PROPOSED TOWNSHIP ESTABLISHMENT OF GREATER SEVILLE EXT 3 ON THE REMAINDER OF PORTION 1 AND PORTION 2 OF THE FARM SEVILLE 224 KU, MPUMALANGA

1:100 RETURN PERIOD FLOODLINE DETERMINATION REPORT

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PREPARED BY:

Dalimede Projects (PTY) LTD
No. 11 Pierre street,
IT Park RentCo Building,
Office 6,
Bendor, Polokwane,
South Africa,
0699

Tel: 015 291 0775, Cell: 079 368 8414,
E-mail: admin@dalimede.com

PREPARED FOR:

Bushbuckridge Local Municipality
R533 Graskop Main Road
Bushbuckridge
1280

Tel: 013 065 0814

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1.0 INTRODUCTION

1.1 Study Request

The report study is to undertake floodline assessment relating to the proposed township development of Greater Seville Ext 3 on the Remainder of Portion 1 and Portion 2 of the Farm Seville 224 KU, Mpumalanga Province.

1.2 Locality

The proposed township is situated 145km north of Mbombela along the R40, in Mpumalanga Province, South Africa. The area is administered by Bushbuckridge Local Municipality under Ehlanzeni District Municipality. GPS coordinates of site are 24°39'45.06"S 31°24'15.00"E.

The locality map is shown on the figures below.

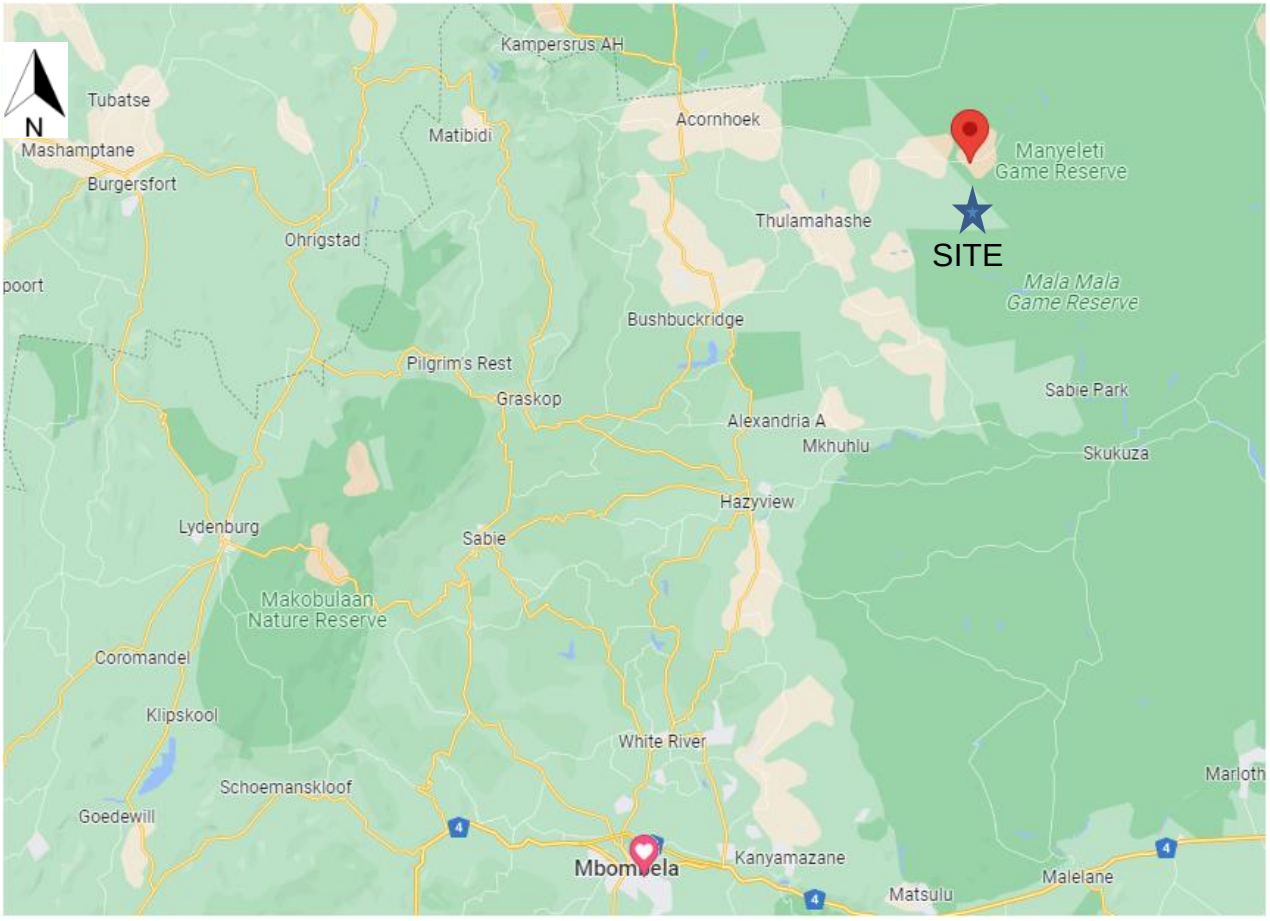


Figure 1 Location of development site

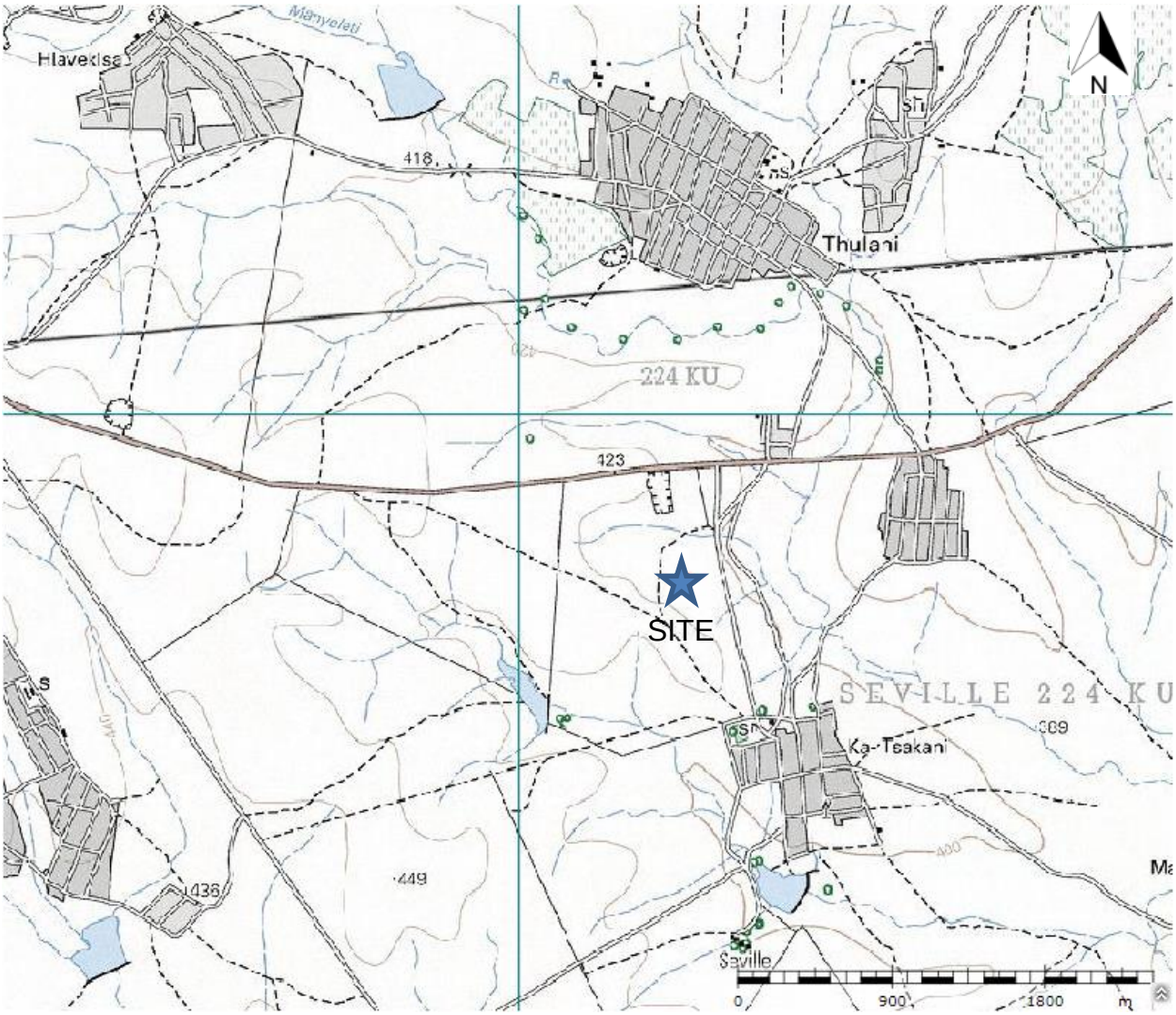


Figure 2 Project site

1.3 Excavations / Pits onsite

Site visit revealed excavation pits dotted within the proposed development site. The excavations onsite are shown as cyan colour polygons, while the site boundary is shown as a thick white line in the figure below.

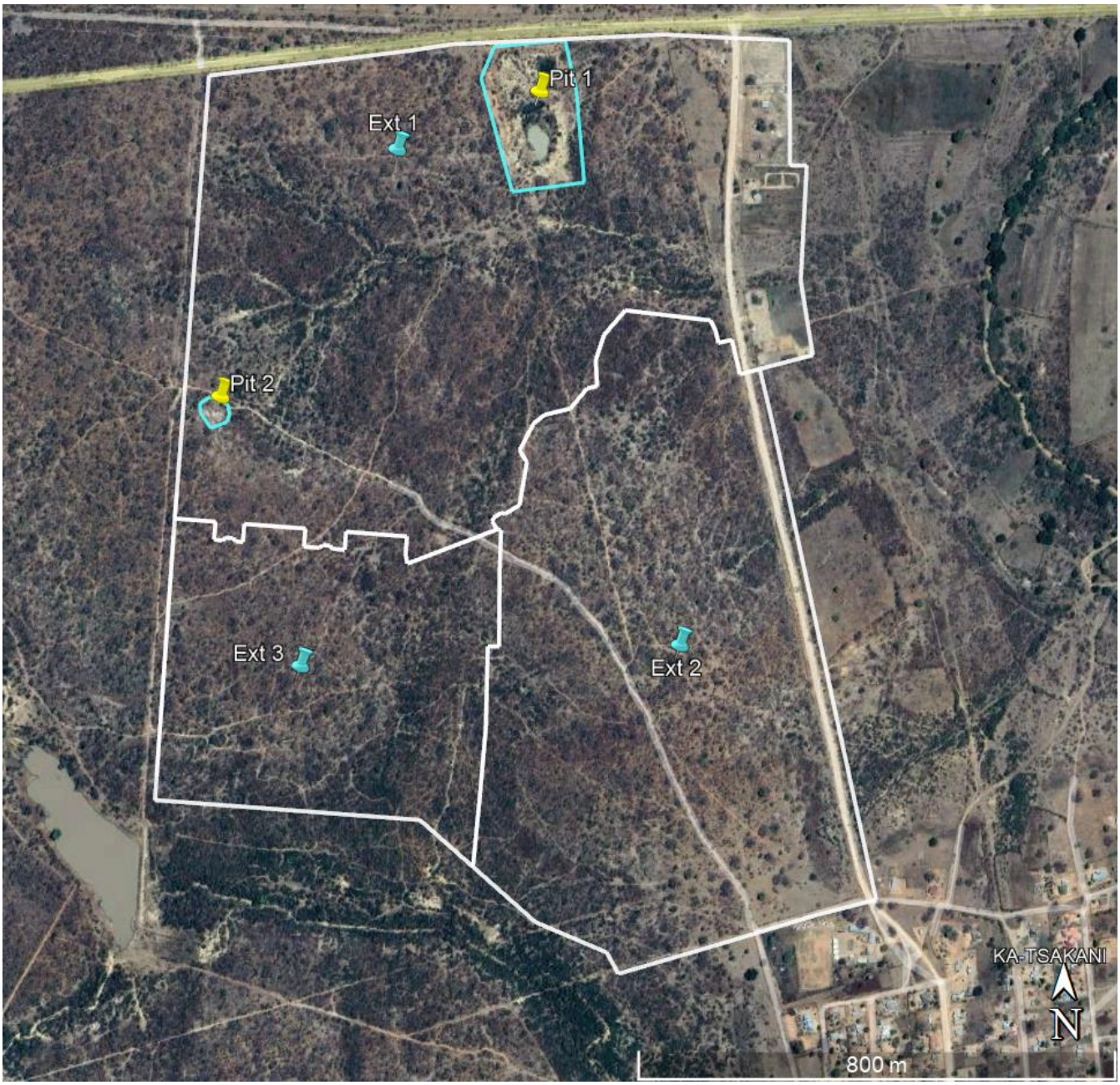


Figure 3 Excavations pits formation onsite

Figure 4 Pit 1 onsite

Figure 5 Pit 2 onsite

1.4 Background

A flood line analysis must be conducted along the stream / river traversing or in proximity of the site of proposed development.

See the figures below for the streams in catchment area in proximity to the site.

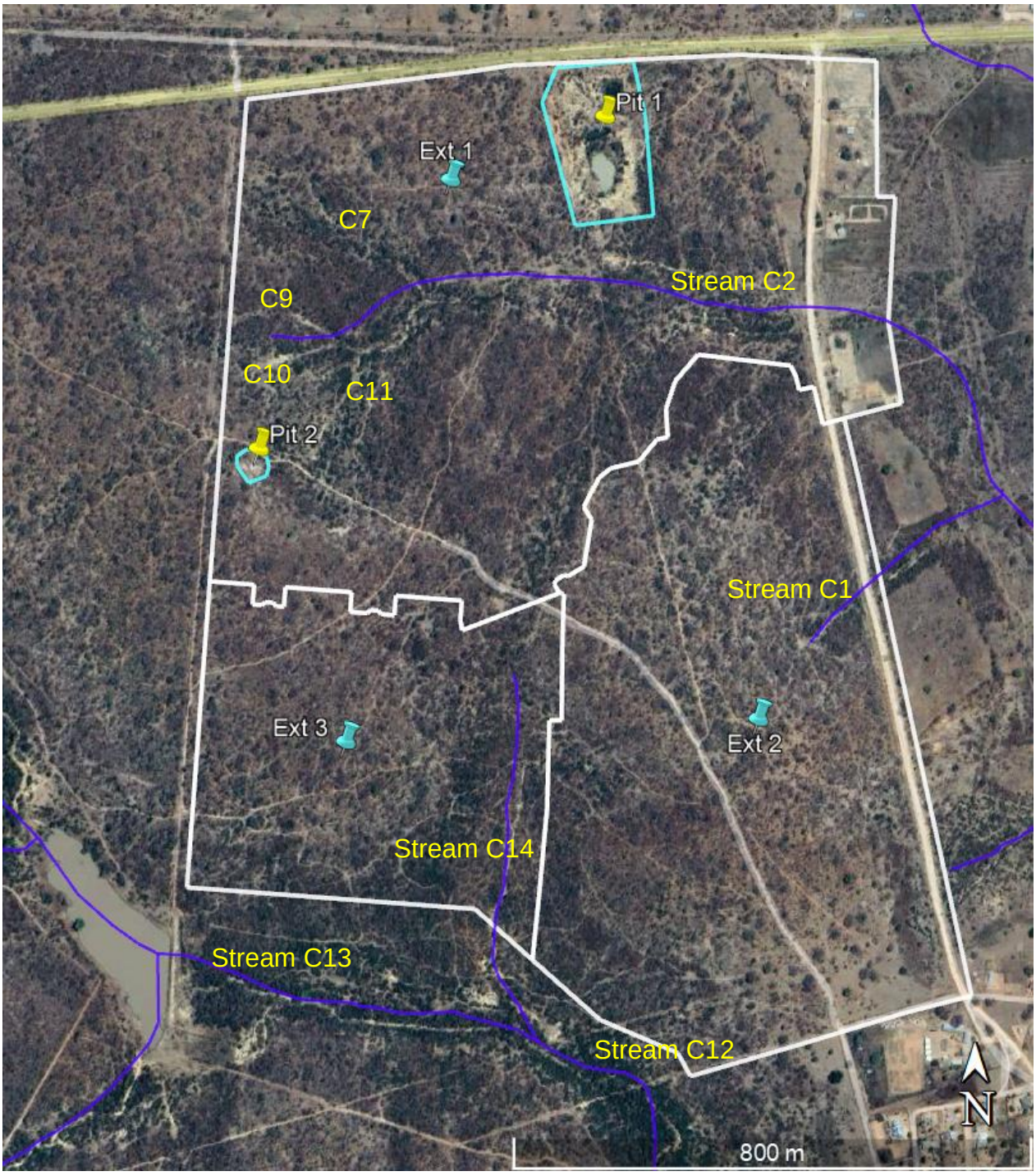


Figure 6 Streams (blue line)

Figure 7 Stream C1 culvert 1200mm high x 1200mm wide

Figure 8 Stream C1 onsite

Figure 9 Stream C2 onsite

Figure 10 Stream C2 culvert 900mm diameter

Figure 11 Stream C10 onsite

Figure 12 Stream C11 onsite

Figure 13 Stream C12 onsite

Figure 14 Stream C13 onsite

Figure 15 Stream C14 onsite

1.4 Methodology

1.4.1 general

The study consists of 2 major components:

- a flood analysis to determine the flood peak flow and,
- a surface water profile analysis to determine the flood line.

The magnitude of a flood is dependent on many factors, such as catchment size, slope and rainfall intensity. There are several different methods for determining floods and in general, different methods arrive at different estimates of the peak flow rate. The accepted approach is therefore to use several methods and then make a judgment call as to which method is the most applicable to the catchment under consideration. For this study, the Rational, Alternative Rational, Standard Design Flood (SDF) methods were used to determine the peak flow rate for the 1:100 return flood.

The reason for choosing these methods was because they are applicable to the catchment and to show the variance in the flood line between the method that produced the highest flood peak and the method that produced the lowest flood peak. Hence a flood line has been produced to take cognisance of the uncertainty related to estimating floods and flood lines.

The area of the catchment in which the adjacent stream is located was determined using GIS software as were additional properties applicable to the catchment, such as the length of the watercourse and the centroid of the catchment. The flood peak flows provide the flow used in the flood line analysis using the *HEC-RAS* software.

Other input required for *HEC-RAS* is channel geometry and roughness parameters.

Channel cross-sections were taken at points along the river / stream course, within the area that contour lines were provided. The stream reaches that were analysed are in a natural state.

1.4.2 Flood Modelling Methodology

Flood peaks for the catchments selected for flood modelling were estimated by the following methods using the Utility Programs for Drainage (UPD) software, 2007 with the methods detailed in SANRAL, 2013:

- Rational Method (RM).
- Alternative Rational Method (ARM).
- Standard Design Flood (SDF).

1.4.2.1 Rational Method

This method is based on the conservation of mass and is applicable for catchment areas below 15 km^2. Aerial and time distributions of rainfall in this method are assumed to be uniform throughout the catchment. Flood peaks and empirical hydrographs can be determined by this method.

Where: The peak flow is obtained from the following relationship:

$$Q = \frac{CIA}{3.6}$$

Where: Q = peak flow (m^3/s)
C = runoff coefficient (dimensionless)
I = average rainfall intensity over the catchment (mm/hour)
A = effective runoff area of the catchment (km^2)
3.6 = conversion factor

1.4.2.2 Alternative Rational Method

This method is based on the rational method with the point precipitation being adjusted using the Design Rainfall Estimation Methodology developed by Smithers and Schulze (2003) to consider local South African conditions.
Design rainfall values for the study area were extracted from the database of six closest to site South African Weather Service stations, using the Design Rainfall Utility developed by Smithers and Schulze (2000).

Table 1 Design Rainfall Values for the site

Duration		Return Period (Years) Design Rainfall Depth (mm)						
		1:2	1:5	1:10	1:20	1:50	1:100	1:200
5	m	8.2	11.4	13.9	16.5	20.3	23.6	27.2
10	m	13.4	18.6	22.6	26.9	33.2	38.5	44.3
15	m	17.9	24.8	30.2	35.9	44.2	51.3	59.1
30	m	25	34.8	42.3	50.3	62	71.9	82.8
45	m	30.5	42.4	51.5	61.2	75.5	87.6	100.9
1	h	35.1	48.8	59.3	70.5	86.9	100.7	116.1
1.5	h	42.8	59.5	72.2	85.9	105.8	122.8	141.5
2	h	49.2	68.4	83.1	98.8	121.8	141.3	162.8
4	h	57.8	80.3	97.5	115.9	142.9	165.7	190.9
6	h	63.4	88.2	107	127.3	156.9	181.9	209.6
8	h	67.8	94.2	114.4	136	167.6	194.4	224
10	h	71.3	99.2	120.4	143.2	176.4	204.7	235.8
12	h	74.4	103.4	125.6	149.3	184	213.4	245.9
16	h	79.5	110.5	134.2	159.5	196.6	228.1	262.8
20	h	83.7	116.3	141.3	167.9	207	240.1	276.6
24	h	87.3	121.3	147.3	175.1	215.9	250.4	288.5
1	d	72.4	100.6	122.2	145.3	179.1	207.7	239.4
2	d	91.1	126.6	153.7	182.8	225.3	261.3	301.1
3	d	104.2	144.8	175.8	209	257.6	298.8	344.3
4	d	114.1	158.6	192.6	229	282.2	327.4	377.2
5	d	122.5	170.3	206.7	245.8	303	351.4	404.9
6	d	129.8	180.4	219.1	260.4	321	372.3	429
7	d	136.3	189.4	230	273.5	337.1	391	450.5

2.0 PROPOSED DEVELOPMENT

2.1 Flood Analysis

To make the analysis possible, properties of the catchments that influence the runoff relating to the 1:100 return flood event need to be determined. These properties are described in the following sections.

2.1.1 Catchment Properties

The catchment topography is composed of mainly flat areas, to hilly. The topographic elevation ranges from 393m to 445m above sea level. The landscape soils are mostly with moderate infiltration rates with slightly restricted permeability (Schulze, 2010). The soils are classified to be permeable and with a moderately low runoff potential.

The Mean Annual Precipitation (MAP) of the catchment was determined from weather stations gridded from in the vicinity of the site. The MAP for the catchment is estimated to be 805mm.

Table 2 Rainfall data

Station Name	**SAWS**	**Distance**	**Record**	**Latitude**		**Longitude**		**MAP**
	Number	(km)	(Years)	(°)	(')	(°)	(')	(mm)
TSAKANE	0595579_W	7.2	32	24	39	31	20	638
ALLANDALE	0595463_W	17.7	36	24	43	31	15	729
NEWINGTON	0595711_W	21.6	33	24	51	31	24	643
KINGFISHERSPRUIT	0638748_W	21.9	42	24	27	31	26	631
CUNNINGMOORE	0595443_W	30	32	24	53	31	15	727
CUNNING MOOR	0595353_W	33.2	28	24	53	31	12	806

The climate is characterised by hot and rainy summers for a long period as well as cold and dry winters over a short period.

2.1.2 Catchment Delineation

There were fourteen catchments that were delineated.
The catchment area is within the Inkomati Water Management Area.

Catchment in the table below was delineated to cover the stream nearest to the project boundary and was utilised to determine the flood peaks for 1:100 return extreme events. The catchment information is listed in the table below.

Table 3 Catchment area

Catchment Site	Catchment area (km^2)	Remark	Quaternary catchment
Stream 1	0.105	Rural	X32H
Stream 2	0.837	Rural	X32H
Stream 3	0.649	Rural	X32H
Stream 4	0.108	Rural	X32H
Stream 5	0.112	Rural	X32H
Stream 6	0.478	Rural	X32H
Stream 7	0.079	Rural	X32H
Stream 8	0.256	Rural	X32H
Stream 9	0.054	Rural	X32H
Stream 10	0.073	Rural	X32H
Stream 11	0.069	Rural	X32H
Stream 12	4.497	Rural	X32H
Stream 13	3.980	Rural	X32H
Stream 14	0.220	Rural	X32H

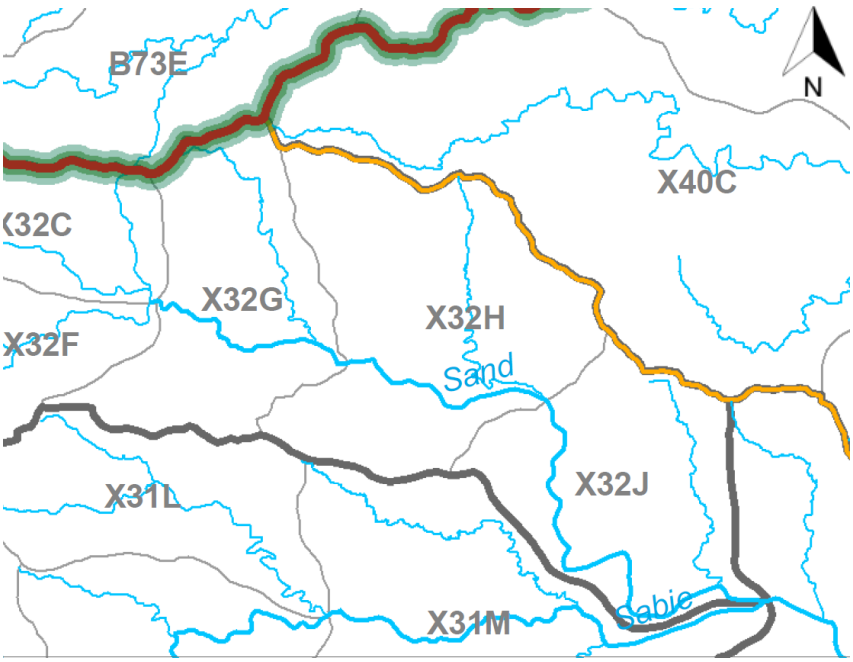


Figure 16 Quaternary catchments

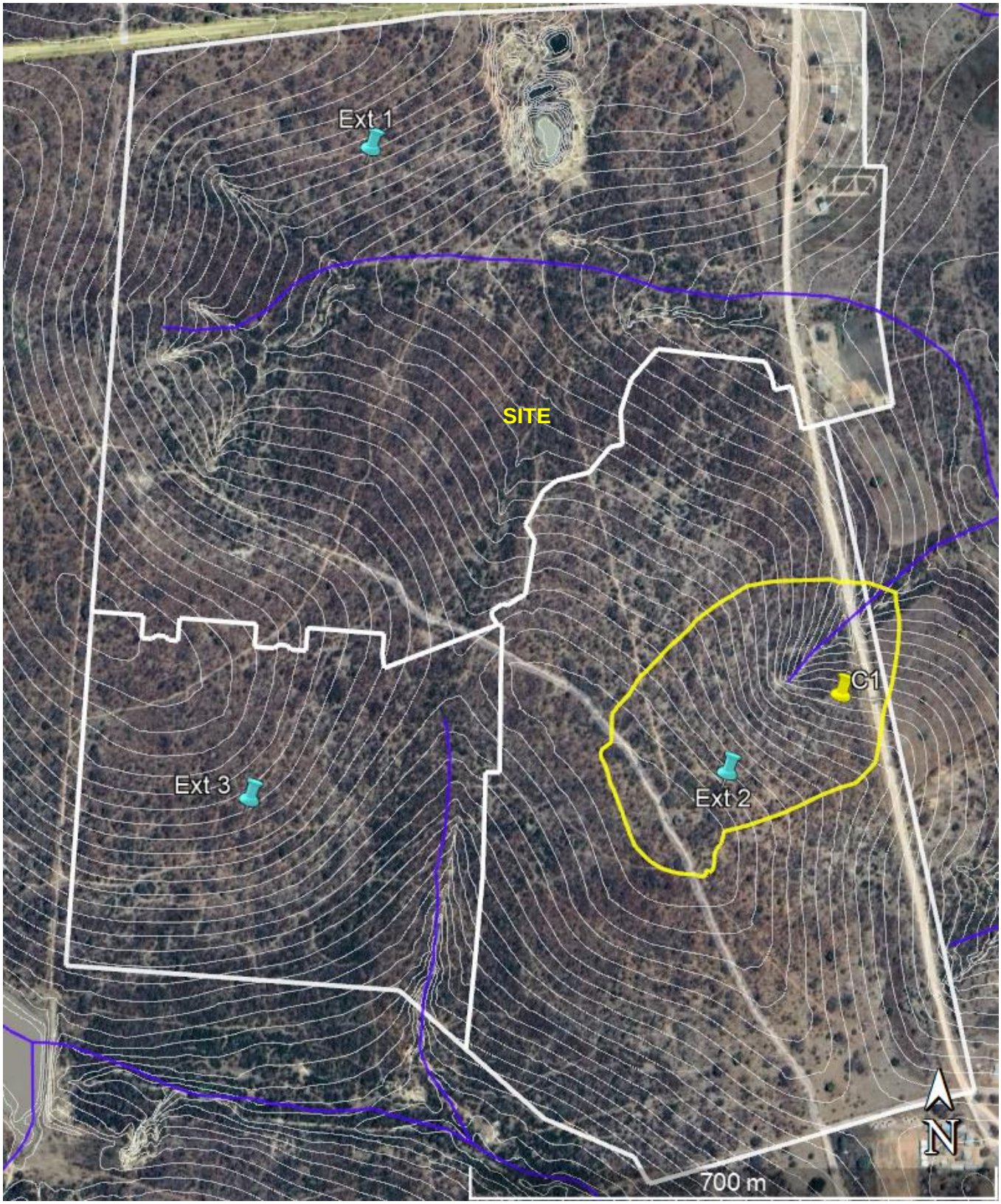


Figure 17 Catchment C1 delineation (yellow line boundary)

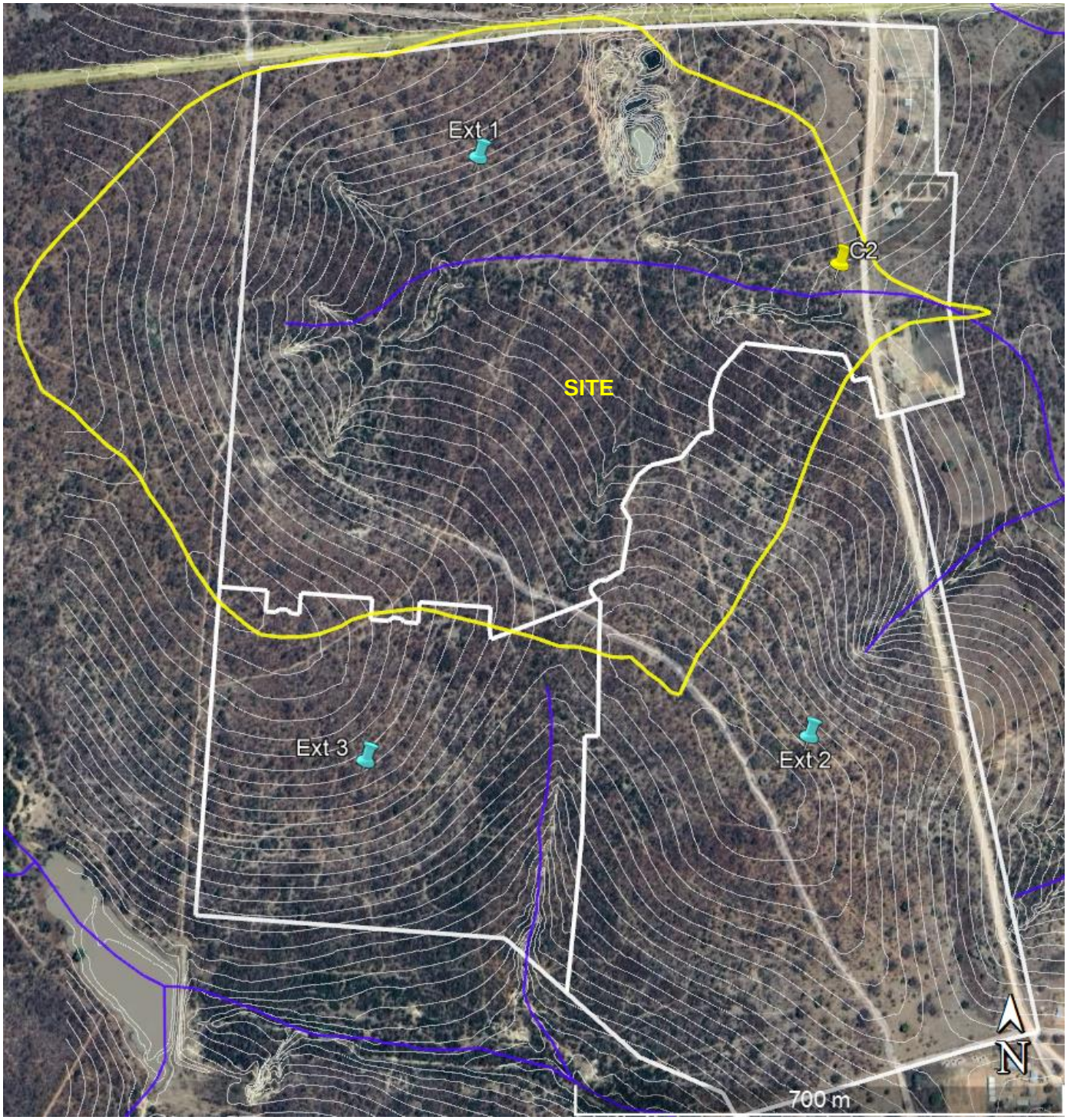


Figure 18 Catchment C2 (yellow line boundary)

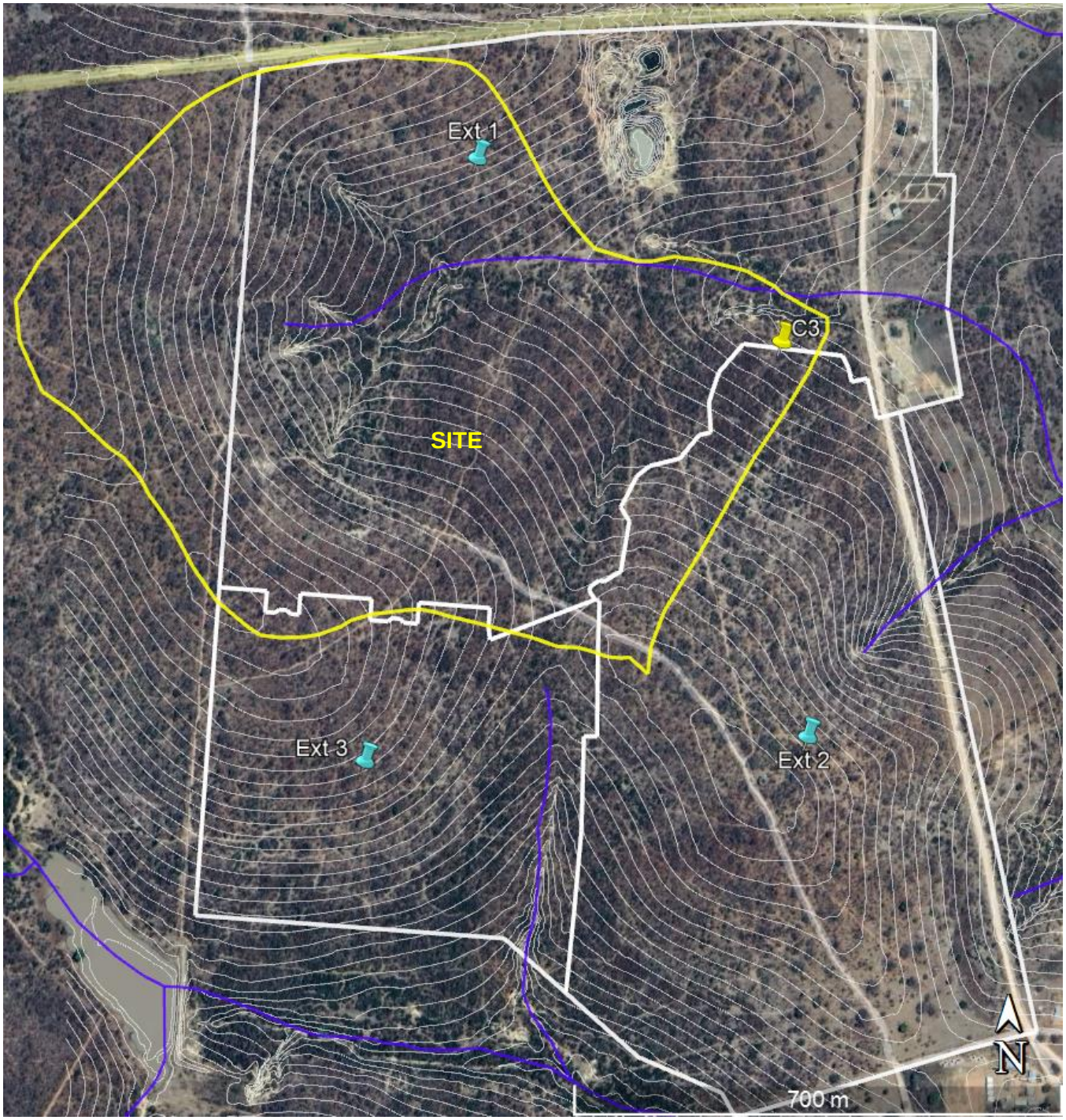


Figure 19 Catchment C3 (yellow line boundary)

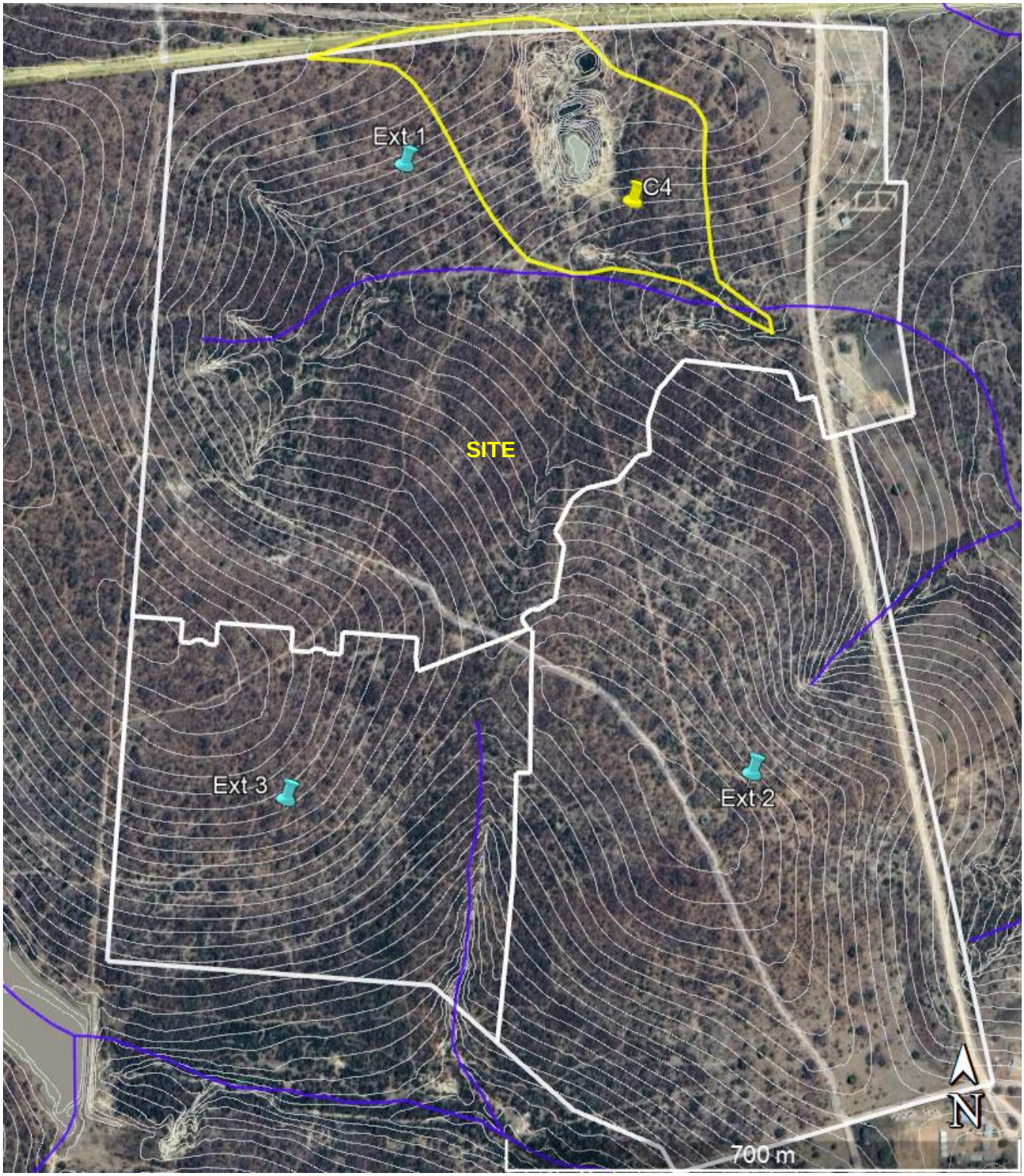


Figure 20 Catchment C4 (yellow line boundary)

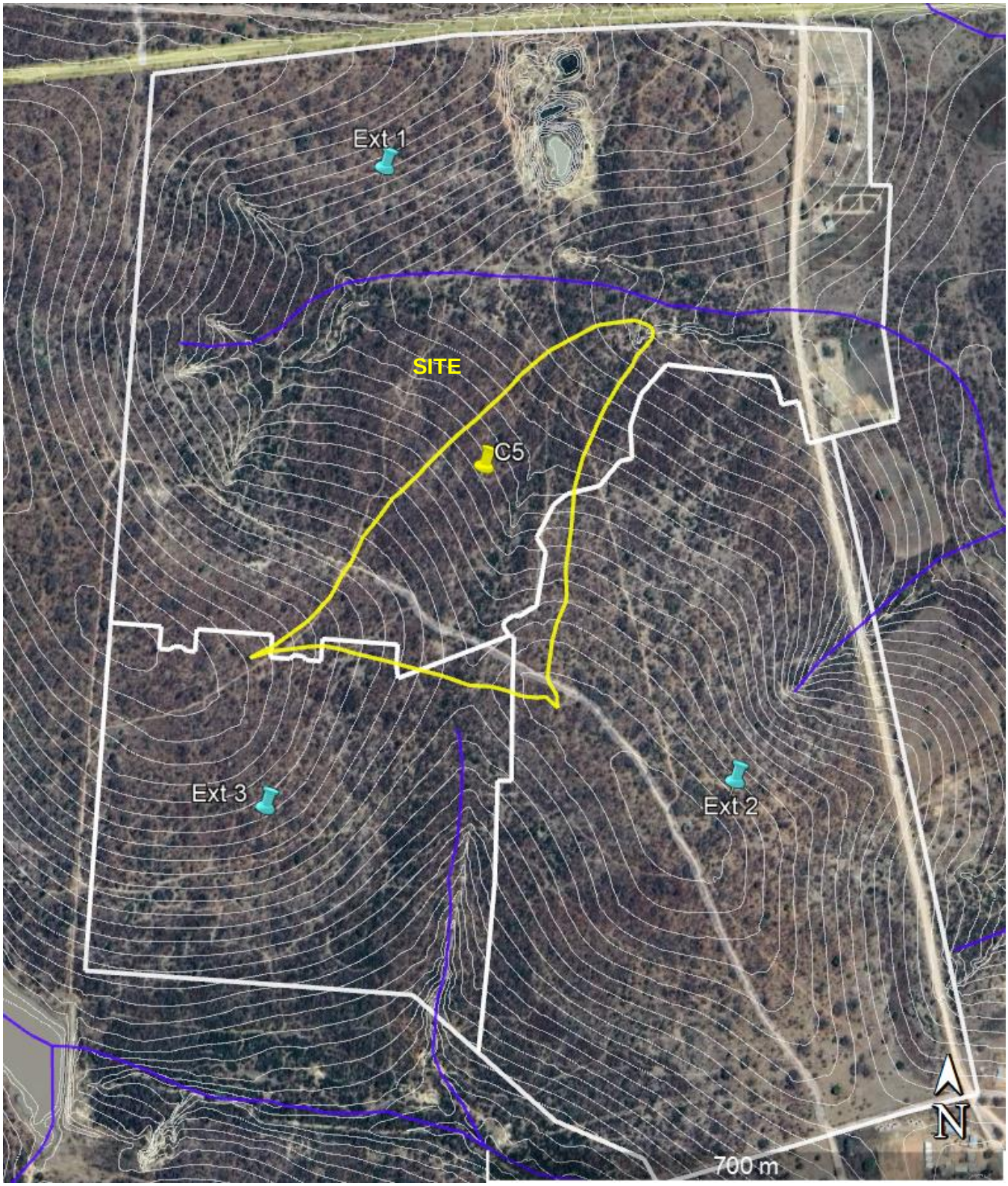


Figure 21 Catchment C5 (yellow line boundary)

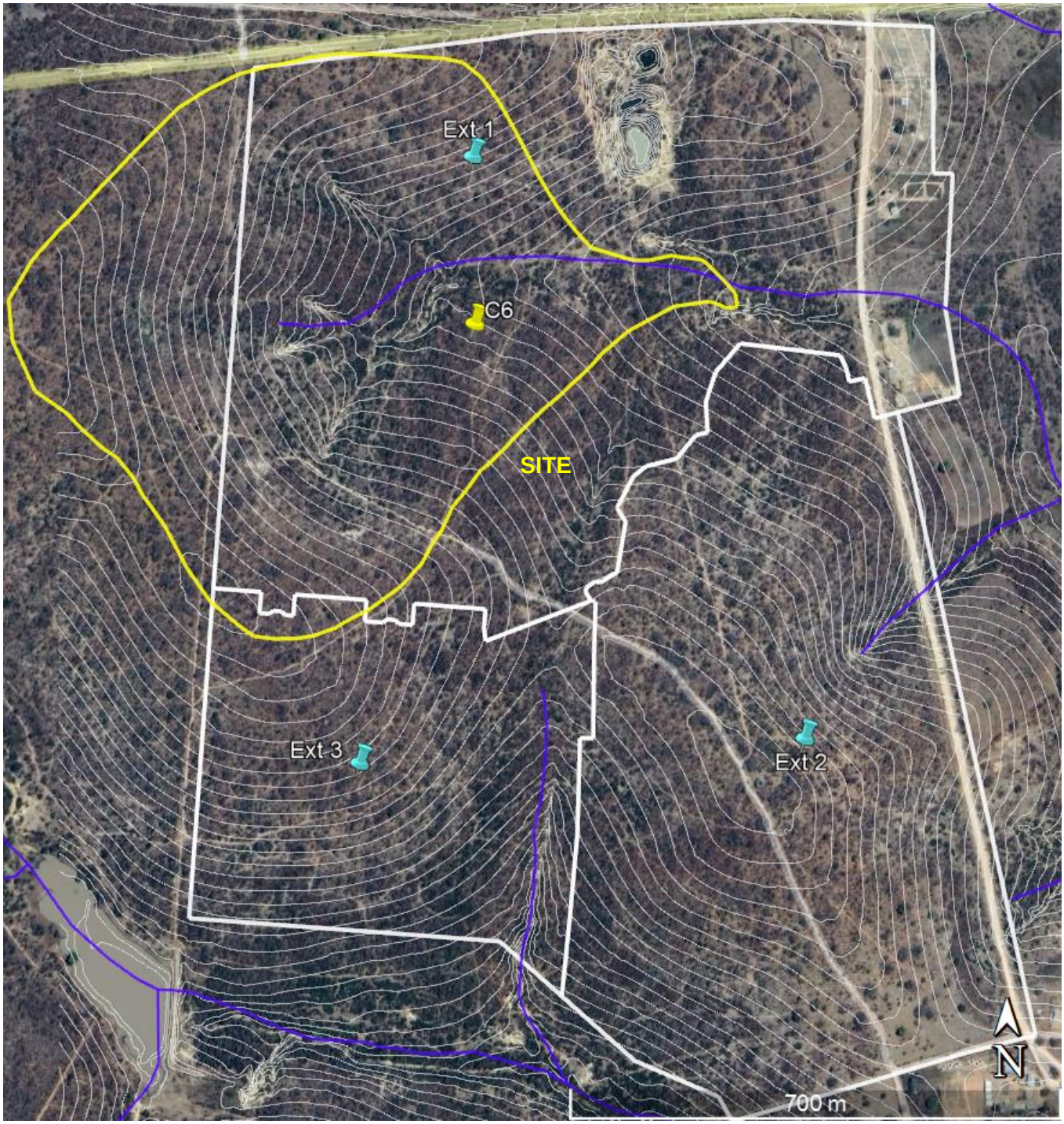


Figure 22 Catchment C6 (yellow line boundary)

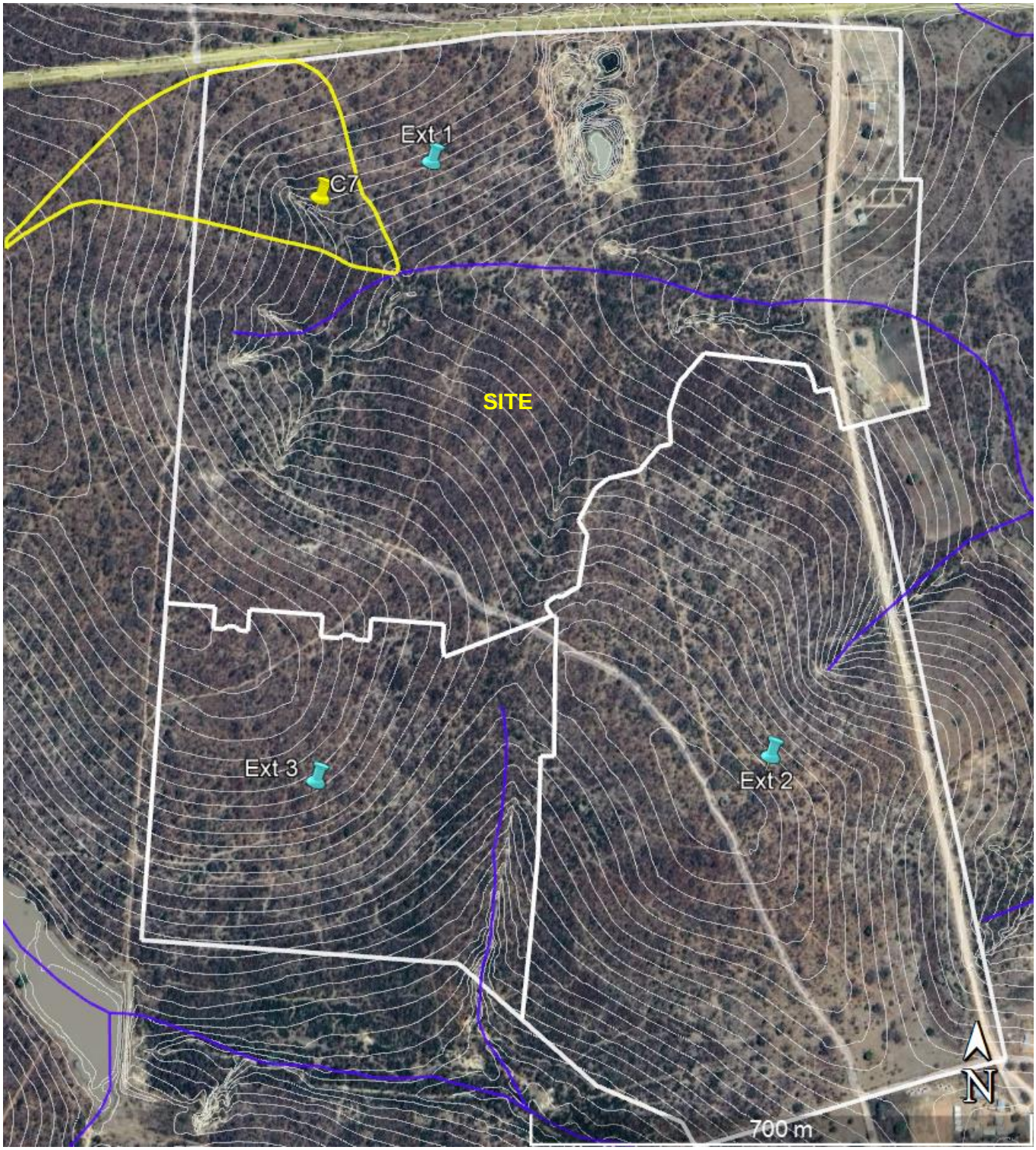


Figure 23 Catchment C7 (yellow line boundary)

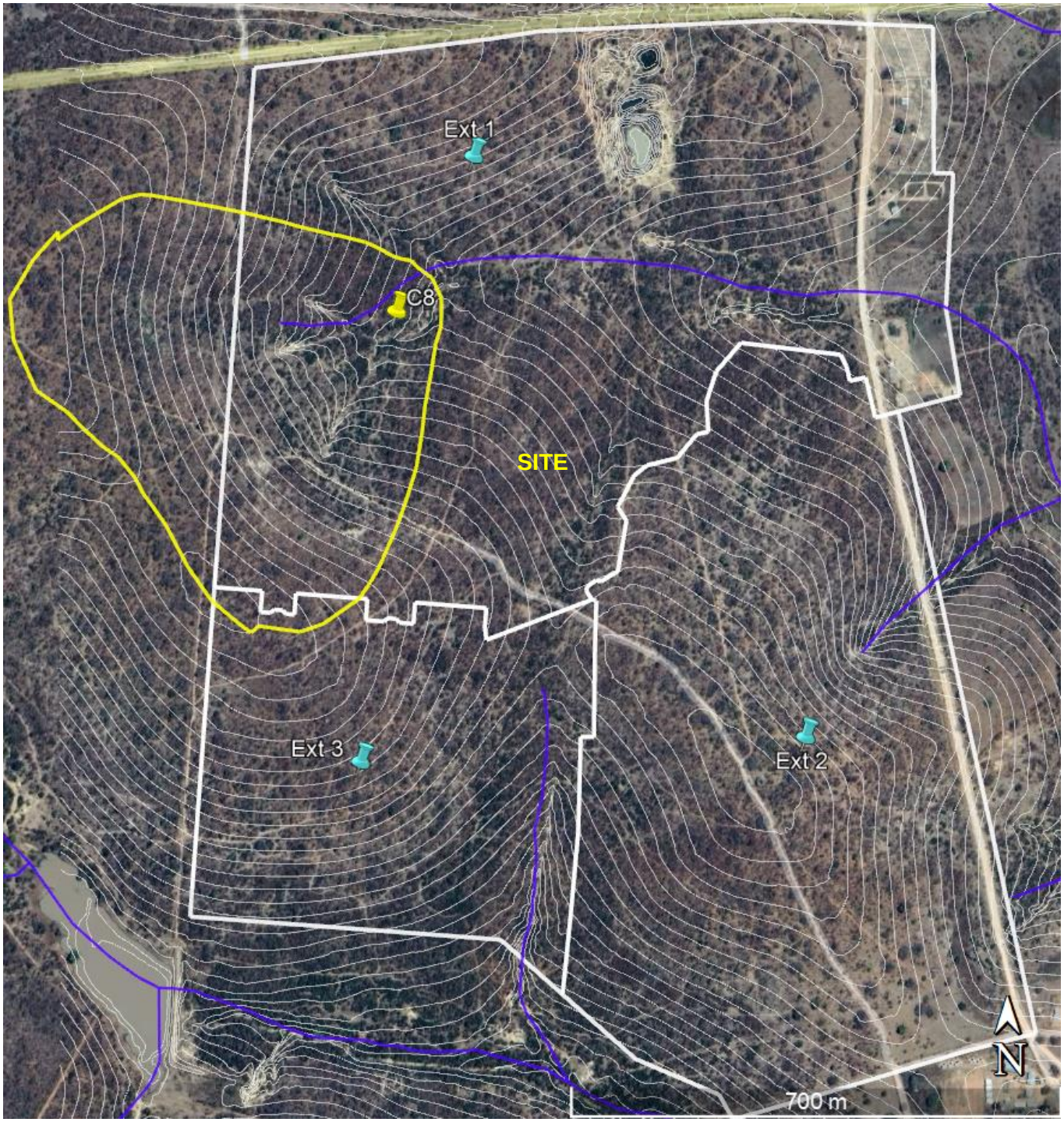


Figure 24 Catchment C8 (yellow line boundary)

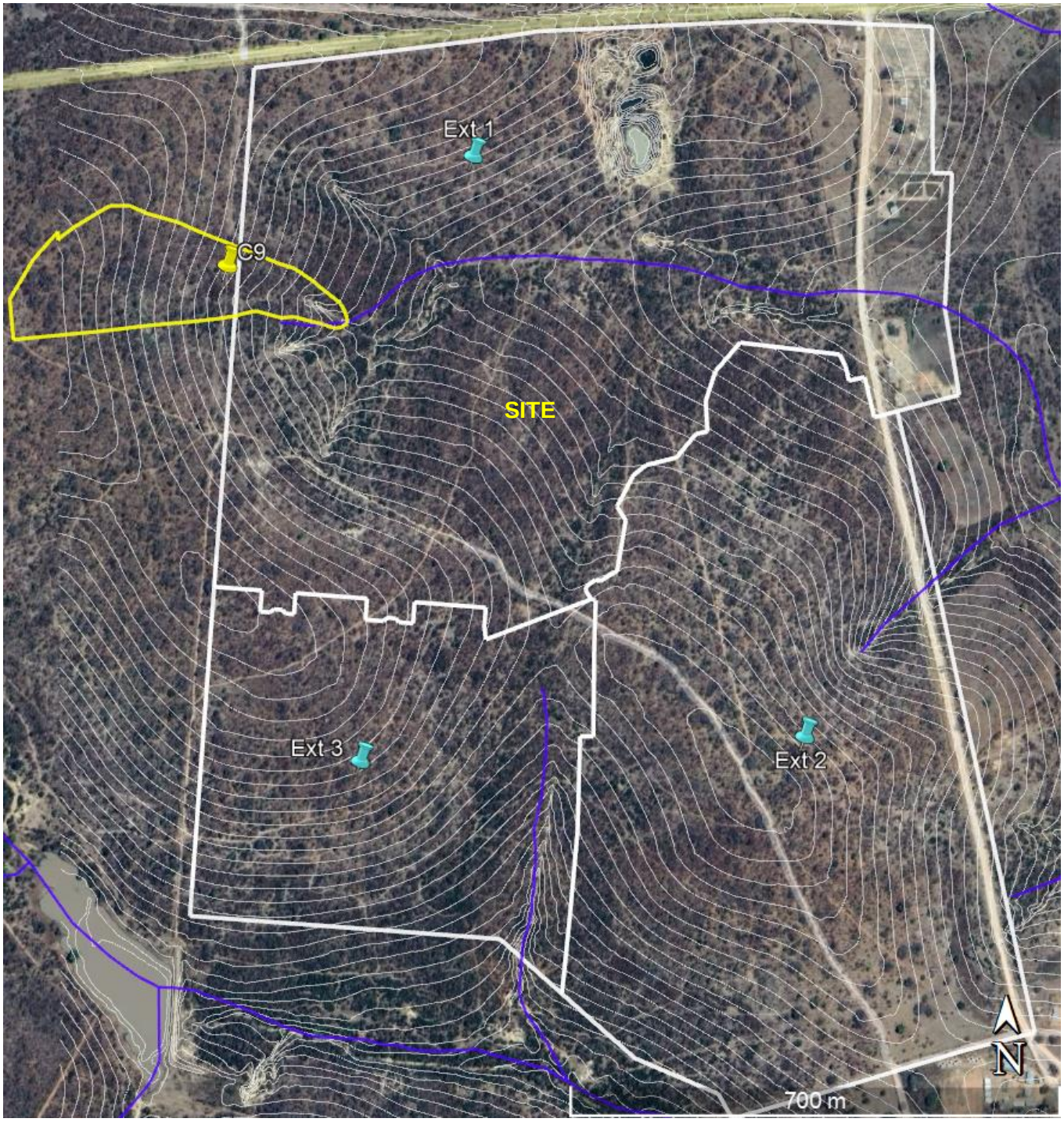


Figure 25 Catchment C9 (yellow line boundary)

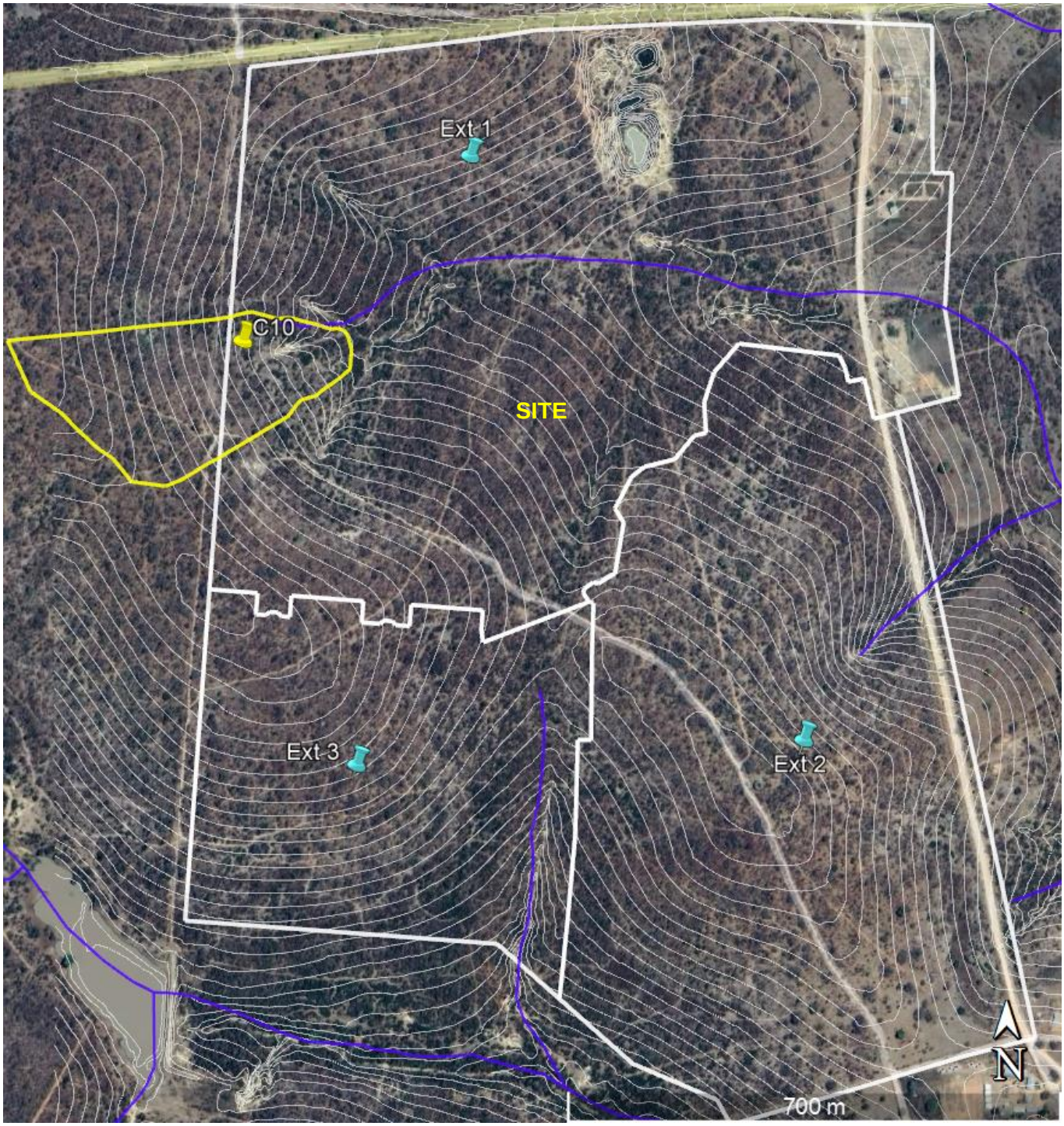


Figure 26 Catchment C10 (yellow line boundary)

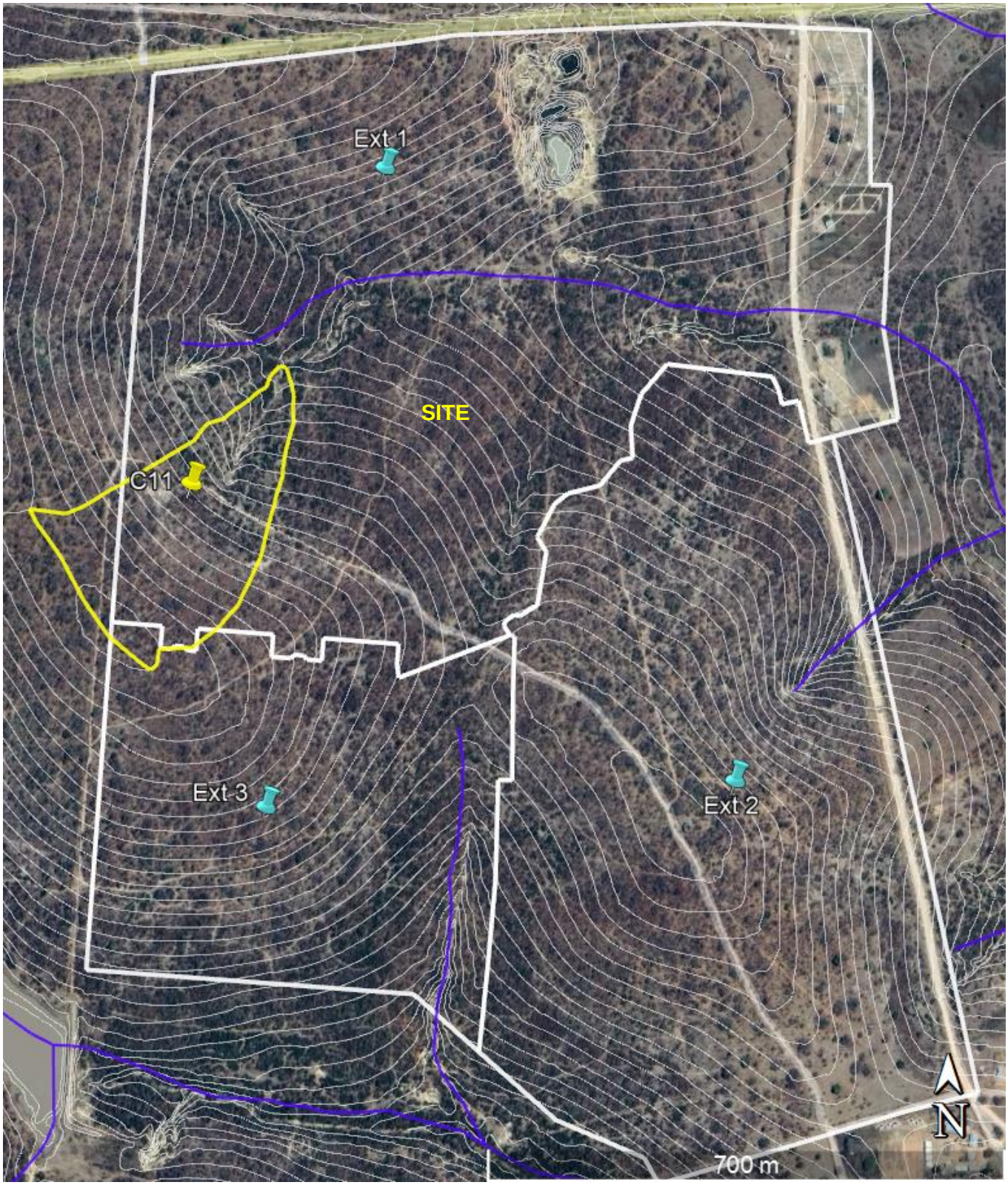


Figure 27 Catchment C11 (yellow line boundary)

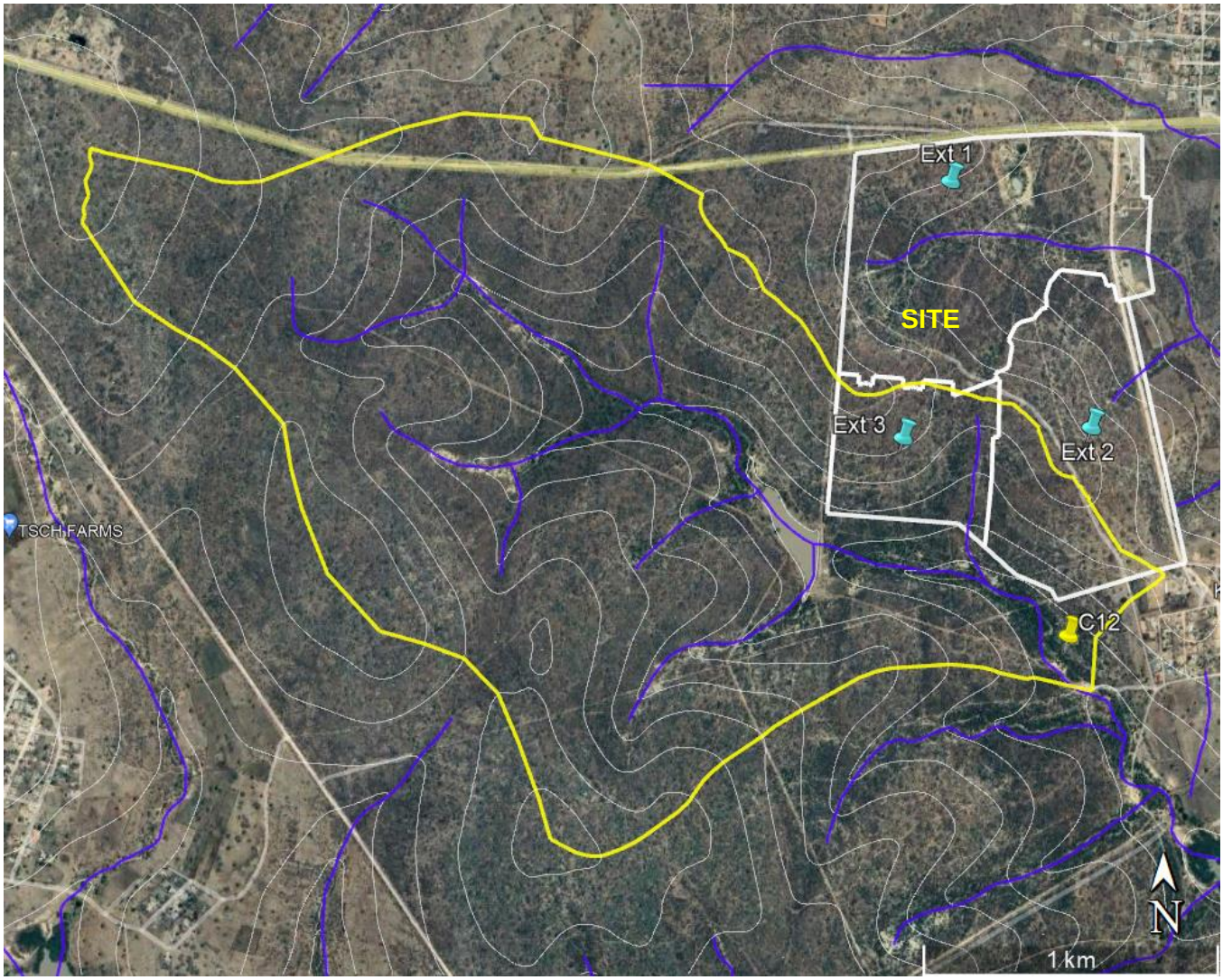


Figure 28 Catchment C12 (yellow line boundary)

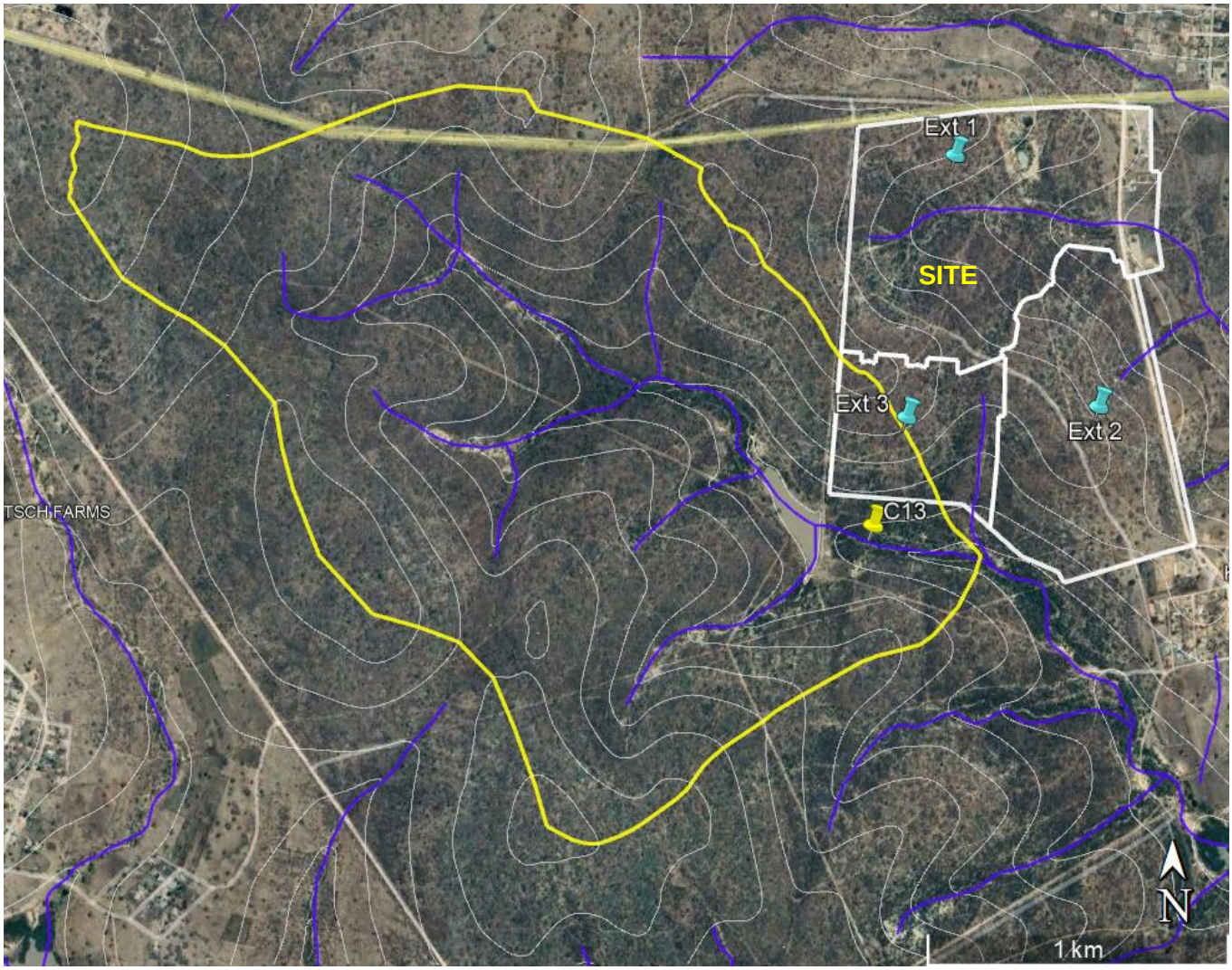


Figure 29 Catchment C13 (yellow line boundary)

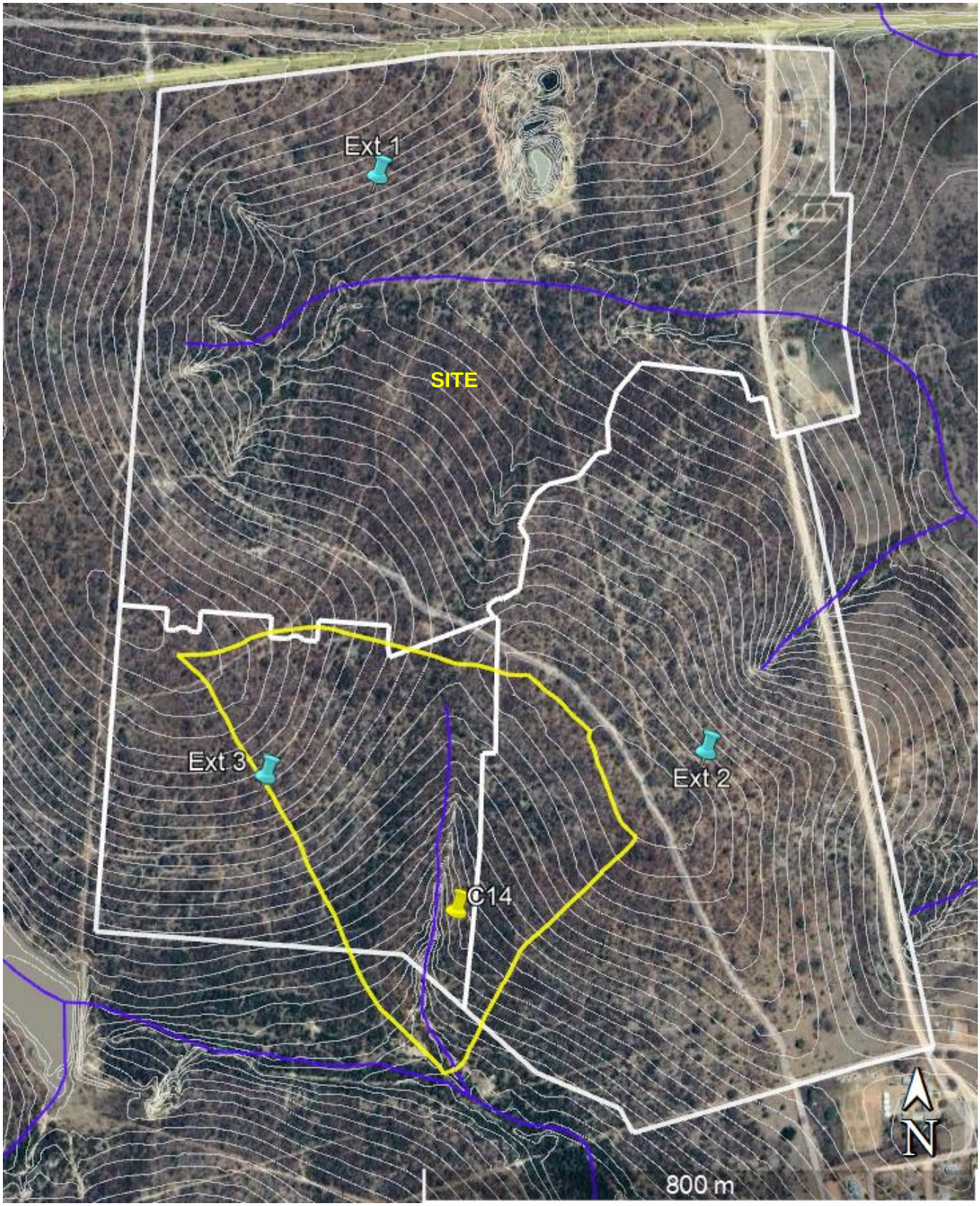


Figure 30 Catchment C14 (yellow line boundary)

Table 4 Catchment Characteristic

Characteristic	Rural	Urban	Lakes	Total
	Distribution	Distribution	Distribution	
Catchment	%	%	%	(%)
Stream 1	100%	0%	0%	100.0%
Stream 2	100%	0%	0%	100.0%
Stream 3	100%	0%	0%	100.0%
Stream 4	100%	0%	0%	100.0%
Stream 5	100%	0%	0%	100.0%
Stream 6	100%	0%	0%	100.0%
Stream 7	100%	0%	0%	100.0%
Stream 8	100%	0%	0%	100.0%
Stream 9	100%	0%	0%	100.0%
Stream 10	100%	0%	0%	100.0%
Stream 11	100%	0%	0%	100.0%
Stream 12	99%	0%	1%	100.0%
Stream 13	99%	0%	1%	100.0%
Stream 14	100%	0%	0%	100.0%

Table 5 Rural area - Surface slope

Rural area - Surface slope	Lakes and pans (<3%)	Flat area (3 to 10%)	Hilly (10 to 30%)	Steep areas (>30%)	Total
	Distribution	Distribution	Distribution	Distribution	
Catchment	(%)	(%)	(%)	(%)	(%)
Stream 1	16%	77%	7%	0%	100.0%
Stream 2	18%	80%	2%	0%	100.0%
Stream 3	16%	83%	1%	0%	100.0%
Stream 4	25%	61%	12%	2%	100.0%
Stream 5	11%	89%	0%	0%	100.0%
Stream 6	18%	81%	1%	0%	100.0%
Stream 7	25%	74%	1%	0%	100.0%
Stream 8	11%	87%	2%	0%	100.0%
Stream 9	6%	92%	2%	0%	100.0%
Stream 10	10%	88%	2%	0%	100.0%
Stream 11	20%	79%	1%	0%	100.0%
Stream 12	27%	73%	0%	0%	100.0%
Stream 13	28%	72%	0%	0%	100.0%
Stream 14	9%	88%	3%	0%	100.0%

Table 6 Rural area – Permeability

Rural area - Permeability	Very permeable	Permeable	Semi-permeable	Impermeable	Total
	Distribution	Distribution	Distribution	Distribution	
Catchment	(%)	(%)	(%)	(%)	(%)
Stream 1	0%	100%	0%	0%	100.0%
Stream 2	0%	100%	0%	0%	100.0%
Stream 3	0%	100%	0%	0%	100.0%
Stream 4	0%	100%	0%	0%	100.0%
Stream 5	0%	100%	0%	0%	100.0%
Stream 6	0%	100%	0%	0%	100.0%
Stream 7	0%	100%	0%	0%	100.0%
Stream 8	0%	100%	0%	0%	100.0%
Stream 9	0%	100%	0%	0%	100.0%
Stream 10	0%	100%	0%	0%	100.0%
Stream 11	0%	100%	0%	0%	100.0%
Stream 12	30%	70%	0%	0%	100.0%
Stream 13	34%	66%	0%	0%	100.0%
Stream 14	0%	100%	0%	0%	100.0%

Table 7 Rural area - Vegetation

Rural area - Vegetation	Thick bush & forests	Light bush & cultivated land	Grasslands	Bare	Total
	Distribution	Distribution	Distribution	Distribution	
Catchment					(%)
Stream 1	12%	77%	5%	6%	100.0%
Stream 2	17%	68%	7%	8%	100.0%
Stream 3	16%	69%	7%	8%	100.0%
Stream 4	7%	56%	5%	32%	100.0%
Stream 5	14%	72%	6%	8%	100.0%
Stream 6	13%	76%	6%	5%	100.0%
Stream 7	12%	79%	5%	4%	100.0%
Stream 8	15%	77%	4%	4%	100.0%
Stream 9	16%	78%	3%	3%	100.0%
Stream 10	12%	79%	5%	4%	100.0%
Stream 11	14%	78%	4%	4%	100.0%
Stream 12	18%	69%	5%	8%	100.0%
Stream 13	20%	68%	5%	7%	100.0%
Stream 14	14%	79%	3%	4%	100.0%

Table 8 Run-off factors

Catchment	Run-off factor			
	Rural (C_R)	Urban (C_U)	Lakes (C_L)	Combined (C)
Stream 1	0.274	0	0	**0.274**
Stream 2	0.271	0	0	**0.271**
Stream 3	0.272	0	0	**0.272**
Stream 4	0.325	0	0	**0.325**
Stream 5	0.274	0	0	**0.274**
Stream 6	0.267	0	0	**0.267**
Stream 7	0.262	0	0	**0.262**
Stream 8	0.266	0	0	**0.266**
Stream 9	0.266	0	0	**0.266**
Stream 10	0.270	0	0	**0.270**
Stream 11	0.262	0	0	**0.262**
Stream 12	0.251	0	0	**0.248**
Stream 13	0.245	0	0	**0.243**
Stream 14	0.268	0	0	**0.268**

Table 9 Hydrological input data

Catchment	Catchment Area (km^2)	Longest water course (km)	Height difference 1085 method (m)	Days thunder was heard (No.)	Area Dolomite (%)	Mean Annual Precipitation (mm)	SDF Basin no. (No.)
Stream 1	0.105	0.486	20.2	27	0	805	29
Stream 2	0.837	1.418	28.3	27	0	805	29
Stream 3	0.649	1.185	27.2	27	0	805	29
Stream 4	0.108	0.813	20.7	27	0	805	29
Stream 5	0.112	0.843	19.4	27	0	805	29
Stream 6	0.478	1.052	25.1	27	0	805	29
Stream 7	0.079	0.514	14.2	27	0	805	29
Stream 8	0.256	0.552	18.6	27	0	805	29
Stream 9	0.054	0.426	16.0	27	0	805	29
Stream 10	0.073	0.405	14.9	27	1	805	29
Stream 11	0.069	0.437	6.4	27	2	805	29
Stream 12	4.497	4.201	44.4	27	3	805	29
Stream 13	3.980	3.635	42.7	27	4	805	29
Stream 14	0.220	0.911	22.3	27	5	805	29

Table 10 Catchment characteristics

Catchment Site	Catchment area (km^2)	Longest water course, L (km)	Height difference along 10-85 slope (m)	Average slope S_{av} (m/m)	Time of concentration, Tc (hours)	% Slope	MAP (mm)	Run-off factor C
Stream 1	0.105	0.486	20.2	0.05535242	0.115909498	5.54%	805	0.274
Stream 2	0.837	1.418	28.3	0.02658235	0.350807416	2.66%	805	0.271
Stream 3	0.649	1.185	27.2	0.03064247	0.289299564	3.06%	805	0.272
Stream 4	0.108	0.813	20.7	0.03395680	0.208067629	3.40%	805	0.325
Stream 5	0.112	0.843	19.4	0.03074989	0.222134963	3.07%	805	0.274
Stream 6	0.478	1.052	25.1	0.03174033	0.260422509	3.17%	805	0.267
Stream 7	0.079	0.514	14.2	0.03675408	0.141834052	3.68%	805	0.262
Stream 8	0.256	0.552	18.6	0.04492630	0.138544277	4.49%	805	0.266
Stream 9	0.054	0.426	16.0	0.05017264	0.108723237	5.02%	805	0.266
Stream 10	0.073	0.405	14.9	0.04897770	0.105569054	4.90%	805	0.27
Stream 11	0.069	0.437	6.4	0.01951499	0.159602409	1.95%	805	0.262
Stream 12	4.497	4.201	44.4	0.01408753	1.033696173	1.41%	805	0.248
Stream 13	3.980	3.635	42.7	0.01565062	0.888046987	1.57%	805	0.243
Stream 14	0.220	0.911	22.3	0.03267004	0.230549493	3.27%	805	0.268

Flood magnitudes

The flood magnitudes from the 1:2 return up to 1:100 return floods are presented in the Tables below.

Table 11 Estimated stormwater flow (m^3/s)

	Rational method						Alternative rational method					
Return	**1:2**	**1:5**	**1:10**	**1:20**	**1:50**	**1:100**	**1:2**	**1:5**	**1:10**	**1:20**	**1:50**	**1:100**
Catchment												
Stream 1	0.68	0.98	1.32	1.72	2.36	3.06	0.68	1.23	1.71	2.23	2.95	3.58
Stream 2	3.40	4.93	6.63	8.66	11.87	15.36	3.06	5.51	7.66	10.02	13.24	16.05
Stream 3	2.91	4.23	5.68	7.43	10.18	13.18	2.68	4.82	6.69	8.75	11.57	14.03
Stream 4	0.67	0.98	1.31	1.71	2.35	3.05	0.64	1.15	1.60	2.09	2.77	3.36
Stream 5	0.57	0.83	1.12	1.46	2.00	2.59	0.54	0.97	1.35	1.77	2.34	2.83
Stream 6	2.22	3.22	4.32	5.65	7.75	10.03	2.06	3.70	5.15	6.73	8.90	10.79
Stream 7	0.46	0.66	0.89	1.16	1.60	2.07	0.45	0.82	1.13	1.48	1.96	2.38
Stream 8	1.51	2.20	2.95	3.86	5.29	6.85	1.51	2.71	3.77	4.93	6.52	7.91
Stream 9	0.34	0.50	0.67	0.87	1.20	1.55	0.35	0.62	0.87	1.13	1.50	1.82
Stream 10	0.47	0.69	0.93	1.21	1.66	2.15	0.48	0.87	1.20	1.57	2.08	2.52
Stream 11	0.38	0.56	0.75	0.98	1.34	1.73	0.38	0.68	0.94	1.23	1.62	1.97
Stream 12	8.44	12.24	16.44	21.45	29.35	37.91	7.19	12.94	17.98	23.52	31.09	37.70
Stream 13	8.15	11.82	15.86	20.70	28.32	36.59	6.96	12.52	17.40	22.77	30.09	36.49
Stream 14	1.08	1.57	2.11	2.75	3.78	4.89	1.02	1.83	2.54	3.33	4.40	5.33

Table 12 Estimated stormwater flow (m^3/s)

	Standard design flood method					
Return	**1:2**	**1:5**	**1:10**	**1:20**	**1:50**	**1:100**
Catchment						
Stream 1	0.35	1.08	1.74	2.50	3.61	4.54
Stream 2	1.57	4.88	7.92	11.33	16.38	20.61
Stream 3	1.37	4.26	6.90	9.87	14.27	17.96
Stream 4	0.27	0.85	1.38	1.98	2.86	3.60
Stream 5	0.27	0.85	1.38	1.98	2.86	3.60
Stream 6	1.07	3.33	5.41	7.73	11.19	14.07
Stream 7	0.24	0.75	1.21	1.74	2.51	3.16
Stream 8	0.79	2.45	3.97	5.68	8.22	10.34
Stream 9	0.18	0.57	0.92	1.31	1.90	2.39
Stream 10	0.25	0.77	1.25	1.79	2.59	3.26
Stream 11	0.20	0.62	1.01	1.44	2.08	2.62
Stream 12	4.04	12.55	20.34	29.10	42.10	52.96
Stream 13	3.99	12.40	20.10	28.76	41.60	52.34
Stream 14	0.53	1.64	2.66	3.81	5.51	6.93

The applications and limitation of flood calculation methods are shown in the table below.

Table 13 Applications and limitation of flood calculation methods

Method	Recommended maximum area (km^2)	Return period of floods that could be determined
Statistical method	No limitation (larger areas)	1:2 to 1:200
Rational method	Usually less than $15km^2$	1:2 to 1:200
Unit Hydrograph method	$15km^2$ to $5,000km^2$	1:2 to 1:100
Standard Design Flood method	No limitation	1:2 to 1:200
SCS-SA method	Less than $30km^2$	1:2 to 1:100
Empirical methods	No limitation (larger areas)	1:10 to 1:100

Flood magnitudes for the 1:100-year floods

The Rational, Alternative Rational (AR), and Standard Design Flood (SDF) methods were used to select the flood peak.

The flow results were similar, therefore, the method with the highest magnitude of the peak flow was used for the 1:100 return flood for a sub-catchment.

The selected maximum peak flow is shown in the table below.

Table 14 Catchment generated estimated 1:100 peak flow

Stream 1	Catchment, estimated 100year peak flow =	4.54	m^3/s
Stream 2	Catchment, estimated 100year peak flow =	20.61	m^3/s
Stream 3	Catchment, estimated 100year peak flow =	17.96	m^3/s
Stream 4	Catchment, estimated 100year peak flow =	3.60	m^3/s
Stream 5	Catchment, estimated 100year peak flow =	3.60	m^3/s
Stream 6	Catchment, estimated 100year peak flow =	14.07	m^3/s
Stream 7	Catchment, estimated 100year peak flow =	3.16	m^3/s
Stream 8	Catchment, estimated 100year peak flow =	10.34	m^3/s
Stream 9	Catchment, estimated 100year peak flow =	2.39	m^3/s
Stream 10	Catchment, estimated 100year peak flow =	3.26	m^3/s
Stream 11	Catchment, estimated 100year peak flow =	2.62	m^3/s
Stream 12	Catchment, estimated 100year peak flow =	52.96	m^3/s
Stream 13	Catchment, estimated 100year peak flow =	52.34	m^3/s
Stream 14	Catchment, estimated 100year peak flow =	6.93	m^3/s

The estimated 1:100 stream flow is listed in the table below.

Table 15 Stream 1:100 return peak flow estimates

Stream - Reach	Flow (m^3/s)
Stream 1	4.54
Stream 2	20.61
Stream 3	17.96
Stream 4	3.60
Stream 5	3.60
Stream 6	14.07
Stream 7	3.16
Stream 8	10.34
Stream 9	2.39
Stream 10	3.26
Stream 11	2.62
Stream 12	52.96
Stream 13	52.34
Stream 14	6.93

2.2 Flood line Modelling

The HEC-RAS model was used to determine the flood line during the event of a flood for any return period, and in this case the 1:100-year floods were modelled.

2.2.1 Cross section profile

Cross sectional data was generated using GIS and CAD software, as well as the lidar 0.5m contour lines that were obtained from the Bushbuckridge Local Municipality. Sections shown in Annexure 5 were used to approximate the geometry for the river.

2.2.2 Flood profiles

Annexure 4 shows the longitudinal profile for the 1:100 return peak flow.

3.0 CONCLUSION

The determination of the 1:100 return period floodlines was undertaken for the site of the proposed development. The results of this determination provide an indication as to the extent of the areas that will be inundated by the 1:100 return design flood.

It is recommended that a buffer zone of 20m should be provided between the 1:100 flood line and any proposed development.

The lateral extent of the 1:100 return flood line is shown in Annexure 2. These flood lines have also been provided as Gauss Conform WGS84 LO31 coordinated CAD dwg softcopy files.

4.0 REFERENCES

- Smithers J.C. and Schulze R.E. (2002): Drainage rainfall and flood estimation in South Africa, WRC project KS/1060.

- The South African National Roads Agency Limited (2013): Drainage manual, 6th Edition.

ANNEXURE 1: FLOODLINE CERTIFICATE

Reg. No: 2014 / 233383 / 07

Branch Offices
Polokwane, Limpopo

DALIMEDE PROJECTS (PTY) LTD
No. 11 Pierre street,
IT Park RentCo Building, Office 6,
Bendor, Polokwane, South Africa, 0699
Tel: 015 291 0775, Cell: 079 368 8414,
E-mail: admin@dalimede.com

FLOOD LINE CERTIFICATE

Dalimede Projects (PTY) LTD was appointed by Nkanivo Development Consultants (PTY) Ltd to undertake floodline assessment relating to the proposed township development situated for Greater Seville Ext 3 on the Remainder of Portion 1 and Portion 2 of the Farm Seville 224 KU, Mpumalanga Province.

This will entail to delineate the 1:100 return flood line.

Site: *Remainder of Portion 1 and Portion 2 of the Farm Seville 224 KU, Mpumalanga Province*

Township Name: *Greater Seville Ext 3*

Co-ordinates: *24°39'45.06"S 31°24'15.00"E*

Municipality: *Bushbuckridge Local Municipality*

In terms of section 114 of the National Water Act, Act 36 of 1998 the above-mentioned property is affected by flood water within the 1:100 period from the stream / river as indicated in the floodline report. Development must be done outside of the floodline.

It is recommended that a buffer zone of 20m should be provided between the 1:100 flood line and any proposed development.

Thus, done and signed in Polokwane on this day 2022 / 11 / 14

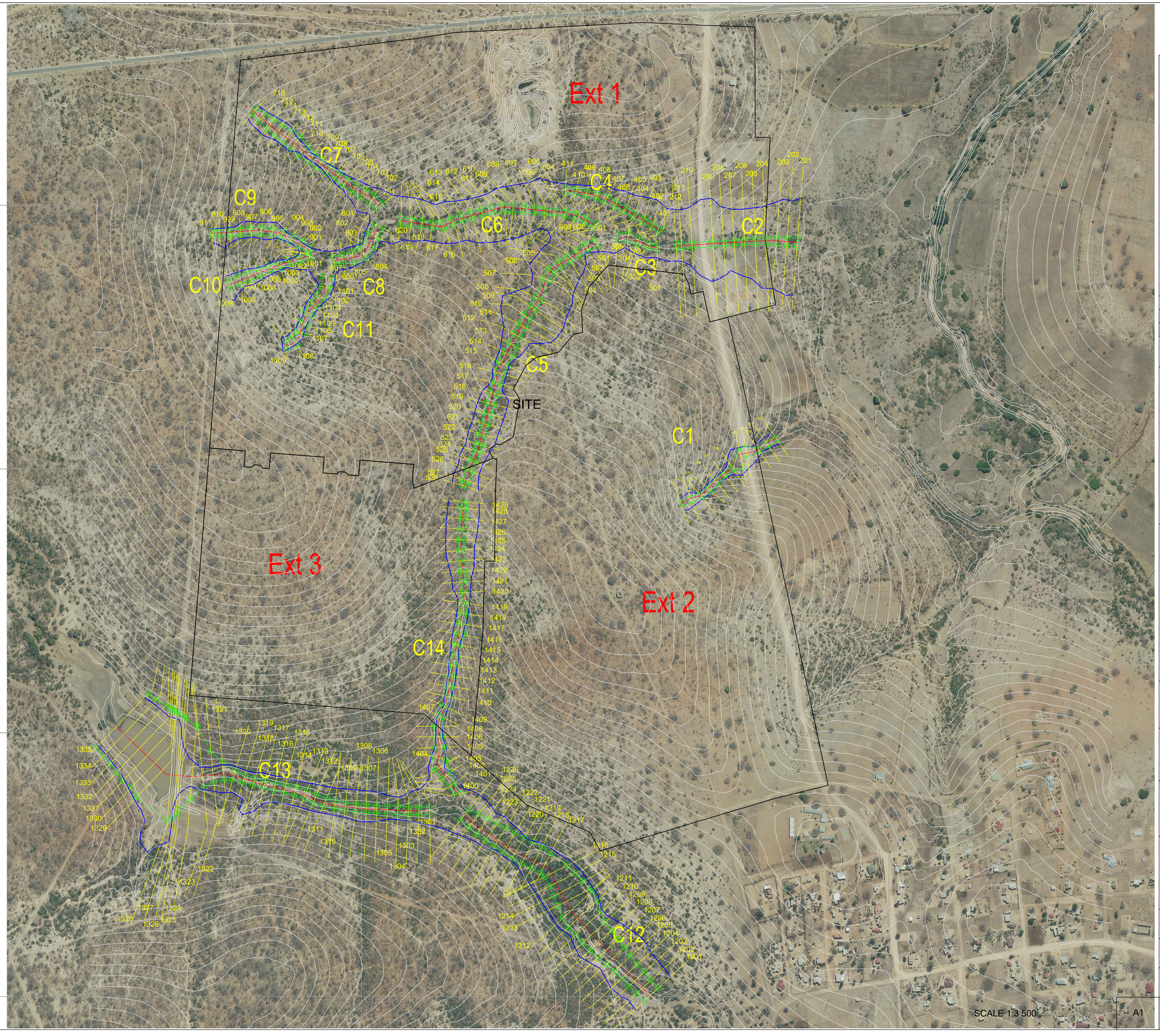
Signature: .....

Engineer: Litmos Mthunzi

Pr Tech Eng

Pr no.: ECSA 201770075

ANNEXURE 2: FLOODLINE DELINEATION



SCALE 1:3 500

A1

NOTES

KEY

FLOODLINE

100 CROSS SECTION

STREAM / RIVER

REVISIONS

REV	DATE	SIGN	DESCRIPTION
0	../../...	....	.....

CLIENT

Bushbuckridge Local Municipality
R533 Graskop Main Road
Bushbuckridge
1280

Tel: 013 065 0814

CONSULTANT

Dalimede Projects (PTY) LTD
No. 11 Pierre street, IT Park RentCo Building, Office 6,
Bendor, Polokwane, South Africa, 0699

Tel: 015 291 0775, Cell: 079 368 8414,
E-mail: admin@dalimede.com
GPS; Lat: -23.894692 Long: 29.479758

DRAWING STATUS

FOR INFORMATION

PROJECT TITLE

Proposed township development situated on a portion of portion 1, 2 and 3 of the farm Seville 224 KU, Mpumalanga Province

PROJECT LOCATION

The proposed township is situated in 145km north of Mbombela along the R40, in Mpumalanga Province, South Africa. GPS coordinates of site are 24°39'30.99"S 31°24'34.87"E.

DRAWING DESCRIPTION

FLOODLINE DELINEATION 1:100 RETURN PERIOD

SCALE	DATE	DESIGNED	DRAWN	CHECKED
As Shown	Sept 2022	LM	AK	CM

DRAWING No.

SEVILLE/FL/01

REVISION B

ANNEXURE 3: HEC-RAS PROGRAMME MODELLING RESULTS

HEC-RAS Plan: Current mode River: Stream C1 Reach: 1 Profile: 1:100yr

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
1	112	1:100yr	4.54	406.62	406.88	406.88	406.95	0.030796	1.42	4.53	32.09	0.97
1	111	1:100yr	4.54	404.65	405.05	405.05	405.16	0.028075	1.58	3.41	15.72	0.96
1	110	1:100yr	4.54	402.27	402.76	402.76	402.90	0.030404	1.67	2.74	10.27	1.00
1	109	1:100yr	4.54	400.93	401.39	401.39	401.53	0.028716	1.67	2.82	10.62	0.98
1	108	1:100yr	4.54	399.80	400.26	400.26	400.40	0.028527	1.70	2.88	10.69	0.98
1	107	1:100yr	4.54	398.88	399.31	399.31	399.46	0.026947	1.71	2.82	10.79	0.96
1	106	1:100yr	4.54	398.07	398.85		398.88	0.002176	0.76	7.47	17.96	0.31
1	105	1:100yr	4.54	398.00	398.87	398.65	398.87	0.000037	0.12	43.98	67.84	0.04
1	104.5		Culvert									
1	104	1:100yr	4.54	395.88	396.40	396.40	396.66	0.025898	2.23	2.04	9.90	1.01
1	103	1:100yr	4.54	395.20	395.78		395.87	0.015503	1.40	3.58	11.53	0.74
1	102	1:100yr	4.54	394.77	395.34	395.34	395.46	0.027696	1.62	3.16	13.52	0.96
1	101	1:100yr	4.54	394.09	394.57	394.57	394.69	0.030008	1.66	3.06	12.44	0.99

HEC-RAS Plan: Current mode River: Stream C2 Reach: 2 Profile: 1:100

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
2	212	1:100	20.61	394.67	395.58		395.65	0.006737	1.49	24.07	74.86	0.55
2	211	1:100	20.61	394.55	395.58		395.60	0.002314	0.95	37.53	85.85	0.33
2	210	1:100	20.61	394.31	395.39	395.39	395.49	0.018394	1.83	20.11	92.90	0.79
2	209.5		Culvert									
2	209	1:100	20.61	393.79	395.34	395.34	395.41	0.014304	1.55	26.25	152.60	0.66
2	208	1:100	20.61	393.50	393.96		394.02	0.016343	1.63	22.68	97.30	0.79
2	207	1:100	20.61	393.21	393.61		393.67	0.019203	1.58	21.47	92.07	0.83
2	206	1:100	20.61	392.91	393.28		393.33	0.015064	1.37	23.38	94.38	0.73
2	205	1:100	20.61	392.61	392.95		393.00	0.017443	1.41	23.24	105.74	0.78
2	204	1:100	20.61	392.30	392.63		392.67	0.014887	1.27	25.41	114.25	0.72
2	203	1:100	20.61	392.00	392.27		392.32	0.021428	1.37	23.10	117.81	0.84
2	202	1:100	20.61	391.57	391.83		391.87	0.023805	1.33	23.48	131.90	0.86
2	201	1:100	20.61	391.15	391.36	391.32	391.40	0.023014	1.08	25.36	151.81	0.81

HEC-RAS Plan: Current mode River: Stream C3 Reach: 3 Profile: 1:100

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
3	305	1:100	17.96	396.15	397.41	397.23	397.49	0.010885	1.37	15.83	40.63	0.65
3	304	1:100	17.96	396.00	396.86	396.86	397.16	0.022888	2.45	7.59	13.08	0.99
3	303	1:100	17.96	395.99	396.69		396.78	0.007700	1.45	16.12	41.28	0.58
3	302	1:100	17.96	395.71	396.45		396.58	0.012184	1.80	14.67	45.07	0.72
3	301	1:100	17.96	395.12	396.06	396.06	396.30	0.019022	2.27	9.73	26.77	0.90

HEC-RAS Plan: Current mode River: Stream C4 Reach: 4 Profile: 1:100

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
4	411	1:100	3.60	399.00	399.40	399.31	399.44	0.009975	1.01	4.06	18.00	0.58
4	410	1:100	3.60	398.79	399.08	399.06	399.16	0.021609	1.26	3.13	17.05	0.82
4	409	1:100	3.60	398.50	398.95		398.97	0.004468	0.75	5.47	21.90	0.40
4	408	1:100	3.60	398.20	398.55	398.54	398.63	0.022331	1.24	3.22	21.12	0.83
4	407	1:100	3.60	397.91	398.16		398.21	0.018693	1.08	4.02	26.50	0.75
4	406	1:100	3.60	397.62	397.90		397.93	0.011059	0.90	5.85	43.88	0.59
4	405	1:100	3.60	397.34	397.58	397.57	397.63	0.020765	1.13	4.53	37.61	0.79
4	404	1:100	3.60	397.05	397.26	397.21	397.28	0.014272	0.84	6.33	54.78	0.63
4	403	1:100	3.60	396.66	396.83	396.83	396.87	0.031344	1.18	4.70	50.13	0.93
4	402	1:100	3.60	396.26	396.45		396.47	0.012317	0.82	6.78	52.48	0.60
4	401	1:100	3.60	395.80	395.98	395.98	396.03	0.045182	1.27	3.94	39.45	1.09

HEC-RAS Plan: Current mode River: Stream C5 Reach: 5 Profile: 1:100

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
5	528	1:100	3.60	414.15	414.47		414.51	0.011296	0.97	4.93	30.61	0.60
5	527	1:100	3.60	414.03	414.30	414.28	414.35	0.021085	1.13	4.14	30.29	0.79
5	526	1:100	3.60	413.69	413.95		414.00	0.014303	1.00	4.12	22.81	0.66
5	525	1:100	3.60	413.34	413.64		413.70	0.016315	1.08	3.89	23.90	0.71
5	524	1:100	3.60	412.99	413.20	413.20	413.26	0.030014	1.25	3.66	28.10	0.93
5	523	1:100	3.60	412.64	412.87	412.85	412.92	0.022120	1.16	3.92	27.49	0.81
5	522	1:100	3.60	412.11	412.34	412.34	412.41	0.030580	1.24	3.75	31.71	0.93
5	521	1:100	3.60	411.54	411.75	411.75	411.81	0.029016	1.19	3.79	30.70	0.90
5	520	1:100	3.60	410.95	411.15	411.15	411.21	0.031471	1.19	3.78	33.16	0.93
5	519	1:100	3.60	410.22	410.43	410.43	410.50	0.031073	1.23	3.43	26.99	0.94
5	518	1:100	3.60	409.44	409.69	409.69	409.77	0.032769	1.28	3.09	20.88	0.96
5	517	1:100	3.60	408.28	408.59	408.59	408.69	0.035069	1.39	2.59	13.37	1.01
5	516	1:100	3.60	407.42	407.81	407.81	407.93	0.033384	1.51	2.38	10.48	1.01
5	515	1:100	3.60	406.79	407.15	407.13	407.24	0.023827	1.27	2.84	12.89	0.85
5	514	1:100	3.60	406.28	406.68	406.66	406.76	0.023432	1.24	2.93	14.08	0.84
5	513	1:100	3.60	405.86	406.27		406.31	0.020695	0.99	3.95	22.75	0.76
5	512	1:100	3.60	405.57	405.92	405.88	405.96	0.014633	0.95	4.43	28.13	0.66
5	511	1:100	3.60	405.27	405.59	405.55	405.64	0.017730	1.01	4.17	35.63	0.72
5	510	1:100	3.60	404.93	405.05	405.05	405.09	0.046466	1.01	4.95	71.38	1.04
5	509	1:100	3.60	404.23	404.35	404.34	404.37	0.027949	0.84	6.10	78.09	0.82
5	508	1:100	3.60	403.43	403.51	403.51	403.55	0.062169	0.68	4.18	47.94	1.05
5	507	1:100	3.60	401.97	402.03	401.99	402.05	0.023744	0.31	5.53	48.95	0.60
5	506	1:100	3.60	401.36	401.50	401.49	401.52	0.034020	0.98	5.55	71.86	0.92
5	505	1:100	3.60	400.70	400.83	400.80	400.86	0.029184	0.65	4.64	37.48	0.78
5	504	1:100	3.60	400.12	400.28		400.31	0.026708	0.84	4.90	43.78	0.80
5	503	1:100	3.60	399.44	399.61	399.61	399.66	0.040286	1.20	3.86	36.49	1.03
5	502	1:100	3.60	397.99	398.31	398.31	398.43	0.031361	1.56	2.34	9.99	0.99
5	501	1:100	3.60	396.99	397.72		397.72	0.000867	0.46	8.96	18.44	0.19

HEC-RAS Plan: Current mode River: Stream C6 Reach: 6 Profile: 1:100

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
6	620	1:100	14.07	405.09	405.60	405.59	405.70	0.017717	1.64	12.78	57.57	0.82
6	619	1:100	14.07	404.97	405.26		405.31	0.019740	1.19	14.12	60.99	0.78
6	618	1:100	14.07	404.60	404.84		404.90	0.022227	1.24	14.51	69.00	0.83
6	617	1:100	14.07	404.20	404.53		404.57	0.012356	1.15	17.23	68.66	0.65
6	616	1:100	14.07	403.74	404.16	404.16	404.26	0.021851	1.66	12.59	67.83	0.88
6	615	1:100	14.07	403.31	403.73		403.81	0.018666	1.55	13.82	62.64	0.82
6	614	1:100	14.07	402.91	403.35	403.31	403.44	0.017920	1.61	12.35	48.54	0.82
6	613	1:100	14.07	402.57	403.00		403.08	0.018032	1.55	13.72	63.04	0.81
6	612	1:100	14.07	402.23	402.62	402.59	402.70	0.019847	1.53	13.77	62.75	0.84
6	611	1:100	14.07	401.89	402.26		402.33	0.017104	1.46	14.25	61.59	0.78
6	610	1:100	14.07	401.61	402.00		402.05	0.011014	1.22	18.03	81.53	0.63
6	609	1:100	14.07	401.35	401.75		401.81	0.013739	1.37	16.61	79.42	0.71
6	608	1:100	14.07	401.08	401.38		401.45	0.025182	1.50	14.37	77.40	0.91
6	607	1:100	14.07	400.73	400.91		400.96	0.023398	1.04	15.00	79.05	0.81
6	606	1:100	14.07	400.34	400.46	400.41	400.51	0.021247	0.74	14.31	74.32	0.71
6	605	1:100	14.07	399.95	400.10		400.15	0.015562	0.76	14.29	62.58	0.64
6	604	1:100	14.07	399.53	399.85		399.89	0.010717	1.04	16.91	65.58	0.60
6	603	1:100	14.07	399.12	399.46	399.45	399.56	0.027106	1.75	11.97	54.59	0.97
6	602	1:100	14.07	398.59	398.95	398.92	399.04	0.024619	1.72	11.89	48.14	0.93
6	601	1:100	14.07	398.04	398.35	398.35	398.45	0.035153	1.86	11.14	54.00	1.09

HEC-RAS Plan: Current mode River: Stream C7 Reach: 7 Profile: 1:100

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
7	716	1:100	3.16	418.65	418.77	418.77	418.81	0.040682	1.06	4.12	51.66	1.00
7	715	1:100	3.16	417.77	417.90	417.90	417.94	0.035786	1.01	4.08	49.20	0.94
7	714	1:100	3.16	416.77	416.90	416.90	416.95	0.046545	1.03	3.62	43.52	1.04
7	713	1:100	3.16	415.71	415.86	415.86	415.92	0.036268	1.02	3.35	36.16	0.95
7	712	1:100	3.16	414.62	414.77	414.77	414.82	0.039924	1.05	3.20	30.62	0.99
7	711	1:100	3.16	413.18	413.39	413.39	413.46	0.038016	1.19	2.66	18.92	1.00
7	710	1:100	3.16	411.58	411.95	411.95	412.07	0.033020	1.53	2.06	8.78	1.01
7	709	1:100	3.16	410.40	410.88	410.88	411.04	0.031315	1.72	1.83	6.17	1.01
7	708	1:100	3.16	409.80	410.23		410.30	0.014343	1.20	2.64	8.67	0.69
7	707	1:100	3.16	409.49	410.01		410.05	0.010291	0.94	3.36	12.41	0.58
7	706	1:100	3.16	409.19	409.60	409.60	409.70	0.035179	1.39	2.27	11.72	1.01
7	705	1:100	3.16	408.79	409.10		409.15	0.020480	1.04	3.03	16.18	0.77
7	704	1:100	3.16	408.23	408.54	408.54	408.61	0.037181	1.23	2.59	18.38	1.00
7	703	1:100	3.16	407.64	407.85	407.84	407.91	0.028741	1.09	3.06	23.75	0.88
7	702	1:100	3.16	407.00	407.19	407.19	407.25	0.037292	1.13	3.04	25.76	0.98
7	701	1:100	3.16	405.75	406.23		406.24	0.002345	0.52	6.23	20.43	0.29

HEC-RAS Plan: Current mode River: Stream C8 Reach: 8 Profile: 1:100

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
8	807	1:100	10.34	407.73	408.15	408.13	408.27	0.025947	1.70	7.41	29.01	0.95
8	806	1:100	10.34	407.13	407.64	407.64	407.80	0.028989	1.77	6.15	21.59	1.00
8	805	1:100	10.34	406.56	407.12	407.09	407.24	0.022185	1.50	7.03	24.65	0.87
8	804	1:100	10.34	406.03	406.56	406.56	406.72	0.030124	1.73	5.98	19.85	1.01
8	803	1:100	10.34	405.65	406.26		406.32	0.008561	1.11	9.29	23.21	0.56
8	802	1:100	10.34	405.31	405.96		406.08	0.016113	1.58	6.55	16.12	0.78
8	801	1:100	10.34	405.00	405.94		405.96	0.002103	0.75	18.73	54.59	0.30

HEC-RAS Plan: Current mode River: Stream C9 Reach: 9 Profile: 1:100

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
9	911	1:100	2.39	418.10	418.25	418.25	418.30	0.042134	1.16	2.84	33.08	1.03
9	910	1:100	2.39	417.41	417.57	417.57	417.62	0.043233	1.15	2.63	27.40	1.04
9	909	1:100	2.39	416.42	416.60	416.60	416.66	0.042663	1.15	2.50	23.68	1.04
9	908	1:100	2.39	415.61	415.80	415.80	415.85	0.032475	1.05	2.67	24.37	0.92
9	907	1:100	2.39	414.89	415.06	415.06	415.12	0.036350	1.12	2.43	22.32	0.97
9	906	1:100	2.39	413.96	414.15	414.15	414.22	0.036856	1.15	2.22	17.88	0.98
9	905	1:100	2.39	413.06	413.21	413.21	413.26	0.037735	1.06	2.79	29.89	0.97
9	904	1:100	2.39	411.35	411.64	411.64	411.72	0.037346	1.27	1.88	11.68	1.01
9	903	1:100	2.39	410.00	410.35	410.32	410.44	0.023545	1.32	1.82	7.53	0.86
9	902	1:100	2.39	409.44	409.77	409.77	409.86	0.036179	1.35	1.78	9.85	1.01
9	901	1:100	2.39	408.85	409.20		409.23	0.008590	0.85	3.29	14.46	0.53

HEC-RAS Plan: Current mode River: Stream C10 Reach: 10 Profile: 1:100

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
10	1009	1:100	3.26	417.30	417.45	417.45	417.50	0.035425	1.10	3.76	39.29	0.96
10	1008	1:100	3.26	416.14	416.29	416.29	416.35	0.040958	1.13	3.42	33.10	1.02
10	1007	1:100	3.26	414.95	415.14	415.14	415.20	0.032875	1.11	3.43	32.91	0.93
10	1006	1:100	3.26	412.99	413.37	413.37	413.48	0.033991	1.48	2.20	10.07	1.01
10	1005	1:100	3.26	411.23	411.78	411.78	411.94	0.030684	1.77	1.84	5.91	1.01
10	1004	1:100	3.26	410.65	411.13		411.20	0.014640	1.17	2.82	10.51	0.70
10	1003	1:100	3.26	410.24	410.71	410.69	410.81	0.025538	1.41	2.32	9.23	0.90
10	1002	1:100	3.26	409.69	410.12	410.12	410.23	0.034301	1.44	2.28	11.71	1.01
10	1001	1:100	3.26	408.96	409.30		409.36	0.016013	1.12	3.41	17.50	0.71

HEC-RAS Plan: Current mode River: Stream C11 Reach: 11 Profile: 1:100

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
11	1109	1:100	2.62	415.17	415.20	415.20	415.26	0.068942	0.33	2.29	17.88	0.91
11	1108	1:100	2.62	413.74	414.00	414.00	414.07	0.031757	1.23	2.40	18.00	0.94
11	1107	1:100	2.62	412.36	412.75	412.75	412.86	0.033537	1.49	1.76	7.90	1.01
11	1106	1:100	2.62	411.44	411.82	411.82	411.93	0.032905	1.45	1.80	8.27	1.00
11	1105	1:100	2.62	410.83	411.29		411.37	0.023633	1.26	2.08	9.22	0.85
11	1104	1:100	2.62	410.34	410.70	410.70	410.79	0.036726	1.29	2.03	12.13	1.01
11	1103	1:100	2.62	409.81	410.06	410.05	410.12	0.029001	1.13	2.36	15.51	0.89
11	1102	1:100	2.62	409.15	409.39	409.39	409.47	0.037238	1.20	2.21	16.14	1.00
11	1101	1:100	2.62	408.57	408.95		408.98	0.008866	0.78	3.79	19.44	0.52

HEC-RAS Plan: Current mode River: Stream C12 Reach: 12 Profile: 1:100yr

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
12	1226	1:100yr	52.96	397.00	398.24		398.34	0.005454	1.53	42.07	71.35	0.49
12	1225	1:100yr	52.96	397.00	398.22		398.26	0.002001	1.04	63.31	74.39	0.31
12	1224	1:100yr	52.96	397.00	398.13		398.21	0.003499	1.27	46.60	59.49	0.40
12	1223	1:100yr	52.96	396.99	397.93		398.08	0.011204	1.77	32.00	53.11	0.67
12	1222	1:100yr	52.96	396.69	397.62		397.82	0.015834	1.97	27.93	50.89	0.78
12	1221	1:100yr	52.96	396.13	397.52		397.62	0.005335	1.39	38.69	49.46	0.47
12	1220	1:100yr	52.96	396.00	397.30		397.46	0.010934	1.75	30.20	41.76	0.66
12	1219	1:100yr	52.96	396.00	396.94	396.86	397.17	0.018845	2.15	24.87	41.56	0.85
12	1218	1:100yr	52.96	396.00	396.71		396.84	0.012364	1.66	35.00	65.11	0.68
12	1217	1:100yr	52.96	395.86	396.55		396.63	0.007839	1.36	43.38	73.29	0.55
12	1216	1:100yr	52.96	395.65	396.43		396.50	0.006516	1.27	46.88	80.72	0.50
12	1215	1:100yr	52.96	395.48	396.32		396.38	0.005313	1.15	51.11	86.61	0.45
12	1214	1:100yr	52.96	395.32	396.23		396.28	0.004536	1.08	53.67	89.43	0.42
12	1213	1:100yr	52.96	395.15	396.16		396.20	0.002824	0.92	61.18	89.65	0.34
12	1212	1:100yr	52.96	394.86	396.14		396.16	0.001120	0.68	81.75	91.29	0.22
12	1211	1:100yr	52.96	394.35	396.13		396.15	0.000613	0.59	92.55	81.97	0.17
12	1210	1:100yr	52.96	394.00	396.10		396.13	0.000951	0.74	73.01	62.90	0.21
12	1209	1:100yr	52.96	394.00	396.09		396.11	0.000751	0.68	82.94	74.78	0.19
12	1208	1:100yr	52.96	394.00	396.06		396.09	0.001208	0.78	74.82	84.59	0.24
12	1207	1:100yr	52.96	394.22	396.00		396.05	0.003100	1.07	54.43	83.64	0.36
12	1206	1:100yr	52.96	394.00	395.92		395.99	0.003367	1.15	50.86	78.24	0.38
12	1205	1:100yr	52.96	394.01	395.84		395.91	0.004197	1.25	48.18	80.22	0.42
12	1204	1:100yr	52.96	394.00	395.72		395.81	0.005866	1.42	42.66	76.41	0.49
12	1203	1:100yr	52.96	394.00	395.42	395.38	395.61	0.017125	2.02	29.48	73.80	0.81
12	1202	1:100yr	52.96	394.00	395.16		395.32	0.011948	1.81	33.14	65.32	0.69
12	1201	1:100yr	52.96	393.85	395.01	394.78	395.12	0.007503	1.56	40.97	73.49	0.56

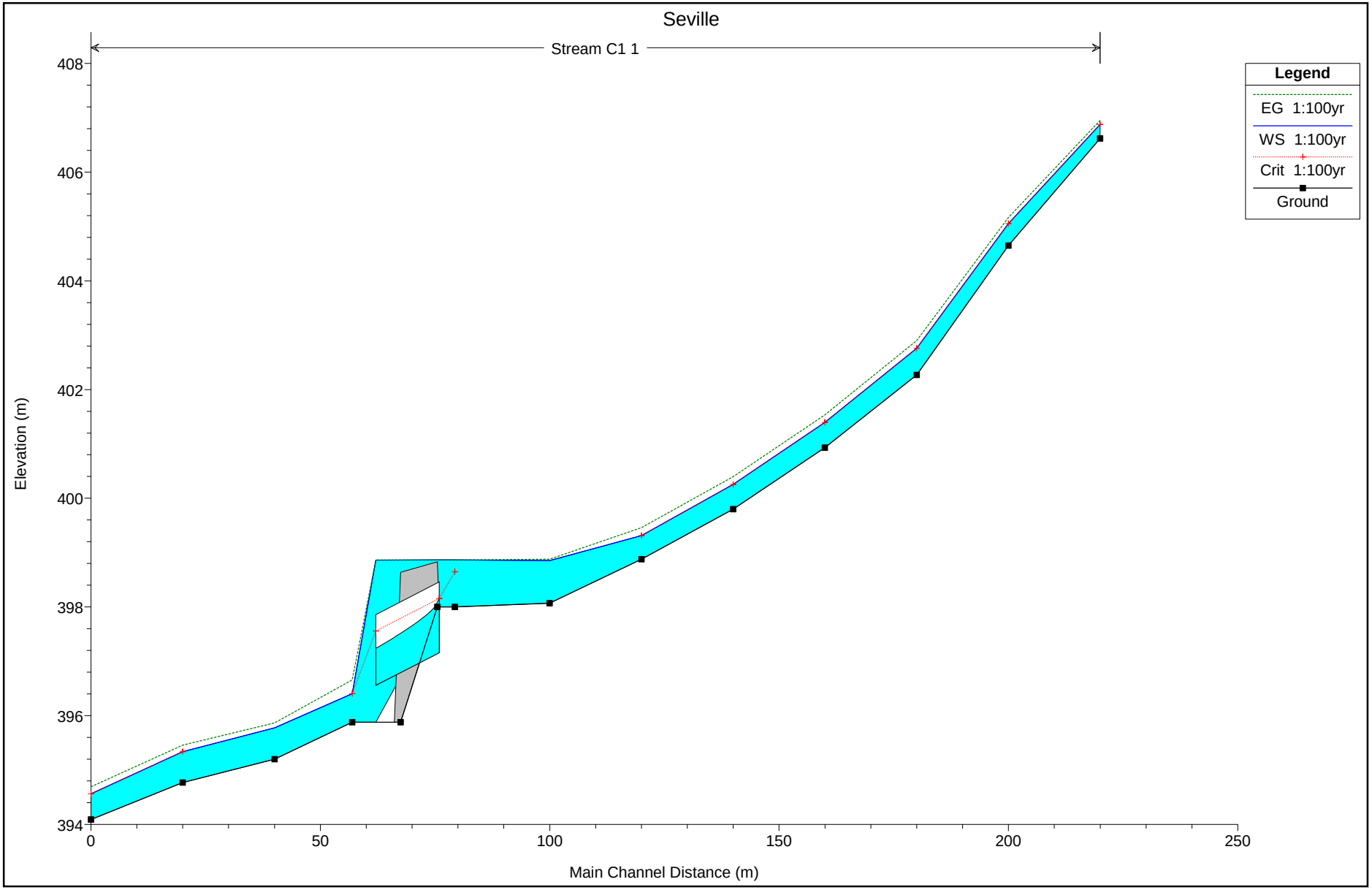
HEC-RAS Plan: Current mode River: Stream C13 Reach: 13 Profile: 1:100yr

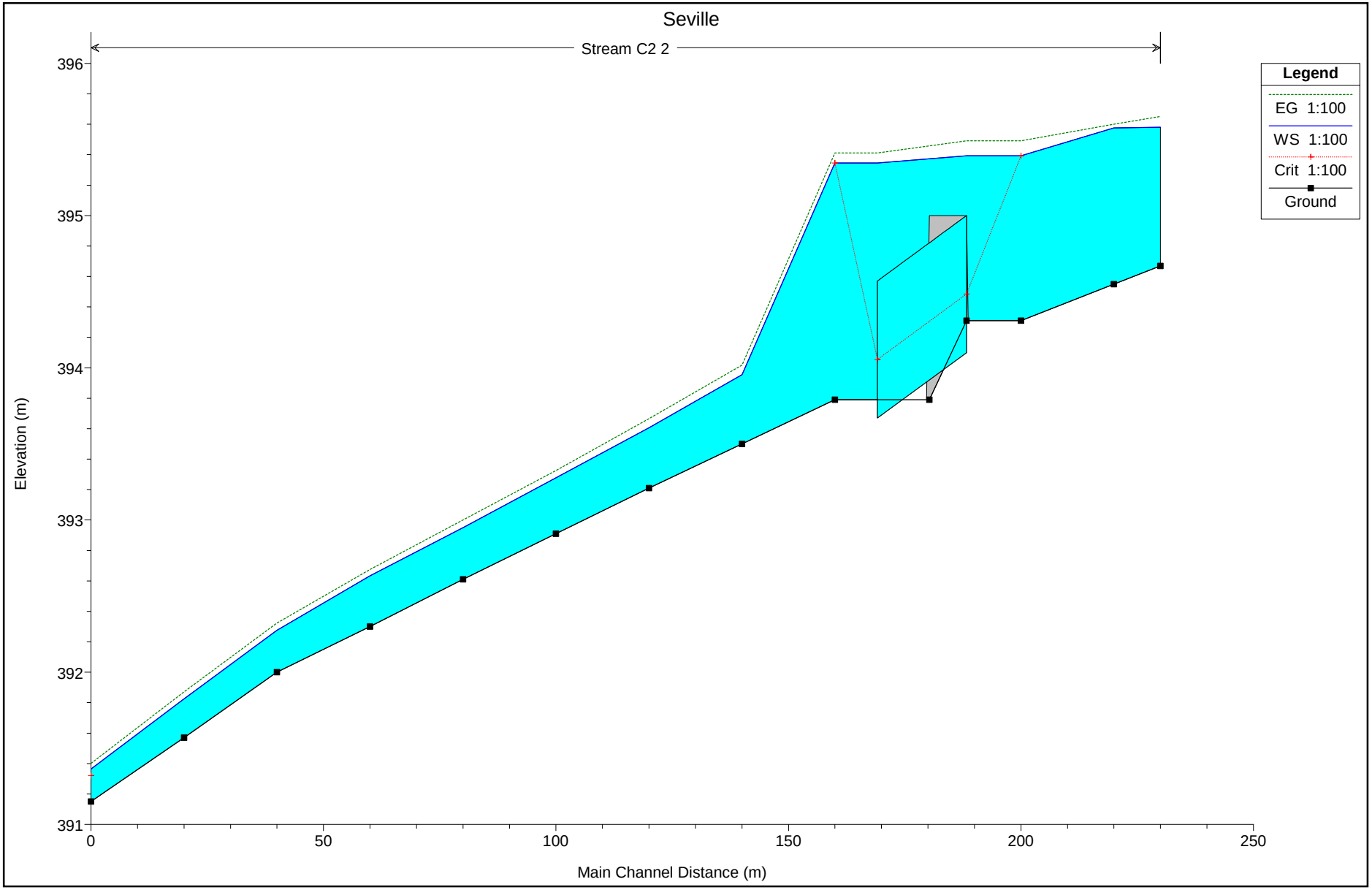
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
13	1335	1:100yr	52.34	403.00	405.55		405.56	0.000058	0.24	218.01	117.21	0.06
13	1334	1:100yr	52.34	403.00	405.55		405.55	0.000046	0.22	238.01	121.43	0.05
13	1333	1:100yr	52.34	403.00	405.55		405.55	0.000040	0.21	252.44	128.11	0.05
13	1332	1:100yr	52.34	403.00	405.55		405.55	0.000040	0.21	254.97	130.66	0.05
13	1331	1:100yr	52.34	403.00	405.55		405.55	0.000037	0.19	269.05	140.74	0.04
13	1330	1:100yr	52.34	403.00	405.55		405.55	0.000030	0.18	296.63	155.60	0.04
13	1329	1:100yr	52.34	403.00	405.55		405.55	0.000024	0.16	327.33	169.78	0.04
13	1328	1:100yr	52.34	403.00	405.55		405.55	0.000025	0.15	355.84	230.05	0.04
13	1327	1:100yr	52.34	405.01	405.40	405.40	405.53	0.034517	1.71	33.16	122.03	1.01
13	1326	1:100yr	52.34	404.19	404.76	404.76	404.94	0.032597	1.87	27.96	79.65	1.01
13	1325	1:100yr	52.34	402.72	403.35	403.35	403.56	0.030812	2.01	26.10	64.21	1.00
13	1324	1:100yr	52.34	400.90	402.10	402.10	402.39	0.027185	2.40	21.82	37.30	1.00
13	1323	1:100yr	52.34	400.00	401.53		401.68	0.008117	1.71	30.83	37.54	0.58
13	1322	1:100yr	52.34	400.00	401.33		401.50	0.008879	1.92	29.89	38.27	0.62
13	1321	1:100yr	52.34	399.99	401.20		401.34	0.006701	1.70	35.27	46.34	0.54
13	1320	1:100yr	52.34	399.73	401.01		401.19	0.008148	2.03	31.52	42.40	0.61
13	1319	1:100yr	52.34	399.41	400.83		401.02	0.009065	2.16	31.43	42.28	0.64
13	1318	1:100yr	52.34	399.08	400.85		400.90	0.002050	1.18	65.83	75.68	0.32
13	1317	1:100yr	52.34	398.00	400.85		400.87	0.000447	0.80	88.08	51.52	0.16
13	1316	1:100yr	52.34	398.19	400.77		400.85	0.001703	1.39	50.06	43.47	0.31
13	1315	1:100yr	52.34	398.54	400.69		400.80	0.002954	1.62	41.55	41.42	0.39
13	1314	1:100yr	52.34	398.88	400.60		400.73	0.004667	1.78	37.47	41.94	0.48
13	1313	1:100yr	52.34	399.00	400.50		400.64	0.004742	1.77	36.95	41.56	0.48
13	1312	1:100yr	52.34	399.00	400.41		400.54	0.004740	1.75	37.55	41.00	0.48
13	1311	1:100yr	52.34	398.95	400.29		400.44	0.005357	1.82	36.17	43.09	0.51
13	1310	1:100yr	52.34	398.80	400.15		400.32	0.006562	2.00	33.55	41.03	0.56
13	1309	1:100yr	52.34	398.66	400.06		400.19	0.005411	1.84	38.24	45.13	0.51
13	1308	1:100yr	52.34	398.51	399.97		400.08	0.004610	1.73	41.21	47.86	0.47
13	1307	1:100yr	52.34	398.37	399.88		399.99	0.004386	1.72	41.85	49.22	0.47
13	1306	1:100yr	52.34	398.22	399.73		399.89	0.005887	1.96	35.69	44.00	0.54
13	1305	1:100yr	52.34	398.08	399.33	399.33	399.68	0.017735	2.81	23.51	37.35	0.89
13	1304	1:100yr	52.34	397.81	398.87	398.87	399.23	0.019888	2.86	22.28	33.56	0.93
13	1303	1:100yr	52.34	397.42	398.68		398.88	0.009762	2.25	30.46	41.10	0.67
13	1302	1:100yr	52.34	397.04	398.63		398.73	0.004141	1.67	44.91	55.44	0.45
13	1301	1:100yr	52.34	397.00	398.56		398.65	0.003731	1.59	49.10	62.34	0.43

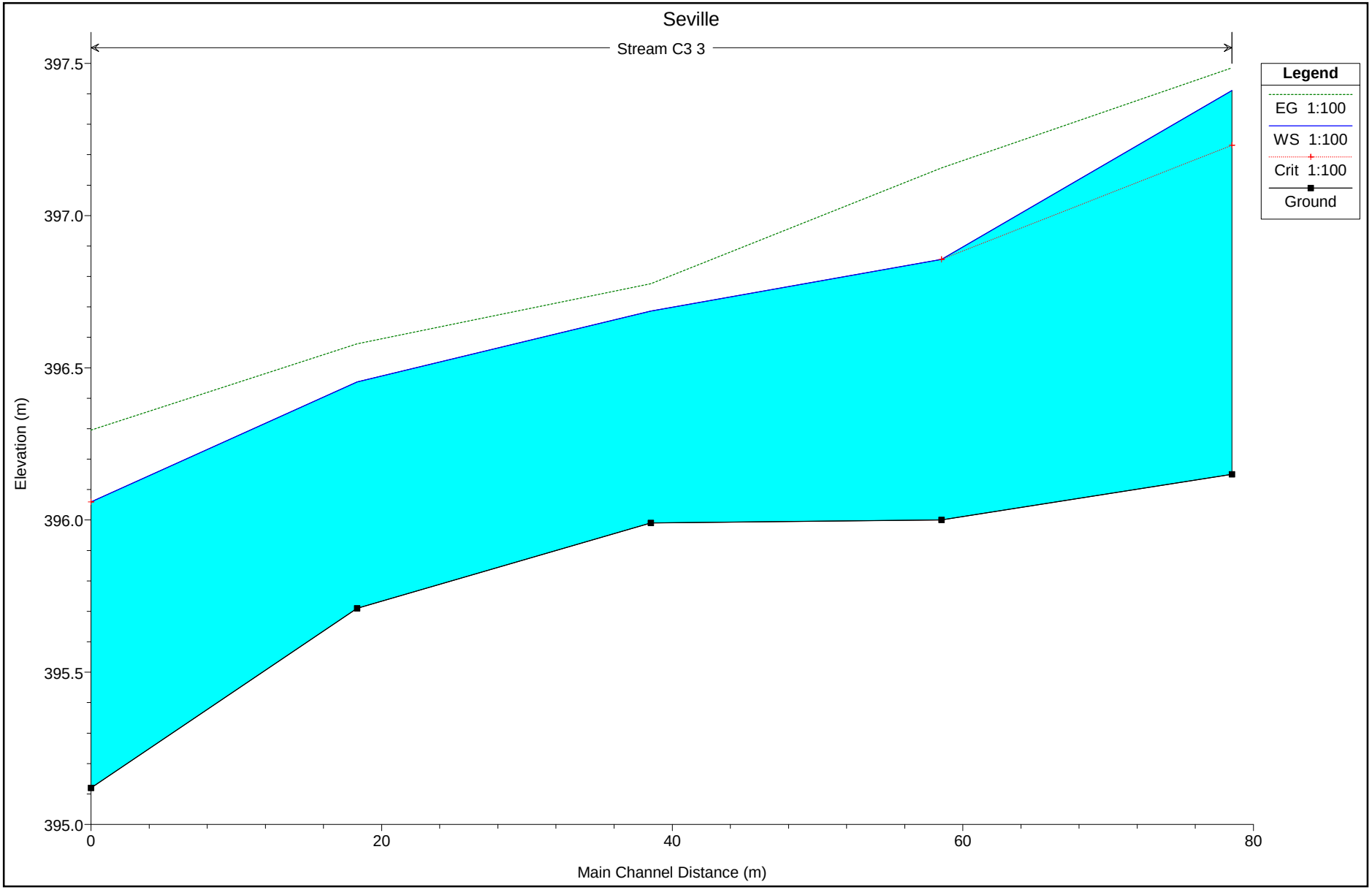
HEC-RAS Plan: Current mode River: Stream C14 Reach: 14 Profile: 1:100yr

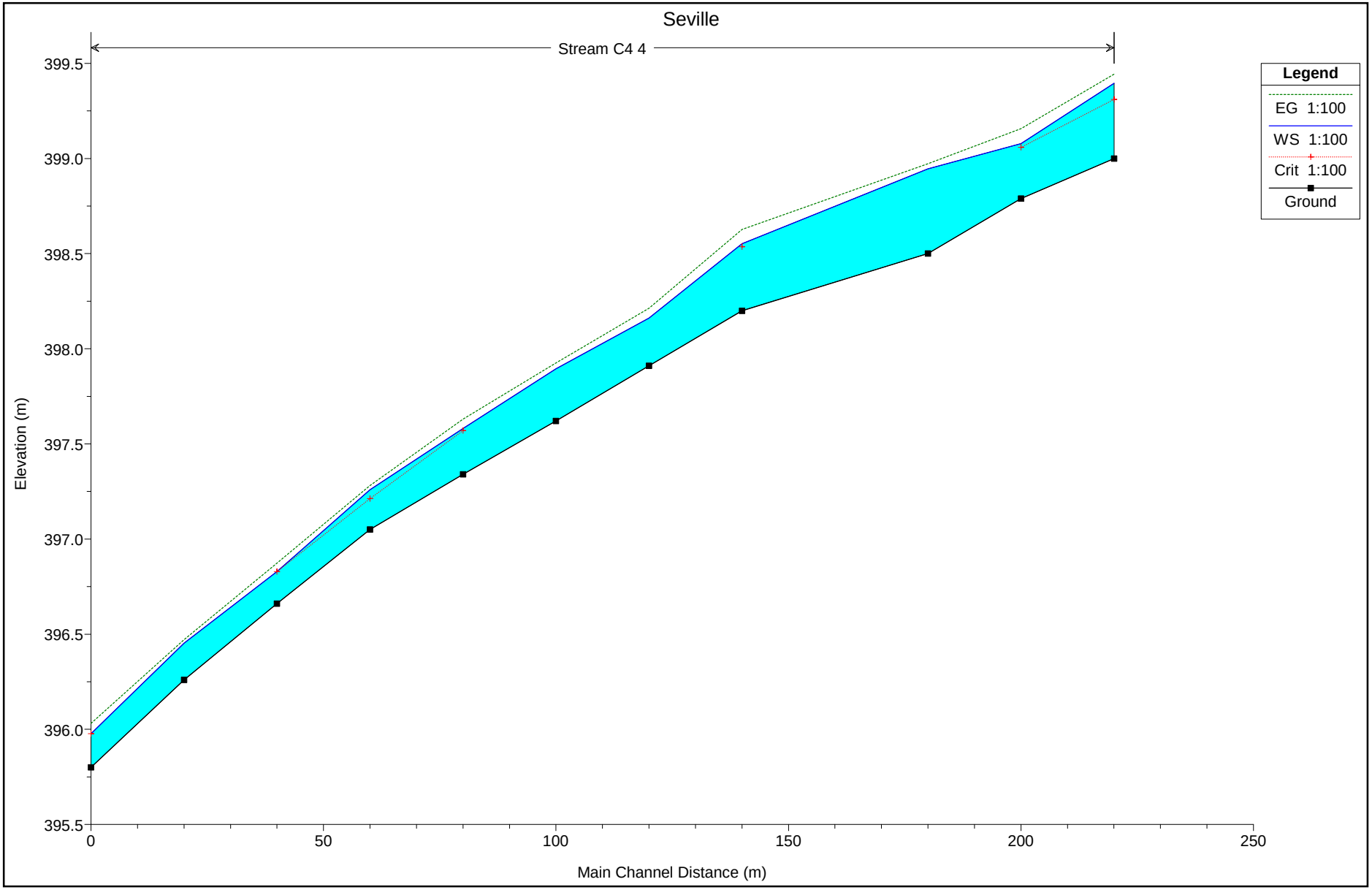
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
14	1429	1:100yr	6.93	414.13	414.51		414.56	0.015518	1.25	8.01	41.66	0.69
14	1428	1:100yr	6.93	413.96	414.27		414.33	0.023157	1.33	7.25	40.57	0.81
14	1427	1:100yr	6.93	413.55	413.89		413.94	0.016770	1.23	7.85	40.37	0.71
14	1426	1:100yr	6.93	413.13	413.41	413.41	413.49	0.032634	1.44	6.63	42.29	0.95
14	1425	1:100yr	6.93	412.62	412.90		412.95	0.022078	1.24	7.27	38.35	0.79
14	1424	1:100yr	6.93	412.06	412.36	412.35	412.44	0.029154	1.48	6.14	35.02	0.91
14	1423	1:100yr	6.93	411.42	411.73	411.73	411.83	0.032420	1.59	5.63	29.79	0.97
14	1422	1:100yr	6.93	410.71	411.02	411.02	411.13	0.031204	1.64	5.47	26.90	0.96
14	1421	1:100yr	6.93	409.85	410.23	410.23	410.36	0.029820	1.69	4.88	21.10	0.95
14	1420	1:100yr	6.93	408.95	409.37	409.37	409.50	0.027487	1.71	4.71	19.43	0.92
14	1419	1:100yr	6.93	407.27	407.92	407.90	408.07	0.026238	1.71	4.19	12.62	0.91
14	1418	1:100yr	6.93	406.53	407.32	407.32	407.49	0.031836	1.80	3.93	12.95	0.98
14	1417	1:100yr	6.93	405.99	406.49	406.46	406.62	0.022845	1.65	4.58	14.50	0.85
14	1416	1:100yr	6.93	405.33	405.93	405.93	406.10	0.029288	1.84	4.02	12.92	0.96
14	1415	1:100yr	6.93	404.58	405.16	405.16	405.33	0.030734	1.87	3.77	11.35	0.98
14	1414	1:100yr	6.93	403.62	404.24	404.24	404.42	0.031485	1.84	3.82	11.86	0.99
14	1413	1:100yr	6.93	402.78	403.42	403.38	403.57	0.023477	1.73	4.03	10.76	0.87
14	1412	1:100yr	6.93	402.31	403.15		403.24	0.011172	1.33	5.25	11.77	0.62
14	1411	1:100yr	6.93	401.74	402.65	402.65	402.87	0.033274	2.04	3.40	8.26	1.01
14	1410	1:100yr	6.93	401.00	401.80		401.93	0.016075	1.56	4.43	9.59	0.73
14	1409	1:100yr	6.93	400.60	401.27	401.27	401.49	0.029100	2.10	3.38	8.08	0.98
14	1408	1:100yr	6.93	400.00	400.67	400.63	400.83	0.023359	1.78	3.90	9.40	0.87
14	1407	1:100yr	6.93	399.58	400.12	400.12	400.30	0.030108	1.89	3.81	11.19	0.98
14	1406	1:100yr	6.93	399.00	399.79		399.87	0.009059	1.26	5.59	11.86	0.56
14	1405	1:100yr	6.93	399.00	399.65		399.71	0.006797	1.02	6.77	14.60	0.48
14	1404	1:100yr	6.93	398.99	399.43		399.51	0.016060	1.24	5.59	17.35	0.70
14	1403	1:100yr	6.93	398.53	398.94	398.94	399.06	0.030994	1.60	4.69	20.43	0.95
14	1402	1:100yr	6.93	398.00	398.58		398.63	0.006131	0.97	7.90	22.56	0.46
14	1401	1:100yr	6.93	397.97	398.48		398.51	0.005216	0.91	10.58	45.86	0.42
14	1400	1:100yr	6.93	397.85	398.46		398.46	0.000950	0.42	25.19	78.95	0.18

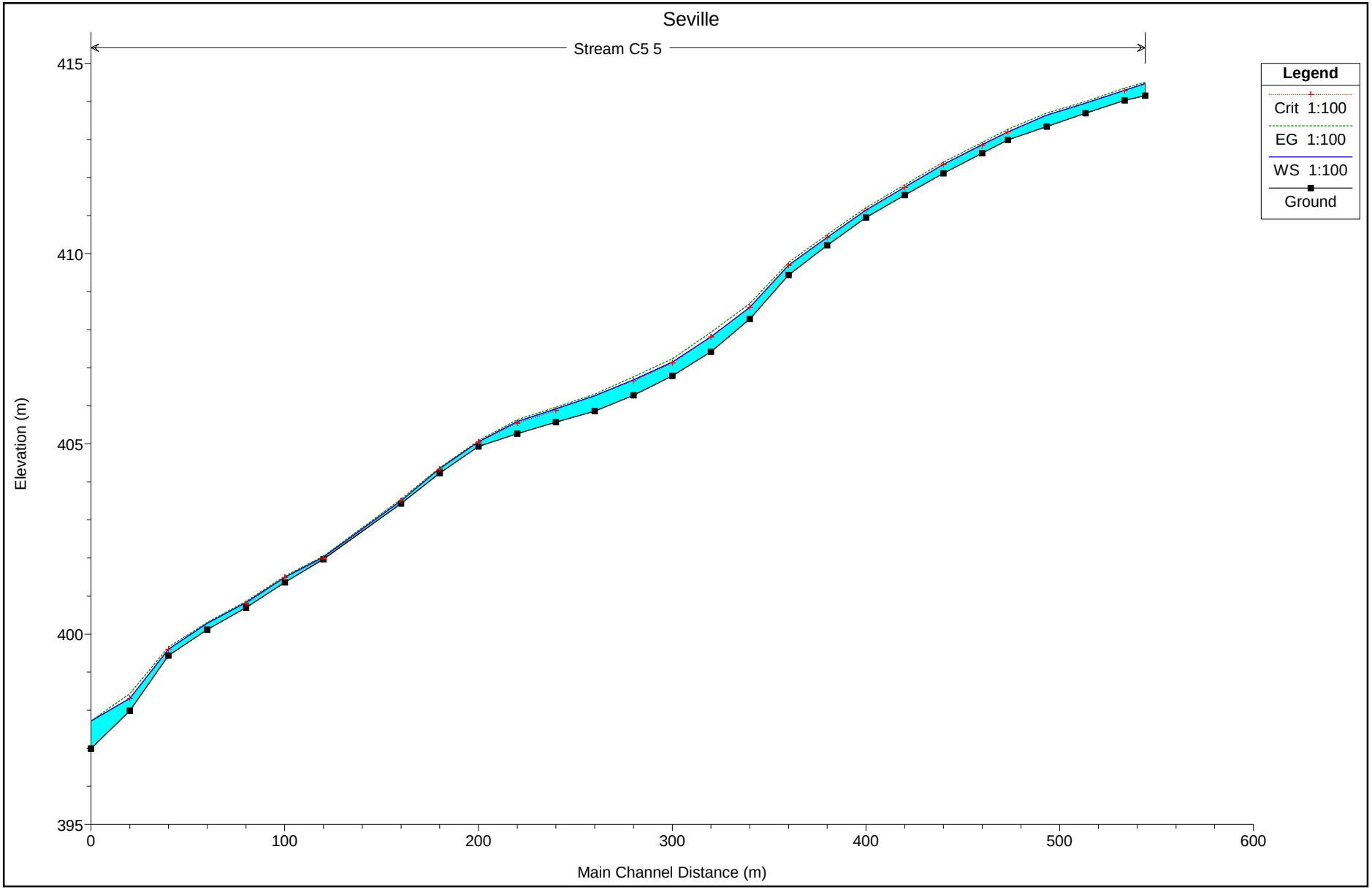
ANNEXURE 4: LONGITUDINAL FLOW PROFILE FOR THE FLOOD PEAK

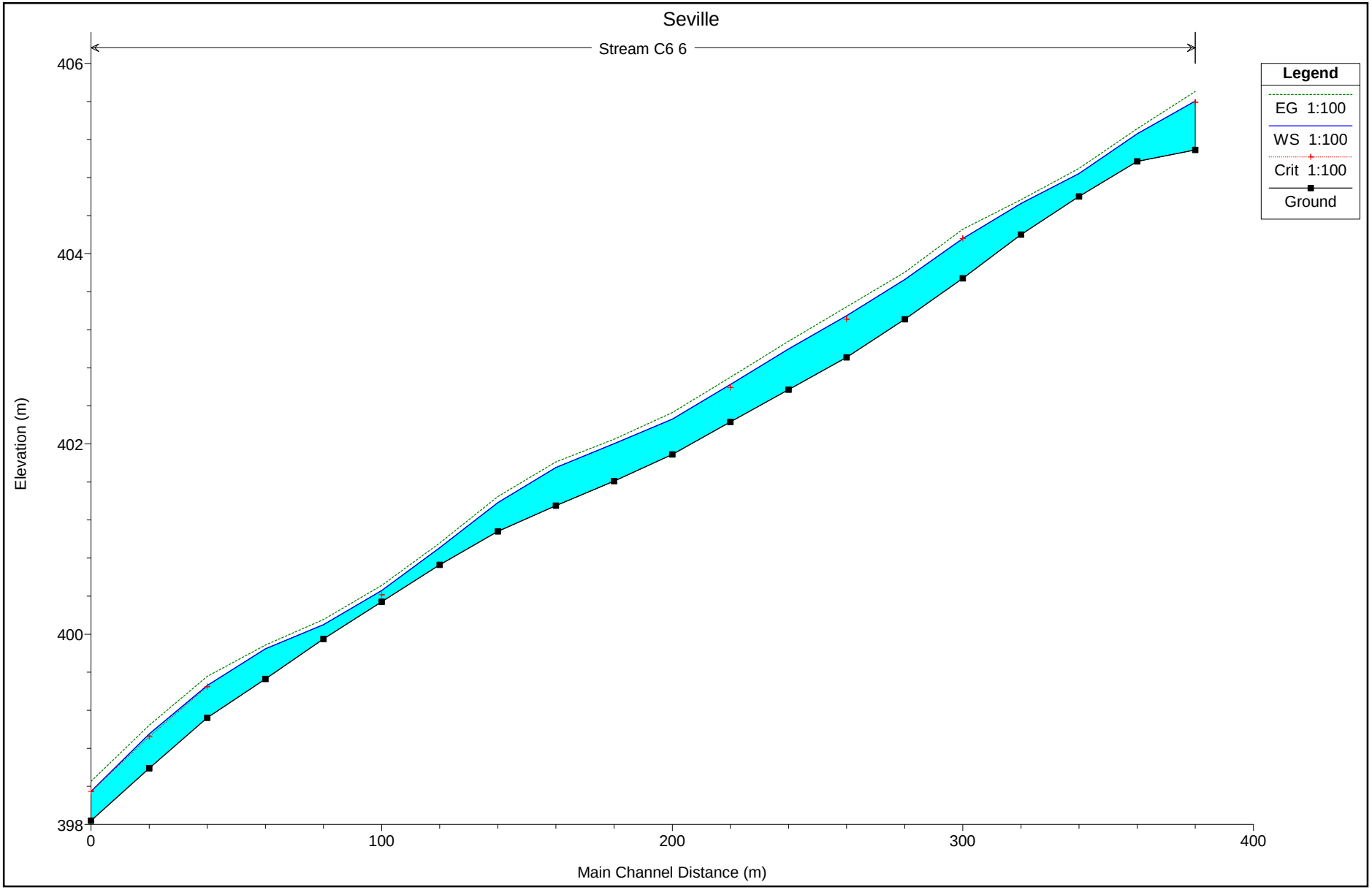

Seville
Stream C1 1
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Elevation (m)
408
406
404
402
400
398
396
394
0
50
100
150
200
250
Main Channel Distance (m)

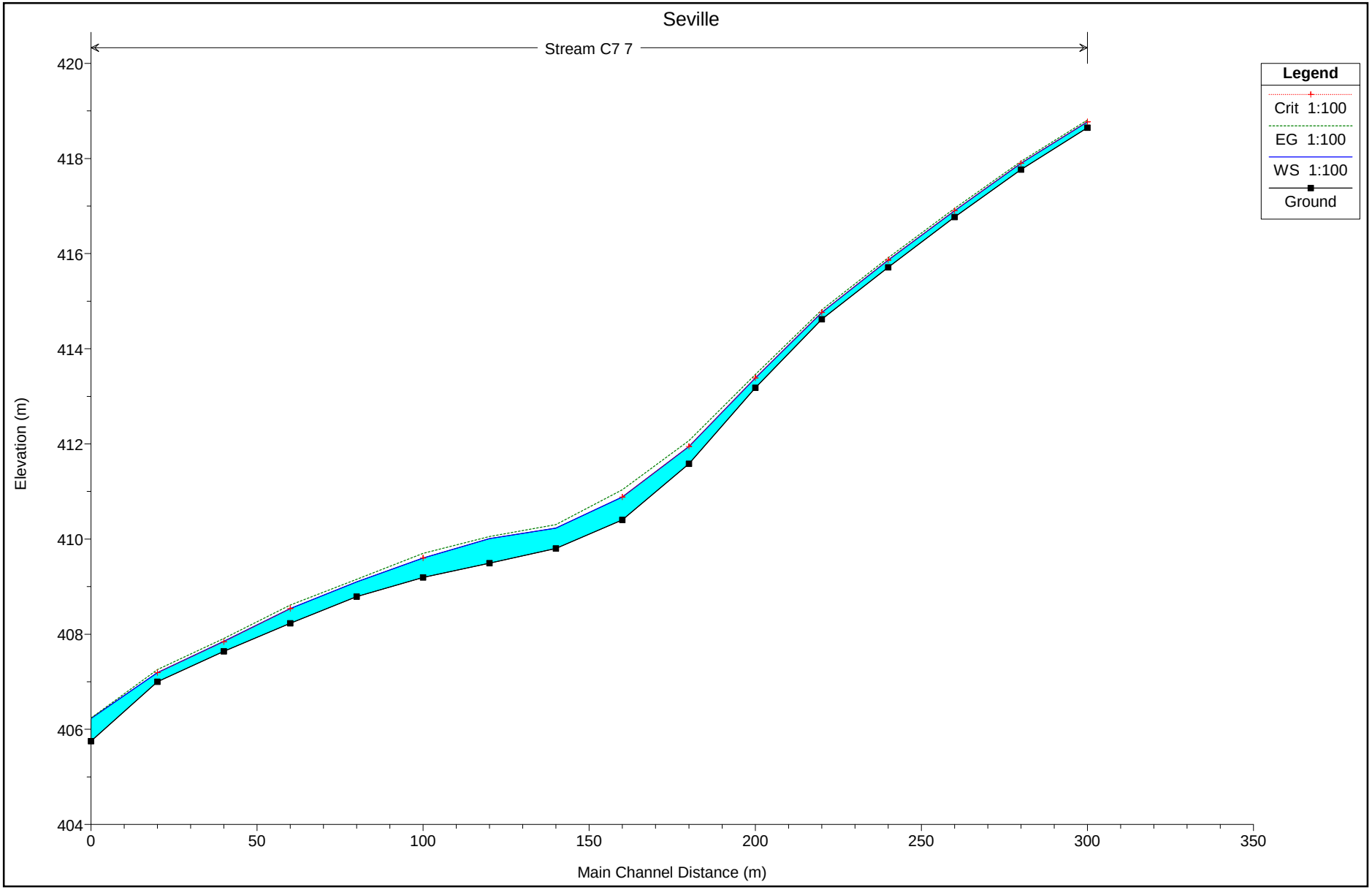

Seville
Stream C2 2
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Elevation (m)
396
395
394
393
392
391
0
50
100
150
200
250
Main Channel Distance (m)

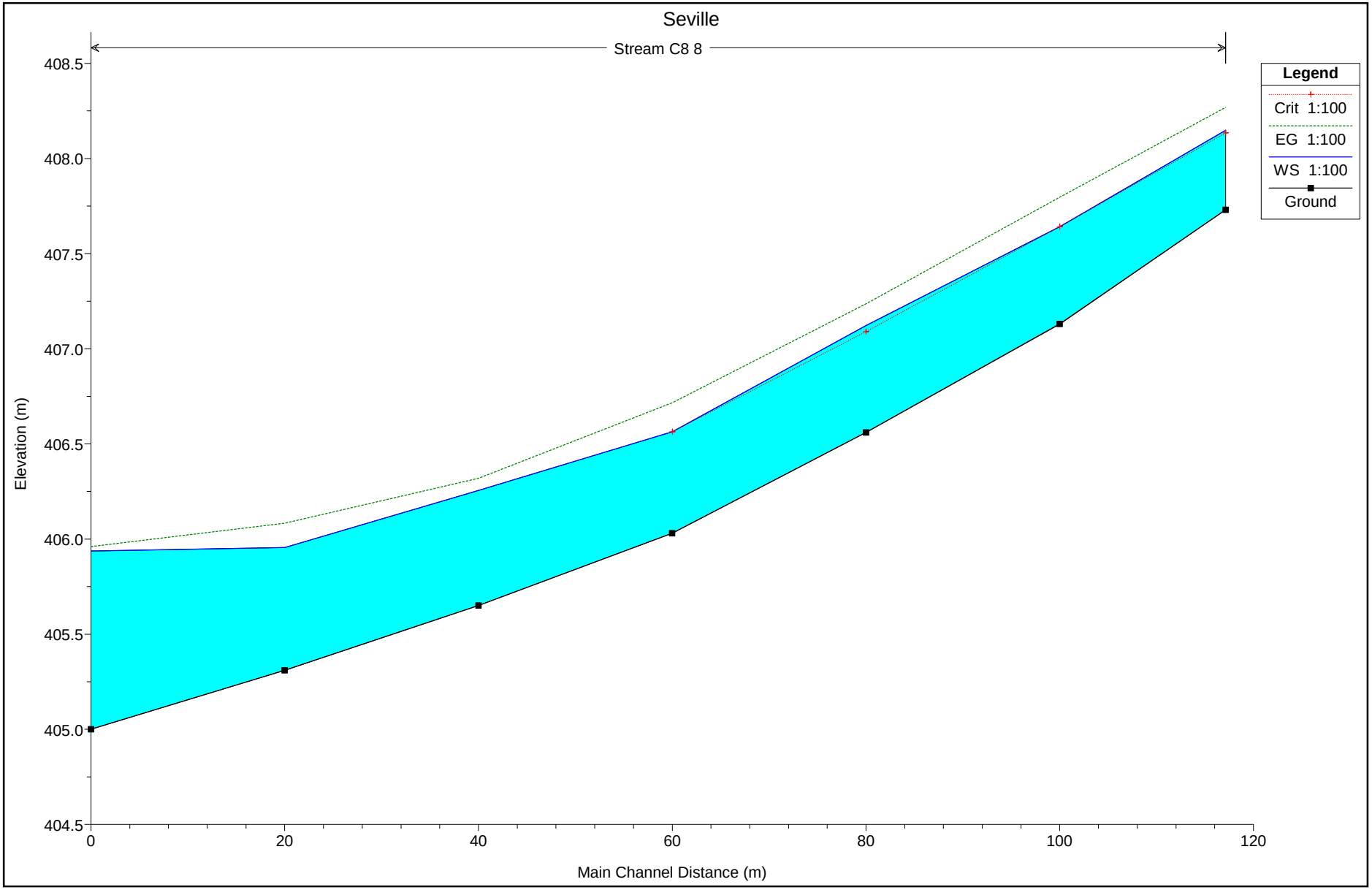

Seville
Stream C3 3
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Elevation (m)
397.5
397.0
396.5
396.0
395.5
395.0
0
20
40
60
80
Main Channel Distance (m)

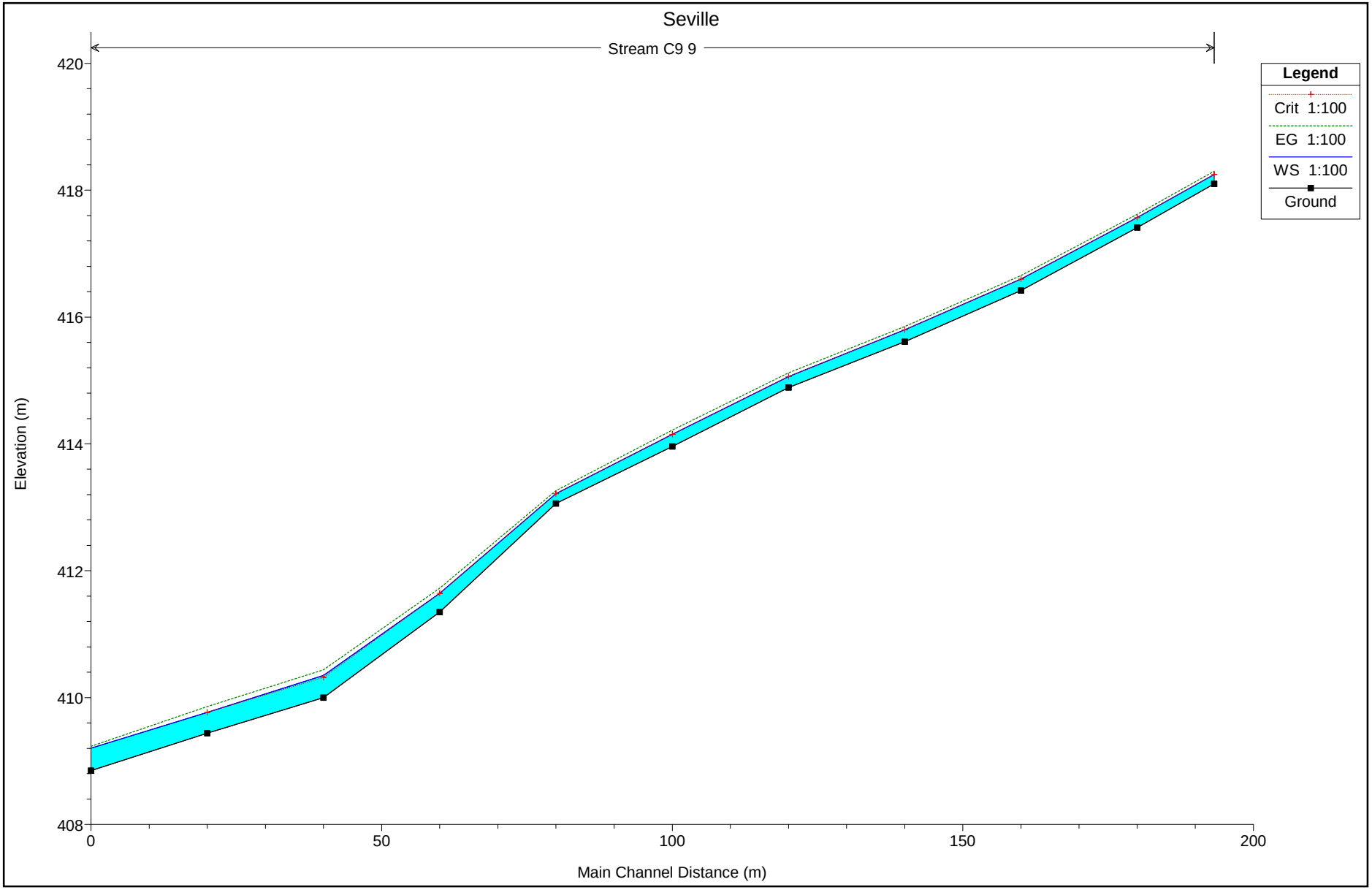

Seville
Stream C4 4
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Elevation (m)
399.5
399.0
398.5
398.0
397.5
397.0
396.5
396.0
395.5
0
50
100
150
200
250
Main Channel Distance (m)

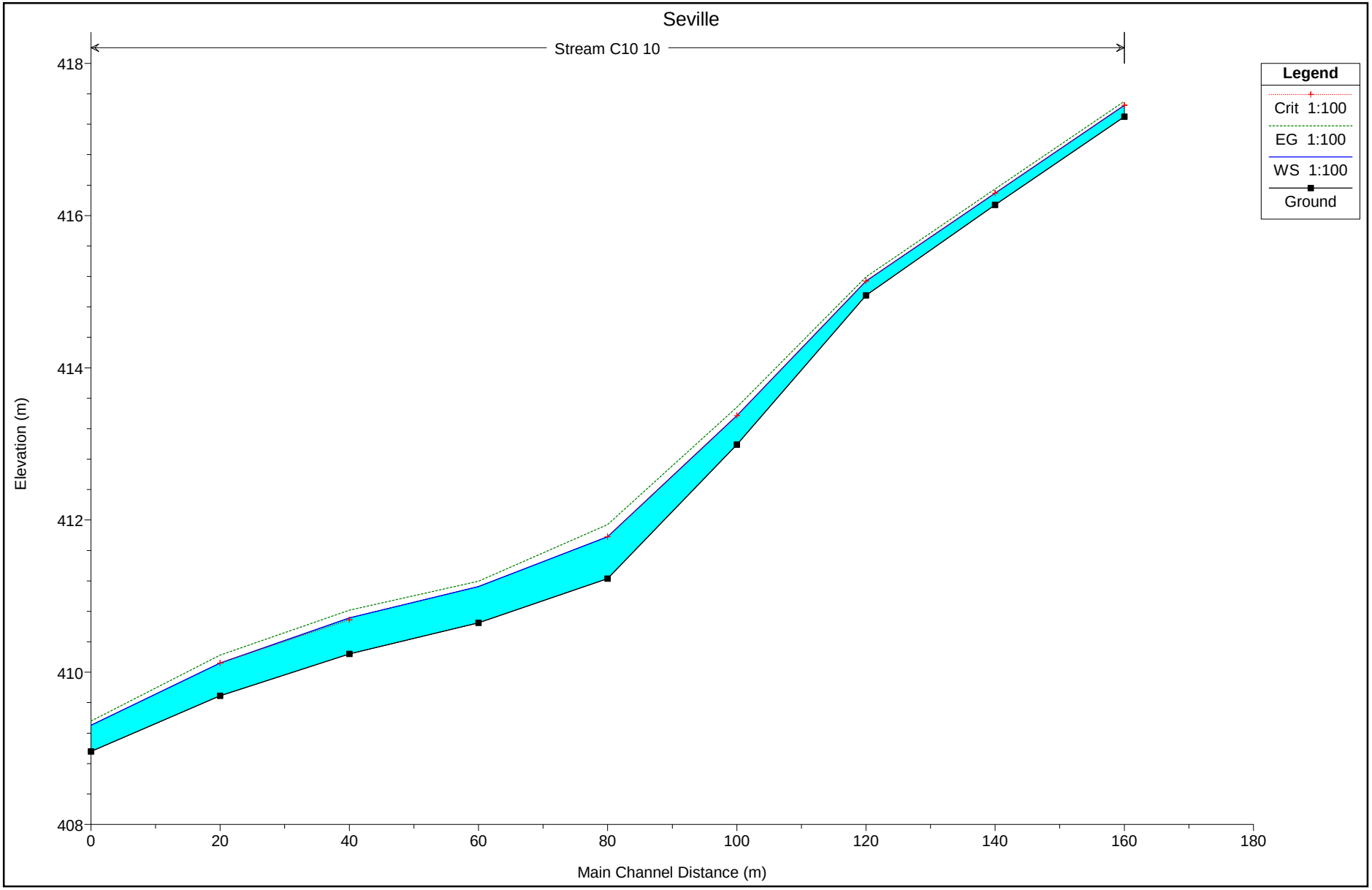

Seville
Stream C5 5
Legend
Crit 1:100
EG 1:100
WS 1:100
Ground
Elevation (m)
415
410
405
400
395
0
100
200
300
400
500
600
Main Channel Distance (m)

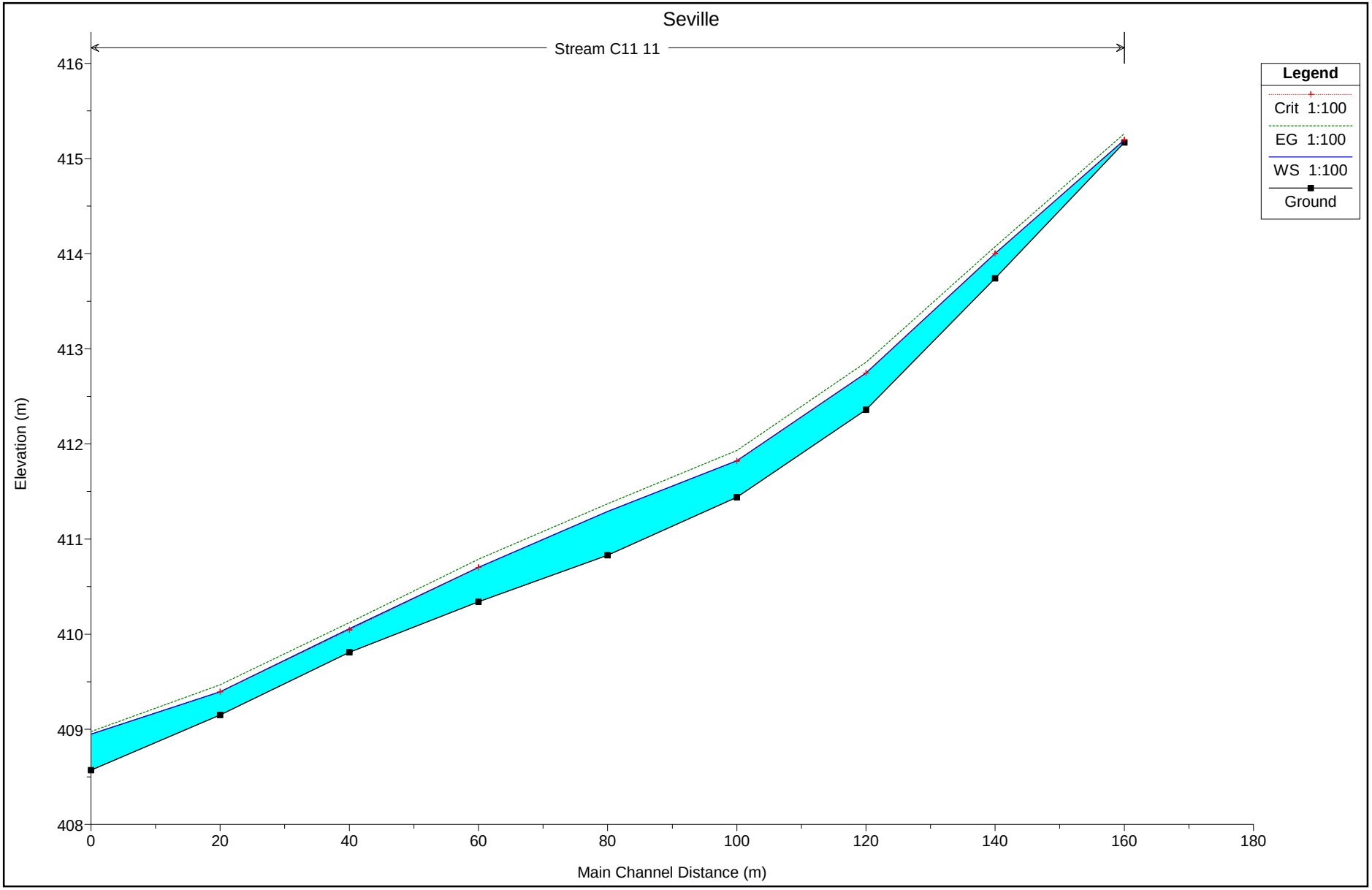

Seville
Stream C6 6
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Elevation (m)
406
404
402
400
398
0
100
200
300
400
Main Channel Distance (m)

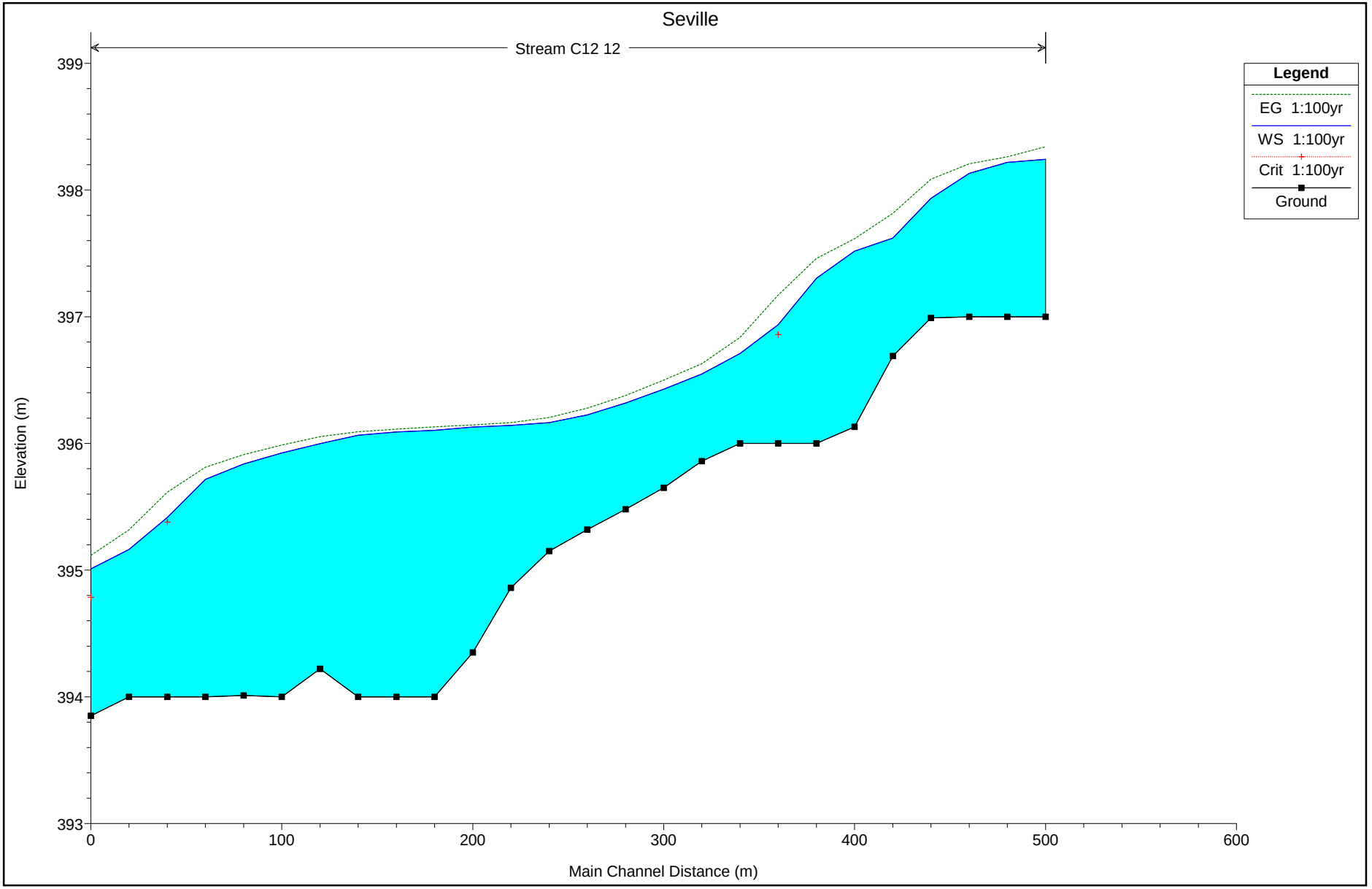

Seville
Stream C7 7
Legend
Crit 1:100
EG 1:100
WS 1:100
Ground
Elevation (m)
420
418
416
414
412
410
408
406
404
0
50
100
150
200
250
300
350
Main Channel Distance (m)

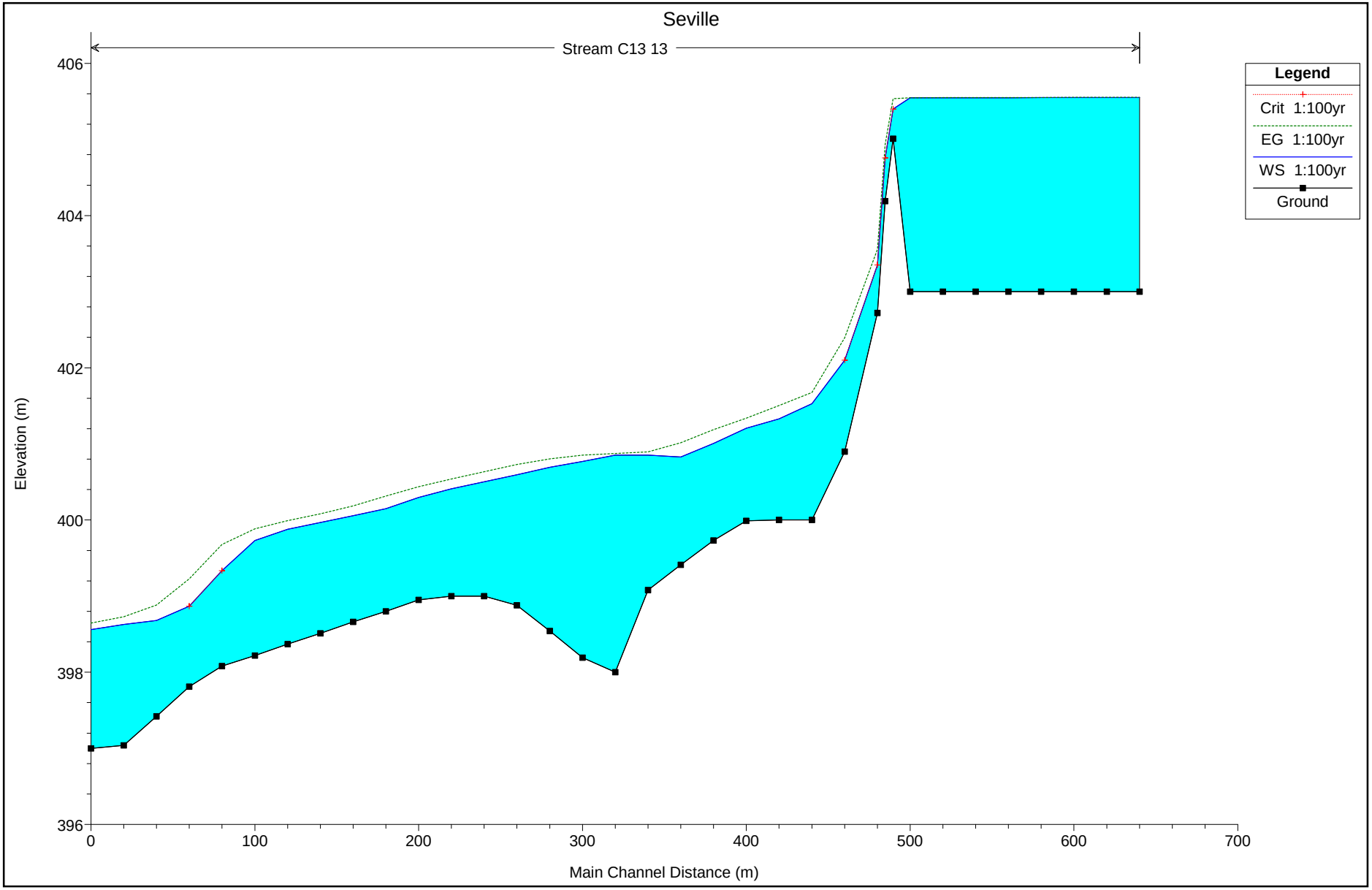

Seville
Stream C8 8
Legend
Crit 1:100
EG 1:100
WS 1:100
Ground
Elevation (m)
408.5
408.0
407.5
407.0
406.5
406.0
405.5
405.0
404.5
0
20
40
60
80
100
120
Main Channel Distance (m)

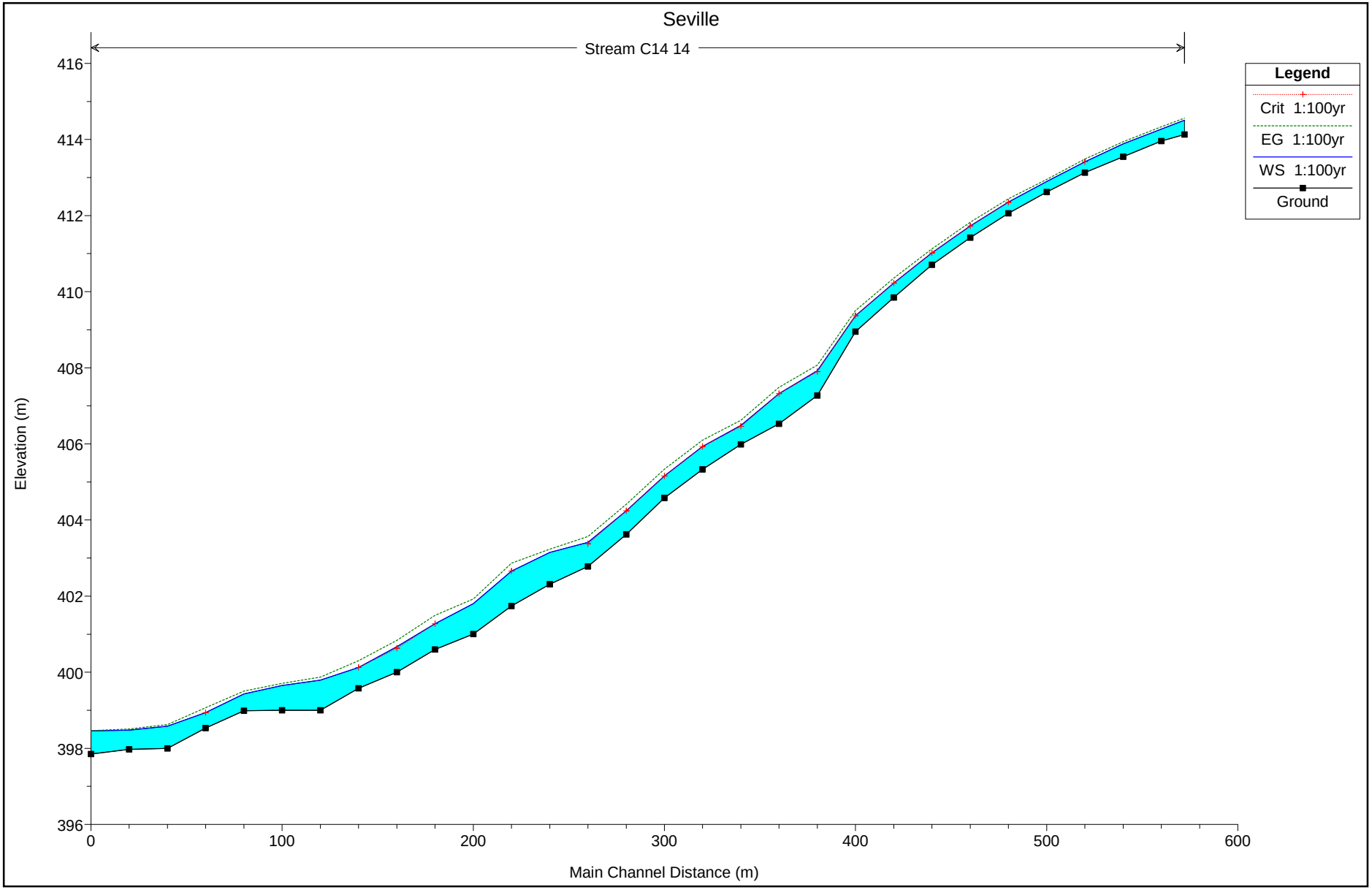

Seville
Stream C9 9
Legend
Crit 1:100
EG 1:100
WS 1:100
Ground
Elevation (m)
420
418
416
414
412
410
408
0
50
100
150
200
Main Channel Distance (m)


Seville
Stream C10 10
Legend
Crit 1:100
EG 1:100
WS 1:100
Ground
Elevation (m)
418
416
414
412
410
408
0
20
40
60
80
100
120
140
160
180
Main Channel Distance (m)

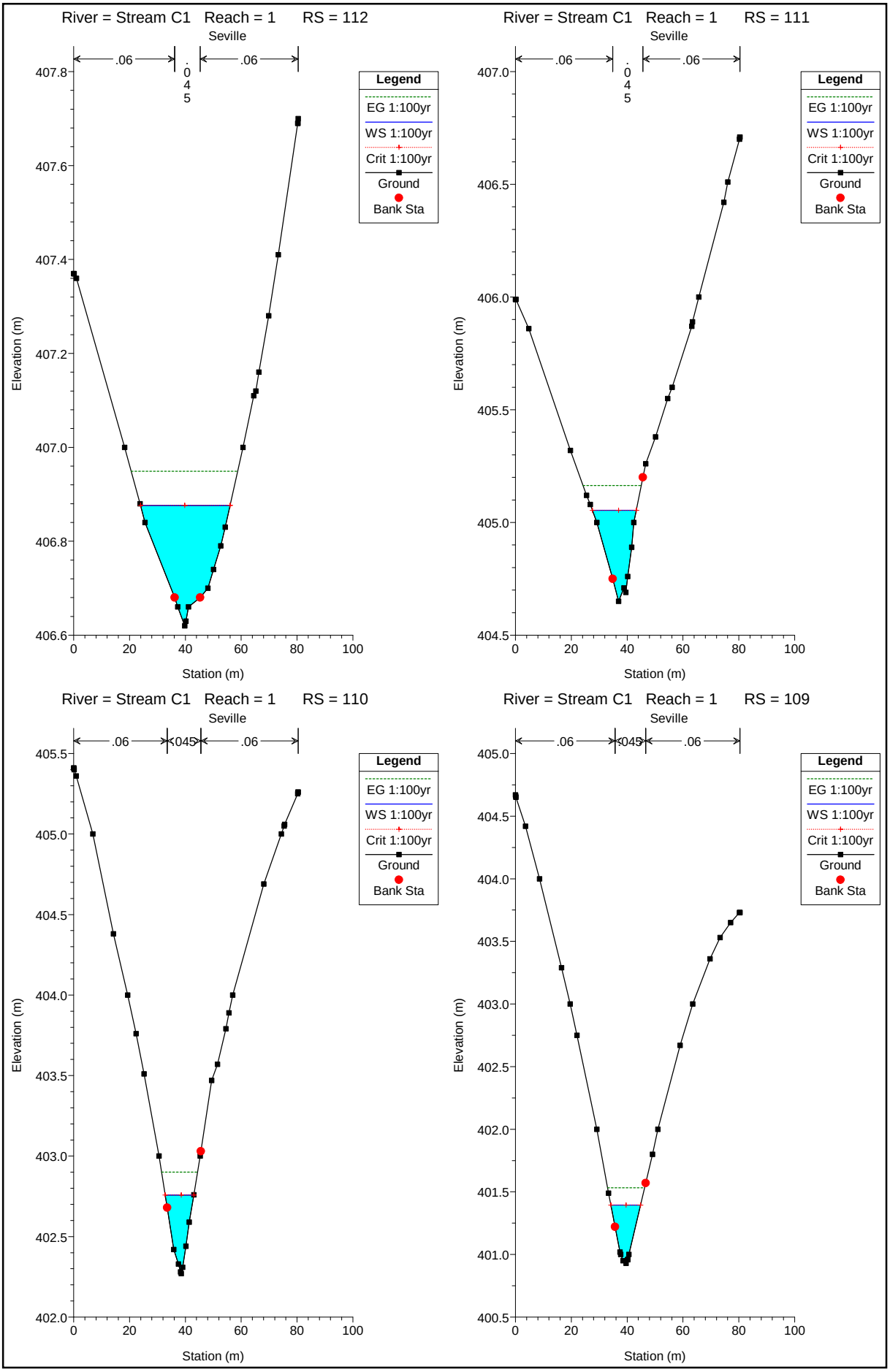

Seville
Stream C11 11
Legend
Crit 1:100
EG 1:100
WS 1:100
Ground
Elevation (m)
Main Channel Distance (m)
416
415
414
413
412
411
410
409
408
0
20
40
60
80
100
120
140
160
180

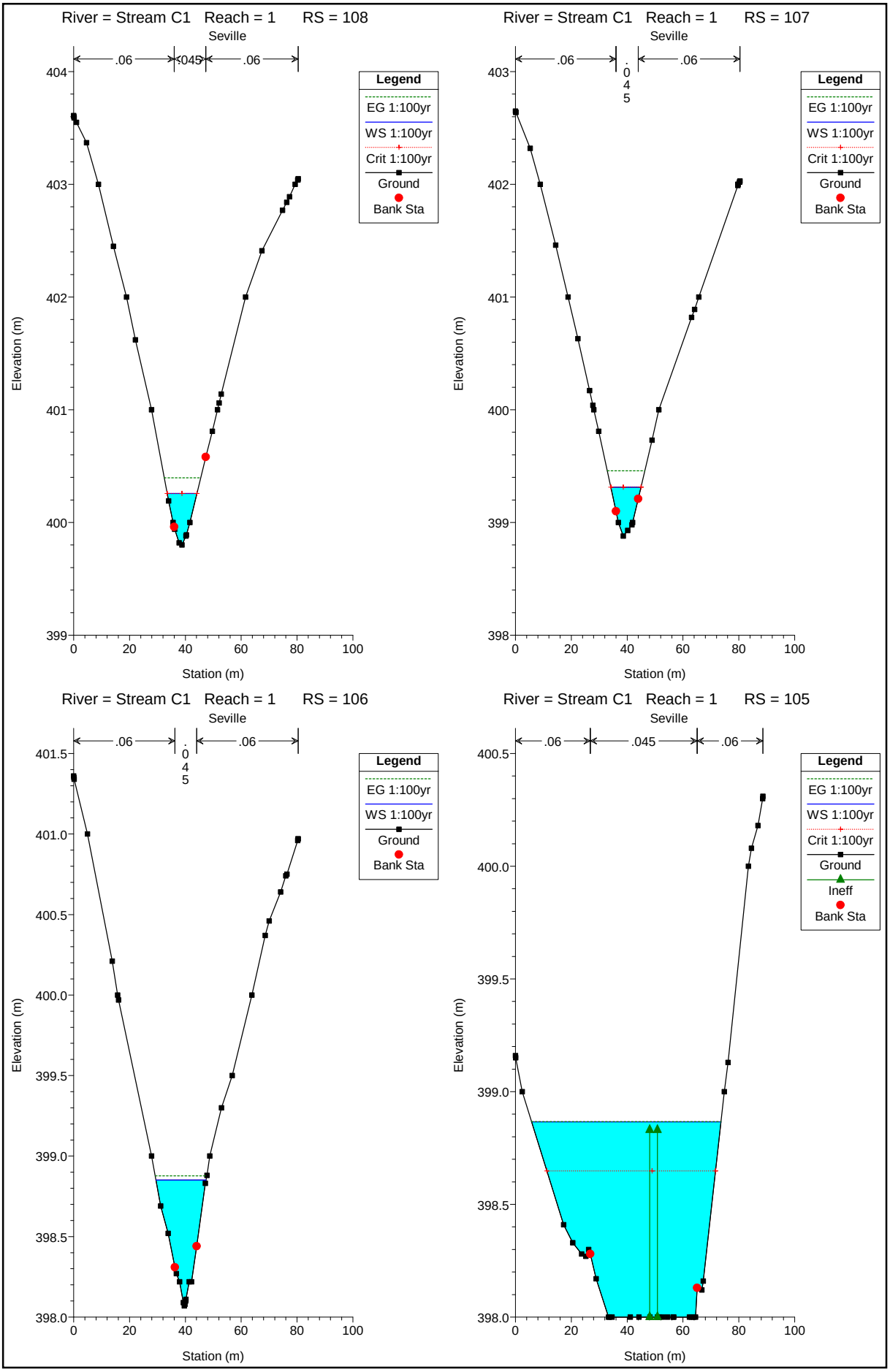

Seville
Stream C12 12
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Elevation (m)
399
398
397
396
395
394
393
0
100
200
300
400
500
600
Main Channel Distance (m)

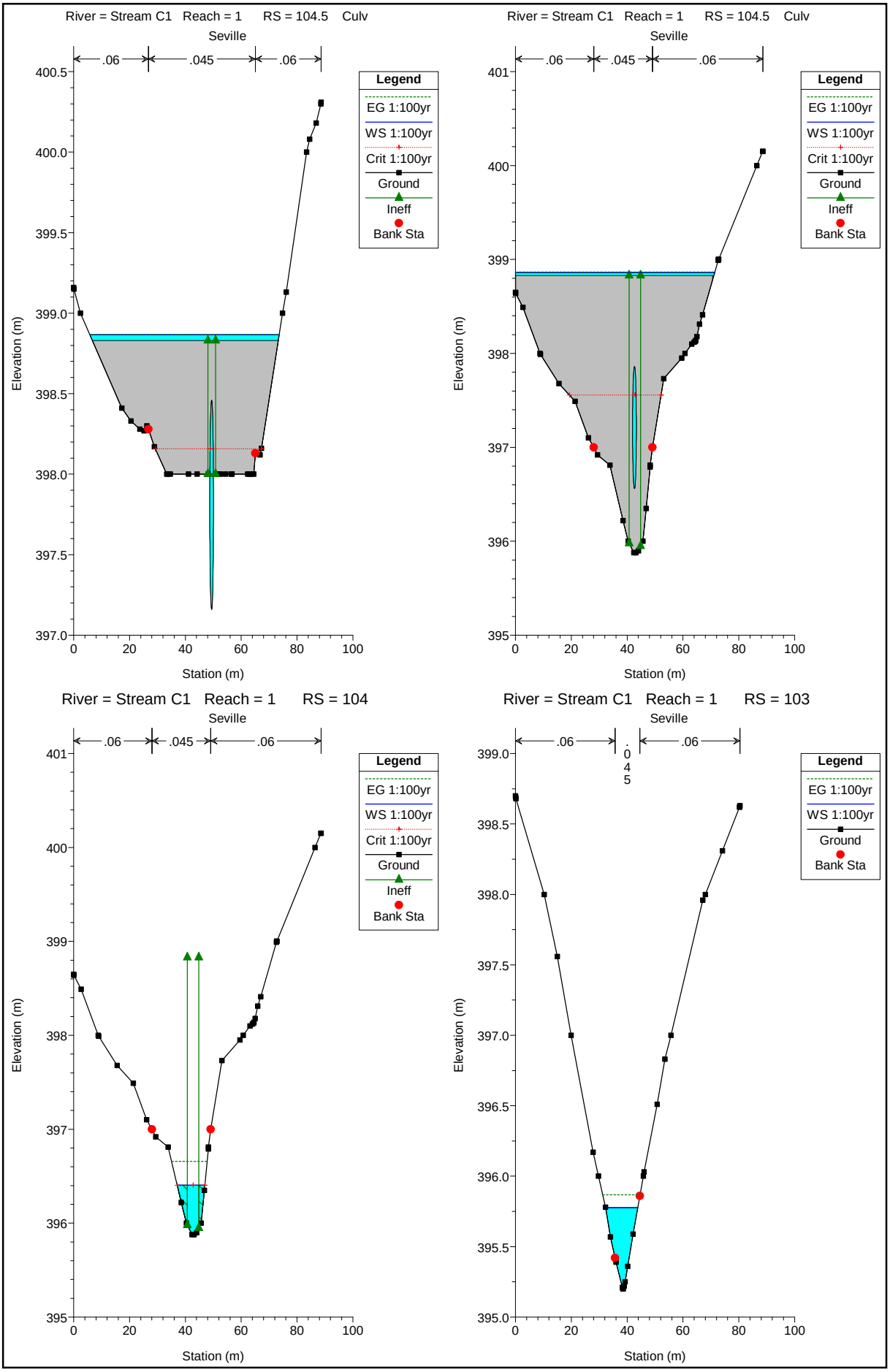

Seville
Stream C13 13
Legend
Crit 1:100yr
EG 1:100yr
WS 1:100yr
Ground
Elevation (m)
406
404
402
400
398
396
0
100
200
300
400
500
600
700
Main Channel Distance (m)

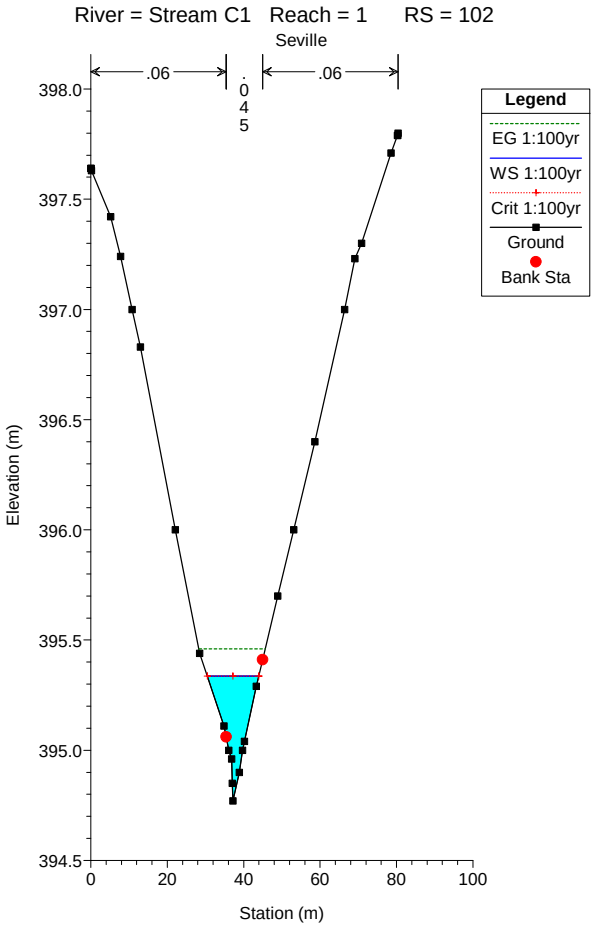

Seville
Stream C14 14
Legend
Crit 1:100yr
EG 1:100yr
WS 1:100yr
Ground
Elevation (m)
416
414
412
410
408
406
404
402
400
398
396
0
100
200
300
400
500
600
Main Channel Distance (m)

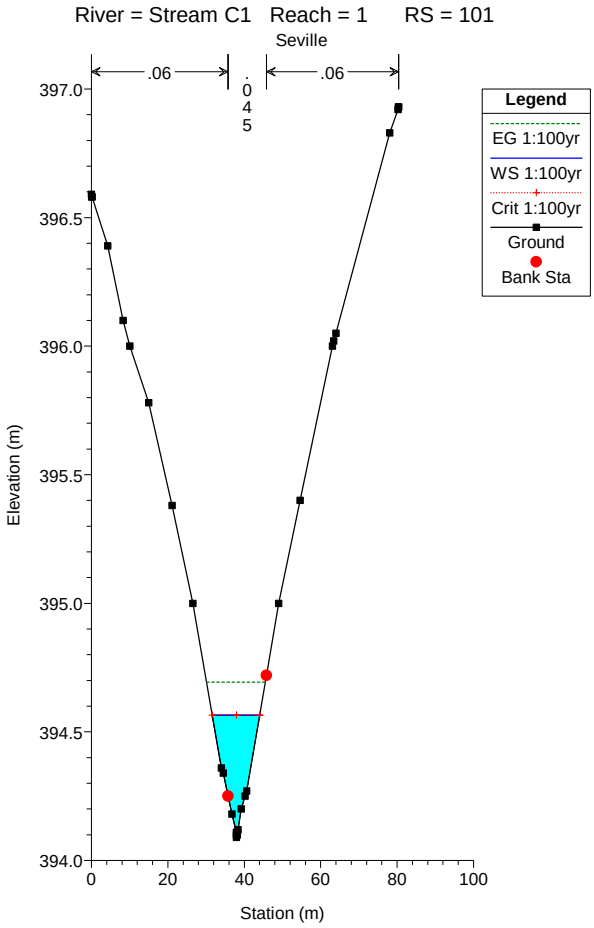
ANNEXURE 5: FLOW CROSS SECTIONS FOR THE FLOOD PEAK

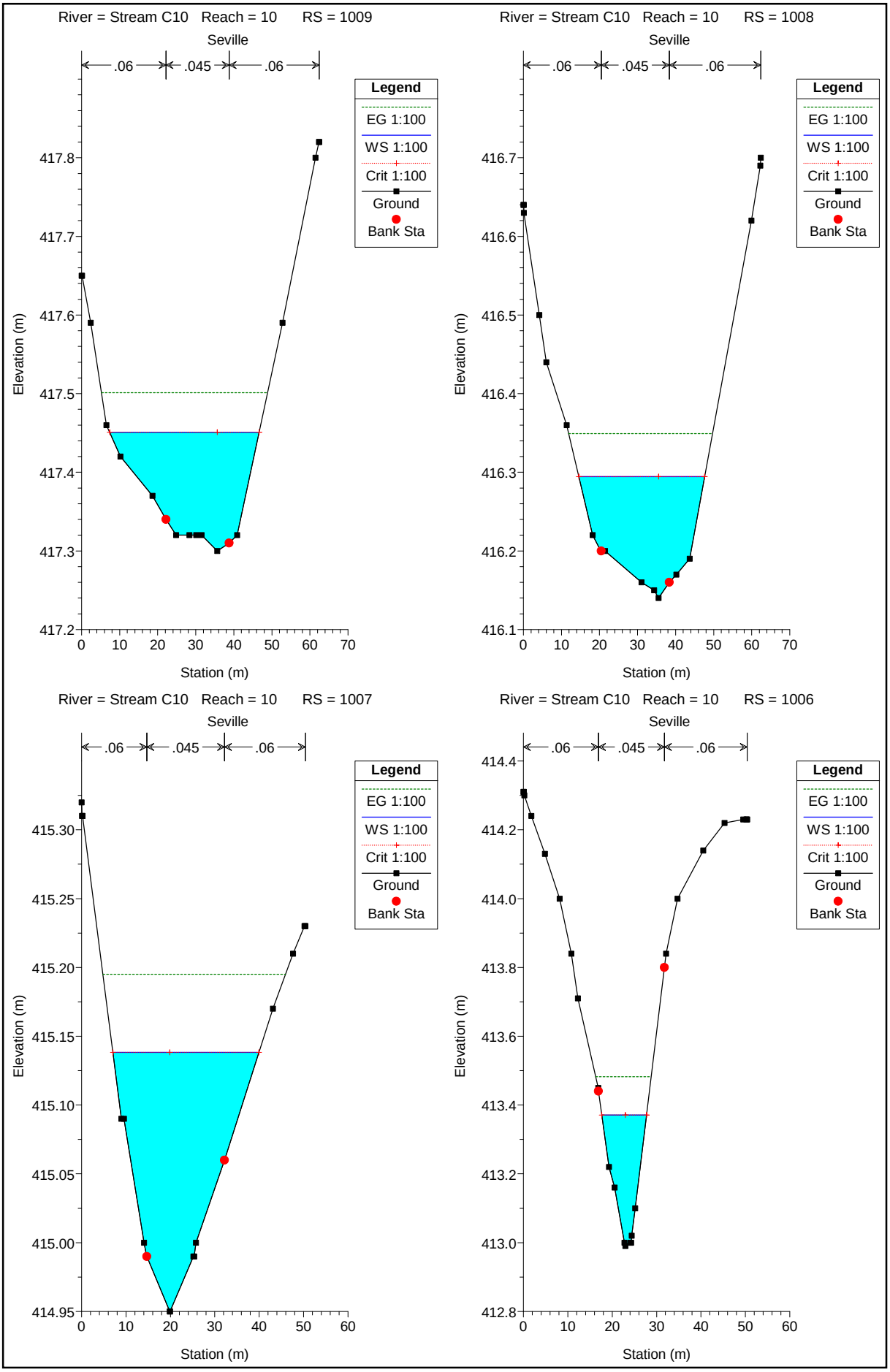

River = Stream C1 Reach = 1 RS = 112
Seville
.06
.045
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C1 Reach = 1 RS = 111
Seville
.06
.045
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C1 Reach = 1 RS = 110
Seville
.06
.045
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C1 Reach = 1 RS = 109
Seville
.06
.045
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)

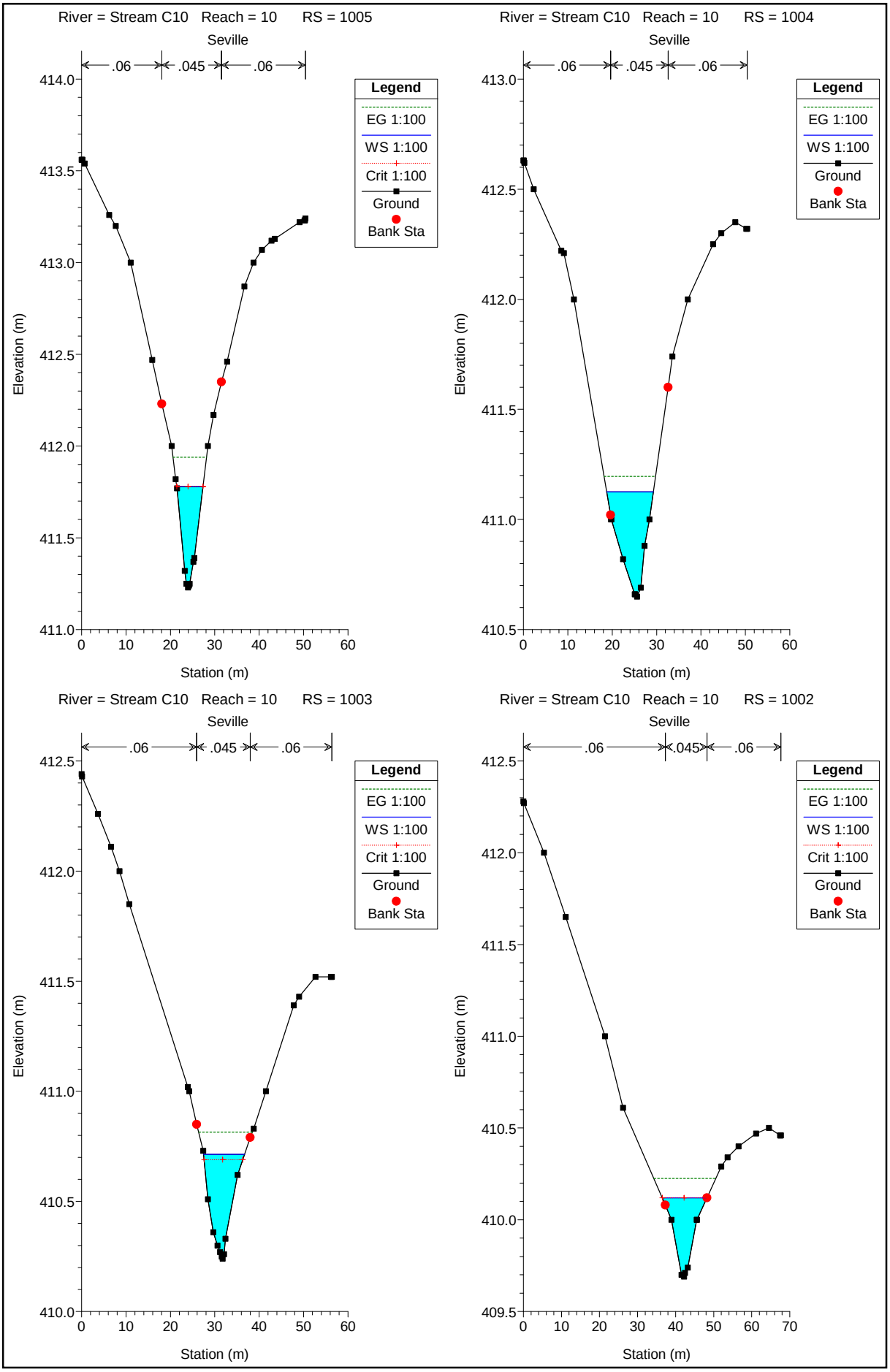

River = Stream C1 Reach = 1 RS = 108
Seville
.06
.045
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C1 Reach = 1 RS = 107
Seville
.06
.045
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C1 Reach = 1 RS = 106
Seville
.06
.045
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C1 Reach = 1 RS = 105
Seville
.06
.045
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)

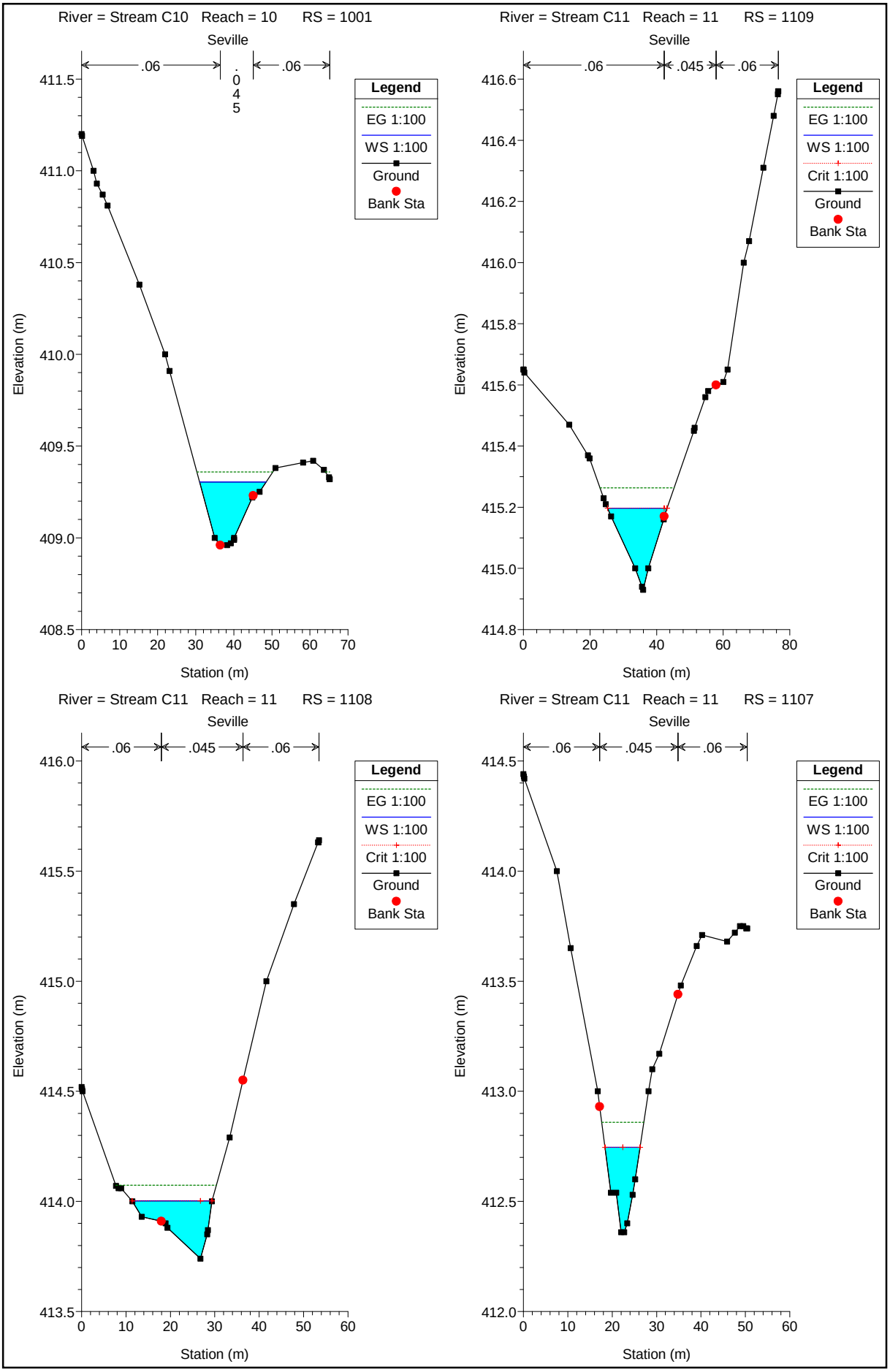

River = Stream C1 Reach = 1 RS = 104.5 Culv
Seville
.06
.045
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)
River = Stream C1 Reach = 1 RS = 104.5 Culv
Seville
.06
.045
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)
River = Stream C1 Reach = 1 RS = 104
Seville
.06
.045
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)
River = Stream C1 Reach = 1 RS = 103
Seville
.06
.045
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)

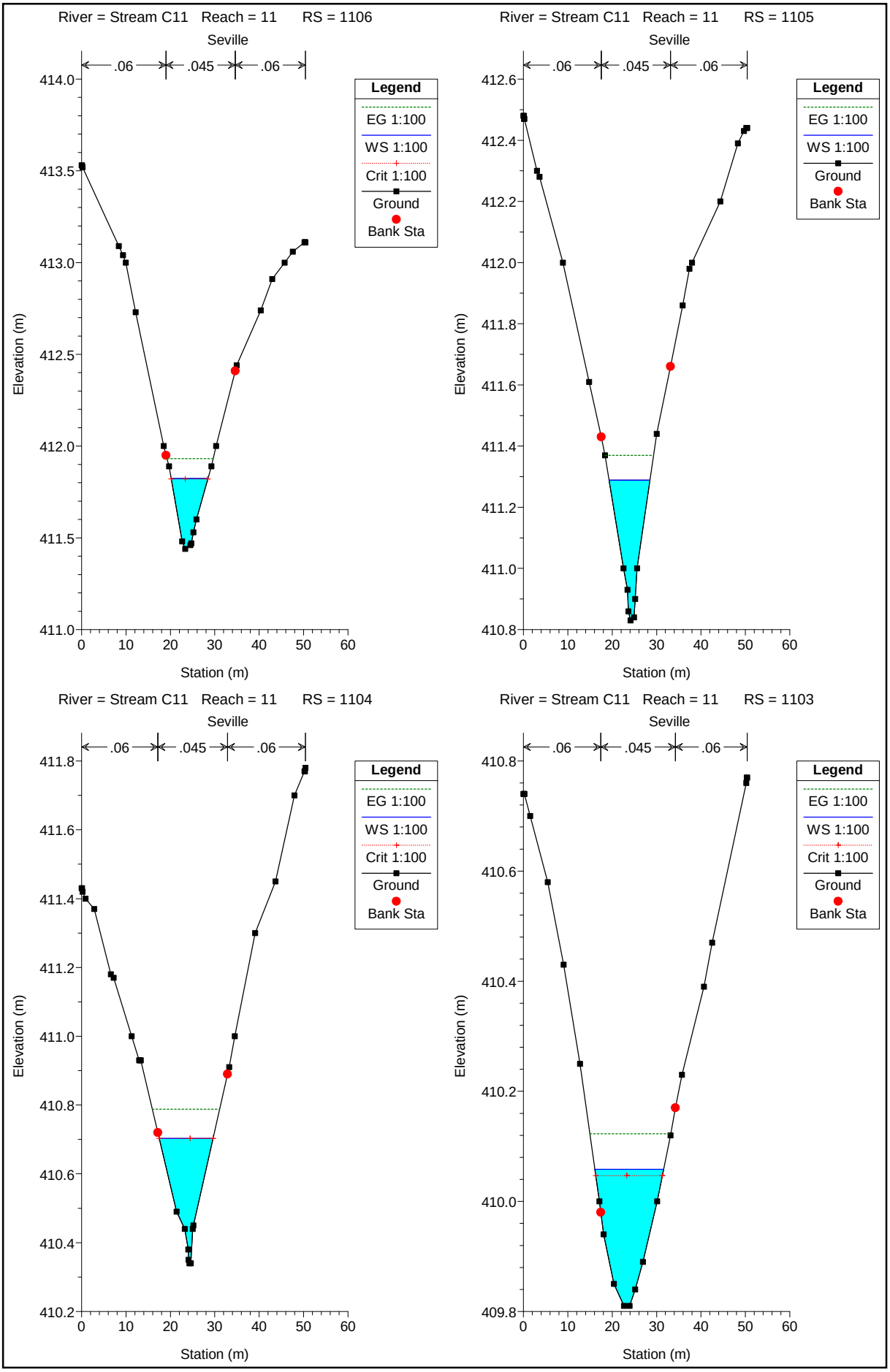

River = Stream C1 Reach = 1 RS = 102
Seville
.06
.045
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
398.0
397.5
397.0
396.5
396.0
395.5
395.0
394.5
0
20
40
60
80
100

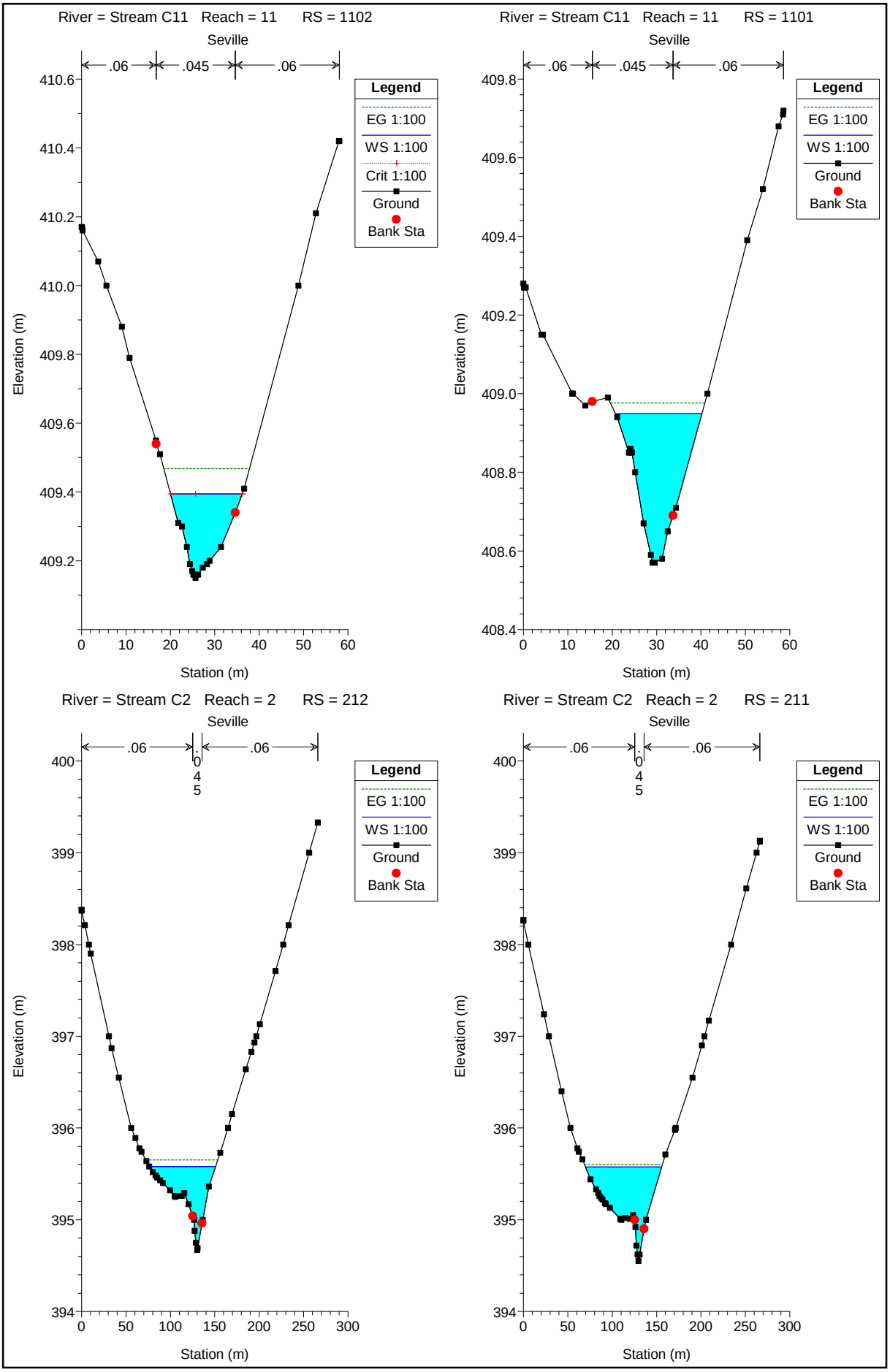

River = Stream C1 Reach = 1 RS = 101
Seville
.06
.045
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
397.0
396.5
396.0
395.5
395.0
394.5
394.0
0
20
40
60
80
100

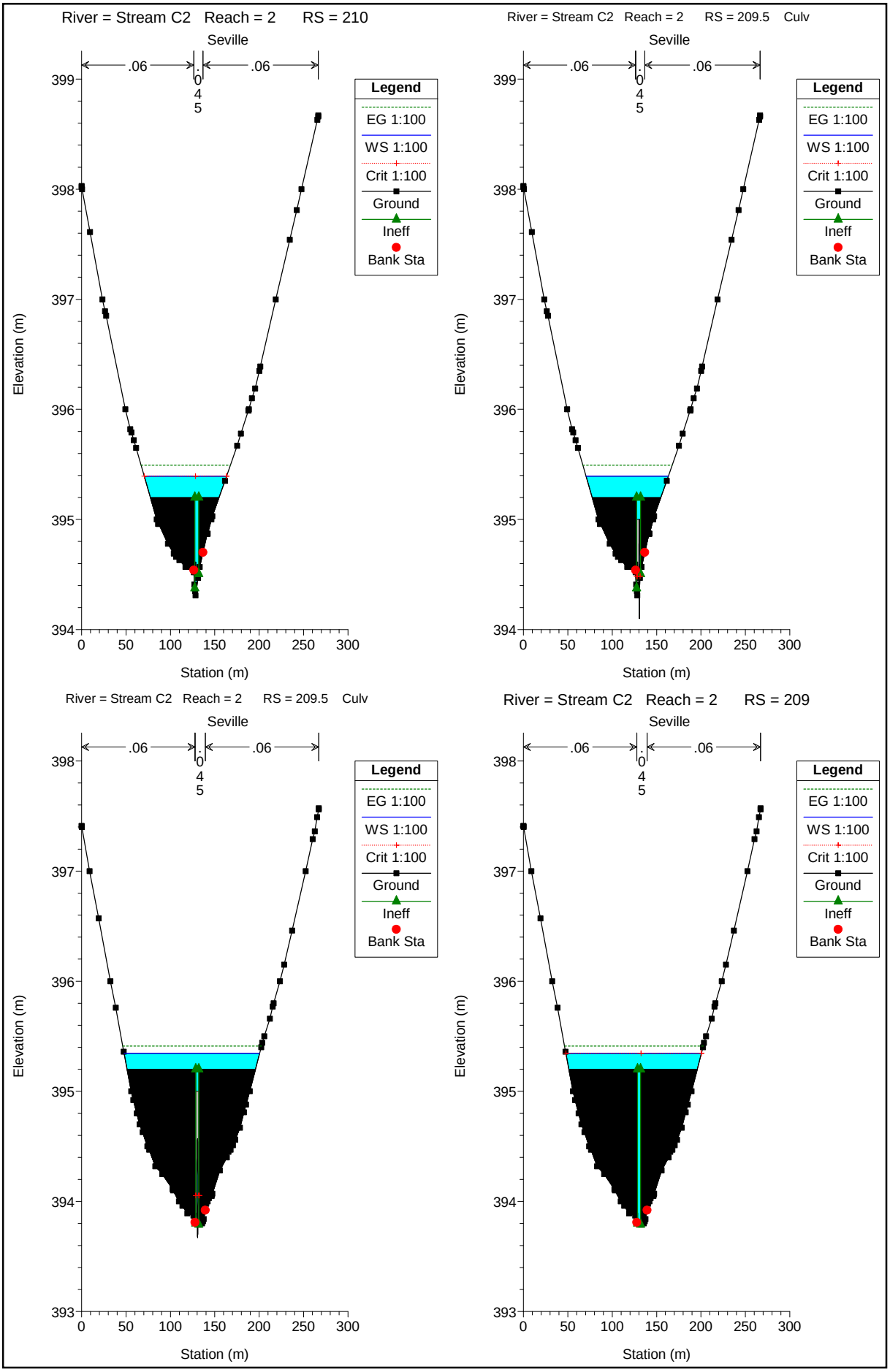

River = Stream C10 Reach = 10 RS = 1009
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C10 Reach = 10 RS = 1008
Seville
River = Stream C10 Reach = 10 RS = 1007
Seville
River = Stream C10 Reach = 10 RS = 1006
Seville

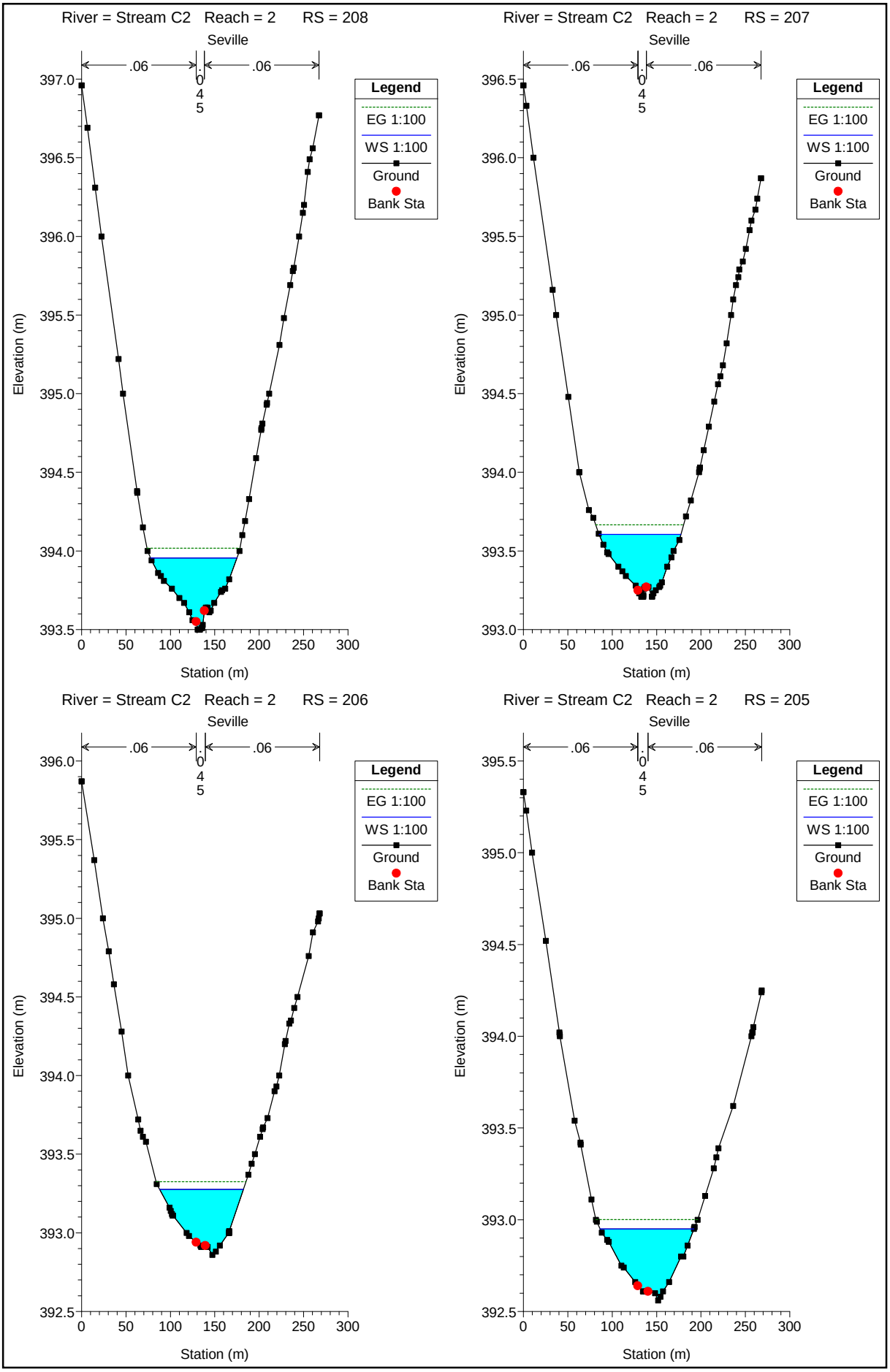

River = Stream C10 Reach = 10 RS = 1005
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C10 Reach = 10 RS = 1004
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C10 Reach = 10 RS = 1003
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C10 Reach = 10 RS = 1002
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)

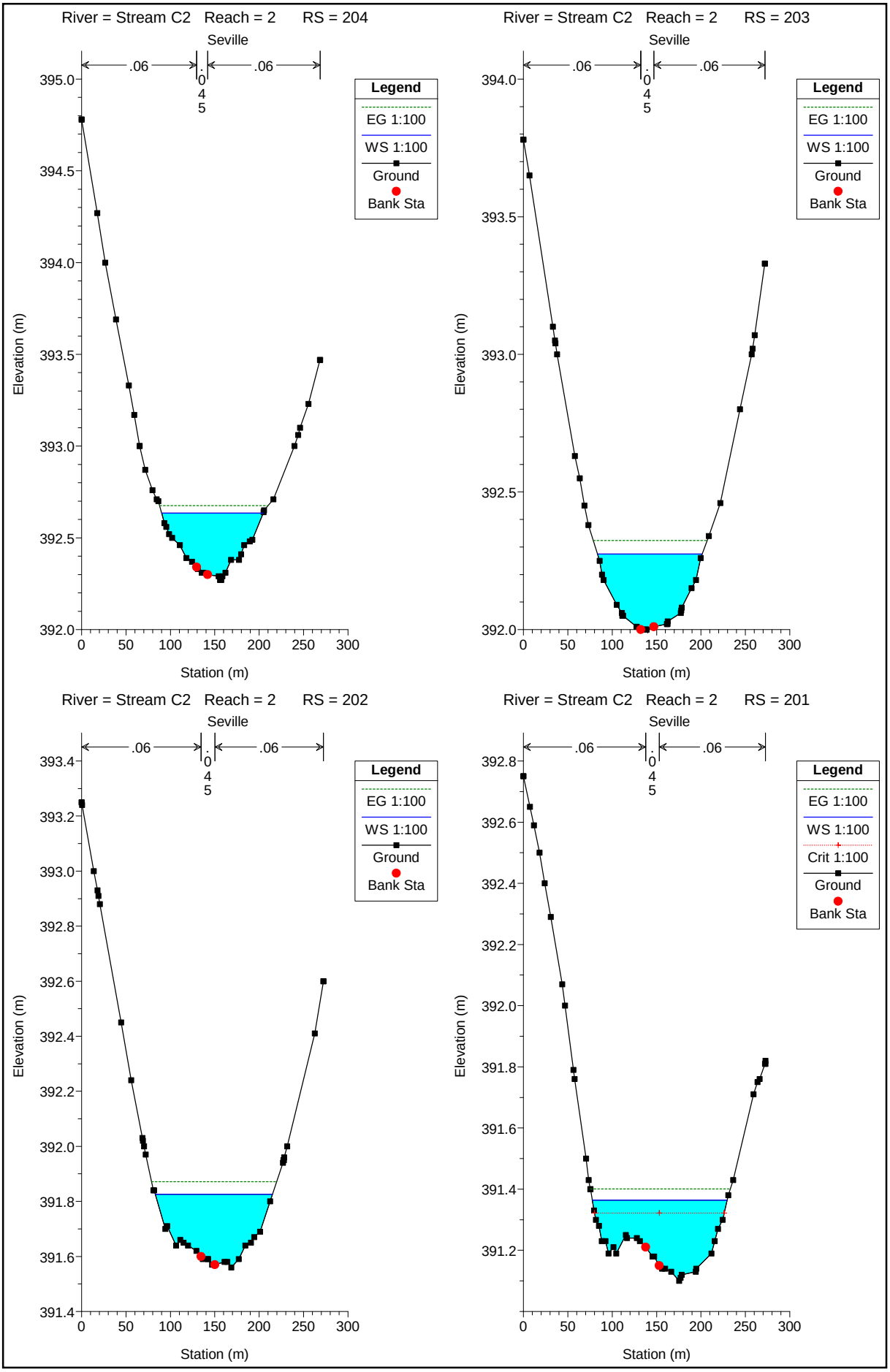

River = Stream C10 Reach = 10 RS = 1001
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C11 Reach = 11 RS = 1109
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C11 Reach = 11 RS = 1108
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C11 Reach = 11 RS = 1107
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)

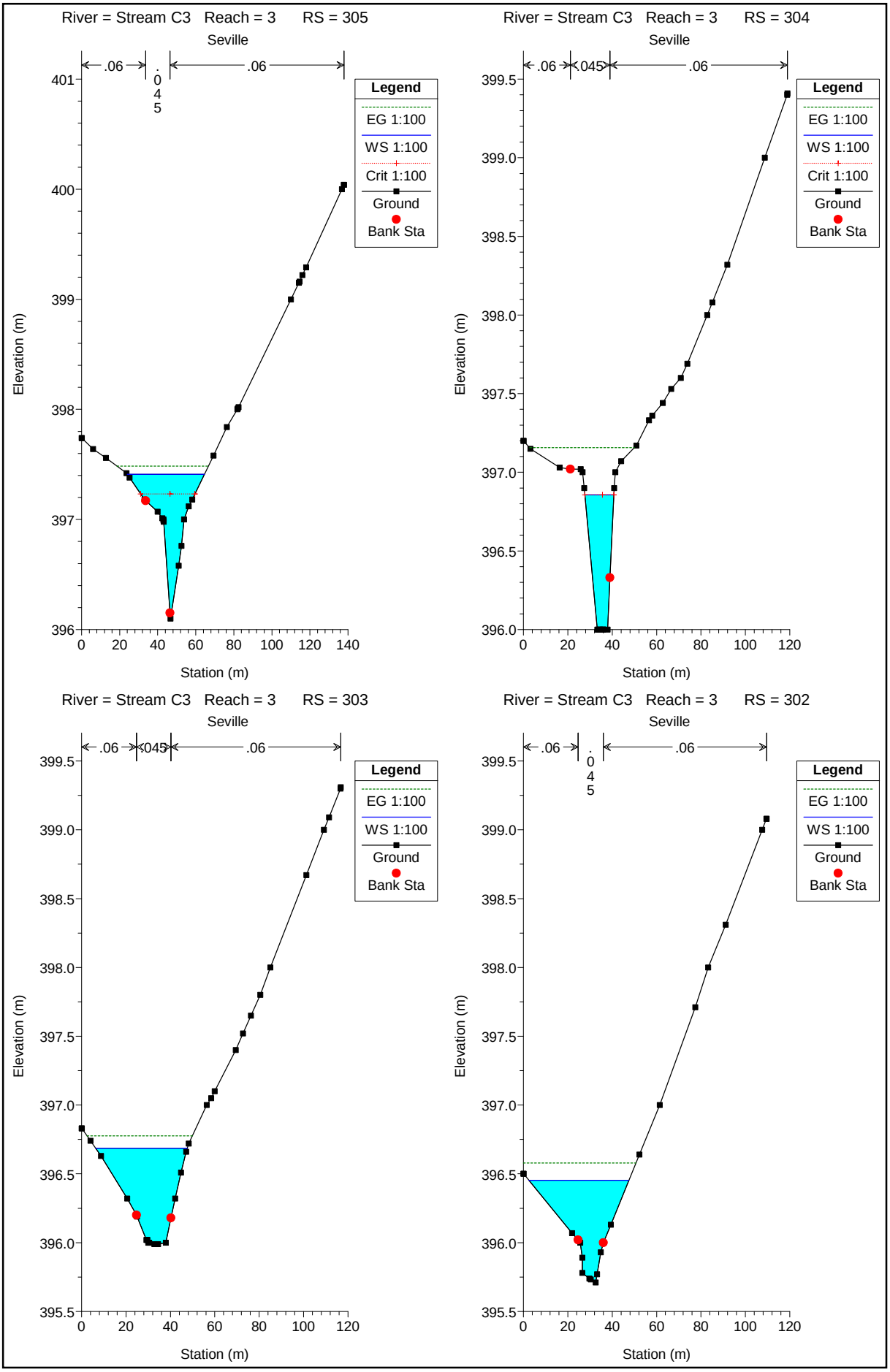

River = Stream C11 Reach = 11 RS = 1106
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C11 Reach = 11 RS = 1105
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C11 Reach = 11 RS = 1104
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C11 Reach = 11 RS = 1103
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)

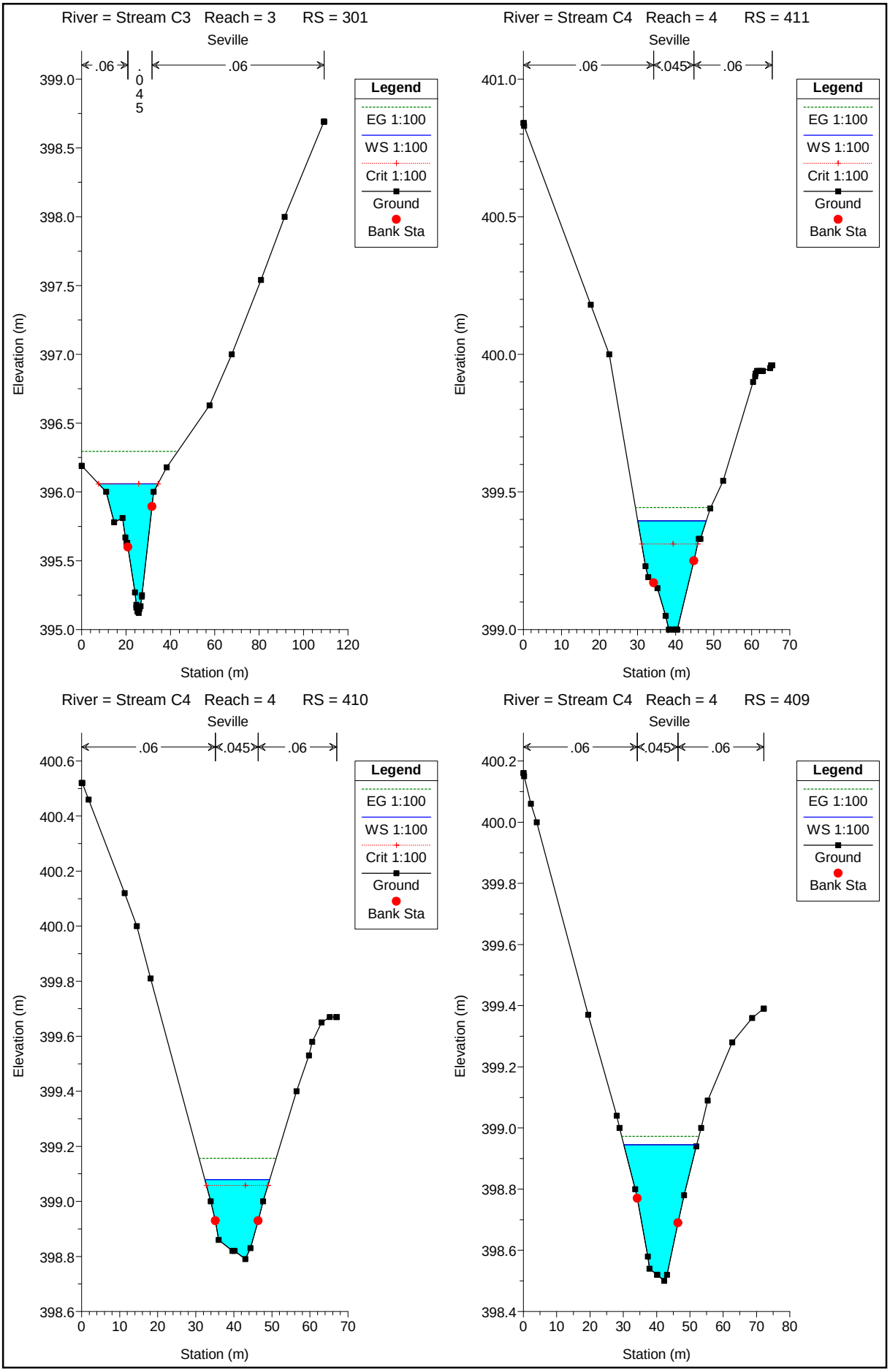

River = Stream C11 Reach = 11 RS = 1102
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C11 Reach = 11 RS = 1101
Seville
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C2 Reach = 2 RS = 212
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C2 Reach = 2 RS = 211
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)

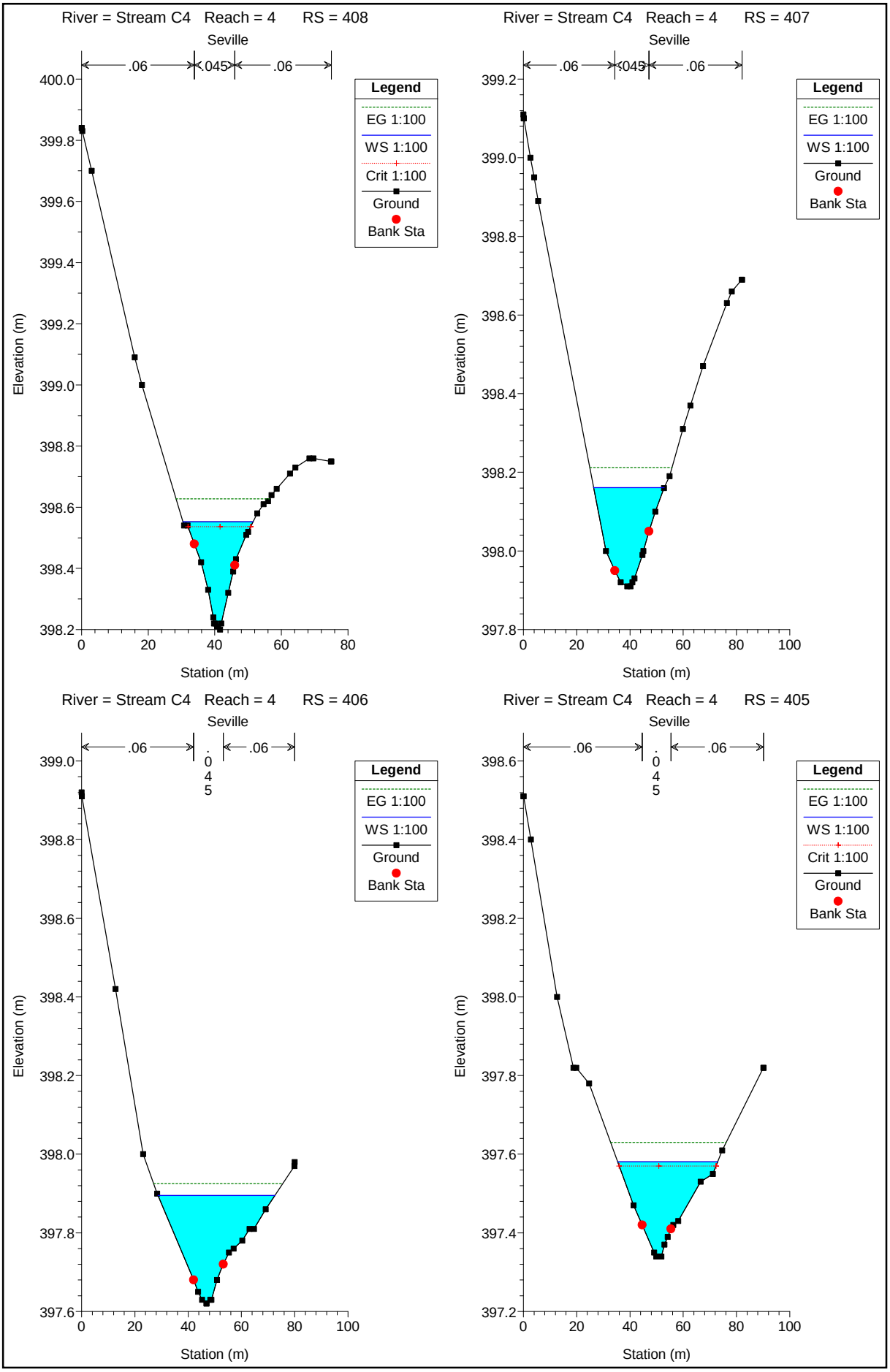

River = Stream C2 Reach = 2 RS = 210
Seville
.06
.06
.045
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)
River = Stream C2 Reach = 2 RS = 209.5 Culv
Seville
.06
.06
.045
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)
River = Stream C2 Reach = 2 RS = 209.5 Culv
Seville
.06
.06
.045
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)
River = Stream C2 Reach = 2 RS = 209
Seville
.06
.06
.045
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)

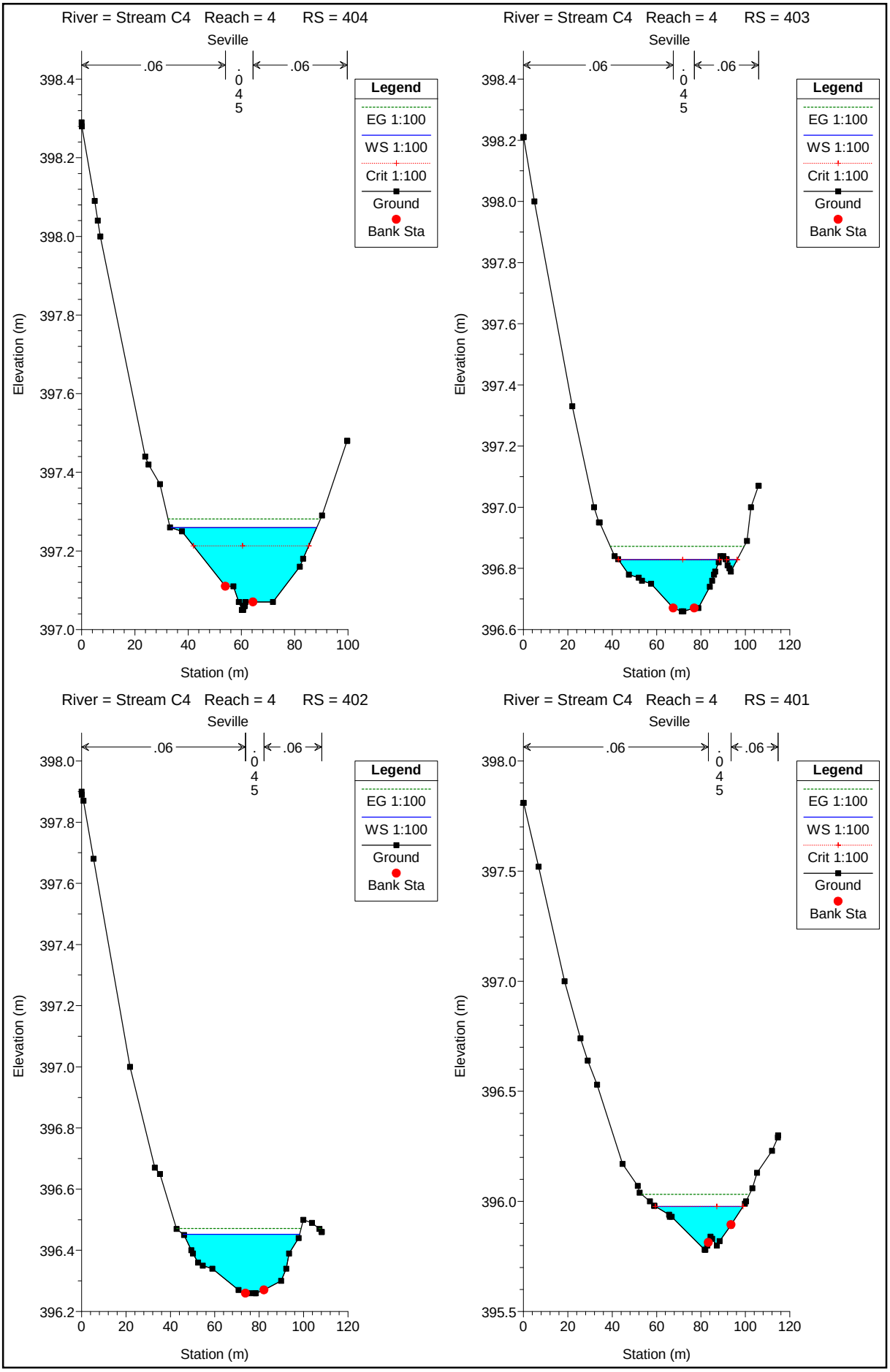

River = Stream C2 Reach = 2 RS = 208
Seville
.06
.06
0.045
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C2 Reach = 2 RS = 207
Seville
.06
.06
0.045
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C2 Reach = 2 RS = 206
Seville
.06
.06
0.045
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C2 Reach = 2 RS = 205
Seville
.06
.06
0.045
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)

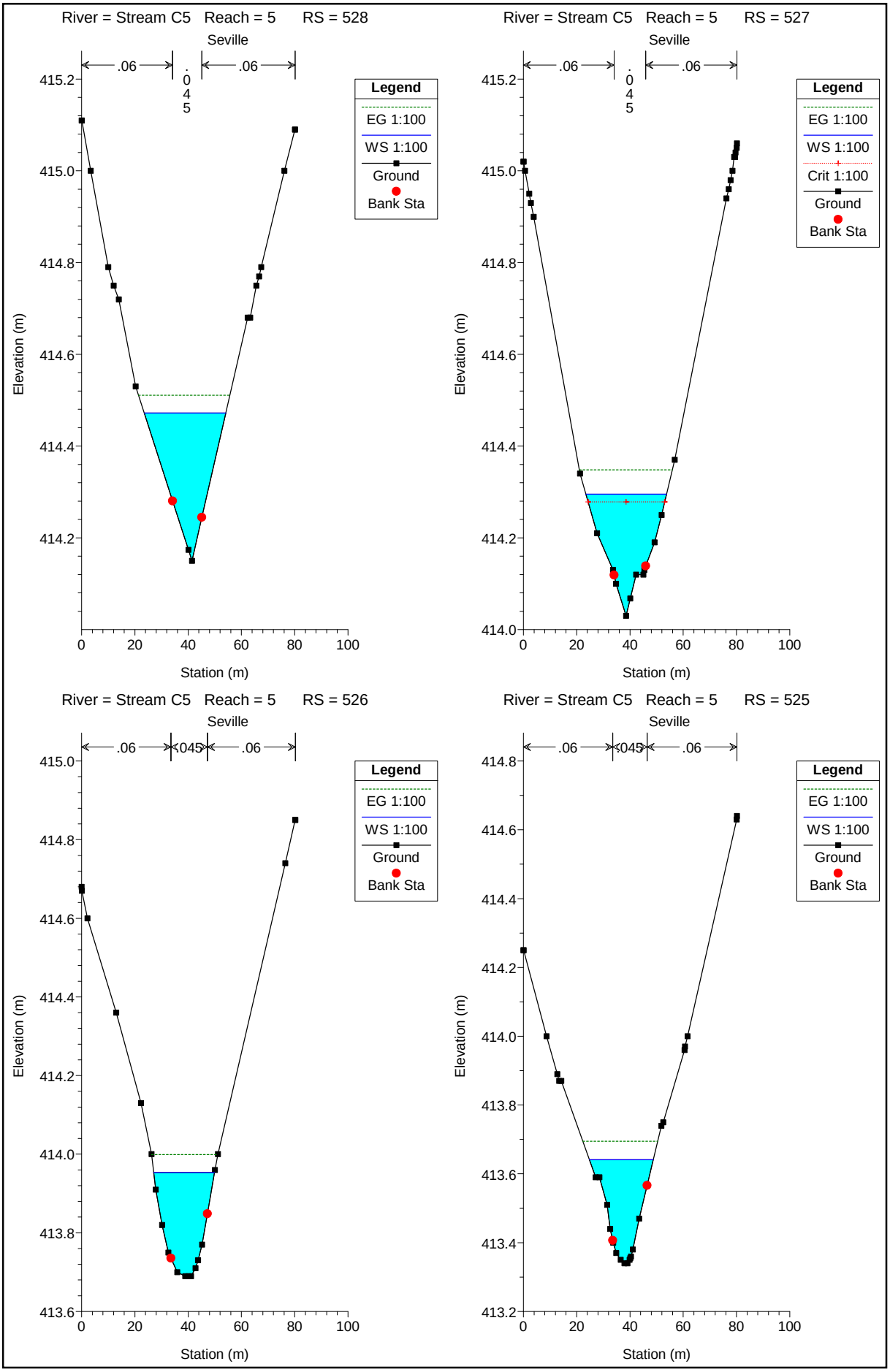

River = Stream C2 Reach = 2 RS = 204
Seville
.06
.06
.045
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C2 Reach = 2 RS = 203
Seville
.06
.06
.045
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C2 Reach = 2 RS = 202
Seville
.06
.06
.045
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C2 Reach = 2 RS = 201
Seville
.06
.06
.045
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)

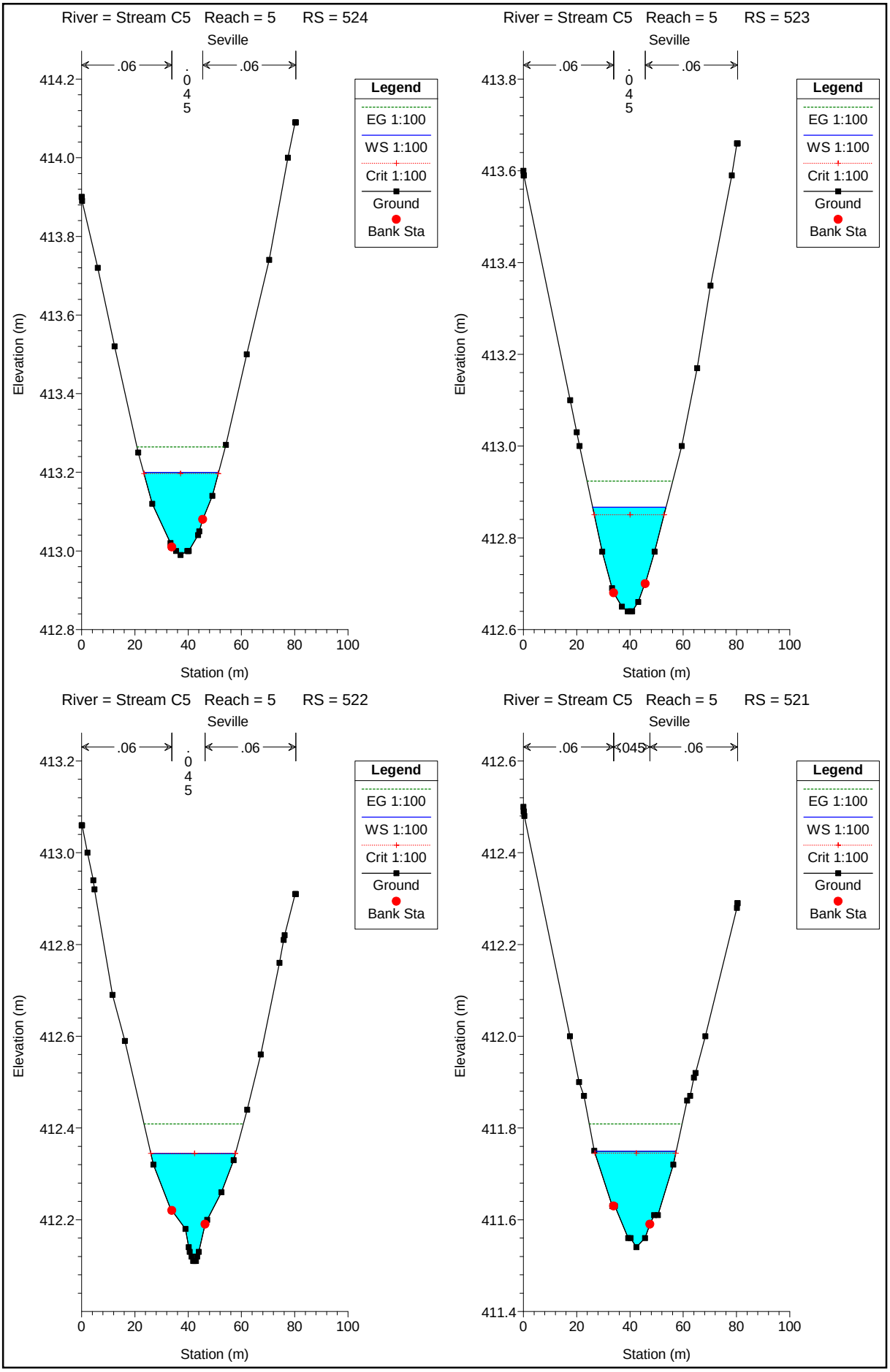

River = Stream C3 Reach = 3 RS = 305
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C3 Reach = 3 RS = 304
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C3 Reach = 3 RS = 303
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C3 Reach = 3 RS = 302
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)

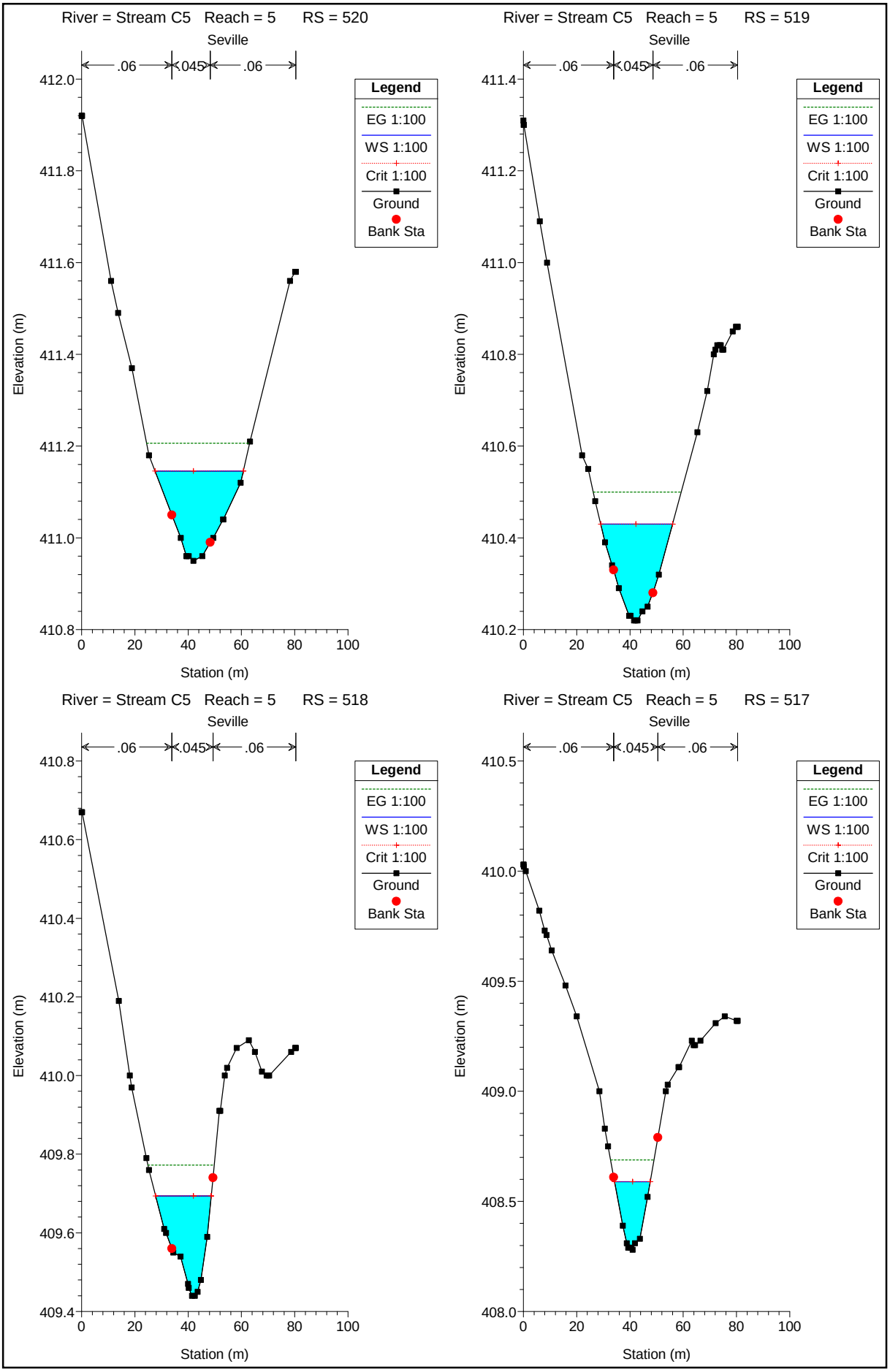

River = Stream C3 Reach = 3 RS = 301
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C4 Reach = 4 RS = 411
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C4 Reach = 4 RS = 410
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C4 Reach = 4 RS = 409
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)

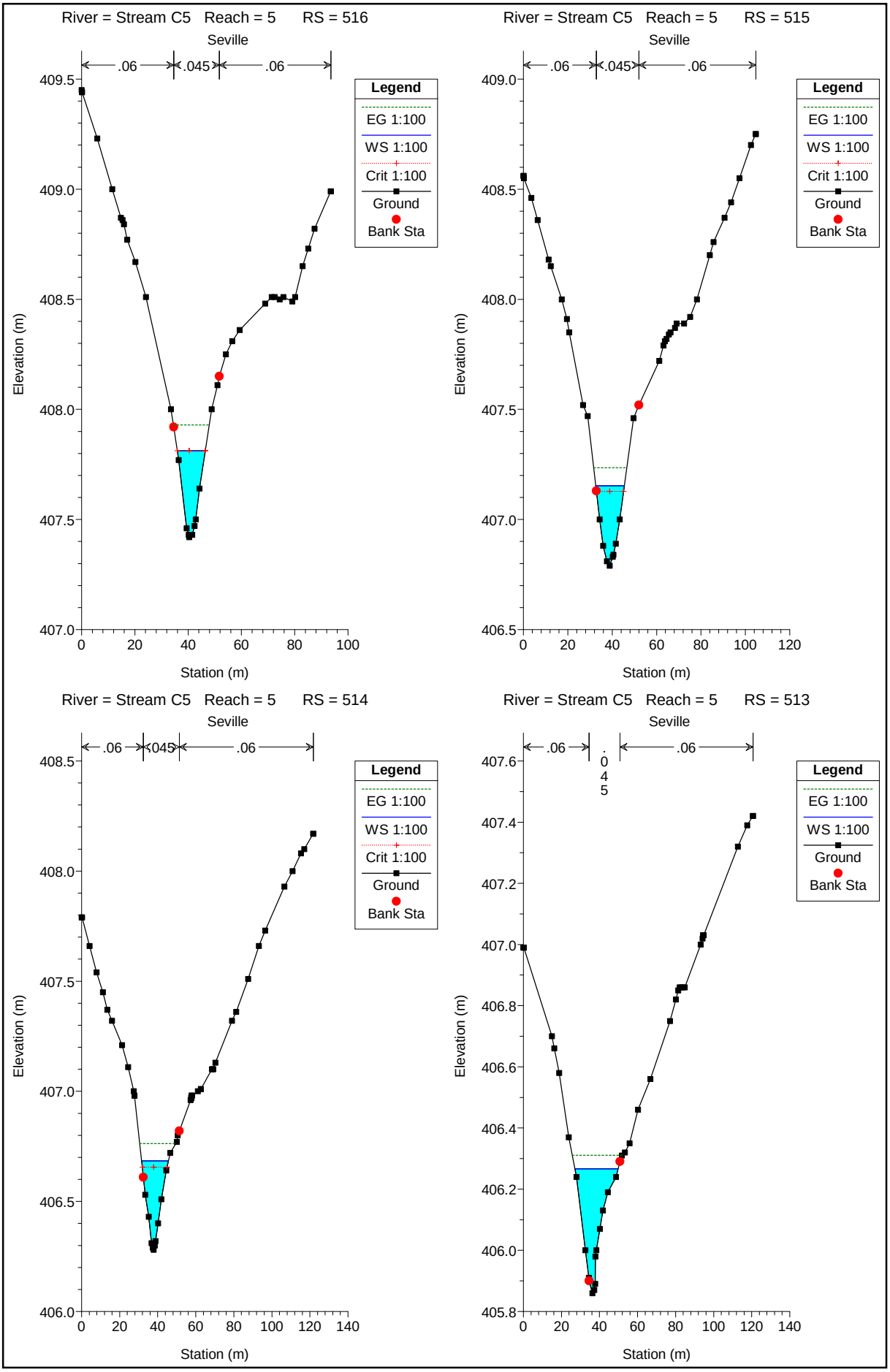

River = Stream C4 Reach = 4 RS = 408
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C4 Reach = 4 RS = 407
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C4 Reach = 4 RS = 406
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C4 Reach = 4 RS = 405
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)

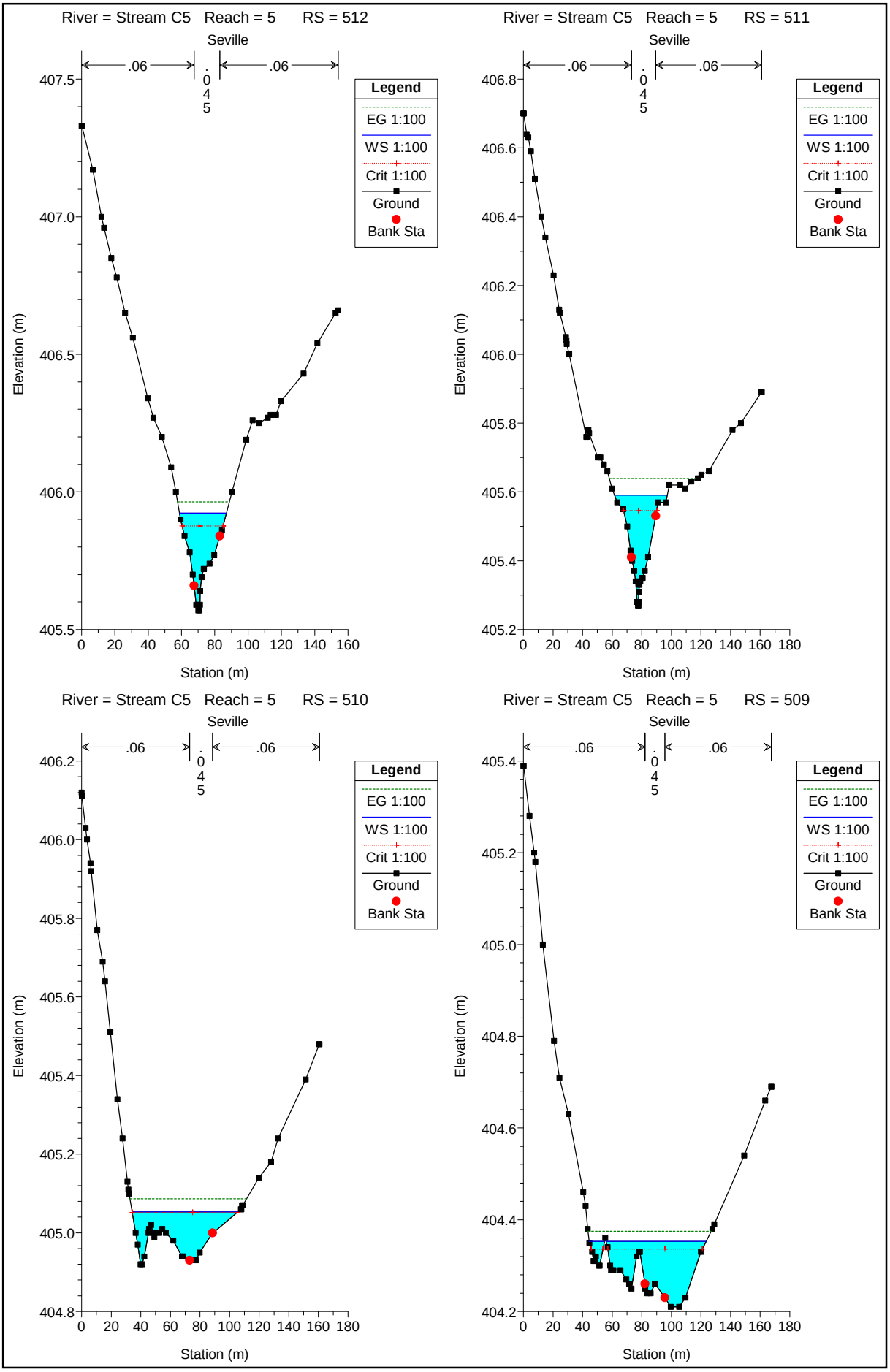

River = Stream C4 Reach = 4 RS = 404
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C4 Reach = 4 RS = 403
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C4 Reach = 4 RS = 402
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C4 Reach = 4 RS = 401
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)

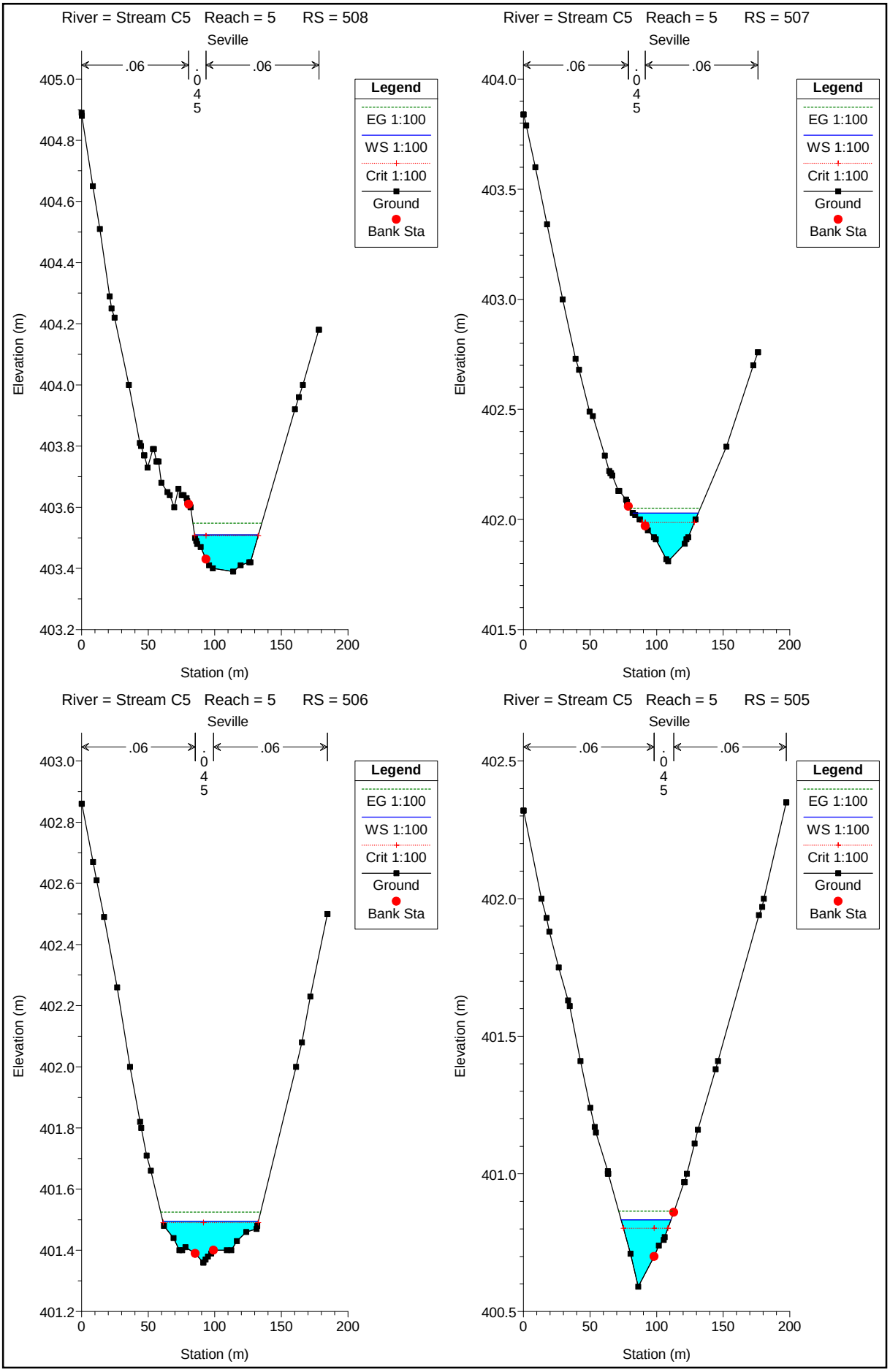

River = Stream C5 Reach = 5 RS = 528
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C5 Reach = 5 RS = 527
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C5 Reach = 5 RS = 526
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C5 Reach = 5 RS = 525
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)

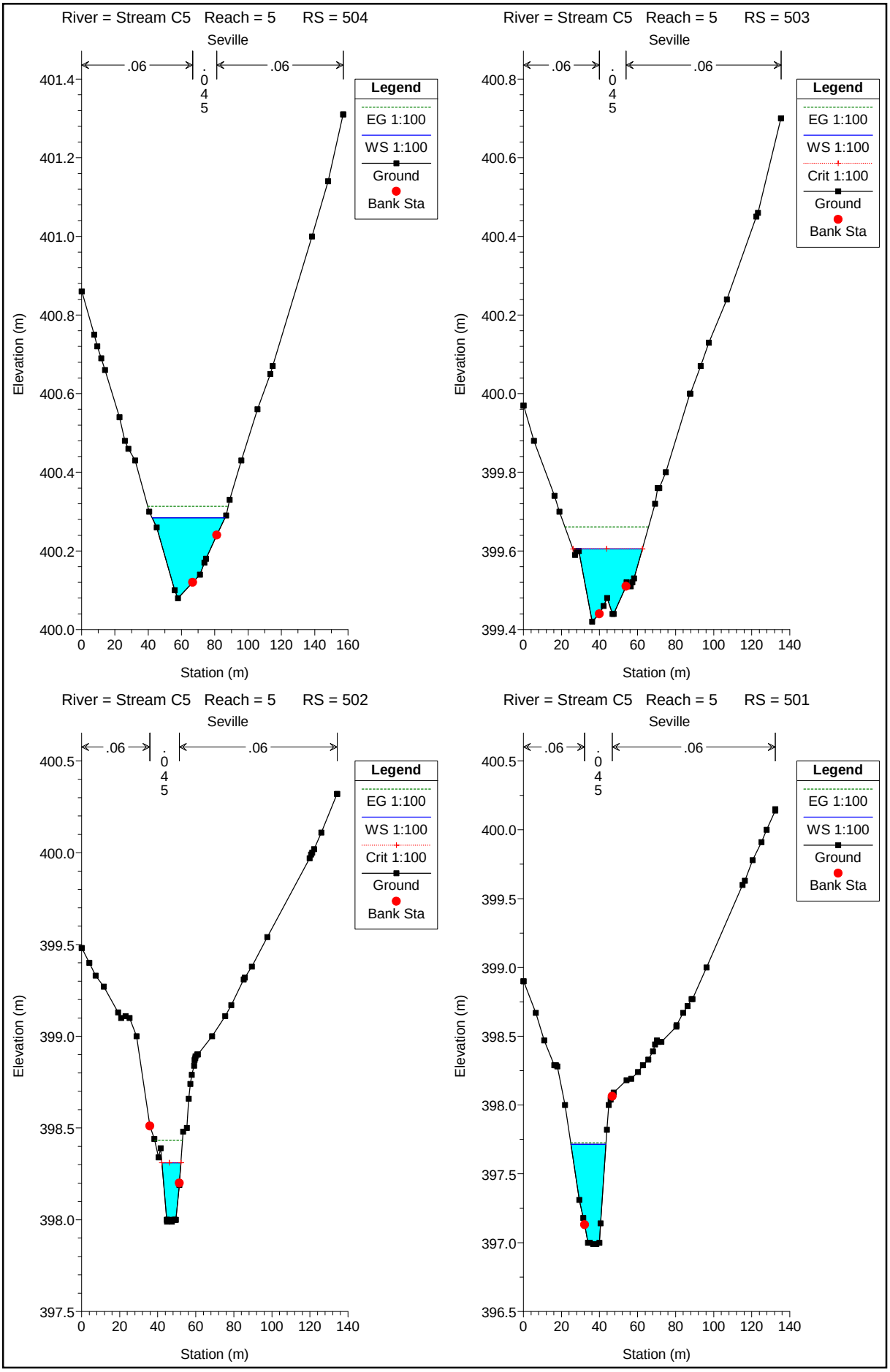

River = Stream C5 Reach = 5 RS = 524
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C5 Reach = 5 RS = 523
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C5 Reach = 5 RS = 522
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C5 Reach = 5 RS = 521
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)

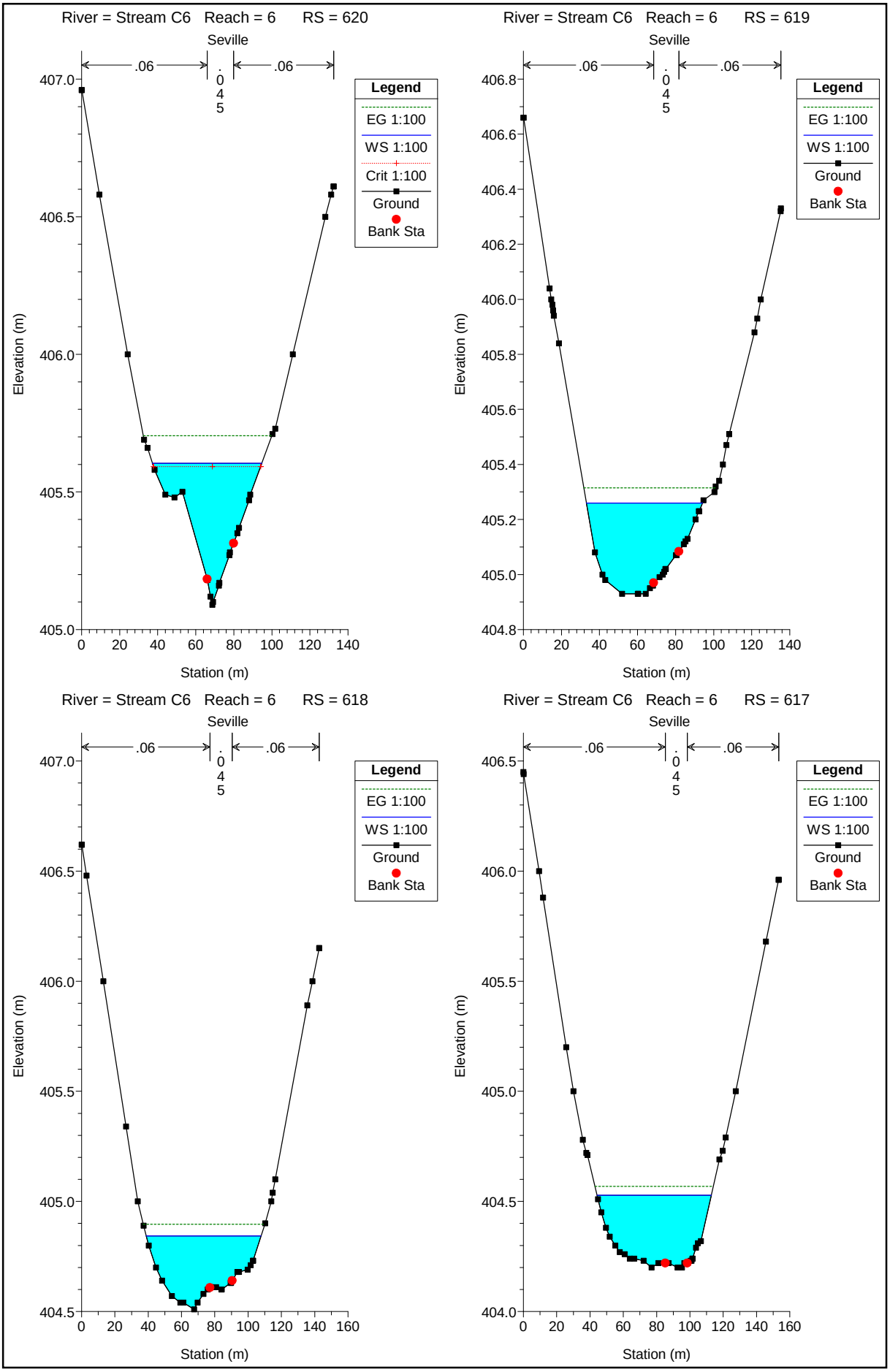

River = Stream C5 Reach = 5 RS = 520
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C5 Reach = 5 RS = 519
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C5 Reach = 5 RS = 518
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C5 Reach = 5 RS = 517
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)

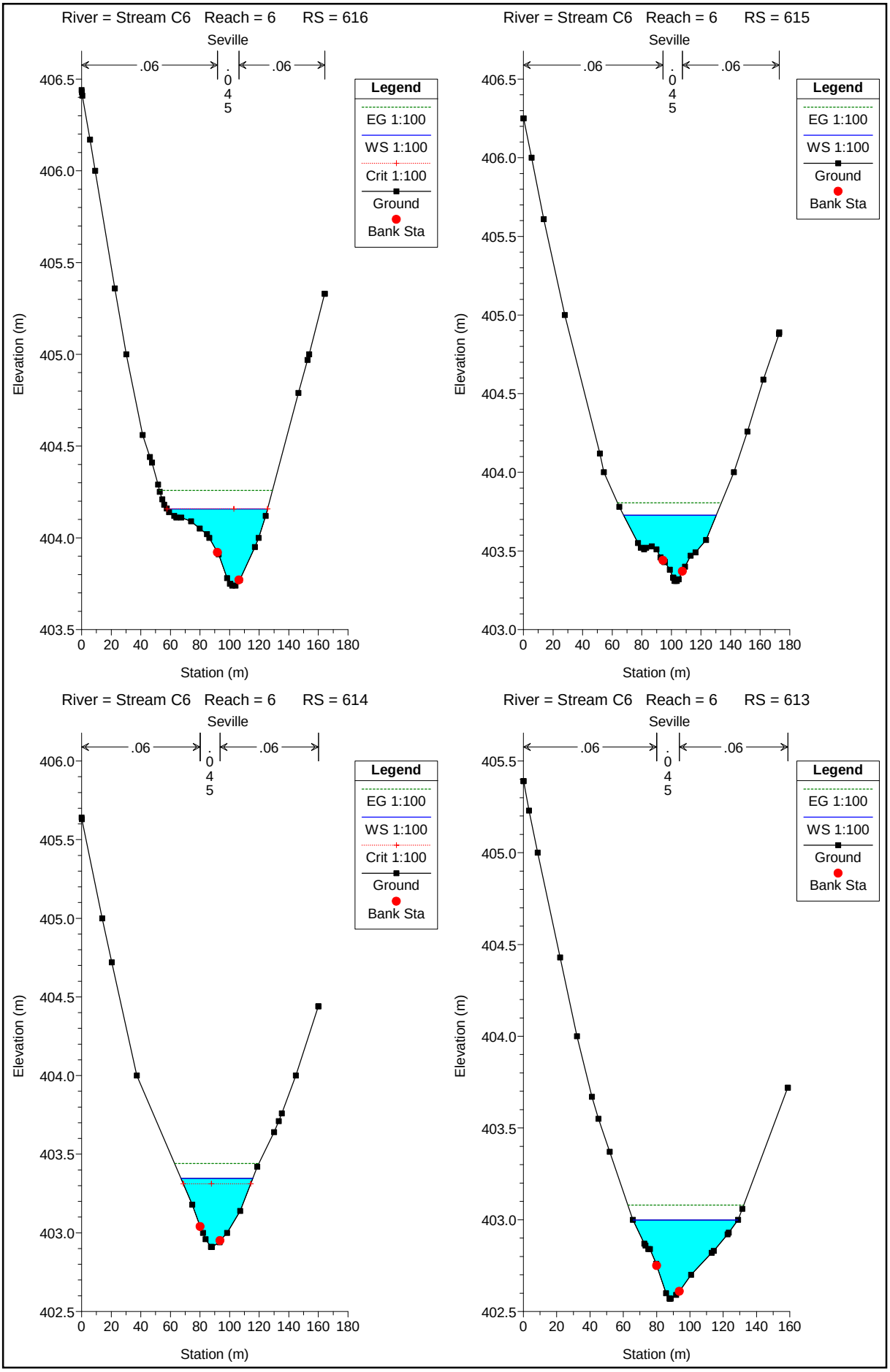

River = Stream C5 Reach = 5 RS = 516
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C5 Reach = 5 RS = 515
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C5 Reach = 5 RS = 514
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C5 Reach = 5 RS = 513
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)

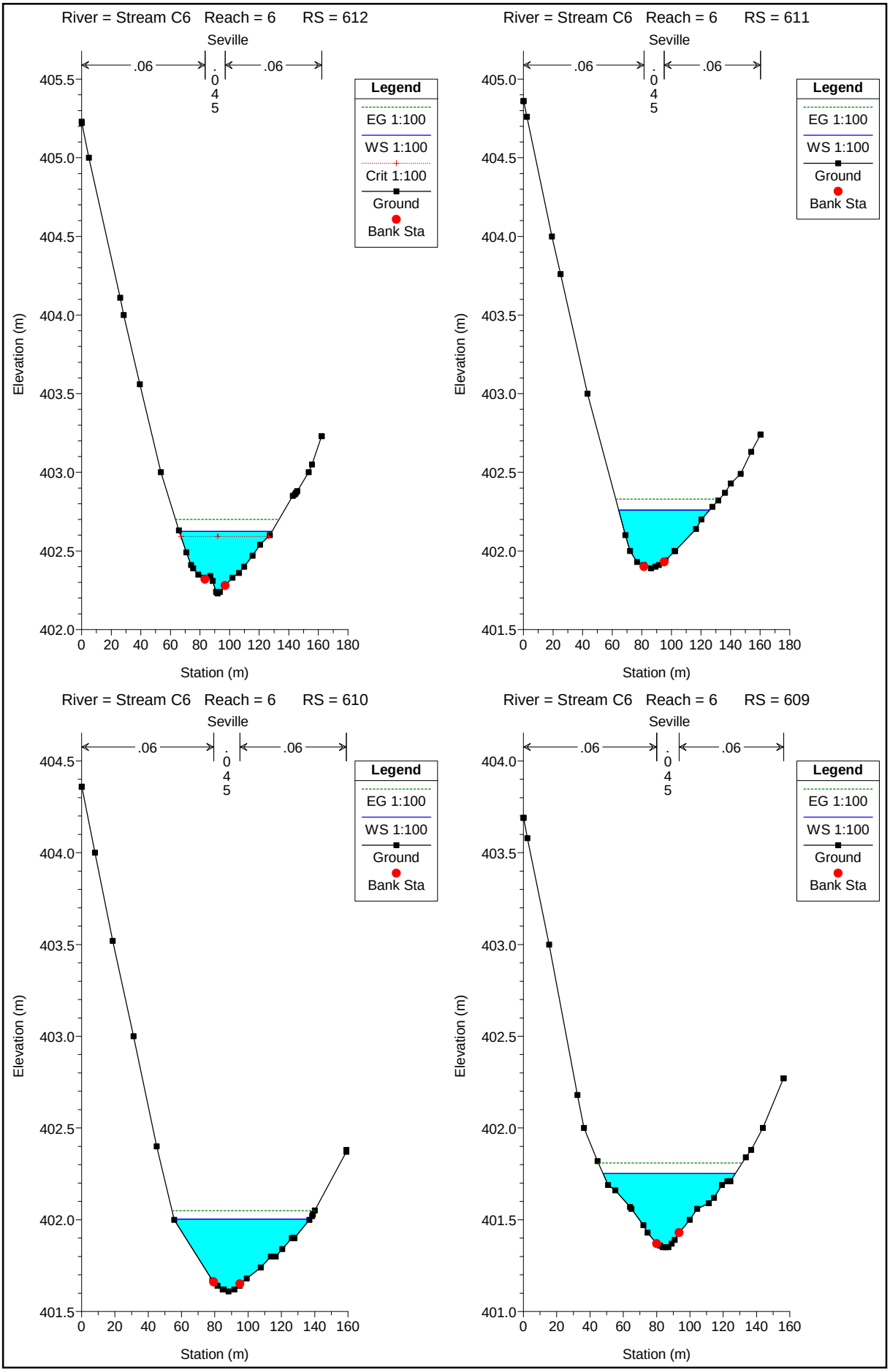

River = Stream C5 Reach = 5 RS = 512
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C5 Reach = 5 RS = 511
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C5 Reach = 5 RS = 510
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C5 Reach = 5 RS = 509
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)

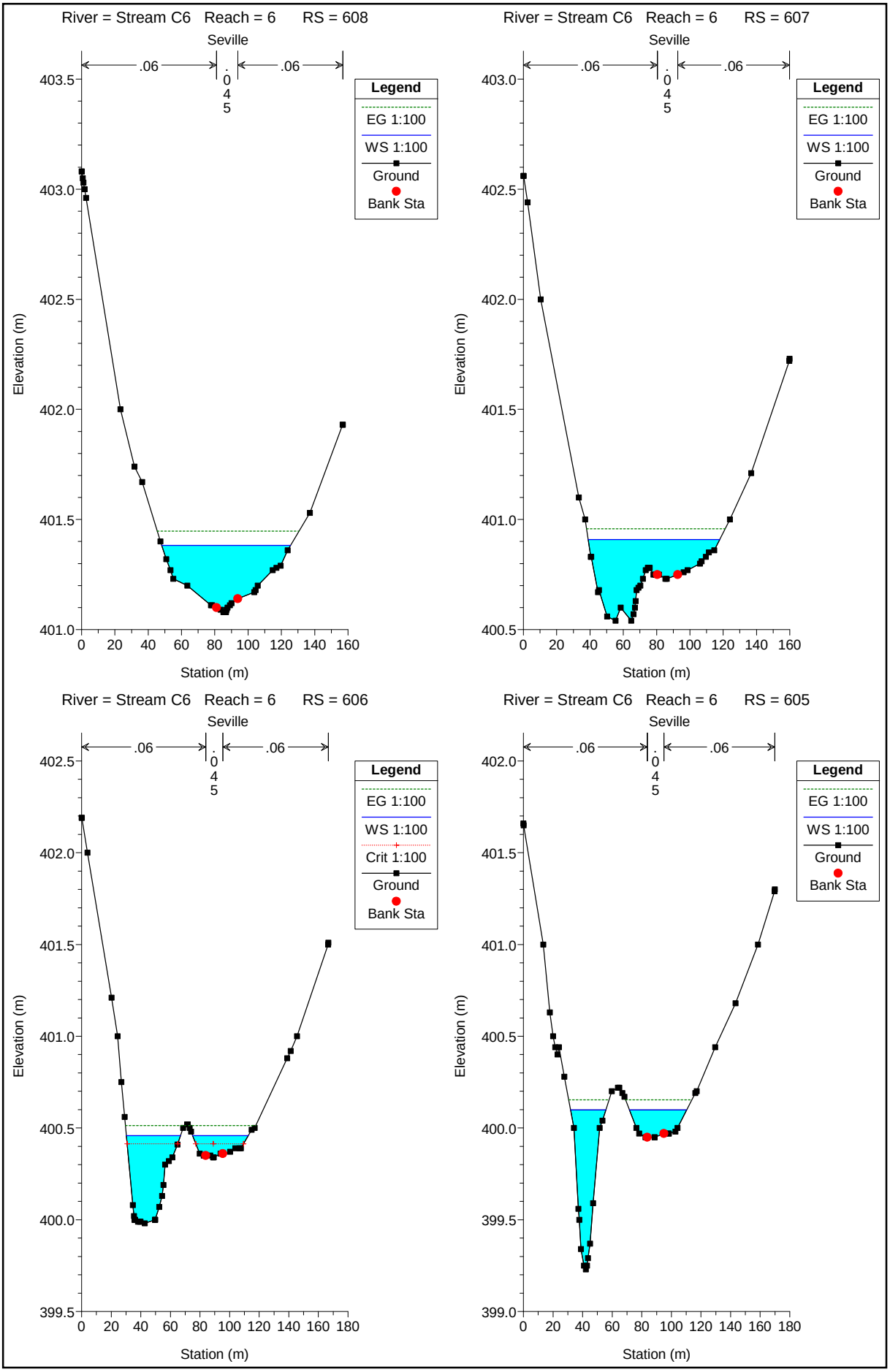

River = Stream C5 Reach = 5 RS = 508
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C5 Reach = 5 RS = 507
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C5 Reach = 5 RS = 506
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C5 Reach = 5 RS = 505
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)

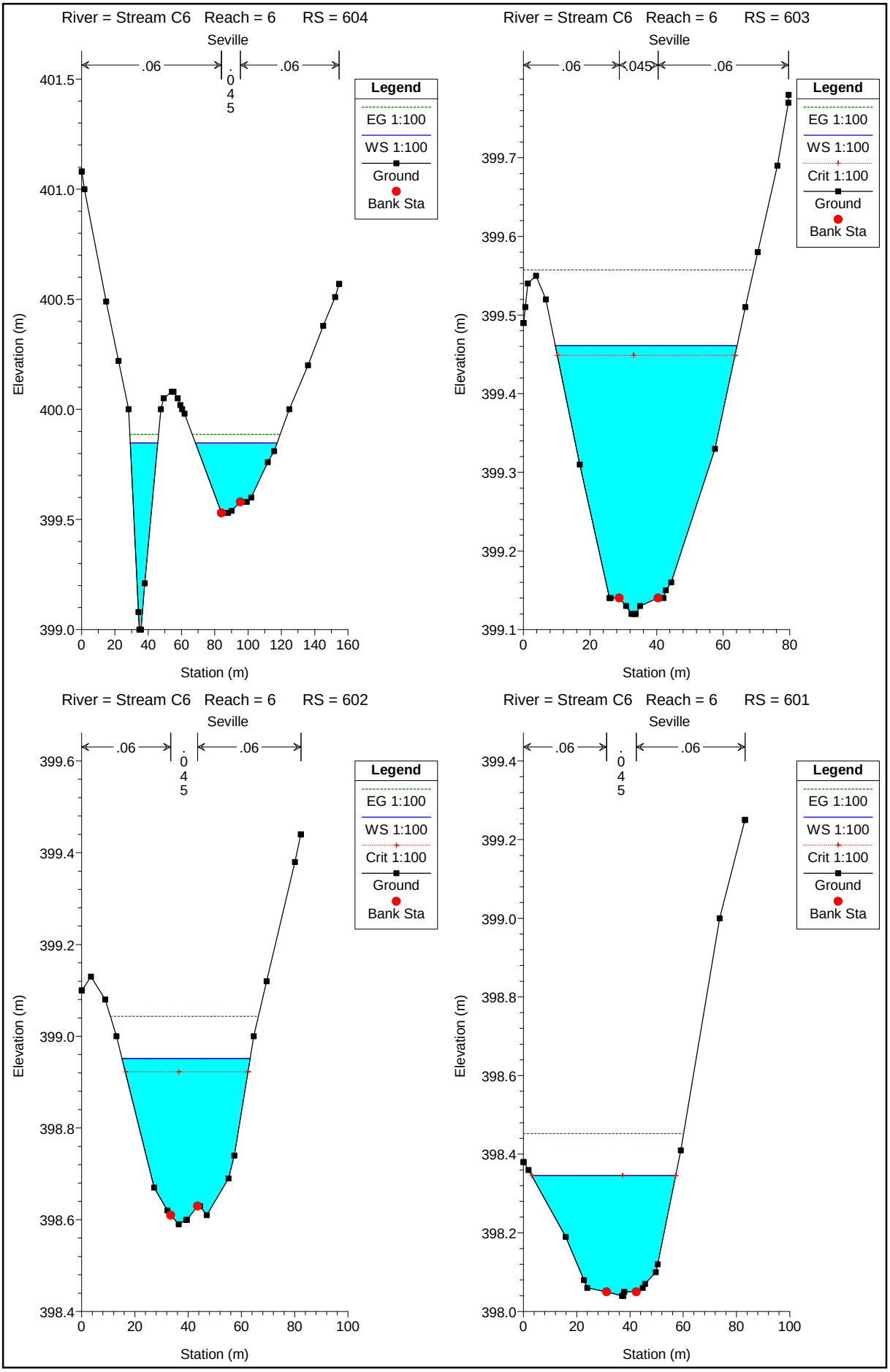

River = Stream C5 Reach = 5 RS = 504
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C5 Reach = 5 RS = 503
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C5 Reach = 5 RS = 502
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C5 Reach = 5 RS = 501
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)

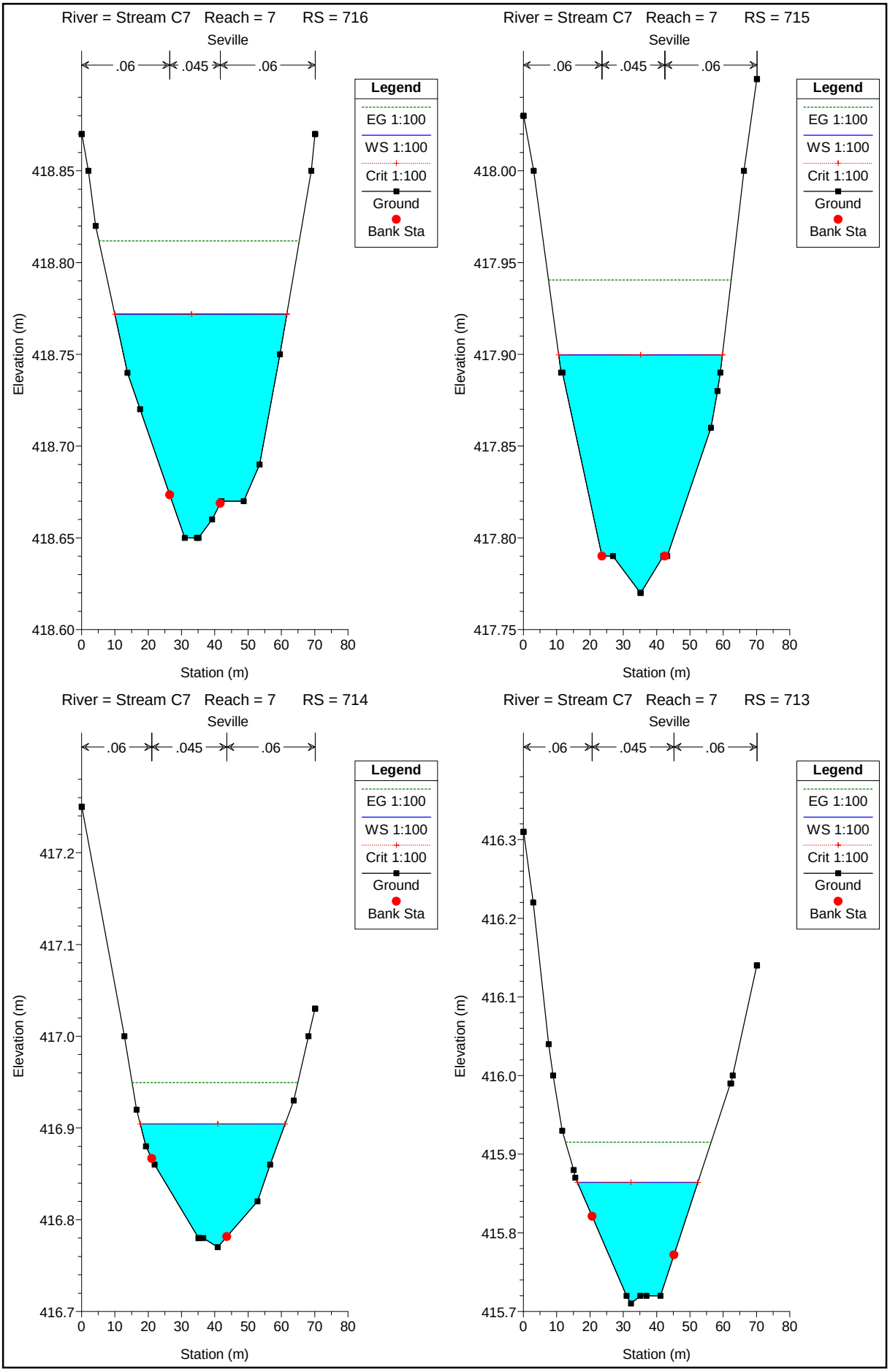

River = Stream C6 Reach = 6 RS = 620
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C6 Reach = 6 RS = 619
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C6 Reach = 6 RS = 618
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C6 Reach = 6 RS = 617
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)

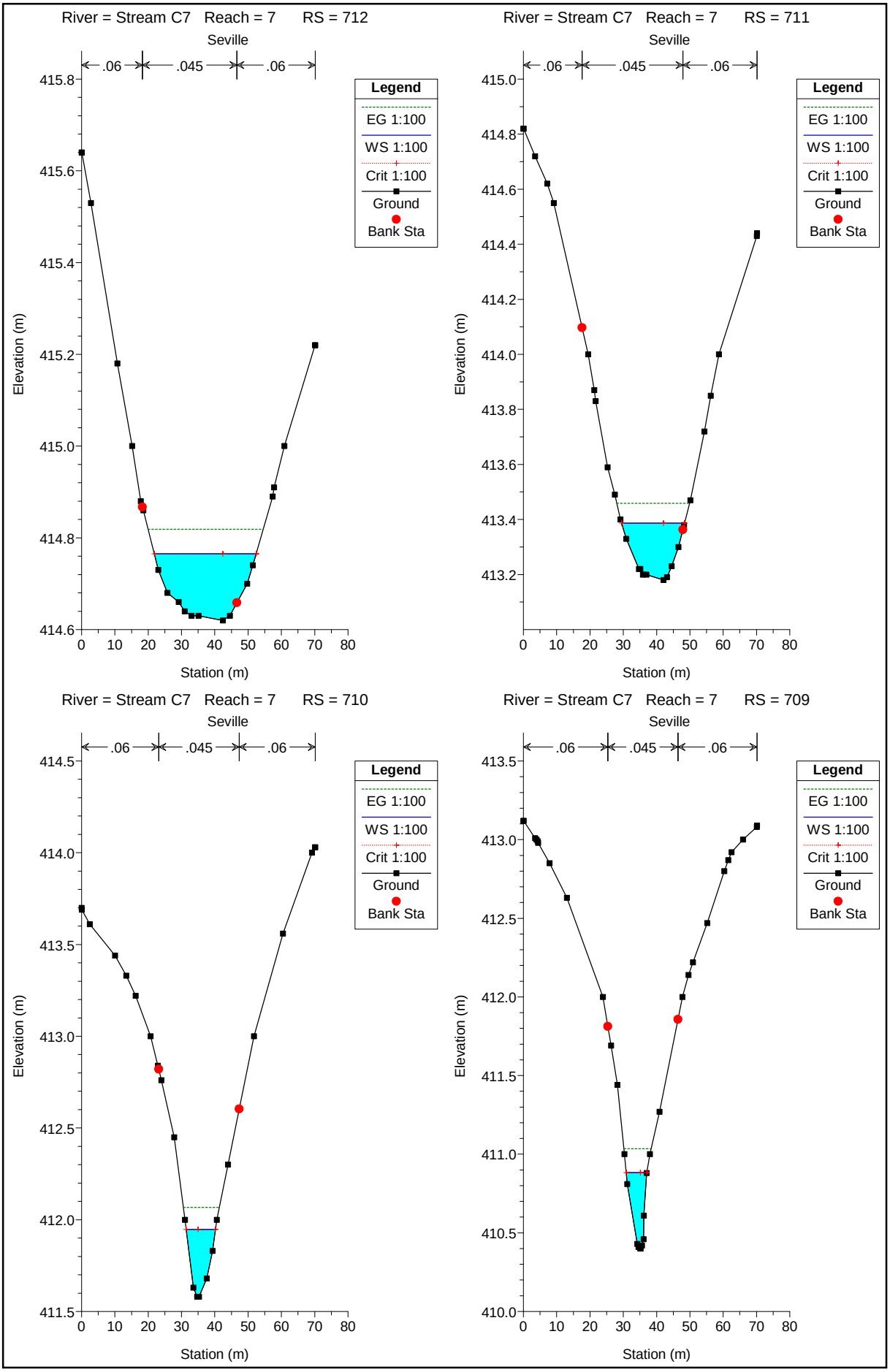

River = Stream C6 Reach = 6 RS = 616
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C6 Reach = 6 RS = 615
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C6 Reach = 6 RS = 614
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C6 Reach = 6 RS = 613
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)

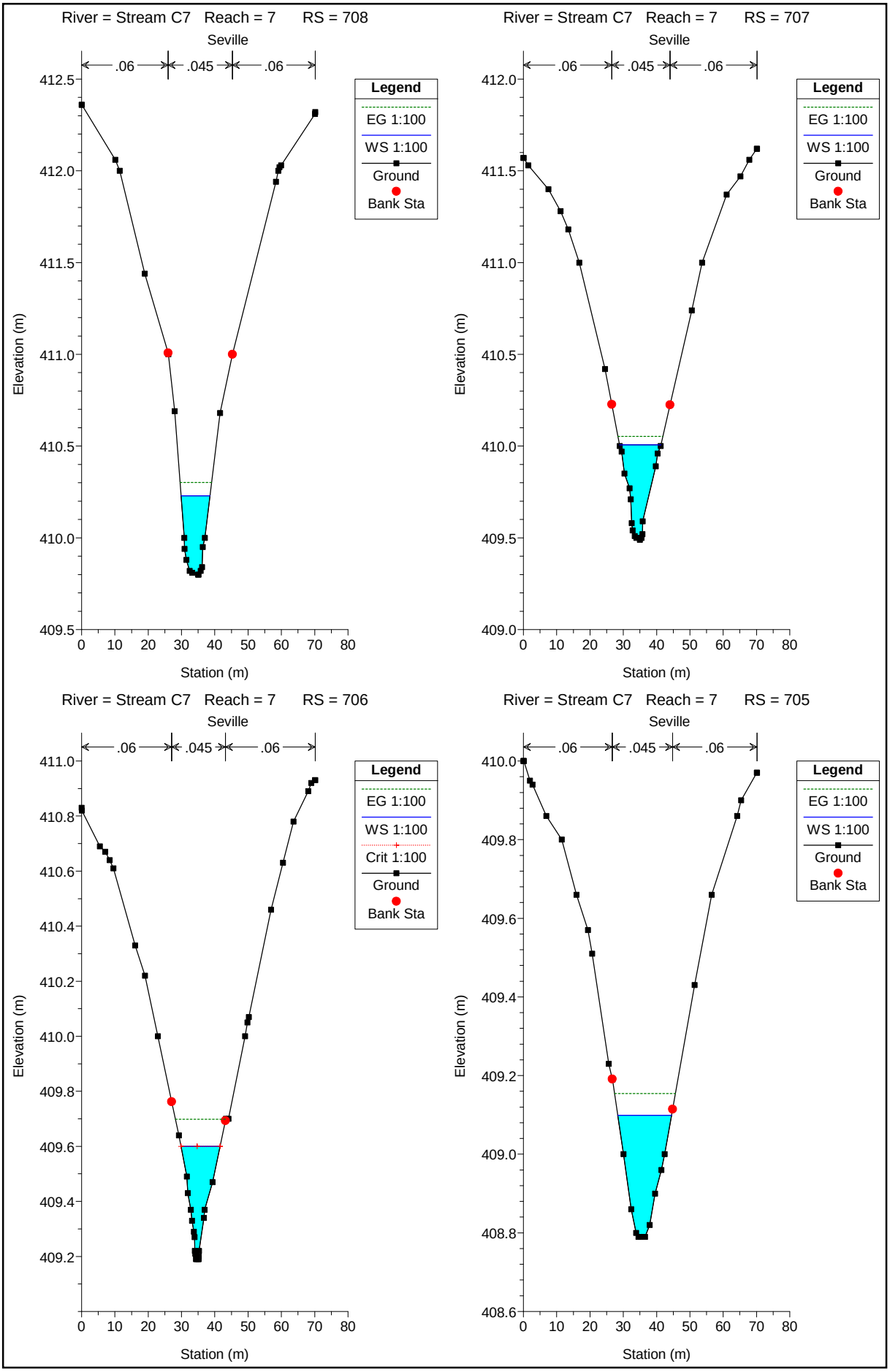

River = Stream C6 Reach = 6 RS = 612
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C6 Reach = 6 RS = 611
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C6 Reach = 6 RS = 610
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C6 Reach = 6 RS = 609
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)

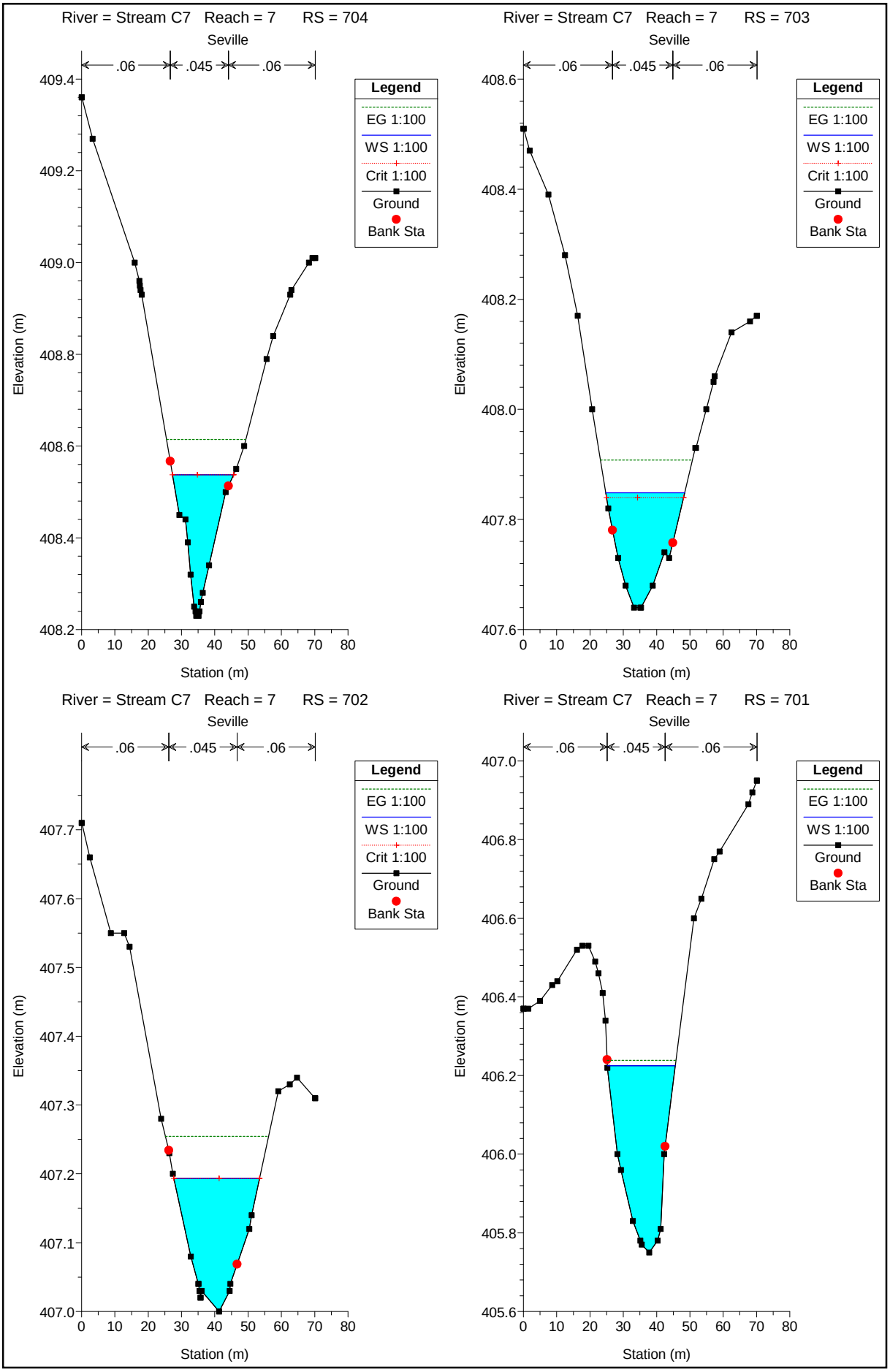

River = Stream C6 Reach = 6 RS = 608
Seville
.06
.06
.045
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C6 Reach = 6 RS = 607
Seville
.06
.06
.045
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C6 Reach = 6 RS = 606
Seville
.06
.06
.045
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C6 Reach = 6 RS = 605
Seville
.06
.06
.045
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)

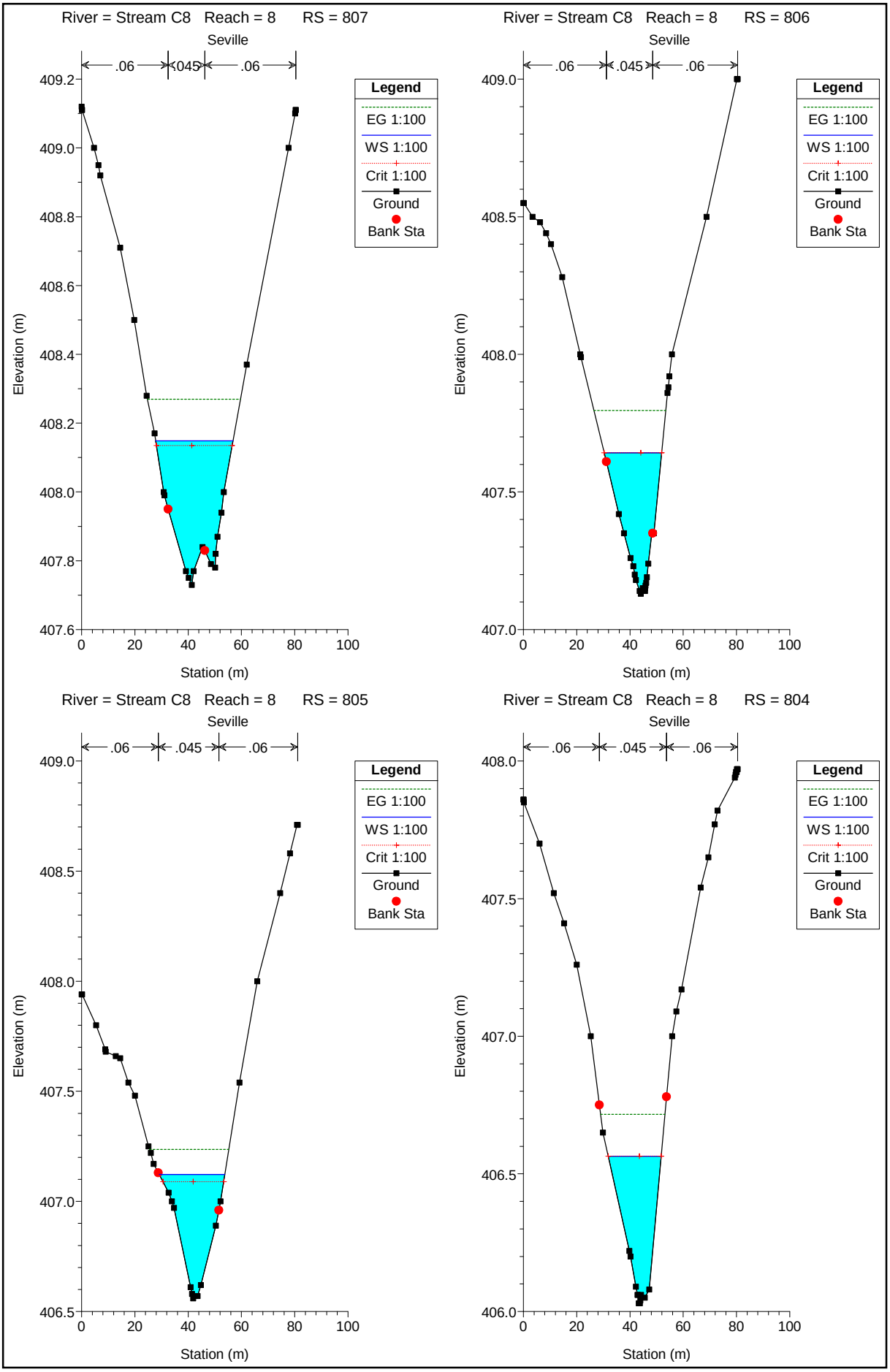

River = Stream C6 Reach = 6 RS = 604
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C6 Reach = 6 RS = 603
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C6 Reach = 6 RS = 602
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C6 Reach = 6 RS = 601
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)

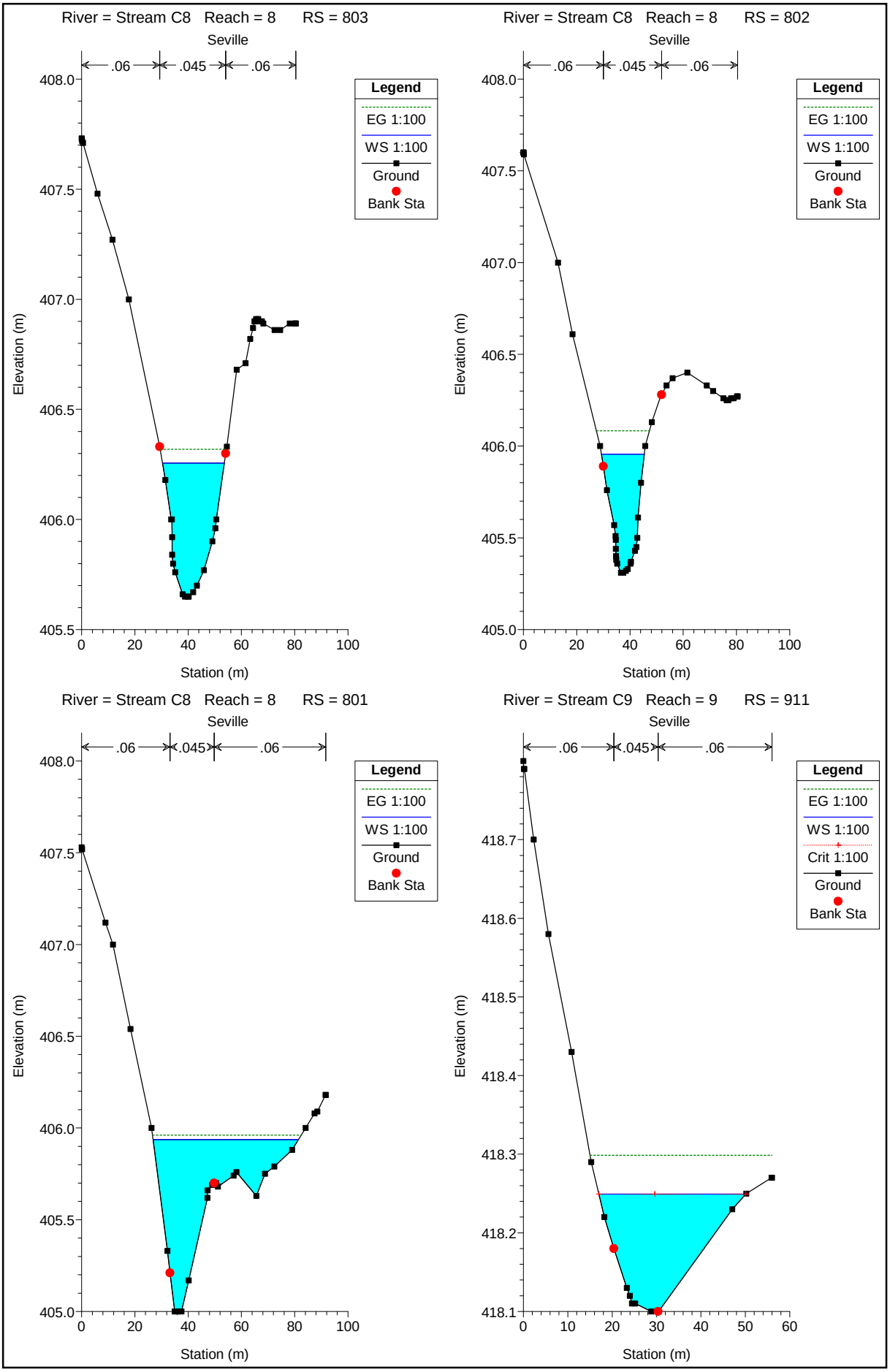

River = Stream C7 Reach = 7 RS = 716
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
418.85
418.80
418.75
418.70
418.65
418.60
0 10 20 30 40 50 60 70 80
Station (m)
River = Stream C7 Reach = 7 RS = 715
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
418.00
417.95
417.90
417.85
417.80
417.75
0 10 20 30 40 50 60 70 80
Station (m)
River = Stream C7 Reach = 7 RS = 714
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
417.2
417.1
417.0
416.9
416.8
416.7
0 10 20 30 40 50 60 70 80
Station (m)
River = Stream C7 Reach = 7 RS = 713
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
416.3
416.2
416.1
416.0
415.9
415.8
415.7
0 10 20 30 40 50 60 70 80
Station (m)

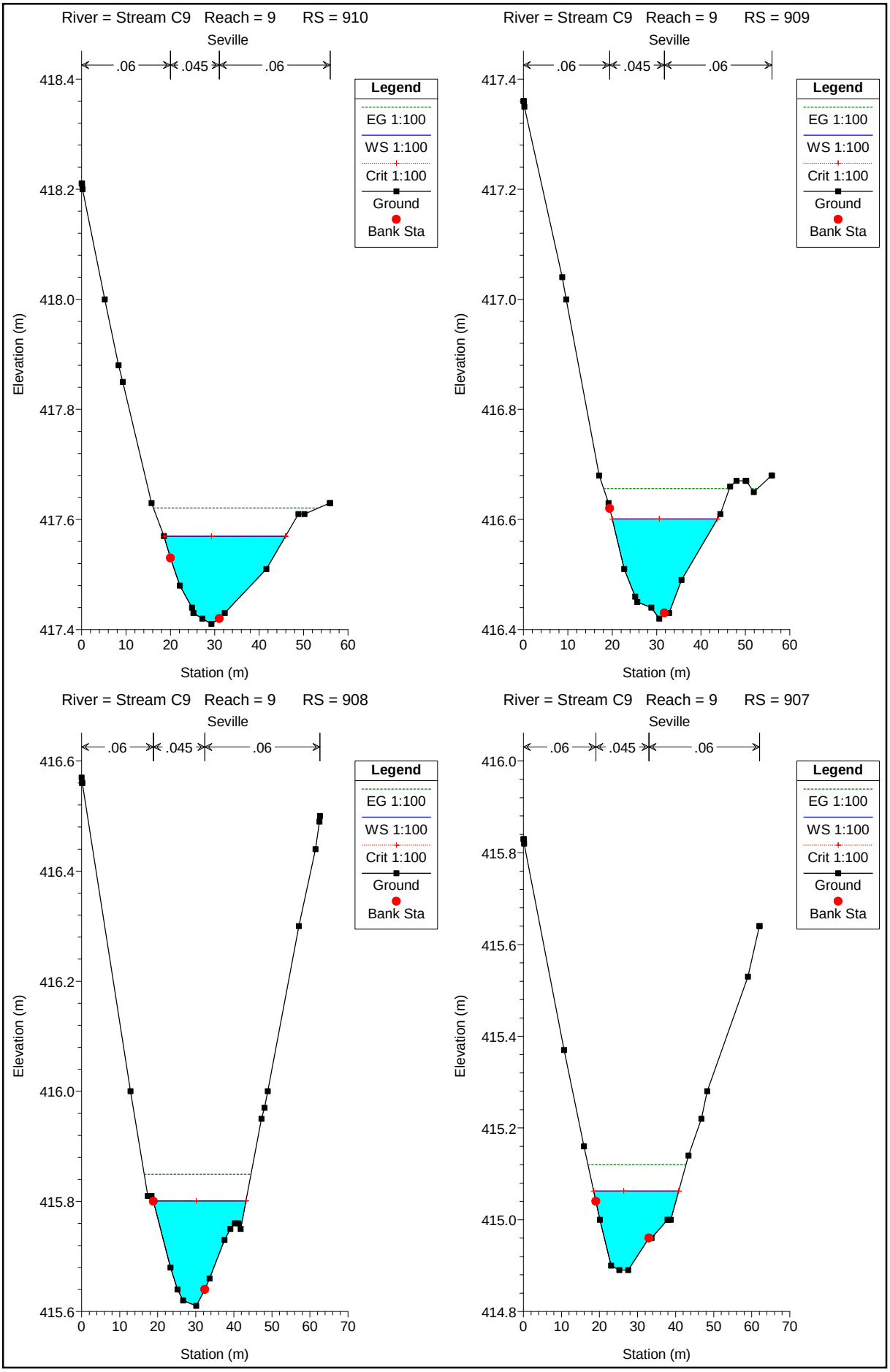

River = Stream C7 Reach = 7 RS = 712
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C7 Reach = 7 RS = 711
Seville
River = Stream C7 Reach = 7 RS = 710
Seville
River = Stream C7 Reach = 7 RS = 709
Seville

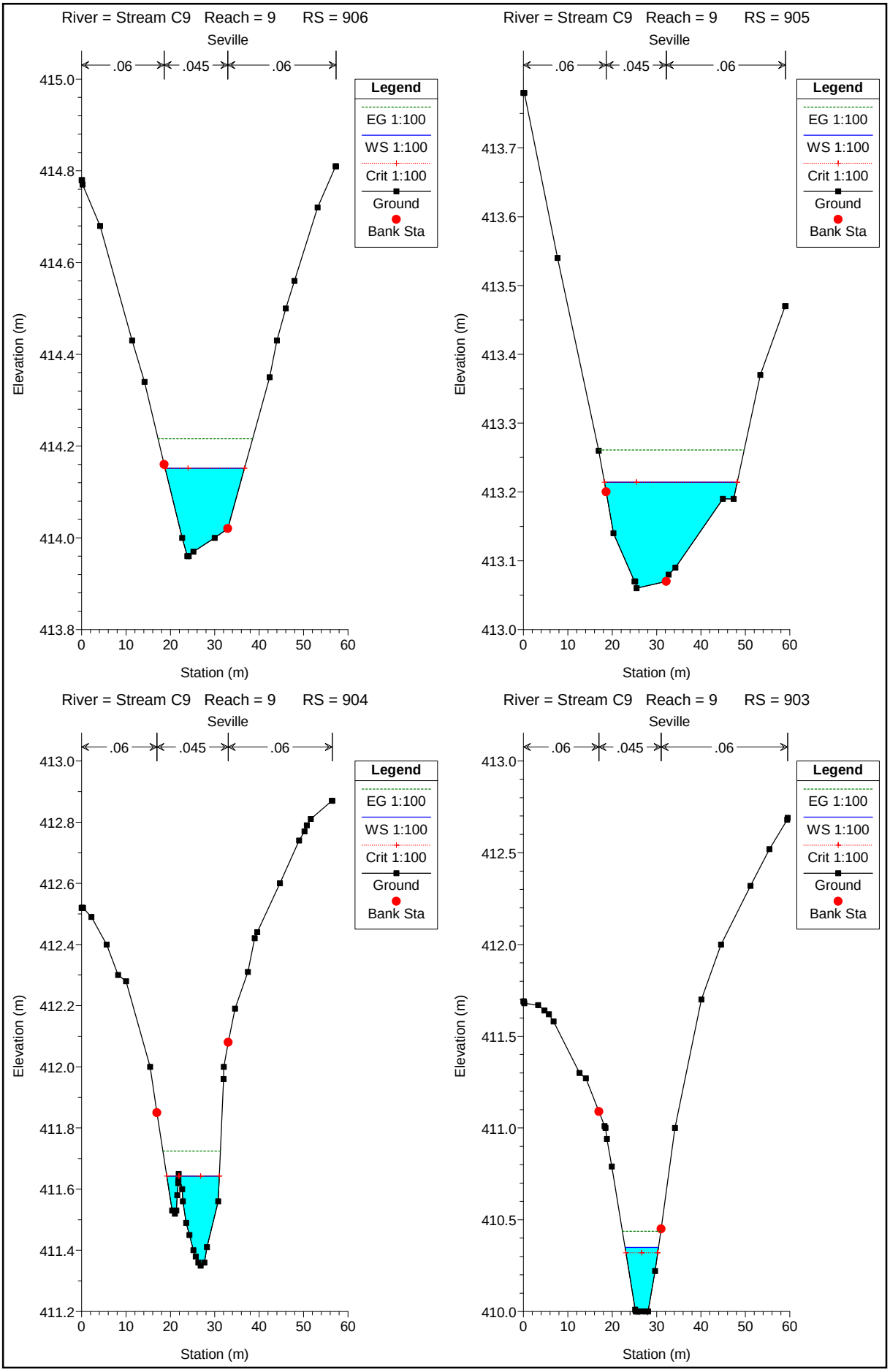

River = Stream C7 Reach = 7 RS = 708
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C7 Reach = 7 RS = 707
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C7 Reach = 7 RS = 706
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C7 Reach = 7 RS = 705
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)

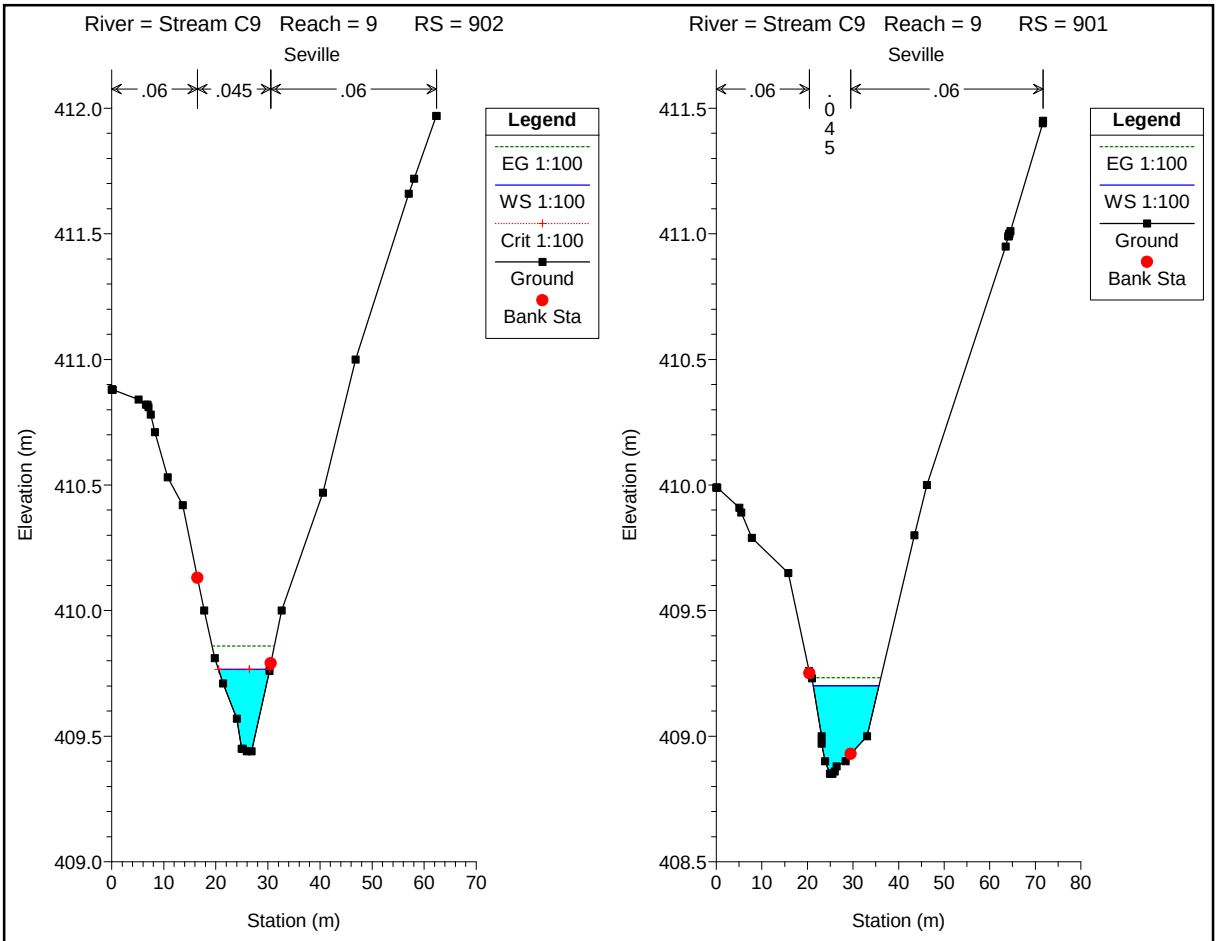

River = Stream C7 Reach = 7 RS = 704
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C7 Reach = 7 RS = 703
Seville
River = Stream C7 Reach = 7 RS = 702
Seville
River = Stream C7 Reach = 7 RS = 701
Seville

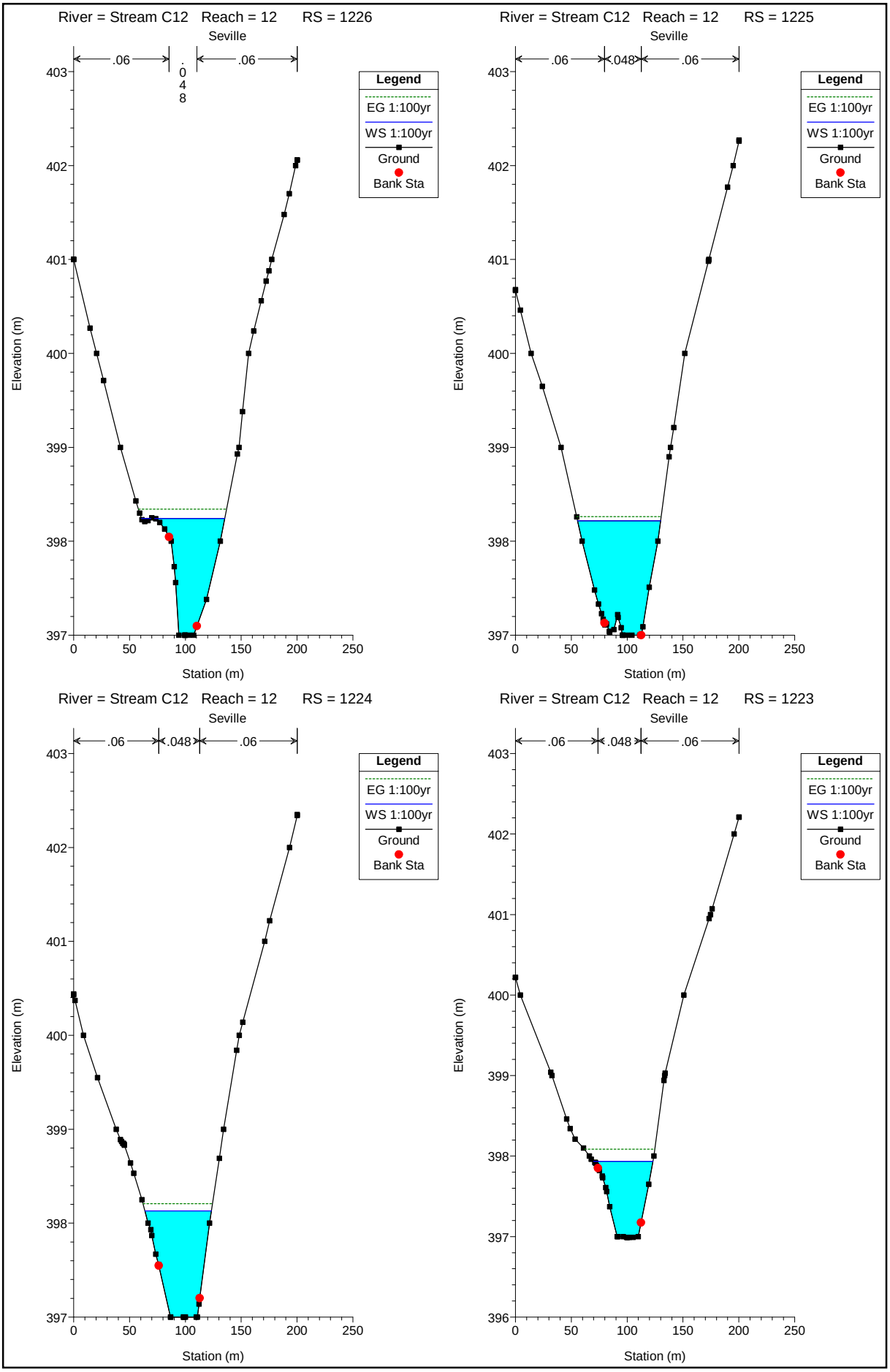

River = Stream C8 Reach = 8 RS = 807
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C8 Reach = 8 RS = 806
Seville
River = Stream C8 Reach = 8 RS = 805
Seville
River = Stream C8 Reach = 8 RS = 804
Seville

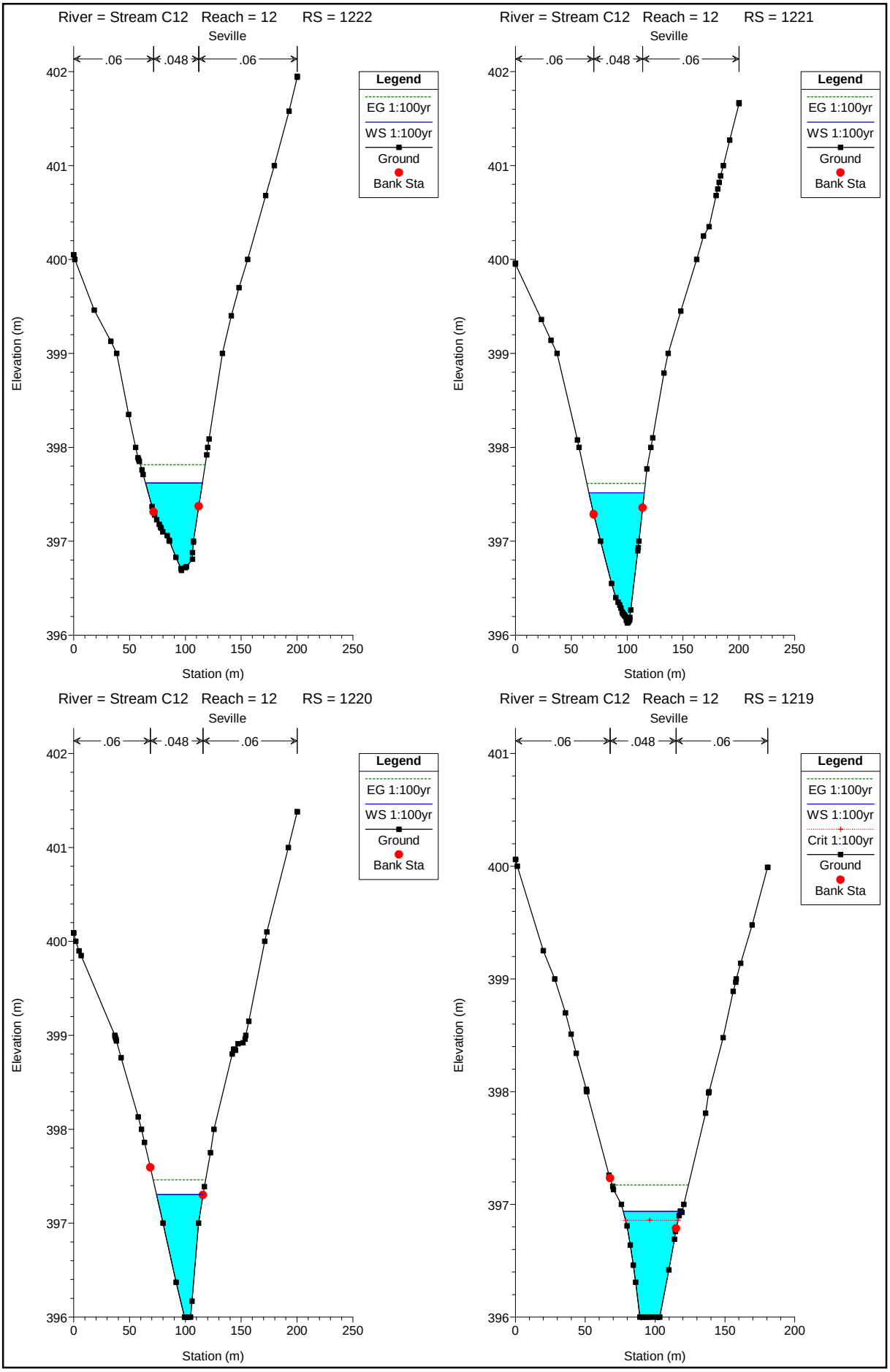

River = Stream C8 Reach = 8 RS = 803
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C8 Reach = 8 RS = 802
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C8 Reach = 8 RS = 801
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C9 Reach = 9 RS = 911
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)

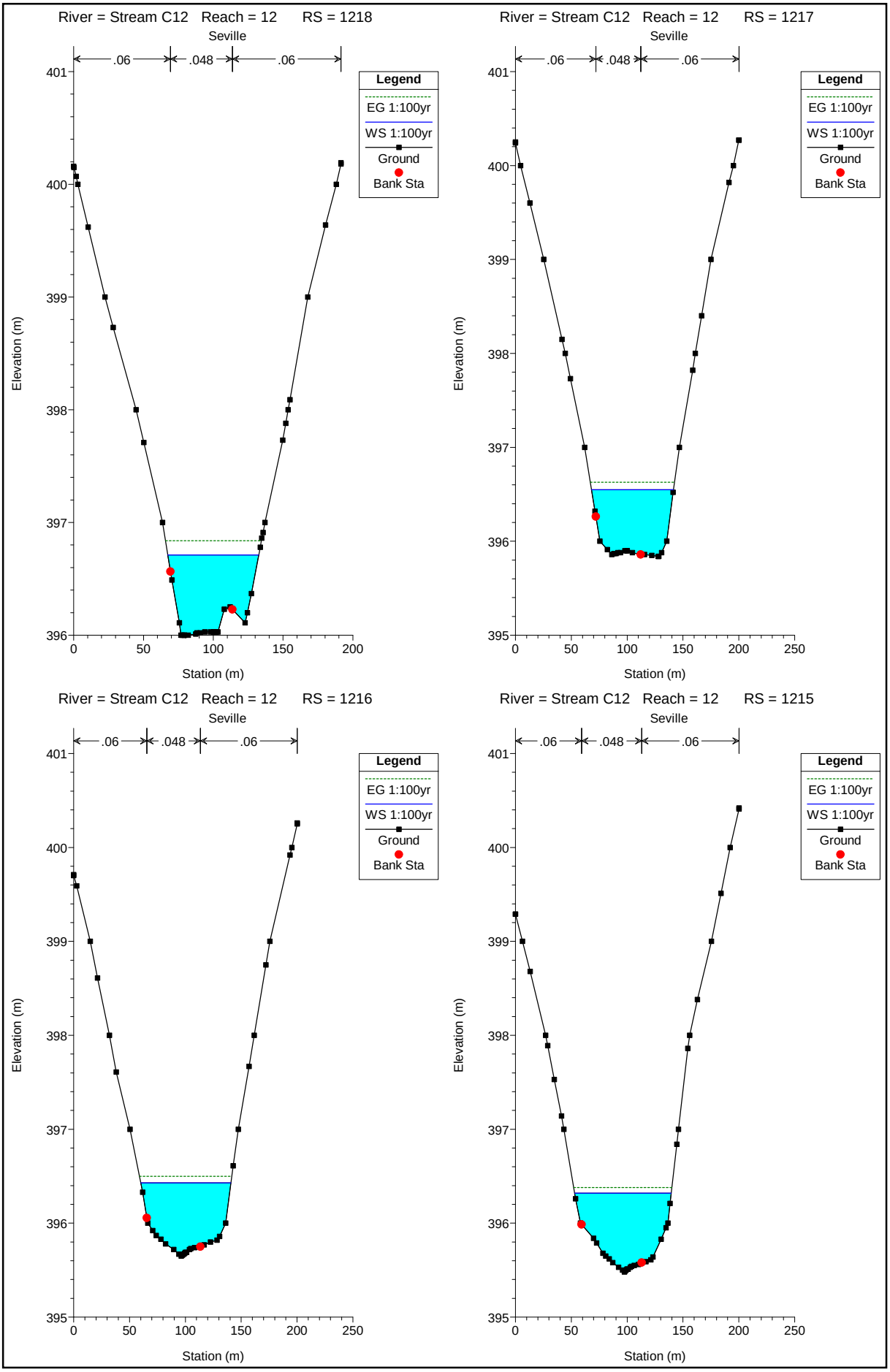

River = Stream C9 Reach = 9 RS = 910
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C9 Reach = 9 RS = 909
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C9 Reach = 9 RS = 908
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C9 Reach = 9 RS = 907
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)

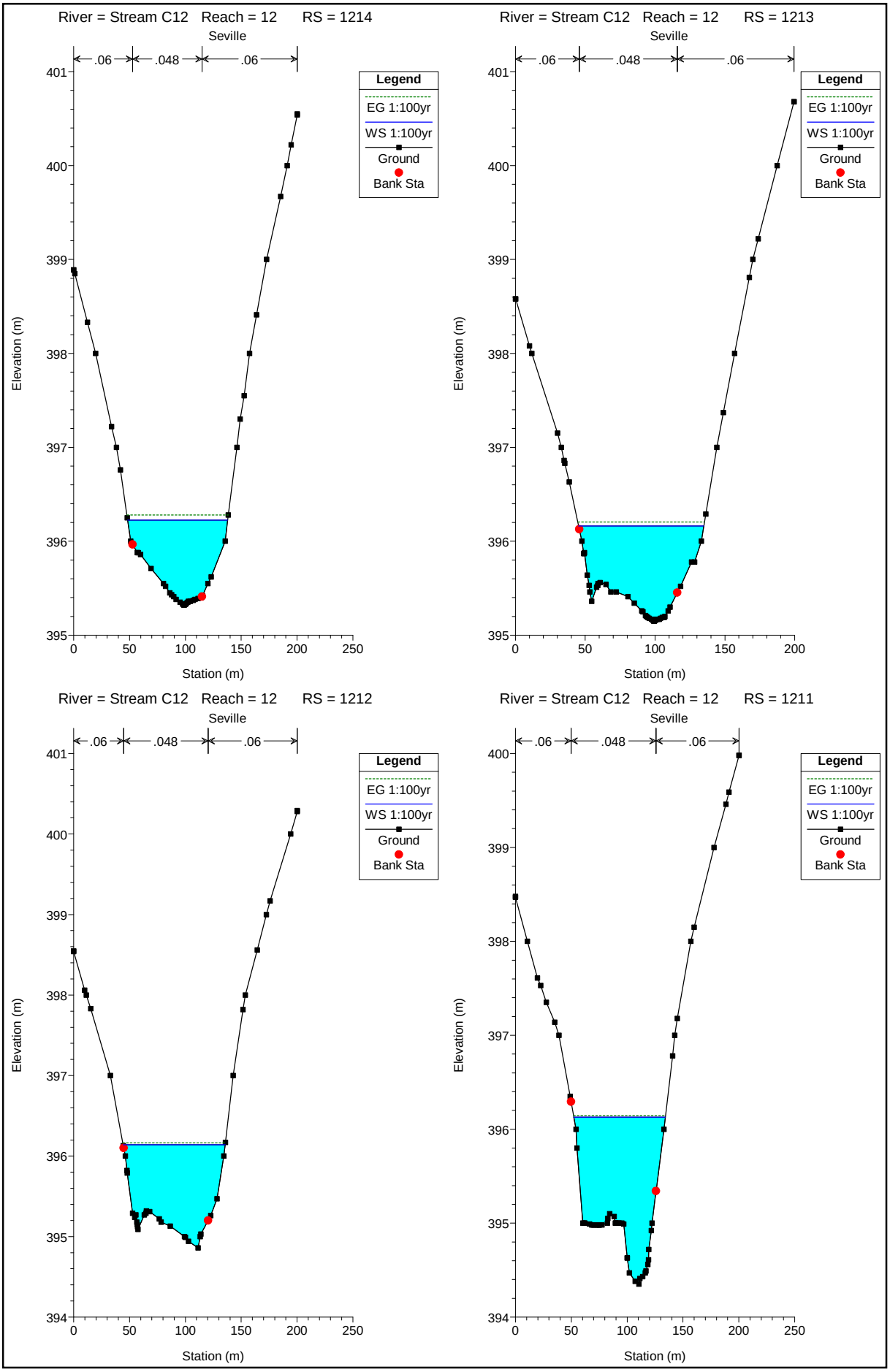

River = Stream C9 Reach = 9 RS = 906
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C9 Reach = 9 RS = 905
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C9 Reach = 9 RS = 904
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C9 Reach = 9 RS = 903
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)

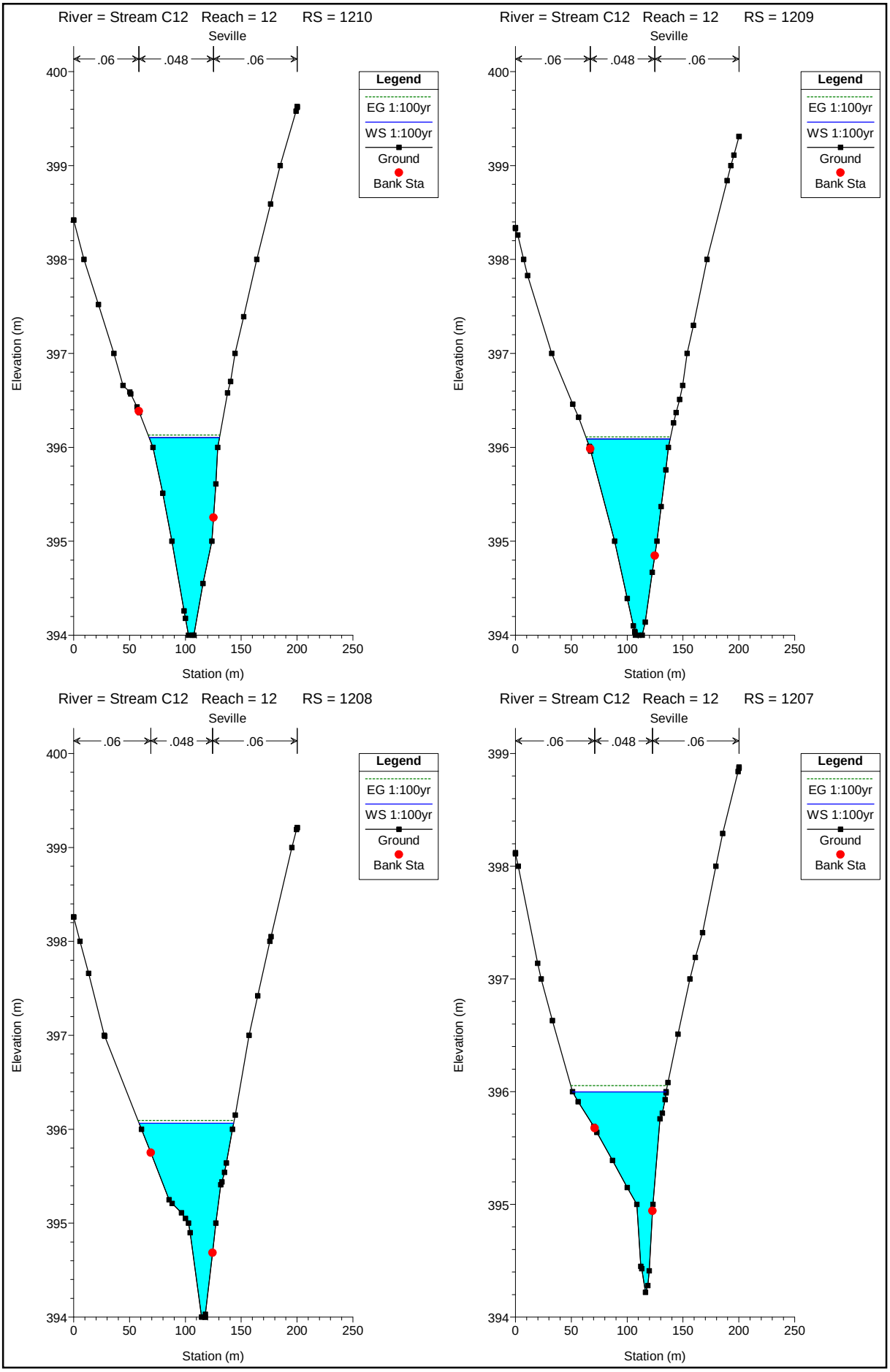

River = Stream C9 Reach = 9 RS = 902
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Crit 1:100
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C9 Reach = 9 RS = 901
Seville
.06
.045
.06
Legend
EG 1:100
WS 1:100
Ground
Bank Sta
Elevation (m)
Station (m)

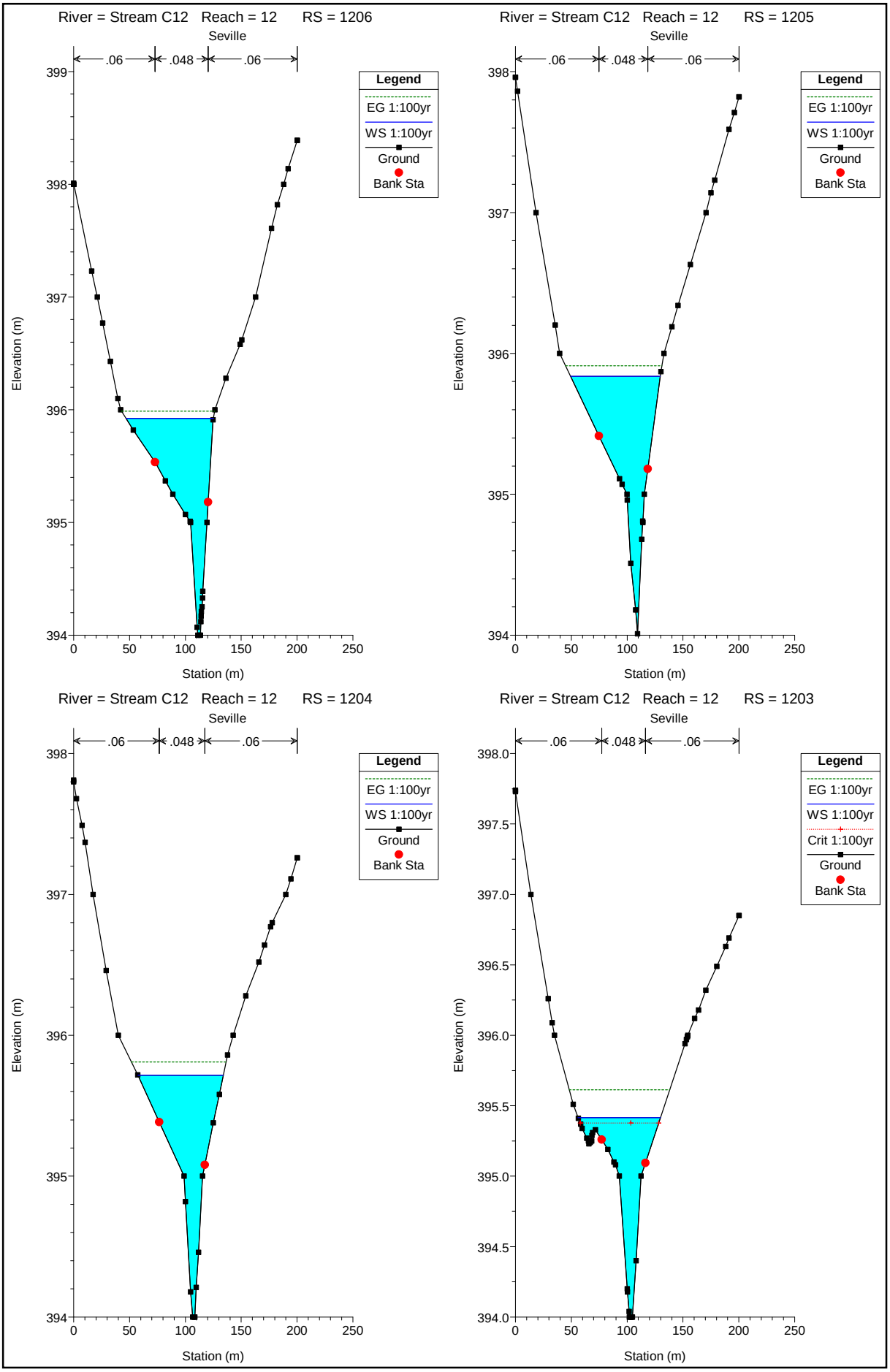

River = Stream C12 Reach = 12 RS = 1226
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C12 Reach = 12 RS = 1225
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C12 Reach = 12 RS = 1224
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C12 Reach = 12 RS = 1223
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)

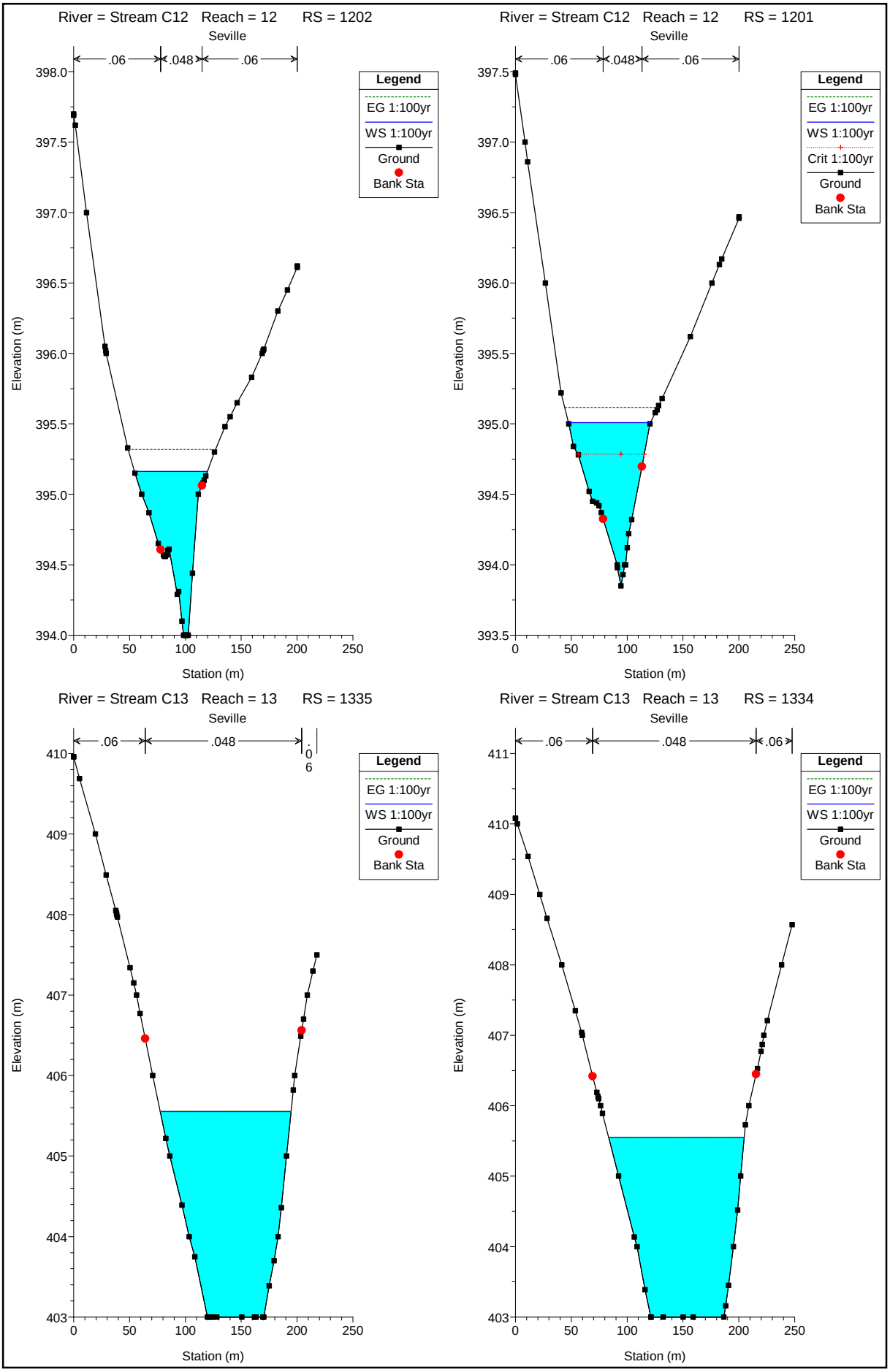

River = Stream C12 Reach = 12 RS = 1222
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C12 Reach = 12 RS = 1221
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C12 Reach = 12 RS = 1220
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C12 Reach = 12 RS = 1219
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)

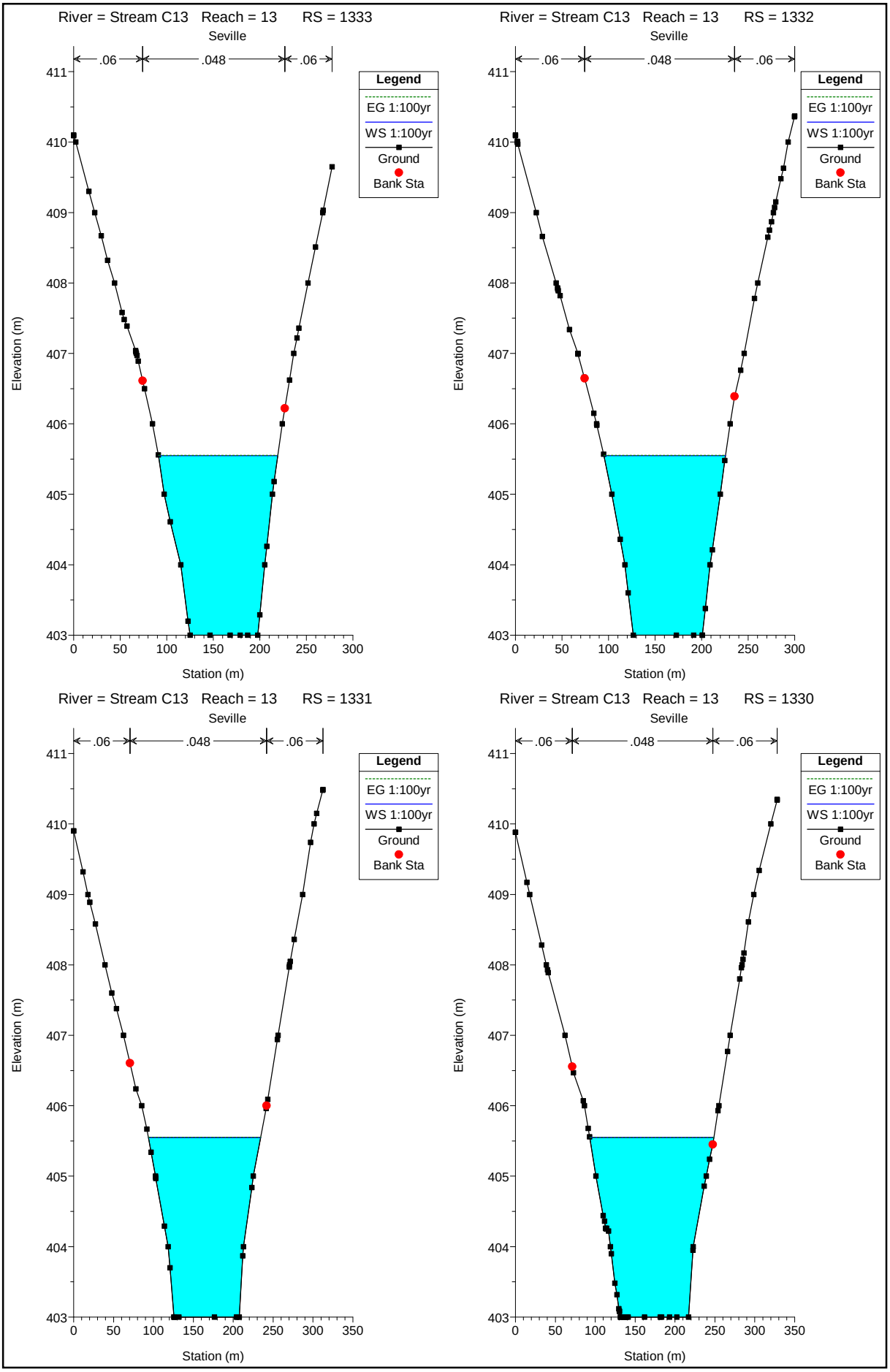

River = Stream C12 Reach = 12 RS = 1218
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C12 Reach = 12 RS = 1217
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C12 Reach = 12 RS = 1216
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C12 Reach = 12 RS = 1215
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)

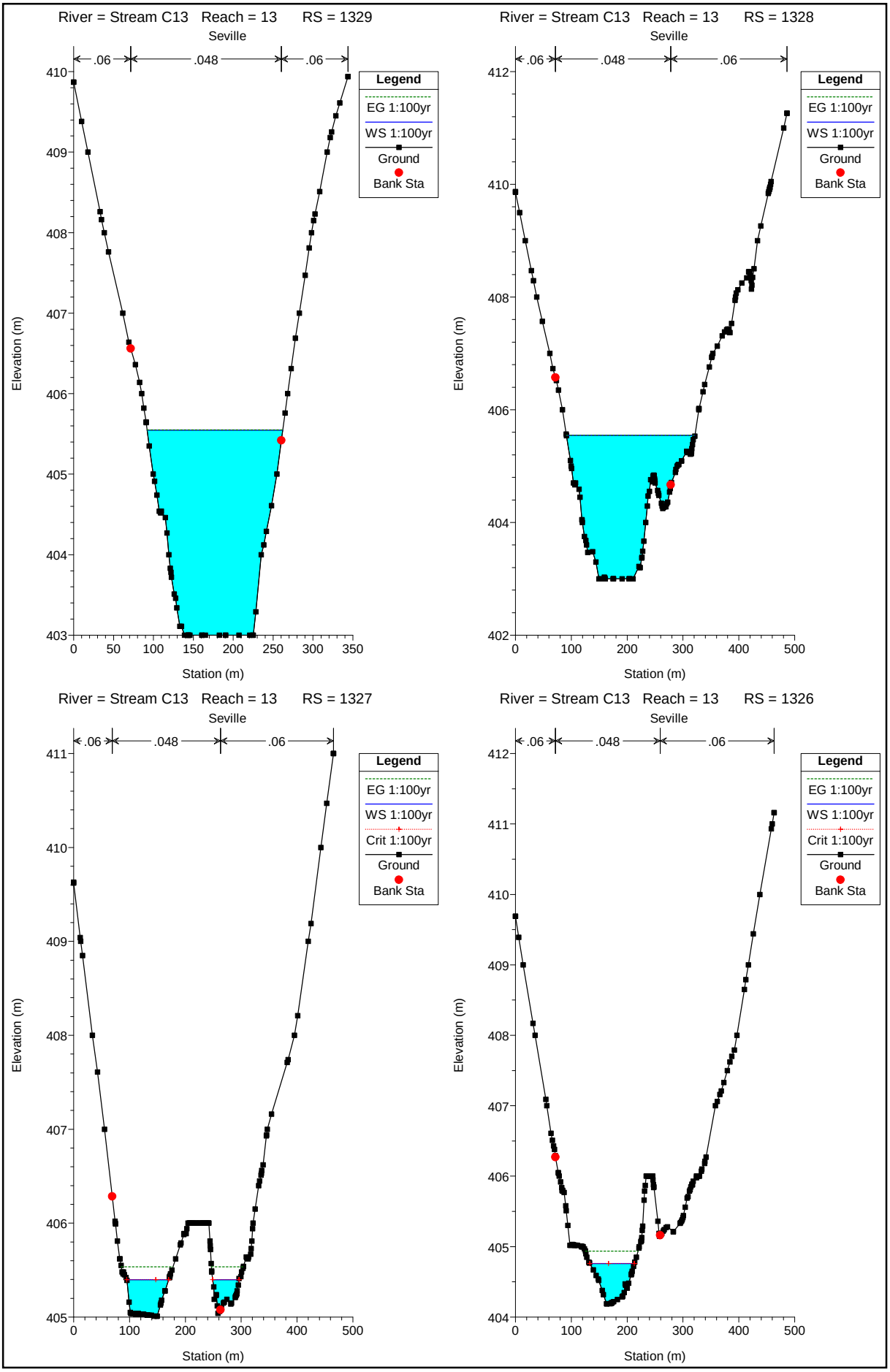

River = Stream C12 Reach = 12 RS = 1214
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C12 Reach = 12 RS = 1213
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C12 Reach = 12 RS = 1212
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C12 Reach = 12 RS = 1211
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)

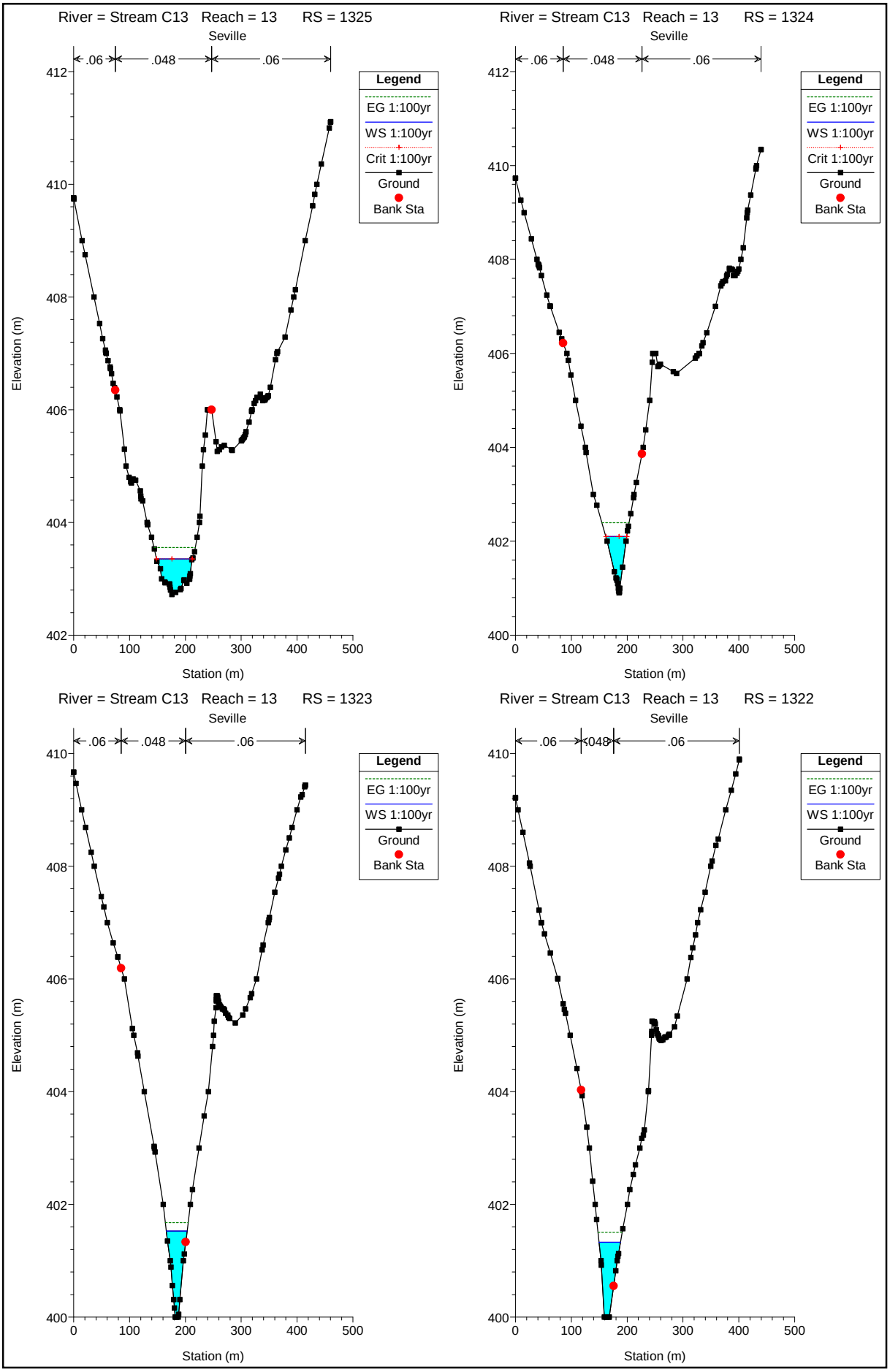

River = Stream C12 Reach = 12 RS = 1210
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C12 Reach = 12 RS = 1209
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C12 Reach = 12 RS = 1208
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C12 Reach = 12 RS = 1207
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)

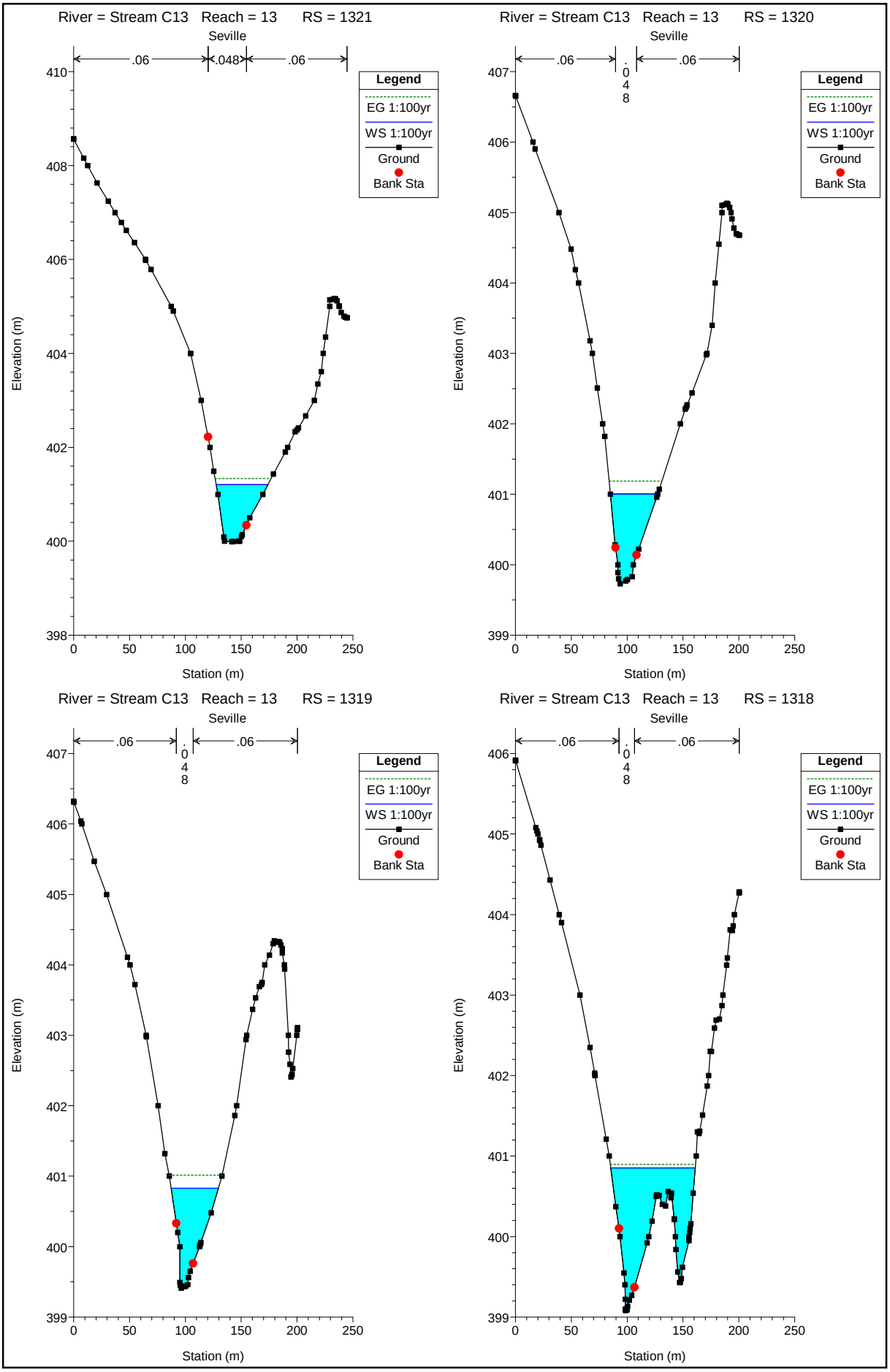

River = Stream C12 Reach = 12 RS = 1206
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C12 Reach = 12 RS = 1205
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C12 Reach = 12 RS = 1204
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C12 Reach = 12 RS = 1203
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)

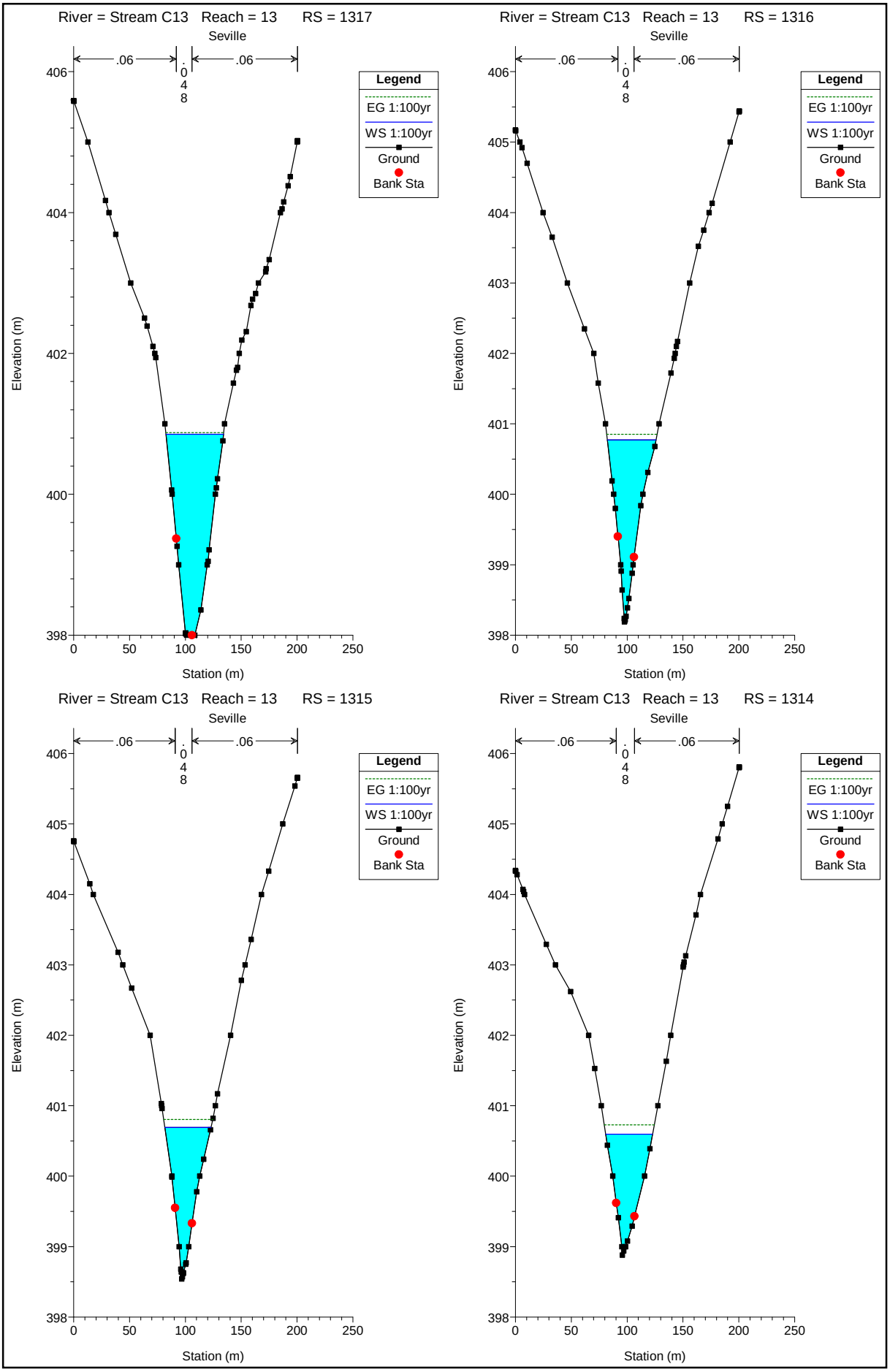

River = Stream C12 Reach = 12 RS = 1202
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C12 Reach = 12 RS = 1201
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C13 Reach = 13 RS = 1335
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C13 Reach = 13 RS = 1334
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)

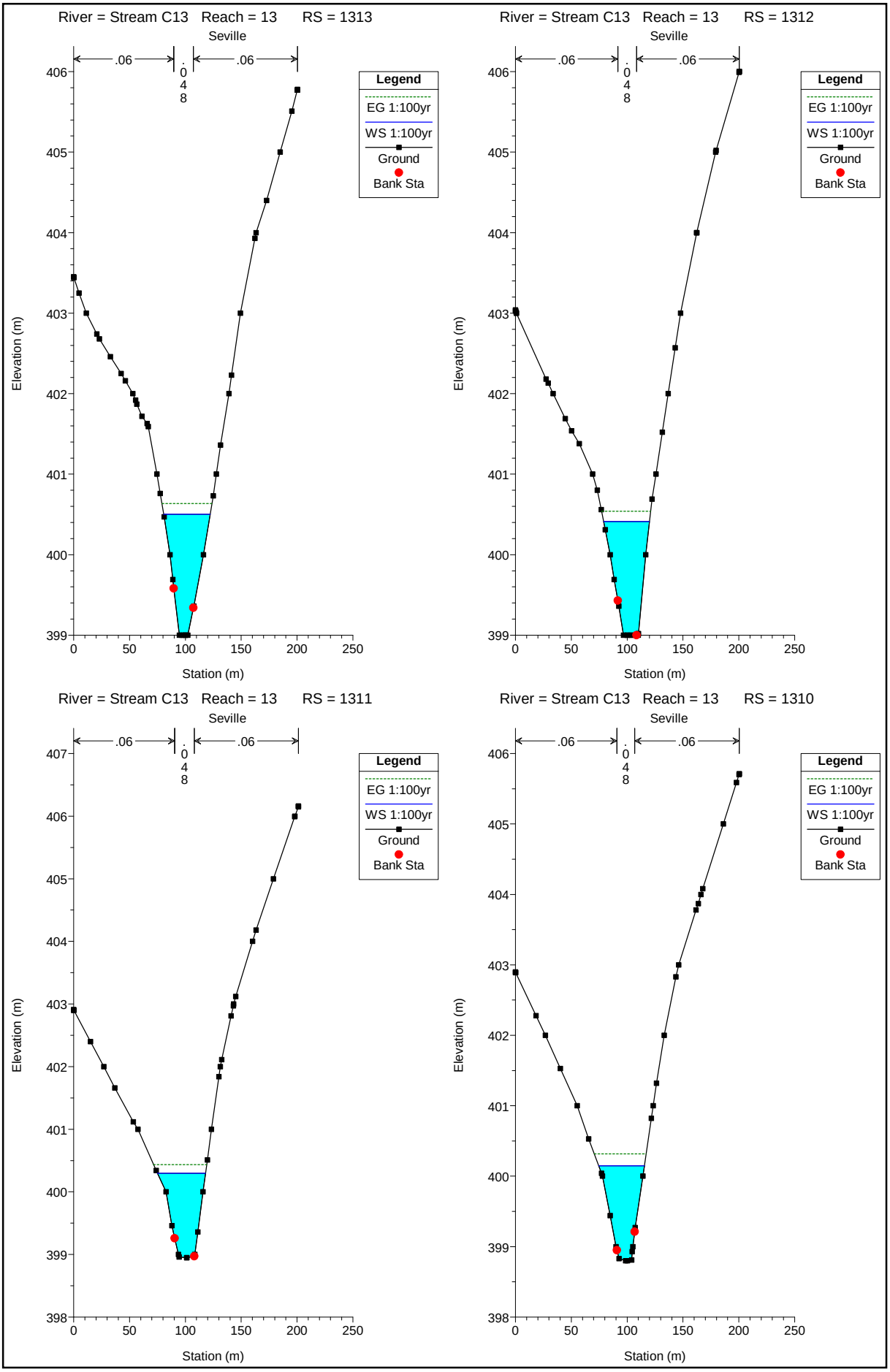

River = Stream C13 Reach = 13 RS = 1333
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C13 Reach = 13 RS = 1332
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C13 Reach = 13 RS = 1331
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C13 Reach = 13 RS = 1330
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)

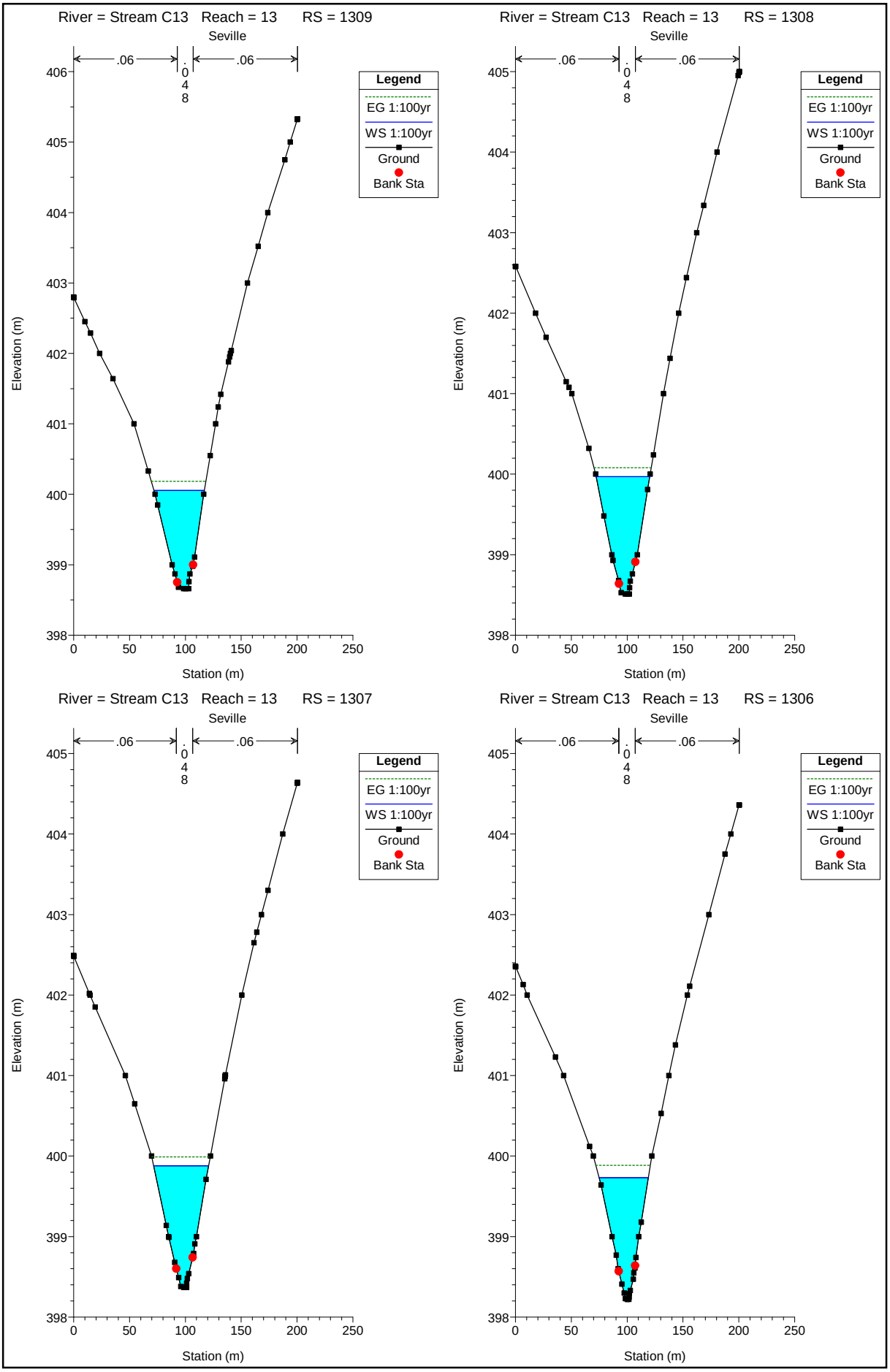

River = Stream C13 Reach = 13 RS = 1329
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C13 Reach = 13 RS = 1328
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C13 Reach = 13 RS = 1327
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C13 Reach = 13 RS = 1326
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)

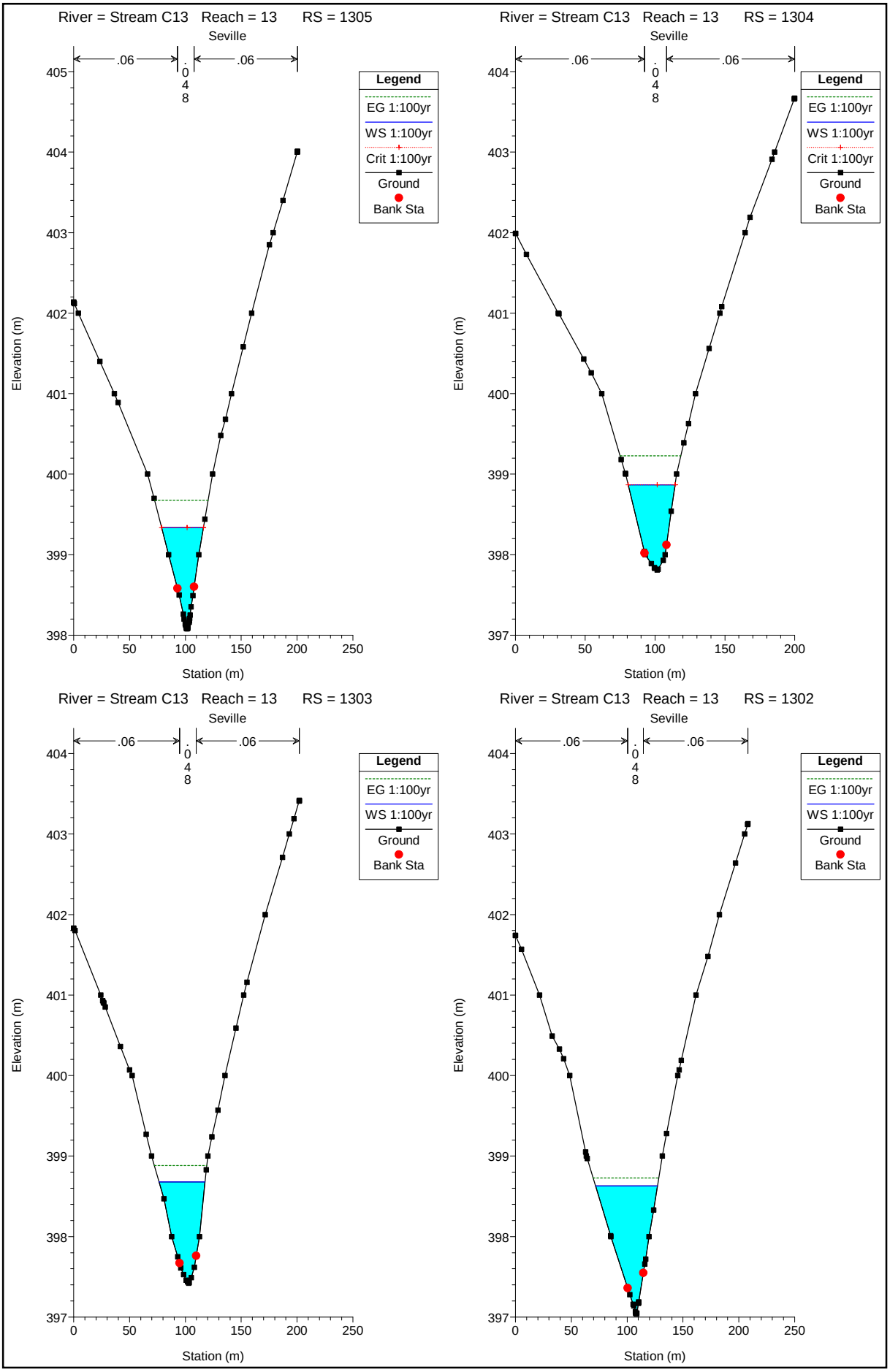

River = Stream C13 Reach = 13 RS = 1325
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C13 Reach = 13 RS = 1324
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C13 Reach = 13 RS = 1323
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C13 Reach = 13 RS = 1322
Seville
.06
048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)

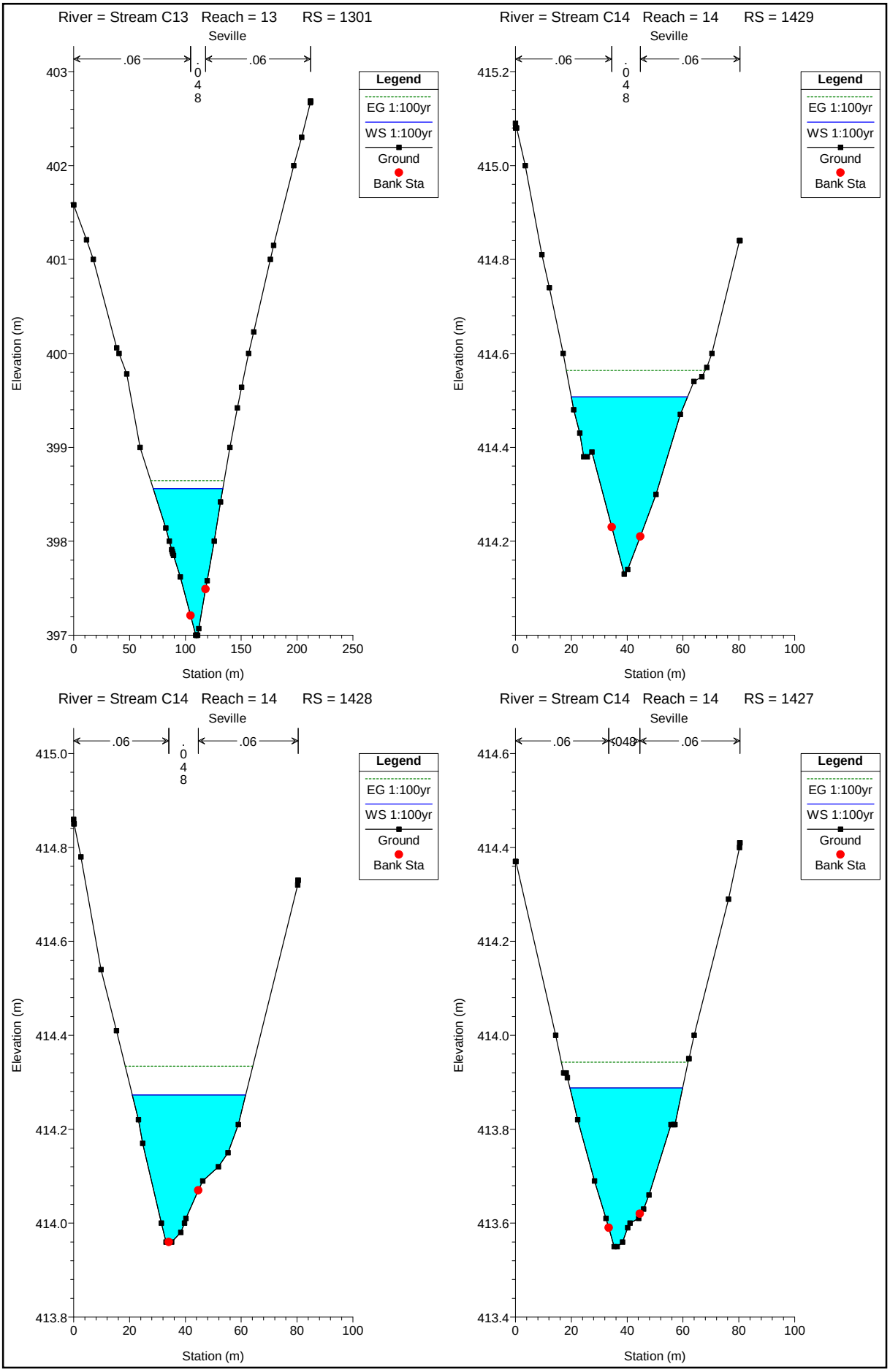

River = Stream C13 Reach = 13 RS = 1321
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C13 Reach = 13 RS = 1320
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C13 Reach = 13 RS = 1319
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C13 Reach = 13 RS = 1318
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)

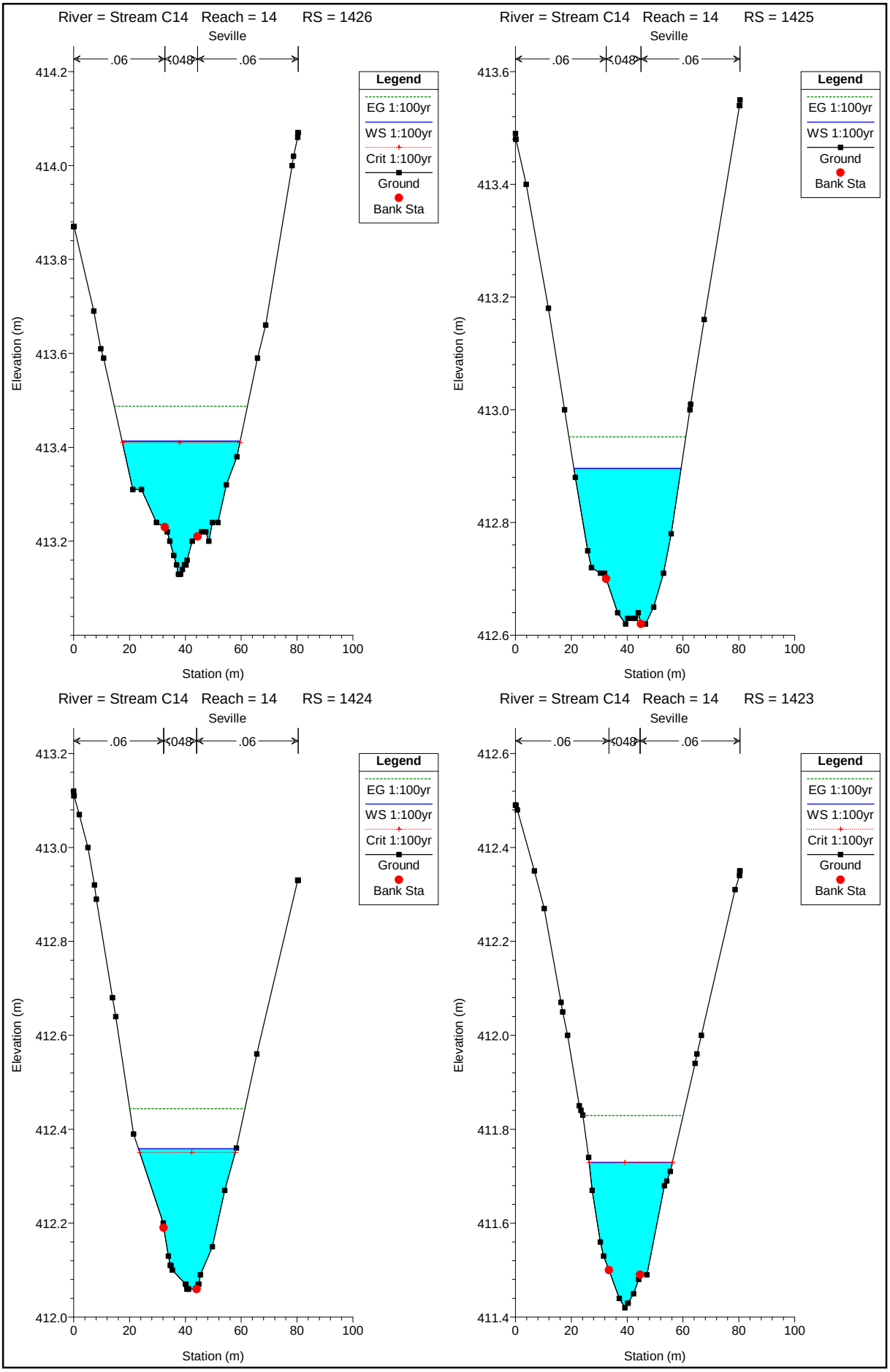

River = Stream C13 Reach = 13 RS = 1317
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C13 Reach = 13 RS = 1316
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C13 Reach = 13 RS = 1315
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C13 Reach = 13 RS = 1314
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)

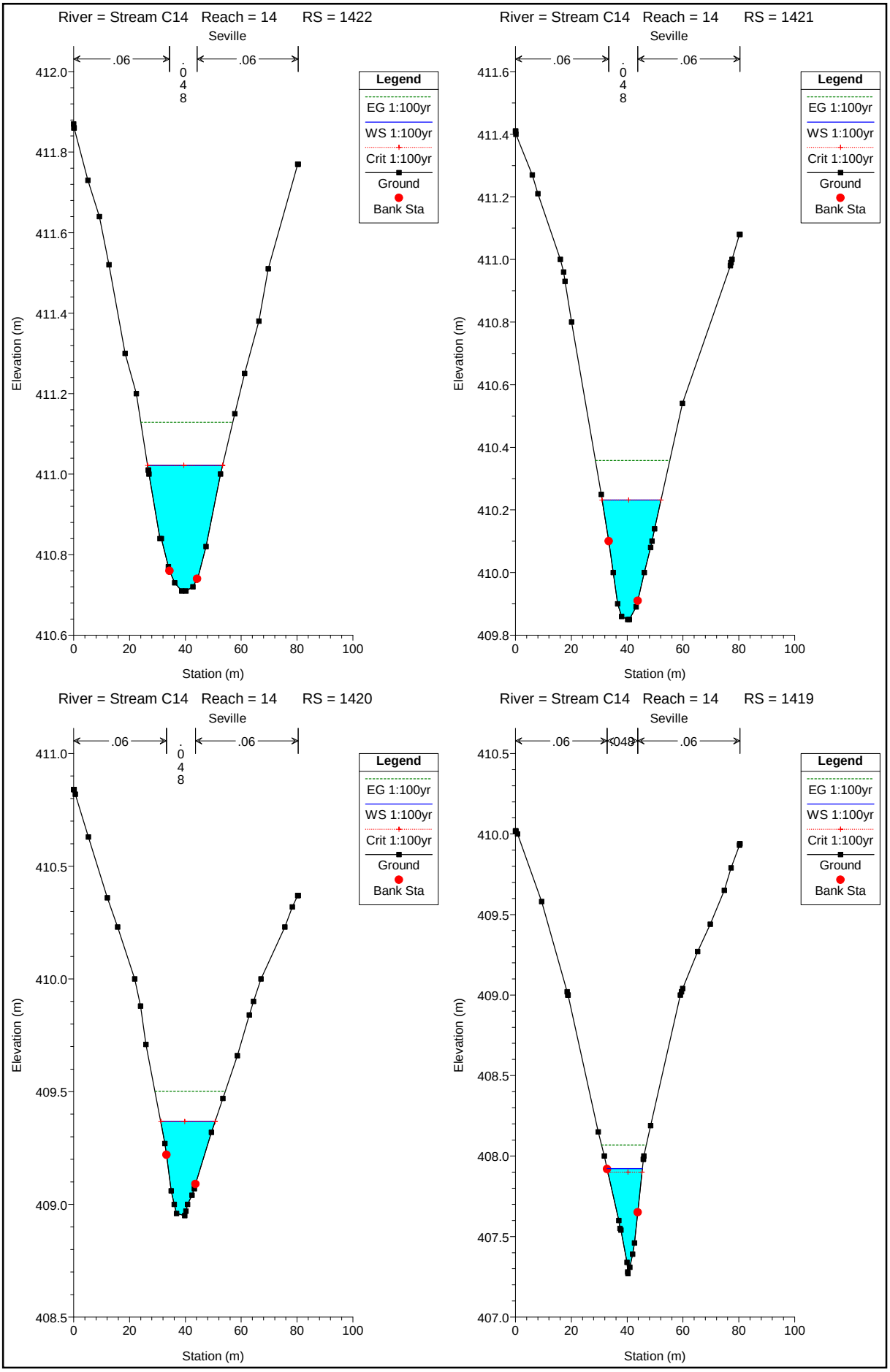

River = Stream C13 Reach = 13 RS = 1313
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C13 Reach = 13 RS = 1312
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C13 Reach = 13 RS = 1311
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C13 Reach = 13 RS = 1310
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)

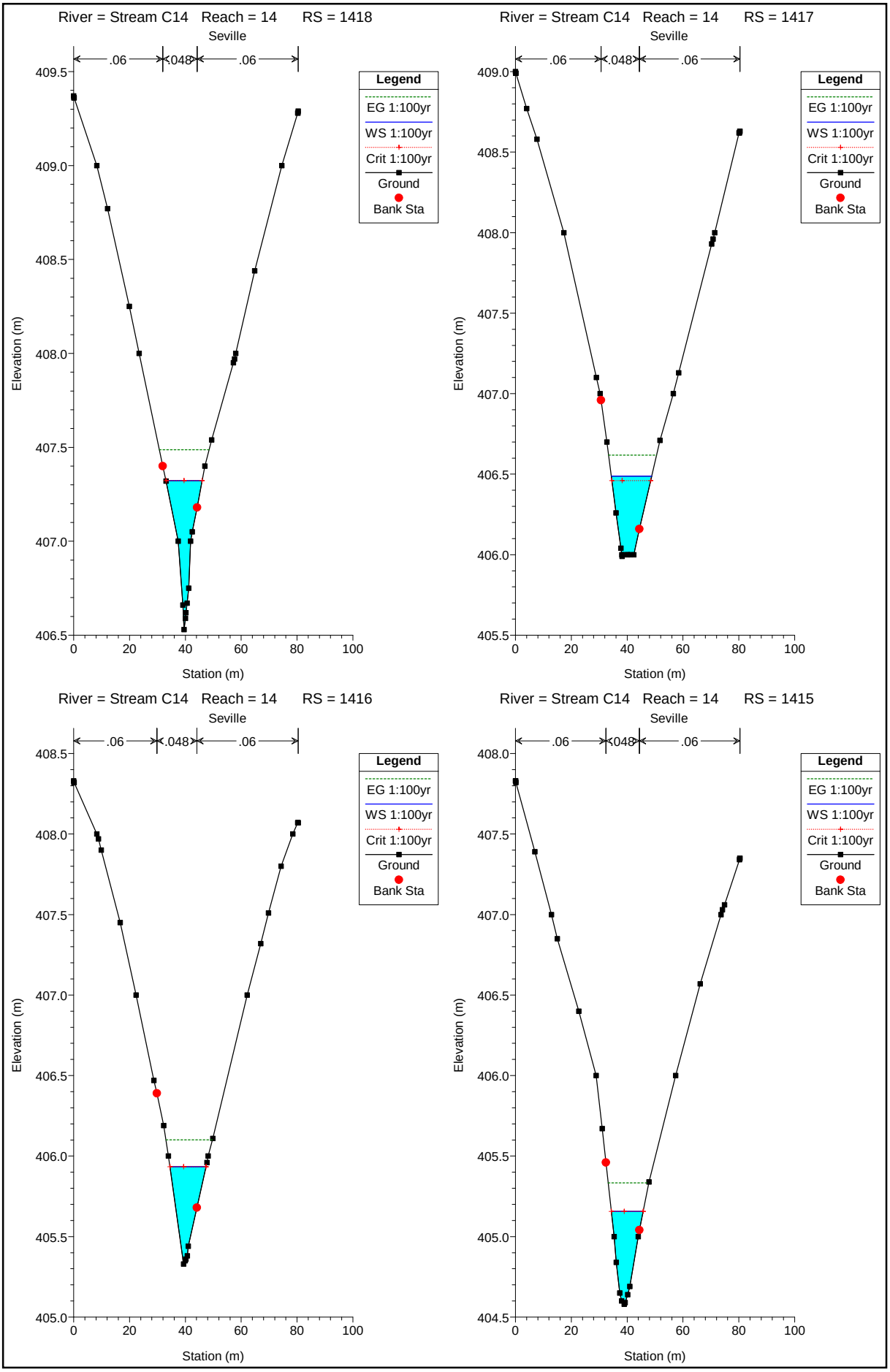

River = Stream C13 Reach = 13 RS = 1309
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C13 Reach = 13 RS = 1308
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C13 Reach = 13 RS = 1307
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C13 Reach = 13 RS = 1306
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)

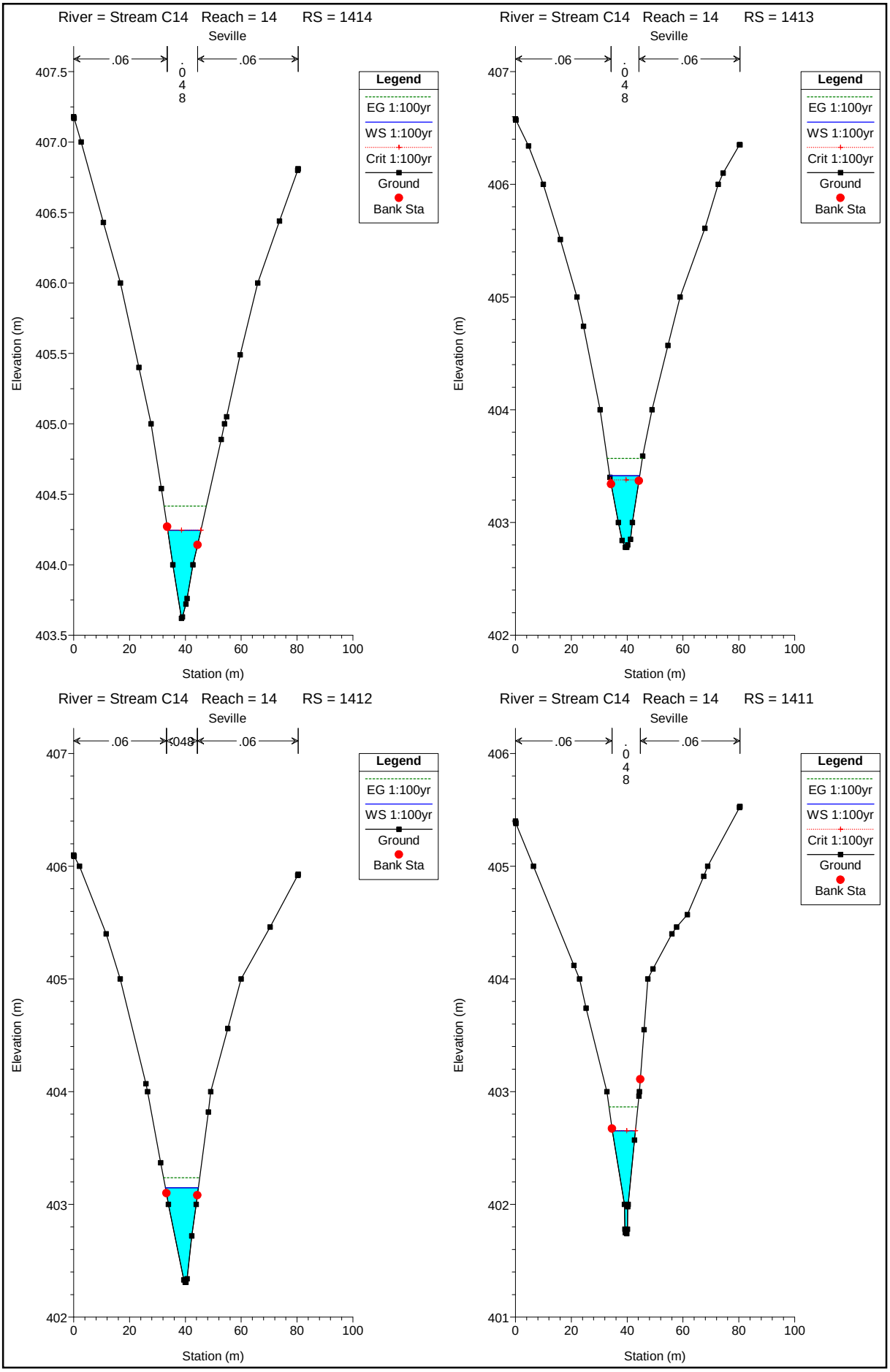

River = Stream C13 Reach = 13 RS = 1305
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C13 Reach = 13 RS = 1304
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C13 Reach = 13 RS = 1303
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C13 Reach = 13 RS = 1302
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)

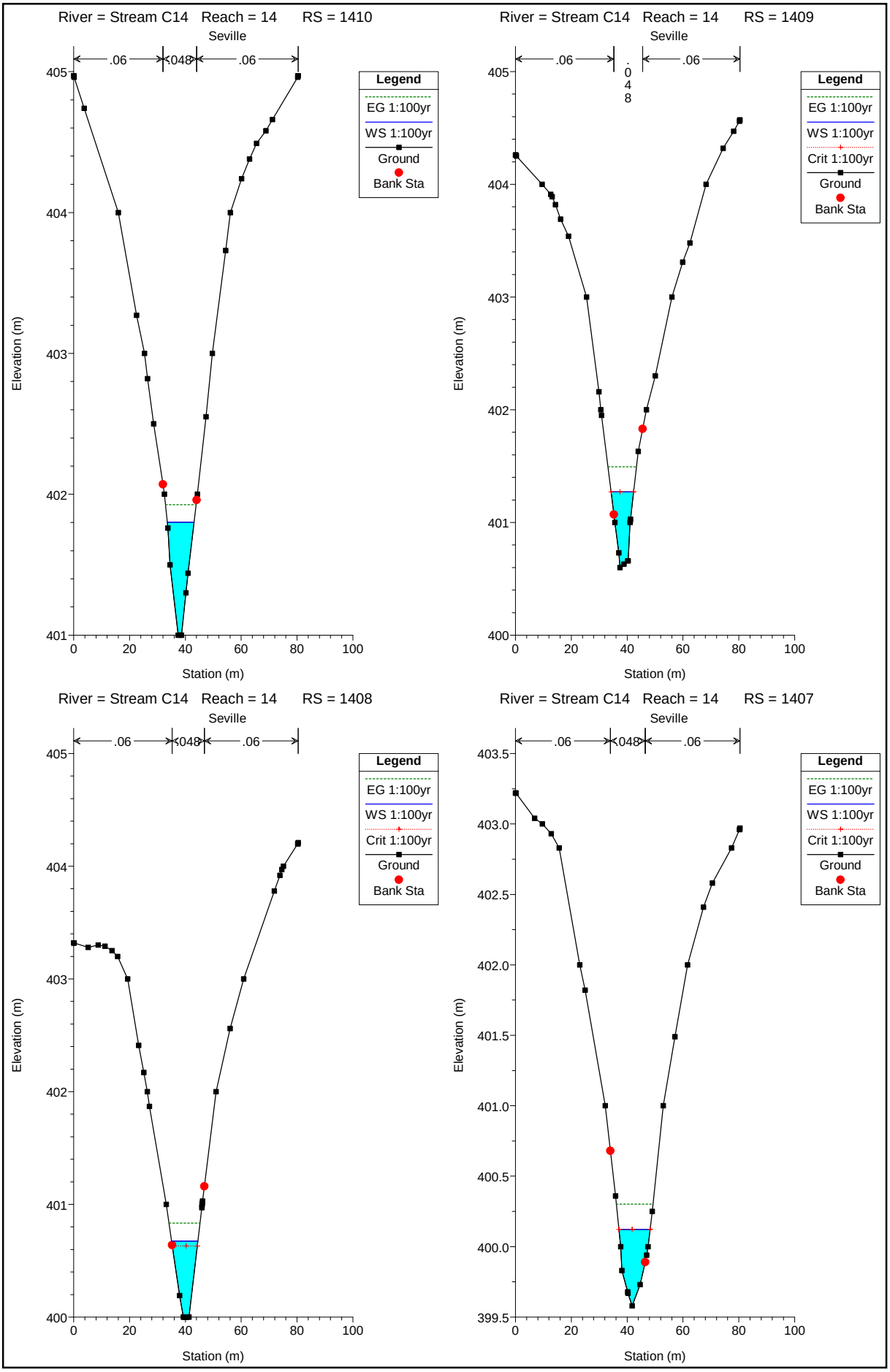

River = Stream C13 Reach = 13 RS = 1301
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C14 Reach = 14 RS = 1429
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C14 Reach = 14 RS = 1428
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C14 Reach = 14 RS = 1427
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)

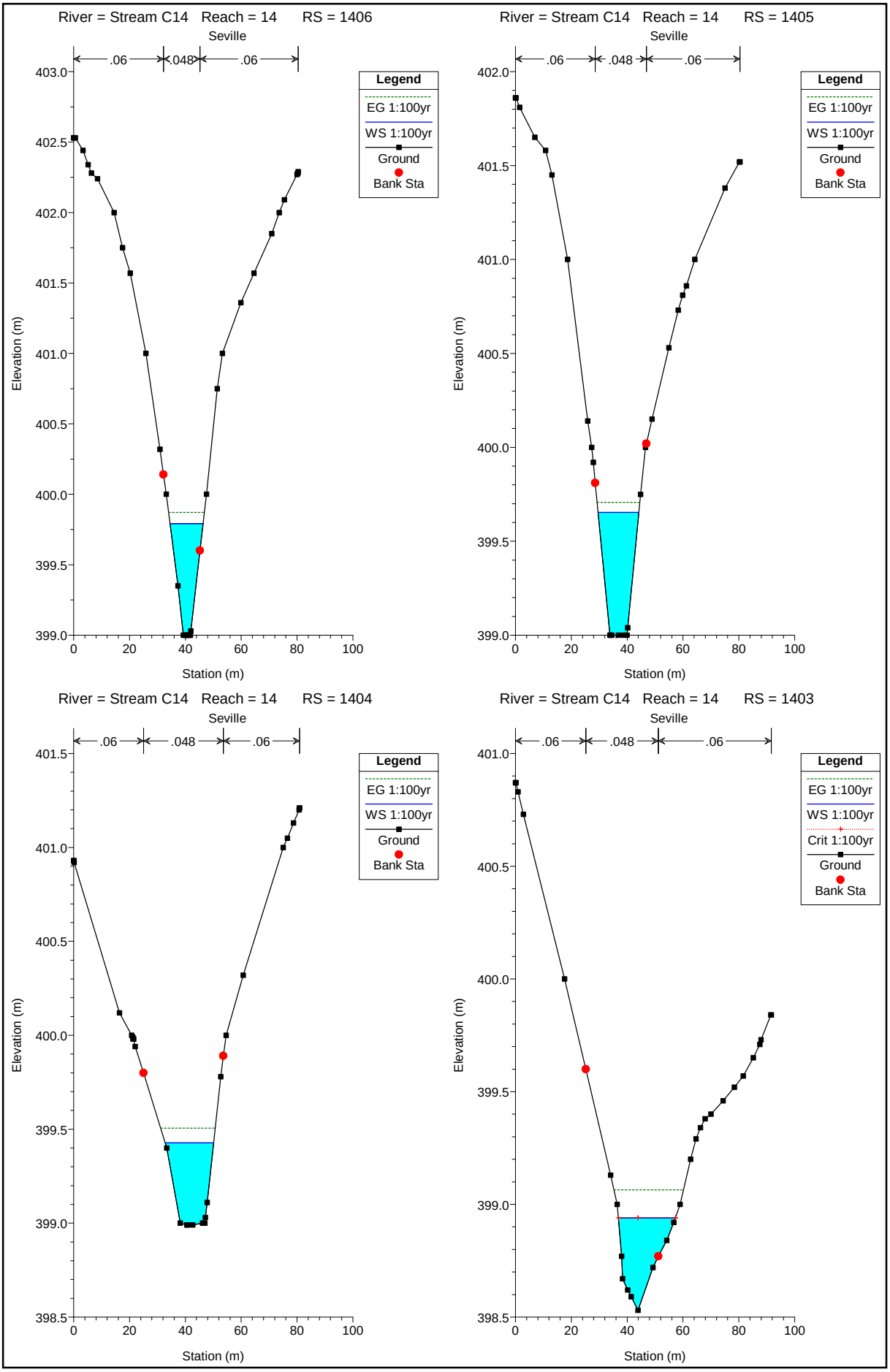

River = Stream C14 Reach = 14 RS = 1426
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C14 Reach = 14 RS = 1425
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C14 Reach = 14 RS = 1424
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C14 Reach = 14 RS = 1423
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)

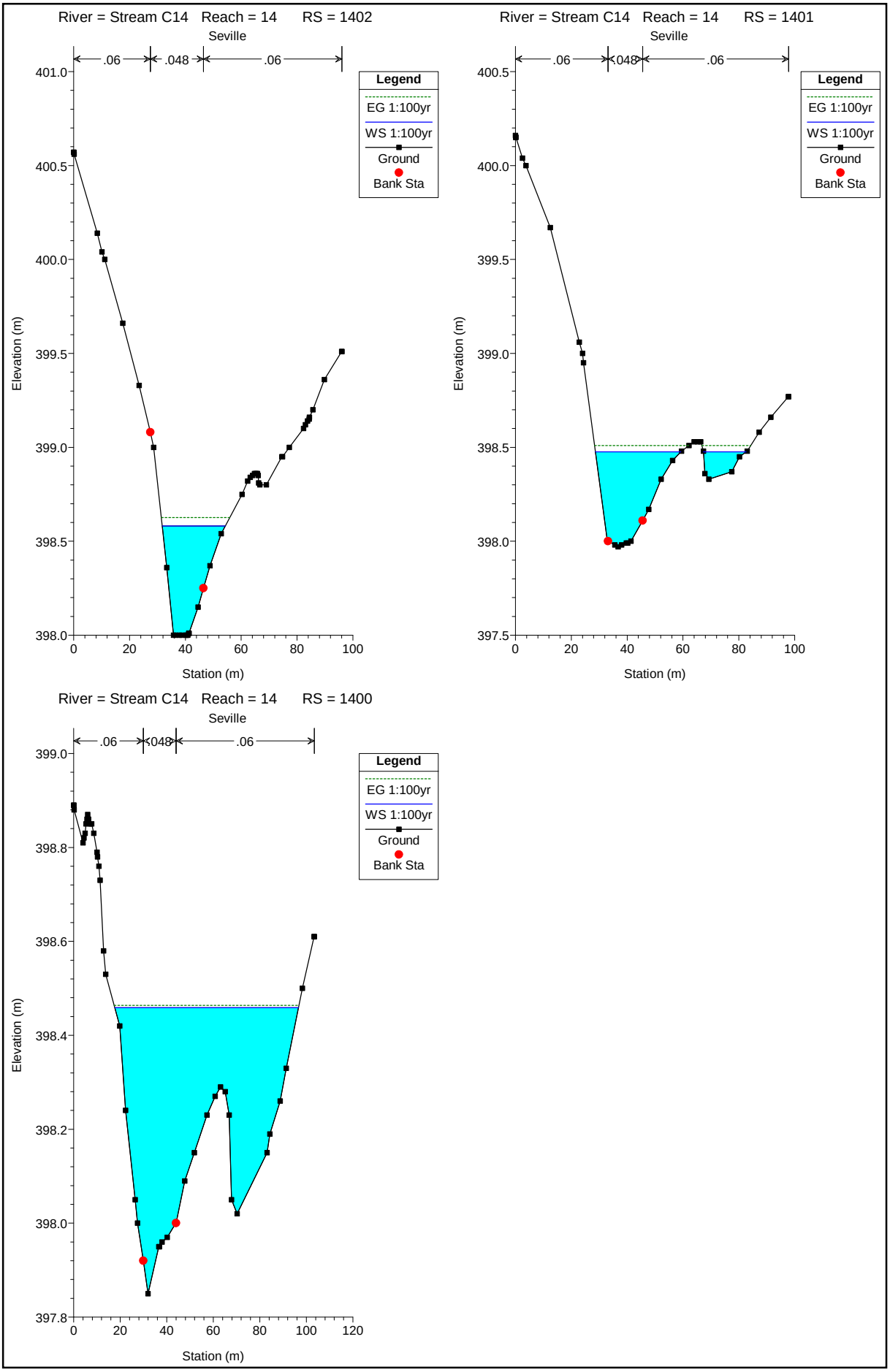

River = Stream C14 Reach = 14 RS = 1422
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C14 Reach = 14 RS = 1421
Seville
River = Stream C14 Reach = 14 RS = 1420
Seville
River = Stream C14 Reach = 14 RS = 1419
Seville


River = Stream C14 Reach = 14 RS = 1418
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C14 Reach = 14 RS = 1417
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C14 Reach = 14 RS = 1416
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C14 Reach = 14 RS = 1415
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)


River = Stream C14 Reach = 14 RS = 1414
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C14 Reach = 14 RS = 1413
Seville
River = Stream C14 Reach = 14 RS = 1412
Seville
River = Stream C14 Reach = 14 RS = 1411
Seville


River = Stream C14 Reach = 14 RS = 1410
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C14 Reach = 14 RS = 1409
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C14 Reach = 14 RS = 1408
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C14 Reach = 14 RS = 1407
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)


River = Stream C14 Reach = 14 RS = 1406
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C14 Reach = 14 RS = 1405
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C14 Reach = 14 RS = 1404
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C14 Reach = 14 RS = 1403
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Crit 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)


River = Stream C14 Reach = 14 RS = 1402
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C14 Reach = 14 RS = 1401
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)
River = Stream C14 Reach = 14 RS = 1400
Seville
.06
.048
.06
Legend
EG 1:100yr
WS 1:100yr
Ground
Bank Sta
Elevation (m)
Station (m)