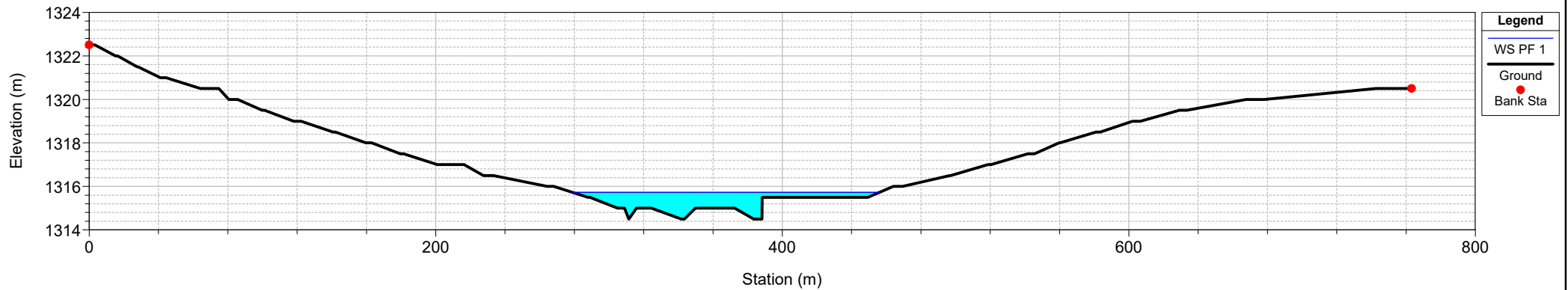
ADDENDUM 4



SECTION 23

1:100 YEAR FLOOD

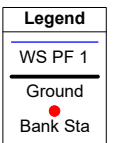
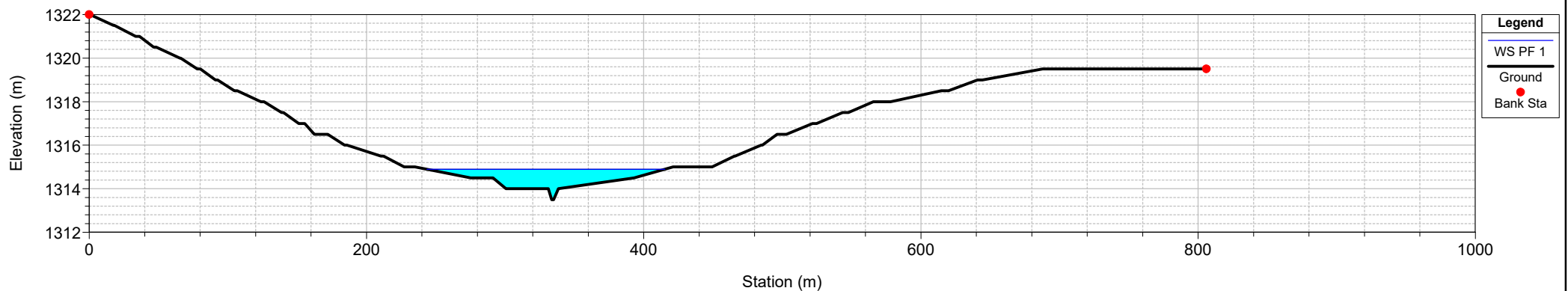
ADDENDUM 4



SECTION 22

1:100 YEAR FLOOD

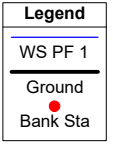
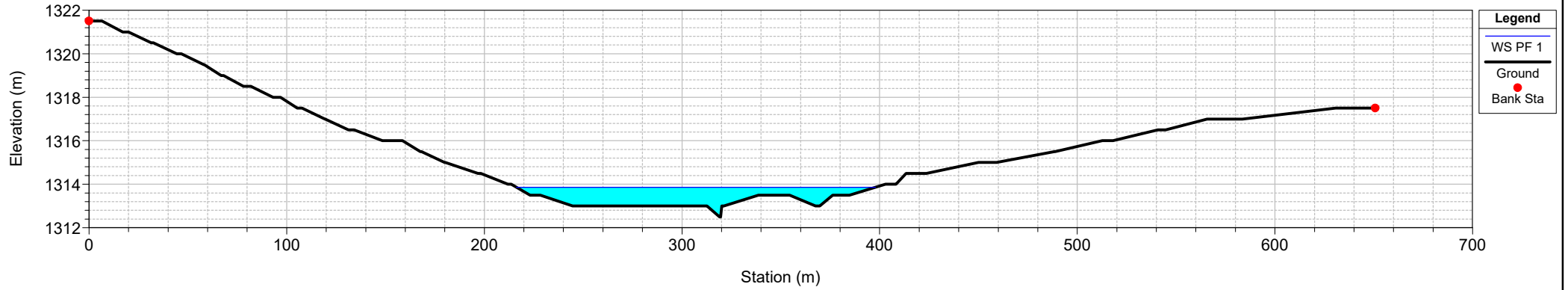
ADDENDUM 4



SECTION 21

1:100 YEAR FLOOD

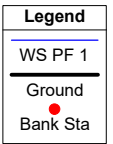
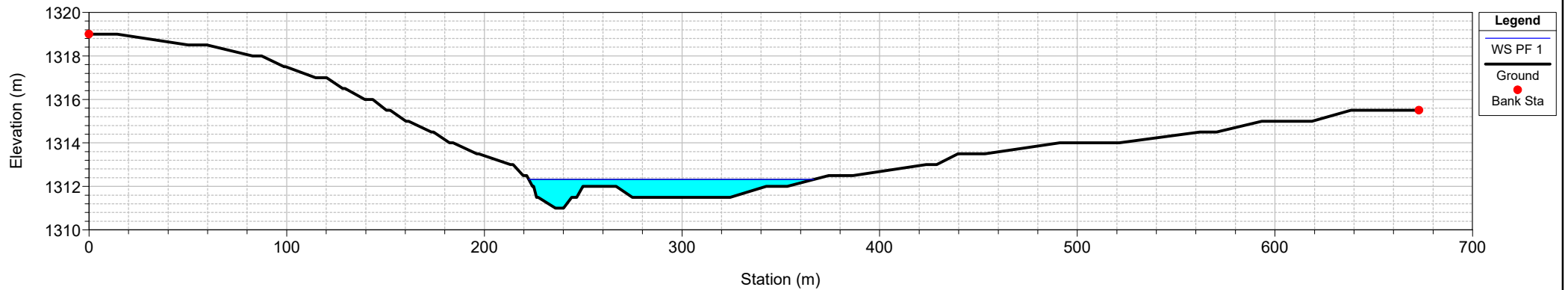
ADDENDUM 4



SECTION 20

1:100 YEAR FLOOD

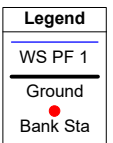
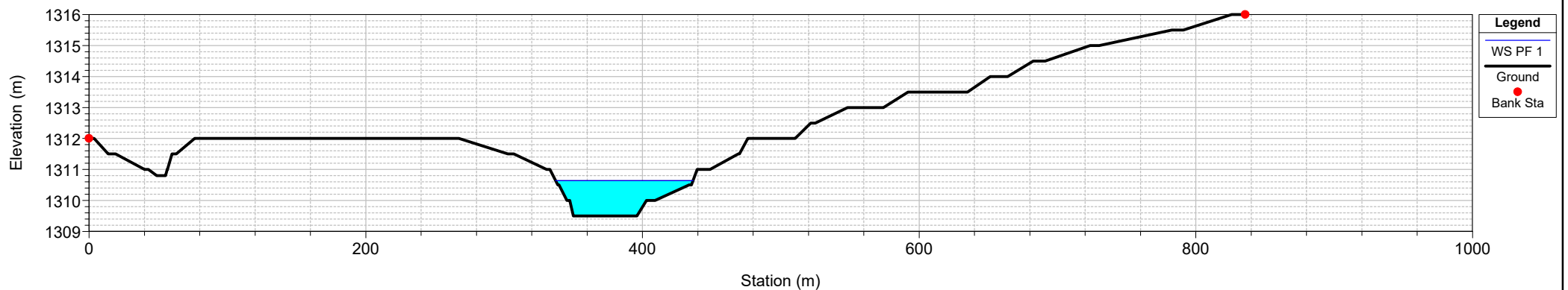
ADDENDUM 4



SECTION 19

1:100 YEAR FLOOD

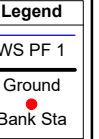
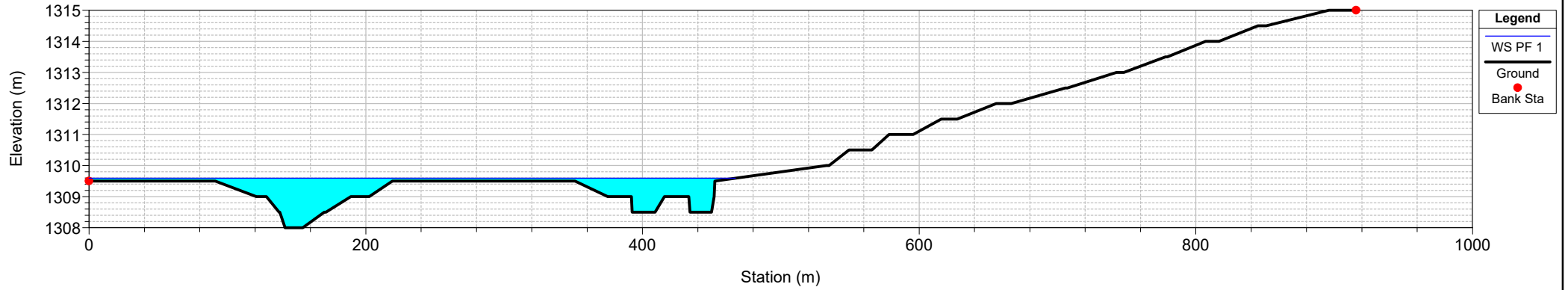
ADDENDUM 4



SECTION 18

1:100 YEAR FLOOD

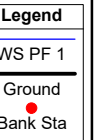
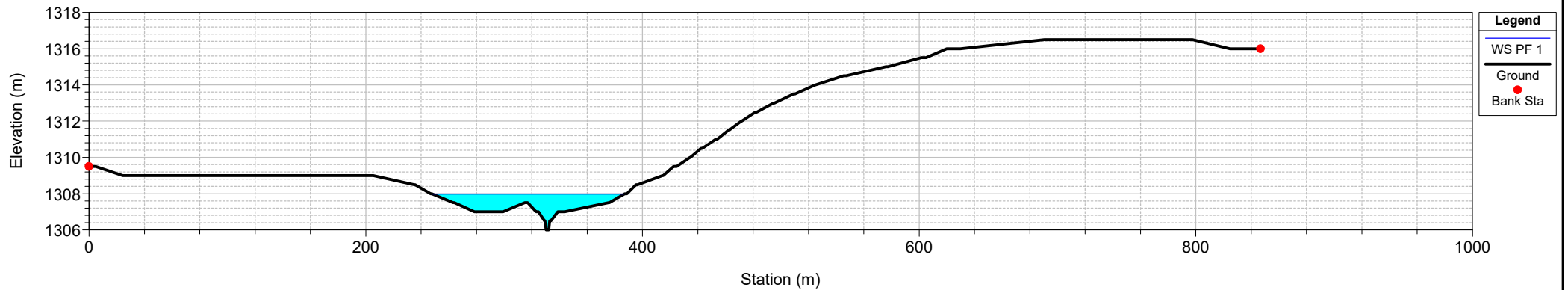
ADDENDUM 4



SECTION 17

1:100 YEAR FLOOD

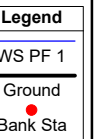
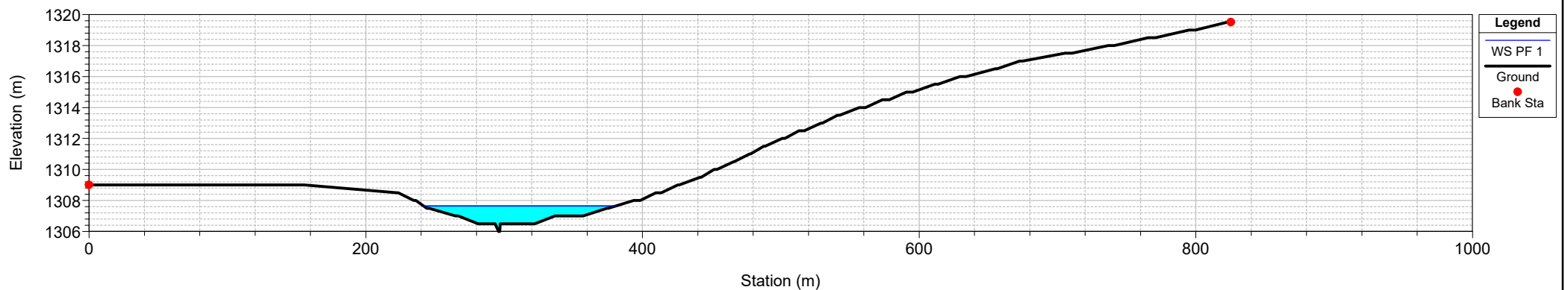
ADDENDUM 4



SECTION 16

1:100 YEAR FLOOD

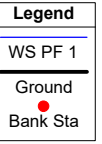
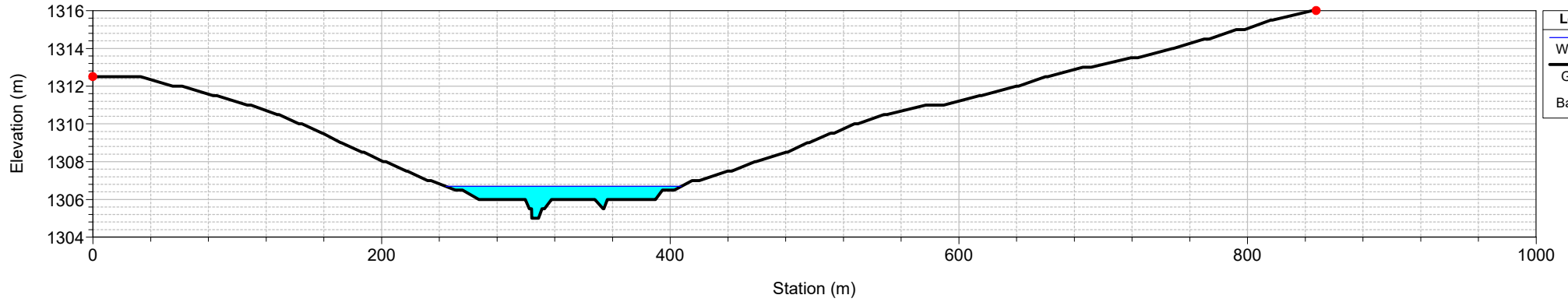
ADDENDUM 4



SECTION 15

1:100 YEAR FLOOD

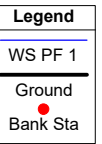
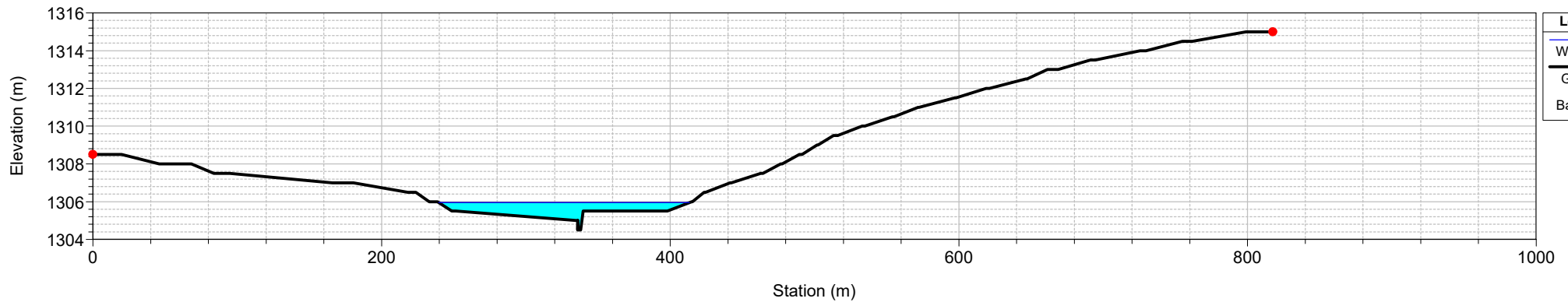
ADDENDUM 4



SECTION 14

1:100 YEAR FLOOD

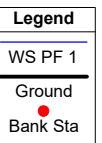
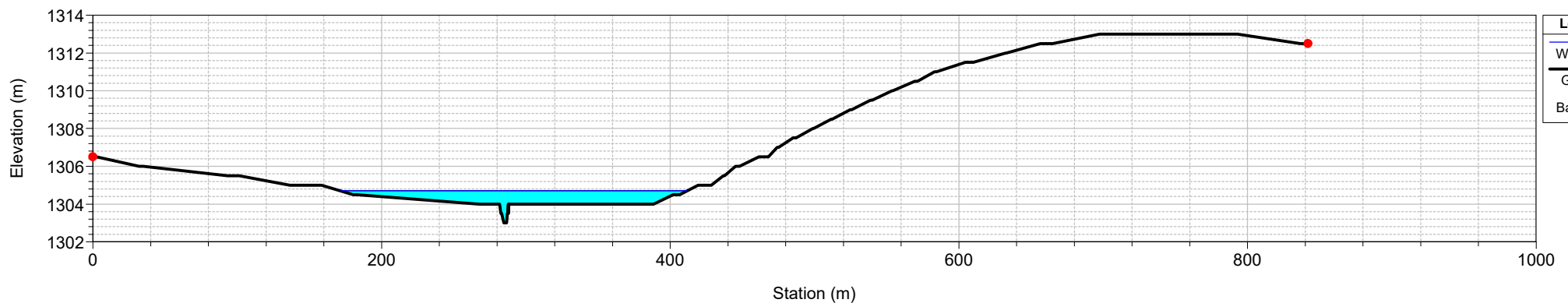
ADDENDUM 4



SECTION 13

1:100 YEAR FLOOD

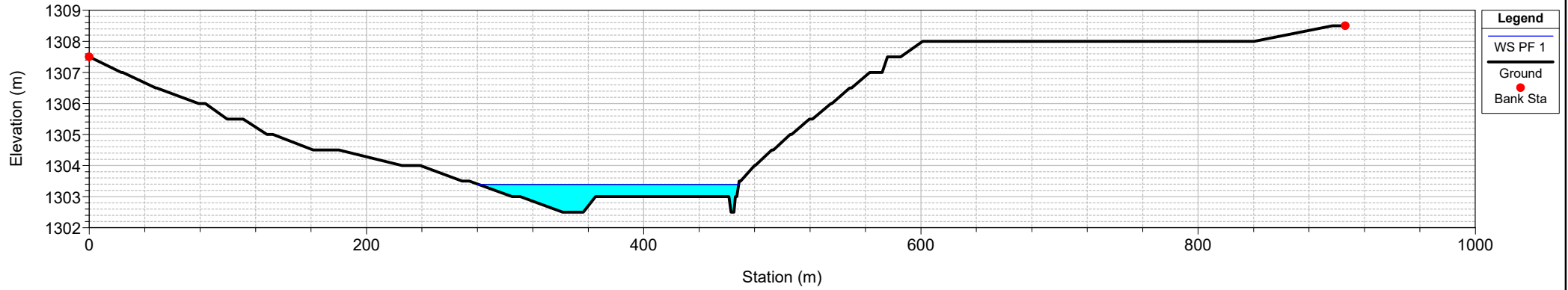
ADDENDUM 4



SECTION 12

1:100 YEAR FLOOD

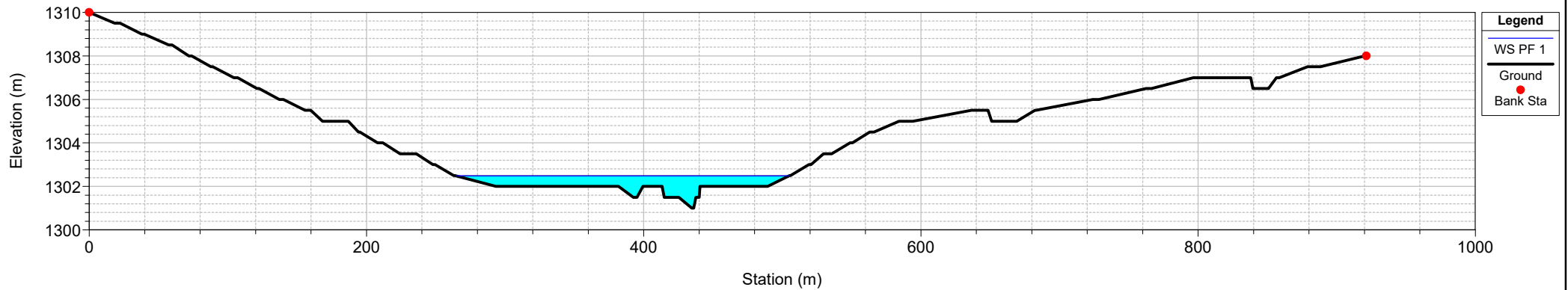
ADDENDUM 4



SECTION 11

1:100 YEAR FLOOD

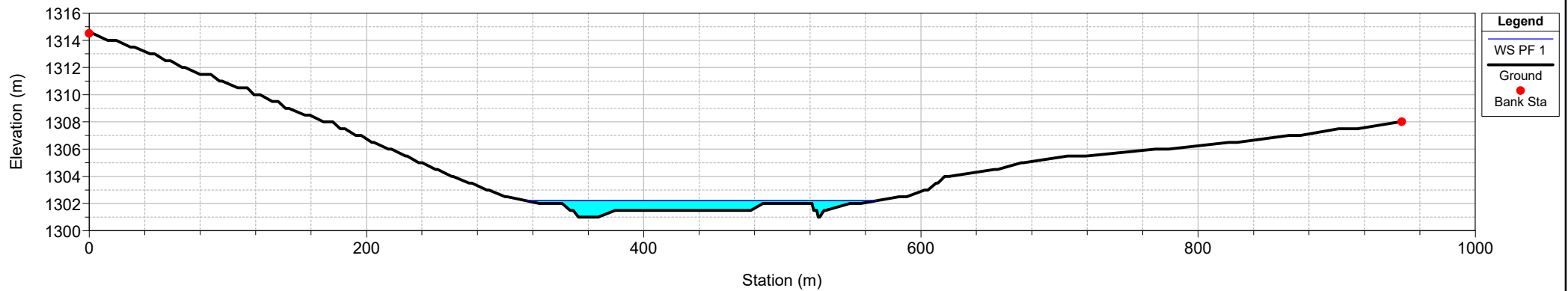
ADDENDUM 4



SECTION 10

1:100 YEAR FLOOD

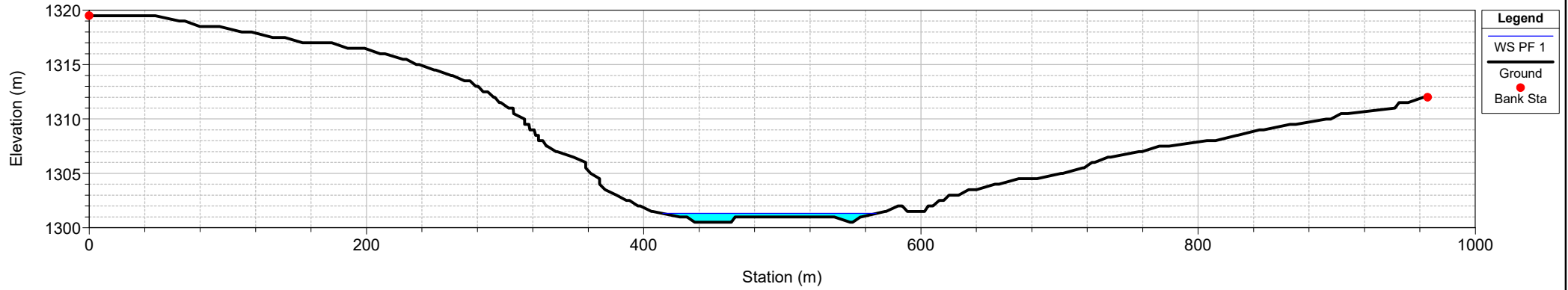
ADDENDUM 4



SECTION 9

1:100 YEAR FLOOD

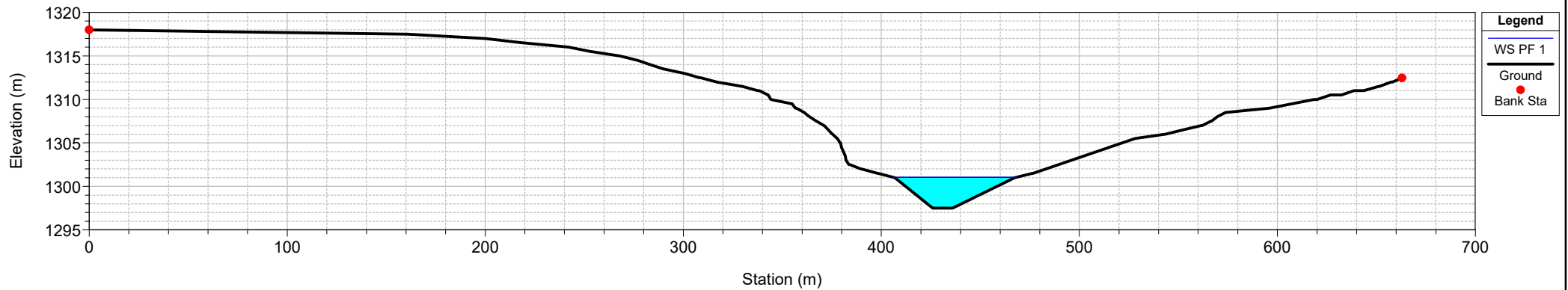
ADDENDUM 4



SECTION 8

1:100 YEAR FLOOD

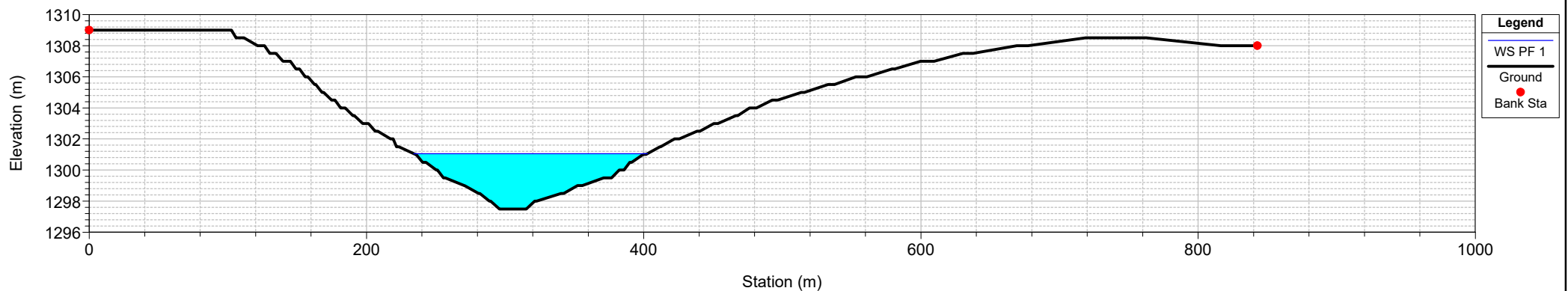
ADDENDUM 4



SECTION 7

1:100 YEAR FLOOD

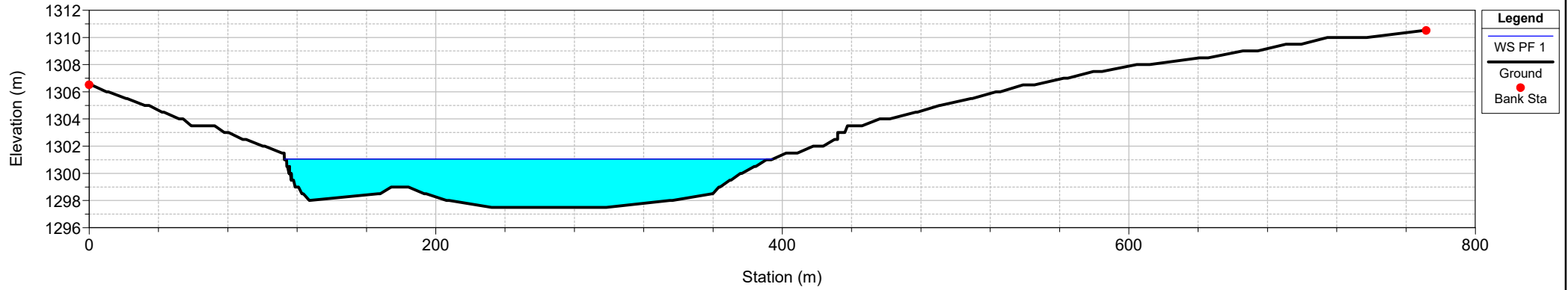
ADDENDUM 4



SECTION 6

1:100 YEAR FLOOD

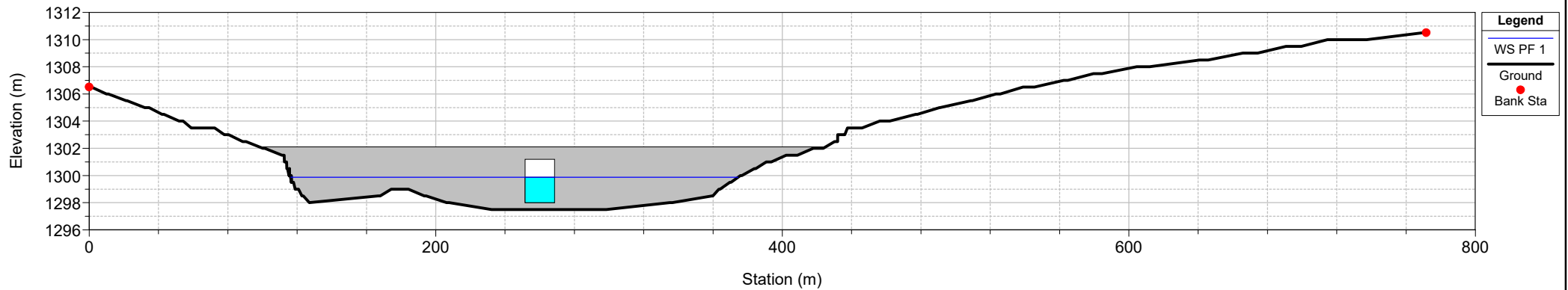
ADDENDUM 4



RAIL BRIDGE

1:100 YEAR FLOOD

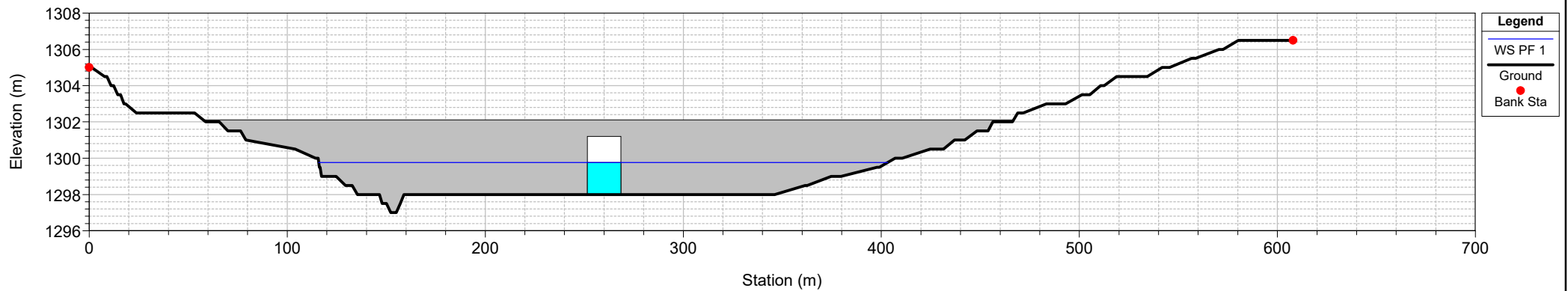
ADDENDUM 4



RAIL BRIDGE

1:100 YEAR FLOOD

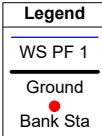
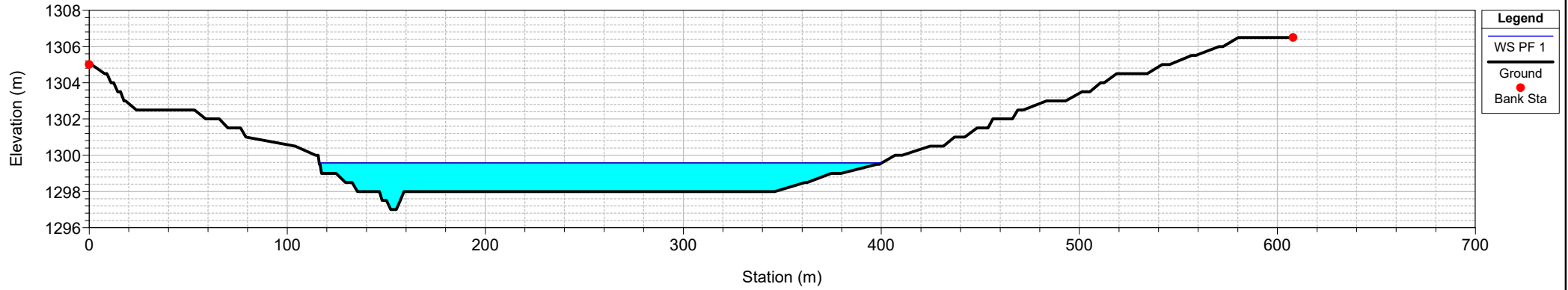
ADDENDUM 4



SECTION 5

1:100 YEAR FLOOD

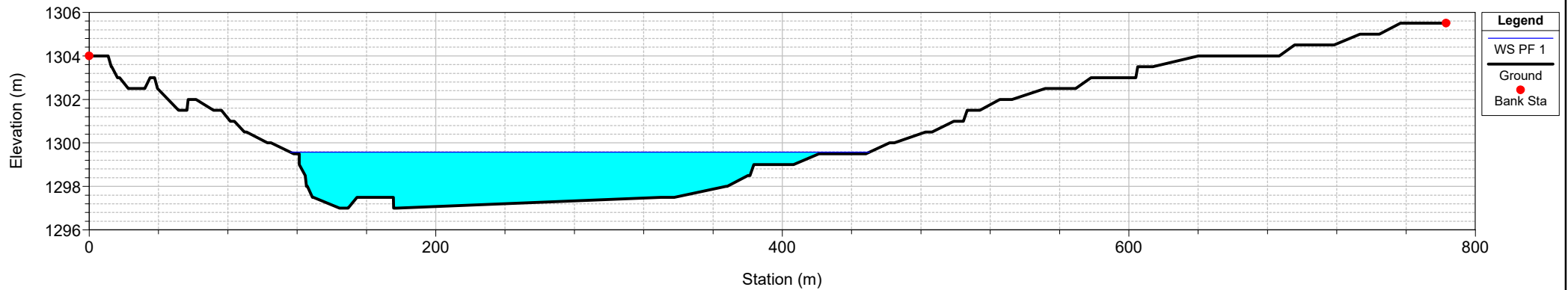
ADDENDUM 4



SECTION 4

1:100 YEAR FLOOD

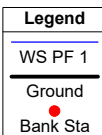
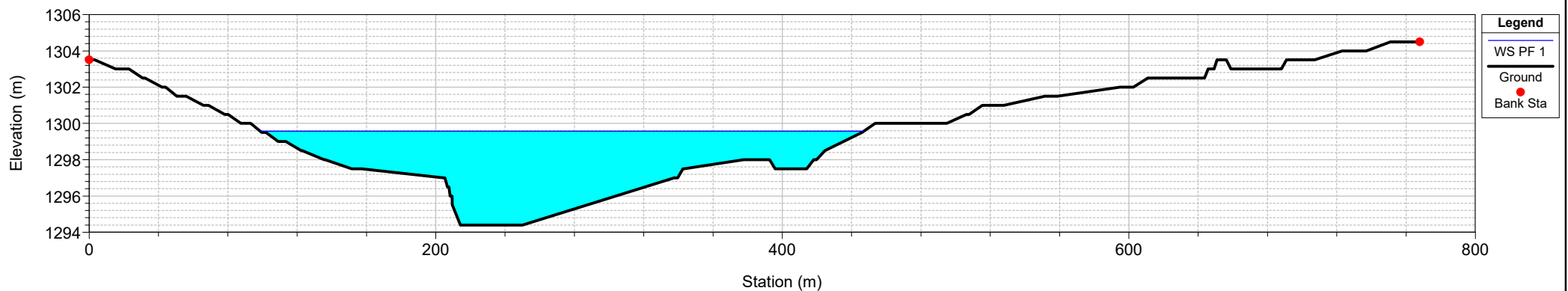
ADDENDUM 4



SECTION 3

1:100 YEAR FLOOD

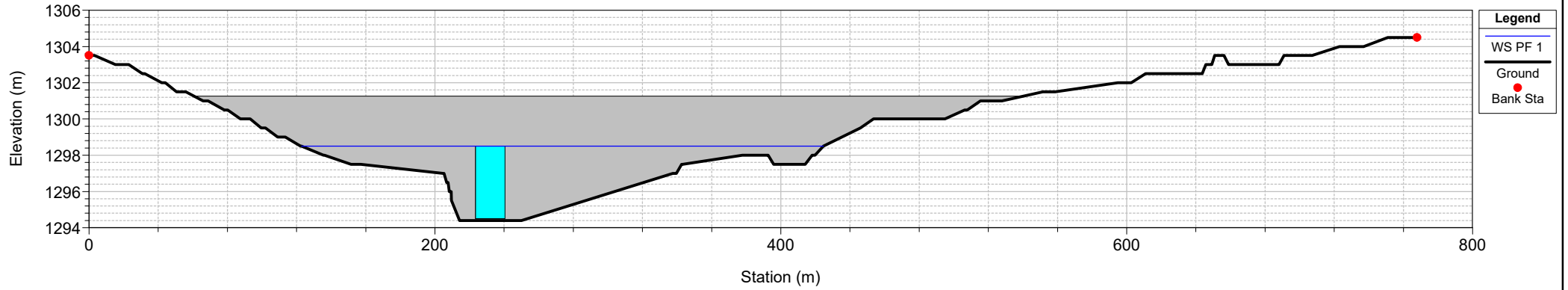
ADDENDUM 4



ROAD BRIDGE

1:100 YEAR FLOOD

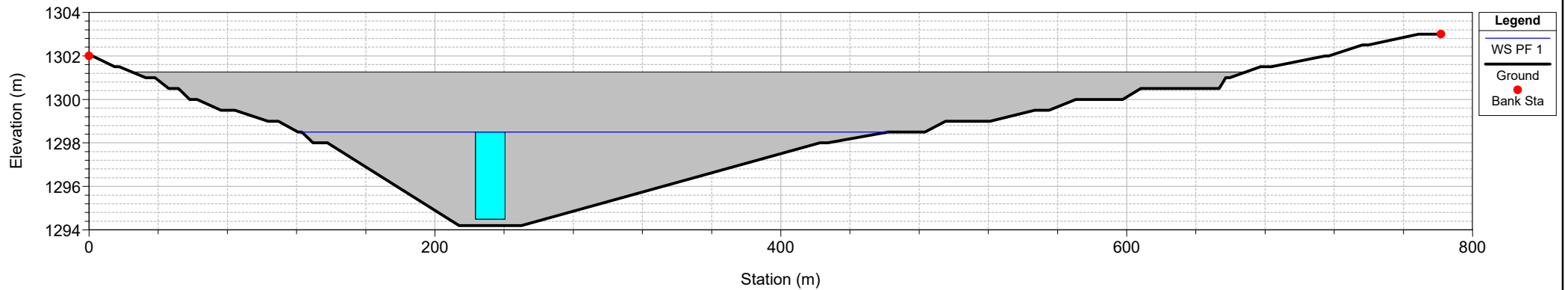
ADDENDUM 4



ROAD BRIDGE

1:100 YEAR FLOOD

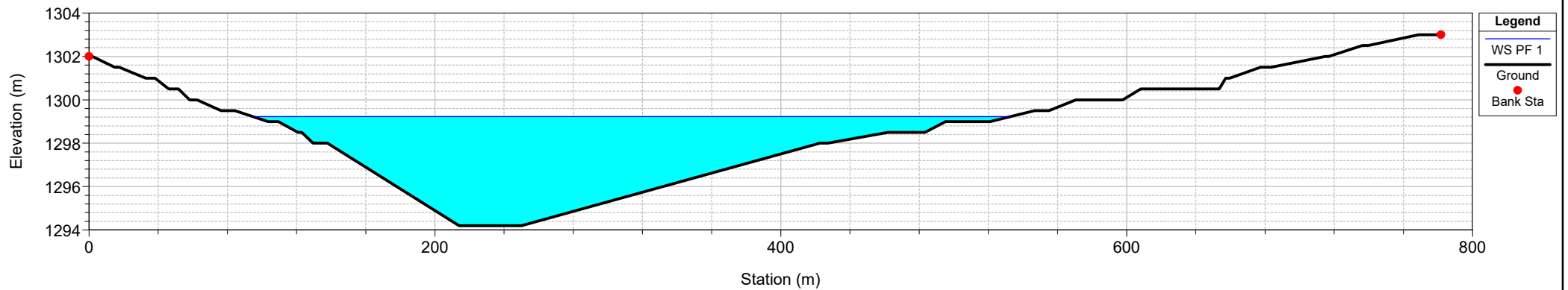
ADDENDUM 4



SECTION 2

1:100 YEAR FLOOD

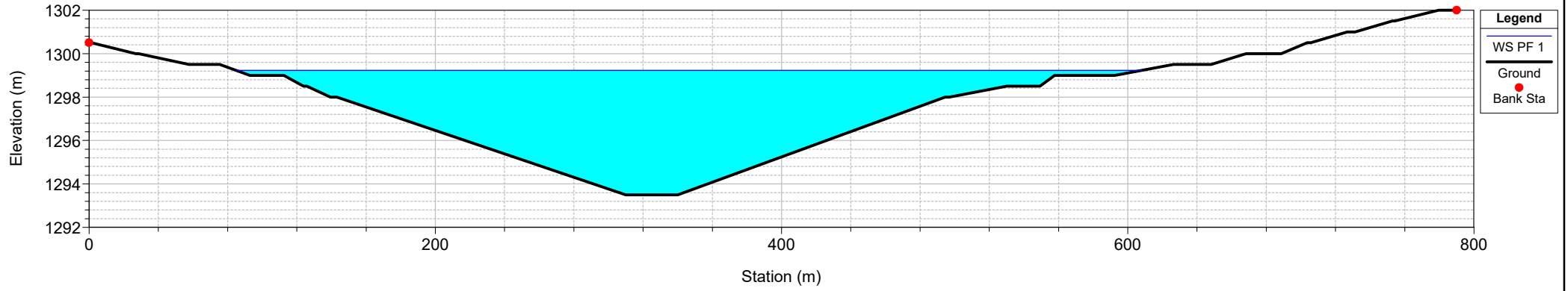
ADDENDUM 4



SECTION 1

1:100 YEAR FLOOD

ADDENDUM 4



Legend

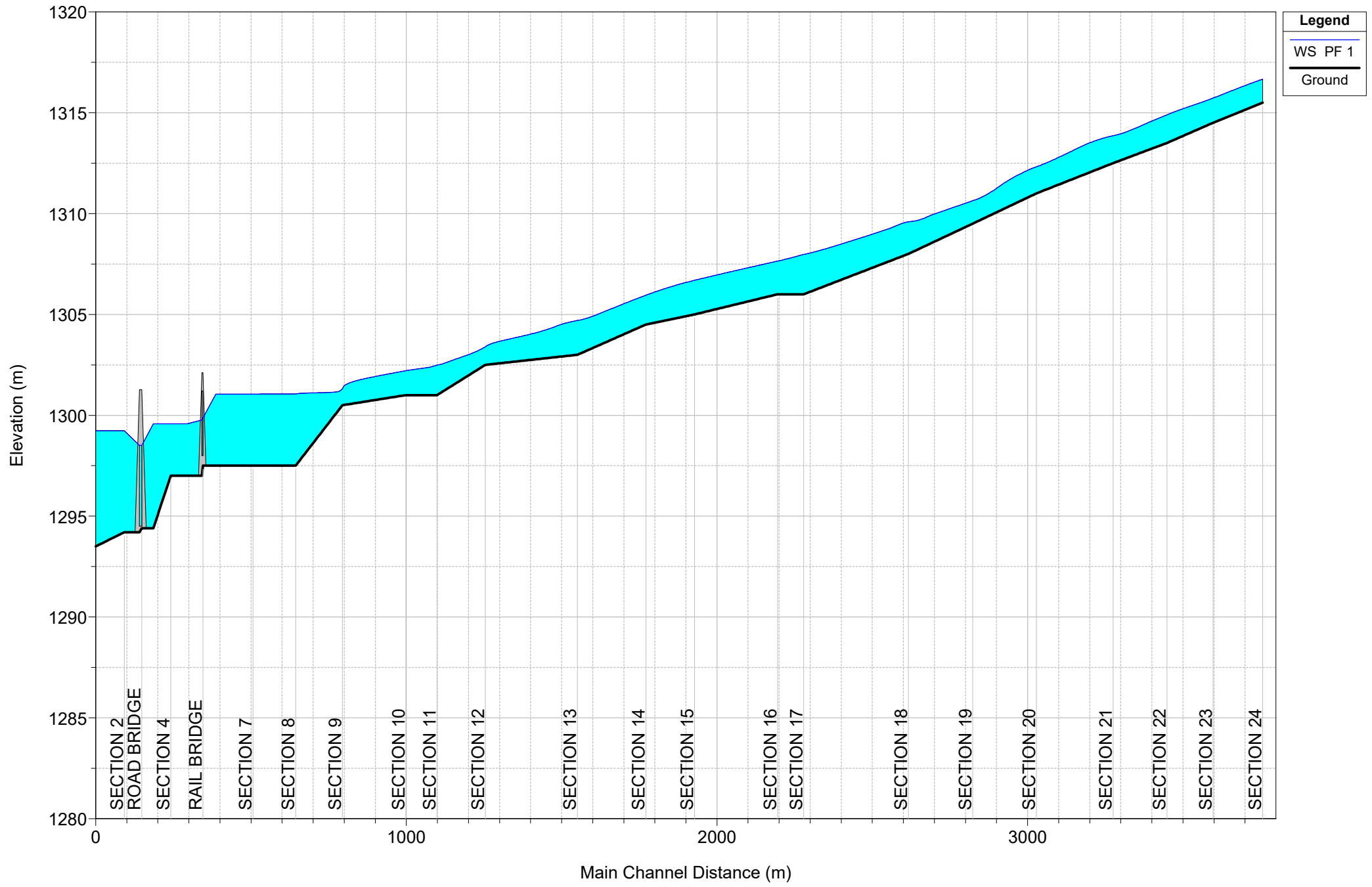
WS PF 1

Ground

Bank Sta

LONGITUDINAL SECTION 1:100 YEAR FLOOD

ADDENDUM 5



ADDENDUM 6

Rational Method

Project = SCHWEIZER RENEKE IPELEGENG EXT 12
 Analysed by = CAS COETZER
 Name of river = UNNAMED NON-PERENNIAL STREAM
 Description of site = SCHWEIZER-RENEKE (POS) 0397581AW
 Date = 2020/09/07
 Area of catchment = 52.4 km²
 Dolomitic area = 0.0 %
 Mean annual rainfall (MAR) = 523.00 mm
 Length of longest watercourse = 13.8 km
 Flow of water = Defined water course
 Height difference along 10-85 slope = 77.3 m
 Rainfall region = Inland
 Area distribution = Rural: 100 %, Urban: 0 %, Lakes: 0 %

Catchment description - Urban area (%)

Lawns		Residential and industry	Business		
Sandy, flat (<2%)	0	Houses	0	City centre	0
Sandy, steep (>7%)	0	Flats	0	Suburban	0
Heavy soil, flat (<2%)	0	Light industry	0	Streets	0
Heavy soil, steep (>7%)	0	Heavy industry	0	Maximum flood	0

Catchment description - Rural area (%)

Surface slopes		Permeability		Vegetation	
Lakes and pans	0	Very permeable	0	Thick bush & forests	0
Flat area	95	Permeable	0	Light bush & cultivated land	0

Hilly	5	Semi-permeable	100	Grasslands	100
Steep areas	0	Impermeable	0	Bare	0

Average slope = 0.00747 m/m
Time of concentration = 3.30 h
Run-off factor
Rural - C1 = 0.353
Urban - C2 = 0.000
Lakes - C3 = 0.000
Combined - C = 0.353

The HRU, Report 2/78, Depth-Duration-Frequency diagram was used to determine the point rainfall.

Return Period (years)	Time of concentration (hours)	Point rainfall (mm)	ARF (%)	Average intensity (mm/h)	Factor Ft	Runoff coefficient (%)	Peak flow (m ³ /s)
1:2	3.30	33.8	98.5	10.1	0.75	26.5	38.88
1:5	3.30	46.0	97.9	13.7	0.80	28.2	56.16
1:10	3.30	58.2	97.4	17.2	0.85	30.0	75.09
1:20	3.30	71.9	96.7	21.1	0.90	31.8	97.53
1:50	3.30	93.5	95.8	27.1	0.95	33.5	132.48
1:100	3.30	115.0	94.8	33.1	1.00	35.3	169.88

Run-off coefficient percentage includes adjustment saturation factors (Ft) for steep and impermeable catchments

Alternative Rational Method

Project = SCHWEIZER RENEKE IPELEGENG EXT 12
Analysed by = CAS COETZER
Name of river = UNNAMED NON-PERENNIAL STREAM
Description of site = SCHWEIZER-RENEKE (POS) 0397581AW
Date = 2020/09/07
Area of catchment = 52.4 km²
Dolomitic area = 0.0 %
Length of longest watercourse = 13.8 km
Flow of water = Defined water course
Height difference along 10-85 slope = 77.3 m
Area distribution = Rural: 100 %, Urban: 0 %, Lakes: 0 %

Catchment description - Urban area (%)

Lawns	Residential	and industry	Business		
Sandy, flat (<2%)	0	Houses	0	City centre	0
Sandy, steep (>7%)	0	Flats	0	Suburban	0
Heavy soil, flat (<2%)	0	Light industry	0	Streets	0
Heavy soil, steep (>7%)	0	Heavy industry	0	Maximum flood	0

Catchment description - Rural area (%)

Surface slopes	Permeability	Vegetation			
Lakes and pans	0	Very permeable	0	Thick bush & forests	0
Flat area	95	Permeable	0	Light bush & cultivated land	0
Hilly	5	Semi-permeable	100	Grasslands	100
Steep areas	0	Impermeable	0	Bare	0

Days on which thunder was heard = 70 days/year
Weather Services station number = 397581
Weather Services station location = SCHWEIZER-RENEKE (SAP)
Mean annual precipitation (MAP) = 489 mm

Duration 2	5	10	20	50	100	200
1 day	50	71	87	105	131	153
2 days	63	91	113	137	173	203
3 days	68	98	121	146	183	215
7 days	85	124	155	187	235	275

The modified recalibrated Hershfield relationship was used to determine point rainfall.

Average slope	= 0.00747 m/m
Time of concentration	= 3.30 h
Run-off factor	
Rural - C1	= 0.353
Urban - C2	= 0.000
Lakes - C3	= 0.000
Combined - C	= 0.353

Return period (years)	Time of concentration (hours)	Point rainfall (mm)	ARF (%)	Average intensity (mm/h)	Factor Ft	Runoff coefficient (%)	Peak flow (m ³ /s)
1:2	3.30	34.92	96.4	10.21	0.75	26.5	39.35
1:5	3.30	58.91	96.4	17.23	0.80	28.2	70.80
1:10	3.30	77.06	96.4	22.53	0.85	30.0	98.40
1:20	3.30	95.21	96.4	27.84	0.90	31.8	128.73
1:50	3.30	119.20	96.4	34.85	0.95	33.5	170.12
1:100	3.30	137.34	96.4	40.16	1.00	35.3	206.34
1:200	3.30	155.49	96.4	45.46	1.00	35.3	233.60

Run-off coefficient percentage includes adjustment saturation factors (Ft) for steep and impermeable catchments

Unit Hydrograph Method

Project = SCHWEIZER RENEKE IPELEGENG EXT 12
Analysed by = CAS COETZER
Name of river = UNNAMED NON-PERENNIAL STREAM
Description of site = SCHWEIZER-RENEKE (POS) 0397581AW
Date = 2020/09/07
Area of catchment = 52.4 km²
Length of longest watercourse = 13.8 km
Height difference along equal area slope = 76.1 m
Distance to catchment centroid = 6.584 km
Veld type = Region 1
Duration interval = 30 minutes

Slope of longest stream = 0.0055 m/m
Catchment index = 1223.5
Catchment lag = 13.319
Coefficient (Ku) = 0.261 m³/s - hours/km²
Peak discharge of unit hydrograph (Qp) = 1.027 m³/s

Return period	Storm duration (minutes)	Peak discharge (m ³ /s)
------------------	--------------------------------	--

1:2 year	450	4.236
1:5 year	450	6.914
1:10 year	450	10.03
1:20 year	450	13.96
1:50 year	450	21.07
1:100 year	450	29.16

Standard Design Flood method

Project name	= SCHWEIZER RENEKE IPELEGENG EXT 12
Analysed by	= CAS COETZER
Name of river	= UNNAMED NON-PERENNIAL STREAM
Description of site	= SCHWEIZER-RENEKE (POS) 0397581AW
Date	= 2020/09/07
Catchment characteristics:	
Area of catchment	= 52.4 km ²
Length of longest watercourse	= 13.8 km
1085 height difference	= 77.3 m
Average slope	= 0.0075 m/m
Drainage basin characteristics:	
Drainage basin number	= 8
Mean annual daily max rain	= 47 mm
Days on which thunder was heard	= 29 days
Runoff coefficient C2	= 5 %
Runoff coefficient C100	= 20 %
Basin mean annual precipitation	= 380 mm
Basin mean annual evaporation	= 2100 mm
Basin evaporation index MAE/MAP	= 5.53

RAINFALL DATA

The rainfall data in the table below are derived from two sources. The daily rainfall is from the Department of Water Affairs's publication TR102 for the representative site. The modified Hershfield equation is used for durations up to four hours. Linear interpolation is used for values between 4 hours and one day.

Weather Services station ex TR102 = 322071 @ DANIELSKUIL
Point mean annual precipitation = 380 mm

Dur:	RP =2	5	10	20	50	100	200
.25 h	13	22	29	36	45	52	59
.50 h	17	29	38	47	59	68	77
1 h	21	36	47	58	72	83	94
2 h	25	42	56	69	86	99	112
4 h	29	49	64	80	100	115	130
1 day	47	69	86	104	132	156	183
2 days	60	91	116	144	187	224	267
3 days	65	100	128	160	208	250	297
7 days	79	126	164	207	272	329	393

Runoff coefficients C2 = 5 % C100 = 20 %

Return period (years)	Time of concentration (hours)	Point precipitation (mm)	ARF (%)	Catchment precipitation (mm)	Runoff coefficient (%)	Peak flow (m ³ /s)
1:2	3.30	28.1	96.4	27.1	5.0	5.975
1:5	3.30	47.3	96.4	45.6	10.4	20.98
1:10	3.30	61.9	96.4	59.7	13.2	34.91
1:20	3.30	76.5	96.4	73.8	15.6	50.68
1:50	3.30	95.8	96.4	92.3	18.2	74.22
1:100	3.30	110.3	96.4	106.4	20.0	93.99
1:200	3.30	124.9	96.4	120.5	21.6	114.98